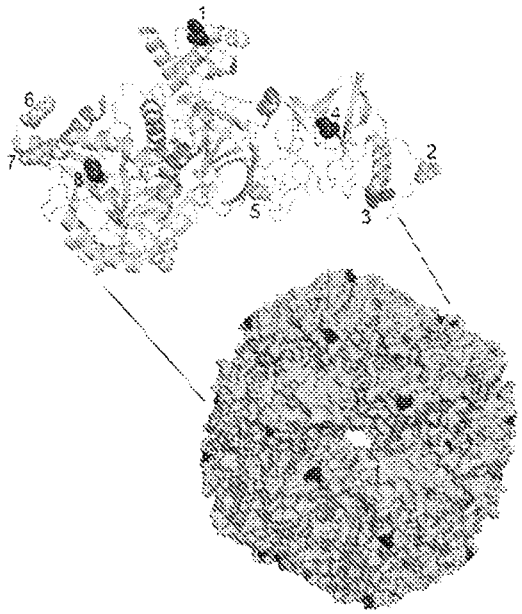
a



b

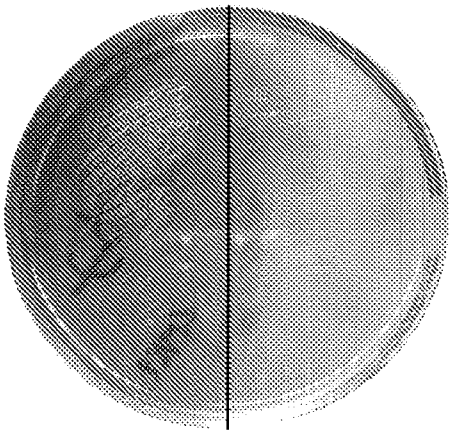
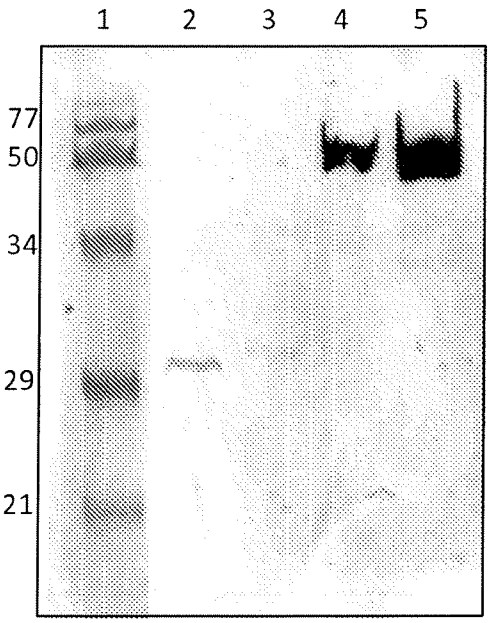


