



# wwPDB EM Validation Summary Report ⓘ

Mar 28, 2026 – 02:30 PM UTC

PDB ID : 4V91 / pdb\_00004v91  
EMDB ID : EMD-2599  
Title : Kluyveromyces lactis 80S ribosome in complex with CrPV-IRES  
Authors : Fernandez, I.S.; Bai, X.; Scheres, S.H.W.; Ramakrishnan, V.  
Deposited on : 2014-03-21  
Resolution : 3.70 Å(reported)  
Based on initial model : 3B31

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>  
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

EMDB validation analysis : 0.0.1.dev132  
MolProbity : 4-5-2 with Phenix2.0  
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)  
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.49

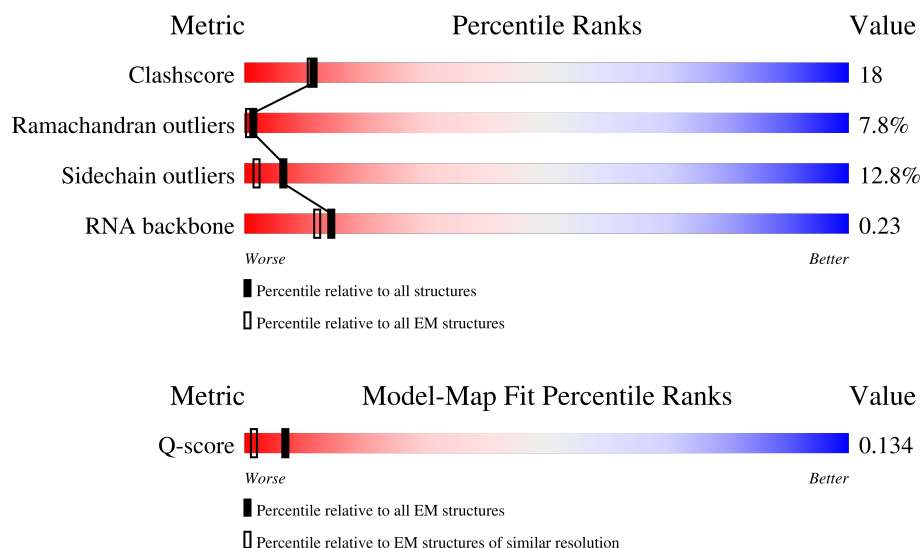
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.70 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



| Metric                | Whole archive<br>(#Entries) | EM structures<br>(#Entries) | Similar EM resolution<br>(#Entries, resolution range(Å)) |
|-----------------------|-----------------------------|-----------------------------|----------------------------------------------------------|
| Clashscore            | 229148                      | 23984                       | -                                                        |
| Ramachandran outliers | 224038                      | 23583                       | -                                                        |
| Sidechain outliers    | 223484                      | 23102                       | -                                                        |
| RNA backbone          | 8273                        | 3508                        | -                                                        |
| Q-score               | -                           | 25397                       | 11569 ( 3.20 - 4.20 )                                    |

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion  $< 40\%$ ). The numeric value is given above the bar.

| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 1   | 1     | 3397   |                  |
| 2   | 3     | 121    |                  |
| 3   | 4     | 158    |                  |

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| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 4   | A     | 254    |                  |
| 5   | B     | 387    |                  |
| 6   | C     | 362    |                  |
| 7   | D     | 297    |                  |
| 8   | E     | 176    |                  |
| 9   | F     | 244    |                  |
| 10  | G     | 256    |                  |
| 11  | H     | 191    |                  |
| 12  | I     | 221    |                  |
| 13  | J     | 174    |                  |
| 14  | L     | 199    |                  |
| 15  | M     | 138    |                  |
| 16  | N     | 204    |                  |
| 17  | O     | 398    |                  |
| 18  | P     | 184    |                  |
| 19  | Q     | 186    |                  |
| 20  | R     | 189    |                  |
| 21  | S     | 172    |                  |
| 22  | T     | 160    |                  |
| 23  | U     | 121    |                  |
| 24  | V     | 137    |                  |
| 25  | W     | 155    |                  |
| 26  | X     | 142    |                  |
| 27  | Y     | 127    |                  |
| 28  | Z     | 136    |                  |

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| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 29  | a     | 149    |                  |
| 30  | b     | 59     |                  |
| 31  | c     | 105    |                  |
| 32  | d     | 113    |                  |
| 33  | e     | 130    |                  |
| 34  | f     | 107    |                  |
| 35  | g     | 121    |                  |
| 36  | h     | 120    |                  |
| 37  | i     | 100    |                  |
| 38  | j     | 88     |                  |
| 39  | k     | 78     |                  |
| 40  | l     | 51     |                  |
| 41  | m     | 128    |                  |
| 42  | n     | 25     |                  |
| 43  | o     | 106    |                  |
| 44  | p     | 92     |                  |
| 45  | t     | 217    |                  |

## 2 Entry composition

There are 45 unique types of molecules in this entry. The entry contains 125665 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a RNA chain called 25S RRNA.

| Mol | Chain | Residues | Atoms |       |       |       |      | AltConf | Trace |
|-----|-------|----------|-------|-------|-------|-------|------|---------|-------|
| 1   | 1     | 3203     | Total | C     | N     | O     | P    | 0       | 0     |
|     |       |          | 68514 | 30602 | 12358 | 22351 | 3203 |         |       |

- Molecule 2 is a RNA chain called 5S RRNA.

| Mol | Chain | Residues | Atoms |      |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|-----|---------|-------|
| 2   | 3     | 121      | Total | C    | N   | O   | P   | 0       | 0     |
|     |       |          | 2579  | 1152 | 461 | 845 | 121 |         |       |

- Molecule 3 is a RNA chain called 5.8S RRNA.

| Mol | Chain | Residues | Atoms |      |     |      |     | AltConf | Trace |
|-----|-------|----------|-------|------|-----|------|-----|---------|-------|
| 3   | 4     | 158      | Total | C    | N   | O    | P   | 0       | 0     |
|     |       |          | 3353  | 1500 | 586 | 1109 | 158 |         |       |

- Molecule 4 is a protein called UL2.

| Mol | Chain | Residues | Atoms |      |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|-------|
| 4   | A     | 252      | Total | C    | N   | O   | S | 0       | 0     |
|     |       |          | 1914  | 1191 | 388 | 334 | 1 |         |       |

- Molecule 5 is a protein called UL3.

| Mol | Chain | Residues | Atoms |      |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|-------|
| 5   | B     | 386      | Total | C    | N   | O   | S | 0       | 0     |
|     |       |          | 3075  | 1950 | 584 | 533 | 8 |         |       |

- Molecule 6 is a protein called UL4.

| Mol | Chain | Residues | Atoms |      |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|-------|
| 6   | C     | 361      | Total | C    | N   | O   | S | 0       | 0     |
|     |       |          | 2748  | 1729 | 522 | 494 | 3 |         |       |

- Molecule 7 is a protein called UL18.

| Mol | Chain | Residues | Atoms |      |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|-------|
| 7   | D     | 296      | Total | C    | N   | O   | S | 0       | 0     |
|     |       |          | 2375  | 1501 | 414 | 458 | 2 |         |       |

- Molecule 8 is a protein called EL6.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 8   | E     | 156      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1239  | 800 | 222 | 216 | 1 |         |       |

- Molecule 9 is a protein called UL30.

| Mol | Chain | Residues | Atoms |      |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|-------|
| 9   | F     | 222      | Total | C    | N   | O   | S | 0       | 0     |
|     |       |          | 1784  | 1151 | 324 | 308 | 1 |         |       |

- Molecule 10 is a protein called EL8.

| Mol | Chain | Residues | Atoms |      |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|-------|
| 10  | G     | 233      | Total | C    | N   | O   | S | 0       | 0     |
|     |       |          | 1804  | 1151 | 323 | 327 | 3 |         |       |

- Molecule 11 is a protein called UL6.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 11  | H     | 191      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1518  | 963 | 274 | 277 | 4 |         |       |

- Molecule 12 is a protein called UL16.

| Mol | Chain | Residues | Atoms |      |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|-------|
| 12  | I     | 211      | Total | C    | N   | O   | S | 0       | 0     |
|     |       |          | 1705  | 1083 | 322 | 294 | 6 |         |       |

- Molecule 13 is a protein called UL5.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 13  | J     | 169      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1353  | 847 | 253 | 249 | 4 |         |       |

- Molecule 14 is a protein called EL13.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 14  | L     | 193      | Total | C   | N   | O   | 0       | 0     |
|     |       |          | 1543  | 962 | 315 | 266 |         |       |

- Molecule 15 is a protein called EL14.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 15  | M     | 136      | Total | C   | N   | O   | S       | 0     |
|     |       |          | 1053  | 675 | 199 | 177 | 2       | 0     |

- Molecule 16 is a protein called EL15.

| Mol | Chain | Residues | Atoms |      |     |     | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---------|-------|
| 16  | N     | 203      | Total | C    | N   | O   | S       | 0     |
|     |       |          | 1720  | 1077 | 361 | 281 | 1       | 0     |

- Molecule 17 is a protein called UL13.

| Mol | Chain | Residues | Atoms |      |     |     | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---------|-------|
| 17  | O     | 197      | Total | C    | N   | O   | S       | 0     |
|     |       |          | 1555  | 1003 | 289 | 262 | 1       | 0     |

- Molecule 18 is a protein called UL22.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 18  | P     | 183      | Total | C   | N   | O   |         | 0     |
|     |       |          | 1420  | 882 | 281 | 257 |         | 0     |

- Molecule 19 is a protein called EL18.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 19  | Q     | 185      | Total | C   | N   | O   | S       | 0     |
|     |       |          | 1441  | 908 | 290 | 241 | 2       | 0     |

- Molecule 20 is a protein called EL19.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 20  | R     | 188      | Total | C   | N   | O   |         | 0     |
|     |       |          | 1521  | 935 | 326 | 260 |         | 0     |

- Molecule 21 is a protein called EL20.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 21  | S     | 172      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1445  | 930 | 267 | 244 | 4 |         |       |

- Molecule 22 is a protein called EL21.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 22  | T     | 159      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1276  | 805 | 246 | 221 | 4 |         |       |

- Molecule 23 is a protein called EL22.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 23  | U     | 100      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 796   | 516 | 131 | 149 |   |         |       |

- Molecule 24 is a protein called UL14.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 24  | V     | 136      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1003  | 628 | 189 | 179 | 7 |         |       |

- Molecule 25 is a protein called EL24.

| Mol | Chain | Residues | Atoms |     |    |    |   | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---|---------|-------|
| 25  | W     | 60       | Total | C   | N  | O  | S | 0       | 0     |
|     |       |          | 500   | 322 | 98 | 79 | 1 |         |       |

- Molecule 26 is a protein called UL23.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 26  | X     | 121      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 964   | 620 | 169 | 173 | 2 |         |       |

- Molecule 27 is a protein called UL24.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 27  | Y     | 126      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 993   | 625 | 192 | 176 |   |         |       |

- Molecule 28 is a protein called EL27.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 28  | Z     | 135      | Total | C   | N   | O   | 0       | 0     |
|     |       |          | 1092  | 710 | 202 | 180 |         |       |

- Molecule 29 is a protein called UL15.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 29  | a     | 148      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1173  | 749 | 231 | 190 | 3 |         |       |

- Molecule 30 is a protein called EL29.

| Mol | Chain | Residues | Atoms |     |     |    | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|----|---------|-------|
| 30  | b     | 58       | Total | C   | N   | O  | 0       | 0     |
|     |       |          | 462   | 289 | 100 | 73 |         |       |

- Molecule 31 is a protein called EL30.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 31  | c     | 97       | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 743   | 479 | 124 | 139 | 1 |         |       |

- Molecule 32 is a protein called EL31.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 32  | d     | 109      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 876   | 556 | 167 | 152 | 1 |         |       |

- Molecule 33 is a protein called EL32.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 33  | e     | 127      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1020  | 647 | 205 | 167 | 1 |         |       |

- Molecule 34 is a protein called EL33.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 34  | f     | 106      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 850   | 540 | 165 | 144 | 1 |         |       |

- Molecule 35 is a protein called EL34.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 35  | g     | 112      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 880   | 545 | 179 | 152 | 4 |         |       |

- Molecule 36 is a protein called UL29.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 36  | h     | 119      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 969   | 615 | 186 | 167 | 1 |         |       |

- Molecule 37 is a protein called EL36.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 37  | i     | 99       | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 771   | 481 | 156 | 132 | 2 |         |       |

- Molecule 38 is a protein called EL37.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 38  | j     | 87       | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 681   | 414 | 148 | 114 | 5 |         |       |

- Molecule 39 is a protein called EL38.

| Mol | Chain | Residues | Atoms |     |     |     | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|
| 39  | k     | 77       | Total | C   | N   | O   | 0       | 0     |
|     |       |          | 612   | 391 | 115 | 106 |         |       |

- Molecule 40 is a protein called EL39.

| Mol | Chain | Residues | Atoms |     |    |    |   | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---|---------|-------|
| 40  | l     | 50       | Total | C   | N  | O  | S | 0       | 0     |
|     |       |          | 436   | 272 | 97 | 65 | 2 |         |       |

- Molecule 41 is a protein called EL40.

| Mol | Chain | Residues | Atoms |     |    |    |   | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---|---------|-------|
| 41  | m     | 52       | Total | C   | N  | O  | S | 0       | 0     |
|     |       |          | 417   | 259 | 86 | 67 | 5 |         |       |

- Molecule 42 is a protein called EL41.

| Mol | Chain | Residues | Atoms |     |    |    |   | AltConf | Trace |
|-----|-------|----------|-------|-----|----|----|---|---------|-------|
| 42  | n     | 25       | Total | C   | N  | O  | S | 0       | 0     |
|     |       |          | 233   | 142 | 63 | 27 | 1 |         |       |

- Molecule 43 is a protein called EL42.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 43  | o     | 105      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 847   | 534 | 170 | 138 | 5 |         |       |

- Molecule 44 is a protein called EL43.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 44  | p     | 91       | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 694   | 429 | 138 | 121 | 6 |         |       |

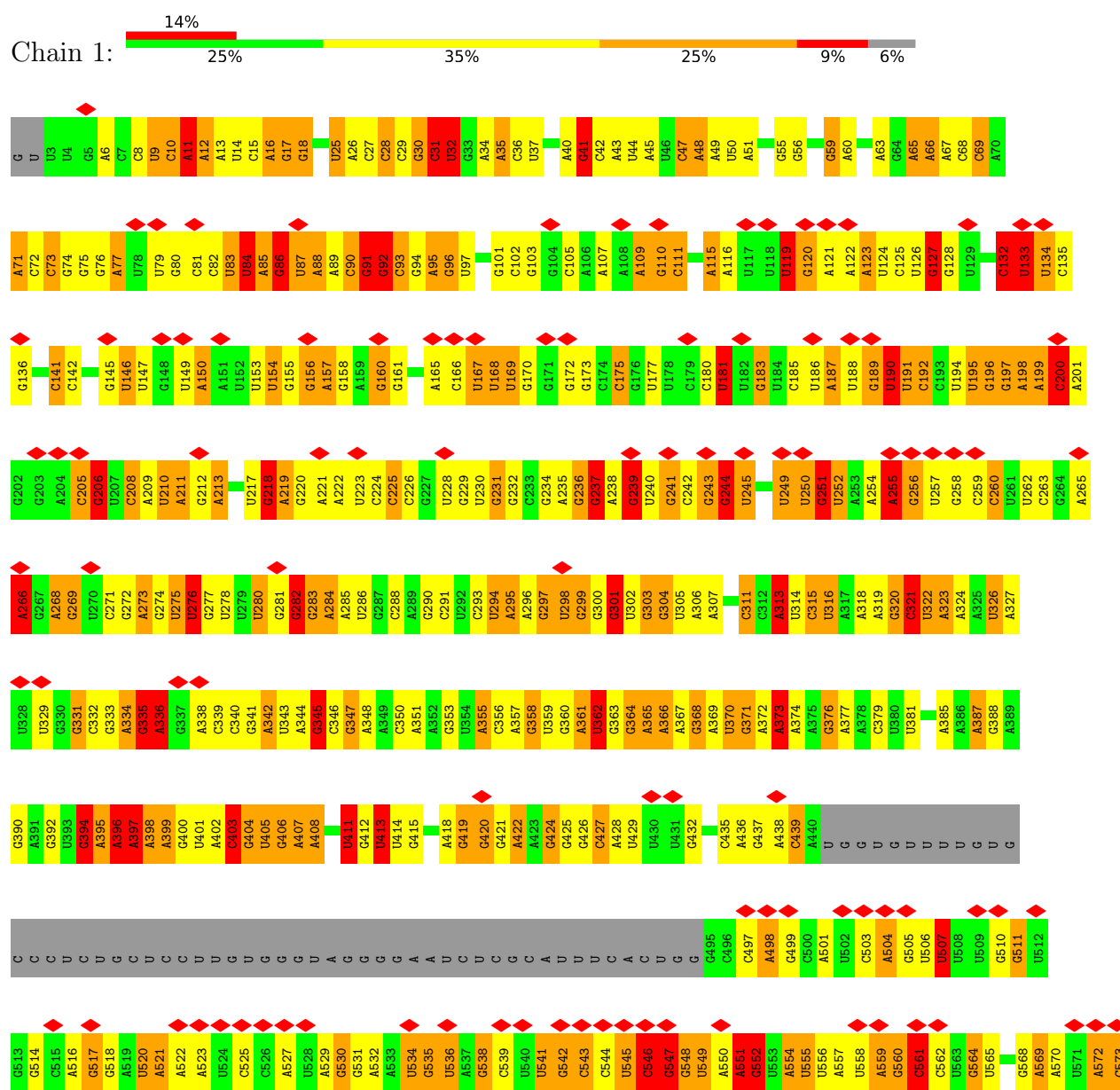
- Molecule 45 is a protein called UL1.

