HUMAN GENES AND GENE EXPRESSION PRODUCTS V

Field of the Invention

The present invention relates to polynucleotides of human origin and the encoded gene products.

Background of the Invention

Identification of novel polynucleotides, particularly those that encode an expressed gene product, is important in the advancement of drug discovery, diagnostic technologies, and the understanding of the progression and nature of complex diseases such as cancer. Identification of genes expressed in different cell types isolated from sources that differ in disease state or stage, developmental stage, exposure to various environmental factors, the tissue of origin, the species from which the tissue was isolated, and the like is key to identifying the genetic factors that are responsible for the phenotypes associated with these various differences.

This invention provides novel human polynucleotides, the polypeptides encoded by these polynucleotides, and the genes and proteins corresponding to these novel polynucleotides.

Summary of the Invention

This invention relates to novel human polynucleotides and variants thereof, their encoded polypeptides and variants thereof, to genes corresponding to these polynucleotides and to proteins expressed by the genes. The invention also relates to diagnostics and therapeutics comprising such novel human polynucleotides, their corresponding genes or gene products, including probes, antisense nucleotides, and antibodies. The polynucleotides of the invention correspond to a polynucleotide comprising the sequence information of at least one of SEQ ID NOS:1-2707.

Various aspects and embodiments of the invention will be readily apparent to the ordinarily skilled artisan upon reading the description provided herein.

Detailed Description of the Invention

The invention relates to polynucleotides comprising the disclosed nucleotide sequences, to full length cDNA, mRNA genomic sequences, and genes corresponding to these sequences and degenerate variants thereof, and to polypeptides encoded by the polynucleotides of the invention and polypeptide variants. The following detailed description describes the polynucleotide compositions encompassed by the invention, methods for obtaining cDNA or genomic DNA encoding a full-length gene product, expression of these polynucleotides and genes, identification of structural motifs of the polynucleotides and genes, identification of the function of a gene product encoded by a gene corresponding to a polynucleotide of the invention, use of the provided polynucleotides as probes and in mapping and in tissue profiling, use of the corresponding polypeptides and other gene

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products to raise antibodies, and use of the polynucleotides and their encoded gene products for therapeutic and diagnostic purposes.

Polynucleotide Compositions

The scope of the invention with respect to polynucleotide compositions includes, but is not necessarily limited to, polynucleotides having a sequence set forth in any one of SEQ ID NOS:1-2707; polynucleotides obtained from the biological materials described herein or other biological sources (particularly human sources) by hybridization under stringent conditions (particularly conditions of high stringency); genes corresponding to the provided polynucleotides: variants of the provided polynucleotides and their corresponding genes, particularly those variants that retain a biological activity of the encoded gene product (*e.g.*, a biological activity ascribed to a gene product corresponding to the provided polynucleotides as a result of the assignment of the gene product to a protein family(ies) and/or identification of a functional domain present in the gene product). Other nucleic acid compositions contemplated by and within the scope of the present invention will be readily apparent to one of ordinary skill in the art when provided with the disclosure here. "Polynucleotide" and "nucleic acid" as used herein with reference to nucleic acids of the composition is not intended to be limiting as to the length or structure of the nucleic acid unless specifically indicted.

The invention features polynucleotides that are expressed in human tissue, specifically human colon, breast, and/or lung tissue. Novel nucleic acid compositions of the invention of particular interest comprise a sequence set forth in any one of SEQ ID NOS:1-2707 or an identifying sequence thereof. An "identifying sequence" is a contiguous sequence of residues at least about 10 nt to about 20 nt in length, usually at least about 50 nt to about 100 nt in length, that uniquely identifies a polynucleotide sequence, *e.g.*, exhibits less than 90%, usually less than about 80% to about 85% sequence identity to any contiguous nucleotide sequence of more than about 20 nt. Thus, the subject novel nucleic acid compositions include full length cDNAs or mRNAs that encompass an identifying sequence of contiguous nucleotides from any one of SEQ ID NOS: 1-2707.

The polynucleotides of the invention also include polynucleotides having sequence similarity or sequence identity. Nucleic acids having sequence similarity are detected by hybridization under low stringency conditions, for example, at 50°C and 10XSSC (0.9 M saline/0.09 M sodium citrate) and remain bound when subjected to washing at 55°C in 1XSSC. Sequence identity can be determined by hybridization under stringent conditions, for example, at 50°C or higher and 0.1XSSC (9 mM saline/0.9 mM sodium citrate). Hybridization methods and conditions are well known in the art, see, *e.g.*, USPN 5,707,829. Nucleic acids that are substantially identical to the provided polynucleotide sequences, *e.g.* allelic variants, genetically altered versions of the gene,

etc.. bind to the provided polynucleotide sequences (SEQ ID NOS:1-2707) under stringent hybridization conditions. By using probes, particularly labeled probes of DNA sequences, one can isolate homologous or related genes. The source of homologous genes can be any species, *e.g.* primate species, particularly human; rodents, such as rats and mice; canines, felines, bovines, ovines, equines, yeast, nematodes, *etc.*

Preferably, hybridization is performed using at least 15 contiguous nucleotides (nt) of at least one of SEQ ID NOS:1-2707. That is, when at least 15 contiguous nt of one of the disclosed SEQ ID NOS. is used as a probe, the probe will preferentially hybridize with a nucleic acid comprising the complementary sequence, allowing the identification and retrieval of the nucleic acids that uniquely hybridize to the selected probe. Probes from more than one SEQ ID NO. can hybridize with the same nucleic acid if the cDNA from which they were derived corresponds to one mRNA. Probes of more than 15 nt can be used, e.g., probes of from about 18 nt to about 100 nt, but 15 nt represents sufficient sequence for unique identification.

The polynucleotides of the invention also include naturally occurring variants of the nucleotide sequences (*e.g.*, degenerate variants, allelic variants, *etc.*). Variants of the polynucleotides of the invention are identified by hybridization of putative variants with nucleotide sequences disclosed herein, preferably by hybridization under stringent conditions. For example, by using appropriate wash conditions, variants of the polynucleotides of the invention can be identified where the allelic variant exhibits at most about 25-30% base pair (bp) mismatches relative to the selected polynucleotide probe. In general, allelic variants contain 15-25% bp mismatches, and can contain as little as even 5-15%, or 2-5%, or 1-2% bp mismatches, as well as a single bp mismatch.

The invention also encompasses homologs corresponding to the polynucleotides of SEQ ID NOS:1-2707, where the source of homologous genes can be any mammalian species, *e.g.*, primate species, particularly human; rodents, such as rats; canines, felines, bovines, ovines, equines, yeast, nematodes, etc. Between mammalian species, *e.g.*, human and mouse, homologs generally have substantial sequence similarity, *e.g.*, at least 75% sequence identity, usually at least 90%, more usually at least 95% between nucleotide sequences. Sequence similarity is calculated based on a reference sequence, which may be a subset of a larger sequence, such as a conserved motif, coding region, flanking region, *etc.* A reference sequence will usually be at least about 18 contiguous nt long, more usually at least about 30 nt long, and may extend to the complete sequence that is being compared. Algorithms for sequence analysis are known in the art, such as gapped BLAST, described in Altschul, et al. *Nucleic Acids Res.* (1997) *25*:3389-3402.

In general, variants of the invention have a sequence identity greater than at least about 65%, preferably at least about 75%, more preferably at least about 85%, and can be greater than at least about 90% or more as determined by the Smith-Waterman homology search algorithm as

implemented in MPSRCH program (Oxford Molecular). For the purposes of this invention, a preferred method of calculating percent identity is the Smith-Waterman algorithm, using the following. Global DNA sequence identity must be greater than 65% as determined by the Smith-Waterman homology search algorithm as implemented in MPSRCH program (Oxford Molecular) using an affine gap search with the following search parameters: gap open penalty, 12; and gap extension penalty, 1.

The subject nucleic acids can be cDNAs or genomic DNAs, as well as fragments thereof, particularly fragments that encode a biologically active gene product and/or are useful in the methods disclosed herein (*e.g.*, in diagnosis, as a unique identifier of a differentially expressed gene of interest, *etc*) The term "cDNA" as used herein is intended to include all nucleic acids that share the arrangement of sequence elements found in native mature mRNA species, where sequence elements are exons and 3' and 5' non-coding regions. Normally mRNA species have contiguous exons, with the intervening introns, when present, being removed by nuclear RNA splicing, to create a continuous open reading frame encoding a polypeptide of the invention.

A genomic sequence of interest comprises the nucleic acid present between the initiation codon and the stop codon, as defined in the listed sequences, including all of the introns that are normally present in a native chromosome. It can further include the 3' and 5' untranslated regions found in the mature mRNA. It can further include specific transcriptional and translational regulatory sequences, such as promoters, enhancers, *etc* , including about 1 kb, but possibly more, of flanking genomic DNA at either the 5' and 3' end of the transcribed region. The genomic DNA can be isolated as a fragment of 100 kbp or smaller; and substantially free of flanking chromosomal sequence. The genomic DNA flanking the coding region, either 3' and 5', or internal regulatory sequences as sometimes found in introns, contains sequences required for proper tissue, stage-specific, or disease-state specific expression.

The nucleic acid compositions of the subject invention can encode all or a part of the subject polypeptides. Double or single stranded fragments can be obtained from the DNA sequence by chemically synthesizing oligonucleotides in accordance with conventional methods, by restriction enzyme digestion, by PCR amplification, *etc*. Isolated polynucleotides and polynucleotide fragments of the invention comprise at least about 10, about 15, about 20, about 35, about 50, about 100, about 150 to about 200, about 250 to about 300, or about 350 contiguous nt selected from the polynucleotide sequences as shown in SEQ ID NOS:1-2707. For the most part, fragments will be of at least 15 nt, usually at least 18 nt or 25 nt, and up to at least about 50 contiguous nt in length or more. In a preferred embodiment, the polynucleotide molecules comprise a contiguous sequence of at least 12 nt selected from the group consisting of the polynucleotides shown in SEQ ID NOS:1-2707.

Probes specific to the polynucleotides of the invention can be generated using the polynucleotide sequences disclosed in SEQ ID NOS:1-2707 The probes are preferably at least about a 12, 15, 16, 18, 20, 22, 24, or 25 nt fragment of a corresponding contiguous sequence of SEQ ID NOS:1-2707, and can be less than 2, 1, 0.5, 0.1, or 0.05 kb in length. The probes can be synthesized chemically or can be generated from longer polynucleotides using restriction enzymes. The probes can be labeled, for example, with a radioactive, biotinylated, or fluorescent tag. Preferably, probes are designed based upon an identifying sequence of a polynucleotide of one of SEQ ID NOS:1-2707 . More preferably, probes are designed based on a contiguous sequence of one of the subject polynucleotides that remain unmasked following application of a masking program for masking low complexity (*e.g.*, XBLAST) to the sequence., *i.e.*, one would select an unmasked region, as indicated by the polynucleotides outside the poly-n stretches of the masked sequence produced by the masking program.

The polynucleotides of the subject invention are isolated and obtained in substantial purity, generally as other than an intact chromosome. Usually, the polynucleotides, either as DNA or RNA, will be obtained substantially free of other naturally-occurring nucleic acid sequences, generally being at least about 50%, usually at least about 90% pure and are typically "recombinant", *e.g.*, flanked by one or more nucleotides with which it is not normally associated on a naturally occurring chromosome.

The polynucleotides of the invention can be provided as a linear molecule or within a circular molecule, and can be provided within autonomously replicating molecules (vectors) or within molecules without replication sequences Expression of the polynucleotides can be regulated by their own or by other regulatory sequences known in the art. The polynucleotides of the invention can be introduced into suitable host cells using a variety of techniques available in the art, such as transferrin polycation-mediated DNA transfer, transfection with naked or encapsulated nucleic acids, liposome-mediated DNA transfer, intracellular transportation of DNA-coated latex beads, protoplast fusion, viral infection, electroporation, gene gun, calcium phosphate-mediated transfection, and the like.

The subject nucleic acid compositions can be used to, for example, produce polypeptides, as probes for the detection of mRNA of the invention in biological samples (*e g.*, extracts of human cells) to generate additional copies of the polynucleotides, to generate ribozymes or antisense oligonucleotides, and as single stranded DNA probes or as triple-strand forming oligonucleotides. The probes described herein can be used to, for example, determine the presence or absence of the polynucleotide sequences as shown in SEQ ID NOS. 1-2707 or variants thereof in a sample These and other uses are described in more detail below.

Use of Polynucleotides to Obtain Full-Length cDNA, Gene, and Promoter Region

Full-length cDNA molecules comprising the disclosed polynucleotides are obtained as follows. A polynucleotide having a sequence of one of SEQ ID NOS:1-2707, or a portion thereof comprising at least 12, 15, 18, or 20 nt, is used as a hybridization probe to detect hybridizing members of a cDNA library using probe design methods, cloning methods, and clone selection techniques such as those described in USPN 5,654,173. Libraries of cDNA are made from selected tissues, such as normal or tumor tissue, or from tissues of a mammal treated with, for example, a pharmaceutical agent. Preferably, the tissue is the same as the tissue from which the polynucleotides of the invention were isolated, as both the polynucleotides described herein and the cDNA represent expressed genes. Most preferably, the cDNA library is made from the biological material described herein in the Examples. The choice of cell type for library construction can be made after the identity of the protein encoded by the gene corresponding to the polynucleotide of the invention is known. This will indicate which tissue and cell types are likely to express the related gene, and thus represent a suitable source for the mRNA for generating the cDNA. Where the provided polynucleotides are isolated from cDNA libraries, the libraries are prepared from mRNA of human colon cells, more preferably, human colon cancer cells, even more preferably, from a highly metastatic colon cell, Km12L4-A.

Techniques for producing and probing nucleic acid sequence libraries are described, for example, in Sambrook *et al.*, *Molecular Cloning: A Laboratory Manual, 2nd Ed.*, (1989) Cold Spring Harbor Press, Cold Spring Harbor, NY. The cDNA can be prepared by using primers based on sequence from SEQ ID NOS:1-2707 . In one embodiment, the cDNA library can be made from only poly-adenylated mRNA. Thus, poly-T primers can be used to prepare cDNA from the mRNA.

Members of the library that are larger than the provided polynucleotides, and preferably that encompass the complete coding sequence of the native message, are obtained. In order to confirm that the entire cDNA has been obtained, RNA protection experiments are performed as follows. Hybridization of a full-length cDNA to an mRNA will protect the RNA from RNase degradation. If the cDNA is not full length, then the portions of the mRNA that are not hybridized will be subject to RNase degradation. This is assayed, as is known in the art, by changes in electrophoretic mobility on polyacrylamide gels, or by detection of released monoribonucleotides. Sambrook *et al.*, *Molecular Cloning: A Laboratory Manual, 2nd Ed.*, (1989) Cold Spring Harbor Press, Cold Spring Harbor, NY. In order to obtain additional sequences 5' to the end of a partial cDNA, 5' RACE (*PCR Protocols: A Guide to Methods and Applications*, (1990) Academic Press, Inc.) can be performed.

Genomic DNA is isolated using the provided polynucleotides in a manner similar to the isolation of full-length cDNAs. Briefly, the provided polynucleotides, or portions thereof, are used as probes to libraries of genomic DNA. Preferably, the library is obtained from the cell type that

was used to generate the polynucleotides of the invention, but this is not essential. Most preferably, the genomic DNA is obtained from the biological material described herein in the Examples. Such libraries can be in vectors suitable for carrying large segments of a genome, such as P1 or YAC, as described in detail in Sambrook *et al.*, 9 4-9.30. In addition, genomic sequences can be isolated from human BAC libraries, which are commercially available from Research Genetics, Inc., Huntsville, Alabama, USA, for example. In order to obtain additional 5' or 3' sequences, chromosome walking is performed, as described in Sambrook *et al.*, such that adjacent and overlapping fragments of genomic DNA are isolated. These are mapped and pieced together, as is known in the art, using restriction digestion enzymes and DNA ligase.

Using the polynucleotide sequences of the invention, corresponding full-length genes can be isolated using both classical and PCR methods to construct and probe cDNA libraries Using either method. Northern blots, preferably, are performed on a number of cell types to determine which cell lines express the gene of interest at the highest level. Classical methods of constructing cDNA libraries are taught in Sambrook *et al.*, *supra*. With these methods, cDNA can be produced from mRNA and inserted into viral or expression vectors. Typically, libraries of mRNA comprising poly(A) tails can be produced with poly(T) primers. Similarly, cDNA libraries can be produced using the instant sequences as primers.

PCR methods are used to amplify the members of a cDNA library that comprise the desired insert. In this case, the desired insert will contain sequence from the full length cDNA that corresponds to the instant polynucleotides. Such PCR methods include gene trapping and RACE methods. Gene trapping entails inserting a member of a cDNA library into a vector. The vector then is denatured to produce single stranded molecules. Next, a substrate-bound probe, such a biotinylated oligo, is used to trap cDNA inserts of interest. Biotinylated probes can be linked to an avidin-bound solid substrate. PCR methods can be used to amplify the trapped cDNA. To trap sequences corresponding to the full length genes, the labeled probe sequence is based on the polynucleotide sequences of the invention. Random primers or primers specific to the library vector can be used to amplify the trapped cDNA. Such gene trapping techniques are described in Gruber *et al.*, WO 95/04745 and Gruber *et al.*, USPN 5,500,356. Kits are commercially available to perform gene trapping experiments from, for example, Life Technologies, Gaithersburg, Maryland, USA.

"Rapid amplification of cDNA ends," or RACE, is a PCR method of amplifying cDNAs from a number of different RNAs. The cDNAs are ligated to an oligonucleotide linker, and amplified by PCR using two primers. One primer is based on sequence from the instant polynucleotides, for which full length sequence is desired, and a second primer comprises sequence that hybridizes to the oligonucleotide linker to amplify the cDNA. A description of this methods is reported in WO 97/19110. In preferred embodiments of RACE, a common primer is designed to

anneal to an arbitrary adaptor sequence ligated to cDNA ends (Apte and Siebert, *Biotechniques* (1993) *15*:890-893; Edwards *et al.*, *Nuc. Acids Res.* (1991) *19*:5227-5232). When a single gene-specific RACE primer is paired with the common primer, preferential amplification of sequences between the single gene specific primer and the common primer occurs Commercial cDNA pools modified for use in RACE are available.

Another PCR-based method generates full-length cDNA library with anchored ends without needing specific knowledge of the cDNA sequence. The method uses lock-docking primers (I-VI), where one primer, poly TV (I-III) locks over the polyA tail of eukaryotic mRNA producing first strand synthesis and a second primer, polyGH (IV-VI) locks onto the polyC tail added by terminal deoxynucleotidyl transferase (TdT)(see, e.g., WO 96/40998)

The promoter region of a gene generally is located 5' to the initiation site for RNA polymerase II. Hundreds of promoter regions contain the "TATA" box, a sequence such as TATTA or TATAA, which is sensitive to mutations. The promoter region can be obtained by performing 5' RACE using a primer from the coding region of the gene. Alternatively, the cDNA can be used as a probe for the genomic sequence, and the region 5' to the coding region is identified by "walking up." If the gene is highly expressed or differentially expressed, the promoter from the gene can be of use in a regulatory construct for a heterologous gene.

Once the full-length cDNA or gene is obtained, DNA encoding variants can be prepared by site-directed mutagenesis, described in detail in Sambrook *et al.*, 15.3-15.63. The choice of codon or nucleotide to be replaced can be based on disclosure herein on optional changes in amino acids to achieve altered protein structure and/or function.

As an alternative method to obtaining DNA or RNA from a biological material, nucleic acid comprising nucleotides having the sequence of one or more polynucleotides of the invention can be synthesized. Thus, the invention encompasses nucleic acid molecules ranging in length from 15 nt (corresponding to at least 15 contiguous nt of one of SEQ ID NOS:1-2707) up to a maximum length suitable for one or more biological manipulations, including replication and expression, of the nucleic acid molecule. The invention includes but is not limited to (a) nucleic acid having the size of a full gene, and comprising at least one of SEQ ID NOS:1-2707; (b) the nucleic acid of (a) also comprising at least one additional gene, operably linked to permit expression of a fusion protein; (c) an expression vector comprising (a) or (b); (d) a plasmid comprising (a) or (b) ; and (e) a recombinant viral particle comprising (a) or (b). Once provided with the polynucleotides disclosed herein, construction or preparation of (a) - (e) are well within the skill in the art.

The sequence of a nucleic acid comprising at least 15 contiguous nt of at least any one of SEQ ID NOS:1-2707, preferably the entire sequence of at least any one of SEQ ID NOS:1-2707, is not limited and can be any sequence of A, T, G, and/or C (for DNA) and A, U, G, and/or C (for

RNA) or modified bases thereof, including inosine and pseudouridine. The choice of sequence will depend on the desired function and can be dictated by coding regions desired, the intron-like regions desired, and the regulatory regions desired. Where the entire sequence of any one of SEQ ID NOS:1-2707 is within the nucleic acid, the nucleic acid obtained is referred to herein as a polynucleotide comprising the sequence of any one of SEQ ID NOS:1-2707.

Expression of Polypeptide Encoded by Full-Length cDNA or Full-Length Gene

The provided polynucleotides (*e.g.*, a polynucleotide having a sequence of one of SEQ ID NOS:1-2707), the corresponding cDNA, or the full-length gene is used to express a partial or complete gene product. Constructs of polynucleotides having sequences of SEQ ID NOS:1-2707 can also be generated synthetically. Alternatively, single-step assembly of a gene and entire plasmid from large numbers of oligodeoxyribonucleotides is described by, *e.g.*, Stemmer *et al*, *Gene (Amsterdam)* (1995) *164(1)*:49-53 In this method, assembly PCR (the synthesis of long DNA sequences from large numbers of oligodeoxyribonucleotides (oligos)) is described. The method is derived from DNA shuffling (Stemmer, *Nature* (1994) *370*:389-391), and does not rely on DNA ligase, but instead relies on DNA polymerase to build increasingly longer DNA fragments during the assembly process.

Appropriate polynucleotide constructs are purified using standard recombinant DNA techniques as described in, for example, Sambrook *et al.*, *Molecular Cloning: A Laboratory Manual, 2nd Ed.*, (1989) Cold Spring Harbor Press, Cold Spring Harbor, NY, and under current regulations described in United States Dept. of HHS, National Institute of Health (NIH) Guidelines for Recombinant DNA Research. The gene product encoded by a polynucleotide of the invention is expressed in any expression system, including, for example, bacterial, yeast, insect, amphibian and mammalian systems. Vectors, host cells and methods for obtaining expression in same are well known in the art. Suitable vectors and host cells are described in USPN 5,654,173.

Polynucleotide molecules comprising a polynucleotide sequence provided herein are generally propagated by placing the molecule in a vector. Viral and non-viral vectors are used, including plasmids. The choice of plasmid will depend on the type of cell in which propagation is desired and the purpose of propagation. Certain vectors are useful for amplifying and making large amounts of the desired DNA sequence. Other vectors are suitable for expression in cells in culture. Still other vectors are suitable for transfer and expression in cells in a whole animal or person. The choice of appropriate vector is well within the skill of the art. Many such vectors are available commercially. Methods for preparation of vectors comprising a desired sequence are well known in the art.

The polynucleotides set forth in SEQ ID NOS:1-2707 or their corresponding full-length polynucleotides are linked to regulatory sequences as appropriate to obtain the desired expression

properties. These can include promoters (attached either at the 5' end of the sense strand or at the 3' end of the antisense strand), enhancers, terminators, operators, repressors, and inducers. The promoters can be regulated or constitutive. In some situations it may be desirable to use conditionally active promoters, such as tissue-specific or developmental stage-specific promoters. These are linked to the desired nucleotide sequence using the techniques described above for linkage to vectors. Any techniques known in the art can be used.

When any of the above host cells, or other appropriate host cells or organisms, are used to replicate and/or express the polynucleotides or nucleic acids of the invention, the resulting replicated nucleic acid, RNA, expressed protein or polypeptide, is within the scope of the invention as a product of the host cell or organism. The product is recovered by any appropriate means known in the art.

Once the gene corresponding to a selected polynucleotide is identified, its expression can be regulated in the cell to which the gene is native. For example, an endogenous gene of a cell can be regulated by an exogenous regulatory sequence as disclosed in USPN 5,641,670.

Identification of Functional and Structural Motifs of Novel Genes Screening Against Publicly Available Databases

Translations of the nucleotide sequence of the provided polynucleotides, cDNAs or full genes can be aligned with individual known sequences. Similarity with individual sequences can be used to determine the activity of the polypeptides encoded by the polynucleotides of the invention. Also, sequences exhibiting similarity with more than one individual sequence can exhibit activities that are characteristic of either or both individual sequences.

The full length sequences and fragments of the polynucleotide sequences of the nearest neighbors can be used as probes and primers to identify and isolate the full length sequence corresponding to provided polynucleotides. The nearest neighbors can indicate a tissue or cell type to be used to construct a library for the full-length sequences corresponding to the provided polynucleotides.

Typically, a selected polynucleotide is translated in all six frames to determine the best alignment with the individual sequences. The sequences disclosed herein in the Sequence Listing are in a 5' to 3' orientation and translation in three frames can be sufficient (with a few specific exceptions as described in the Examples). These amino acid sequences are referred to, generally, as query sequences, which will be aligned with the individual sequences. Databases with individual sequences are described in "Computer Methods for Macromolecular Sequence Analysis" *Methods in Enzymology* (1996) *266*, Doolittle, Academic Press, Inc., a division of Harcourt Brace & Co., San Diego, California, USA. Databases include GenBank, EMBL, and DNA Database of Japan (DDBJ).

Query and individual sequences can be aligned using the methods and computer programs described above, and include BLAST 2.0, available over the world wide web at http://www.ncbi.nlm.nih.gov/BLAST/. See also Altschul, et al. *Nucleic Acids Res.* (1997) *25*:3389-3402. Another alignment algorithm is Fasta, available in the Genetics Computing Group (GCG) package, Madison, Wisconsin, USA, a wholly owned subsidiary of Oxford Molecular Group, Inc. Other techniques for alignment are described in Doolittle, *supra*. Preferably, an alignment program that permits gaps in the sequence is utilized to align the sequences. The Smith-Waterman is one type of algorithm that permits gaps in sequence alignments. See *Meth. Mol. Biol.* (1997) *70*: 173-187. Also, the GAP program using the Needleman and Wunsch alignment method can be utilized to align sequences An alternative search strategy uses MPSRCH software, which runs on a MASPAR computer. MPSRCH uses a Smith-Waterman algorithm to score sequences on a massively parallel computer. This approach improves ability to identify sequences that are distantly related matches, and is especially tolerant of small gaps and nucleotide sequence errors. Amino acid sequences encoded by the provided polynucleotides can be used to search both protein and DNA databases. Incorporated herein by reference are all sequences that have been made public as of the filing date of this application by any of the DNA or protein sequence databases, including the patent databases (*e.g.*, GeneSeq). Also incorporated by reference are those sequences that have been submitted to these databases as of the filing date of the present application but not made public until after the filing date of the present application.

Results of individual and query sequence alignments can be divided into three categories: high similarity, weak similarity, and no similarity. Individual alignment results ranging from high similarity to weak similarity provide a basis for determining polypeptide activity and/or structure. Parameters for categorizing individual results include: percentage of the alignment region length where the strongest alignment is found, percent sequence identity, and p value. The percentage of the alignment region length is calculated by counting the number of residues of the individual sequence found in the region of strongest alignment, *e.g* , contiguous region of the individual sequence that contains the greatest number of residues that are identical to the residues of the corresponding region of the aligned query sequence. This number is divided by the total residue length of the query sequence to calculate a percentage. For example, a query sequence of 20 amino acid residues might be aligned with a 20 amino acid region of an individual sequence. The individual sequence might be identical to amino acid residues 5, 9-15, and 17-19 of the query sequence. The region of strongest alignment is thus the region stretching from residue 9-19, an 11 amino acid stretch. The percentage of the alignment region length is: 11 (length of the region of strongest alignment) divided by (query sequence length) 20 or 55%.

Percent sequence identity is calculated by counting the number of amino acid matches between the query and individual sequence and dividing total number of matches by the number of residues of the individual sequences found in the region of strongest alignment. Thus, the percent identity in the example above would be 10 matches divided by 11 amino acids, or approximately, 90.9%

P value is the probability that the alignment was produced by chance. For a single alignment, the p value can be calculated according to Karlin *et al.*, *Proc. Natl. Acad. Sci.* (1990) *87*:2264 and Karlin *et al.*, *Proc. Natl. Acad. Sci.* (1993) *90*. The p value of multiple alignments using the same query sequence can be calculated using an heuristic approach described in Altschul *et al.*, *Nat Genet* (1994) *6*.119. Alignment programs such as BLAST program can calculate the p value See also Altschul *et al.*, *Nucleic Acids Res* (1997) *25*:3389-3402.

Another factor to consider for determining identity or similarity is the location of the similarity or identity. Strong local alignment can indicate similarity even if the length of alignment is short. Sequence identity scattered throughout the length of the query sequence also can indicate a similarity between the query and profile sequences. The boundaries of the region where the sequences align can be determined according to Doolittle, *supra*; BLAST 2.0 (see, *e.g.*, Altschul, et al. *Nucleic Acids Res.* (1997) *25*:3389-3402) or FAST programs; or by determining the area where sequence identity is highest.

High Similarity. In general, in alignment results considered to be of high similarity, the percent of the alignment region length is typically at least about 55% of total length query sequence; more typically, at least about 58%; even more typically; at least about 60% of the total residue length of the query sequence. Usually, percent length of the alignment region can be as much as about 62%; more usually, as much as about 64%; even more usually, as much as about 66% Further, for high similarity, the region of alignment, typically, exhibits at least about 75% of sequence identity; more typically, at least about 78%; even more typically; at least about 80% sequence identity. Usually, percent sequence identity can be as much as about 82%; more usually, as much as about 84%; even more usually, as much as about 86%.

The p value is used in conjunction with these methods. If high similarity is found, the query sequence is considered to have high similarity with a profile sequence when the p value is less than or equal to about 10^{-2}; more usually; less than or equal to about 10^{-3}; even more usually; less than or equal to about 10^{-4}. More typically, the p value is no more than about 10^{-5}; more typically; no more than or equal to about 10^{-10}; even more typically; no more than or equal to about 10^{-15} for the query sequence to be considered high similarity.

Weak Similarity. In general, where alignment results considered to be of weak similarity, there is no minimum percent length of the alignment region nor minimum length of alignment. A better showing of weak similarity is considered when the region of alignment is, typically, at least about 15 amino acid residues in length; more typically, at least about 20; even more typically; at least about 25 amino acid residues in length. Usually, length of the alignment region can be as much as about 30 amino acid residues; more usually, as much as about 40; even more usually, as much as about 60 amino acid residues. Further, for weak similarity, the region of alignment, typically, exhibits at least about 35% of sequence identity; more typically, at least about 40%; even more typically; at least about 45% sequence identity. Usually, percent sequence identity can be as much as about 50%; more usually, as much as about 55%; even more usually, as much as about 60%.

If low similarity is found, the query sequence is considered to have weak similarity with a profile sequence when the p value is usually less than or equal to about 10^{-2}, more usually; less than or equal to about 10^{-3}; even more usually; less than or equal to about 10^{-4}. More typically, the p value is no more than about 10^{-5}; more usually; no more than or equal to about 10^{-10}; even more usually; no more than or equal to about 10^{-15} for the query sequence to be considered weak similarity.

Similarity Determined by Sequence Identity Alone. Sequence identity alone can be used to determine similarity of a query sequence to an individual sequence and can indicate the activity of the sequence. Such an alignment, preferably, permits gaps to align sequences. Typically, the query sequence is related to the profile sequence if the sequence identity over the entire query sequence is at least about 15%; more typically, at least about 20%; even more typically, at least about 25%; even more typically, at least about 50%. Sequence identity alone as a measure of similarity is most useful when the query sequence is usually, at least 80 residues in length; more usually, 90 residues, even more usually, at least 95 amino acid residues in length. More typically, similarity can be concluded based on sequence identity alone when the query sequence is preferably 100 residues in length; more preferably, 120 residues in length; even more preferably, 150 amino acid residues in length.

Alignments with Profile and Multiple Aligned Sequences. Translations of the provided polynucleotides can be aligned with amino acid profiles that define either protein families or common motifs. Also, translations of the provided polynucleotides can be aligned to multiple sequence alignments (MSA) comprising the polypeptide sequences of members of protein families or motifs. Similarity or identity with profile sequences or MSAs can be used to determine the activity of the gene products (*e.g.*, polypeptides) encoded by the provided polynucleotides or

corresponding cDNA or genes. For example, sequences that show an identity or similarity with a chemokine profile or MSA can exhibit chemokine activities.

Profiles can designed manually by (1) creating an MSA, which is an alignment of the amino acid sequence of members that belong to the family and (2) constructing a statistical representation of the alignment. Such methods are described, for example, in Birney *et al.*, *Nucl. Acid Res* (1996) *24(14)*: 2730-2739. MSAs of some protein families and motifs are publicly available. For example, http://genome.wustl.edu/Pfam/ includes MSAs of 547 different families and motifs. These MSAs are described also in Sonnhammer *et al.*, *Proteins* (1997) *28*: 405-420 Other sources over the world wide web include the site at http://www.embl-heidelberg.de/argos/ali/ali.html; alternatively, a message can be sent to ALI@EMBL-HEIDELBERG.DE for the information. A brief description of these MSAs is reported in Pascarella *et al.*, *Prot. Eng.* (1996) *9(3)*:249-251 Techniques for building profiles from MSAs are described in Sonnhammer *et al.*, *supra*; Birney *et al.*, *supra*; and "Computer Methods for Macromolecular Sequence Analysis," *Methods in Enzymology* (1996) *266*, Doolittle, Academic Press, Inc., San Diego, California, USA.

Similarity between a query sequence and a protein family or motif can be determined by (a) comparing the query sequence against the profile and/or (b) aligning the query sequence with the members of the family or motif. Typically, a program such as Searchwise is used to compare the query sequence to the statistical representation of the multiple alignment, also known as a profile (see Birney *et al.*, *supra)*. Other techniques to compare the sequence and profile are described in Sonnhammer *et al.*, *supra* and Doolittle, *supra*

Next, methods described by Feng *et al.*, *J. Mol. Evol.* (1987) *25*:351 and Higgins *et al.*, *CABIOS* (1989) *5*:151 can be used align the query sequence with the members of a family or motif, also known as a MSA. Sequence alignments can be generated using any of a variety of software tools. Examples include PileUp, which creates a multiple sequence alignment, and is described in Feng *et al.*, *J. Mol. Evol.* (1987) *25*:351. Another method, GAP, uses the alignment method of Needleman *et al.*, *J. Mol Biol.* (1970) *48*:443. GAP is best suited for global alignment of sequences. A third method, BestFit, functions by inserting gaps to maximize the number of matches using the local homology algorithm of Smith *et al.*, *Adv. Appl. Math.* (1981) *2*:482. In general, the following factors are used to determine if a similarity between a query sequence and a profile or MSA exists: (1) number of conserved residues found in the query sequence, (2) percentage of conserved residues found in the query sequence, (3) number of frameshifts, and (4) spacing between conserved residues.

Some alignment programs that both translate and align sequences can make any number of frameshifts when translating the nucleotide sequence to produce the best alignment. The fewer frameshifts needed to produce an alignment, the stronger the similarity or identity between the query and profile or MSAs. For example, a weak similarity resulting from no frameshifts can be a better

indication of activity or structure of a query sequence, than a strong similarity resulting from two frameshifts. Preferably, three or fewer frameshifts are found in an alignment; more preferably two or fewer frameshifts; even more preferably, one or fewer frameshifts; even more preferably, no frameshifts are found in an alignment of query and profile or MSAs.

Conserved residues are those amino acids found at a particular position in all or some of the family or motif members. Alternatively, a position is considered conserved if only a certain class of amino acids is found in a particular position in all or some of the family members. For example, the N-terminal position can contain a positively charged amino acid, such as lysine, arginine, or histidine.

Typically, a residue of a polypeptide is conserved when a class of amino acids or a single amino acid is found at a particular position in at least about 40% of all class members; more typically, at least about 50%; even more typically, at least about 60% of the members. Usually, a residue is conserved when a class or single amino acid is found in at least about 70% of the members of a family or motif; more usually, at least about 80%; even more usually, at least about 90%; even more usually, at least about 95%.

A residue is considered conserved when three unrelated amino acids are found at a particular position in the some or all of the members; more usually, two unrelated amino acids. These residues are conserved when the unrelated amino acids are found at particular positions in at least about 40% of all class member; more typically, at least about 50%; even more typically, at least about 60% of the members. Usually, a residue is conserved when a class or single amino acid is found in at least about 70% of the members of a family or motif; more usually, at least about 80%; even more usually, at least about 90%; even more usually, at least about 95%.

A query sequence has similarity to a profile or MSA when the query sequence comprises at least about 25% of the conserved residues of the profile or MSA; more usually, at least about 30%; even more usually; at least about 40%. Typically, the query sequence has a stronger similarity to a profile sequence or MSA when the query sequence comprises at least about 45% of the conserved residues of the profile or MSA; more typically, at least about 50%; even more typically; at least about 55%.

Identification of Secreted & Membrane-Bound Polypeptides

Both secreted and membrane-bound polypeptides of the present invention are of particular interest. For example, levels of secreted polypeptides can be assayed in body fluids that are convenient, such as blood, plasma, serum, and other body fluids such as urine, prostatic fluid and semen. Membrane-bound polypeptides are useful for constructing vaccine antigens or inducing an immune response. Such antigens would comprise all or part of the extracellular region of the membrane-bound polypeptides. Because both secreted and membrane-bound polypeptides comprise

a fragment of contiguous hydrophobic amino acids. hydrophobicity predicting algorithms can be used to identify such polypeptides.

A signal sequence is usually encoded by both secreted and membrane-bound polypeptide genes to direct a polypeptide to the surface of the cell. The signal sequence usually comprises a stretch of hydrophobic residues. Such signal sequences can fold into helical structures. Membrane-bound polypeptides typically comprise at least one transmembrane region that possesses a stretch of hydrophobic amino acids that can transverse the membrane. Some transmembrane regions also exhibit a helical structure. Hydrophobic fragments within a polypeptide can be identified by using computer algorithms. Such algorithms include Hopp & Woods, *Proc. Natl Acad. Sci. USA* (1981) 78:3824-3828: Kyte & Doolittle, *J. Mol. Biol.* (1982) *157*: 105-132: and RAOAR algorithm, Degli Esposti *et al.*, *Eur. J. Biochem.* (1990) *190*: 207-219

Another method of identifying secreted and membrane-bound polypeptides is to translate the polynucleotides of the invention in all six frames and determine if at least 8 contiguous hydrophobic amino acids are present. Those translated polypeptides with at least 8: more typically. 10: even more typically, 12 contiguous hydrophobic amino acids are considered to be either a putative secreted or membrane bound polypeptide. Hydrophobic amino acids include alanine. glycine, histidine, isoleucine. leucine, lysine. methionine. phenylalanine. proline. threonine. tryptophan. tyrosine. and valine

Identification of the Function of an Expression Product of a Full-Length Gene

Ribozymes. antisense constructs, and dominant negative mutants can be used to determine function of the expression product of a gene corresponding to a polynucleotide provided herein. These methods and compositions are particularly useful where the provided novel polynucleotide exhibits no significant or substantial homology to a sequence encoding a gene of known function. Antisense molecules and ribozymes can be constructed from synthetic polynucleotides. Typically, the phosphoramidite method of oligonucleotide synthesis is used. See Beaucage *et al.*, *Tet. Lett.* (1981) *22*:1859 and USPN 4,668,777. Automated devices for synthesis are available to create oligonucleotides using this chemistry. Examples of such devices include Biosearch 8600. Models 392 and 394 by Applied Biosystems, a division of Perkin-Elmer Corp., Foster City, California, USA; and Expedite by Perceptive Biosystems. Framingham, Massachusetts, USA. Synthetic RNA. phosphate analog oligonucleotides, and chemically derivatized oligonucleotides can also be produced, and can be covalently attached to other molecules. RNA oligonucleotides can be synthesized, for example. using RNA phosphoramidites. This method can be performed on an automated synthesizer. such as Applied Biosystems, Models 392 and 394, Foster City, California, USA.

Phosphorothioate oligonucleotides can also be synthesized for antisense construction. A sulfurizing reagent, such as tetraethylthiruam disulfide (TETD) in acetonitrile can be used to convert the internucleotide cyanoethyl phosphite to the phosphorothioate triester within 15 minutes at room temperature. TETD replaces the iodine reagent. while all other reagents used for standard phosphoramidite chemistry remain the same. Such a synthesis method can be automated using Models 392 and 394 by Applied Biosystems. for example.

Oligonucleotides of up to 200 nt can be synthesized. more typically, 100 nt. more typically 50 nt: even more typically 30 to 40 nt. These synthetic fragments can be annealed and ligated together to construct larger fragments. See, for example. Sambrook *et al.. supra.* Trans-cleaving catalytic RNAs (ribozymes) are RNA molecules possessing endoribonuclease activity Ribozymes are specifically designed for a particular target. and the target message must contain a specific nucleotide sequence. They are engineered to cleave any RNA species site-specifically in the background of cellular RNA. The cleavage event renders the mRNA unstable and prevents protein expression. Importantly, ribozymes can be used to inhibit expression of a gene of unknown function for the purpose of determining its function in an in vitro or in vivo context. by detecting the phenotypic effect. One commonly used ribozyme motif is the hammerhead, for which the substrate sequence requirements are minimal. Design of the hammerhead ribozyme. as well as therapeutic uses of ribozymes. are disclosed in Usman *et al., Current Opin. Struct. Biol.* (1996) *6*:527. Methods for production of ribozymes. including hairpin structure ribozyme fragments. methods of increasing ribozyme specificity, and the like are known in the art.

The hybridizing region of the ribozyme can be modified or can be prepared as a branched structure as described in Horn and Urdea, *Nucleic Acids Res.* (1989) *17*:6959. The basic structure of the ribozymes can also be chemically altered in ways familiar to those skilled in the art. and chemically synthesized ribozymes can be administered as synthetic oligonucleotide derivatives modified by monomeric units. In a therapeutic context. liposome mediated delivery of ribozymes improves cellular uptake, as described in Birikh *et al.. Eur J Biochem* (1997) *245*:1.

Antisense nucleic acids are designed to specifically bind to RNA. resulting in the formation of RNA-DNA or RNA-RNA hybrids, with an arrest of DNA replication. reverse transcription or messenger RNA translation. Antisense polynucleotides based on a selected polynucleotide sequence can interfere with expression of the corresponding gene. Antisense polynucleotides are typically generated within the cell by expression from antisense constructs that contain the antisense strand as the transcribed strand. Antisense polynucleotides based on the disclosed polynucleotides will bind and/or interfere with the translation of mRNA comprising a sequence complementary to the antisense polynucleotide. The expression products of control cells and cells treated with the antisense construct are compared to detect the protein product of the gene corresponding to the

polynucleotide upon which the antisense construct is based. The protein is isolated and identified using routine biochemical methods.

Given the extensive background literature and clinical experience in antisense therapy, one skilled in the art can use selected polynucleotides of the invention as additional potential therapeutics. The choice of polynucleotide can be narrowed by first testing them for binding to "hot spot" regions of the genome of cancerous cells. If a polynucleotide is identified as binding to a "hot spot", testing the polynucleotide as an antisense compound in the corresponding cancer cells is warranted.

As an alternative method for identifying function of the gene corresponding to a polynucleotide disclosed herein, dominant negative mutations are readily generated for corresponding proteins that are active as homomultimers. A mutant polypeptide will interact with wild-type polypeptides (made from the other allele) and form a non-functional multimer. Thus, a mutation is in a substrate-binding domain, a catalytic domain, or a cellular localization domain. Preferably, the mutant polypeptide will be overproduced. Point mutations are made that have such an effect. In addition, fusion of different polypeptides of various lengths to the terminus of a protein can yield dominant negative mutants. General strategies are available for making dominant negative mutants (see, *e.g.*, Herskowitz, *Nature* (1987) *329*:219). Such techniques can be used to create loss of function mutations, which are useful for determining protein function.

Polypeptides and Variants Thereof

The polypeptides of the invention include those encoded by the disclosed polynucleotides, as well as nucleic acids that, by virtue of the degeneracy of the genetic code, are not identical in sequence to the disclosed polynucleotides. Thus, the invention includes within its scope a polypeptide encoded by a polynucleotide having the sequence of any one of SEQ ID NOS:1-2707 or a variant thereof.

In general, the term "polypeptide" as used herein refers to both the full length polypeptide encoded by the recited polynucleotide, the polypeptide encoded by the gene represented by the recited polynucleotide, as well as portions or fragments thereof. "Polypeptides" also includes variants of the naturally occurring proteins, where such variants are homologous or substantially similar to the naturally occurring protein, and can be of an origin of the same or different species as the naturally occurring protein (*e.g.*, human, murine, or some other species that naturally expresses the recited polypeptide, usually a mammalian species). In general, variant polypeptides have a sequence that has at least about 80%, usually at least about 90%, and more usually at least about 98% sequence identity with a differentially expressed polypeptide of the invention, as measured by BLAST 2.0 using the parameters described above. The variant polypeptides can be naturally or non-

naturally glycosylated, *i.e.*, the polypeptide has a glycosylation pattern that differs from the glycosylation pattern found in the corresponding naturally occurring protein.

The invention also encompasses homologs of the disclosed polypeptides (or fragments thereof) where the homologs are isolated from other species, *i.e.* other animal or plant species, where such homologs, usually mammalian species, *e g* rodents, such as mice, rats; domestic animals, *e.g.*, horse, cow, dog, cat; and humans. By "homolog" is meant a polypeptide having at least about 35%, usually at least about 40% and more usually at least about 60% amino acid sequence identity to a particular differentially expressed protein as identified above, where sequence identity is determined using the BLAST 2.0 algorithm, with the parameters described *supra*.

In general, the polypeptides of the subject invention are provided in a non-naturally occurring environment, *e.g.* are separated from their naturally occurring environment. In certain embodiments, the subject protein is present in a composition that is enriched for the protein as compared to a control. As such, purified polypeptide is provided, where by purified is meant that the protein is present in a composition that is substantially free of non-differentially expressed polypeptides, where by substantially free is meant that less than 90%, usually less than 60% and more usually less than 50% of the composition is made up of non-differentially expressed polypeptides.

Also within the scope of the invention are variants; variants of polypeptides include mutants, fragments, and fusions. Mutants can include amino acid substitutions, additions or deletions. The amino acid substitutions can be conservative amino acid substitutions or substitutions to eliminate non-essential amino acids, such as to alter a glycosylation site, a phosphorylation site or an acetylation site, or to minimize misfolding by substitution or deletion of one or more cysteine residues that are not necessary for function. Conservative amino acid substitutions are those that preserve the general charge, hydrophobicity/ hydrophilicity, and/or steric bulk of the amino acid substituted. Variants can be designed so as to retain or have enhanced biological activity of a particular region of the protein (*e.g.*, a functional domain and/or, where the polypeptide is a member of a protein family, a region associated with a consensus sequence). Selection of amino acid alterations for production of variants can be based upon the accessibility (interior vs. exterior) of the amino acid (see. e.g., Go *et al. Int. J Peptide Protein Res.* (1980) *15*:211), the thermostability of the variant polypeptide (see. e.g., Querol *et al.*, *Prot. Eng.* (1996) *9*:265), desired glycosylation sites (see. e.g., Olsen and Thomsen, *J. Gen. Microbiol.* (1991) *137*:579), desired disulfide bridges (see, e.g., Clarke *et al.*, *Biochemistry* (1993) *32*:4322; and Wakarchuk *et al.*, *Protein Eng.* (1994) 7:1379), desired metal binding sites (see, e.g., Toma *et al.*, *Biochemistry* (1991) *30*:97, and Haezerbrouck *et al.*, *Protein Eng.* (1993) 6:643), and desired substitutions with in proline loops (see. e.g., Masul *et*

al., *Appl. Env. Microbiol.* (1994) *60*:3579). Cysteine-depleted muteins can be produced as disclosed in USPN 4,959,314.

Variants also include fragments of the polypeptides disclosed herein, particularly biologically active fragments and/or fragments corresponding to functional domains. Fragments of interest will typically be at least about 10 aa to at least about 15 aa in length, usually at least about 50 aa in length, and can be as long as 300 aa in length or longer, but will usually not exceed about 1000 aa in length, where the fragment will have a stretch of amino acids that is identical to a polypeptide encoded by a polynucleotide having a sequence of any SEQ ID NOS:1-2707, or a homolog thereof. The protein variants described herein are encoded by polynucleotides that are within the scope of the invention. The genetic code can be used to select the appropriate codons to construct the corresponding variants.

Computer-Related Embodiments

In general, a library of polynucleotides is a collection of sequence information, which information is provided in either biochemical form (*e.g.*, as a collection of polynucleotide molecules), or in electronic form (*e.g.*, as a collection of polynucleotide sequences stored in a computer-readable form, as in a computer system and/or as part of a computer program). The sequence information of the polynucleotides can be used in a variety of ways, *e.g.*, as a resource for gene discovery, as a representation of sequences expressed in a selected cell type (*e.g.*, cell type markers), and/or as markers of a given disease or disease state. In general, a disease marker is a representation of a gene product that is present in all cells affected by disease either at an increased or decreased level relative to a normal cell (*e.g.*, a cell of the same or similar type that is not substantially affected by disease). For example, a polynucleotide sequence in a library can be a polynucleotide that represents an mRNA, polypeptide, or other gene product encoded by the polynucleotide, that is either overexpressed or underexpressed in a breast ductal cell affected by cancer relative to a normal (*i.e.*, substantially disease-free) breast cell.

The nucleotide sequence information of the library can be embodied in any suitable form, *e.g.*, electronic or biochemical forms. For example, a library of sequence information embodied in electronic form comprises an accessible computer data file (or, in biochemical form, a collection of nucleic acid molecules) that contains the representative nucleotide sequences of genes that are differentially expressed (*e.g.*, overexpressed or underexpressed) as between, for example, i) a cancerous cell and a normal cell; ii) a cancerous cell and a dysplastic cell; iii) a cancerous cell and a cell affected by a disease or condition other than cancer; iv) a metastatic cancerous cell and a normal cell and/or non-metastatic cancerous cell; v) a malignant cancerous cell and a non-malignant cancerous cell (or a normal cell) and/or vi) a dysplastic cell relative to a normal cell. Other combinations and comparisons of cells affected by various diseases or stages of disease will be

readily apparent to the ordinarily skilled artisan. Biochemical embodiments of the library include a collection of nucleic acids that have the sequences of the genes in the library, where the nucleic acids can correspond to the entire gene in the library or to a fragment thereof, as described in greater detail below.

The polynucleotide libraries of the subject invention generally comprise sequence information of a plurality of polynucleotide sequences, where at least one of the polynucleotides has a sequence of any of SEQ ID NOS:1-2707. By plurality is meant at least 2, usually at least 3 and can include up to all of SEQ ID NOS:1-2707. The length and number of polynucleotides in the library will vary with the nature of the library, *e.g.*, if the library is an oligonucleotide array, a cDNA array, a computer database of the sequence information, etc.

Where the library is an electronic library, the nucleic acid sequence information can be present in a variety of media. "Media" refers to a manufacture, other than an isolated nucleic acid molecule, that contains the sequence information of the present invention. Such a manufacture provides the genome sequence or a subset thereof in a form that can be examined by means not directly applicable to the sequence as it exists in a nucleic acid. For example, the nucleotide sequence of the present invention, *e.g.* the nucleic acid sequences of any of the polynucleotides of SEQ ID NOS:1-2707, can be recorded on computer readable media, *e.g.* any medium that can be read and accessed directly by a computer. Such media include, but are not limited to: magnetic storage media, such as a floppy disc, a hard disc storage medium, and a magnetic tape; optical storage media such as CD-ROM; electrical storage media such as RAM and ROM; and hybrids of these categories such as magnetic/optical storage media. One of skill in the art can readily appreciate how any of the presently known computer readable mediums can be used to create a manufacture comprising a recording of the present sequence information. "Recorded" refers to a process for storing information on computer readable medium, using any such methods as known in the art. Any convenient data storage structure can be chosen, based on the means used to access the stored information. A variety of data processor programs and formats can be used for storage, *e.g.* word processing text file, database format, *etc.* In addition to the sequence information, electronic versions of the libraries of the invention can be provided in conjunction or connection with other computer-readable information and/or other types of computer-readable files (*e.g.*, searchable files, executable files, *etc*, including, but not limited to, for example, search program software, *etc.*).

By providing the nucleotide sequence in computer readable form, the information can be accessed for a variety of purposes. Computer software to access sequence information is publicly available. For example, the gapped BLAST (Altschul *et al. Nucleic Acids Res.* (1997) *25*:3389-3402) and BLAZE (Brutlag *et al. Comp. Chem.* (1993) 17:203) search algorithms on a Sybase

system can be used to identify open reading frames (ORFs) within the genome that contain homology to ORFs from other organisms.

As used herein, "a computer-based system" refers to the hardware means, software means, and data storage means used to analyze the nucleotide sequence information of the present invention. The minimum hardware of the computer-based systems of the present invention comprises a central processing unit (CPU), input means, output means, and data storage means. A skilled artisan can readily appreciate that any one of the currently available computer-based system are suitable for use in the present invention. The data storage means can comprise any manufacture comprising a recording of the present sequence information as described above, or a memory access means that can access such a manufacture.

"Search means" refers to one or more programs implemented on the computer-based system, to compare a target sequence or target structural motif, or expression levels of a polynucleotide in a sample, with the stored sequence information. Search means can be used to identify fragments or regions of the genome that match a particular target sequence or target motif. A variety of known algorithms are publicly known and commercially available, *e.g.* MacPattern (EMBL), BLASTN and BLASTX (NCBI). A "target sequence" can be any polynucleotide or amino acid sequence of six or more contiguous nucleotides or two or more amino acids, preferably from about 10 to 100 amino acids or from about 30 to 300 nt A variety of comparing means can be used to accomplish comparison of sequence information from a sample (e.g., to analyze target sequences, target motifs, or relative expression levels) with the data storage means. A skilled artisan can readily recognize that any one of the publicly available homology search programs can be used as the search means for the computer based systems of the present invention to accomplish comparison of target sequences and motifs. Computer programs to analyze expression levels in a sample and in controls are also known in the art.

A "target structural motif," or "target motif," refers to any rationally selected sequence or combination of sequences in which the sequence(s) are chosen based on a three-dimensional configuration that is formed upon the folding of the target motif, or on consensus sequences of regulatory or active sites. There are a variety of target motifs known in the art. Protein target motifs include, but are not limited to, enzyme active sites and signal sequences. Nucleic acid target motifs include, but are not limited to, hairpin structures, promoter sequences and other expression elements such as binding sites for transcription factors.

A variety of structural formats for the input and output means can be used to input and output the information in the computer-based systems of the present invention. One format for an output means ranks the relative expression levels of different polynucleotides. Such presentation

provides a skilled artisan with a ranking of relative expression levels to determine a gene expression profile. .

As discussed above, the "library" of the invention also encompasses biochemical libraries of the polynucleotides of SEQ ID NOS:1-2707 , *e.g.*, collections of nucleic acids representing the provided polynucleotides. The biochemical libraries can take a variety of forms, *e.g.*, a solution of cDNAs, a pattern of probe nucleic acids stably associated with a surface of a solid support (*i.e.*, an array) and the like. Of particular interest are nucleic acid arrays in which one or more of SEQ ID NOS:1-2707 is represented on the array By array is meant a an article of manufacture that has at least a substrate with at least two distinct nucleic acid targets on one of its surfaces, where the number of distinct nucleic acids can be considerably higher, typically being at least 10 nt, usually at least 20 nt and often at least 25 nt. A variety of different array formats have been developed and are known to those of skill in the art. The arrays of the subject invention find use in a variety of applications, including gene expression analysis, drug screening, mutation analysis and the like, as disclosed in the above-listed exemplary patent documents.

In addition to the above nucleic acid libraries, analogous libraries of polypeptides are also provided, where the where the polypeptides of the library will represent at least a portion of the polypeptides encoded by SEQ ID NOS:1-2707.

Utilities

Use of Polynucleotide Probes in Mapping, and in Tissue Profiling

Polynucleotide probes, generally comprising at least 12 contiguous nt of a polynucleotide as shown in the Sequence Listing, are used for a variety of purposes, such as chromosome mapping of the polynucleotide and detection of transcription levels. Additional disclosure about preferred regions of the disclosed polynucleotide sequences is found in the Examples. A probe that hybridizes specifically to a polynucleotide disclosed herein should provide a detection signal at least 5-, 10-, or 20-fold higher than the background hybridization provided with other unrelated sequences.

Detection of Expression Levels. Nucleotide probes are used to detect expression of a gene corresponding to the provided polynucleotide. In Northern blots, mRNA is separated electrophoretically and contacted with a probe. A probe is detected as hybridizing to an mRNA species of a particular size. The amount of hybridization is quantitated to determine relative amounts of expression, for example under a particular condition. Probes are used for in situ hybridization to cells to detect expression. Probes can also be used *in vivo* for diagnostic detection of hybridizing sequences. Probes are typically labeled with a radioactive isotope. Other types of detectable labels can be used such as chromophores, fluors, and enzymes. Other examples of nucleotide hybridization assays are described in WO92/02526 and USPN 5,124,246.

Alternatively, the Polymerase Chain Reaction (PCR) is another means for detecting small amounts of target nucleic acids (see, *e.g.*, Mullis *et al.*, *Meth Enzymol* (1987) *155*:335; USPN 4,683,195; and USPN 4,683,202). Two primer polynucleotides nucleotides that hybridize with the target nucleic acids are used to prime the reaction. The primers can be composed of sequence within or 3' and 5' to the polynucleotides of the Sequence Listing. Alternatively, if the primers are 3' and 5' to these polynucleotides, they need not hybridize to them or the complements. After amplification of the target with a thermostable polymerase, the amplified target nucleic acids can be detected by methods known in the art, e.g , Southern blot. mRNA or cDNA can also be detected by traditional blotting techniques (e.g., Southern blot, Northern blot, etc.) described in Sambrook *et al.*, "Molecular Cloning: A Laboratory Manual" (New York, Cold Spring Harbor Laboratory, 1989) (e.g., without PCR amplification). In general, mRNA or cDNA generated from mRNA using a polymerase enzyme can be purified and separated using gel electrophoresis, and transferred to a solid support, such as nitrocellulose. The solid support is exposed to a labeled probe, washed to remove any unhybridized probe, and duplexes containing the labeled probe are detected.

Mapping. Polynucleotides of the present invention can be used to identify a chromosome on which the corresponding gene resides. Such mapping can be useful in identifying the function of the polynucleotide-related gene by its proximity to other genes with known function. Function can also be assigned to the polynucleotide-related gene when particular syndromes or diseases map to the same chromosome. For example, use of polynucleotide probes in identification and quantification of nucleic acid sequence aberrations is described in USPN 5,783,387. An exemplary mapping method is fluorescence in situ hybridization (FISH), which facilitates comparative genomic hybridization to allow total genome assessment of changes in relative copy number of DNA sequences (see, e.g., Valdes *et al.*, *Methods in Molecular Biology* (1997) *68*:1). Polynucleotides can also be mapped to particular chromosomes using, for example, radiation hybrids or chromosome-specific hybrid panels. See Leach *et al.*, *Advances in Genetics*, (1995) *33*:63-99, Walter *et al.*, *Nature Genetics* (1994) 7:22; Walter and Goodfellow, *Trends in Genetics* (1992) *9*:352. Panels for radiation hybrid mapping are available from Research Genetics, Inc., Huntsville, Alabama, USA. Databases for markers using various panels are available via the world wide web at http:/F/shgc-www.stanford.edu; and http://www-genome.wi.mit.edu/cgi-bin/contig/rhmapper.pl. The statistical program RHMAP can be used to construct a map based on the data from radiation hybridization with a measure of the relative likelihood of one order versus another RHMAP is available via the world wide web at http://www.sph.umich.edu/group/statgen/software. In addition, commercial programs are available for identifying regions of chromosomes commonly associated with disease, such as cancer.

Tissue Typing or Profiling. Expression of specific mRNA corresponding to the provided polynucleotides can vary in different cell types and can be tissue-specific. This variation of mRNA levels in different cell types can be exploited with nucleic acid probe assays to determine tissue types. For example, PCR, branched DNA probe assays, or blotting techniques utilizing nucleic acid probes substantially identical or complementary to polynucleotides listed in the Sequence Listing can determine the presence or absence of the corresponding cDNA or mRNA.

Tissue typing can be used to identify the developmental organ or tissue source of a metastatic lesion by identifying the expression of a particular marker of that organ or tissue. If a polynucleotide is expressed only in a specific tissue type, and a metastatic lesion is found to express that polynucleotide, then the developmental source of the lesion has been identified. Expression of a particular polynucleotide can be assayed by detection of either the corresponding mRNA or the protein product. As would be readily apparent to any forensic scientist, the sequences disclosed herein are useful in differentiating human tissue from non-human tissue In particular, these sequences are useful to differentiate human tissue from bird, reptile, and amphibian tissue, for example.

