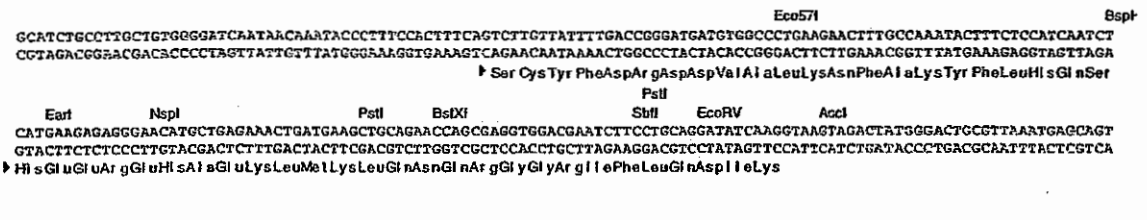
A. Exon 1



B. Exon 2



C. Exons 3 and 4

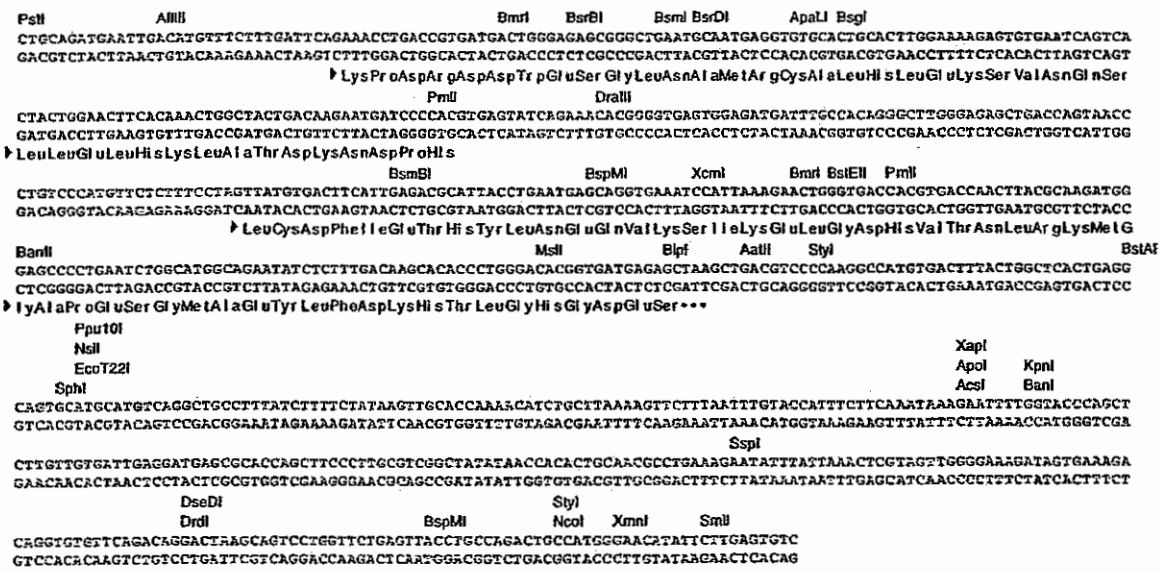


FIGURE 1

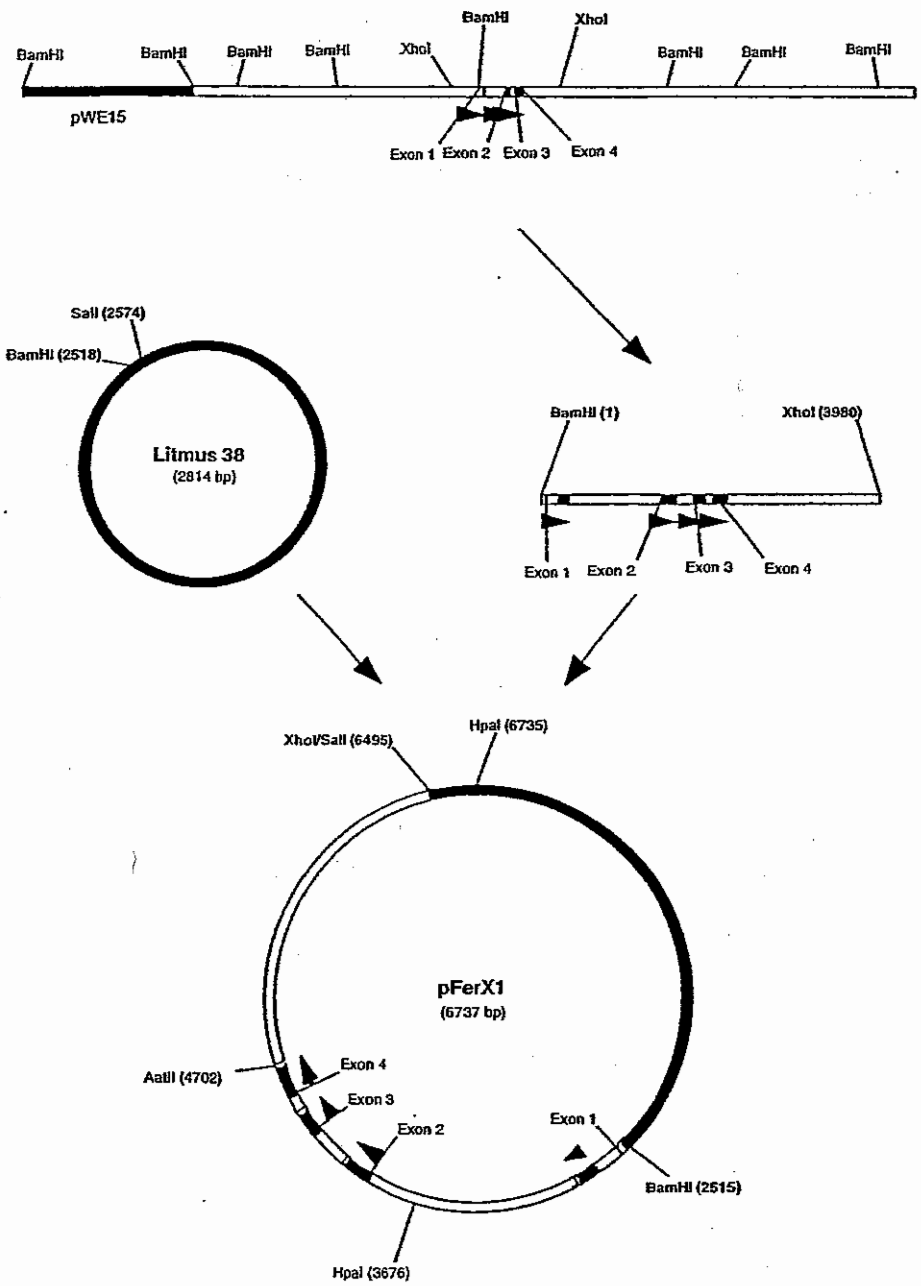

BamHI
BamHI
BamHI
BamHI
XhoI
BamHI
XhoI
BamHI
BamHI
BamHI
pWE15
Exon 1
Exon 2
Exon 3
Exon 4
SalI (2574)
BamHI (2518)
Litmus 38
(2814 bp)
BamHI (1)
XhoI (3980)
Exon 1
Exon 2
Exon 3
Exon 4
XhoI/SalI (6495)
HpaI (6735)
pFerX1
(6737 bp)
AatII (4702)
Exon 4
Exon 3
Exon 2
Exon 1
BamHI (2515)
HpaI (3676)