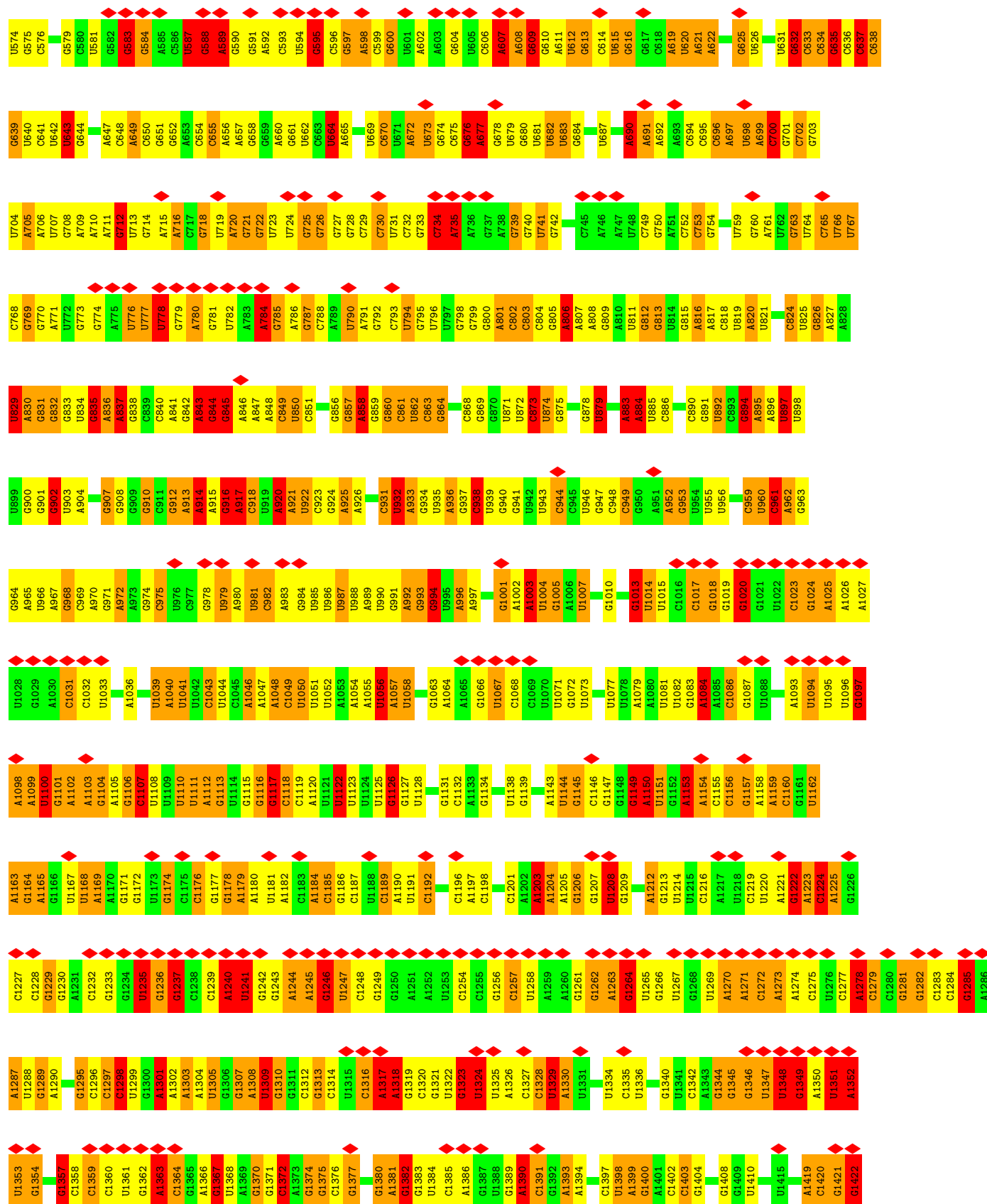
| Mol | Chain | Residues | Atoms |      |     |     |    | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|----|---------|-------|
| 45  | t     | 217      | Total | C    | N   | O   | S  | 0       | 0     |
|     |       |          | 1718  | 1097 | 299 | 312 | 10 |         |       |

### 3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

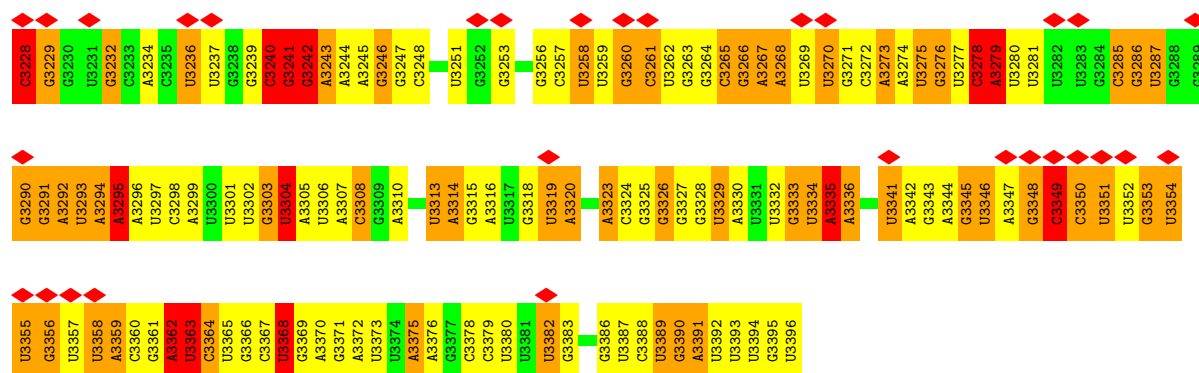
#### • Molecule 1: 25S rRNA



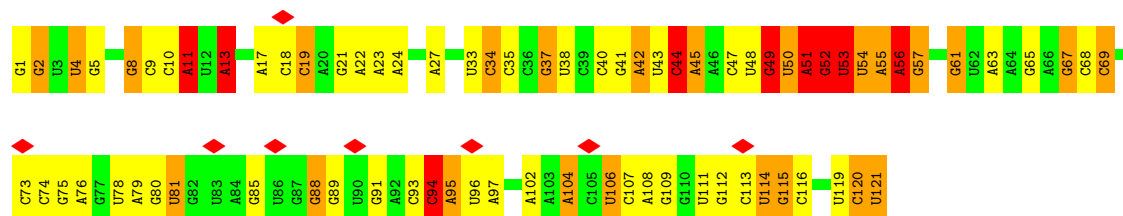




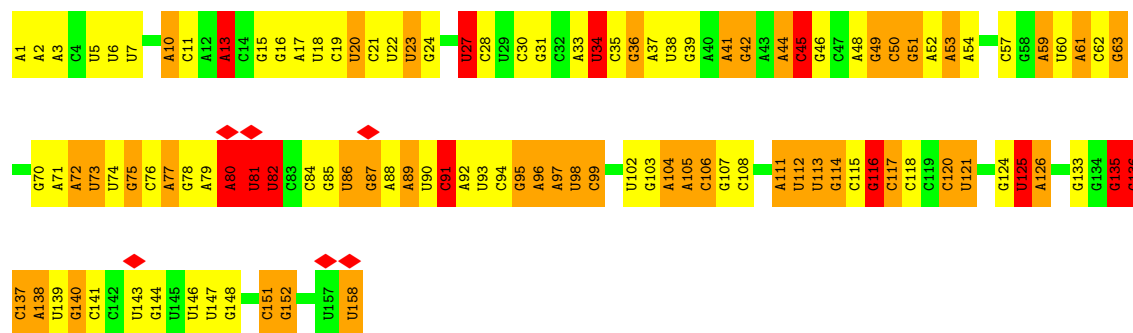
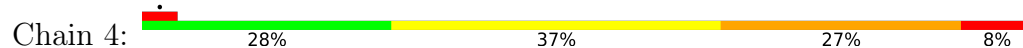
|       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
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| G3101 | U3104 | U3105 | A3106 | U3107 | G3108 | G3109 | C3110 | A3114 | C3115 | G3116 | C3117 | C3118 | U3119 | C3120 | A3121 | A3122 | A3123 | A3127 | G3128 | A3129 | A3130 | U3131 | C3132 | C3133 | A3134 | G3135 | G3136 | C3137 | U3138 | A3139 | G3140 | A3141 | A3142 | G3143 | G3144 | C3145 | G3146 | G3147 | U3148 | C3149 | A3150 | U3151 | U3152 | U3153 | C3154 | U3155 | U3156 | U3157 | G3158 | C3159 | C3160 | C3161 | C3162 | A3163 | C3164 | C3165 | C3166 |       |       |       |
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| G2614 | U2617 | G2618 | G2619 | G2620 | G2621 | A2622 | G2623 | G2624 | G2625 | C2626 | C2627 | A2628 | A2629 | C2630 | U2631 | G2632 | U2633 | U2634 | A2635 | A2636 | A2637 | U2641 | A2642 | A2643 | C2644 | A2649 | U2650 | G2651 | C2652 | U2653 | A2654 | U2655 | A2656 | C2657 | G2658 | G2659 | G2660 | G2661 | C2662 | A2663 | C2664 | A2667 | U2668 | G2669 | G2670 | A2671 | A2672 | A2673 | A2674 | C2675 | A2676 | C2677 | A2678 | A2680 |       |       |       |       |       |       |
| C2548 | G2549 | U2550 | U2551 | C2552 | U2553 | A2554 | C2555 | G2556 | A2557 | U2558 | U2559 | C2560 | A2561 | G2562 | U2563 | C2564 | U2565 | C2566 | C2567 | C2568 | A2569 | U2570 | U2571 | C2572 | G2573 | U2574 | G2575 | C2576 | C2582 | C2583 | G2584 | G2585 | G2586 | U2587 | U2588 | G2589 | G2592 | A2593 | C2594 | U2595 | U2597 | C2600 | A2601 | G2602 | G2603 | U2604 | G2605 | G2606 | G2607 | G2608 | A2609 | G2610 | U2611 | U2612 | U2613 |       |       |       |       |       |
| U2482 | G2483 | A2484 | A2485 | A2486 | U2487 | A2488 | C2489 | A2490 | A2491 | U2492 | C2493 | C2494 | U2495 | C2499 | U2500 | U2501 | A     | U2502 | U2503 | U2505 | C2506 | U2507 | U2508 | U2509 | A2510 | C2511 | C2512 | U2513 | A2514 | A2515 | A2520 | U2521 | G2522 | A2523 | A2524 | G2525 | C2526 | A2529 | C2530 | C2531 | U2532 | G2533 | A2536 | U2537 | U2538 | C2539 | A2540 | U2541 | U2542 | U2543 | U2544 | C2545 | C2546 | A2547 |       |       |       |       |       |       |
| A2419 | C2420 | U2421 | C2422 | G2425 | U2426 | U2427 | U2428 | A2429 | A2430 | C2431 | U2434 | G2435 | U2436 | U2437 | A2438 | A2439 | G2440 | A2443 | C2444 | A2445 | A2446 | G2447 | U2448 | G2449 | A2450 | U2451 | U2452 | C2453 | G2454 | U2455 | A2456 | G2457 | U2458 | A2459 | U2460 | A2461 | G2462 | U2463 | U2464 | G2465 | G2466 | G2467 | A2468 | C2469 | C2470 | G2471 | C2472 | U2473 | G2475 | C2476 | G2477 | C2478 | C2479 | G2480 | G2481 |       |       |       |       |       |



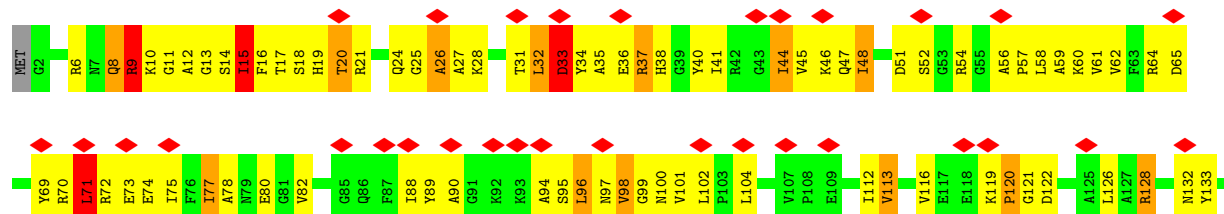
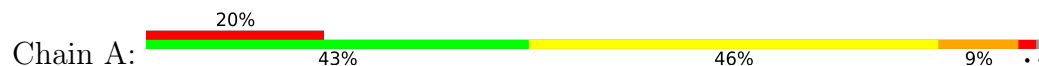
• Molecule 2: 5S RRNA

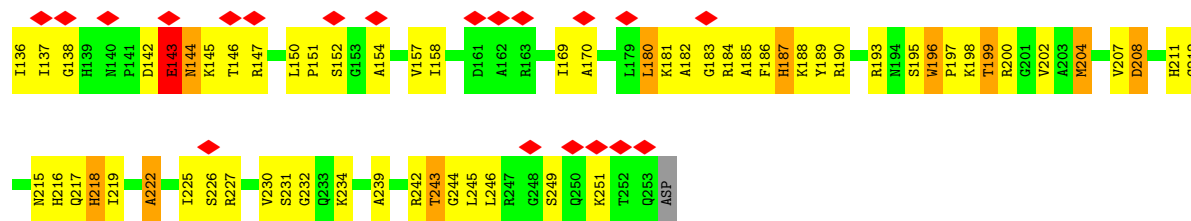


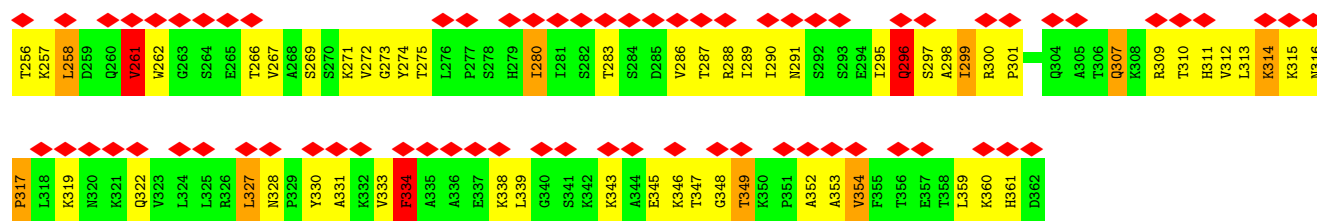
• Molecule 3: 5.8S RRNA



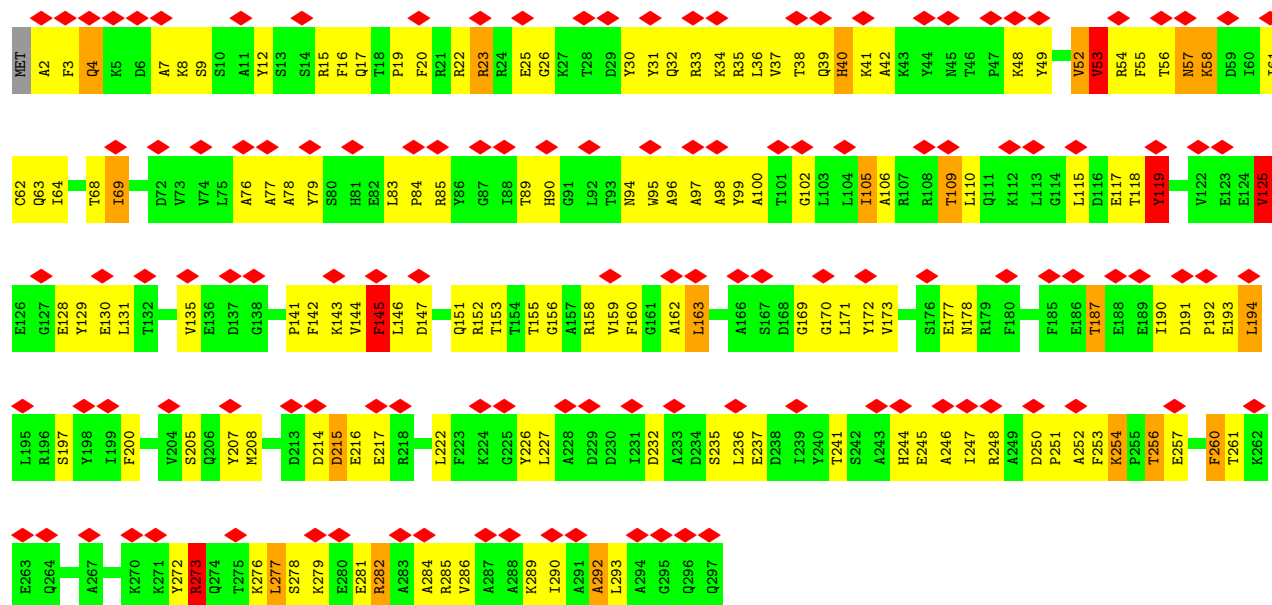
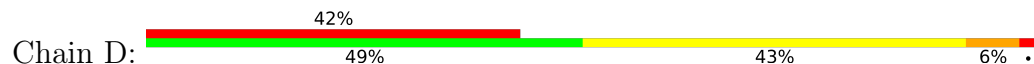
• Molecule 4: UL2