Use of Polymorphisms A polynucleotide of the invention can be used in forensics, genetic analysis, mapping, and diagnostic applications where the corresponding region of a gene is polymorphic in the human population. Any means for detecting a polymorphism in a gene can be used, including, but not limited to electrophoresis of protein polymorphic variants, differential sensitivity to restriction enzyme cleavage, and hybridization to allele-specific probes.

Antibody Production

Expression products of a polynucleotide of the invention, as well as the corresponding mRNA, cDNA, or complete gene, can be prepared and used for raising antibodies for experimental, diagnostic, and therapeutic purposes. For polynucleotides to which a corresponding gene has not been assigned, this provides an additional method of identifying the corresponding gene. The polynucleotide or related cDNA is expressed as described above, and antibodies are prepared. These antibodies are specific to an epitope on the polypeptide encoded by the polynucleotide, and can precipitate or bind to the corresponding native protein in a cell or tissue preparation or in a cell-free extract of an in vitro expression system.

Methods for production of antibodies that specifically bind a selected antigen are well known in the art. Immunogens for raising antibodies can be prepared by mixing a polypeptide encoded by a polynucleotide of the invention with an adjuvant, and/or by making fusion proteins with larger immunogenic proteins. Polypeptides can also be covalently linked to other larger immunogenic proteins, such as keyhole limpet hemocyanin. Immunogens are typically administered intradermally, subcutaneously, or intramuscularly to experimental animals such as rabbits, sheep,

and mice, to generate antibodies. Monoclonal antibodies can be Monoclonal antibodies can be generated by isolating spleen cells and fusing myeloma cells to form hybridomas. Alternatively, the selected polynucleotide is administered directly, such as by intramuscular injection, and expressed in vivo. The expressed protein generates a variety of protein-specific immune responses, including production of antibodies, comparable to administration of the protein.

Preparations of polyclonal and monoclonal antibodies specific for polypeptides encoded by a selected polynucleotide are made using standard methods known in the art. The antibodies specifically bind to epitopes present in the polypeptides encoded by polynucleotides disclosed in the Sequence Listing. Typically, at least 6, 8, 10, or 12 contiguous amino acids are required to form an epitope. Epitopes that involve non-contiguous amino acids may require a longer polypeptide, e.g., at least 15, 25, or 50 amino acids. Antibodies that specifically bind to human polypeptides encoded by the provided polypeptides should provide a detection signal at least 5-, 10-, or 20-fold higher than a detection signal provided with other proteins when used in Western blots or other immunochemical assays. Preferably, antibodies that specifically polypeptides of the invention do not bind to other proteins in immunochemical assays at detectable levels and can immunoprecipitate the specific polypeptide from solution.

The invention also contemplates naturally occurring antibodies specific for a polypeptide of the invention. For example, serum antibodies to a polypeptide of the invention in a human population can be purified by methods well known in the art, e.g., by passing antiserum over a column to which the corresponding selected polypeptide or fusion protein is bound. The bound antibodies can then be eluted from the column, for example using a buffer with a high salt concentration.

In addition to the antibodies discussed above, the invention also contemplates genetically engineered antibodies, antibody derivatives (e.g., single chain antibodies, antibody fragments (e.g., Fab, etc.)), according to methods well known in the art.

Polynucleotides or Arrays for Diagnostics

Polynucleotide arrays provide a high throughput technique that can assay a large number of polynucleotide sequences in a sample. This technology can be used as a diagnostic and as a tool to test for differential expression, e.g., to determine function of an encoded protein. Arrays can be created by spotting polynucleotide probes onto a substrate (*e.g.*, glass, nitrocelllose, *etc*) in a two-dimensional matrix or array having bound probes. The probes can be bound to the substrate by either covalent bonds or by non-specific interactions, such as hydrophobic interactions. Samples of polynucleotides can be detectably labeled (*e.g.*, using radioactive or fluorescent labels) and then hybridized to the probes. Double stranded polynucleotides, comprising the labeled sample polynucleotides bound to probe polynucleotides, can be detected once the unbound portion of the

sample is washed away. Techniques for constructing arrays and methods of using these arrays are described in EP 799 897; WO 97/29212; WO 97/27317; EP 785 280; WO 97/02357; USPN 5,593,839; USPN 5,578,832; EP 728 520; USPN 5,599,695; EP 721 016; USPN 5,556,752; WO 95/22058; and USPN 5,631,734 Arrays can be used to, for example, examine differential expression of genes and can be used to determine gene function. For example, arrays can be used to detect differential expression of a polynucleotide between a test cell and control cell (*e.g.*, cancer cells and normal cells). For example, high expression of a particular message in a cancer cell, which is not observed in a corresponding normal cell, can indicate a cancer specific gene product. Exemplary uses of arrays are further described in, for example, Pappalarado *et al*., *Sem. Radiation Oncol.* (1998) *8*:217; and Ramsay *Nature Biotechnol.* (1998) *16*:40.

Differential Expression in Diagnosis

The polynucleotides of the invention can also be used to detect differences in expression levels between two cells, *e.g.*, as a method to identify abnormal or diseased tissue in a human. For polynucleotides corresponding to profiles of protein families, the choice of tissue can be selected according to the putative biological function. In general, the expression of a gene corresponding to a specific polynucleotide is compared between a first tissue that is suspected of being diseased and a second, normal tissue of the human. The tissue suspected of being abnormal or diseased can be derived from a different tissue type of the human, but preferably it is derived from the same tissue type; for example an intestinal polyp or other abnormal growth should be compared with normal intestinal tissue. The normal tissue can be the same tissue as that of the test sample, or any normal tissue of the patient, especially those that express the polynucleotide-related gene of interest (*e.g.*, brain, thymus, testis, heart, prostate, placenta, spleen, small intestine, skeletal muscle, pancreas, and the mucosal lining of the colon). A difference between the polynucleotide-related gene, mRNA, or protein in the two tissues which are compared, for example in molecular weight, amino acid or nucleotide sequence, or relative abundance, indicates a change in the gene, or a gene which regulates it, in the tissue of the human that was suspected of being diseased. Examples of detection of differential expression and its use in diagnosis of cancer are described in USPNs 5,688,641 and 5,677,125.

A genetic predisposition to disease in a human can also be detected by comparing expression levels of an mRNA or protein corresponding to a polynucleotide of the invention in a fetal tissue with levels associated in normal fetal tissue. Fetal tissues that are used for this purpose include, but are not limited to, amniotic fluid, chorionic villi, blood, and the blastomere of an in vitro-fertilized embryo. The comparable normal polynucleotide-related gene is obtained from any tissue. The mRNA or protein is obtained from a normal tissue of a human in which the polynucleotide-related gene is expressed. Differences such as alterations in the nucleotide sequence

or size of the same product of the fetal polynucleotide-related gene or mRNA, or alterations in the molecular weight, amino acid sequence, or relative abundance of fetal protein, can indicate a germline mutation in the polynucleotide-related gene of the fetus, which indicates a genetic predisposition to disease. In general, diagnostic, prognostic, and other methods of the invention based on differential expression involve detection of a level or amount of a gene product, particularly a differentially expressed gene product, in a test sample obtained from a patient suspected of having or being susceptible to a disease (*e.g.*, breast cancer, lung cancer, colon cancer and/or metastatic forms thereof), and comparing the detected levels to those levels found in normal cells (*e.g.*, cells substantially unaffected by cancer) and/or other control cells (*e.g.*, to differentiate a cancerous cell from a cell affected by dysplasia). Furthermore, the severity of the disease can be assessed by comparing the detected levels of a differentially expressed gene product with those levels detected in samples representing the levels of differentially gene product associated with varying degrees of severity of disease. It should be noted that use of the term "diagnostic" herein is not necessarily meant to exclude "prognostic" or "prognosis," but rather is used as a matter of convenience

The term "differentially expressed gene" is generally intended to encompass a polynucleotide that can, for example, include an open reading frame encoding a gene product (*e.g.*, a polypeptide), and/or introns of such genes and adjacent 5' and 3' non-coding nucleotide sequences involved in the regulation of expression, up to about 20 kb beyond the coding region, but possibly further in either direction. The gene can be introduced into an appropriate vector for extrachromosomal maintenance or for integration into a host genome. In general, a difference in expression level associated with a decrease in expression level of at least about 25%, usually at least about 50% to 75%, more usually at least about 90% or more is indicative of a differentially expressed gene of interest, *i e* , a gene that is underexpressed or down-regulated in the test sample relative to a control sample. Furthermore, a difference in expression level associated with an increase in expression of at least about 25%, usually at least about 50% to 75%, more usually at least about 90% and can be at least about 1 ½-fold, usually at least about 2-fold to about 10-fold, and can be about 100-fold to about 1,000-fold increase relative to a control sample is indicative of a differentially expressed gene of interest, *i.e.*, an overexpressed or up-regulated gene.

"Differentially expressed polynucleotide" as used herein means a nucleic acid molecule (RNA or DNA) comprising a sequence that represents a differentially expressed gene, *e.g.*, the differentially expressed polynucleotide comprises a sequence (*e g.*, an open reading frame encoding a gene product) that uniquely identifies a differentially expressed gene so that detection of the differentially expressed polynucleotide in a sample is correlated with the presence of a differentially expressed gene in a sample. "Differentially expressed polynucleotides" is also meant to encompass

fragments of the disclosed polynucleotides, *e g.*, fragments retaining biological activity, as well as nucleic acids homologous, substantially similar, or substantially identical (*e.g.*, having about 90% sequence identity) to the disclosed polynucleotides.

"Diagnosis" as used herein generally includes determination of a subject's susceptibility to a disease or disorder, determination as to whether a subject is presently affected by a disease or disorder, as well as to the prognosis of a subject affected by a disease or disorder (*e.g.*, identification of pre-metastatic or metastatic cancerous states, stages of cancer, or responsiveness of cancer to therapy). The present invention particularly encompasses diagnosis of subjects in the context of breast cancer (*e g.*, carcinoma in situ (*e.g* , ductal carcinoma in situ), estrogen receptor (ER)-positive breast cancer, ER-negative breast cancer, or other forms and/or stages of breast cancer), lung cancer (*e g* , small cell carcinoma, non-small cell carcinoma, mesothelioma, and other forms and/or stages of lung cancer), and colon cancer (*e g.*, adenomatous polyp, colorectal carcinoma, and other forms and/or stages of colon cancer).

"Sample" or "biological sample" as used throughout here are generally meant to refer to samples of biological fluids or tissues, particularly samples obtained from tissues, especially from cells of the type associated with the disease for which the diagnostic application is designed (*e.g.*, ductal adenocarcinoma), and the like. "Samples" is also meant to encompass derivatives and fractions of such samples (*e.g.*, cell lysates). Where the sample is solid tissue, the cells of the tissue can be dissociated or tissue sections can be analyzed.

Methods of the subject invention useful in diagnosis or prognosis typically involve comparison of the abundance of a selected differentially expressed gene product in a sample of interest with that of a control to determine any relative differences in the expression of the gene product, where the difference can be measured qualitatively and/or quantitatively Quantitation can be accomplished, for example, by comparing the level of expression product detected in the sample with the amounts of product present in a standard curve. A comparison can be made visually: by using a technique such as densitometry, with or without computerized assistance: by preparing a representative library of cDNA clones of mRNA isolated from a test sample, sequencing the clones in the library to determine that number of cDNA clones corresponding to the same gene product, and analyzing the number of clones corresponding to that same gene product relative to the number of clones of the same gene product in a control sample; or by using an array to detect relative levels of hybridization to a selected sequence or set of sequences, and comparing the hybridization pattern to that of a control. The differences in expression are then correlated with the presence or absence of an abnormal expression pattern. A variety of different methods for determining the nucleic acid abundance in a sample are known to those of skill in the art (see, e.g., WO 97/27317). In general, diagnostic assays of the invention involve detection of a gene product of a the polynucleotide

sequence (*e.g.*, mRNA or polypeptide) that corresponds to a sequence of SEQ ID NOS:1-2707 . The patient from whom the sample is obtained can be apparently healthy, susceptible to disease (*e.g.*, as determined by family history or exposure to certain environmental factors), or can already be identified as having a condition in which altered expression of a gene product of the invention is implicated.

Diagnosis can be determined based on detected gene product expression levels of a gene product encoded by at least one, preferably at least two or more, at least 3 or more, or at least 4 or more of the polynucleotides having a sequence set forth in SEQ ID NOS:1-2707 , and can involve detection of expression of genes corresponding to all of SEQ ID NOS:1-2707 and/or additional sequences that can serve as additional diagnostic markers and/or reference sequences Where the diagnostic method is designed to detect the presence or susceptibility of a patient to cancer, the assay preferably involves detection of a gene product encoded by a gene corresponding to a polynucleotide that is differentially expressed in cancer. Examples of such differentially expressed polynucleotides are described in the Examples below. Given the provided polynucleotides and information regarding their relative expression levels provided herein, assays using such polynucleotides and detection of their expression levels in diagnosis and prognosis will be readily apparent to the ordinarily skilled artisan.

Any of a variety of detectable labels can be used in connection with the various embodiments of the diagnostic methods of the invention. Suitable detectable labels include fluorochromes,(*e.g.* fluorescein isothiocyanate (FITC), rhodamine, Texas Red, phycoerythrin, allophycocyanin, 6-carboxyfluorescein (6-FAM), 2',7'-dimethoxy-4',5'-dichloro-6-carboxyfluorescein, 6-carboxy-X-rhodamine (ROX), 6-carboxy-2',4',7',4,7-hexachlorofluorescein (HEX), 5-carboxyfluorescein (5-FAM) or N,N,N',N'-tetramethyl-6-carboxyrhodamine (TAMRA)), radioactive labels, (*e.g.* ^{32}P, ^{35}S, ^{3}H, *etc.*), and the like. The detectable label can involve a two stage systems (*e g.*, biotin-avidin, hapten-anti-hapten antibody, *etc*)

Reagents specific for the polynucleotides and polypeptides of the invention, such as antibodies and nucleotide probes, can be supplied in a kit for detecting the presence of an expression product in a biological sample. The kit can also contain buffers or labeling components, as well as instructions for using the reagents to detect and quantify expression products in the biological sample. Exemplary embodiments of the diagnostic methods of the invention are described below in more detail.

Polypeptide detection in diagnosis. In one embodiment, the test sample is assayed for the level of a differentially expressed polypeptide. Diagnosis can be accomplished using any of a number of methods to determine the absence or presence or altered amounts of the differentially expressed polypeptide in the test sample. For example, detection can utilize staining of cells or

histological sections with labeled antibodies, performed in accordance with conventional methods. Cells can be permeabilized to stain cytoplasmic molecules. In general, antibodies that specifically bind a differentially expressed polypeptide of the invention are added to a sample, and incubated for a period of time sufficient to allow binding to the epitope, usually at least about 10 minutes. The antibody can be detectably labeled for direct detection (*e.g.*, using radioisotopes, enzymes, fluorescers, chemiluminescers, and the like), or can be used in conjunction with a second stage antibody or reagent to detect binding (*e.g.*, biotin with horseradish peroxidase-conjugated avidin, a secondary antibody conjugated to a fluorescent compound, *e.g.* fluorescein, rhodamine, Texas red, *etc.*). The absence or presence of antibody binding can be determined by various methods, including flow cytometry of dissociated cells, microscopy, radiography, scintillation counting, *etc.* Any suitable alternative methods can of qualitative or quantitative detection of levels or amounts of differentially expressed polypeptide can be used, for example ELISA, western blot, immunoprecipitation, radioimmunoassay, etc.

mRNA detection. The diagnostic methods of the invention can also or alternatively involve detection of mRNA encoded by a gene corresponding to a differentially expressed polynucleotides of the invention. Any suitable qualitative or quantitative methods known in the art for detecting specific mRNAs can be used. mRNA can be detected by, for example, *in situ* hybridization in tissue sections, by reverse transcriptase-PCR, or in Northern blots containing poly A+ mRNA. One of skill in the art can readily use these methods to determine differences in the size or amount of mRNA transcripts between two samples. mRNA expression levels in a sample can also be determined by generation of a library of expressed sequence tags (ESTs) from the sample, where the EST library is representative of sequences present in the sample (Adams, et al., (1991) *Science* 252 1651). Enumeration of the relative representation of ESTs within the library can be used to approximate the relative representation of the gene transcript within the starting sample. The results of EST analysis of a test sample can then be compared to EST analysis of a reference sample to determine the relative expression levels of a selected polynucleotide, particularly a polynucleotide corresponding to one or more of the differentially expressed genes described herein. Alternatively, gene expression in a test sample can be performed using serial analysis of gene expression (SAGE) methodology (e.g., Velculescu et al., *Science* (1995) *270*:484) or differential display (DD) methodology (see, *e.g.*, U.S. 5,776,683; and U.S. 5,807,680).

Alternatively, gene expression can be analyzed using hybridization analysis. Oligonucleotides or cDNA can be used to selectively identify or capture DNA or RNA of specific sequence composition, and the amount of RNA or cDNA hybridized to a known capture sequence determined qualitatively or quantitatively, to provide information about the relative representation of a particular message within the pool of cellular messages in a sample. Hybridization analysis can be

designed to allow for concurrent screening of the relative expression of hundreds to thousands of genes by using, for example, array-based technologies having high density formats, including filters, microscope slides, or microchips, or solution-based technologies that use spectroscopic analysis (*e.g.*, mass spectrometry). One exemplary use of arrays in the diagnostic methods of the invention is described below in more detail.

Use of a single gene in diagnostic applications. The diagnostic methods of the invention can focus on the expression of a single differentially expressed gene. For example, the diagnostic method can involve detecting a differentially expressed gene, or a polymorphism of such a gene (*e g* , a polymorphism in an coding region or control region), that is associated with disease. Disease-associated polymorphisms can include deletion or truncation of the gene, mutations that alter expression level and/or affect activity of the encoded protein, *etc.*

A number of methods are available for analyzing nucleic acids for the presence of a specific sequence, *e g.* a disease associated polymorphism. Where large amounts of DNA are available, genomic DNA is used directly. Alternatively, the region of interest is cloned into a suitable vector and grown in sufficient quantity for analysis. Cells that express a differentially expressed gene can be used as a source of mRNA, which can be assayed directly or reverse transcribed into cDNA for analysis. The nucleic acid can be amplified by conventional techniques, such as the polymerase chain reaction (PCR), to provide sufficient amounts for analysis, and a detectable label can be included in the amplification reaction (*e.g.*, using a detectably labeled primer or detectably labeled oligonucleotides) to facilitate detection. Alternatively, various methods are also known in the art that utilize oligonucleotide ligation as a means of detecting polymorphisms, see e.g., Riley *et al* . *Nucl. Acids Res.* (1990) *18*:2887; and Delahunty *et al*., *Am. J. Hum. Genet.* (1996) *58*:1239

The amplified or cloned sample nucleic acid can be analyzed by one of a number of methods known in the art. The nucleic acid can be sequenced by dideoxy or other methods, and the sequence of bases compared to a selected sequence, *e.g* , to a wild-type sequence. Hybridization with the polymorphic or variant sequence can also be used to determine its presence in a sample (*e g* , by Southern blot, dot blot, *etc.)*. The hybridization pattern of a polymorphic or variant sequence and a control sequence to an array of oligonucleotide probes immobilized on a solid support, as described in US 5,445,934, or in WO 95/35505, can also be used as a means of identifying polymorphic or variant sequences associated with disease. Single strand conformational polymorphism (SSCP) analysis, denaturing gradient gel electrophoresis (DGGE), and heteroduplex analysis in gel matrices are used to detect conformational changes created by DNA sequence variation as alterations in electrophoretic mobility. Alternatively, where a polymorphism creates or destroys a recognition site for a restriction endonuclease, the sample is digested with that endonuclease, and the products size

fractionated to determine whether the fragment was digested. Fractionation is performed by gel or capillary electrophoresis, particularly acrylamide or agarose gels.

Screening for mutations in a gene can be based on the functional or antigenic characteristics of the protein. Protein truncation assays are useful in detecting deletions that can affect the biological activity of the protein. Various immunoassays designed to detect polymorphisms in proteins can be used in screening. Where many diverse genetic mutations lead to a particular disease phenotype, functional protein assays have proven to be effective screening tools. The activity of the encoded protein can be determined by comparison with the wild-type protein.

Pattern matching in diagnosis using arrays. In another embodiment, the diagnostic and/or prognostic methods of the invention involve detection of expression of a selected set of genes in a test sample to produce a test expression pattern (TEP). The TEP is compared to a reference expression pattern (REP), which is generated by detection of expression of the selected set of genes in a reference sample (*e.g.*, a positive or negative control sample). The selected set of genes includes at least one of the genes of the invention, which genes correspond to the polynucleotide sequences of SEQ ID NOS:1-2707 . Of particular interest is a selected set of genes that includes gene differentially expressed in the disease for which the test sample is to be screened.

"Reference sequences" or "reference polynucleotides" as used herein in the context of differential gene expression analysis and diagnosis/prognosis refers to a selected set of polynucleotides, which selected set includes at least one or more of the differentially expressed polynucleotides described herein. A plurality of reference sequences, preferably comprising positive and negative control sequences, can be included as reference sequences. Additional suitable reference sequences are found in GenBank, Unigene, and other nucleotide sequence databases (including, *e g* , expressed sequence tag (EST), partial, and full-length sequences).

"Reference array" means an array having reference sequences for use in hybridization with a sample, where the reference sequences include all, at least one of, or any subset of the differentially expressed polynucleotides described herein. Usually such an array will include at least 3 different reference sequences, and can include any one or all of the provided differentially expressed sequences. Arrays of interest can further comprise sequences, including polymorphisms, of other genetic sequences, particularly other sequences of interest for screening for a disease or disorder (*e.g.*, cancer, dysplasia, or other related or unrelated diseases, disorders, or conditions). The oligonucleotide sequence on the array will usually be at least about 12 nt in length, and can be of about the length of the provided sequences, or can extend into the flanking regions to generate fragments of 100 nt to 200 nt in length or more. Reference arrays can be produced according to any suitable methods known in the art. For example, methods of producing large arrays of oligonucleotides are described in U.S. 5,134,854, and U.S. 5,445,934 using light-directed synthesis

techniques. Using a computer controlled system, a heterogeneous array of monomers is converted, through simultaneous coupling at a number of reaction sites, into a heterogeneous array of polymers. Alternatively, microarrays are generated by deposition of pre-synthesized oligonucleotides onto a solid substrate, for example as described in PCT published application no. WO 95/35505.

A "reference expression pattern" or "REP" as used herein refers to the relative levels of expression of a selected set of genes, particularly of differentially expressed genes, that is associated with a selected cell type, *e.g.*, a normal cell, a cancerous cell, a cell exposed to an environmental stimulus, and the like. A "test expression pattern" or "TEP" refers to relative levels of expression of a selected set of genes, particularly of differentially expressed genes, in a test sample (*e.g.*, a cell of unknown or suspected disease state, from which mRNA is isolated).

REPs can be generated in a variety of ways according to methods well known in the art. For example, REPs can be generated by hybridizing a control sample to an array having a selected set of polynucleotides (particularly a selected set of differentially expressed polynucleotides), acquiring the hybridization data from the array, and storing the data in a format that allows for ready comparison of the REP with a TEP. Alternatively, all expressed sequences in a control sample can be isolated and sequenced, *e.g.*, by isolating mRNA from a control sample, converting the mRNA into cDNA, and sequencing the cDNA. The resulting sequence information roughly or precisely reflects the identity and relative number of expressed sequences in the sample. The sequence information can then be stored in a format (*e.g.*, a computer-readable format) that allows for ready comparison of the REP with a TEP. The REP can be normalized prior to or after data storage, and/or can be processed to selectively remove sequences of expressed genes that are of less interest or that might complicate analysis (*e.g.*, some or all of the sequences associated with housekeeping genes can be eliminated from REP data).

TEPs can be generated in a manner similar to REPs, *e.g.*, by hybridizing a test sample to an array having a selected set of polynucleotides, particularly a selected set of differentially expressed polynucleotides, acquiring the hybridization data from the array, and storing the data in a format that allows for ready comparison of the TEP with a REP. The REP and TEP to be used in a comparison can be generated simultaneously, or the TEP can be compared to previously generated and stored REPs.

In one embodiment of the invention, comparison of a TEP with a REP involves hybridizing a test sample with a reference array, where the reference array has one or more reference sequences for use in hybridization with a sample. The reference sequences include all, at least one of, or any subset of the differentially expressed polynucleotides described herein. Hybridization data for the test sample is acquired, the data normalized, and the produced TEP compared with a REP generated using an array having the same or similar selected set of differentially expressed polynucleotides.

Probes that correspond to sequences differentially expressed between the two samples will show decreased or increased hybridization efficiency for one of the samples relative to the other.

Methods for collection of data from hybridization of samples with a reference arrays are well known in the art. For example, the polynucleotides of the reference and test samples can be generated using a detectable fluorescent label, and hybridization of the polynucleotides in the samples detected by scanning the microarrays for the presence of the detectable label using, for example, a microscope and light source for directing light at a substrate. A photon counter detects fluorescence from the substrate, while an x-y translation stage varies the location of the substrate. A confocal detection device that can be used in the subject methods is described in USPN 5,631.734. A scanning laser microscope is described in Shalon et al., *Genome Res.* (1996) *6*:639. A scan, using the appropriate excitation line, is performed for each fluorophore used. The digital images generated from the scan are then combined for subsequent analysis. For any particular array element, the ratio of the fluorescent signal from one sample (*e.g* , a test sample) is compared to the fluorescent signal from another sample (*e.g.*, a reference sample), and the relative signal intensity determined.

Methods for analyzing the data collected from hybridization to arrays are well known in the art. For example, where detection of hybridization involves a fluorescent label, data analysis can include the steps of determining fluorescent intensity as a function of substrate position from the data collected, removing outliers, *i.e.* data deviating from a predetermined statistical distribution, and calculating the relative binding affinity of the targets from the remaining data The resulting data can be displayed as an image with the intensity in each region varying according to the binding affinity between targets and probes.

In general, the test sample is classified as having a gene expression profile corresponding to that associated with a disease or non-disease state by comparing the TEP generated from the test sample to one or more REPs generated from reference samples (*e.g.*, from samples associated with cancer or specific stages of cancer, dysplasia, samples affected by a disease other than cancer, normal samples, *etc.*). The criteria for a match or a substantial match between a TEP and a REP include expression of the same or substantially the same set of reference genes, as well as expression of these reference genes at substantially the same levels (*e.g.*, no significant difference between the samples for a signal associated with a selected reference sequence after normalization of the samples, or at least no greater than about 25% to about 40% difference in signal strength for a given reference sequence. In general, a pattern match between a TEP and a REP includes a match in expression, preferably a match in qualitative or quantitative expression level, of at least one of, all or any subset of the differentially expressed genes of the invention.

Pattern matching can be performed manually, or can be performed using a computer program Methods for preparation of substrate matrices (*e.g*, arrays), design of oligonucleotides for use with such matrices, labeling of probes, hybridization conditions, scanning of hybridized matrices, and analysis of patterns generated, including comparison analysis, are described in, for example, U S. 5,800.992.

Diagnosis, Prognosis and Management of Cancer

The polynucleotides of the invention and their gene products are of particular interest as genetic or biochemical markers (e.g., in blood or tissues) that will detect the earliest changes along the carcinogenesis pathway and/or to monitor the efficacy of various therapies and preventive interventions. For example, the level of expression of certain polynucleotides can be indicative of a poorer prognosis, and therefore warrant more aggressive chemo- or radio-therapy for a patient or vice versa. The correlation of novel surrogate tumor specific features with response to treatment and outcome in patients can define prognostic indicators that allow the design of tailored therapy based on the molecular profile of the tumor. These therapies include antibody targeting and gene therapy. Determining expression of certain polynucleotides and comparison of a patients profile with known expression in normal tissue and variants of the disease allows a determination of the best possible treatment for a patient, both in terms of specificity of treatment and in terms of comfort level of the patient. Surrogate tumor markers, such as polynucleotide expression, can also be used to better classify, and thus diagnose and treat, different forms and disease states of cancer. Two classifications widely used in oncology that can benefit from identification of the expression levels of the polynucleotides of the invention are staging of the cancerous disorder, and grading the nature of the cancerous tissue

The polynucleotides of the invention can be useful to monitor patients having or susceptible to cancer to detect potentially malignant events at a molecular level before they are detectable at a gross morphological level. Furthermore, a polynucleotide of the invention identified as important for one type of cancer can also have implications for development or risk of development of other types of cancer, e.g., where a polynucleotide is differentially expressed across various cancer types. Thus, for example, expression of a polynucleotide that has clinical implications for metastatic colon cancer can also have clinical implications for stomach cancer or endometrial cancer.

Staging. Staging is a process used by physicians to describe how advanced the cancerous state is in a patient. Staging assists the physician in determining a prognosis, planning treatment and evaluating the results of such treatment. Staging systems vary with the types of cancer, but generally involve the following "TNM" system: the type of tumor, indicated by T; whether the cancer has metastasized to nearby lymph nodes, indicated by N; and whether the cancer has metastasized to more distant parts of the body, indicated by M. Generally, if a cancer is only detectable in the area

of the primary lesion without having spread to any lymph nodes it is called Stage I If it has spread only to the closest lymph nodes, it is called Stage II. In Stage III, the cancer has generally spread to the lymph nodes in near proximity to the site of the primary lesion Cancers that have spread to a distant part of the body, such as the liver, bone, brain or other site, are Stage IV, the most advanced stage.

The polynucleotides of the invention can facilitate fine-tuning of the staging process by identifying markers for the aggresivity of a cancer, *e.g.* the metastatic potential, as well as the presence in different areas of the body. Thus, a Stage II cancer with a polynucleotide signifying a high metastatic potential cancer can be used to change a borderline Stage II tumor to a Stage III tumor, justifying more aggressive therapy. Conversely, the presence of a polynucleotide signifying a lower metastatic potential allows more conservative staging of a tumor

Grading of cancers. Grade is a term used to describe how closely a tumor resembles normal tissue of its same type. The microscopic appearance of a tumor is used to identify tumor grade based on parameters such as cell morphology, cellular organization, and other markers of differentiation. As a general rule, the grade of a tumor corresponds to its rate of growth or aggressiveness, with undifferentiated or high-grade tumors being more aggressive than well differentiated or low-grade tumors. The following guidelines are generally used for grading tumors: 1) GX Grade cannot be assessed; 2) G1 Well differentiated; G2 Moderately well differentiated; 3) G3 Poorly differentiated; 4) G4 Undifferentiated. The polynucleotides of the invention can be especially valuable in determining the grade of the tumor, as they not only can aid in determining the differentiation status of the cells of a tumor, they can also identify factors other than differentiation that are valuable in determining the aggressiveness of a tumor, such as metastatic potential.

Detection of lung cancer. The polynucleotides of the invention can be used to detect lung cancer in a subject. Although there are more than a dozen different kinds of lung cancer, the two main types of lung cancer are small cell and nonsmall cell, which encompass about 90% of all lung cancer cases. Small cell carcinoma (also called oat cell carcinoma) usually starts in one of the larger bronchial tubes, grows fairly rapidly, and is likely to be large by the time of diagnosis. Nonsmall cell lung cancer (NSCLC) is made up of three general subtypes of lung cancer. Epidermoid carcinoma (also called squamous cell carcinoma) usually starts in one of the larger bronchial tubes and grows relatively slowly. The size of these tumors can range from very small to quite large. Adenocarcinoma starts growing near the outside surface of the lung and can vary in both size and growth rate. Some slowly growing adenocarcinomas are described as alveolar cell cancer. Large cell carcinoma starts near the surface of the lung, grows rapidly, and the growth is usually fairly large when diagnosed. Other less common forms of lung cancer are carcinoid, cylindroma, mucoepidermoid, and malignant mesothelioma.

The polynucleotides of the invention, e.g., polynucleotides differentially expressed in normal cells versus cancerous lung cells (e.g., tumor cells of high or low metastatic potential) or between types of cancerous lung cells (e.g., high metastatic versus low metastatic), can be used to distinguish types of lung cancer as well as identifying traits specific to a certain patient's cancer and selecting an appropriate therapy. For example, if the patient's biopsy expresses a polynucleotide that is associated with a low metastatic potential, it may justify leaving a larger portion of the patient's lung in surgery to remove the lesion. Alternatively, a smaller lesion with expression of a polynucleotide that is associated with high metastatic potential may justify a more radical removal of lung tissue and/or the surrounding lymph nodes, even if no metastasis can be identified through pathological examination.

Detection of breast cancer. The majority of breast cancers are adenocarcinomas subtypes, which can be summarized as follows: 1) ductal carcinoma in situ (DCIS), including comedocarcinoma; 2) infiltrating (or invasive) ductal carcinoma (IDC); 3) lobular carcinoma in situ (LCIS); 4) infiltrating (or invasive) lobular carcinoma (ILC); 5) inflammatory breast cancer; 6) medullary carcinoma; 7) mucinous carcinoma; 8) Paget's disease of the nipple; 9) Phyllodes tumor; and 10) tubular carcinoma;

The expression of polynucleotides of the invention can be used in the diagnosis and management of breast cancer, as well as to distinguish between types of breast cancer. Detection of breast cancer can be determined using expression levels of any of the appropriate polynucleotides of the invention, either alone or in combination. Determination of the aggressive nature and/or the metastatic potential of a breast cancer can also be determined by comparing levels of one or more polynucleotides of the invention and comparing levels of another sequence known to vary in cancerous tissue, *e.g.* ER expression. In addition, development of breast cancer can be detected by examining the ratio of expression of a differentially expressed polynucleotide to the levels of steroid hormones (*e.g.*, testosterone or estrogen) or to other hormones (*e.g.*, growth hormone, insulin). Thus expression of specific marker polynucleotides can be used to discriminate between normal and cancerous breast tissue, to discriminate between breast cancers with different cells of origin, to discriminate between breast cancers with different potential metastatic rates, etc.

Detection of colon cancer. The polynucleotides of the invention exhibiting the appropriate expression pattern can be used to detect colon cancer in a subject. Colorectal cancer is one of the most common neoplasms in humans and perhaps the most frequent form of hereditary neoplasia. Prevention and early detection are key factors in controlling and curing colorectal cancer. Colorectal cancer begins as polyps, which are small, benign growths of cells that form on the inner lining of the colon. Over a period of several years, some of these polyps accumulate additional mutations and become cancerous. Multiple familial colorectal cancer disorders have been identified,

which are summarized as follows: 1) Familial adenomatous polyposis (FAP); 2) Gardner's syndrome; 3) Hereditary nonpolyposis colon cancer (HNPCC); and 4) Familial colorectal cancer in Ashkenazi Jews. The expression of appropriate polynucleotides of the invention can be used in the diagnosis, prognosis and management of colorectal cancer. Detection of colon cancer can be determined using expression levels of any of these sequences alone or in combination with the levels of expression. Determination of the aggressive nature and/or the metastatic potential of a colon cancer can be determined by comparing levels of one or more polynucleotides of the invention and comparing total levels of another sequence known to vary in cancerous tissue, *e.g.*, expression of p53, DCC ras, lor FAP (see, e.g., Fearon ER, *et al.*, *Cell* (1990) *61(5)*:759; Hamilton SR *et al.*, *Cancer* (1993) *72*:957; Bodmer W, *et al*., *Nat Genet.* (1994) *4(3)*:217; Fearon ER, *Ann N Y Acad Sci.* (1995) *768*:101). For example, development of colon cancer can be detected by examining the ratio of any of the polynucleotides of the invention to the levels of oncogenes (*e.g.* ras) or tumor suppressor genes (*e.g.* FAP or p53). Thus expression of specific marker polynucleotides can be used to discriminate between normal and cancerous colon tissue, to discriminate between colon cancers with different cells of origin, to discriminate between colon cancers with different potential metastatic rates, etc.

Use of Polynucleotides to Screen for Peptide Analogs and Antagonists

Polypeptides encoded by the instant polynucleotides and corresponding full length genes can be used to screen peptide libraries to identify binding partners, such as receptors, from among the encoded polypeptides. Peptide libraries can be synthesized according to methods known in the art (see, e.g., USPN 5,010,175, and WO 91/17823). Agonists or antagonists of the polypeptides if the invention can be screened using any available method known in the art, such as signal transduction, antibody binding, receptor binding, mitogenic assays, chemotaxis assays, etc. The assay conditions ideally should resemble the conditions under which the native activity is exhibited *in vivo*, that is, under physiologic pH, temperature, and ionic strength. Suitable agonists or antagonists will exhibit strong inhibition or enhancement of the native activity at concentrations that do not cause toxic side effects in the subject. Agonists or antagonists that compete for binding to the native polypeptide can require concentrations equal to or greater than the native concentration, while inhibitors capable of binding irreversibly to the polypeptide can be added in concentrations on the order of the native concentration.

Such screening and experimentation can lead to identification of a novel polypeptide binding partner, such as a receptor, encoded by a gene or a cDNA corresponding to a polynucleotide of the invention, and at least one peptide agonist or antagonist of the novel binding partner. Such agonists and antagonists can be used to modulate, enhance, or inhibit receptor function in cells to which the receptor is native, or in cells that possess the receptor as a result of genetic engineering.

Further, if the novel receptor shares biologically important characteristics with a known receptor, information about agonist/antagonist binding can facilitate development of improved agonists/antagonists of the known receptor.

Pharmaceutical Compositions and Therapeutic Uses

Pharmaceutical compositions of the invention can comprise polypeptides, antibodies, or polynucleotides (including antisense nucleotides and ribozymes) of the claimed invention in a therapeutically effective amount. The term "therapeutically effective amount" as used herein refers to an amount of a therapeutic agent to treat, ameliorate, or prevent a desired disease or condition, or to exhibit a detectable therapeutic or preventative effect. The effect can be detected by, for example, chemical markers or antigen levels. Therapeutic effects also include reduction in physical symptoms, such as decreased body temperature. The precise effective amount for a subject will depend upon the subject's size and health, the nature and extent of the condition, and the therapeutics or combination of therapeutics selected for administration. Thus, it is not useful to specify an exact effective amount in advance. However, the effective amount for a given situation is determined by routine experimentation and is within the judgment of the clinician. For purposes of the present invention, an effective dose will generally be from about 0.01 mg/ kg to 50 mg/kg or 0.05 mg/kg to about 10 mg/kg of the DNA constructs in the individual to which it is administered.

A pharmaceutical composition can also contain a pharmaceutically acceptable carrier. The term "pharmaceutically acceptable carrier" refers to a carrier for administration of a therapeutic agent, such as antibodies or a polypeptide, genes, and other therapeutic agents. The term refers to any pharmaceutical carrier that does not itself induce the production of antibodies harmful to the individual receiving the composition, and which can be administered without undue toxicity. Suitable carriers can be large, slowly metabolized macromolecules such as proteins, polysaccharides, polylactic acids, polyglycolic acids, polymeric amino acids, amino acid copolymers, and inactive virus particles. Such carriers are well known to those of ordinary skill in the art. Pharmaceutically acceptable carriers in therapeutic compositions can include liquids such as water, saline, glycerol and ethanol. Auxiliary substances, such as wetting or emulsifying agents, pH buffering substances, and the like, can also be present in such vehicles. Typically, the therapeutic compositions are prepared as injectables, either as liquid solutions or suspensions; solid forms suitable for solution in, or suspension in, liquid vehicles prior to injection can also be prepared. Liposomes are included within the definition of a pharmaceutically acceptable carrier. Pharmaceutically acceptable salts can also be present in the pharmaceutical composition, e.g., mineral acid salts such as hydrochlorides, hydrobromides, phosphates, sulfates, and the like; and the salts of organic acids such as acetates, propionates, malonates, benzoates, and the like. A thorough

discussion of pharmaceutically acceptable excipients is available in *Remington's Pharmaceutical Sciences* (Mack Pub. Co., N.J. 1991).

Delivery Methods. Once formulated, the compositions of the invention can be (1) administered directly to the subject (*e.g.*, as polynucleotide or polypeptides); or (2) delivered ex vivo, to cells derived from the subject (*e.g.*, as in *ex vivo* gene therapy). Direct delivery of the compositions will generally be accomplished by parenteral injection, e.g., subcutaneously, intraperitoneally, intravenously or intramuscularly, intratumoral or to the interstitial space of a tissue. Other modes of administration include oral and pulmonary administration, suppositories, and transdermal applications, needles, and gene guns or hyposprays. Dosage treatment can be a single dose schedule or a multiple dose schedule.

Methods for the ex vivo delivery and reimplantation of transformed cells into a subject are known in the art and described in *e.g.*, International Publication No. WO 93/14778 Examples of cells useful in ex vivo applications include, for example, stem cells, particularly hematopoetic, lymph cells, macrophages, dendritic cells, or tumor cells. Generally, delivery of nucleic acids for both ex vivo and in vitro applications can be accomplished by, for example, dextran-mediated transfection, calcium phosphate precipitation, polybrene mediated transfection, protoplast fusion, electroporation, encapsulation of the polynucleotide(s) in liposomes, and direct microinjection of the DNA into nuclei, all well known in the art.

Once a gene corresponding to a polynucleotide of the invention has been found to correlate with a proliferative disorder, such as neoplasia, dysplasia, and hyperplasia, the disorder can be amenable to treatment by administration of a therapeutic agent based on the provided polynucleotide, corresponding polypeptide or other corresponding molecule (e.g., antisense, ribozyme, etc.).

The dose and the means of administration of the inventive pharmaceutical compositions are determined based on the specific qualities of the therapeutic composition, the condition, age, and weight of the patient, the progression of the disease, and other relevant factors. For example, administration of polynucleotide therapeutic compositions agents of the invention includes local or systemic administration, including injection, oral administration, particle gun or catheterized administration, and topical administration. Preferably, the therapeutic polynucleotide composition contains an expression construct comprising a promoter operably linked to a polynucleotide of at least 12, 22, 25, 30, or 35 contiguous nt of the polynucleotide disclosed herein. Various methods can be used to administer the therapeutic composition directly to a specific site in the body. For example, a small metastatic lesion is located and the therapeutic composition injected several times in several different locations within the body of tumor. Alternatively, arteries which serve a tumor are identified, and the therapeutic composition injected into such an artery, in order to deliver the

composition directly into the tumor. A tumor that has a necrotic center is aspirated and the composition injected directly into the now empty center of the tumor. The antisense composition is directly administered to the surface of the tumor, for example, by topical application of the composition. X-ray imaging is used to assist in certain of the above delivery methods.

Receptor-mediated targeted delivery of therapeutic compositions containing an antisense polynucleotide, subgenomic polynucleotides, or antibodies to specific tissues can also be used. Receptor-mediated DNA delivery techniques are described in, for example, Findeis *et al.*, *Trends Biotechnol.* (1993) *11*:202; Chiou *et al.*, *Gene Therapeutics: Methods And Applications Of Direct Gene Transfer* (J.A. Wolff, ed.) (1994); Wu *et al.*, *J. Biol Chem* (1988) *263*:621; Wu *et al.*, *J. Biol Chem.* (1994) *269*:542; Zenke *et al.*, *Proc Natl. Acad. Sci. (USA)* (1990) *87*:3655; Wu *et al.*, *J Biol Chem.* (1991) *266*:338. Therapeutic compositions containing a polynucleotide are administered in a range of about 100 ng to about 200 mg of DNA for local administration in a gene therapy protocol. Concentration ranges of about 500 ng to about 50 mg, about 1 g to about 2 mg, about 5 g to about 500 g, and about 20 g to about 100 g of DNA can also be used during a gene therapy protocol. Factors such as method of action (e.g., for enhancing or inhibiting levels of the encoded gene product) and efficacy of transformation and expression are considerations which will affect the dosage required for ultimate efficacy of the antisense subgenomic polynucleotides Where greater expression is desired over a larger area of tissue, larger amounts of antisense subgenomic polynucleotides or the same amounts readministered in a successive protocol of administrations, or several administrations to different adjacent or close tissue portions of, for example, a tumor site, may be required to effect a positive therapeutic outcome. In all cases, routine experimentation in clinical trials will determine specific ranges for optimal therapeutic effect. For polynucleotide-related genes encoding polypeptides or proteins with anti-inflammatory activity, suitable use, doses, and administration are described in USPN 5,654,173.

The therapeutic polynucleotides and polypeptides of the present invention can be delivered using gene delivery vehicles. The gene delivery vehicle can be of viral or non-viral origin (see generally, Jolly, *Cancer Gene Therapy* (1994) *1*:51; Kimura, *Human Gene Therapy* (1994) *5*:845; Connelly, *Human Gene Therapy* (1995) *1*:185; and Kaplitt, *Nature Genetics* (1994) *6*.148). Expression of such coding sequences can be induced using endogenous mammalian or heterologous promoters. Expression of the coding sequence can be either constitutive or regulated.

Viral-based vectors for delivery of a desired polynucleotide and expression in a desired cell are well known in the art. Exemplary viral-based vehicles include, but are not limited to, recombinant retroviruses (see, e.g., WO 90/07936; WO 94/03622; WO 93/25698; WO 93/25234; USPN 5, 219,740; WO 93/11230; WO 93/10218; USPN 4,777,127, GB Patent No. 2,200,651; EP 0 345 242; and WO 91/02805), alphavirus-based vectors (e.g., Sindbis virus vectors, Semliki forest

virus (ATCC VR-67; ATCC VR-1247), Ross River virus (ATCC VR-373, ATCC VR-1246) and Venezuelan equine encephalitis virus (ATCC VR-923; ATCC VR-1250; ATCC VR 1249; ATCC VR-532), and adeno-associated virus (AAV) vectors (see, e.g., WO 94/12649, WO 93/03769; WO 93/19191; WO 94/28938; WO 95/11984 and WO 95/00655). Administration of DNA linked to killed adenovirus as described in Curiel, *Hum. Gene Ther.* (1992) *3*:147 can also be employed.

Non-viral delivery vehicles and methods can also be employed, including, but not limited to, polycationic condensed DNA linked or unlinked to killed adenovirus alone (see, e.g., Curiel, *Hum Gene Ther.* (1992) *3*:147); ligand-linked DNA(see, e.g., Wu, *J. Biol. Chem.* (1989) *264*:16985); eukaryotic cell delivery vehicles cells (see, e.g., USPN 5,814,482; WO 95/07994; WO 96/17072; WO 95/30763; and WO 97/42338) and nucleic charge neutralization or fusion with cell membranes. Naked DNA can also be employed. Exemplary naked DNA introduction methods are described in WO 90/11092 and USPN 5,580,859. Liposomes that can act as gene delivery vehicles are described in USPN 5,422,120; WO 95/13796; WO 94/23697; WO 91/14445; and EP 0524968. Additional approaches are described in Philip, *Mol Cell Biol.* (1994) *14*:2411, and in Woffendin, *Proc. Natl. Acad. Sci.* (1994) *91*:1581

Further non-viral delivery suitable for use includes mechanical delivery systems such as the approach described in Woffendin *et al.*, *Proc Natl. Acad. Sci USA* (1994) *91*(24):11581. Moreover, the coding sequence and the product of expression of such can be delivered through deposition of photopolymerized hydrogel materials or use of ionizing radiation (see, e.g., USPN 5,206,152 and WO 92/11033). Other conventional methods for gene delivery that can be used for delivery of the coding sequence include, for example, use of hand-held gene transfer particle gun (see, e.g., USPN 5,149,655); use of ionizing radiation for activating transferred gene (see, e.g., USPN 5,206,152 and WO 92/11033).

The present invention will now be illustrated by reference to the following examples which set forth particularly advantageous embodiments. However, it should be noted that these embodiments are illustrative and are not to be construed as restricting the invention in any way.

EXAMPLES

Example 1: Source of Biological Materials and Overview of Novel Polynucleotides Expressed by the Biological Materials

cDNA libraries were constructed from either human colon cancer cell line Km12L4-A (Morikawa, et al., *Cancer Research* (1988) *48*:6863), KM12C (Morikawa et al. *Cancer Res.* (1988) *48*:1943-1948), or MDA-MB-231 (Brinkley et al. *Cancer Res.* (1980) *40*:3118-3129) was used to construct a cDNA library from mRNA isolated from the cells. Sequences expressed by these cell lines were isolated and analyzed; most sequences were about 275-300 nucleotides in length. The

KM12L4-A cell line is derived from the KM12C cell line. The KM12C cell line, which is poorly metastatic (low metastatic) was established in culture from a Dukes' stage B_2 surgical specimen (Morikawa *et al. Cancer Res.* (1988) *48*:6863) The KML4-A is a highly metastatic subline derived from KM12C (Yeatman *et al. Nucl. Acids. Res.* (1995) *23*:4007; Bao-Ling *et al. Proc. Annu. Meet. Am Assoc Cancer Res.* (1995) *21*:3269). The KM12C and KM12C-derived cell lines (*e.g.*, KM12L4, KM12L4-A, *etc*) are well-recognized in the art as a model cell line for the study of colon cancer (see, *e.g.*, Moriakawa *et al.*, *supra*; Radinsky *et al. Clin. Cancer Res.* (1995) *1*:19; Yeatman *et al.*, (1995) *supra*; Yeatman *et al. Clin Exp Metastasis* (1996) *14*:246). The MDA-MB-231 cell line was originally isolated from pleural effusions (Cailleau, *J Natl. Cancer. Inst.* (1974) *53*:661), is of high metastatic potential, and forms poorly differentiated adenocarcinoma grade II in nude mice consistent with breast carcinoma.

The sequences of the isolated polynucleotides were first masked to eliminate low complexity sequences using the XBLAST masking program (Claverie "Effective Large-Scale Sequence Similarity Searches." In: Computer Methods for Macromolecular Sequence Analysis, Doolittle, ed., *Meth Enzymol.* 266:212-227 Academic Press, NY, NY (1996); see particularly Claverie, in "Automated DNA Sequencing and Analysis Techniques" Adams *et al.*, eds., Chap. 36, p. 267 Academic Press, San Diego, 1994 and Claverie *et al Comput. Chem.* (1993) 17:191). Generally, masking does not influence the final search results, except to eliminate sequences of relative little interest due to their low complexity, and to eliminate multiple "hits" based on similarity to repetitive regions common to multiple sequences, e.g., Alu repeats. Masking resulted in the elimination of 43 sequences The remaining sequences were then used in a BLASTN vs GenBank search; sequences that exhibited greater than 70% overlap, 99% identity, and a p value of less than 1×10^{-40} were discarded. Sequences from this search also were discarded if the inclusive parameters were met, but the sequence was ribosomal or vector-derived.

The resulting sequences from the previous search were classified into three groups (1, 2 and 3 below) and searched in a BLASTX vs. NRP (non-redundant proteins) database search: (1) unknown (no hits in the GenBank search), (2) weak similarity (greater than 45% identity and p value of less than 1×10^{-5}), and (3) high similarity (greater than 60% overlap, greater than 80% identity, and p value less than 1×10^{-5}). Sequences having greater than 70% overlap, greater than 99% identity, and p value of less than 1×10^{-40} were discarded

The remaining sequences were classified as unknown (no hits), weak similarity, and high similarity (parameters as above). Two searches were performed on these sequences. First, a BLAST vs. EST database search was performed and sequences with greater than 99% overlap,

greater than 99% similarity and a p value of less than 1×10^{-40} were discarded. Sequences with a p value of less than 1×10^{-65} when compared to a database sequence of human origin were also excluded. Second, a BLASTN vs. Patent GeneSeq database was performed and sequences having greater than 99% identity, p value less than 1×10^{-40}, and greater than 99% overlap were discarded

The remaining sequences were subjected to screening using other rules and redundancies in the dataset. Sequences with a p value of less than 1×10^{-111} in relation to a database sequence of human origin were specifically excluded The final result provided the 1,565 sequences listed as SEQ ID NOS:1-1565 in the accompanying Sequence Listing and summarized in Table 1A (inserted prior to claims). Each identified polynucleotide represents sequence from at least a partial mRNA transcript.

Table 1A provides: 1) the SEQ ID NO assigned to each sequence for use in the present specification; 2) the filing date of the U.S. priority application in which the sequence was first filed. 3) the attorney docket number assigned to the priority application (for internal use); 4) the SEQ ID NO assigned to the sequence in the priority application; 5) the sequence name used as an internal identifier of the sequence; and 6) the name assigned to the clone from which the sequence was isolated. Because the provided polynucleotides represent partial mRNA transcripts, two or more polynucleotides of the invention may represent different regions of the same mRNA transcript and the same gene. Thus, if two or more SEQ ID NOS: are identified as belonging to the same clone, then either sequence can be used to obtain the full-length mRNA or gene.

In order to confirm the sequences of SEQ ID NOS:1-1565, the clones were retrieved from a library using a robotic retrieval system, and the inserts of the retrieved clones re-sequenced. These "validation" sequences are provided as SEQ ID NOS:1566-2610 in the Sequence Listing, and a summary of the "validation" sequences provided in Table 1B (inserted prior to claims). Table 1B provides: 1) the SEQ ID NO assigned to each sequence for use in the present specification; 2) the sequence name assigned to the "validation" sequence obtained; 3) whether the "validation" sequence contains sequence that overlaps with an original sequence of SEQ ID NOS:1-1565 (Validation Overlap (VO)), or whether the "validation" sequence does not substantially overlap with an original sequence of SEQ ID NOS:1-1565 (indicated by Validation Non-Overlap (VNO)); and 4) where the sequence is indicated as VO, the name of the clone that contains the indicated "validation" sequence. "Validation" sequences are indicated as "VO" where the "validation" sequence overlaps with an original sequence (*e.g.*, one of SEQ ID NOS:1-1565), and/or the "validation" sequence belongs to the same cluster as the original sequence using the clustering technique described above. Because the inserts of the clones are generally longer than the original

sequence and the validation sequence. it is possible that a "validation" sequence can be obtained from the same clone as an original sequence but yet not share any of the sequence of the original. Such validation sequences will, however, belong to the same cluster as the original sequence using the clustering technique described above. VO "validation" sequences are contained within the same clone as the original sequence (one of SEQ ID NOS:1-1565). "Validation" sequences that provided overlapping sequence are indicating by "VO" can be correlated with the original sequences they validate by referring to Table 1A. Sequences indicated as VNO are treated as newly isolated sequences and may or may not be related to the sequences of SEQ ID NOS:1-1565. Because the "validation" sequences are often longer than the original polynucleotide sequences and thus provide additional sequence information. All validation sequences can be obtained either from an indicated clone (*e.g.*, for VO sequences) or from a cDNA library described herein (*e.g.*, using primers designed from the sequence provided in the sequence listing).

Example 2: Results of Public Database Search to Identify Function of Gene Products

SEQ ID NOS:1566-2610 were translated in all three reading frames, and the nucleotide sequences and translated amino acid sequences used as query sequences to search for homologous sequences in either the GenBank (nucleotide sequences) or Non-Redundant Protein (amino acid sequences) databases. Query and individual sequences were aligned using the BLAST 2.0 programs, available over the world wide web at http://ww.ncbi.nlm.nih.gov/BLAST/. (see also Altschul, et al. *Nucleic Acids Res.* (1997) *25*:3389-3402). The sequences were masked to various extents to prevent searching of repetitive sequences or poly-A sequences, using the XBLAST program for masking low complexity as described above in Example 1.

Tables 2A and 2B (inserted before the claims) provide the alignment summaries having a p value of 1×10^{-2} or less indicating substantial homology between the sequences of the present invention and those of the indicated public databases. Table 2A provides the SEQ ID NO of the query sequence, the accession number of the GenBank database entry of the homologous sequence, and the p value of the alignment. Table 2A provides the SEQ ID NO of the query sequence, the accession number of the Non-Redundant Protein database entry of the homologous sequence, and the p value of the alignment. The alignments provided in Tables 2A and 2B are the best available alignment to a DNA or amino acid sequence at a time just prior to filing of the present specification. The activity of the polypeptide encoded by the SEQ ID NOS listed in Tables 2A and 2B can be extrapolated to be substantially the same or substantially similar to the activity of the reported nearest neighbor or closely related sequence. The accession number of the nearest neighbor is reported, providing a publicly available reference to the activities and functions exhibited by the

nearest neighbor. The public information regarding the activities and functions of each of the nearest neighbor sequences is incorporated by reference in this application. Also incorporated by reference is all publicly available information regarding the sequence, as well as the putative and actual activities and functions of the nearest neighbor sequences listed in Table 2 and their related sequences. The search program and database used for the alignment, as well as the calculation of the p value are also indicated.

Full length sequences or fragments of the polynucleotide sequences of the nearest neighbors can be used as probes and primers to identify and isolate the full length sequence of the corresponding polynucleotide The nearest neighbors can indicate a tissue or cell type to be used to construct a library for the full-length sequences of the corresponding polynucleotides.

Example 3: Members of Protein Families

SEQ ID NOS:1566-2601 were used to conduct a profile search as described in the specification above. Several of the polynucleotides of the invention were found to encode polypeptides having characteristics of a polypeptide belonging to a known protein family (and thus represent new members of these protein families) and/or comprising a known functional domain (Table 3A, inserted prior to claims). Table 3A provides the SEQ ID NO: of the query sequence, a brief description of the profile hit, the position of the query sequence within the individual sequence (indicated as "start" and "stop"), and the orientation (Direction) of the query sequence with respect to the individual sequence, where forward (for) indicates that the alignment is in the same direction (left to right) as the sequence provided in the Sequence Listing and reverse (rev) indicates that the alignment is with a sequence complementary to the sequence provided in the Sequence Listing.

Some polynucleotides exhibited multiple profile hits where the query sequence contains overlapping profile regions, and/or where the sequence contains two different functional domains. Each of the profile hits of Table 3A are described in more detail below The acronyms for the profiles (provided in parentheses) are those used to identify the profile in the Pfam and Prosite databases. The Pfam database can be accessed through any of the following URLS: http://pfam.wustl.edu/index.html; http://www.sanger.ac.uk/ Software/Pfam/; and http://www.cgr.ki.se/Pfam/. The Prosite database can be accessed at http://www.expasy.ch/prosite/. The public information available on the Pfam and Prosite databases regarding the various profiles, including but not limited to the activities, function, and consensus sequences of various proteins families and protein domains, is incorporated herein by reference.

14-3-3 Family (14_3_3). SEQ ID NO:1967 corresponds to a sequence encoding a 14-3-3 protein family member. The 14-3-3 protein family includes a group of closely related acidic homodimeric proteins of about 30 kD first identified as very abundant in mammalian brain tissues

and located preferentially in neurons (Aitken et al. *Trends Biochem Sci.* (1995) *20*.95-97: Morrison *Science* (1994) *266*:56-57: and Xiao et al. *Nature* (1995) *376*:188-191). The 14-3-3 proteins have multiple biological activities. including a key role in signal transduction pathways and the cell cycle. 14-3-3 proteins interact with kinases (*e.g.*, PKC or Raf-1), and can also function as protein-kinase dependent activators of tyrosine and tryptophan hydroxylases. The 14-3-3 protein sequences are extremely well conserved. and include two highly conserved regions: the first is a peptide of 11 residues located in the N-terminal section: the second, a 20 amino acid region located in the C-terminal section. The consensus patterns are as follows: 1) R-N-L-[LIV]-S-[VG]-[GA]-Y-[KN]-N-[IVA]; 2) Y-K-[DE]-S-T-L-I-[IM]-Q-L-[LF]-[RHC]-D-N-[LF]-T-[LS]-W-[TAN]-[SAD].

3'5'-Cyclin Nucleotide Phosphodiesterases (PDEase). SEQ ID NO: 2366 represents a polynucleotide encoding a novel 3'5'-cyclic nucleotide phosphodiesterase. PDEases catalyze the hydrolysis of cAMP or cGMP to the corresponding nucleoside 5' monophosphates (Charbonneau et al *Proc. Natl Acad. Sci. U.S.A.* (1986) *83*:9308) There are at least seven different subfamilies of PDEases (Beavo et al., *Trends Pharmacol. Sci.* (1990) *11*:150; http://weber.u.washington.edu/~pde/: 1) Type 1. calmodulin/calcium-dependent PDEases; 2) Type 2, cGMP-stimulated PDEases: 3) Type 3. cGMP-inhibited PDEases: 4) Type 4, cAMP-specific PDEases.; 5) Type 5, cGMP-specific PDEases; 6) Type 6. rhodopsin-sensitive cGMP-specific PDEases: and 7) Type 7. High affinity cAMP-specific PDEases. All PDEase forms share a conserved domain of about 270 residues. The signature pattern is determined from a stretch of 12 residues that contains two conserved histidines: H-D-[LIVMFY]-x-H-x-[AG]-x(2)-[NQ]-x-[LIVMFY].

