# wwPDB EM Validation Summary Report

Feb 5, 2024 – 02:15 PM EST

| | | |
|---|---|---|
| PDB ID | : | 8G31 |
| EMDB ID | : | EMD-29687 |
| Title | : | Time-resolved cryo-EM study of the 70S recycling by the HflX:2nd Intermediate |
| Authors | : | Bhattacharjee, S.; Brown, P.Z.; Frank, J. |
| Deposited on | : | 2023-02-06 |
| Resolution | : | 3.20 Å(reported) |

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

We welcome your comments at *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.

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

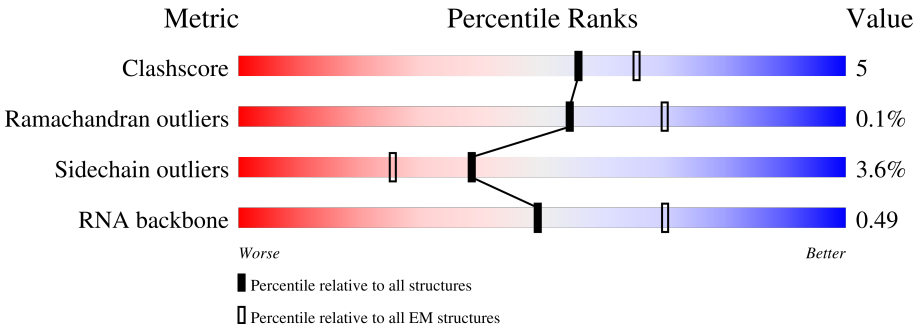
| | | |
|---|---|---|
| EMDB validation analysis | : | 0.0.1.dev70 |
| MolProbity | : | 4.02b-467 |
| Percentile statistics | : | 20191225.v01 (using entries in the PDB archive December 25th 2019) |
| MapQ | : | 1.9.9 |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.36 |

# 1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.20 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 (#Entries) | EM structures (#Entries) |
|---|---|---|
| Clashscore | 158937 | 4297 |
| Ramachandran outliers | 154571 | 4023 |
| Sidechain outliers | 154315 | 3826 |
| RNA backbone | 4643 | 859 |

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 >=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 <=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 | 0 | 56 | 64% 77% 20% · |
| 2 | 1 | 51 | 100% 78% 22% |
| 3 | 2 | 46 | 70% 83% 17% |
| 4 | 3 | 64 | 78% 81% 17% · |
| 5 | 4 | 38 | 71% 66% 26% 8% |
| 6 | 6 | 426 | 82% 80% 18% · |
| 7 | A | 117 | 57% 60% 28% 12% |

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| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 8 | B | 2903 | 56% 60% 33% 6% |
| 9 | C | 272 | 65% 80% 20% |
| 10 | D | 209 | 79% 90% 10% |
| 11 | E | 201 | 79% 88% 11% |
| 12 | F | 178 | 99% 78% 21% |
| 13 | G | 176 | 85% 81% 18% |
| 14 | J | 142 | 68% 75% 23% |
| 15 | K | 122 | 71% 75% 25% |
| 16 | L | 143 | 69% 83% 16% |
| 17 | M | 136 | 63% 81% 19% |
| 18 | N | 121 | 72% 76% 22% |
| 19 | O | 116 | 78% 78% 22% |
| 20 | P | 114 | 74% 75% 24% |
| 21 | Q | 117 | 74% 72% 25% |
| 22 | R | 103 | 67% 85% 15% |
| 23 | S | 110 | 70% 68% 29% |
| 24 | T | 94 | 79% 82% 15% |
| 25 | U | 103 | 77% 83% 17% |
| 26 | V | 94 | 82% 88% 11% |
| 27 | W | 79 | 70% 65% 32% |
| 28 | X | 77 | 60% 79% 21% |
| 29 | Y | 63 | 65% 76% 21% |
| 30 | Z | 58 | 78% 76% 22% |
| 31 | c | 205 | 53% 97% |
| 32 | d | 150 | 31% 97% |

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| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 33 | e | 100 | 64% 92% 8% |
| 34 | f | 151 | 92% 97% |
| 35 | g | 129 | 33% 99% |
| 36 | h | 127 | 84% 98% |
| 37 | i | 98 | 63% 98% |
| 38 | j | 117 | 52% 94% 6% |
| 39 | k | 123 | 48% 98% |
| 40 | l | 114 | 88% 96% |
| 41 | m | 100 | 67% 91% 5% |
| 42 | n | 88 | 50% 94% 6% |
| 43 | o | 82 | 52% 99% |
| 44 | p | 80 | 66% 99% |
| 45 | q | 55 | 38% 100% |
| 46 | r | 79 | 96% 97% |
| 47 | s | 85 | 59% 100% |
| 48 | t | 51 | 86% 94% 6% |
| 49 | u | 59 | 100% 92% 8% |
| 50 | v | 1539 | 42% 69% 28% |
| 51 | w | 218 | 78% 95% 5% |
| 52 | x | 206 | 27% 98% |

# 2 Entry composition (i)

There are 52 unique types of molecules in this entry. The entry contains 144258 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 protein called 50S ribosomal protein L32.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 1 | 0 | 56 | 444 | 269 | 94 | 80 | 1 | 0 | 0 |

- Molecule 2 is a protein called 50S ribosomal protein L33.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | | |
| 2 | 1 | 51 | 410 | 263 | 76 | 71 | 0 | 1 |

- Molecule 3 is a protein called 50S ribosomal protein L34.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 3 | 2 | 46 | 377 | 228 | 90 | 57 | 2 | 0 | 0 |

- Molecule 4 is a protein called 50S ribosomal protein L35.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 4 | 3 | 64 | 504 | 323 | 105 | 74 | 2 | 0 | 0 |

- Molecule 5 is a protein called 50S ribosomal protein L36.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 5 | 4 | 38 | 302 | 185 | 65 | 48 | 4 | 0 | 0 |

- Molecule 6 is a protein called GTPase HflX.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 6 | 6 | 426 | 3403 | 2129 | 624 | 641 | 9 | 0 | 0 |

- Molecule 7 is a RNA chain called 5S.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 7 | A | 117 | Total | C | N | O | P | 0 | 0 |
| | | | 2504 | 1116 | 459 | 813 | 116 | | |

- Molecule 8 is a RNA chain called 23S.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 8 | B | 2903 | Total | C | N | O | P | 0 | 0 |
| | | | 62317 | 27801 | 11467 | 20147 | 2902 | | |

- Molecule 9 is a protein called 50S ribosomal protein L2.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 9 | C | 272 | Total | C | N | O | S | 0 | 1 |
| | | | 2083 | 1288 | 424 | 364 | 7 | | |

- Molecule 10 is a protein called 50S ribosomal protein L3.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 10 | D | 209 | Total | C | N | O | S | 0 | 0 |
| | | | 1565 | 979 | 288 | 294 | 4 | | |

- Molecule 11 is a protein called 50S ribosomal protein L4.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 11 | E | 201 | Total | C | N | O | S | 0 | 0 |
| | | | 1552 | 974 | 283 | 290 | 5 | | |

- Molecule 12 is a protein called 50S ribosomal protein L5.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 12 | F | 178 | Total | C | N | O | S | 0 | 0 |
| | | | 1420 | 905 | 251 | 258 | 6 | | |

- Molecule 13 is a protein called 50S ribosomal protein L6.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 13 | G | 176 | Total | C | N | O | S | 0 | 0 |
| | | | 1323 | 832 | 243 | 246 | 2 | | |

- Molecule 14 is a protein called 50S ribosomal protein L13.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 14 | J | 142 | Total | C | N | O | S | 0 | 0 |
| | | | 1129 | 714 | 212 | 199 | 4 | | |

- Molecule 15 is a protein called 50S ribosomal protein L14.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 15 | K | 122 | Total | C | N | O | S | 0 | 1 |
| | | | 931 | 582 | 180 | 164 | 5 | | |

- Molecule 16 is a protein called 50S ribosomal protein L15.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 16 | L | 143 | Total | C | N | O | S | 0 | 0 |
| | | | 1045 | 649 | 206 | 189 | 1 | | |

- Molecule 17 is a protein called 50S ribosomal protein L16.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 17 | M | 136 | Total | C | N | O | S | 0 | 0 |
| | | | 1074 | 686 | 205 | 177 | 6 | | |

- Molecule 18 is a protein called 50S ribosomal protein L17.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 18 | N | 121 | Total | C | N | O | S | 0 | 1 |
| | | | 961 | 593 | 197 | 166 | 5 | | |

- Molecule 19 is a protein called 50S ribosomal protein L18.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 19 | O | 116 | Total | C | N | O | 0 | 0 |
| | | | 892 | 552 | 178 | 162 | | |

- Molecule 20 is a protein called 50S ribosomal protein L19.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 20 | P | 114 | Total | C | N | O | S | 0 | 0 |
| | | | 917 | 574 | 179 | 163 | 1 | | |

- Molecule 21 is a protein called 50S ribosomal protein L20.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 21 | Q | 117 | Total<br>947 | C<br>604 | N<br>192 | O<br>151 | 0 | 0 |

- Molecule 22 is a protein called Ribosomal protein L21.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 22 | R | 103 | Total<br>816 | C<br>516 | N<br>153 | O<br>145 | S<br>2 | 0 | 0 |

- Molecule 23 is a protein called 50S ribosomal protein L22.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 23 | S | 110 | Total<br>857 | C<br>532 | N<br>166 | O<br>156 | S<br>3 | 0 | 0 |

- Molecule 24 is a protein called 50S ribosomal protein L23.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 24 | T | 94 | Total<br>739 | C<br>466 | N<br>140 | O<br>131 | S<br>2 | 0 | 1 |

- Molecule 25 is a protein called 50S ribosomal protein L24.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 25 | U | 103 | Total<br>780 | C<br>492 | N<br>147 | O<br>141 | 0 | 1 |

- Molecule 26 is a protein called 50S ribosomal protein L25.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 26 | V | 94 | Total<br>753 | C<br>479 | N<br>137 | O<br>134 | S<br>3 | 0 | 0 |

- Molecule 27 is a protein called 50S ribosomal protein L27.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 27 | W | 79 | Total<br>596 | C<br>367 | N<br>120 | O<br>108 | S<br>1 | 0 | 0 |

- Molecule 28 is a protein called 50S ribosomal protein L28.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 28 | X | 77 | Total | C | N | O | S | 0 | 0 |
| | | | 625 | 388 | 129 | 106 | 2 | | |

- Molecule 29 is a protein called 50S ribosomal protein L29.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 29 | Y | 63 | Total | C | N | O | S | 0 | 0 |
| | | | 509 | 313 | 99 | 95 | 2 | | |

- Molecule 30 is a protein called 50S ribosomal protein L30.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 30 | Z | 58 | Total | C | N | O | S | 0 | 0 |
| | | | 449 | 281 | 87 | 79 | 2 | | |

- Molecule 31 is a protein called 30S ribosomal protein S4.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 31 | c | 205 | Total | C | N | O | S | 0 | 0 |
| | | | 1643 | 1026 | 315 | 298 | 4 | | |

- Molecule 32 is a protein called 30S ribosomal protein S5.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 32 | d | 150 | Total | C | N | O | S | 0 | 0 |
| | | | 1106 | 687 | 211 | 202 | 6 | | |

- Molecule 33 is a protein called 30S ribosomal protein S6, non-modified isoform.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 33 | e | 100 | Total | C | N | O | S | 0 | 0 |
| | | | 818 | 515 | 148 | 149 | 6 | | |

- Molecule 34 is a protein called 30S ribosomal protein S7.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 34 | f | 151 | Total | C | N | O | S | 0 | 0 |
| | | | 1182 | 735 | 227 | 216 | 4 | | |

- Molecule 35 is a protein called 30S ribosomal protein S8.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 35 | g | 129 | Total | C | N | O | S | 0 | 0 |
| | | | 979 | 616 | 173 | 184 | 6 | | |

- Molecule 36 is a protein called 30S ribosomal protein S9.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 36 | h | 127 | Total | C | N | O | S | 0 | 0 |
| | | | 1022 | 634 | 206 | 179 | 3 | | |

- Molecule 37 is a protein called 30S ribosomal protein S10.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 37 | i | 98 | Total | C | N | O | S | 0 | 0 |
| | | | 787 | 493 | 150 | 143 | 1 | | |

- Molecule 38 is a protein called 30S ribosomal protein S11.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 38 | j | 117 | Total | C | N | O | S | 0 | 0 |
| | | | 877 | 540 | 174 | 160 | 3 | | |

- Molecule 39 is a protein called 30S ribosomal protein S12.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 39 | k | 123 | Total | C | N | O | S | 0 | 0 |
| | | | 955 | 590 | 196 | 165 | 4 | | |

- Molecule 40 is a protein called 30S ribosomal protein S13.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 40 | l | 114 | Total | C | N | O | S | 0 | 0 |
| | | | 884 | 546 | 178 | 157 | 3 | | |

- Molecule 41 is a protein called 30S ribosomal protein S14.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 41 | m | 96 | Total | C | N | O | S | 0 | 0 |
| | | | 774 | 483 | 160 | 128 | 3 | | |

- Molecule 42 is a protein called 30S ribosomal protein S15.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 42 | n | 88 | Total | C | N | O | S | 0 | 0 |
| | | | 714 | 439 | 144 | 130 | 1 | | |

- Molecule 43 is a protein called 30S ribosomal protein S16.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 43 | o | 82 | Total | C | N | O | S | 0 | 0 |
| | | | 649 | 406 | 128 | 114 | 1 | | |

- Molecule 44 is a protein called 30S ribosomal protein S17.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 44 | p | 80 | Total | C | N | O | S | 0 | 0 |
| | | | 649 | 411 | 121 | 114 | 3 | | |

- Molecule 45 is a protein called 30S ribosomal protein S18.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 45 | q | 55 | Total | C | N | O | 0 | 0 |
| | | | 456 | 288 | 86 | 82 | | |

- Molecule 46 is a protein called 30S ribosomal protein S19.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 46 | r | 79 | Total | C | N | O | S | 0 | 0 |
| | | | 638 | 408 | 120 | 108 | 2 | | |

- Molecule 47 is a protein called 30S ribosomal protein S20.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 47 | s | 85 | Total | C | N | O | S | 0 | 0 |
| | | | 665 | 411 | 137 | 114 | 3 | | |

- Molecule 48 is a protein called 30S ribosomal protein S21 (Fragment).

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 48 | t | 51 | Total | C | N | O | S | 0 | 0 |
| | | | 426 | 265 | 86 | 74 | 1 | | |

- Molecule 49 is a protein called Transcription termination/antitermination protein NusG.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 49 | u | 59 | Total | C | N | O | S | 0 | 0 |
| | | | 468 | 297 | 78 | 92 | 1 | | |

- Molecule 50 is a RNA chain called 16S.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 50 | v | 1539 | Total | C | N | O | P | 0 | 0 |
| | | | 33012 | 14725 | 6052 | 10697 | 1538 | | |

- Molecule 51 is a protein called 30S ribosomal protein S2.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 51 | w | 218 | Total | C | N | O | S | 0 | 0 |
| | | | 1705 | 1081 | 305 | 312 | 7 | | |

- Molecule 52 is a protein called 30S ribosomal protein S3.

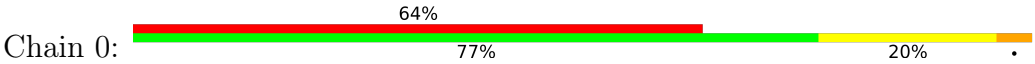
| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 52 | x | 206 | Total | C | N | O | S | 0 | 0 |
| | | | 1625 | 1028 | 305 | 289 | 3 | | |

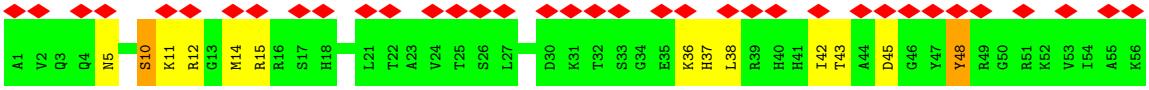
# 3 Residue-property plots (i)

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: 50S ribosomal protein L32

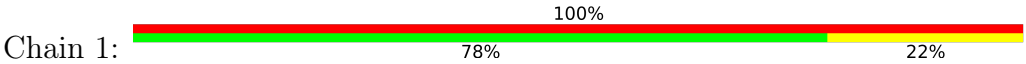
Chain 0:




• Molecule 2: 50S ribosomal protein L33

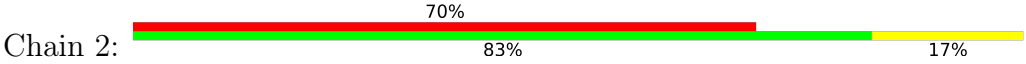
Chain 1:

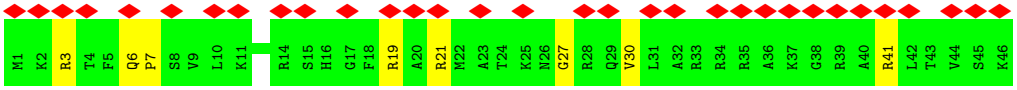




• Molecule 3: 50S ribosomal protein L34

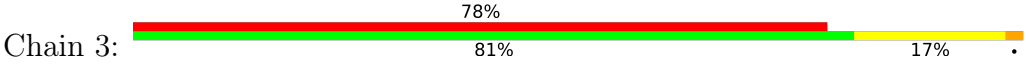
Chain 2:




• Molecule 4: 50S ribosomal protein L35

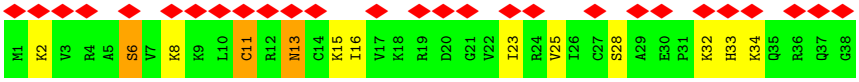
Chain 3:





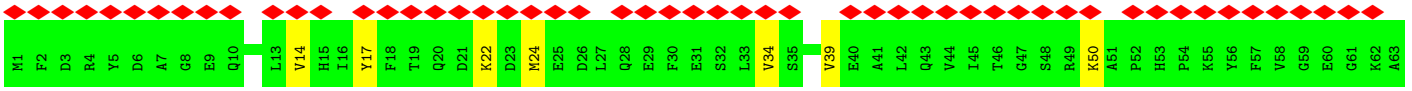
• Molecule 5: 50S ribosomal protein L36

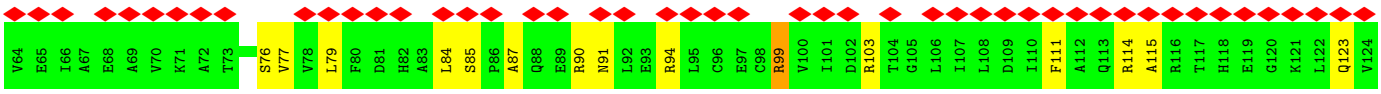
Chain 4:

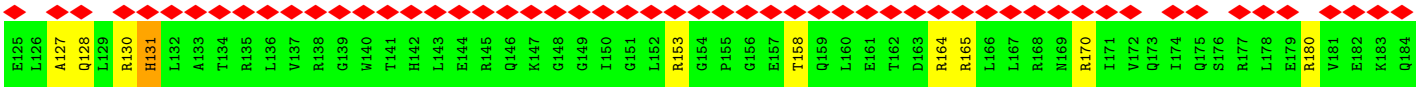


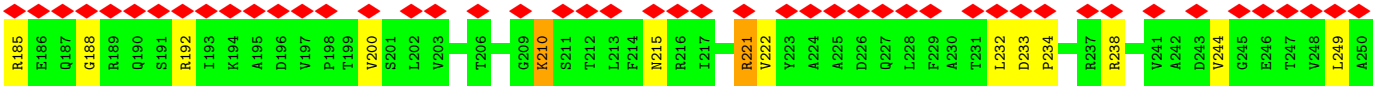

• Molecule 6: GTPase HflX

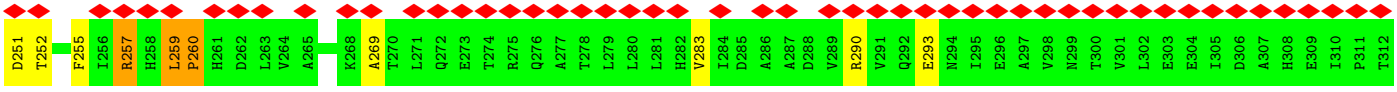
Chain 6:

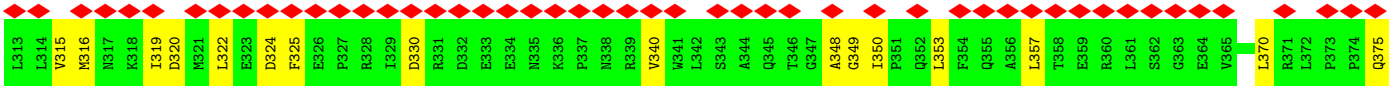



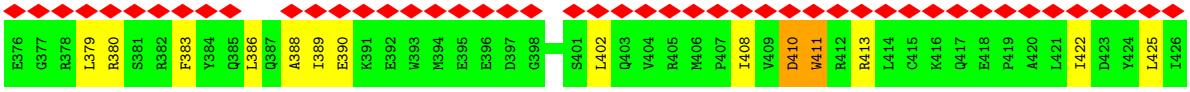




• Molecule 7: 5S

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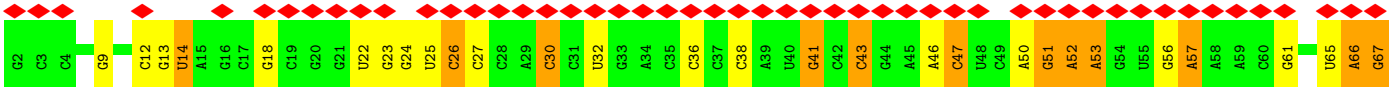


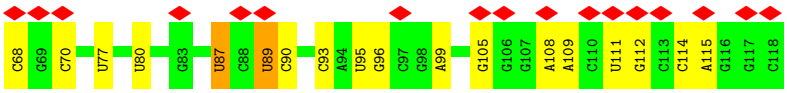


• Molecule 8: 23S

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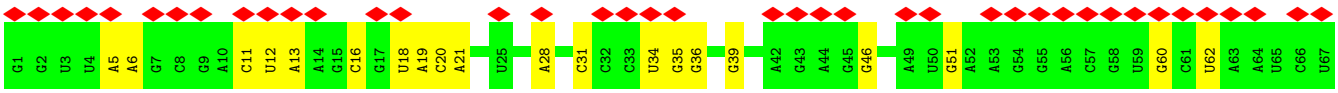


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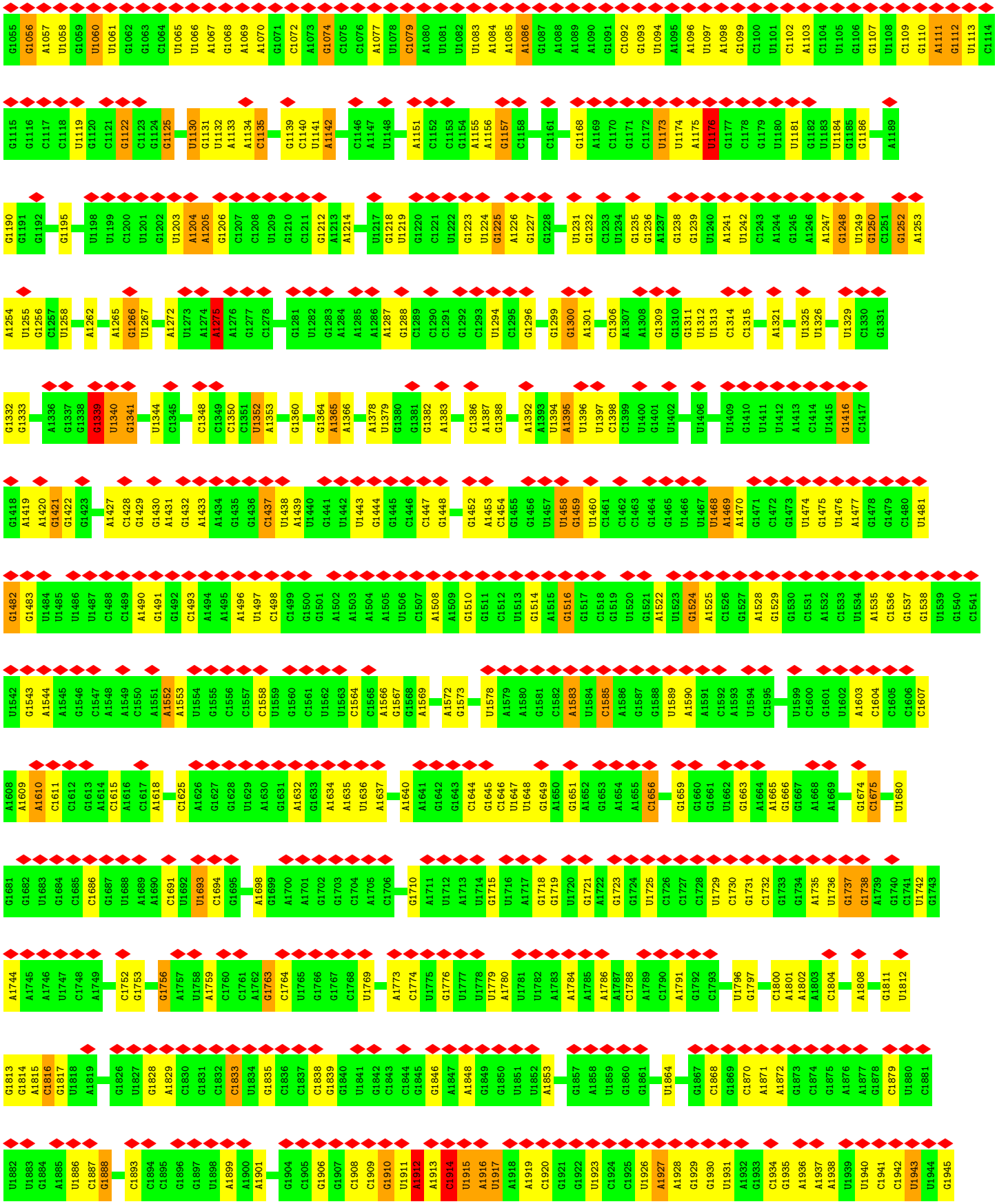
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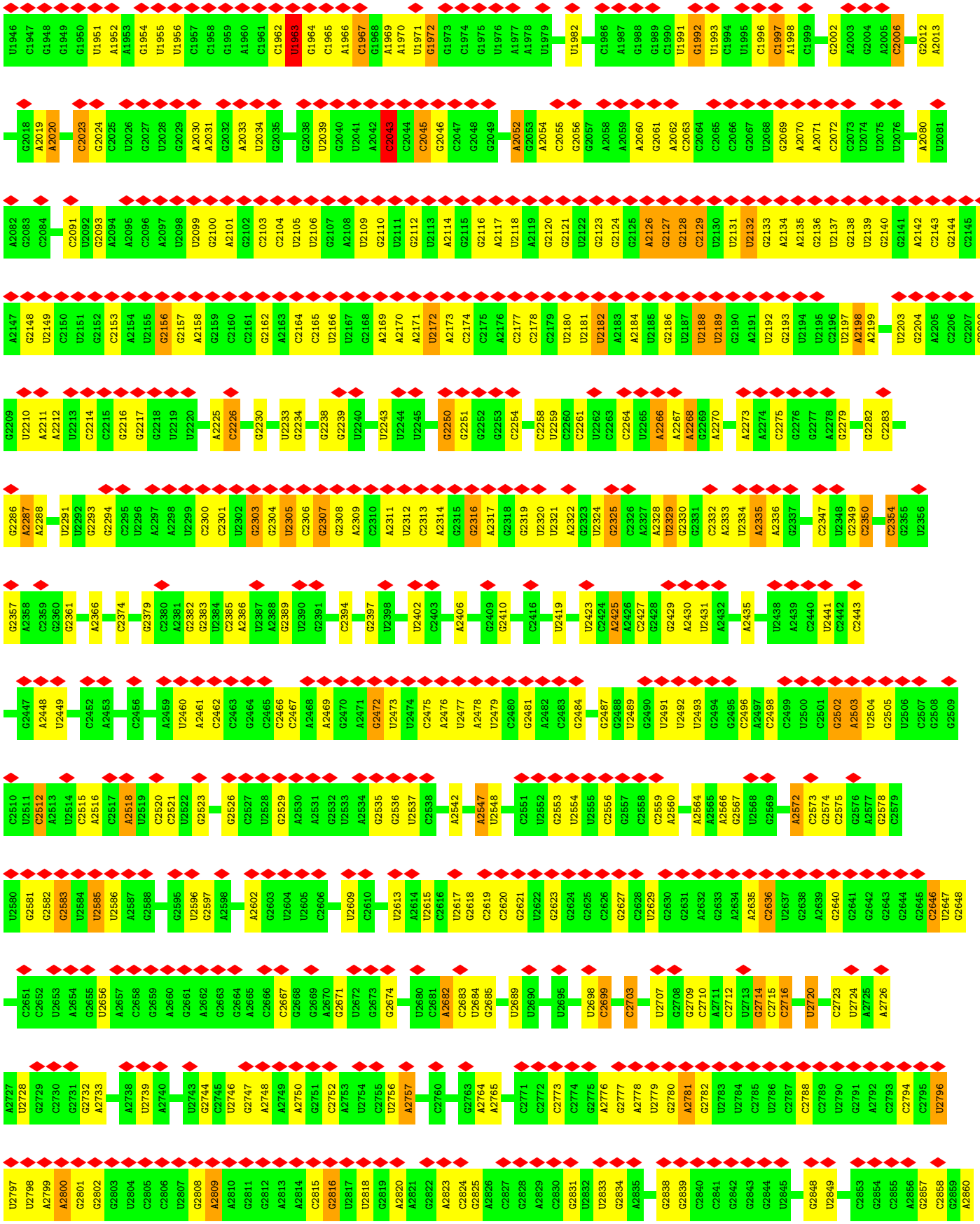
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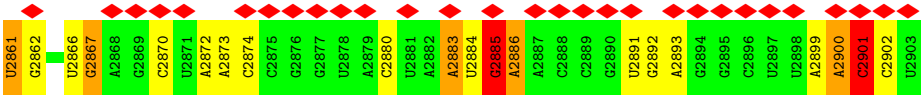
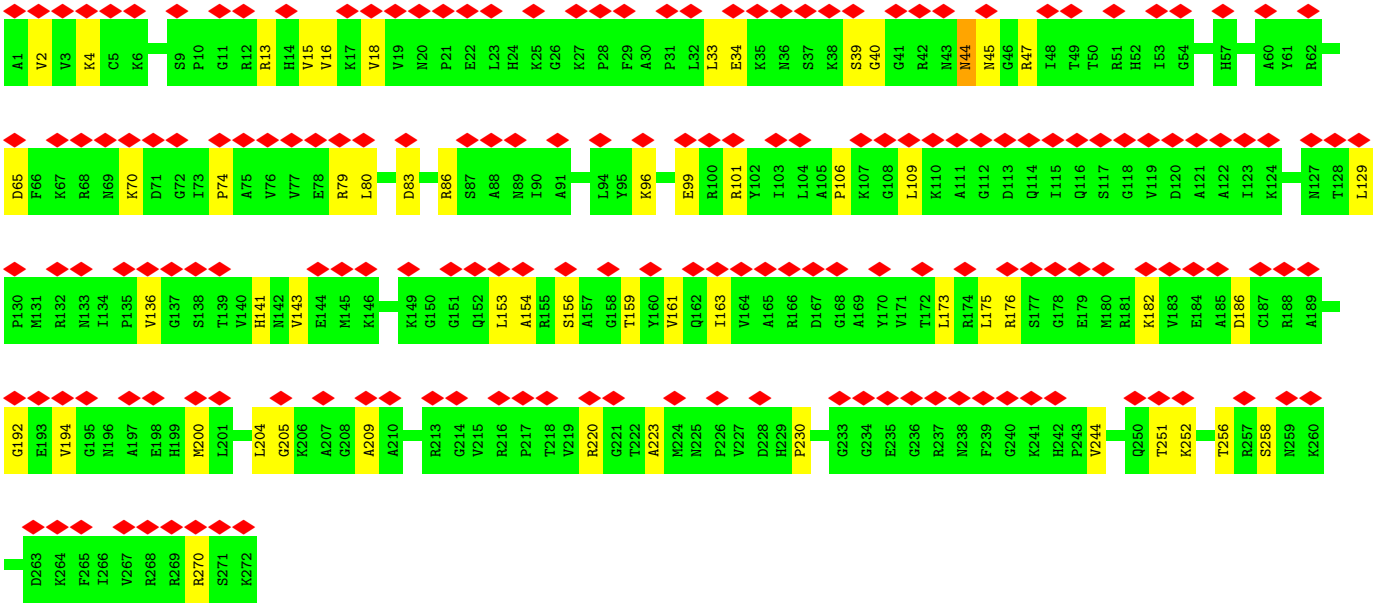


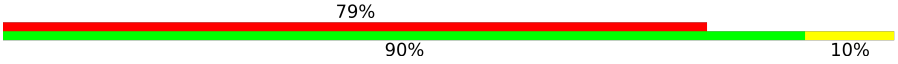

• Molecule 9: 50S ribosomal protein L2

Chain C:


• Molecule 10: 50S ribosomal protein L3

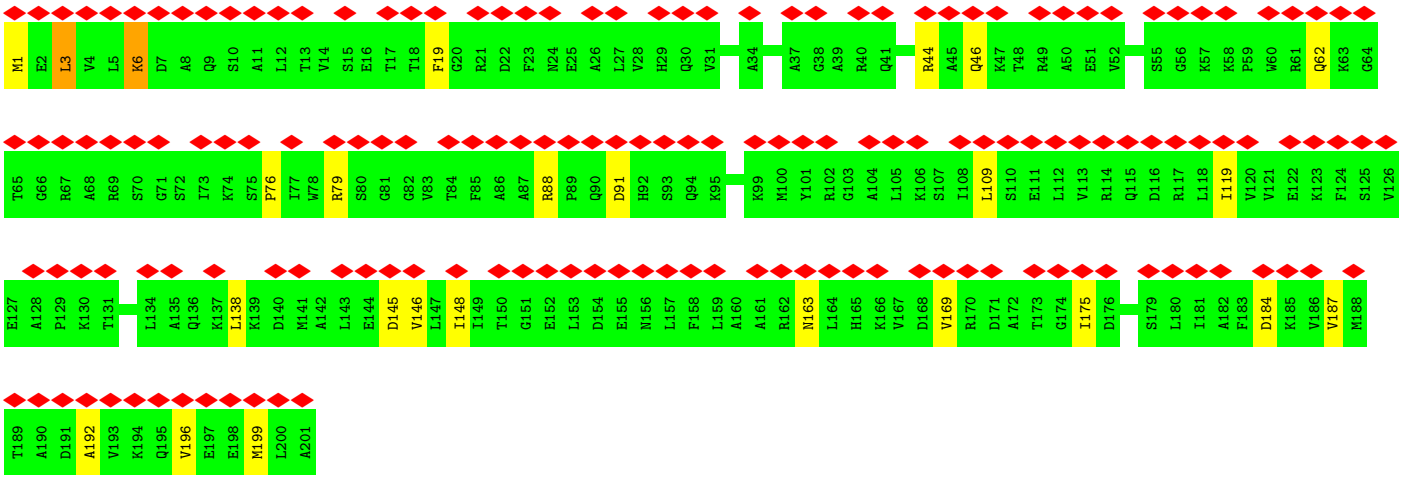
Chain D:





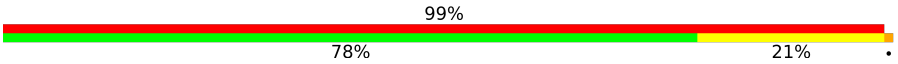
• Molecule 11: 50S ribosomal protein L4

Chain E:




• Molecule 12: 50S ribosomal protein L5

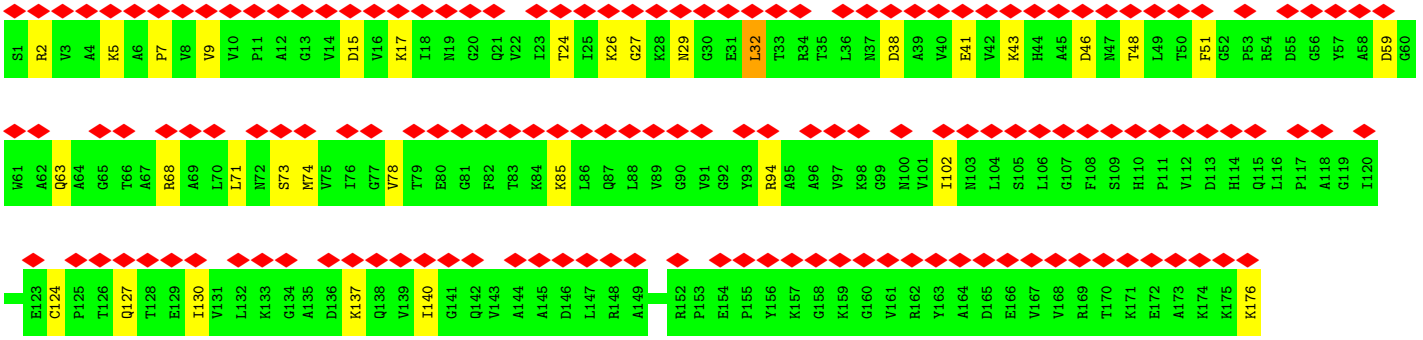
Chain F:





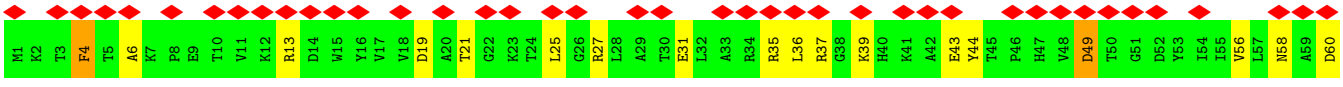
• Molecule 13: 50S ribosomal protein L6

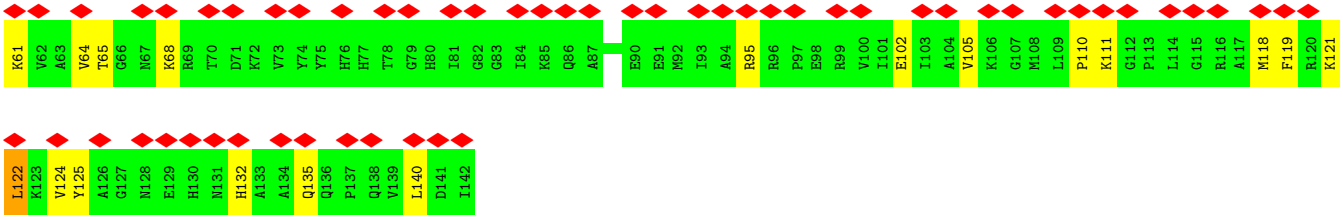
Chain G:


• Molecule 14: 50S ribosomal protein L13

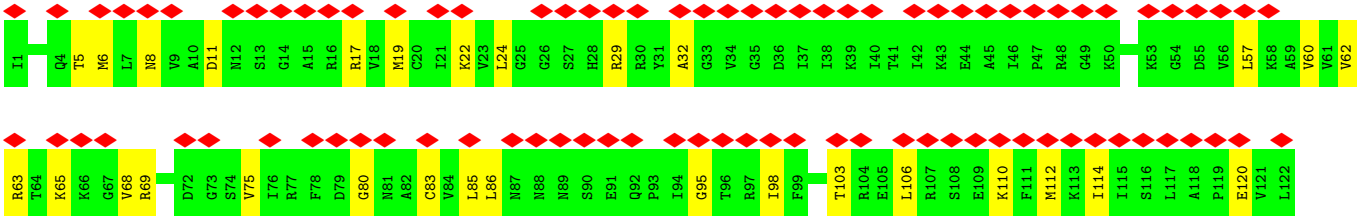
Chain J:



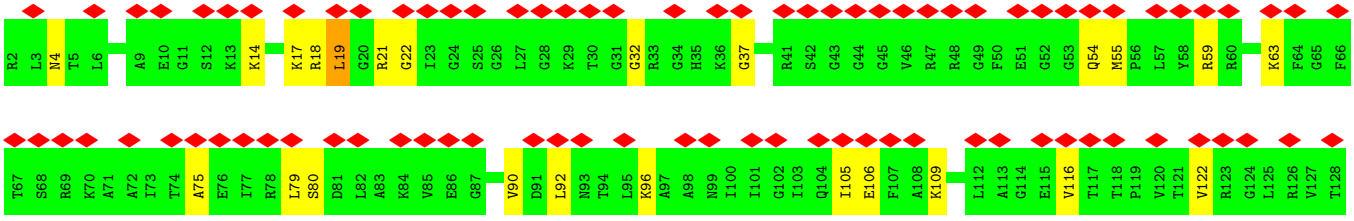

• Molecule 15: 50S ribosomal protein L14

Chain K:

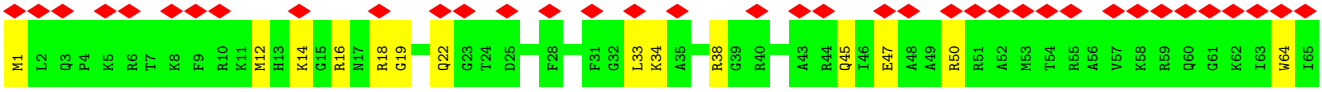

• Molecule 16: 50S ribosomal protein L15

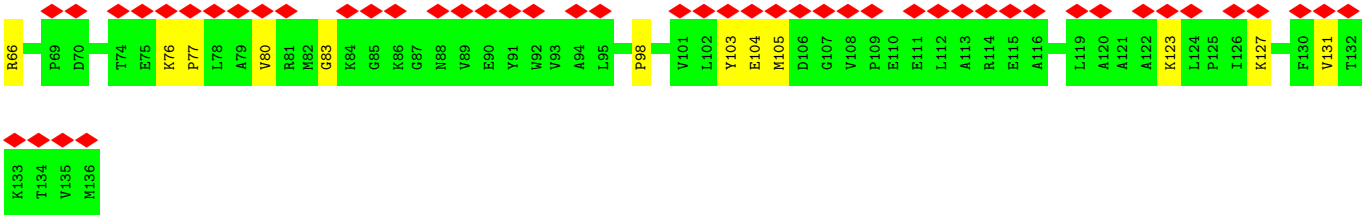
Chain L:


• Molecule 17: 50S ribosomal protein L16

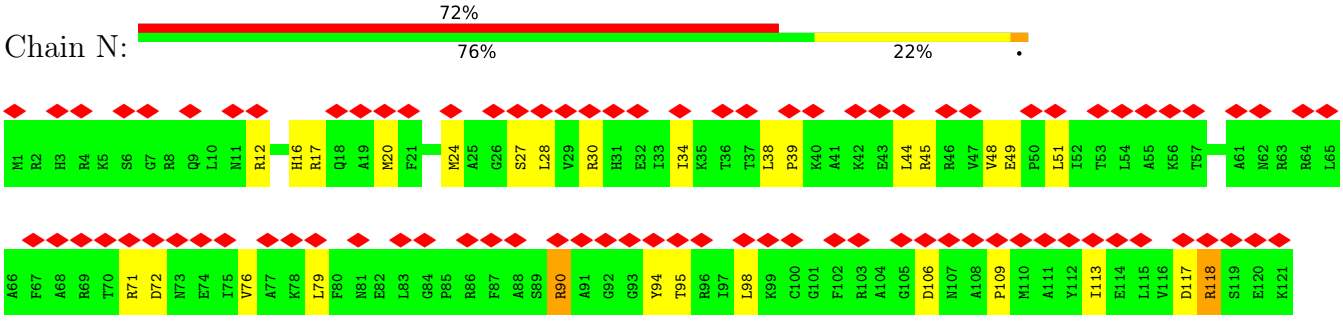
Chain M:

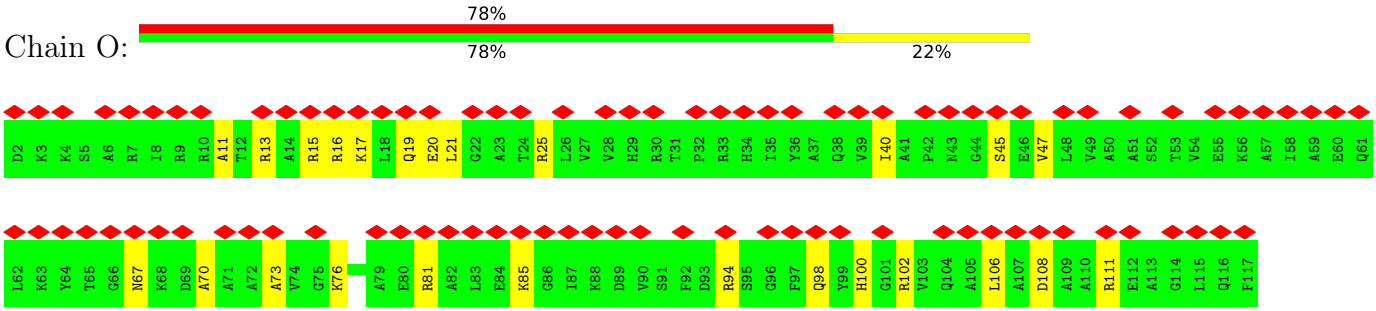

• Molecule 18: 50S ribosomal protein L17

Chain N:



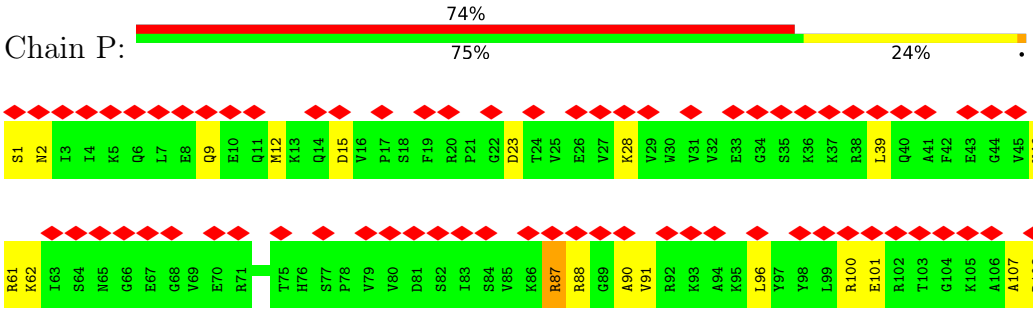

• Molecule 19: 50S ribosomal protein L18

Chain O:



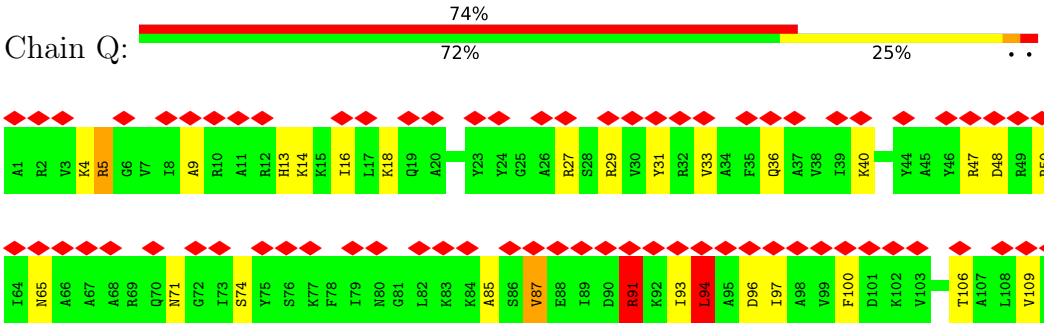

• Molecule 20: 50S ribosomal protein L19

Chain P:



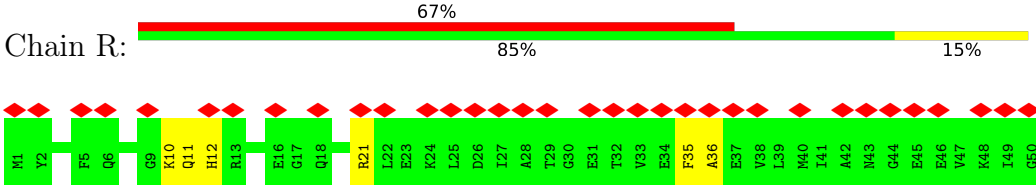

• Molecule 21: 50S ribosomal protein L20

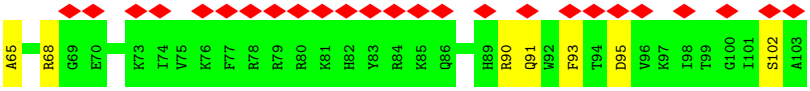
Chain Q:



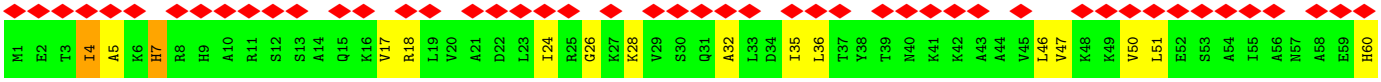

• Molecule 22: Ribosomal protein L21

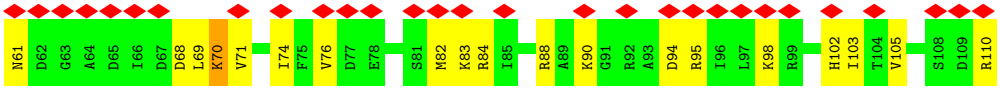
Chain R:



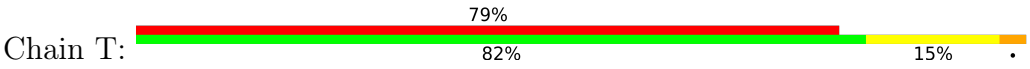


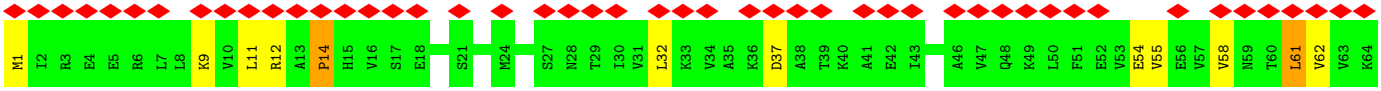

• Molecule 23: 50S ribosomal protein L22

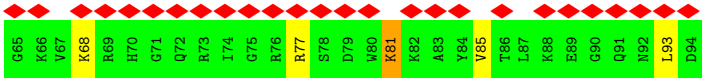



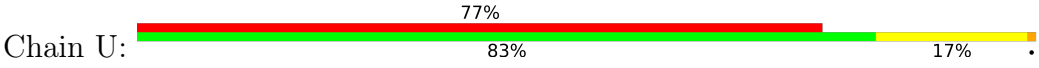

• Molecule 24: 50S ribosomal protein L23

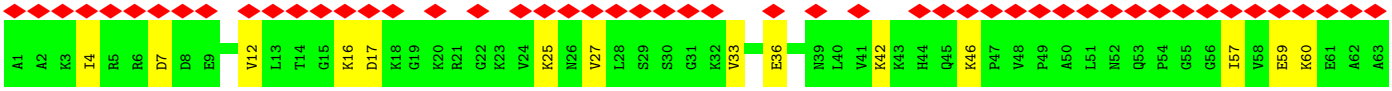


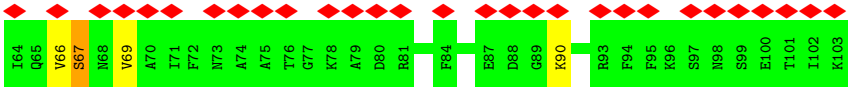



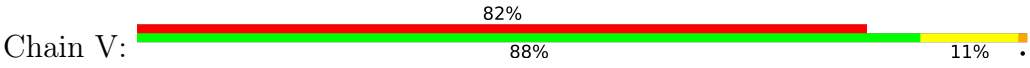

• Molecule 25: 50S ribosomal protein L24

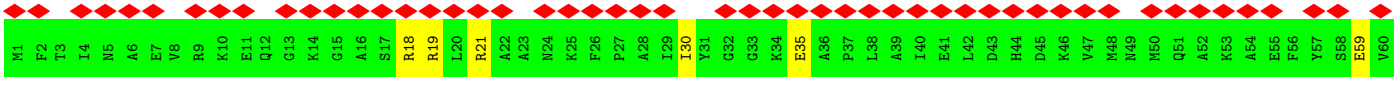


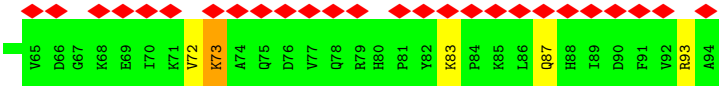




• Molecule 26: 50S ribosomal protein L25

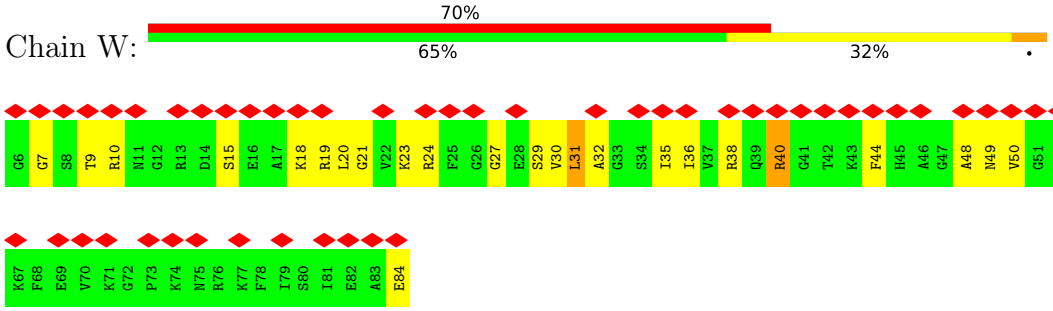


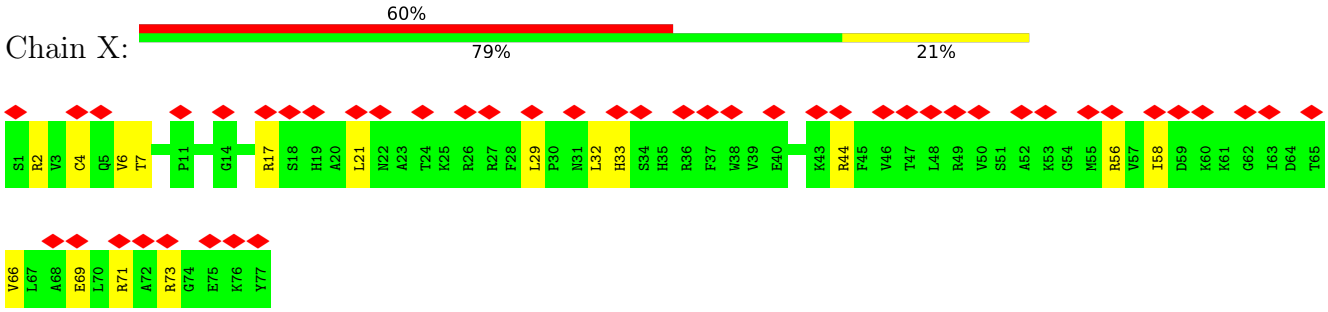

• Molecule 27: 50S ribosomal protein L27

Chain W:



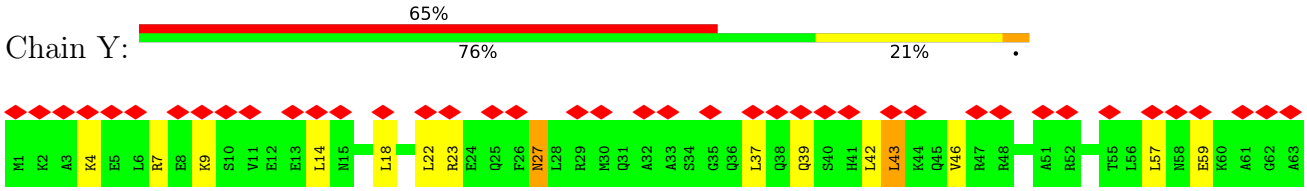

• Molecule 28: 50S ribosomal protein L28

Chain X:



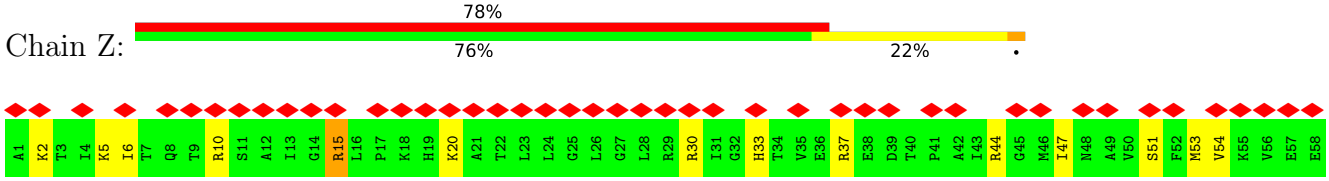

• Molecule 29: 50S ribosomal protein L29

Chain Y:



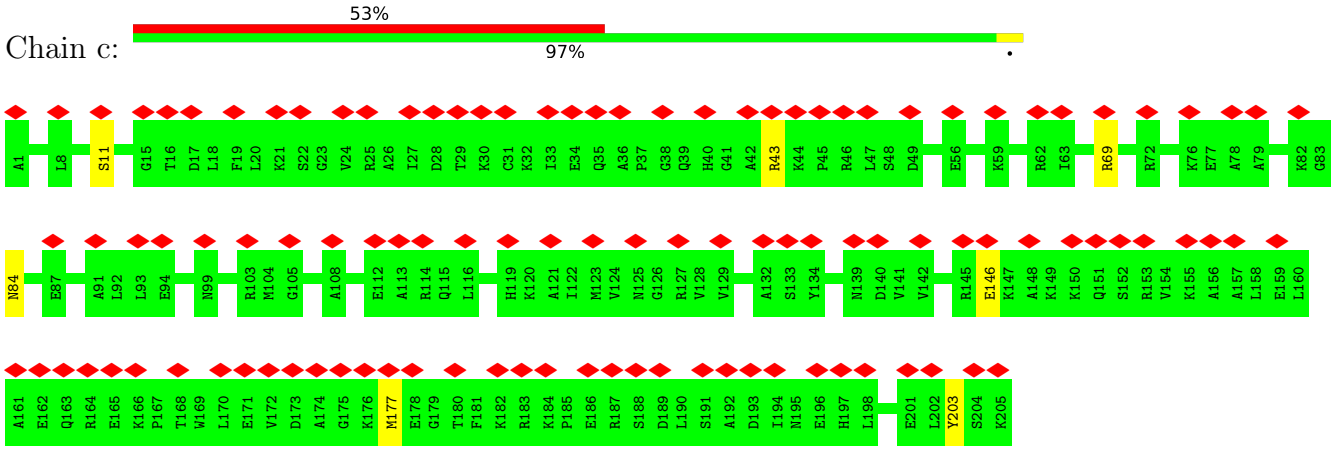

• Molecule 30: 50S ribosomal protein L30

Chain Z:



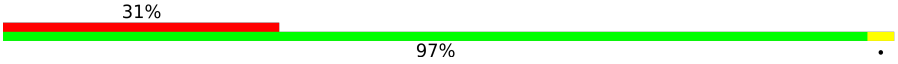

• Molecule 31: 30S ribosomal protein S4

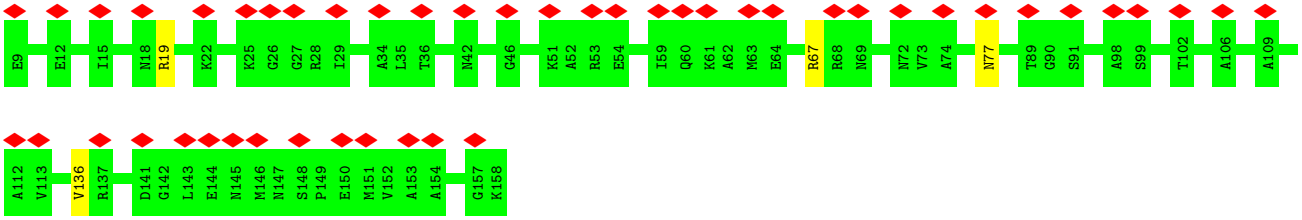
Chain c:



• Molecule 32: 30S ribosomal protein S5

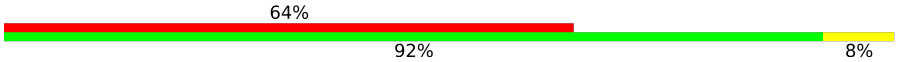
Chain d:

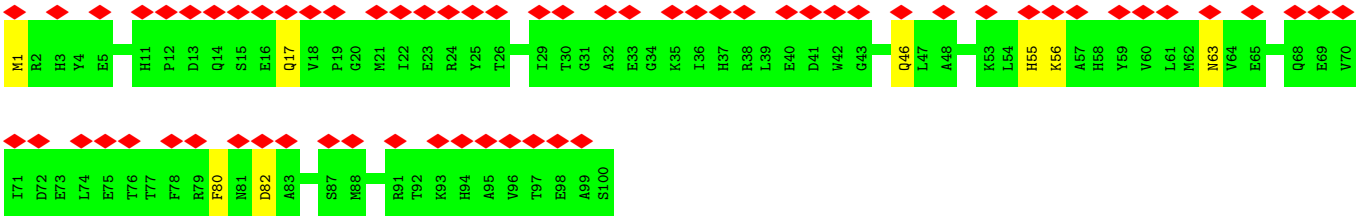



• Molecule 33: 30S ribosomal protein S6, non-modified isoform

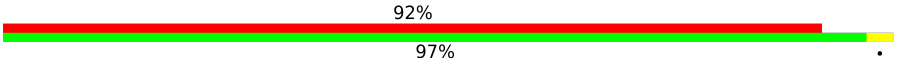
Chain e:

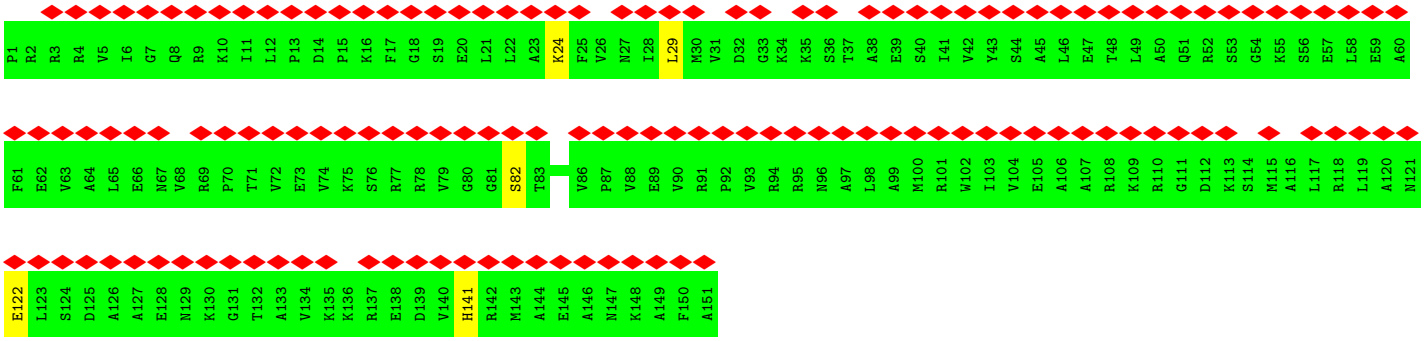



• Molecule 34: 30S ribosomal protein S7

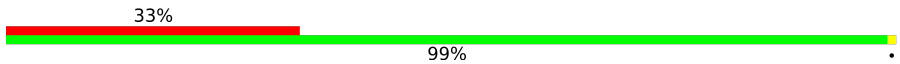
Chain f:

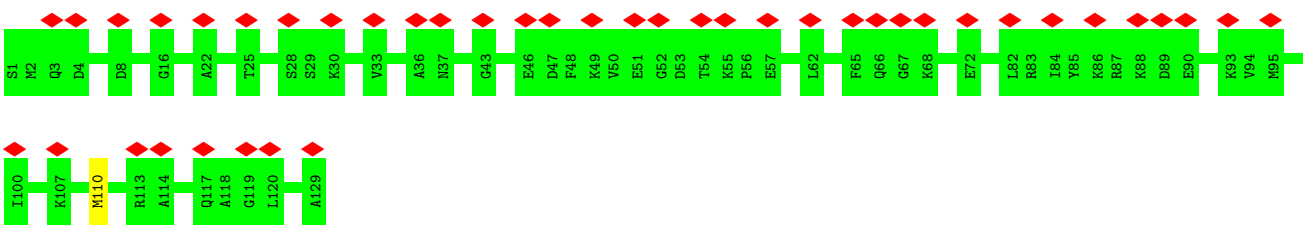



• Molecule 35: 30S ribosomal protein S8

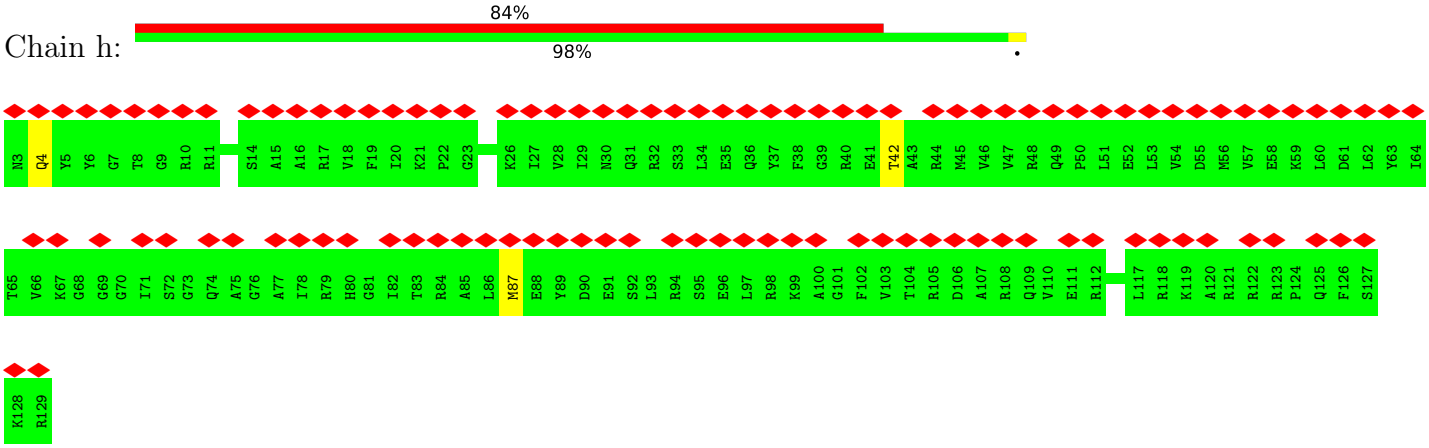
Chain g:



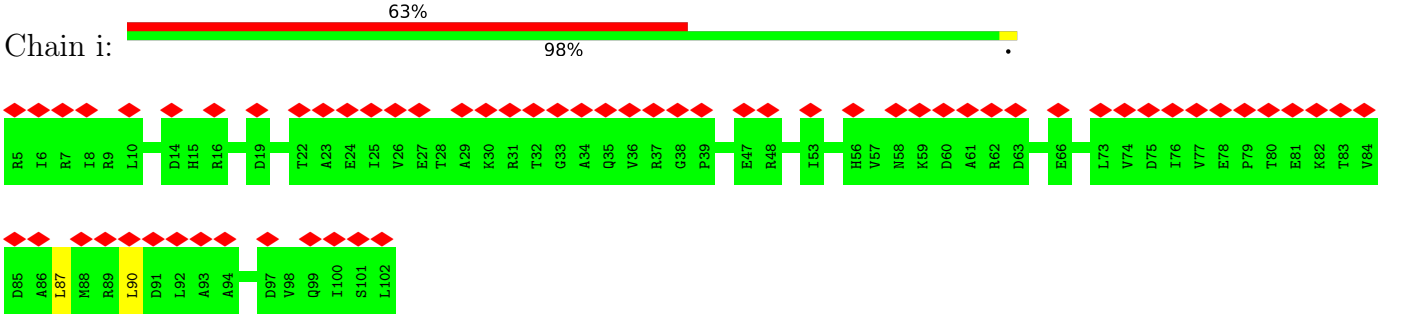

• Molecule 36: 30S ribosomal protein S9

Chain h:



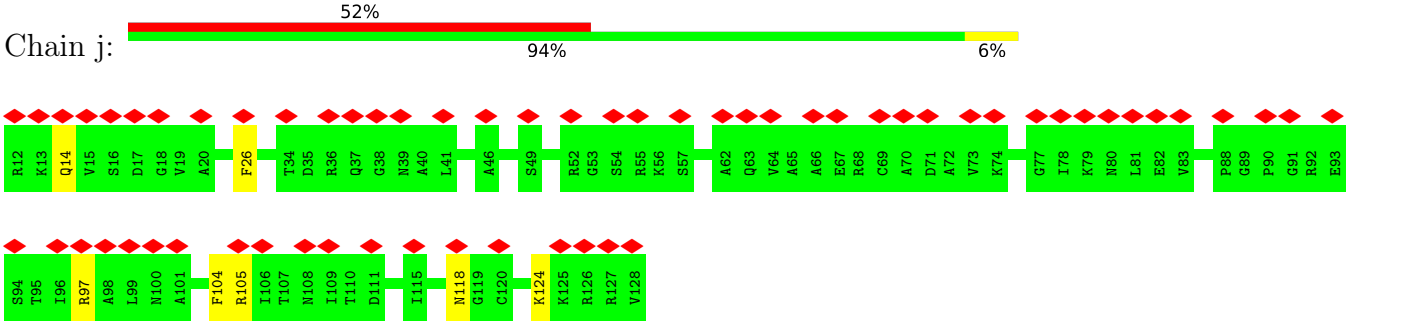

• Molecule 37: 30S ribosomal protein S10

Chain i:



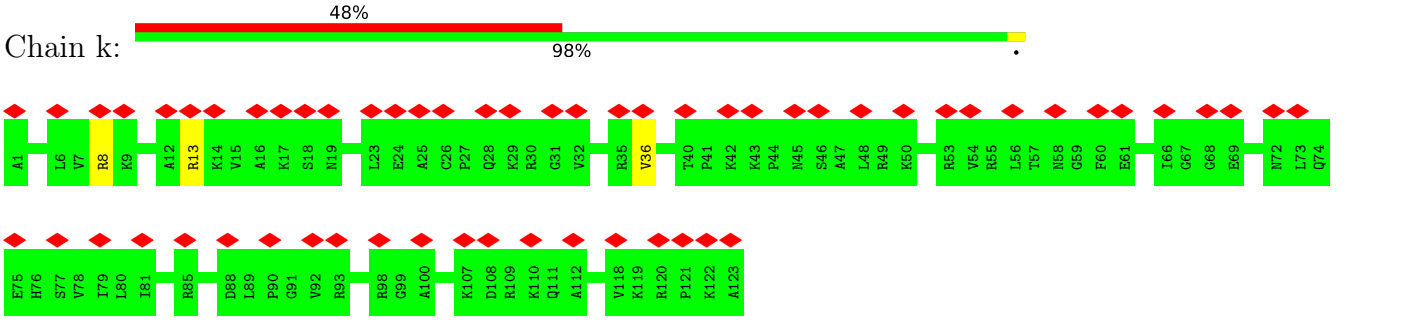

• Molecule 38: 30S ribosomal protein S11

Chain j:




• Molecule 39: 30S ribosomal protein S12

Chain k:

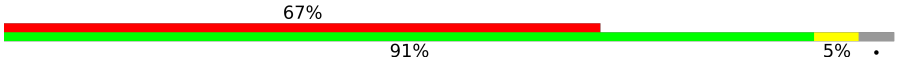


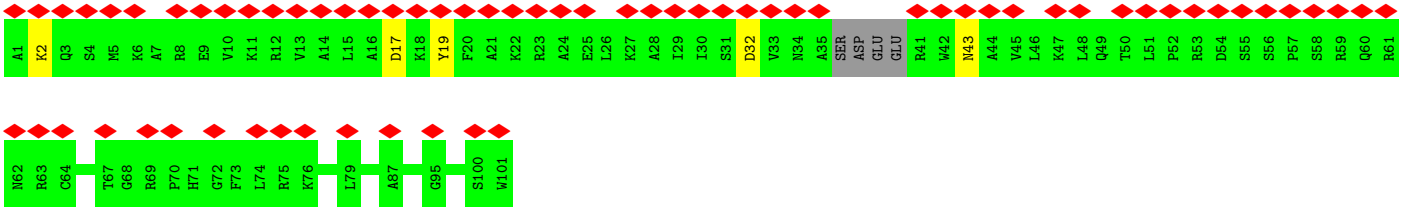

• Molecule 40: 30S ribosomal protein S13

Chain l:


• Molecule 41: 30S ribosomal protein S14

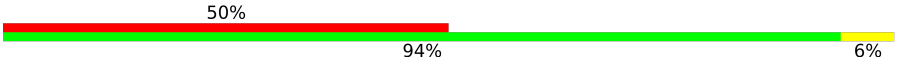
Chain m:

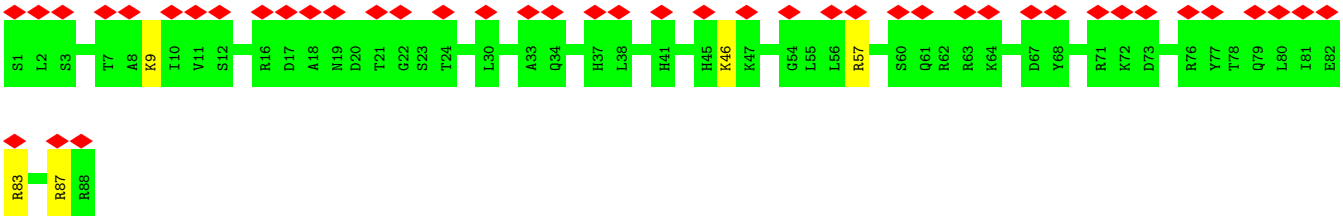



• Molecule 42: 30S ribosomal protein S15

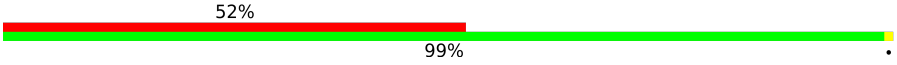
Chain n:

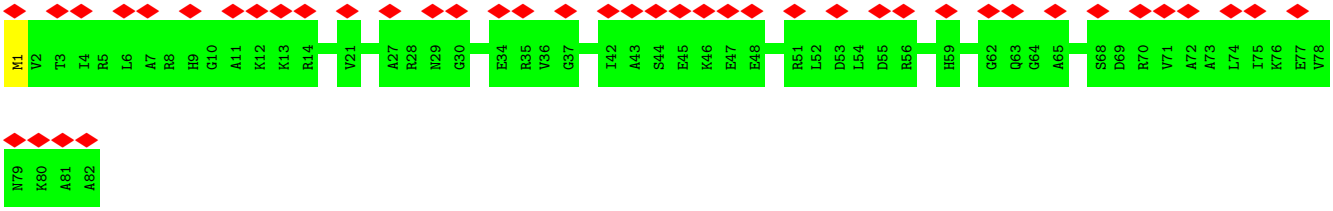



• Molecule 43: 30S ribosomal protein S16

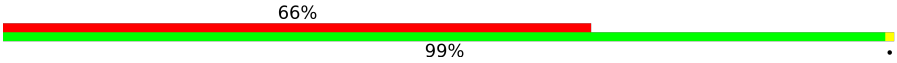
Chain o:

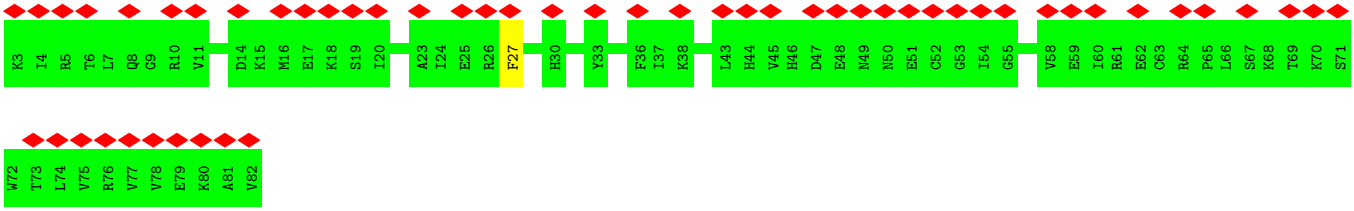



• Molecule 44: 30S ribosomal protein S17

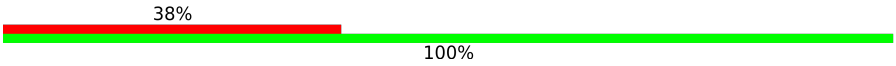
Chain p:

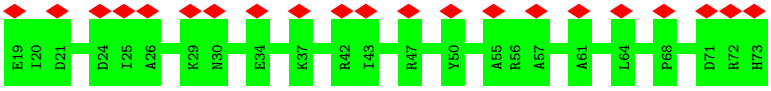


• Molecule 45: 30S ribosomal protein S18

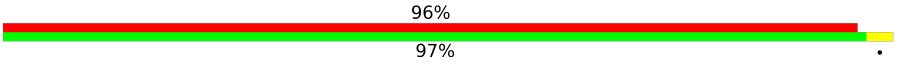
Chain q:

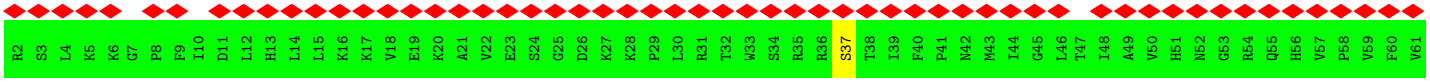


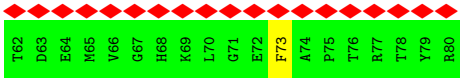




• Molecule 46: 30S ribosomal protein S19

Chain r:

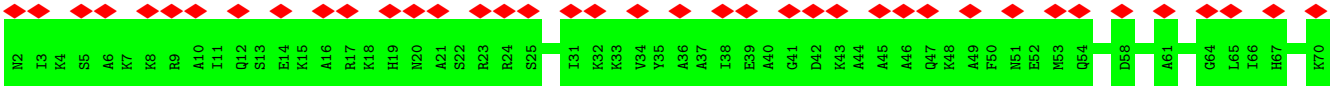


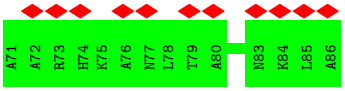




• Molecule 47: 30S ribosomal protein S20

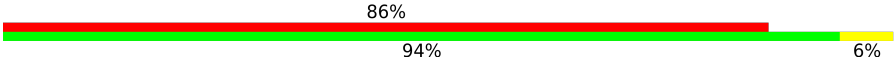
Chain s:

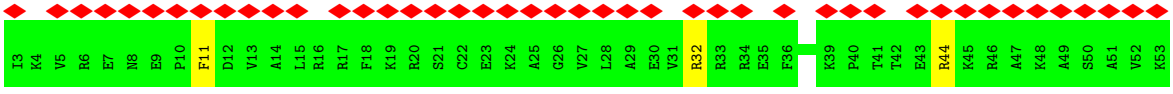




• Molecule 48: 30S ribosomal protein S21 (Fragment)

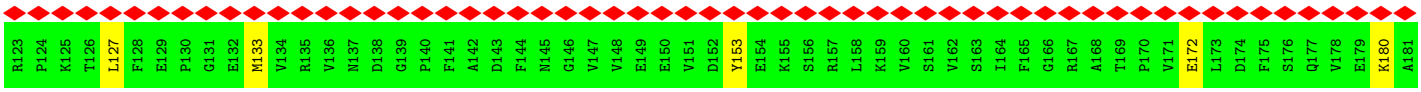
Chain t:



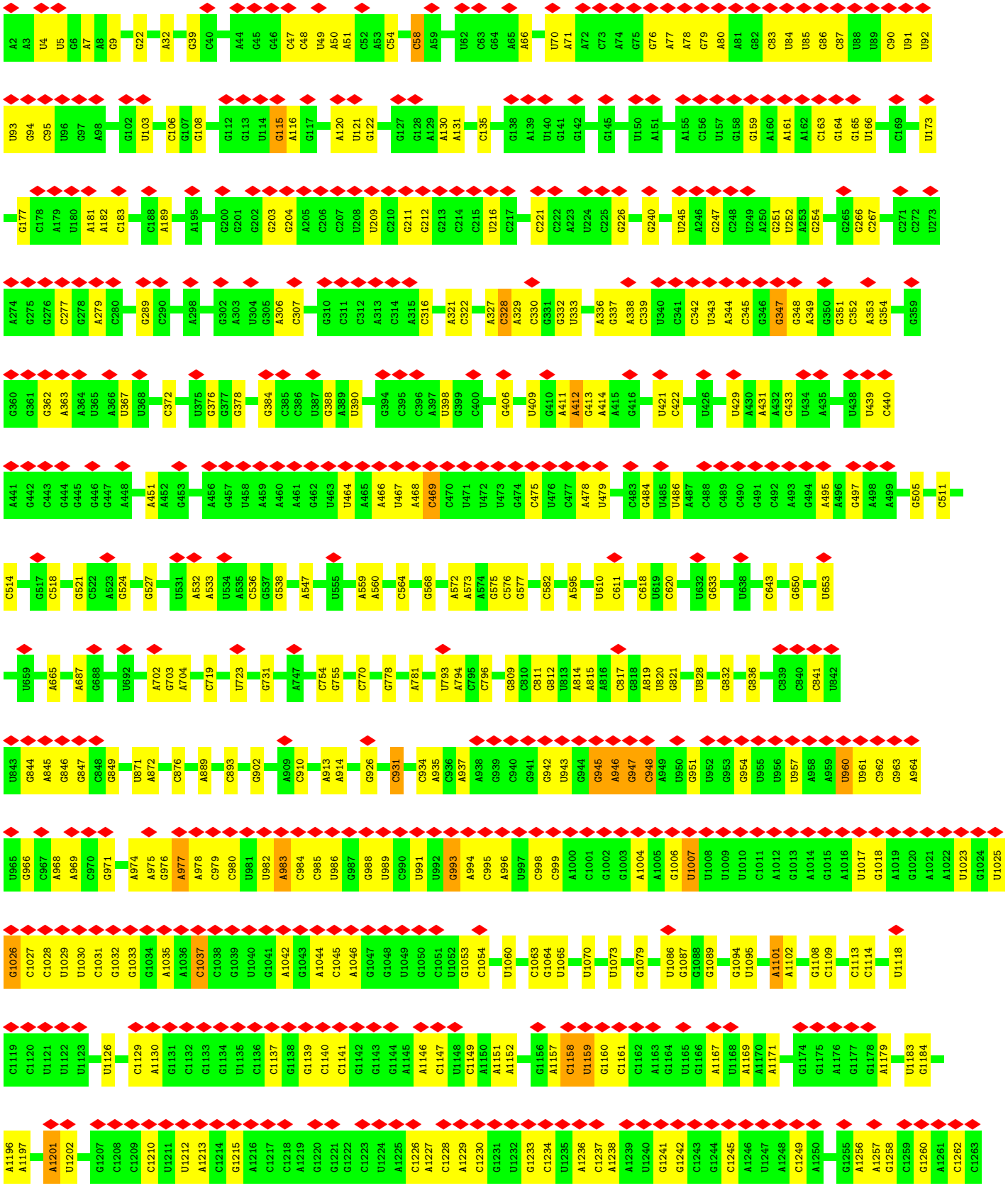

• Molecule 49: Transcription termination/antitermination protein NusG

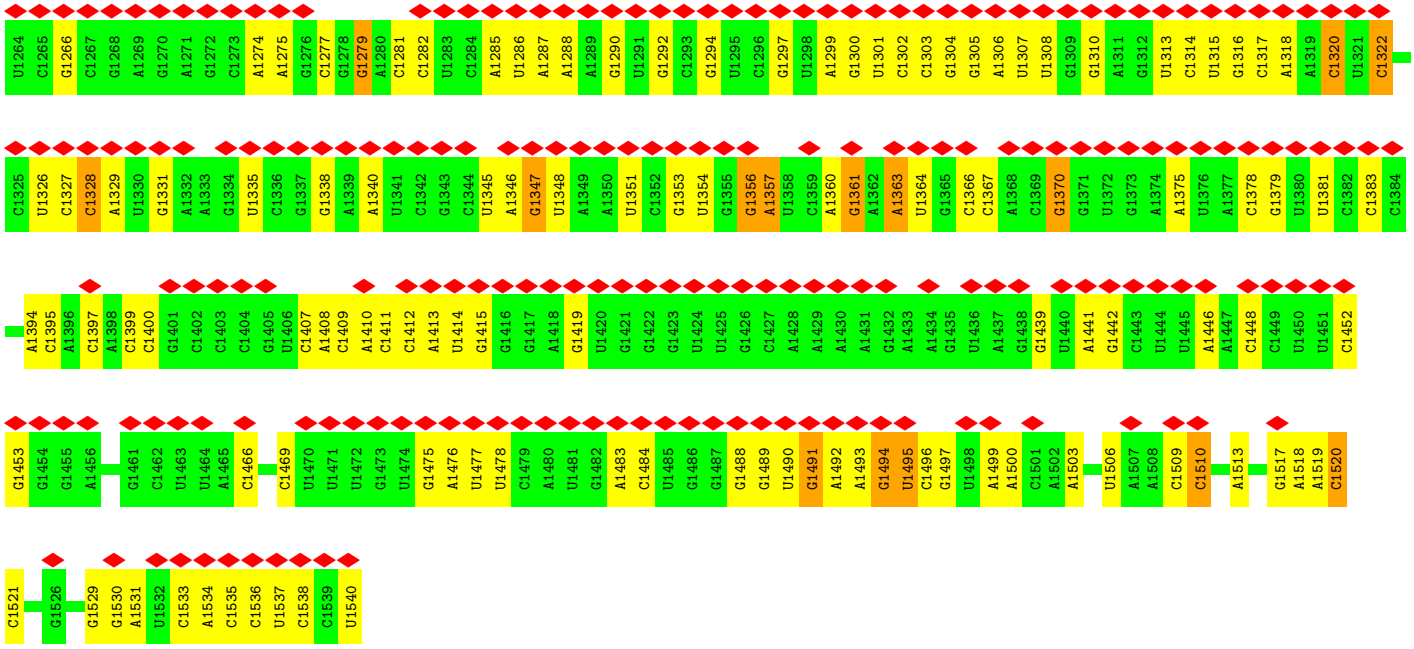
Chain u:


• Molecule 50: 16S

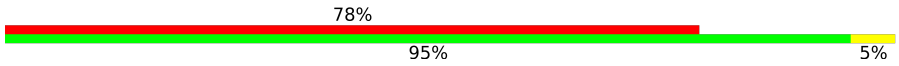
Chain v:

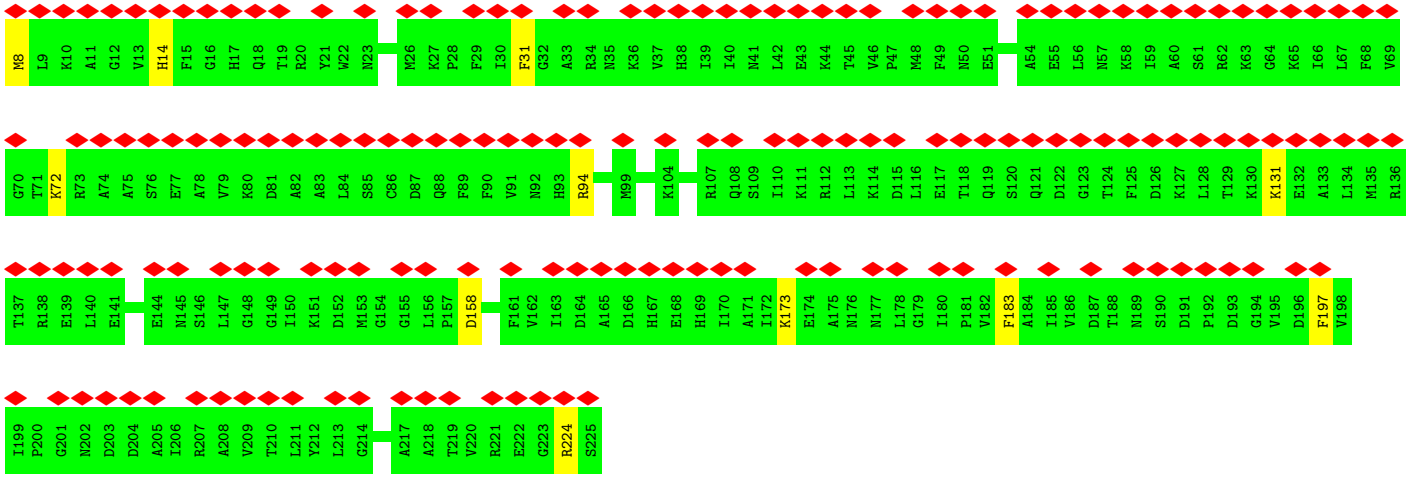

A2 A3 U4 U5 G6 A7 A8 G9 G22 A32 G39 C40 A44 G45 G46 C47 C48 U49 A50 A51 C52 A53 C54 C58 A59 U62 C63 G64 A65 A66 U70 A71 A72 C73 A74 G75 G76 A77 A78 G79 A80 A81 G82 C83 U84 U85 G86 C87 U88 U89 C90 U91 U92
U93 G94 C95 U96 G97 A98 G102 U103 C106 G107 G108 G112 G113 U114 G115 A116 G117 A120 U121 G122 G127 G128 A129 A130 A131 C135 G138 A139 U140 G141 G142 G145 U150 A151 A155 C156 U157 G158 G159 A160 A161 A162 C163 G164 G165 U166 C169 U173
G177 C178 A179 U180 A181 A182 C183 C188 A189 A195 G200 G201 G202 G203 G204 A205 C206 C207 U208 U209 C210 G211 G212 G213 C214 C215 U216 C217 C221 C222 A223 U224 C225 G226 G240 U245 A246 G247 C248 U249 A250 G251 U252 A253 G254 G265 G266 C267 C271 C272 U273
A274 G275 G276 C277 G278 A279 C280 G289 C290 A298 G302 A303 U304 G305 A306 C307 G310 C311 C312 A313 C314 A315 C316 A321 C322 A327 C328 A329 C330 G331 G332 U333 A336 G337 A338 C339 U340 C341 C342 U343 A344 C345 G346 G347 G348 A349 G350 G351 C352 A353 G354 G359
G360 G361 G362 A363 A364 U365 A366 U367 U368 C372 U375 G376 G377 G378 G384 C385 C386 U387 G388 A389 U390 G394 C395 C396 A397 U398 G399 C400 G406 U409 G410 A411 A412 G413 A414 A415 G416 U421 C422 U426 U429 A430 A431 A432 G433 U434 A435 U438 U439 C440
A441 G442 C443 G444 G445 G446 G447 A448 A451 A452 G453 A456 G457 U458 A459 A460 A461 G462 U463 U464 A465 A466 U467 A468 C469 C470 U471 U472 U473 G474 C475 U476 C477 A478 U479 C483 G484 U485 U486 A487 C488 C489 C490 G491 C492 A493 G494 A495 A496 G497 A498 A499 G505 C511
C514 G517 C518 G521 C522 A523 G524 G527 U531 A532 A533 U534 A535 C536 G537 G538 A547 U555 A559 A560 C564 G568 A572 A573 A574 G575 C576 G577 C582 A595 U610 C611 C618 U619 C620 U632 G633 U638 C643 G650 U653
U659 A665 A687 G688 U692 A702 G703 A704 C719 U723 G731 A747 C754 G755 C770 G778 A781 U793 A794 C795 C796 G809 C810 C811 G812 U813 A814 A815 A816 C817 G818 A819 U820 G821 U828 G832 G836 C839 C840 C841 U842
U843 G844 A845 G846 G847 C848 G849 U871 A872 C876 A889 C893 G902 A909 C910 A913 A914 G926 C931 C934 A935 C936 A937 A938 G939 C940 G941 G942 U943 G944 G945 A946 G947 C948 A949 U950 G951 U952 G953 G954 U955 U956 U957 A958 A959 U960 U961 C962 G963 A964
U965 G966 C967 A968 A969 C970 G971 A974 A975 G976 A977 A978 C979 C980 U981 U982 A983 C984 C985 U986 G987 G988 U989 C990 U991 U992 G993 A994 C995 A996 U997 C998 C999 A1000 C1001 G1002 G1003 A1004 A1005 G1006 U1007 U1008 U1009 U1010 C1011 A1012 G1013 A1014 G1015 A1016 U1017 G1018 A1019 G1020 A1021 A1022 U1023 G1024 U1025
G1026 C1027 C1028 U1029 U1030 C1031 G1032 G1033 G1034 A1035 A1036 C1037 C1038 G1039 U1040 G1041 A1042 G1043 A1044 C1045 A1046 G1047 G1048 U1049 G1050 C1051 U1052 G1053 C1054 U1060 C1063 G1064 U1065 U1070 U1073 G1079 U1086 G1087 G1088 G1089 G1094 U1095 A1101 A1102 G1108 C1109 C1113 C1114 U1118
C1119 C1120 U1121 U1122 U1123 U1126 C1129 A1130 G1131 C1132 G1133 C1134 U1135 C1136 C1137 G1138 G1139 C1140 C1141 G1142 G1143 G1144 A1145 A1146 C1147 U1148 C1149 A1150 A1151 A1152 G1156 A1157 C1158 U1159 G1160 C1161 C1162 A1163 G1164 U1165 G1166 A1167 U1168 A1169 A1170 A1171 G1174 G1175 A1176 G1177 G1178 A1179 U1183 G1184
A1196 A1197 A1201 U1202 G1207 C1208 C1209 C1210 U1211 U1212 A1213 C1214 G1215 A1216 C1217 C1218 A1219 G1220 G1221 G1222 C1223 U1224 A1225 C1226 A1227 C1228 A1229 C1230 G1231 U1232 G1233 C1234 U1235 A1236 C1237 A1238 A1239 U1240 G1241 G1242 C1243 G1244 C1245 A1246 U1247 A1248 C1249 A1250 G1255 A1256 A1257 G1258 C1259 G1260 A1261 C1262 C1263