FIGURE 2

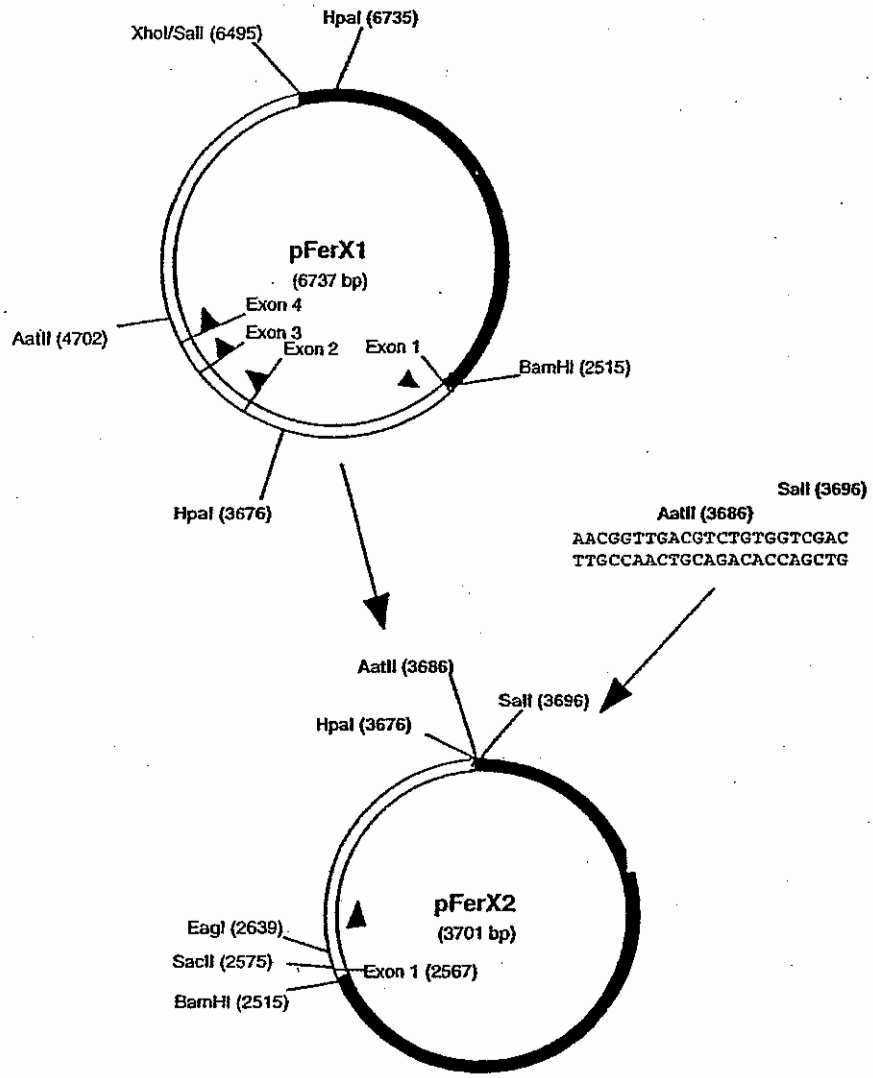

XhoI/SalI (6495)
HpaI (6735)
pFerX1
(6737 bp)
Exon 4
Exon 3
Exon 2
Exon 1
AatII (4702)
BamHI (2515)
HpaI (3676)
SalI (3696)
AatII (3686)
AACGGTTGACGTCTGTGGTCGAC
TTGCCAACTGCAGACACCAGCTG
AatII (3686)
SalI (3696)
HpaI (3676)
pFerX2
(3701 bp)
EagI (2639)
SacII (2575)
Exon 1 (2567)
BamHI (2515)

FIGURE 3

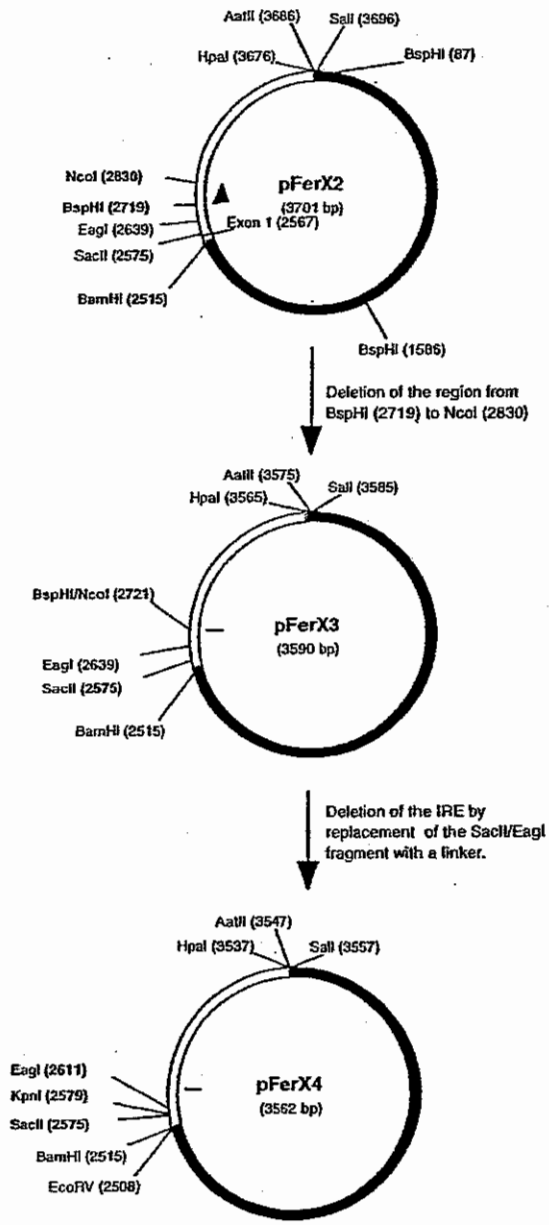
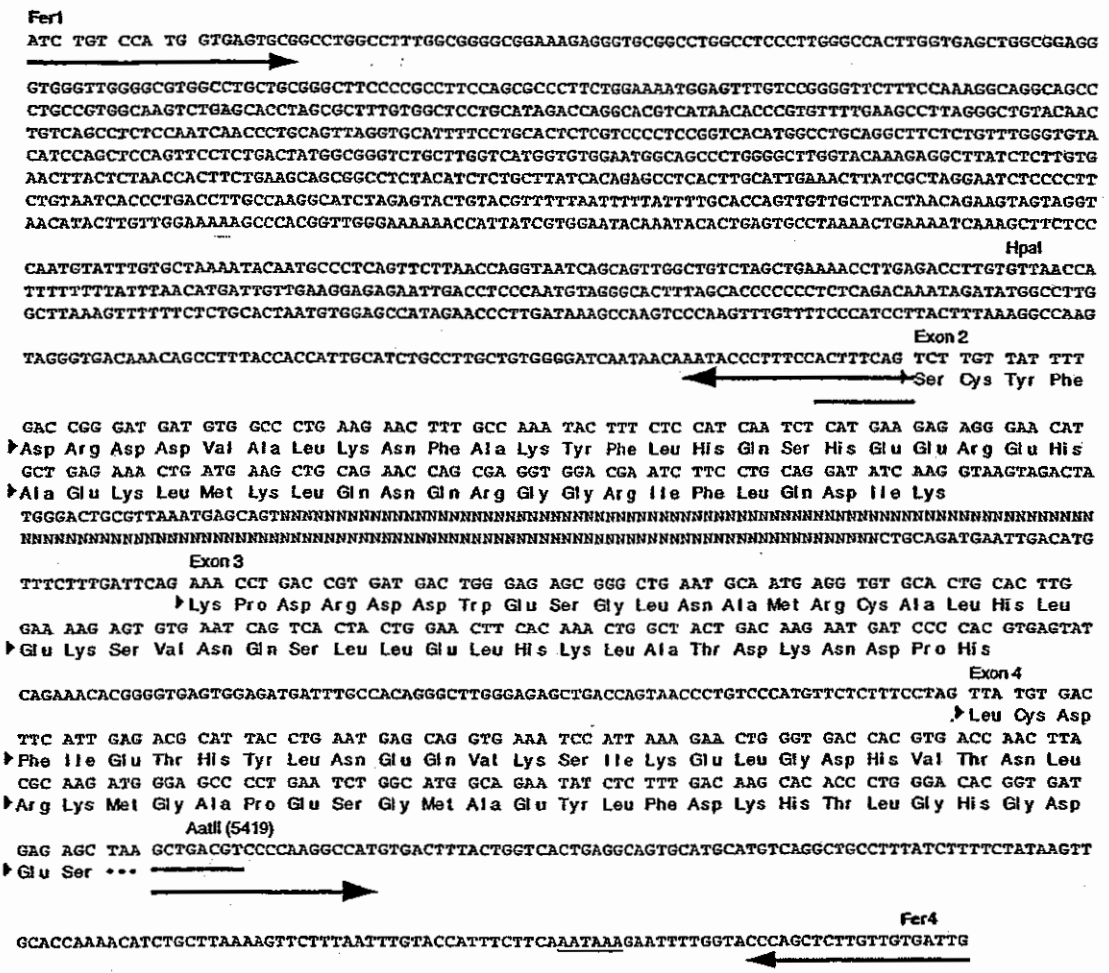