Four Transmembrane Integral Membrane Proteins (transmembrane4). SEQ ID NOS:1579 and 1978 sequences correspond to a sequence encoding a member of the four transmembrane segments integral membrane protein family (tm4 family). The tm4 family of proteins includes a number of evolutionarily-related eukaryotic cell surface antigens (Levy *et al., J. Biol Chem.*, (1991) *266*:14597; Tomlinson *et al . Eur. J. Immunol.* (1993) *23*:136; Barclay *et al.* The leucocyte antigen factbooks. (1993) Academic Press, London/San Diego). The tm4 family members are type III membrane proteins. which are integral membrane proteins containing an N-terminal membrane-anchoring domain that functions both as a translocation signal and as a membrane anchor. The family members also contain three additional transmembrane regions, at least seven conserved cysteines residues, and are of approximately the same size (218 to 284 residues). The consensus pattern spans a conserved region including two cysteines located in a short cytoplasmic loop between two transmembrane domains: Consensus pattern: G-x(3)-[LIVMF]-x(2)-[GSA]-[LIVMF](2)-G-C-x-[GA]-[STA]- x(2)-[EG]-x(2)-[CWN]-[LIVM](2).

Seven Transmembrane Integral Membrane Proteins -- Rhodopsin Family (7tm_1). SEQ ID NOS:1652. 1927. and 2068 correspond to a sequence encoding a member of the seven

transmembrane (7tm) receptor rhodopsin family. G-protein coupled receptors of the (7tm) rhodopsin family include hormones, neurotransmitters, and light receptors that transduce extracellular signals by interaction with guanine nucleotide-binding (G) proteins (Strosberg *Eur J. Biochem.* (1991) *196*:1, Kerlavage *Curr. Opin. Struct Biol.* (1991) *1*:394, Probst, et al., *DNA Cell Biol.* (1992) *11*:1, Savarese, et al., Biochem. J. (1992) *283*:1, http://www.gcrdb.uthscsa.edu/, http://swift.embl-heidelberg.de/7tm/) The consensus pattern that contains the conserved triplet and that also spans the major part of the third transmembrane helix is used to detect this widespread family of proteins: [GSTALIVMFYWC]-[GSTANCPDE]-{EDPKRH}-x(2)-[LIVMNQGA]-x(2)-[LIVMFT]-[GSTANC]-[LIVMFYWSTAC]-[DENH]-R-[FYWCSH]-x(2)-[LIVM].

Seven Transmembrane Integral Membrane Proteins -- Secretin Family (7tm_2). SEQ ID NOS:1598, 1719, 1911, 1927, 2068, and 2341 correspond to a sequence encoding a member of the seven transmembrane receptor (7tm) secretin family (Jueppner et al. *Science* (1991) *254*:1024; Hamann et al. *Genomics* (1996) *32*:144) The N-terminal extracellular domain of these receptors contains five conserved cysteines residues involved in disulfide bonds, with a consensus pattern in the region that spans the first three cysteines. One of the most highly conserved regions spans the C-terminal part of the last transmembrane region and the beginning of the adjacent intracellular region and is used as a second signature pattern. The two consensus patterns are. 1) C-x(3)-[FYWLIV]-D-x(3,4)-C-[FW]-x(2)-[STAGV]-x(8,9)-C-[PF]; and 2) Q-G-[LMFCA]-[LIVMFT]-[LIV]-x-[LIVFST]-[LIF]-[VFYH]-C- [LFY]-x-N-x(2)-V

ATPases Associated with Various Cellular Activities (ATPases) Several of the polynucleotides of the invention correspond to a sequence that encodes a member of a family of ATPases Associated with diverse cellular Activities (AAA). The AAA protein family is composed of a large number of ATPases that share a conserved region of about 220 amino acids containing an ATP-binding site (Froehlich *et al., J. Cell Biol.* (1991) *114*:443; Erdmann *et al. Cell* (1991) *64*:499; Peters *et al., EMBO J.* (1990) *9*:1757; Kunau *et al., Biochimie* (1993) *75*:209-224; Confalonieri *et al., BioEssays* (1995) *17*:639; http://yeamob.pci. chemie.uni-tuebingen.de/AAA/Description.html). The AAA domain, which can be present in one or two copies, acts as an ATP-dependent protein clamp (Confalonieri *et al.* (1995) *BioEssays 17*:639) and contains a highly conserved region located in the central part of the domain. The consensus pattern is: [LIVMT]-x-[LIVMT]-[LIVMF]-x-[GATMC]-[ST]-[NS]-x(4)-[LIVM]- D-x-A-[LIFA]-x-R.

Basic Region Plus Leucine Zipper Transcription Factors (BZIP). SEQ ID NO:1623 represents a polynucleotide encoding a novel member of the family of basic region plus leucine zipper transcription factors. The bZIP superfamily (Hurst, *Protein Prof.* (1995) *2*:105; and Ellenberger, *Curr. Opin Struct. Biol.* (1994) *4*:12) of eukaryotic DNA-binding transcription factors encompasses proteins that contain a basic region mediating sequence-specific DNA-binding

followed by a leucine zipper required for dimerization. The consensus pattern for this protein family is: [KR]-x(1,3)-[RKSAQ]-N-x(2)-[SAQ](2)-x-[RKTAENQ]-x-R-x-[RK].

C2 domain (C2). SEQ ID NOS: 1715 and 2426 correspond to a sequence encoding a C2 domain, which is involved in calcium-dependent phospholipid binding (Davletov *J. Biol. Chem.* (1993) *268*:26386-26390) or, in proteins that do not bind calcium, the domain may facilitate binding to inositol-1,3,4,5-tetraphosphate (Fukuda et al. *J Biol Chem.* (1994) *269*:29206-29211; Sutton et al. *Cell* (1995) *80*:929-938). The consensus sequence is: [ACG]-x(2)-L-x(2,3)-D-x(1,2)-[NGSTLIF]-[GTMR]-x-[STAP]-D- [PA]-[FY].

Cysteine proteases (Cys-protease). SEQ ID NO:2238 represents a polynucleotide encoding a protein having a eukaryotic thiol (cysteine) protease active site. Cysteine proteases (Dufour *Biochimie* (1988) *70*:1335) are a family of proteolytic enzymes that contain an active site cysteine. Catalysis proceeds through a thioester intermediate and is facilitated by a nearby histidine side chain; an asparagine completes the essential catalytic triad. The sequences around the three active site residues are well conserved and can be used as signature patterns: Q-x(3)-[GE]-x-C-[YW]-x(2)-[STAGC]-[STAGCV] (where C is the active site residue); 2) [LIVMGSTAN]-x-H-[GSACE]-[LIVM]-x-[LIVMAT](2)-G-x-[GSADNH] (where H is the active site residue); and 3) [FYCH]-[WI]-[LIVT]-x-[KRQAG]-N-[ST]-W-x(3)-[FYW]-G-x(2)-G- [LFYW]-[LIVMFYG]-x-[LIVMF] (where N is the active site residue).

DEAD and DEAH box families ATP-dependent helicases (Dead_box_helic). SEQ ID NOS:1630, 1865, and 2517 represent polynucleotides encoding a novel member of the DEAD and DEAH box families (Schmid et al , *Mol. Microbiol.* (1992) *6*:283; Linder et al., *Nature* (1989) *337*:121; Wassarman, et al., *Nature* (1991) *349*:463). All members of these families are involved in ATP-dependent, nucleic-acid unwinding. All DEAD box family members share a number of conserved sequence motifs, some of which are specific to the DEAD family, with others shared by other ATP-binding proteins or by proteins belonging to the helicases 'superfamily' (Hodgman *Nature* (1988) *333*:22 and *Nature* (1988) *333*:578 (Errata); http://www.expasy.ch/ www/ linder/ HELICASES_ TEXT.html). One of these motifs, called the 'D-E-A-D-box', represents a special version of the B motif of ATP-binding proteins. Proteins that have His instead of the second Asp and are 'D-E-A-H-box' proteins (Wassarman et al., *Nature* (1991) *349*:463; Harosh, et al., *Nucleic Acids Res.* (1991) *19*:6331; Koonin , et al., *J. Gen. Virol.* (1992) *73*:989; http://www.expasy.ch/ www/linder/HELICASES_TEXT.html). The following signature patterns are used to identify member for both subfamilies: 1) [LIVMF](2)-D-E-A-D-[RKEN]-x-[LIVMFYGSTN]; and 2) [GSAH]-x-[LIVMF](3)-D-E-[ALIV]-H-[NECR].

Dual specificity phosphatase (DSPc). Dual specificity phosphatases (DSPs) are Ser/Thr and Tyr protein phosphatases that comprise a tertiary fold highly similar to that of tyrosine-specific

phosphatases, except for a "recognition" region connecting helix alpha1 to strand beta1. This tertiary fold may determine differences in substrate specific between VH-1 related dual specificity phosphatase (VHR), the protein tyrosine phosphatases (PTPs), and other DSPs. Phosphatases are important in the control of cell growth, proliferation, differentiation and transformation.

EF Hand (EFhand). SEQ ID NO:1595 corresponds to a polynucleotide encoding a member of the EF-hand protein family, a calcium binding domain shared by many calcium-binding proteins belonging to the same evolutionary family (Kawasaki *et al.*, *Protein. Prof.* (1995) *2*.305-490). The domain is a twelve residue loop flanked on both sides by a twelve residue alpha-helical domain, with a calcium ion coordinated in a pentagonal bipyramidal configuration. The six residues involved in the binding are in positions 1, 3, 5, 7, 9 and 12; these residues are denoted by X, Y, Z, -Y, -X and -Z. The invariant Glu or Asp at position 12 provides two oxygens for liganding Ca (bidentate ligand). The consensus pattern includes the complete EF-hand loop as well as the first residue which follows the loop and which seem to always be hydrophobic: D-x-[DNS]-{ILVFYW}-[DENSTG]-[DNQGHRK]-{GP}-[LIVMC]-[DENQSTAGC]-x(2)-[DE]-[LIVMFYW].

Eukaryotic Aspartyl Proteases (asp). Several of the polynucleotides of the invention correspond to a sequence encoding a novel eukaryotic aspartyl protease. Aspartyl proteases, known as acid proteases, (EC 3.4.23.-) are a widely distributed family of proteolytic enzymes (Foltmann., *Essays Biochem.* (1981) *17*:52; Davies, *Annu. Rev Biophys. Chem.* (1990) *19*.189; Rao, *et al*., *Biochemistry* (1991) *30*:4663) known to exist in vertebrates, fungi, plants, retroviruses and some plant viruses. Aspartate proteases of eukaryotes are monomeric enzymes which consist of two domains. Each domain contains an active site centered on a catalytic aspartyl residue. The consensus pattern to identify eukaryotic aspartyl protease is: [LIVMFGAC]-[LIVMTADN]-[LIVFSA]-D-[ST]-G-[STAV]-[STAPDENQ]- x-[LIVMFSTNC]-x-[LIVMFGTA], where D is the active site residue.

Fibronectin Type II collagen-binding domain (FntypeII). SEQ ID NO: 1968 corresponds to a polynucleotide encoding a polypeptide having a type II fibronectin collagen binding domain. Fibronectin is a plasma protein that binds cell surfaces and various compounds including collagen, fibrin, heparin, DNA, and actin. The major part of the sequence of fibronectin consists of the repetition of three types of domains, called type I, II, and III (Skorstengaardet al., *Eur. J. Biochem.* (1986) *161*:441). The type II domain, which is duplicated in fibronectin, is approximately forty residues long, contains four conserved cysteines involved in disulfide bonds and is part of the collagen-binding region of fibronectin. The consensus pattern for identifying members of this family, which pattern spans this entire domain, is: C-x(2)-P-F-x-[FYWI]-x(7)-C-x(8,10)-W-C-x(4)-[DNSR]-[FYW]- x(3,5)-[FYW]-x-[FYWI]-C (where the four C's are involved in disulfide bonds).

G-Protein Alpha Subunit (G-alpha). SEQ ID NO: 1779 corresponds to a gene encoding a

member of the G-protein alpha subunit family. G-proteins are a family of membrane-associated proteins that couple extracellularly-activated integral-membrane receptors to intracellular effectors, such as ion channels and enzymes that vary the concentration of second messenger molecules. G-proteins are composed of 3 subunits (alpha, beta and gamma) which, in the resting state, associate as a trimer at the inner face of the plasma membrane. The alpha subunit, which binds GTP and exhibits GTPase activity, is about 350-400 amino acids in length with a molecular weight in the range of 40-45 kDa. Seventeen distinct types of alpha subunit have been identified in mammals, and fall into 4 main groups on the basis of both sequence similarity and function: alpha-s, alpha-q, alpha-i and alpha-12 (Simon *et al.*, *Science* (1993) *252*:802). They are often N-terminally acylated, usually with myristate and/or palmitoylate, and these fatty acid modifications can be important for membrane association and high- affinity interactions with other proteins.

Helicases conserved C-terminal domain (helicase_C). SEQ ID NOS: 1621 and 1652 represent polynucleotides encoding novel members of the DEAD/H helicase family. The DEAD and DEAH families are described above.

Helix-Loop-Helix (HLH) DNA Binding Domain (HLH). SEQ ID NO:2192 corresponds to a sequence encoding an HLH domain. The HLH domain, which normally spans about 40 to 50 amino acids, is present in a number of eukaryotic transcription factors. The HLH domain is formed of two amphipathic helices joined by a variable length linker region that forms a loop that mediates protein dimerization (Murre et al. *Cell* (1989) *56*:777-783). Basic HLH proteins (bHLH), which have an extra basic region of about 15 amino acid residues adjacent the HLH domain and specifically bind to DNA, include two groups: class A (ubiquitous) and class B (tissue-specific). bHLH family members bind variations of the E-box motif (CANNTG). The homo- or heterodimerization mediated by the HLH domain is independent of, but necessary for DNA binding, as two basic regions are required for DNA binding activity. The HLH proteins lacking the basic domain function as negative regulators since they form heterodimers, but fail to bind DNA. Consensus pattern: [DENSTAP]-[KTR]-[LIVMAGSNT]-{FYWCPHKR}-[LIVMT]-[LIVM]- x(2)-[STAV]-[LIVMSTACKR]-x-[VMFYH]-[LIVMTA]-{P}-{P}-[LIVMRKHQ].

Kinase Domain of Tors. The TOR profile is directed towards a lipid kinase protein family. This family is composed of large proteins with a lipid and protein kinase domain and characterized through their sensitivity to rapamycin (an antifungal compound). TOR proteins are involved in signal transduction downstream of PI3 kinase and many other signals. TOR (also called FRAP, RAFT) plays a role in regulating protein synthesis and cell growth., and in yeast controls translation initiation and early G1 progression. See, *e.g.*, Barbet *et al. Mol Biol Cell.* (1996) 7(1):25-42; Helliwell *et al. Genetics* (1998) *148*:99-112.

MAP kinase kinase (mkk). SEQ ID NOS: 1825,1876, 2039, and 2526 represent members of

the MAP kinase kinase (mkk) family MAP kinases (MAPK) are involved in signal transduction, and are important in cell cycle and cell growth controls The MAP kinase kinases (MAPKK) are dual-specificity protein kinases which phosphorylate and activate MAP kinases. MAPKK homologues have been found in yeast, invertebrates, amphibians, and mammals. Moreover, the MAPKK/MAPK phosphorylation switch constitutes a basic module activated in distinct pathways in yeast and in vertebrates. MAPKKs are essential transducers through which signals must pass before reaching the nucleus. For review, see, *e.g*, Biologique *Biol Cell* (1993) *79*:193-207. Nishida *et al*., *Trends Biochem Sci* (1993) *18*:128-31: Ruderman *Curr Opin Cell Biol* (1993) *5*:207-13, Dhanasekaran *et al*., *Oncogene* (1998) *17*:1447-55; Kiefer *et al*, *Biochem Soc Trans* (1997) *25*.491-8: and Hill. *Cell Signal* (1996) *8*:533-44.

Neurotransmitter-Gated Ion-Channel (neur_chan). Several of the sequences correspond to a sequence encoding a neurotransmitter-gated ion channel. Neurotransmitter-gated ion-channels, which provide the molecular basis for rapid signal transmission at chemical synapses, are post-synaptic oligomeric transmembrane complexes that transiently form a ionic channel upon the binding of a specific neurotransmitter. Five types of neurotransmitter-gated receptors are known: 1) nicotinic acetylcholine receptor (AchR): 2) glycine receptor; 3) gamma-aminobutyric-acid (GABA) receptor; 4) serotonin 5HT3 receptor: and 5) glutamate receptor. All known sequences of subunits from neurotransmitter-gated ion-channels are structurally related, and are composed of a large extracellular glycosylated N-terminal ligand-binding domain, followed by three hydrophobic transmembrane regions that form the ionic channel, followed by an intracellular region of variable length. A fourth hydrophobic region is found at the C-terminal of the sequence. The consensus pattern is: C-x-[LIVMFQ]-x-[LIVMF]-x(2)-[FY]-P-x-D-x(3)-C, where the two C's are linked by a disulfide bond.

Protein Kinase (protkinase). Several sequences represent polynucleotides encoding protein kinases, which catalyze phosphorylation of proteins in a variety of pathways, and are implicated in cancer. Eukaryotic protein kinases (Hanks, *et al*., *FASEB J.* (1995) *9*:576; Hunter, *Meth. Enzymol.* (1991) *200*:3; Hanks, *et al*., *Meth. Enzymol.* (1991) *200*:38; Hanks, *Curr. Opin. Struct. Biol.* (1991) *1*:369; Hanks *et al*., *Science* (1988) *241*:42) belong to a very extensive family of proteins that share a conserved catalytic core common to both serine/threonine and tyrosine protein kinases. There are a number of conserved regions in the catalytic domain of protein kinases. The first region, located in the N-terminal extremity of the catalytic domain, is a glycine-rich stretch of residues in the vicinity of a lysine residue, which has been shown to be involved in ATP binding. The second region, located in the central part of the catalytic domain, contains a conserved an aspartic acid residue that is important for the catalytic activity of the enzyme (Knighton, *et al*., *Science* (1991) *253*:407).

The protein kinase profile includes two signature patterns for this second region: one

specific for serine/threonine kinases and the other for tyrosine kinases. A third profile is based on the alignment in (Hanks, *et al.*, *FASEB J.* (1995) *9*:576) and covers the entire catalytic domain. The consensus patterns are as follows: 1) [LIV]-G-{P}-G-{P}-[FYWMGSTNH]-[SGA]-{PW}-[LIVCAT]-{PD}-x-[GSTACLIVMFY]-x(5,18)-[LIVMFYWCSTAR]-[AIVP]-[LIVMFAGCKR]-K, where K binds ATP; 2) [LIVMFYC]-x-[HY]-x-D-[LIVMFY]-K-x(2)-N-[LIVMFYCT](3), where D is an active site residue; and 3) [LIVMFYC]-x-[HY]-x-D-[LIVMFY]-[RSTAC]-x(2)-N-[LIVMFYC], where D is an active site residue.

Protein Tyrosine Phosphatase (Y_phosphatase) (PTPase). SEQ ID NOS:1719, 1769, 2062, 2197, and 2275 represent polynucleotides encoding a tyrosine-specific protein phosphatase, a kinase that catalyzes the removal of a phosphate groups attached to a tyrosine residue (EC 3.1.3.48) (PTPase) (Fischer *et al.*, *Science* (1991) *253*:401; Charbonneau *et al.*, *Annu. Rev. Cell Biol.* (1992) *8*:463, Trowbridge *Biol. Chem* (1991) *266*:23517, Tonks *et al.*, *Trends Biochem. Sci.* (1989) *14*:497, and Hunter, *Cell* (1989) *58*:1013). PTPases are important in the control of cell growth, proliferation, differentiation and transformation. Multiple forms of PTPase have been characterized and can be classified into two categories: soluble PTPases and transmembrane receptor proteins that contain PTPase domain(s). Structurally, all known receptor PTPases are made up of a variable length extracellular domain, followed by a transmembrane region and a C-terminal catalytic cytoplasmic domain. PTPase domains consist of about 300 amino acids. Two conserved cysteines are absolutely required for activity, with a number of other conserved residues in the immediate vicinity also important for activity. The consensus pattern for PTPases is: [LIVMF]-H-C-x(2)-G-x(3)-[STC]-[STAGP]-x-[LIVMFY]; C is the active site residue.

RNA Recognition Motif (rrm). SEQ ID NOS: 1850 and 2194 correspond to sequence encoding an RNA recognition motif, also known as an RRM, RBD, or RNP domain. This domain, which is about 90 amino acids long, is contained in eukaryotic proteins that bind single-stranded RNA (Bandziulis et al. *Genes Dev.* (1989) *3*:431-437; Dreyfuss et al. *Trends Biochem. Sci.* (1988) *13*:86-91). Two regions within the RNA-binding domain are highly conserved: the first is a hydrophobic segment of six residues (which is called the RNP-2 motif), the second is an octapeptide motif (which is called RNP-1 or RNP-CS). The consensus pattern is: [RK]-G-{EDRKHPCG}-[AGSCI]-[FY]-[LIVA]-x-[FYLM].

SH2 Domain (SH2). SEQ ID NO: 2441 corresponds to a sequence encoding an SH2 domain. The Src homology 2 (SH2) domain includes an approximately 100 amino acid residue domain, which is conserved in the oncoproteins Src and Fps, as well as in many other intracellular signal-transducing proteins (Sadowski et al. *Mol. Cell. Biol.* (1986) *6*:4396-4408; Russel et al. *FEBS Lett.* (1992) *304*:15-20). SH2 domains function as regulatory modules of intracellular signaling cascades by interacting with high affinity to phosphotyrosine-containing target peptides in

a sequence-specific and strictly phosphorylation-dependent manner. The SH2 domain has a conserved 3D structure consisting of two alpha helices and six to seven beta-strands. The core of the domain is formed by a continuous beta-meander composed of two connected beta-sheets (Kuriyan et al. *Curr Opin Struct. Biol.* (1993) *3*:828-837).

Thioredoxin family active site (Thioredox). SEQ ID NO: 1618 represents a polynucleotide encoding a protein of the thioredoxin family. Thioredoxins are small proteins of approximately one hundred amino acid residues that participate in various redox reactions via the reversible oxidation of an active center disulfide bond (Holmgren. *Annu Rev. Biochem.* (1985) *54*:237: Gleason, et al., *FEMS Microbiol. Rev.* (1988) *54*:271; Holmgren A. *J. Biol Chem* (1989) *264*:13963. Eklund, et al. *Proteins* (1991) *11*:13). Thioredoxins exist in either reduced or oxidized forms where the two cysteine residues are linked in an intramolecular disulfide bond. The sequence around the redox-active disulfide bond is well conserved The consensus pattern is: [LIVMF]-[LIVMSTA]-x-[LIVMFYC]-[FYWSTHE]-x(2)-[FYWGTN]-C- [GATPLVE]-[PHYWSTA]-C-x(6)-[LIVMFYWT] (where the two C's form the redox-active bond).

Trypsin (trypsin). SEQ ID NOS: 1579, 2290, 2341, 2421, 2430, and 2438 correspond to novel serine proteases of the trypsin family. The catalytic activity of the serine proteases from the trypsin family is provided by a charge relay system involving an aspartic acid residue hydrogen-bonded to a histidine, which itself is hydrogen-bonded to a serine. The sequences in the vicinity of the active site serine and histidine residues are well conserved (Brenner *Nature* (1988) *334*:528). The consensus patterns for the trypsin protein family are: 1) [LIVM]-[ST]-A-[STAG]-H-C, where H is the active site residue; and 2) [DNSTAGC]-[GSTAPIMVQH]-x(2)-G-[DE]-S-G-[GS]-[SAPHV]-[LIVMFYWH]-[LIVMFYSTANQH], where S is the active site residue. All sequences known to belong to this family are detected by the above consensus sequences, except for 18 different proteases which have lost the first conserved glycine. If a protein includes both the serine and the histidine active site signatures, the probability of it being a trypsin family serine protease is 100%.

WD Domain, G-Beta Repeats (WD_domain). SEQ ID NO: 2281 represents a members of the WD domain/G-beta repeat family. Beta-transducin (G-beta) is one of the three subunits (alpha, beta, and gamma) of the guanine nucleotide-binding proteins (G proteins) which act as intermediaries in the transduction of signals generated by transmembrane receptors (Gilman, *Annu. Rev Biochem.* (1987) *56*:615). The alpha subunit binds to and hydrolyzes GTP; the beta and gamma subunits are required for the replacement of GDP by GTP as well as for membrane anchoring and receptor recognition. In higher eukaryotes, G-beta exists as a small multigene family of highly conserved proteins of about 340 amino acid residues. Structurally, G-beta has eight tandem repeats of about 40 residues, each containing a central Trp-Asp motif (this type of repeat is sometimes called a WD-40 repeat). The consensus pattern for the WD domain/G-Beta repeat family is:

[LIVMSTAC]-[LIVMFYWSTAGC]-[LIMSTAG]-[LIVMSTAGC]-x(2)-[DN]-x(2)-[LIVMWSTAC]-x-[LIVMFSTAG]-W-[DEN]-[LIVMFSTAGCN].

wnt Family of Developmental Signaling Proteins (Wnt_dev_sign). Several of the sequences correspond to novel members of the wnt family of developmental signaling proteins. Wnt-1 (previously known as int-1), the seminal member of this family, (Nusse, *Trends Genet* (1988) *4*:291) plays a role in intercellular communication and is important in central nervous system development. All wnt family proteins share the following features characteristic of secretory proteins: a signal peptide, several potential N-glycosylation sites and 22 conserved cysteines that may be involved in disulfide bonds. Wnt proteins generally adhere to the plasma membrane of secreting cells and are therefore likely to signal over only few cell diameters The consensus pattern, which is based upon a highly conserved region including three cysteines, is as follows: C-K-C-H-G-[LIVMT]-S-G-x-C

Zinc Finger, C2H2 Type (Zincfing_C2H2). SEQ ID NOS: 1735, 1942, 2018, 2254, and 2515 correspond to polynucleotides encoding members of the C2H2 type zinc finger protein family, which contain zinc finger domains that facilitate nucleic acid binding (Klug *et al.*, *Trends Biochem. Sci.* (1987) *12*:464; Evans *et al.*, *Cell* (1988) *52*:1; Payre *et al*., *FEBS Lett* (1988) *234*:245; Miller *et al*., *EMBO J.* (1985) *4*:1609; and Berg, *Proc. Natl. Acad. Sci USA* (1988) *85*:99). In addition to the conserved zinc ligand residues, a number of other positions are also important for the structural integrity of the C2H2 zinc fingers. (Rosenfeld *et al.*, *J Biomol. Struct. Dyn* (1993) *11*:557) The best conserved position, which is generally an aromatic or aliphatic residue, is located four residues after the second cysteine. The consensus pattern for C2H2 zinc fingers is: C-x(2,4)-C-x(3)-[LIVMFYWC]-x(8)-H-x(3,5)-H. The two C's and two H's are zinc ligands

Example 4: Differential Expression of Polynucleotides of the Invention: Description of Libraries and Detection of Differential Expression

The relative expression levels of the polynucleotides of the invention was assessed in several libraries prepared from various sources, including cell lines and patient tissue samples. Table 4 provides a summary of these libraries, including the shortened library name (used hereafter), the mRNA source used to prepared the cDNA library, the "nickname" of the library that is used in the tables below (in quotes), and the approximate number of clones in the library

Table 4. Description of cDNA Libraries

Library (lib #)	Description	Number of Clones in Cluster
1	Km12 L4 Human Colon Cell Line, High Metastatic Potential (derived from Km12C): "High Met Colon"	307133

Library (lib #)	Description	Number of Clones in Cluster
2	Km12C Human Colon Cell Line, Low Metastatic Potential; "Low Met Colon"	284755
3	MDA-MB-231 Human Breast Cancer Cell Line, High Metastatic Potential; micro-metastases in lung, "High Met Breast"	326937
4	MCF7 Human Breast Cancer Cell, Non Metastatic; "Low Met Breast"	318979
8	MV-522 Human Lung Cancer Cell Line, High Metastatic Potential; "High Met Lung"	223620
9	UCP-3 Human Lung Cancer Cell Line, Low Metastatic Potential; "Low Met Lung"	312503
12	Human microvascular endothelial cells (HMEC) – Untreated PCR (OligodT) cDNA library; "HMEC"	41938
13	Human microvascular endothelial cells (HMEC) – Basic fibroblast growth factor (bFGF) treated PCR (OligodT) cDNA library; "HMEC-bFGF"	42100
14	Human microvascular endothelial cells (HMEC) – Vascular endothelial growth factor (VEGF) treated PCR (OligodT) cDNA library; "HMEC-VEGF"	42825
15	Normal Colon – UC#2 Patient PCR (OligodT) cDNA library; "Normal Colon Tissue"	282722
16	Colon Tumor – UC#2 Patient PCR (OligodT) cDNA library; "Normal Colon Tumor Tissue"	298831
17	Liver Metastasis from Colon Tumor of UC#2 Patient PCR (OligodT) cDNA library; "High Met Colon Tissue"	303467
18	Normal Colon – UC#3 Patient PCR (OligodT) cDNA library; "Normal Colon Tissue"	36216
19	Colon Tumor – UC#3 Patient PCR (OligodT) cDNA library; "Colon Tumor Tissue"	41388
20	Liver Metastasis from Colon Tumor of UC#3 Patient PCR (OligodT) cDNA library; "High Met Colon Tissue"	30956
21	GRRpz Human Prostate Cell Line; "Normal Prostate"	164801
22	Woca Human Prostate Cancer Cell Line; "Prostate Cancer"	162088

The KM12L4, KM12C, and MDA-MB-231 cell lines are described in Example 1 above. The MCF7 cell line was derived from a pleural effusion of a breast adenocarcinoma and is non-metastatic. The MV-522 cell line is derived from a human lung carcinoma and is of high metastatic potential. The UCP-3 cell line is a low metastatic human lung carcinoma cell line; the MV-522 is a high metastatic variant of UCP-3. These cell lines are well-recognized in the art as models for the study of human breast and lung cancer (see, *e.g.*, Chandrasekaran *et al.*, *Cancer Res.* (1979) *39*:870 (MDA-MB-231 and MCF-7); Gastpar *et al.*, *J Med Chem* (1998) *41*:4965 (MDA-MB-231 and

MCF-7); Ranson *et al*., *Br J Cancer* (1998) *77*:1586 (MDA-MB-231 and MCF-7); Kuang *et al*., *Nucleic Acids Res* (1998) *26*:1116 (MDA-MB-231 and MCF-7), Varki *et al*., *Int J Cancer* (1987) *40*:46 (UCP-3); Varki *et al*., *Tumour Biol* (1990) *11* 327; (MV-522 and UCP-3), Varki *et al*., *Anticancer Res.* (1990) *10*:637; (MV-522); Kelner *et al*., *Anticancer Res* (1995) *15*:867 (MV-522); and Zhang *et al*., *Anticancer Drugs* (1997) *8*:696 (MV522)). The samples of libraries 15-20 are derived from two different patients (UC#2, and UC#3). The bFGF-treated HMEC were prepared by incubation with bFGF at 10ng/ml for 2 hrs; the VEGF-treated HMEC were prepared by incubation with 20ng/ml VEGF for 2 hrs. Following incubation with the respective growth factor, the cells were washed and lysis buffer added for RNA preparation. The GRRpz and WOca cell lines were provided by Dr. Donna M. Peehl, Department of Medicine, Stanford University School of Medicine. GRRpz was derived from normal prostate epithelium. The WOca cell line is a Gleason Grade 4 cell line.

Each of the libraries is composed of a collection of cDNA clones that in turn are representative of the mRNAs expressed in the indicated mRNA source. In order to facilitate the analysis of the millions of sequences in each library, the sequences were assigned to clusters. The concept of "cluster of clones" is derived from a sorting/grouping of cDNA clones based on their hybridization pattern to a panel of roughly 300 7bp oligonucleotide probes (see Drmanac *et al*., *Genomics* (1996) *37*(1):29). Random cDNA clones from a tissue library are hybridized at moderate stringency to 300 7bp oligonucleotides. Each oligonucleotide has some measure of specific hybridization to that specific clone. The combination of 300 of these measures of hybridization for 300 probes equals the "hybridization signature" for a specific clone. Clones with similar sequence will have similar hybridization signatures. By developing a sorting/grouping algorithm to analyze these signatures, groups of clones in a library can be identified and brought together computationally. These groups of clones are termed "clusters". Depending on the stringency of the selection in the algorithm (similar to the stringency of hybridization in a classic library cDNA screening protocol), the "purity" of each cluster can be controlled. For example, artifacts of clustering may occur in computational clustering just as artifacts can occur in "wet-lab" screening of a cDNA library with 400 bp cDNA fragments, at even the highest stringency The stringency used in the implementation of cluster herein provides groups of clones that are in general from the same cDNA or closely related cDNAs. Closely related clones can be a result of different length clones of the same cDNA, closely related clones from highly related gene families, or splice variants of the same cDNA.

Differential expression for a selected cluster was assessed by first determining the number of cDNA clones corresponding to the selected cluster in the first library (Clones in 1st), and the determining the number of cDNA clones corresponding to the selected cluster in the second library

(Clones in 2nd) Differential expression of the selected cluster in the first library relative to the second library is expressed as a "ratio" of percent expression between the two libraries. In general, the "ratio" is calculated by: 1) calculating the percent expression of the selected cluster in the first library by dividing the number of clones corresponding to a selected cluster in the first library by the total number of clones analyzed from the first library, 2) calculating the percent expression of the selected cluster in the second library by dividing the number of clones corresponding to a selected cluster in a second library by the total number of clones analyzed from the second library; 3) dividing the calculated percent expression from the first library by the calculated percent expression from the second library. If the "number of clones" corresponding to a selected cluster in a library is zero, the value is set at 1 to aid in calculation. The formula used in calculating the ratio takes into account the "depth" of each of the libraries being compared, *i.e.*, the total number of clones analyzed in each library.

In general, a polynucleotide is said to be significantly differentially expressed between two samples when the ratio value is greater than at least about 2, preferably greater than at least about 3, more preferably greater than at least about 5 , where the ratio value is calculated using the method described above The significance of differential expression is determined using a z score test (Zar, Biostatistical Analysis, Prentice Hall, Inc., USA, "Differences between Proportions," pp 296-298 (1974).

Examples 5-12: Differential Expression of Polynucleotides of the Invention

A number of polynucleotide sequences have been identified that are differentially expressed between, for example, cells derived from high metastatic potential cancer tissue and low metastatic cancer cells, and between cells derived from high metastatic potential cancer tissue and normal tissue. Evaluation of the levels of expression of the genes corresponding to these sequences can be valuable in diagnosis, prognosis, and/or treatment (*e.g.*, to facilitate rationale design of therapy, monitoring during and after therapy, *etc.*). Moreover, the genes corresponding to differentially expressed sequences described herein can be therapeutic targets due to their involvement in regulation (*e g* , inhibition or promotion) of development of, for example, the metastatic phenotype. For example, sequences that correspond to genes that are increased in expression in high metastatic potential cells relative to normal or non-metastatic tumor cells may encode genes or regulatory sequences involved in processes such as angiogenesis, differentiation, cell replication, and metastasis.

Detection of the relative expression levels of differentially expressed polynucleotides described herein can provide valuable information to guide the clinician in the choice of therapy. For example, a patient sample exhibiting an expression level of one or more of these polynucleotides

that corresponds to a gene that is increased in expression in metastatic or high metastatic potential cells may warrant more aggressive treatment for the patient. In contrast, detection of expression levels of a polynucleotide sequence that corresponds to expression levels associated with that of low metastatic potential cells may warrant a more positive prognosis than the gross pathology would suggest.

A number of polynucleotide sequences of the present invention are differentially expressed between human microvascular endothelial cells (HMEC) that have been treated with growth factors relative to untreated HMEC. Sequences that are differentially expressed between growth factor-treated HMEC and untreated HMEC can represent sequences encoding gene products involved in angiogenesis, metastasis (cell migration), and other development and oncogenic processes For example, sequences that are more highly expressed in HMEC treated with growth factors (such as bFGF or VEGF) relative to untreated HMEC can serve as markers of cancer cells of higher metastatic potential. Detection of expression of these sequences in colon cancer tissue can be valuable in determining diagnostic, prognostic and/or treatment information associated with the prevention of achieving the malignant state in these tissues, and can be important in risk assessment for a patient. A patient sample displaying an increased level of one or more of these polynucleotides may thus warrant closer attention or more frequent screening procedures to catch the malignant state as early as possible.

The differential expression of the polynucleotides described herein can thus be used as, for example, diagnostic markers, prognostic markers, for risk assessment, patient treatment and the like. These polynucleotide sequences can also be used in combination with other known molecular and/or biochemical markers The following examples provide relative expression levels of polynucleotides from specified cell lines and patient tissue samples.

Example 5: High Metastatic Potential Breast Cancer Versus Low Metastatic Breast Cancer Cells

The following tables summarize polynucleotides that represent genes that are differentially expressed between high metastatic potential and low metastatic potential breast cancer cells

Table 5. High metastatic potential breast (lib3) > low metastatic potential (lib4) breast cancer cells

SEQ ID NO:	Lib3 Clones	Lib4 Clones	Lib3/Lib4
1213	40	0	39
1538	60	3	20
1466	14	0	14
1356	10	0	10
1383	10	1	10
1158	10	1	10
441	10	1	10
1338	10	0	10
1426	19	2	9

SEQ ID NO:	Lib3 Clones	Lib4 Clones	Lib3/Lib4
1547	9	1	9
1313	8	1	8
841	8	1	8
1534	8	0	8
1503	8	0	8
829	8	1	8
1408	8	0	8
1447	7	0	7
1389	7	0	7
356	7	0	7
1492	7	0	7
1543	22	3	7
799	7	0	7
1437	6	0	6
1251	6	0	6
972	18	3	6
1482	6	0	6
1299	6	0	6
109	24	4	6
1558	6	0	6
1355	6	0	6
1548	11	2	5
250	10	2	5
919	26	6	4
358	36	12	3
1525	75	28	3
1157	49	17	3

Table 6 Low metastatic potential breast (lib4) > high metastatic potential breast cancer cells (lib3)

SEQ ID NO:	Lib3 Clones	Lib4 Clones	Lib4/Lib3
248	0	58	59
726	1	23	24
14	1	19	19
699	0	14	14
763	1	14	14
20	1	13	13
79	1	13	13
715	0	10	10
991	0	8	8
1199	0	8	8
707	0	7	7
1128	4	26	7
891	0	6	6
1146	2	11	6
731	7	44	6
1518	3	15	5
340	3	13	4
949	4	13	3

SEQ ID NO:	Lib3 Clones	Lib4 Clones	Lib4/Lib3
1247	7	18	3
1185	497	1216	3

Example 6: High Metastatic Potential Lung Cancer Versus Low Metastatic Lung Cancer Cells

The following summarizes polynucleotides that represent genes differentially expressed between high metastatic potential lung cancer cells and low metastatic potential lung cancer cells.

Table 7. High metastatic potential lung (lib8) > low metastatic potential lung (lib9) lung cancer cells

SEQ ID NO:	Lib8 Clones	Lib9 Clones	Lib8/Lib9
150	31	0	43
651	43	2	30
1298	14	1	20
57	11	0	15
625	7	0	10
1322	7	1	10
36	7	0	10
621	18	3	8
215	6	1	8
561	19	4	7
247	5	0	7
199	5	0	7
998	5	0	7
502	5	0	7
1382	8	2	6
1181	17	4	6
1309	8	2	6
1157	15	4	5
1260	14	5	4
1185	710	266	4
1525	21	10	3

Table 8. Low metastatic potential lung (lib9) > high metastatic potential lung (lib8) cancer cells

SEQ ID NO:	Lib8 Clones	Lib9 Clones	Lib9/Lib8
924	1	13	9
822	1	13	9
728	1	12	9
341	1	12	9
1527	3	31	7
698	4	26	5
949	2	15	5
744	3	23	5
973	8	27	2

Example 7. High Metastatic Potential Colon Cancer Versus Low Metastatic Colon Cancer Cells

Tables 9 and 10 summarize polynucleotides that represent genes differentially expressed between high metastatic potential and low metastatic potential colon cancer cells:

Table 9. High metastatic potential (lib1) > low metastatic potential (lib2) colon cancer cells

SEQ ID NO:	Lib1 Clones	Lib2 Clones	Lib1/Lib2
248	67	2	31
87	12	0	11
698	11	0	10
57	13	3	4
924	24	10	2
1249	24	9	2

Table 10. Low metastatic potential (lib2) > high metastatic potential colon cancer (lib1) cells

SEQ ID NO:	Lib1 Clones	Lib2 Clones	Lib2/Lib1
1268	1	17	18
1114	0	15	16
1032	1	14	15
109	5	60	13
973	1	11	12
91	1	11	12
982	0	9	10
1267	3	28	10
93	1	8	9
1556	1	8	9
1251	0	8	9
1206	2	17	9
812	0	8	9
1254	0	7	8
1220	0	7	8
766	0	7	8
1156	0	7	8
1007	0	7	8
981	0	7	8
762	0	7	8
876	0	6	6
1234	2	11	6
1183	0	6	6
1044	2	12	6
785	0	6	6
1069	3	17	6
770	0	6	6
778	0	6	6
792	0	6	6
822	2	10	5
1258	7	23	4
1224	7	17	3

SEQ ID NO:	Lib1 Clones	Lib2 Clones	Lib2/Lib1
984	8	19	3
841	10	28	3
339	14	34	3
1213	11	29	3
1201	5	14	3
1192	22	48	2

Example 8: High Metastatic Potential Colon Cancer Patient Tissue Vs. Normal Patient Tissue

Tables11 summarizes polynucleotides that represent genes differentially expressed between high metastatic potential colon cancer cells and normal colon cells of patient tissue. :

Table 11. High metastatic potential colon tissue (lib17) vs. normal colon tissue (lib15)

SEQ ID NO:	Lib15 Clones	Lib17 Clones	Lib17/Lib15
1422	1	13	12
1132	1	10	9
730	1	9	8
1311	0	7	7
78	9	48	5
822	5	20	4
SEQ ID NO:	**Lib15 Clones**	**Lib17 Clones**	**Lib15/Lib17**
463	8	1	9

Example 9: High Tumor Potential Colon Tissue Vs. Metastasized Colon Cancer Tissue

The following table summarizes polynucleotides that represent genes differentially expressed between high tumor potential colon cancer cels and cells derived from high metastatic potential colon cancer cells of a patient.

Table 12. High tumor potential colon tissue (lib16) vs. high metastatic colon tissue (lib17)

SEQ ID NO:	Lib16 Clones	Lib17 Clones	Lib16/Lib17
1185	14	4	4
SEQ ID NO:	**Lib16 Clones**	**Lib17 Clones**	**Lib17/Lib16**
822	2	20	10

Example 10: High Tumor Potential Colon Cancer Patient Tissue Versus Normal Patient Tissue

Tables 13 and 14 summarize polynucleotides that represent genes differentially expressed between high metastatic potential colon cancer cells and normal colon cells in patient tissue:

Table 13. Higher expression in tumor potential colon tissue (lib16) vs. normal colon tissue (lib15)

SEQ ID NO:	Lib15 Clones	Lib16 Clones	Lib16/Lib15
1311	0	8	8
78	9	28	3

Table 14. Higher expression in normal colon tissue (lib15) vs. tumor potential colon tissue (lib16)

SEQ ID NO:	Lib15 Clones	Lib16 Clones	Lib15/Lib16
463	8	0	8
1099	12	3	4

Example 11: Growth Factor-Stimulated Human Microvascular Endothelial Cells (HMEC) Relative to Untreated HMEC

The following tables summarize polynucleotides that represent genes differentially expressed between growth factor-treated and untreated HMEC.

Table 15. Higher expression in bFGF treated HMEC (lib13) vs. untreated HMEC (lib12)

SEQ ID NO:	Lib12 Clones	Lib13 Clones	Lib13/Lib12
1520	9	23	3
1538	17	35	2

Table 16. Higher expression in VEGF treated HMEC (lib14) vs. untreated HMEC (lib12)

SEQ ID NO:	Lib12 Clones	Lib14 Clones	Lib14/Lib12
1154	2	12	6
1226	2	10	5
1538	17	38	2

Example 12: Polynucleotides Differentially Expressed in Human Prostate Cancer Cells Relative to Normal Human Prostate Cells

The following tables summarize identified polynucleotides that represent genes differentially expressed between prostate cancer cells and normal prostate cells:

Table 17. Higher expression in normal prostate cells (lib21) relative to prostate cancer cells (lib22)

SEQ ID NO:	Lib21 Clones	Lib22 Clones	Lib21/Lib22
1525	6	0	6
248	116	51	2
1203	22	9	2

Table 18 Higher expression in prostate cancer cells (lib22) relative to normal prostate cells (lib21)

SEQ ID NO:	Lib21 Clones	Lib22 Clones	Lib22/Lib21
1213	0	34	35
340	1	12	12
699	0	11	11

Example 13: Differential Expression Across Multiple Libraries

A number of polynucleotide sequences have been identified that represent genes that are differentially expressed across multiple libraries. Expression of these sequences in a tissue or any

origin can be valuable in determining diagnostic, prognostic and/or treatment information associated with the prevention of achieving the malignant state in these tissues, and can be important in risk assessment for a patient. These polynucleotides can also serve as non-tissue specific markers of, for example, risk of metastasis of a tumor. Table 19 summarizes this data.

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Table 19. Genes Differentially Expressed Across Multiple Library Comparisons

SEQ ID NO:	Cell or Tissue Sample and Cancer State Compared	Ratio
57	High Met Lung (lib8) > Low Met Lung (lib9)	15
57	High Met Colon (lib1) > Low Met Colon (lib2)	4
78	High Met Colon Tissue (lib17) > Normal Colon Tissue (lib15)	5
78	Normal Colon Tumor Tissue (lib16) > Normal Colon Tissue (lib15)	3
109	High Met Breast (lib3) > Low Met Breast (lib4)	6
109	Low Met Colon (lib2) > High Met Colon (lib1)	13
248	High Met Colon (lib1) > Low Met Colon (lib2)	31
248	Normal Prostate (lib21) > Prostate Cancer (lib22)	2
248	Low Met Breast (lib4) > High Met Breast (lib3)	59
340	Prostate Cancer (lib22) > Normal Prostate (lib21)	12
340	Low Met Breast (lib4) > High Met Breast (lib3)	4
463	Normal Colon Tissue (lib15) > High Met Colon Tissue (lib17)	9
463	Normal Colon Tissue (lib15) > Normal Colon Tumor Tissue (lib16)	8
698	High Met Colon (lib1) > Low Met Colon (lib2)	10
698	Low Met Lung (lib9) > High Met Lung (lib8)	5
699	Low Met Breast (lib4) > High Met Breast (lib3)	14
699	Prostate Cancer (lib22) > Normal Prostate (lib21)	11
822	High Met Colon Tissue (lib17) > Normal Colon Tumor Tissue (lib16)	10
822	Low Met Lung (lib9) > High Met Lung (lib8)	9
822	Low Met Colon (lib2) > High Met Colon (lib1)	5
822	High Met Colon Tissue (lib17) > Normal Colon Tissue (lib15)	4
841	High Met Breast (lib3) > Low Met Breast (lib4)	8
841	Low Met Colon (lib2) > High Met Colon (lib1)	3
924	High Met Colon (lib1) > Low Met Colon (lib2)	2
924	Low Met Lung (lib9) > High Met Lung (lib8)	9
949	Low Met Lung (lib9) > High Met Lung (lib8)	5
949	Low Met Breast (lib4) > High Met Breast (lib3)	3
973	Low Met Colon (lib2) > High Met Colon (lib1)	12
973	Low Met Lung (lib9) > High Met Lung (lib8)	2
1157	High Met Lung (lib8) > Low Met Lung (lib9)	5
1157	High Met Breast (lib3) > Low Met Breast (lib4)	3
1185	Normal Colon Tumor Tissue (lib16) > High Met Colon Tissue (lib17)	4
1185	High Met Lung (lib8) > Low Met Lung (lib9)	4
1185	Low Met Breast (lib4) > High Met Breast (lib3)	3
1213	High Met Breast (lib3) > Low Met Breast (lib4)	39
1213	Prostate Cancer (lib22) > Normal Prostate (lib21)	35
1213	Low Met Colon (lib2) > High Met Colon (lib1)	3
1251	High Met Breast (lib3) > Low Met Breast (lib4)	6
1251	Low Met Colon (lib2) > High Met Colon (lib1)	9
1311	Normal Colon Tumor Tissue (lib16) > Normal Colon Tissue (lib15)	8

SEQ ID NO:	Cell or Tissue Sample and Cancer State Compared	Ratio
1311	High Met Colon Tissue (lib17) > Normal Colon Tissue (lib15)	7
1525	Normal Prostate (lib21) > Prostate Cancer (lib22)	6
1525	High Met Lung (lib8) > Low Met Lung (lib9)	3
1525	High Met Breast (lib3) > Low Met Breast (lib4)	3
1538	High Met Breast (lib3) > Low Met Breast (lib4)	20
1538	HMEC-VEGF (lib14) > HMEC (lib12)	2
1538	HMEC-bFGF (lib13) > HMEC (lib12)	2

Key for Table 19. High Met = high metastatic potential; Low Met = low metastatic potential; met = metastasized; tumor = non-metastasized tumor; HMEC = human microvascular endothelial cell; bFGF = bFGF treated; VEGF = VEGF treated.

Example 14: Identification of Contiguous Sequences Having a Polynucleotide of the Invention

The novel polynucleotides were used to screen publicly available and proprietary databases to determine if any of the polynucleotides of SEQ ID NOS:2611-2707 would facilitate identification of a contiguous sequence, *e.g.*, the polynucleotides would provide sequence that would result in 5' extension of another DNA sequence, resulting in production of a longer contiguous sequence composed of the provided polynucleotide and the other DNA sequence(s). Contiging was performed using the Gelmerge application (default settings) of GCG from the Univ. of Wisconsin.

Using these parameters, 97 contiged sequences were generated. These contiged sequences are provided as SEQ ID NOS:2611-2707 (see Table 1C). Table 1C provides the SEQ ID NO of the contig sequence, the name of the sequence used to create the contig, and the accession number of the publicly available tentative human consensus (THC) sequence used with the sequence of the corresponding sequence name to provide the contig. The sequence name of Table 1C can be correlated with the SEQ ID NO: of the polynucleotide of the invention using Tables 1A and 1B.

The contiged sequences (SEQ ID NOS.2611-2707) thus represent longer sequences that encompass a polynucleotide sequence of the invention. The contiged sequences were then translated in all three reading frames to determine the best alignment with individual sequences using the BLAST programs as described above. The sequences were masked using the XBLAST program for masking low complexity as described above in Example 1. Several of the contiged sequences were found to encode polypeptides having characteristics of a polypeptide belonging to a known protein families (and thus represent new members of these protein families) and/or comprising a known functional domain (Table 3B, inserted prior to claims). Thus the invention encompasses fragments, fusions, and variants of such polynucleotides that retain biological activity associated with the protein family and/or functional domain identified herein.

Descriptions of the profiles for the indicated protein families and functional domains are provided in Example 3 above. A description of the profile for PR55 is provided below.

Protein Phosphatase 2A Regulatory Subunit PR55 (PR55). Several of the contigs correspond to a sequence encoding a protein comprising a protein phosphatase 2A (PP2A) regulatory subunit PR55. PP2A is a serine/threonine phosphatase involved in many aspects of cellular function including the regulation of metabolic enzymes and proteins involved in signal transduction. PP2A is a trimeric enzyme comprising a core composed of a catalytic subunit associated with a 65 Kd regulatory subunit (PR65, also called subunit A). This complex associates with a third variable subunit (subunit B), which confers distinct properties to the holoenzyme (Mayer-Jaekel et al. *Trends Cell Biol* (1994) 4:287-291). One of the forms of the variable subunit is a 55 Kd protein (PR55) which is highly conserved in mammals and may facilitate substrate recognition or targeting the enzyme complex to the appropriate subcellular compartment. The PR55 subunit comprises two conserved sequences of 15 residues; one located in the N-terminal region, the other in the center of the protein. The consensus patterns are: E-F-D-Y-L-K-S-L-E-I-E-E-K-I-N; and N-[AG]-H-[TA]-Y-H-I-N-S-I-S-[LIVM]-N-S-D.

Those skilled in the art will recognize, or be able to ascertain, using not more than routine experimentation, many equivalents to the specific embodiments of the invention described herein. Such specific embodiments and equivalents are intended to be encompassed by the following claims.

All publications and patent applications cited in this specification are herein incorporated by reference as if each individual publication or patent application were specifically and individually indicated to be incorporated by reference. The citation of any publication is for its disclosure prior to the filing date and should not be construed as an admission that the present invention is not entitled to antedate such publication by virtue of prior invention.

Although the foregoing invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is readily apparent to those of ordinary skill in the art in light of the teachings of this invention that certain changes and modifications may be made thereto without departing from the spirit or scope of the appended claims.

Deposit Information. The following materials were deposited with the American Type Culture Collection (CMCC = Chiron Master Culture Collection).

Table 20. Cell Lines Deposited with ATCC

Cell Line	Deposit Date	ATCC Accession No.	CMCC Accession No.
KM12L4-A	March 19, 1998	CRL-12496	11606
Km12C	May 15, 1998	CRL-12533	11611
MDA-MB-231	May 15, 1998	CRL-12532	10583
MCF-7	October 9, 1998	CRL-12584	10377

In addition, pools of selected clones, as well as libraries containing specific clones, were assigned an "ES" number (internal reference) and deposited with the ATCC. Table 21 below provides the ATCC Accession Nos. of the ES deposits, all of which were deposited on or before May 13, 1999. The names of the clones contained within each of these deposits are provided in the tables numbered 22 and greater (inserted before the claims).

Table 21: Pools of Clones and Libraries Deposited with ATCC on or before May 13, 1999

ES #	ATCC Accession #	ES #	ATCC Accession #	ES #	ATCC Accession #
34	PTA-47	41	PTA-52	48	PTA-49
35	PTA-57	42	PTA-53	49	PTA-66
36	PTA-54	43	PTA-62	50	PTA-50
37	PTA-58	44	PTA-55	51	PTA-65
38	PTA-48	45	PTA-61	52	PTA-46
39	PTA-60	46	PTA-64	53	PTA-51
40	PTA-63	47	PTA-56	54	PTA-59

The deposits described herein are provided merely as convenience to those of skill in the art, and is not an admission that a deposit is required under 35 U.S.C. §112. The sequence of the polynucleotides contained within the deposited material, as well as the amino acid sequence of the polypeptides encoded thereby, are incorporated herein by reference and are controlling in the event of any conflict with the written description of sequences herein. A license may be required to make, use, or sell the deposited material, and no such license is granted hereby.

Retrieval of Individual Clones from Deposit of Pooled Clones. Where the ATCC deposit is composed of a pool of cDNA clones or a library of cDNA clones, the deposit was prepared by first transfecting each of the clones into separate bacterial cells. The clones in the pool or library were then deposited as a pool of equal mixtures in the composite deposit. Particular clones can be obtained from the composite deposit using methods well known in the art. For example, a bacterial cell containing a particular clone can be identified by isolating single colonies, and identifying colonies containing the specific clone through standard colony hybridization techniques, using an oligonucleotide probe or probes designed to specifically hybridize to a sequence of the clone insert (*e.g.*, a probe based upon unmasked sequence of the encoded polynucleotide having the indicated SEQ ID NO). The probe should be designed to have a T_m of approximately 80°C (assuming 2°C for each A or T and 4°C for each G or C). Positive colonies can then be picked, grown in culture, and the recombinant clone isolated. Alternatively, probes designed in this manner can be used to PCR to isolate a nucleic acid molecule from the pooled clones according to methods well known in the art, *e.g.*, by purifying the cDNA from the deposited culture pool, and using the probes in PCR reactions to produce an amplified product having the corresponding desired polynucleotide sequence.

