HCV Genome and Recombinant Proteins

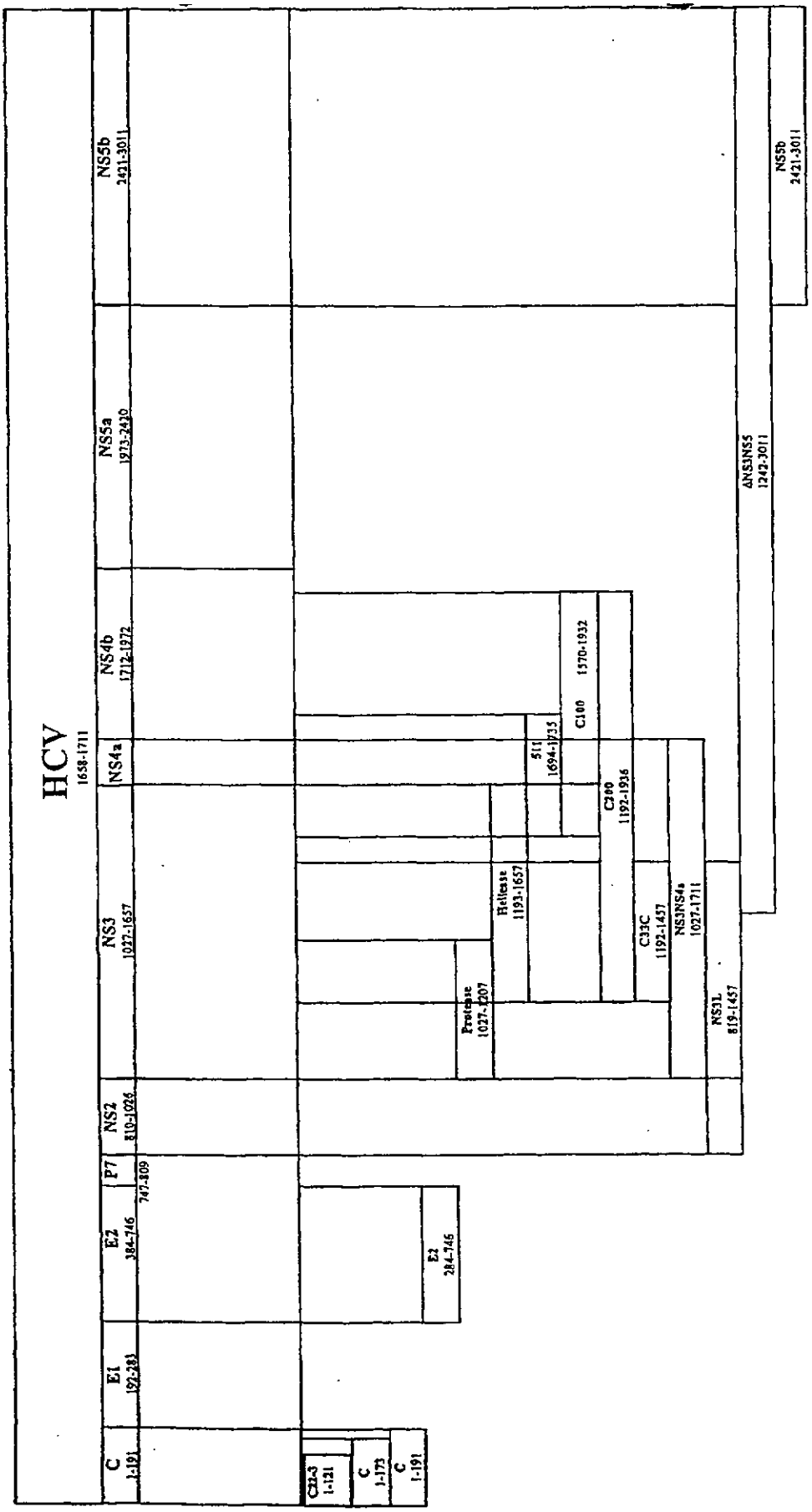


FIG. 1

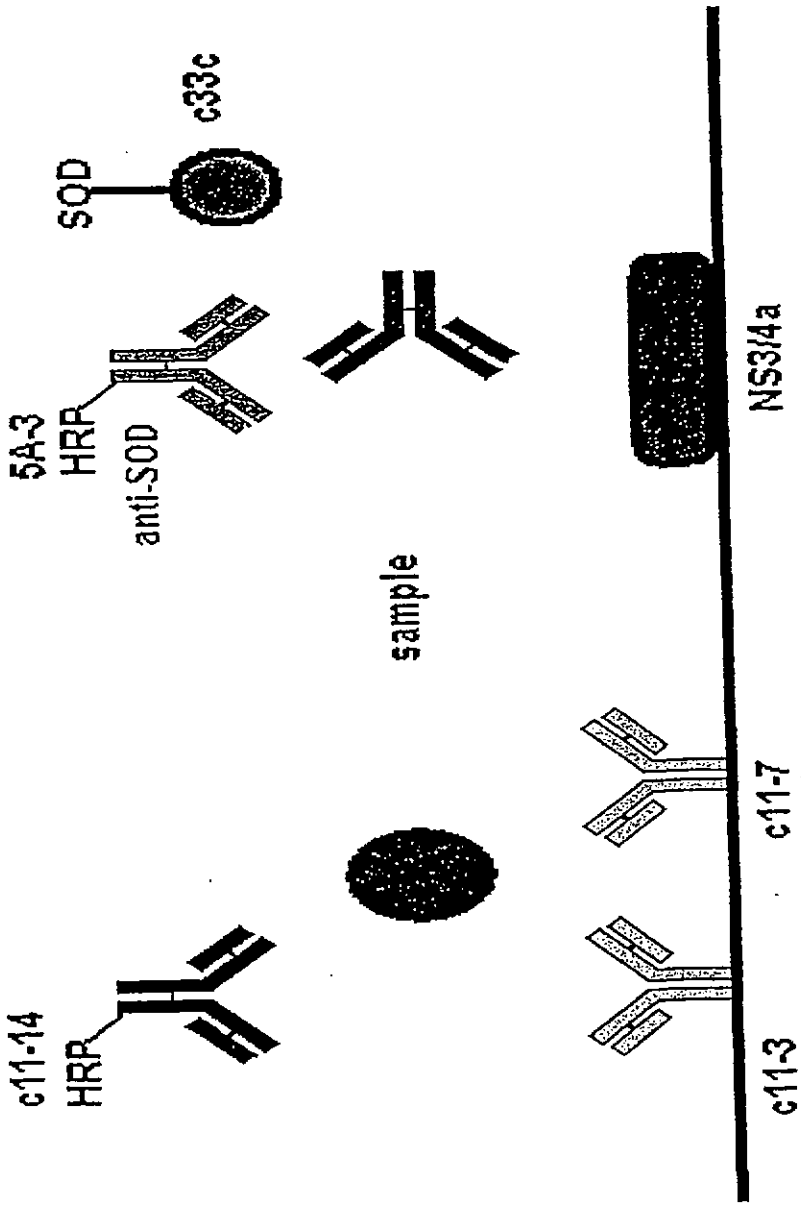


FIG. 2

```
MSPIDPMGHHHHHHGRRRASVAAGILVPRGSPGLDGICSIEEFAPITAYAQQTRGLLGCIITSLTGRDKNQVE  73
GEVQIVSTAAQTFLATCINGVCWTVYHGAGTRTIASPKGPVIQMYTNVDQDLVGWPASQGTRSLTPCTCGSSD 146
LYLVTRHADVIPVRRRGDSRGSLLSPRPISYLKGSAGGPLLCPAGHAVGIFRAAVCTRGVAKAVDFIPVENLE 219
TTMRSPVFTDNSSPPVVPQSFQVAHLHAPTGSGKSTKVPAAYAAQGYKVLVLNPSVAATLGFGAYMSKAHGID 292
PNIRTGVRTITTGSPITYSTYGKFLADGGCSGGAYDIIICDECHSTDATSILGIGTVLDQAETAGARLVVLAT 365
ATPPGSVTVPHPNIEEVALSTTGEIPFYGKAIPLEVIKGGRHLIFCHSKKKCDELAAKLVALGINAVAYYRGL 438
DVSVIPPIGDVVVVATDALMTGYTGDFDSVIDCNTCVTQTVDFSLDPTFTIETITLPQDAVSRTQRRGRTGRG 511
KPGIYRFVAPGERPSGMFDSSVLCECYDAGCAWYELTPAETTVRLRAYMNTPGLPVCQDHLEFWEGVFTGLTH 584
IDAHFLSQTKQSGENLPYLVAYQATVCARAQAPPPSWDQMWKCLIRLKPTLHGPTPLLYRLGAVQNEITLTHP 657
VTKYIMTCMSADLEVVTSTWVLVGGVLAALAAYCLSTGCVVIVGRVVLSGKPAIIPDREVLYREFDEMEEC   728
```

