HCV Molecular Immunology: Maps of Helper Epitope Locations Plotted by Protein

Theoretical Biology & Biophysics, Los Alamos National Laboratory

February 15, 2007

All HCV T-Helper(Th) epitopes mapped to within a region of 21 amino acids or less are indicated on the HCV protein epitope maps. The location and HLA restriction elements of Th epitopes are indicated on protein sequences of H77. These maps are meant to provide the relative location of defined epitopes on a given protein, but the H77 sequence may not actually carry the epitope of interest, as it may vary relative to the sequence for which the epitope was defined. Epitopes with identical boundaries and HLA fields are included in the maps only once. If one laboratory determines HLA presenting molecules at the serotype level (example: A2) and another at the genotype level (example: A*0201) both will be included in the map. MHC specificities are indicative of the host species; when no MHC presenting molecule is defined, the host species is noted.

1 Core Helper Epitope Map

Figure 1: Core Helper Map 1, aa 1-50

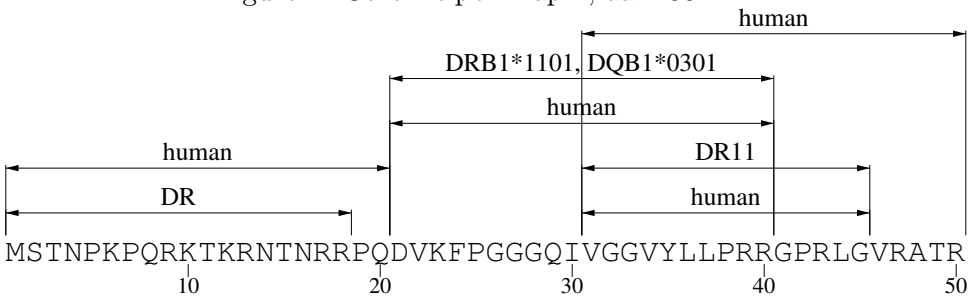


Figure 2: Core Helper Map 2, aa 51-100

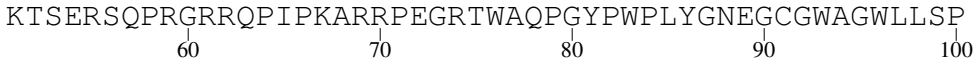


Figure 3: Core Helper Map 3, aa 101-150

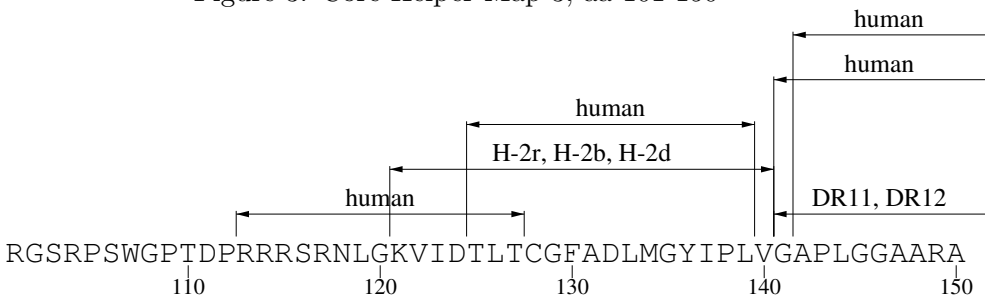
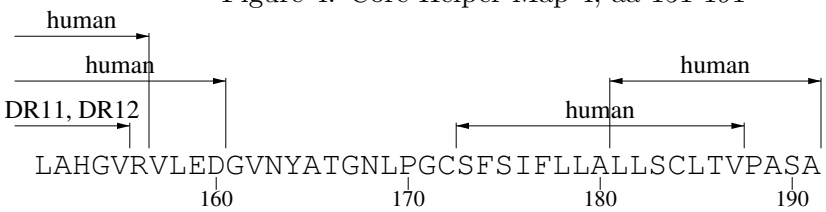