Table 1A

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
1	5/14/98	1487	1	RTA00000608F.d.17.1	M00003981C:E04
2	5/14/98	1487	2	RTA00000589F.n.08.1	M00004182D:H03
3	5/14/98	1487	3	RTA00000589F.p.06.1	M00004223D:D07
4	5/14/98	1487	4	RTA00000597F.b.03.4	M00003770D:C07
5	5/14/98	1487	5	RTA00000608F.k.12.1	M00004029A:E01
6	5/14/98	1487	6	RTA00000585F.h.08.2	M00001432B:H08
7	5/14/98	1487	7	RTA00000585F.h.14.2	M00001433A:C07
8	5/14/98	1487	8	RTA00000609F.f.01.3	M00004060C:A02
9	5/14/98	1487	9	RTA00000588F.j.01.3	M00003835A:E03
10	5/14/98	1487	10	RTA00000596F.b 19 1	M00001663C:C03
11	5/14/98	1487	11	RTA00000585F.m.18.1	M00001444A:A09
12	5/14/98	1487	12	RTA00000596F.m.11.1	M00003753C:B01
13	5/14/98	1487	13	RTA00000589F.k.05.1	M00004133C:B02
14	5/14/98	1487	14	RTA00000589F.a.18.2	M00003984C:F04
15	5/14/98	1487	15	RTA00000585F.g.19.2	M00001431A:E05
16	5/14/98	1487	16	RTA00000595F.c.21.1	M00001598C:D10
17	5/14/98	1487	17	RTA00000584F.n.20.1	M00001406C:A11
18	5/14/98	1487	18	RTA00000611F.o.18.5	M00004204A:D04
19	5/14/98	1487	19	RTA00000597F.f.23.1	M00003787D:A06
20	5/14/98	1487	20	RTA00000585F.p.13.2	M00001452B:H06
21	5/14/98	1487	21	RTA00000583F.f.06.1	M00001348D:H08
22	5/14/98	1487	22	RTA00000585F.h.08.1	M00001432B:H08
23	5/14/98	1487	23	RTA00000589F.n.10.1	M00004184B:F11
24	5/14/98	1487	24	RTA00000614F.k.01.1	M00004465C:B12
25	5/14/98	1487	25	RTA00000587F.p.24.1	M00001584C:A03
26	5/14/98	1487	26	RTA00000587F.g.19.2	M00001548C:A09
27	5/14/98	1487	27	RTA00000612F.c.12.2	M00004222A:H10
28	5/14/98	1487	28	RTA00000589F.f.09.1	M00004064A:B12
29	5/14/98	1487	29	RTA00000586F.k.02.1	M00001490B:G04
30	5/14/98	1487	30	RTA00000609F.b.20.2	M00004050A:F02
31	5/14/98	1487	31	RTA00000584F.m.13.1	M00001402D:C07
32	5/14/98	1487	32	RTA00000614F.i.12.1	M00004447D:D10
33	5/14/98	1487	33	RTA00000608F.m.14.1	M00004035A:A10
34	5/14/98	1487	34	RTA00000608F.m.01.1	M00004033C:D10
35	5/14/98	1487	35	RTA00000597F.o.18.1	M00003819C:E04
36	5/14/98	1487	36	RTA00000584F.g.06.1	M00001390A:C06
37	5/14/98	1487	37	RTA00000609F.a.07.2	M00004046A:F04
38	5/14/98	1487	38	RTA00000607F.o.12.2	M00003961C:G02
39	5/14/98	1487	39	RTA00000597F p.17.1	M00003821C:E04

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
40	5/14/98	1487	40	RTA00000609F.f.16.3	M00004063C:B11
41	5/14/98	1487	41	RTA00000584F.o.04.1	M00001407B:A08
42	5/14/98	1487	42	RTA00000608F.d.21.1	M00003982A:G03
43	5/14/98	1487	43	RTA00000614F.b.23.1	M00004389C:E01
44	5/14/98	1487	44	RTA00000612F.l.04.1	M00004268C:F08
45	5/14/98	1487	45	RTA00000611F.n.20.3	M00004200D:A07
46	5/14/98	1487	46	RTA00000608F.e.01.1	M00003982B:C10
47	5/14/98	1487	47	RTA00000585F.k.21.1	M00001439C:G06
48	5/14/98	1487	48	RTA00000589F.d.07.1	M00004037B:A09
49	5/14/98	1487	49	RTA00000614F.j.07.1	M00004460B:H09
50	5/14/98	1487	50	RTA00000614F.o.08.1	M00004508B:G02
51	5/14/98	1487	51	RTA00000608F.e.11.1	M00003983C:E07
52	5/14/98	1487	52	RTA00000589F.d.08.1	M00004037B:B05
53	5/14/98	1487	53	RTA00000614F.l.09.1	M00004491D:D07
54	5/14/98	1487	54	RTA00000607F.m.15.1	M00003949B:D05
55	5/14/98	1487	55	RTA00000609F.p.17.1	M00004093D:D09
56	5/14/98	1487	56	RTA00000583F.d.22.1	M00001346B:G03
57	5/14/98	1487	57	RTA00000589F.h.07.1	M00004081B:C11
58	5/14/98	1487	58	RTA00000611F.k.19.3	M00004191B:G01
59	5/14/98	1487	59	RTA00000595F.p.10.1	M00001654D:F06
60	5/14/98	1487	60	RTA00000609F.h.01.1	M00004068D:B01
61	5/14/98	1487	61	RTA00000612F.g.24.2	M00004244B:A02
62	5/14/98	1487	62	RTA00000608F.b.10.1	M00003975B:H09
63	5/14/98	1487	63	RTA00000587F.i.12.1	M00001555D:F11
64	5/14/98	1487	64	RTA00000610F.p.02.1	M00004152C:E01
65	5/14/98	1487	65	RTA00000608F.f.15.2	M00003987A:C07
66	5/14/98	1487	66	RTA00000614F.k.11.1	M00004467D:F09
67	5/14/98	1487	67	RTA00000612F.b.10.2	M00004216D:E10
68	5/14/98	1487	68	RTA00000606F.k.11.1	M00003864B:A04
69	5/14/98	1487	69	RTA00000583F.g.18.1	M00001352C:E01
70	5/14/98	1487	70	RTA00000585F.i.13.1	M00001435A:F03
71	5/14/98	1487	71	RTA00000612F.g.11.2	M00004240D:A07
72	5/14/98	1487	72	RTA00000607F.l.05.1	M00003936C:F10
73	5/14/98	1487	73	RTA00000610F.a.11.1	M00004097C:A03
74	5/14/98	1487	74	RTA00000596F.k.09.1	M00003746B:E12
75	5/14/98	1487	75	RTA00000611F.d.11.1	M00004169A:B11
76	5/14/98	1487	76	RTA00000588F.g.06.1	M00003797D:E10
77	5/14/98	1487	77	RTA00000595F.n.15.1	M00001648C:F06
78	5/14/98	1487	78	RTA00000584F.c.22.1	M00001382C:C09
79	5/14/98	1487	79	RTA00000585F.l.17.1	M00001441D:H05

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
80	5/14/98	1487	80	RTA00000608F.k.15.2	M00004029C:B03
81	5/14/98	1487	81	RTA00000597F.g.14.1	M00003789C:E03
82	5/14/98	1487	82	RTA00000588F.n.16.3	M00003906C:H12
83	5/14/98	1487	83	RTA00000606F.o.14.1	M00003886C:D10
84	5/14/98	1487	84	RTA00000608F.n.09.1	M00004037A:A07
85	5/14/98	1487	85	RTA00000613F.h.06.1	M00004329C:F11
86	5/14/98	1487	86	RTA00000587F.l.08.1	M00001564C:D04
87	5/14/98	1487	87	RTA00000590F.d.23.1	M00004350B:F06
88	5/14/98	1487	88	RTA00000609F.i.24.2	M00004073D:E01
89	5/14/98	1487	89	RTA00000614F.j.23.1	M00004465C:B10
90	5/14/98	1487	90	RTA00000587F.p.15.1	M00001582D:B10
91	5/14/98	1487	91	RTA00000640F.a.05.1	M00004190A:A09
92	5/14/98	1487	92	RTA00000609F.k.01.2	M00004077D:D10
93	5/14/98	1487	93	RTA00000589F.e.14.2	M00004054D:D02
94	5/14/98	1487	94	RTA00000586F.a.13.1	M00001455A:E09
95	5/14/98	1487	95	RTA00000590F.d.10.1	M00004337D:G08
96	5/14/98	1487	96	RTA00000608F.i.18.1	M00003998A:D03
97	5/14/98	1487	97	RTA00000608F.m.05.1	M00004034A:E08
98	5/14/98	1487	98	RTA00000597F.p.10.1	M00003820D:E02
99	5/14/98	1487	99	RTA00000585F.n.20.1	M00001446D:B10
100	5/14/98	1487	100	RTA00000584F.a.14.1	M00001377A:D03
101	5/14/98	1487	101	RTA00000609F.p.03.2	M00004092A:C03
102	5/14/98	1487	102	RTA00000606F.f.06.1	M00003841A:E09
103	5/14/98	1487	103	RTA00000609F.o.22.1	M00004091D:D09
104	5/14/98	1487	104	RTA00000587F.d.02.1	M00001537B:C12
105	5/14/98	1487	105	RTA00000612F.n.07.2	M00004277C:H11
106	5/14/98	1487	106	RTA00000606F.p.03.1	M00003888C:E01
107	5/14/98	1487	107	RTA00000589F.g.15.1	M00004076D:B03
108	5/14/98	1487	108	RTA00000610F.b.09.1	M00004102C:F07
109	5/14/98	1487	109	RTA00000603F.a.13.1	M00003820C:A09
110	5/14/98	1487	110	RTA00000606F.o.01.1	M00003883D:C03
111	5/14/98	1487	111	RTA00000589F.c.17.1	M00004030B:C05
112	5/14/98	1487	112	RTA00000589F.k.22.1	M00004140B:B01
113	5/14/98	1487	113	RTA00000585F.k.08.1	M00001438C:H05
114	5/14/98	1487	114	RTA00000595F.a.09.1	M00001586A:F09
115	5/14/98	1487	115	RTA00000597F.g.22.1	M00003790B:F12
116	5/14/98	1487	116	RTA00000597F.c.02.3	M00003773A:C09
117	5/14/98	1487	117	RTA00000587F.b.18.1	M00001530A:D11
118	5/14/98	1487	118	RTA00000606F.a.18.1	M00003824B:D06
119	5/14/98	1487	119	RTA00000612F.j.14.2	M00004260A:B07

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
120	5/14/98	1487	120	RTA00000612F.g.23.3	M00004243C:E10
121	5/14/98	1487	121	RTA00000583F.p.05.1	M00001374C:C09
122	5/14/98	1487	122	RTA00000586F.a.12.1	M00001455A:C03
123	5/14/98	1487	123	RTA00000613F.d.21.1	M00004308A:E06
124	5/14/98	1487	124	RTA00000586F.e.02.2	M00001466C:F02
125	5/14/98	1487	125	RTA00000595F.f.07.1	M00001609A:B12
126	5/14/98	1487	126	RTA00000607F.o.13.2	M00003962B:B09
127	5/14/98	1487	127	RTA00000595F.b.06.1	M00001590D:A07
128	5/14/98	1487	128	RTA00000609F.l.04.2	M00004081C:A01
129	5/14/98	1487	129	RTA00000610F.b.08.1	M00004102B:B04
130	5/14/98	1487	130	RTA00000585F.k.06.1	M00001438B:H06
131	5/14/98	1487	131	RTA00000611F.o.20.5	M00004204B:A04
132	5/14/98	1487	132	RTA00000614F.g.09.1	M00004421A:G04
133	5/14/98	1487	133	RTA00000597F.h.12.1	M00003793C:D11
134	5/14/98	1487	134	RTA00000597F.p.21.1	M00003822A:G05
135	5/14/98	1487	135	RTA00000595F.l.24.2	M00001641B:G05
136	5/14/98	1487	136	RTA00000584F.l.05.1	M00001399C:E10
137	5/14/98	1487	137	RTA00000586F.j.16.1	M00001489B:F08
138	5/14/98	1487	138	RTA00000613F.h.20.1	M00004332B:E11
139	5/14/98	1487	139	RTA00000606F.k.06.1	M00003862C:H10
140	5/14/98	1487	140	RTA00000587F.j.01.1	M00001557C:B08
141	5/14/98	1487	141	RTA00000610F.l.23.1	M00004143A:H07
142	5/14/98	1487	142	RTA00000606F.j.21.1	M00003860B:A07
143	5/14/98	1487	143	RTA00000608F.i.15.1	M00003997D.D07
144	5/14/98	1487	144	RTA00000596F.o.21.1	M00003763D:F06
145	5/14/98	1487	145	RTA00000597F.l.05.1	M00003809B:D08
146	5/14/98	1487	146	RTA00000608F.h.04.1	M00003992D:G01
147	5/14/98	1487	147	RTA00000585F.d.21.1	M00001424A:H09
148	5/14/98	1487	148	RTA00000606F.k.15.1	M00003864C:D09
149	5/14/98	1487	149	RTA00000612F.k.16.2	M00004266A:F10
150	5/14/98	1487	150	RTA00000589F.b.14.1	M00003991B:B05
151	5/14/98	1487	151	RTA00000597F.m.17.1	M00003813D:A06
152	5/14/98	1487	152	RTA00000585F.k.14.1	M00001439B:E02
153	5/14/98	1487	153	RTA00000584F.f.21.1	M00001389B:B06
154	5/14/98	1487	154	RTA00000597F.i.09.1	M00003796C:H03
155	5/14/98	1487	155	RTA00000597F.h.20.1	M00003795A:B01
156	5/14/98	1487	156	RTA00000608F.k.24.1	M00004030B:B02
157	5/14/98	1487	157	RTA00000586F.n.05.1	M00001500B:H07
158	5/14/98	1487	158	RTA00000608F.n.02.1	M00004035D:E04
159	5/14/98	1487	159	RTA00000585F.e.11.2	M00001425C:E10

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
160	5/14/98	1487	160	RTA00000596F.k.08.1	M00003746A:E01
161	5/14/98	1487	161	RTA00000611F.b.14.1	M00004163A:D11
162	5/14/98	1487	162	RTA00000607F.m.10.1	M00003948B:B03
163	5/14/98	1487	163	RTA00000586F.p.01.1	M00001506A:F01
164	5/14/98	1487	164	RTA00000589F.g.08.1	M00004075C:C09
165	5/14/98	1487	165	RTA00000608F.n.19.1	M00004037D:B05
166	5/14/98	1487	166	RTA00000607F.c.16.2	M00003905C:B01
167	5/14/98	1487	167	RTA00000595F.i.09.1	M00001622C:F06
168	5/14/98	1487	168	RTA00000584F.j.10.1	M00001397B:E02
169	5/14/98	1487	169	RTA00000589F.i.13.1	M00004103B:C07
170	5/14/98	1487	170	RTA00000585F.f.04.2	M00001427A:C05
171	5/14/98	1487	171	RTA00000606F.d.24.1	M00003837C.F05
172	5/14/98	1487	172	RTA00000609F.n.22.1	M00004088A:F12
173	5/14/98	1487	173	RTA00000610F.m.14.1	M00004144D:B06
174	5/14/98	1487	174	RTA00000606F.k.17.1	M00003864D:G05
175	5/14/98	1487	175	RTA00000583F.d.06.1	M00001345A:A12
176	5/14/98	1487	176	RTA00000608F.m.09.1	M00004034C:F05
177	5/14/98	1487	177	RTA00000608F.o.17.1	M00004040D:B05
178	5/14/98	1487	178	RTA00000583F.k.15.3	M00001362B:H09
179	5/14/98	1487	179	RTA00000610F.f.16.1	M00004120A:C02
180	5/14/98	1487	180	RTA00000608F.h.19.2	M00003994C:C11
181	5/14/98	1487	181	RTA00000584F.m.07.1	M00001401D:D04
182	5/14/98	1487	182	RTA00000587F.h.20.2	M00001552B:D01
183	5/14/98	1487	183	RTA00000596F.b.01.1	M00001660A:F10
184	5/14/98	1487	184	RTA00000611F.n.13.2	M00004199D:C02
185	5/14/98	1487	185	RTA00000597F.o.06.1	M00003818A:F09
186	5/14/98	1487	186	RTA00000589F.n.03.1	M00004178B:F06
187	5/14/98	1487	187	RTA00000597F.k.07.1	M00003805A:G05
188	5/14/98	1487	188	RTA00000611F.c.19.2	M00004166B:E10
189	5/14/98	1487	189	RTA00000606F.l.12.1	M00003868D:F02
190	5/14/98	1487	190	RTA00000614F.d.22.1	M00004407D:B09
191	5/14/98	1487	191	RTA00000608F.n.16.1	M00004037C:D07
192	5/14/98	1487	192	RTA00000595F.l.20.2	M00001640D:C10
193	5/14/98	1487	193	RTA00000608F.k.22.1	M00004030A:E09
194	5/14/98	1487	194	RTA00000583F.h.23.1	M00001355B:A01
195	5/14/98	1487	195	RTA00000608F.c.23.1	M00003980C:A11
196	5/14/98	1487	196	RTA00000585F.n.01.1	M00001444A:G12
197	5/14/98	1487	197	RTA00000596F.n.08.1	M00003756C:C08
198	5/14/98	1487	198	RTA00000612F.d.16.2	M00004229C:G11
199	5/14/98	1487	199	RTA00000589F.c.19.1	M00004031A:B04

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
200	5/14/98	1487	200	RTA00000584F.j.08.1	M00001397A:F10
201	5/14/98	1487	201	RTA00000583F.j.03.3	M00001358D:D09
202	5/14/98	1487	202	RTA00000597F.j.09.1	M00003801D:F05
203	5/14/98	1487	203	RTA00000614F.n.21.1	M00004506C:H10
204	5/14/98	1487	204	RTA00000606F.d.05.1	M00003833B:A11
205	5/14/98	1487	205	RTA00000589F.d.10.1	M00004038C:D12
206	5/14/98	1487	206	RTA00000597F.p.01.1	M00003820A:H04
207	5/14/98	1487	207	RTA00000586F.l.20.1	M00001496A:B03
208	5/14/98	1487	208	RTA00000607F.c.07.2	M00003903C:A12
209	5/14/98	1487	209	RTA00000595F.b.02.1	M00001589C:D12
210	5/14/98	1487	210	RTA00000597F.n.18.1	M00003816C:F10
211	5/14/98	1487	211	RTA00000612F.d.10 2	M00004228C:D11
212	5/14/98	1487	212	RTA00000609F.n.13.1	M00004086D:A07
213	5/14/98	1487	213	RTA00000610F.b.02.1	M00004101D:A03
214	5/14/98	1487	214	RTA00000590F.a.17.1	M00004249C:E12
215	5/14/98	1487	215	RTA00000587F.i.02.1	M00001553D:B06
216	5/14/98	1487	216	RTA00000583F.p.22.1	M00001376A:H02
217	5/14/98	1487	217	RTA00000609F.d.08.1	M00004054D:A03
218	5/14/98	1487	218	RTA00000609F.k.06.2	M00004078C:A08
219	5/14/98	1487	219	RTA00000585F.i.20.1	M00001435B:G10
220	5/14/98	1487	220	RTA00000585F.e.15.2	M00001426A:F09
221	5/14/98	1487	221	RTA00000595F.c.18.1	M00001597C:B03
222	5/14/98	1487	222	RTA00000596F.p.18.1	M00003766A:G09
223	5/14/98	1487	223	RTA00000611F.l.04.3	M00004193A:C07
224	5/14/98	1487	224	RTA00000614F.o.06.1	M00004508A:G12
225	5/14/98	1487	225	RTA00000586F.o.13.1	M00001504D:D09
226	5/14/98	1487	226	RTA00000612F.o.21.1	M00004283C:D03
227	5/14/98	1487	227	RTA00000585F.k.18.1	M00001439C:A01
228	5/14/98	1487	228	RTA00000611F.o.19.5	M00004204A:D10
229	5/14/98	1487	229	RTA00000611F.l.10.3	M00004193C:H01
230	5/14/98	1487	230	RTA00000612F.b.22.2	M00004217D:G10
231	5/14/98	1487	231	RTA00000583F.n.06.1	M00001370B:B12
232	5/14/98	1487	232	RTA00000611F.p.08.3	M00004206C:G11
233	5/14/98	1487	233	RTA00000607F.e.03.2	M00003909D:G01
234	5/14/98	1487	234	RTA00000607F.b.09.2	M00003896D:B01
235	5/14/98	1487	235	RTA00000585F.j.16.1	M00001436D:C10
236	5/14/98	1487	236	RTA00000607F.g.05.2	M00003915C:G01
237	5/14/98	1487	237	RTA00000586F.o.14.1	M00001505A:E09
238	5/14/98	1487	238	RTA00000607F.h.15.1	M00003920B:A10
239	5/14/98	1487	239	RTA00000586F.m.14.1	M00001499B:H05

	Priority Appln Information				
SEQ ID NO·	Filed	Dkt No.	SEQ ID NO·	Sequence Name	Clone Name
240	5/14/98	1487	240	RTA00000610F.p.17.1	M00004154D:F11
241	5/14/98	1487	241	RTA00000584F.d.11.1	M00001383C:C07
242	5/14/98	1487	242	RTA00000610F.e.07.1	M00004114C:F02
243	5/14/98	1487	243	RTA00000610F.b.17.1	M00004103B:C09
244	5/14/98	1487	244	RTA00000596F.c.05.1	M00001669A:H11
245	5/14/98	1487	245	RTA00000586F.b.17.1	M00001458B:F06
246	5/14/98	1487	246	RTA00000607F.l.16.1	M00003939A:A02
247	5/14/98	1487	247	RTA00000590F.f.18.2	M00004446A:G01
248	5/14/98	1487	248	RTA00000603F.b.07.1	M00004242C:C01
249	5/14/98	1487	249	RTA00000589F.f.11.1	M00004066A:E12
250	5/14/98	1487	250	RTA00000589F.j.09.1	M00004115A:G09
251	5/14/98	1487	251	RTA00000583F.a.18.1	M00001339B:E05
252	5/14/98	1487	252	RTA00000612F f.23.3	M00004239C:C09
253	5/14/98	1487	253	RTA00000597F.o.12.1	M00003818C:E09
254	5/14/98	1487	254	RTA00000607F.b.05.2	M00003896B:F08
255	5/14/98	1487	255	RTA00000607F.e.23.2	M00003912C:C11
256	5/14/98	1487	256	RTA00000586F.m.11 1	M00001499A:D05
257	5/14/98	1487	257	RTA00000585F.g.18.2	M00001431A:C10
258	5/14/98	1487	258	RTA00000614F.d.07.1	M00004403A:B05
259	5/14/98	1487	259	RTA00000606F.c.23.1	M00003832B:G03
260	5/14/98	1487	260	RTA00000609F.d.13.1	M00004055B:F06
261	5/14/98	1487	261	RTA00000606F.c.04.1	M00003829A:E02
262	5/14/98	1487	262	RTA00000587F.f.02.1	M00001542C:F06
263	5/14/98	1487	263	RTA00000585F.e.14.2	M00001426A:C02
264	5/14/98	1487	264	RTA00000584F.o.03.2	M00001406D:H01
265	5/14/98	1487	265	RTA00000614F.m.24.1	M00004501A:G06
266	5/14/98	1487	266	RTA00000586F.j.21.1	M00001489D:C08
267	5/14/98	1487	267	RTA00000585F.d.02.2	M00001421C:A03
268	5/14/98	1487	268	RTA00000597F.o.19.1	M00003819D.G09
269	5/14/98	1487	269	RTA00000613F.h.02 1	M00004328A:H06
270	5/14/98	1487	270	RTA00000612F.m.08.2	M00004273D:E11
271	5/14/98	1487	271	RTA00000606F.g.04.1	M00003844C:H05
272	5/14/98	1487	272	RTA00000608F.h.04.2	M00003992D:G01
273	5/14/98	1487	273	RTA00000609F.e.19.3	M00004059A:G09
274	5/14/98	1487	274	RTA00000613F.c.10.1	M00004297D:B08
275	5/14/98	1487	275	RTA00000587F.d.24.1	M00001539B:B01
276	5/14/98	1487	276	RTA00000597F.a.22.5	M00003769D·G12
277	5/14/98	1487	277	RTA00000595F.m.11.1	M00001644D:F09
278	5/14/98	1487	278	RTA00000613F.k.05.1	M00004346B:D06
279	5/14/98	1487	279	RTA00000611F.n.15 2	M00004200A:G06

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
280	5/14/98	1487	280	RTA00000609F.m.20.2	M00004085B:G06
281	5/14/98	1487	281	RTA00000609F.c.08.1	M00004051C:D10
282	5/14/98	1487	282	RTA00000586F.k.13.1	M00001491C:C01
283	5/14/98	1487	283	RTA00000595F.i.16.1	M00001623D:A09
284	5/14/98	1487	284	RTA00000588F.j.17.3	M00003839D:G06
285	5/14/98	1487	285	RTA00000610F.i.05.1	M00004129A:H08
286	5/14/98	1487	286	RTA00000596F.o.14.1	M00003762A:D11
287	5/14/98	1487	287	RTA00000583F.e.15.1	M00001347B:H01
288	5/14/98	1487	288	RTA00000584F.a.01.2	M00001376B:C11
289	5/14/98	1487	289	RTA00000597F.c.10 4	M00003773D:C02
290	5/14/98	1487	290	RTA00000595F.d.20.1	M00001604B·D09
291	5/14/98	1487	291	RTA00000609F.m.04.2	M00004084A:D11
292	5/14/98	1487	292	RTA00000589F.b.08 1	M00003988C:A06
293	5/14/98	1487	293	RTA00000583F.k.13.3	M00001362B:A09
294	5/14/98	1487	294	RTA00000606F.b.07.1	M00003825C:B02
295	5/14/98	1487	295	RTA00000583F.a.17.1	M00001339B:A03
296	5/14/98	1487	296	RTA00000611F.o.09.5	M00004201D:E12
297	5/14/98	1487	297	RTA00000610F.j.15.1	M00004134C:B11
298	5/14/98	1487	298	RTA00000608F.e.21.1	M00003985A:C01
299	5/14/98	1487	299	RTA00000614F.k.08.1	M00004467A:F09
300	5/14/98	1487	300	RTA00000610F.p.11.1	M00004153D:E06
301	5/14/98	1487	301	RTA00000595F.l.14.1	M00001639A:A04
302	5/14/98	1487	302	RTA00000596F.m.03.1	M00003752A:B06
303	5/14/98	1487	303	RTA00000595F.n.06.2	M00001647C:C07
304	5/14/98	1487	304	RTA00000596F.e.22.2	M00001679C:F03
305	5/14/98	1487	305	RTA00000607F.c.18.2	M00003905C.E10
306	5/14/98	1487	306	RTA00000597F.o.15.1	M00003819A:B09
307	5/14/98	1487	307	RTA00000584F.f.10.1	M00001387D:C07
308	5/14/98	1487	308	RTA00000597F.b.07.5	M00003771A:G09
309	5/14/98	1487	309	RTA00000584F.m.17.1	M00001403B:A01
310	5/14/98	1487	310	RTA00000608F.g.08.2	M00003989C:F01
311	5/14/98	1487	311	RTA00000587F.o.03.1	M00001575A:H02
312	5/14/98	1487	312	RTA00000597F.m.10.1	M00003812D:E08
313	5/14/98	1487	313	RTA00000596F.l.10.1	M00003749D:G07
314	5/14/98	1487	314	RTA00000584F.h.08.1	M00001391D:A07
315	5/14/98	1487	315	RTA00000587F.f.07.1	M00001543A:F01
316	5/14/98	1487	316	RTA00000595F.b.04.1	M00001589D:G10
317	5/14/98	1487	317	RTA00000590F.d.17.1	M00004345A:H06
318	5/14/98	1487	318	RTA00000612F.l.07.2	M00004268D:G07
319	5/14/98	1487	319	RTA00000607F.e.15.2	M00003911C:G05

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
320	5/14/98	1487	320	RTA00000614F.i.23 1	M00004449D:H01
321	5/14/98	1487	321	RTA00000612F.l.08.2	M00004269A:B11
322	5/14/98	1487	322	RTA00000608F.n.23.1	M00004038C:C05
323	5/14/98	1487	323	RTA00000583F.e.11.1	M00001347A:G06
324	5/14/98	1487	324	RTA00000612F.e.10.3	M00004234B:E03
325	5/14/98	1487	325	RTA00000609F.o.20.1	M00004091C:F04
326	5/14/98	1487	326	RTA00000583F.d.19.1	M00001346B:A07
327	5/14/98	1487	327	RTA00000609F.o.16.2	M00004091B:C12
328	5/14/98	1487	328	RTA00000586F.a.23.1	M00001456C:F02
329	5/14/98	1487	329	RTA00000583F.j.04.3	M00001359A:B07
330	5/14/98	1487	330	RTA00000585F.a.02 3	M00001412D:C03
331	5/14/98	1487	331	RTA00000606F.o.02.1	M00003884B:E06
332	5/14/98	1487	332	RTA00000609F.m.09.2	M00004084C:G04
333	5/14/98	1487	333	RTA00000606F.b.10.1	M00003826B:D01
334	5/14/98	1487	334	RTA00000596F.k.19.1	M00003748B:B06
335	5/14/98	1487	335	RTA00000596F.o.17.1	M00003763B:D03
336	5/14/98	1487	336	RTA00000611F.g.23.1	M00004180B:F04
337	5/14/98	1487	337	RTA00000586F.m.05.1	M00001496D:D02
338	5/14/98	1487	338	RTA00000612F.n.03.2	M00004277B:C06
339	5/14/98	1487	339	RTA00000585F.b.18.3	M00001417B:E01
340	5/14/98	1487	340	RTA00000606F.b.03 1	M00003825B:A05
341	5/14/98	1487	341	RTA00000583F.n.05.1	M00001370B:B04
342	5/14/98	1487	342	RTA00000607F.o.10.2	M00003961B:A12
343	5/14/98	1487	343	RTA00000613F.c.13.1	M00004297D:E08
344	5/14/98	1487	344	RTA00000595F.f.14.1	M00001610B:A01
345	5/14/98	1487	345	RTA00000608F.a.10.3	M00003973A:C05
346	5/14/98	1487	346	RTA00000609F.j.05.3	M00004075A·G10
347	5/14/98	1487	347	RTA00000586F.d.01.1	M00001463C:A01
348	5/14/98	1487	348	RTA00000612F.h.03.3	M00004245A:G09
349	5/14/98	1487	349	RTA00000596F.e.18.2	M00001678D:A12
350	5/14/98	1487	350	RTA00000606F.g.18.1	M00003846B:H02
351	5/14/98	1487	351	RTA00000597F.c.07.4	M00003773B:G08
352	5/14/98	1487	352	RTA00000610F.e.15.1	M00004117B:F01
353	5/14/98	1487	353	RTA00000595F.h.07 1	M00001618C:E06
354	5/14/98	1487	354	RTA00000597F.f.17.1	M00003786D:C06
355	5/14/98	1487	355	RTA00000606F.l.10.1	M00003868B:C07
356	5/14/98	1487	356	RTA00000586F.g.20.1	M00001478A:B06
357	5/14/98	1487	357	RTA00000606F.b.05.1	M00003825B:D12
358	5/14/98	1487	358	RTA00000588F.p.09.2	M00003972B:A11
359	5/14/98	1487	359	RTA00000595F.d.05.1	M00001599A:H09

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
360	5/14/98	1487	360	RTA00000587F.n.19.1	M00001572C:E07
361	5/14/98	1487	361	RTA00000590F.a.02.1	M00004240D:E06
362	5/14/98	1487	362	RTA00000587F.m.18.1	M00001569B:F04
363	5/14/98	1487	363	RTA00000583F.k.09.3	M00001362A:C10
364	5/14/98	1487	364	RTA00000608F.a.23.1	M00003974B:A04
365	5/14/98	1487	365	RTA00000597F.e.22.1	M00003784C:B09
366	5/14/98	1487	366	RTA00000583F.e.21.1	M00001348A:G04
367	5/14/98	1487	367	RTA00000607F.e.20.2	M00003912B:G11
368	5/14/98	1487	368	RTA00000614F.b.16.1	M00004388C:D05
369	5/14/98	1487	369	RTA00000587F.b.03.1	M00001518D:A10
370	5/14/98	1487	370	RTA00000609F.f.02.3	M00004060C:A11
371	5/14/98	1487	371	RTA00000587F.c.20.1	M00001536B:B11
372	5/14/98	1487	372	RTA00000612F.h.05.3	M00004245C:A03
373	5/14/98	1487	373	RTA00000596F.i.13.1	M00001693D:F07
374	5/14/98	1487	374	RTA00000585F.f.01.2	M00001426D:D09
375	5/14/98	1487	375	RTA00000611F.m.07.3	M00004196C:G05
376	5/14/98	1487	376	RTA00000606F.b.08.1	M00003825C:B12
377	5/14/98	1487	377	RTA00000609F.b.10.2	M00004048D:A07
378	5/14/98	1487	378	RTA00000609F.g.13.1	M00004067C:D08
379	5/14/98	1487	379	RTA00000587F.l.11.1	M00001565A:A02
380	5/14/98	1487	380	RTA00000608F.h.07.2	M00003993A.E12
381	5/14/98	1487	381	RTA00000596F.m.21.1	M00003754C:F01
382	5/14/98	1487	382	RTA00000586F.p.11.1	M00001506D:A11
383	5/14/98	1487	383	RTA00000610F.c.01.1	M00004104A:H09
384	5/14/98	1487	384	RTA00000597F.n.10 1	M00003815C:A06
385	5/14/98	1487	385	RTA00000595F.c.14.1	M00001597A:C07
386	5/14/98	1487	386	RTA00000586F.j.09.1	M00001488B:G12
387	5/14/98	1487	387	RTA00000608F.l.20.1	M00004032D:D03
388	5/14/98	1487	388	RTA00000613F.g.13.1	M00004324B:D09
389	5/14/98	1487	389	RTA00000587F.j.21.1	M00001561B:C10
390	5/14/98	1487	390	RTA00000583F.l.16.3	M00001365D:H09
391	5/14/98	1487	391	RTA00000614F.d.16.1	M00004406A:H03
392	5/14/98	1487	392	RTA00000610F.j.11.1	M00004134A:F08
393	5/14/98	1487	393	RTA00000611F.j.11.1	M00004188A:E05
394	5/14/98	1487	394	RTA00000609F.p.14.1	M00004093A:F03
395	5/14/98	1487	395	RTA00000597F.l.18.1	M00003811B:E07
396	5/14/98	1487	396	RTA00000585F.h.03.2	M00001432A:F12
397	5/14/98	1487	397	RTA00000607F.h.23.1	M00003920D:D09
398	5/14/98	1487	398	RTA00000607F.f.23.2	M00003915B:G07
399	5/14/98	1487	399	RTA00000607F.f.18.2	M00003915A:D09

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
400	5/14/98	1487	400	RTA00000609F.i.23.2	M00004073D:B11
401	5/14/98	1487	401	RTA00000612F.f.05.3	M00004236D:F04
402	5/14/98	1487	402	RTA00000597F.o.07 1	M00003818B:A01
403	5/14/98	1487	403	RTA00000611F.o.06.5	M00004201D:C11
404	5/14/98	1487	404	RTA00000589F.e.05.2	M00004051C:D02
405	5/14/98	1487	405	RTA00000584F.o.07.1	M00001407D:H11
406	5/14/98	1487	406	RTA00000608F.e.06.1	M00003983A:D02
407	5/14/98	1487	407	RTA00000595F.a.22.1	M00001588D:H08
408	5/14/98	1487	408	RTA00000611F.c.03.2	M00004164D:D02
409	5/14/98	1487	409	RTA00000585F.c.03.2	M00001418A:C02
410	5/14/98	1487	410	RTA00000611F.b.07.1	M00004161B:A12
411	5/14/98	1487	411	RTA00000587F.g 09.2	M00001546B:H01
412	5/14/98	1487	412	RTA00000611F.c.11.2	M00004165C:E09
413	5/14/98	1487	413	RTA00000610F c.18.1	M00004108A:D04
414	5/14/98	1487	414	RTA00000611F.i.21.1	M00004186B:E05
415	5/14/98	1487	415	RTA00000597F.e.11.1	M00003782D:F04
416	5/14/98	1487	416	RTA00000586F.m.02.1	M00001496C:H10
417	5/14/98	1487	417	RTA00000585F.b.20.3	M00001417C:A09
418	5/14/98	1487	418	RTA00000606F.n.15.1	M00003881D:D09
419	5/14/98	1487	419	RTA00000611F.h.17.2	M00004183A:D06
420	5/14/98	1487	420	RTA00000609F.c.15.1	M00004052C:A08
421	5/14/98	1487	421	RTA00000614F.m.10.1	M00004497C:E09
422	5/14/98	1487	422	RTA00000612F.c.08.2	M00004218D:F12
423	5/14/98	1487	423	RTA00000613F.h.22.1	M00004332C:E09
424	5/14/98	1487	424	RTA00000587F.f.05.1	M00001543A:D03
425	5/14/98	1487	425	RTA00000585F.k.04.1	M00001438A:H10
426	5/14/98	1487	426	RTA00000585F.k.15 1	M00001439B:F10
427	5/14/98	1487	427	RTA00000609F.p.04.1	M00004092A:D04
428	5/14/98	1487	428	RTA00000585F.j.01.1	M00001435C:H05
429	5/14/98	1487	429	RTA00000587F.a.20.1	M00001517D:C03
430	5/14/98	1487	430	RTA00000609F.f.04.3	M00004060D:A07
431	5/14/98	1487	431	RTA00000611F.k.13.2	M00004190D:A10
432	5/14/98	1487	432	RTA00000586F.f.08.2	M00001471C:G03
433	5/14/98	1487	433	RTA00000585F.i.14.1	M00001435A:G01
434	5/14/98	1487	434	RTA00000614F.b.08.1	M00004385C:B11
435	5/14/98	1487	435	RTA00000609F.o.04.2	M00004089A:G03
436	5/14/98	1487	436	RTA00000583F.n.03.1	M00001370A:B01
437	5/14/98	1487	437	RTA00000584F.j.05.1	M00001396C:G02
438	5/14/98	1487	438	RTA00000608F.a.16.2	M00003973B:H06
439	5/14/98	1487	439	RTA00000583F.b.15.1	M00001341A:A11

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
440	5/14/98	1487	440	RTA00000596F.a.22.1	M00001659D:G08
441	5/14/98	1487	441	RTA00000589F.c.15.1	M00004030A:G12
442	5/14/98	1487	442	RTA00000610F.o.03.1	M00004149B:H12
443	5/14/98	1487	443	RTA00000596F.e.06.2	M00001677A:A12
444	5/14/98	1487	444	RTA00000607F.p.01.2	M00003965A:F07
445	5/14/98	1487	445	RTA00000611F.c.16.2	M00004166A:F02
446	5/14/98	1487	446	RTA00000611F.b.01.1	M00004159D:H07
447	5/14/98	1487	447	RTA00000612F.b.12.2	M00004217A:A11
448	5/14/98	1487	448	RTA00000584F.h.09.1	M00001391D:A09
449	5/14/98	1487	449	RTA00000612F.g.18.3	M00004242C:C02
450	5/14/98	1487	450	RTA00000609F.b.18.2	M00004049D:G04
451	5/14/98	1487	451	RTA00000608F.f.17 1	M00003987D:F06
452	5/14/98	1487	452	RTA00000589F.e.21.2	M00004058B:F12
453	5/14/98	1487	453	RTA00000606F.j.07.1	M00003857C:A03
454	5/14/98	1487	454	RTA00000610F.b.21.1	M00004103C:F11
455	5/14/98	1487	455	RTA00000611F.c.22.2	M00004166D:G07
456	5/14/98	1487	456	RTA00000583F.d.04.1	M00001344D:G11
457	5/14/98	1487	457	RTA00000610F h.08.1	M00004126B:G02
458	5/14/98	1487	458	RTA00000596F.a.06.1	M00001658B:C07
459	5/14/98	1487	459	RTA00000612F.o.10.2	M00004281B:B05
460	5/14/98	1487	460	RTA00000610F.l.22.1	M00004143A:G12
461	5/14/98	1487	461	RTA00000612F.o.09.2	M00004281B:B03
462	5/14/98	1487	462	RTA00000596F.f.09.2	M00001681A.H09
463	5/14/98	1487	463	RTA00000607F.p.13.2	M00003970A:G10
464	5/14/98	1487	464	RTA00000610F.e.11.1	M00004115C:H04
465	5/14/98	1487	465	RTA00000611F.b.02.1	M00004160A:A01
466	5/14/98	1487	466	RTA00000608F.j.24.1	M00004027C:H01
467	5/14/98	1487	467	RTA00000614F.k.22.1	M00004470C:A02
468	5/14/98	1487	468	RTA00000612F.h.09.3	M00004247A:E01
469	5/14/98	1487	469	RTA00000587F.f.01.1	M00001542C:D10
470	5/14/98	1487	470	RTA00000608F.d.04.1	M00003980C:G10
471	5/14/98	1487	471	RTA00000585F.m.16.2	M00001443D:C03
472	5/14/98	1487	472	RTA00000613F.c.17.1	M00004298B:D04
473	5/14/98	1487	473	RTA00000613F.h.19.1	M00004332B:D02
474	5/14/98	1487	474	RTA00000609F.d.07.1	M00004054B:G02
475	5/14/98	1487	475	RTA00000606F.o.17.1	M00003887B:C03
476	5/14/98	1487	476	RTA00000585F.n.10.1	M00001445B:E03
477	5/14/98	1487	477	RTA00000612F.p.04.2	M00004284B:F07
478	5/14/98	1487	478	RTA00000589F.c.02.1	M00003997B:H04
479	5/14/98	1487	479	RTA00000608F.p.16.1	M00004044A:F08

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
480	5/14/98	1487	480	RTA00000597F.n.12.1	M00003815D.D01
481	5/14/98	1487	481	RTA00000608F.l.10.1	M00004031A:G05
482	5/14/98	1487	482	RTA00000606F.o.05.1	M00003884D:A12
483	5/14/98	1487	483	RTA00000587F j.05.1	M00001558B:A12
484	5/14/98	1487	484	RTA00000584F.d.15.1	M00001384A:C09
485	5/14/98	1487	485	RTA00000612F.n.22.1	M00004279D:E02
486	5/14/98	1487	486	RTA00000585F.m.13 2	M00001443D:A01
487	5/14/98	1487	487	RTA00000586F.m.22.1	M00001500A:D09
488	5/14/98	1487	488	RTA00000608F i.17.1	M00003997D:G11
489	5/14/98	1487	489	RTA00000614F.k.04.1	M00004466A:E09
490	5/14/98	1487	490	RTA00000608F.n.15.1	M00004037C·C05
491	5/14/98	1487	491	RTA00000610F.m.06.1	M00004143C:F08
492	5/14/98	1487	492	RTA00000585F d.12.2	M00001422D:D02
493	5/14/98	1487	493	RTA00000608F.b.19 1	M00003976D:D12
494	5/14/98	1487	494	RTA00000596F.k.06.1	M00003745C:E03
495	5/14/98	1487	495	RTA00000609F.o.14.2	M00004091A:E01
496	5/14/98	1487	496	RTA00000607F.m.14.1	M00003949B:A08
497	5/14/98	1487	497	RTA00000606F.f.08.1	M00003841B:D05
498	5/14/98	1487	498	RTA00000583F.l.14.3	M00001365D:D12
499	5/14/98	1487	499	RTA00000614F.g.04.1	M00004419D:G01
500	5/14/98	1487	500	RTA00000610F.m.21.1	M00004145C:A03
501	5/14/98	1487	501	RTA00000585F.d.16.1	M00001423C:D06
502	5/14/98	1487	502	RTA00000588F.o.05.2	M00003918C:E07
503	5/14/98	1487	503	RTA00000585F.b.04.3	M00001415D:E12
504	5/14/98	1487	504	RTA00000588F.d.21.1	M00001687C.A06
505	5/14/98	1487	505	RTA00000595F.g.16.1	M00001614C:G04
506	5/14/98	1487	506	RTA00000612F.i.18.2	M00004253B:F06
507	5/14/98	1487	507	RTA00000612F.e.12.1	M00004234B:G06
508	5/14/98	1487	508	RTA00000583F.p.08 1	M00001374D:D09
509	5/14/98	1487	509	RTA00000608F.b.04.1	M00003974C:A05
510	5/14/98	1487	510	RTA00000596F.l.07.1	M00003749B:C08
511	5/14/98	1487	511	RTA00000597F.l.02.1	M00003809A:H12
512	5/14/98	1487	512	RTA00000595F.j.05.1	M00001626C:C10
513	5/14/98	1487	513	RTA00000586F k.18.1	M00001491D:E07
514	5/14/98	1487	514	RTA00000608F.p.07.1	M00004041D:E06
515	5/14/98	1487	515	RTA00000596F.m.07 1	M00003752D:D09
516	5/14/98	1487	516	RTA00000588F.l.20.2	M00003859C:B09
517	5/14/98	1487	517	RTA00000614F.a.20.1	M00004383A:F02
518	5/14/98	1487	518	RTA00000597F.i.20 1	M00003799B:D02
519	5/14/98	1487	519	RTA00000611F.n.14.3	M00004200A:A09

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
520	5/14/98	1487	520	RTA00000586F.m.10.1	M00001499A:D01
521	5/14/98	1487	521	RTA00000607F.i.06.4	M00003921D:C06
522	5/14/98	1487	522	RTA00000585F.p.19.2	M00001453B:F08
523	5/14/98	1487	523	RTA00000583F.c.06.1	M00001342C:A04
524	5/14/98	1487	524	RTA00000595F.p.20.1	M00001656D:F11
525	5/14/98	1487	525	RTA00000606F.g.02.1	M00003844C:D04
526	5/14/98	1487	526	RTA00000606F.d.10.1	M00003834A:A03
527	5/14/98	1487	527	RTA00000597F.f.21.1	M00003787B:D07
528	5/14/98	1487	528	RTA00000613F.h.17.1	M00004331D:H08
529	5/14/98	1487	529	RTA00000612F.h.19.3	M00004249D:G02
530	5/14/98	1487	530	RTA00000589F.h.23.1	M00004091B:G04
531	5/14/98	1487	531	RTA00000614F.e.06.1	M00004408D:A10
532	5/14/98	1487	532	RTA00000612F.j.20.2	M00004262C:C01
533	5/14/98	1487	533	RTA00000597F.m.07.1	M00003812B:F08
534	5/14/98	1487	534	RTA00000589F.j.08.1	M00004115A:F01
535	5/14/98	1487	535	RTA00000609F.g.16.1	M00004068A:F02
536	5/14/98	1487	536	RTA00000587F.i.18.1	M00001556D:A11
537	5/14/98	1487	537	RTA00000610F.c.05.1	M00004104D:C09
538	5/14/98	1487	538	RTA00000607F.o.16.2	M00003963B:D12
539	5/14/98	1487	539	RTA00000585F.i.08.1	M00001434C:D05
540	5/14/98	1487	540	RTA00000584F.a.15.2	M00001377A:E01
541	5/14/98	1487	541	RTA00000611F.p.24.2	M00004210A:B09
542	5/14/98	1487	542	RTA00000607F.a.13.3	M00003893C:D12
543	5/14/98	1487	543	RTA00000612F.f.03.1	M00004236D:E07
544	5/14/98	1487	544	RTA00000606F.p 14.1	M00003890B.H07
545	5/14/98	1487	545	RTA00000612F.j.17.2	M00004260C:E10
546	5/14/98	1487	546	RTA00000585F.c.24.2	M00001421A:H07
547	5/14/98	1487	547	RTA00000607F.i.24.2	M00003926B:E03
548	5/14/98	1487	548	RTA00000609F.e.15.3	M00004058C:E08
549	5/14/98	1487	549	RTA00000584F.p.18 1	M00001411C:G02
550	5/14/98	1487	550	RTA00000610F.i.10.1	M00004130C:A09
551	5/14/98	1487	551	RTA00000585F.b.17.3	M00001417B:C07
552	5/14/98	1487	552	RTA00000586F.o.12.1	M00001504C:H11
553	5/14/98	1487	553	RTA00000608F.g.24.1	M00003992C:G01
554	5/14/98	1487	554	RTA00000584F.e.20.1	M00001387A:A04
555	5/14/98	1487	555	RTA00000588F.j.23.3	M00003843A:B01
556	5/14/98	1487	556	RTA00000585F.b.21.3	M00001417C:E02
557	5/14/98	1487	557	RTA00000584F.o.08.1	M00001408A:B02
558	5/14/98	1487	558	RTA00000587F.k.22.1	M00001563C:D06
559	5/14/98	1487	559	RTA00000608F.a.07.3	M00003972C:F02

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
560	5/14/98	1487	560	RTA00000597F.c.04.4	M00003773B:E09
561	5/14/98	1487	561	RTA00000596F.c.06 1	M00001669B:A03
562	5/14/98	1487	562	RTA00000588F.o.01.2	M00003912C.H01
563	5/14/98	1487	563	RTA00000597F.i.16.1	M00003797D:H06
564	5/14/98	1487	564	RTA00000583F.n.07.1	M00001370B:D04
565	5/14/98	1487	565	RTA00000597F.f.07.1	M00003785D:E01
566	5/14/98	1487	566	RTA00000587F.f.06.1	M00001543A:E04
567	5/14/98	1487	567	RTA00000614F.o.11.1	M00004509A:H02
568	5/14/98	1487	568	RTA00000597F.b.16.5	M00003771D:A10
569	5/14/98	1487	569	RTA00000608F.m.19.1	M00004035B:H11
570	5/14/98	1487	570	RTA00000597F k.21.1	M00003808C:D09
571	5/14/98	1487	571	RTA00000584F.o.13.1	M00001409C:D01
572	5/14/98	1487	572	RTA00000588F.n.10.3	M00003895D:A03
573	5/14/98	1487	573	RTA00000589F.h.17.1	M00004089A:F02
574	5/14/98	1487	574	RTA00000609F.h.13.1	M00004069D:G02
575	5/14/98	1487	575	RTA00000608F.p.15.1	M00004043D:C10
576	5/14/98	1487	576	RTA00000595F.l.16.1	M00001640A:F02
577	5/14/98	1487	577	RTA00000585F.j.21.1	M00001437B:B05
578	5/14/98	1487	578	RTA00000595F.o.01.2	M00001649B:E08
579	5/14/98	1487	579	RTA00000606F.c.03.1	M00003829A:B08
580	5/14/98	1487	580	RTA00000583F.n.04.1	M00001370A:G09
581	5/14/98	1487	581	RTA00000596F.p.20.1	M00003766B:G04
582	5/14/98	1487	582	RTA00000611F.c.20.2	M00004166C:A03
583	5/14/98	1487	583	RTA00000584F.l.19.1	M00001399D:F09
584	5/14/98	1487	584	RTA00000589F.p.23.1	M00004239C:A07
585	5/14/98	1487	585	RTA00000607F.c.09.2	M00003903C:H03
586	5/14/98	1487	586	RTA00000585F.p.23.2	M00001453D:F09
587	5/14/98	1487	587	RTA00000596F.j.13.1	M00003741A:E01
588	5/14/98	1487	588	RTA00000584F.m.03.1	M00001400D:B08
589	5/14/98	1487	589	RTA00000595F.o.03.2	M00001649D:H05
590	5/14/98	1487	590	RTA00000589F.j.03.1	M00004109B:A01
591	5/14/98	1487	591	RTA00000610F.c.14.1	M00004107C:A01
592	5/14/98	1487	592	RTA00000614F.f.02.1	M00004412B:E03
593	5/14/98	1487	593	RTA00000608F.b.23.1	M00003977C:A08
594	5/14/98	1487	594	RTA00000597F.i.06.1	M00003796B:C07
595	5/14/98	1487	595	RTA00000609F.n.20.1	M00004087C:F05
596	5/14/98	1487	596	RTA00000597F.c.08.2	M00003773C:G06
597	5/14/98	1487	597	RTA00000612F.c.05.2	M00004218C:G10
598	5/14/98	1487	598	RTA00000589F.o.14.1	M00004202B:A02
599	5/14/98	1487	599	RTA00000609F.h.15.1	M00004071A:H03

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
600	5/14/98	1487	600	RTA00000596F.p.15.1	M00003765D:E02
601	5/14/98	1487	601	RTA00000597F.k.22.1	M00003809A:A12
602	5/14/98	1487	602	RTA00000608F.k.09.1	M00004028C:D01
603	5/14/98	1487	603	RTA00000612F.p.23.2	M00004287C:B06
604	5/14/98	1487	604	RTA00000610F.n.02.1	M00004146D:A07
605	5/14/98	1487	605	RTA00000587F.h.19.2	M00001551D:C12
606	5/14/98	1487	606	RTA00000607F.k.18 1	M00003934D:F01
607	5/14/98	1487	607	RTA00000588F.m.10.3	M00003868D:F07
608	5/14/98	1487	608	RTA00000612F.p.21 1	M00004287B:B12
609	5/14/98	1487	609	RTA00000585F.m.08.1	M00001443A:E02
610	5/14/98	1487	610	RTA00000612F.d.01.1	M00004225D:F01
611	5/14/98	1487	611	RTA00000596F.d.20.1	M00001675C:B03
612	5/14/98	1487	612	RTA00000611F.k.12.2	M00004190C:G07
613	5/14/98	1487	613	RTA00000612F.j.11.2	M00004257C:A08
614	5/14/98	1487	614	RTA00000614F.j.16.1	M00004463C:F11
615	5/14/98	1487	615	RTA00000611F.k.15.3	M00004190D:G12
616	5/14/98	1487	616	RTA00000612F.j.01.2	M00004253D:F09
617	5/14/98	1487	617	RTA00000606F.o.23.1	M00003888B:A10
618	5/14/98	1487	618	RTA00000606F.i.13.1	M00003852D:D03
619	5/14/98	1487	619	RTA00000588F.i.22.3	M00003833D:D06
620	5/14/98	1487	620	RTA00000585F.j.03.1	M00001435D:A06
621	5/14/98	1487	621	RTA00000608F.i.21.1	M00003998A:G12
622	5/14/98	1487	622	RTA00000584F.o.02.1	M00001406D:B06
623	5/14/98	1487	623	RTA00000608F.m.17.1	M00004035B:F05
624	5/14/98	1487	624	RTA00000612F.k.08.2	M00004263D:F06
625	5/14/98	1487	625	RTA00000608F.p.20.1	M00004045A:B12
626	5/14/98	1487	626	RTA00000610F.n.07.1	M00004147A:G03
627	5/14/98	1487	627	RTA00000608F.j.17.1	M00004027A:B10
628	5/14/98	1487	628	RTA00000596F.n.23.1	M00003759A:E10
629	5/14/98	1487	629	RTA00000612F.a.17.2	M00004214A:D03
630	5/14/98	1487	630	RTA00000612F.i.17.2	M00004253B:A10
631	5/14/98	1487	631	RTA00000585F.p.15.2	M00001452D:E05
632	5/14/98	1487	632	RTA00000614F m.15.1	M00004498B:E01
633	5/14/98	1487	633	RTA00000607F.a.08.3	M00003892D:D04
634	5/14/98	1487	634	RTA00000606F.p.16.1	M00003890D:C03
635	5/14/98	1487	635	RTA00000610F.j.12.1	M00004134A:H04
636	5/14/98	1487	636	RTA00000608F.o.16.1	M00004040C:G12
637	5/14/98	1487	637	RTA00000588F.o.20.2	M00003958C:C10
638	5/14/98	1487	638	RTA00000585F.p.06.2	M00001451B:H11
639	5/14/98	1487	639	RTA00000610F.j.05.1	M00004133D:A01

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
640	5/14/98	1487	640	RTA00000606F.e.17.1	M00003839C:B05
641	5/14/98	1487	641	RTA00000609F.n.05.1	M00004086A:A03
642	5/14/98	1487	642	RTA00000614F.p.22.1	M00004609C:C11
643	5/14/98	1487	643	RTA00000585F.h.16.2	M00001433A:F04
644	5/14/98	1487	644	RTA00000611F.n.02.3	M00004198D:H04
645	5/14/98	1487	645	RTA00000614F.p.06.1	M00004605C:A09
646	5/14/98	1487	646	RTA00000584F.l.17.1	M00001399D:F01
647	5/14/98	1487	647	RTA00000584F.p.17.1	M00001411C:F02
648	5/14/98	1487	648	RTA00000595F.l.17.1	M00001640A:F04
649	5/14/98	1487	649	RTA00000583F.h.07.1	M00001353B:D11
650	5/14/98	1487	650	RTA00000585F.l.19 1	M00001442A:D08
651	5/14/98	1487	651	RTA00000610F.i.13 1	M00004130D:E04
652	5/14/98	1487	652	RTA00000608F.n.05.1	M00004036B:F09
653	5/14/98	1487	653	RTA00000612F.m.19.1	M00004276C:E12
654	5/14/98	1487	654	RTA00000595F.h.22.1	M00001621C:A04
655	5/14/98	1487	655	RTA00000608F.j.12.1	M00003999C:C12
656	5/14/98	1487	656	RTA00000608F.k.07.2	M00004028C:B04
657	5/14/98	1487	657	RTA00000608F.o.12.1	M00004040B:B09
658	5/14/98	1487	658	RTA00000597F.a.08.5	M00003767C:F04
659	5/14/98	1487	659	RTA00000585F.i.23.1	M00001435C:G08
660	5/14/98	1487	660	RTA00000586F.j.06.1	M00001487D:G03
661	5/14/98	1487	661	RTA00000608F.b.15.1	M00003976C:C05
662	5/14/98	1487	662	RTA00000609F.h.06.1	M00004069B:B01
663	5/14/98	1487	663	RTA00000612F.h.13.3	M00004248A:G08
664	5/14/98	1487	664	RTA00000611F.j.08 1	M00004187C:H09
665	5/14/98	1487	665	RTA00000609F.j.18.1	M00004076A:E02
666	5/14/98	1487	666	RTA00000608F.p.01.1	M00004041B:F01
667	5/14/98	1487	667	RTA00000584F.m.16.1	M00001402D:H03
668	5/14/98	1487	668	RTA00000589F.d.04.1	M00004036C:D01
669	5/14/98	1487	669	RTA00000612F.p.12.2	M00004285B:E01
670	5/14/98	1487	670	RTA00000589F.e.09.1	M00004052C:B05
671	5/14/98	1487	671	RTA00000584F.m.11.1	M00001402C:E09
672	5/14/98	1487	672	RTA00000595F.i.18.1	M00001624A:A09
673	5/14/98	1487	673	RTA00000609F.k.04.2	M00004078A:F03
674	5/14/98	1487	674	RTA00000611F.n.17.2	M00004200B:B04
675	5/14/98	1487	675	RTA00000595F.j.03.1	M00001626B:H05
676	5/14/98	1487	676	RTA00000611F.o.11.3	M00004202B:F04
677	5/14/98	1487	677	RTA00000597F.e.16.1	M00003783C:A06
678	5/14/98	1487	678	RTA00000583F.d.16.1	M00001346A:B09
679	5/14/98	1487	679	RTA00000589F.l.24.1	M00004159D:C04

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
680	5/14/98	1487	680	RTA00000597F.a.17.2	M00003769B:A04
681	5/14/98	1487	681	RTA00000584F.p.22.1	M00001412A.A11
682	5/14/98	1487	682	RTA00000587F.i.23.1	M00001557B:D10
683	5/14/98	1487	683	RTA00000612F.l.16.2	M00004269D:E08
684	5/14/98	1487	684	RTA00000584F.c.01.1	M00001380C.D10
685	5/14/98	1487	685	RTA00000606F.g.21.1	M00003846D.C12
686	5/14/98	1487	686	RTA00000611F.j.12.1	M00004188A:E10
687	5/14/98	1487	687	RTA00000585F.h.10.2	M00001432C:G01
688	5/14/98	1487	688	RTA00000585F.h.10.1	M00001432C:G01
689	5/14/98	1487	689	RTA00000587F.j.15.1	M00001560C:C01
690	5/14/98	1487	690	RTA00000608F.o.06.1	M00004039D:D03
691	5/14/98	1487	691	RTA00000596F.e.05.2	M00001677A:A06
692	5/14/98	1487	692	RTA00000584F.p.07.1	M00001411A:D01
693	5/14/98	1487	693	RTA00000612F.i.13.2	M00004252D:H08
694	5/14/98	1487	694	RTA00000607F.i.14.4	M00003923A:H07
695	5/14/98	1487	695	RTA00000595F.m.17.2	M00001645B:C09
696	5/14/98	1487	696	RTA00000595F.i.02.1	M00001621D:B09
697	5/14/98	1487	697	RTA00000585F.p.12.2	M00001452B:F09
698	5/14/98	1487	698	RTA00000589F.m.02.1	M00004160A:D07
699	5/14/98	1487	699	RTA00000595F.p.11.1	M00001655A:F07
700	5/14/98	1487	700	RTA00000589F.o.15.1	M00004202B:G09
701	5/14/98	1487	701	RTA00000609F.e.12.3	M00004058B:C11
702	5/14/98	1487	702	RTA00000588F.l.13.2	M00003858A:D01
703	5/14/98	1487	703	RTA00000608F.f.22.2	M00003988B:C10
704	5/14/98	1487	704	RTA00000612F.i.11.2	M00004252D:A07
705	5/14/98	1487	705	RTA00000590F.b.13.1	M00004277D.C08
706	5/14/98	1487	706	RTA00000609F.a.21.2	M00004047B:G09
707	5/14/98	1487	707	RTA00000586F.e.12.1	M00001468D:D11
708	5/14/98	1487	708	RTA00000595F.k.10.1	M00001634C:E12
709	5/14/98	1487	709	RTA00000583F.e.02.1	M00001346C:B07
710	5/14/98	1487	710	RTA00000589F.d.01.1	M00004035D:C05
711	5/14/98	1487	711	RTA00000584F.n.14.1	M00001406A:G12
712	5/14/98	1487	712	RTA00000612F.k.21.2	M00004266B:H06
713	5/14/98	1487	713	RTA00000612F.m.05.1	M00004272D:D02
714	5/14/98	1487	714	RTA00000584F.a.20.2	M00001377C:B08
715	5/14/98	1487	715	RTA00000612F.b.11.2	M00004217A:A05
716	5/14/98	1487	716	RTA00000610F.h.13.1	M00004126D:B11
717	5/14/98	1487	717	RTA00000611F.d.04.1	M00004167C:F10
718	5/14/98	1487	718	RTA00000607F.f.12.2	M00003914C:E03
719	5/14/98	1487	719	RTA00000586F.j.10.1	M00001488B:H02

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
720	5/14/98	1487	720	RTA00000584F.p.20.1	M00001411D:C01
721	5/14/98	1487	721	RTA00000612F.i.19.2	M00004253C:E10
722	5/14/98	1487	722	RTA00000608F.i.09.1	M00003996D:C04
723	5/14/98	1487	723	RTA00000584F.g.09.1	M00001390A:H01
724	5/14/98	1487	724	RTA00000584F.n.12.1	M00001405D:F05
725	5/14/98	1487	725	RTA00000584F.j.12.1	M00001397B:H11
726	5/14/98	1487	726	RTA00000611F.h.21.2	M00004183D:B07
727	5/14/98	1487	727	RTA00000606F.l.23.1	M00003871A:E09
728	5/14/98	1487	728	RTA00000585F.b.01.3	M00001415D:A05
729	5/14/98	1487	729	RTA00000595F.i.13.1	M00001623B:B01
730	5/14/98	1487	730	RTA00000589F.l.22.1	M00004158C:F03
731	5/14/98	1487	731	RTA00000608F.l.14 1	M00004031D·G02
732	5/14/98	1487	732	RTA00000614F.k.18.1	M00004469A:C12
733	5/14/98	1487	733	RTA00000609F g.19.1	M00004068B:D04
734	5/14/98	1487	734	RTA00000606F.g.05 1	M00003845A:A05
735	5/14/98	1487	735	RTA00000585F.i.03.1	M00001434A:A01
736	5/14/98	1487	736	RTA00000590F.a.15.1	M00004247B:C11
737	5/14/98	1487	737	RTA00000612F.j.15.2	M00004260C:A12
738	5/14/98	1487	738	RTA00000612F.g.13.3	M00004241B:B01
739	5/14/98	1487	739	RTA00000606F.d.21.1	M00003835D:H05
740	5/14/98	1487	740	RTA00000584F.b.06.1	M00001378B:F06
741	5/14/98	1487	741	RTA00000614F.e.17.1	M00004410A:E03
742	5/14/98	1487	742	RTA00000612F.a.13.2	M00004213A:H12
743	5/14/98	1487	743	RTA00000585F.o.10.2	M00001448A:D05
744	5/14/98	1487	744	RTA00000588F.i.14.3	M00003830A A10
745	5/14/98	1487	745	RTA00000595F.e.10.1	M00001605D:G01
746	5/14/98	1487	746	RTA00000584F.b.06.2	M00001378B:F06
747	5/14/98	1487	747	RTA00000608F.j.05.1	M00003998C:H10
748	5/14/98	1487	748	RTA00000611F.j.24.2	M00004190A:C12
749	5/14/98	1487	749	RTA00000606F.h 12.1	M00003850B:D11
750	5/14/98	1487	750	RTA00000608F.c.22.1	M00003980B:F12
751	5/14/98	1487	751	RTA00000588F.b.03.1	M00001618B:F02
752	5/15/98	1488	1	RTA00000623F.c.23.1	M00007118C:G2
753	5/15/98	1488	2	RTA00000592F.e.05.1	M00005799C:C12
754	5/15/98	1488	3	RTA00000590F.p.04.1	M00005390B:G10
755	5/15/98	1488	4	RTA00000621F.m.13.1	M00006986C:G11
756	5/15/98	1488	5	RTA00000625F.n.12.1	M00006604C:H10
757	5/15/98	1488	6	RTA00000624F.b.01.1	M00005539D:G7
758	5/15/98	1488	7	RTA00000618F.h.12.1	M00006698B:E6
759	5/15/98	1488	8	RTA00000615F.h.16.1	M00005015D:D11