AatII (3686)
SalI (3696)
HpaI (3676)
BspHI (87)
NcoI (2830)
BspHI (2719)
EagI (2639)
SacII (2575)
BamHI (2515)
pFerX2
(3701 bp)
Exon 1 (2567)
BspHI (1586)
Deletion of the region from BspHI (2719) to NcoI (2830)
AatII (3575)
HpaI (3565)
SalI (3585)
BspHI/NcoI (2721)
EagI (2639)
SacII (2575)
BamHI (2515)
pFerX3
(3590 bp)
Deletion of the IRE by replacement of the SacII/EagI fragment with a linker.
AatII (3547)
HpaI (3537)
SalI (3557)
EagI (2611)
KpnI (2579)
SacII (2575)
BamHI (2515)
EcoRV (2508)
pFerX4
(3562 bp)

FIGURE 4

A.


Fer1
Hpal
Exon 2
Exon 3
Exon 4
AatII (5419)
Fer4

B.

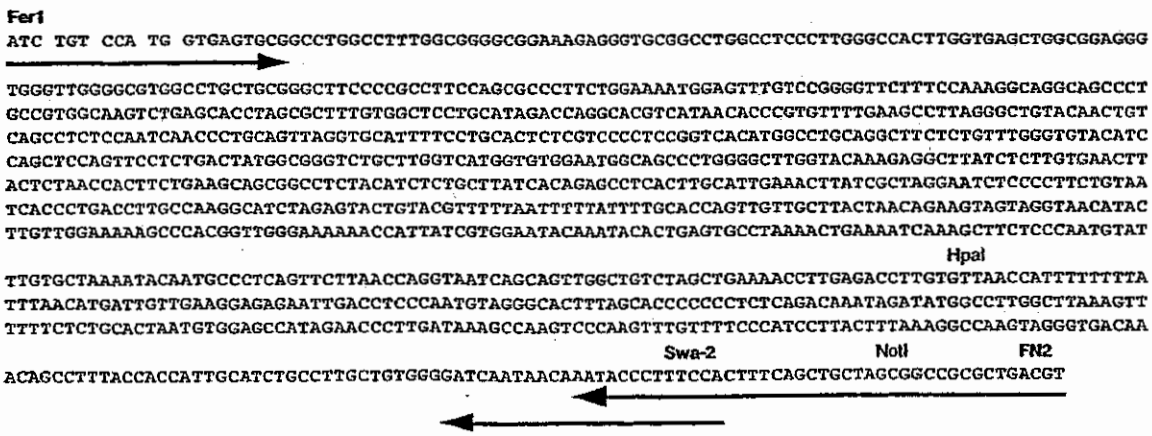
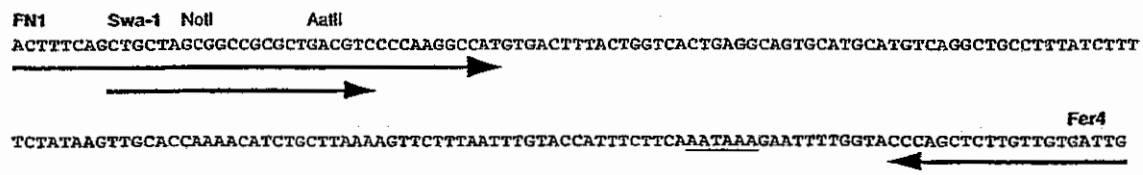

Fer1
Hpal
Swa-2
NotI
FN2

FIGURE 5A

C.


FN1
Swa-1
NotI
AatII
ACTTTCAGCTGCTAGCGGCCGCGCTGACGTCCCCAAGGCCATGTGACTTTACTGGTCACTGAGGCAGTGCATGCATGTCAGGCTGCCTTTATCTTT
Fer4
TCTATAAGTTGCACCAAAACATCTGCTTAAAAGTTCTTTAATTTGTACCATTTCTTCAAATAAAGAATTTTGGTACCCAGCTCTTGTTGTGATTG

D.