Figure 4: Core Helper Map 4, aa 151-191



2 E1 Helper Epitope Map

Figure 5: E1 Helper Map 1, aa 192-241

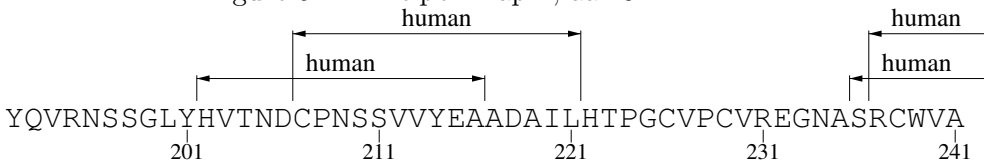


Figure 6: E1 Helper Map 2, aa 242-291

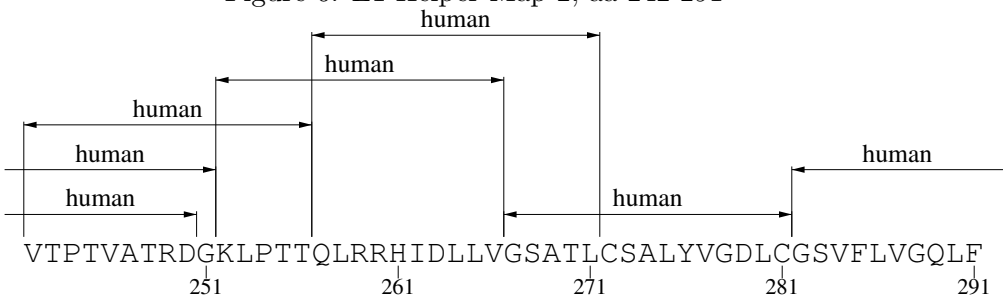


Figure 7: E1 Helper Map 3, aa 292-341

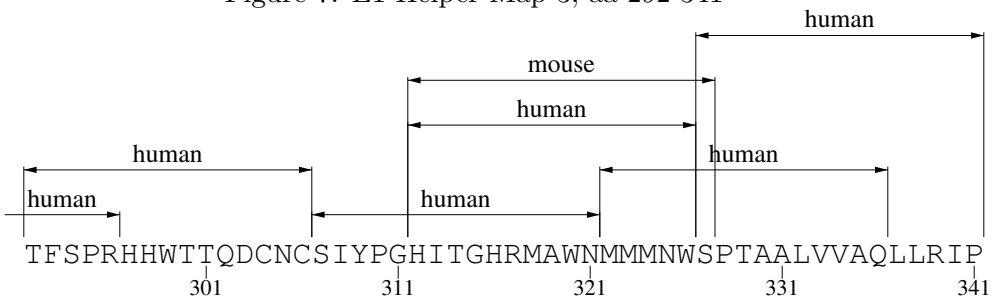
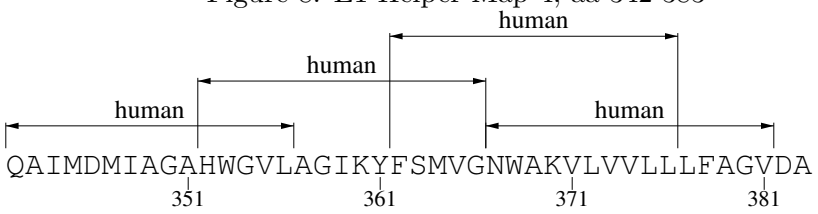


Figure 8: E1 Helper Map 4, aa 342-383



3 E2 Helper Epitope Map

Figure 9: E2 Helper Map 1, aa 384-433

DRB1*1101

ETHVTGGNAGRTTAGLVGLLTPGAKQNIQLINTNGSWHINSTALNCNESL

393 403 413 423 433

Figure 10: E2 Helper Map 2, aa 434-483

NTGWLAGLFYQHKFNSSGCPERLASCRRLTDFAQGWGPISYANGSGLDER

443 453 463 473 483

Figure 11: E2 Helper Map 3, aa 484-533

PYCWHYPPRPCGIVPAKSVCGPVYCFTPSPVVVGTTDRSGAPTYSWGAND

493 503 513 523 533

Figure 12: E2 Helper Map 4, aa 534-583

```
TDVFVLNNTRPPLGNWFGCTWMNSTGFTKVCGAPPCVIGGVGNNTLLCPT
          543       553       563       573       583
```

Figure 13: E2 Helper Map 5, aa 584-633

```
DCFRKYPEATYSRCGSGPRITPRCMVDYPYRLWHYPCTINYTIFKVRMYV
          593       603       613       623       633
```

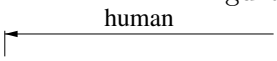
Figure 14: E2 Helper Map 6, aa 634-683

```
GGVEHRLEAACNWTRGERCDLEDRDRSELSPLLLSTTQWQVLPCSFTTLP
          643       653       663       673       683
```

Figure 15: E2 Helper Map 7, aa 684-733

```
ALSTGLIHLHQNIVDVQYLYGVGSSIASWAIKWEYVVLLFLLLADARVCS
          693       703       713       723       733
```

Figure 16: E2 Helper Map 8, aa 734-746




```
CLWMMLLISQAEA
          743
```

4 p7 Helper Epitope Map

Figure 17: p7 Helper Map 1, aa 747-796

```
ALENLVILNAASLAGTHGLVSFLVFFCFAWYLKGRWVPGAVYALYGMWPL
           756       766       776       786       796
```

Figure 18: p7 Helper Map 2, aa 797-809

```
LLLLLALPQRAYA
          806
```

5 NS2 Helper Epitope Map

Figure 19: NS2 Helper Map 1, aa 810-859

```
LDTEVAASCGGVVLVGLMALTLSPYYKRYISWCMWWLQYFLTRVEAQLHV
          819       829       839       849       859
```

Figure 20: NS2 Helper Map 2, aa 860-909

```
                 human
                 human                    human
WVPPLNVRGGRDAVILLTCVVHPALVFDITKLLLAIFGPLWILQASLLKV
          869       879       889       899       909
```

Figure 21: NS2 Helper Map 3, aa 910-959

```
human
PYFVRVQGLLRICALARKIAGGHYVQMAIIKLGALTGTCVYNHLAPLRDW
          919       929       939       949       959
```

Figure 22: NS2 Helper Map 4, aa 960-1009

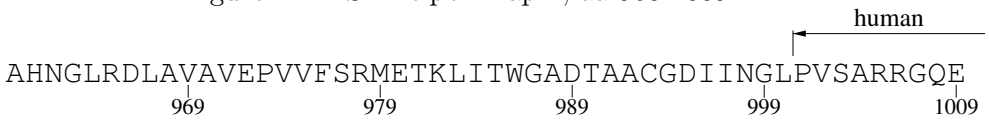
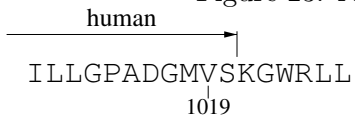