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
760	5/15/98	1488	9	RTA00000618F.l.23.1	M00006721C:G7
761	5/15/98	1488	10	RTA00000619F.n.10.3	M00006820A:G5
762	5/15/98	1488	11	RTA00000621F.o.06.1	M00006992C:G2
763	5/15/98	1488	12	RTA00000619F.c.17.1	M00006756D:E10
764	5/15/98	1488	13	RTA00000615F.i.14.1	M00005294D:H2
765	5/15/98	1488	14	RTA00000617F.k.23.1	M00005496D:A10
766	5/15/98	1488	15	RTA00000623F.e.05.1	M00007125D·E3
767	5/15/98	1488	16	RTA00000617F.c 04.1	M00005456B:B7
768	5/15/98	1488	17	RTA00000623F.a.23.1	M00007107A:D11
769	5/15/98	1488	18	RTA00000619F.f.15.1	M00006770B:C5
770	5/15/98	1488	19	RTA00000626F.f.07.1	M00006650A:A10
771	5/15/98	1488	20	RTA00000624F.h.14.1	M00005621D:F1
772	5/15/98	1488	21	RTA00000617F.f.09.2	M00005469D:C11
773	5/15/98	1488	22	RTA00000620F.b.02.1	M00006835B·F4
774	5/15/98	1488	23	RTA00000616F.k.05 1	M00005415D·G2
775	5/15/98	1488	24	RTA00000617F.a.01.1	M00005447B:D2
776	5/15/98	1488	25	RTA00000592F.f.23.1	M00006587A:H8
777	5/15/98	1488	26	RTA00000623F.h.17.1	M00007150A:C9
778	5/15/98	1488	27	RTA00000622F.b.02.1	M00007010B:H1
779	5/15/98	1488	28	RTA00000621F.p.05.1	M00006995C:A2
780	5/15/98	1488	29	RTA00000620F.j.05.1	M00006884D:D6
781	5/15/98	1488	30	RTA00000623F.h.20.1	M00007150A:H6
782	5/15/98	1488	31	RTA00000590F.p.21.1	M00005399A:D1
783	5/15/98	1488	32	RTA00000622F.c.03 1	M00007013B:F2
784	5/15/98	1488	33	RTA00000623F.f.06.1	M00007132B:B11
785	5/15/98	1488	34	RTA00000617F.e.23.2	M00005468A:D8
786	5/15/98	1488	35	RTA00000623F.n.17.1	M00007204C:F9
787	5/15/98	1488	36	RTA00000619F.a.12.1	M00006743B:G12
788	5/15/98	1488	37	RTA00000621F.n.06.1	M00006989B:C11
789	5/15/98	1488	38	RTA00000623F.a.18 1	M00007105D:C7
790	5/15/98	1488	39	RTA00000624F.a.15.1	M00005534B:H10
791	5/15/98	1488	40	RTA00000625F.h.04.1	M00005810C:D4
792	5/15/98	1488	41	RTA00000591F.g.05.1	M00005460B:D2
793	5/15/98	1488	42	RTA00000620F.i.14.1	M00006882A:D1
794	5/15/98	1488	43	RTA00000624F.a.14.1	M00005534A:G6
795	5/15/98	1488	44	RTA00000621F.h.14.1	M00006960D:E6
796	5/15/98	1488	45	RTA00000617F.k.19.1	M00005494D:F11
797	5/15/98	1488	46	RTA00000625F.d.17.1	M00005763B:H9
798	5/15/98	1488	47	RTA00000620F.l.13.1	M00006901D:A11
799	5/15/98	1488	48	RTA00000623F.g.04.1	M00007140A:F11

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
800	5/15/98	1488	49	RTA00000622F.b.03.1	M00007010B:H3
801	5/15/98	1488	50	RTA00000615F.k.17 1	M00005342A:C4
802	5/15/98	1488	51	RTA00000618F.m.11.1	M00006725A:A3
803	5/15/98	1488	52	RTA00000618F.e.06.1	M00006686A:G12
804	5/15/98	1488	53	RTA00000619F.k.08.1	M00006805B:C4
805	5/15/98	1488	54	RTA00000590F.h.23.2	M00004840C:F2
806	5/15/98	1488	55	RTA00000622F.c.09.1	M00007014C:B7
807	5/15/98	1488	56	RTA00000619F.h.17.1	M00006785B:F9
808	5/15/98	1488	57	RTA00000617F d.01.1	M00005460A:B10
809	5/15/98	1488	58	RTA00000620F.b.17.1	M00006837C:G6
810	5/15/98	1488	59	RTA00000616F.c.13.1	M00005383D:D6
811	5/15/98	1488	60	RTA00000619F.g.16.1	M00006779B:A11
812	5/15/98	1488	61	RTA00000591F.i.12.1	M00005480A:H12
813	5/15/98	1488	62	RTA00000615F.b.20.1	M00004846A:D2
814	5/15/98	1488	63	RTA00000615F.l.18.1	M00005352C:G9
815	5/15/98	1488	64	RTA00000591F.m.19.1	M00005519B:H4
816	5/15/98	1488	65	RTA00000620F.i.10.1	M00006879A:H11
817	5/15/98	1488	66	RTA00000618F.o.02.1	M00006733D:G12
818	5/15/98	1488	67	RTA00000620F.c.18.1	M00006846A:B1
819	5/15/98	1488	68	RTA00000624F.a.07.1	M00005530B:D3
820	5/15/98	1488	69	RTA00000592F.c.10.1	M00005704A:B11
821	5/15/98	1488	70	RTA00000618F.c.04.1	M00006676B:F11
822	5/15/98	1488	71	RTA00000591F.f.04.1	M00005452C:A2
823	5/15/98	1488	72	RTA00000617F.k.22.1	M00005496C:A1
824	5/15/98	1488	73	RTA00000626F.e.02.1	M00006644A:B11
825	5/15/98	1488	74	RTA00000592F.d.09.1	M00005765C:C4
826	5/15/98	1488	75	RTA00000615F.n.23.1	M00005359D:H8
827	5/15/98	1488	76	RTA00000591F.i.15 1	M00005480C:B12
828	5/15/98	1488	77	RTA00000624F.a.11.1	M00005531B:A3
829	5/15/98	1488	78	RTA00000590F.i.01.1	M00004841C:B9
830	5/15/98	1488	79	RTA00000626F.d.05.1	M00006640A:B1
831	5/15/98	1488	80	RTA00000591F.e.19.1	M00005450A:B10
832	5/15/98	1488	81	RTA00000625F.m.06.1	M00006594A:E8
833	5/15/98	1488	82	RTA00000615F.k.22.1	M00005342B:G10
834	5/15/98	1488	83	RTA00000615F.m.11.1	M00005354C:E2
835	5/15/98	1488	84	RTA00000624F.j.16.1	M00005631A:A11
836	5/15/98	1488	85	RTA00000626F.d.07.1	M00006640B:F5
837	5/15/98	1488	86	RTA00000620F.p.19.1	M00006923C:B1
838	5/15/98	1488	87	RTA00000615F.f.10.1	M00004999A:F1
839	5/15/98	1488	88	RTA00000615F.b.19.1	M00004845D:E11

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
840	5/15/98	1488	89	RTA00000626F.a.07.1	M00006626A:G11
841	5/15/98	1488	90	RTA00000592F.b.20.1	M00005685B:D8
842	5/15/98	1488	91	RTA00000622F.p.16.1	M00007100C:D1
843	5/15/98	1488	92	RTA00000620F a.16.1	M00006834A:C8
844	5/15/98	1488	93	RTA00000623F.e.21.1	M00007130B:B3
845	5/15/98	1488	94	RTA00000619F k.05.1	M00006805A:E11
846	5/15/98	1488	95	RTA00000626F.c.10.1	M00006636D:A5
847	5/15/98	1488	96	RTA00000619F.i.13.1	M00006791B:B8
848	5/15/98	1488	97	RTA00000620F.k.22 1	M00006895D:E10
849	5/15/98	1488	98	RTA00000617F.a.17.1	M00005450D:D2
850	5/15/98	1488	99	RTA00000617F c 18.1	M00005457D:C8
851	5/15/98	1488	100	RTA00000626F.g.12.1	M00006664B:B4
852	5/15/98	1488	101	RTA00000617F.j.11.1	M00005489A:F6
853	5/15/98	1488	102	RTA00000621F.c.11.1	M00006936B:E9
854	5/15/98	1488	103	RTA00000623F.f.12.1	M00007134B·G7
855	5/15/98	1488	104	RTA00000626F.g.17.1	M00006665A:F7
856	5/15/98	1488	105	RTA00000619F.o.06.4	M00006823D:D12
857	5/15/98	1488	106	RTA00000625F.j.10.1	M00005837A:D12
858	5/15/98	1488	107	RTA00000620F.k.12.1	M00006893C:F2
859	5/15/98	1488	108	RTA00000625F.j.06.1	M00005828D:C9
860	5/15/98	1488	109	RTA00000616F.b.12.1	M00005378A:A8
861	5/15/98	1488	110	RTA00000620F.d.04.1	M00006850C:G7
862	5/15/98	1488	111	RTA00000624F.n.20.1	M00005655D:C4
863	5/15/98	1488	112	RTA00000620F.m.14 1	M00006907C:D3
864	5/15/98	1488	113	RTA00000625F.m.15.1	M00006596D·H4
865	5/15/98	1488	114	RTA00000619F.g.19.1	M00006779D:D3
866	5/15/98	1488	115	RTA00000626F.b.10.1	M00006633D:A6
867	5/15/98	1488	116	RTA00000618F.c.23.1	M00006679C:D7
868	5/15/98	1488	117	RTA00000591F.o.17.1	M00005616B:D5
869	5/15/98	1488	118	RTA00000615F.b.23.1	M00004846D:H9
870	5/15/98	1488	119	RTA00000616F.e.20.1	M00005394A:G7
871	5/15/98	1488	120	RTA00000625F.b.23.1	M00005720B:D9
872	5/15/98	1488	121	RTA00000616F.i.13.4	M00005409D:C2
873	5/15/98	1488	122	RTA00000624F.l.02.1	M00005637D:C5
874	5/15/98	1488	123	RTA00000619F.b.06.1	M00006745D:E8
875	5/15/98	1488	124	RTA00000626F.b.23.1	M00006636A.E6
876	5/15/98	1488	125	RTA00000615F.k.24.1	M00005342D:F3
877	5/15/98	1488	126	RTA00000621F.h.22.1	M00006963A:H11
878	5/15/98	1488	127	RTA00000626F.b.05.1	M00006631D:C4
879	5/15/98	1488	128	RTA00000621F.i.20.2	M00006966D:G3

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
880	5/15/98	1488	129	RTA00000624F.m.10.1	M00005646D:B3
881	5/15/98	1488	130	RTA00000623F.m.19.1	M00007198C:A10
882	5/15/98	1488	131	RTA00000622F.c.12.1	M00007014D:D4
883	5/15/98	1488	132	RTA00000617F.i.08.1	M00005483D:A2
884	5/15/98	1488	133	RTA00000625F.b.07.1	M00005710A.C8
885	5/15/98	1488	134	RTA00000620F.f.23.1	M00006867C:E7
886	5/15/98	1488	135	RTA00000620F.f.15.1	M00006866C:F3
887	5/15/98	1488	136	RTA00000621F.k 17 1	M00006974B:D6
888	5/15/98	1488	137	RTA00000625F.h.18.1	M00005813D:F6
889	5/15/98	1488	138	RTA00000622F.p.17.1	M00007101A:A11
890	5/15/98	1488	139	RTA00000620F.d.08.1	M00006851C·H9
891	5/15/98	1488	140	RTA00000621F.i.14.2	M00006966B:B9
892	5/15/98	1488	141	RTA00000625F.j.19.1	M00006576D:F11
893	5/15/98	1488	142	RTA00000618F.o.23.1	M00006737C:A8
894	5/15/98	1488	143	RTA00000618F.m.12.1	M00006725A:B3
895	5/15/98	1488	144	RTA00000625F.o.19.1	M00006616D:C8
896	5/15/98	1488	145	RTA00000619F.a.18.1	M00006744C:C6
897	5/15/98	1488	146	RTA00000624F.c.15.1	M00005565C:A8
898	5/15/98	1488	147	RTA00000617F.e.13.2	M00005465C:H2
899	5/15/98	1488	148	RTA00000592F.j.06.1	M00006664D:H9
900	5/15/98	1488	149	RTA00000615F.n.18.1	M00005359B:G1
901	5/15/98	1488	150	RTA00000624F.c.02.1	M00005550B:D9
902	5/15/98	1488	151	RTA00000620F.j.10.1	M00006886A:D6
903	5/15/98	1488	152	RTA00000620F.e.07.1	M00006860B:H1
904	5/15/98	1488	153	RTA00000625F.g.07.1	M00005798B:C11
905	5/15/98	1488	154	RTA00000617F.d.22.1	M00005462C:B2
906	5/15/98	1488	155	RTA00000622F.a.12.1	M00007006D:D4
907	5/15/98	1488	156	RTA00000620F.i.11.1	M00006879D:A10
908	5/15/98	1488	157	RTA00000616F.k.03.1	M00005415C:G8
909	5/15/98	1488	158	RTA00000624F.k.17.1	M00005636C:D11
910	5/15/98	1488	159	RTA00000615F.f.11.1	M00004999B:D12
911	5/15/98	1488	160	RTA00000620F.o.07.1	M00006917C.E7
912	5/15/98	1488	161	RTA00000617F.k.11.1	M00005493B:C8
913	5/15/98	1488	162	RTA00000622F.g.04.1	M00007037B:D4
914	5/15/98	1488	163	RTA00000591F.n.04.1	M00005528D:H6
915	5/15/98	1488	164	RTA00000625F.a.16.1	M00005706D:A9
916	5/15/98	1488	165	RTA00000620F.m.18.1	M00006908C:A5
917	5/15/98	1488	166	RTA00000620F.a.04.1	M00006832D:F10
918	5/15/98	1488	167	RTA00000624F.j.20.1	M00005632C:D6
919	5/15/98	1488	168	RTA00000590F.n.19 1	M00005378C:A10

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
920	5/15/98	1488	169	RTA00000626F.c.13.1	M00006636D:F11
921	5/15/98	1488	170	RTA00000617F.f.01.2	M00005468B:D4
922	5/15/98	1488	171	RTA00000621F.i.18.2	M00006966C:B7
923	5/15/98	1488	172	RTA00000617F.a.13.1	M00005450A:A2
924	5/15/98	1488	173	RTA00000591F.m.06.1	M00005513A:D8
925	5/15/98	1488	174	RTA00000615F.g.07.1	M00005004B:C11
926	5/15/98	1488	175	RTA00000616F.o.24.1	M00005442D:C5
927	5/15/98	1488	176	RTA00000617F.a.20.1	M00005451A:E3
928	5/15/98	1488	177	RTA00000626F.a.18.1	M00006629D:D4
929	5/15/98	1488	178	RTA00000616F.c.23.1	M00005385C:D8
930	5/15/98	1488	179	RTA00000623F.m.07.1	M00007193D:A4
931	5/15/98	1488	180	RTA00000620F.h.18.1	M00006875D:D10
932	5/15/98	1488	181	RTA00000615F.l.16.1	M00005352B:D2
933	5/15/98	1488	182	RTA00000592F.c.17 1	M00005708D:B3
934	5/15/98	1488	183	RTA00000616F.c.24.1	M00005385C:G5
935	5/15/98	1488	184	RTA00000619F.l.16.1	M00006813A:C4
936	5/15/98	1488	185	RTA00000622F.c.18.1	M00007015C:G5
937	5/15/98	1488	186	RTA00000620F.p.09.1	M00006921B:E3
938	5/15/98	1488	187	RTA00000626F.f.08.1	M00006650A:B11
939	5/15/98	1488	188	RTA00000621F.h.08.1	M00006960A:G11
940	5/15/98	1488	189	RTA00000591F.g.19 1	M00005466A:F12
941	5/15/98	1488	190	RTA00000623F.m.10.1	M00007195B:B2
942	5/15/98	1488	191	RTA00000619F.j.13.1	M00006796A:H10
943	5/15/98	1488	192	RTA00000619F.f.22.1	M00006771A:H7
944	5/15/98	1488	193	RTA00000622F.m.06.1	M00007075C:D8
945	5/15/98	1488	194	RTA00000623F.i.03.1	M00007154A:E4
946	5/15/98	1488	195	RTA00000625F.k.08.1	M00006581D:H8
947	5/15/98	1488	196	RTA00000615F.c.13 1	M00004854A:C9
948	5/15/98	1488	197	RTA00000619F.j.11.1	M00006796A:C3
949	5/15/98	1488	198	RTA00000619F.o.01.1	M00006822D:F7
950	5/15/98	1488	199	RTA00000590F.h.12.2	M00004826A:E9
951	5/15/98	1488	200	RTA00000623F.d.07.1	M00007121C:H1
952	5/15/98	1488	201	RTA00000616F.f.24.1	M00005397C:B3
953	5/15/98	1488	202	RTA00000625F.o.03.1	M00006609A:G10
954	5/15/98	1488	203	RTA00000619F.k.20.1	M00006807D:D8
955	5/15/98	1488	204	RTA00000625F.n.22.1	M00006607B:F4
956	5/15/98	1488	205	RTA00000625F.n.03.1	M00006601D:F4
957	5/15/98	1488	206	RTA00000619F.c.13.1	M00006756B:B8
958	5/15/98	1488	207	RTA00000625F.g.21.1	M00005805D:E6
959	5/15/98	1488	208	RTA00000620F.g.06.1	M00006868D:E2

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
960	5/15/98	1488	209	RTA00000622F.l.04.1	M00007065B:B12
961	5/15/98	1488	210	RTA00000624F.d.21.1	M00005587B:H2
962	5/15/98	1488	211	RTA00000622F.f.20.1	M00007036A:D2
963	5/15/98	1488	212	RTA00000616F.d.09.1	M00005388A:F7
964	5/15/98	1488	213	RTA00000620F.n.05.1	M00006912B:E1
965	5/15/98	1488	214	RTA00000624F.k.22.1	M00005637B:D12
966	5/15/98	1488	215	RTA00000618F.p.11.1	M00006739B:B12
967	5/15/98	1488	216	RTA00000615F.g.09.1	M00005005C:E6
968	5/15/98	1488	217	RTA00000618F.j.23.1	M00006712B·H10
969	5/15/98	1488	218	RTA00000617F.l.02.1	M00005497B:H7
970	5/15/98	1488	219	RTA00000617F.l.09.1	M00005498B:F8
971	5/15/98	1488	220	RTA00000625F.n.21.1	M00006607B:E3
972	5/15/98	1488	221	RTA00000623F.c.20.1	M00007118B:B4
973	5/15/98	1488	222	RTA00000603F d.13.1	M00007019A:B1
974	5/15/98	1488	223	RTA00000625F k.06 1	M00006581C:D2
975	5/15/98	1488	224	RTA00000624F.b.23.1	M00005548B:E3
976	5/15/98	1488	225	RTA00000626F.d.11 1	M00006640D:H8
977	5/15/98	1488	226	RTA00000620F.g.14.1	M00006870C:H6
978	5/15/98	1488	227	RTA00000621F.l.17.1	M00006980A:F2
979	5/15/98	1488	228	RTA00000624F.o.13.1	M00005685A:A4
980	5/15/98	1488	229	RTA00000621F.k.18.1	M00006974B:F6
981	5/15/98	1488	230	RTA00000591F.a.23.1	M00005411D:A3
982	5/15/98	1488	231	RTA00000592F.i.01.1	M00006641C:H2
983	5/15/98	1488	232	RTA00000625F.p.10.1	M00006619B:C11
984	5/15/98	1488	233	RTA00000622F h.04 1	M00007041B:C5
985	5/15/98	1488	234	RTA00000591F.e.08.1	M00005446A.G1
986	5/15/98	1488	235	RTA00000619F.d.13.1	M00006758D:C4
987	5/15/98	1488	236	RTA00000622F.p.10.1	M00007099A:F9
988	5/15/98	1488	237	RTA00000623F.m.04.1	M00007192C:H8
989	5/15/98	1488	238	RTA00000617F.i.06.1	M00005483A:F5
990	5/15/98	1488	239	RTA00000624F.d.24.1	M00005589C:B3
991	5/15/98	1488	240	RTA00000616F.p.08.1	M00005444B:E11
992	5/15/98	1488	241	RTA00000615F.j.18.1	M00005326B:F3
993	5/15/98	1488	242	RTA00000625F.p.19.1	M00006621A:G10
994	5/15/98	1488	243	RTA00000624F.h.09.1	M00005620C:C5
995	5/15/98	1488	244	RTA00000619F.d.23.1	M00006760D:G12
996	5/15/98	1488	245	RTA00000618F.f.24.1	M00006692B:E4
997	5/15/98	1488	246	RTA00000617F.l.12.1	M00005498C:G5
998	5/15/98	1488	247	RTA00000621F.o.09.1	M00006993B:B9
999	5/15/98	1488	248	RTA00000616F.p.04.1	M00005443D:C12

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
1000	5/15/98	1488	249	RTA00000620F.c.08.1	M00006841D.A8
1001	5/15/98	1488	250	RTA00000625F.n.01.1	M00006601C A7
1002	5/15/98	1488	251	RTA00000617F.k.10 1	M00005493B:A12
1003	5/15/98	1488	252	RTA00000624F.l 11.1	M00005641B:E2
1004	5/15/98	1488	253	RTA00000624F.h.06.1	M00005619C:H10
1005	5/15/98	1488	254	RTA00000624F.h.11 1	M00005621A:G10
1006	5/15/98	1488	255	RTA00000590F.h.07.2	M00004824C·G9
1007	5/15/98	1488	256	RTA00000590F.o.09.1	M00005384A:A1
1008	5/15/98	1488	257	RTA00000620F.e.16.1	M00006863B:E6
1009	5/15/98	1488	258	RTA00000620F.k.11.1	M00006893C:B2
1010	5/15/98	1488	259	RTA00000619F.o.18.4	M00006825C.D6
1011	5/15/98	1488	260	RTA00000621F.k.03.1	M00006972A:F10
1012	5/15/98	1488	261	RTA00000625F.c.11.1	M00005722D:G3
1013	5/15/98	1488	262	RTA00000618F.n.05.1	M00006727B:G8
1014	5/15/98	1488	263	RTA00000623F.d.02.1	M00007119B:H10
1015	5/15/98	1488	264	RTA00000615F.k.05.1	M00005330C:F9
1016	5/15/98	1488	265	RTA00000623F.f.09.1	M00007132D:G8
1017	5/15/98	1488	266	RTA00000622F.d.01.1	M00007016C:E6
1018	5/15/98	1488	267	RTA00000618F.p.10.1	M00006739B:B10
1019	5/15/98	1488	268	RTA00000624F.l 23.1	M00005645D:F8
1020	5/15/98	1488	269	RTA00000619F.e.19.1	M00006764B:D5
1021	5/15/98	1488	270	RTA00000622F.h.12.1	M00007043A:B5
1022	5/15/98	1488	271	RTA00000622F.i.23.1	M00007051D:D9
1023	5/15/98	1488	272	RTA00000624F.l.13.1	M00005642B:C3
1024	5/15/98	1488	273	RTA00000624F.a.04.1	M00005528D:A10
1025	5/15/98	1488	274	RTA00000622F.e.17 1	M00007031C:D1
1026	5/15/98	1488	275	RTA00000590F.l.12.1	M00005353B:B9
1027	5/15/98	1488	276	RTA00000626F.f.01.1	M00006648C:E4
1028	5/15/98	1488	277	RTA00000620F.a.05.1	M00006832D:F11
1029	5/15/98	1488	278	RTA00000623F.d.04.1	M00007121A:A5
1030	5/15/98	1488	279	RTA00000618F.p.15.1	M00006739C:H7
1031	5/15/98	1488	280	RTA00000618F.o.03.1	M00006734A:H12
1032	5/15/98	1488	281	RTA00000640F.b.02.1	M00006927C:F12
1033	5/15/98	1488	282	RTA00000619F.g.20.1	M00006780A:H12
1034	5/15/98	1488	283	RTA00000618F.n.09.1	M00006728C:B6
1035	5/15/98	1488	284	RTA00000621F.d.09.1	M00006939B:E5
1036	5/15/98	1488	285	RTA00000619F.n.23.4	M00006822D:D5
1037	5/15/98	1488	286	RTA00000616F.k.16.1	M00005417A:E10
1038	5/15/98	1488	287	RTA00000625F.f.21.1	M00005783A:C5
1039	5/15/98	1488	288	RTA00000619F.b.17.1	M00006751B:B11

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
1040	5/15/98	1488	289	RTA00000622F.h.11.1	M00007042A:E7
1041	5/15/98	1488	290	RTA00000621F.k.12.1	M00006973D:E11
1042	5/15/98	1488	291	RTA00000620F.p.08.1	M00006921B:E1
1043	5/15/98	1488	292	RTA00000625F.d.13.1	M00005762D:A1
1044	5/15/98	1488	293	RTA00000592F.g.18.1	M00006618C:G8
1045	5/15/98	1488	294	RTA00000622F.b.17.1	M00007012B:D7
1046	5/15/98	1488	295	RTA00000624F.i.07.1	M00005625D:C3
1047	5/15/98	1488	296	RTA00000619F.c.01 1	M00006754B:D5
1048	5/15/98	1488	297	RTA00000621F.a.07.1	M00006926A:H11
1049	5/15/98	1488	298	RTA00000620F.d 21.1	M00006855C:H2
1050	5/15/98	1488	299	RTA00000616F.c.15.1	M00005383D:E7
1051	5/15/98	1488	300	RTA00000619F n.19.4	M00006822A:D7
1052	5/15/98	1488	301	RTA00000615F.l.09.1	M00005349B:G1
1053	5/15/98	1488	302	RTA00000626F.b.04.1	M00006631D:B2
1054	5/15/98	1488	303	RTA00000617F.j.23.1	M00005491B:C3
1055	5/15/98	1488	304	RTA00000615F.k.14.1	M00005333C:C8
1056	5/15/98	1488	305	RTA00000616F.l.07.1	M00005419A:D5
1057	5/15/98	1488	306	RTA00000619F.d.04.1	M00006758A:B12
1058	5/15/98	1488	307	RTA00000622F.o.15.1	M00007093A:F9
1059	5/15/98	1488	308	RTA00000625F.m.11.1	M00006594D:F9
1060	5/15/98	1488	309	RTA00000619F.e.10.1	M00006763B:B11
1061	5/15/98	1488	310	RTA00000617F.n.15 1	M00005508B:B4
1062	5/15/98	1488	311	RTA00000615F.n.22.1	M00005359D:G7
1063	5/15/98	1488	312	RTA00000622F.j.21.1	M00007058A:C2
1064	5/15/98	1488	313	RTA00000625F.c.09.1	M00005722A:E9
1065	5/15/98	1488	314	RTA00000591F.m.01.1	M00005510B:D6
1066	5/15/98	1488	315	RTA00000617F.n.14.1	M00005508A:H1
1067	5/15/98	1488	316	RTA00000624F.p.18.1	M00005703A:C8
1068	5/15/98	1488	317	RTA00000623F.j.10.2	M00007163B:A12
1069	5/15/98	1488	318	RTA00000591F.e.20.1	M00005450B:B1
1070	5/15/98	1488	319	RTA00000615F.i.11.1	M00005294C:G8
1071	5/15/98	1488	320	RTA00000622F.p.12.1	M00007099C:F9
1072	5/15/98	1488	321	RTA00000619F.j.22.1	M00006800C:G8
1073	5/15/98	1488	322	RTA00000621F.g.12.1	M00006953D:H11
1074	5/15/98	1488	323	RTA00000617F.m.14.1	M00005505A:C8
1075	5/15/98	1488	324	RTA00000619F.k.06.1	M00006805A:H9
1076	5/15/98	1488	325	RTA00000616F.k.18.1	M00005417C:E10
1077	5/15/98	1488	326	RTA00000625F.d.04.1	M00005743B:F2
1078	5/15/98	1488	327	RTA00000626F.b.06.1	M00006631D:E9
1079	5/15/98	1488	328	RTA00000621F.p.15.1	M00006997B:E6

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
1080	5/15/98	1488	329	RTA00000618F.d.19.1	M00006681C:G4
1081	5/15/98	1488	330	RTA00000618F.a.02.1	M00006665B:D10
1082	5/15/98	1488	331	RTA00000592F.f.15.1	M00006577B:H12
1083	5/15/98	1488	332	RTA00000619F.d.12.1	M00006758D:C1
1084	5/15/98	1488	333	RTA00000624F.d.08.1	M00005571A:E11
1085	5/15/98	1488	334	RTA00000620F.o.15.1	M00006919B:C3
1086	5/15/98	1488	335	RTA00000620F e.03.1	M00006859A:F6
1087	5/15/98	1488	336	RTA00000622F.a.24.1	M00007010B:C11
1088	5/15/98	1488	337	RTA00000619F.n.04.2	M00006819A:D10
1089	5/15/98	1488	338	RTA00000616F.d.16.1	M00005388D:F9
1090	5/15/98	1488	339	RTA00000622F.n.15.1	M00007085A:B7
1091	5/15/98	1488	340	RTA00000619F.i.04.1	M00006789C:F4
1092	5/15/98	1488	341	RTA00000617F.i.13.1	M00005484A:D9
1093	5/15/98	1488	342	RTA00000616F.l.11.1	M00005419C:D9
1094	5/15/98	1488	343	RTA00000617F.b.18.1	M00005454C:H12
1095	5/15/98	1488	344	RTA00000618F.j.01.1	M00006705B:D2
1096	5/15/98	1488	345	RTA00000618F.k.24.1	M00006717A:D4
1097	5/15/98	1488	346	RTA00000618F.c.05.1	M00006676D:D11
1098	5/15/98	1488	347	RTA00000619F.g.08.1	M00006777B:D10
1099	5/15/98	1488	348	RTA00000618F.n.04.1	M00006727B:E9
1100	5/15/98	1488	349	RTA00000617F.i.09.1	M00005483D:A12
1101	5/15/98	1488	350	RTA00000617F.l.04.1	M00005497C:C7
1102	5/15/98	1488	351	RTA00000619F.n.17.4	M00006821C:C10
1103	5/15/98	1488	352	RTA00000622F.l.09.1	M00007065D:C1
1104	5/15/98	1488	353	RTA00000623F.j.03.2	M00007161A:H3
1105	5/15/98	1488	354	RTA00000615F.m.17.1	M00005356A:D9
1106	5/15/98	1488	355	RTA00000616F.g.13.1	M00005400A:D2
1107	5/15/98	1488	356	RTA00000615F.f.15.1	M00004999D:E1
1108	5/15/98	1488	357	RTA00000591F.f.15.1	M00005455A:D1
1109	5/15/98	1488	358	RTA00000592F.g.07.1	M00006596A:F7
1110	5/15/98	1488	359	RTA00000625F.o.16.1	M00006615D:F4
1111	5/15/98	1488	360	RTA00000622F.f.13.1	M00007033D:F4
1112	5/15/98	1488	361	RTA00000619F.p.02.3	M00006826B:H3
1113	5/15/98	1488	362	RTA00000625F.h.11.1	M00005812C:F10
1114	5/15/98	1488	363	RTA00000591F.i.05.1	M00005477C:D8
1115	5/15/98	1488	364	RTA00000622F.j.07.1	M00007053B:C7
1116	5/15/98	1488	365	RTA00000619F.k.01.1	M00006801A:G5
1117	5/15/98	1488	366	RTA00000619F.b.24 1	M00006754B:D5
1118	5/15/98	1488	367	RTA00000619F.b.16.1	M00006751A:F3
1119	5/15/98	1488	368	RTA00000618F.p.04.1	M00006738A:E5

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
1120	5/15/98	1488	369	RTA00000615F.k.18.1	M00005342A:D4
1121	5/15/98	1488	370	RTA00000618F.g.23.1	M00006695B.F8
1122	5/15/98	1488	371	RTA00000618F.n.14.1	M00006728D:G10
1123	5/15/98	1488	372	RTA00000619F.e.23.1	M00006765B:H6
1124	5/15/98	1488	373	RTA00000617F.j.06.1	M00005487A:H1
1125	5/15/98	1488	374	RTA00000622F.f.06.1	M00007033A:H5
1126	5/15/98	1488	375	RTA00000622F.e.09.1	M00007030C:F8
1127	5/15/98	1488	376	RTA00000624F.k.11.1	M00005635C:F11
1128	5/15/98	1488	377	RTA00000619F.a.24.1	M00006745A:A1
1129	5/15/98	1488	378	RTA00000625F.i.03.1	M00005818C:G1
1130	5/15/98	1488	379	RTA00000590F.l.10.1	M00005352D·E6
1131	5/15/98	1488	380	RTA00000623F.d.12.1	M00007122B·A11
1132	5/15/98	1488	381	RTA00000622F.o.05.1	M00007090B:A2
1133	5/15/98	1488	382	RTA00000623F.n.07.1	M00007200B:C2
1134	5/15/98	1488	383	RTA00000621F.k.10.1	M00006973C:E11
1135	5/15/98	1488	384	RTA00000616F.b.05.1	M00005377A:A4
1136	5/15/98	1488	385	RTA00000619F.p.11.4	M00006828D:C12
1137	5/15/98	1488	386	RTA00000616F.d.15.1	M00005388D.B11
1138	5/15/98	1488	387	RTA00000615F.b.07.1	M00004839C:B1
1139	5/15/98	1488	388	RTA00000619F.f.19.1	M00006771A:E6
1140	5/15/98	1488	389	RTA00000621F.l.06.1	M00006976C:E9
1141	5/15/98	1488	390	RTA00000624F.m.08.1	M00005646C:B9
1142	5/15/98	1488	391	RTA00000617F.k.13.1	M00005493B:E1
1143	5/15/98	1488	392	RTA00000592F.h.07.1	M00006630B:H6
1144	5/15/98	1488	393	RTA00000619F.f.24.1	M00006771B:F3
1145	5/15/98	1488	394	RTA00000622F.e.20.1	M00007032A:F11
1146	5/15/98	1488	395	RTA00000623F.h.23.1	M00007152A:B4
1147	5/15/98	1488	396	RTA00000626F.b.20.1	M00006635C:B10
1148	5/15/98	1488	397	RTA00000623F.n.03.1	M00007199D:B7
1149	5/15/98	1488	398	RTA00000625F.i.02.1	M00005818C:E8
1150	5/15/98	1488	399	RTA00000622F.i.08.1	M00007047B:D1
1151	5/15/98	1488	400	RTA00000621F.c.23.1	M00006937B:G9
1152	5/15/98	1488	401	RTA00000619F.f.11.1	M00006769D:A4
1153	5/15/98	1488	402	RTA00000621F.b.14.1	M00006934A:G2
1154	5/15/98	1488	403	RTA00000621F.g.10.1	M00006953B:H10
1155	5/15/98	1488	404	RTA00000619F.p.22.3	M00006832A:F5
1156	5/15/98	1488	405	RTA00000590F.p.23.1	M00005399D:B2
1157	5/15/98	1488	406	RTA00000621F.m.23.1	M00006987B:F4
1158	5/15/98	1488	407	RTA00000592F d.20.1	M00005772A:F3
1159	5/15/98	1488	408	RTA00000624F.m.14.1	M00005647D:D9

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
1160	5/15/98	1488	409	RTA00000617F.a.08.1	M00005448D:E8
1161	5/15/98	1488	410	RTA00000620F.i.04.1	M00006877B:E5
1162	5/15/98	1488	411	RTA00000623F.l.12.1	M00007188A:D3
1163	5/15/98	1488	412	RTA00000591F.b.02.1	M00005411D:E5
1164	5/15/98	1488	413	RTA00000623F.h.07.1	M00007146D:G1
1165	5/15/98	1488	414	RTA00000624F.p.21.1	M00005703C:B1
1166	5/15/98	1488	415	RTA00000623F.j.09.2	M00007163A:F11
1167	5/15/98	1488	416	RTA00000623F.l.17.1	M00007189D:A9
1168	5/15/98	1488	417	RTA00000619F.p.18.3	M00006831B:B4
1169	5/15/98	1488	418	RTA00000622F.h.06 1	M00007041B:G1
1170	5/15/98	1488	419	RTA00000591F.m.20.1	M00005519C:F8
1171	5/15/98	1488	420	RTA00000623F.h.10.1	M00007148B:C6
1172	5/15/98	1488	421	RTA00000619F.i.10.1	M00006790D:A5
1173	5/15/98	1488	422	RTA00000625F.b.13.1	M00005711A:H1
1174	5/15/98	1488	423	RTA00000623F.e.16.1	M00007129A:E4
1175	5/15/98	1488	424	RTA00000625F.k.12.1	M00006582D:E5
1176	5/15/98	1488	425	RTA00000624F.i.09.1	M00005626A:B11
1177	5/15/98	1488	426	RTA00000625F.k.09.1	M00006582A:B9
1178	5/15/98	1488	427	RTA00000622F.k.10.1	M00007062A:D3
1179	5/15/98	1488	428	RTA00000616F.h.12.1	M00005403D:E11
1180	5/15/98	1488	429	RTA00000623F.k.07.1	M00007170D:A10
1181	5/15/98	1488	430	RTA00000620F.p.18.1	M00006923B:H8
1182	5/15/98	1488	431	RTA00000620F.e.01.1	M00006855D:H2
1183	5/15/98	1488	432	RTA00000616F.b.10.1	M00005377D:F11
1184	5/15/98	1488	433	RTA00000615F.d.06.1	M00004858D:E6
1185	5/15/98	1488	434	RTA00000592F.h.23.1	M00006640B:H9
1186	5/15/98	1488	435	RTA00000622F.e.07.1	M00007030A:G1
1187	5/15/98	1488	436	RTA00000617F.f.23.2	M00005473D:E10
1188	5/15/98	1488	437	RTA00000620F.h.10.1	M00006875A:A2
1189	5/15/98	1488	438	RTA00000615F.g.19.1	M00005009B:A2
1190	5/15/98	1488	439	RTA00000626F.b.09 1	M00006633C:E11
1191	5/15/98	1488	440	RTA00000626F.e.10.1	M00006644D:C2
1192	5/15/98	1488	441	RTA00000591F.a.08 1	M00005404C:F2
1193	5/15/98	1488	442	RTA00000622F.j.09.1	M00007053B:H3
1194	5/15/98	1488	443	RTA00000591F.n.01.1	M00005524C:B1
1195	5/15/98	1488	444	RTA00000623F.e.12.1	M00007127B:A4
1196	5/15/98	1488	445	RTA00000625F.p.01.1	M00006617B:D9
1197	5/15/98	1488	446	RTA00000623F.f.13.1	M00007134C:F7
1198	5/15/98	1488	447	RTA00000620F.c.24.1	M00006850C:D9
1199	5/15/98	1488	448	RTA00000618F.i.21.1	M00006704D:D3

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
1200	5/15/98	1488	449	RTA00000617F.l.08.1	M00005497C:E3
1201	5/15/98	1488	450	RTA00000619F.l.07.1	M00006810D:A5
1202	5/15/98	1488	451	RTA00000624F.n.16.1	M00005655B:C2
1203	5/15/98	1488	452	RTA00000621F.n.24.1	M00006991D:G7
1204	5/15/98	1488	453	RTA00000621F.c.20.1	M00006937B:F7
1205	5/15/98	1488	454	RTA00000623F.g.07.1	M00007140D:C12
1206	5/15/98	1488	455	RTA00000591F.i.17.1	M00005481C:A5
1207	5/15/98	1488	456	RTA00000626F.b.22.1	M00006636A:B8
1208	5/15/98	1488	457	RTA00000620F.i.16.1	M00006882D:F3
1209	5/15/98	1488	458	RTA00000623F.f.21.1	M00007137D:C10
1210	5/15/98	1488	459	RTA00000591F.f.18.1	M00005455A:G3
1211	5/15/98	1488	460	RTA00000616F.e.10 1	M00005392C:C4
1212	5/15/98	1488	461	RTA00000619F.l.22.1	M00006814A:F7
1213	5/15/98	1488	462	RTA00000591F.a.20.1	M00005411A:C7
1214	5/15/98	1488	463	RTA00000623F.b.23.1	M00007112B:C6
1215	5/15/98	1488	464	RTA00000621F.n.15.1	M00006990B:H9
1216	5/15/98	1488	465	RTA00000620F.m.15.1	M00006907D:C7
1217	5/15/98	1488	466	RTA00000591F.a.15.1	M00005406D:B8
1218	5/15/98	1488	467	RTA00000620F.p.05.1	M00006921B:C2
1219	5/15/98	1488	468	RTA00000620F.h.04.1	M00006873B:G11
1220	5/15/98	1488	469	RTA00000592F.g.15.1	M00006615B:F5
1221	5/15/98	1488	470	RTA00000625F.b.21.1	M00005720A:D3
1222	5/15/98	1488	471	RTA00000621F.n.18.1	M00006991A:E7
1223	5/15/98	1488	472	RTA00000591F.h.08.1	M00005470B:E1
1224	5/15/98	1488	473	RTA00000591F.j.13.1	M00005486C:B3
1225	5/15/98	1488	474	RTA00000626F.e.08.1	M00006644C:E9
1226	5/15/98	1488	475	RTA00000623F.d.23.1	M00007124C:A11
1227	5/15/98	1488	476	RTA00000592F.g.04.1	M00006592A:D3
1228	5/15/98	1488	477	RTA00000590F.p.22.1	M00005399B:F2
1229	5/15/98	1488	478	RTA00000590F.n.10.1	M00005377A:D5
1230	5/15/98	1488	479	RTA00000623F.j.16.2	M00007166B:E6
1231	5/15/98	1488	480	RTA00000619F.j.19.1	M00006797B·D12
1232	5/15/98	1488	481	RTA00000621F.c.12.1	M00006936B:F10
1233	5/15/98	1488	482	RTA00000618F.b.17.1	M00006674B:F4
1234	5/15/98	1488	483	RTA00000621F.p.08.1	M00006995D:A3
1235	5/15/98	1488	484	RTA00000626F.b.13.1	M00006634B:C2
1236	5/15/98	1488	485	RTA00000623F.e.18.1	M00007129A:G10
1237	5/15/98	1488	486	RTA00000625F.j.01.1	M00005827B:H8
1238	5/15/98	1488	487	RTA00000625F.o.18.1	M00006616C:H9
1239	5/15/98	1488	488	RTA00000623F.k.13.1	M00007172D:C8

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
1240	5/15/98	1488	489	RTA00000623F.k.10.1	M00007172A:A5
1241	5/15/98	1488	490	RTA00000626F.d.12.1	M00006641A:B3
1242	5/15/98	1488	491	RTA00000626F.d.23.1	M00006643A:E10
1243	5/15/98	1488	492	RTA00000623F.j.02.1	M00007160C:B8
1244	5/15/98	1488	493	RTA00000618F.o.07.1	M00006735A:H2
1245	5/15/98	1488	494	RTA00000620F.a.08.1	M00006833B:E11
1246	5/15/98	1488	495	RTA00000623F.d.11 1	M00007122A:G11
1247	5/15/98	1488	496	RTA00000623F.h.16.1	M00007149D:G6
1248	5/15/98	1488	497	RTA00000624F.a.17.1	M00005535B:F6
1249	5/15/98	1488	498	RTA00000621F.n.17.1	M00006990D:D6
1250	5/15/98	1488	499	RTA00000625F.n.02.1	M00006601C:E6
1251	5/15/98	1488	500	RTA00000591F.n.05.1	M00005530B:E4
1252	5/15/98	1488	501	RTA00000622F.n.09.1	M00007084B:A5
1253	5/15/98	1488	502	RTA00000617F.l.05.1	M00005497C:C10
1254	5/15/98	1488	503	RTA00000623F.j.08.2	M00007163A:B10
1255	5/15/98	1488	504	RTA00000626F.g.02.1	M00006656C:C10
1256	5/15/98	1488	505	RTA00000617F.l.06.1	M00005497C:C12
1257	5/15/98	1488	506	RTA00000592F.a.06.1	M00005635B:A6
1258	5/15/98	1488	507	RTA00000591F.j.11.1	M00005485C:A3
1259	5/15/98	1488	508	RTA00000622F.h.21.1	M00007046A:D2
1260	5/15/98	1488	509	RTA00000591F.h.03.1	M00005468D:F4
1261	5/15/98	1488	510	RTA00000620F.g.22.1	M00006872B:G1
1262	5/15/98	1488	511	RTA00000617F.c.05.1	M00005456B:E3
1263	5/15/98	1488	512	RTA00000616F.e.15.3	M00005393A:E11
1264	5/15/98	1488	513	RTA00000616F.f.15.3	M00005396B:C4
1265	5/15/98	1488	514	RTA00000622F.c.11.1	M00007014D:C5
1266	5/15/98	1488	515	RTA00000621F.f.12.1	M00006949B:F3
1267	5/15/98	1488	516	RTA00000603F.c.23.1	M00006720C:C11
1268	5/15/98	1488	517	RTA00000640F.a.23 1	M00005817D:E12
1269	5/15/98	1488	518	RTA00000618F.h.15.1	M00006699B:C7
1270	5/15/98	1488	519	RTA00000616F.p.22.1	M00005446C:D12
1271	5/15/98	1488	520	RTA00000621F.p.18.1	M00006997D:B3
1272	5/15/98	1488	521	RTA00000615F.b.10.1	M00004840C:H5
1273	5/15/98	1488	522	RTA00000590F.l.05.1	M00005332A:H10
1274	5/15/98	1488	523	RTA00000619F.g.06.1	M00006774D:C1
1275	5/15/98	1488	524	RTA00000619F.c.24.1	M00006757D:E4
1276	5/15/98	1488	525	RTA00000619F.f.23.1	M00006771B:A9
1277	5/15/98	1489	1	RTA00000639F.e.11.1	M00023011A:A6
1278	5/15/98	1489	2	RTA00000631F.e.20.1	M00022386B:D11
1279	5/15/98	1489	3	RTA00000631F.e.15.1	M00022386A:A7

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
1280	5/15/98	1489	4	RTA00000639F.d.02.1	M00022993A:F2
1281	5/15/98	1489	5	RTA00000639F.f.10.1	M00023021A:H8
1282	5/15/98	1489	6	RTA00000628F.e.17.1	M00021862D:F1
1283	5/15/98	1489	7	RTA00000627F.p.18.1	M00021670B:G11
1284	5/15/98	1489	8	RTA00000633F.o.22.1	M00022901D:C9
1285	5/15/98	1489	9	RTA00000632F.b.04.1	M00022493C:B7
1286	5/15/98	1489	10	RTA00000639F.g.14.1	M00023034C:E5
1287	5/15/98	1489	11	RTA00000631F.p.10.1	M00022474A:H9
1288	5/15/98	1489	12	RTA00000628F.c.20.1	M00021828A:C8
1289	5/15/98	1489	13	RTA00000630F.o.20.1	M00022289A:D5
1290	5/15/98	1489	14	RTA00000630F e.18.1	M00022202C:F11
1291	5/15/98	1489	15	RTA00000628F.b.18.1	M00021690C:B7
1292	5/15/98	1489	16	RTA00000590F.j.07.1	M00004873C.C10
1293	5/15/98	1489	17	RTA00000630F.a.19.1	M00022169D·C2
1294	5/15/98	1489	18	RTA00000630F i.02.1	M00022226D:A7
1295	5/15/98	1489	19	RTA00000631F.a.22.1	M00022364C·G12
1296	5/15/98	1489	20	RTA00000630F.l.19.1	M00022255D:E3
1297	5/15/98	1489	21	RTA00000633F.a.15.1	M00022661D:H1
1298	5/15/98	1489	22	RTA00000639F.c.06.1	M00022972D:C10
1299	5/15/98	1489	23	RTA00000630F.p.23.1	M00022305C:A1
1300	5/15/98	1489	24	RTA00000629F.o.19.2	M00022150D:D11
1301	5/15/98	1489	25	RTA00000632F.j.18.1	M00022599D:E7
1302	5/15/98	1489	26	RTA00000630F.o.21.1	M00022289D:B6
1303	5/15/98	1489	27	RTA00000629F.l.02.1	M00022117C:G7
1304	5/15/98	1489	28	RTA00000628F.e.13.1	M00021861C:A2
1305	5/15/98	1489	29	RTA00000632F j.02.1	M00022587C.G4
1306	5/15/98	1489	30	RTA00000639F.e.01.1	M00023003C:A3
1307	5/15/98	1489	31	RTA00000631F.f.01 1	M00022386C:D7
1308	5/15/98	1489	32	RTA00000630F.p.22.1	M00022305A:H11
1309	5/15/98	1489	33	RTA00000628F.l.05.1	M00021946D:C11
1310	5/15/98	1489	34	RTA00000629F.b.06.1	M00022049A:A2
1311	5/15/98	1489	35	RTA00000628F.g.20.1	M00021892B:H3
1312	5/15/98	1489	36	RTA00000628F.n.11.1	M00021982C:F8
1313	5/15/98	1489	37	RTA00000593F.e.21.1	M00022074D:F11
1314	5/15/98	1489	38	RTA00000633F.c.07.1	M00022674D:G4
1315	5/15/98	1489	39	RTA00000629F.k.17.1	M00022110A:E4
1316	5/15/98	1489	40	RTA00000633F.a.11.1	M00022661B:E11
1317	5/15/98	1489	41	RTA00000629F.e.16.1	M00022068D:D12
1318	5/15/98	1489	42	RTA00000631F.c.01.1	M00022372B:D3
1319	5/15/98	1489	43	RTA00000630F.n.22.1	M00022278C:E3

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
1320	5/15/98	1489	44	RTA00000628F.j.14.1	M00021927B:F1
1321	5/15/98	1489	45	RTA00000631F.l.14.1	M00022449D:F6
1322	5/15/98	1489	46	RTA00000631F.j.06.1	M00022423B:D3
1323	5/15/98	1489	47	RTA00000630F.b.17.1	M00022175A:A11
1324	5/15/98	1489	48	RTA00000593F.i.08.2	M00022218C:B6
1325	5/15/98	1489	49	RTA00000631F.l.12.1	M00022449C.B1
1326	5/15/98	1489	50	RTA00000628F.m.20.1	M00021978A:F8
1327	5/15/98	1489	51	RTA00000632F.c.02.1	M00022504B:E3
1328	5/15/98	1489	52	RTA00000632F.h.03.1	M00022565C:H2
1329	5/15/98	1489	53	RTA00000592F.l.16.1	M00007977C:E8
1330	5/15/98	1489	54	RTA00000630F.c.01.1	M00022176A:E8
1331	5/15/98	1489	55	RTA00000593F.e.19.1	M00022071C:D9
1332	5/15/98	1489	56	RTA00000632F.a.10.1	M00022490C:C1
1333	5/15/98	1489	57	RTA00000632F.f.12.1	M00022536B:B4
1334	5/15/98	1489	58	RTA00000630F.m.06.1	M00022259B:G2
1335	5/15/98	1489	59	RTA00000629F.e.07.1	M00022067D:C5
1336	5/15/98	1489	60	RTA00000627F.k.19.1	M00021618D:D7
1337	5/15/98	1489	61	RTA00000629F.o.15.2	M00022149B:D5
1338	5/15/98	1489	62	RTA00000592F.o.02.1	M00008015D:E9
1339	5/15/98	1489	63	RTA00000628F.h.18.1	M00021906C:G11
1340	5/15/98	1489	64	RTA00000632F.h.23.1	M00022578D:A8
1341	5/15/98	1489	65	RTA00000639F.h.18.1	M00023103A:E11
1342	5/15/98	1489	66	RTA00000630F.p.11.1	M00022296B:C11
1343	5/15/98	1489	67	RTA00000632F.o.18.1	M00022651D:C6
1344	5/15/98	1489	68	RTA00000629F.a.24 1	M00022032A:E7
1345	5/15/98	1489	69	RTA00000633F.f.19.1	M00022708D:G10
1346	5/15/98	1489	70	RTA00000627F.n.04.1	M00021640A:G3
1347	5/15/98	1489	71	RTA00000630F.p.04.1	M00022294A:D11
1348	5/15/98	1489	72	RTA00000633F.h.21.1	M00022730A:E4
1349	5/15/98	1489	73	RTA00000632F.d.12.1	M00022515D:C4
1350	5/15/98	1489	74	RTA00000627F.o.23.1	M00021660C:G4
1351	5/15/98	1489	75	RTA00000628F.j.12.1	M00021927A:C11
1352	5/15/98	1489	76	RTA00000632F.f.03.1	M00022531B:D7
1353	5/15/98	1489	77	RTA00000593F.o.03.1	M00022549B:G7
1354	5/15/98	1489	78	RTA00000631F.b.06.1	M00022366B:E9
1355	5/15/98	1489	79	RTA00000633F.g.15.1	M00022716D:D8
1356	5/15/98	1489	80	RTA00000594F.b.04.1	M00022828C:E4
1357	5/15/98	1489	81	RTA00000623F.o.14.1	M00007929B:H10
1358	5/15/98	1489	82	RTA00000632F.g.02.1	M00022551A:G3
1359	5/15/98	1489	83	RTA00000629F.h.11.1	M00022084B:F4

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
1360	5/15/98	1489	84	RTA00000632F.b.17.1	M00022498C:C8
1361	5/15/98	1489	85	RTA00000631F.m.04.1	M00022452C:B3
1362	5/15/98	1489	86	RTA00000627F.k.02 1	M00021614B.G12
1363	5/15/98	1489	87	RTA00000631F n.06.1	M00022457C:B1
1364	5/15/98	1489	88	RTA00000633F.i.15.1	M00022737A:C8
1365	5/15/98	1489	89	RTA00000639F.f.11.1	M00023023A:B12
1366	5/15/98	1489	90	RTA00000630F.j.04.1	M00022236D:A3
1367	5/15/98	1489	91	RTA00000630F.j.14.1	M00022239D:A7
1368	5/15/98	1489	92	RTA00000627F.k.24.1	M00021619B:G10
1369	5/15/98	1489	93	RTA00000630F.j.13.1	M00022239B:B7
1370	5/15/98	1489	94	RTA00000629F.j.07.1	M00022094B.G10
1371	5/15/98	1489	95	RTA00000628F m.02.1	M00021964A:C4
1372	5/15/98	1489	96	RTA00000639F.g.08.1	M00023033A:E10
1373	5/15/98	1489	97	RTA00000628F.i.05.1	M00021910A:C10
1374	5/15/98	1489	98	RTA00000639F.a.16.1	M00022953B·C7
1375	5/15/98	1489	99	RTA00000633F.c.21.1	M00022682A:F12
1376	5/15/98	1489	100	RTA00000639F.b.03.1	M00022960D:E8
1377	5/15/98	1489	101	RTA00000633F.b.05.1	M00022666C:H11
1378	5/15/98	1489	102	RTA00000631F.h.05.2	M00022412A:C8
1379	5/15/98	1489	103	RTA00000628F.h.14.1	M00021905B:A1
1380	5/15/98	1489	104	RTA00000633F b.03.1	M00022666B:E12
1381	5/15/98	1489	105	RTA00000632F.g.08.1	M00022556B:G2
1382	5/15/98	1489	106	RTA00000593F.g.18.1	M00022171D:B8
1383	5/15/98	1489	107	RTA00000592F.p.10.1	M00008061A:F2
1384	5/15/98	1489	108	RTA00000639F.f.19.1	M00023028A:A2
1385	5/15/98	1489	109	RTA00000630F.f.04.1	M00022206B:G6
1386	5/15/98	1489	110	RTA00000633F.o.02.1	M00022893C:H11
1387	5/15/98	1489	111	RTA00000632F.b.12.1	M00022495C:G5
1388	5/15/98	1489	112	RTA00000632F.g.20.1	M00022562C:H10
1389	5/15/98	1489	113	RTA00000593F.f.12.1	M00022109B:A11
1390	5/15/98	1489	114	RTA00000633F.c.19.1	M00022681C:H2
1391	5/15/98	1489	115	RTA00000629F.e.12.1	M00022068B:H11
1392	5/15/98	1489	116	RTA00000629F.j.01.1	M00022093A:A5
1393	5/15/98	1489	117	RTA00000627F.m.07.1	M00021625A:C7
1394	5/15/98	1489	118	RTA00000633F.n.12.1	M00022856C:B11
1395	5/15/98	1489	119	RTA00000632F.e.15.1	M00022527D:B3
1396	5/15/98	1489	120	RTA00000632F.a.09.1	M00022490C:A8
1397	5/15/98	1489	121	RTA00000631F.k.12.1	M00022439A:E7
1398	5/15/98	1489	122	RTA00000628F.c.02.1	M00021694B:A7
1399	5/15/98	1489	123	RTA00000632F.f.10.1	M00022535D:B11

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
1400	5/15/98	1489	124	RTA00000631F.f.11.1	M00022389B:H4
1401	5/15/98	1489	125	RTA00000633F.n.06.1	M00022854D:H7
1402	5/15/98	1489	126	RTA00000628F.l.14.1	M00021954A:A3
1403	5/15/98	1489	127	RTA00000632F.k.10.1	M00022607B:A4
1404	5/15/98	1489	128	RTA00000629F.b.08.1	M00022049A:D6
1405	5/15/98	1489	129	RTA00000629F.l.10.1	M00022122D:D6
1406	5/15/98	1489	130	RTA00000632F.c.04.1	M00022505D:A12
1407	5/15/98	1489	131	RTA00000630F.h.22.1	M00022221D:E8
1408	5/15/98	1489	132	RTA00000593F.e.18.1	M00022070B:C10
1409	5/15/98	1489	133	RTA00000630F.l.02.1	M00022252C:E6
1410	5/15/98	1489	134	RTA00000632F.k.20 1	M00022613D.C4
1411	5/15/98	1489	135	RTA00000628F.p.01 1	M00022005C:G3
1412	5/15/98	1489	136	RTA00000631F.l.01.1	M00022444A:A11
1413	5/15/98	1489	137	RTA00000628F.a.16.1	M00021678A:B8
1414	5/15/98	1489	138	RTA00000632F.j.14.1	M00022598A:F11
1415	5/15/98	1489	139	RTA00000628F.e 06.1	M00021859A:D4
1416	5/15/98	1489	140	RTA00000631F.n.08.1	M00022458B:E6
1417	5/15/98	1489	141	RTA00000630F.g.18.1	M00022216D·C1
1418	5/15/98	1489	142	RTA00000628F.m.08.1	M00021967D:E8
1419	5/15/98	1489	143	RTA00000592F.k.12.1	M00007961A:B1
1420	5/15/98	1489	144	RTA00000631F.e.22 1	M00022386C:A4
1421	5/15/98	1489	145	RTA00000628F.b.21.1	M00021692A:E3
1422	5/15/98	1489	146	RTA00000631F.d.13.1	M00022381C.C12
1423	5/15/98	1489	147	RTA00000629F.p.04.2	M00022153D:D11
1424	5/15/98	1489	148	RTA00000628F b.01 1	M00021680B:C1
1425	5/15/98	1489	149	RTA00000630F.c.19.1	M00022183A:G3
1426	5/15/98	1489	150	RTA00000593F.l.06.1	M00022404D:G5
1427	5/15/98	1489	151	RTA00000628F.c.11.1	M00021698B:B12
1428	5/15/98	1489	152	RTA00000630F.l.05.1	M00022253B:E6
1429	5/15/98	1489	153	RTA00000628F.b.22.1	M00021692C:E6
1430	5/15/98	1489	154	RTA00000633F.g.19.1	M00022718D:G5
1431	5/15/98	1489	155	RTA00000629F.p.10.2	M00022157B:A10
1432	5/15/98	1489	156	RTA00000628F.b.17.1	M00021690B:B6
1433	5/15/98	1489	157	RTA00000627F.j.18.1	M00021611D:H3
1434	5/15/98	1489	158	RTA00000627F.p.10.1	M00021665A:D4
1435	5/15/98	1489	159	RTA00000628F.e.15.1	M00021862A:A4
1436	5/15/98	1489	160	RTA00000630F.h.12.1	M00022218D:B12
1437	5/15/98	1489	161	RTA00000628F.i.08.1	M00021912B:H11
1438	5/15/98	1489	162	RTA00000630F.c.09.1	M00022178D:H1
1439	5/15/98	1489	163	RTA00000633F.o.08.1	M00022897A:F4

