

Class 11: Structural Bioinformatics pt.2

Carolina Merino (PID 14484883)

```
##AlphaFold DB
```

The EBI mantains the largest database of AlphaFold structure prediction models at :
<https://alphafold.ebi.ac.uk/>

From the last class (before Halloween) we saw that the PDB had 244,290 (Oct 2025)

The total number of proteins sequences in UnitProtKB is 199,579,901

Key Point: This is a tiny fraction of sequence space that has structural coverage (0.12%)

```
244290/199579901 * 100
```

```
[1] 0.1224021
```

AFDB is attempting to address this gap..

There are two “Quality Scores” from AlphaFold one for residues (i.e. each amino acid) called **pLDDT score**. The other **PAE** score that measures the confidence in the relative position of two residues (i.e. a score for every pair of residues).

```
##Generating your own structure predictions
```

The notebook generates the following output files: - **ranked_*.pdb** Predicted 3D structures - ***.json** pLDDT and PAE data - ***.a3m** Multiple Sequence Alignment used by AlphaFold - ***.csv** Summary metrics

Superposed:

```
knitr::include_graphics("Superimposed.png")
```



Superposed Monomer models

Now a model with Uncertainty Displayed

```
knitr::include_graphics("Red.png")
```



HIV-Pr monomers (red for high confidence)

and model 5

```
##Custom analysis of resulting models in R
```

Read key result files into R. The first thing I need to know is what my results directory/folder is called (i.e. its name is different for every AlphaFold run/job.)

```
results.dir <- "HIVPR_dimer_23119"  
# File names for all PDB models  
pdb_files <- list.files(path = results.dir,  
                         pattern = "*.pdb",  
                         full.names = TRUE)  
  
# Print out PDB file names  
basename(pdb_files)
```

```
[1] "HIVPR_dimer_23119_unrelaxed_rank_001_alphafold2_multimer_v3_model_4_seed_000.pdb"  
[2] "HIVPR_dimer_23119_unrelaxed_rank_002_alphafold2_multimer_v3_model_1_seed_000.pdb"  
[3] "HIVPR_dimer_23119_unrelaxed_rank_003_alphafold2_multimer_v3_model_5_seed_000.pdb"  
[4] "HIVPR_dimer_23119_unrelaxed_rank_004_alphafold2_multimer_v3_model_2_seed_000.pdb"  
[5] "HIVPR_dimer_23119_unrelaxed_rank_005_alphafold2_multimer_v3_model_3_seed_000.pdb"
```

```
library(bio3d)

# Read all data from Models
# and superpose/fit coords
pdbs <- pdbaln(pdb_files, fit=TRUE, exefile="msa")
```

Reading PDB files:

```
HIVPR_dimer_23119/HIVPR_dimer_23119_unrelaxed_rank_001_alphaFold2_multimer_v3_model_4_seed_00
HIVPR_dimer_23119/HIVPR_dimer_23119_unrelaxed_rank_002_alphaFold2_multimer_v3_model_1_seed_00
HIVPR_dimer_23119/HIVPR_dimer_23119_unrelaxed_rank_003_alphaFold2_multimer_v3_model_5_seed_00
HIVPR_dimer_23119/HIVPR_dimer_23119_unrelaxed_rank_004_alphaFold2_multimer_v3_model_2_seed_00
HIVPR_dimer_23119/HIVPR_dimer_23119_unrelaxed_rank_005_alphaFold2_multimer_v3_model_3_seed_00
....
```

Extracting sequences

```
pdb/seq: 1  name: HIVPR_dimer_23119/HIVPR_dimer_23119_unrelaxed_rank_001_alphaFold2_multimer_v3_model_4_seed_00
pdb/seq: 2  name: HIVPR_dimer_23119/HIVPR_dimer_23119_unrelaxed_rank_002_alphaFold2_multimer_v3_model_1_seed_00
pdb/seq: 3  name: HIVPR_dimer_23119/HIVPR_dimer_23119_unrelaxed_rank_003_alphaFold2_multimer_v3_model_5_seed_00
pdb/seq: 4  name: HIVPR_dimer_23119/HIVPR_dimer_23119_unrelaxed_rank_004_alphaFold2_multimer_v3_model_2_seed_00
pdb/seq: 5  name: HIVPR_dimer_23119/HIVPR_dimer_23119_unrelaxed_rank_005_alphaFold2_multimer_v3_model_3_seed_00
```

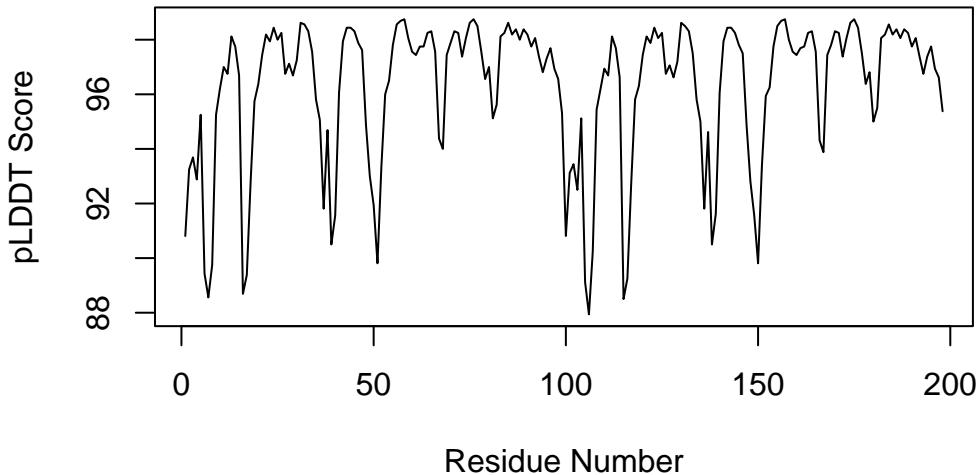
```
#Read one model to plot its per-residue confidence

m1 <- read.pdb(pdb_files[1])

#Plot B-factors (which store pLDDT scores)

plot(m1$atom$b[m1$calpha],
      type = "l",
      xlab = "Residue Number",
      ylab = "pLDDT Score",
      main = "Residue Confidence per Model")
```

Residue Confidence per Model



How similar predictive models are..

```
# --- Step 5: Calculate RMSD between all models ---
# RMSD = Root Mean Square Deviation; shows how similar the 3D structures are
rd <- rmsd(pdbs, fit = TRUE)
```

Warning in rmsd(pdbs, fit = TRUE): No indices provided, using the 198 non NA positions

```
# Range of RMSD values
range(rd)
```

[1] 0.000 14.754

Let's plot the heatmap of the RMSD values:

