encompass sequences which are greater than 98.5% identical, and preferably, greater than about 99% identical, to the Sequence Listing. Also included in one embodiment, are natural variants and engineered modifications of the sequences provided in SEQ ID NO: 1, 32, or 63 and their complementary strands. Such modifications include, for example, labels that are known in the art, methylation, and substitution of one or more of the naturally occurring nucleotides with a degenerate nucleotide.

Regions		**SAdV-40 ORF SEQ ID NO: 1**	**SAdV-31 ORF SEQ ID NO: 32**	**SAdV-34 ORF SEQ ID NO: 63**
ITR		1..113	1..121	1..119
E1a	13S 12S 9S	Join 589..1129, 1243..1541	Join 586..1126, 1250..1551	Join 589..1129, 1242..1540
E1b	Small T/19K	1641..2276	1728..2288	1640..2275
	Large T/55K	2021..3541	2033..3553	2020..3540
	IX	3640..4098	3655..4116	3637..4101
E2b	pTP	Complement (8652..10652, 14211..14219)	Complement (8670..10664, 14224..14232)	Complement (8649..10649, 14212..14220)
	Poly-merase	Complement (5269..8850, 14211..14219)	Complement (5287..8868, 14224..14232)	Complement (5272..8847, 14212..14220)
	IVa2	Complement (4163..5496, 5775..5787)	Complement (4181..5514, 5793..5805)	Complement (4166..5499, 5778..5790)
L1	52/55D	11105 . . 12361	11118..12377	11102..12358
	IIIa	12388 . . 14160	12404..14167	12385..14160
L2	Penton	14256..16034	14272..16038	14185..16035
	VII	16052..16645	06062..16655	16053..16646
	V	16721..17833	16721..17839	16772..17843
	pX	17861..18103	17868..18110	17862..18104

Regions		SAdV-40 ORF SEQ ID NO: 1	SAdV-31 ORF SEQ ID NO: 32	SAdV-34 ORF SEQ ID NO: 63
L3	VI	18202..18954	18207..18965	18197..18949
	Hexon	19069..21948	19077..21938	19064..21937
	Endo-protease	21981..22607	21974..22603	21970..22596
E2a	DBP	Complement (22727..24376)	Complement (22728..24395)	Complement (22713..24362)
L4	100 kD	24414..26915	24433..26928	24400..26901
	33 kD homolog	Join 26611..26940, 27215..27529	Join 26627..26953, 27249..27545	Join 26597..26926, 27180..27515
	22 kD	26611..27207	26627..27220	26597..27193
	VIII	27607..28287	27623..28303	27593..28273
E3	12.5K	28291..28605	28307..28621	28277..28591
	CR1-alpha	28586..29125	28602..29141	28572..29111
	gp19K	29303..29797	29319..29816	29211..29783
	CR1-beta	29829..30722	29848..30720	29815..30693
	CR1-gamma	30722..31561	30720..31559	30693..31541
	RID-alpha	31576..31845	31574..31843	31556..31825
	RID-beta	31851..32246	31849..32244	31831..32226
	14.7K	32242..32625	32240..32623	32222..32605
L5	Fiber	32834..34462	32799..34566	32760..34547
E4	Orf 6/7	Complement (34673..34945, 35648..35830)	Complement (34785..35057, 35760..35942)	Complement (34758..35030, 35733..35888)
	Orf 6	Complement (34949..35830)	Complement (35061..35942)	Complement (35034..35888)
	Orf 4	Complement (35733..36095)	Complement (35845..36207)	Complement (35818..36180)
	Orf 3	Complement (36115..36459)	Complement (36224..36568)	Complement (36200..36544)

Regions		SAdV-40 ORF SEQ ID NO: 1	SAdV-31 ORF SEQ ID NO: 32	SAdV-34 ORF SEQ ID NO: 63
	Orf 2	Complement (36459..36848)	Complement (36568..36957)	Complement (36544..36993)
	Orf 1	Complement (36908..37291)	Complement (37019..37402)	Complement (36989..37372)
ITR		Complement (37600..37718)	Complement (37708..37828)	Complement (37681..37799)

In one embodiment, fragments of the sequences of SAdV-40, SAdV-31 or SAdV-34, and their complementary strand, cDNA and RNA complementary thereto are provided. Suitable fragments are at least 15 nucleotides in length, and encompass functional fragments, *i.e.*, fragments which are of biological interest. For example, a functional fragment can express a desired adenoviral product or may be useful in production of recombinant viral vectors. Such fragments include the gene sequences and fragments listed in the table herein. The table provides the transcript regions and open reading frames in the SAdV-40, SAdV-31 or SAdV-34 sequences. For certain genes, the transcripts and open reading frames (ORFs) are located on the strand complementary to that presented in SEQ ID NO: 1, 32, or 63. See, e.g., E2b, E4 and E2a. The calculated molecular weights of the encoded proteins are also shown. Note that the E1a open reading frame of SAdV-40, SAdV-31 or SAdV-34 and the E2b open reading frame contain internal splice sites. These splice sites are noted in the table above.