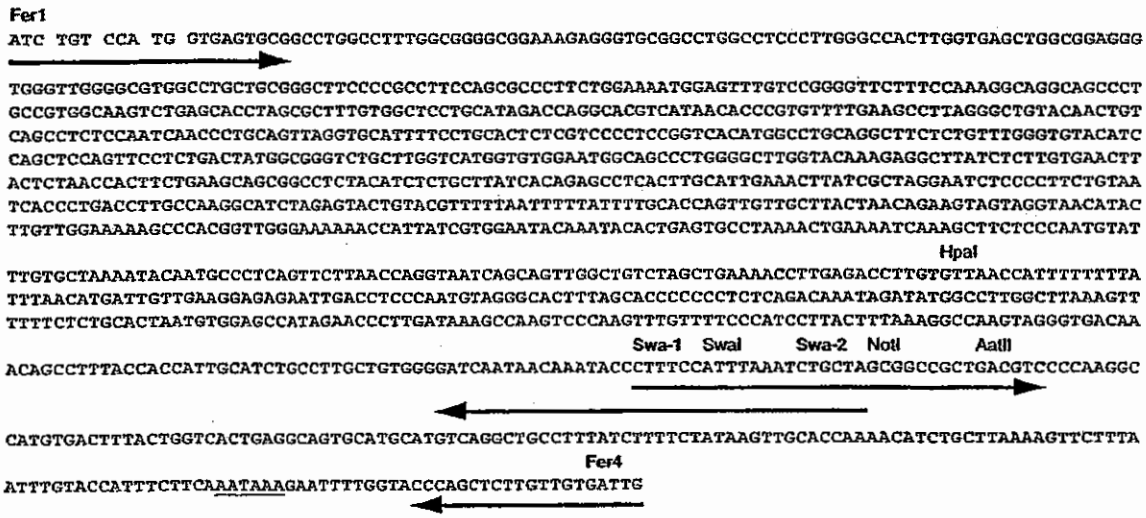

Fer1
ATC TGT CCA TG GTGAGTGCGGCCTGGCCTTTGGCGGGGCGGAAAGAGGGTGCGGCCTGGCCTCCCTTGGGCCACTTGGTGAGCTGGCGGAGGG
TGGGTTGGGGCGTGGCCTGCTGCGGGCTTCCCCGCCTTCCAGCGCCCTTCTGGAAAATGGAGTTTGTCCGGGGTTCTTTCCAAAGGCAGGCAGCCCT
GCCGTGGCAAGTCTGAGCACCTAGCGCTTTGTGGCTCCTGCATAGACCAGGCACGTCATAACACCCGTGTTTTGAAGCCTTAGGGCTGTACAACTGT
CAGCCTCTCCAATCAACCCTGCAGTTAGGTGCATTTTCCTGCACTCTCGTCCCCTCCGGTCACATGGCCTGCAGGCTTCTCTGTTTGGGTGTACATC
CAGCTCCAGTTCCTCTGACTATGGCGGGTCTGCTTGGTCATGGTGTGGAATGGCAGCCCTGGGGCTTGGTACAAAGAGGCTTATCTCTTGTGAACTT
ACTCTAACCACTTCTGAAGCAGCGGCCTCTACATCTCTGCTTATCACAGAGCCTCACTTGCATTGAAACTTATCGCTAGGAATCTCCCCTTCTGTAA
TCACCCTGACCTTGCCAAGGCATCTAGAGTACTGTACGTTTTTAATTTTTATTTTGCACCAGTTGTTGCTTACTAACAGAAGTAGTAGGTAACATAC
TTGTTGGAAAAAGCCCACGGTTGGGAAAAAACCATTATCGTGGAATACAAATACACTGAGTGCCTAAAACTGAAAATCAAAGCTTCTCCCAATGTAT
HpaI
TTGTGCTAAAATACAATGCCCTCAGTTCTTAACCAGGTAATCAGCAGTTGGCTGTCTAGCTGAAAACCTTGAGACCTTGTGTTAACCATTTTTTTTA
TTTAACATGATTGTTGAAGGAGAGAATTGACCTCCCAATGTAGGGCACTTTAGCACCCCCCCTCTCAGACAAATAGATATGGCCTTGGCTTAAAGTT
TTTTCTCTGCACTAATGTGGAGCCATAGAACCCTTGATAAAGCCAAGTCCCAAGTTTGTTTTCCCATCCTTACTTTAAAGGCCAAGTAGGGTGACAA
Swa-1 SwaI Swa-2 NotI AatII
ACAGCCTTTACCACCATTGCATCTGCCTTGCTGTGGGGATCAATAACAAATACCCTTTCCATTTAAATCTGCTAGCGGCCGCTGACGTCCCCAAGGC
CATGTGACTTTACTGGTCACTGAGGCAGTGCATGCATGTCAGGCTGCCTTTATCTTTCTATAAGTTGCACCAAAACATCTGCTTAAAAGTTCTTTA
Fer4
ATTTGTACCATTTCTTCAAATAAAGAATTTTGGTACCCAGCTCTTGTTGTGATTG

FIGURE 5B

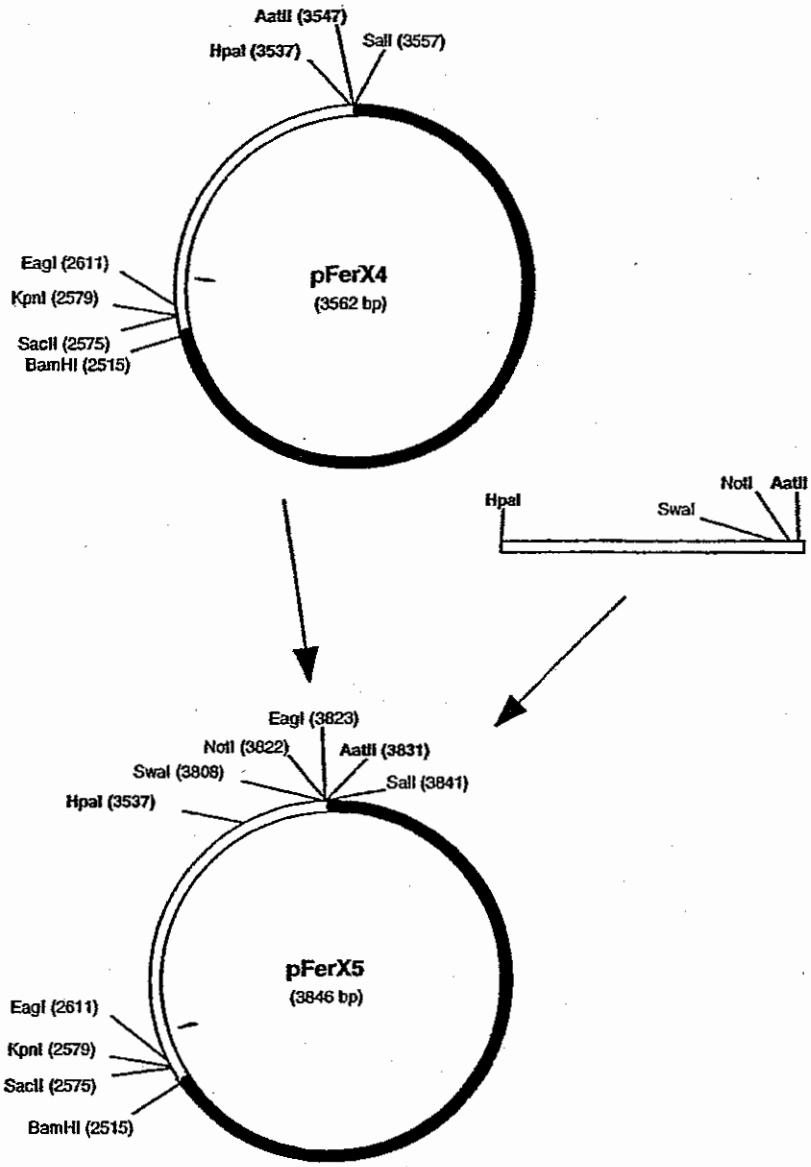

AatII (3547)
HpaI (3537)
SalI (3557)
EagI (2611)
KpnI (2579)
SacII (2575)
BamHI (2515)
pFerX4
(3562 bp)
HpaI
SwaI
NotI
AatII
EagI (3823)
NotI (3822)
AatII (3831)
SwaI (3808)
SalI (3841)
HpaI (3537)
pFerX5
(3846 bp)
EagI (2611)
KpnI (2579)
SacII (2575)
BamHI (2515)