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
1440	5/15/98	1489	164	RTA00000628F.l.07 1	M00021947A:C1
1441	5/15/98	1489	165	RTA00000628F.n.18 1	M00021983D:B10
1442	5/15/98	1489	166	RTA00000630F.l.10.1	M00022254C:D8
1443	5/15/98	1489	167	RTA00000632F.i.01 1	M00022578D:F3
1444	5/15/98	1489	168	RTA00000629F.j.04 1	M00022093D:B10
1445	5/15/98	1489	169	RTA00000627F.j.16.1	M00021611D:D5
1446	5/15/98	1489	170	RTA00000629F.e.20 1	M00022069D:G2
1447	5/15/98	1489	171	RTA00000632F.h.21.1	M00022578C:B7
1448	5/15/98	1489	172	RTA00000629F.p.09.2	M00022157A:F12
1449	5/15/98	1489	173	RTA00000631F.d.22.1	M00022382D:H11
1450	5/15/98	1489	174	RTA00000630F.l 14.1	M00022255A:C8
1451	5/15/98	1489	175	RTA00000633F.h.12.1	M00022725C:E9
1452	5/15/98	1489	176	RTA00000630F.i.11.1	M00022231C:A4
1453	5/15/98	1489	177	RTA00000632F.a.05.1	M00022489C:A8
1454	5/15/98	1489	178	RTA00000629F.g.21.1	M00022081C:G11
1455	5/15/98	1489	179	RTA00000632F.e.12.1	M00022527A:E5
1456	5/15/98	1489	180	RTA00000632F.g.11.1	M00022557B:A8
1457	5/15/98	1489	181	RTA00000629F.f.22.1	M00022075D:F5
1458	5/15/98	1489	182	RTA00000630F.j.12.1	M00022239A:A10
1459	5/15/98	1489	183	RTA00000629F.h.16.1	M00022085C:C4
1460	5/15/98	1489	184	RTA00000633F.j.13 1	M00022745A:B4
1461	5/15/98	1489	185	RTA00000633F.h.10.1	M00022725C:B3
1462	5/15/98	1489	186	RTA00000632F.b.05.1	M00022493C.C6
1463	5/15/98	1489	187	RTA00000633F.h.18.1	M00022727B:C5
1464	5/15/98	1489	188	RTA00000633F.h.13.1	M00022726A·A6
1465	5/15/98	1489	189	RTA00000630F.i.09.1	M00022231A.F12
1466	5/15/98	1489	190	RTA00000593F.h.03.1	M00022176C:A8
1467	5/15/98	1489	191	RTA00000632F.c.18.1	M00022509D:F6
1468	5/15/98	1489	192	RTA00000593F.f.03.1	M00022081C:B11
1469	5/15/98	1489	193	RTA00000627F.n.21.1	M00021653A:G7
1470	5/15/98	1489	194	RTA00000631F.g.18.2	M00022407C:H11
1471	5/15/98	1489	195	RTA00000639F.c.14.1	M00022980B:E11
1472	5/15/98	1489	196	RTA00000633F.m.08.1	M00022824C:H11
1473	5/15/98	1489	197	RTA00000627F.m.10.1	M00021629D:D5
1474	5/15/98	1489	198	RTA00000632F.h.20.1	M00022578B:G5
1475	5/15/98	1489	199	RTA00000627F.o.09.1	M00021657B:C8
1476	5/15/98	1489	200	RTA00000632F.j.06.1	M00022594B:H12
1477	5/15/98	1489	201	RTA00000632F.d.07.1	M00022514A:D4
1478	5/15/98	1489	202	RTA00000629F.d.23.1	M00022064C:H7
1479	5/15/98	1489	203	RTA00000629F.m.05.1	M00022128A:D4

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
1480	5/15/98	1489	204	RTA00000639F.b.08.1	M00022963A:D11
1481	5/15/98	1489	205	RTA00000627F.l.21.1	M00021624A:D7
1482	5/15/98	1489	206	RTA00000628F.j.16.1	M00021927D:D12
1483	5/15/98	1489	207	RTA00000628F.b.08.1	M00021681C:B10
1484	5/15/98	1489	208	RTA00000630F.e.10.1	M00022199C:F3
1485	5/15/98	1489	209	RTA00000639F.b.21.1	M00022968A:F2
1486	5/15/98	1489	210	RTA00000631F.h.04.1	M00022411D:G9
1487	5/15/98	1489	211	RTA00000639F.c.15.1	M00022980C:A9
1488	5/15/98	1489	212	RTA00000631F.d.11.1	M00022381A:F5
1489	5/15/98	1489	213	RTA00000633F.e 18.1	M00022698C E6
1490	5/15/98	1489	214	RTA00000615F.e.19.1	M00004875A:G9
1491	5/15/98	1489	215	RTA00000629F.n.11.2	M00022139A:C1
1492	5/15/98	1489	216	RTA00000631F.g.11.2	M00022404B:H5
1493	5/15/98	1489	217	RTA00000630F.o.18.1	M00022288C:D4
1494	5/15/98	1489	218	RTA00000633F.h.22.1	M00022730D:E10
1495	5/15/98	1489	219	RTA00000633F.e.24.1	M00022701B:B12
1496	5/15/98	1489	220	RTA00000633F.o.19.1	M00022900D:E8
1497	5/15/98	1489	221	RTA00000630F.e.04.1	M00022198A:C12
1498	5/15/98	1489	222	RTA00000627F.o.01.1	M00021654C:A2
1499	5/15/98	1489	223	RTA00000629F.k.21.1	M00022114C:B2
1500	5/15/98	1489	224	RTA00000631F.g.04.1	M00022399C:A10
1501	5/15/98	1489	225	RTA00000630F.m.03.1	M00022258C:F6
1502	5/15/98	1489	226	RTA00000629F.i.08.1	M00022090A:G8
1503	5/15/98	1489	227	RTA00000593F.d.02.2	M00021682B:D12
1504	5/15/98	1489	228	RTA00000631F.a.24.1	M00022365A:A1
1505	5/15/98	1489	229	RTA00000629F.p.06.2	M00022154A:C1
1506	5/15/98	1489	230	RTA00000633F.n.09 1	M00022856B:D7
1507	5/15/98	1489	231	RTA00000633F.f.14.1	M00022708A:C8
1508	5/15/98	1489	232	RTA00000629F.k.11 1	M00022106C:F4
1509	5/15/98	1489	233	RTA00000630F.b.02.1	M00022170D:H9
1510	5/15/98	1489	234	RTA00000633F.p.04.1	M00022902D:D3
1511	5/15/98	1489	235	RTA00000633F.n.08.1	M00022856A:D2
1512	5/15/98	1489	236	RTA00000628F.h.06.1	M00021897B:A6
1513	5/15/98	1489	237	RTA00000628F.d.05.1	M00021841C:D7
1514	5/15/98	1489	238	RTA00000627F.l.22.1	M00021624B:A3
1515	5/15/98	1489	239	RTA00000630F.f.19.1	M00022212C:C2
1516	5/15/98	1489	240	RTA00000630F.h.17.1	M00022220C:F8
1517	5/15/98	1489	241	RTA00000632F.i.15.1	M00022583B:E5
1518	5/15/98	1489	242	RTA00000633F.j.15.1	M00022745B:G2
1519	5/15/98	1489	243	RTA00000628F.k.05.1	M00021932C:G10

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO.	Sequence Name	Clone Name
1520	5/15/98	1489	244	RTA00000633F.d.04 1	M00022685A·F11
1521	5/15/98	1489	245	RTA00000639F.h.10.1	M00023094A·C4
1522	5/15/98	1489	246	RTA00000632F.f.11.1	M00022535D:C4
1523	5/15/98	1489	247	RTA00000631F.p.20.1	M00022480B:E7
1524	5/15/98	1489	248	RTA00000629F.o.17.2	M00022150A:H6
1525	5/15/98	1489	249	RTA00000592F.l.23 1	M00007986C·C5
1526	5/15/98	1489	250	RTA00000630F.d.10.1	M00022189A:A1
1527	5/15/98	1489	251	RTA00000632F.j.19.1	M00022600C:A6
1528	5/15/98	1489	252	RTA00000633F.n.10.1	M00022856B:F4
1529	5/15/98	1489	253	RTA00000628F.h.13.1	M00021905A.G5
1530	5/15/98	1489	254	RTA00000633F.k.05.1	M00022763A·E10
1531	5/15/98	1489	255	RTA00000633F.i.11.1	M00022735B:B1
1532	5/15/98	1489	256	RTA00000633F.o.20 1	M00022900D.G3
1533	5/15/98	1489	257	RTA00000628F b.19.1	M00021690D:E5
1534	5/15/98	1489	258	RTA00000627F.p.14.1	M00021667D:E3
1535	5/15/98	1489	259	RTA00000628F.n.15.1	M00021983B:B3
1536	5/15/98	1489	260	RTA00000592F.p.22.1	M00008074D:C1
1537	5/15/98	1489	261	RTA00000628F.m.19.1	M00021977D:E2
1538	5/15/98	1489	262	RTA00000593F.a.05.1	M00008078C:C6
1539	5/15/98	1489	263	RTA00000639F.g.17 1	M00023036D·C4
1540	5/15/98	1489	264	RTA00000632F.j.15.1	M00022599A:C3
1541	5/15/98	1489	265	RTA00000592F.l.04.1	M00007971A:B4
1542	5/15/98	1489	266	RTA00000629F.c.07.1	M00022054D:C5
1543	5/15/98	1489	267	RTA00000592F.l.21.1	M00007985A:B9
1544	5/15/98	1489	268	RTA00000629F.h.15 1	M00022085C:A7
1545	5/15/98	1489	269	RTA00000633F.n.02.1	M00022835C:E6
1546	5/15/98	1489	270	RTA00000630F.n.24.1	M00022278D:F10
1547	5/15/98	1489	271	RTA00000592F.k.09.1	M00007953B:B3
1548	5/15/98	1489	272	RTA00000592F.l.10.1	M00007974B·C11
1549	5/15/98	1489	273	RTA00000628F.k.04 1	M00021932C:C5
1550	5/15/98	1489	274	RTA00000630F.h.24.1	M00022226C:B6
1551	5/15/98	1489	275	RTA00000629F.i.13.1	M00022091B:B7
1552	5/15/98	1489	276	RTA00000630F.b.01.1	M00022170D:H7
1553	5/15/98	1489	277	RTA00000628F.g.13.1	M00021886D:E4
1554	5/15/98	1489	278	RTA00000592F.m.13.1	M00007995D:E6
1555	5/15/98	1489	279	RTA00000633F.h.20.1	M00022728A:A9
1556	5/15/98	1489	280	RTA00000593F.d.08.2	M00021860B:G6
1557	5/15/98	1489	281	RTA00000629F.f.01.1	M00022071B:D5
1558	5/15/98	1489	282	RTA00000632F.i.11.1	M00022582C:E12
1559	5/15/98	1489	283	RTA00000632F.j.24.1	M00022604B:C11

	Priority Appln Information				
SEQ ID NO:	Filed	Dkt No.	SEQ ID NO:	Sequence Name	Clone Name
1560	5/15/98	1489	284	RTA00000629F.f 03.1	M00022071C:C9
1561	5/15/98	1489	285	RTA00000593F.b.04.1	M00008094A:E10
1562	5/15/98	1489	286	RTA00000628F.l.12.1	M00021952B:F11
1563	5/15/98	1489	287	RTA00000632F.j.12.1	M00022597B:F11
1564	5/15/98	1489	288	RTA00000592F.k.23.1	M00007964B:D10
1565	5/15/98	1489	289	RTA00000632F.g.07.1	M00022556B:C4

Table 1B

SEQ ID NO:	Sample Name	Overlap	Clone Name
1566	803.F11.sp6:165002	VO	M00004236D:E07
1567	180.B11.sp6:135937	VO	M00001453B:F08
1568	1033.D01.sp6:188349	VO	M00001455A:E09
1569	1164.H10.sp6:186952	VO	M00001455A:E09
1570	80.E12.sp6:130267	VNO	
1571	121.C2.sp6:131906	VNO	
1572	1035.D01.sp6:188733	VO	M00003939A:A02
1573	1034.G03 sp6:188579	VNO	
1574	020.C1.sp6:128615	VO	M00003820C:A09
1575	019.B1.sp6:128411	VO	M00003820C:A09
1576	803.F4.sp6:164995	VO	M00004052C:B05
1577	1033.C06.sp6:188342	VO	M00001654D:F06
1578	1035.H07.sp6:188787	VO	M00004034C.F05
1579	396.C9.sp6:149508	VO	M00004034C:F05
1580	396.D9.sp6:149520	VO	M00004035B:F05
1581	1035.B08.sp6:188716	VO	M00004035B·F05
1582	396.H9.sp6:149568	VNO	
1583	1035 D09 sp6:188741	VO	M00004037C:D07
1584	1036.B05.sp6:188905	VO	M00004115C:H04
1585	404.G2.sp6:162929	VNO	
1586	1035.D07.sp6:188739	VO	M00004031D:G02
1587	1034.A05.sp6:188509	VO	M00003829A:B08
1588	395.B5.sp6:149300	VO	M00003829A:B08
1589	1034.F07.sp6:188571	VO	M00003852D:D03
1590	1035.E04 sp6:188748	VO	M00003982A:G03
1591	396.F3.sp6:149538	VO	M00003982A:G03
1592	396.H3.sp6:149562	VO	M00003982B:C10
1593	1035.F04.sp6:188760	VNO	
1594	396.D4.sp6:149515	VO	M00003983A:D02
1595	1035.G04.sp6:188772	VO	M00003983A:D02
1596	396.D5.sp6:149516	VO	M00003985A:C01
1597	1035.B05.sp6:188713	VO	M00003985A:C01
1598	1035.C06.sp6:188726	VO	M00004028C:D01
1599	396.A7.sp6:149482	VNO	
1600	1035.E06.sp6:188750	VO	M00004029C:B03
1601	801.E1.sp6:164692	VO	M00001344D:G11
1602	801.F1.sp6:164704	VO	M00001345A:A12
1603	801.A2.sp6:164645	VNO	
1604	801.B2.sp6:164657	VNO	
1605	801.C2.sp6:164669	VO	M00001347A:G06
1606	801.D2.sp6:164681	VO	M00001347B:H01
1607	801.E2.sp6:164693	VNO	

SEQ ID NO:	Sample Name	Overlap	Clone Name
1608	801.F2.sp6:164705	VNO	
1609	801.A3.sp6:164646	VO	M00001355B:A01
1610	801.B3.sp6:164658	VO	M00001358D:D09
1611	801.C3.sp6:164670	VO	M00001359A:B07
1612	801.D3.sp6:164682	VO	M00001362A:C10
1613	801.E3.sp6:164694	VO	M00001362B:A09
1614	801.G3.sp6:164718	VO	M00001365D.D12
1615	801.H3.sp6:164730	VO	M00001365D:H09
1616	801.A4.sp6.164647	VNO	
1617	801.B4.sp6:164659	VO	M00001370A.G09
1618	801.C4.sp6:164671	VO	M00001370B:B04
1619	801.D4.sp6.164683	VO	M00001370B:B12
1620	801.E4.sp6:164695	VNO	
1621	801.G4.sp6:164719	VO	M00001374D:D09
1622	801.D5.sp6:164684	VO	M00001377C.B08
1623	801.F5.sp6:164708	VNO	
1624	801.G5.sp6:164720	VNO	
1625	801.H5.sp6:164732	VNO	
1626	801.A6.sp6:164649	VO	M00001384A:C09
1627	801.B6.sp6:164661	VO	M00001387A.A04
1628	801.D6.sp6:164685	VO	M00001389B:B06
1629	801.E6.sp6:164697	VO	M00001390A:C06
1630	801.F6.sp6:164709	VO	M00001390A:H01
1631	801.D7.sp6:164686	VNO	
1632	801.E7.sp6:164698	VO	M00001399C:E10
1633	1033.A01.sp6:188313	VO	M00001399D:F09
1634	801.G7.sp6:164722	VNO	
1635	801.H7.sp6:164734	VO	M00001401D.D04
1636	801.A8.sp6:164651	VNO	
1637	801.B8.sp6:164663	VO	M00001402D:C07
1638	801.C8.sp6:164675	VO	M00001402D:H03
1639	801.D8.sp6:164687	VO	M00001403B:A01
1640	801.E8.sp6:164699	VO	M00001405D:F05
1641	801.G8.sp6:164723	VO	M00001406C:A11
1642	801.B9.sp6:164664	VO	M00001407B:A08
1643	801.C9.sp6:164676	VO	M00001407D:H11
1644	801.D9.sp6:164688	VNO	
1645	801.E9.sp6:164700	VNO	
1646	801.F9.sp6:164712	VO	M00001411A:D01
1647	801.G9.sp6:164724	VNO	
1648	801.H9.sp6:164736	VO	M00001411C:G02
1649	801.B10.sp6:164665	VO	M00001412A.A11
1650	801.C10.sp6:164677	VNO	

SEQ ID NO:	Sample Name	Overlap	Clone Name
1651	801.D10.sp6:164689	VNO	
1652	801.E10.sp6:164701	VO	M00001415D:E12
1653	801.F10.sp6:164713	VNO	
1654	801.G10.sp6:164725	VO	M00001417B:E01
1655	020.A6.sp6:128596	VO	M00001417B:E01
1656	801.H10.sp6:164737	VNO	
1657	801.A11.sp6:164654	VO	M00001417C:E02
1658	801.B11.sp6:164666	VNO	
1659	801.C11.sp6:164678	VO	M00001421A:H07
1660	801.F11.sp6:164714	VO	M00001423C:D06
1661	801.G11.sp6:164726	VO	M00001424A:H09
1662	801.H11.sp6:164738	VO	M00001425C:E10
1663	801.B12.sp6:164667	VO	M00001426A:F09
1664	801.C12.sp6:164679	VO	M00001426D:D09
1665	801.E12.sp6:164703	VO	M00001431A:C10
1666	801.F12.sp6:164715	VO	M00001431A:E05
1667	801.G12.sp6:164727	VO	M00001432A F12
1668	801.H12.sp6:164739	VO	M00001432B:H08
1669	802.A1.sp6:164740	VO	M00001432C:G01
1670	802.B1.sp6:164752	VO	M00001433A:C07
1671	802.C1.sp6:164764	VNO	
1672	802.D1.sp6:164776	VO	M00001434A:A01
1673	802.E1.sp6:164788	VNO	
1674	802.F1.sp6:164800	VO	M00001435A:F03
1675	802.G1.sp6:164812	VO	M00001435A.G01
1676	802.H1.sp6.164824	VO	M00001435B:G10
1677	802.A2.sp6:164741	VO	M00001435C.G08
1678	802.B2.sp6:164753	VNO	
1679	802.C2.sp6.164765	VO	M00001435D:A06
1680	802.D2.sp6.164777	VO	M00001436D:C10
1681	802.E2.sp6.164789	VO	M00001437B:B05
1682	802.G2.sp6 164813	VNO	
1683	802.H2.sp6:164825	VO	M00001438C:H05
1684	802.A3.sp6:164742	VNO	
1685	802.B3.sp6.164754	VO	M00001439B.F10
1686	802.C3.sp6:164766	VO	M00001439C:A01
1687	802.D3.sp6:164778	VO	M00001439C:G06
1688	802.E3.sp6:164790	VO	M00001441D:H05
1689	802.F3.sp6:164802	VO	M00001442A:D08
1690	802.G3.sp6:164814	VNO	
1691	802.H3.sp6:164826	VO	M00001443D:A01
1692	802.A4.sp6:164743	VNO	
1693	802.B4.sp6:164755	VO	M00001444A:A09

SEQ ID NO:	Sample Name	Overlap	Clone Name
1694	802.C4.sp6:164767	VNO	
1695	802.D4.sp6:164779	VNO	
1696	802.E4.sp6:164791	VO	M00001446D:B10
1697	1033.B01.sp6:188325	VO	M00001448A:D05
1698	802 F4.sp6:164803	VO	M00001451B:H11
1699	802.G4.sp6:164815	VNO	
1700	802.H4.sp6:164827	VO	M00001452B:H06
1701	802.A5.sp6:164744	VO	M00001452D:E05
1702	802.C5.sp6:164768	VO	M00001453D:F09
1703	1033.C01.sp6:188337	VO	M00001455A:C03
1704	1033.E01.sp6:188361	VO	M00001456C:F02
1705	1033.F01.sp6:188373	VO	M00001458B:F06
1706	802.D5.sp6:164780	VO	M00001463C:A01
1707	802.E5.sp6.164792	VO	M00001466C:F02
1708	802.F5.sp6:164804	VNO	
1709	802.G5.sp6:164816	VO	M00001471C:G03
1710	1033.G01.sp6:188385	VO	M00001478A:B06
1711	1033.H01.sp6:188397	VO	M00001487D:G03
1712	802.H5.sp6:164828	VO	M00001488B:G12
1713	802.B6.sp6:164757	VO	M00001489B:F08
1714	802.C6.sp6:164769	VO	M00001489D:C08
1715	802.D6.sp6:164781	VO	M00001490B:G04
1716	802.E6.sp6:164793	VO	M00001491C:C01
1717	802.F6.sp6:164805	VNO	
1718	802.G6.sp6:164817	VO	M00001496A:B03
1719	802.H6.sp6:164829	VNO	
1720	802.A7.sp6:164746	VO	M00001496D:D02
1721	802.B7.sp6:164758	VNO	
1722	802.D7.sp6:164782	VNO	
1723	802.E7.sp6:164794	VO	M00001500A:D09
1724	802.F7.sp6:164806	VNO	
1725	802.G7.sp6:164818	VNO	
1726	802.H7.sp6:164830	VO	M00001504D:D09
1727	802.A8.sp6:164747	VO	M00001505A:E09
1728	802.B8.sp6:164759	VO	M00001506A:F01
1729	802.D8.sp6:164783	VO	M00001517D:C03
1730	802.E8.sp6:164795	VO	M00001518D:A10
1731	1033.A02.sp6:188314	VO	M00001530A:D11
1732	802.F8.sp6:164807	VO	M00001536B:B11
1733	802.G8.sp6:164819	VO	M00001537B:C12
1734	1033.B02.sp6:188326	VO	M00001539B:B01
1735	802.H8.sp6:164831	VO	M00001542C:D10
1736	802.A9.sp6:164748	VO	M00001542C:F06

SEQ ID NO:	Sample Name	Overlap	Clone Name
1737	802.B9.sp6:164760	VNO	
1738	802.C9.sp6:164772	VO	M00001543A:E04
1739	802.E9.sp6:164796	VO	M00001546B:H01
1740	802.G9.sp6:164820	VO	M00001551D:C12
1741	802.H9.sp6:164832	VO	M00001552B:D01
1742	802.A10.sp6:164749	VO	M00001553D:B06
1743	802.B10.sp6:164761	VNO	
1744	802.C10.sp6:164773	VO	M00001556D:A11
1745	802.D10.sp6:164785	VNO	
1746	802.E10.sp6:164797	VO	M00001557C:B08
1747	802.F10.sp6:164809	VO	M00001558B:A12
1748	802.G10.sp6:164821	VO	M00001560C.C01
1749	802.H10.sp6:164833	VO	M00001561B:C10
1750	1033.C02.sp6:188338	VO	M00001563C:D06
1751	1033.D02.sp6:188350	VO	M00001564C.D04
1752	1033.E02 sp6:188362	VO	M00001565A:A02
1753	1033.F02.sp6:188374	VO	M00001569B:F04
1754	1033.G02.sp6:188386	VO	M00001572C:E07
1755	1033.H02.sp6:188398	VO	M00001575A:H02
1756	1033.A03.sp6:188315	VO	M00001582D:B10
1757	1033.B03.sp6:188327	VO	M00001584C:A03
1758	1033.E04.sp6:188364	VO	M00001618B:F02
1759	1033.B08.sp6:188332	VO	M00001687C:A06
1760	1033.H12.sp6:188408	VNO	
1761	1034.C05.sp6:188533	VO	M00003830A:A10
1762	1034.F05.sp6:188569	VO	M00003833D:D06
1763	1034.D06.sp6:188546	VO	M00003839D:G06
1764	1034.G06.sp6:188582	VO	M00003843A:B01
1765	1034.H07.sp6:188595	VO	M00003858A:D01
1766	1034.A08.sp6:188512	VO	M00003859C:B09
1767	1034.E08.sp6.188560	VO	M00003868D:F07
1768	1034.C10.sp6:188538	VO	M00003895D:A03
1769	1034.B11.sp6:188527	VO	M00003906C:H12
1770	1034.G11.sp6:188587	VNO	
1771	1034.D12.sp6:188552	VO	M00003918C.E07
1772	1035.H01.sp6:188781	VNO	
1773	1035.G02.sp6:188770	VNO	
1774	325.D3.sp6:145862	VNO	
1775	1035.A05.sp6:188701	VNO	
1776	1035.F05.sp6:188761	VNO	
1777	803.H1.sp6:165016	VNO	
1778	803.F2.sp6:164993	VNO	
1779	1035.G06.sp6:188774	VO	M00004030A:G12

SEQ ID NO:	Sample Name	Overlap	Clone Name
1780	1035.A07.sp6:188703	VO	M00004030B:C05
1781	1035.B07.sp6:188715	VNO	
1782	1035.D08.sp6:188740	VO	M00004035D:C05
1783	1035.G08.sp6:188776	VO	M00004036C:D01
1784	1035.A09.sp6:188705	VNO	
1785	1035.B09.sp6.188717	VO	M00004037B:B05
1786	1035.G09.sp6:188777	VO	M00004038C:D12
1787	803.C4.sp6.164959	VO	M00004051C:D02
1788	803.A5.sp6:164936	VNO	
1789	774.E2.sp6:162484	VO	M00004054D:D02
1790	803.D5.sp6:164972	VNO	
1791	803.C6.sp6·164961	VNO	
1792	803.D6.sp6.164973	VNO	
1793	1035.A12.sp6:188708	VNO	
1794	1035 C12.sp6:188732	VO	M00004076D·B03
1795	774.E4.sp6·162500	VO	M00004081B·C11
1796	1035.G12.sp6:188780	VO	M00004081B·C11
1797	1036.H01 sp6:188973	VO	M00004089A:F02
1798	1036.D02.sp6:188926	VO	M00004091B:G04
1799	1036.G03.sp6:188963	VO	M00004103B:C07
1800	1036.F04.sp6:188952	VNO	
1801	1036.H04.sp6:188976	VO	M00004115A:F01
1802	1036.A05.sp6:188893	VO	M00004115A:G09
1803	1036.B06.sp6:188906	VNO	
1804	803.A7.sp6:164938	VNO	
1805	803.E8.sp6:164987	VNO	
1806	803.F8.sp6:164999	VO	M00004159D C04
1807	803.A9.sp6:164940	VO	M00004160A:D07
1808	1036 D06.sp6:188930	VO	M00004178B:F06
1809	1036.F06.sp6:188954	VNO	
1810	1036.H06.sp6:188978	VO	M00004184B:F11
1811	1036.D09.sp6:188933	VO	M00004202B:A02
1812	1036.F09.sp6:188957	VO	M00004202B:G09
1813	803.H10.sp6:165025	VNO	
1814	803.H11.sp6:165026	VNO	
1815	803.C12.sp6:164967	VNO	
1816	804.D1.sp6:165160	VNO	
1817	983.D01.sp6:186199	VO	M00004247B:C11
1818	1036.D11.sp6:188935	VO	M00004249C:E12
1819	804.B3.sp6:165138	VNO	
1820	983.B03.sp6:186181	VO	M00004277D:C08
1821	804.F5.sp6:165188	VNO	
1822	983.F05.sp6:186221	VO	M00004337D.G08

SEQ ID NO:	Sample Name	Overlap	Clone Name
1823	983.G05.sp6:186230	VO	M00004345A:H06
1824	804.G5.sp6:165200	VNO	
1825	983.A06.sp6:186174	VO	M00004350B:F06
1826	804.A6.sp6:165129	VNO	
1827	774.D12.sp6:162563	VO	M00004350B.F06
1828	804.F7.sp6:165190	VNO	
1829	983.F07.sp6:186223	VO	M00004446A:G01
1830	992.E01.sp6:186367	VO	M00005332A:H10
1831	992 G02.sp6:186392	VNO	
1832	992.A04.sp6:186322	VO	M00005378C.A10
1833	992.D04.sp6:186358	VO	M00005384A:A01
1834	992.B05.sp6:186335	VO	M00005390B:G10
1835	992.H05.sp6:186407	VO	M00005399A:D01
1836	992.A06.sp6:186324	VNO	
1837	992.B06.sp6:186336	VO	M00005399D:B02
1838	020.G4.sp6:128666	VO	M00005404C:F02
1839	020.G8.sp6:128670	VO	M00005411A:C07
1840	992.H06.sp6:186408	VNO	
1841	953.F01.sp6:185185	VO	M00005411D:A03
1842	992.A07.sp6:186325	VO	M00005411D:A03
1843	992.D08.sp6:186362	VO	M00005446A:G01
1844	992.B09.sp6:186339	VO	M00005450B:B01
1845	953.A07.sp6:185131	VO	M00005450B:B01
1846	953.E07.sp6:185179	VO	M00005452C.A02
1847	992.E09.sp6:186375	VO	M00005452C:A02
1848	992.G09.sp6:186399	VO	M00005455A:D01
1849	992.H09.sp6:186411	VO	M00005455A.G03
1850	992.D11.sp6:186365	VNO	
1851	953.H10.sp6:185218	VO	M00005477C:D08
1852	992.F11.sp6:186389	VO	M00005477C:D08
1853	953.D11.sp6:185171	VO	M00005480A:H12
1854	992.H11.sp6:186413	VO	M00005480C·B12
1855	992.A12.sp6:186330	VO	M00005481C:A05
1856	953.E11.sp6:185183	VO	M00005481C:A05
1857	953.C12.sp6:185160	VO	M00005485C:A03
1858	992.F12.sp6:186390	VO	M00005485C:A03
1859	953.E12.sp6:185184	VO	M00005486C:B03
1860	993.C03.sp6:186537	VO	M00005510B:D06
1861	993.D03.sp6:186549	VO	M00005513A:D08
1862	993.E03.sp6:186561	VO	M00005524C:B01
1863	993.G03.sp6:186585	VO	M00005528D:H06
1864	993.A04.sp6:186514	VO	M00005530B:E04
1865	993.B05.sp6:186527	VO	M00005616B:D05

SEQ ID NO:	Sample Name	Overlap	Clone Name
1866	993.C06.sp6:186540	VNO	
1867	993.B08.sp6:186530	VO	M00005704A:B11
1868	993.C08.sp6:186542	VO	M00005708D:B03
1869	993.D09.sp6:186555	VO	M00005765C:C04
1870	993.E09.sp6:186567	VO	M00005772A.F03
1871	993.F10.sp6:186580	VO	M00006577B:H12
1872	993.C11.sp6:186545	VO	M00006587A:H08
1873	993.D11.sp6:186557	VNO	
1874	993.G11.sp6:186593	VNO	
1875	993.H12.sp6:186606	VO	M00006615B:F05
1876	626.B2.sp6:157417	VO	M00007953B:B03
1877	627.E6.sp6:157649	VO	M00007985A:B09
1878	633.C4.sp6:156098	VO	M00008061A·F02
1879	636.F10.sp6:158241	VO	M00022070B:C10
1880	641.G8.GZ42:158428	VO	M00022109B:A11
1881	642.B7.sp6:156281	VO	M00022176C·A08
1882	1010.F02.sp6:189986	VNO	
1883	1010.A09.sp6:189945	VO	M00022828C:E04
1884	1033.C03.sp6:188339	VO	M00001586A:F09
1885	1033.D03.sp6:188351	VO	M00001588D:H08
1886	1033.E03.sp6:188363	VO	M00001589C:D12
1887	1033.F03.sp6:188375	VO	M00001589D:G10
1888	1033.G03.sp6:188387	VO	M00001590D:A07
1889	802.A11.sp6:164750	VNO	
1890	802.B11.sp6:164762	VO	M00001597C:B03
1891	1033.H03.sp6:188399	VO	M00001598C:D10
1892	1033.A04.sp6:188316	VO	M00001599A:H09
1893	1033.B04.sp6:188328	VNO	
1894	1033.C04.sp6:188340	VO	M00001610B:A01
1895	1033.D04.sp6:188352	VO	M00001614C:G04
1896	1033.F04.sp6:188376	VO	M00001618C:E06
1897	1033.G04.sp6:188388	VO	M00001621C.A04
1898	802.E11.sp6:164798	VNO	
1899	802.G11.sp6:164822	VO	M00001623B:B01
1900	802.H11.sp6:164834	VO	M00001623D:A09
1901	1033.H04.sp6:188400	VO	M00001626B:H05
1902	1033.A05.sp6:188317	VNO	
1903	1033.B05.sp6:188329	VO	M00001634C:E12
1904	1033.C05.sp6:188341	VO	M00001639A:A04
1905	1033.D05.sp6:188353	VNO	
1906	1033.E05.sp6:188365	VO	M00001640A:F04
1907	1033.F05.sp6:188377	VO	M00001641B:G05
1908	802.C12.sp6:164775	VO	M00001644D·F09

SEQ ID NO:	Sample Name	Overlap	Clone Name
1909	1033.G05.sp6:188389	VO	M00001647C:C07
1910	1033.H05.sp6:188401	VO	M00001648C:F06
1911	1033.A06.sp6:188318	VNO	
1912	1033.B06.sp6:188330	VO	M00001649D:H05
1913	1033.D06.sp6:188354	VO	M00001655A:F07
1914	1033.E06.sp6:188366	VO	M00001656D:F11
1915	1033.F06.sp6:188378	VNO	
1916	1033.G06.sp6:188390	VNO	
1917	1033 H06.sp6:188402	VO	M00001660A:F10
1918	1033.A07.sp6:188319	VO	M00001663C:C03
1919	1033.B07.sp6:188331	VO	M00001669A:H11
1920	1033.C07.sp6:188343	VO	M00001669B:A03
1921	1033.D07.sp6:188355	VO	M00001675C.B03
1922	1033.E07.sp6:188367	VO	M00001677A.A06
1923	1033.F07 sp6:188379	VO	M00001677A:A12
1924	1033.G07.sp6:188391	VO	M00001678D:A12
1925	1033.H07.sp6:188403	VNO	
1926	1033.A08.sp6.188320	VNO	
1927	1033.C08.sp6:188344	VO	M00001693D:F07
1928	1033.D08.sp6:188356	VO	M00003741A:E01
1929	1033.E08.sp6:188368	VO	M00003745C:E03
1930	1033.F08.sp6:188380	VO	M00003746A:E01
1931	1033.G08.sp6:188392	VNO	
1932	1033.H08.sp6.188404	VO	M00003748B:B06
1933	1033.A09.sp6:188321	VO	M00003749B:C08
1934	1033.B09.sp6:188333	VO	M00003749D:G07
1935	1033.C09.sp6:188345	VO	M00003752A·B06
1936	1033.D09.sp6.188357	VO	M00003752D:D09
1937	1033.E09.sp6:188369	VO	M00003753C:B01
1938	1033.F09.sp6:188381	VO	M00003754C:F01
1939	1033.G09.sp6:188393	VO	M00003756C:C08
1940	1033.H09.sp6:188405	VO	M00003759A:E10
1941	1033.A10.sp6:188322	VO	M00003762A:D11
1942	1033.B10.sp6:188334	VO	M00003763B:D03
1943	1033.C10.sp6:188346	VO	M00003763D:F06
1944	1033.D10.sp6:188358	VO	M00003765D:E02
1945	1033.E10.sp6:188370	VO	M00003766A:G09
1946	1033.F10.sp6:188382	VO	M00003766B:G04
1947	1033.G10.sp6:188394	VO	M00003767C:F04
1948	1033.H10.sp6:188406	VO	M00003769B:A04
1949	1033.A11.sp6:188323	VO	M00003769D:G12
1950	1033.B11.sp6:188335	VO	M00003770D:C07
1951	1033.C11.sp6:188347	VO	M00003771A:G09

SEQ ID NO:	Sample Name	Overlap	Clone Name
1952	1033.D11.sp6:188359	VO	M00003771D:A10
1953	1033.E11.sp6:188371	VO	M00003773A:C09
1954	1033.F11.sp6:188383	VO	M00003773B:E09
1955	1033.G11.sp6:188395	VO	M00003773B:G08
1956	1033.H11.sp6:188407	VO	M00003773C:G06
1957	1033.A12.sp6:188324	VO	M00003773D:C02
1958	802.E12.sp6:164799	VNO	
1959	802.F12.sp6·164811	VNO	
1960	802.G12.sp6:164823	VO	M00003784C·B09
1961	802.H12.sp6:164835	VO	M00003785D:E01
1962	803.A1.sp6:164932	VNO	
1963	803.B1.sp6.164944	VNO	
1964	803.C1.sp6:164956	VNO	
1965	1033 B12.sp6:188336	VO	M00003789C:E03
1966	1033.C12.sp6.188348	VO	M00003790B.F12
1967	1033.D12.sp6:188360	VO	M00003793C:D11
1968	1033.F12.sp6:188384	VO	M00003796B C07
1969	1033.G12.sp6:188396	VO	M00003796C:H03
1970	1034.A01.sp6:188505	VO	M00003797D:H06
1971	1034.B01.sp6:188517	VNO	
1972	1034.C01.sp6:188529	VO	M00003801D:F05
1973	1034.D01.sp6:188541	VO	M00003805A:G05
1974	1034.E01.sp6:188553	VO	M00003808C:D09
1975	1034.F01.sp6:188565	VO	M00003809A:A12
1976	1034.G01.sp6:188577	VO	M00003809A:H12
1977	1034.H01.sp6:188589	VO	M00003809B:D08
1978	1034.A02.sp6:188506	VO	M00003811B:E07
1979	1034.B02.sp6:188518	VO	M00003812B:F08
1980	1034.C02.sp6:188530	VO	M00003812D:E08
1981	1034.D02.sp6:188542	VO	M00003813D:A06
1982	1034.E02.sp6:188554	VO	M00003815C.A06
1983	1034.F02.sp6:188566	VNO	
1984	1034.G02.sp6:188578	VNO	
1985	1034.H02.sp6:188590	VO	M00003818A:F09
1986	1034.A03.sp6:188507	VO	M00003818B:A01
1987	1034.B03.sp6:188519	VO	M00003818C:E09
1988	1034.C03.sp6:188531	VNO	
1989	1034.D03.sp6:188543	VO	M00003819C:E04
1990	1034.E03.sp6:188555	VO	M00003819D:G09
1991	1034.F03.sp6:188567	VO	M00003820A:H04
1992	1034.H03.sp6:188591	VO	M00003820D:E02
1993	1034.A04.sp6:188508	VO	M00003821C:E04
1994	1034.B04.sp6:188520	VO	M00003822A:G05

SEQ ID NO:	Sample Name	Overlap	Clone Name
1995	803.E12.sp6:164991	VNO	
1996	020.E2.sp6:128640	VO	M00004242C:C01
1997	019.F9.sp6:128467	VO	M00006720C:C11
1998	019.G10.sp6:128480	VO	M00007019A:B01
1999	1034.C04.sp6:188532	VNO	
2000	1034.D04.sp6:188544	VO	M00003825B:A05
2001	1034.E04.sp6:188556	VNO	
2002	1034.F04.sp6:188568	VO	M00003825C:B02
2003	1034.G04.sp6:188580	VO	M00003825C:B12
2004	1034.B05.sp6:188521	VO	M00003829A:E02
2005	1034.D05.sp6:188545	VO	M00003832B:G03
2006	1034.E05.sp6:188557	VO	M00003833B.A11
2007	1034.G05.sp6:188581	VO	M00003834A:A03
2008	1034.A06.sp6.188510	VO	M00003835D.H05
2009	1034.B06.sp6:188522	VO	M00003837C:F05
2010	1034.C06.sp6:188534	VNO	
2011	1034.E06.sp6:188558	VO	M00003841A:E09
2012	1034.F06.sp6:188570	VO	M00003841B:D05
2013	1034.H06.sp6:188594	VO	M00003844C:D04
2014	1034.A07.sp6:188511	VO	M00003844C:H05
2015	1034.B07.sp6:188523	VO	M00003845A:A05
2016	1034.C07.sp6:188535	VO	M00003846B:H02
2017	1034.D07.sp6:188547	VO	M00003846D:C12
2018	1034.E07.sp6:188559	VO	M00003850B:D11
2019	1034.G07.sp6:188583	VNO	
2020	1034.B08.sp6.188524	VO	M00003860B:A07
2021	803.D1.sp6:164968	VO	M00003862C·H10
2022	803.E1.sp6:164980	VO	M00003864B:A04
2023	803.F1.sp6:164992	VNO	
2024	803.G1.sp6:165004	VO	M00003864D·G05
2025	1034.C08.sp6:188536	VNO	
2026	1034.D08.sp6:188548	VO	M00003868D:F02
2027	1034.F08.sp6:188572	VO	M00003871A:E09
2028	1034.G08.sp6:188584	VNO	
2029	1034.H08.sp6·188596	VNO	
2030	1034.A09.sp6:188513	VNO	
2031	1034.B09.sp6:188525	VO	M00003884D:A12
2032	1034.C09.sp6:188537	VNO	
2033	1034.D09.sp6:188549	VO	M00003887B:C03
2034	1034.E09.sp6:188561	VO	M00003888B:A10
2035	1034.F09.sp6:188573	VO	M00003888C:E01
2036	1034.G09.sp6:188585	VO	M00003890B:H07
2037	1034.H09.sp6:188597	VO	M00003890D:C03

SEQ ID NO:	Sample Name	Overlap	Clone Name
2038	1034.A10.sp6:188514	VO	M00003892D:D04
2039	1034.B10.sp6:188526	VO	M00003893C:D12
2040	1034.D10.sp6:188550	VO	M00003896B:F08
2041	1034.E10.sp6:188562	VO	M00003896D:B01
2042	1034.F10.sp6:188574	VNO	
2043	1034.G10.sp6:188586	VO	M00003903C:H03
2044	1034.H10.sp6:188598	VO	M00003905C.B01
2045	1034.A11.sp6:188515	VO	M00003905C:E10
2046	1034 C11.sp6:188539	VO	M00003909D:G01
2047	1034.D11.sp6:188551	VO	M00003911C:G05
2048	1034.E11.sp6:188563	VO	M00003912B:G11
2049	1034.F11.sp6:188575	VO	M00003912C:C11
2050	1034.H11.sp6:188599	VO	M00003914C:E03
2051	1034.A12.sp6:188516	VO	M00003915A.D09
2052	1034 B12.sp6:188528	VNO	
2053	1034.C12.sp6:188540	VO	M00003915C:G01
2054	1034.E12.sp6:188564	VO	M00003920B:A10
2055	1034.F12.sp6:188576	VNO	
2056	1034.G12.sp6:188588	VO	M00003921D:C06
2057	1034.H12.sp6:188600	VO	M00003923A:H07
2058	1035.A01.sp6:188697	VNO	
2059	1035.B01.sp6:188709	VNO	
2060	1035.C01.sp6:188721	VO	M00003936C:F10
2061	1035.E01.sp6:188745	VO	M00003948B:B03
2062	1035.F01.sp6:188757	VO	M00003949B:A08
2063	1035.G01.sp6:188769	VO	M00003949B:D05
2064	1035.A02.sp6:188698	VO	M00003961B:A12
2065	1035.B02.sp6:188710	VO	M00003961C:G02
2066	1035.C02.sp6:188722	VO	M00003962B.B09
2067	1035.D02.sp6:188734	VO	M00003963B:D12
2068	1035.E02.sp6:188746	VO	M00003965A:F07
2069	1035.F02.sp6:188758	VNO	
2070	1035.H02.sp6:188782	VNO	
2071	1035.A03.sp6:188699	VO	M00003973A:C05
2072	1035.B03.sp6:188711	VO	M00003973B:H06
2073	1035.C03.sp6:188723	VO	M00003974B:A04
2074	1035.D03.sp6:188735	VNO	
2075	1035.E03.sp6:188747	VNO	
2076	1035.F03.sp6:188759	VNO	
2077	1035.G03.sp6:188771	VO	M00003976D:D12
2078	1035.H03.sp6:188783	VO	M00003977C:A08
2079	1035.A04.sp6:188700	VO	M00003980B:F12
2080	1035.B04.sp6:188712	VO	M00003980C:A11

SEQ ID NO:	Sample Name	Overlap	Clone Name
2081	1035.C04.sp6:188724	VO	M00003980C:G10
2082	1035.D04.sp6:188736	VO	M00003981C:E04
2083	1035.H04.sp6:188784	VO	M00003983C.E07
2084	1035.C05.sp6:188725	VNO	
2085	1035.D05.sp6:188737	VO	M00003987D:F06
2086	1035.E05.sp6:188749	VO	M00003988B:C10
2087	1035.G05.sp6:188773	VNO	
2088	803.A2.sp6:164933	VO	M00003992C:G01
2089	803.B2.sp6:164945	VO	M00003992D:G01
2090	803.C2.sp6:164957	VNO	
2091	803.D2.sp6.164969	VO	M00003994C·C11
2092	803.E2.sp6:164981	VO	M00003996D:C04
2093	803.G2.sp6:165005	VO	M00003997D:D07
2094	803.H2.sp6:165017	VNO	
2095	803.A3.sp6:164934	VO	M00003998A:D03
2096	803.B3.sp6:164946	VO	M00003998A·G12
2097	803.C3.sp6:164958	VO	M00003998C:H10
2098	803 D3.sp6.164970	VO	M00003999C:C12
2099	1035.H05.sp6:188785	VO	M00004027A:B10
2100	1035.A06.sp6:188702	VO	M00004027C:H01
2101	1035.B06.sp6:188714	VO	M00004028C:B04
2102	1035.D06.sp6:188738	VO	M00004029A.E01
2103	1035.F06.sp6:188762	VNO	
2104	1035.H06.sp6:188786	VO	M00004030B:B02
2105	1035.C07.sp6:188727	VO	M00004031A:G05
2106	1035.E07.sp6:188751	VO	M00004032D:D03
2107	1035.F07.sp6:188763	VNO	
2108	1035.G07.sp6:188775	VNO	
2109	1035.A08.sp6:188704	VNO	
2110	1035.C08.sp6.188728	VO	M00004035B:H11
2111	1035.E08.sp6:188752	VO	M00004035D:E04
2112	1035.F08.sp6:188764	VO	M00004036B:F09
2113	1035.H08.sp6:188788	VO	M00004037A:A07
2114	1035.C09.sp6:188729	VO	M00004037C:C05
2115	1035.E09.sp6:188753	VO	M00004037D:B05
2116	1035.F09.sp6:188765	VO	M00004038C:C05
2117	1035.H09.sp6:188789	VO	M00004039D:D03
2118	1035.A10.sp6:188706	VO	M00004040B:B09
2119	1035.B10.sp6:188718	VO	M00004040C:G12
2120	1035.C10.sp6:188730	VO	M00004040D:B05
2121	1035.D10.sp6:188742	VO	M00004041B·F01
2122	1035.E10.sp6:188754	VO	M00004041D:E06
2123	1035.F10.sp6:188766	VO	M00004043D:C10

SEQ ID NO:	Sample Name	Overlap	Clone Name
2124	1035.G10.sp6:188778	VNO	
2125	803.E3.sp6:164982	VO	M00004045A:B12
2126	803.F3.sp6:164994	VO	M00004046A:F04
2127	803.G3.sp6:165006	VNO	
2128	803.H3.sp6:165018	VNO	
2129	803.A4 sp6:164935	VNO	
2130	803.B4.sp6:164947	VNO	
2131	803.D4.sp6:164971	VNO	
2132	803.E4.sp6.164983	VO	M00004052C:A08
2133	803.G4.sp6:165007	VO	M00004054B:G02
2134	803.H4.sp6:165019	VO	M00004054D:A03
2135	803.B5.sp6:164948	VO	M00004055B:F06
2136	803.C5.sp6·164960	VO	M00004058B:C11
2137	803.E5.sp6:164984	VO	M00004058C·E08
2138	803.F5.sp6:164996	VO	M00004059A:G09
2139	803.G5.sp6:165008	VO	M00004060C:A02
2140	803.H5.sp6.165020	VNO	
2141	803.A6.sp6:164937	VO	M00004060D:A07
2142	803.B6.sp6:164949	VO	M00004063C:B11
2143	803.E6.sp6:164985	VNO	
2144	1035.H10.sp6.188790	VO	M00004068A:F02
2145	1035.A11.sp6:188707	VO	M00004068B:D04
2146	1035.B11.sp6·188719	VNO	
2147	1035.C11.sp6:188731	VO	M00004069B:B01
2148	1035.D11.sp6:188743	VO	M00004069D:G02
2149	1035.E11.sp6.188755	VO	M00004071A:H03
2150	1035.F11.sp6:188767	VO	M00004073D:B11
2151	1035.G11.sp6:188779	VNO	
2152	1035.H11.sp6:188791	VNO	
2153	1035.B12.sp6:188720	VNO	
2154	1035.D12.sp6:188744	VNO	
2155	1035.E12.sp6:188756	VNO	
2156	1035.F12.sp6:188768	VO	M00004078C:A08
2157	1035.H12.sp6:188792	VO	M00004081C:A01
2158	1036.A01.sp6:188889	VO	M00004084A:D11
2159	1036.B01.sp6:188901	VO	M00004084C:G04
2160	1036.C01.sp6:188913	VO	M00004085B:G06
2161	1036.D01.sp6:188925	VO	M00004086A:A03
2162	1036.E01.sp6:188937	VO	M00004086D:A07
2163	1036.F01.sp6:188949	VO	M00004087C:F05
2164	1036.G01.sp6:188961	VO	M00004088A:F12
2165	1036.A02.sp6:188890	VO	M00004089A·G03
2166	1036.B02.sp6:188902	VO	M00004091A:E01

SEQ ID NO:	Sample Name	Overlap	Clone Name
2167	1036.C02.sp6:188914	VO	M00004091B:C12
2168	1036.E02.sp6:188938	VO	M00004091C.F04
2169	1036.F02.sp6:188950	VO	M00004091D·D09
2170	1036.G02.sp6:188962	VO	M00004092A:C03
2171	1036.H02.sp6:188974	VO	M00004092A:D04
2172	1036 A03.sp6·188891	VO	M00004093A.F03
2173	1036.B03.sp6:188903	VO	M00004093D:D09
2174	1036.C03.sp6:188915	VNO	
2175	1036 D03.sp6:188927	VO	M00004101D:A03
2176	1036.E03.sp6:188939	VO	M00004102B:B04
2177	1036.F03.sp6:188951	VO	M00004102C:F07
2178	1036.H03.sp6:188975	VNO	
2179	1036.A04.sp6:188892	VNO	
2180	1036.B04.sp6:188904	VNO	
2181	1036.C04.sp6:188916	VNO	
2182	1036.D04.sp6:188928	VO	M00004107C:A01
2183	1036.E04.sp6:188940	VNO	
2184	1036.G04.sp6:188964	VO	M00004114C:F02
2185	1036.C05.sp6:188917	VO	M00004117B:F01
2186	1036.D05.sp6:188929	VO	M00004120A:C02
2187	1036.E05.sp6:188941	VO	M00004126B:G02
2188	1036.F05.sp6:188953	VNO	
2189	1036.G05.sp6:188965	VO	M00004129A:H08
2190	1036.H05.sp6:188977	VO	M00004130C:A09
2191	1036.A06.sp6:188894	VO	M00004130D:E04
2192	1036.C06.sp6:188918	VO	M00004133D:A01
2193	803.F6.sp6:164997	VNO	
2194	803.G6 sp6:165009	VNO	
2195	803.H6.sp6:165021	VNO	
2196	803.B7.sp6:164950	VO	M00004143A:G12
2197	803.C7.sp6:164962	VO	M00004143A:H07
2198	803.D7.sp6:164974	VNO	
2199	803.E7.sp6:164986	VNO	
2200	803.F7.sp6:164998	VO	M00004145C:A03
2201	803.G7.sp6:165010	VO	M00004146D:A07
2202	803.H7.sp6:165022	VO	M00004147A:G03
2203	803.A8.sp6:164939	VO	M00004149B:H12
2204	803.B8.sp6:164951	VNO	
2205	803.C8.sp6:164963	VO	M00004153D:E06
2206	803.D8.sp6:164975	VO	M00004154D:F11
2207	803.G8.sp6:165011	VNO	
2208	803.H8.sp6:165023	VNO	
2209	803.B9.sp6:164952	VNO	

SEQ ID NO:	Sample Name	Overlap	Clone Name
2210	803.C9.sp6:164964	VNO	
2211	803.D9.sp6:164976	VNO	
2212	803.E9.sp6:164988	VNO	
2213	803.F9.sp6:165000	VNO	
2214	803.G9.sp6:165012	VO	M00004166B:E10
2215	803.H9.sp6:165024	VO	M00004166C:A03
2216	803.A10.sp6:164941	VO	M00004166D:G07
2217	803.B10.sp6:164953	VNO	
2218	803.C10.sp6:164965	VNO	
2219	1036.E06.sp6:188942	VO	M00004180B:F04
2220	1036.G06.sp6:188966	VNO	
2221	803.D10.sp6:164977	VNO	
2222	1036.A07.sp6:188895	VNO	
2223	1036.B07.sp6:188907	VNO	
2224	1036.C07.sp6:188919	VNO	
2225	1036.D07.sp6:188931	VO	M00004188A:E10
2226	1036.F07.sp6:188955	VNO	
2227	1036.G07.sp6:188967	VO	M00004190C:G07
2228	1036.H07.sp6:188979	VO	M00004190D:A10
2229	1036.A08.sp6:188896	VNO	
2230	1036.B08.sp6:188908	VO	M00004191B:G01
2231	1036.C08.sp6:188920	VO	M00004193A:C07
2232	1036.D08.sp6:188932	VO	M00004193C:H01
2233	803.E10.sp6:164989	VO	M00004196C:G05
2234	1036.E08.sp6:188944	VO	M00004198D:H04
2235	1036.F08.sp6.188956	VO	M00004199D:C02
2236	1036.G08.sp6:188968	VO	M00004200A:A09
2237	1036.H08.sp6:188980	VO	M00004200A:G06
2238	803 F10.sp6:165001	VNO	
2239	1036.A09.sp6:188897	VO	M00004200D:A07
2240	1036.B09.sp6:188909	VO	M00004201D:C11
2241	1036.C09.sp6:188921	VO	M00004201D:E12
2242	1036.E09.sp6:188945	VNO	
2243	1036.G09.sp6:188969	VO	M00004204A:D04
2244	1036.H09.sp6:188981	VO	M00004204A:D10
2245	1036.A10.sp6:188898	VO	M00004204B:A04
2246	1036.B10.sp6:188910	VNO	
2247	1036.C10.sp6:188922	VO	M00004210A:B09
2248	1036.D10.sp6:188934	VO	M00004213A:H12
2249	1036.E10.sp6:188946	VO	M00004214A:D03
2250	1036.F10.sp6:188958	VO	M00004216D:E10
2251	1036.G10.sp6:188970	VO	M00004217A:A05
2252	1036.H10.sp6:188982	VO	M00004217A:A11

SEQ ID NO:	Sample Name	Overlap	Clone Name
2253	1036.A11.sp6:188899	VO	M00004217D:G10
2254	1036.B11.sp6:188911	VO	M00004218C:G10
2255	1036.C11.sp6:188923	VNO	
2256	803.G10.sp6:165013	VNO	
2257	803.A11.sp6:164942	VNO	
2258	803.B11.sp6:164954	VNO	
2259	803.C11.sp6:164966	VNO	
2260	803.D11.sp6:164978	VO	M00004234B:E03
2261	803.E11.sp6:164990	VO	M00004234B:G06
2262	803.G11.sp6:165014	VO	M00004236D:F04
2263	803.A12.sp6:164943	VNO	
2264	803.B12 sp6:164955	VO	M00004240D:A07
2265	803.D12.sp6:164979	VNO	
2266	803.F12.sp6:165003	VO	M00004242C:C02
2267	803.G12.sp6:165015	VNO	
2268	803.H12.sp6:165027	VO	M00004244B:A02
2269	804.A1.sp6:165124	VNO	
2270	983.A01.sp6:186169	VO	M00004245A:G09
2271	983.B01.sp6.186179	VO	M00004245C:A03
2272	804.C1.sp6:165148	VNO	
2273	983.C01.sp6:186189	VO	M00004247A:E01
2274	983.E01.sp6:186208	VO	M00004248A:G08
2275	804.E1.sp6:165172	VNO	
2276	1036.E11.sp6:188947	VNO	
2277	1036.F11.sp6:188959	VO	M00004252D:A07
2278	1036.G11.sp6:188971	VO	M00004252D:H08
2279	1036.H11.sp6:188983	VO	M00004253B:A10
2280	1036.A12.sp6:188900	VO	M00004253B:F06
2281	1036.B12.sp6:188912	VO	M00004253C:E10
2282	1036.C12.sp6:188924	VO	M00004253D:F09
2283	1036.D12.sp6:188936	VO	M00004257C:A08
2284	1036.E12.sp6:188948	VO	M00004260A:B07
2285	1036.F12.sp6:188960	VO	M00004260C:A12
2286	1036.G12.sp6:188972	VO	M00004260C:E10
2287	1036.H12.sp6:188984	VO	M00004262C:C01
2288	804.F1 sp6:165184	VNO	
2289	983.F01.sp6:186217	VO	M00004263D:F06
2290	983.G01.sp6:186226	VNO	
2291	983.H01.sp6:186235	VO	M00004266B:H06
2292	804.H1.sp6:165208	VNO	
2293	983.A02.sp6:186170	VO	M00004268C.F08
2294	983.B02.sp6:186180	VO	M00004268D:G07
2295	804.B2.sp6:165137	VNO	

SEQ ID NO:	Sample Name	Overlap	Clone Name
2296	983.C02.sp6:186190	VO	M00004269A:B11
2297	804.D2.sp6:165161	VNO	
2298	983.D02.sp6:186200	VO	M00004269D:E08
2299	983.E02.sp6:186209	VO	M00004272D:D02
2300	804.E2.sp6:165173	VNO	
2301	804.F2.sp6:165185	VNO	
2302	983.F02.sp6:186218	VO	M00004273D:E11
2303	804.G2.sp6:165197	VNO	
2304	983.G02.sp6:186227	VO	M00004276C:E12
2305	804.H2.sp6:165209	VNO	
2306	983.H02.sp6:186236	VNO	
2307	983.A03.sp6.186171	VO	M00004277C.H11
2308	804.A3.sp6:165126	VNO	
2309	804.C3.sp6:165150	VNO	
2310	983.C03.sp6:186191	VO	M00004279D·E02
2311	983.D03.sp6:186201	VNO	
2312	804.D3.sp6:165162	VNO	
2313	983.E03.sp6:186210	VO	M00004281B:B05
2314	804.E3.sp6:165174	VNO	
2315	804.F3.sp6:165186	VNO	
2316	983.F03.sp6:186219	VO	M00004283C:D03
2317	983.G03.sp6:186228	VNO	
2318	804.G3.sp6:165198	VNO	
2319	804.H3.sp6:165210	VNO	
2320	983.H03.sp6:186237	VO	M00004285B:E01
2321	804.A4.sp6:165127	VNO	
2322	983.A04.sp6.186172	VNO	
2323	804.B4.sp6:165139	VNO	
2324	983.B04.sp6:186182	VNO	
2325	804.C4.sp6:165151	VNO	
2326	983.C04.sp6:186192	VNO	
2327	983.D04.sp6:186202	VO	M00004297D:E08
2328	804.D4.sp6:165163	VNO	
2329	804.E4.sp6:165175	VNO	
2330	983.E04.sp6:186211	VO	M00004298B:D04
2331	804.F4.sp6:165187	VNO	
2332	983.F04.sp6.186220	VO	M00004308A:E06
2333	804.G4.sp6:165199	VNO	
2334	983.G04.sp6:186229	VO	M00004324B:D09
2335	983.H04.sp6:186238	VO	M00004328A:H06
2336	804.H4.sp6:165211	VNO	
2337	804.A5.sp6:165128	VNO	
2338	983.A05.sp6:186173	VO	M00004329C:F11

SEQ ID NO:	Sample Name	Overlap	Clone Name
2339	804.B5.sp6:165140	VNO	
2340	983.B05.sp6:186183	VO	M00004331D:H08
2341	983.C05.sp6:186193	VNO	
2342	804.C5.sp6:165152	VNO	
2343	983.D05.sp6:186203	VO	M00004332B:E11
2344	804.D5.sp6:165164	VNO	
2345	983.E05.sp6:186212	VO	M00004332C:E09
2346	804.E5.sp6:165176	VNO	
2347	983.H05.sp6:186239	VNO	
2348	804.H5.sp6:165212	VNO	
2349	804.B6.sp6:165141	VNO	
2350	983.B06.sp6:186184	VO	M00004383A:F02
2351	983.C06.sp6:186194	VO	M00004385C:B11
2352	804.C6.sp6:165153	VNO	
2353	983.D06.sp6:186204	VO	M00004388C:D05
2354	804.D6.sp6:165165	VNO	
2355	804.E6.sp6:165177	VNO	
2356	983.E06.sp6:186213	VO	M00004389C:E01
2357	983.F06.sp6:186222	VNO	
2358	804.F6.sp6:165189	VNO	
2359	983.G06.sp6:186231	VO	M00004406A:H03
2360	804.G6.sp6:165201	VNO	
2361	983.H06.sp6:186240	VNO	
2362	804.H6.sp6:165213	VNO	
2363	804.A7.sp6:165130	VO	M00004408D:A10
2364	983 A07.sp6:186175	VO	M00004408D:A10
2365	983.B07.sp6:186185	VO	M00004410A:E03
2366	983.C07.sp6:186195	VO	M00004412B:E03
2367	983.D07.sp6:186205	VO	M00004419D:G01
2368	804.E7.sp6:165178	VNO	
2369	983.E07.sp6:186214	VO	M00004421A:G04
2370	804.G7.sp6:165202	VNO	
2371	983.G07.sp6:186232	VO	M00004447D:D10
2372	804.H7.sp6:165214	VNO	
2373	983.H07.sp6:186241	VO	M00004449D:H01
2374	983.A08.sp6:186176	VO	M00004460B:H09
2375	804.A8.sp6:165131	VNO	
2376	804.B8.sp6:165143	VNO	
2377	983.B08.sp6:186186	VNO	
2378	983.C08.sp6:186196	VO	M00004465C:B10
2379	804.C8.sp6:165155	VNO	
2380	983.D08.sp6:186206	VO	M00004465C:B12
2381	804.D8.sp6:165167	VNO	