The SAdV-40, SAdV-31 or SAdV-34 adenoviral nucleic acid sequences are useful as therapeutic agents and in construction of a variety of vector systems and host cells. As used herein, a vector includes any suitable nucleic acid molecule including, naked DNA, a plasmid, a virus, a cosmid, or an episome. These sequences and products may be used alone or in combination with other adenoviral sequences or fragments, or in combination with elements from other adenoviral or non-adenoviral sequences. The SAdV-40, SAdV-31 or SAdV-34 sequences are also useful as antisense delivery vectors, gene therapy vectors, or vaccine vectors. Thus, further provided are nucleic acid molecules, gene delivery vectors, and host cells which contain the SAdV-40, SAdV-31 or SAdV-34 sequences.

B. SAdV-40, SAdV-31 or SAdV-34 Adenoviral Proteins

Gene products of the SAdV-40, SAdV-31 or SAdV-34 adenovirus, such as proteins, enzymes, and fragments thereof, which are encoded by the adenoviral nucleic acids described herein are provided. Further encompassed are SAdV-40, SAdV-31 or SAdV-34 proteins, enzymes, and fragments thereof, having the amino acid sequences encoded by these nucleic acid sequences which are generated by other methods. Such proteins include those encoded by the open reading frames identified in the table above, the proteins in the table below (also shown in the Sequence Listing) and fragments thereof of the proteins and polypeptides.

Regions		**SAdV-40** SEQ ID NO:	**SAdV-31** SEQ ID NO:	**SAdV 34** SEQ ID NO:
E1a	13S 12S 9S	29	60	91
E1b	Small T/19K	22	53	64
	Large T/55K	2	33	84
	IX	3	34	65
L1	52/55 kD	4	35	66
	IIIa	5	36	67
L2	Penton	6	37	68
	VII	7	38	69
	V	8	39	70
	pX	9	40	71
L3	VI	10	41	72
	Hexon	11	42	73
	Endoprotease	12	43	74
L4	100 kD	13	44	86
	33 kD homolog	31	62	93
	22 kD	24	55	75
	VIII	14	45	76
E3	12.5K	15	46	77
	CR1-alpha	25	56	87
	gp19K	16	47	78
	CR1-beta	17	48	79
	CR1-gamma	26	57	88
	RID-alpha	18	49	80
	RID-beta	19	50	81

Regions		SAdV-40 SEQ ID NO:	SAdV-31 SEQ ID NO:	SAdV 34 SEQ ID NO:
	14.7 K	27	58	89
L5	Fiber	20	51	82

Thus, in one aspect, unique simian adenoviral proteins which are substantially pure, *i.e.*, are free of other viral and proteinaceous proteins are provided. Preferably, these proteins are at least 10% homogeneous, more preferably 60% homogeneous, and most preferably 95% homogeneous.

In one embodiment, unique simian-derived capsid proteins are provided. As used herein, a simian-derived capsid protein includes any adenoviral capsid protein that contains a SAdV-40, SAdV-31 or SAdV-34 capsid protein or a fragment thereof, as defined above, including, without limitation, chimeric capsid proteins, fusion proteins, artificial capsid proteins, synthetic capsid proteins, and recombinant capsid proteins, without limitation to means of generating these proteins.

Suitably, these simian-derived capsid proteins contain one or more SAdV-40, SAdV-31 or SAdV-34 regions or fragments thereof (*e.g.*, a hexon, penton, fiber, or fragment thereof) in combination with capsid regions or fragments thereof of different adenoviral serotypes, or modified simian capsid proteins or fragments, as described herein. A "modification of a capsid protein associated with altered tropism" as used herein includes an altered capsid protein, *i.e.*, a penton, hexon or fiber protein region, or fragment thereof, such as the knob domain of the fiber region, or a polynucleotide encoding same, such that specificity is altered. The simian-derived capsid may be constructed with one or more of the simian Ad described herein or another Ad serotype which may be of human or non-human origin. Such Ad may be obtained from a variety of sources including the ATCC, commercial and academic sources, or the sequences of the Ad may be obtained from GenBank or other suitable sources.

The amino acid sequences of the penton proteins of SAdV-40 [SEQ ID NO: 6], SAdV-31 [SEQ ID NO: 37], or SAdV-34 [SEQ ID NO: 68] are provided. Suitably, this penton protein, or unique fragments thereof, may be utilized for a variety of purposes. Examples of suitable fragments include the penton having N-terminal and/or C-terminal truncations of about 50, 100, 150, or 200 amino acids, based upon the amino acid numbering

encompass sequences which are greater than 98.5% identical, and preferably, greater than about 99% identical, to the Sequence Listing. Also included in one embodiment, are natural variants and engineered modifications of the sequences provided in SEQ ID NO: 1, 32, or 63 and their complementary strands. Such modifications include, for example, labels that are known in the art, methylation, and substitution of one or more of the naturally occurring nucleotides with a degenerate nucleotide.