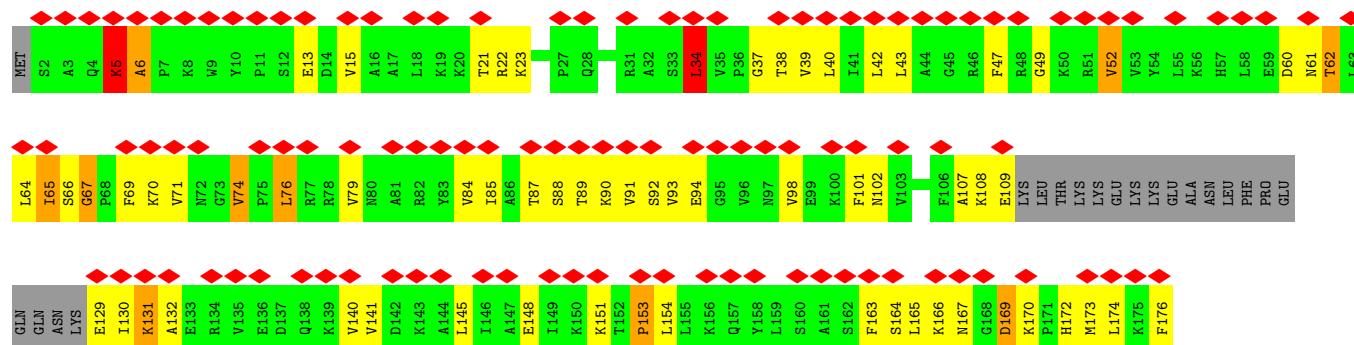




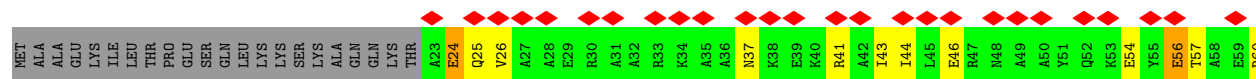
• Molecule 7: UL18

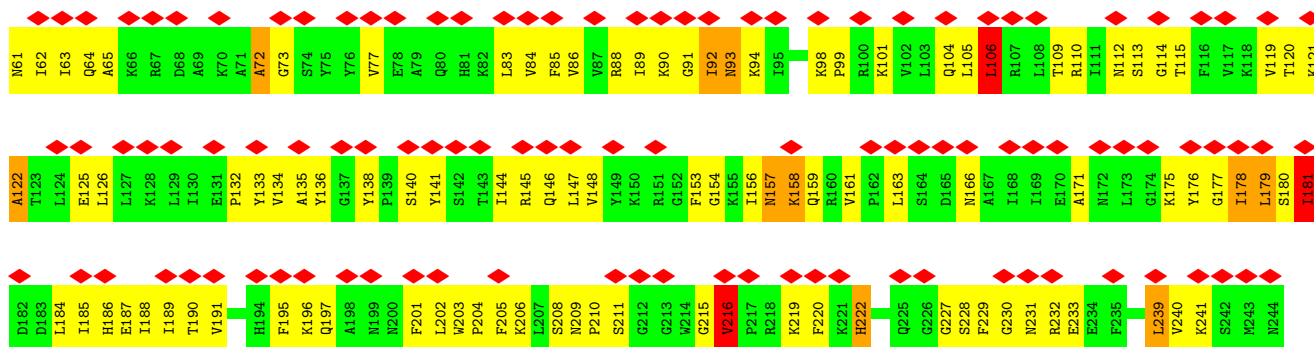


• Molecule 8: EL6

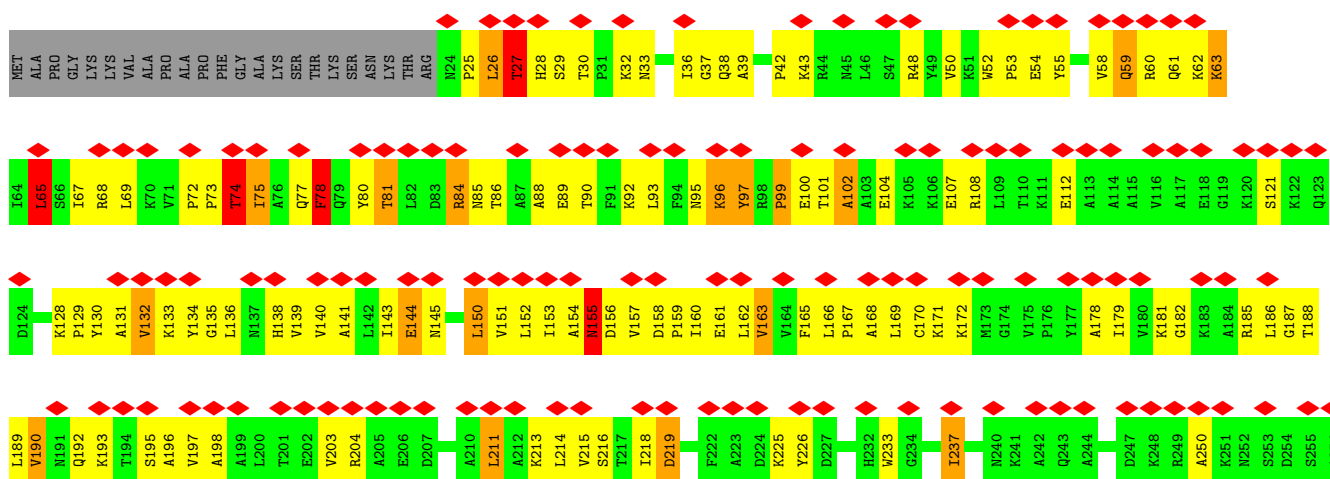


• Molecule 9: UL30

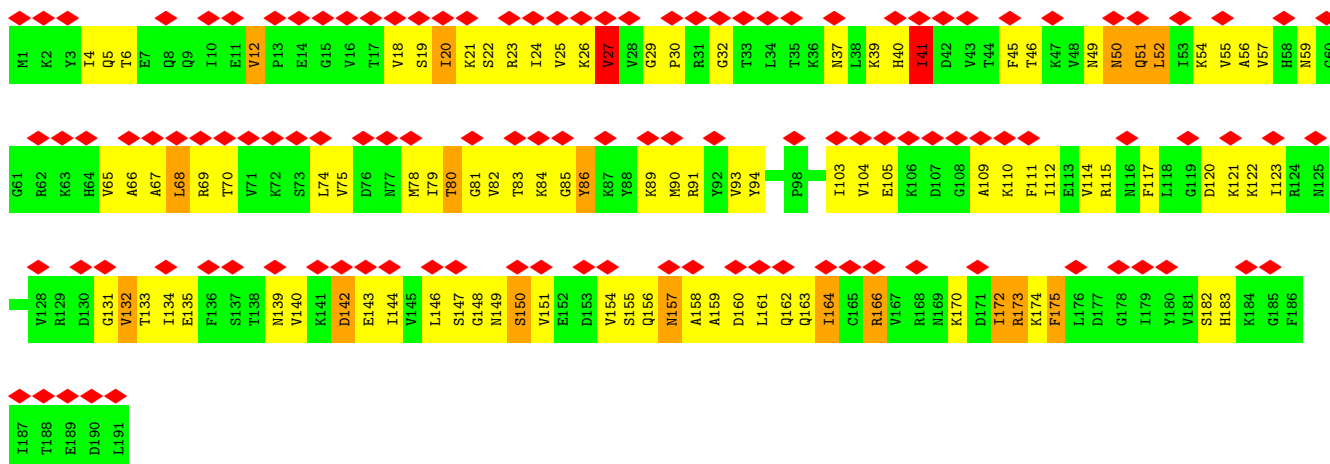




• Molecule 10: EL8

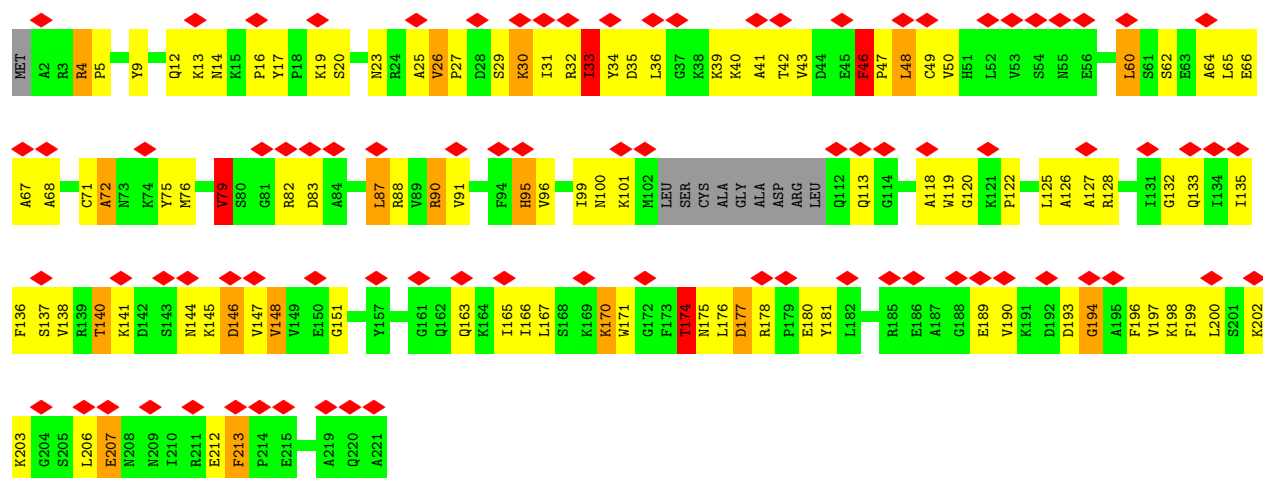


• Molecule 11: UL6

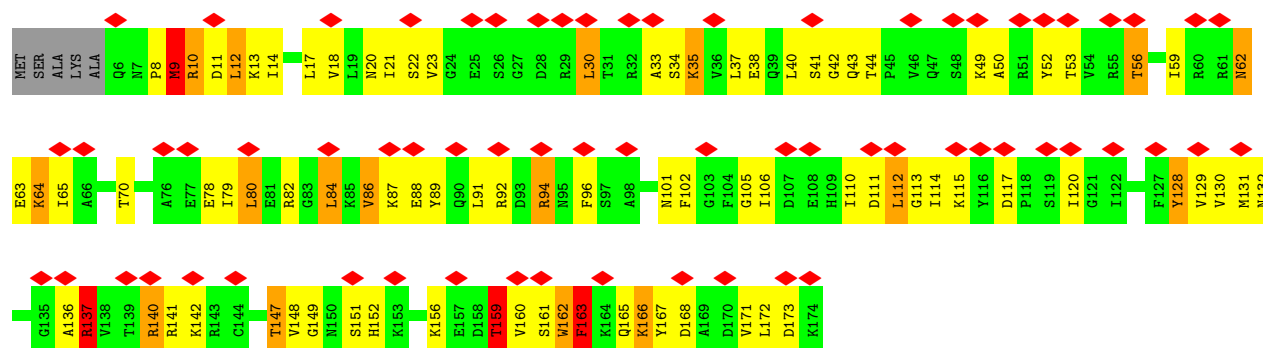


• Molecule 12: UL16

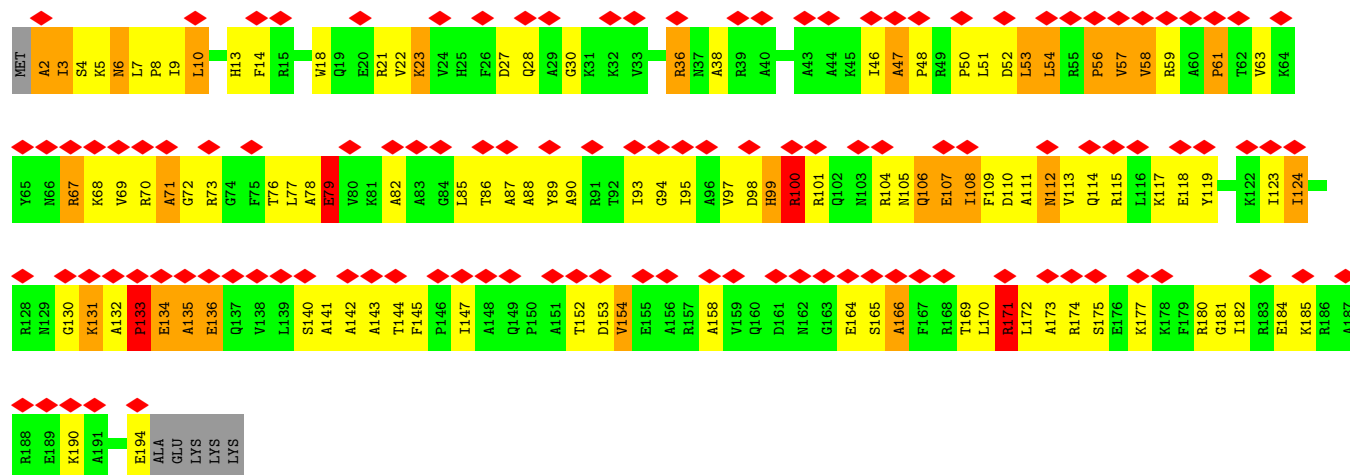
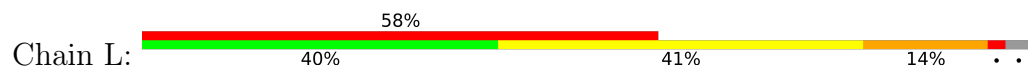




- Molecule 13: UL5

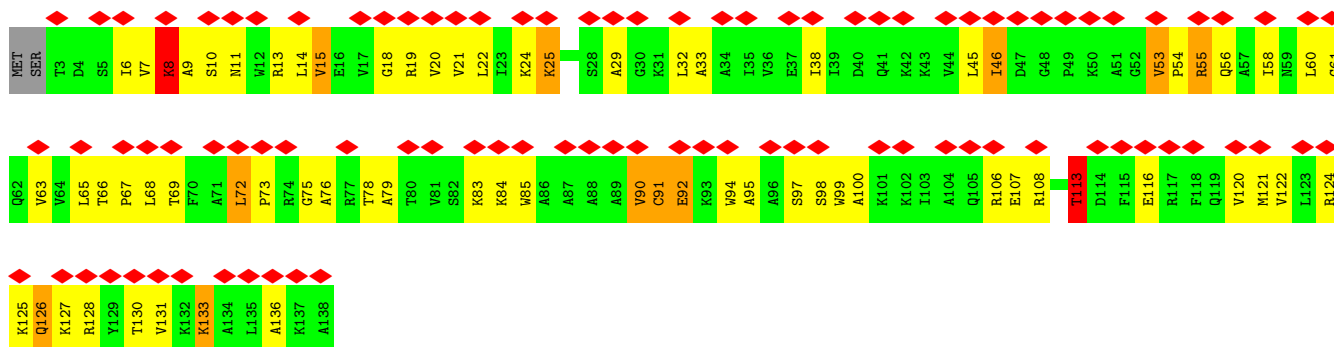


- Molecule 14: EL13

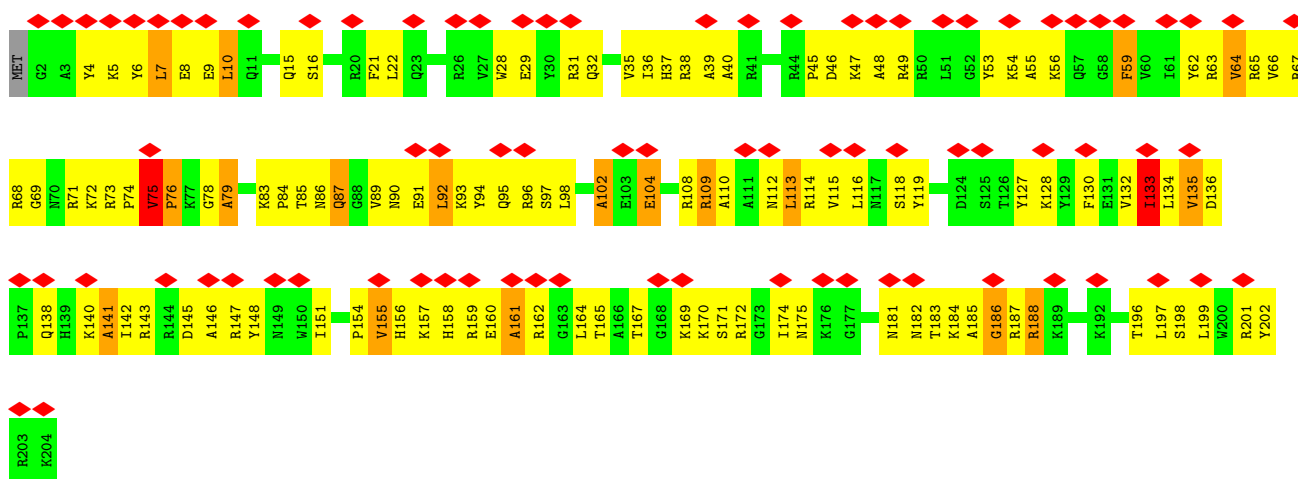


- Molecule 15: EL14

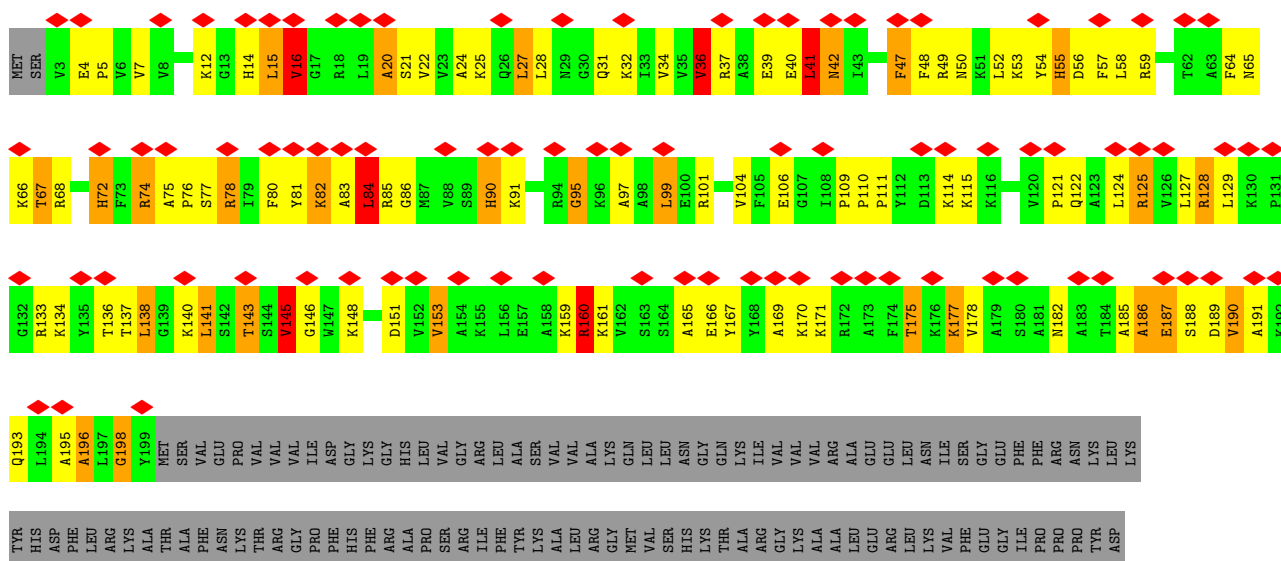
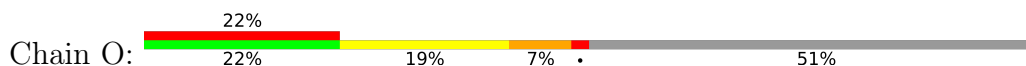