Figure 1

a


1
2
3
4
5
77
50
34
29
21

b

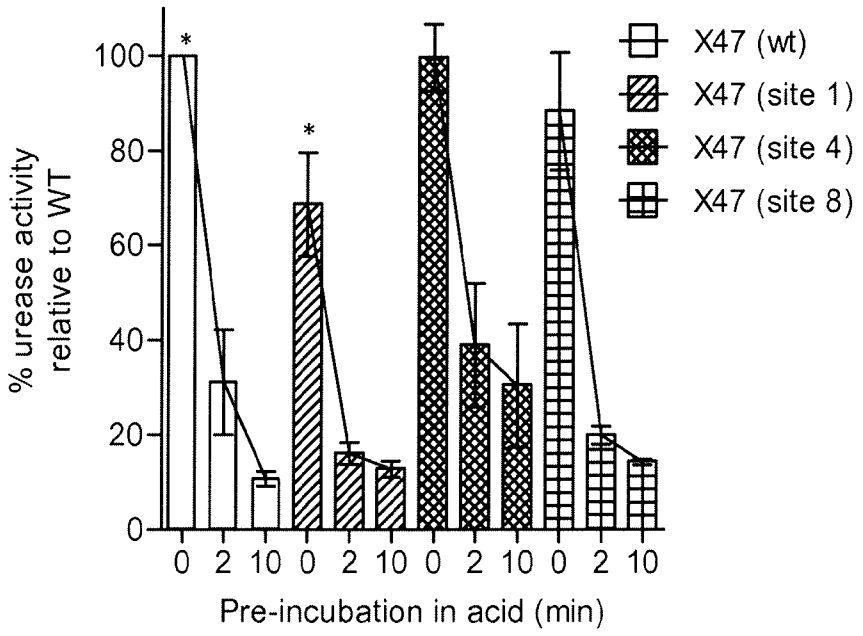

% urease activity relative to WT
100
80
60
40
20
0
*
*
0 2 10 0 2 10 0 2 10 0 2 10