Regions		**SAdV-40 ORF SEQ ID NO: 1**	**SAdV-31 ORF SEQ ID NO: 32**	**SAdV-34 ORF SEQ ID NO: 63**
ITR		1..113	1..121	1..119
E1a	13S 12S 9S	Join 589..1129, 1243..1541	Join 586..1126, 1250..1551	Join 589..1129, 1242..1540
E1b	Small T/19K	1641..2276	1728..2288	1640..2275
	Large T/55K	2021..3541	2033..3553	2020..3540
	IX	3640..4098	3655..4116	3637..4101
E2b	pTP	Complement (8652..10652, 14211..14219)	Complement (8670..10664, 14224..14232)	Complement (8649..10649, 14212..14220)
	Poly-merase	Complement (5269..8850, 14211..14219)	Complement (5287..8868, 14224..14232)	Complement (5272..8847, 14212..14220)
	IVa2	Complement (4163..5496, 5775..5787)	Complement (4181..5514, 5793..5805)	Complement (4166..5499, 5778..5790)
L1	52/55D	11105 . . 12361	11118..12377	11102..12358
	IIIa	12388 . . 14160	12404..14167	12385..14160
L2	Penton	14256..16034	14272..16038	14185..16035
	VII	16052..16645	06062..16655	16053..16646
	V	16721..17833	16721..17839	16772..17843
	pX	17861..18103	17868..18110	17862..18104

Regions		SAdV-40 ORF SEQ ID NO: 1	SAdV-31 ORF SEQ ID NO: 32	SAdV-34 ORF SEQ ID NO: 63
L3	VI	18202..18954	18207..18965	18197..18949
	Hexon	19069..21948	19077..21938	19064..21937
	Endo-protease	21981..22607	21974..22603	21970..22596
E2a	DBP	Complement (22727..24376)	Complement (22728..24395)	Complement (22713..24362)
L4	100 kD	24414..26915	24433..26928	24400..26901
	33 kD homolog	Join 26611..26940, 27215..27529	Join 26627..26953, 27249..27545	Join 26597..26926, 27180..27515
	22 kD	26611..27207	26627..27220	26597..27193
	VIII	27607..28287	27623..28303	27593..28273
E3	12.5K	28291..28605	28307..28621	28277..28591
	CR1-alpha	28586..29125	28602..29141	28572..29111
	gp19K	29303..29797	29319..29816	29211..29783
	CR1-beta	29829..30722	29848..30720	29815..30693
	CR1-gamma	30722..31561	30720..31559	30693..31541
	RID-alpha	31576..31845	31574..31843	31556..31825
	RID-beta	31851..32246	31849..32244	31831..32226
	14.7K	32242..32625	32240..32623	32222..32605
L5	Fiber	32834..34462	32799..34566	32760..34547
E4	Orf 6/7	Complement (34673..34945, 35648..35830)	Complement (34785..35057, 35760..35942)	Complement (34758..35030, 35733..35888)
	Orf 6	Complement (34949..35830)	Complement (35061..35942)	Complement (35034..35888)
	Orf 4	Complement (35733..36095)	Complement (35845..36207)	Complement (35818..36180)
	Orf 3	Complement (36115..36459)	Complement (36224..36568)	Complement (36200..36544)

Regions		SAdV-40 ORF SEQ ID NO: 1	SAdV-31 ORF SEQ ID NO: 32	SAdV-34 ORF SEQ ID NO: 63
	Orf 2	Complement (36459..36848)	Complement (36568..36957)	Complement (36544..36993)
	Orf 1	Complement (36908..37291)	Complement (37019..37402)	Complement (36989..37372)
ITR		Complement (37600..37718)	Complement (37708..37828)	Complement (37681..37799)

In one embodiment, fragments of the sequences of SAdV-40, SAdV-31 or SAdV-34, and their complementary strand, cDNA and RNA complementary thereto are provided. Suitable fragments are at least 15 nucleotides in length, and encompass functional fragments, *i.e.*, fragments which are of biological interest. For example, a functional fragment can express a desired adenoviral product or may be useful in production of recombinant viral vectors. Such fragments include the gene sequences and fragments listed in the table herein. The table provides the transcript regions and open reading frames in the SAdV-40, SAdV-31 or SAdV-34 sequences. For certain genes, the transcripts and open reading frames (ORFs) are located on the strand complementary to that presented in SEQ ID NO: 1, 32, or 63. See, *e.g.*, E2b, E4 and E2a. The calculated molecular weights of the encoded proteins are also shown. Note that the E1a open reading frame of SAdV-40, SAdV-31 or SAdV-34 and the E2b open reading frame contain internal splice sites. These splice sites are noted in the table above.