• Molecule 16: EL15

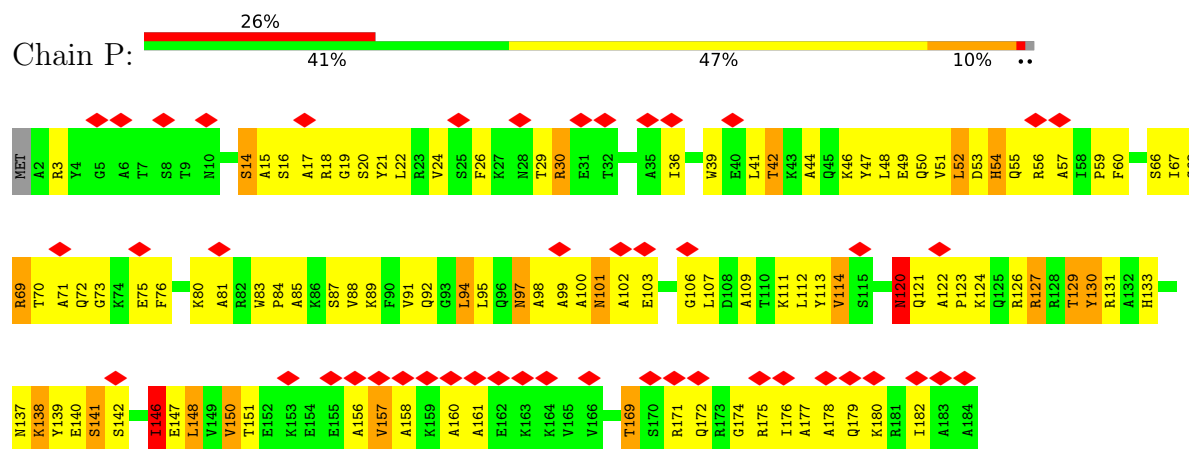


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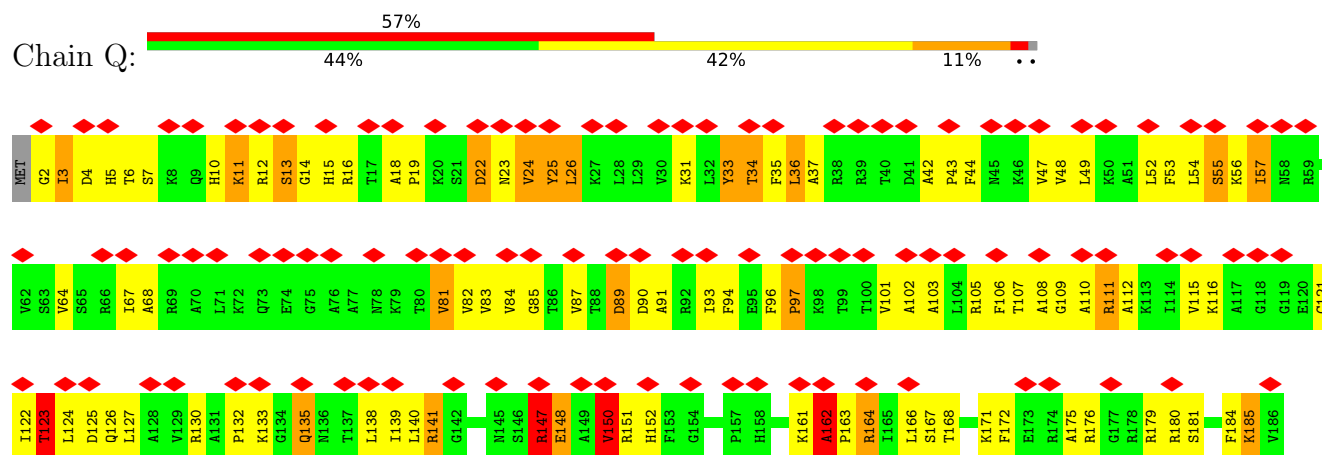


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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| LYS | LYS | LYS | ARG | VAL | VAL | VAL | PRO | GLN | ALA | LEU | ARG | VAL | LEU | ARG | LEU | ARG | LEU | ASP | VAL | VAL | LEU | LYS | LYS | THR | THR | THR | THR | VAL | GLY | GLY | LYS | LYS | THR | TRP | LYS | LYS | GLU | ASP | VAL | VAL | VAL | ALA | ALA | LYS | LEU | GLU | ALA | LYS | VAL | SER | SER | SER | GLU | TYR | ALA | LYS | LYS | ARG | ALA |     |
| PHE | THR | LYS | LYS | VAL | ALA | SER | ALA | ASN | ALA | THR | ALA | ALA | ALA | GLU | SER | ASP | VAL | VAL | ALA | ALA | PRO | GLY | ARG | LYS | LEU | ALA | ALA | THR | THR | LEU | GLY | GLY | LYS | LYS | THR | TRP | LYS | GLU | ASP | VAL | VAL | VAL | ALA | ALA | LYS | LEU | GLU | ALA | LYS | VAL | SER | SER | SER | GLU | TYR | ALA | LYS | LYS | ARG | ALA |

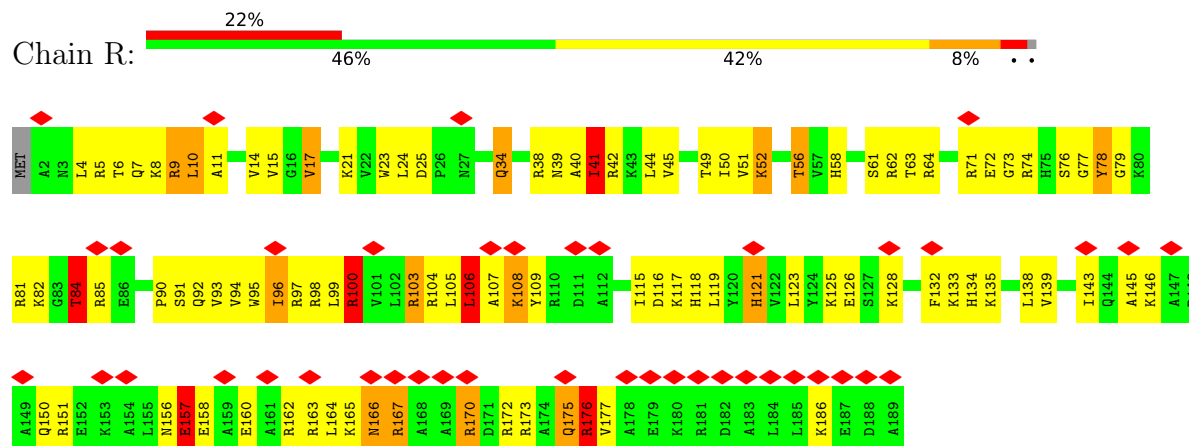
• Molecule 18: UL22



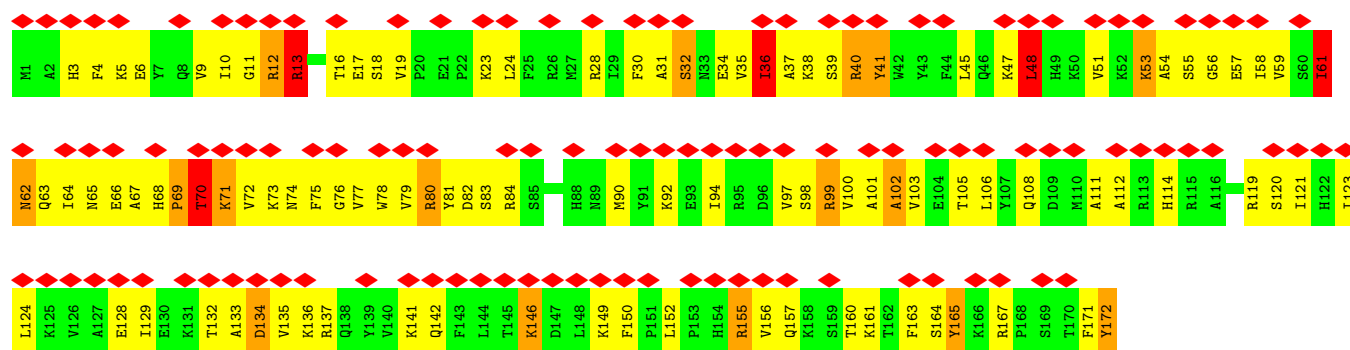
• Molecule 19: EL18



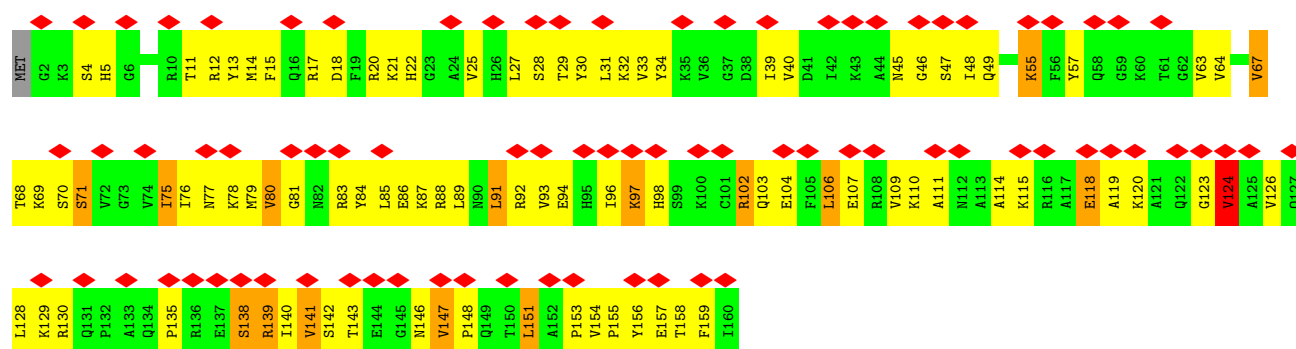
• Molecule 20: EL19



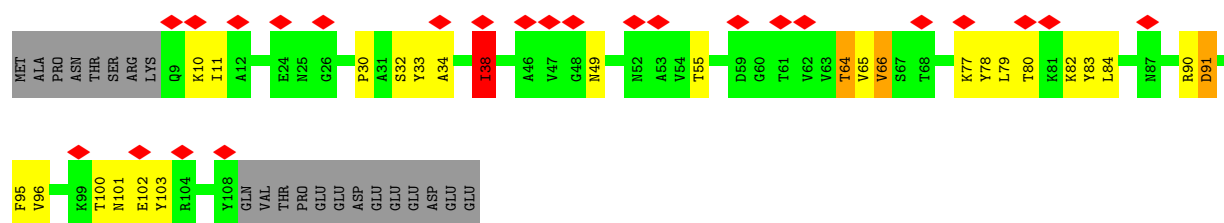
• Molecule 21: EL20



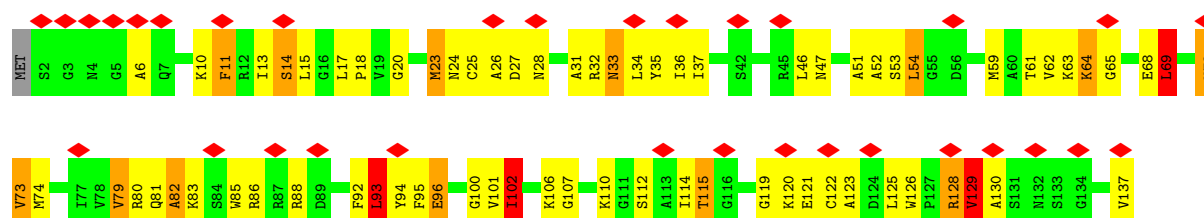
• Molecule 22: EL21



• Molecule 23: EL22



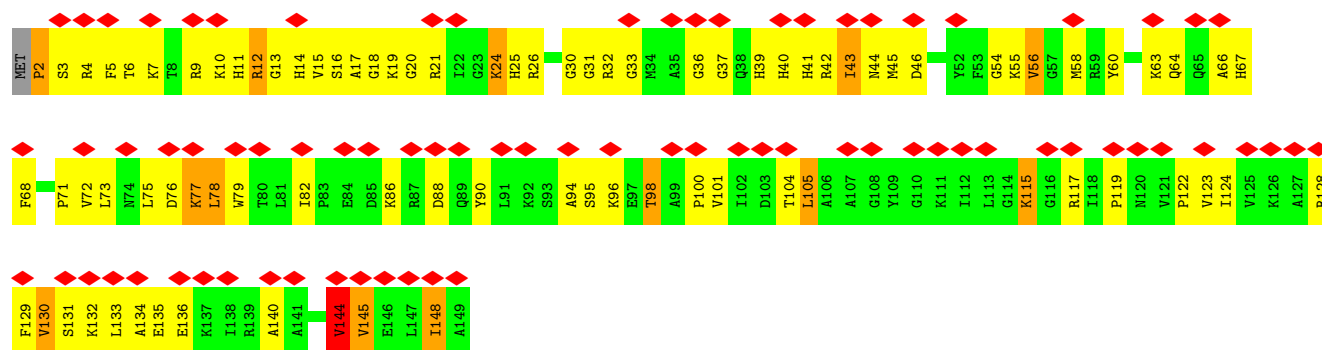
• Molecule 24: UL14



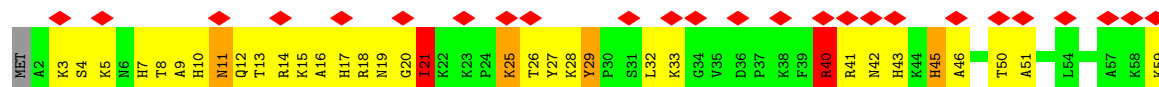
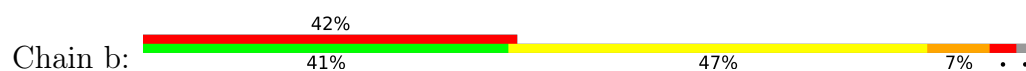




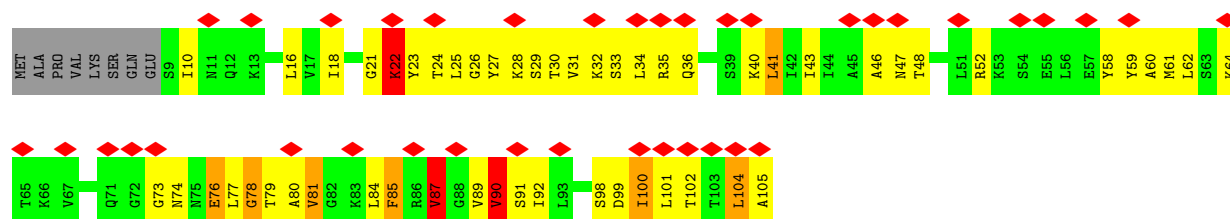
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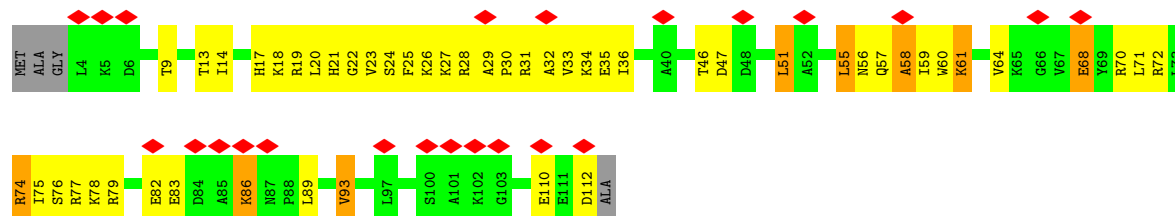
• Molecule 30: EL29