Pre-incubation in acid (min)
X47 (wt)
X47 (site 1)
X47 (site 4)
X47 (site 8)

Figure 2

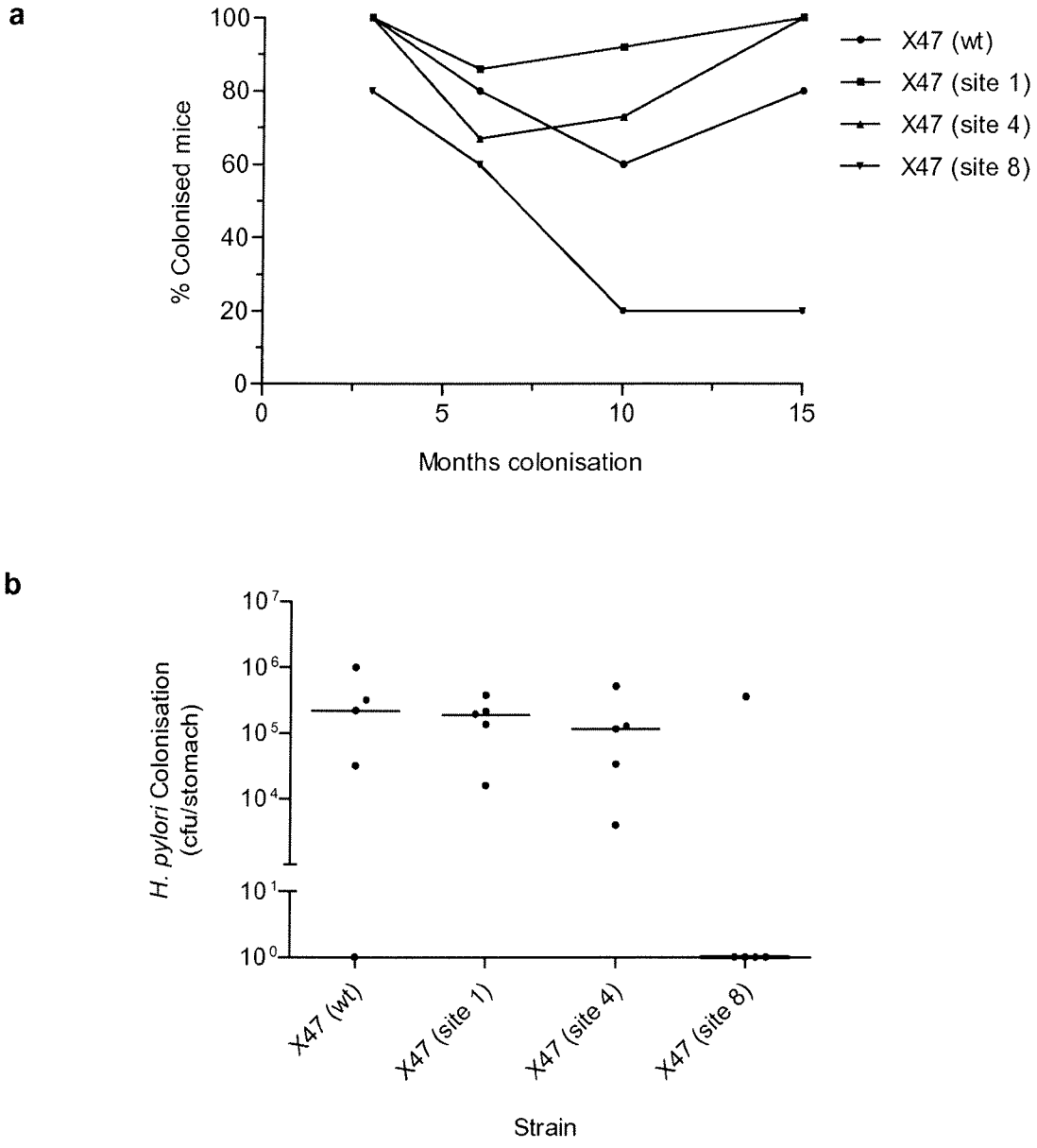
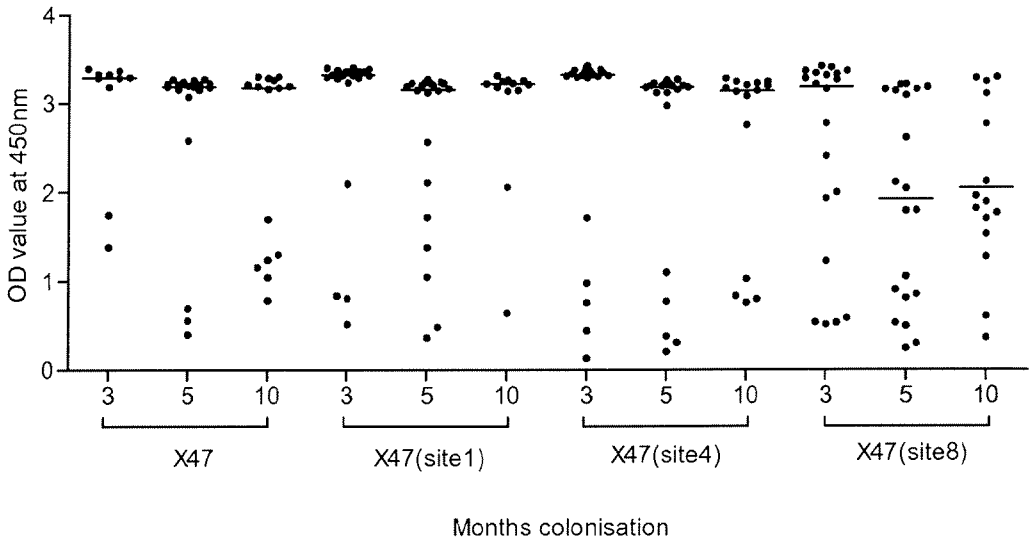