FIGURE 6

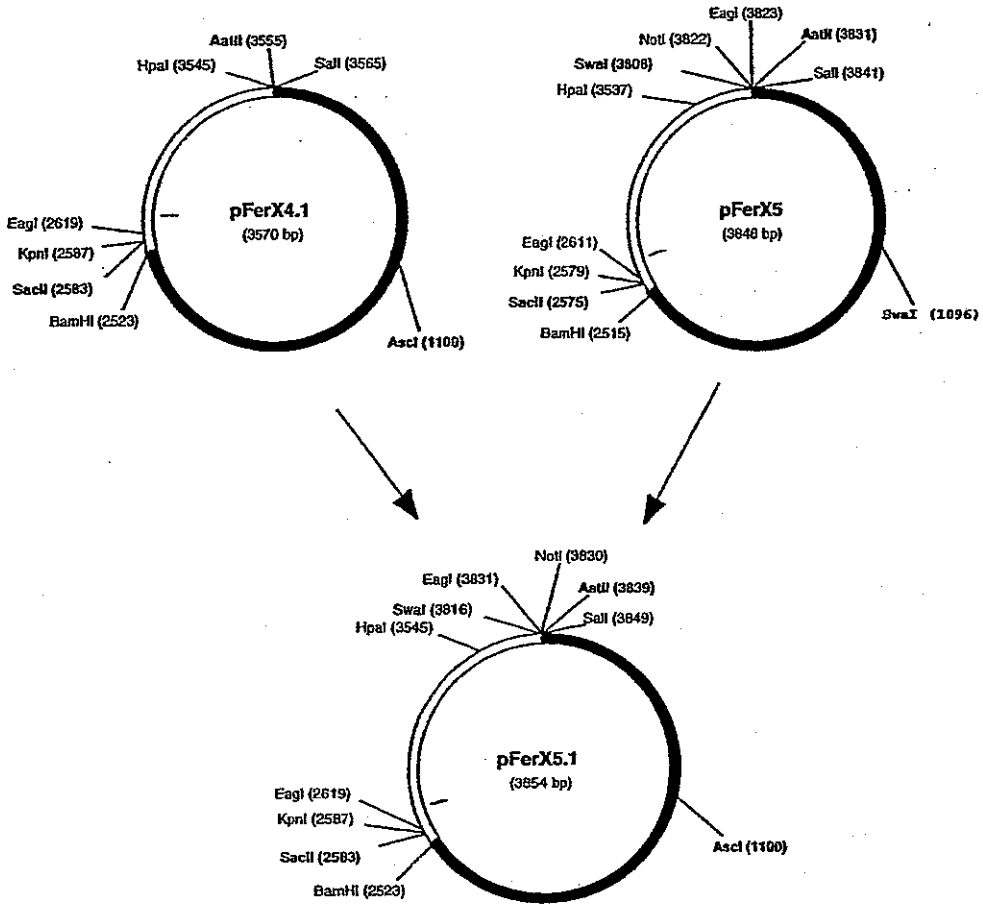

AatII (3555)
HpaI (3545)
SalI (3565)
pFerX4.1
(3570 bp)
EagI (2619)
KpnI (2587)
SacII (2583)
BamHI (2523)
AscI (1109)
EagI (3823)
NotI (3822)
AatII (3831)
SwaI (3808)
SalI (3841)
HpaI (3537)
pFerX5
(3848 bp)
EagI (2611)
KpnI (2579)
SacII (2575)
BamHI (2515)
SwaI (1096)
NotI (3830)
EagI (3831)
AatII (3839)
SwaI (3816)
SalI (3849)
HpaI (3545)
pFerX5.1
(3854 bp)
EagI (2619)
KpnI (2587)
SacII (2583)
BamHI (2523)
AscI (1100)

FIGURE 7

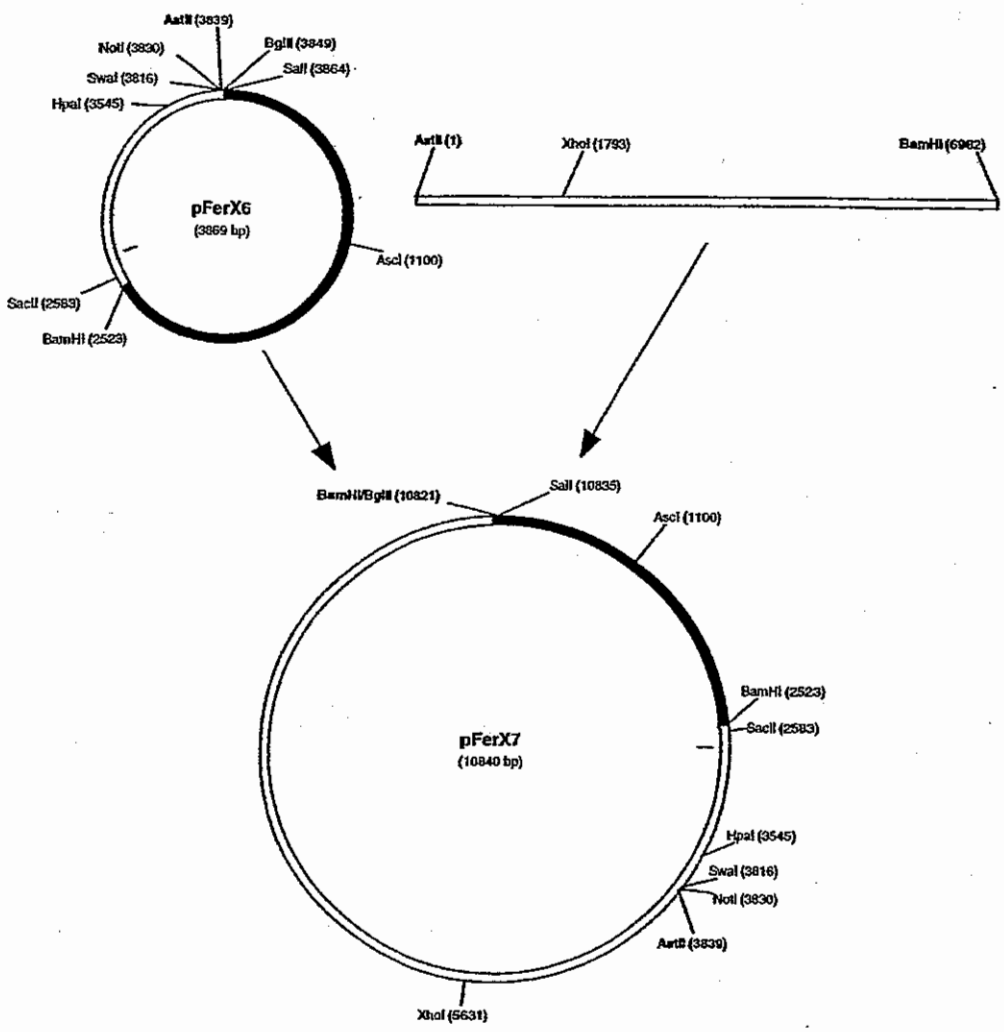

AatII (3839)
NotI (3830)
BglII (3849)
SalI (3864)
SwaI (3816)
HpaI (3545)
pFerX6
(3869 bp)
AscI (1100)
SacII (2583)
BamHI (2523)
AatII (1)
XhoI (1793)
BamHI (6962)
BamHI/BglII (10821)
SalI (10835)
AscI (1100)
BamHI (2523)
SacII (2583)
pFerX7
(10840 bp)
HpaI (3545)
SwaI (3816)
NotI (3830)
AatII (3839)
XhoI (5631)