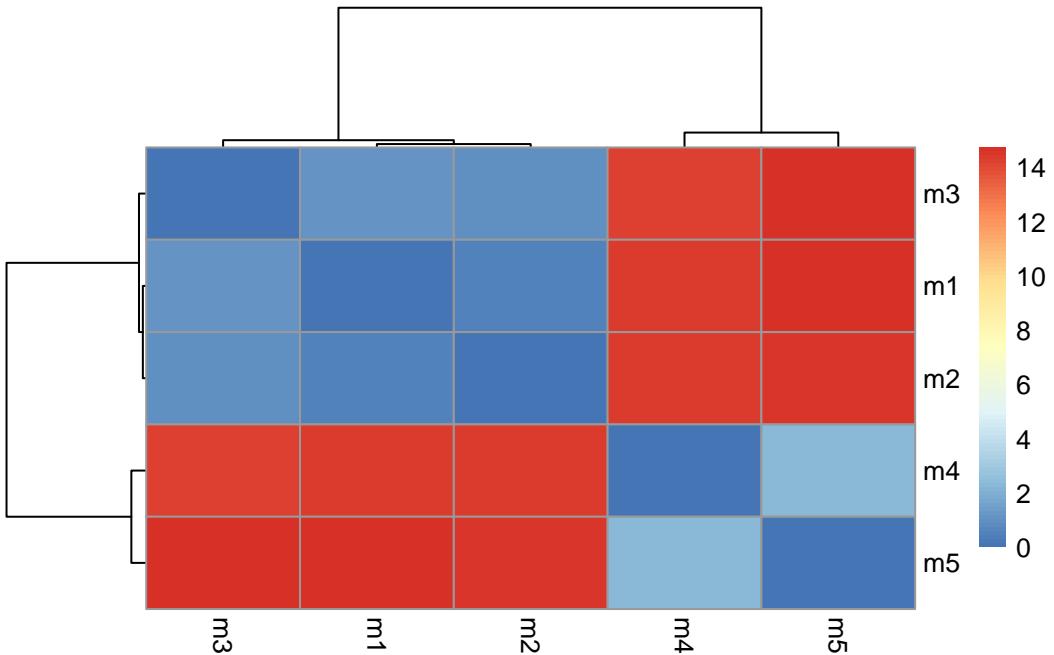
```
# --- Step 6: Draw heatmap of RMSD values ---
#install package first on console
#install.packages("pheatmap")

library(pheatmap)
```

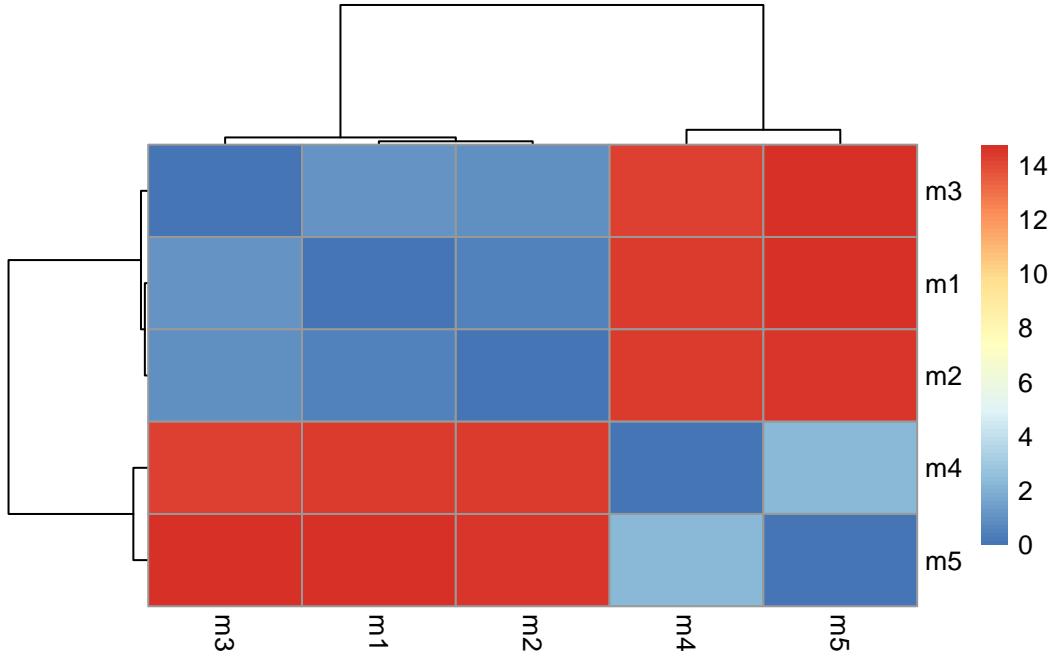
```
Warning: package 'pheatmap' was built under R version 4.5.2
```

```
# Label rows and columns by model number
colnames(rd) <- paste0("m", 1:5)
rownames(rd) <- paste0("m", 1:5)

# Plot the heatmap
pheatmap(rd)
```



```
colnames(rd) <- paste0("m",1:5)
rownames(rd) <- paste0("m",1:5)
pheatmap(rd)
```



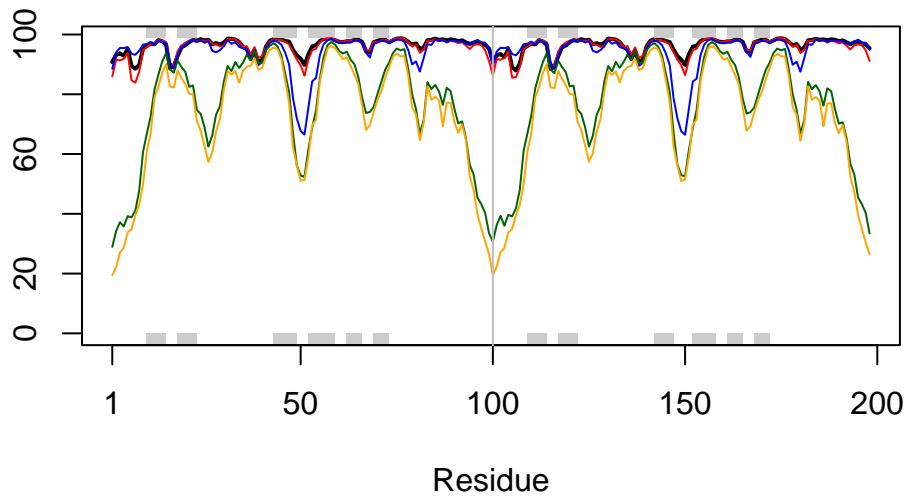
We can see that the RMSD heatmap shows that models 1 and 2 are most similar, models 4 and 5 are also close, and model 3 is intermediate between the two groups.