• Molecule 31: EL30

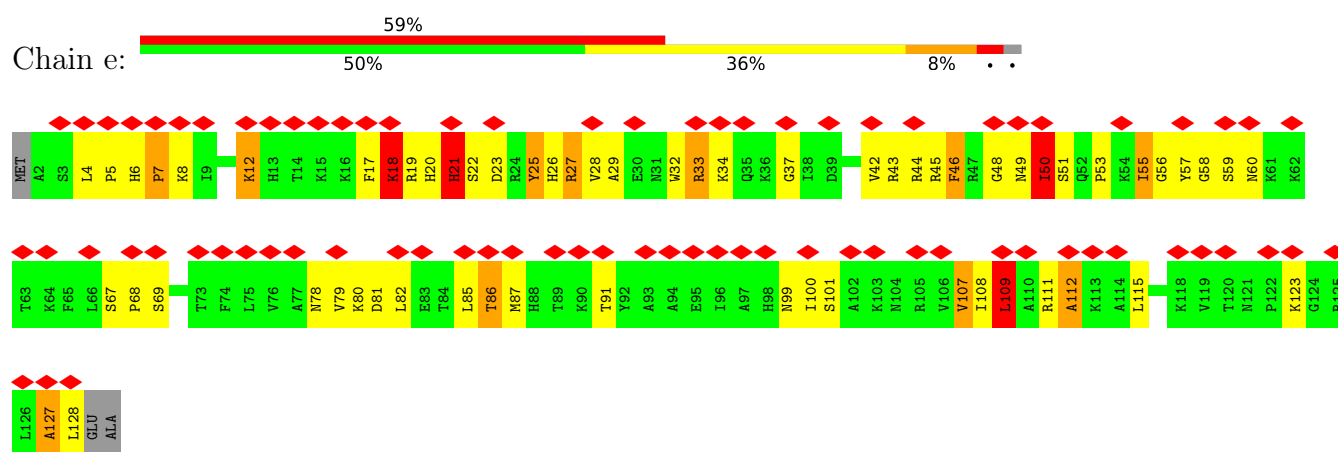


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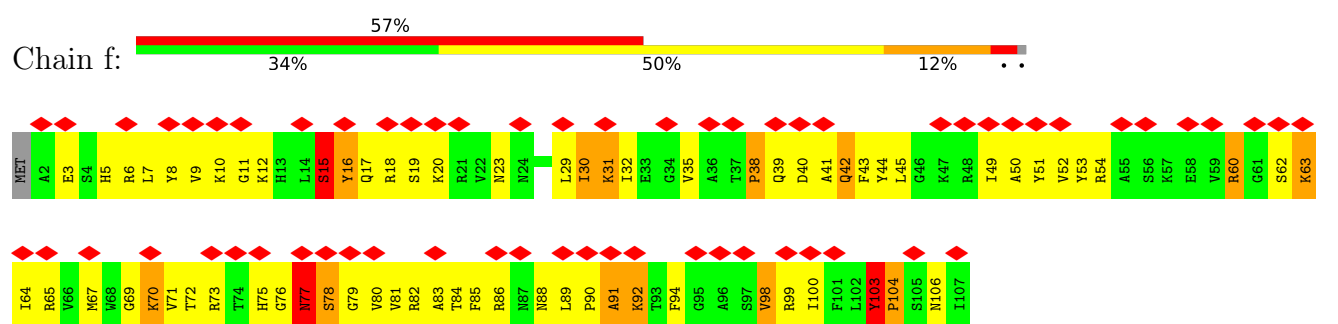


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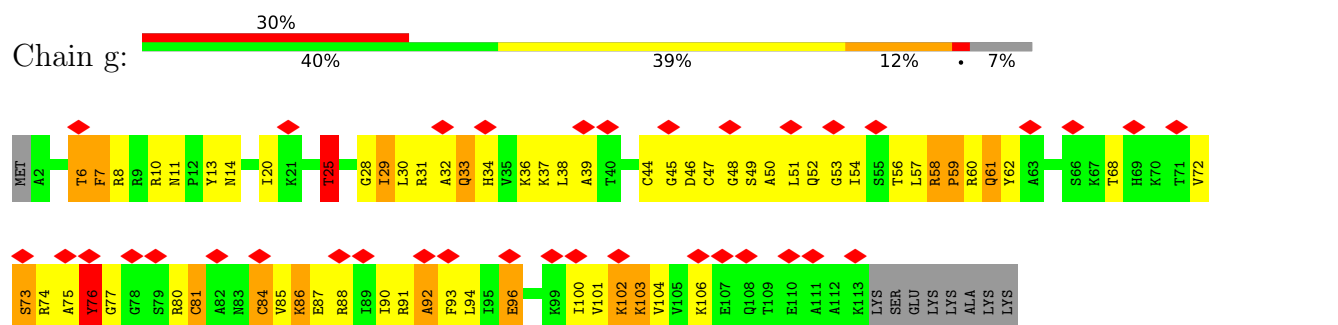




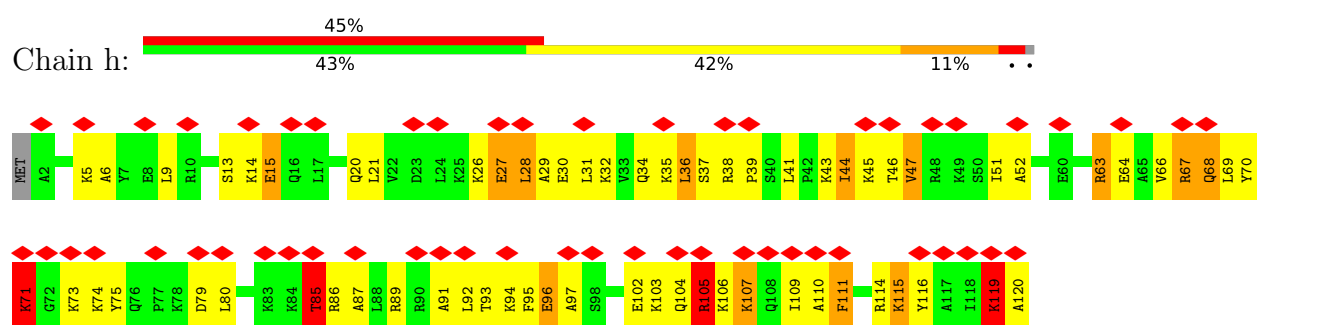
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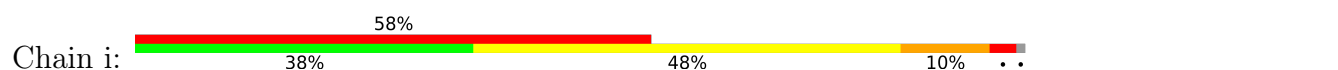
- Molecule 35: EL34



- Molecule 36: UL29

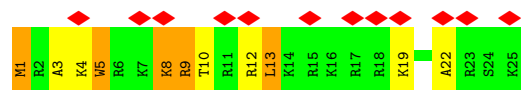


- Molecule 37: EL36

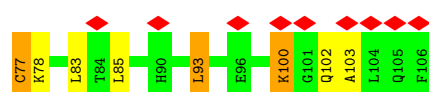
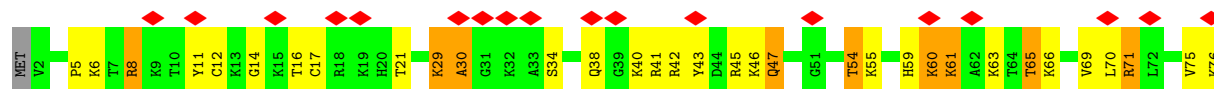




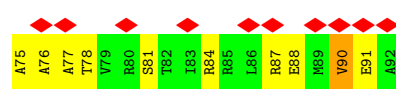
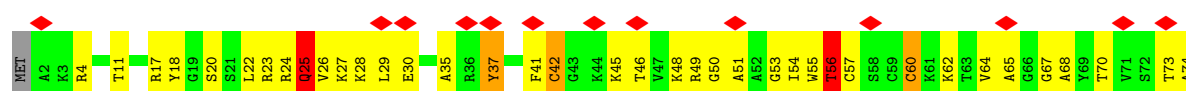
- Molecule 42: EL41



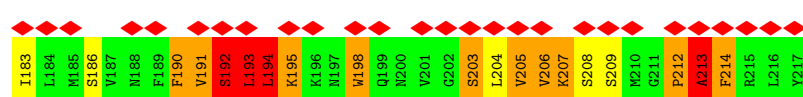
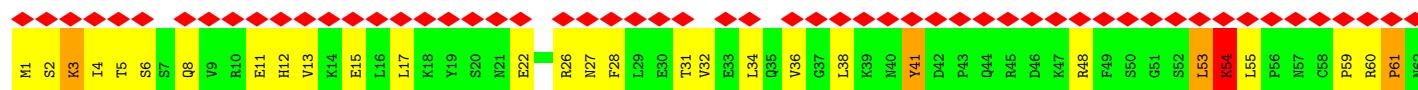
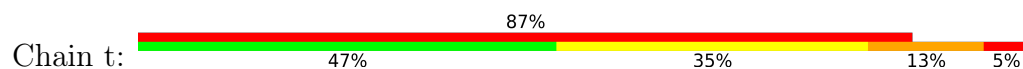
- Molecule 43: EL42



- Molecule 44: EL43



- Molecule 45: UL1



## 4 Experimental information

| Property                             | Value                           | Source    |
|--------------------------------------|---------------------------------|-----------|
| EM reconstruction method             | SINGLE PARTICLE                 | Depositor |
| Imposed symmetry                     | POINT, C1                       | Depositor |
| Number of particles used             | 18132                           | Depositor |
| Resolution determination method      | Not provided                    |           |
| CTF correction method                | EACH PARTICLE                   | Depositor |
| Microscope                           | FEI TITAN KRIOS                 | Depositor |
| Voltage (kV)                         | 300                             | Depositor |
| Electron dose ( $e^-/\text{\AA}^2$ ) | 40                              | Depositor |
| Minimum defocus (nm)                 | 1.8                             | Depositor |
| Maximum defocus (nm)                 | 3                               | Depositor |
| Magnification                        | 47000                           | Depositor |
| Image detector                       | FEI FALCON II (4k x 4k)         | Depositor |
| Maximum map value                    | 1.275                           | Depositor |
| Minimum map value                    | -0.841                          | Depositor |
| Average map value                    | 0.003                           | Depositor |
| Map value standard deviation         | 0.050                           | Depositor |
| Recommended contour level            | 0.12                            | Depositor |
| Map size ( $\text{\AA}$ )            | 428.80002, 428.80002, 428.80002 | wwPDB     |
| Map dimensions                       | 320, 320, 320                   | wwPDB     |
| Map angles ( $^\circ$ )              | 90.0, 90.0, 90.0                | wwPDB     |
| Pixel spacing ( $\text{\AA}$ )       | 1.34, 1.34, 1.34                | Depositor |

## 5 Model quality ⓘ

### 5.1 Standard geometry ⓘ

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

| Mol | Chain | Bond lengths |                 | Bond angles |                    |
|-----|-------|--------------|-----------------|-------------|--------------------|
|     |       | RMSZ         | $\# Z  > 5$     | RMSZ        | $\# Z  > 5$        |
| 1   | 1     | 0.77         | 28/76106 (0.0%) | 1.41        | 1926/117228 (1.6%) |
| 2   | 3     | 0.42         | 0/2857          | 1.43        | 74/4387 (1.7%)     |
| 3   | 4     | 1.07         | 3/3723 (0.1%)   | 1.46        | 104/5740 (1.8%)    |
| 4   | A     | 0.46         | 0/1881          | 1.14        | 22/2416 (0.9%)     |
| 5   | B     | 0.47         | 0/3064          | 1.24        | 45/3982 (1.1%)     |
| 6   | C     | 0.47         | 1/2721 (0.0%)   | 1.11        | 36/3553 (1.0%)     |
| 7   | D     | 0.46         | 0/2353          | 1.05        | 30/3055 (1.0%)     |
| 8   | E     | 0.42         | 0/1233          | 1.08        | 17/1613 (1.1%)     |
| 9   | F     | 0.43         | 0/1773          | 1.09        | 17/2307 (0.7%)     |
| 10  | G     | 0.45         | 0/1771          | 1.03        | 23/2286 (1.0%)     |
| 11  | H     | 0.43         | 0/1493          | 1.12        | 21/1935 (1.1%)     |
| 12  | I     | 0.68         | 1/1690 (0.1%)   | 1.21        | 30/2182 (1.4%)     |
| 13  | J     | 0.47         | 0/1339          | 1.22        | 20/1737 (1.2%)     |
| 14  | L     | 1.39         | 1/1518 (0.1%)   | 1.25        | 22/1956 (1.1%)     |
| 15  | M     | 0.47         | 0/1040          | 1.06        | 11/1354 (0.8%)     |
| 16  | N     | 0.43         | 0/1706          | 1.10        | 17/2201 (0.8%)     |
| 17  | O     | 3.46         | 23/1577 (1.5%)  | 6.37        | 89/2104 (4.2%)     |
| 18  | P     | 0.44         | 0/1400          | 1.10        | 16/1815 (0.9%)     |
| 19  | Q     | 0.43         | 0/1417          | 1.15        | 21/1821 (1.2%)     |
| 20  | R     | 0.71         | 3/1492 (0.2%)   | 1.33        | 26/1912 (1.4%)     |
| 21  | S     | 0.41         | 0/1435          | 1.08        | 17/1852 (0.9%)     |
| 22  | T     | 0.44         | 0/1266          | 1.15        | 17/1641 (1.0%)     |
| 23  | U     | 0.43         | 0/788           | 0.89        | 3/1027 (0.3%)      |
| 24  | V     | 0.48         | 0/984           | 1.12        | 15/1267 (1.2%)     |
| 25  | W     | 0.37         | 0/496           | 1.11        | 3/632 (0.5%)       |
| 26  | X     | 0.40         | 0/957           | 0.96        | 8/1255 (0.6%)      |
| 27  | Y     | 0.46         | 0/974           | 1.30        | 17/1251 (1.4%)     |
| 28  | Z     | 0.44         | 0/1080          | 1.19        | 15/1383 (1.1%)     |
| 29  | a     | 0.41         | 0/1163          | 1.04        | 10/1489 (0.7%)     |
| 30  | b     | 0.41         | 0/456           | 1.21        | 4/578 (0.7%)       |
| 31  | c     | 0.49         | 0/727           | 1.24        | 11/936 (1.2%)      |
| 32  | d     | 0.42         | 0/867           | 1.07        | 9/1127 (0.8%)      |
| 33  | e     | 0.42         | 0/1015          | 1.19        | 18/1316 (1.4%)     |
| 34  | f     | 0.47         | 0/837           | 1.29        | 15/1075 (1.4%)     |

| Mol | Chain | Bond lengths |                  | Bond angles |                    |
|-----|-------|--------------|------------------|-------------|--------------------|
|     |       | RMSZ         | # Z  >5          | RMSZ        | # Z  >5            |
| 35  | g     | 0.44         | 0/863            | 1.37        | 15/1108 (1.4%)     |
| 36  | h     | 0.42         | 0/948            | 1.16        | 12/1211 (1.0%)     |
| 37  | i     | 0.45         | 0/748            | 1.16        | 9/944 (1.0%)       |
| 38  | j     | 0.45         | 0/674            | 1.18        | 7/857 (0.8%)       |
| 39  | k     | 2.05         | 1/599 (0.2%)     | 1.26        | 9/769 (1.2%)       |
| 40  | l     | 0.49         | 0/431            | 1.24        | 8/552 (1.4%)       |
| 41  | m     | 0.40         | 0/409            | 0.81        | 2/520 (0.4%)       |
| 42  | n     | 0.83         | 0/228            | 0.93        | 1/282 (0.4%)       |
| 43  | o     | 0.44         | 0/843            | 1.27        | 14/1085 (1.3%)     |
| 44  | p     | 0.43         | 0/684            | 0.97        | 5/883 (0.6%)       |
| 45  | t     | 0.65         | 3/1692 (0.2%)    | 1.29        | 36/2183 (1.6%)     |
| All | All   | 0.80         | 64/133318 (0.0%) | 1.48        | 2847/192807 (1.5%) |

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

| Mol | Chain | #Chirality outliers | #Planarity outliers |
|-----|-------|---------------------|---------------------|
| 1   | 1     | 103                 | 0                   |
| 2   | 3     | 1                   | 0                   |
| 3   | 4     | 4                   | 0                   |
| 4   | A     | 7                   | 0                   |
| 5   | B     | 11                  | 3                   |
| 6   | C     | 11                  | 3                   |
| 7   | D     | 6                   | 0                   |
| 8   | E     | 3                   | 0                   |
| 9   | F     | 5                   | 0                   |
| 10  | G     | 6                   | 0                   |
| 11  | H     | 5                   | 0                   |
| 12  | I     | 4                   | 0                   |
| 13  | J     | 3                   | 0                   |
| 14  | L     | 6                   | 1                   |
| 15  | M     | 2                   | 0                   |
| 16  | N     | 2                   | 0                   |
| 17  | O     | 3                   | 16                  |
| 18  | P     | 5                   | 0                   |
| 19  | Q     | 4                   | 0                   |
| 20  | R     | 13                  | 0                   |
| 21  | S     | 5                   | 0                   |
| 22  | T     | 6                   | 0                   |
| 24  | V     | 3                   | 0                   |

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| Mol | Chain | #Chirality outliers | #Planarity outliers |
|-----|-------|---------------------|---------------------|
| 25  | W     | 2                   | 0                   |
| 26  | X     | 2                   | 0                   |
| 27  | Y     | 4                   | 0                   |
| 28  | Z     | 2                   | 0                   |
| 29  | a     | 3                   | 0                   |
| 30  | b     | 2                   | 0                   |
| 31  | c     | 3                   | 0                   |
| 32  | d     | 3                   | 0                   |
| 33  | e     | 2                   | 0                   |
| 34  | f     | 4                   | 2                   |
| 35  | g     | 4                   | 0                   |
| 36  | h     | 4                   | 0                   |
| 37  | i     | 2                   | 0                   |
| 38  | j     | 3                   | 1                   |
| 40  | l     | 3                   | 0                   |
| 43  | o     | 7                   | 0                   |
| 44  | p     | 1                   | 0                   |
| 45  | t     | 8                   | 5                   |
| All | All   | 277                 | 31                  |

The worst 5 of 64 bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z      | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|-------|--------|-------------|----------|
| 17  | O     | 143 | THR  | C-N   | -58.80 | 0.46        | 1.33     |
| 14  | L     | 57  | VAL  | C-N   | 51.17  | 2.00        | 1.33     |
| 39  | k     | 51  | LEU  | C-N   | 48.62  | 2.00        | 1.33     |
| 17  | O     | 171 | LYS  | C-N   | 42.61  | 1.94        | 1.33     |
| 17  | O     | 67  | THR  | C-N   | -41.99 | 0.74        | 1.33     |