The SAdV-40, SAdV-31 or SAdV-34 adenoviral nucleic acid sequences are useful as therapeutic agents and in construction of a variety of vector systems and host cells. As used herein, a vector includes any suitable nucleic acid molecule including, naked DNA, a plasmid, a virus, a cosmid, or an episome. These sequences and products may be used alone or in combination with other adenoviral sequences or fragments, or in combination with elements from other adenoviral or non-adenoviral sequences. The SAdV-40, SAdV-31 or SAdV-34 sequences are also useful as antisense delivery vectors, gene therapy vectors, or vaccine vectors. Thus, further provided are nucleic acid molecules, gene delivery vectors, and host cells which contain the SAdV-40, SAdV-31 or SAdV-34 sequences.

B. SAdV-40, SAdV-31 or SAdV-34 Adenoviral Proteins

Gene products of the SAdV-40, SAdV-31 or SAdV-34 adenovirus, such as proteins, enzymes, and fragments thereof, which are encoded by the adenoviral nucleic acids described herein are provided. Further encompassed are SAdV-40, SAdV-31 or SAdV-34 proteins, enzymes, and fragments thereof, having the amino acid sequences encoded by these nucleic acid sequences which are generated by other methods. Such proteins include those encoded by the open reading frames identified in the table above, the proteins in the table below (also shown in the Sequence Listing) and fragments thereof of the proteins and polypeptides.

Regions		**SAdV-40** SEQ ID NO:	**SAdV-31** SEQ ID NO:	**SAdV 34** SEQ ID NO:
E1a	13S	29	60	91
	12S			
	9S			
E1b	Small T/19K	22	53	64
	Large T/55K	2	33	84
	IX	3	34	65
L1	52/55 kD	4	35	66
	IIIa	5	36	67
L2	Penton	6	37	68
	VII	7	38	69
	V	8	39	70
	pX	9	40	71
L3	VI	10	41	72
	Hexon	11	42	73
	Endoprotease	12	43	74
L4	100 kD	13	44	86
	33 kD homolog	31	62	93
	22 kD	24	55	75
	VIII	14	45	76
E3	12.5K	15	46	77
	CR1-alpha	25	56	87
	gp19K	16	47	78
	CR1-beta	17	48	79
	CR1-gamma	26	57	88
	RID-alpha	18	49	80
	RID-beta	19	50	81

Regions		SAdV-40 SEQ ID NO:	SAdV-31 SEQ ID NO:	SAdV 34 SEQ ID NO:
	14.7 K	27	58	89
L5	Fiber	20	51	82

Thus, in one aspect, unique simian adenoviral proteins which are substantially pure, *i.e.*, are free of other viral and proteinaceous proteins are provided. Preferably, these proteins are at least 10% homogeneous, more preferably 60% homogeneous, and most preferably 95% homogeneous.

In one embodiment, unique simian-derived capsid proteins are provided. As used herein, a simian-derived capsid protein includes any adenoviral capsid protein that contains a SAdV-40, SAdV-31 or SAdV-34 capsid protein or a fragment thereof, as defined above, including, without limitation, chimeric capsid proteins, fusion proteins, artificial capsid proteins, synthetic capsid proteins, and recombinant capsid proteins, without limitation to means of generating these proteins.

Suitably, these simian-derived capsid proteins contain one or more SAdV-40, SAdV-31 or SAdV-34 regions or fragments thereof (*e.g.*, a hexon, penton, fiber, or fragment thereof) in combination with capsid regions or fragments thereof of different adenoviral serotypes, or modified simian capsid proteins or fragments, as described herein. A "modification of a capsid protein associated with altered tropism" as used herein includes an altered capsid protein, *i.e.*, a penton, hexon or fiber protein region, or fragment thereof, such as the knob domain of the fiber region, or a polynucleotide encoding same, such that specificity is altered. The simian-derived capsid may be constructed with one or more of the simian Ad described herein or another Ad serotype which may be of human or non-human origin. Such Ad may be obtained from a variety of sources including the ATCC, commercial and academic sources, or the sequences of the Ad may be obtained from GenBank or other suitable sources.

The amino acid sequences of the penton proteins of SAdV-40 [SEQ ID NO: 6], SAdV-31 [SEQ ID NO: 37], or SAdV-34 [SEQ ID NO: 68] are provided. Suitably, this penton protein, or unique fragments thereof, may be utilized for a variety of purposes. Examples of suitable fragments include the penton having N-terminal and/or C-terminal truncations of about 50, 100, 150, or 200 amino acids, based upon the amino acid numbering