FIG. 3

```
                                1                                  10
                                M   A   P   I   T   A   Y   A   Q   Q
                              ATG GCG CCC ATC ACG GCG TAC GCC CAG CAG

                                                  20
 T   R   G   L   L   G   C   I   I   T   S   L   T   G   R
ACA AGG GGC CTC CTA GGG TGC ATA ATC ACC AGC CTA ACT GGC CGG

                        30                                         40
 D   K   N   Q   V   E   G   E   V   Q   I   V   S   T   A
GAC AAA AAC CAA GTG GAG GGT GAG GTC CAG ATT GTG TCA ACT GCT

                                              50
 A   Q   T   F   L   A   T   C   I   N   G   V   C   W   T
GCC CAA ACC TTC CTG GCA ACG TGC ATC AAT GGG GTG TGC TGG ACT

                        60                                         70
 V   Y   H   G   A   G   T   R   T   I   A   S   P   K   G
GTC TAC CAC GGG GCC GGA ACG AGG ACC ATC GCG TCA CCC AAG GGT

                                              80
 P   V   I   Q   M   Y   T   N   V   D   Q   D   L   V   G
CCT GTC ATC CAG ATG TAT ACC AAT GTA GAC CAA GAC CTT GTG GGC

                        90                                        100
 W   P   A   P   Q   G   S   R   S   L   T   P   C   T   C
TGG CCC GCT CCG CAA GGT AGC CGA TCA TTG ACA CCC TGC ACT TGC

                                             110
 G   S   S   D   L   Y   L   V   T   R   H   A   D   V   I
GGC TCC TCG GAC CTT TAC CTG GTC ACG AGG CAC GCC GAT GTC ATT

                       120                                        130
 P   V   R   R   R   G   D   S   R   G   S   L   L   S   P
CCC GTG CGC CGG CGG GGT GAT AGC AGG GGC AGC CTG CTG TCG CCC

                                             140
 R   P   I   S   Y   L   K   G   S   S   G   G   P   L   L
CGG CCC ATT TCC TAC TTG AAA GGC TCC TCG GGG GGT CCG CTG TTG

                       150                                        160
 C   P   A   G   H   A   V   G   I   F   R   A   A   V   C
TGC CCC GCG GGG CAC GCC GTG GGC ATA TTT AGG GCC GCG GTG TGC

                                             170
 T   R   G   V   A   K   A   V   D   F   I   P   V   E   N
ACC CGT GGA GTG GCT AAG GCG GTG GAC TTT ATC CCT GTG GAG AAC

                       180                                        190
 L   E   T   T   M   R   S   P   V   F   T   D   N   S   S
CTA GAG ACA ACC ATG AGG TCC CCG GTG TTC ACG GAT AAC TCC TCT
```

FIG. 4A

```
                                                200
 P   P   V   V   P   Q   S   F   Q   V   A   H   L   H   A
CCA CCA GTA GTG CCC CAG AGC TTC CAG GTG GCT CAC CTC CAT GCT

                    210                                 220
 P   T   G   S   G   K   S   T   K   V   P   A   A   Y   A
CCC ACA GGC AGC GGC AAA AGC ACC AAG GTC CCG GCT GCA TAT GCA

                                            230
 A   Q   G   Y   K   V   L   V   L   N   P   S   V   A   A
GCT CAG GGC TAT AAG GTG CTA GTA CTC AAC CCC TCT GTT GCT GCA

                    240                                 250
 T   L   G   F   G   A   Y   M   S   K   A   H   G   I   D
ACA CTG GGC TTT GGT GCT TAC ATG TCC AAG GCT CAT GGG ATC GAT

                                        260
 P   N   I   R   T   G   V   R   T   I   T   T   G   S   P
CCT AAC ATC AGG ACC GGG GTG AGA ACA ATT ACC ACT GGC AGC CCC

                    270                                 280
 I   T   Y   S   T   Y   G   K   F   L   A   D   G   G   C
ATC ACG TAC TCC ACC TAC GGC AAG TTC CTT GCC GAC GGC GGG TGC

                                        290
 S   G   G   A   Y   D   I   I   I   C   D   E   C   H   S
TCG GGG GGC GCT TAT GAC ATA ATA ATT TGT GAC GAG TGC CAC TCC

                    300                                 310
 T   D   A   T   S   I   L   G   I   G   T   V   L   D   Q
ACG GAT GCC ACA TCC ATC TTG GGC ATT GGC ACT GTC CTT GAC CAA

                                        320
 A   E   T   A   G   A   R   L   V   V   L   A   T   A   T
GCA GAG ACT GCG GGG GCG AGA CTG GTT GTG CTC GCC ACC GCC ACC

                    330                                 340
 P   P   G   S   V   T   V   P   H   P   N   I   E   E   V
CCT CCG GGC TCC GTC ACT GTG CCC CAT CCC AAC ATC GAG GAG GTT

                                        350
 A   L   S   T   T   G   E   I   P   F   Y   G   K   A   I
GCT CTG TCC ACC ACC GGA GAG ATC CCT TTT TAC GGC AAG GCT ATC

                    360                                 370
 P   L   E   V   I   K   G   G   R   H   L   I   F   C   H
CCC CTC GAA GTA ATC AAG GGG GGG AGA CAT CTC ATC TTC TGT CAT

                                        380
 S   K   K   K   C   D   E   L   A   A   K   L   V   A   L
TCA AAG AAG AAG TGC GAC GAA CTC GCC GCA AAG CTG GTC GCA TTG
```