The worst 5 of 2847 bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z      | Observed(°) | Ideal(°) |
|-----|-------|-----|------|-------|--------|-------------|----------|
| 17  | O     | 153 | VAL  | O-C-N | -84.66 | 39.27       | 122.23   |
| 17  | O     | 186 | ALA  | O-C-N | -83.55 | 23.52       | 122.11   |
| 17  | O     | 72  | HIS  | O-C-N | -82.61 | 21.26       | 122.87   |
| 17  | O     | 64  | PHE  | O-C-N | -73.33 | 26.36       | 122.42   |
| 17  | O     | 125 | ARG  | O-C-N | -71.78 | 40.37       | 122.20   |

5 of 277 chirality outliers are listed below:

| Mol | Chain | Res | Type | Atom |
|-----|-------|-----|------|------|
| 1   | 1     | 69  | C    | C2'  |

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| Mol | Chain | Res | Type | Atom |
|-----|-------|-----|------|------|
| 1   | 1     | 92  | G    | C2'  |
| 1   | 1     | 95  | A    | C2'  |
| 1   | 1     | 109 | A    | C3'  |
| 1   | 1     | 167 | U    | C3'  |

5 of 31 planarity outliers are listed below:

| Mol | Chain | Res | Type | Group   |
|-----|-------|-----|------|---------|
| 5   | B     | 17  | LEU  | Peptide |
| 5   | B     | 256 | HIS  | Peptide |
| 5   | B     | 36  | ASP  | Peptide |
| 6   | C     | 148 | ILE  | Peptide |
| 6   | C     | 226 | GLU  | Peptide |

## 5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 1   | 1     | 68514 | 0        | 35042    | 1290    | 0            |
| 2   | 3     | 2579  | 0        | 1330     | 33      | 0            |
| 3   | 4     | 3353  | 0        | 1721     | 67      | 0            |
| 4   | A     | 1914  | 0        | 1914     | 151     | 0            |
| 5   | B     | 3075  | 0        | 3060     | 186     | 0            |
| 6   | C     | 2748  | 0        | 2780     | 167     | 0            |
| 7   | D     | 2375  | 0        | 2253     | 105     | 0            |
| 8   | E     | 1239  | 0        | 1299     | 34      | 0            |
| 9   | F     | 1784  | 0        | 1814     | 84      | 0            |
| 10  | G     | 1804  | 0        | 1812     | 104     | 0            |
| 11  | H     | 1518  | 0        | 1541     | 75      | 0            |
| 12  | I     | 1705  | 0        | 1684     | 81      | 0            |
| 13  | J     | 1353  | 0        | 1348     | 52      | 0            |
| 14  | L     | 1543  | 0        | 1557     | 91      | 0            |
| 15  | M     | 1053  | 0        | 1121     | 46      | 0            |
| 16  | N     | 1720  | 0        | 1728     | 119     | 0            |
| 17  | O     | 1555  | 0        | 1635     | 1       | 0            |
| 18  | P     | 1420  | 0        | 1394     | 85      | 0            |
| 19  | Q     | 1441  | 0        | 1495     | 76      | 0            |

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| Mol | Chain | Non-H  | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|--------|----------|----------|---------|--------------|
| 20  | R     | 1521   | 0        | 1571     | 77      | 0            |
| 21  | S     | 1445   | 0        | 1441     | 83      | 0            |
| 22  | T     | 1276   | 0        | 1289     | 61      | 0            |
| 23  | U     | 796    | 0        | 788      | 15      | 0            |
| 24  | V     | 1003   | 0        | 1014     | 64      | 0            |
| 25  | W     | 500    | 0        | 508      | 21      | 0            |
| 26  | X     | 964    | 0        | 1003     | 33      | 0            |
| 27  | Y     | 993    | 0        | 1051     | 53      | 0            |
| 28  | Z     | 1092   | 0        | 1117     | 52      | 0            |
| 29  | a     | 1173   | 0        | 1174     | 82      | 0            |
| 30  | b     | 462    | 0        | 474      | 23      | 0            |
| 31  | c     | 743    | 0        | 773      | 36      | 0            |
| 32  | d     | 876    | 0        | 889      | 34      | 0            |
| 33  | e     | 1020   | 0        | 1064     | 52      | 0            |
| 34  | f     | 850    | 0        | 849      | 61      | 0            |
| 35  | g     | 880    | 0        | 918      | 57      | 0            |
| 36  | h     | 969    | 0        | 1048     | 50      | 0            |
| 37  | i     | 771    | 0        | 819      | 47      | 0            |
| 38  | j     | 681    | 0        | 665      | 49      | 0            |
| 39  | k     | 612    | 0        | 662      | 19      | 0            |
| 40  | l     | 436    | 0        | 463      | 37      | 0            |
| 41  | m     | 417    | 0        | 445      | 19      | 0            |
| 42  | n     | 233    | 0        | 278      | 8       | 0            |
| 43  | o     | 847    | 0        | 901      | 18      | 0            |
| 44  | p     | 694    | 0        | 721      | 45      | 0            |
| 45  | t     | 1718   | 0        | 1758     | 115     | 0            |
| All | All   | 125665 | 0        | 90211    | 3851    | 0            |

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 18.

The worst 5 of 3851 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

| Atom-1           | Atom-2         | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|----------------|--------------------------|-------------------|
| 12:I:95:HIS:C    | 12:I:96:VAL:N  | 1.97                     | 1.23              |
| 45:t:54:LYS:HB2  | 45:t:153:SER:C | 1.63                     | 1.23              |
| 21:S:160:THR:HG1 | 21:S:161:LYS:N | 1.36                     | 1.21              |
| 1:1:2178:A:O3'   | 1:1:2179:C:P   | 2.00                     | 1.20              |
| 39:k:51:LEU:C    | 39:k:52:TYR:N  | 2.00                     | 1.18              |

There are no symmetry-related clashes.

## 5.3 Torsion angles ⓘ

### 5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

| Mol | Chain | Analysed      | Favoured  | Allowed  | Outliers | Percentiles |     |
|-----|-------|---------------|-----------|----------|----------|-------------|-----|
| 4   | A     | 135/254 (53%) | 107 (79%) | 21 (16%) | 7 (5%)   | 1           | 17  |
| 5   | B     | 240/387 (62%) | 198 (82%) | 25 (10%) | 17 (7%)  | 1           | 12  |
| 6   | C     | 215/362 (59%) | 168 (78%) | 26 (12%) | 21 (10%) | 0           | 6   |
| 7   | D     | 164/297 (55%) | 128 (78%) | 25 (15%) | 11 (7%)  | 1           | 13  |
| 8   | E     | 103/176 (58%) | 91 (88%)  | 7 (7%)   | 5 (5%)   | 1           | 17  |
| 9   | F     | 136/244 (56%) | 121 (89%) | 10 (7%)  | 5 (4%)   | 2           | 22  |
| 10  | G     | 122/256 (48%) | 100 (82%) | 13 (11%) | 9 (7%)   | 1           | 11  |
| 11  | H     | 106/191 (56%) | 84 (79%)  | 18 (17%) | 4 (4%)   | 2           | 22  |
| 12  | I     | 119/221 (54%) | 102 (86%) | 12 (10%) | 5 (4%)   | 2           | 20  |
| 13  | J     | 103/174 (59%) | 85 (82%)  | 10 (10%) | 8 (8%)   | 1           | 10  |
| 14  | L     | 103/199 (52%) | 79 (77%)  | 14 (14%) | 10 (10%) | 0           | 7   |
| 15  | M     | 84/138 (61%)  | 68 (81%)  | 10 (12%) | 6 (7%)   | 1           | 12  |
| 16  | N     | 114/204 (56%) | 94 (82%)  | 11 (10%) | 9 (8%)   | 1           | 10  |
| 17  | O     | 181/398 (46%) | 69 (38%)  | 53 (29%) | 59 (33%) | 0           | 0   |
| 18  | P     | 106/184 (58%) | 96 (91%)  | 7 (7%)   | 3 (3%)   | 4           | 27  |
| 19  | Q     | 100/186 (54%) | 81 (81%)  | 13 (13%) | 6 (6%)   | 1           | 15  |
| 20  | R     | 105/189 (56%) | 74 (70%)  | 26 (25%) | 5 (5%)   | 2           | 17  |
| 21  | S     | 87/172 (51%)  | 63 (72%)  | 17 (20%) | 7 (8%)   | 1           | 9   |
| 22  | T     | 93/160 (58%)  | 69 (74%)  | 19 (20%) | 5 (5%)   | 1           | 16  |
| 23  | U     | 58/121 (48%)  | 50 (86%)  | 5 (9%)   | 3 (5%)   | 1           | 17  |
| 24  | V     | 73/137 (53%)  | 65 (89%)  | 6 (8%)   | 2 (3%)   | 4           | 27  |
| 25  | W     | 33/155 (21%)  | 29 (88%)  | 4 (12%)  | 0        | 100         | 100 |
| 26  | X     | 76/142 (54%)  | 63 (83%)  | 8 (10%)  | 5 (7%)   | 1           | 13  |
| 27  | Y     | 71/127 (56%)  | 50 (70%)  | 17 (24%) | 4 (6%)   | 1           | 16  |
| 28  | Z     | 66/136 (48%)  | 48 (73%)  | 13 (20%) | 5 (8%)   | 1           | 10  |

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| Mol | Chain | Analysed        | Favoured   | Allowed   | Outliers | Percentiles |    |
|-----|-------|-----------------|------------|-----------|----------|-------------|----|
| 29  | a     | 75/149 (50%)    | 56 (75%)   | 13 (17%)  | 6 (8%)   | 1           | 9  |
| 30  | b     | 27/59 (46%)     | 19 (70%)   | 5 (18%)   | 3 (11%)  | 0           | 5  |
| 31  | c     | 56/105 (53%)    | 44 (79%)   | 8 (14%)   | 4 (7%)   | 1           | 12 |
| 32  | d     | 68/113 (60%)    | 59 (87%)   | 6 (9%)    | 3 (4%)   | 2           | 19 |
| 33  | e     | 82/130 (63%)    | 68 (83%)   | 8 (10%)   | 6 (7%)   | 1           | 12 |
| 34  | f     | 52/107 (49%)    | 42 (81%)   | 7 (14%)   | 3 (6%)   | 1           | 15 |
| 35  | g     | 65/121 (54%)    | 57 (88%)   | 6 (9%)    | 2 (3%)   | 3           | 26 |
| 36  | h     | 66/120 (55%)    | 52 (79%)   | 8 (12%)   | 6 (9%)   | 0           | 8  |
| 37  | i     | 47/100 (47%)    | 33 (70%)   | 10 (21%)  | 4 (8%)   | 0           | 8  |
| 38  | j     | 48/88 (54%)     | 35 (73%)   | 7 (15%)   | 6 (12%)  | 0           | 4  |
| 39  | k     | 43/78 (55%)     | 32 (74%)   | 9 (21%)   | 2 (5%)   | 2           | 18 |
| 40  | l     | 27/51 (53%)     | 20 (74%)   | 5 (18%)   | 2 (7%)   | 1           | 11 |
| 41  | m     | 26/128 (20%)    | 22 (85%)   | 3 (12%)   | 1 (4%)   | 2           | 22 |
| 42  | n     | 14/25 (56%)     | 9 (64%)    | 4 (29%)   | 1 (7%)   | 1           | 12 |
| 43  | o     | 71/106 (67%)    | 58 (82%)   | 10 (14%)  | 3 (4%)   | 2           | 20 |
| 44  | p     | 59/92 (64%)     | 53 (90%)   | 4 (7%)    | 2 (3%)   | 3           | 25 |
| 45  | t     | 121/217 (56%)   | 82 (68%)   | 24 (20%)  | 15 (12%) | 0           | 4  |
| All | All   | 3740/6999 (53%) | 2923 (78%) | 527 (14%) | 290 (8%) | 1           | 10 |

5 of 290 Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 4   | A     | 33  | ASP  |
| 4   | A     | 120 | PRO  |
| 5   | B     | 61  | ASP  |
| 5   | B     | 113 | GLU  |
| 5   | B     | 146 | ARG  |

### 5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

| Mol | Chain | Analysed       | Rotameric | Outliers | Percentiles |    |
|-----|-------|----------------|-----------|----------|-------------|----|
| 4   | A     | 193/196 (98%)  | 168 (87%) | 25 (13%) | 4           | 20 |
| 5   | B     | 320/323 (99%)  | 273 (85%) | 47 (15%) | 3           | 17 |
| 6   | C     | 288/289 (100%) | 261 (91%) | 27 (9%)  | 8           | 32 |
| 7   | D     | 244/245 (100%) | 213 (87%) | 31 (13%) | 4           | 21 |
| 8   | E     | 134/153 (88%)  | 122 (91%) | 12 (9%)  | 9           | 33 |
| 9   | F     | 186/205 (91%)  | 168 (90%) | 18 (10%) | 8           | 31 |
| 10  | G     | 187/208 (90%)  | 171 (91%) | 16 (9%)  | 10          | 34 |
| 11  | H     | 171/171 (100%) | 155 (91%) | 16 (9%)  | 8           | 32 |
| 12  | I     | 177/187 (95%)  | 158 (89%) | 19 (11%) | 6           | 27 |
| 13  | J     | 147/150 (98%)  | 123 (84%) | 24 (16%) | 2           | 14 |
| 14  | L     | 154/159 (97%)  | 138 (90%) | 16 (10%) | 7           | 28 |
| 15  | M     | 107/109 (98%)  | 93 (87%)  | 14 (13%) | 4           | 20 |
| 16  | N     | 175/176 (99%)  | 159 (91%) | 16 (9%)  | 9           | 33 |
| 17  | O     | 160/324 (49%)  | 129 (81%) | 31 (19%) | 1           | 9  |
| 18  | P     | 140/146 (96%)  | 115 (82%) | 25 (18%) | 2           | 12 |
| 19  | Q     | 150/151 (99%)  | 129 (86%) | 21 (14%) | 3           | 18 |
| 20  | R     | 153/154 (99%)  | 133 (87%) | 20 (13%) | 4           | 20 |
| 21  | S     | 156/156 (100%) | 143 (92%) | 13 (8%)  | 10          | 35 |
| 22  | T     | 136/137 (99%)  | 117 (86%) | 19 (14%) | 3           | 18 |
| 23  | U     | 87/107 (81%)   | 81 (93%)  | 6 (7%)   | 14          | 41 |
| 24  | V     | 104/105 (99%)  | 93 (89%)  | 11 (11%) | 6           | 27 |
| 25  | W     | 53/129 (41%)   | 47 (89%)  | 6 (11%)  | 5           | 25 |
| 26  | X     | 104/118 (88%)  | 88 (85%)  | 16 (15%) | 2           | 16 |
| 27  | Y     | 109/110 (99%)  | 97 (89%)  | 12 (11%) | 6           | 26 |
| 28  | Z     | 115/116 (99%)  | 101 (88%) | 14 (12%) | 5           | 22 |
| 29  | a     | 118/119 (99%)  | 106 (90%) | 12 (10%) | 7           | 29 |
| 30  | b     | 46/47 (98%)    | 39 (85%)  | 7 (15%)  | 3           | 16 |
| 31  | c     | 81/88 (92%)    | 70 (86%)  | 11 (14%) | 3           | 19 |
| 32  | d     | 92/97 (95%)    | 79 (86%)  | 13 (14%) | 3           | 18 |
| 33  | e     | 109/111 (98%)  | 97 (89%)  | 12 (11%) | 6           | 26 |
| 34  | f     | 90/91 (99%)    | 77 (86%)  | 13 (14%) | 3           | 18 |
| 35  | g     | 95/103 (92%)   | 83 (87%)  | 12 (13%) | 4           | 21 |

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| Mol | Chain | Analysed        | Rotameric  | Outliers  | Percentiles |    |
|-----|-------|-----------------|------------|-----------|-------------|----|
| 36  | h     | 104/105 (99%)   | 86 (83%)   | 18 (17%)  | 2           | 12 |
| 37  | i     | 81/82 (99%)     | 68 (84%)   | 13 (16%)  | 2           | 15 |
| 38  | j     | 70/71 (99%)     | 62 (89%)   | 8 (11%)   | 5           | 24 |
| 39  | k     | 68/69 (99%)     | 51 (75%)   | 17 (25%)  | 0           | 4  |
| 40  | l     | 45/46 (98%)     | 37 (82%)   | 8 (18%)   | 2           | 12 |
| 41  | m     | 47/116 (40%)    | 41 (87%)   | 6 (13%)   | 4           | 21 |
| 42  | n     | 23/23 (100%)    | 18 (78%)   | 5 (22%)   | 1           | 7  |
| 43  | o     | 90/91 (99%)     | 76 (84%)   | 14 (16%)  | 2           | 15 |
| 44  | p     | 71/72 (99%)     | 61 (86%)   | 10 (14%)  | 3           | 18 |
| 45  | t     | 198/198 (100%)  | 164 (83%)  | 34 (17%)  | 2           | 13 |
| All | All   | 5378/5853 (92%) | 4690 (87%) | 688 (13%) | 6           | 21 |

5 of 688 residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 28  | Z     | 24  | VAL  |
| 37  | i     | 7   | ILE  |
| 29  | a     | 24  | LYS  |
| 28  | Z     | 14  | VAL  |
| 33  | e     | 19  | ARG  |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 104 such sidechains are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 20  | R     | 3   | ASN  |
| 27  | Y     | 4   | GLN  |
| 44  | p     | 32  | GLN  |
| 20  | R     | 166 | ASN  |
| 22  | T     | 131 | GLN  |

### 5.3.3 RNA ⓘ

| Mol | Chain | Analysed        | Backbone Outliers | Pucker Outliers |
|-----|-------|-----------------|-------------------|-----------------|
| 1   | 1     | 3129/3397 (92%) | 1408 (44%)        | 379 (12%)       |
| 2   | 3     | 119/121 (98%)   | 44 (36%)          | 10 (8%)         |
| 3   | 4     | 156/158 (98%)   | 60 (38%)          | 14 (8%)         |

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| Mol | Chain | Analysed        | Backbone Outliers | Pucker Outliers |
|-----|-------|-----------------|-------------------|-----------------|
| All | All   | 3404/3676 (92%) | 1512 (44%)        | 403 (11%)       |

5 of 1512 RNA backbone outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | 1     | 6   | A    |
| 1   | 1     | 9   | U    |
| 1   | 1     | 10  | C    |
| 1   | 1     | 11  | A    |
| 1   | 1     | 12  | A    |

5 of 403 RNA pucker outliers are listed below:

| Mol | Chain | Res  | Type |
|-----|-------|------|------|
| 1   | 1     | 2206 | G    |
| 1   | 1     | 2622 | C    |
| 3   | 4     | 112  | U    |
| 1   | 1     | 2267 | C    |
| 1   | 1     | 2458 | G    |

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

## 5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

There are no ligands in this entry.