Now lets plot the pLDDT values across all models

```
# Read a reference PDB structure
pdb <- read.pdb("1hsg")
```

Note: Accessing on-line PDB file

```
plotb3(pdbs$b[1,], typ="l", lwd=2, sse=pdb)
points(pdbs$b[2,], typ="l", col="red")
points(pdbs$b[3,], typ="l", col="blue")
points(pdbs$b[4,], typ="l", col="darkgreen")
points(pdbs$b[5,], typ="l", col="orange")
abline(v=100, col="gray")
```



```
core <- core.find(pdbs)
```

```
core size 197 of 198  vol = 9836.196
core size 196 of 198  vol = 6800.793
core size 195 of 198  vol = 1322.091
core size 194 of 198  vol = 1032.249
core size 193 of 198  vol = 944.133
core size 192 of 198  vol = 894.048
core size 191 of 198  vol = 829.724
core size 190 of 198  vol = 766.628
core size 189 of 198  vol = 728.681
core size 188 of 198  vol = 693.317
core size 187 of 198  vol = 656.166
core size 186 of 198  vol = 622.063
core size 185 of 198  vol = 586.601
core size 184 of 198  vol = 565.358
core size 183 of 198  vol = 532.747
core size 182 of 198  vol = 511.421
core size 181 of 198  vol = 489.077
core size 180 of 198  vol = 468.599
core size 179 of 198  vol = 449.222
core size 178 of 198  vol = 433.122
```

```
core size 177 of 198 vol = 418.651
core size 176 of 198 vol = 405.069
core size 175 of 198 vol = 391.855
core size 174 of 198 vol = 381.006
core size 173 of 198 vol = 371.54
core size 172 of 198 vol = 355.539
core size 171 of 198 vol = 345.156
core size 170 of 198 vol = 335.982
core size 169 of 198 vol = 325.275
core size 168 of 198 vol = 313.603
core size 167 of 198 vol = 302.908
core size 166 of 198 vol = 293.343
core size 165 of 198 vol = 284.547
core size 164 of 198 vol = 277.932
core size 163 of 198 vol = 269.592
core size 162 of 198 vol = 258.167
core size 161 of 198 vol = 246.856
core size 160 of 198 vol = 239.073
core size 159 of 198 vol = 234.174
core size 158 of 198 vol = 226.309
core size 157 of 198 vol = 221.212
core size 156 of 198 vol = 214.951
core size 155 of 198 vol = 206.027
core size 154 of 198 vol = 197.301
core size 153 of 198 vol = 190.889
core size 152 of 198 vol = 185.403
core size 151 of 198 vol = 179.154
core size 150 of 198 vol = 174.709
core size 149 of 198 vol = 167.269
core size 148 of 198 vol = 160.866
core size 147 of 198 vol = 156.173
core size 146 of 198 vol = 148.395
core size 145 of 198 vol = 143.389
core size 144 of 198 vol = 138.428
core size 143 of 198 vol = 132.99
core size 142 of 198 vol = 126.924
core size 141 of 198 vol = 121.257
core size 140 of 198 vol = 116.407
core size 139 of 198 vol = 112.241
core size 138 of 198 vol = 107.813
core size 137 of 198 vol = 104.807
core size 136 of 198 vol = 100.968
core size 135 of 198 vol = 97.21
```

```
core size 134 of 198 vol = 92.54
core size 133 of 198 vol = 87.964
core size 132 of 198 vol = 85.621
core size 131 of 198 vol = 81.514
core size 130 of 198 vol = 77.627
core size 129 of 198 vol = 74.881
core size 128 of 198 vol = 72.642
core size 127 of 198 vol = 70.352
core size 126 of 198 vol = 68.627
core size 125 of 198 vol = 66.349
core size 124 of 198 vol = 64.019
core size 123 of 198 vol = 61.763
core size 122 of 198 vol = 58.758
core size 121 of 198 vol = 56.354
core size 120 of 198 vol = 54.129
core size 119 of 198 vol = 51.611
core size 118 of 198 vol = 49.502
core size 117 of 198 vol = 48.045
core size 116 of 198 vol = 46.489
core size 115 of 198 vol = 44.599
core size 114 of 198 vol = 43.185
core size 113 of 198 vol = 40.978
core size 112 of 198 vol = 39.029
core size 111 of 198 vol = 36.363
core size 110 of 198 vol = 33.953
core size 109 of 198 vol = 31.343
core size 108 of 198 vol = 29.304
core size 107 of 198 vol = 27.188
core size 106 of 198 vol = 25.655
core size 105 of 198 vol = 24.03
core size 104 of 198 vol = 22.504
core size 103 of 198 vol = 20.906
core size 102 of 198 vol = 19.803
core size 101 of 198 vol = 18.215
core size 100 of 198 vol = 15.652
core size 99 of 198 vol = 14.762
core size 98 of 198 vol = 11.574
core size 97 of 198 vol = 9.391
core size 96 of 198 vol = 7.327
core size 95 of 198 vol = 6.123
core size 94 of 198 vol = 5.592
core size 93 of 198 vol = 4.689
core size 92 of 198 vol = 3.66
```

```
core size 91 of 198  vol = 2.779
core size 90 of 198  vol = 2.147
core size 89 of 198  vol = 1.725
core size 88 of 198  vol = 1.158
core size 87 of 198  vol = 0.88
core size 86 of 198  vol = 0.682
core size 85 of 198  vol = 0.527
core size 84 of 198  vol = 0.37
FINISHED: Min vol ( 0.5 ) reached
```

```
core inds <- print(core, vol=0.5)
```

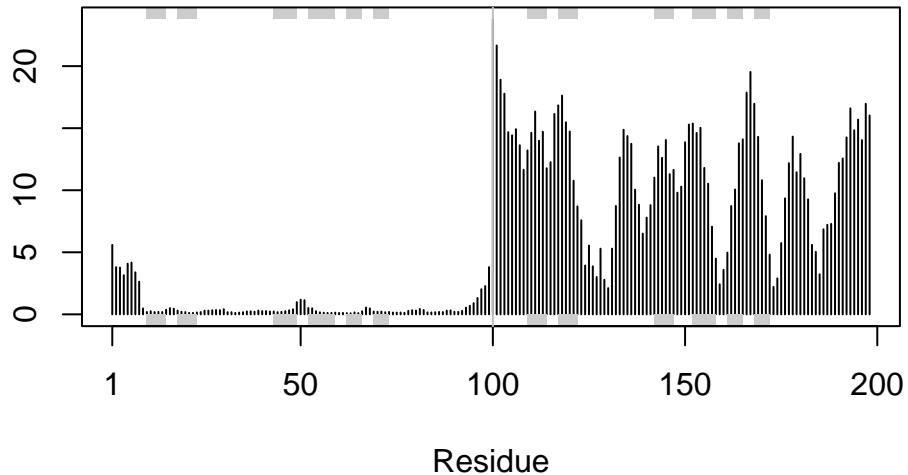
```
# 85 positions (cumulative volume <= 0.5 Angstrom^3)
  start end length
1      9   49     41
2     52   95     44
```

```
xyz <- pdbfit(pdbs, core inds, outpath="corefit_structures")
```

Now we can examine the RMSF between positions of the structure. RMSF is an often used measure of conformational variance along the structure:

```
rf <- rmsf(xyz)

plotb3(rf, sse=pdb)
abline(v=100, col="gray", ylab="RMSF")
```



The first chain appears largely consistent across all models, while the second chain shows much greater variability, as we observed earlier in Mol*.