Figure 23: NS2 Helper Map 5, aa 1010-1026



6 NS3 Helper Epitope Map

Figure 24: NS3 Helper Map 1, aa 1027-1076

Figure 25: NS3 Helper Map 2, aa 1077-1126

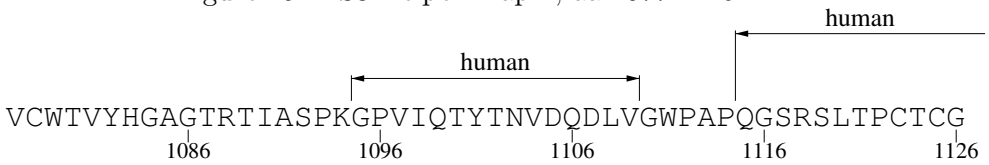


Figure 26: NS3 Helper Map 3, aa 1127-1176

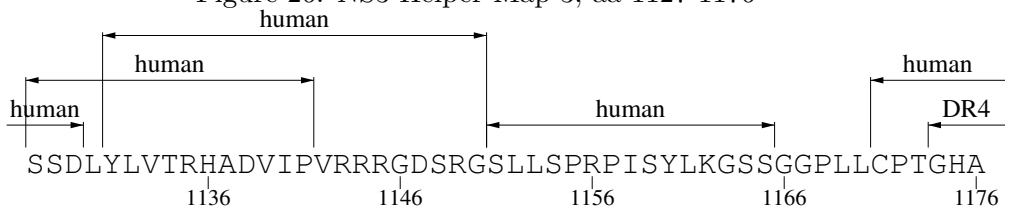


Figure 27: NS3 Helper Map 4, aa 1177-1226

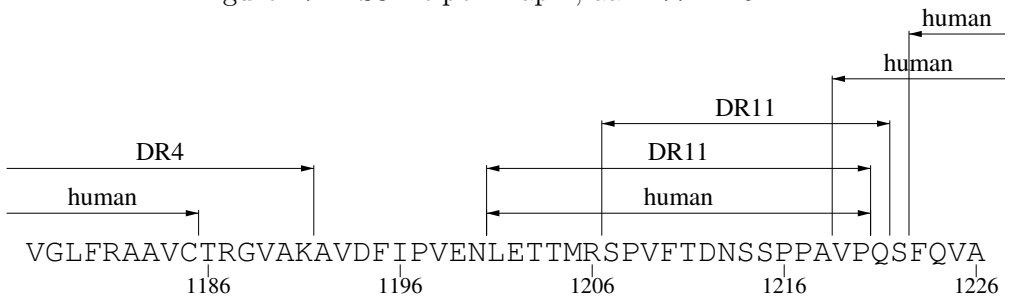


