# Full wwPDB EM Validation Report

Dec 1, 2021 – 01:04 am GMT

| | | |
|---|---|---|
| PDB ID | : | 7OHV |
| EMDB ID | : | EMD-12910 |
| Title | : | Nog1-TAP associated immature ribosomal particles from S. cerevisiae after rpL2 expression shut down, population C |
| Authors | : | Milkereit, P.; Poell, G. |
| Deposited on | : | 2021-05-11 |
| Resolution | : | 3.90 Å(reported) |
| Based on initial model | : | 6ELZ |

This is a Full wwPDB EM Validation 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 (i) symbol.

The following versions of software and data (see references (1)) were used in the production of this report:

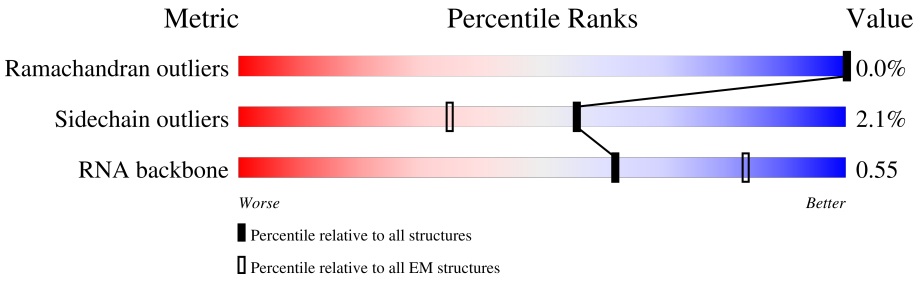
| | | |
|---|---|---|
| EMDB validation analysis | : | 0.0.0.dev97 |
| MolProbity | : | 4.02b-467 |
| Percentile statistics | : | 20191225.v01 (using entries in the PDB archive December 25th 2019) |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.23.2 |

# 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 3.90 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) |
|---|---|---|
| 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 | 1 | 3396 | 50% 13% 37% |
| 2 | 2 | 158 | 78% 20% |
| 3 | 6 | 232 | 18% 9% 72% |
| 4 | A | 291 | 34% 67% 32% |
| 5 | B | 387 | 85% 12% |
| 6 | C | 362 | 6% 98% |
| 7 | D | 505 | 11% 85% 13% |
| 8 | E | 176 | 89% 11% |

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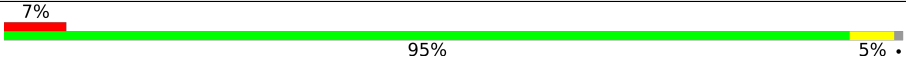
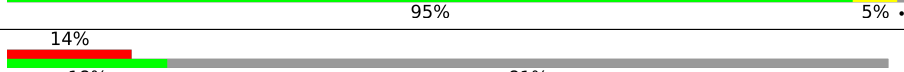
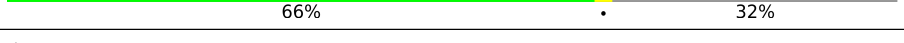
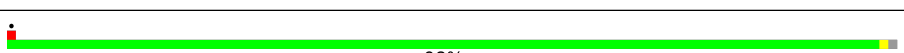
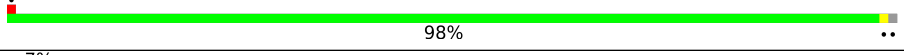
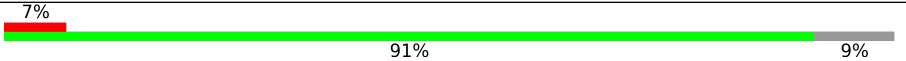
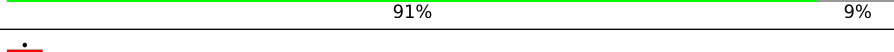
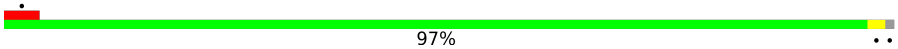
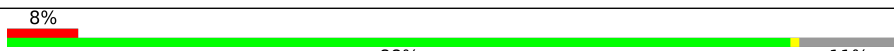
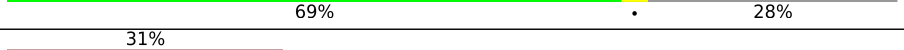
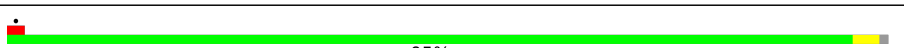
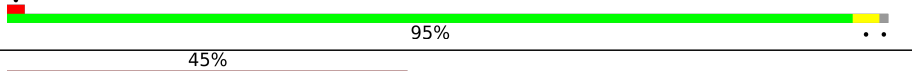
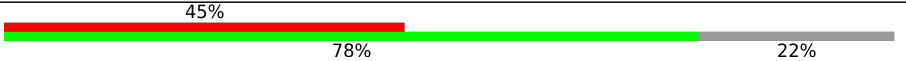
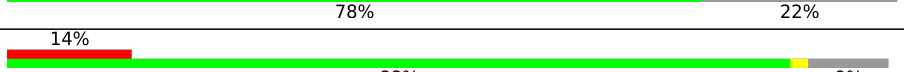
| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 9 | F | 244 |   |
| 10 | G | 256 |   |
| 11 | H | 191 |   |
| 12 | J | 427 |   |
| 13 | K | 376 |   |
| 14 | L | 199 |   |
| 15 | M | 138 |   |
| 16 | N | 204 |   |
| 17 | O | 199 |   |
| 18 | P | 184 |   |
| 19 | Q | 186 |   |
| 20 | R | 189 |   |
| 21 | S | 172 |   |
| 22 | U | 121 |   |
| 23 | V | 137 |   |
| 24 | W | 236 |   |
| 25 | X | 142 |   |
| 26 | Y | 127 |   |
| 27 | Z | 136 |   |
| 28 | a | 149 |   |
| 29 | b | 647 |   |
| 30 | d | 113 |   |
| 31 | e | 130 |   |
| 32 | f | 107 |   |
| 33 | h | 120 |   |

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| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 34 | i | 100 | 9% 82% 17% |
| 35 | j | 88 | 81% 17% |
| 36 | k | 78 | 33% 79% 19% |
| 37 | m | 807 | 29% 71% 28% |
| 38 | n | 605 | 66% 32% |
| 39 | o | 220 | 60% 40% |
| 40 | p | 460 | 19% 55% 44% |
| 41 | r | 261 | 28% 72% |
| 42 | t | 322 | 7% 86% 11% |
| 43 | u | 199 | 56% 42% |
| 44 | v | 231 | 55% 44% |
| 45 | w | 841 | 7% 8% 92% |
| 46 | y | 245 | 6% 91% 8% |

# 2 Entry composition

There are 47 unique types of molecules in this entry. The entry contains 205079 atoms, of which 91259 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | H | N | O | P | | |
| 1 | 1 | 2141 | 68875 | 20469 | 23027 | 8298 | 14940 | 2141 | 0 | 0 |

- Molecule 2 is a RNA chain called 5.8S rRNA.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | H | N | O | P | | |
| 2 | 2 | 155 | 4955 | 1472 | 1664 | 577 | 1087 | 155 | 0 | 0 |

- Molecule 3 is a RNA chain called ITS2.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | H | N | O | P | | |
| 3 | 6 | 65 | 2061 | 614 | 691 | 228 | 463 | 65 | 0 | 0 |

- Molecule 4 is a protein called Ribosome biogenesis protein BRX1.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | H | N | O | S | | |
| 4 | A | 198 | 3250 | 1043 | 1627 | 284 | 290 | 6 | 0 | 0 |

- Molecule 5 is a protein called 60S ribosomal protein L3.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | H | N | O | S | | |
| 5 | B | 341 | 5483 | 1715 | 2781 | 501 | 480 | 6 | 0 | 0 |

- Molecule 6 is a protein called 60S ribosomal protein L4-A.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | H | N | O | S | | |
| 6 | C | 359 | 5584 | 1720 | 2853 | 518 | 490 | 3 | 0 | 0 |

- Molecule 7 is a protein called ATP-dependent RNA helicase HAS1.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 7 | D | 437 | Total | C | H | N | O | S | 0 | 0 |
| | | | 7106 | 2247 | 3620 | 600 | 627 | 12 | | |

- Molecule 8 is a protein called 60S ribosomal protein L6-A.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 8 | E | 156 | Total | C | H | N | O | S | 0 | 0 |
| | | | 2567 | 800 | 1328 | 222 | 216 | 1 | | |

- Molecule 9 is a protein called 60S ribosomal protein L7-A.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 | F | 222 | Total | C | H | N | O | S | 0 | 0 |
| | | | 3647 | 1151 | 1863 | 324 | 308 | 1 | | |

- Molecule 10 is a protein called 60S ribosomal protein L8-A.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 10 | G | 184 | Total | C | H | N | O | S | 0 | 0 |
| | | | 2960 | 930 | 1522 | 249 | 257 | 2 | | |

- Molecule 11 is a protein called 60S ribosomal protein L9-A.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 11 | H | 190 | Total | C | H | N | O | S | 0 | 0 |
| | | | 3086 | 957 | 1576 | 273 | 276 | 4 | | |

- Molecule 12 is a protein called rRNA-processing protein EBP2.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 12 | J | 79 | Total | C | H | N | O | S | 0 | 0 |
| | | | 1318 | 420 | 656 | 116 | 124 | 2 | | |

- Molecule 13 is a protein called Proteasome-interacting protein CIC1.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 13 | K | 257 | Total | C | H | N | O | S | 0 | 0 |
| | | | 4230 | 1337 | 2157 | 341 | 392 | 3 | | |

- Molecule 14 is a protein called 60S ribosomal protein L13-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 14 | L | 117 | Total | C | H | N | O | 0 | 0 |
| | | | 1962 | 601 | 1004 | 202 | 155 | | |

- Molecule 15 is a protein called 60S ribosomal protein L14-A.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | M | 136 | Total | C | H | N | O | S | 0 | 0 |
| | | | 2203 | 675 | 1150 | 199 | 177 | 2 | | |

- Molecule 16 is a protein called 60S ribosomal protein L15-A.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 16 | N | 186 | Total | C | H | N | O | S | 0 | 0 |
| | | | 3224 | 994 | 1637 | 333 | 259 | 1 | | |

- Molecule 17 is a protein called 60S ribosomal protein L16-A.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 17 | O | 197 | Total | C | H | N | O | S | 0 | 0 |
| | | | 3215 | 1003 | 1660 | 289 | 262 | 1 | | |

- Molecule 18 is a protein called 60S ribosomal protein L17-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 18 | P | 163 | Total | C | H | N | O | 0 | 0 |
| | | | 2608 | 799 | 1321 | 255 | 233 | | |

- Molecule 19 is a protein called 60S ribosomal protein L18-A.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 19 | Q | 134 | Total | C | H | N | O | S | 0 | 0 |
| | | | 2151 | 659 | 1116 | 196 | 179 | 1 | | |

- Molecule 20 is a protein called 60S ribosomal protein L19-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 20 | R | 89 | Total | C | H | N | O | 0 | 0 |
| | | | 1521 | 460 | 796 | 147 | 118 | | |

- Molecule 21 is a protein called 60S ribosomal protein L20-A.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 21 | S | 170 | Total | C | H | N | O | S | 0 | 0 |
| | | | 2903 | 922 | 1471 | 265 | 242 | 3 | | |

- Molecule 22 is a protein called 60S ribosomal protein L22-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 22 | U | 94 | Total | C | H | N | O | 0 | 0 |
| | | | 1519 | 489 | 767 | 123 | 140 | | |

- Molecule 23 is a protein called 60S ribosomal protein L23-A.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 23 | V | 124 | Total | C | H | N | O | S | 0 | 0 |
| | | | 1897 | 584 | 974 | 171 | 161 | 7 | | |