SEQ ID NO:	Sample Name	Overlap	Clone Name
2382	983.E08.sp6:186215	VNO	
2383	804.E8.sp6.165179	VNO	
2384	983.F08.sp6:186224	VO	M00004467A:F09
2385	804.F8.sp6:165191	VNO	
2386	804.G8.sp6:165203	VNO	
2387	983.G08.sp6:186233	VO	M00004467D:F09
2388	804.H8.sp6:165215	VNO	
2389	983.H08.sp6:186242	VO	M00004469A:C12
2390	804.A9.sp6:165132	VNO	
2391	983.A09.sp6:186177	VNO	
2392	983.B09.sp6:186187	VO	M00004491D:D07
2393	804.B9.sp6:165144	VNO	
2394	804.C9.sp6:165156	VNO	
2395	983.C09.sp6:186197	VO	M00004497C:E09
2396	983.D09.sp6:186207	VO	M00004498B:E01
2397	804.D9.sp6:165168	VNO	
2398	804.E9.sp6:165180	VNO	
2399	983.E09.sp6:186216	VO	M00004501A:G06
2400	983.F09.sp6:186225	VO	M00004506C.H10
2401	804.G9.sp6:165204	VNO	
2402	983.G09.sp6:186234	VO	M00004508A:G12
2403	804.H9.sp6·165216	VNO	
2404	983.H09.sp6:186243	VO	M00004508B:G02
2405	804.A10.sp6:165133	VNO	
2406	983.A10.sp6:186178	VO	M00004509A·H02
2407	983.B10.sp6:186188	VNO	
2408	804.B10.sp6:165145	VNO	
2409	983.C10.sp6:186198	VO	M00004609C:C11
2410	992.B01.sp6:186331	VO	M00005294D:H02
2411	992.C01.sp6:186343	VO	M00005326B·F03
2412	992.G01.sp6:186391	VO	M00005342A:C04
2413	992.H01.sp6:186403	VO	M00005342A:D04
2414	992.A02.sp6:186320	VO	M00005342B:G10
2415	992.B02.sp6.186332	VO	M00005342D:F03
2416	992.C02.sp6:186344	VO	M00005349B:G01
2417	992.D02.sp6:186356	VO	M00005352B:D02
2418	992.H02.sp6:186404	VO	M00005354C:E02
2419	992.A03.sp6·186321	VO	M00005356A:D09
2420	992.C03.sp6:186345	VO	M00005359D:G07
2421	992.E03.sp6:186369	VO	M00005377A:A04
2422	992.H03.sp6:186405	VO	M00005378A:A08
2423	992.B04.sp6:186334	VO	M00005383D:D06
2424	992.C04.sp6·186346	VO	M00005383D:E07

SEQ ID NO:	Sample Name	Overlap	Clone Name
2425	992.E04 sp6:186370	VNO	
2426	992.F04.sp6.186382	VO	M00005385C:G05
2427	992.G04.sp6:186394	VNO	
2428	992.A05.sp6:186323	VO	M00005388D:F09
2429	992.D05.sp6:186359	VO	M00005393A.E11
2430	992.E05.sp6:186371	VO	M00005394A:G07
2431	992.G05.sp6:186395	VO	M00005397C:B03
2432	992.D06.sp6:186360	VNO	
2433	992.G06.sp6:186396	VO	M00005409D:C02
2434	992.C07.sp6:186349	VO	M00005415C:G08
2435	992.E07.sp6:186373	VO	M00005417A:E10
2436	992.F07.sp6:186385	VNO	
2437	992.A08.sp6:186326	VO	M00005442D:C05
2438	992.B08.sp6:186338	VNO	
2439	992.C08.sp6:186350	VO	M00005444B:E11
2440	992.E08.sp6:186374	VO	M00005446C:D12
2441	992.F08.sp6:186386	VNO	
2442	992.G08.sp6:186398	VNO	
2443	992.H08.sp6:186410	VNO	
2444	992.D09.sp6:186363	VNO	
2445	992.F09.sp6:186387	VO	M00005454C:H12
2446	992.E10.sp6:186376	VO	M00005462C:B02
2447	992.H10.sp6:186412	VO	M00005468A:D08
2448	953.H09.sp6:185217	VO	M00005468A:D08
2449	992.C11.sp6:186353	VO	M00005469D:C11
2450	992.D12.sp6:186366	VO	M00005483D:A12
2451	992.E12.sp6:186378	VO	M00005484A:D09
2452	992.H12.sp6:186414	VNO	
2453	993.A01.sp6:186511	VNO	
2454	993.B01.sp6:186523	VO	M00005491B:C03
2455	993.C01.sp6:186535	VO	M00005493B:A12
2456	993.D01.sp6:186547	VO	M00005493B:C08
2457	993.E01.sp6:186559	VO	M00005493B:E01
2458	993.F01.sp6:186571	VO	M00005494D:F11
2459	993.G01.sp6:186583	VO	M00005496C:A01
2460	993.H01.sp6:186595	VO	M00005496D:A10
2461	993.A02.sp6:186512	VO	M00005497B:H07
2462	993.B02.sp6:186524	VO	M00005497C:C07
2463	993.C02.sp6:186536	VNO	
2464	993.D02.sp6:186548	VO	M00005497C:C12
2465	993.E02.sp6:186560	VO	M00005497C:E03
2466	993.F02.sp6:186572	VO	M00005498B:F08
2467	993.G02.sp6 186584	VO	M00005498C:G05

SEQ ID NO:	Sample Name	Overlap	Clone Name
2468	993.H02.sp6:186596	VO	M00005505A:C08
2469	993.A03.sp6:186513	VO	M00005508A:H01
2470	993.B03.sp6:186525	VO	M00005508B:B04
2471	993.F03.sp6:186573	VO	M00005528D:A10
2472	993.H03.sp6:186597	VO	M00005530B:D03
2473	993.B04.sp6:186526	VO	M00005534A:G06
2474	993.C04.sp6.186538	VO	M00005534B.H10
2475	993.D04.sp6:186550	VO	M00005539D:G07
2476	993.E04.sp6:186562	VO	M00005548B·E03
2477	993.F04.sp6·186574	VO	M00005550B:D09
2478	993.G04.sp6:186586	VO	M00005565C.A08
2479	993.H04.sp6:186598	VO	M00005571A.E11
2480	993.A05.sp6:186515	VO	M00005589C:B03
2481	993.C05.sp6:186539	VNO	
2482	993.D05.sp6:186551	VO	M00005620C:C05
2483	993.E05.sp6:186563	VO	M00005621A:G10
2484	993.F05.sp6:186575	VO	M00005621D:F01
2485	993.G05.sp6:186587	VNO	
2486	993.H05.sp6:186599	VO	M00005626A:B11
2487	993.A06.sp6:186516	VO	M00005631A:A11
2488	993.B06.sp6:186528	VO	M00005632C:D06
2489	993.D06.sp6:186552	VNO	
2490	993.E06.sp6:186564	VO	M00005636C.D11
2491	993.F06.sp6:186576	VO	M00005637B:D12
2492	993.G06.sp6:186588	VNO	
2493	993.H06.sp6:186600	VNO	
2494	993.A07.sp6:186517	VO	M00005642B:C03
2495	993.B07.sp6:186529	VO	M00005645D:F08
2496	993.C07.sp6:186541	VNO	
2497	993.D07.sp6:186553	VNO	
2498	993.E07.sp6:186565	VO	M00005647D:D09
2499	993.F07.sp6:186577	VO	M00005655B:C02
2500	993.G07.sp6:186589	VNO	
2501	993.H07.sp6:186601	VO	M00005703A:C08
2502	993.A08.sp6:186518	VNO	
2503	993.D08.sp6:186554	VO	M00005710A:C08
2504	993.E08.sp6:186566	VO	M00005720A:D03
2505	993.F08.sp6:186578	VO	M00005720B:D09
2506	993.G08.sp6:186590	VNO	
2507	993.H08.sp6:186602	VO	M00005722D:G03
2508	993.A09.sp6:186519	VO	M00005743B:F02
2509	993.B09.sp6:186531	VO	M00005762D:A01
2510	993.C09.sp6:186543	VO	M00005763B:H09

SEQ ID NO:	Sample Name	Overlap	Clone Name
2511	993.F09.sp6:186579	VO	M00005783A:C05
2512	993.G09.sp6:186591	VO	M00005810C:D04
2513	993.H09.sp6:186603	VO	M00005812C:F10
2514	993.A10.sp6:186520	VO	M00005813D:F06
2515	993.C10.sp6:186544	VO	M00005818C:E08
2516	993.D10.sp6:186556	VO	M00005818C:G01
2517	993.E10.sp6:186568	VO	M00006576D:F11
2518	993.G10.sp6:186592	VO	M00006581C:D02
2519	993.H10.sp6:186604	VO	M00006581D:H08
2520	993 A11.sp6:186521	VNO	
2521	993 B11.sp6:186533	VO	M00006582D:E05
2522	993.E11.sp6:186569	VO	M00006594A:E08
2523	993.F11.sp6:186581	VO	M00006594D:F09
2524	993.H11.sp6:186605	VO	M00006596D:H04
2525	993.A12.sp6:186522	VO	M00006601C.A07
2526	993.B12.sp6:186534	VO	M00006601C:E06
2527	993.C12.sp6:186546	VO	M00006601D:F04
2528	993.D12.sp6:186558	VO	M00006604C:H10
2529	993.E12.sp6:186570	VO	M00006607B:E03
2530	993.F12.sp6:186582	VO	M00006607B:F04
2531	993.G12.sp6:186594	VO	M00006609A:G10
2532	1010.A01.sp6:189937	VO	M00022495C:G05
2533	1010.B01.sp6·189947	VO	M00022498C:C08
2534	1010.C01.sp6:189957	VO	M00022504B:E03
2535	1010.D01.sp6:189967	VO	M00022505D:A12
2536	1010.E01 sp6:189976	VO	M00022509D:F06
2537	1010 F01 sp6:189985	VNO	
2538	1010.G01.sp6:189994	VO	M00022515D:C04
2539	1010.H01.sp6·190003	VO	M00022527A:E05
2540	1010.A02.sp6:189938	VO	M00022527D:B03
2541	1010.B02.sp6:189948	VO	M00022531B:D07
2542	1010.C02.sp6:189958	VO	M00022535D:B11
2543	1010.D02.sp6:189968	VO	M00022535D:C04
2544	1010.E02.sp6:189977	VO	M00022536B:B04
2545	1010.G02.sp6:189995	VO	M00022551A:G03
2546	1010.H02.sp6:190004	VO	M00022556B:C04
2547	1010.A03.sp6:189939	VO	M00022556B:G02
2548	1010.B03.sp6:189949	VNO	
2549	1010.C03.sp6:189959	VO	M00022562C:H10
2550	1010.D03.sp6:189969	VNO	
2551	1010.E03.sp6:189978	VO	M00022578B:G05
2552	1010.F03.sp6:189987	VO	M00022578C:B07
2553	1010.G03 sp6:189996	VO	M00022578D:A08

SEQ ID NO:	Sample Name	Overlap	Clone Name
2554	1010.H03.sp6:190005	VO	M00022578D:F03
2555	1010.A04.sp6.189940	VNO	
2556	1010.B04.sp6:189950	VO	M00022583B:E05
2557	1010.C04.sp6:189960	VO	M00022587C:G04
2558	1010.D04.sp6:189970	VO	M00022594B:H12
2559	1010.E04.sp6:189979	VO	M00022597B:F11
2560	1010.F04.sp6:189988	VO	M00022598A:F11
2561	1010.G04.sp6:189997	VNO	
2562	1010.H04.sp6:190006	VO	M00022599D:E07
2563	1010.A05.sp6:189941	VO	M00022600C:A06
2564	1010.B05.sp6:189951	VO	M00022604B:C11
2565	1010.C05.sp6:189961	VO	M00022607B:A04
2566	1010.D05.sp6:189971	VO	M00022613D:C04
2567	1010.E05.sp6:189980	VO	M00022651D:C06
2568	1010.F05.sp6:189989	VNO	
2569	1010.G05.sp6:189998	VNO	
2570	1010.H05.sp6:190007	VO	M00022666B:E12
2571	1010.A06.sp6:189942	VO	M00022666C:H11
2572	1010.B06.sp6:189952	VNO	
2573	1010.C06.sp6:189962	VO	M00022681C:H02
2574	1010.D06.sp6:189972	VO	M00022682A:F12
2575	1010.E06.sp6:189981	VO	M00022685A:F11
2576	1010.F06.sp6:189990	VO	M00022698C:E06
2577	1010.G06.sp6:189999	VO	M00022701B:B12
2578	1010.H06.sp6:190008	VO	M00022708A:C08
2579	1010.A07 sp6:189943	VO	M00022708D:G10
2580	1010.B07.sp6:189953	VO	M00022716D.D08
2581	1010.C07.sp6:189963	VNO	
2582	1010.D07.sp6:189973	VO	M00022725C:B03
2583	1010.E07.sp6:189982	VO	M00022725C:E09
2584	1010.F07.sp6:189991	VO	M00022726A:A06
2585	1010.G07.sp6:190000	VNO	
2586	1010.H07.sp6:190009	VNO	
2587	1010.A08.sp6:189944	VO	M00022730A:E04
2588	1010.B08.sp6:189954	VNO	
2589	1010.C08.sp6:189964	VO	M00022735B:B01
2590	1010.D08.sp6:189974	VO	M00022737A:C08
2591	1010.E08.sp6:189983	VNO	
2592	1010.F08.sp6:189992	VO	M00022745B:G02
2593	1010.G08.sp6:190001	VO	M00022763A:E10
2594	1010.H08.sp6:190010	VO	M00022824C:H11
2595	1010.B09.sp6:189955	VO	M00022835C:E06
2596	1010.C09.sp6:189965	VO	M00022854D:H07

SEQ ID NO:	Sample Name	Overlap	Clone Name
2597	1010.D09.sp6:189975	VO	M00022856A:D02
2598	1010.E09.sp6:189984	VNO	
2599	1010.F09.sp6:189993	VO	M00022856B:F04
2600	1010.G09.sp6:190002	VO	M00022856C:B11
2601	1010.H09.sp6:190011	VO	M00022893C:H11
2602	1010.A10.sp6:189946	VO	M00022897A:F04
2603	1010.B10.sp6:189956	VO	M00022900D:E08
2604	1010.C10.sp6:189966	VO	M00022900D:G03
2605	019.C4.sp6:128426	VO	M00004190A:A09
2606	774.C8.sp6:162530	VO	M00004190A·A09
2607	1036.E07.sp6:188943	VO	M00004190A·A09
2608	019.E11.sp6:128457	VO	M00005817D:E12
2609	993.B10.sp6:186532	VO	M00005817D:E12
2610	019.G5.sp6:128475	VO	M00006927C:F12

Table 1C

SEQ ID NO:	Sequence Name	THC Accession No.
2611	RTA00000587F.p.24.1.Seq	THC226834
2612	RTA00000629F.l.02.1.Seq	THC210324
2613	RTA00000623F.n.17.1.Seq	THC208388
2614	RTA00000593F.i.08.2.Seq	H91190
2615	RTA00000622F.b.03.1.Seq	AA554045
2616	RTA00000618F.e.06.1.Seq	THC226692
2617	RTA00000592F o.02.1.Seq	AA099789
2618	RTA00000618F.c 04.1.Seq	THC222808
2619	RTA00000590F.i.01.1.Seq	THC173163
2620	RTA00000606F.o.14.1.Seq	THC223717
2621	RTA00000626F.d.07.1.Seq	THC234888
2622	RTA00000587F.l.08.1.Seq	THC104384
2623	RTA00000586F.a.13.1.Seq	THC140691
2624	RTA00000617F.a.17.1.Seq	THC221850
2625	RTA00000615F.b.23.1.Seq	THC205191
2626	RTA00000632F.f.10.1.Seq	N39216
2627	RTA00000607F.o.13.2.Seq	THC233619
2628	RTA00000622F.c.12.1.Seq	THC118482
2629	RTA00000625F.b.07.1.Seq	THC223154
2630	RTA00000587F.j.01.1.Seq	H63018
2631	RTA00000608F.i.15.1.Seq	THC216448
2632	RTA00000592F.j.06.1.Seq	THC148215
2633	RTA00000589F.b.14.1.Seq	THC158020
2634	RTA00000633F.g.19.1.Seq	THC202541
2635	RTA00000620F.o.07.1.Seq	THC155200
2636	RTA00000586F.p.01.1.Seq	AA558590
2637	RTA00000630F.l.10.1.Seq	THC204748
2638	RTA00000626F.c.13.1.Seq	AA159259
2639	RTA00000591F.m.06.1.Seq	THC227858
2640	RTA00000630F.i.11.1.Seq	THC228806
2641	RTA00000621F.h.08.1.Seq	THC163604
2642	RTA00000589F.d.10.1.Seq	THC177076
2643	RTA00000597F.p.01.1.Seq	THC210746
2644	RTA00000619F.c.13.1.Seq	R57955
2645	RTA00000607F.c.07.2.Seq	THC208762
2646	RTA00000595F.b.02.1.Seq	THC233682
2647	RTA00000631F.h.04.1.Seq	THC223281
2648	RTA00000596F.p.18.1.Seq	THC197103
2649	RTA00000586F.o.13.1.Seq	THC222729
2650	RTA00000610F.p.17.1.Seq	EST19015
2651	RTA00000596F.c.05.1.Seq	EST72617

SEQ ID NO:	Sequence Name	THC Accession No.
2652	RTA00000632F.j.19.1.Seq	THC90741
2653	RTA00000607F.e.23.2.Seq	AA639216
2654	RTA00000628F.b.19.1.Seq	THC118075
2655	RTA00000609F.d.13.1.Seq	THC195579
2656	RTA00000621F.k.03.1.Seq	EST70278
2657	RTA00000592F.l.04.1.Seq	THC91941
2658	RTA00000592F.k.09.1.Seq	THC229803
2659	RTA00000622F.e.17.1.Seq	R57425
2660	RTA00000628F.g.13.1.Seq	THC176706
2661	RTA00000592F.k.23.1.Seq	THC232202
2662	RTA00000609F.m.04.2.Seq	AA507611
2663	RTA00000626F.b.04.1.Seq	EST69420
2664	RTA00000591F.m.01.1.Seq	H41850
2665	RTA00000608F.n.23.1.Seq	THC214886
2666	RTA00000583F.d.19.1.Seq	THC229251
2667	RTA00000621F.p.15.1.Seq	THC212450
2668	RTA00000583F.n.05.1.Seq	AA252468
2669	RTA00000597F.f.17.1.Seq	THC219322
2670	RTA00000606F.l.10.1.Seq	THC225232
2671	RTA00000618F.n.14.1.Seq	THC216591
2672	RTA00000612F.h.05.3.Seq	THC158250
2673	RTA00000619F.a.24.1.Seq	AA437370
2674	RTA00000617F.k.13.1.Seq	AA244445
2675	RTA00000623F.h.07.1.Seq	THC212330
2676	RTA00000620F.e.01.1.Seq	THC167493
2677	RTA00000620F.h.10.1.Seq	THC232456
2678	RTA00000589F.e.21.2.Seq	THC208239
2679	RTA00000626F.b.22.1.Seq	THC225644
2680	RTA00000620F.i.16.1.Seq	AA536090
2681	RTA00000613F.c.17 1.Seq	THC92470
2682	RTA00000621F.c.12.1.Seq	THC156244
2683	RTA00000618F.b.17.1.Seq	THC209838
2684	RTA00000585F.d.16.1.Seq	THC211870
2685	RTA00000592F.a.06.1.Seq	THC233200
2686	RTA00000583F.p.08.1.Seq	THC196844
2687	RTA00000622F.h.21.1.Seq	EST12698
2688	RTA00000591F.h.03.1.Seq	THC213771
2689	RTA00000620F.g.22.1.Seq	THC224063
2690	RTA00000588F.l.20.2.Seq	R84876
2691	RTA00000614F.a.20.1.Seq	R84876
2692	RTA00000611F.n.14.3.Seq	THC200742
2693	RTA00000619F.f.23.1.Seq	THC227573

SEQ ID NO:	Sequence Name	THC Accession No.
2694	RTA00000608F.g.24.1.Seq	T93977
2695	RTA00000595F.o.01.2.Seq	EST61392
2696	RTA00000608F.b.23.1.Seq	THC161665
2697	RTA00000606F.o.23.1.Seq	AA464645
2698	RTA00000588F.i.22.3.Seq	THC162216
2699	RTA00000610F.i.13.1.Seq	AA595068
2700	RTA00000608F.b.15.1.Seq	EST11866
2701	RTA00000597F.e.16.1.Seq	N88730
2702	RTA00000610F.h.13.1.Seq	THC195895
2703	RTA00000611F.h.21.2.Seq	EST46722
2704	RTA00000584F.b.06.1.Seq	EST02998
2705	RTA00000584F.b.06 2.Seq	EST02998
2706	RTA00000608F.j.05.1.Seq	EST60433
2707	RTA00000588F.b.03.1.Seq	THC164651

Table 2A: Nearest Neighbor (BlastN vs. Genbank)

SEQ ID	ACC'N	DESCRIP.	P VALUE
571	L17043	Homo sapiens pregnancy-specific beta-1-glycoprotein-11 gene.	1.00E-12
578	M18864	Rat bone protein I (BP-I) mRNA, partial cds.	7.00E-30
609	L13838	Human genomic sequence from chromosome 13, clone ch13lambdacDNA17-18.	4.00E-36
618	U09646	Human carnitine palmitoyltransferase II precursor	1.00E-34
627	U72621	Human LOT1 mRNA, complete cds	1.00E-43
629	M20910	Human 7S L gene, complete.	1.00E-35
636	Z48950	H.sapiens hH3.3B gene for histone H3.3	4.00E-36
639	X00247	Human translocated c-myc gene in Raji Burkitt lymphoma cells	3.00E-44
643	D80007	Human mRNA for KIAA0185 gene, partial cds	7.00E-52
646	U14967	Human ribosomal protein L21 mRNA, complete cds.	2.00E-42
649	M13934	Human ribosomal protein S14 gene, complete cds.	4.00E-45
652	NM_003902.1	Homo sapiens far upstream element binding protein (FUBP) mRNA > :: gb|U05040|HSU05040 Human FUSE binding protein mRNA, complete cds.	1.00E-54
657	L41142	Homo sapiens signal transducer and activator of transcription (STAT5) mRNA, complete cds.	2.00E-62
665	Z12112	pWE15A cosmid vector DNA	2.00E-52
667	Z54386	H.sapiens CpG island DNA genomic Mse1 fragment, clone 10g3, forward read cpg10g3.ft1a	7 00E-48
668	X80333	M.musculus rab18 mRNA	2.00E-52
669	X52126	Human alternatively spliced c-myb mRNA	1.00E-64
671	L26247	Homo sapiens sui1iso1 mRNA, complete cds.	3.00E-54
676	NM_001736.1	Homo sapiens complement component 5 receptor 1 C5a anaphylatoxin receptor mRNA, complete cds.	4.00E-56
677	Z50798	G.gallus mRNA for p52	4 00E-55
679	AB002368	Human mRNA for KIAA0370 gene, partial cds	2.00E-58
681	M26697	Human nucleolar protein (B23) mRNA, complete cds.	4.00E-48
683	D42087	Human mRNA for KIAA0118 gene, partial cds	4.00E-56
693	D50734	Rat mRNA of antizyme inhibitor, complete cds	2.00E-50
697	X02344	Homo sapiens beta 2 gene	1 00E-67
698	NM_001067.1	Homo sapiens topoisomerase (DNA) II alpha topoisomerase II (top2) mRNA, complete cds.	7.00E-63
701	U36309	Gallus gallus rhoGap protein mRNA, complete cds	3.00E-62
703	NM_002842.1	Homo sapiens protein tyrosine phosphatase, receptor type, H (PTPRH) mRNA > :: dbj|D15049|HUMSAP1C Human mRNA for protein tyrosine phosphatase	2.00E-81
707	U47322	Cloning vector DNA, complete sequence.	1.00E-63

Table 2A: Nearest Neighbor (BlastN vs. Genbank)

SEQ ID	ACC'N	DESCRIP	P VALUE
714	NM_001190 1	Homo sapiens branched chain aminotransferase 2, mitochondrial (BCAT2) mRNA > :: gb|U68418|HSU68418 Human branched chain aminotransferase precursor (BCATm) mRNA, nuclear gene encoding mitochondrial protein, complete cds	4.00E-67
718	S62077	HP1Hs alpha=25 kda chromosomal autoantigen [human, mRNA, 876 nt]	5.00E-68
719	U34991	Human endogenous retrovirus clone c18.4, HERV-H/HERV-E hybrid multiply spliced protease/integrase mRNA, complete cds, and envelope protein mRNA, partial cds	2.00E-61
722	U18671	Human Stat2 gene, complete cds.	4.00E-77
723	L18964	Human protein kinase C iota isoform (PRKCI) mRNA, complete cds.	4.00E-68
724	D29956	Human mRNA for KIAA0055 gene, complete cds	6.00E-70
725	M77140	H.sapiens pro-galanin mRNA, 3' end.	2.00E-72
728	U51432	Homo sapiens nuclear protein Skip mRNA, complete cds	1.00E-75
729	M84334	Macacca mulatta hnRNP A1-gamma isoform mRNA, complete cds.	5.00E-50
730	NM_002592 .1	Homo sapiens proliferating cell nuclear antigen (PCNA) mRNA > :: gb|M15796|HUMCYL Human cyclin protein gene, complete cds.	1.00E-74
731	M88458	Human ELP-1 mRNA sequence.	4.00E-76
732	U44940	Mus musculus quaking type I (QKI) mRNA, complete cds	2 00E-69
733	D17577	Mouse mRNA for kinesin-like protein (Kif1b), complete cds	2.00E-71
734	U18920	Human chromosome 17q12-21 mRNA, clone pOV-3, partial cds.	2.00E-72
736	M21188	Human insulin-degrading enzyme (IDE) mRNA, complete cds.	7.00E-82
737	U49058	Rattus norvegicus CTD-binding SR-like protein rA4 mRNA, partial cds	1.00E-67
739	D10630	Mus musculus mRNA for zinc finger protein, complete cds, clone:CTfin51	4 00E-76
740	U29156	Mus musculus eps15R mRNA, complete cds.	3.00E-84
741	Y08135	M.musculus mRNA for ASM-like phosphodiesterase 3a	1.00E-86
742	U90567	Gallus gallus glutamine rich protein mRNA, partial cds	5.00E-58
743	U58280	Mus musculus second largest subunit of RNA polymerase I (RPA2) mRNA, complete cds	4.00E-77
744	S79539	Pat-12=Pat-12 product [mice, embryonic stem ES cells, mRNA, 2781 nt]	9.00E-84
745	D30666	Rat mRNA for brain acyl-CoA synthetase II, complete cds	2.00E-89
746	U29156	Mus musculus eps15R mRNA, complete cds.	2.00E-92

Table 2A: Nearest Neighbor (BlastN vs. Genbank)

SEQ ID	ACC'N	DESCRIP.	P VALUE
748	U36909	Bos taurus Rho-associated kinase mRNA, complete cds	e-104
749	L36315	Mus musculus (clone pMLZ-1) zinc finger protein	e-105
750	X80169	M.musculus mRNA for 200 kD protein	e-106
751	X83577	M.musculus mRNA for K-glypican	e-107
1060	Z95437	Human DNA sequence from cosmid A1 on chromosome 6 contains ESTs. HERV like retroviral sequence	8.00E-21
1112	X69907	H.sapiens gene for mitochondrial ATP synthase c subunit (P1 form)	6.00E-07
1125	M19390	Bovine interstitial retinol binding protein	8.00E-31
1156	U19247	Homo sapiens interferon-gamma receptor alpha chain gene, exon 7 and complete cds	7.00E-41
1170	U20239	Mus musculus fibrosin mRNA, partial cds	5.00E-38
1171	D26361	Human mRNA for KIAA0042 gene, complete cds	2.00E-41
1195	NM_000694.1	Homo sapiens aldehyde dehydrogenase 7 (ALDH7) mRNA >.' gb|U10868|HSU10868 Human aldehyde dehydrogenase ALDH7 mRNA, complete cds.	1.00E-37
1196	U84404	Human E6-associated protein E6-AP/ubiquitin-protein ligase (UBE3A) mRNA, alternatively spliced, complete cds	1.00E-46
1203	U51714	Human GPI protein p137 mRNA, partial sequence, 3'-UTR.	9.00E-53
1204	U58884	Mus musculus SH3-containing protein SH3P7 mRNA, complete cds, similar to Human Drebrin	2.00E-49
1210	X79067	H.sapiens ERF-1 mRNA 3' end	2.00E-72
1212	U00946	Human clone A9A2BRB5 (CAC)n/(GTG)n repeat-containing mRNA	3.00E-54
1217	D11078	Homo sapiens RGH2 gene, retrovirus-like element	6.00E-49
1219	U05989	Rattus norvegicus clone par-4 induced by effectors of apoptosis mRNA, complete cds.	3.00E-64
1220	U13185	Cloning vector pbetagal-Enhancer, complete sequence.	3.00E-52
1222	D87443	Human mRNA for KIAA0254 gene, complete cds	8.00E-63
1225	U19867	Cloning vector pSPL3, exon splicing vector, complete sequence. HIV envelope protein gp160 and beta-lactamase, complete cds.	7.00E-72
1227	U04817	Human protein kinase PITSLRE alpha 2-3 mRNA, complete cds.	4.00E-57
1230	U03687	Photinus pyralis modified luciferase gene, complete cds, and pUC18 derived vector.	3.00E-62
1231	U27196	Gallus gallus zinc finger protein (Fzf-1) mRNA, complete cds.	1.00E-66
1235	X53586	Human mRNA for integrin alpha 6	2.00E-71
1236	J05016	Human (clone pA3) protein disulfide isomerase related protein (ERp72) mRNA, complete cds.	3.00E-67

Table 2A: Nearest Neighbor (BlastN vs. Genbank)

SEQ ID	ACC'N	DESCRIP.	P VALUE
1237	M86752	Human transformation-sensitive protein (IEF SSP 3521) mRNA, complete cds.	1.00E-66
1239	L19437	Human transaldolase mRNA containing transposable element, complete cds	5.00E-70
1241	X90857	H.sapiens mRNA for -14 gene, containing globin regulatory element	1.00E-74
1242	NM_003980 1	Homo sapiens microtubule associated protein 7 mRNA	9.00E-76
1245	U17901	Rattus norvegicus phospholipase A-2-activating protein (plap) mRNA, complete cds.	3 00E-75
1246	S80632	threonine, tyrosine phosphatase [human, brain, mRNA Partial, 1236 nt]	2.00E-69
1247	M76541	Human DNA-binding protein (NF-E1) mRNA, complete cds.	2.00E-80
1248	S55305	14-3-3 protein gamma subtype=putative protein kinase C regulatory protein [rats, brain, mRNA, 3410 nt] > :. dbj|D17447|D17447 Rattus norvegicus mRNA for 14-3-3 protein gamma-subtype, complete cds	7.00E-93
1249	NM_002350 .1	Homo sapiens v-yes-1 Yamaguchi sarcoma viral related oncogene homolog (LYN) mRNA > :: gb|M16038|HUMLYN Human lyn mRNA encoding a tyrosine kinase.	3.00E-86
1250	Y10725	M.musculus mRNA for protein kinase KIS	4.00E-68
1251	U89931	Cloning vector pTRE, complete sequence	3.00E-65
1252	Z46386	Bovine herpesvirus type 4 DNA for nonconserved region F (DN599 like strain)	3.00E-73
1253	L77599	Homo sapiens (clone SEL214) 17q YAC (303G8) RNA.	2 00E-69
1255	Y10746	H.sapiens mRNA for protein containing MBD 1	2.00E-79
1256	L77599	Homo sapiens (clone SEL214) 17q YAC (303G8) RNA.	2.00E-71
1257	Z57619	H.sapiens CpG island DNA genomic Mse1 fragment, clone 187a6, forward read cpg187a6.ft1b	7.00E-72
1258	U48807	Human MAP kinase phosphatase (MKP-2) mRNA, complete cds	3.00E-76
1260	M27444	Bos taurus (clone pTKD7) dopamine and cyclic AMP-regulated neuronal phosphoprotein (DARPP-32) mRNA, complete cds.	4.00E-76
1261	U37150	Bos taurus peptide methionine sulfoxide reductase (msrA) mRNA, complete cds	5.00E-78
1262	U02435	Cloning vector pSVbeta, complete sequence	1.00E-77
1263	U09662	Cloning vector pSEAP-Enhancer, complete sequence	4.00E-79
1264	M99566	sCos cloning vector SfiI containing bacteriophage promoters and flanking restriction sites in sCos vectors.	1.00E-79
1266	Z12112	pWE15A cosmid vector DNA	4.00E-80

Table 2A: Nearest Neighbor (BlastN vs. Genbank)

SEQ ID	ACC'N	DESCRIP.	P VALUE
1267	U55387	Cricetulus griseus SL15 mRNA, complete cds	2.00E-82
1269	L14684	Rattus norvegicus nuclear-encoded mitochondrial elongation factor G mRNA, complete cds.	2.00E-91
1270	U49057	Rattus norvegicus CTD-binding SR-like protein rA9 mRNA, complete cds	7.00E-93
1271	U57368	Mus musculus EGF repeat transmembrane protein mRNA, complete cds.	4.00E-97
1272	AF000938	Mus musculus RNA polymerase I largest subunit	8.00E-94
1274	X80169	M.musculus mRNA for 200 kD protein	e-102
1275	U09874	Mus musculus SKD3 mRNA, complete cds.	e-105
1276	D78020	Rat mRNA for NFI-A4, partial cds	e-108
1515	Z73360	Human DNA sequence from cosmid 92M18, BRCA2 gene region chromosome 13q12-13	9 00E-22
1522	X62078	H.sapiens mRNA for GM2 activator protein	7.00E-72
1523	X85750	H.sapiens mRNA for transcript associated with monocyte to macrophage differentiation	2.00E-50
1525	X03473	Human gene for histone H1(0)	1.00E-67
1535	X64411	R.norvegicus mRNA for 100 kDa protein	1.00E-54
1538	X13345	Human gene for plasminogen activator inhibitor 1	2.00E-59
1542	D86971	Human mRNA for KIAA0217 gene, partial cds	7.00E-83
1543	NM_001859.1	Homo sapiens solute carrier family 31 gb|U83460|HSU83460 Human high-affinity copper uptake protein (hCTR1) mRNA, complete cds	7.00E-72
1544	X68194	H.sapiens h-Sp1 mRNA	5.00E-57
1545	AB002326	Human mRNA for KIAA0328 gene, partial cds	3.00E-74
1548	D31762	Human mRNA for KIAA0057 gene, complete cds	3.00E-85
1550	X58472	Mouse KIN17 mRNA for kin17 protein	2.00E-57
1551	U13185	Cloning vector pbetagal-Enhancer, complete sequence	2.00E-79
1552	U55939	Expression vector pVP-Nco, complete sequence.	1.00E-76
1553	D87671	Rattus norvegicus mRNA for TIP120, complete cds	1.00E-87
1554	U25691	Mus musculus lymphocyte specific helicase mRNA, complete cds	4.00E-86
1555	U55939	Expression vector pVP-Nco, complete sequence.	5.00E-79
1556	Z12112	pWE15A cosmid vector DNA	2.00E-79
1557	U13185	Cloning vector pbetagal-Enhancer, complete sequence	2.00E-79
1558	U13185	Cloning vector pbetagal-Enhancer, complete sequence.	6.00E-80
1559	Z12112	pWE15A cosmid vector DNA	6.00E-80
1560	U09661	Cloning vector pSEAP-Control, complete sequence	6.00E-80
1561	U36909	Bos taurus Rho-associated kinase mRNA, complete cds	2.00E-90
1562	L36610	Mus musculus protein synthesis initiation factor 4A (eIF-4A) gene, exons 5, 6, 7, 8, and 9.	2.00E-71

Table 2A: Nearest Neighbor (BlastN vs. Genbank)

SEQ ID	ACC'N	DESCRIP.	P VALUE
1563	S79463	M-Sema F=a factor in neural network development	1.00E-85
1564	U35312	Mus musculus nuclear receptor co-repressor mRNA, complete cds	1.00E-98
1571	L32977	Homo sapiens (clone f17252) ubiquinol cytochrome c reductase Rieske iron-sulphur protein (UQCRFS1) gene, exon 2	0
1576	S78454	Mus musculus metal response element DNA-binding protein M96 mRNA, complete cds	0
1586	M88458	Human ELP-1 mRNA sequence.	0
1622	S77512	LAMB2=laminin beta 2 chain [human, placenta, mRNA, 5642 nt]	e-131
1624	X53305	H.sapiens mRNA for stathmin	0
1625	J03591	Human ADP/ATP translocase mRNA, 3' end, clone pHAT3	0
1630	L18964	Human protein kinase C iota isoform (PRKCI) mRNA, complete cds.	2E-67
1640	D29956	Human mRNA for KIAA0055 gene, complete cds	0
1649	M26697	Human nucleolar protein (B23) mRNA, complete cds.	e-149
1669	U47322	Cloning vector DNA, complete sequence	4E-65
1689	NM_002079.1	Homo sapiens glutamic-oxaloacetic transaminase 1, soluble (aspartate aminotransferase 1) aspartate aminotransferase mRNA, complete cds.	0
1693	U55939	Expression vector pVP-Nco, complete sequence.	2E-70
1694	D80007	Human mRNA for KIAA0185 gene, partial cds	0
1695	NM_001904.1	Homo sapiens catenin (cadherin-associated protein), beta 1 (88kD) (CTNNB1) mRNA > :: emb|X87838|HSRNABECA H.sapiens mRNA for beta-catenin	e-108
1701	U19867	Cloning vector pSPL3, exon splicing vector, complete sequence. HIV envelope protein gp160 and beta-lactamase, complete cds.	1E-44
1702	M31061	Human ornithine decarboxylase gene, complete cds.	0
1721	Z96177	H.sapiens telomeric DNA sequence, clone 10QTEL040, read 10QTELOO040.seq	2E-70
1722	NM_001904.1	Homo sapiens catenin (cadherin-associated protein), beta 1 (88kD) (CTNNB1) mRNA > :: emb|X87838|HSRNABECA H.sapiens mRNA for beta-catenin	e-176
1758	X83577	M.musculus mRNA for K-glypican	0
1761	S79539	Pat-12=Pat-12 product [mice, embryonic stem ES cells, mRNA, 2781 nt]	e-176
1773	L38951	Homo sapiens importin beta subunit mRNA, complete cds	1E-78

Table 2A: Nearest Neighbor (BlastN vs. Genbank)

SEQ ID	ACC'N	DESCRIP.	P VALUE
1776	NM_003902.1	Homo sapiens far upstream element binding protein (FUBP) mRNA > :: gb|U05040|HSU05040 Human FUSE binding protein mRNA, complete cds.	0
1791	L08783	BlueScribe M13 Plus cloning vector.	0
1809	U86751	Human nucleolar fibrillar center protein (ASE-1) mRNA, complete cds	8E-95
1817	M21188	Human insulin-degrading enzyme (IDE) mRNA, complete cds.	e-134
1831	NM_001614.1	Homo sapiens actin, gamma 1 (ACTG1) mRNA > :: emb|X04098|HSACTCGR Human mRNA for cytoskeletal gamma-actin	0.00E+00
1836	U12404	Human Csa-19 mRNA, complete cds.	0
1837	X79236	H.sapiens rps26 gene	e-145
1838	NM_003313.1	Homo sapiens tissue specific transplantation antigen P35B (TSTA3) mRNA > :: gb|U58766|HSU58766 Human FX protein mRNA, complete cds	0
1839	M27436	Human tissue factor gene, complete cds, with a Alu repetitive sequence in the 3' untranslated region. > :: gb|I05724| Sequence 12 from Patent EP 0278776	e-121
1849	X79067	H.sapiens ERF-1 mRNA 3' end	0
1850	NM_003017.1	Homo sapiens splicing factor, arginine/serine-rich 3 (SFRS3) mRNA > :. gb|L10838|HUMSRP20 Homo sapiens SR protein family, pre-mRNA splicing factor (SRp20) mRNA, complete cds.	e-135
1857	U48807	Human MAP kinase phosphatase (MKP-2) mRNA, complete cds	0.00E+00
1858	U48807	Human MAP kinase phosphatase (MKP-2) mRNA, complete cds	0.00E+00
1873	U04817	Human protein kinase PITSLRE alpha 2-3 mRNA, complete cds.	8.00E-53
1876	U18297	Human MST1 (MST1) mRNA, complete cds.	0.00E+00
1877	NM_001859.1	Homo sapiens solute carrier family 31 gb|U83460|HSU83460 Human high-affinity copper uptake protein (hCTR1) mRNA, complete cds	0
1889	X70272	single stranded replicative centromeric Saccharomyces cerevisiae /E. coli shuttle vector	3.00E-76
1897	L26050	Human mitochondrial 2,4-dienoyl-CoA reductase mRNA, complete cds.	0.00E+00
1899	X06747	Human hnRNP core protein A1	e-157
1901	M64571	Human microtubule-associated protein 4 mRNA, complete cds.	0.00E+00

Table 2A: Nearest Neighbor (BlastN vs. Genbank)

SEQ ID	ACC'N	DESCRIP.	P VALUE
1908	X65322.1	Cloning vector pCAT-Basic	9.00E-53
1913	NM_002654.1	Homo sapiens pyruvate kinase, muscle (PKM2) mRNA > :: gb|M23725|HUMPKM2L Human M2-type pyruvate kinase mRNA, complete cds.	e-159
1916	U49352	Human liver 2,4-dienoyl-CoA reductase mRNA, complete cds	2.00E-71
1926	D31889	Human mRNA for KIAA0072 gene, partial cds > · gb|G27027|G27027 human STS SHGC-31585	e-167
1941	U43944	Human breast cancer cytosolic NADP(+)-dependent malic enzyme mRNA, partial cds	1.00E-89
1971	U83659	Human multidrug resistance-associated protein homolog (MRP3) mRNA, partial cds	3.00E-85
1996	M33519	Human HLA-B-associated transcript 3 (BAT3) mRNA, complete cds.	3.00E-84
1997	U55387	Cricetulus griseus SL15 mRNA, complete cds	e-150
2018	L36315	Mus musculus (clone pMLZ-1) zinc finger protein	e-162
2025	NM_003902.1	Homo sapiens far upstream element binding protein (FUBP) mRNA > :: gb|U05040|HSU05040 Human FUSE binding protein mRNA, complete cds.	e-175
2032	X56932	H.sapiens mRNA for 23 kD highly basic protein	0.00E+00
2039	X98654	H.sapiens mRNA for DRES9 protein	9.00E-97
2050	S62077	HP1Hs alpha=25 kda chromosomal autoantigen [human, mRNA, 876 nt]	4.00E-68
2057	M23619	Human HMG-I protein isoform mRNA (HMGI gene), clone 6A.	e-117
2077	NM_003217.1	Homo sapiens testis enhanced gene transcript	4E-99
2092	U18671	Human Stat2 gene, complete cds.	0.00E+00
2096	D43636	Human mRNA for KIAA0096 gene, partial cds	0
2098	NM_002734.1	Homo sapiens protein kinase, cAMP-dependent, regulatory, type I, alpha (tissue specific extinguisher 1) (PRKAR1A) mRNA > :: gb|M33336|HUMCAMPPK Human cAMP-dependent protein kinase type I-alpha subunit	0
2099	U72621	Human LOT1 mRNA, complete cds	0.00E+00
2112	NM_003902.1	Homo sapiens far upstream element binding protein (FUBP) mRNA > :: gb|U05040|HSU05040 Human FUSE binding protein mRNA, complete cds.	0.00E+00
2118	L41142	Homo sapiens signal transducer and activator of transcription (STAT5) mRNA, complete cds.	0.00E+00
2119	Z48950	H.sapiens hH3.3B gene for histone H3.3	0.00E+00
2153	L09260	Human (chromosome 3p25) membrane protein mRNA.	e-100
2158	X65304.1	Cloning vector pGEM-3Z	e-173

Table 2A: Nearest Neighbor (BlastN vs. Genbank)

SEQ ID	ACC'N	DESCRIP.	P VALUE
2163	NM_003358.1	Homo sapiens UDP-glucose ceramide glucosyltransferase (UGCG) mRNA > :. dbj|D50840|HUMCGA Homo sapiens mRNA for ceramide glucosyltransferase, complete cds > :: dbj|E12454|E12454 cDNA encoding human ceramide glucosyltransferase	e-141
2179	M95605	Bos taurus S-adenosylmethionine decarboxylase	e-175
2180	M12623	Human non-histone chromosomal protein HMG-17 mRNA, complete cds.	0.00E+00
2181	U79143	Human phosphoinositide 3'-hydroxykinase p110-alpha subunit mRNA, complete cds	0.00E+00
2192	K01906	Human fetal liver c-myc proto-oncogene, exon 3 and flanks.	e-165
2194	X74870	H.sapiens gene for RNA pol II largest subunit, exons 23-29	e-161
2235	L16991	Human thymidylate kinase (CDC8) mRNA, complete cds.	0.00E+00
2257	L08783	BlueScribe M13 Plus cloning vector.	0.00E+00
2276	NM_002245.1	Homo sapiens potassium inwardly-rectifying channel, subfamily K, member 1 (KCNK1) mRNA > :: gb|U33632|HSU33632 Human two P-domain K+ channel TWIK-1 mRNA, complete cds.	0
2278	D50734	Rat mRNA of antizyme inhibitor, complete cds	e-157
2279	U26401	Human galactokinase (galK) mRNA, complete cds. >	0.00E+00
2285	U49058	Rattus norvegicus CTD-binding SR-like protein rA4 mRNA, partial cds	e-138
2287	X65306.1	Cloning vector pGEM-3Zf(+)	e-116
2299	NM_001172.1	Homo sapiens arginase, type II (ARG2) mRNA > :: gb|U82256|HSU82256 Homo sapiens arginase type II mRNA, complete cds	e-127
2309	M25160	Human Na,K-ATPase beta subunit (ATP1B) gene, exons 3 through 6.	0.00E+00
2315	Y08736	H.sapiens vegf gene, 3'UTR	1.00E-78
2320	U13737	Human cysteine protease CPP32 isoform alpha mRNA, complete cds.	0.00E+00
2323	Y08135	M.musculus mRNA for ASM-like phosphodiesterase 3a	e-148
2324	Y08135	M.musculus mRNA for ASM-like phosphodiesterase 3a	0
2328	NM_001677.1	Homo sapiens ATPase, Na+/K+ transporting, beta 1 polypeptide (ATP1B1) mRNA > :: emb|X03747|HSATPBR Human mRNA for Na/K-ATPase beta subunit	1E-77
2337	Y08135	M.musculus mRNA for ASM-like phosphodiesterase 3a	e-168
2364	U54778	Human 14-3-3 epsilon mRNA, complete cds	1E-67
2365	Y08135	M.musculus mRNA for ASM-like phosphodiesterase 3a	0

Table 2A: Nearest Neighbor (BlastN vs. Genbank)

SEQ ID	ACC'N	DESCRIP.	P VALUE
2368	NM_001172.1	Homo sapiens arginase, type II (ARG2) mRNA > :: gb|U82256|HSU82256 Homo sapiens arginase type II mRNA, complete cds	e-127
2385	AB002293	Human mRNA for KIAA0295 gene, partial cds	0
2394	M21188	Human insulin-degrading enzyme (IDE) mRNA, complete cds	2E-81
2425	D87466	Human mRNA for KIAA0276 gene, partial cds	1E-97
2429	U58884	Mus musculus SH3-containing protein SH3P7 mRNA, complete cds, similar to Human Drebrin	4E-96
2441	AB005216	Homo sapiens mRNA for Nck, Ash and phospholipase C gamma binding protein NAP4, partial cds	0
2442	NM_001960.1	Homo sapiens eukaryotic translation elongation factor 1 delta (guanine nucleotide exchange protein) (EEF1D) mRNA > :: emb|Z21507|HSEF1DELA H.sapiens EF-1delta gene encoding human elongation factor-1-delta	0.00E+00
2444	M92449	Human LTR mRNA, 3' end of coding region and 3' flank.	e-143
2452	NM_003350.1	Homo sapiens ubiquitin-conjugating enzyme E2 variant 2 (UBE2V2) mRNA > :: emb|X98091|HSVITDITR H sapiens mRNA for protein induced by vitamin D	0
2456	U44975	Homo sapiens DNA-binding protein CPBP (CPBP) mRNA, partial cds	5.00E-69
2459	Z84510	H.sapiens flow-sorted chromosome 6 HindIII fragment, SC6pA28B7	4.00E-66
2463	Z48042	H.sapiens mRNA encoding GPI-anchored protein p137	e-172
2497	U32986	Human xeroderma pigmentosum group E UV-damaged DNA binding factor mRNA, complete cds.	0
2515	NM_003419.1	Homo sapiens zinc finger protein 10 (KOX 1) for zinc finger protein	e-129
2520	Y00711	Human mRNA for lactate dehydrogenase B (LDH-B)	0.00E+00
2526	Y10725	M.musculus mRNA for protein kinase KIS	0.00E+00
2543	X62078	H.sapiens mRNA for GM2 activator protein	e-164
2548	NM_001009.1	Homo sapiens ribosomal protein S5 (RPS5) mRNA complete cds.	0.00E+00
2556	U97188	Homo sapiens putative RNA binding protein KOC	1E-86
2575	NM_002852.1	Homo sapiens pentaxin-related gene, rapidly induced by IL-1 beta (PTX3) mRNA > :: emb|X63613|HSPTX3R H.sapiens mRNA for pentaxin (PTX3)	0.00E+00
2578	X67155	H.sapiens mRNA for mitotic kinesin-like protein-1	0.00E+00
2588	M54968	Human K-ras oncogene protein mRNA, complete cds >	e-123
2591	D88687	Homo sapiens mRNA for KM-102-derived reductase-like factor, complete cds	0

Table 2A: Nearest Neighbor (BlastN vs. Genbank)

SEQ ID	ACC'N	DESCRIP.	P VALUE
2593	NM_001436 1	Homo sapiens fibrillarin (FBL) mRNA > :: gb|M59849|HUMFIBAA Human fibrillarin (Hfib1) mRNA, complete cds.	e-103
2595	AB002326	Human mRNA for KIAA0328 gene, partial cds	0.00E+00
2598	M11948	Human promyelocytic leukemia cell mRNA, clones pHH58 and pHH81.	9.00E-84

Table 2B Nearest Neighbor (BlastX vs. Non-Redundant Proteins)

SEQ ID	ACC'N	DESCRIP.	P VALUE
37	4239895	(AB016816) MASL1 [Homo sapiens]	9.00E-54
66	4514653	(AB024057) vascular Rab-GAP/TBC-containing protein [Homo sapiens]	6.00E-55
78	4454524	(AC004841) similar to insulin receptor substrate BAP2; similar to PID:g4126477 [Homo sapiens]	6.00E-22
79	4545264	(AF118240) peroxisomal biogenesis factor 16 [Homo sapiens]	1.00E-45
112	3413938	(AB007963) KIAA0494 protein [Homo sapiens]	3.00E-44
122	4239895	(AB016816) MASL1 [Homo sapiens]	1.00E-47
139	4502371	breast cancer antiestrogen resistance 3 >gi|3237306 (U92715) breast cancer antiestrogen resistance 3 protein [Homo sapiens]	2.00E-44
154	4586880	(AB017114) AD 3 [Homo sapiens]	4.00E-48
157	3327170	(AB014578) KIAA0678 protein [Homo sapiens]	2.00E-51
168	3153241	(AF053004) class I cytokine receptor [Homo sapiens]	2.00E-17
171	4138233	(AJ007780) parp-2 gene [Mus musculus]	2.00E-32
174	3287173	(AJ006266) AND-1 protein [Homo sapiens]	2.00E-42
187	4507145	UNKNOWN >gi|3873216 (AF065485) sorting nexin 4 [Homo sapiens]	8.00E-46
207	4153860	(AC005074) similar to U47321 (PID:g1245146) [Homo sapiens]	4.00E-15
224	3236430	(AF067379) ubiquitin-protein ligase E3-alpha [Mus musculus]	3.00E-35
253	3043696	(AB011158) KIAA0586 protein [Homo sapiens]	1.00E-44
260	4519623	(AB017616) homologous to the yeast YGR163 gene [Mus musculus]	2.00E-54
280	4455035	(AF116238) pseudouridine synthase 1 [Homo sapiens]	4.00E-48
304	3075377	(AC004602) F23487_2 [Homo sapiens]	2.00E-21
306	4505611	poly(A)-specific ribonuclease	7.00E-41
373	1825606	(U88169) similar to molybdoterin biosynthesis MOEB proteins [Caenorhabditis elegans]	2.00E-37
382	4586287	(AB004794) DUF140 [Xenopus laevis]	7.00E-45
396	3941342	(AF043250) mitochondrial outer membrane protein [Homo sapiens] >gi|3941347 (AF043253) mitochondrial outer membrane protein [Homo sapiens] >gi|4105703|gb|AAD02504|	5.00E-40
414	4586844	(AB015633) type II membrane protein	2.00E-46
422	3327078	(AB014532) KIAA0632 protein [Homo sapiens]	6.00E-36
433	3327230	(AB014608) KIAA0708 protein [Homo sapiens]	5.00E-52
472	3372677	(AF061749) tumorous imaginal discs protein Tid56 homolog	7.00E-35
502	4050034	(AF098482) transcriptional coactivator p52 [Homo sapiens]	1.00E-36

Table 2B Nearest Neighbor (BlastX vs. Non-Redundant Proteins)

SEQ ID	ACC'N	DESCRIP	P VALUE
504	4406632	(AF131801) Unknown [Homo sapiens]	3.00E-21
512	3114828	(AJ005897) JM5 [Homo sapiens]	3.00E-44
530	3766209	(AF071777) IRE1 [Mus musculus]	2.00E-29
561	3043644	(AB011132) KIAA0560 protein [Homo sapiens]	3.00E-43
572	3088575	(AF059531) protein arginine N-methyltransferase 3 [Homo sapiens]	4 00E-46
578	4505891	UNKNOWN >gi|3153235 (AF046889) lysyl hydroxylase isoform 3 [Homo sapiens] >gi|3551836	3.00E-30
590	3114828	(AJ005897) JM5 [Homo sapiens]	1.00E-24
592	3242214	(AJ006778) DRIM protein [Homo sapiens]	2.00E-36
598	4200236	(AL035308) hypothetical protein [Homo sapiens]	8.00E-09
600	3413892	(AB007934) KIAA0465 protein [Homo sapiens]	2.00E-51
635	3043626	(AB011123) KIAA0551 protein [Homo sapiens]	3.00E-31
643	2498864	RRP5 PROTEIN HOMOLOG (KIAA0185) hypothetical protein YM9959.11C of S.cerevisiae. [Homo sapiens]	3.00E-13
670	3402197	(AJ010014) M96A protein [Homo sapiens]	1.00E-21
677	2217964	(Z50798) p52 [Gallus gallus]	7.00E-14
686	3043626	(AB011123) KIAA0551 protein [Homo sapiens]	1.00E-40
697	135470	TUBULIN BETA-5 CHAIN sapiens]	3.00E-21
701	3327056	(AB014521) KIAA0621 protein [Homo sapiens]	2.00E-29
704	4506787	UNKNOWN GTPASE-ACTIVATING-LIKE PROTEIN IQGAP1 (P195) (KIAA0051) protein - human >gi|473931|dbj|BAA06123| (D29640) KIAA0051 [Homo sapiens] >gi|536844 (L33075) ras GTPase-activating-like protein [Homo sapiens]	4.00E-41
709	1350762	60S RIBOSOMAL PROTEIN L6 sapiens]	2.00E-22
713	2687400	(AF035824) vesicle soluble NSF attachment protein receptor [Homo sapiens]	1.00E-23
730	2914385	Chain C, Human Pcna >gi|2914387|pdb|1AXC|E Chain E. Human Pcna	2.00E-27
731	284076	ERD-2-like protein, ELP-1 - human	1.00E-26
733	2497524	KINESIN-LIKE PROTEIN KIF1B mouse >gi|407339|dbj|BAA04503| (D17577) Kif1b [Mus musculus]	9.00E-33
735	3327056	(AB014521) KIAA0621 protein [Homo sapiens]	1.00E-13
736	279567	insulinase (EC 3.4.99.45) - human	2.00E-26
738	487416	(L20302) actin filament protein [Gallus gallus]	3.00E-45
739	1731428	ZINC FINGER PROTEIN ZFP-38	7.00E-35
740	968973	(U29156) involved in signaling by the epidermal growth factor receptor; Method: conceptual translation supplied by author. [Mus musculus]	1.00E-22

Table 2B Nearest Neighbor (BlastX vs. Non-Redundant Proteins)

SEQ ID	ACC'N	DESCRIP.	P VALUE
741	1552350	(Y08135) acid sphingomyelinase-like phosphodiesterase [Mus musculus]	2.00E-35
742	3327098	(AB014542) KIAA0642 protein [Homo sapiens]	3.00E-15
743	3914801	DNA-DIRECTED RNA POLYMERASE I 135 KD POLYPEPTIDE (RNA POLYMERASE I SUBUNIT 2) (RPA135) (RNA POLYMERASE I 127 KD SUBUNIT) >gi|2739048 (AF025424) RNA polymerase I 127 kDa subunit [Rattus norvegicus]	2.00E-45
745	4165018	(D89053) Acyl-CoA synthetase 3 [Homo sapiens]	2.00E-53
746	968973	(U29156) involved in signaling by the epidermal growth factor receptor: Method: conceptual translation supplied by author. [Mus musculus]	3 00E-40
747	4519883	(AB017970) dipeptidyl peptidase III	4.00E-50
748	3327052	(AB014519) KIAA0619 protein [Homo sapiens]	7.00E-30
749	538413	(L36315) zinc finger protein [Mus musculus]	6.00E-55
750	1717793	PROTEIN TSG24 (MEIOTIC CHECK POINT REGULATOR) >gi|1083553|pir||A55117 tsg24 protein - mouse	1.00E-50
751	3420277	(AF064826) glypican 4 [Homo sapiens]	3.00E-54
808	4580645	(AF118855) trans-prenyltransferase [Mus musculus]	2.00E-48
829	3882171	(AB018268) KIAA0725 protein [Homo sapiens]	3.00E-24
833	4104976	(AF043117) ubiquitin-fusion degradation protein 2 [Homo sapiens]	2.00E-41
841	3242214	(AJ006778) DRIM protein [Homo sapiens]	4.00E-34
914	4191810	(AB006532) DNA helicase [Homo sapiens]	5 00E-41
959	3043714	(AB011167) KIAA0595 protein [Homo sapiens]	5.00E-20
982	4379097	(Y17999) Dyrk1B protein kinase [Homo sapiens]	3.00E-21
1028	3043712	(AB011166) KIAA0594 protein [Homo sapiens]	2.00E-49
1079	4240227	(AB020676) KIAA0869 protein [Homo sapiens]	4 00E-35
1091	4235226	(AF061025) leucine zipper-EF-hand containing transmembrane protein 1 [Homo sapiens]	6.00E-34
1134	3426268	(AF044201) neural membrane protein 35; NMP35 [Rattus norvegicus]	1.00E-29
1152	4507367	threonyl-tRNA synthetase SYNTHETASE, CYTOPLASMIC (THREONINE--TRNA LIGASE) (THRRS) 6.1.1.3) - human >gi|1464742 (M63180) threonyl-tRNA synthetase [Homo sapiens]	3.00E-26
1153	2072294	(U95097) mitotic phosphoprotein 43 [Xenopus laevis]	1.00E-19
1163	543222	glutamine (Q)-rich factor 1, QRF-1 - mouse factor 1, QRF-1 [mice, B-cell leukemia, BCL1, Peptide Partial, 84 aa]	1.00E-39

Table 2B Nearest Neighbor (BlastX vs. Non-Redundant Proteins)