a
100
80
60
40
20
0
% Colonised mice
0
5
10
15
Months colonisation
X47 (wt)
X47 (site 1)
X47 (site 4)
X47 (site 8)
b
10^7
10^6
10^5
10^4
10^1
10^0
H. pylori Colonisation
(cfu/stomach)
X47 (wt)
X47 (site 1)
X47 (site 4)
X47 (site 8)
Strain

Figure 3

c



d

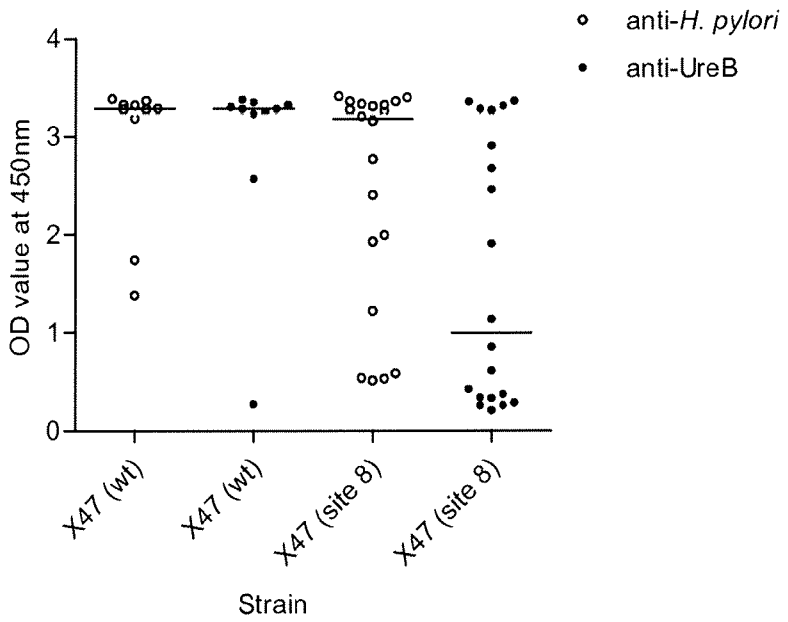


Figure 3 Cont.