##Predicted Alignment Error for domains

The Predicted Alignment Error (PAE) shows how confident AlphaFold is about the relative positions of residues or domains. Low PAE means high confidence, high PAE means uncertainty. It highlights which regions are well-defined versus flexible.

```
library(jsonlite)

# Listing of all PAE JSON files
# Step 1: Define your results folder
results_dir <- "C:/Users/Linda Kubera/Desktop/Bimm 143 Class/Class 11/HIVPR_dimer_23119"

# Step 2: Load jsonlite
library(jsonlite)

# Step 3: List all PAE JSON files
pae_files <- list.files(path = results_dir,
                        pattern = ".*model.*\\.json",
                        full.names = TRUE)
```

```
# Step 4: Check the files  
pae_files
```

```
[1] "C:/Users/Linda Kubera/Desktop/Bimm 143 Class/Class 11/HIVPR_dimer_23119/HIVPR_dimer_23119  
[2] "C:/Users/Linda Kubera/Desktop/Bimm 143 Class/Class 11/HIVPR_dimer_23119/HIVPR_dimer_23119  
[3] "C:/Users/Linda Kubera/Desktop/Bimm 143 Class/Class 11/HIVPR_dimer_23119/HIVPR_dimer_23119  
[4] "C:/Users/Linda Kubera/Desktop/Bimm 143 Class/Class 11/HIVPR_dimer_23119/HIVPR_dimer_23119  
[5] "C:/Users/Linda Kubera/Desktop/Bimm 143 Class/Class 11/HIVPR_dimer_23119/HIVPR_dimer_23119
```

PAE JSON FILE

```
# Read the first PAE JSON file  
pae_data <- fromJSON(pae_files[1])
```

```
# Check what's inside  
names(pae_data)
```

```
[1] "plddt"     "max_pae"   "pae"       "ptm"       "iptm"
```

```
library(jsonlite)  
library(pheatmap)
```

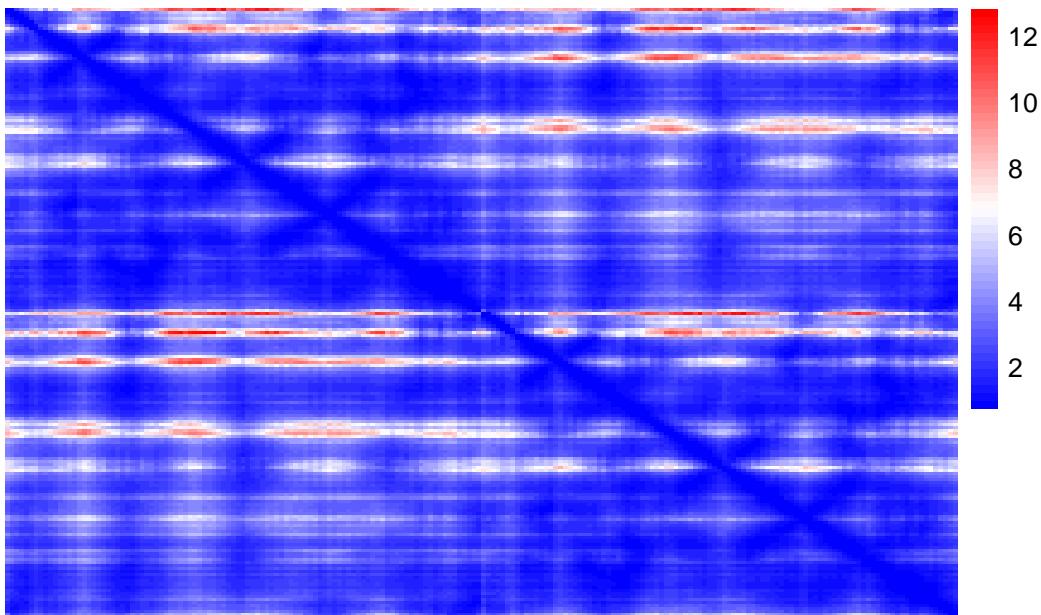
```
# Read the first PAE JSON file  
pae_data <- fromJSON(pae_files[1])
```

```
# Extract the PAE matrix  
pae_matrix <- pae_data$pae
```

```
# Optional: limit the max value for better visualization  
pae_matrix[pae_matrix > 30] <- 30
```

```
# Plot the heatmap  
pheatmap(pae_matrix,  
         cluster_rows = FALSE,  
         cluster_cols = FALSE,  
         color = colorRampPalette(c("blue", "white", "red"))(50),  
         main = "Predicted Alignment Error (PAE) Heatmap")
```

Predicted Alignment Error (PAE) Heatmap



The PAE heatmap shows the predicted alignment error between all residue pairs in the model. Blue regions indicate high confidence (low error), while red regions indicate low confidence (high error). This helps identify which parts of the protein structure are more reliably predicted.

```
##Residue conservation from alignment file
```

```
# Path to your MSA file (adjust name as needed)
msa_file <- list.files(path = results.dir, pattern = "*.a3m", full.names = TRUE)[1]

# Read the MSA
library(bio3d)
msa <- read.fasta(msa_file)
```

```
[1] " ** Duplicated sequence id's: 101 **"
[2] " ** Duplicated sequence id's: 101 **"
```

```
# Check the first few sequences
head(msa$ali)
```

```
101
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487
[,1] [,2]
"P"   "Q"
"P"   "Q"
```

```

UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "P" "Q"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "P" "Q"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "P" "Q"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "P" "Q"
[ ,3] [ ,4]
101 "I" "T"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "I" "T"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "I" "T"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "I" "T"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "I" "T"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "I" "T"
[ ,5] [ ,6]
101 "L" "W"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "L" "W"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "L" "W"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "L" "W"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "L" "W"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "L" "W"
[ ,7] [ ,8]
101 "Q" "R"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "Q" "R"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "Q" "R"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "Q" "R"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "Q" "R"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "Q" "R"
[ ,9] [ ,10]
101 "P" "L"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "P" "L"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "P" "M"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "P" "L"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "P" "L"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "P" "L"
[ ,11]
101 "V"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "V"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "V"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "V"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "V"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "V"
[ ,12]
101 "T"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "T"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "T"