FIG. 4B

```
                    390                                                 400
 G   I   N   A   V   A   Y   Y   R   G   L   D   V   S   V
GGC ATC AAT GCC GTG GCC TAC TAC CGC GGT CTT GAC GTG TCC GTC

                                        410
 I   P   P   I   G   D   V   V   V   V   A   T   D   A   L
ATC CCG CCC ATC GGC GAT GTT GTC GTC GTG GCA ACC GAT GCC CTC

                    420                                             430
 M   T   G   Y   T   G   D   F   D   S   V   I   D   C   N
ATG ACC GGC TAT ACC GGC GAC TTC GAC TCG GTG ATA GAC TGC AAT

                                        440
 T   C   V   T   Q   T   V   D   F   S   L   D   P   T   F
ACG TGT GTC ACC CAG ACA GTC GAT TTC AGC CTT GAC CCT ACC TTC

                    450                                             460
 T   I   E   T   I   T   L   P   Q   D   A   V   S   R   T
ACC ATT GAG ACA ATC ACG CTC CCC CAA GAT GCT GTC TCC CGC ACT

                                        470
 Q   R   R   G   R   T   G   R   G   K   P   G   I   Y   R
CAA CGT CGG GGC AGG ACT GGC AGG GGG AAG CCA GGC ATC TAC AGA

                    480                                             490
 F   V   A   P   G   E   R   P   S   G   M   F   D   S   S
TTT GTG GCA CCG GGG GAG CGC CCC TCC GGC ATG TTC GAC TCG TCC

                                        500
 V   L   C   E   C   Y   D   A   G   C   A   W   Y   E   L
GTC CTC TGT GAG TGC TAT GAC GCA GGC TGT GCT TGG TAT GAG CTC

                    510                                             520
 T   P   A   E   T   T   V   R   L   R   A   Y   M   N   T
ACG CCC GCC GAG ACT ACA GTT AGG CTA CGA GCG TAC ATG AAC ACC

                                        530
 P   G   L   P   V   C   Q   D   H   L   E   F   W   E   G
CCG GGG CTT CCC GTG TGC CAG GAC CAT CTT GAA TTT TGG GAG GGC

                    540                                             550
 V   F   T   G   L   T   H   I   D   A   H   F   L   S   Q
GTC TTT ACA GGC CTC ACT CAT ATA GAT GCC CAC TTT CTA TCC CAG

                                        560
 T   K   Q   S   G   E   N   L   P   Y   L   V   A   Y   Q
ACA AAG CAG AGT GGG GAG AAC CTT CCT TAC CTG GTA GCG TAC CAA

                    570                                             580
 A   T   V   C   A   R   A   Q   A   P   P   P   S   W   D
GCC ACC GTG TGC GCT AGG GCT CAA GCC CCT CCC CCA TCG TGG GAC
```

FIG. 4C

```
                                                590
 Q   M   W   K   C   L   I   R   L   K   P   T   L   H   G
CAG ATG TGG AAG TGT TTG ATT CGC CTC AAG CCC ACC CTC CAT GGG

                    600                                 610
 P   T   P   L   L   Y   R   L   G   A   V   Q   N   E   I
CCA ACA CCC CTG CTA TAC AGA CTG GGC GCT GTT CAG AAT GAA ATC

                                                620
 T   L   T   H   P   V   T   K   Y   I   M   T   C   M   S
ACC CTG ACG CAC CCA GTC ACC AAA TAC ATC ATG ACA TGC ATG TCG

                    630                                 640
 A   D   L   E   V   V   T   S   T   W   V   L   V   G   G
GCC GAC CTG GAG GTC GTC ACG AGC ACC TGG GTG CTC GTT GGC GGC

                                                650
 V   L   A   A   L   A   A   Y   C   L   S   T   G   C   V
GTC CTG GCT GCT TTG GCC GCG TAT TGC CTG TCA ACA GGC TGC GTG

                    660                                 670
 V   I   V   G   R   V   V   L   S   G   K   P   A   I   I
GTC ATA GTG GGC AGG GTC GTC TTG TCC GGG AAG CCG GCA ATC ATA

                                                680
 P   D   R   E   V   L   Y   R   E   F   D   E   M   E   E
CCT GAC AGG GAA GTC CTC TAC CGA GAG TTC GAT GAG ATG GAA GAG

686
 C
TGC
```