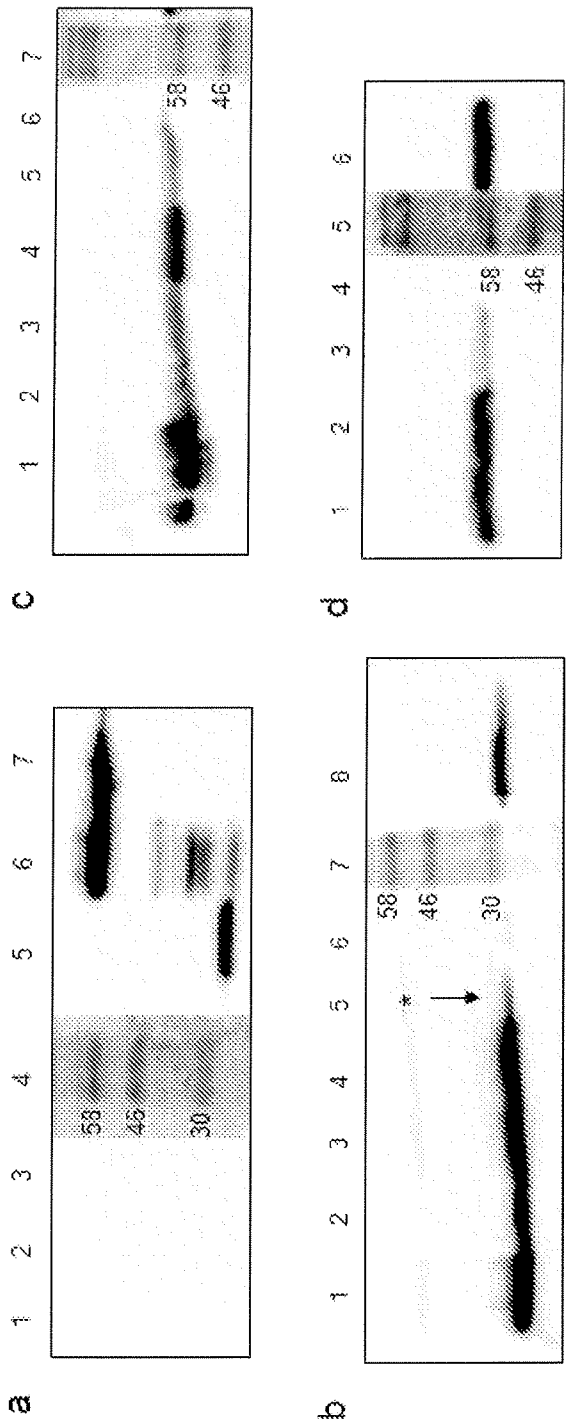


Figure 4

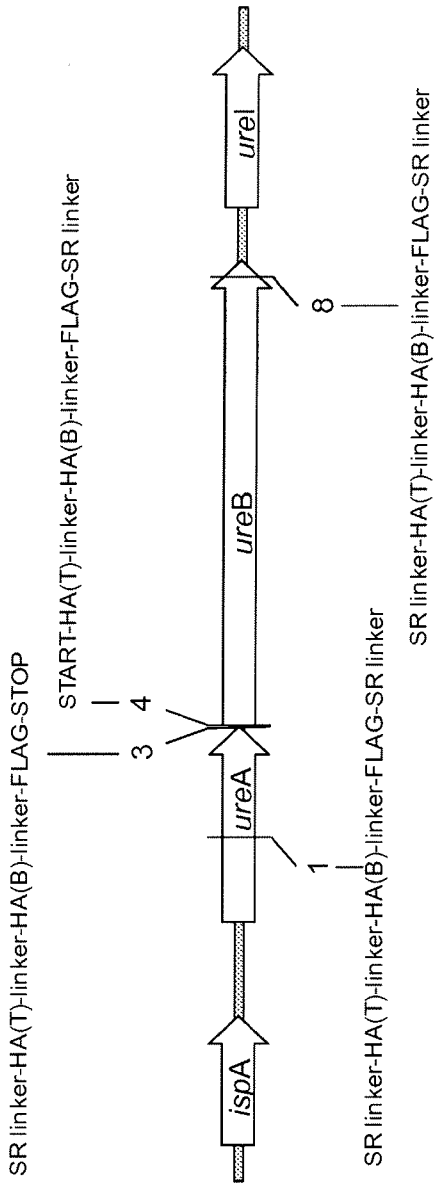

ispA
ureA
ureB
ureI
1
3
4
8
SR linker-HA(T)-linker-HA(B)-linker-FLAG-STOP
START-HA(T)-linker-HA(B)-linker-FLAG-SR linker
SR linker-HA(T)-linker-HA(B)-linker-FLAG-SR linker
SR linker-HA(T)-linker-HA(B)-linker-FLAG-SR linker