• Molecule 51: 30S ribosomal protein S2

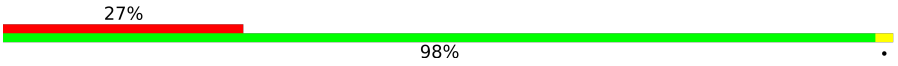
Chain w:

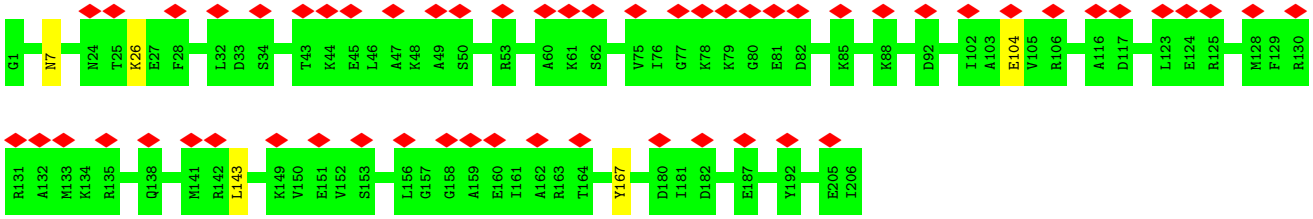



• Molecule 52: 30S ribosomal protein S3

Chain x:



# 4 Experimental information (i)

| Property | Value | Source |
|---|---|---|
| EM reconstruction method | SINGLE PARTICLE | Depositor |
| Imposed symmetry | POINT, Not provided | |
| Number of particles used | 140682 | Depositor |
| Resolution determination method | FSC 0.143 CUT-OFF | Depositor |
| CTF correction method | PHASE FLIPPING AND AMPLITUDE CORRECTION | Depositor |
| Microscope | FEI TITAN KRIOS | Depositor |
| Voltage (kV) | 300 | Depositor |
| Electron dose ($e^-/Å^2$) | 58 | Depositor |
| Minimum defocus (nm) | 1000 | Depositor |
| Maximum defocus (nm) | 2500 | Depositor |
| Magnification | Not provided | |
| Image detector | GATAN K3 (6k x 4k) | Depositor |
| Maximum map value | 2.382 | Depositor |
| Minimum map value | -0.072 | Depositor |
| Average map value | 0.006 | Depositor |
| Map value standard deviation | 0.054 | Depositor |
| Recommended contour level | 0.182 | Depositor |
| Map size (Å) | 350.19998, 350.19998, 350.19998 | wwPDB |
| Map dimensions | 340, 340, 340 | wwPDB |
| Map angles (°) | 90.0, 90.0, 90.0 | wwPDB |
| Pixel spacing (Å) | 1.03, 1.03, 1.03 | Depositor |

# 5 Model quality (i)

## 5.1 Standard geometry (i)

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 | 0 | 0.40 | 0/450 | 0.70 | 0/599 |
| 2 | 1 | 0.26 | 0/417 | 0.53 | 0/556 |
| 3 | 2 | 0.45 | 0/380 | 0.73 | 0/498 |
| 4 | 3 | 0.38 | 0/513 | 0.84 | 2/676 (0.3%) |
| 5 | 4 | 0.41 | 0/303 | 0.71 | 0/397 |
| 6 | 6 | 0.31 | 0/3456 | 0.73 | 4/4675 (0.1%) |
| 7 | A | 0.48 | 0/2800 | 1.10 | 14/4367 (0.3%) |
| 8 | B | 0.65 | 1/69796 (0.0%) | 1.07 | 302/108888 (0.3%) |
| 9 | C | 0.37 | 0/2122 | 0.67 | 1/2854 (0.0%) |
| 10 | D | 0.36 | 0/1586 | 0.66 | 0/2134 |
| 11 | E | 0.45 | 1/1571 (0.1%) | 0.78 | 5/2113 (0.2%) |
| 12 | F | 0.28 | 0/1444 | 0.61 | 0/1937 |
| 13 | G | 0.33 | 0/1343 | 0.66 | 2/1816 (0.1%) |
| 14 | J | 0.44 | 0/1152 | 0.71 | 1/1551 (0.1%) |
| 15 | K | 0.40 | 0/940 | 0.72 | 1/1260 (0.1%) |
| 16 | L | 0.37 | 0/1054 | 0.77 | 1/1403 (0.1%) |
| 17 | M | 0.37 | 0/1093 | 0.67 | 0/1460 |
| 18 | N | 0.42 | 0/974 | 0.75 | 1/1303 (0.1%) |
| 19 | O | 0.36 | 0/902 | 0.81 | 2/1209 (0.2%) |
| 20 | P | 0.41 | 0/929 | 0.73 | 1/1242 (0.1%) |
| 21 | Q | 0.49 | 0/960 | 0.74 | 1/1278 (0.1%) |
| 22 | R | 0.41 | 0/829 | 0.70 | 0/1107 |
| 23 | S | 0.42 | 0/864 | 0.78 | 2/1156 (0.2%) |
| 24 | T | 0.40 | 0/745 | 0.77 | 2/996 (0.2%) |
| 25 | U | 0.39 | 0/788 | 0.68 | 0/1053 |
| 26 | V | 0.34 | 0/766 | 0.69 | 0/1025 |
| 27 | W | 0.41 | 0/603 | 0.88 | 3/797 (0.4%) |
| 28 | X | 0.39 | 0/635 | 0.73 | 1/848 (0.1%) |
| 29 | Y | 0.37 | 0/510 | 0.89 | 1/677 (0.1%) |
| 30 | Z | 0.33 | 0/453 | 0.66 | 0/605 |
| 31 | c | 0.40 | 0/1665 | 0.68 | 0/2227 |
| 32 | d | 0.43 | 0/1119 | 0.78 | 1/1504 (0.1%) |
| 33 | e | 0.42 | 0/836 | 0.75 | 0/1128 |
| 34 | f | 0.49 | 1/1196 (0.1%) | 0.70 | 1/1602 (0.1%) |

| Mol | Chain | Bond lengths | | Bond angles | |
|---|---|---|---|---|---|
| | | RMSZ | #\|Z\| >5 | RMSZ | #\|Z\| >5 |
| 35 | g | 0.43 | 0/989 | 0.64 | 0/1326 |
| 36 | h | 0.35 | 0/1034 | 0.83 | 2/1375 (0.1%) |
| 37 | i | 0.38 | 0/797 | 0.73 | 1/1077 (0.1%) |
| 38 | j | 0.38 | 0/893 | 0.68 | 0/1205 |
| 39 | k | 0.38 | 0/969 | 0.70 | 0/1300 |
| 40 | l | 0.36 | 0/893 | 0.77 | 1/1193 (0.1%) |
| 41 | m | 0.44 | 0/785 | 0.82 | 0/1043 |
| 42 | n | 0.38 | 0/722 | 0.67 | 0/964 |
| 43 | o | 0.43 | 0/659 | 0.64 | 0/884 |
| 44 | p | 0.37 | 0/658 | 0.65 | 0/881 |
| 45 | q | 0.43 | 0/463 | 0.66 | 0/621 |
| 46 | r | 0.31 | 0/653 | 0.63 | 0/877 |
| 47 | s | 0.36 | 0/671 | 0.67 | 0/888 |
| 48 | t | 0.34 | 0/431 | 0.77 | 0/570 |
| 49 | u | 0.28 | 0/477 | 0.55 | 0/642 |
| 50 | v | 0.69 | 0/36963 | 1.15 | 217/57662 (0.4%) |
| 51 | w | 0.35 | 0/1736 | 0.69 | 0/2338 |
| 52 | x | 0.42 | 0/1652 | 0.68 | 0/2225 |
| All | All | 0.59 | 3/156639 (0.0%) | 1.01 | 570/234012 (0.2%) |

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 |
|---|---|---|---|
| 6 | 6 | 0 | 3 |
| 21 | Q | 0 | 2 |
| 23 | S | 0 | 1 |
| 27 | W | 0 | 1 |
| 38 | j | 0 | 1 |
| 39 | k | 0 | 1 |
| All | All | 0 | 9 |

All (3) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 11 | E | 76 | PRO | CG-CD | -8.84 | 1.21 | 1.50 |
| 34 | f | 122 | GLU | CD-OE2 | -8.30 | 1.16 | 1.25 |
| 8 | B | 2267 | A | N9-C4 | -5.30 | 1.34 | 1.37 |

The worst 5 of 570 bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 11 | E | 76 | PRO | N-CD-CG | -12.02 | 85.17 | 103.20 |
| 50 | v | 1322 | C | N1-C2-O2 | 10.95 | 125.47 | 118.90 |
| 50 | v | 135 | C | C6-N1-C2 | -10.59 | 116.07 | 120.30 |
| 6 | 6 | 259 | LEU | C-N-CD | -10.26 | 98.03 | 120.60 |
| 8 | B | 828 | U | C2-N1-C1' | 10.23 | 129.98 | 117.70 |

There are no chirality outliers.

5 of 9 planarity outliers are listed below:

| Mol | Chain | Res | Type | Group |
|---|---|---|---|---|
| 6 | 6 | 257 | ARG | Peptide |
| 6 | 6 | 259 | LEU | Peptide |
| 6 | 6 | 260 | PRO | Peptide |
| 21 | Q | 91 | ARG | Sidechain |
| 21 | Q | 94 | LEU | Peptide |

## 5.2 Too-close contacts (i)

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 | 0 | 444 | 0 | 461 | 11 | 0 |
| 2 | 1 | 410 | 0 | 440 | 6 | 0 |
| 3 | 2 | 377 | 0 | 418 | 5 | 0 |
| 4 | 3 | 504 | 0 | 574 | 8 | 0 |
| 5 | 4 | 302 | 0 | 343 | 10 | 0 |
| 6 | 6 | 3403 | 0 | 3434 | 49 | 0 |
| 7 | A | 2504 | 0 | 1271 | 23 | 0 |
| 8 | B | 62317 | 0 | 31345 | 368 | 0 |
| 9 | C | 2083 | 0 | 2157 | 36 | 0 |
| 10 | D | 1565 | 0 | 1616 | 16 | 0 |
| 11 | E | 1552 | 0 | 1619 | 15 | 0 |
| 12 | F | 1420 | 0 | 1460 | 23 | 0 |
| 13 | G | 1323 | 0 | 1374 | 16 | 0 |
| 14 | J | 1129 | 0 | 1162 | 26 | 0 |
| 15 | K | 931 | 0 | 1003 | 19 | 0 |
| 16 | L | 1045 | 0 | 1117 | 19 | 0 |
| 17 | M | 1074 | 0 | 1157 | 19 | 0 |
| 18 | N | 961 | 0 | 1000 | 20 | 0 |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|---|---|---|---|---|---|---|
| 19 | O | 892 | 0 | 923 | 15 | 0 |
| 20 | P | 917 | 0 | 964 | 15 | 0 |
| 21 | Q | 947 | 0 | 1022 | 27 | 0 |
| 22 | R | 816 | 0 | 839 | 10 | 0 |
| 23 | S | 857 | 0 | 922 | 18 | 0 |
| 24 | T | 739 | 0 | 807 | 10 | 0 |
| 25 | U | 780 | 0 | 834 | 11 | 0 |
| 26 | V | 753 | 0 | 780 | 10 | 0 |
| 27 | W | 596 | 0 | 610 | 17 | 0 |
| 28 | X | 625 | 0 | 655 | 11 | 0 |
| 29 | Y | 509 | 0 | 543 | 8 | 0 |
| 30 | Z | 449 | 0 | 491 | 11 | 0 |
| 31 | c | 1643 | 0 | 1710 | 0 | 0 |
| 32 | d | 1106 | 0 | 1148 | 0 | 0 |
| 33 | e | 818 | 0 | 808 | 0 | 0 |
| 34 | f | 1182 | 0 | 1240 | 0 | 0 |
| 35 | g | 979 | 0 | 1034 | 0 | 0 |
| 36 | h | 1022 | 0 | 1070 | 0 | 0 |
| 37 | i | 787 | 0 | 828 | 0 | 0 |
| 38 | j | 877 | 0 | 887 | 0 | 0 |
| 39 | k | 955 | 0 | 1019 | 0 | 0 |
| 40 | l | 884 | 0 | 944 | 0 | 0 |
| 41 | m | 774 | 0 | 827 | 0 | 0 |
| 42 | n | 714 | 0 | 737 | 0 | 0 |
| 43 | o | 649 | 0 | 666 | 0 | 0 |
| 44 | p | 649 | 0 | 691 | 0 | 0 |
| 45 | q | 456 | 0 | 478 | 0 | 0 |
| 46 | r | 638 | 0 | 665 | 0 | 0 |
| 47 | s | 665 | 0 | 714 | 0 | 0 |
| 48 | t | 426 | 0 | 449 | 0 | 0 |
| 49 | u | 468 | 0 | 458 | 0 | 0 |
| 50 | v | 33012 | 0 | 16618 | 0 | 0 |
| 51 | w | 1705 | 0 | 1732 | 0 | 0 |
| 52 | x | 1625 | 0 | 1699 | 0 | 0 |
| All | All | 144258 | 0 | 97763 | 719 | 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 5.

The worst 5 of 719 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) |
|---|---|---|---|
| 8:B:1311:G:N2 | 8:B:1603:A:H62 | 1.59 | 1.00 |
| 8:B:1168:G:H1 | 8:B:1181:U:H3 | 1.07 | 0.94 |
| 8:B:1311:G:H21 | 8:B:1603:A:H62 | 0.91 | 0.89 |
| 7:A:22:U:H3 | 7:A:61:G:H1 | 1.17 | 0.87 |
| 8:B:1311:G:H21 | 8:B:1603:A:N6 | 1.71 | 0.86 |

There are no symmetry-related clashes.