FIG. 4D

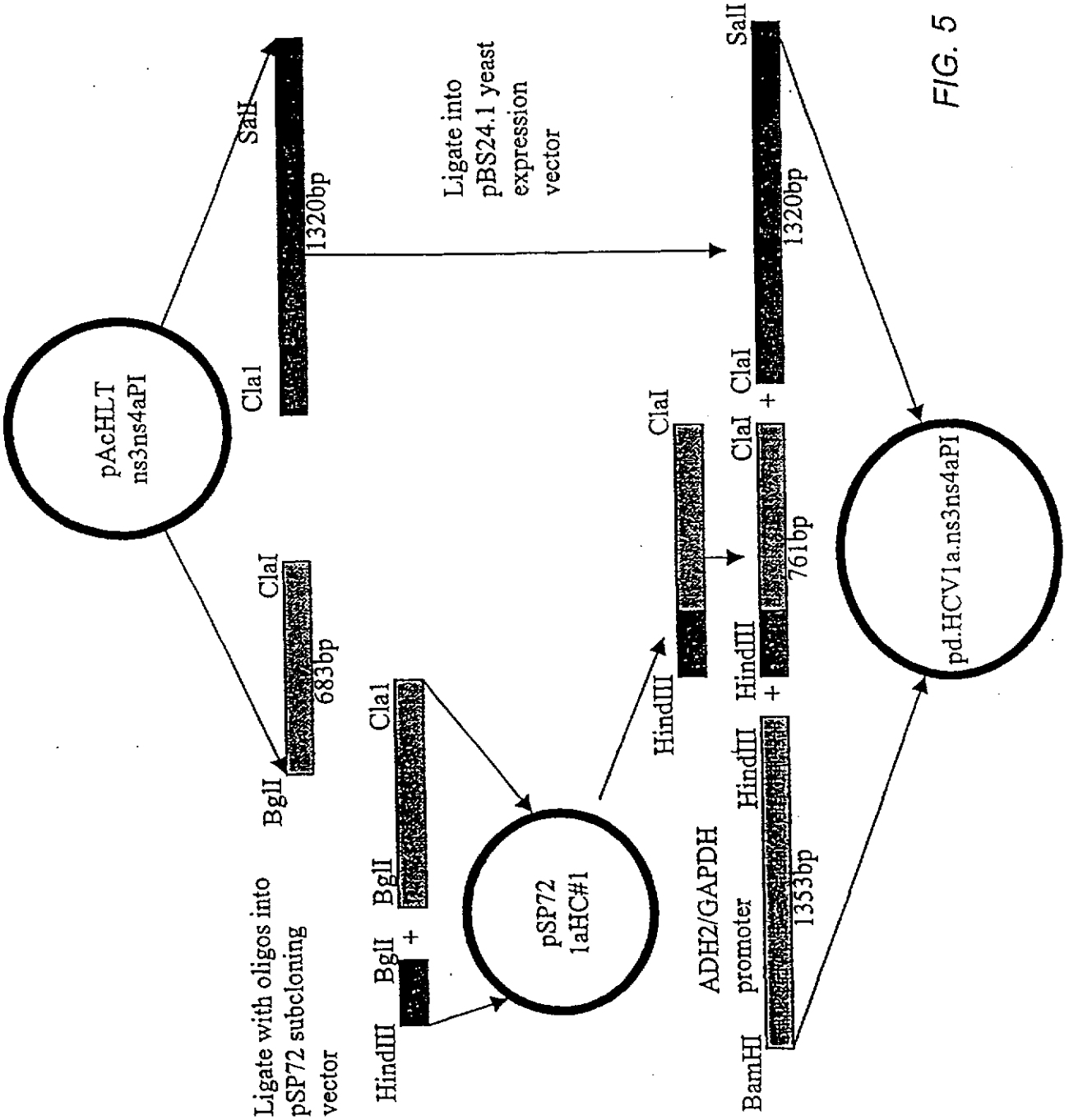
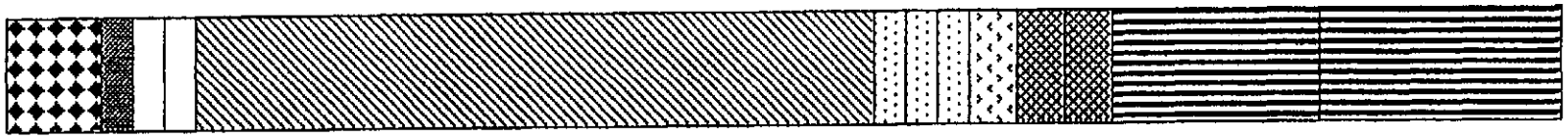

pAcHLT
ns3ns4aPI
SalI
ClaI
1320bp
Ligate into
pBS24.1 yeast
expression
vector
ClaI
683bp
BglII
Ligate with oligos into
pSP72 subcloning
vector
ClaI
BglII
BglII
+
HindIII
pSP72
1aHC#1
ClaI
HindIII
ADH2/GAPDH
promoter
HindIII
BamHI
1353bp
ClaI
+
761bp
HindIII
+
ClaI
SalI
1320bp
pd.HCV1a.ns3ns4aPI

FIG. 5

MEFA 12 Antigen Construct



SOD

E1

E2 HVR1a

E2 HVR 1+2 consensus

C33c short

5-1-1: 1+3+2

C100-1 C-terminal

NS5 major 1a

Core 1+2

FIG. 6

```
 1                                                  10
 M   A   T   K   A   V   C   V   L   K   G   D   G   P   V
ATG GCT ACA AAG GCT GTT TGT GTT TTG AAG GGT GAC GGC CCA GTT  45

                    20                                  30
 Q   G   I   I   N   F   E   Q   K   E   S   N   G   P   V
CAA GGT ATT ATT AAC TTC GAG CAG AAG GAA AGT AAT GGA CCA GTG  90

                                    40
 K   V   W   G   S   I   K   G   L   T   E   G   L   H   G
AAG GTG TGG GGA AGC ATT AAA GGA CTG ACT GAA GGC CTG CAT GGA 135

                    50                                  60
 F   H   V   H   E   F   G   D   N   T   A   G   C   T   S
TTC CAT GTT CAT GAG TTT GGA GAT AAT ACA GCA GGC TGT ACC AGT 180

                                    70
 A   G   P   H   F   N   P   L   S   T   R   G   C   N   C
GCA GGT CCT CAC TTT AAT CCT CTA TCC ACG CGT GGT TGC AAT TGC 225

                    80                                  90
 S   I   Y   P   G   H   I   T   G   H   R   M   A   W   K
TCT ATC TAT CCC GGC CAT ATA ACG GGT CAC CGC ATG GCA TGG AAG 270

                                   100
 L   G   S   A   A   R   T   T   S   G   F   V   S   L   F
CTT GGT TCC GCC GCC AGA ACT ACC TCG GGC TTT GTC TCC TTG TTC 315

                   110                                 120
 A   P   G   A   K   Q   N   E   T   H   V   T   G   G   A
GCC CCA GGT GCC AAA CAA AAC GAA ACT CAC GTC ACG GGA GGC GCA 360

                                   130
 A   A   R   T   T   S   G   L   T   S   L   F   S   P   G
GCC GCC CGA ACT ACG TCT GGG TTG ACC TCT TTG TTC TCC CCA GGT 405
```