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

| Mol | Chain | Number of breaks |
|-----|-------|------------------|
| 1   | 1     | 614              |
| 5   | B     | 82               |
| 6   | C     | 79               |
| 7   | D     | 72               |
| 4   | A     | 67               |
| 10  | G     | 65               |
| 45  | t     | 53               |
| 12  | I     | 52               |
| 14  | L     | 51               |
| 16  | N     | 51               |
| 19  | Q     | 48               |
| 9   | F     | 48               |
| 20  | R     | 46               |
| 11  | H     | 46               |
| 21  | S     | 46               |
| 18  | P     | 43               |
| 29  | a     | 41               |
| 28  | Z     | 38               |
| 13  | J     | 35               |
| 24  | V     | 34               |
| 22  | T     | 34               |
| 34  | f     | 31               |
| 37  | i     | 30               |
| 27  | Y     | 30               |
| 36  | h     | 30               |
| 15  | M     | 28               |
| 8   | E     | 27               |
| 35  | g     | 27               |
| 33  | e     | 26               |
| 2   | 3     | 26               |
| 3   | 4     | 26               |
| 17  | O     | 25               |
| 23  | U     | 24               |
| 31  | c     | 24               |
| 32  | d     | 23               |
| 38  | j     | 22               |
| 26  | X     | 22               |
| 39  | k     | 20               |
| 43  | o     | 17               |
| 30  | b     | 17               |
| 44  | p     | 17               |
| 25  | W     | 16               |
| 41  | m     | 14               |

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| Mol | Chain | Number of breaks |
|-----|-------|------------------|
| 40  | l     | 12               |
| 42  | n     | 6                |

The worst 5 of 2185 chain breaks are listed below:

| Model | Chain | Residue-1 | Atom-1 | Residue-2 | Atom-2 | Distance (Å) |
|-------|-------|-----------|--------|-----------|--------|--------------|
| 1     | R     | 171:ASP   | C      | 172:ARG   | N      | 8.98         |
| 1     | t     | 52:SER    | C      | 53:LEU    | N      | 8.07         |
| 1     | 1     | 2511:C    | O3'    | 2512:C    | P      | 7.92         |
| 1     | R     | 170:ARG   | C      | 171:ASP   | N      | 7.88         |
| 1     | 1     | 2468:A    | O3'    | 2469:G    | P      | 6.79         |

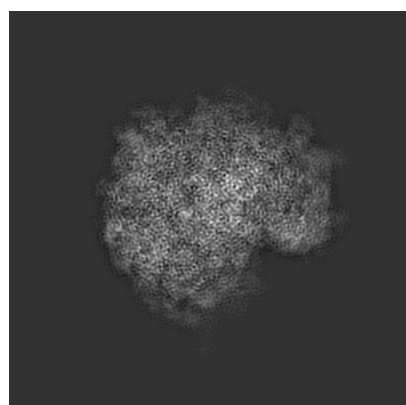
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-2599. These allow visual inspection of the internal detail of the map and identification of artifacts.

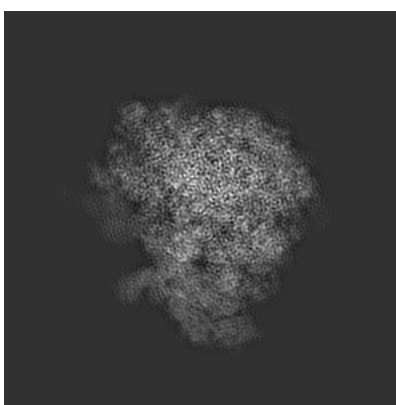
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections [i](#)

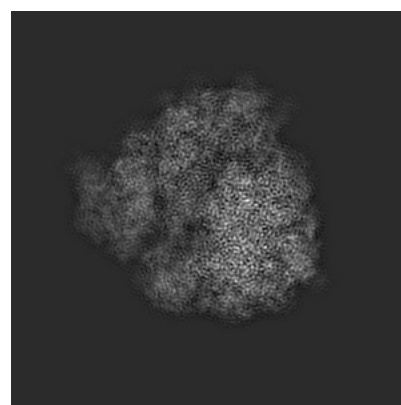
#### 6.1.1 Primary map



X



Y

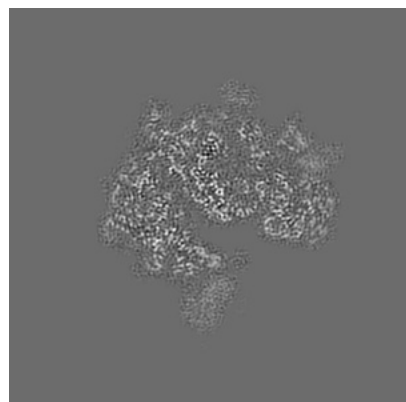


Z

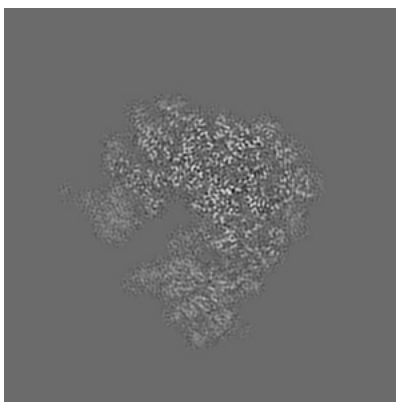
The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

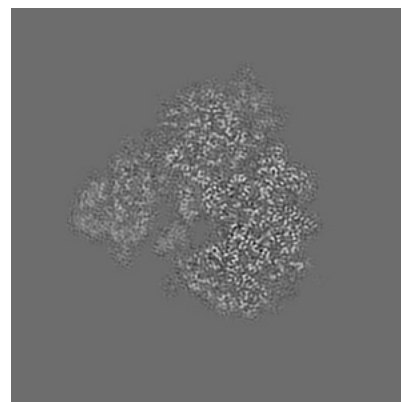
#### 6.2.1 Primary map



X Index: 160



Y Index: 160

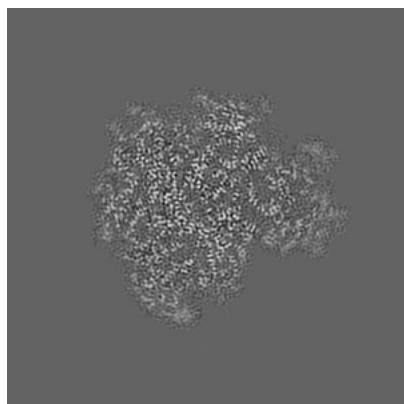


Z Index: 160

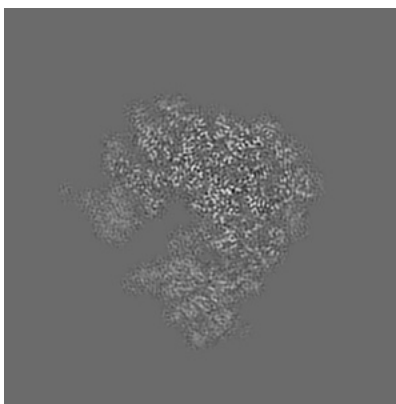
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

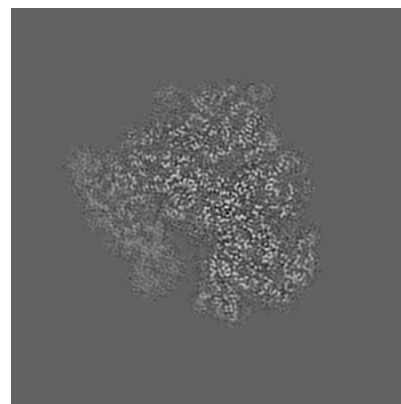
### 6.3.1 Primary map



X Index: 184



Y Index: 160

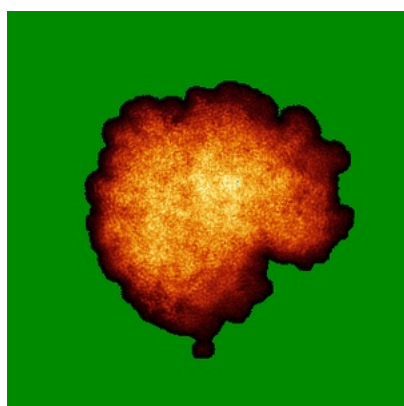


Z Index: 180

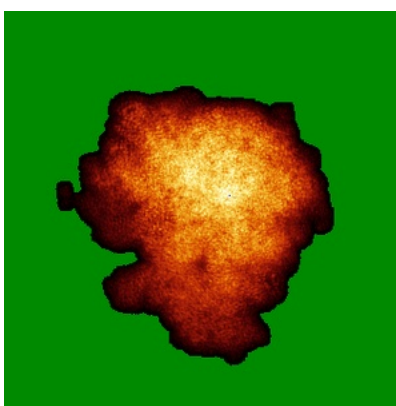
The images above show the largest variance slices of the map in three orthogonal directions.

## 6.4 Orthogonal standard-deviation projections (False-color) [i](#)

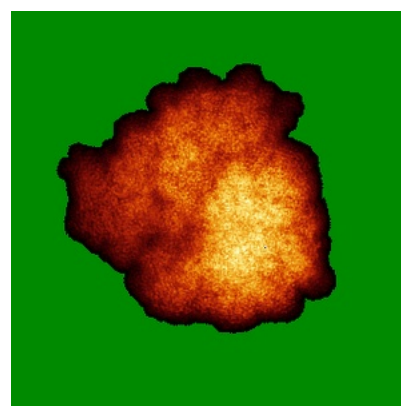
### 6.4.1 Primary map



X



Y

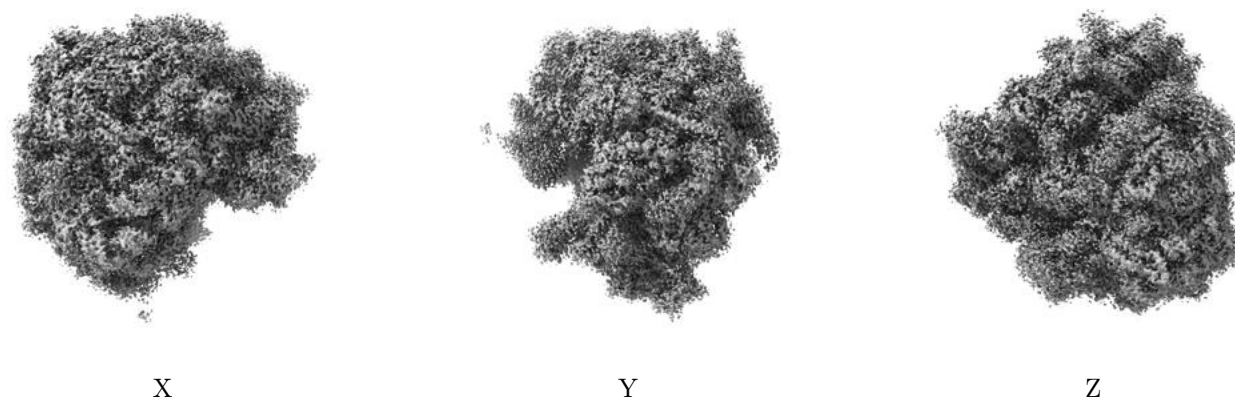


Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.12. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

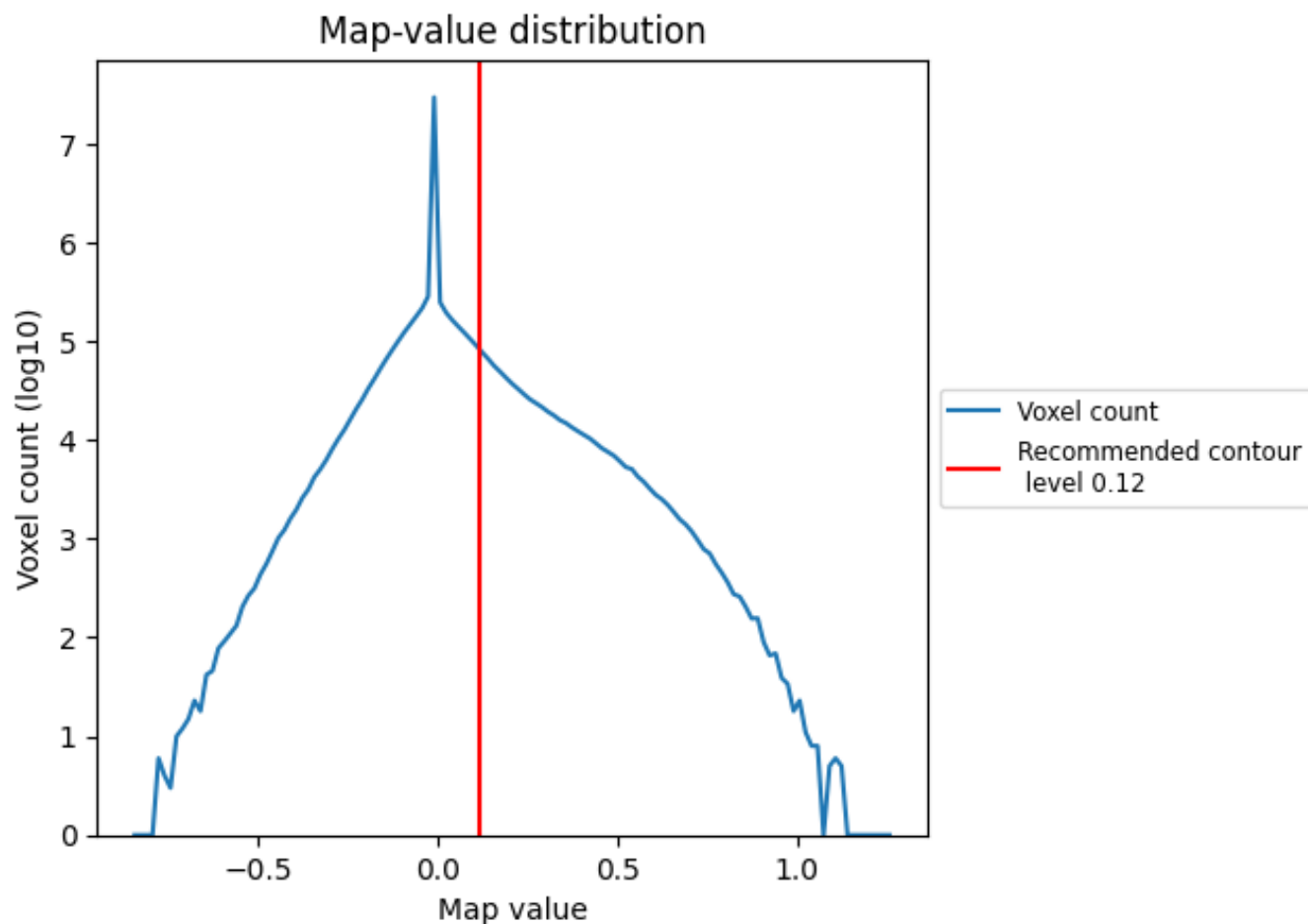
## 6.6 Mask visualisation [i](#)

This section was not generated. No masks/segmentation were deposited.