## 5.3 Torsion angles (i)

### 5.3.1 Protein backbone (i)

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 | |
|---|---|---|---|---|---|---|---|
| 1 | 0 | 54/56 (96%) | 48 (89%) | 6 (11%) | 0 | 100 | 100 |
| 2 | 1 | 49/51 (96%) | 49 (100%) | 0 | 0 | 100 | 100 |
| 3 | 2 | 44/46 (96%) | 44 (100%) | 0 | 0 | 100 | 100 |
| 4 | 3 | 62/64 (97%) | 58 (94%) | 4 (6%) | 0 | 100 | 100 |
| 5 | 4 | 36/38 (95%) | 32 (89%) | 4 (11%) | 0 | 100 | 100 |
| 6 | 6 | 424/426 (100%) | 382 (90%) | 42 (10%) | 0 | 100 | 100 |
| 9 | C | 270/272 (99%) | 260 (96%) | 10 (4%) | 0 | 100 | 100 |
| 10 | D | 207/209 (99%) | 176 (85%) | 31 (15%) | 0 | 100 | 100 |
| 11 | E | 199/201 (99%) | 188 (94%) | 11 (6%) | 0 | 100 | 100 |
| 12 | F | 176/178 (99%) | 162 (92%) | 14 (8%) | 0 | 100 | 100 |
| 13 | G | 174/176 (99%) | 166 (95%) | 8 (5%) | 0 | 100 | 100 |
| 14 | J | 140/142 (99%) | 128 (91%) | 12 (9%) | 0 | 100 | 100 |
| 15 | K | 120/122 (98%) | 110 (92%) | 10 (8%) | 0 | 100 | 100 |
| 16 | L | 141/143 (99%) | 136 (96%) | 5 (4%) | 0 | 100 | 100 |
| 17 | M | 134/136 (98%) | 128 (96%) | 6 (4%) | 0 | 100 | 100 |
| 18 | N | 119/121 (98%) | 110 (92%) | 9 (8%) | 0 | 100 | 100 |

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| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 19 | O | 114/116 (98%) | 112 (98%) | 2 (2%) | 0 | 100 | 100 |
| 20 | P | 112/114 (98%) | 101 (90%) | 11 (10%) | 0 | 100 | 100 |
| 21 | Q | 115/117 (98%) | 110 (96%) | 4 (4%) | 1 (1%) | 17 | 56 |
| 22 | R | 101/103 (98%) | 94 (93%) | 6 (6%) | 1 (1%) | 15 | 54 |
| 23 | S | 108/110 (98%) | 99 (92%) | 9 (8%) | 0 | 100 | 100 |
| 24 | T | 92/94 (98%) | 84 (91%) | 7 (8%) | 1 (1%) | 14 | 51 |
| 25 | U | 101/103 (98%) | 90 (89%) | 11 (11%) | 0 | 100 | 100 |
| 26 | V | 92/94 (98%) | 89 (97%) | 3 (3%) | 0 | 100 | 100 |
| 27 | W | 77/79 (98%) | 65 (84%) | 12 (16%) | 0 | 100 | 100 |
| 28 | X | 75/77 (97%) | 73 (97%) | 2 (3%) | 0 | 100 | 100 |
| 29 | Y | 61/63 (97%) | 57 (93%) | 4 (7%) | 0 | 100 | 100 |
| 30 | Z | 56/58 (97%) | 54 (96%) | 2 (4%) | 0 | 100 | 100 |
| 31 | c | 203/205 (99%) | 192 (95%) | 11 (5%) | 0 | 100 | 100 |
| 32 | d | 148/150 (99%) | 136 (92%) | 12 (8%) | 0 | 100 | 100 |
| 33 | e | 98/100 (98%) | 91 (93%) | 7 (7%) | 0 | 100 | 100 |
| 34 | f | 149/151 (99%) | 144 (97%) | 5 (3%) | 0 | 100 | 100 |
| 35 | g | 127/129 (98%) | 126 (99%) | 1 (1%) | 0 | 100 | 100 |
| 36 | h | 125/127 (98%) | 116 (93%) | 9 (7%) | 0 | 100 | 100 |
| 37 | i | 96/98 (98%) | 91 (95%) | 5 (5%) | 0 | 100 | 100 |
| 38 | j | 115/117 (98%) | 111 (96%) | 4 (4%) | 0 | 100 | 100 |
| 39 | k | 121/123 (98%) | 113 (93%) | 8 (7%) | 0 | 100 | 100 |
| 40 | l | 112/114 (98%) | 107 (96%) | 5 (4%) | 0 | 100 | 100 |
| 41 | m | 92/100 (92%) | 89 (97%) | 3 (3%) | 0 | 100 | 100 |
| 42 | n | 86/88 (98%) | 84 (98%) | 2 (2%) | 0 | 100 | 100 |
| 43 | o | 80/82 (98%) | 78 (98%) | 2 (2%) | 0 | 100 | 100 |
| 44 | p | 78/80 (98%) | 72 (92%) | 6 (8%) | 0 | 100 | 100 |
| 45 | q | 53/55 (96%) | 53 (100%) | 0 | 0 | 100 | 100 |
| 46 | r | 77/79 (98%) | 72 (94%) | 5 (6%) | 0 | 100 | 100 |
| 47 | s | 83/85 (98%) | 81 (98%) | 2 (2%) | 0 | 100 | 100 |
| 48 | t | 49/51 (96%) | 45 (92%) | 4 (8%) | 0 | 100 | 100 |
| 49 | u | 57/59 (97%) | 56 (98%) | 1 (2%) | 0 | 100 | 100 |

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| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles |
|---|---|---|---|---|---|---|
| 51 | w | 216/218 (99%) | 202 (94%) | 14 (6%) | 0 | 100 100 |
| 52 | x | 204/206 (99%) | 196 (96%) | 8 (4%) | 0 | 100 100 |
| All | All | 5822/5926 (98%) | 5460 (94%) | 359 (6%) | 3 (0%) | 54 83 |

All (3) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 22 | R | 36 | ALA |
| 24 | T | 14 | PRO |
| 21 | Q | 87 | VAL |

### 5.3.2 Protein sidechains (i)

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 |
|---|---|---|---|---|---|
| 1 | 0 | 47/47 (100%) | 42 (89%) | 5 (11%) | 6 27 |
| 2 | 1 | 45/46 (98%) | 45 (100%) | 0 | 100 100 |
| 3 | 2 | 38/38 (100%) | 36 (95%) | 2 (5%) | 22 58 |
| 4 | 3 | 51/51 (100%) | 48 (94%) | 3 (6%) | 19 54 |
| 5 | 4 | 34/34 (100%) | 31 (91%) | 3 (9%) | 10 36 |
| 6 | 6 | 364/364 (100%) | 350 (96%) | 14 (4%) | 33 67 |
| 9 | C | 216/217 (100%) | 209 (97%) | 7 (3%) | 39 71 |
| 10 | D | 164/164 (100%) | 160 (98%) | 4 (2%) | 49 77 |
| 11 | E | 165/165 (100%) | 162 (98%) | 3 (2%) | 59 82 |
| 12 | F | 149/149 (100%) | 139 (93%) | 10 (7%) | 16 50 |
| 13 | G | 137/137 (100%) | 131 (96%) | 6 (4%) | 28 64 |
| 14 | J | 116/116 (100%) | 114 (98%) | 2 (2%) | 60 83 |
| 15 | K | 102/103 (99%) | 100 (98%) | 2 (2%) | 55 80 |
| 16 | L | 102/102 (100%) | 100 (98%) | 2 (2%) | 55 80 |
| 17 | M | 109/109 (100%) | 107 (98%) | 2 (2%) | 59 82 |

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| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles |
|---|---|---|---|---|---|
| 18 | N | 100/101 (99%) | 98 (98%) | 2 (2%) | 55 80 |
| 19 | O | 86/86 (100%) | 81 (94%) | 5 (6%) | 20 55 |
| 20 | P | 99/99 (100%) | 96 (97%) | 3 (3%) | 41 73 |
| 21 | Q | 89/89 (100%) | 85 (96%) | 4 (4%) | 27 63 |
| 22 | R | 84/84 (100%) | 82 (98%) | 2 (2%) | 49 77 |
| 23 | S | 93/93 (100%) | 88 (95%) | 5 (5%) | 22 58 |
| 24 | T | 80/81 (99%) | 77 (96%) | 3 (4%) | 33 67 |
| 25 | U | 83/84 (99%) | 79 (95%) | 4 (5%) | 25 61 |
| 26 | V | 78/78 (100%) | 77 (99%) | 1 (1%) | 69 87 |
| 27 | W | 59/59 (100%) | 55 (93%) | 4 (7%) | 16 49 |
| 28 | X | 67/67 (100%) | 66 (98%) | 1 (2%) | 65 85 |
| 29 | Y | 55/55 (100%) | 53 (96%) | 2 (4%) | 35 69 |
| 30 | Z | 48/48 (100%) | 47 (98%) | 1 (2%) | 53 79 |
| 31 | c | 172/172 (100%) | 165 (96%) | 7 (4%) | 30 66 |
| 32 | d | 113/113 (100%) | 110 (97%) | 3 (3%) | 44 75 |
| 33 | e | 87/87 (100%) | 79 (91%) | 8 (9%) | 9 33 |
| 34 | f | 124/124 (100%) | 121 (98%) | 3 (2%) | 49 77 |
| 35 | g | 104/104 (100%) | 103 (99%) | 1 (1%) | 76 90 |
| 36 | h | 105/105 (100%) | 104 (99%) | 1 (1%) | 76 90 |
| 37 | i | 86/86 (100%) | 85 (99%) | 1 (1%) | 71 88 |
| 38 | j | 90/90 (100%) | 84 (93%) | 6 (7%) | 16 50 |
| 39 | k | 103/103 (100%) | 101 (98%) | 2 (2%) | 57 81 |
| 40 | l | 92/92 (100%) | 88 (96%) | 4 (4%) | 29 64 |
| 41 | m | 79/83 (95%) | 74 (94%) | 5 (6%) | 18 52 |
| 42 | n | 76/76 (100%) | 71 (93%) | 5 (7%) | 16 51 |
| 43 | o | 65/65 (100%) | 64 (98%) | 1 (2%) | 65 85 |
| 44 | p | 74/74 (100%) | 73 (99%) | 1 (1%) | 67 86 |
| 45 | q | 48/48 (100%) | 48 (100%) | 0 | 100 100 |
| 46 | r | 70/70 (100%) | 68 (97%) | 2 (3%) | 42 74 |
| 47 | s | 65/65 (100%) | 65 (100%) | 0 | 100 100 |
| 48 | t | 44/44 (100%) | 41 (93%) | 3 (7%) | 16 49 |

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| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles |
|---|---|---|---|---|---|
| 49 | u | 52/52 (100%) | 47 (90%) | 5 (10%) | 8 32 |
| 51 | w | 180/180 (100%) | 169 (94%) | 11 (6%) | 18 54 |
| 52 | x | 170/170 (100%) | 165 (97%) | 5 (3%) | 42 74 |
| All | All | 4859/4869 (100%) | 4683 (96%) | 176 (4%) | 38 69 |

5 of 176 residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 33 | e | 55 | HIS |
| 42 | n | 9 | LYS |
| 33 | e | 82 | ASP |
| 38 | j | 105 | ARG |
| 46 | r | 37 | SER |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 11 such sidechains are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 46 | r | 42 | ASN |
| 47 | s | 60 | GLN |
| 51 | w | 202 | ASN |
| 51 | w | 189 | ASN |
| 33 | e | 58 | HIS |

### 5.3.3 RNA

| Mol | Chain | Analysed | Backbone Outliers | Pucker Outliers |
|---|---|---|---|---|
| 50 | v | 1538/1539 (99%) | 395 (25%) | 0 |
| 7 | A | 116/117 (99%) | 25 (21%) | 0 |
| 8 | B | 2902/2903 (99%) | 697 (24%) | 9 (0%) |
| All | All | 4556/4559 (99%) | 1117 (24%) | 9 (0%) |

5 of 1117 RNA backbone outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 7 | A | 9 | G |
| 7 | A | 12 | C |
| 7 | A | 13 | G |
| 7 | A | 23 | G |
| 7 | A | 24 | G |

5 of 9 RNA pucker outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 8 | B | 1963 | U |
| 8 | B | 2756 | U |
| 8 | B | 1339 | G |
| 8 | B | 1364 | G |
| 8 | B | 1912 | A |

## 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 monosaccharides 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)

There are no chain breaks in this entry.

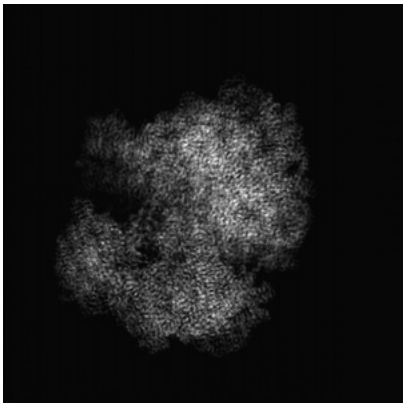
# 6 Map visualisation

This section contains visualisations of the EMDB entry EMD-29687. These allow visual inspection of the internal detail of the map and identification of artifacts.

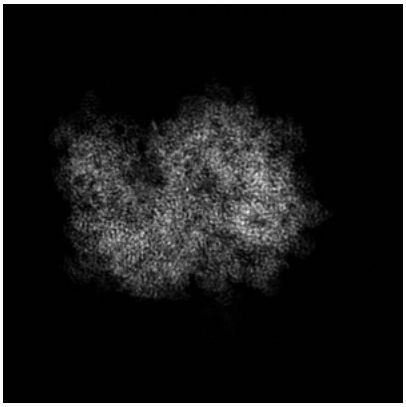
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

## 6.1 Orthogonal projections

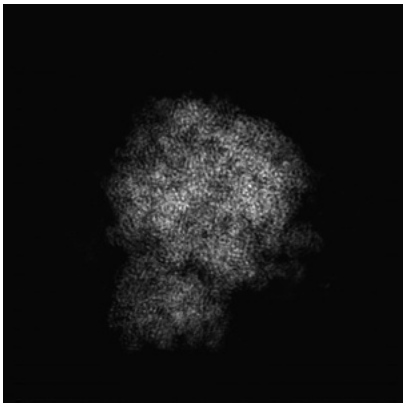
### 6.1.1 Primary map



X



Y



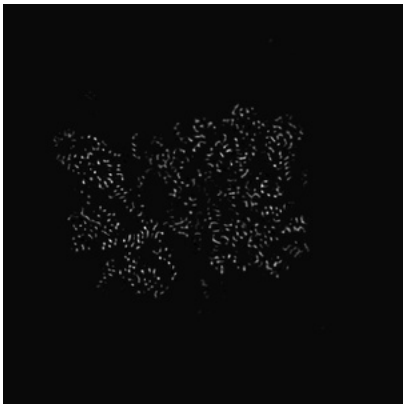
Z

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

## 6.2 Central slices

### 6.2.1 Primary map

X Index: 170



Y Index: 170

Z Index: 170

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: 146

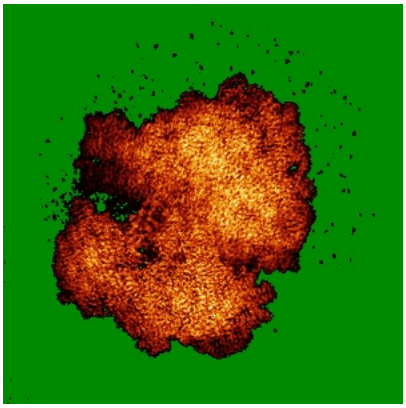
Y Index: 178

Z Index: 220

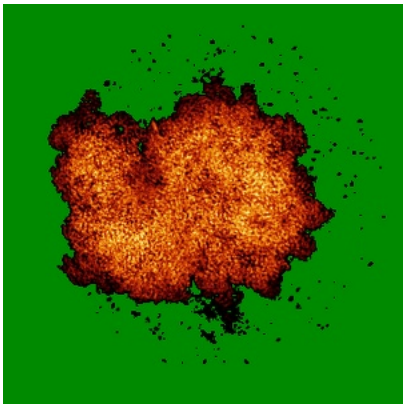
The images above show the largest variance slices of the map in three orthogonal directions.

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

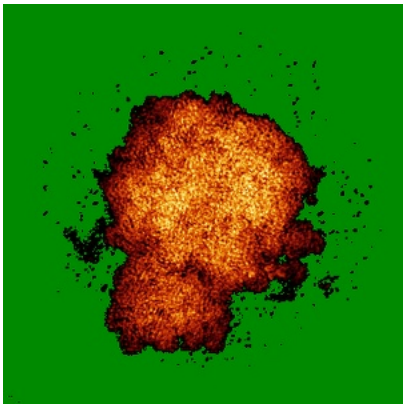
### 6.4.1 Primary map



X



Y

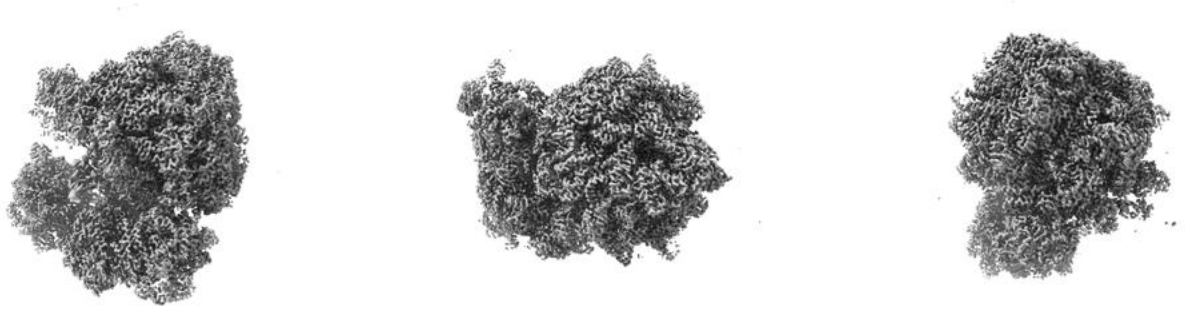


Z

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



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.182. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

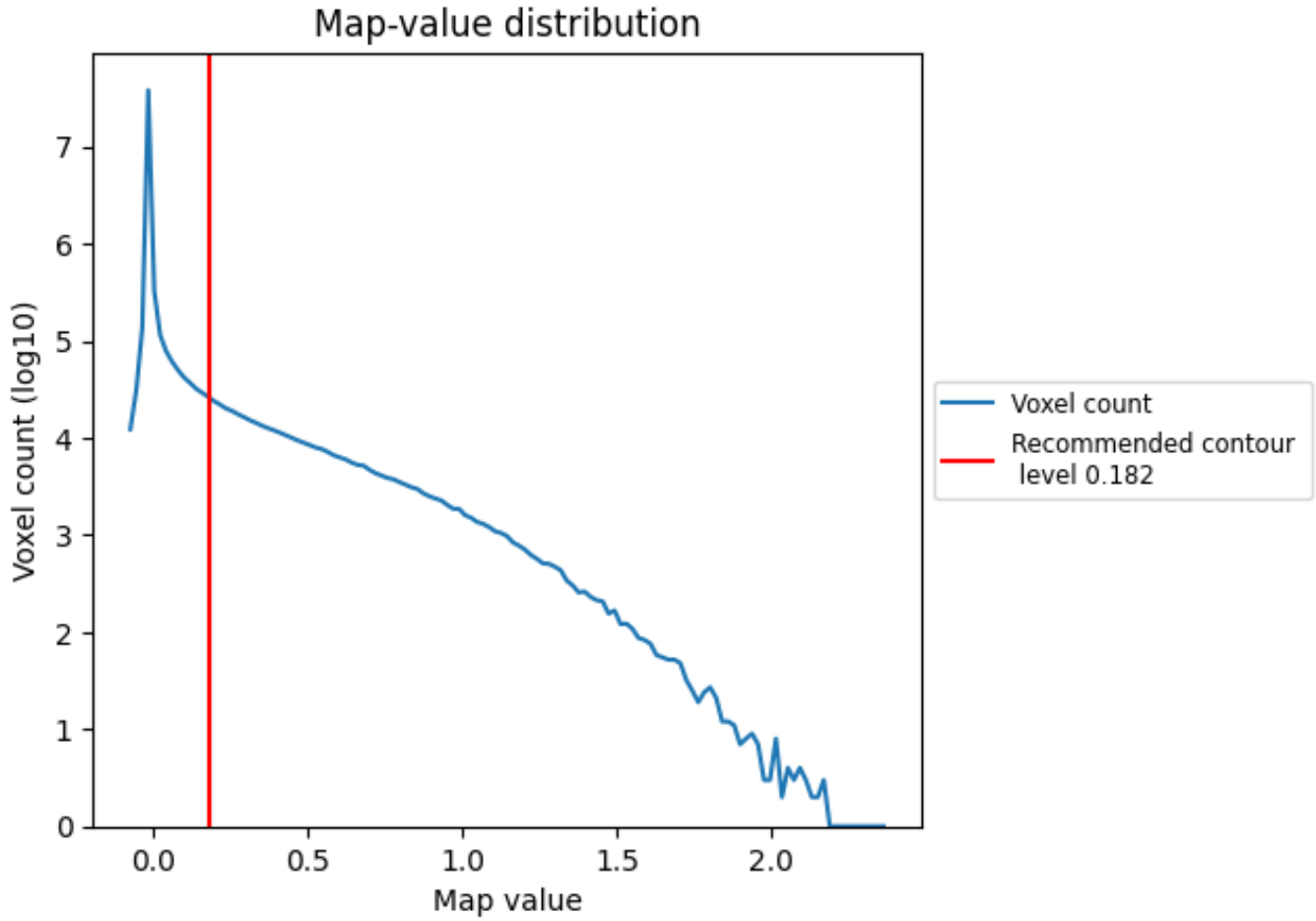
## 6.6 Mask visualisation (i)