FIGURE 8

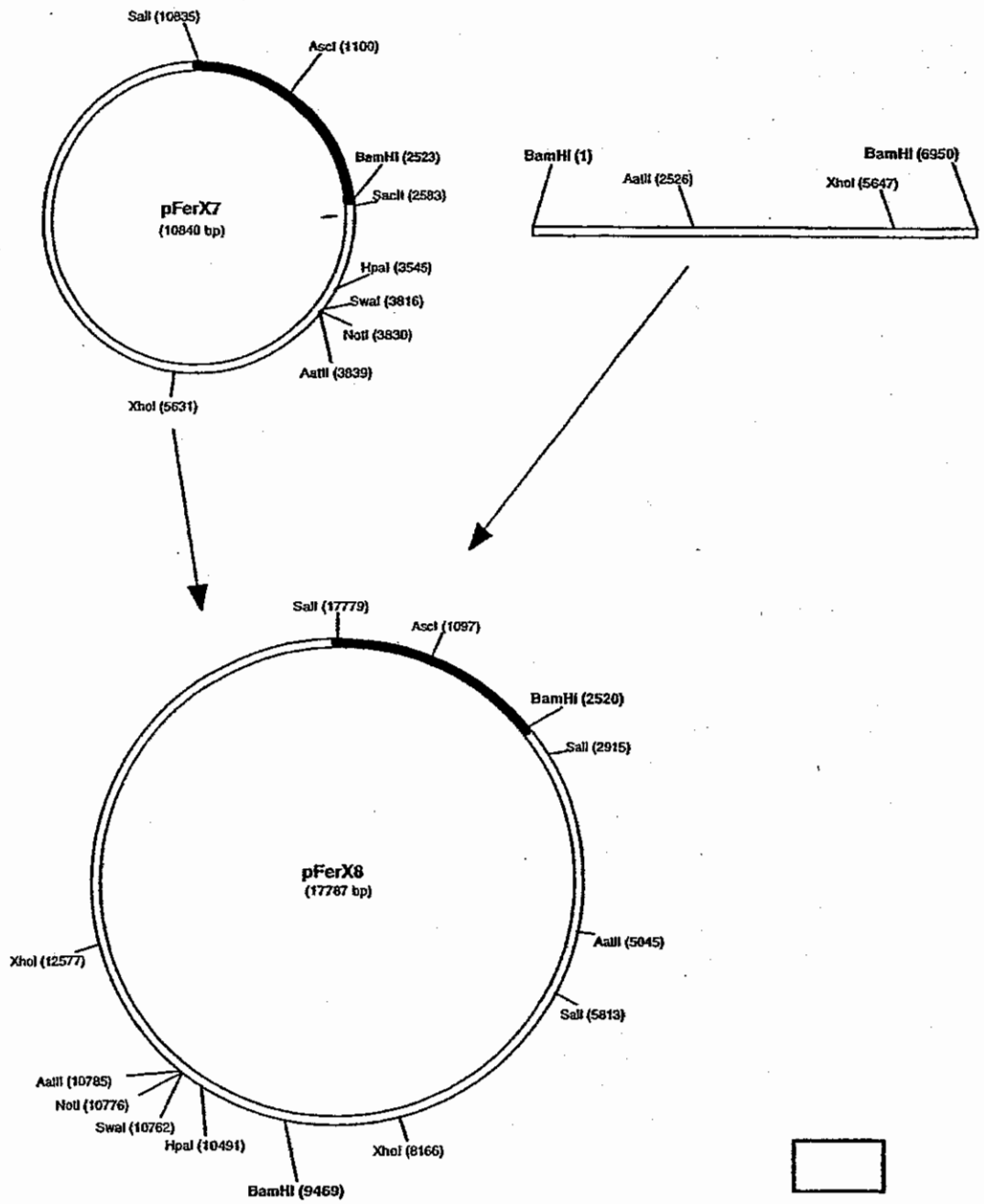

SalI (10835)
AscI (1100)
BamHI (2523)
SacII (2583)
pFerX7
(10840 bp)
HpaI (3545)
SwaI (3816)
NotI (3830)
AatII (3839)
XhoI (5631)
BamHI (1)
AatII (2526)
XhoI (5647)
BamHI (6950)
SalI (17779)
AscI (1097)
BamHI (2520)
SalI (2915)
pFerX8
(17787 bp)
AatII (5045)
SalI (5813)
XhoI (8166)
BamHI (9469)
XhoI (12577)
AatII (10785)
NotI (10776)
SwaI (10762)
HpaI (10491)

FIGURE 9

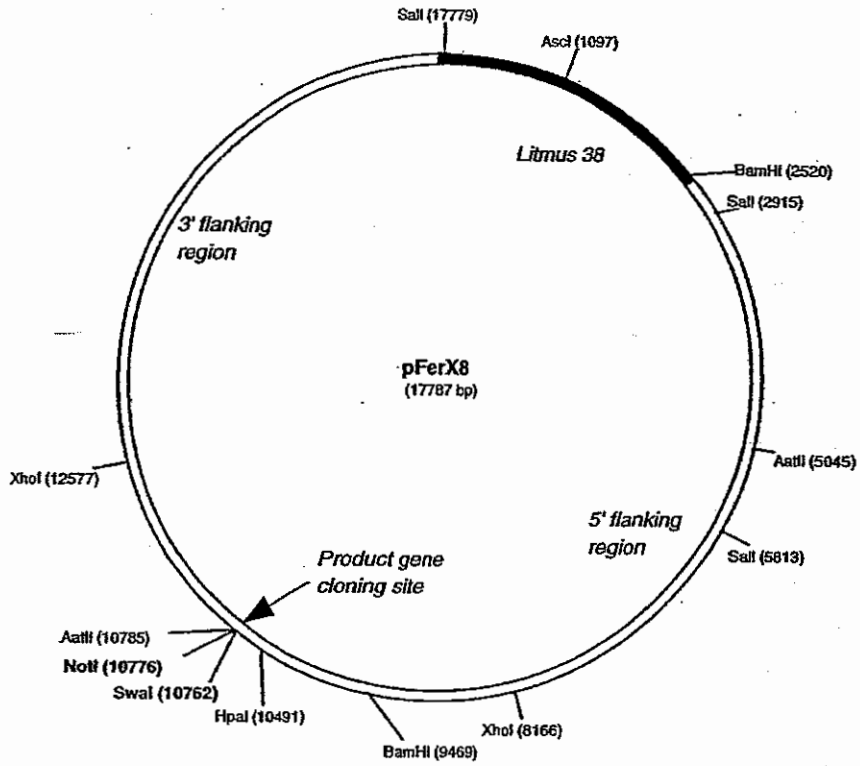

SalI (17779)
AscI (1097)
Litmus 38
BamHI (2520)
SalI (2915)
3' flanking region
pFerX8
(17787 bp)
AatII (5045)
XhoI (12577)
5' flanking region
SalI (5813)
Product gene cloning site
AatII (10785)
NotI (10776)
SwaI (10762)
HpaI (10491)
XhoI (8166)
BamHI (9469)