Figure 28: NS3 Helper Map 5, aa 1227-1276

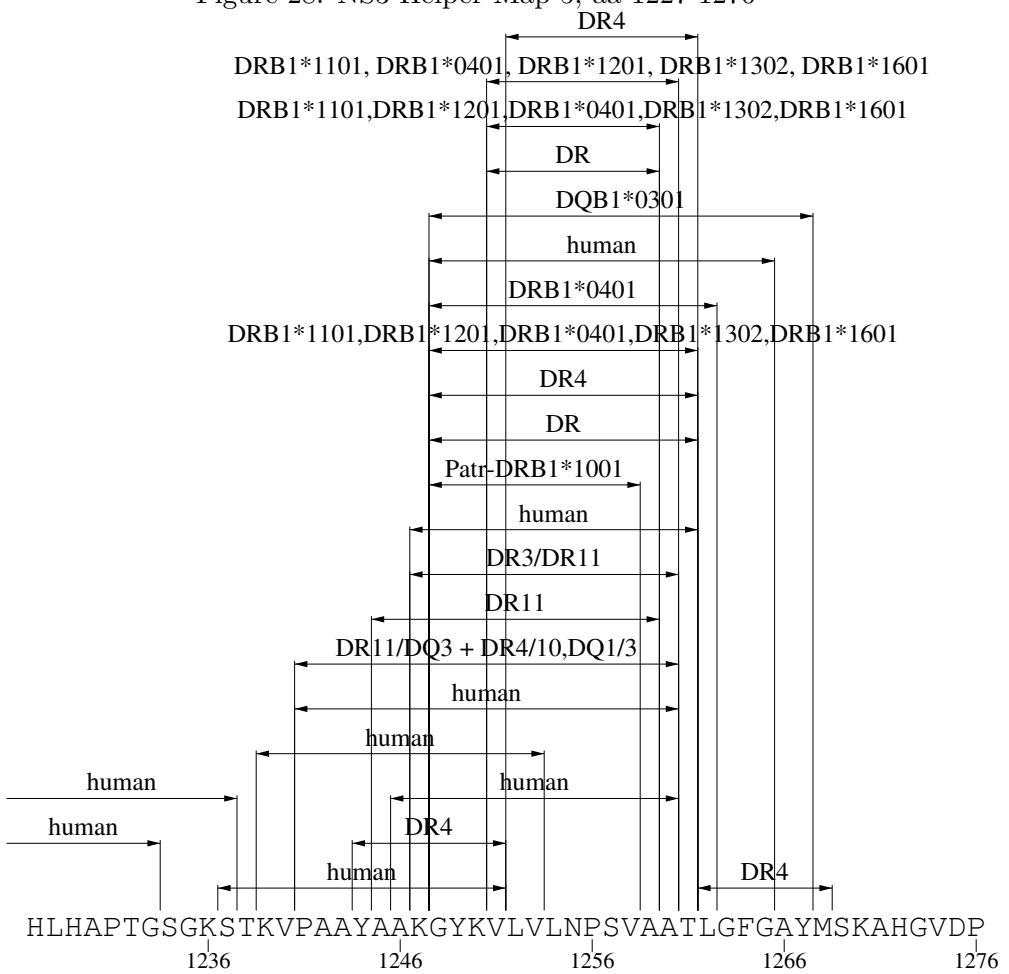


Figure 29: NS3 Helper Map 6, aa 1277-1326

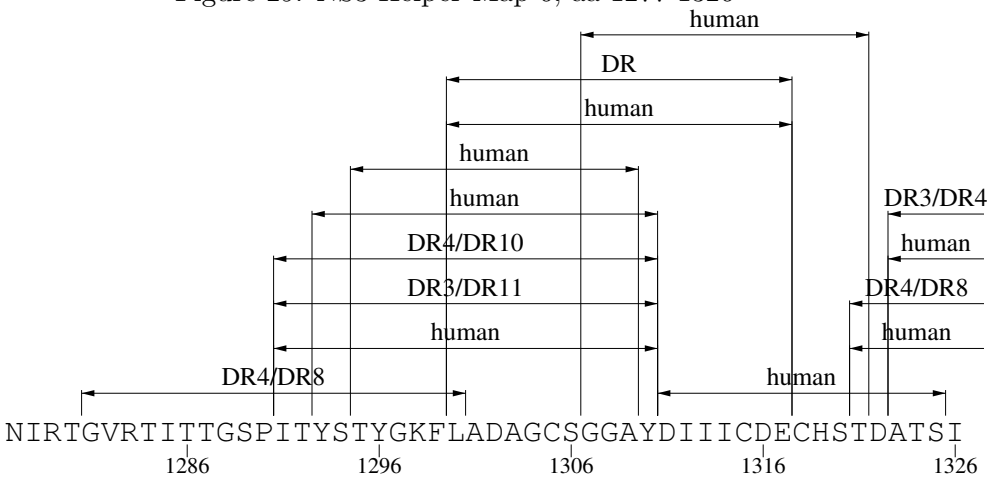


Figure 30: NS3 Helper Map 7, aa 1327-1376

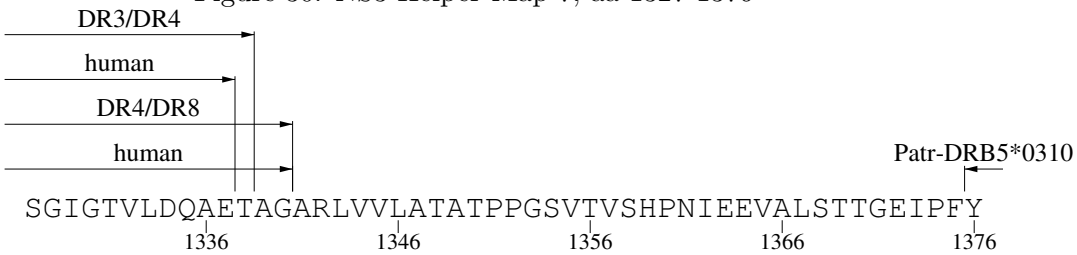


Figure 31: NS3 Helper Map 8, aa 1377-1426

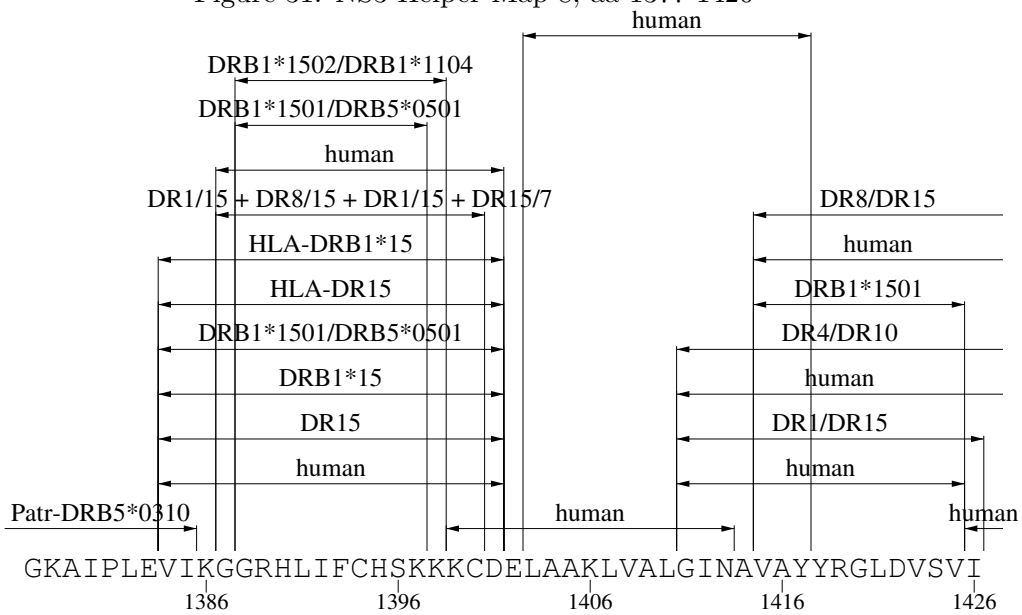