## 7 Map analysis [i](#)

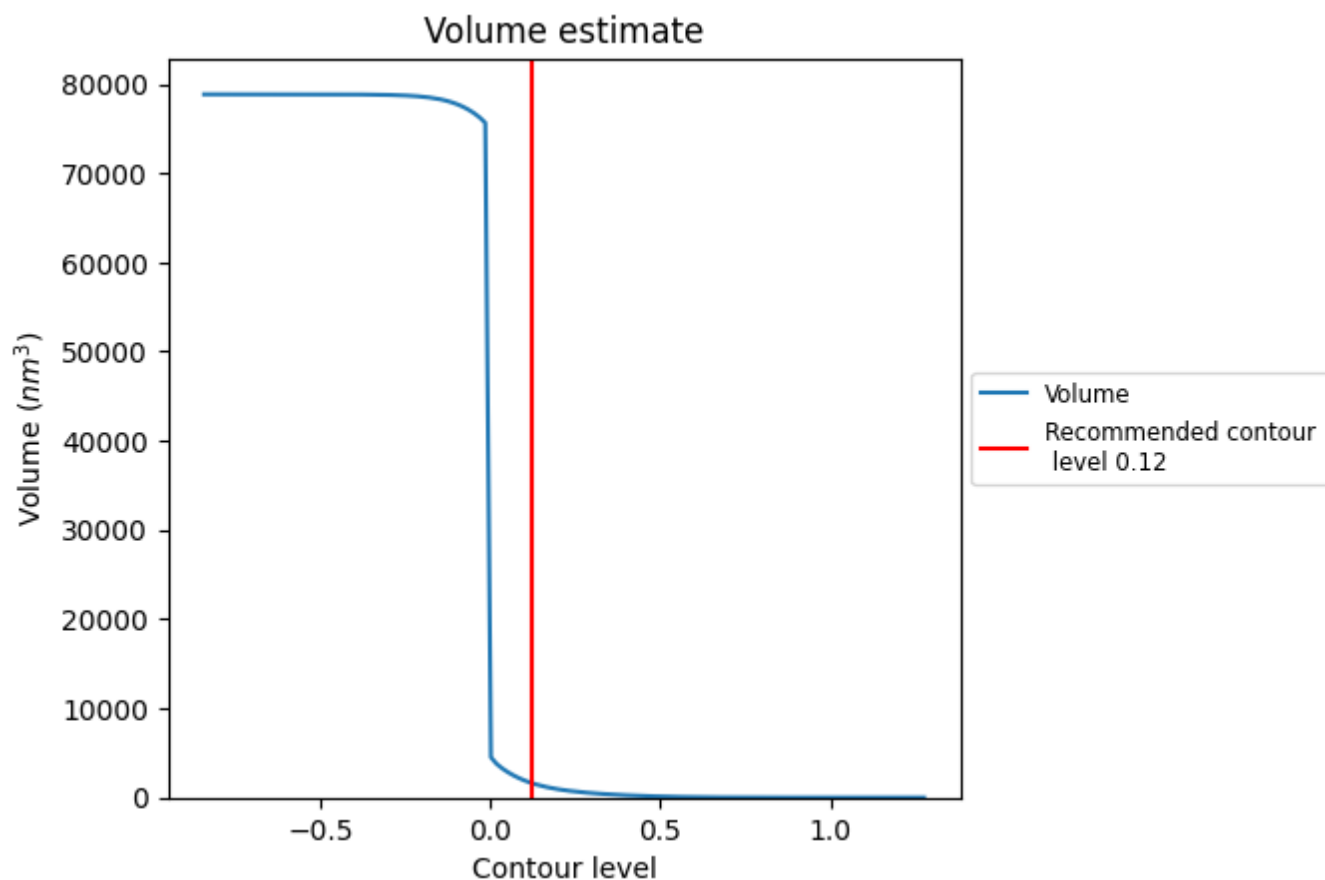
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

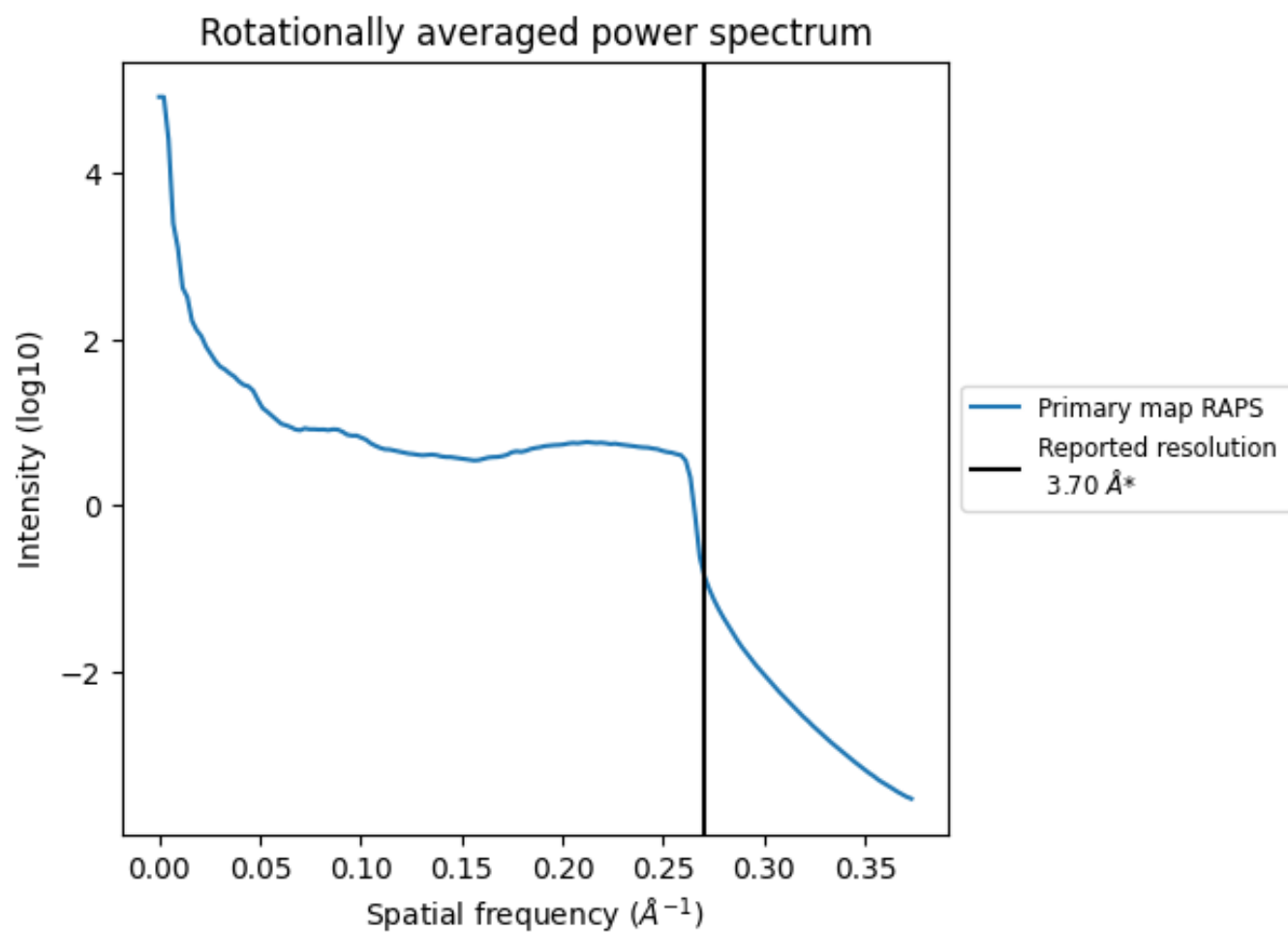
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1648  $\text{nm}^3$ ; this corresponds to an approximate mass of 1489 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

### 7.3 Rotationally averaged power spectrum ⓘ



\*Reported resolution corresponds to spatial frequency of 0.270 Å<sup>-1</sup>

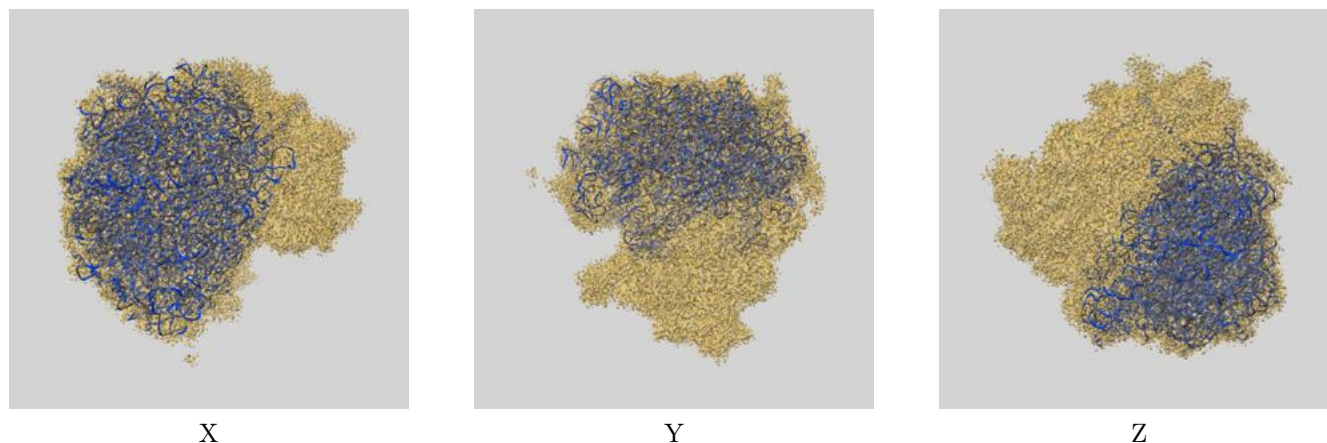
## 8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

## 9 Map-model fit [i](#)

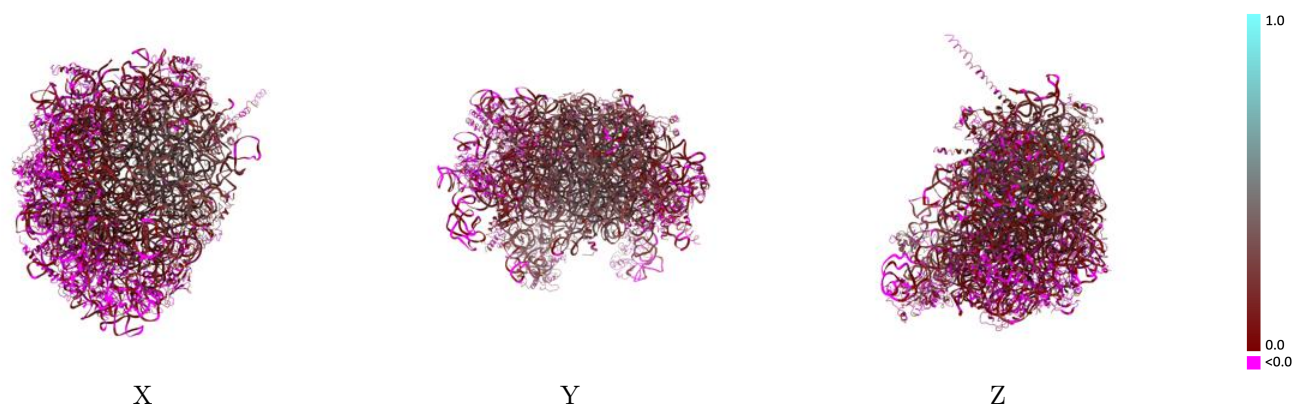
This section contains information regarding the fit between EMDB map EMD-2599 and PDB model 4V91. Per-residue inclusion information can be found in [section 3](#) on [page 12](#).

### 9.1 Map-model overlay [i](#)



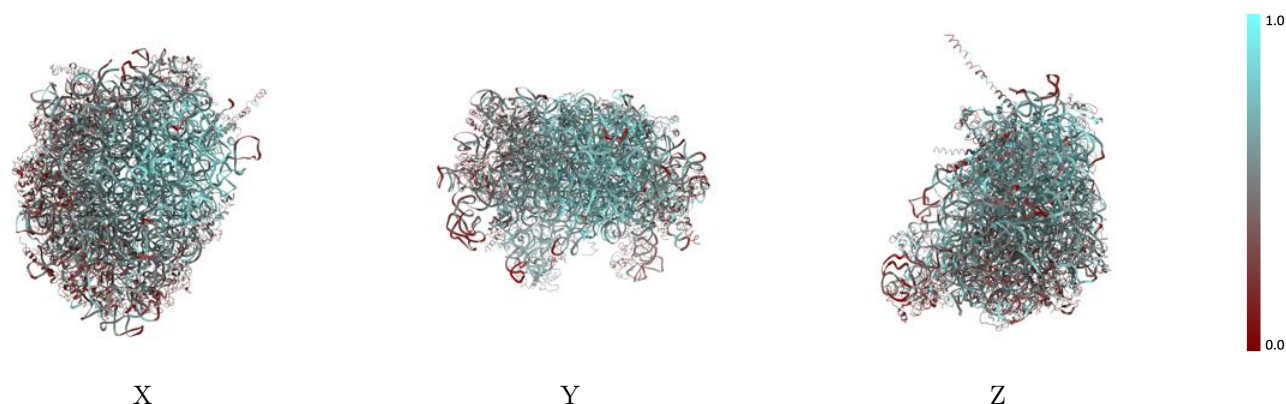
The images above show the 3D surface view of the map at the recommended contour level 0.12 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 9.2 Q-score mapped to coordinate model [i](#)



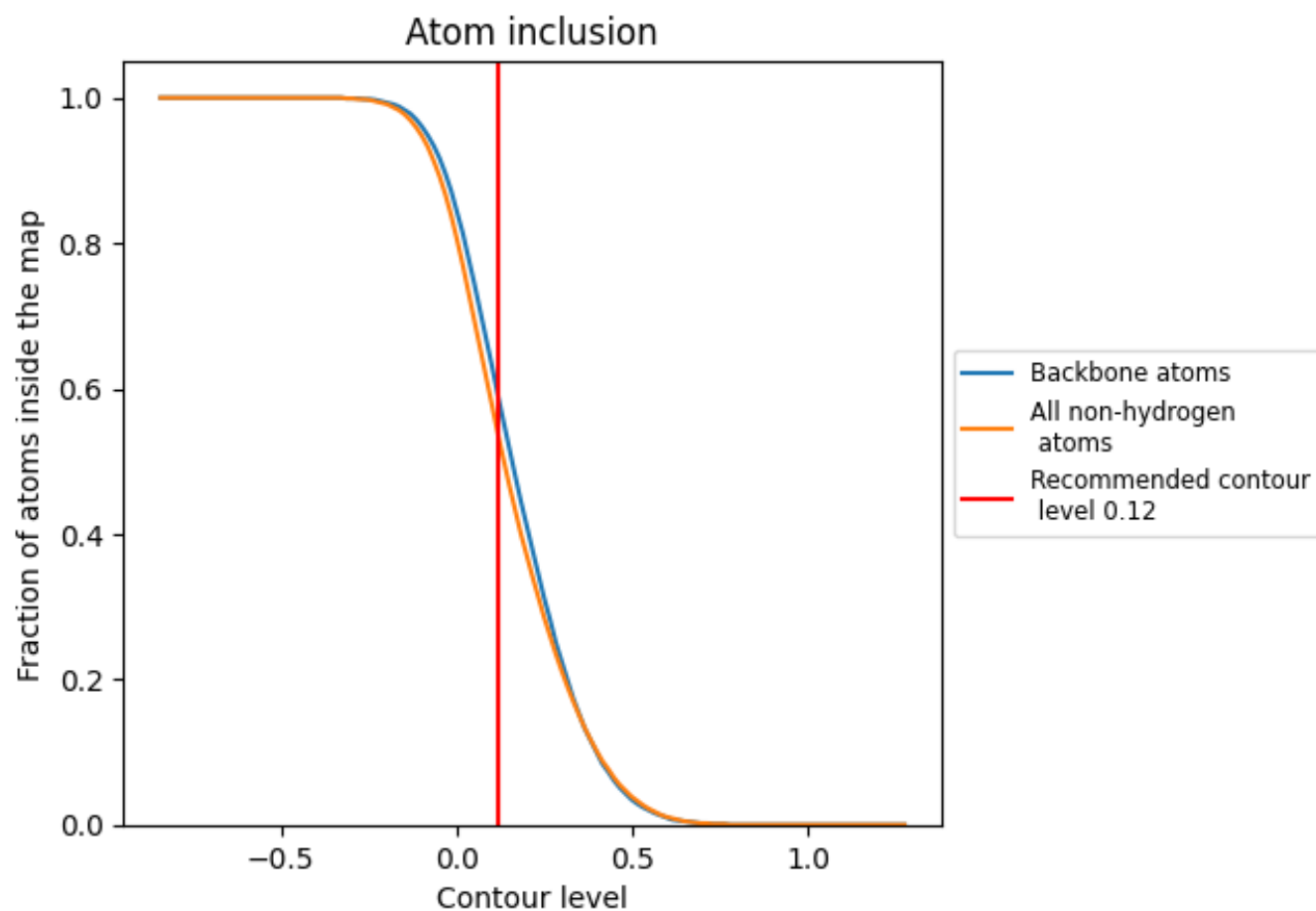
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

## 9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.12).

## 9.4 Atom inclusion [i](#)



At the recommended contour level, 59% of all backbone atoms, 53% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.12) and Q-score for the entire model and for each chain.

| Chain | Atom inclusion                                                                             | Q-score                                                                                       |
|-------|--------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| All   |  0.5340   |  0.1340      |
| 1     |  0.5930   |  0.1600      |
| 3     |  0.5980   |  0.1370      |
| 4     |  0.5950   |  0.1370      |
| A     |  0.5940   |  0.2230      |
| B     |  0.5260   |  0.1570      |
| C     |  0.3670   |  0.0180      |
| D     |  0.4590   |  0.1080      |
| E     |  0.2870   |  -0.0390   |
| F     |  0.3600   |  0.0040      |
| G     |  0.3870   |  0.0320      |
| H     |  0.3660   |  0.0180      |
| I     |  0.4840   |  0.1280      |
| J     |  0.5120   |  0.1870      |
| L     |  0.3730  |  0.0280     |
| M     |  0.3110 |  -0.0470 |
| N     |  0.4640 |  0.1000    |
| O     |  0.4380 |  0.0820    |
| P     |  0.5650 |  0.1900    |
| Q     |  0.3860 |  0.0350    |
| R     |  0.5890 |  0.2100    |
| S     |  0.3270 |  -0.0130 |
| T     |  0.4310 |  0.0910    |
| U     |  0.5750 |  0.2370    |
| V     |  0.5590 |  0.2220    |
| W     |  0.5250 |  0.1610    |
| X     |  0.5050 |  0.1530    |
| Y     |  0.4080 |  0.0450    |
| Z     |  0.4000 |  0.0490    |
| a     |  0.4050 |  0.0640    |
| b     |  0.4380 |  0.1040    |
| c     |  0.4500 |  0.1090    |
| d     |  0.6470 |  0.2700    |
| e     |  0.3700 |  0.0600    |
| f     |  0.3650 |  0.0310    |



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| Chain | Atom inclusion                                                                           | Q-score                                                                                  |
|-------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| g     |  0.5450 |  0.1720 |
| h     |  0.4380 |  0.0830 |
| i     |  0.3850 |  0.0410 |
| j     |  0.5880 |  0.2040 |
| k     |  0.5010 |  0.1560 |
| l     |  0.5400 |  0.2220 |
| m     |  0.4370 |  0.0880 |
| n     |  0.4620 |  0.1890 |
| o     |  0.5280 |  0.1710 |
| p     |  0.5800 |  0.2120 |
| t     |  0.2020 |  0.0280 |