FIGURE 10

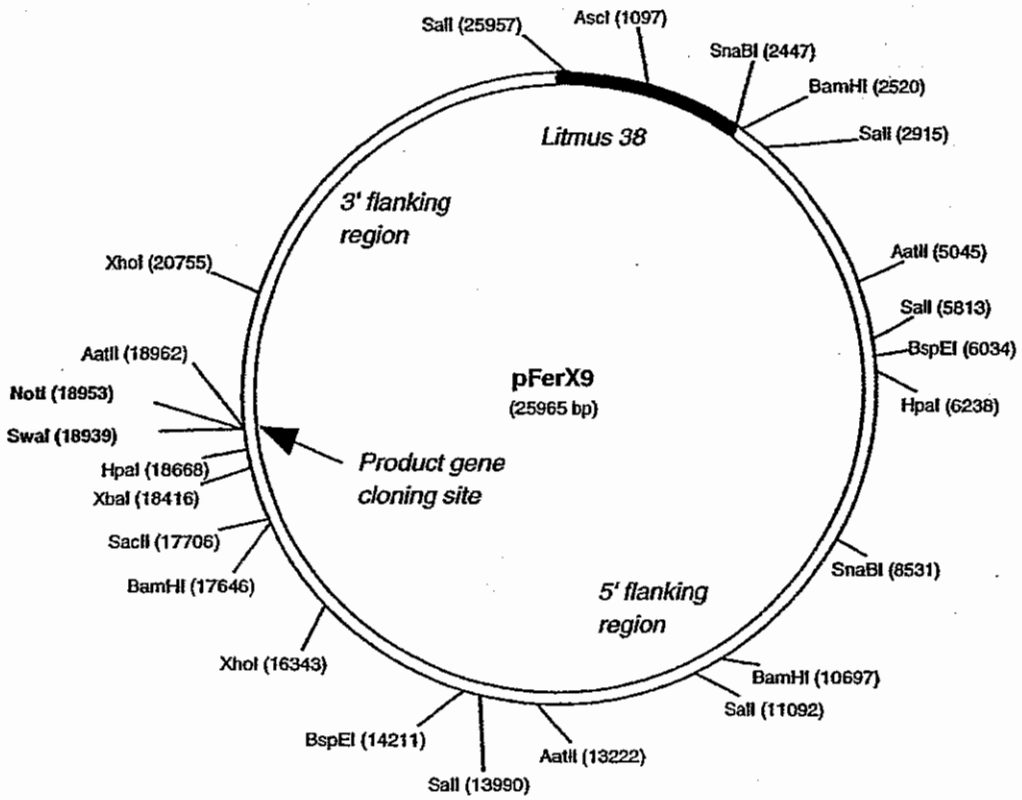

SalI (25957)
AscI (1097)
SnaBI (2447)
BamHI (2520)
SalI (2915)
Litmus 38
3' flanking region
AatII (5045)
SalI (5813)
BspEI (6034)
HpaI (6238)
SnaBI (8531)
5' flanking region
BamHI (10697)
SalI (11092)
AatII (13222)
SalI (13990)
BspEI (14211)
XhoI (16343)
BamHI (17646)
SacII (17706)
XbaI (18416)
HpaI (18668)
SwaI (18939)
NotI (18953)
AatII (18962)
XhoI (20755)
pFerX9
(25965 bp)
Product gene cloning site

FIGURE 11

SacII
BamHI (9469) CAP (9521) KpnI (9533)
GGATCCCGCTATAAAGTGCGGCCCGCTGGTCCCTACGCCAGACGTTCTCGCCCAGAGTCGCCGCGGTACCGGTGCTCG
ACCCCTCCGACCCCCGTCCGGCCGCTTTGAGCCTGAGCCCTTTGCAACTTCGTCGCTCCGCCGCTCCAGCGTCGCCTC
CGCGCCTCGCCCAGCCGCCATC ATG gtgagtgcggcctggcctttggcggggcggaaagagggtgcggcctggcct
Met
cccttgggccacttggtgagctggcggagggtgggttggggcgtggcctgctgcgggcttccccgccttccagcgccc
ttctggaaaatggagtttgtccggggttctttccaaaggcaggcagccctgccgtggcaagtctgagcacctagcgct
ttgtggctcctgcatagaccaggcacgtcataacacccgtgttttgaagccttagggctgtacaactgtcagcctctc
caatcaaccctgcagttaggtgcattttcctgcactctcgtcccctccggtcacatggcctgcaggcttctctgtttg
ggtgtacatccagctccagttcctctgactatggcgggtctgcttggtcatggtgtggaatggcagccctggggcttg
gtacaaagaggcttatctcttgtgaacttactctaaccacttctgaagcagcggcctctacatctctgcttatcacag
agcctcacttgcattgaaacttatcgctaggaatctcccttctgtaatcaccctgaccttgccaaggcatctagagt
actgtacgtttttaatttttatttgcaccagttgttgcttactaacagaagtagtaggtaacatacttgttggaaaa
agcccacggttgggaaaaaaccattatcgtggaatacaaatacactgagtgcctaaaactgaaaatcaaagcttctcc
caatgtatttgtgctaaaatacaatgccctcagttcttaaccaggtaatcagcagttggctgtctagctgaaaaccttt
gagaccttgtgttaaccatttttttttatttaacatgattgttgaaggagagaattgacctcccaatgtagggcacttt
agcaccccccctctcagacaaatagatatggccttggcttaaagtttttttctctgcactaatgtggagccatagaacc
cttgataaagccaagtcccaagtttgttttcccatccttactttaaaggccaagtagggtgacaaacagcctttaccа
AatII (10785)
SwaI (10762) NotI (10776)
ccattgcatctgccttgctgtggggatcaataacaaataccctttccatttAAATCTGCTAGCGGCCGCTGACGTCCC
CAAGGCCATGTGACTTTACTGGTCACTGAGGCAGTGCATGCATGTCAGGCTGCCTTTATCTTTTCTATAAGTTGCACC
KpnI (10927)
AAAACATCTGCTTAAAAGTTCTTTAATTTGTACCATTTCTTCAAATAAAGAATTTTGGTACCCAGCTCTTGTTGTGAT
TGAGGATGAGCGCACCAGCTTCCCTTGCGTCGGCTATACTAACCACACTGCA

FIGURE 12

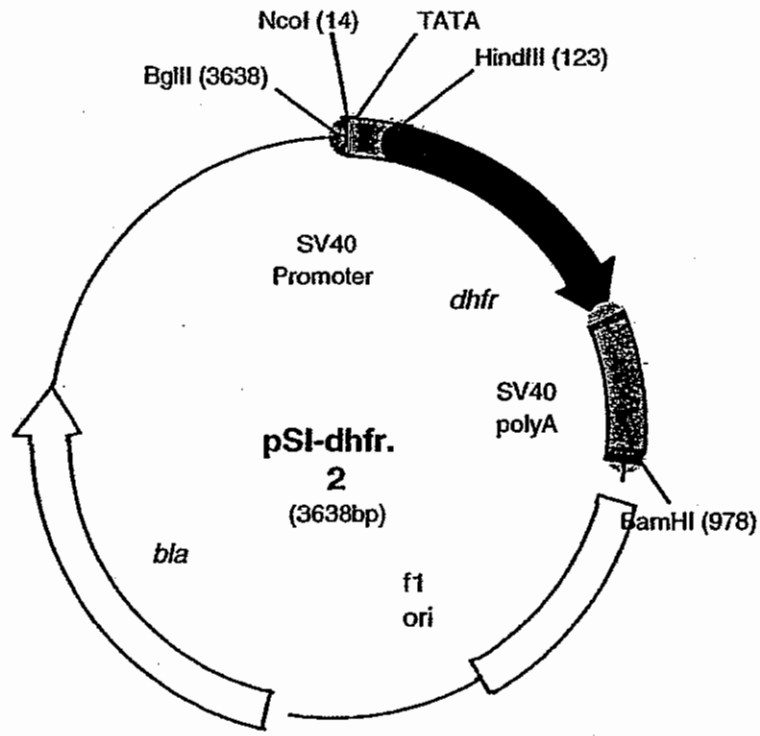

NcoI (14)
TATA
HindIII (123)
BglII (3638)
SV40
Promoter
dhfr
SV40
polyA
pSI-dhfr.
2
(3638bp)
BamHI (978)
bla
f1
ori