FIG. 7A

```
                    140                                                 150
 A   S   Q   N   I   Q   L   I   T   S   T   D   N   S   S
GCC AGC CAA AAC ATT CAA TTG ATT ACT AGT ACG GAT AAC TCC TCT  450

                                    160
 P   P   V   V   P   Q   S   F   Q   V   A   H   L   H   A
CCA CCA GTA GTG CCC CAG AGC TTC CAG GTG GCT CAC CTC CAT GCT  495

                    170                                                 180
 P   T   G   S   G   K   S   T   K   V   P   A   A   Y   A
CCC ACA GGC AGC GGC AAA AGC ACC AAG GTC CCG GCT GCA TAT GCA  540

                                    190
 A   Q   G   Y   K   V   L   V   L   N   P   S   V   A   A
GCT CAG GGC TAT AAG GTG CTA GTA CTC AAC CCC TCT GTT GCT GCA  585

                    200                                                 210
 T   L   G   F   G   A   Y   M   S   K   A   H   G   I   D
ACA CTG GGC TTT GGT GCT TAC ATG TCC AAG GCT CAT GGG ATC GAT  630

                                    220
 P   N   I   R   T   G   V   R   T   I   T   T   G   S   P
CCT AAC ATC AGG ACC GGG GTG AGA ACA ATT ACC ACT GGC AGC CCC  675

                    230                                                 240
 I   T   Y   S   T   Y   G   K   F   L   A   D   G   G   C
ATC ACG TAC TCC ACC TAC GGC AAG TTC CTT GCC GAC GGC GGG TGC  720

                                    250
 S   G   G   A   Y   D   I   I   I   C   D   E   C   H   S
TCG GGG GGC GCT TAT GAC ATA ATA ATT TGT GAC GAG TGC CAC TCC  765

                    260                                                 270
 T   D   A   T   S   I   L   G   I   G   T   V   L   D   Q
ACG GAT GCC ACA TCC ATC TTG GGC ATC GGC ACT GTC CTT GAC CAA  810

                                    280
 A   E   T   A   G   A   R   L   V   V   L   A   T   A   T
GCA GAG ACT GCG GGG GCG AGA CTG GTT GTG CTC GCC ACC GCC ACC  855

                    290                                                 300
 P   P   G   S   V   T   V   P   H   P   N   I   E   E   V
CCT CCG GGC TCC GTC ACT GTG CCC CAT CCC AAC ATC GAG GAG GTT  900
```

FIG. 7B

```
                                                  310
 A   L   S   T   T   G   E   I   P   F   Y   G   K   A   I
GCT CTG TCC ACC ACC GGA GAG ATC CCT TTT TAC GGC AAG GCT ATC  945

                    320                                 330
 P   L   E   V   I   K   G   G   R   H   L   I   F   C   H
CCC CTC GAA GTA ATC AAG GGG GGG AGA CAT CTC ATC TTC TGT CAT  990

                                                  340
 S   K   K   K   C   D   E   L   A   A   K   L   V   A   L
TCA AAG AAG AAG TGC GAC GAA CTC GCC GCA AAG CTG GTC GCA TTG 1035

                    350                                 360
 G   I   N   A   V   A   Y   Y   R   G   L   D   V   S   V
GGC ATC AAT GCC GTG GCC TAC TAC CGC GGT CTT GAC GTG TCC GTC 1080

                                                  370
 I   P   T   S   G   D   V   V   V   V   A   T   D   A   L
ATC CCG ACC AGC GGC GAT GTT GTC GTC GTG GCA ACC GAT GCC CTC 1125

                    380                                 390
 M   T   G   Y   T   G   D   F   D   S   V   I   D   C   N
ATG ACC GGC TAT ACC GGC GAC TTC GAC TCG GTG ATA GAC TGC AAT 1170

                                                  400
 T   C   A   C   S   G   K   P   A   I   I   P   D   R   E
ACG TGT GCA TGC TCC GGG AAG CCG GCA ATC ATA CCT GAC AGG GAA 1215

                    410                                 420
 V   L   Y   R   E   F   D   E   M   E   E   C   S   Q   H
GTC CTC TAC CGA GAG TTC GAT GAG ATG GAA GAG TGC TCT CAG CAC 1260

                                                  430
 L   P   Y   I   E   Q   G   M   M   L   A   E   Q   F   K
TTA CCG TAC ATC GAG CAA GGG ATG ATG CTC GCC GAG CAG TTC AAG 1305

                    440                                 450
 Q   K   A   L   G   L   S   R   G   G   K   P   A   I   V
CAG AAG GCC CTC GGC CTC TCG CGA GGG GGC AAG CCG GCA ATC GTT 1350

                                                  460
 P   D   K   E   V   L   Y   Q   Q   Y   D   E   M   E   E
CCA GAC AAA GAG GTG TTG TAT CAA CAA TAC GAT GAG ATG GAA GAG 1395
```