Figure 32: NS3 Helper Map 9, aa 1427-1476

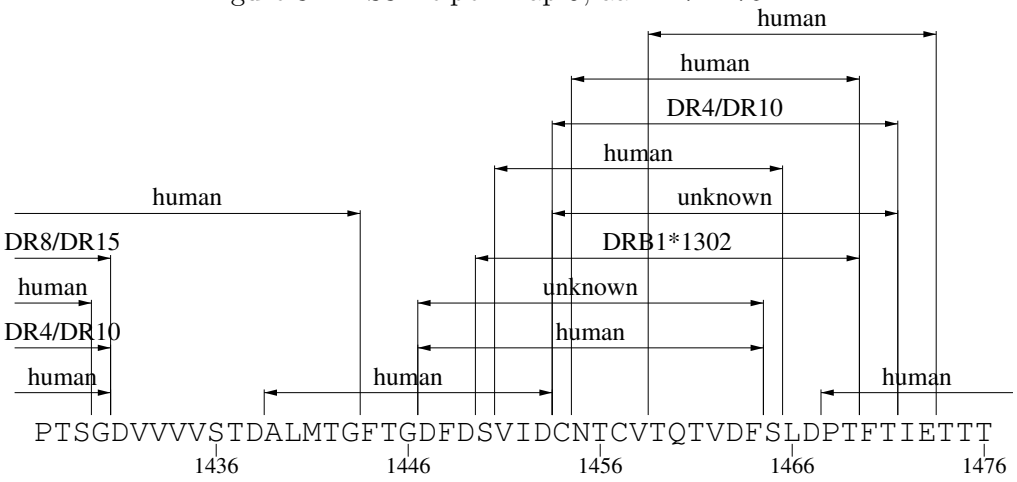


Figure 33: NS3 Helper Map 10, aa 1477-1526

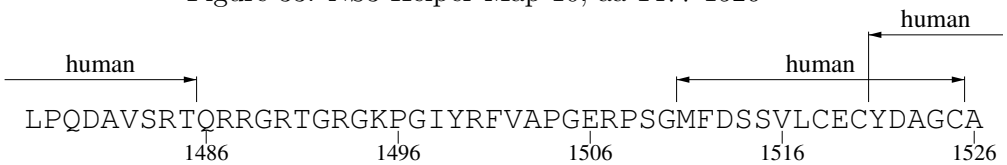


Figure 34: NS3 Helper Map 11, aa 1527-1576

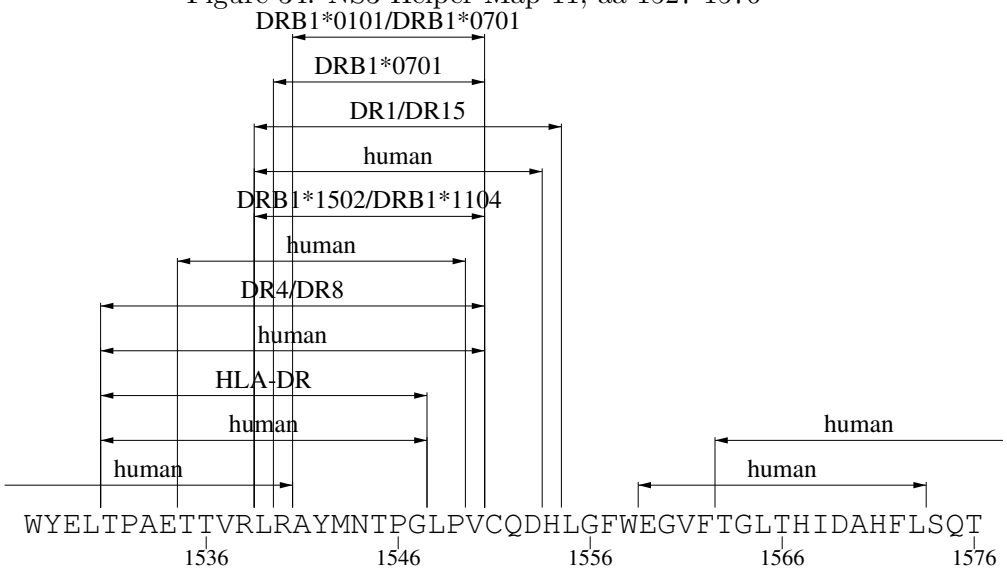


Figure 35: NS3 Helper Map 12, aa 1577-1626

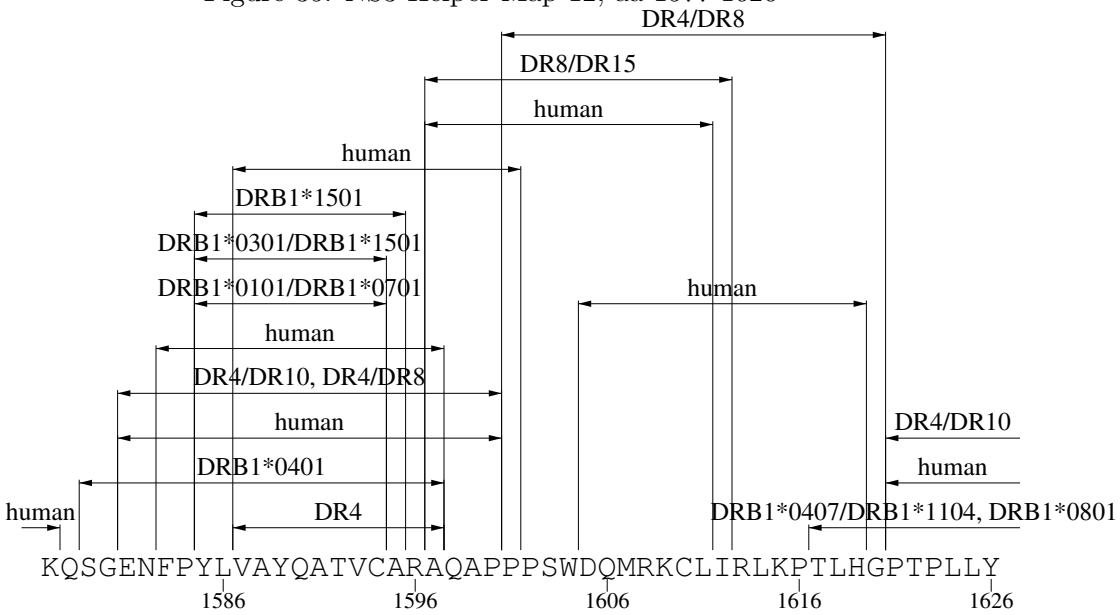
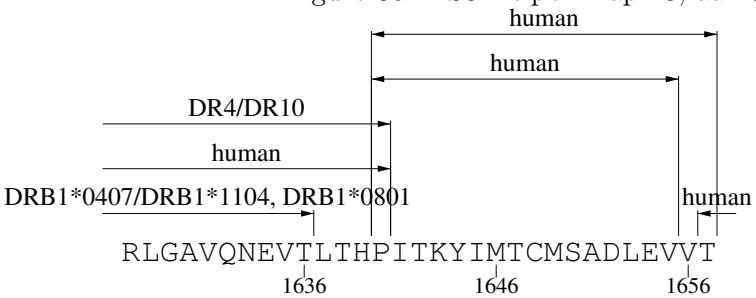