Figure 5

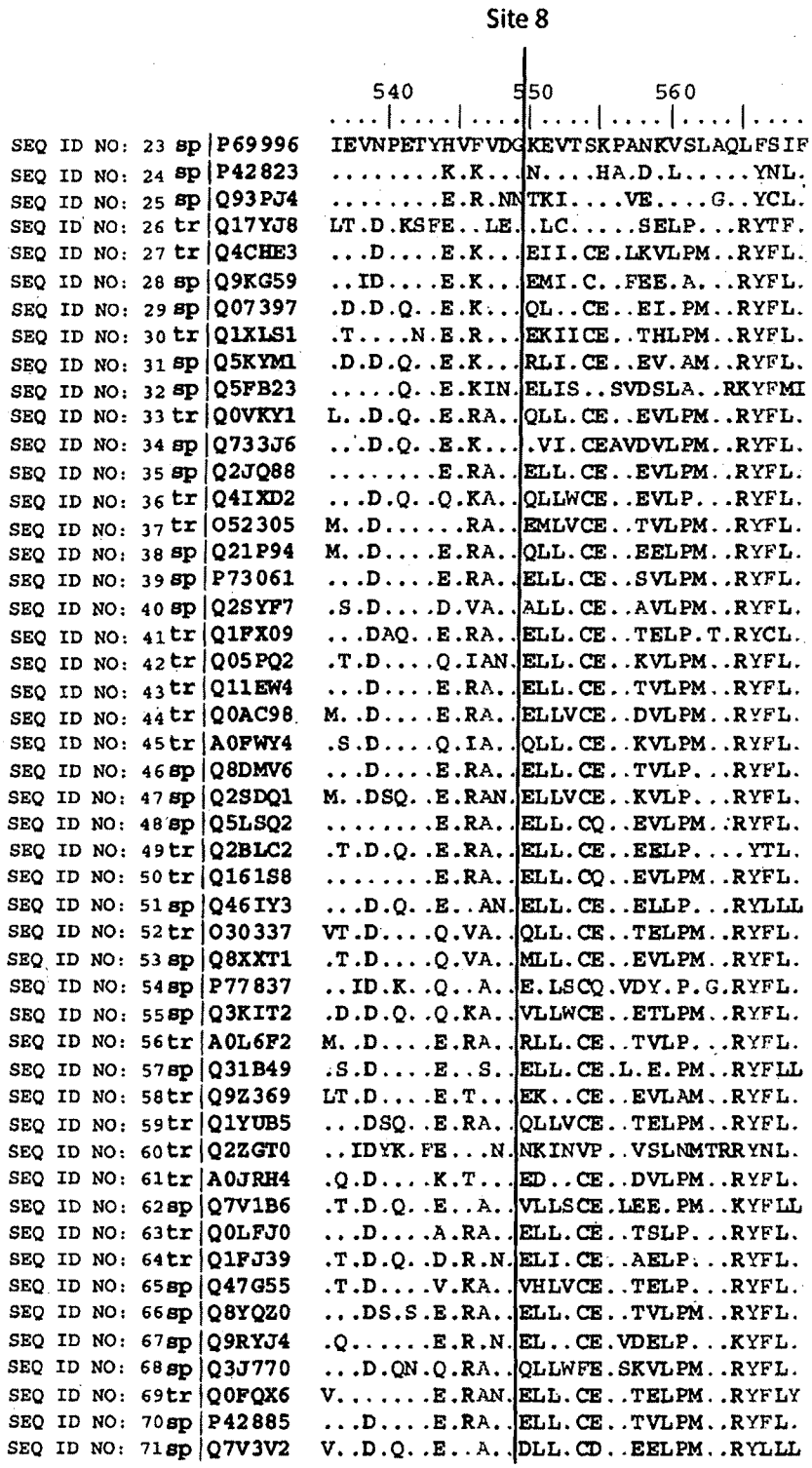

Site 8
540
550
560
SEQ ID NO: 23 sp|P69996 IEVNPETYHVFVDGKEVTSKPANKVSLAQLFSIF
SEQ ID NO: 24 sp|P42823 .....K.K...N....HA.D.L.....YNL.
SEQ ID NO: 25 sp|Q93PJ4 .....E.R.NMTKI....VE....G..YCL.
SEQ ID NO: 26 tr|Q17YJ8 LT.D.KSFE..LE..LC.....SELP...RYTF.
SEQ ID NO: 27 tr|Q4CHE3 ...D....E.K...EII.CE.LKVLPM..RYFL.
SEQ ID NO: 28 sp|Q9KG59 ..ID....E.K...EMI.C..FEE.A...RYFL.
SEQ ID NO: 29 sp|Q07397 .D.D.Q..E.K...QL..CE..EI.PM..RYFL.
SEQ ID NO: 30 tr|Q1XLS1 .T....N.E.R...EKIICE..THLPM..RYFL.
SEQ ID NO: 31 sp|Q5KYM1 .D.D.Q..E.K...RLI.CE..EV.AM..RYFL.
SEQ ID NO: 32 sp|Q5FB23 .....Q..E.KIN.ELIS..SVDSLA..RKYFMI
SEQ ID NO: 33 tr|Q0VKY1 L..D.Q..E.RA..QLL.CE..EVLPM..RYFL.
SEQ ID NO: 34 sp|Q733J6 ...D.Q..E.K....VI.CEAVDVLPM..RYFL.
SEQ ID NO: 35 sp|Q2JQ88 .....E.RA..ELL.CE..EVLPM..RYFL.
SEQ ID NO: 36 tr|Q4IXD2 ...D.Q..Q.KA..QLLWCE..EVLP...RYFL.
SEQ ID NO: 37 tr|O52305 M..D.....RA..EMLVCE..TVLPM..RYFL.
SEQ ID NO: 38 sp|Q21P94 M..D....E.RA..QLL.CE..EELPM..RYFL.
SEQ ID NO: 39 sp|P73061 ...D....E.RA..ELL.CE..SVLPM..RYFL.
SEQ ID NO: 40 sp|Q2SYF7 .S.D....D.VA..ALL.CE..AVLPM..RYFL.
SEQ ID NO: 41 tr|Q1PX09 ...DAQ..E.RA..ELL.CE..TELP.T.RYCL.
SEQ ID NO: 42 tr|Q05PQ2 .T.D....Q.IAN.ELL.CE..KVLPM..RYFL.
SEQ ID NO: 43 tr|Q11EW4 ...D....E.RA..ELL.CE..TVLPM..RYFL.
SEQ ID NO: 44 tr|Q0AC98 M..D....E.RA..ELLVCE..DVLPM..RYFL.
SEQ ID NO: 45 tr|A0FWY4 .S.D....Q.IA..QLL.CE..KVLPM..RYFL.
SEQ ID NO: 46 sp|Q8DMV6 ...D....E.RA..ELL.CE..TVLP...RYFL.