- Molecule 24 is a protein called Ribosome assembly factor MRT4.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 24 | W | 232 | Total | C | H | N | O | S | 0 | 0 |
| | | | 3773 | 1184 | 1903 | 321 | 360 | 5 | | |

- Molecule 25 is a protein called 60S ribosomal protein L25.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 25 | X | 127 | Total | C | H | N | O | S | 0 | 0 |
| | | | 2076 | 645 | 1075 | 175 | 179 | 2 | | |

- Molecule 26 is a protein called 60S ribosomal protein L26-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 26 | Y | 126 | Total | C | H | N | O | 0 | 0 |
| | | | 2075 | 625 | 1082 | 192 | 176 | | |

- Molecule 27 is a protein called 60S ribosomal protein L27-A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 27 | Z | 130 | Total | C | H | N | O | 0 | 0 |
| | | | 2154 | 680 | 1105 | 195 | 174 | | |

- Molecule 28 is a protein called 60S ribosomal protein L28.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 28 | a | 73 | Total | C | H | N | O | 0 | 0 |
| | | | 1188 | 375 | 618 | 98 | 97 | | |

- Molecule 29 is a protein called Nucleolar GTP-binding protein 1.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 29 | b | 421 | Total | C | H | N | O | S | 0 | 0 |
| | | | 6876 | 2180 | 3466 | 585 | 627 | 18 | | |

- Molecule 30 is a protein called 60S ribosomal protein L31-A.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 30 | d | 100 | Total | C | H | N | O | S | 0 | 0 |
| | | | 1687 | 521 | 871 | 157 | 137 | 1 | | |

- Molecule 31 is a protein called 60S ribosomal protein L32.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 31 | e | 124 | Total | C | H | N | O | S | 0 | 0 |
| | | | 2071 | 635 | 1070 | 202 | 163 | 1 | | |

- Molecule 32 is a protein called 60S ribosomal protein L33-A.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 32 | f | 106 | Total | C | H | N | O | S | 0 | 0 |
| | | | 1731 | 540 | 881 | 165 | 144 | 1 | | |

- Molecule 33 is a protein called 60S ribosomal protein L35-A.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 33 | h | 118 | Total | C | H | N | O | S | 0 | 0 |
| | | | 2038 | 612 | 1074 | 185 | 166 | 1 | | |

- Molecule 34 is a protein called 60S ribosomal protein L36-A.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 34 | i | 83 | Total | C | H | N | O | S | 0 | 0 |
| | | | 1371 | 408 | 713 | 135 | 113 | 2 | | |

- Molecule 35 is a protein called 60S ribosomal protein L37-A.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 35 | j | 73 | Total | C | H | N | O | S | 0 | 0 |
| | | | 1169 | 353 | 589 | 126 | 96 | 5 | | |

- Molecule 36 is a protein called 60S ribosomal protein L38.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 36 | k | 63 | Total | C | H | N | O | 0 | 0 |
| | | | 1123 | 340 | 600 | 99 | 84 | | |

- Molecule 37 is a protein called Ribosome biogenesis protein ERB1.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 37 | m | 583 | Total | C | H | N | O | S | 0 | 0 |
| | | | 9518 | 3033 | 4766 | 834 | 870 | 15 | | |

- Molecule 38 is a protein called Pescadillo homolog.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 38 | n | 411 | Total | C | H | N | O | S | 0 | 0 |
| | | | 6868 | 2179 | 3499 | 585 | 592 | 13 | | |

- Molecule 39 is a protein called Ribosome biogenesis protein 15.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 39 | o | 133 | Total | C | H | N | O | S | 0 | 0 |
| | | | 2267 | 716 | 1160 | 198 | 189 | 4 | | |

- Molecule 40 is a protein called Ribosome biogenesis protein YTM1.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 40 | p | 257 | Total | C | H | N | O | S | 0 | 0 |
| | | | 3984 | 1247 | 1990 | 353 | 388 | 6 | | |

- Molecule 41 is a protein called Ribosome biogenesis protein NSA2.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 41 | r | 73 | Total | C | H | N | O | S | 0 | 0 |
| | | | 1288 | 388 | 660 | 133 | 106 | 1 | | |

- Molecule 42 is a protein called Ribosome biogenesis protein RLP7.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 42 | t | 286 | Total | C | H | N | O | S | 0 | 0 |
| | | | 4752 | 1455 | 2455 | 426 | 413 | 3 | | |

- Molecule 43 is a protein called Ribosome biogenesis protein RLP24.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 43 | u | 116 | Total | C | H | N | O | S | 0 | 0 |
| | | | 1987 | 612 | 1011 | 200 | 155 | 9 | | |

- Molecule 44 is a protein called Nucleolar protein 16.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 44 | v | 130 | Total | C | H | N | O | S | 0 | 0 |
| | | | 2223 | 678 | 1136 | 211 | 195 | 3 | | |

- Molecule 45 is a protein called 27S pre-rRNA (guanosine(2922)-2'-O)-methyltransferase.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 45 | w | 69 | Total | C | H | N | O | S | 0 | 0 |
| | | | 1136 | 351 | 577 | 105 | 100 | 3 | | |

- Molecule 46 is a protein called Eukaryotic translation initiation factor 6.

| Mol | Chain | Residues | Atoms | | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 46 | y | 225 | Total | C | H | N | O | S | 0 | 0 |
| | | | 3398 | 1056 | 1697 | 295 | 343 | 7 | | |

- Molecule 47 is ZINC ION (three-letter code: ZN) (formula: Zn).

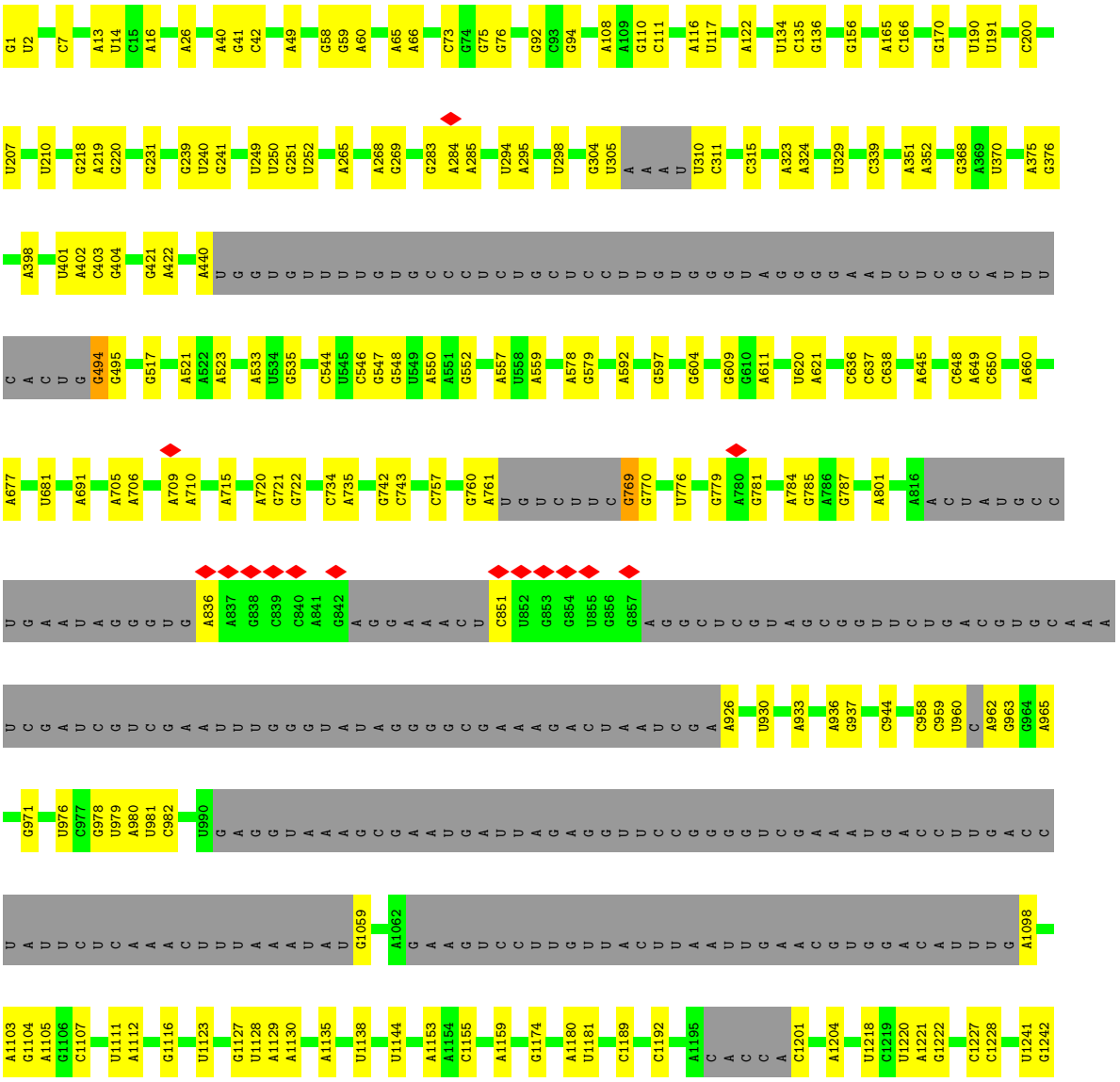
| Mol | Chain | Residues | Atoms | | AltConf |
|---|---|---|---|---|---|
| 47 | j | 1 | Total | Zn | 0 |
| | | | 1 | 1 | |

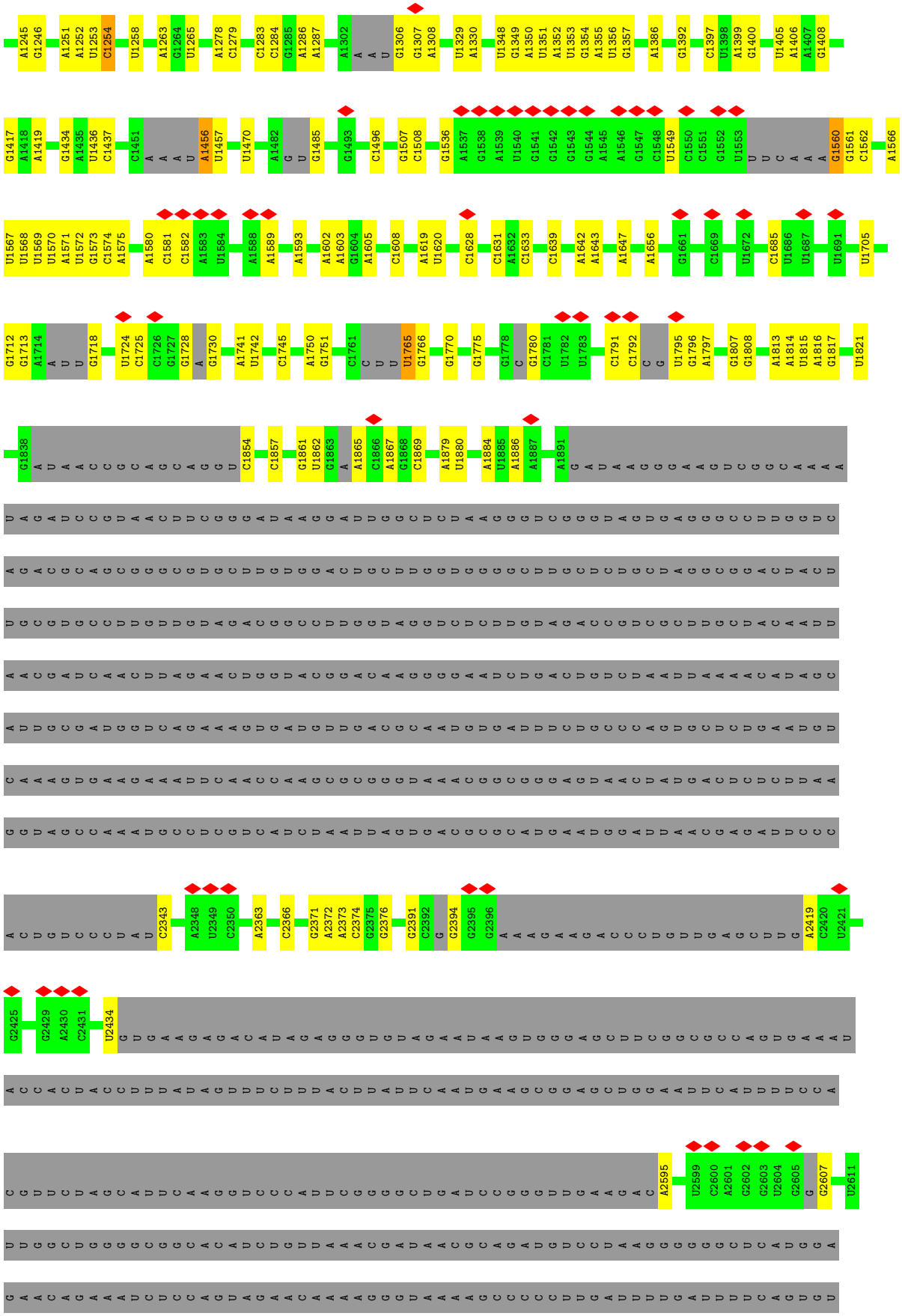
# 3 Residue-property plots (i)