Figure 36: NS3 Helper Map 13, aa 1627-1657



7 NS4a Helper Epitope Map

Figure 37: NS4a Helper Map 1, aa 1658-1707

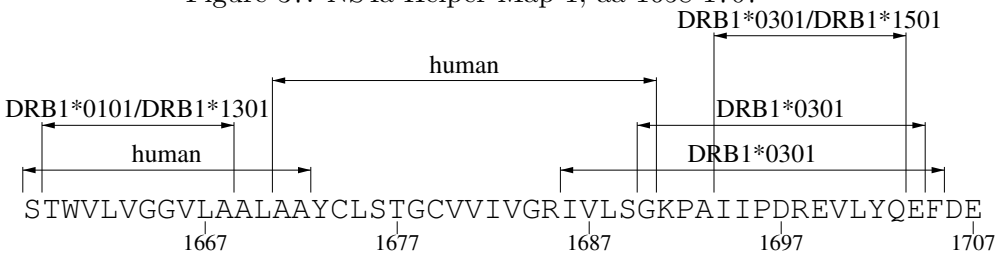


Figure 38: NS4a Helper Map 2, aa 1708-1711

8 NS4b Helper Epitope Map

Figure 39: NS4b Helper Map 1, aa 1712-1761

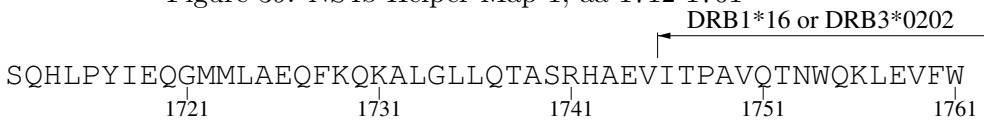


Figure 40: NS4b Helper Map 2, aa 1762-1811

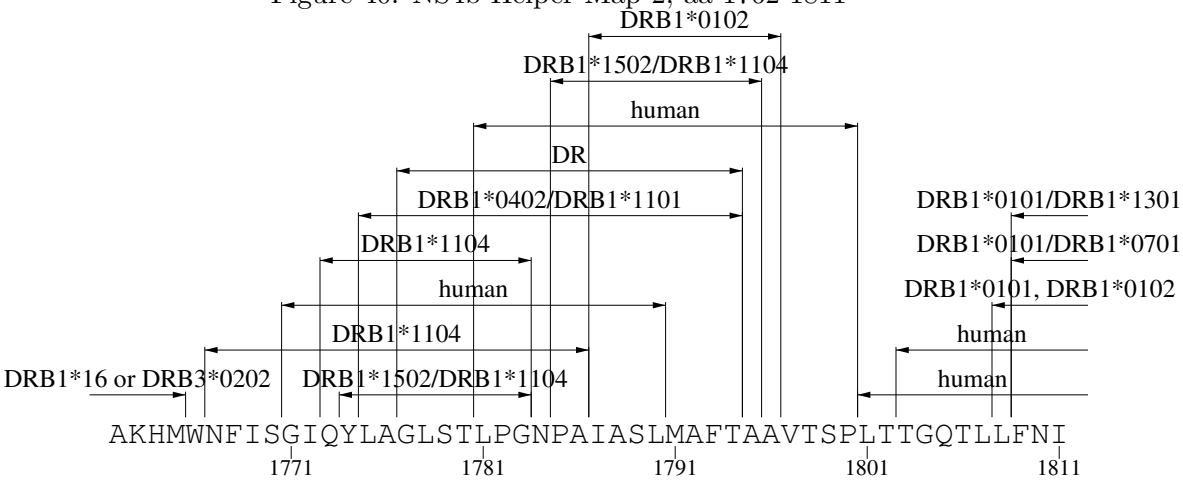


Figure 41: NS4b Helper Map 3, aa 1812-1861

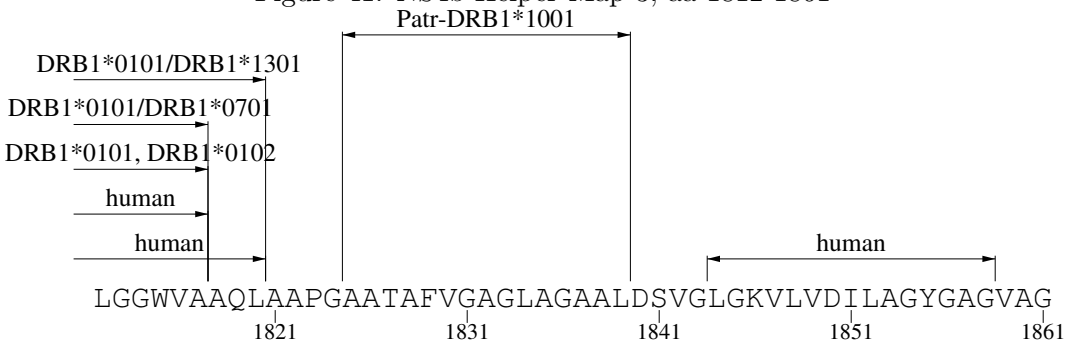


Figure 42: NS4b Helper Map 4, aa 1862-1911

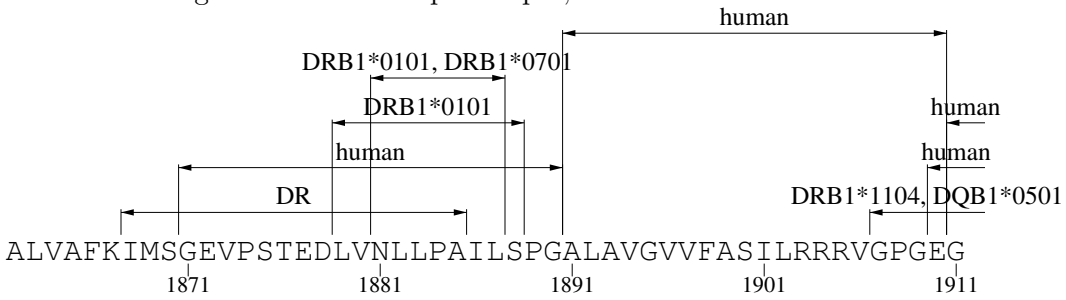


Figure 43: NS4b Helper Map 5, aa 1912-1961

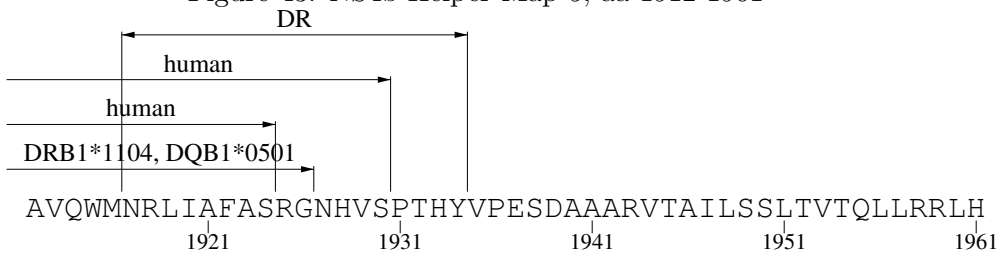


Figure 44: NS4b Helper Map 6, aa 1962-1972

9 NS5a Helper Epitope Map

Figure 45: NS5a Helper Map 1, aa 1973-2022

```
SGSWLRDIWDWICEVLSDFKTWLKAKLMPQLPGIPFVSCQRGYRGVWRGD
          1982      1992      2002      2012      2022
```

Figure 46: NS5a Helper Map 2, aa 2023-2072

```
GIMHTRCHCGAEITGHVKNGTMRIVGPRTCKNMWSGTFFINAYTTGPCTP
          2032      2042      2052      2062      2072
```

Figure 47: NS5a Helper Map 3, aa 2073-2122

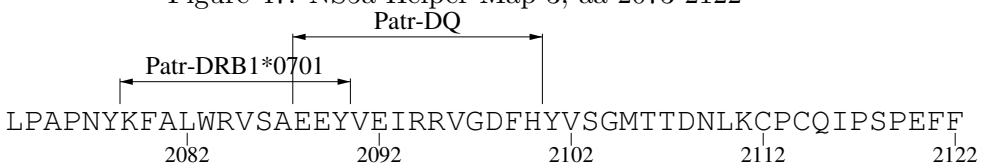


Figure 48: NS5a Helper Map 4, aa 2123-2172

```
TELDGVRLHRFAPPCKPLLREEVSFRVGLHEYPVGSQLPCEPEPDVAVLT