```

```

UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "T"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "T"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "T"
[,13]
101 "I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "V"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "V"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "V"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "V"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "V"
[,14]
101 "K"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "K"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "K"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "K"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "K"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "K"
[,15]
101 "I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "V"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "I"
[,16]
101 "G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "G"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "G"
[,17]
101 "G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "G"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "G"
[,18]
101 "Q"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "Q"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "Q"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "Q"

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UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"Q"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"Q"
	[,19]
101	"L"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"P"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"L"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"P"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"L"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"L"
	[,20]
101	"K"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"I"
	[,21]
101	"E"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"E"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"E"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"E"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"E"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"E"
	[,22]
101	"A"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"A"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"A"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"A"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"A"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"A"
	[,23]
101	"L"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"L"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"L"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"L"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"L"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"L"
	[,24]
101	"L"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"L"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"L"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"L"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"L"

UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"L"
	[,25]
101	"D"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"D"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"D"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"D"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"D"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"D"
	[,26]
101	"T"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"T"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"T"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"T"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"T"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"T"
	[,27]
101	"G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"G"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"G"
	[,28]
101	"A"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"A"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"A"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"A"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"A"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"A"
	[,29]
101	"D"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"D"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"D"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"D"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"D"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"D"
	[,30]
101	"D"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"N"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"D"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"D"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"N"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"N"

[, 31]
101 "T"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "T"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "T"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "T"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "T"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "T"
[, 32]
101 "V"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "V"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "V"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "V"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "V"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "V"
[, 33]
101 "L"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "L"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "L"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "I"
[, 34]
101 "E"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "E"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "E"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "E"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "E"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "E"
[, 35]
101 "E"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "N"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "Q"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "E"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "E"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "E"
[, 36]
101 "M"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "I"
[, 37]

101 "S"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "D"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "N"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "D"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "K"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "N"
[,38]
101 "L"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "L"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "L"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "L"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "L"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "L"
[,39]
101 "P"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "P"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "P"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "P"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "P"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "P"
[,40]
101 "G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "G"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "G"
[,41]
101 "R"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "K"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "K"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "K"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "R"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "R"
[,42]
101 "W"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "W"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "W"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "W"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "W"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "W"
[,43]
101 "K"

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UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "R"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "K"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "K"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "K"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "K"
                                                               [,44]
101
"P"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "P"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "P"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "P"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "P"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "P"
                                                               [,45]
101
"K"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "Q"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "K"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "K"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "K"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "K"
                                                               [,46]
101
"M"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "M"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "M"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "M"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "L"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "L"
                                                               [,47]
101
"I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "I"
                                                               [,48]
101
"G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "G"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "G"
                                                               [,49]
101
"G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "G"

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UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "G"
[,50]
101 "I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "I"
[,51]
101 "G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "G"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "G"
[,52]
101 "G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "G"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "G"
[,53]
101 "F"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "F"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "F"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "F"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "F"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "F"
[,54]
101 "I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "V"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "V"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "I"
[,55]
101 "K"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "K"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "K"

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UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "K"
 UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "K"
 UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "K"
 [,56]
 101 "V"
 UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "V"
 UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "V"
 UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "V"
 UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "V"
 UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "V"
 [,57]
 101 "R"
 UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "R"
 UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "R"
 UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "R"
 UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "R"
 UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "R"
 [,58]
 101 "Q"
 UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "Q"
 UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "Q"
 UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "Q"
 UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "Q"
 UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "Q"
 [,59]
 101 "Y"
 UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "Y"
 UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "Y"
 UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "Y"
 UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "Y"
 UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "Y"
 [,60]
 101 "D"
 UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "D"
 UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "D"
 UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "D"
 UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "D"
 UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "D"
 [,61]
 101 "Q"
 UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "Q"
 UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "Q"
 UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "Q"

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UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340      "Q"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342      "Q"
[,62]
101
"I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487    "I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340      "I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342      "I"
[,63]
101
"L"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487    "L"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "L"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "P"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340      "P"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342      "P"
[,64]
101
"I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487    "I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340      "I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342      "I"
[,65]
101
"E"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487    "E"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "E"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "E"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340      "E"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342      "E"
[,66]
101
"I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487    "I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340      "I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342      "I"
[,67]
101
"C"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487    "C"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "E"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "C"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340      "S"

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UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"S"	
	[,68]	
101	"G"	
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"G"	
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"G"	
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"G"	
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"G"	
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"G"	
	[,69]	
101	"H"	
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"K"	
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"Q"	
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"K"	
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"K"	
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"K"	
	[,70]	
101	"K"	
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"K"	
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"K"	
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"R"	
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"K"	
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"K"	
	[,71]	
101	"A"	
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"A"	
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"A"	
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"A"	
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"V"	
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"V"	
	[,72]	
101	"I"	
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"I"	
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"I"	
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"I"	
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"I"	
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"I"	
	[,73]	
101	"G"	
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"G"	
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"G"	
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"G"	
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"G"	
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"G"	

[,74]
101 "T"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "S"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "T"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "T"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "T"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "T"
[,75]
101 "V"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "V"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "V"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "V"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "V"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "V"
[,76]
101 "L"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "L"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "L"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "L"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "L"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "L"
[,77]
101 "V"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "V"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "V"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "V"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "V"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "V"
[,78]
101 "G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "G"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "G"
[,79]
101 "P"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "P"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "P"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "P"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "P"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "P"
[,80]

101 "T"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "T"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "T"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "T"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "T"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "T"
[,81]
101 "P"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "P"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "P"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "P"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "P"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "P"
[,82]
101 "V"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "V"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "V"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "V"
[,83]
101 "N"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "N"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "N"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "N"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "N"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "N"
[,84]
101 "I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "I"
[,85]
101 "I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "I"
[,86]
101 "G"

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UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "G"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "G"
                                                               [,87]
101
"R"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "R"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "R"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "R"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "R"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "R"
                                                               [,88]
101
"N"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "D"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "N"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "N"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "D"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "D"
                                                               [,89]
101
"L"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "V"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "M"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "M"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "V"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "V"
                                                               [,90]
101
"L"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "L"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "L"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "L"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "M"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "M"
                                                               [,91]
101
"T"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "T"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "T"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "T"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "T"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "T"
                                                               [,92]
101
"Q"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "Q"

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UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "Q"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "Q"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "Q"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "Q"
[,93]
101 "I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "I"
[,94]
101 "G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "G"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "G"
[,95]
101 "C"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "C"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "C"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "C"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "C"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "C"
[,96]
101 "T"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "T"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "T"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "T"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "T"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "T"
[,97]
101 "L"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "L"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "L"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "L"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "L"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "L"
[,98]
101 "N"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "N"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "N"

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UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "N"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "N"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "N"
[ , 99]
101 "F"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "F"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "F"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "F"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "F"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "F"
[ , 100]
101 "F"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "F"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "F"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "F"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "F"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "F"
[ , 101]
101 "F"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "F"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "F"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "F"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "F"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "F"
[ , 102]
101 "F"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "F"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "F"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "F"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "F"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "F"
[ , 103]
101 "F"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "F"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "F"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "F"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "F"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "F"
[ , 104]
101 "F"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "F"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "F"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "F"

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UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"-"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"-"
	[,105]
101	"-"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"-"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"-"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"-"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"-"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"-"
	[,106]
101	"-"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"-"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"-"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"-"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"-"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"-"
	[,107]
101	"-"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"-"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"-"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"-"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"-"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"-"
	[,108]
101	"-"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"-"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"-"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"-"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"-"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"-"
	[,109]
101	"-"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"-"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"-"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"-"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"-"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"-"
	[,110]
101	"-"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"-"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"-"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"-"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"-"