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

# 7 Map analysis

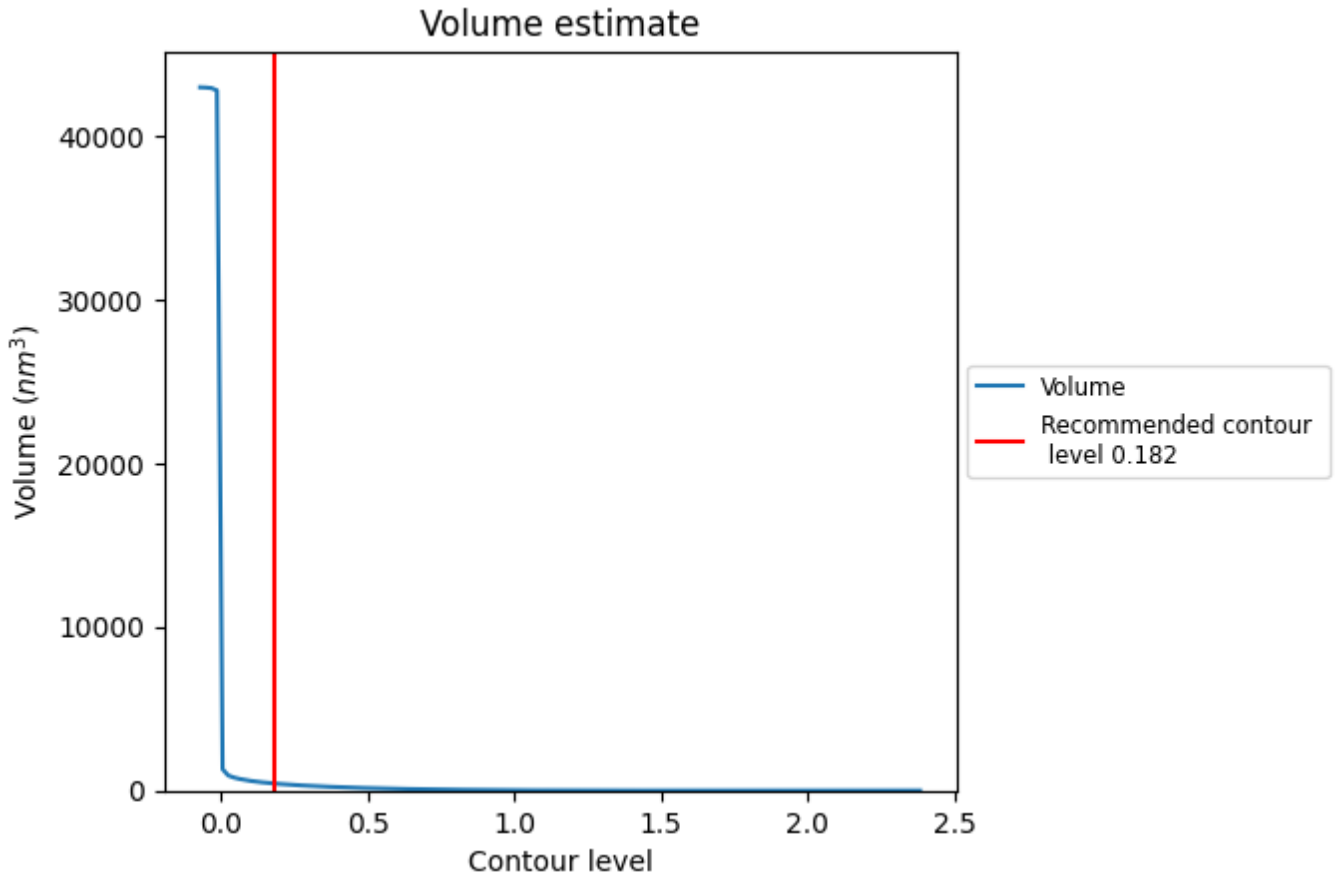
This section contains the results of statistical analysis of the map.

## 7.1 Map-value distribution




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.

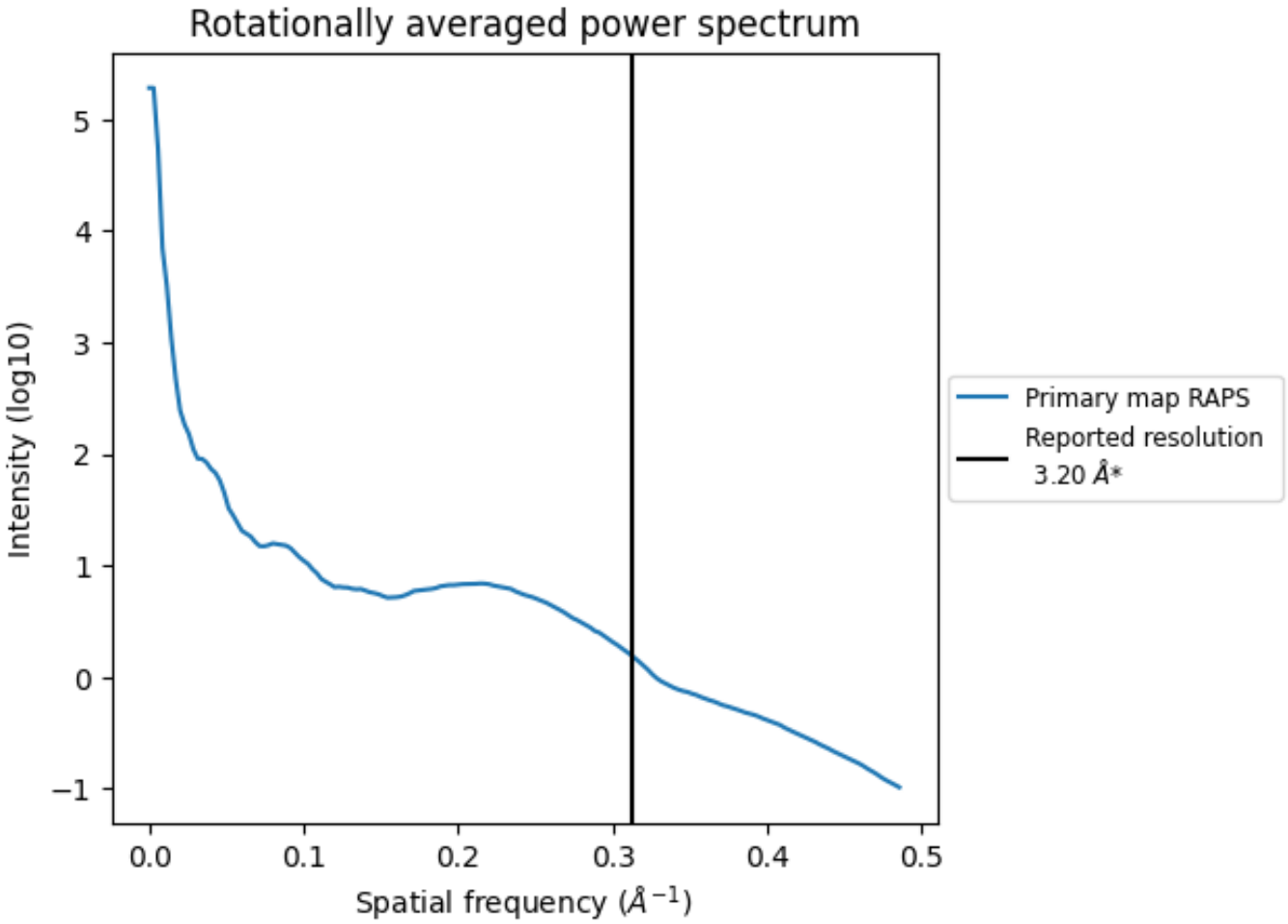
## 7.2 Volume estimate (i)




The volume at the recommended contour level is 430 $nm^3$; this corresponds to an approximate mass of 389 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 (i)




*Reported resolution corresponds to spatial frequency of 0.312 $Å^{-1}$

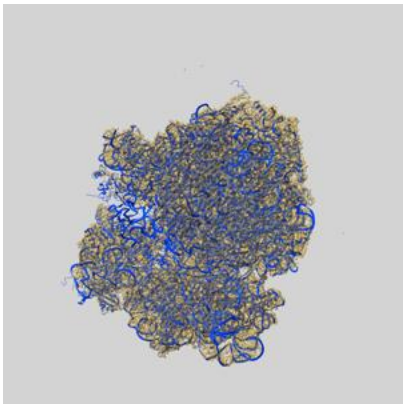
# 8 Fourier-Shell correlation

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

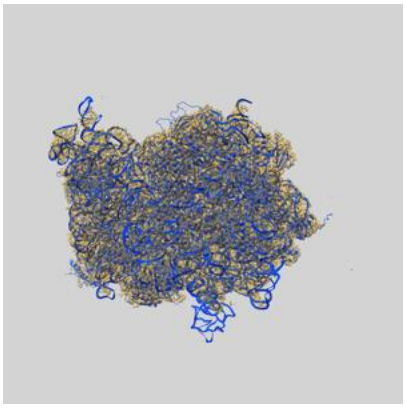
# 9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-29687 and PDB model 8G31. Per-residue inclusion information can be found in section 3 on page 13.

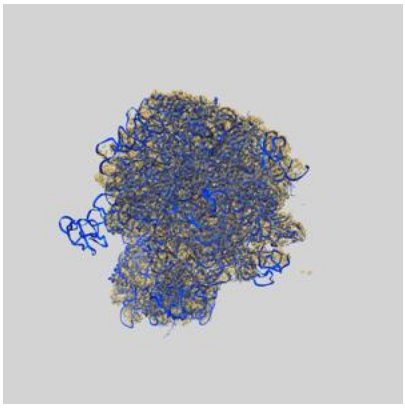
## 9.1 Map-model overlay



X



Y



Z

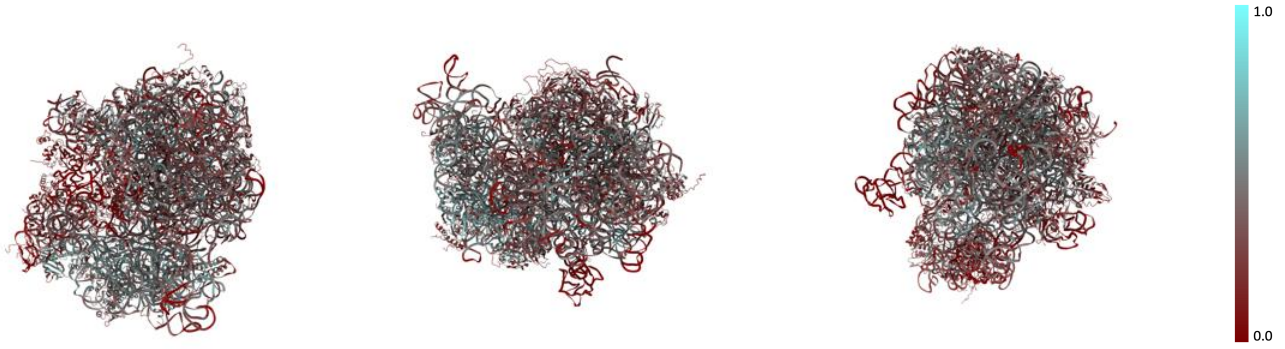
The images above show the 3D surface view of the map at the recommended contour level 0.182 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 9.2 Q-score mapped to coordinate model


X Y Z

The images above show the model with each residue coloured according 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.

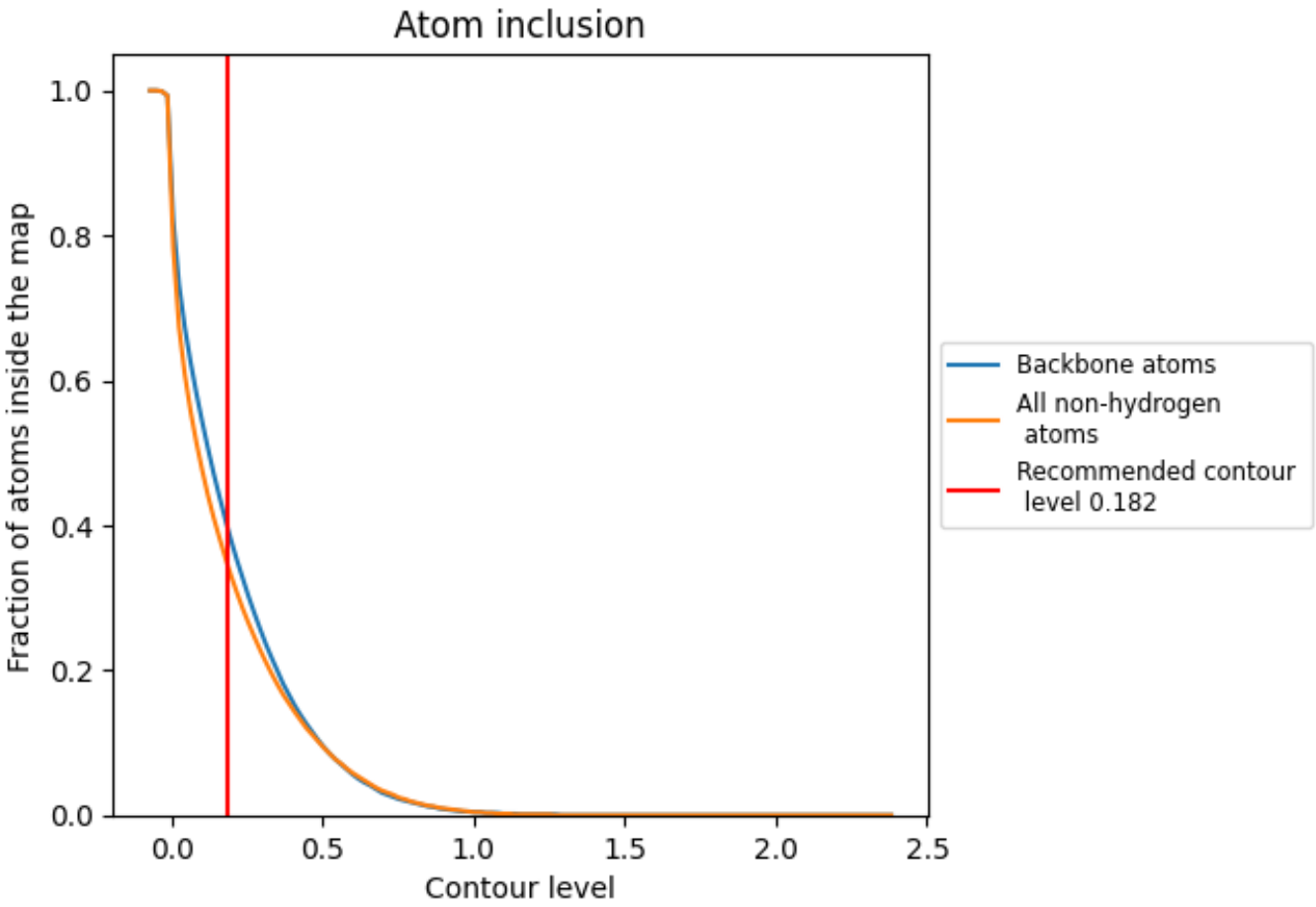
## 9.3 Atom inclusion mapped to coordinate model




X Y Z

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 (0.182).

## 9.4 Atom inclusion (i)




At the recommended contour level, 40% of all backbone atoms, 35% 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 (0.182) and Q-score for the entire model and for each chain.

| Chain | Atom inclusion | Q-score |
|---|---|---|
| All | 0.3490 | 0.0980 |
| 0 | 0.2970 | 0.0420 |
| 1 | 0.0000 | 0.0150 |
| 2 | 0.3520 | 0.0850 |
| 3 | 0.2730 | 0.1190 |
| 4 | 0.3150 | 0.0840 |
| 6 | 0.1530 | -0.0030 |
| A | 0.3450 | 0.1450 |
| B | 0.3580 | 0.0820 |
| C | 0.3310 | 0.1350 |
| D | 0.2210 | 0.0170 |
| E | 0.2520 | 0.0290 |
| F | 0.0330 | -0.0000 |
| G | 0.1770 | 0.0520 |
| J | 0.3320 | 0.0540 |
| K | 0.2830 | 0.0750 |
| L | 0.3150 | 0.0850 |
| M | 0.3020 | 0.0900 |
| N | 0.3240 | 0.0410 |
| O | 0.2580 | 0.1250 |
| P | 0.2610 | 0.0690 |
| Q | 0.3210 | 0.0190 |
| R | 0.3060 | 0.0510 |
| S | 0.3280 | 0.0500 |
| T | 0.2560 | 0.0040 |
| U | 0.2600 | 0.0480 |
| V | 0.2720 | 0.0890 |
| W | 0.3090 | 0.0770 |
| X | 0.3860 | 0.1240 |
| Y | 0.2860 | 0.0440 |
| Z | 0.2400 | 0.0260 |
| c | 0.4040 | 0.1730 |
| d | 0.5100 | 0.2370 |
| e | 0.3380 | 0.1270 |
| f | 0.1380 | -0.0360 |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| Chain | Atom inclusion | Q-score |
|---|---|---|
| g | 0.5040 | 0.2280 |
| h | 0.2120 | -0.0100 |
| i | 0.3190 | 0.1370 |
| j | 0.3990 | 0.1690 |
| k | 0.4040 | 0.1750 |
| l | 0.1750 | -0.0220 |
| m | 0.2870 | 0.0600 |
| n | 0.4270 | 0.1940 |
| o | 0.4150 | 0.1540 |
| p | 0.3180 | 0.1330 |
| q | 0.4760 | 0.1870 |
| r | 0.1110 | -0.0630 |
| s | 0.3860 | 0.1080 |
| t | 0.1600 | 0.0880 |
| u | 0.0000 | -0.0130 |
| v | 0.4180 | 0.1430 |
| w | 0.2360 | 0.1070 |
| x | 0.5220 | 0.3140 |