          2132      2142      2152      2162      2172
```

Figure 49: NS5a Helper Map 5, aa 2173-2222

```
                                        DR
SMLTDPSHITAEAAGRRLARGSPPSMASSSASQLSAPSLKATCTANHDSP
          2182      2192      2202      2212      2222
```

Figure 50: NS5a Helper Map 6, aa 2223-2272

```
                                                                  human
                                                                 DR11
                 human                                          DR11
DAELIEANLLWRQEMGGNITRVESENKVVILDSFDPLVAEEDEREVSVPA
          2232      2242      2252      2262      2272
```

Figure 51: NS5a Helper Map 7, aa 2273-2322

```
          human
        DR11
      DR11                                                Patr-DP
EILRKSRRFAPALPVWARPDYNPLLVETWKKPDYEPPVVHGCPLPPPRSP
          2282      2292      2302      2312      2322
```

Figure 52: NS5a Helper Map 8, aa 2323-2372

```
      Patr-DP
PVPPPRKKRTVVLTESTLPTALAELATKSFGSSSTSGITGDNTTTSSEPA
          2332      2342      2352      2362      2372
```

Figure 53: NS5a Helper Map 9, aa 2373-2420

```
PSGCPPDSDVESYSSMPPLEGEPGDPDLSDGSWSTVSSGADTEDVVCC
          2382      2392      2402      2412
```