```

UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342      " - "
[ , 111]
101
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      " - "
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155      " - "
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156      " - "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340      " - "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342      " - "
[ , 112]
101
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UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155      " - "
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156      " - "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340      " - "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342      " - "
[ , 113]
101
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      " - "
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155      " - "
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156      " - "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340      " - "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342      " - "
[ , 114]
101
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      " - "
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155      " - "
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156      " - "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340      " - "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342      " - "
[ , 115]
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UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      " - "
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155      " - "
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156      " - "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340      " - "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342      " - "
[ , 116]
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UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155      " - "
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156      " - "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340      " - "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342      " - "

```

[,117]
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UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 " "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 " "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 " "
[,118]
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UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 " "
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 " "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 " "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 " "
[,119]
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UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 " "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 " "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 " "
[,120]
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UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 " "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 " "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 " "
[,121]
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UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 " "
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 " "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 " "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 " "
[,122]
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UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 " "
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 " "
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 " "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 " "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 " "
[,123]

101 " - "
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 " - "
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 " - "
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 " - "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 " - "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 " - "
[, 124]
101 " - "
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 " - "
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 " - "
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 " - "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 " - "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 " - "
[, 125]
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UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 " - "
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 " - "
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 " - "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 " - "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 " - "
[, 126]
101 " - "
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 " - "
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 " - "
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 " - "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 " - "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 " - "
[, 127]
101 " - "
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UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 " - "
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 " - "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 " - "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 " - "
[, 128]
101 " - "
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 " - "
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 " - "
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 " - "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 " - "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 " - "
[, 129]
101 " - "

```

UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "-"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "-"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "-"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "-"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "-"
                                                               [,130]
101
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "-"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "-"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "-"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "-"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "-"
                                                               [,131]
101
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "-"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "-"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "-"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "-"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "-"
                                                               [,132]
101
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "-"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "-"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "-"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "-"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "

```

Calculate residue conservation

```
cons <- conserv(msa$ali)
```

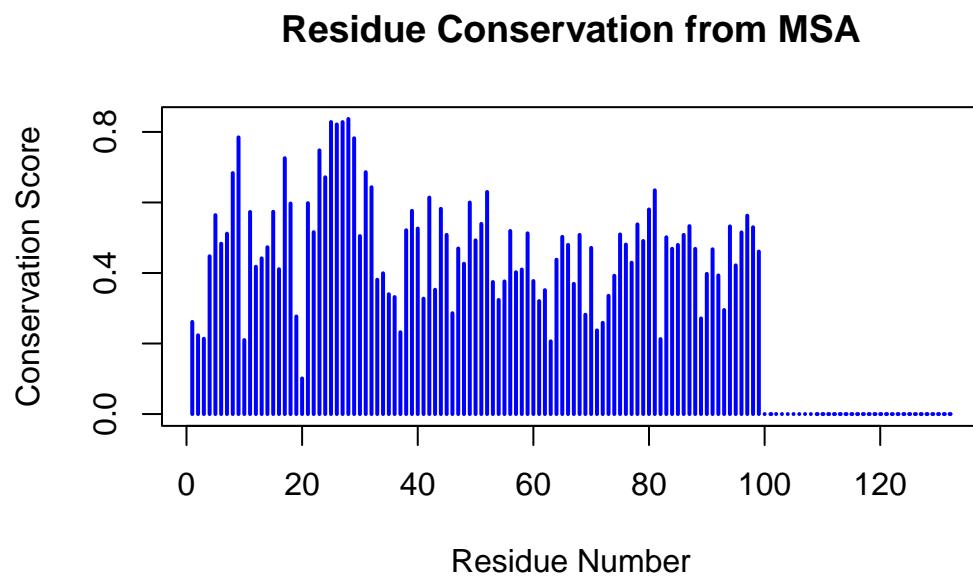
```

Warning in conserv(msa$ali): non standard residue code: a mapped to X
non standard residue code: c mapped to X
non standard residue code: d mapped to X
non standard residue code: e mapped to X
non standard residue code: f mapped to X
non standard residue code: g mapped to X
non standard residue code: h mapped to X
non standard residue code: i mapped to X
non standard residue code: k mapped to X
non standard residue code: l mapped to X
non standard residue code: m mapped to X

```

```
non standard residue code: n mapped to X
non standard residue code: p mapped to X
non standard residue code: q mapped to X
non standard residue code: r mapped to X
non standard residue code: s mapped to X
non standard residue code: t mapped to X
non standard residue code: v mapped to X
non standard residue code: w mapped to X
non standard residue code: x mapped to X
non standard residue code: y mapped to X
```

```
# Plot conservation
plot(cons, type = "h", lwd=2, col="blue",
      xlab="Residue Number", ylab="Conservation Score",
      main="Residue Conservation from MSA")
```



Highly conserved residues (tall peaks) likely indicate structurally or functionally important positions, such as active sites or dimer interfaces. Variable residues (short peaks) may correspond to flexible loops or regions not critical for function.

```
# Read one reference PDB
ref_pdb <- read.pdb(pdb_files[1])

# Extract C-alpha indices
ca_inds <- atom.select(ref_pdb, "calpha")

# Assign conservation scores to B-factor of C atoms
ref_pdb$atom$b[ca_inds$atom] <- cons
```

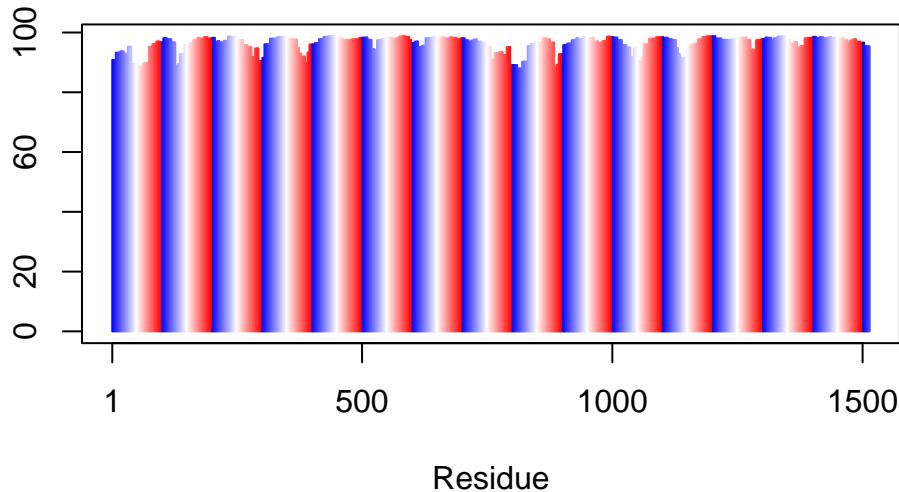
Warning in ref_pdb\$atom\$b[ca_inds\$atom] <- cons: number of items to replace is not a multiple of replacement length