SEQ ID	ACC'N	DESCRIP.	P VALUE
1164	3335569	(AF072759) fatty acid transport protein 4; FATP4 [Mus musculus]	7.00E-39
1168	2996194	(AF053232) SIK similar protein [Mus musculus]	1.00E-31
1172	2935597	(AC004262) R29368_2 [Homo sapiens]	6.00E-49
1201	2645205	(U63648) p160 myb-binding protein [Mus musculus]	1.00E-21
1204	1407655	(U58884) SH3P7 [Mus musculus]	8.00E-21
1214	2134381	polybromo 1 protein - chicken	8 00E-29
1219	4505613	PRKC, apoptosis. WT1. regulator par-4 [Homo sapiens]	6.00E-34
1229	3757892	(AF079765) enhancer of polycomb [Mus musculus]	3.00E-41
1231	2134436	zinc finger protein - chicken (fragment)	4.00E-37
1232	2393722	(U90313) glutathione-S-transferase homolog [Homo sapiens]	6.00E-34
1234	459002	(U00036) R151.6 gene product [Caenorhabditis elegans]	7 00E-10
1236	119530	PROTEIN DISULFIDE ISOMERASE-RELATED PROTEIN PRECURSOR (ERP72) >gi|87320|pir||A23723 protein disulfide-isomerase (EC 5.3.4.1) ERp72 precursor - human protein [Homo sapiens]	3 00E-23
1239	2073541	(L19437) transaldolase [Homo sapiens] >gi|2612879	2.00E-24
1241	984125	(X90857) -14 [Homo sapiens]	2.00E-23
1245	4106818	(AF083395) phospholipase A2-activating protein [Homo sapiens]	4.00E-36
1247	4507955	YY1 transcription factor REPRESSOR PROTEIN YY1 (YIN AND YANG 1) (YY-1) (DELTA TRANSCRIPTION FACTOR) (NF-E1) >gi|38011|emb|CAA78455|	4.00E-27
1250	1698779	(U70372) PAM COOH-terminal interactor protein 2 [Rattus norvegicus]	6.00E-35
1252	4204684	(AF102542) beta-1,6-N-acetylglucosaminyltransferase core 2/core 4 beta-1,6-N-acetylglucosaminyltransferase; core 2/4-GnT [Homo sapiens]	9.00E-43
1255	2239126	(Y10746) methyl-CpG binding protein [Homo sapiens]	4.00E-16
1259	1747519	(U76759) nuclear protein NIP45 [Mus musculus]	2.00E-29
1260	545790	DARPP-32=dopamine and cAMP-regulated phosphoprotein [human, brain, Peptide, 204 aa] sapiens]	1.00E-29
1261	1709689	PEPTIDE METHIONINE SULFOXIDE REDUCTASE (PEPTIDE MET(O) REDUCTASE) >gi|1205993 taurus]	1.00E-37
1265	2736151	(AF021935) mytonic dystrophy kinase-related Cdc42-binding kinase [Rattus norvegicus]	1.00E-41
1267	3329392	(AF038961) SL15 protein [Homo sapiens]	8.00E-36
1268	4097712	(U67322) HBV associated factor [Homo sapiens]	7.00E-56

Table 2B Nearest Neighbor (BlastX vs. Non-Redundant Proteins)

SEQ ID	ACC'N	DESCRIP.	P VALUE
1269	585084	ELONGATION FACTOR G. MITOCHONDRIAL PRECURSOR (MEF-G) >gi|543383|pir||S40780 translation elongation factor G. mitochondrial - rat >gi|310102	7.00E-49
1270	1438534	(U49057) rA9 [Rattus norvegicus]	3.00E-45
1271	1336628	(U57368) EGF repeat transmembrane protein [Mus musculus]	7.00E-47
1272	3914802	DNA-DIRECTED RNA POLYMERASE I LARGEST SUBUNIT (RNA POLYMERASE I 194 KD SUBUNIT) (RPA194)	1.00E-37
1273	3387977	(AF070598) ABC transporter [Homo sapiens]	5.00E-50
1274	1717793	PROTEIN TSG24 (MEIOTIC CHECK POINT REGULATOR) >gi|1083553|pir||A55117 tsg24 protein - mouse	2.00E-48
1275	2493735	SKD3 PROTEIN SKD3 [Mus musculus]	7.00E-43
1276	1041038	(D78020) NFI-A4 [Rattus norvegicus]	3.00E-26
1284	4455118	(AF125158) zinc finger DNA binding protein 99	9.00E-41
1322	4049922	(AF072810) transcription factor WSTF [Homo sapiens]	4.00E-48
1338	4586287	(AB004794) DUF140 [Xenopus laevis]	3.00E-45
1345	3435244	(AF083322) centriole associated protein CEP110 [Homo sapiens]	2.00E-40
1370	3413886	(AB007931) KIAA0462 protein [Homo sapiens]	2.00E-35
1462	3882311	(AB018338) KIAA0795 protein [Homo sapiens]	4.00E-47
1497	4240167	(AB020646) KIAA0839 protein [Homo sapiens]	2.00E-46
1517	4191610	(AF117107) IGF-II mRNA-binding protein 2 [Homo sapiens]	3.00E-49
1519	3135669	(AF064084) prenylcysteine carboxyl methyltransferase	1.00E-39
1529	3043548	(AB011084) KIAA0512 protein [Homo sapiens]	2.00E-47
1531	3093476	(AF008915) EVI-5 homolog [Homo sapiens]	6.00E-19
1532	3834629	(AF094519) diaphanous-related formin: p134 mDia2 [Mus musculus]	1.00E-32
1533	3193226	(AF068706) gamma2-adaptin [Homo sapiens]	1.00E-46
1534	3851584	(AF092563) chromosome-associated protein-E [Homo sapiens]	4.00E-48
1535	4101695	(AF006010) progestin induced protein [Homo sapiens]	5 00E-30
1550	3850704	(AJ005273) Kin17 [Homo sapiens]	9.00E-24
1553	4240147	(AB020636) KIAA0829 protein [Homo sapiens]	9.00E-41
1554	2137490	lymphocyte specific helicase - mouse musculus]	5.00E-35
1561	3327052	(AB014519) KIAA0619 protein [Homo sapiens]	1.00E-41
1563	2137494	M-sema F protein precusor - mouse F [mice, neonatal brain. Peptide, 834 aa] [Mus sp.]	7.00E-34

Table 2B Nearest Neighbor (BlastX vs. Non-Redundant Proteins)

SEQ ID	ACC'N	DESCRIP	P VALUE
1564	2137603	nuclear receptor co-repressor N-CoR - mouse musculus] >gi|1583865|prf||2121436A thyroid hormone receptor co-repressor [Mus musculus]	9.00E-41
1565	2674107	(AF023451) guanine nucleotide-exchange protein [Bos taurus]	3.00E-48
1587	3659505	(AC005084) similar to mouse mCASK-A: similar to e1288039	1.00E-57
1649	114762	NUCLEOPHOSMIN (NPM) (NUCLEOLAR PHOSPHOPROTEIN B23) (NUMATRIN) (NUCLEOLAR PROTEIN NO38) sapiens]	6.00E-35
1651	3327056	(AB014521) KIAA0621 protein [Homo sapiens]	8.00E-40
1688	4545264	(AF118240) peroxisomal biogenesis factor 16 [Homo sapiens]	2.00E-65
1694	2498864	RRP5 PROTEIN HOMOLOG (KIAA0185) hypothetical protein YM9959.11C of S.cerevisiae. [Homo sapiens]	7.00E-77
1758	3420277	(AF064826) glypican 4 [Homo sapiens]	4.00E-76
1768	3088575	(AF059531) protein arginine N-methyltransferase 3 [Homo sapiens]	7.00E-97
1771	4050034	(AF098482) transcriptional coactivator p52 [Homo sapiens]	2.00E-58
1811	4506357	UNKNOWN: PZR >gi|3851145 sapiens]	2.00E-60
1830	3387977	(AF070598) ABC transporter [Homo sapiens]	e-113
1836	1709974	60S RIBOSOMAL PROTEIN L10A protein L10a [Rattus norvegicus] Ribosomal Protein RPL10A) [Homo sapiens]	e-111
1838	4507709	tissue specific transplantation antigen P35B >gi|1381179 (U58766) FX [Homo sapiens]	9.00E-90
1876	1117791	(U18297) MST1 [Homo sapiens]	4E-85
1877	4507015	copper transporter 1	3.00E-72
1897	4503301	2.4-dienoyl CoA reductase REDUCTASE, MITOCHONDRIAL PRECURSOR (2.4-DIENOYL-COA REDUCTASE (NADPH)) (4-ENOYL-COA REDUCTASE (NADPH)) precursor, mitochondrial - human >gi|602703 (L26050) 2.4-dienoyl-CoA reductase [Homo sapiens] >gi|2673979 precursor [Homo sapiens] >gi|4126313 (AF049895) 2,4-dienoyl-CoA reductase [Homo sapiens]	6E-94
1901	126743	MICROTUBULE-ASSOCIATED PROTEIN 4 human >gi|187383 (M64571) microtubule-associated protein 4 [Homo sapiens]	6E-84
1914	4505987	PTPRF interacting protein, binding protein 1 (liprin beta 1) >gi|3309539 (AF034802) liprin-beta1 [Homo sapiens]	4E-89
1920	3043644	(AB011132) KIAA0560 protein [Homo sapiens]	e-108

Table 2B Nearest Neighbor (BlastX vs. Non-Redundant Proteins)

SEQ ID	ACC'N	DESCRIP.	P VALUE
1944	3413892	(AB007934) KIAA0465 protein [Homo sapiens]	7.00E-87
1956	4185796	(AF103796) placenta-specific ATP-binding cassette transporter [Homo sapiens]	2E-68
1973	4507145	UNKNOWN >gi|3873216 (AF065485) sorting nexin 4 [Homo sapiens]	1.00E-73
2008	1083566	zinc finger protein/transactivator Zfp-38 - mouse >gi|55477 |emb| CAA45280| (X63747) Zfp-38 [Mus musculus]	2E-64
2018	1806134	(Z67747) zinc finger protein [Mus musculus]	7.00E-78
2032	730451	60S RIBOSOMAL PROTEIN L13A (23 KD HIGHLY BASIC PROTEIN) >gi|345897|pir||S29539 basic protein. 23K - human >gi|23691|emb|CAA40254| (X56932) 23 kD highly basic protein [Homo sapiens]	4.00E-87
2285	4102967	(AF023142) pre-mRNA splicing SR protein rA4 [Homo sapiens]	1.00E-33
2317	3108093	(AF061258) LIM protein [Homo sapiens]	6.00E-82
2318	3170887	(AF061555) ubiquitin-protein ligase E3-alpha [Mus musculus]	e-104
2324	1552350	(Y08135) acid sphingomyelinase-like phosphodiesterase [Mus musculus]	6.00E-91
2365	1552350	(Y08135) acid sphingomyelinase-like phosphodiesterase [Mus musculus]	e-106
2366	3242214	(AJ006778) DRIM protein [Homo sapiens]	e-114
2387	4514653	(AB024057) vascular Rab-GAP/TBC-containing protein [Homo sapiens]	e-121
2441	2443367	(AB005216) Nck, Ash and phospholipase C gamma-binding protein NAP4 [Homo sapiens]	e-120
2475	119110	EBNA-1 NUCLEAR PROTEIN herpesvirus 4 (strain B95-8) >gi|1334880|emb|CAA24816.1| gene. [Human herpesvirus 4]	2.00E-38
2479	121640	GLYCINE-RICH CELL WALL STRUCTURAL PROTEIN PRECURSOR >gi|72320|pir||KNMU glycine-rich cell wall protein precursor - Arabidopsis thaliana	8.00E-31
2495	1362077	glycin-rich protein - cowpea (fragment)	2E-40
2519	121640	GLYCINE-RICH CELL WALL STRUCTURAL PROTEIN PRECURSOR >gi|72320|pir||KNMU glycine-rich cell wall protein precursor - Arabidopsis thaliana	9.00E-27
2546	2674107	(AF023451) guanine nucleotide-exchange protein [Bos taurus]	5E-89
2548	3717978	(Y12431) 5S ribosomal protein [Mus musculus]	5E-94
2556	4191610	(AF117107) IGF-II mRNA-binding protein 2 [Homo sapiens]	e-111

Table 2B Nearest Neighbor (BlastX vs. Non-Redundant Proteins)

SEQ ID	ACC'N	DESCRIP.	P VALUE
2578	2119281	CHO1 antigen - Chinese hamster	e-101
2579	3435244	(AF083322) centriole associated protein CEP110 [Homo sapiens]	2E-70
2591	1843434	(D88687) KM-102-derived reductase-like factor [Homo sapiens]	4 00E-91
2604	3834629	(AF094519) diaphanous-related formin: p134 mDia2 [Mus musculus]	1E-49

Table 3A Profile Hits

SEQ ID NO:	Description	Start	Stop	Dir
1967	14_3_3 proteins	166	845	for
2366	3'5'-cyclic nucleotide phosphodiesterases	64	573	for
1579	4 transmembrane integral membrane proteins	300	924	rev
1978	4 transmembrane integral membrane proteins	340	941	rev
1652	7 transmembrane receptor (rhodopsin family)	109	647	rev
1927	7 transmembrane receptor (rhodopsin family)	84	947	rev
2068	7 transmembrane receptor (rhodopsin family)	305	975	for
1598	7 transmembrane receptor (Secretin family)	50	1269	for
1719	7 transmembrane receptor (Secretin family)	63	1160	rev
1911	7 transmembrane receptor (Secretin family)	38	869	rev
1927	7 transmembrane receptor (Secretin family)	237	930	rev
2068	7 transmembrane receptor (Secretin family)	188	975	for
2341	7 transmembrane receptor (Secretin family)	377	1524	rev
1671	ATPases Associated with Various Cellular Activities	136	718	for
1672	ATPases Associated with Various Cellular Activities	271	765	for
1688	ATPases Associated with Various Cellular Activities	206	709	rev
1796	ATPases Associated with Various Cellular Activities	139	783	for
1830	ATPases Associated with Various Cellular Activities	265	713	for
1872	ATPases Associated with Various Cellular Activities	152	616	rev
1913	ATPases Associated with Various Cellular Activities	12	510	for
1922	ATPases Associated with Various Cellular Activities	125	658	for
1964	ATPases Associated with Various Cellular Activities	97	752	for
1997	ATPases Associated with Various Cellular Activities	185	664	for
2032	ATPases Associated with Various Cellular Activities	69	485	for
2170	ATPases Associated with Various Cellular Activities	73	550	for
2177	ATPases Associated with Various Cellular Activities	340	928	for

SEQ ID NO:	Description	Start	Stop	Dir
2290	ATPases Associated with Various Cellular Activities	872	1390	rev
2343	ATPases Associated with Various Cellular Activities	122	635	for
2358	ATPases Associated with Various Cellular Activities	84	492	rev
2390	ATPases Associated with Various Cellular Activities	31	434	rev
2414	ATPases Associated with Various Cellular Activities	953	1358	rev
2461	ATPases Associated with Various Cellular Activities	192	690	rev
2476	ATPases Associated with Various Cellular Activities	51	593	for
2482	ATPases Associated with Various Cellular Activities	135	615	rev
2578	ATPases Associated with Various Cellular Activities	0	673	for
1623	Basic region plus leucine zipper transcription factors	81	277	for
1715	C2 domain (prot. kinase C like)	403	582	for
2426	C2 domain (prot. kinase C like)	493	637	for
2238	Cysteine proteases	359	984	rev
1630	DEAD and DEAH box helicases	34	690	rev
1865	DEAD and DEAH box helicases	43	753	for
2517	DEAD and DEAH box helicases	426	719	for
1714	Dual specificity phosphatase, catalytic domain	365	696	rev
1728	Dual specificity phosphatase, catalytic domain	243	597	for
2087	Dual specificity phosphatase, catalytic domain	786	1566	for
1595	EF-hand	556	630	for
1671	Eukaryotic aspartyl proteases	116	763	for
1778	Eukaryotic aspartyl proteases	92	1008	rev
1903	Eukaryotic aspartyl proteases	73	603	rev
1945	Eukaryotic aspartyl proteases	147	694	rev
1963	Eukaryotic aspartyl proteases	38	740	rev
1991	Eukaryotic aspartyl proteases	404	1113	rev
2130	Eukaryotic aspartyl proteases	237	829	rev
2138	Eukaryotic aspartyl proteases	117	729	rev
2193	Eukaryotic aspartyl proteases	217	1397	rev
2290	Eukaryotic aspartyl proteases	413	1366	rev
2291	Eukaryotic aspartyl proteases	8	710	rev

SEQ ID NO:	Description	Start	Stop	Dir
2348	Eukaryotic aspartyl proteases	291	1146	rev
2430	Eukaryotic aspartyl proteases	216	1158	rev
2496	Eukaryotic aspartyl proteases	228	659	for
2523	Eukaryotic aspartyl proteases	276	1291	rev
2589	Eukaryotic aspartyl proteases	525	1431	for
1968	Fibronectin type II domain	455	565	rev
1779	G-protein alpha subunit	24	583	rev
1621	Helicases conserved C-terminal domain	160	309	for
1652	Helicases conserved C-terminal domain	363	560	rev
2192	Helix-loop-helix DNA binding domain	224	382	for
2181	kinase domain of tors	474	713	for
1825	mkk like kinases	17	626	rev
1876	mkk like kinases	35	719	for
2039	mkk like kinases	114	527	for
2526	mkk like kinases	9	463	for
1782	Neurotransmitter-gated ion-channel	267	1411	for
1922	Neurotransmitter-gated ion-channel	367	1168	for
2068	Neurotransmitter-gated ion-channel	222	1024	for
2102	Neurotransmitter-gated ion-channel	352	1273	for
2154	Neurotransmitter-gated ion-channel	377	1159	for
2538	Neurotransmitter-gated ion-channel	112	1120	for
1621	protein kinase	153	743	for
1630	protein kinase	123	904	for
1705	protein kinase	471	1072	for
1706	protein kinase	190	609	for
1710	protein kinase	235	641	for
1744	protein kinase	8	711	rev
1767	protein kinase	90	537	for
1776	protein kinase	200	524	rev
1782	protein kinase	706	1331	for
1822	protein kinase	24	666	for
1825	protein kinase	56	593	rev
1844	protein kinase	263	824	for
1850	protein kinase	217	779	for
1876	protein kinase	290	711	for
1977	protein kinase	38	776	for
2051	protein kinase	14	657	for
2112	protein kinase	202	644	rev
2169	protein kinase	1	656	for
2205	protein kinase	57	689	for
2242	protein kinase	33	646	for

SEQ ID NO:	Description	Start	Stop	Dir
2291	protein kinase	630	1148	rev
2454	protein kinase	49	761	rev
2526	protein kinase	0	463	for
2558	protein kinase	77	590	for
1719	Protein Tyrosine Phosphatase	82	482	rev
1769	Protein Tyrosine Phosphatase	71	461	rev
2062	Protein Tyrosine Phosphatase	270	704	for
2197	Protein Tyrosine Phosphatase	359	851	for
2275	Protein Tyrosine Phosphatase	56	680	for
1850	RNA recognition motif. (aka RRM, RBD, or RNP domain)	165	365	for
2194	RNA recognition motif. (aka RRM, RBD, or RNP domain)	37	174	for
2441	SH2 Domain	201	362	for
1618	Thioredoxins	253	554	for
1579	Trypsin	252	1007	rev
2290	Trypsin	350	1164	rev
2341	Trypsin	447	1211	rev
2421	Trypsin	14	765	rev
2430	Trypsin	700	1556	rev
2438	Trypsin	47	670	rev
2281	WD domain, G-beta repeats	70	161	for
1579	wnt family of developmental signaling proteins	282	1017	rev
1653	wnt family of developmental signaling proteins	154	978	rev
1778	wnt family of developmental signaling proteins	38	858	rev
1826	wnt family of developmental signaling proteins	574	1318	rev
1875	wnt family of developmental signaling proteins	578	1313	rev
1904	wnt family of developmental signaling proteins	205	1068	rev
1992	wnt family of developmental signaling proteins	2	824	rev
2004	wnt family of developmental signaling proteins	621	1420	rev
2129	wnt family of developmental signaling proteins	394	1343	rev
2145	wnt family of developmental signaling proteins	162	1027	rev
2204	wnt family of developmental signaling proteins	274	1405	rev
2238	wnt family of developmental signaling proteins	560	1195	rev
2290	wnt family of developmental signaling proteins	250	1273	rev
2291	wnt family of developmental signaling proteins	523	1409	rev
2294	wnt family of developmental signaling proteins	297	1237	rev
2341	wnt family of developmental signaling proteins	51	1002	rev
2343	wnt family of developmental signaling proteins	28	1180	rev
2348	wnt family of developmental signaling proteins	638	1614	rev
2373	wnt family of developmental signaling proteins	30	1078	rev

SEQ ID NO:	Description	Start	Stop	Dir
2409	wnt family of developmental signaling proteins	4	1074	rev
2410	wnt family of developmental signaling proteins	208	1107	rev
2414	wnt family of developmental signaling proteins	242	1068	rev
2421	wnt family of developmental signaling proteins	159	1057	rev
2430	wnt family of developmental signaling proteins	844	1691	rev
2436	wnt family of developmental signaling proteins	107	784	rev
2438	wnt family of developmental signaling proteins	127	1226	rev
2463	wnt family of developmental signaling proteins	5	704	rev
2473	wnt family of developmental signaling proteins	328	1193	rev
2511	wnt family of developmental signaling proteins	341	1222	rev
2523	wnt family of developmental signaling proteins	820	1617	rev
2528	wnt family of developmental signaling proteins	461	1283	rev
1735	Zinc finger, C2H2 type	495	557	for
1942	Zinc finger, C2H2 type	500	562	for
2018	Zinc finger, C2H2 type	279	341	for
2254	Zinc finger, C2H2 type	148	210	for
2515	Zinc finger, C2H2 type	422	484	for

Table 3B Profile Hits for Contigs

SEQ ID NO:	Description	Start	Stop	Dir
2641	ATPases Associated with Various Cellular Activities	118	661	for
2655	ATPases Associated with Various Cellular Activities	135	536	for
2685	ATPases Associated with Various Cellular Activities	142	574	for
2648	DEAD and DEAH box helicases	66	931	rev
2686	Helicases conserved C-terminal domain	51	242	for
2661	Neurotransmitter-gated ion-channel	169	738	rev
2640	Protein phosphatase 2A regulatory subunit PR55	275	1510	for
2655	Protein phosphatase 2A regulatory subunit PR55	55	1087	for
2670	Protein phosphatase 2A regulatory subunit PR55	13	1183	for
2684	Protein phosphatase 2A regulatory subunit PR55	511	1861	rev
2679	Protein Tyrosine Phosphatase	292	768	for
2668	Thioredoxins	182	475	for

Table 22 Deposits of Pooled Clones

ES34	ES35	ES36	ES37
M00006992C:G02	M00005468A:D08	M00005452C:A02	M00022171D:B08
M00006756D:E10	M00021892B:H03	M00001382C:C09	M00008061A:F02
M00003984C:F04	M00001390A:C06	M00004841C:B09	M00003820C:A09
M00007125D:E03	M00022074D:F11	M00001441D:H05	M00022109B:A11
M00006650A:A10	M00005460B:D02	M00022716D:D08	M00005342D:F03
M00001452B:H06	M00022423B:D03	M00022828C:E04	M00022070B:C10
M00022972D:C10	M00007140A:F11	M00004350B:F06	M00006966B:B09
M00022305C:A01	M00004081B:C11	M00005685B:D08	M00022381C:C12
M00007010B:H01	M00005480A:H12	M00004190A:A09	M00003991B:B05
M00021946D:C11	M00008015D:E09	M00004054D:D02	M00022404D:G05

ES38	ES39	ES40	ES41
M00021912B:H11	M00007118B:B04	M00006993B:B09	M00007974B:C11
M00005378C:A10	M00007019A:B01	M00004242C:C01	M00021860B:G06
M00022578C:B07	M00021682B:D12	M00007986C:C05	M00006927C:F12
M00005513A:D08	M00005411D:A03	M00004115A:G09	M00022582C:E12
M00022176C:A08	M00006641C:H02	M00022600C:A06	M00006618C:G08
M00006822D:F07	M00007041B:C05	M00005384A:A01	M00005450B:B01
M00004031A:B04	M00005444B:E11	M00021667D:E03	M00001417B:E01
M00021927D:D12	M00022745B:G02	M00008078C:C06	M00003825B:A05
M00001553D:B06	M00022685A:F11	M00007985A:B09	M00001370B:B04
M00022404B:H05	M00004446A:G01	M00007953B:B03	M00006727B:E09

ES42	ES43	ES44	ES45
M00001478A:B06	M00006923B:H08	M00006615B:F05	M00005468D:F04
M00003972B:A11	M00005377D:F11	M00005486C:B03	M00006720C:C11
M00005477C:D08	M00006640B:H09	M00007124C:A11	M00005817D:E12
M00006745A:A01	M00005404C:F02	M00006995D:A03	M00001669B:A03
M00007090B:A02	M00004030A:G12	M00007149D:G06	M00003998A:G12
M00007152A:B04	M00006704D:D03	M00006990D:D06	M00004045A:B12
M00006953B:H10	M00006810D:A05	M00005530B:E04	M00004130D:E04
M00005399D:B02	M00005481C:A05	M00003918C:E07	M00004160A:D07
M00006987B:F04	M00005411A:C07	M00007163A:B10	M00001655A:F07
M00005772A:F03	M00003970A:G10	M00005485C:A03	M00001468D:D11

ES46
M00004217A:A05
M00004183D:B07
M00001415D:A05
M00004158C:F03
M00004031D:G02

Table 23. Library Deposits			
ES47	ES48	ES49	ES50
M00001399D:F09	M00004217D:G10	M00004508A:G12	M00021653A:G07
M00001455A:C03	M00004218C:G10	M00004508B:G02	M00021654C:A02
M00001456C:F02	M00004252D:H08	M00001432B:H08	M00021660C:G04
M00001487D:G03	M00004253B:A10	M00001432C:G01	M00021665A:D04
M00001539B:B01	M00004253B:F06	M00003992D:G01	M00021670B:G11
M00001565A:A02	M00004253C:E10	M00005326B:F03	M00021678A:B08
M00001572C:E07	M00004260A:B07	M00005332A:H10	M00021680B:C01
M00001582D:B10	M00004260C:A12	M00005342A:C04	M00021681C:B10
M00001584C:A03	M00004260C:E10	M00005342A:D04	M00021690D:E05
M00001586A:F09	M00001339B:A03	M00005349B:G01	M00021692A:E03
M00001588D:H08	M00001342C:A04	M00005352B:D02	M00021692C:E06
M00001610B:A01	M00001344D:G11	M00005354C:E02	M00021694B:A07
M00001618B:F02	M00001345A:A12	M00005356A:D09	M00021698B:B12
M00001618C:E06	M00001347A:G06	M00005359D:G07	M00021828A:C08
M00001621C:A04	M00001347B:H01	M00005378A:A08	M00021841C:D07
M00001626B:H05	M00001353B:D11	M00005383D:D06	M00021859A:D04
M00001641B:G05	M00001355B:A01	M00005383D:E07	M00021861C:A02
M00001648C:F06	M00001358D:D09	M00005385C:G05	M00021862A:A04
M00001649D:H05	M00001359A:B07	M00005388D:F09	M00021862D:F01
M00001656D:F11	M00001362A:C10	M00005390B:G10	M00021886D:E04
M00001660A:F10	M00001362B:A09	M00005397C:B03	M00021897B:A06
M00001669A:H11	M00001365D:D12	M00005399A:D01	M00021905A:G05
M00003741A:E01	M00001365D:H09	M00005409D:C02	M00021905B:A01
M00003745C:E03	M00001370A:G09	M00005415C:G08	M00021906C:G11
M00003746A:E01	M00001370B:B12	M00005417A:E10	M00021910A:C10
M00003748B:B06	M00001374D:D09	M00005442D:C05	M00021927A:C11
M00003749B:C08	M00001376B:C11	M00005446A:G01	M00021927B:F01
M00003749D:G07	M00001377A:D03	M00005446C:D12	M00021932C:C05
M00003752A:B06	M00001377A:E01	M00005454C:H12	M00021932C:G10
M00003752D:D09	M00001377C:B08	M00005455A:D01	M00021947A:C01
M00003753C:B01	M00001387A:A04	M00005455A:G03	M00021952B:F11
M00003754C:F01	M00001387D:C07	M00005462C:B02	M00021954A:A03
M00003756C:C08	M00001389B:B06	M00005469D:C11	M00021964A:C04
M00003759A:E10	M00001390A:H01	M00005480C:B12	M00021967D:E08
M00003762A:D11	M00001399C:E10	M00005483D:A12	M00021977D:E02
M00003763B:D03	M00001401D:D04	M00005484A:D09	M00021978A:F08
M00003763D:F06	M00001402D:C07	M00005491B:C03	M00021982C:F08
M00003765D:E02	M00001402D:H03	M00005493B:C08	M00021983B:B03
M00003766B:G04	M00001403B:A01	M00005494D:F11	M00021983D:B10
M00003767C:F04	M00001405D:F05	M00005496C:A01	M00022005C:G03
M00003769B:A04	M00001406C:A11	M00005496D:A10	M00022032A:E07
M00003769D:G12	M00001406D:H01	M00005497B:H07	M00022049A:A02
M00003770D:C07	M00001407B:A08	M00005497C:C07	M00022049A:D06

ES47	ES48	ES49	ES50
M00003771A:G09	M00001407D:H11	M00005497C:C12	M00022054D:C05
M00003771D:A10	M00001411A:D01	M00005497C:E03	M00022064C:H07
M00003773A:C09	M00001411C:G02	M00005498B:F08	M00022067D:C05
M00003773B:E09	M00001412A:A11	M00005498C:G05	M00022068B:H11
M00003773B:G08	M00001415D:E12	M00005508B:B04	M00022068D:D12
M00003773C:G06	M00001417C:E02	M00005524C:B01	M00022069D:G02
M00003773D:C02	M00001421A:H07	M00005528D:A10	M00022071B:D05
M00003789C:E03	M00001422D:D02	M00005530B:D03	M00022071C:D09
M00003790B:F12	M00001423C:D06	M00005534B:H10	M00022075D:F05
M00003793C:D11	M00001424A:H09	M00005548B:E03	M00022081C:G11
M00003796B:C07	M00001425C:E10	M00005550B:D09	M00022084B:F04
M00003797D:H06	M00001426A:F09	M00005565C:A08	M00022085C:C04
M00003801D:F05	M00001426D:D09	M00005589C:B03	M00022090A:G08
M00003805A:G05	M00001431A:C10	M00005616B:D05	M00022093A:A05
M00003808C:D09	M00001431A:E05	M00005620C:C05	M00022093D:B10
M00003809A:A12	M00001432A:F12	M00005621A:G10	M00022094B:G10
M00003809A:H12	M00001432B:H08	M00005621D:F01	M00022106C:F04
M00003813D:A06	M00001432C:G01	M00005631A:A11	M00022110A:E04
M00003818A:F09	M00001433A:C07	M00005632C:D06	M00022114C:B02
M00003818B:A01	M00001434A:A01	M00005637B:D12	M00022117C:G07
M00003819D:G09	M00001435A:F03	M00005642B:C03	M00022128A:D04
M00003821C:E04	M00001435A:G01	M00005647D:D09	M00022139A:C01
M00003822A:G05	M00001435B:G10	M00005655B:C02	M00022149B:D05
M00003825C:B02	M00001435C:G08	M00005703A:C08	M00022150A:H06
M00003825C:B12	M00001435D:A06	M00005704A:B11	M00022153D:D11
M00003833B:A11	M00001436D:C10	M00005708D:B03	M00022157A:F12
M00003834A:A03	M00001437B:B05	M00005710A:C08	M00022157B:A10
M00003835D:H05	M00001438C:H05	M00005720A:D03	M00022169D:C02
M00003839D:G06	M00001439B:F10	M00005722D:G03	M00022170D:H09
M00003841A:E09	M00001439C:A01	M00005743B:F02	M00022175A:A11
M00003841B:D05	M00001439C:G06	M00005763B:H09	M00022176A:E08
M00003843A:B01	M00001442A:D08	M00005765C:C04	M00022178D:H01
M00003844C:D04	M00001443D:A01	M00005810C:D04	M00022183A:G03
M00003844C:H05	M00001444A:A09	M00005813D:F06	M00022189A:A01
M00003846B:H02	M00001446D:B10	M00005818C:E08	M00022198A:C12
M00003850B:D11	M00001452D:E05	M00005818C:G01	M00022199C:F03
M00003852D:D03	M00001453D:F09	M00006576D:F11	M00022202C:F11
M00003859C:B09	M00001463C:A01	M00006577B:H12	M00022206B:G06
M00003868D:F02	M00001466C:F02	M00006587A:H08	M00022212C:C02
M00003868D:F07	M00001471C:G03	M00006594A:E08	M00022216D:C01
M00003871A:E09	M00001488B:G12	M00006596D:H04	M00022218C:B06
M00003884D:A12	M00001489B:F08	M00006601C:A07	M00022218D:B12
M00003887B:C03	M00001489D:C08	M00006601C:E06	M00022220C:F08
M00003888B:A10	M00001490B:G04	M00006609A:G10	M00022221D:E08

ES47	ES48	ES49	ES50
M00003888C:E01	M00001491C:C01	M00006633C:E11	M00022226C:B06
M00003890B:H07	M00001496A:B03	M00006633D:A06	M00022226D:A07
M00003890D:C03	M00001496D:D02	M00006634B:C02	M00022231A:F12
M00003892D:D04	M00001500A:D09	M00006636A:B08	M00022231C:A04
M00003893C:D12	M00001504D:D09	M00006644A:B11	M00022236D:A03
M00003895D:A03	M00001505A:E09	M00006644D:C02	M00022239A:A10
M00003896B:F08	M00001506A:F01	M00006686A:G12	M00022239B:B07
M00003896D:B01	M00001517D:C03	M00006692B:E04	M00022239D:A07
M00003903C:H03	M00001518D:A10	M00006728D:G10	M00022252C:E06
M00003905C:B01	M00001536B:B11	M00006733D:G12	M00022253B:E06
M00003905C:E10	M00001537B:C12	M00006734A:H12	M00022254C:D08
M00003906C:H12	M00001542C:D10	M00006735A:H02	M00022255A:C08
M00003909D:G01	M00001542C:F06	M00006764B:D05	M00022255D:E03
M00003911C:G05	M00001543A:E04	M00006765B:H06	M00022258C:F06
M00003912B:G11	M00001546B:H01	M00006785B:F09	M00022259B:G02
M00003912C:C11	M00001551D:C12	M00006791B:B08	M00022278C:E03
M00003914C:E03	M00001552B:D01	M00006796A:C03	M00022278D:F10
M00003915A:D09	M00001556D:A11	M00006800C:G08	M00022288C:D04
M00003915C:G01	M00001557C:B08	M00006814A:F07	M00022289A:D05
M00003920B:A10	M00001558B:A12	M00006819A:D10	M00022289D:B06
M00003921D:C06	M00001560C:C01	M00006820A:G05	M00022294A:D11
M00003923A:H07	M00001561B:C10	M00006821C:C10	M00022296B:C11
M00003936C:F10	M00001597C:B03	M00006822A:D07	M00022305A:H11
M00003948B:B03	M00001623B:B01	M00006823D:D12	M00022364C:G12
M00003949B:A08	M00001623D:A09	M00006826B:H03	M00022366B:E09
M00003949B:D05	M00001644D:F09	M00006828D:C12	M00022372B:D03
M00003961B:A12	M00003784C:B09	M00006832D:F11	M00022381A:F05
M00003961C:G02	M00003785D:E01	M00006846A:B01	M00022382D:H11
M00003962B:B09	M00003862C:H10	M00006850C:D09	M00022386A:A07
M00003963B:D12	M00003864B:A04	M00006850C:G07	M00022386B:D11
M00003973A:C05	M00003864D:G05	M00006851C:H09	M00022386C:A04
M00003973B:H06	M00003992C:G01	M00006863B:E06	M00022386C:D07
M00003976D:D12	M00003992D:G01	M00006866C:F03	M00022399C:A10
M00003977C:A08	M00003994C:C11	M00006867C:E07	M00022407C:H11
M00003980B:F12	M00003996D:C04	M00006868D:E02	M00022411D:G09
M00003980C:G10	M00003997D:D07	M00006870C:H06	M00022412A:C08
M00003981C:E04	M00003998A:D03	M00006873B:G11	M00022444A:A11
M00003983C:E07	M00003998C:H10	M00006875A:A02	M00022449C:B01
M00003987D:F06	M00003999C:C12	M00006877B:E05	M00022452C:B03
M00004027A:B10	M00004046A:F04	M00006879A:H11	M00022457C:B01
M00004027C:H01	M00004051C:D02	M00006882A:D01	M00022495C:G05
M00004028C:B04	M00004052C:A08	M00006901D:A11	M00022504B:E03
M00004030B:B02	M00004052C:B05	M00006907C:D03	M00022505D:A12
M00004030B:C05	M00004054B:G02	M00006907D:C07	M00022509D:F06

ES47	ES48	ES49	ES50
M00004035D:E04	M00004054D:A03	M00006912B:E01	M00022527A:E05
M00004036B:F09	M00004055B:F06	M00006921B:E01	M00022527D:B03
M00004036C:D01	M00004058B:C11	M00006960D:E06	M00022531B:D07
M00004037A:A07	M00004058C:E08	M00006963A:H11	M00022535D:B11
M00004037B:B05	M00004059A:G09	M00006966C:B07	M00022535D:C04
M00004038C:C05	M00004060C:A02	M00006972A:F10	M00022536B:B04
M00004038C:D12	M00004060D:A07	M00006973C:E11	M00022551A:G03
M00004039D:D03	M00004063C:B11	M00006973D:E11	M00022556B:C04
M00004040B:B09	M00004143A:G12	M00006974B:F06	M00022556B:G02
M00004040C:G12	M00004143A:H07	M00006976C:E09	M00022562C:H10
M00004040D:B05	M00004145C:A03	M00007014C:B07	M00022578B:G05
M00004041B:F01	M00004146D:A07	M00007015C:G05	M00022578D:F03
M00004041D:E06	M00004147A:G03	M00007016C:E06	M00022583B:E05
M00004043D:C10	M00004149B:H12	M00007041B:G01	M00022587C:G04
M00004069D:G02	M00004153D:E06	M00007042A:E07	M00022594B:H12
M00004071A:H03	M00004154D:F11	M00007043A:B05	M00022598A:F11
M00004073D:B11	M00004159D:C04	M00007046A:D02	M00022599D:E07
M00004076D:B03	M00004166B:E10	M00007047B:D01	M00022604B:C11
M00004081C:A01	M00004166C:A03	M00007051D:D09	M00022607B:A04
M00004084C:G04	M00004166D:G07	M00007053B:H03	M00022613D:C04
M00004085B:G06	M00004196C:G05	M00007058A:C02	M00022651D:C06
M00004087C:F05	M00004234B:E03	M00007062A:D03	M00022666C:H11
M00004091A:E01	M00004234B:G06	M00007099A:F09	M00022681C:H02
M00004091B:C12	M00004236D:E07	M00007100C:D01	M00022682A:F12
M00004091B:G04	M00004236D:F04	M00007112B:C06	M00022698C:E06
M00004091C:F04	M00004240D:A07	M00007105D:C07	M00022701B:B12
M00004091D:D09	M00004242C:C02	M00007121A:A05	M00022708A:C08
M00004092A:C03	M00004244B:A02	M00007122A:G11	M00022708D:G10
M00004092A:D04	M00004245A:G09	M00007122B:A11	M00022725C.E09
M00004093D:D09	M00004245C:A03	M00007127B:A04	M00022726A:A06
M00004101D:A03	M00004247A:E01	M00007129A:G10	M00022730A:E04
M00004103B:C07	M00004247B:C11	M00007130B:B03	M00022737A:C08
M00004107C:A01	M00004248A:G08	M00007132D:G08	M00022763A:E10
M00004114C:F02	M00004263D:F06	M00007134C:F07	M00022824C:H11
M00004115A:F01	M00004272D:D02	M00007137D:C10	M00022835C:E06
M00004117B:F01	M00004273D:E11	M00007140D:C12	M00022854D:H07
M00004120A:C02	M00004277D:C08	M00007150A:C09	M00022856A:D02
M00004126B:G02	M00004281B:B05	M00007150A:H06	M00022856B:F04
M00004129A:H08	M00004283C:D03	M00007154A:E04	M00022856C:B11
M00004130C:A09	M00004285B:E01	M00007163A:F11	M00022893C:H11
M00004133D:A01	M00004297D:E08	M00007163B:A12	M00022897A:F04
M00004178B:F06	M00004298B:D04	M00007166B:E06	M00022900D:E08
M00004180B:F04	M00004308A:E06	M00007170D:A10	M00022900D:G03
M00004184B:F11	M00004324B:D09	M00007172A:A05	

ES47	ES48	ES49	ES50
M00004191B:G01	M00004328A:H06	M00007172D:C08	
M00004193A:C07	M00004329C:F11	M00007188A:D03	
M00004193C:H01	M00004331D:H08	M00007189D:A09	
M00004199D:C02	M00004332C:E09	M00007193D:A04	
M00004200A:A09	M00004337D:G08	M00007195B:B02	
M00004200A:G06	M00004345A:H06	M00007198C:A10	
M00004200D:A07	M00004383A:F02	M00007199D:B07	
M00004201D:C11	M00004385C:B11	M00007204C:F09	
M00004201D:E12	M00004388C:D05	M00007929B:H10	
M00004202B:A02	M00004406A:H03	M00007961A:B01	
M00004204A:D04	M00004408D:A10	M00007964B:D10	
M00004204A:D10	M00004410A:E03	M00007971A:B04	
M00004204B:A04	M00004412B:E03	M00007977C:E08	
M00004210A:B09	M00004421A:G04	M00007995D:E06	
M00004216D:E10	M00004447D:D10	M00008074D:C01	
M00004217A:A11	M00004460B:H09	M00008094A:E10	
	M00004465C:B10	M00021611D:D05	
	M00004465C:B12	M00021611D:H03	
	M00004467A:F09	M00021614B:G12	
	M00004467D:F09	M00021618D:D07	
	M00004491D:D07	M00021624A:D07	
	M00004497C:E09	M00021624B:A03	
	M00004501A:G06	M00021625A:C07	
	M00004506C:H10	M00021629D:D05	

Table 24 Library Deposits			
ES51	ES52	ES53	ES54
M00001448A:D05	M00001439B:E02	M00006621A:G10	M00021640A:G03
M00001458B:F06	M00001443A:E02	M00006626A:G11	M00021657B:C08
M00001530A:D11	M00001443D:C03	M00006629D:D04	M00021690B:B06
M00001563C:D06	M00001444A:G12	M00006630B:H06	M00021690C:B07
M00001564C:D04	M00001445B:E03	M00006631D:B02	M00022071C:C09
M00001569B:F04	M00001451B:H11	M00006631D:C04	M00022081C:B11
M00001575A:H02	M00001452B:F09	M00006631D:E09	M00022085C:A07
M00001589C:D12	M00001488B:H02	M00006635C:B10	M00022091B:B07
M00001589D:G10	M00001491D:E07	M00006636A:E06	M00022122D:D06
M00001590D:A07	M00001496C:H10	M00006636D:A05	M00022150D:D11
M00001598C:D10	M00001499A:D01	M00006636D:F11	M00022154A:C01
M00001599A:H09	M00001499A:D05	M00006640A:B01	M00022170D:H07
M00001609A:B12	M00001499B:H05	M00006640B:F05	M00022365A:A01
M00001614C:G04	M00001500B:H07	M00006640D:H08	M00022389B:H04
M00001626C:C10	M00001504C:H11	M00006641A:B03	M00022439A:E07
M00001634C:E12	M00001506D:A11	M00006643A:E10	M00022449D:F06
M00001639A:A04	M00001543A:D03	M00006644C:E09	M00022458B:E06
M00001640A:F02	M00001543A:F01	M00006648C:E04	M00022474A:H09
M00001640A:F04	M00001548C:A09	M00006650A:B11	M00022480B:E07
M00001647C:C07	M00001555D:F11	M00006656C:C10	M00022489C:A08
M00001649B:E08	M00001557B:D10	M00006664B:B04	M00022490C:A08
M00001654D:F06	M00001597A:C07	M00006664D:H09	M00022490C:C01
M00001658B:C07	M00001604B:D09	M00006665A:F07	M00022493C:B07
M00001659D:G08	M00001605D:G01	M00006665B:D10	M00022493C:C06
M00001663C:C03	M00001621D:B09	M00006674B:F04	M00022498C:C08
M00001675C:B03	M00001622C:F06	M00006676B:F11	M00022514A:D04
M00001677A:A06	M00001624A:A09	M00006676D:D11	M00022515D:C04
M00001677A:A12	M00001640D:C10	M00006679C:D07	M00022549B:G07
M00001678D:A12	M00001645B:C09	M00006681C:G04	M00022557B:A08
M00001679C:F03	M00003782D:F04	M00006695B:F08	M00022565C:H02
M00001681A:H09	M00003783C:A06	M00006698B:E06	M00022578D:A08
M00001687C:A06	M00003786D:C06	M00006699B:C07	M00022597B:F11
M00001693D:F07	M00003787B:D07	M00006705B:D02	M00022599A:C03
M00003746B:E12	M00003787D:A06	M00006712B:H10	M00022661B:E11
M00003766A:G09	M00003864C:D09	M00006717A:D04	M00022661D:H01
M00003795A:B01	M00003993A:E12	M00006721C:G07	M00022666B:E12
M00003796C:H03	M00003997B:H04	M00006725A:A03	M00022674D:G04
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M00003799B:D02	M00004047B:G09	M00006727B:G08	M00022725C:B03
M00003809B:D08	M00004048D:A07	M00006728C:B06	M00022727B:C05
M00003811B:E07	M00004049D:G04	M00006737C:A08	M00022728A:A09
M00003812B:F08	M00004050A:F02	M00006738A:E05	M00022730D:E10
M00003812D:E08	M00004051C:D10	M00006739B:B10	M00022735B:B01

ES51	ES52	ES53	ES54
M00003815C:A06	M00004058B:F12	M00006739B:B12	M00022745A:B04
M00003815D:D01	M00004060C:A11	M00006739C:H07	M00022856B:D07
M00003816C:F10	M00004064A:B12	M00006743B:G12	M00022901D:C09
M00003818C:E09	M00004066A:E12	M00006744C:C06	M00022902D:D03
M00003819A:B09	M00004067C:D08	M00006745D:E08	M00022953B:C07
M00003819C:E04	M00004134A:F08	M00006751A:F03	M00022960D:E08
M00003820A:H04	M00004134A:H04	M00006758D:C01	M00022963A:D11
M00003820D:E02	M00004134C:B11	M00006760D:G12	M00022968A:F02
M00003824B:D06	M00004140B:B01	M00006763B:B11	M00022980B:E11
M00003825B:D12	M00004143C:F08	M00006769D:A04	M00022980C:A09
M00003826B:D01	M00004144D:B06	M00006770B:C05	M00022993A:F02
M00003829A:E02	M00004152C:E01	M00006771A:E06	M00023003C:A03
M00003832B:G03	M00004159D:H07	M00006771A:H07	M00023011A:A06
M00003833D:D06	M00004160A:A01	M00006771B:A09	M00023021A:H08
M00003835A:E03	M00004161B:A12	M00006771B:F03	M00023023A:B12
M00003837C:F05	M00004163A:D11	M00006774D:C01	M00023028A:A02
M00003839C:B05	M00004164D:D02	M00006777B:D10	M00023033A:E10
M00003845A:A05	M00004165C:E09	M00006779B:A11	M00023034C:E05
M00003846D:C12	M00004166A:F02	M00006779D:D03	M00023036D:C04
M00003857C:A03	M00004167C:F10	M00006780A:H12	M00023094A:C04
M00003858A:D01	M00004169A:B11	M00006789C:F04	M00023103A:E11
M00003860B:A07	M00004200B:B04	M00006790D:A05	M00006754B:D05
M00003868B:C07	M00004222A:H10	M00006796A:H10	
M00003881D:D09	M00004223D:D07	M00006797B:D12	
M00003883D:C03	M00004225D:F01	M00006801A:G05	
M00003884B:E06	M00004228C:D11	M00006805A:E11	
M00003886C:D10	M00004229C:G11	M00006805A:H09	
M00003903C:A12	M00004239C:A07	M00006805B:C04	
M00003912C:H01	M00004239C:C09	M00006807D:D08	
M00003915B:G07	M00004240D:E06	M00006813A:C04	
M00003920D:D09	M00004241B:B01	M00006822D:D05	
M00003926B:E03	M00004243C:E10	M00006825C:D06	
M00003934D:F01	M00004266A:F10	M00006831B:B04	
M00003958C:C10	M00004266B:H06	M00006832A:F05	
M00003965A:F07	M00004268C:F08	M00006832D:F10	
M00003972C:F02	M00004268D:G07	M00006833B:E11	
M00003974B:A04	M00004269A:B11	M00006872B:G01	
M00003974C:A05	M00004269D:E08	M00006875D:D10	
M00003975B:H09	M00004276C:E12	M00006879D:A10	
M00003976C:C05	M00004277B:C06	M00006882D:F03	
M00003980C:A11	M00004277C:H11	M00006884D:D06	
M00003987A:C07	M00004279D:E02	M00006908C:A05	
M00003988B:C10	M00004281B:B03	M00006921B:C02	
M00003988C:A06	M00004284B:F07	M00006921B:E03	

ES51	ES52	ES53	ES54
M00003989C:F01	M00004287B:B12	M00006949B:F03	
M00004028C:D01	M00004287C:B06	M00006960A:G11	
M00004029A:E01	M00004297D:B08	M00006966D:G03	
M00004030A:E09	M00004332B:D02	M00006974B:D06	
M00004031A:G05	M00004332B:E11	M00007013B:F02	
M00004032D:D03	M00004346B:D06	M00007014D:C05	
M00004033C:D10	M00004389C:E01	M00007014D:D04	
M00004034A:E08	M00004403A:B05	M00007030A:G01	
M00004035A:A10	M00004407D:B09	M00007030C:F08	
M00004035B:H11	M00004419D:G01	M00007053B:C07	
M00004035D:C05	M00004449D:H01	M00007065B:B12	
M00004037B:A09	M00004463C:F11	M00007065D:C01	
M00004037C:C05	M00004466A:E09	M00007075C:D08	
M00004037D:B05	M00004469A:C12	M00007085A:B07	
M00004044A:F08	M00004470C:A02	M00007118C:G02	
M00004068A:F02	M00004498B:E01	M00007119B:H10	
M00004068B:D04	M00004509A:H02	M00004824C:G09	
M00004068D:B01	M00004605C:A09	M00004826A:E09	
M00004069B:B01	M00004609C:C11	M00004839C:B01	
M00004073D:E01	M00001378B:F06	M00004840C:F02	
M00004075A:G10	M00005294C:G08	M00004840C:H05	
M00004075C:C09	M00005294D:H02	M00004845D:E11	
M00004076A:E02	M00005330C:F09	M00004846A:D02	
M00004077D:D10	M00005333C:C08	M00004846D:H09	
M00004078A:F03	M00005342B:G10	M00004854A:C09	
M00004078C:A08	M00005352C:G09	M00004858D:E06	
M00004084A:D11	M00005352D:E06	M00004999A:F01	
M00004086A:A03	M00005353B:B09	M00004999B:D12	
M00004086D:A07	M00005359B:G01	M00004999D:E01	
M00004088A:F12	M00005359D:H08	M00005004B:C11	
M00004089A:F02	M00005377A:A04	M00005005C:E06	
M00004089A:G03	M00005377A:D05	M00005009B:A02	
M00004093A:F03	M00005385C:D08	M00005015D:D11	
M00004097C:A03	M00005388A:F07	M00005457D:C08	
M00004102B:B04	M00005388D:B11	M00005519B:H04	
M00004102C:F07	M00005392C:C04	M00005519C:F08	
M00004103B:C09	M00005393A:E11	M00005531B:A03	
M00004103C:F11	M00005394A:G07	M00005535B:F06	
M00004104A:H09	M00005396B:C04	M00005587B:H02	
M00004104D:C09	M00005399B:F02	M00005685A:A04	
M00004108A:D04	M00005400A:D02	M00005706D:A09	
M00004109B:A01	M00005403D:E11	M00005711A:H01	
M00004126D:B11	M00005406D:B08	M00005798B:C11	
M00004133C:B02	M00005411D:E05	M00005799C:C12	

ES51	ES52	ES53	ES54
M00004182D:H03	M00005415D:G02	M00005805D:E06	
M00004183A:D06	M00005417C:E10	M00005827B:H08	
M00004186B:E05	M00005419A:D05	M00005828D:C09	
M00004187C:H09	M00005419C:D09	M00005837A:D12	
M00004188A:E05	M00005443D:C12	M00006751B:B11	
M00004188A:E10	M00005447B:D02	M00006754B:D05	
M00004190A:C12	M00005448D:E08	M00006756B:B08	
M00004190C:G07	M00005450A:A02	M00006757D:E04	
M00004190D:A10	M00005450A:B10	M00006758A:B12	
M00004190D:G12	M00005450D:D02	M00006758D:C04	
M00004198D:H04	M00005451A:E03	M00006834A:C08	
M00004202B:F04	M00005456B:B07	M00006835B:F04	
M00004202B:G09	M00005456B:E03	M00006837C:G06	
M00004206C:G11	M00005460A:B10	M00006841D:A08	
M00004213A:H12	M00005465C:H02	M00006855C:H02	
M00004214A:D03	M00005466A:F12	M00006855D:H02	
M00004218D:F12	M00005468B:D04	M00006859A:F06	
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M00004253D:F09	M00005483D:A02	M00006893C:F02	
M00004257C:A08	M00005487A:H01	M00006895D:E10	
M00004262C:C01	M00005489A:F06	M00006917C:E07	
M00001339B:E05	M00005493B:A12	M00006919B:C03	
M00001341A:A11	M00005493B:E01	M00006923C:B01	
M00001346A:B09	M00005497C:C10	M00006926A:H11	
M00001346B:A07	M00005505A:C08	M00006934A:G02	
M00001346B:G03	M00005508A:H01	M00006936B:E09	
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M00001352C:E01	M00005539D:G07	M00006939B:E05	
M00001362B:H09	M00005571A:E11	M00006953D:H11	
M00001370A:B01	M00005619C:H10	M00006980A:F02	
M00001370B:D04	M00005625D:C03	M00006986C:G11	
M00001374C:C09	M00005626A:B11	M00006989B:C11	
M00001376A:H02	M00005635B:A06	M00006990B:H09	
M00001378B:F06	M00005635C:F11	M00006991A:E07	
M00001380C:D10	M00005636C:D11	M00006991D:G07	
M00001383C:C07	M00005637D:C05	M00006995C:A02	
M00001384A:C09	M00005641B:E02	M00006997B:E06	
M00001391D:A07	M00005645D:F08	M00006997D:B03	
M00001391D:A09	M00005646C:B09	M00007006D:D04	
M00001396C:G02	M00005646D:B03	M00007010B:C11	

ES51	ES52	ES53	ES54
M00001397A:F10	M00005655D:C04	M00007010B:H03	
M00001397B:E02	M00005703C:B01	M00007012B:D07	
M00001397B:H11	M00005720B:D09	M00007031C:D01	
M00001399D:F01	M00005722A:E09	M00007032A:F11	
M00001400D:B08	M00005762D:A01	M00007033A:H05	
M00001402C:E09	M00005783A:C05	M00007033D:F04	
M00001406A:G12	M00005812C:F10	M00007036A:D02	
M00001406D:B06	M00006581C:D02	M00007037B:D04	
M00001408A:B02	M00006581D:H08	M00007084B:A05	
M00001409C:D01	M00006582A:B09	M00007093A:F09	
M00001411C:F02	M00006582D:E05	M00007099C:F09	
M00001411D:C01	M00006592A:D03	M00007101A:A11	
M00001412D:C03	M00006594D:F09	M00007107A:D11	
M00001417B:C07	M00006596A:F07	M00007121C:H01	
M00001417C:A09	M00006601D:F04	M00007129A:E04	
M00001418A:C02	M00006604C:H10	M00007132B:B11	
M00001421C:A03	M00006607B:E03	M00007134B:G07	
M00001426A:C02	M00006607B:F04	M00007146D:G01	
M00001427A:C05	M00006615D:F04	M00007148B:C06	
M00001433A:F04	M00006616C:H09	M00007160C:B08	
M00001434C:D05	M00006616D:C08	M00007161A:H03	
M00001435C:H05	M00006617B:D09	M00007192C:H08	
M00001438A:H10	M00006619B:C11	M00007200B:C02	
M00001438B:H06		M00021619B:G10	

We Claim:

1. An isolated polynucleotide comprising a nucleotide sequence having at least 90% sequence identity to a sequence of SEQ ID NOS: 1-729, 732-918, 920-971, 974-1127, 1129-1191, 1193-1253, 1255-1289, 1291-1491, 1493-2702 or a degenerate variant thereof.

2. An isolated polynucleotide comprising a nucleotide sequence having at least 95% sequence identity to a sequence of SEQ ID NOS: 1-729, 732-918, 920-971, 974-1127, 1129-1191, 1193-1253, 1255-1289, 1291-1491, 1493-2702 or a degenerate variant thereof.

3. An isolated polynucleotide comprising a nucleotide sequence having a sequence of SEQ ID NOS: 1-729, 732-918, 920-971, 974-1127, 1129-1191, 1193-1253, 1255-1289, 1291-1491, 1493-2702 or a degenerate variant thereof.

4. An isolated polynucleotide comprising a nucleotide sequence having a sequence of at least 50 contiguous nucleotides of any of SEQ ID NOS: 1-729, 732-918, 920-971, 974-1127, 1129-1191, 1193-1253, 1255-1289, 1291-1491, 1493-2702 or a degenerate variant thereof.

5. An isolated polynucleotide comprising a nucleotide sequence having a sequence of at least 100 contiguous nucleotides of any of SEQ ID NOS: 1-729, 732-918, 920-971, 974-1127, 1129-1191, 1193-1253, 1255-1289, 1291-1491, 1493-2702 or a degenerate variant thereof.

6. An isolated polynucleotide comprising a nucleotide sequence having a sequence of at least 200 contiguous nucleotides of any of SEQ ID NOS: 1-729, 732-918, 920-971, 974-1127, 1129-1191, 1193-1253, 1255-1289, 1291-1491, 1493-2702 or a degenerate variant thereof.

7. An isolated polynucleotide comprising a nucleotide sequence having a sequence of at least 250 contiguous nucleotides of any of SEQ ID NOS: 1-729, 732-918, 920-971, 974-1127, 1129-1191, 1193-1253, 1255-1289, 1291-1491, 1493-2702 or a degenerate variant thereof.

8. An isolated polynucleotide comprising a sequence selected from the group consisting of: 150 contiguous nucleotides of the sequence of SEQ ID NO:730 or a degenerate variant thereof; 250 contiguous nucleotides of the sequence of SEQ ID NO:731 or a degenerate variant thereof; 50 contiguous nucleotides of the sequence of SEQ ID NO:919 or a degenerate variant thereof; 150 contiguous nucleotides of the sequence of SEQ ID NO:972 or a degenerate variant thereof; 35 contiguous nucleotides of the sequence of SEQ ID NO:973 or a degenerate variant thereof; 100 contiguous nucleotides of the sequence of SEQ ID NO:1128 or a degenerate variant thereof; 100 contiguous nucleotides of the sequence of SEQ ID NO:1192 or a degenerate variant thereof; 150 contiguous nucleotides of the sequence of SEQ ID NO:1254 or a degenerate variant thereof; 35 contiguous nucleotides of the sequence of SEQ ID NO:1290 or a degenerate variant thereof; and 100 contiguous nucleotides of the sequence of SEQ ID NO:1492 or a degenerate variant thereof.

9. A vector comprising the polynucleotide of any one of the preceding claims.

10. A recombinant host cell containing a polynucleotide claim 9.

11. An isolated polypeptide encoded by the polynucleotide of any one of claims 1-8.

12. An antibody that specifically binds a polypeptide of claim 11.

13. A polynucleotide comprising the nucleotide sequence of an insert contained in any one of the clones deposited as ATCC accession number PTA-46 to PTA-66.

14. A method of detecting differentially expressed genes correlated with a cancerous state of a mammalian cell, the method comprising the step of:

detecting at least one differentially expressed gene product in a test sample derived from a cell suspected of being cancerous, where the gene product is encoded by a gene corresponding to a sequence of at least one of SEQ ID NOS: 1213, 1538, 1466, 1356, 1383, 1158, 441, 1338, 1426, 1547, 1313, 841, 1534, 1503, 829, 1408, 1447, 1389, 356, 1492, 1543, 799, 1437, 1251, 972, 1482, 1299, 109, 1558, 1355, 1548, 250, 919, 358, 1525, 1157, 150, 651, 1298, 57, 625, 1322, 36, 621, 215, 561, 247, 199, 998, 502, 1382, 1181, 1309, 1157, 1260, 1185, 1525, 248, 87, 698, 57, 924, 1249, 248, 726, 14, 699, 763, 20, 79, 715, 991, 1199, 707, 1128, 891, 1146, 731, 1518, 340, 949, 1247, 1185, 924, 822, 728, 341, 1527, 698, 949, 744, 973, 1268, 1114, 1032, 109, 973, 91, 982, 1267, 93, 1556, 1251, 1206, 812, 1254, 1220, 766, 1156, 1007, 981, 762, 876, 1234, 1183, 1044, 785, 1069, 770, 778, 792, 822, 1258, 1224, 984, 841, 339, 1213, 1201, 1192

wherein detection of the differentially expressed gene product is correlated with a cancerous state of the cell from which the test sample was derived.