FIG. 7C

```
                    470                                                 480
 C   S   Q   A   A   P   Y   I   E   Q   A   Q   V   I   A
TGC TCA CAA GCT GCC CCA TAT ATC GAA CAA GCT CAG GTA ATA GCT  1440

                                        490
 H   Q   F   K   E   K   V   L   G   L   I   D   N   D   Q
CAC CAG TTC AAG GAA AAA GTC CTT GGA TTG ATC GAT AAT GAT CAA  1485

                    500                                                 510
 V   V   V   T   P   D   K   E   I   L   Y   E   A   F   D
GTG GTT GTG ACT CCT GAC AAA GAA ATC TTA TAT GAG GCC TTT GAT  1530

                                        520
 E   M   E   E   C   A   S   K   A   A   L   I   E   E   G
GAG ATG GAA GAA TGC GCC TCC AAA GCC GCC CTC ATT GAG GAA GGG  1575

                    530                                                 540
 Q   R   M   A   E   M   L   K   S   K   I   Q   G   L   L
CAG CGG ATG GCG GAG ATG CTC AAG TCT AAG ATA CAA GGC CTC CTC  1625

                                        550
 G   I   L   R   R   H   V   G   P   G   E   G   A   V   Q
GGG ATA CTG CGC CGG CAC GTT GGT CCT GGC GAG GGG GCA GTG CAG  1670

                    560                                                 570
 W   M   N   R   L   I   A   F   A   S   R   G   N   H   V
TGG ATG AAC CGG CTG ATA GCC TTC GCC TCC AGA GGG AAC CAT GTT  1715

                                        580
 S   P   T   H   Y   V   P   S   R   S   R   R   F   A   Q
TCC CCC ACG CAC TAC GTT CCG TCT AGA TCC CGG AGA TTC GCC CAG  1760

                    590                                                 600
 A   L   P   V   W   A   R   P   D   Y   N   P   P   L   V
GCC CTG CCC GTT TGG GCG CGG CCG GAC TAT AAC CCC CCG CTA GTG  1805

                                        610
 E   T   W   K   K   P   D   Y   E   P   P   V   V   H   G
GAG ACG TGG AAA AAG CCC GAC TAC GAA CCA CCT GTG GTC CAC GGC  1850

                    620                                                 630
 R   S   S   R   R   F   A   Q   A   L   P   V   W   A   R
AGA TCT TCT CGG AGA TTC GCC CAG GCC CTG CCC GTT TGG GCG CGG  1895
```

FIG. 7D

```
                                                  640
 P   D   Y   N   P   P   L   V   E   T   W   K   K   P   D
CCG GAC TAT AAC CCC CCG CTA GTG GAG ACG TGG AAA AAG CCC GAC  1940

                650                                       660
 Y   E   P   P   V   V   H   G   R   K   T   K   R   N   T
TAC GAA CCA CCT GTG GTC CAT GGC AGA AAG ACC AAA CGT AAC ACC  1985

                                                  670
 N   R   R   P   Q   D   V   K   F   P   G   G   G   Q   I
AAC CGG CGG CCG CAG GAC GTC AAG TTC CCG GGT GGC GGT CAG ATC  2030

                680                                       690
 V   G   G   V   Y   L   L   P   R   R   G   P   R   L   G
GTT GGT GGA GTT TAC TTG TTG CCG CGC AGG GGC CCT AGA TTG GGT  2075

                                                  700
 V   L   A   T   R   K   T   S   P   I   P   K   A   R   R
GTG CTC GCG ACG AGA AAG ACT TCC CCT ATC CCC AAG GCT CGT CGG  2120

                710                                       720
 P   E   G   R   T   W   A   Q   P   G   Y   P   W   P   L
CCC GAG GGC AGG ACC TGG GCT CAG CCC GGT TAC CCT TGG CCC CTC  2165

                                                  730
 Y   G   N   K   D   R   R   S   T   G   K   S   W   G   K
TAT GGC AAT AAG GAC AGA CGG TCT ACA GGT AAG TCC TGG GGT AAG  2210

                740                                       750
 P   G   Y   P   W   P   R   K   T   K   R   N   T   N   R
CCA GGG TAC CCT TGG CCA AGA AAG ACC AAA CGT AAC ACC AAC CGG  2255

                                                  760
 R   P   Q   D   V   K   F   P   G   G   G   Q   I   V   G
CGG CCG CAG GAC GTC AAG TTC CCG GGT GGC GGT CAG ATC GTT GGT  2300

                770                                       780
 G   V   Y   L   L   P   R   R   G   P   R   L   G   V   L
GGA GTT TAC TTG TTG CCG CGC AGG GGC CCT AGA TTG GGT GTG CTC  2345

                                                  790
 A   T   R   K   T   S   P   I   P   K   A   R   R   P   E
GCG ACG AGA AAG ACT TCC CCT ATC CCC AAG GCT CGT CGG CCC GAG  2390
```