```
# Plot the conservation on structure
plotb3(ref_pdb$atom$b, sse=ref_pdb,
       main="Residue Conservation Mapped on Structure",
       col=colorRampPalette(c("blue","white","red"))(100))
```

Warning in pdb2sse(sse): No helix and sheet defined in input 'sse' PDB object: try using dssp()

Warning in plotb3(ref_pdb\$atom\$b, sse = ref_pdb, main = "Residue Conservation Mapped on Structure", : Length of input 'sse' does not equal the length of input 'x'; Ignoring 'sse'

Residue Conservation Mapped on Structure



Residue conservation was calculated from the multiple sequence alignment and mapped onto the 3D structure. Higher conservation scores (red) indicate residues that are more evolutionarily conserved, while lower scores (blue) indicate variable positions. This helps identify functionally important or structurally critical regions in the protein

```
library(bio3d)

# Get full path to the .a3m file
aln_file <- list.files(path = results_dir, pattern = "\\.a3m$", full.names = TRUE)

# Read the alignment
aln <- read.fasta(aln_file[1], to.upper = TRUE)

[1] " ** Duplicated sequence id's: 101 **"
[2] " ** Duplicated sequence id's: 101 **"

# Quick checks
head(aln$ali) # shows first few sequences
```

[,1]	[,2]
"P"	"Q"
"P"	"Q"

```

UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "P" "Q"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "P" "Q"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "P" "Q"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "P" "Q"
[ ,3] [ ,4]
101 "I" "T"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "I" "T"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "I" "T"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "I" "T"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "I" "T"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "I" "T"
[ ,5] [ ,6]
101 "L" "W"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "L" "W"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "L" "W"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "L" "W"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "L" "W"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "L" "W"
[ ,7] [ ,8]
101 "Q" "R"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "Q" "R"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "Q" "R"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "Q" "R"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "Q" "R"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "Q" "R"
[ ,9] [ ,10]
101 "P" "L"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "P" "L"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "P" "M"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "P" "L"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "P" "L"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "P" "L"
[ ,11]
101 "V"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "V"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "V"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "V"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "V"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "V"
[ ,12]
101 "T"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "T"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "T"

```

```

UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "T"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "T"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "T"
[,13]
101 "I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "V"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "V"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "V"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "V"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "V"
[,14]
101 "K"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "K"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "K"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "K"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "K"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "K"
[,15]
101 "I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "V"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "I"
[,16]
101 "G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "G"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "G"
[,17]
101 "G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "G"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "G"
[,18]
101 "Q"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "Q"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "Q"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "Q"

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UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"Q"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"Q"
	[,19]
101	"L"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"P"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"L"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"P"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"L"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"L"
	[,20]
101	"K"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"I"
	[,21]
101	"E"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"E"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"E"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"E"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"E"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"E"
	[,22]
101	"A"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"A"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"A"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"A"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"A"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"A"
	[,23]
101	"L"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"L"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"L"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"L"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"L"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"L"
	[,24]
101	"L"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"L"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"L"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"L"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"L"

UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"L"
	[,25]
101	"D"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"D"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"D"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"D"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"D"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"D"
	[,26]
101	"T"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"T"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"T"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"T"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"T"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"T"
	[,27]
101	"G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"G"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"G"
	[,28]
101	"A"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"A"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"A"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"A"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"A"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"A"
	[,29]
101	"D"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"D"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"D"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"D"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"D"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"D"
	[,30]
101	"D"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"N"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"D"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"D"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"N"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"N"

[, 31]
101 "T"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "T"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "T"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "T"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "T"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "T"
[, 32]
101 "V"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "V"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "V"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "V"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "V"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "V"
[, 33]
101 "L"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "L"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "L"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "I"
[, 34]
101 "E"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "E"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "E"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "E"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "E"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "E"
[, 35]
101 "E"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "N"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "Q"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "E"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "E"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "E"
[, 36]
101 "M"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "I"
[, 37]

101 "S"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "D"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "N"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "D"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "K"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "N"
[,38]
101 "L"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "L"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "L"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "L"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "L"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "L"
[,39]
101 "P"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "P"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "P"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "P"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "P"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "P"
[,40]
101 "G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "G"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "G"
[,41]
101 "R"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "K"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "K"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "K"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "R"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "R"
[,42]
101 "W"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "W"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "W"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "W"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "W"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "W"
[,43]
101 "K"

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UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "R"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "K"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "K"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "K"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "K"
                                                               [,44]
101
"P"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "P"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "P"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "P"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "P"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "P"
                                                               [,45]
101
"K"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "Q"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "K"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "K"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "K"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "K"
                                                               [,46]
101
"M"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "M"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "M"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "M"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "L"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "L"
                                                               [,47]
101
"I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "I"
                                                               [,48]
101
"G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "G"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "G"
                                                               [,49]
101
"G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "G"

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UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "G"
[,50]
101 "I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "I"
[,51]
101 "G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "G"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "G"
[,52]
101 "G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "G"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "G"
[,53]
101 "F"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "F"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "F"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "F"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "F"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "F"
[,54]
101 "I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "V"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "V"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "I"
[,55]
101 "K"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "K"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "K"

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UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "K"
 UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "K"
 UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "K"
 [,56]
 101 "V"
 UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "V"
 UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "V"
 UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "V"
 UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "V"
 UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "V"
 [,57]
 101 "R"
 UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "R"
 UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "R"
 UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "R"
 UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "R"
 UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "R"
 [,58]
 101 "Q"
 UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "Q"
 UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "Q"
 UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "Q"
 UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "Q"
 UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "Q"
 [,59]
 101 "Y"
 UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "Y"
 UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "Y"
 UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "Y"
 UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "Y"
 UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "Y"
 [,60]
 101 "D"
 UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "D"
 UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "D"
 UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "D"
 UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "D"
 UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "D"
 [,61]
 101 "Q"
 UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "Q"
 UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "Q"
 UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "Q"

UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"Q"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"Q"
	[,62]
101	"I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"I"
	[,63]
101	"L"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"L"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"L"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"P"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"P"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"P"
	[,64]
101	"I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"I"
	[,65]
101	"E"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"E"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"E"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"E"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"E"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"E"
	[,66]
101	"I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"I"
	[,67]
101	"C"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"C"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"E"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"C"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"S"

UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"S"
	[,68]
101	"G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"G"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"G"
	[,69]
101	"H"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"K"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"Q"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"K"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"K"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"K"
	[,70]
101	"K"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"K"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"K"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"R"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"K"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"K"
	[,71]
101	"A"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"A"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"A"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"A"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"V"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"V"
	[,72]
101	"I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"I"
	[,73]
101	"G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487	"G"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155	"G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156	"G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340	"G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342	"G"

[,74]
101 "T"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "S"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "T"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "T"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "T"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "T"
[,75]
101 "V"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "V"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "V"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "V"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "V"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "V"
[,76]
101 "L"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "L"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "L"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "L"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "L"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "L"
[,77]
101 "V"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "V"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "V"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "V"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "V"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "V"
[,78]
101 "G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "G"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "G"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "G"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "G"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "G"
[,79]
101 "P"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "P"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "P"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "P"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "P"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "P"
[,80]

101 "T"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "T"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "T"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "T"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "T"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "T"
[,81]
101 "P"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "P"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "P"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "P"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "P"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "P"
[,82]
101 "V"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "V"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "V"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "V"
[,83]
101 "N"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "N"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "N"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "N"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "N"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "N"
[,84]
101 "I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "I"
[,85]
101 "I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "I"
[,86]
101 "G"

UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "G"
 UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "G"
 UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "G"
 UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "G"
 UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "G"
 [, 87]
 101
 "R"
 UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "R"
 UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "R"
 UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "R"
 UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "R"
 UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "R"
 [, 88]
 101
 "N"
 UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "D"
 UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "N"
 UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "N"
 UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "D"
 UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "D"
 [, 89]
 101
 "L"
 UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "V"
 UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "M"
 UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "M"
 UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "V"
 UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "V"
 [, 90]
 101
 "L"
 UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "L"
 UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "L"
 UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "L"
 UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "M"
 UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "M"
 [, 91]
 101
 "T"
 UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "T"
 UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "T"
 UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "T"
 UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "T"
 UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "T"
 [, 92]
 101
 "Q"
 UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "Q"

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UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "Q"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "Q"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "Q"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "Q"
[,93]
101 "I"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "I"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 "I"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 "I"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 "I"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 "I"
[,94]
101 "G"
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 "G"
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UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 " - "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 " - "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 " - "
[, 125]
101 " - "
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 " - "
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 " - "
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 " - "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 " - "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 " - "
[, 126]
101 " - "
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 " - "
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 " - "
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 " - "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 " - "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 " - "
[, 127]
101 " - "
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 " - "
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 " - "
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 " - "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 " - "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 " - "
[, 128]
101 " - "
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487 " - "
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155 " - "
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156 " - "
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340 " - "
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342 " - "
[, 129]
101 " - "

```

UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "-"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "-"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "-"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "-"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "-"
                                         [,130]
101
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "-"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "-"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "-"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "-"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "-"
                                         [,131]
101
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "-"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "-"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "-"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "-"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "-"
                                         [,132]
101
UniRef100_D6Q0C6\t123\t0.828\t1.033E-29\t0\t98\t99\t53\t151\t487      "-"
UniRef100_A0A8F3BXJ0\t120\t0.878\t1.299E-28\t0\t98\t99\t56\t154\t155  "-"
UniRef100_A0A8F2YYV3\t120\t0.898\t1.783E-28\t0\t98\t99\t57\t155\t156  "-"
UniRef100_Q7SMM2\t120\t0.848\t1.783E-28\t0\t98\t99\t0\t98\t340        "-"
UniRef100_Q7SMM3\t120\t0.858\t1.783E-28\t0\t98\t99\t0\t98\t342        "

```

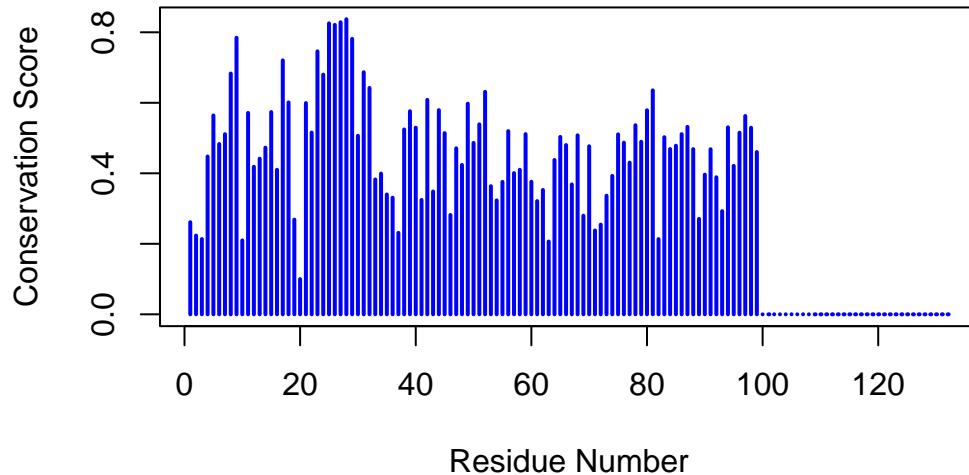
```
dim(aln$ali)    # shows # sequences x # positions
```

```
[1] 5397 132
```

```
# Calculate residue conservation
cons <- conserv(aln$ali)

# Quick plot of conservation
plot(cons, type = "h", lwd=2, col="blue",
      xlab="Residue Number", ylab="Conservation Score",
      main="Residue Conservation from MSA")
```

Residue Conservation from MSA



Consensus sequence calculation with cutoff 0.9

```
# Calculate consensus sequence with 90% cutoff
con <- consensus(aln, cutoff = 0.9)

# View the consensus sequence
con$seq
```

```
library(bio3d)

# Read your alignment file if you haven't already
aln_file <- list.files(path = results_dir, pattern = "\\.a3m$", full.names = TRUE)
aln <- read.fasta(aln_file[1], to.upper = TRUE)
```

```

[1] " ** Duplicated sequence id's: 101 **"
[2] " ** Duplicated sequence id's: 101 **"

# Generate consensus sequence
con <- consensus(aln, cutoff = 0.9)
con$seq # shows positions that are highly conserved

[1] "-"
[19] "-"
[37] "-"
[55] "-"
[73] "-"
[91] "-"
[109] "-"
[127] "-"


```

Map conservation into PBD structure

```

# Convert consensus sequence to numeric: 1 = conserved, 0 = not conserved
cons_numeric <- ifelse(con$seq == "-", 0, 1)

# Assign to chain A
ca_inds <- atom.select(ref_pdb, "calpha", chain="A")
ref_pdb$atom$b[ca_inds$atom] <- cons_numeric[1:length(ca_inds$atom)]

# Repeat for chain B if needed
ca_inds_B <- atom.select(ref_pdb, "calpha", chain="B")
ref_pdb$atom$b[ca_inds_B$atom] <- cons_numeric[1:length(ca_inds_B$atom)]

# Write PDB
write.pdb(ref_pdb, file="m1_conserv_numeric.pdb")

```

```
knitr::include_graphics("M1.png")
```

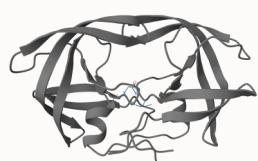


Figure 20: Top-ranked dimer model colored by sequence conservation, highlighting the DTGA motif.

##Limitations: While AlphaFold provides highly informative predictions, some regions of the dimer, particularly the second chain, remain less reliable due to lower confidence scores and higher predicted alignment errors. These areas should be interpreted cautiously, and experimental validation would be required for definitive structural conclusions.

Summary

Our analysis of the HIV-1 protease dimer models from AlphaFold2 shows that models 1 and 2 are highly similar, while models 3–5 display more variability, consistent with their higher RMSD and PAE scores. The pLDDT plots indicate that most of the first chain is confidently predicted, whereas the second chain shows more flexible regions. RMSF analysis further highlights that these flexible regions correspond to areas of structural variability. Residue conservation mapping reveals the central DTGA active site motif as highly conserved, emphasizing its functional importance for substrate binding and inhibitor interactions.