FIGURE 13

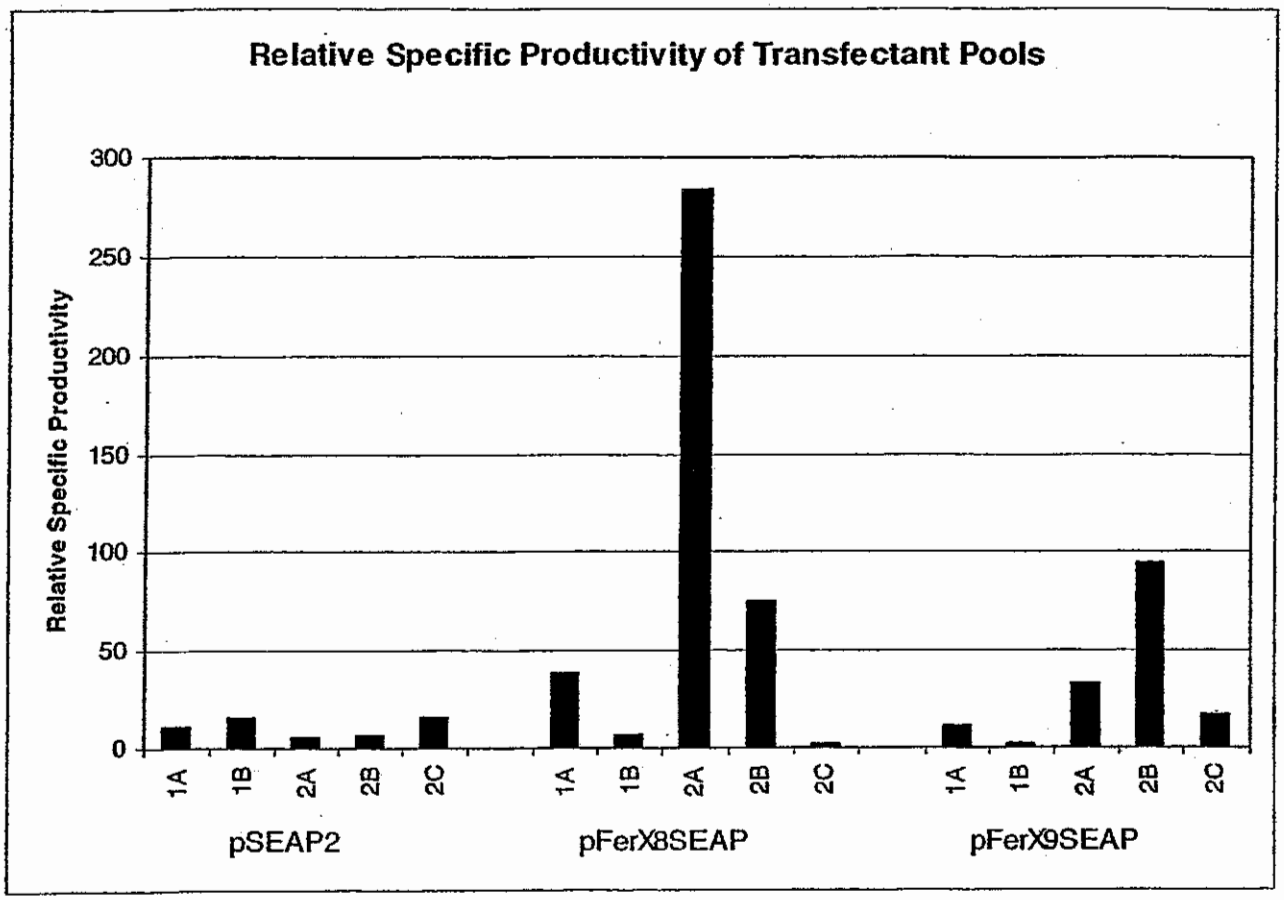

Relative Specific Productivity of Transfectant Pools
Relative Specific Productivity
300
250
200
150
100
50
0
1A
1B
2A
2B
2C
pSEAP2
pFerX8SEAP
pFerX9SEAP

FIGURE 14

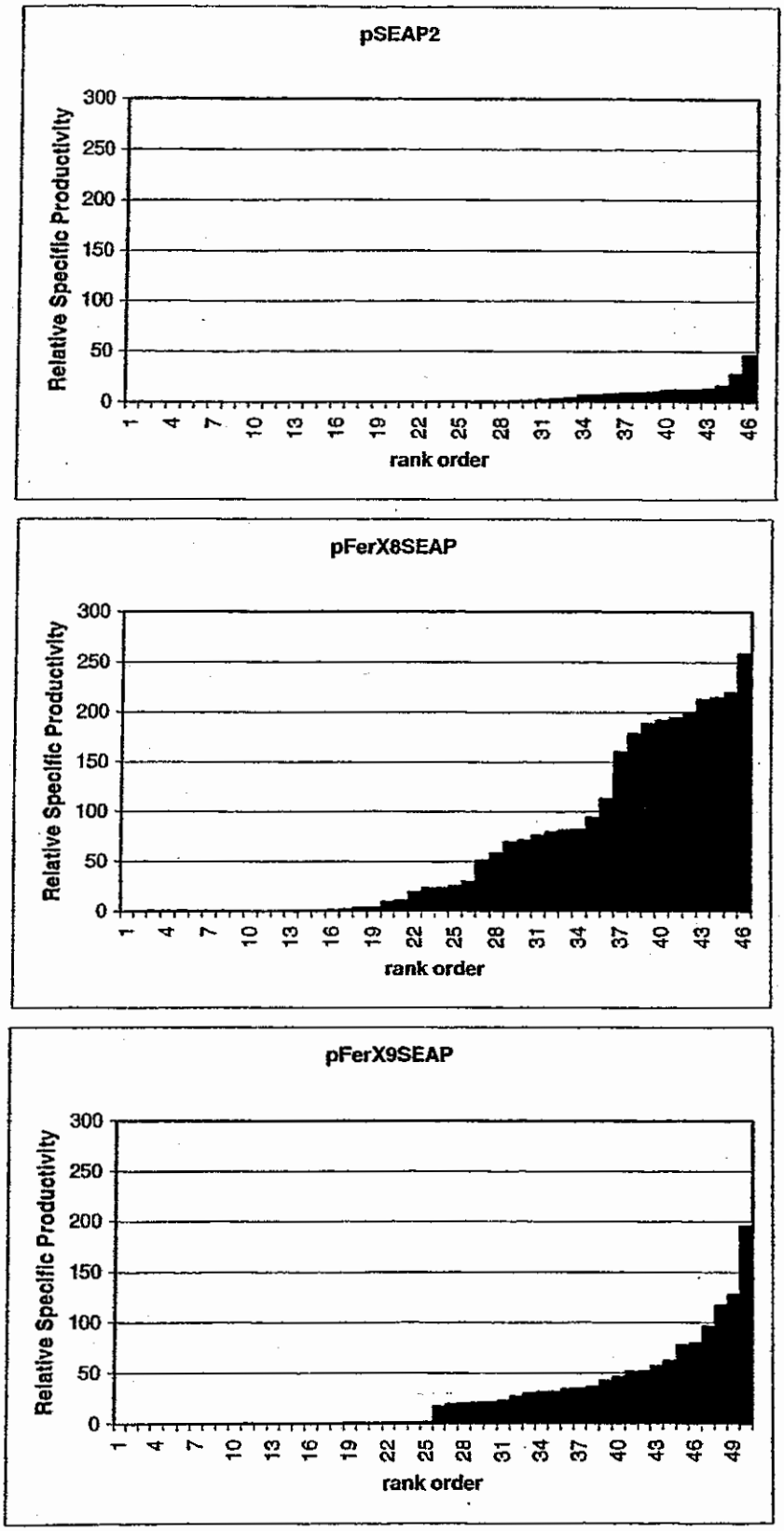

pSEAP2
Relative Specific Productivity
300
250
200
150
100
50
0
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46
rank order
pFerX8SEAP
Relative Specific Productivity
300
250
200
150
100
50
0
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46
rank order
pFerX9SEAP
Relative Specific Productivity
300
250
200
150
100
50
0
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49
rank order

FIGURE 15