10 NS5b Helper Epitope Map

Figure 54: NS5b Helper Map 1, aa 2421-2470

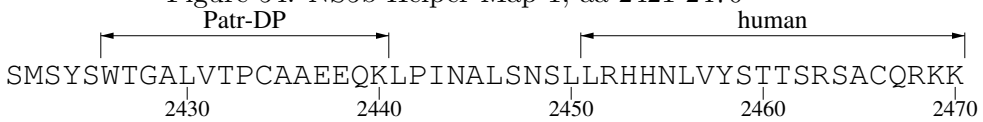


Figure 55: NS5b Helper Map 2, aa 2471-2520

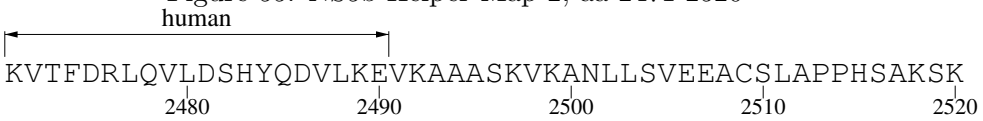


Figure 56: NS5b Helper Map 3, aa 2521-2570

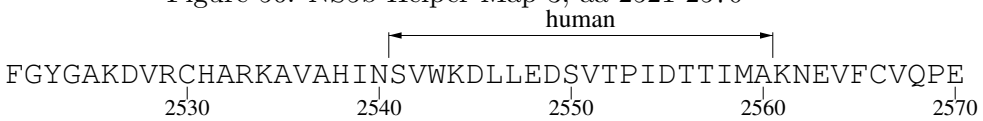


Figure 57: NS5b Helper Map 4, aa 2571-2620

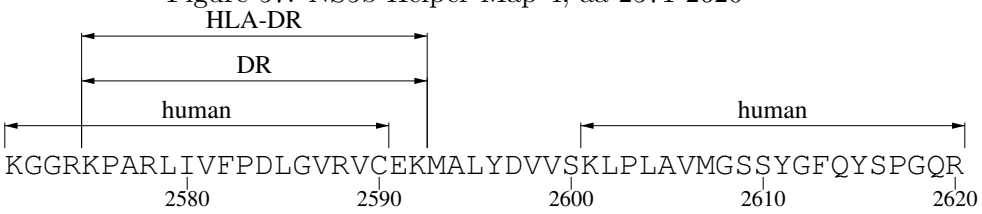


Figure 58: NS5b Helper Map 5, aa 2621-2670

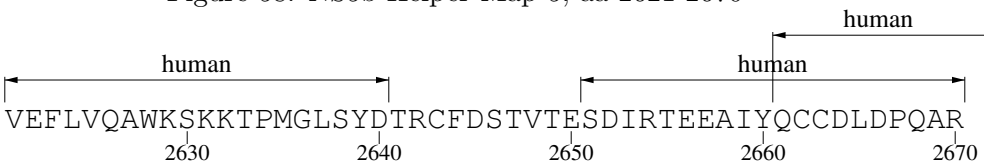


Figure 59: NS5b Helper Map 6, aa 2671-2720

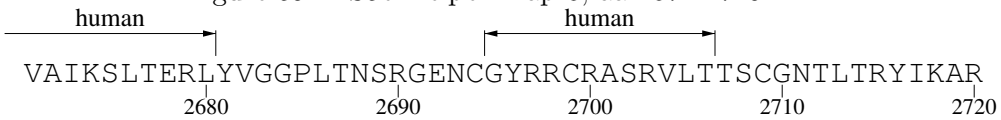


Figure 60: NS5b Helper Map 7, aa 2721-2770

Figure 61: NS5b Helper Map 8, aa 2771-2820

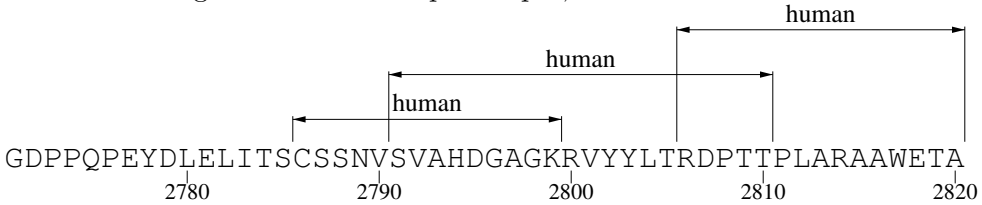


Figure 62: NS5b Helper Map 9, aa 2821-2870

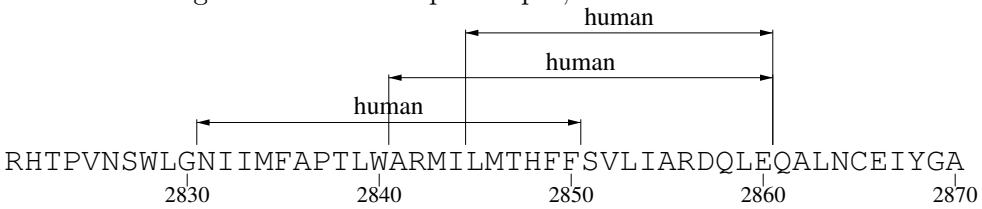


Figure 63: NS5b Helper Map 10, aa 2871-2920

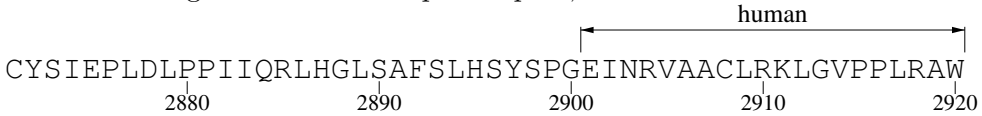


Figure 64: NS5b Helper Map 11, aa 2921-2970

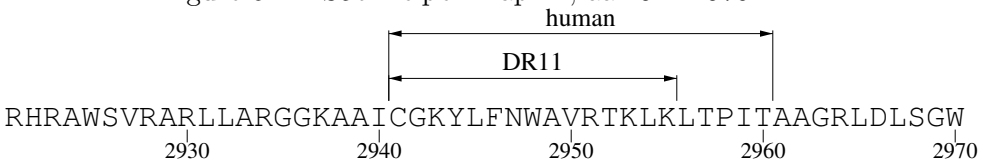
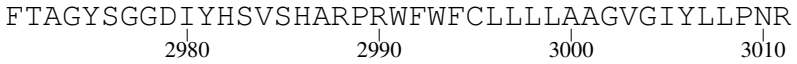



Figure 65: NS5b Helper Map 12, aa 2971-3011