SEQ ID NO: 47 sp|Q2SDQ1 M..DSQ..E.RAN.ELLVCE..KVLP...RYFL.
SEQ ID NO: 48 sp|Q5LSQ2 .....E.RA..ELL.CQ..EVLPM..RYFL.
SEQ ID NO: 49 tr|Q2BLC2 .T.D.Q..E.RA..ELL.CE..EELP....YTL.
SEQ ID NO: 50 tr|Q161S8 .....E.RA..ELL.CQ..EVLPM..RYFL.
SEQ ID NO: 51 sp|Q46IY3 ...D.Q..E..AN.ELL.CE..ELLP...RYLLL
SEQ ID NO: 52 tr|O30337 VT.D....Q.VA..QLL.CE..TELPM..RYFL.
SEQ ID NO: 53 sp|Q8XXT1 .T.D....Q.VA..MLL.CE..EVLPM..RYFL.
SEQ ID NO: 54 sp|P77837 ..ID.K..Q...A..E.LSCQ.VDY.P.G.RYFL.
SEQ ID NO: 55 sp|Q3KIT2 .D.D.Q..Q.KA..VLLWCE..ETLPM..RYFL.
SEQ ID NO: 56 tr|A0L6F2 M..D....E.RA..RLL.CE..TVLP...RYFL.
SEQ ID NO: 57 sp|Q31B49 .S.D....E..S..ELL.CE.L.E.PM..RYFLL
SEQ ID NO: 58 tr|Q9Z369 LT.D....E.T...EK..CE..EVLAM..RYFL.
SEQ ID NO: 59 tr|Q1YUB5 ...DSQ..E.RA..QLLVCE..TELPM..RYFL.
SEQ ID NO: 60 tr|Q2ZGT0 ..IDYK.FE...N.NKINVP..VSLNMTRRYNL.
SEQ ID NO: 61 tr|A0JRH4 .Q.D....K.T...ED..CE..DVLPM..RYFL.
SEQ ID NO: 62 sp|Q7V1B6 .T.D.Q..E..A..VLLSCE.LEE.PM..KYFLL
SEQ ID NO: 63 tr|Q0LFJ0 ...D....A.RA..ELL.CE..TSLP...RYFL.
SEQ ID NO: 64 tr|Q1FJ39 .T.D.Q..D.R.N.ELI.CE..AELP...RYFL.
SEQ ID NO: 65 sp|Q47G55 .T.D....V.KA..VHLVCE..TELP...RYFL.
SEQ ID NO: 66 sp|Q8YQZ0 ...DS.S.E.RA..ELL.CE..TVLPM..RYFL.
SEQ ID NO: 67 sp|Q9RYJ4 .Q.....E.R.N.EL..CE.VDELP...KYFL.
SEQ ID NO: 68 sp|Q3J770 ...D.QN.Q.RA..QLLWFE.SKVLPM..RYFL.
SEQ ID NO: 69 tr|Q0FQX6 V.....E.RAN.ELL.CE..TELPM..RYFLY
SEQ ID NO: 70 sp|P42885 ...D....E.RA..ELL.CE..TVLPM..RYFL.
SEQ ID NO: 71 sp|Q7V3V2 V..D.Q..E..A..DLL.CD..EELPM..RYLLL

Figure 6