FIG. 7E

```
                    800                                                 810
 G   R   T   W   A   Q   P   G   Y   P   W   P   L   Y   G
GGC AGG ACC TGG GCT CAG CCC GGT TAC CCT TGG CCC CTC TAT GGC-  2435

                                        820
 N   K   D   R   R   S   T   G   K   S   W   G   K   P   G
AAT AAG GAC AGA CGG TCT ACA GGT AAG TCC TGG GGT AAG CCA GGG  2480

              829
 Y   P   W   P   OC
TAC CCT TGG CCC TAA TGAGTCGAC
```

FIG. 7F

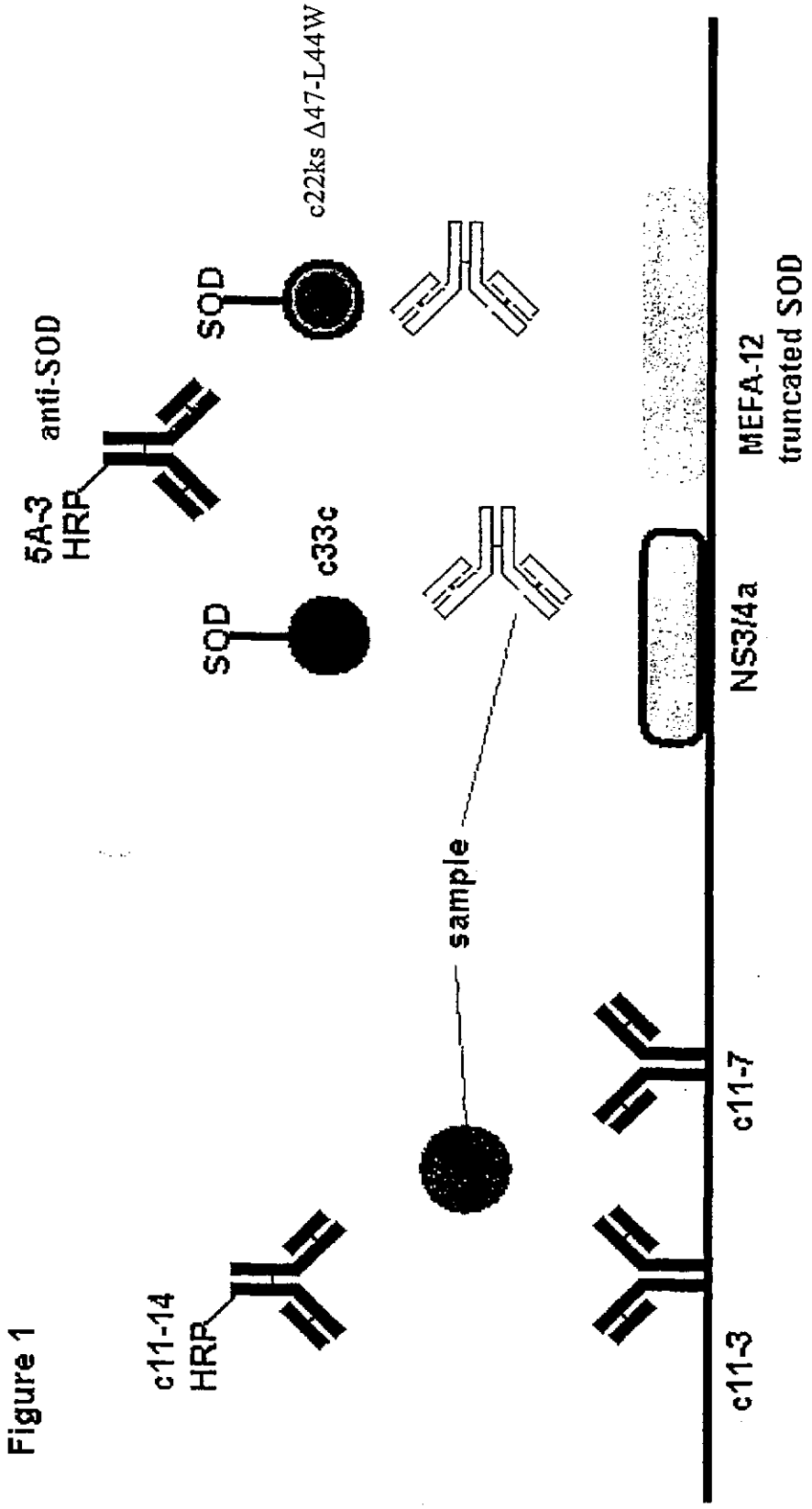


Figure 1

FIG. 8