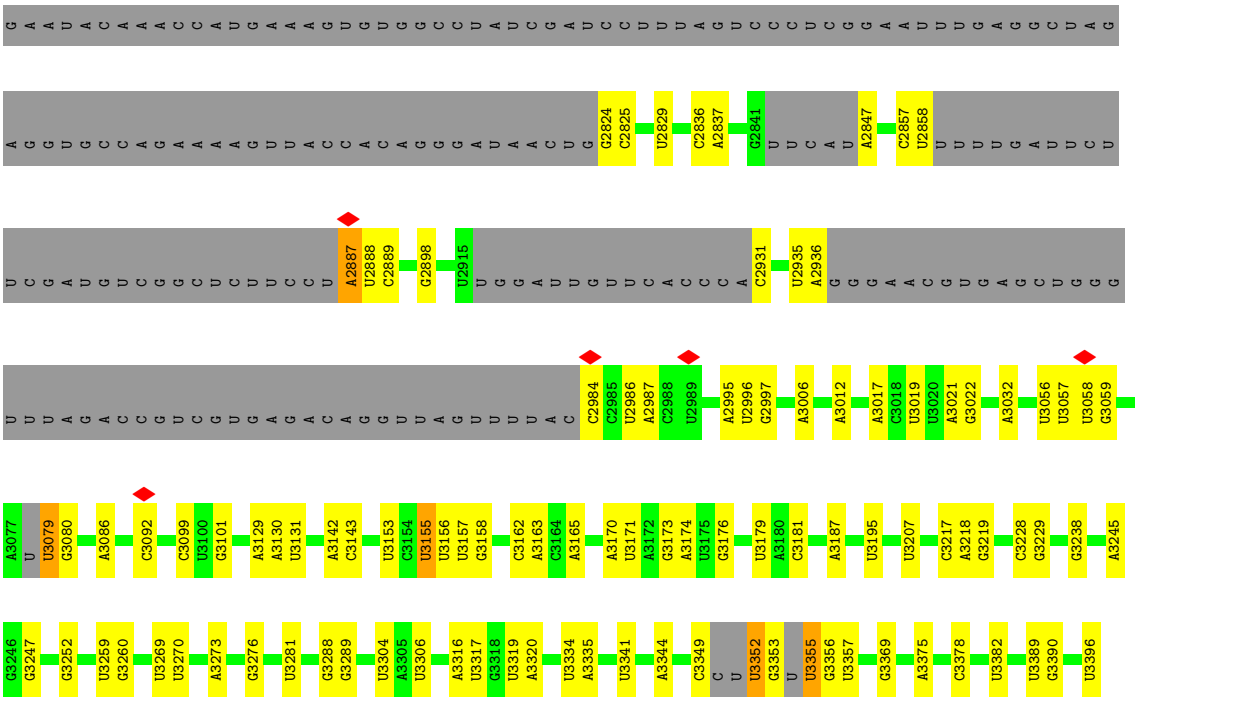
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: 25S rRNA

Chain 1:

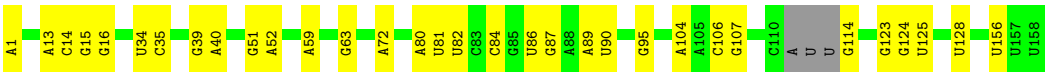







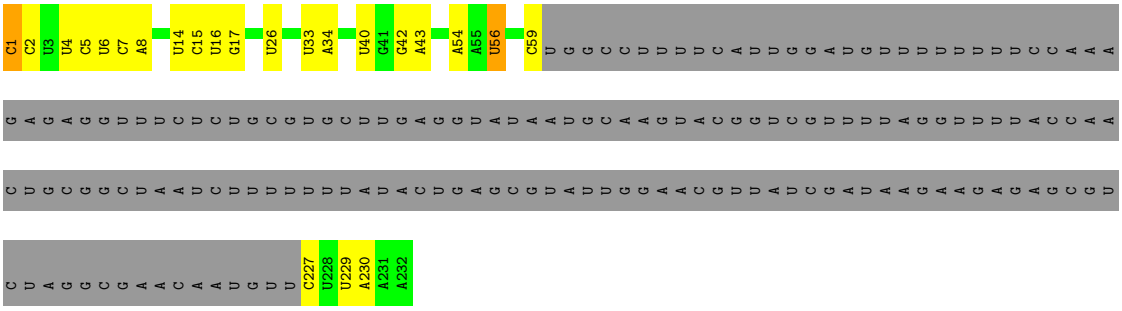
• Molecule 2: 5.8S rRNA

Chain 2:

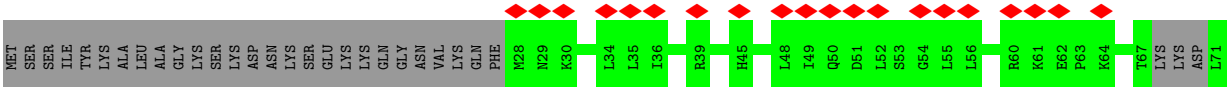
• Molecule 3: ITS2

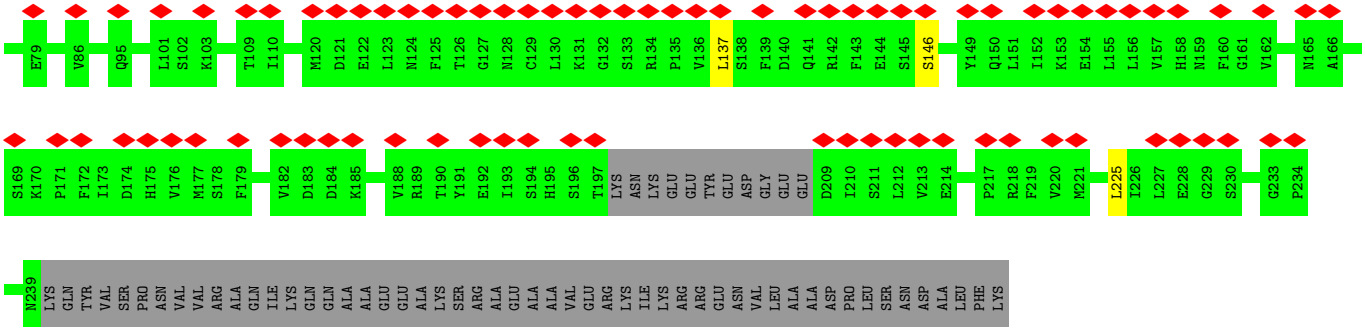
Chain 6:

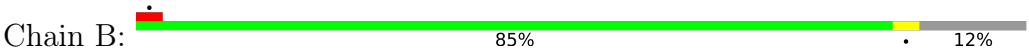
• Molecule 4: Ribosome biogenesis protein BRX1

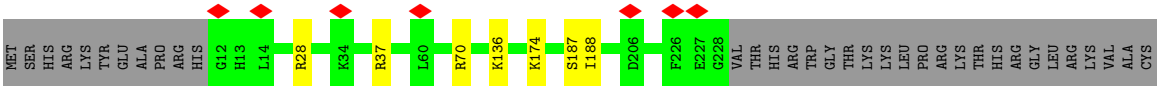
Chain A:

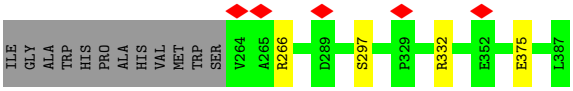





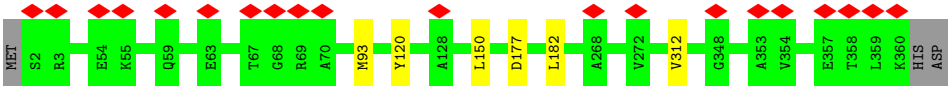

• Molecule 5: 60S ribosomal protein L3



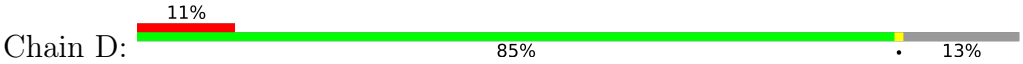



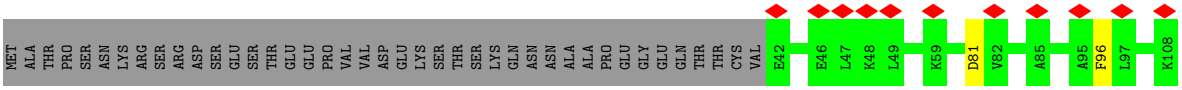



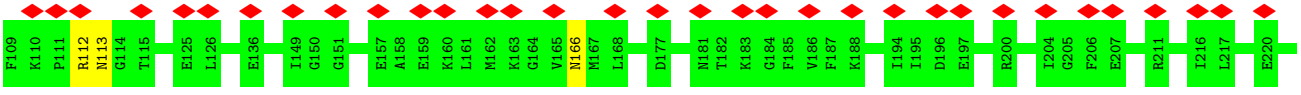

• Molecule 6: 60S ribosomal protein L4-A

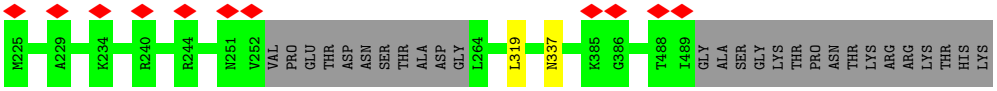




• Molecule 7: ATP-dependent RNA helicase HAS1

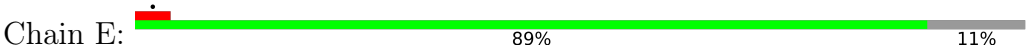


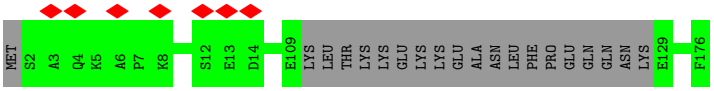



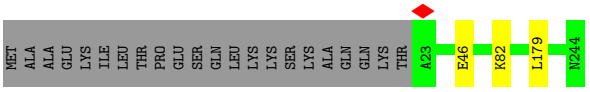

• Molecule 8: 60S ribosomal protein L6-A





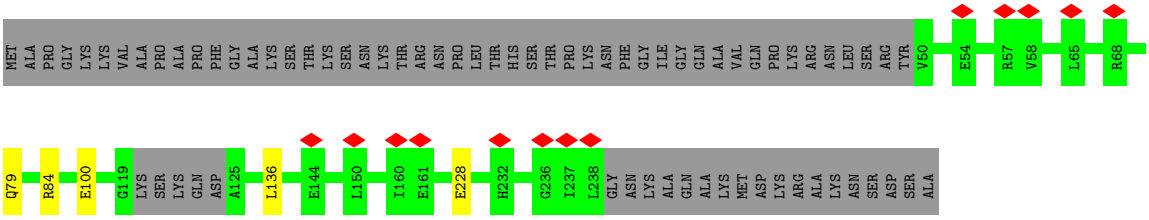

• Molecule 9: 60S ribosomal protein L7-A

Chain F:

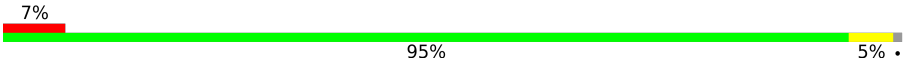

• Molecule 10: 60S ribosomal protein L8-A

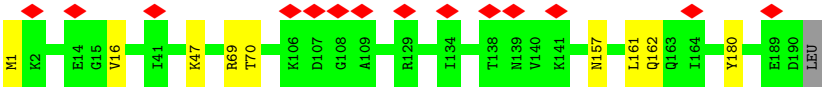
Chain G:


• Molecule 11: 60S ribosomal protein L9-A

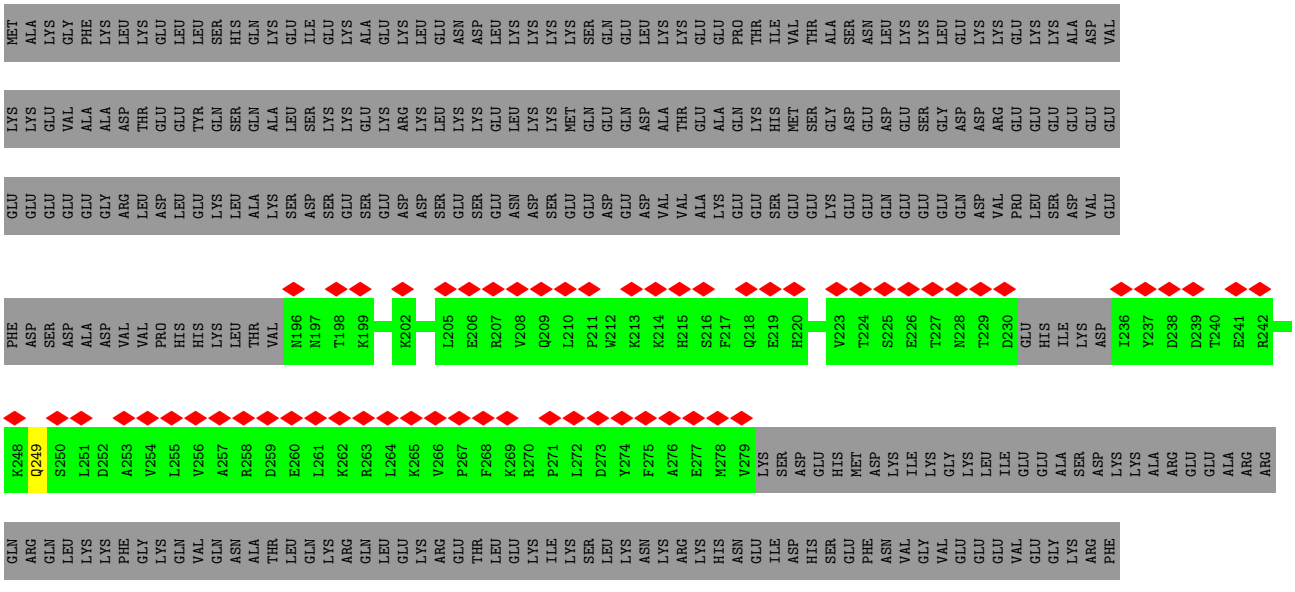
Chain H:



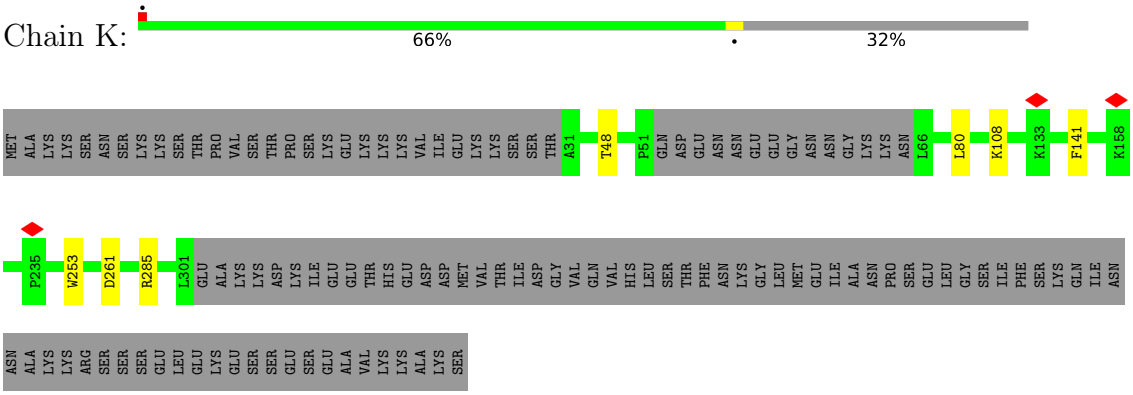




• Molecule 12: rRNA-processing protein EBP2

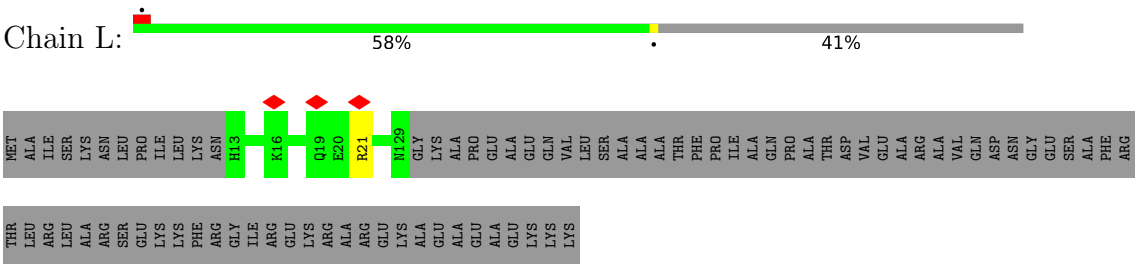
Chain J:

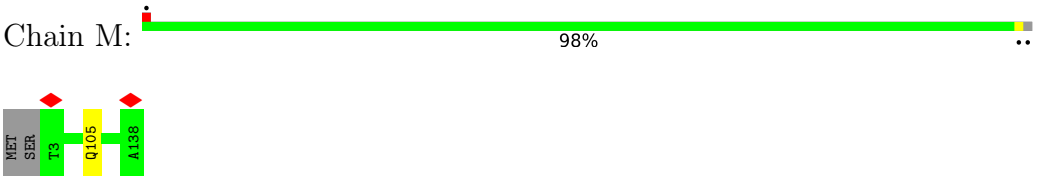

• Molecule 13: Proteasome-interacting protein CIC1



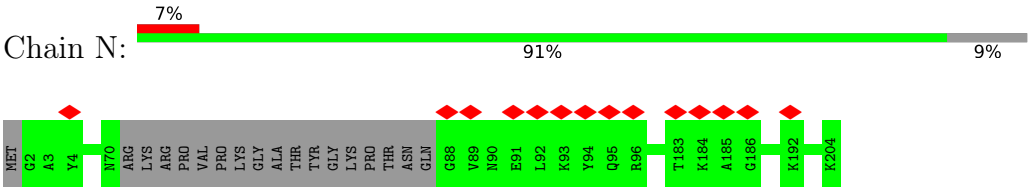

• Molecule 14: 60S ribosomal protein L13-A



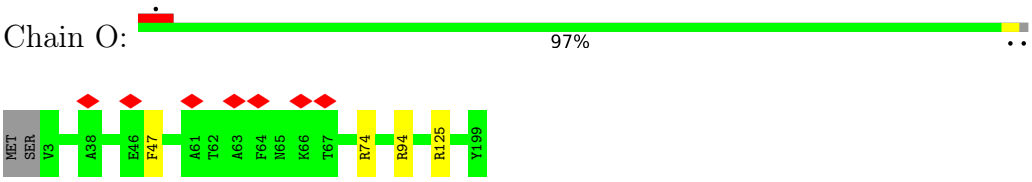

• Molecule 15: 60S ribosomal protein L14-A




• Molecule 16: 60S ribosomal protein L15-A

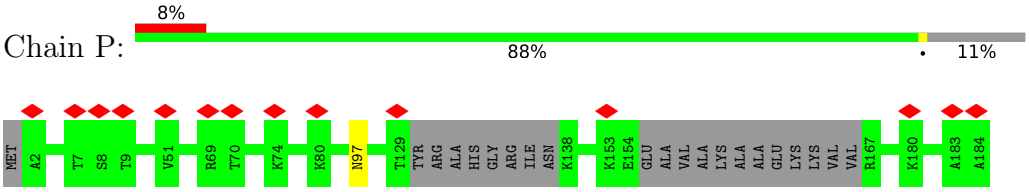



• Molecule 17: 60S ribosomal protein L16-A



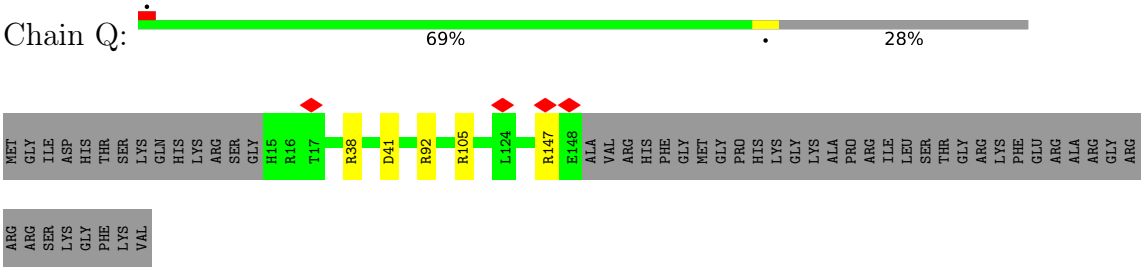

• Molecule 18: 60S ribosomal protein L17-A

Chain P:



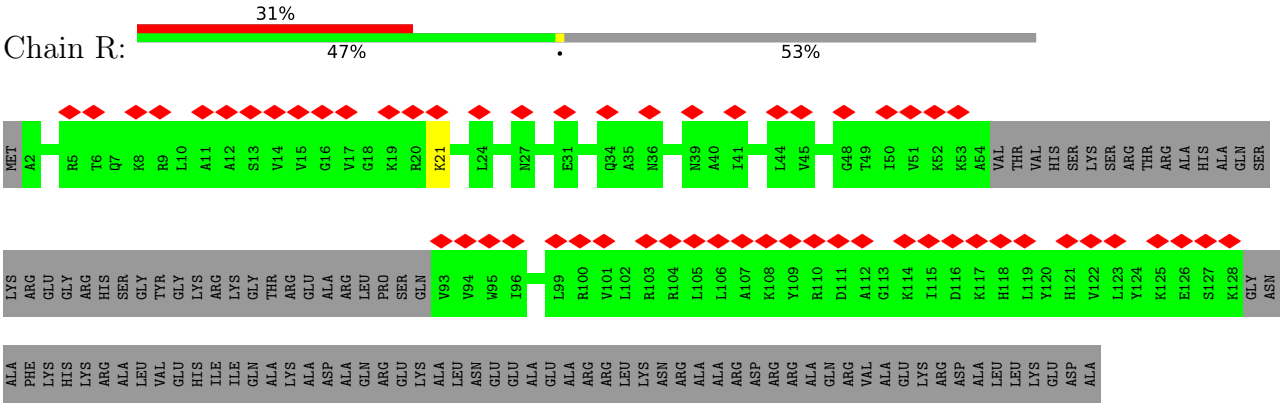

• Molecule 19: 60S ribosomal protein L18-A

Chain Q:



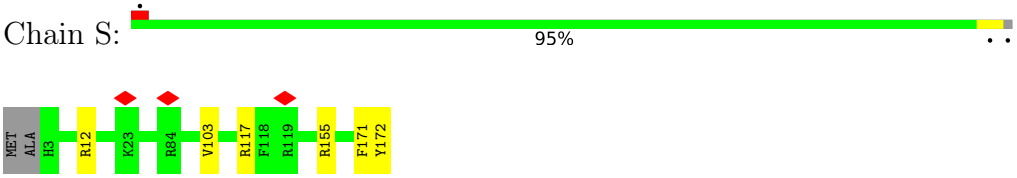

• Molecule 20: 60S ribosomal protein L19-A

Chain R:



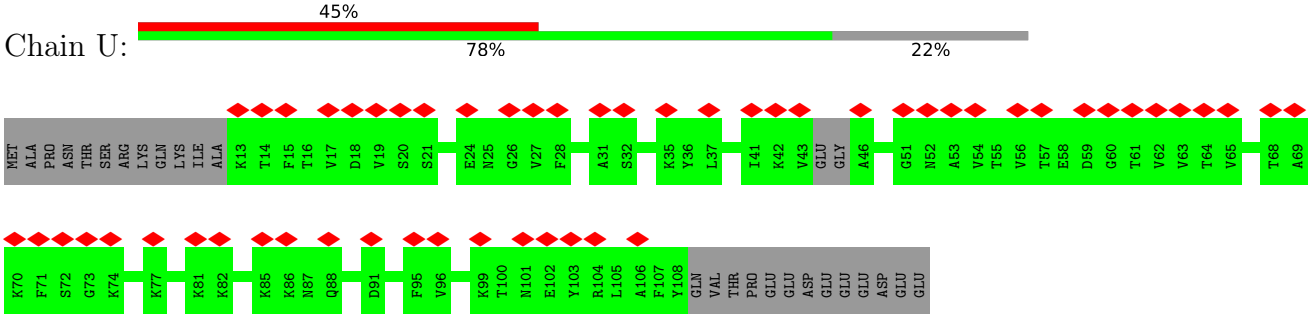

• Molecule 21: 60S ribosomal protein L20-A

Chain S:



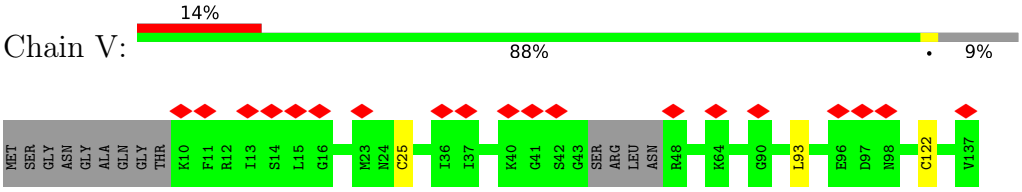

• Molecule 22: 60S ribosomal protein L22-A

Chain U:



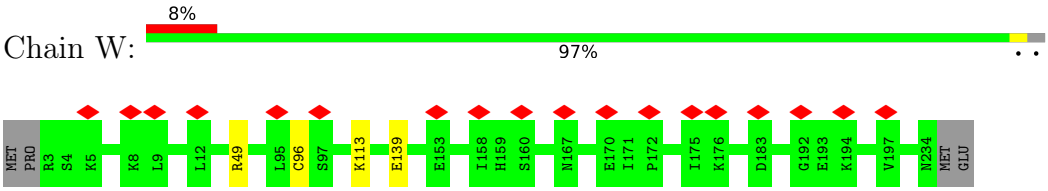

• Molecule 23: 60S ribosomal protein L23-A

Chain V:



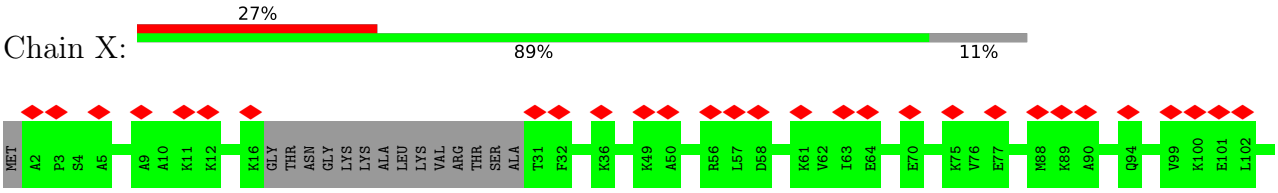

• Molecule 24: Ribosome assembly factor MRT4

Chain W:



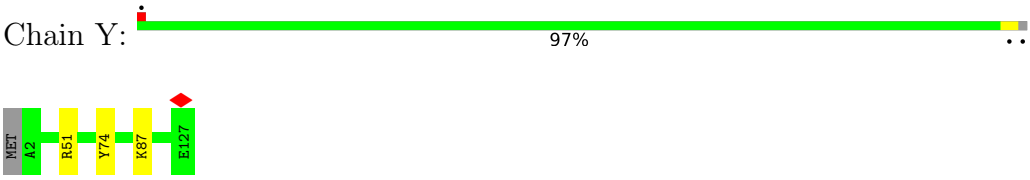

• Molecule 25: 60S ribosomal protein L25

Chain X:



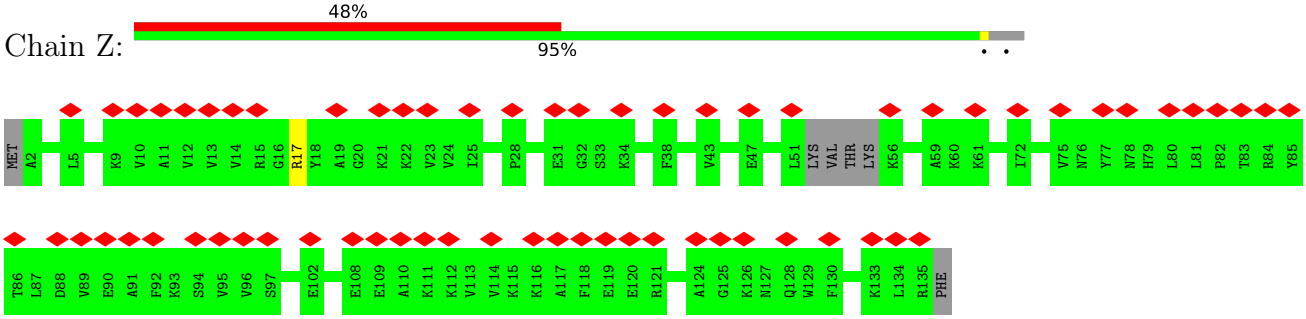

• Molecule 26: 60S ribosomal protein L26-A

Chain Y:



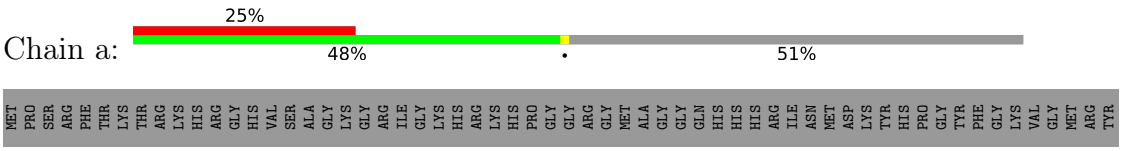

• Molecule 27: 60S ribosomal protein L27-A

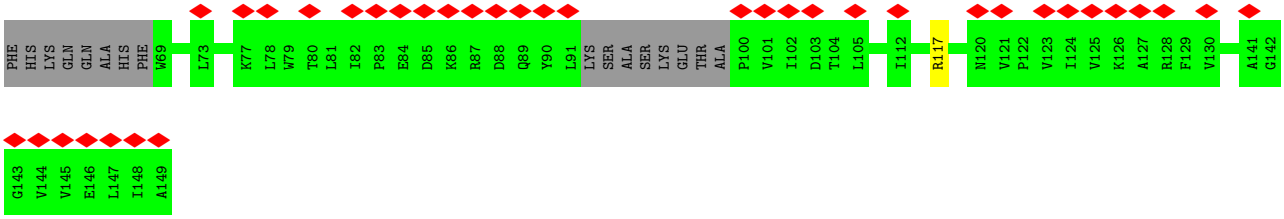
Chain Z:




• Molecule 28: 60S ribosomal protein L28

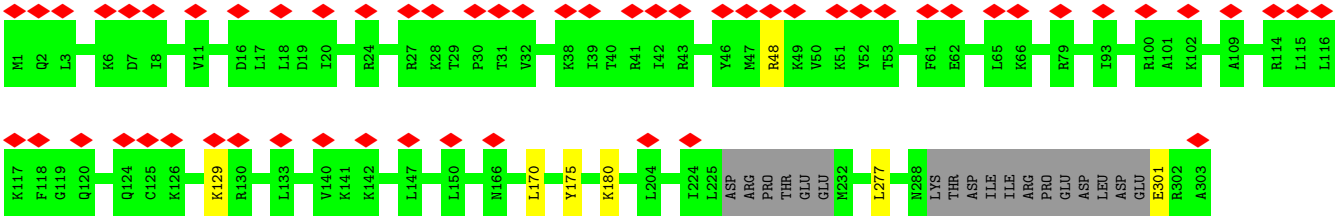
Chain a:

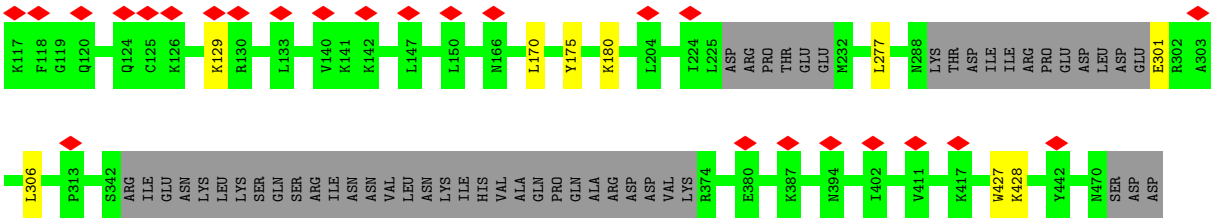


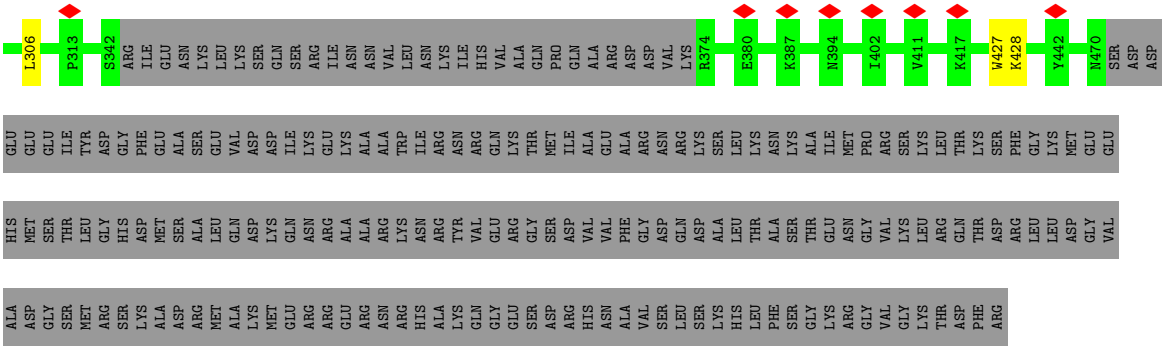


• Molecule 29: Nucleolar GTP-binding protein 1

Chain b:

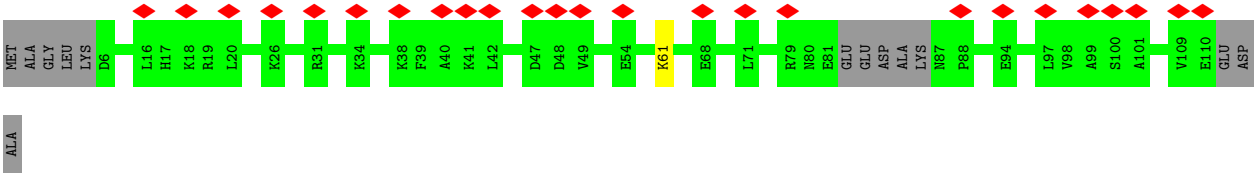







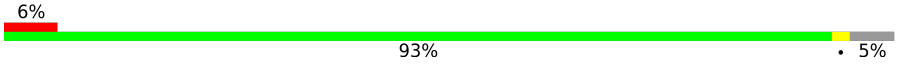
• Molecule 30: 60S ribosomal protein L31-A

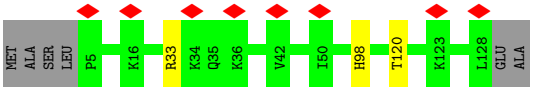
Chain d:

• Molecule 31: 60S ribosomal protein L32

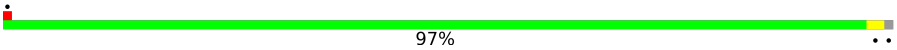
Chain e:

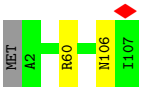


• Molecule 32: 60S ribosomal protein L33-A

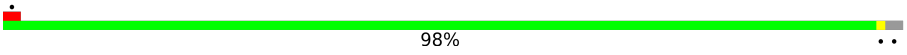
Chain f:

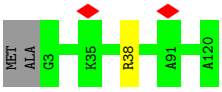





• Molecule 33: 60S ribosomal protein L35-A

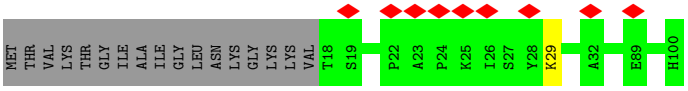
Chain h:



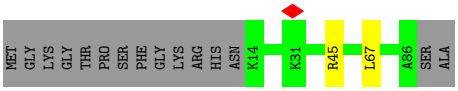

• Molecule 34: 60S ribosomal protein L36-A

Chain i:

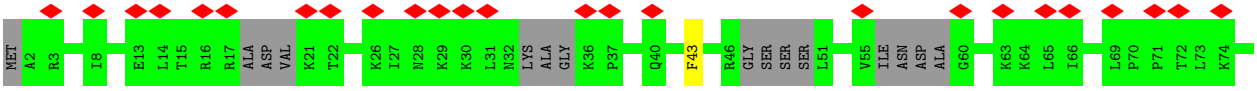

• Molecule 35: 60S ribosomal protein L37-A

Chain j:


• Molecule 36: 60S ribosomal protein L38

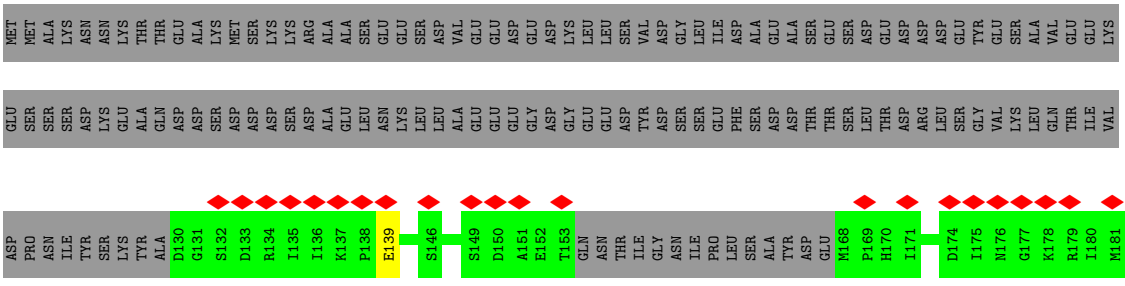
Chain k:

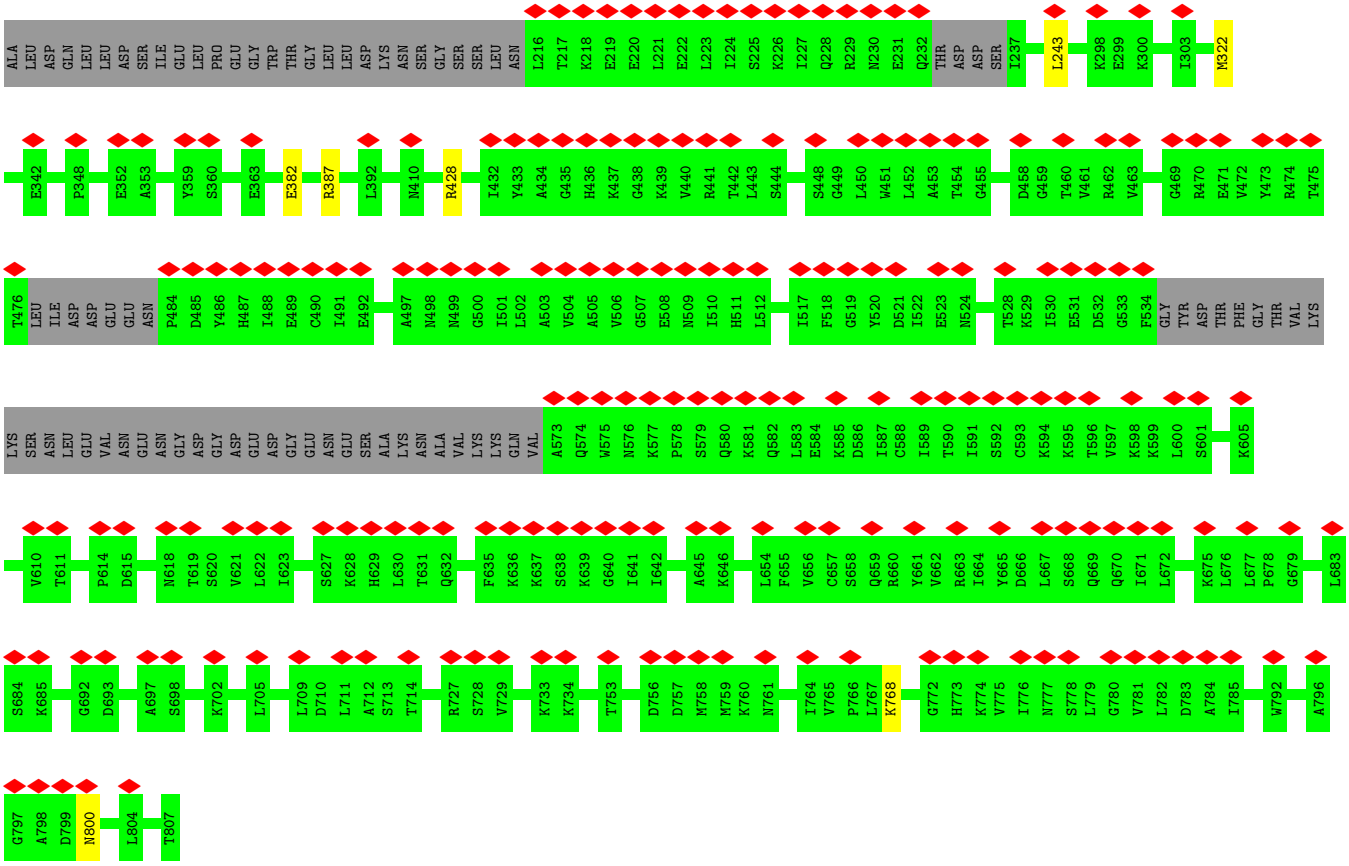





• Molecule 37: Ribosome biogenesis protein ERB1

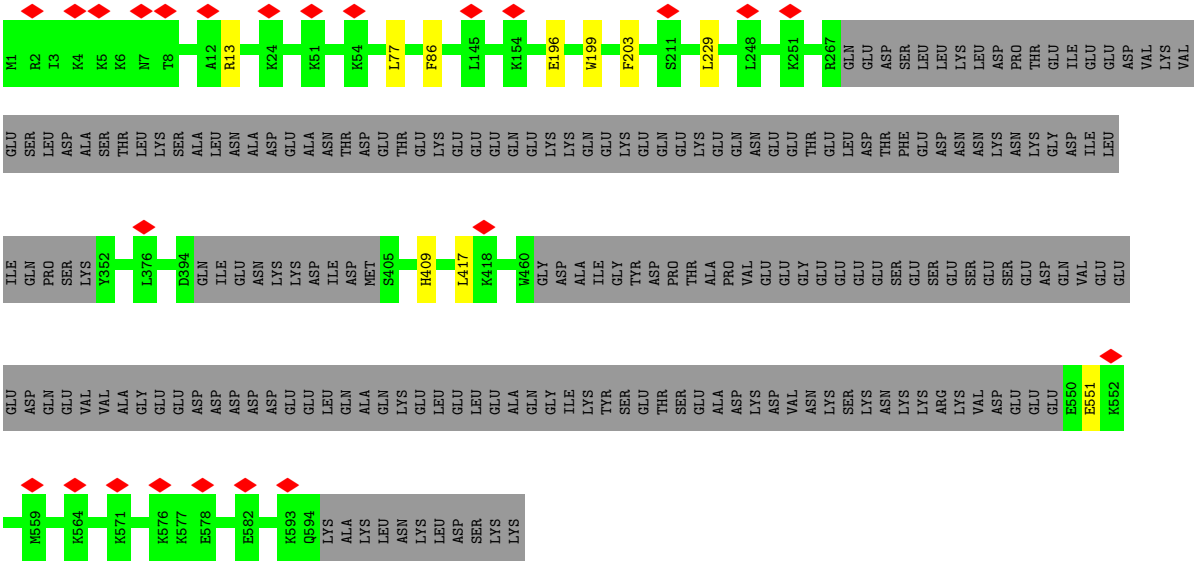
Chain m:



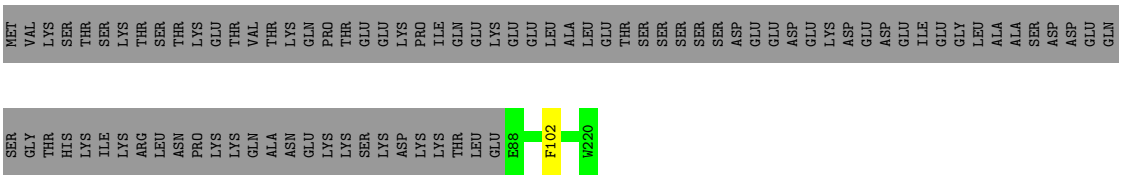
• Molecule 38: Pescadillo homolog

Chain n:

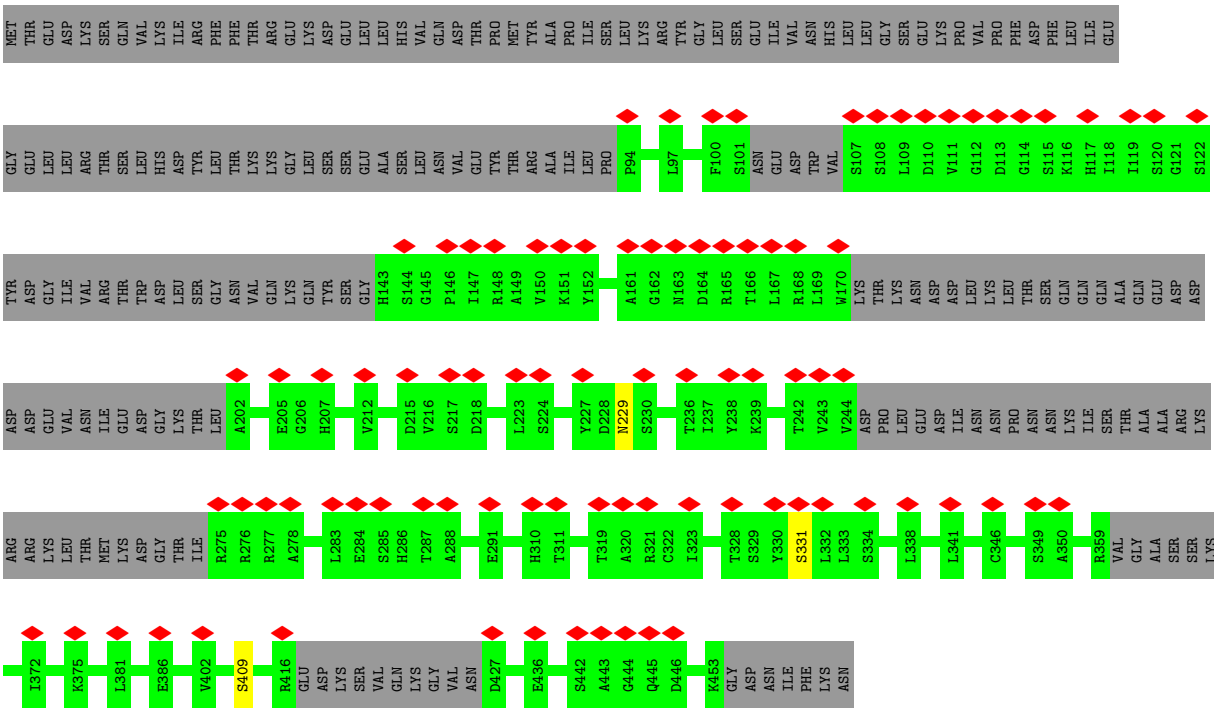



• Molecule 39: Ribosome biogenesis protein 15

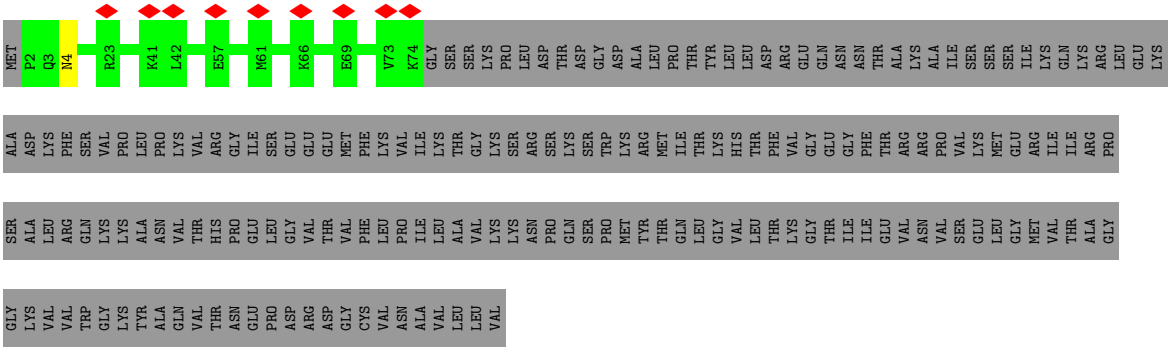
Chain o:



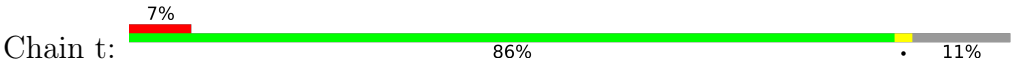

• Molecule 40: Ribosome biogenesis protein YTM1

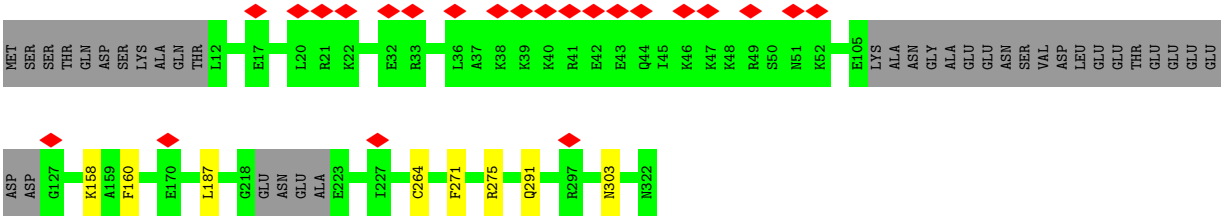




• Molecule 41: Ribosome biogenesis protein NSA2

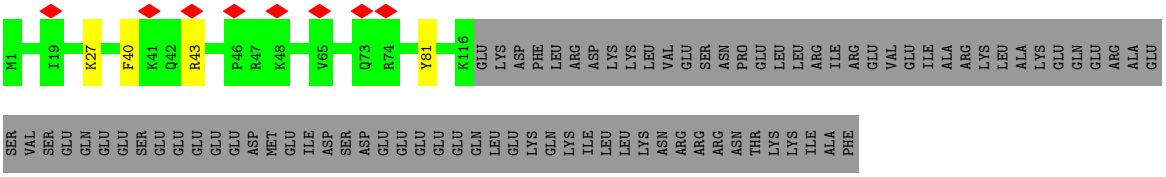

• Molecule 42: Ribosome biogenesis protein RLP7





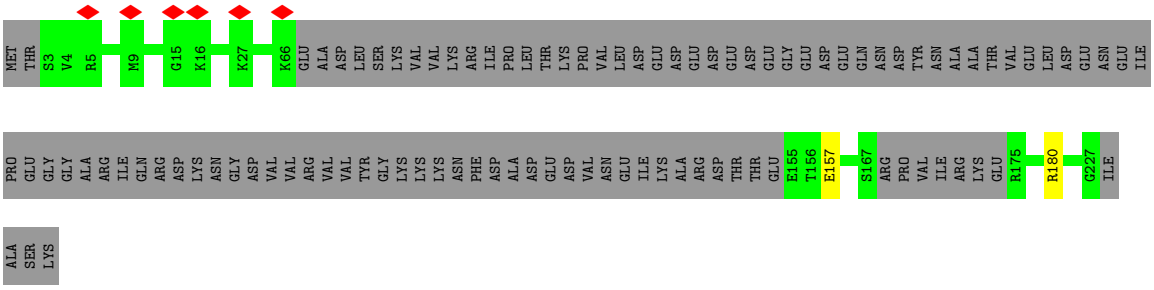
• Molecule 43: Ribosome biogenesis protein RLP24

Chain u:

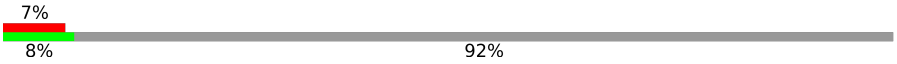
• Molecule 44: Nucleolar protein 16

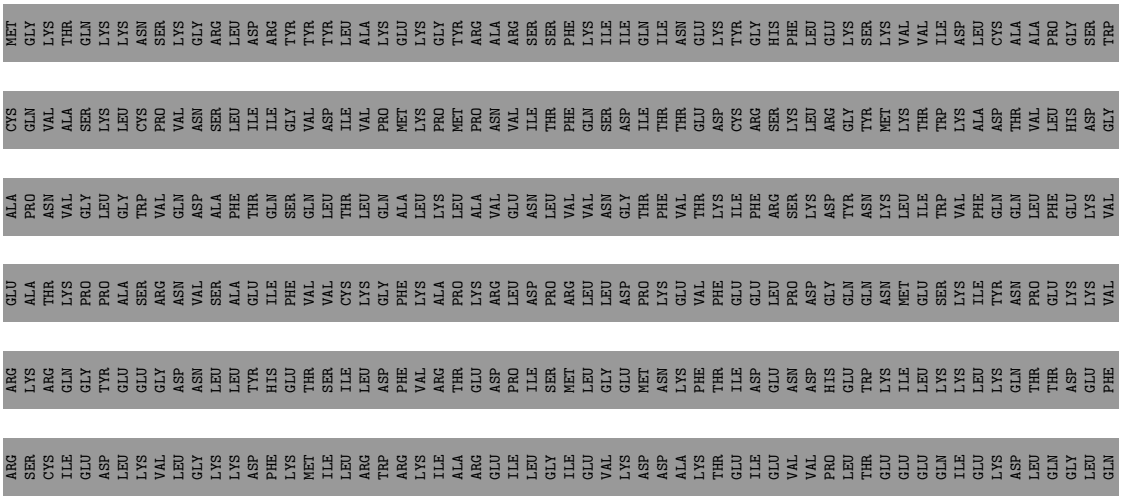
Chain v:

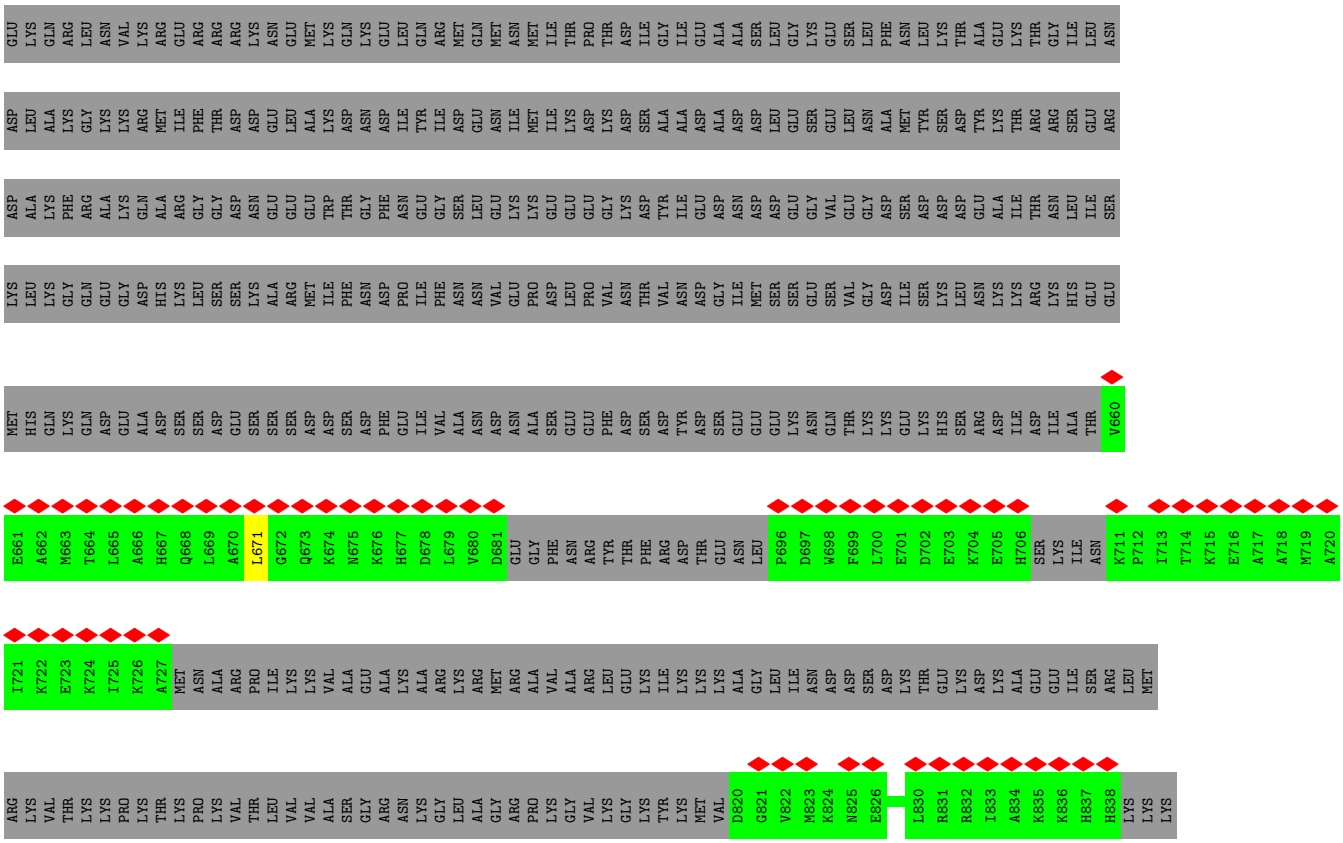



• Molecule 45: 27S pre-rRNA (guanosine(2922)-2'-O)-methyltransferase

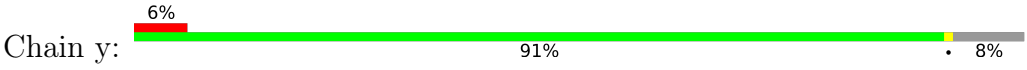
Chain w:

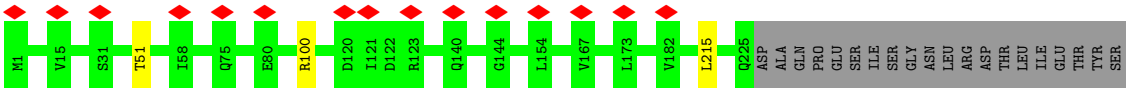





• Molecule 46: Eukaryotic translation initiation factor 6



# 4 Experimental information (i)

| Property | Value | Source |
|---|---|---|
| EM reconstruction method | SINGLE PARTICLE | Depositor |
| Imposed symmetry | POINT, C1 | Depositor |
| Number of particles used | 19178 | 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 ($e^-/Å^2$) | 86.45 | Depositor |
| Minimum defocus (nm) | Not provided | |
| Maximum defocus (nm) | Not provided | |
| Magnification | Not provided | |
| Image detector | FEI FALCON III (4k x 4k) | Depositor |
| Maximum map value | 0.118 | Depositor |
| Minimum map value | -0.038 | Depositor |
| Average map value | -0.000 | Depositor |
| Map value standard deviation | 0.007 | Depositor |
| Recommended contour level | 0.021 | Depositor |
| Map size (Å) | 425.40002, 425.40002, 425.40002 | wwPDB |
| Map dimensions | 400, 400, 400 | wwPDB |
| Map angles (°) | 90.0, 90.0, 90.0 | wwPDB |
| Pixel spacing (Å) | 1.0635, 1.0635, 1.0635 | Depositor |

# 5 Model quality (i)

## 5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: ZN

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 | 0.15 | 0/51295 | 0.74 | 47/79910 (0.1%) |
| 2 | 2 | 0.15 | 0/3676 | 0.74 | 3/5721 (0.1%) |
| 3 | 6 | 0.17 | 0/1527 | 0.79 | 3/2371 (0.1%) |
| 4 | A | 0.24 | 0/1663 | 0.40 | 0/2248 |
| 5 | B | 0.24 | 0/2756 | 0.41 | 0/3702 |
| 6 | C | 0.23 | 0/2782 | 0.41 | 0/3766 |
| 7 | D | 0.24 | 0/3552 | 0.39 | 0/4789 |
| 8 | E | 0.24 | 0/1260 | 0.40 | 0/1694 |
| 9 | F | 0.25 | 0/1821 | 0.40 | 0/2451 |
| 10 | G | 0.25 | 0/1463 | 0.39 | 0/1978 |
| 11 | H | 0.23 | 0/1531 | 0.42 | 0/2062 |
| 12 | J | 0.24 | 0/675 | 0.39 | 0/908 |
| 13 | K | 0.24 | 0/2107 | 0.40 | 0/2845 |
| 14 | L | 0.23 | 0/976 | 0.38 | 0/1311 |
| 15 | M | 0.24 | 0/1068 | 0.39 | 0/1438 |
| 16 | N | 0.23 | 0/1619 | 0.39 | 0/2166 |
| 17 | O | 0.24 | 0/1585 | 0.38 | 0/2128 |
| 18 | P | 0.23 | 0/1306 | 0.40 | 0/1752 |
| 19 | Q | 0.24 | 0/1050 | 0.40 | 0/1419 |
| 20 | R | 0.23 | 0/733 | 0.36 | 0/980 |
| 21 | S | 0.24 | 0/1468 | 0.41 | 0/1973 |
| 22 | U | 0.25 | 0/767 | 0.41 | 0/1038 |
| 23 | V | 0.25 | 0/937 | 0.43 | 0/1259 |
| 24 | W | 0.24 | 0/1902 | 0.42 | 0/2564 |
| 25 | X | 0.24 | 0/1016 | 0.39 | 0/1369 |
| 26 | Y | 0.24 | 0/1004 | 0.40 | 0/1341 |
| 27 | Z | 0.25 | 0/1073 | 0.41 | 0/1436 |
| 28 | a | 0.24 | 0/580 | 0.40 | 0/784 |
| 29 | b | 0.24 | 0/3474 | 0.39 | 0/4683 |
| 30 | d | 0.24 | 0/829 | 0.40 | 0/1112 |
| 31 | e | 0.23 | 0/1022 | 0.40 | 0/1367 |
| 32 | f | 0.24 | 0/868 | 0.41 | 0/1168 |

| Mol | Chain | Bond lengths | | Bond angles | |
|---|---|---|---|---|---|
| | | RMSZ | #\|Z\| >5 | RMSZ | #\|Z\| >5 |
| 33 | h | 0.24 | 0/973 | 0.38 | 0/1294 |
| 34 | i | 0.23 | 0/665 | 0.37 | 0/884 |
| 35 | j | 0.24 | 0/592 | 0.40 | 0/785 |
| 36 | k | 0.24 | 0/525 | 0.39 | 0/694 |
| 37 | m | 0.23 | 0/4874 | 0.41 | 0/6600 |
| 38 | n | 0.24 | 0/3441 | 0.37 | 0/4625 |
| 39 | o | 0.24 | 0/1129 | 0.38 | 0/1502 |
| 40 | p | 0.23 | 0/2027 | 0.43 | 0/2744 |
| 41 | r | 0.23 | 0/638 | 0.36 | 0/837 |
| 42 | t | 0.23 | 0/2323 | 0.39 | 0/3113 |
| 43 | u | 0.24 | 0/996 | 0.39 | 0/1324 |
| 44 | v | 0.23 | 0/1100 | 0.36 | 0/1456 |
| 45 | w | 0.22 | 0/565 | 0.32 | 0/748 |
| 46 | y | 0.23 | 0/1722 | 0.43 | 0/2343 |
| All | All | 0.20 | 0/120955 | 0.60 | 53/174682 (0.0%) |

There are no bond length outliers.

All (53) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 1254 | C | N3-C2-O2 | -7.36 | 116.75 | 121.90 |
| 1 | 1 | 1718 | G | OP1-P-OP2 | -6.89 | 109.27 | 119.60 |
| 1 | 1 | 1 | G | OP1-P-OP2 | -6.82 | 109.37 | 119.60 |
| 1 | 1 | 2419 | A | OP1-P-OP2 | -6.81 | 109.38 | 119.60 |
| 1 | 1 | 1560 | G | OP1-P-OP2 | -6.80 | 109.40 | 119.60 |
| 1 | 1 | 494 | G | OP1-P-OP2 | -6.79 | 109.41 | 119.60 |
| 1 | 1 | 2824 | G | OP1-P-OP2 | -6.78 | 109.43 | 119.60 |
| 1 | 1 | 1201 | C | OP1-P-OP2 | -6.78 | 109.44 | 119.60 |
| 1 | 1 | 2984 | C | OP1-P-OP2 | -6.78 | 109.44 | 119.60 |
| 1 | 1 | 1098 | A | OP1-P-OP2 | -6.77 | 109.45 | 119.60 |
| 2 | 2 | 1 | A | OP1-P-OP2 | -6.77 | 109.44 | 119.60 |
| 1 | 1 | 2887 | A | OP1-P-OP2 | -6.76 | 109.45 | 119.60 |
| 1 | 1 | 1780 | G | OP1-P-OP2 | -6.76 | 109.46 | 119.60 |
| 1 | 1 | 3352 | U | OP1-P-OP2 | -6.76 | 109.46 | 119.60 |
| 1 | 1 | 1059 | G | OP1-P-OP2 | -6.76 | 109.46 | 119.60 |
| 1 | 1 | 1865 | A | OP1-P-OP2 | -6.76 | 109.46 | 119.60 |
| 1 | 1 | 2343 | C | OP1-P-OP2 | -6.76 | 109.46 | 119.60 |
| 1 | 1 | 3079 | U | OP1-P-OP2 | -6.76 | 109.46 | 119.60 |
| 3 | 6 | 227 | C | OP1-P-OP2 | -6.76 | 109.47 | 119.60 |
| 1 | 1 | 1765 | U | OP1-P-OP2 | -6.75 | 109.47 | 119.60 |
| 1 | 1 | 1485 | G | OP1-P-OP2 | -6.75 | 109.48 | 119.60 |
| 1 | 1 | 1730 | G | OP1-P-OP2 | -6.75 | 109.48 | 119.60 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 2607 | G | OP1-P-OP2 | -6.74 | 109.49 | 119.60 |
| 1 | 1 | 2847 | A | OP1-P-OP2 | -6.74 | 109.49 | 119.60 |
| 2 | 2 | 114 | G | OP1-P-OP2 | -6.74 | 109.49 | 119.60 |
| 1 | 1 | 962 | A | OP1-P-OP2 | -6.74 | 109.49 | 119.60 |
| 1 | 1 | 2394 | G | OP1-P-OP2 | -6.74 | 109.50 | 119.60 |
| 1 | 1 | 2595 | A | OP1-P-OP2 | -6.74 | 109.50 | 119.60 |
| 1 | 1 | 1306 | G | OP1-P-OP2 | -6.73 | 109.50 | 119.60 |
| 1 | 1 | 310 | U | OP1-P-OP2 | -6.73 | 109.51 | 119.60 |
| 1 | 1 | 769 | G | OP1-P-OP2 | -6.73 | 109.51 | 119.60 |
| 1 | 1 | 3355 | U | OP1-P-OP2 | -6.73 | 109.51 | 119.60 |
| 1 | 1 | 851 | C | OP1-P-OP2 | -6.72 | 109.51 | 119.60 |
| 1 | 1 | 926 | A | OP1-P-OP2 | -6.72 | 109.52 | 119.60 |
| 1 | 1 | 2931 | C | OP1-P-OP2 | -6.71 | 109.53 | 119.60 |
| 1 | 1 | 836 | A | OP1-P-OP2 | -6.71 | 109.54 | 119.60 |
| 1 | 1 | 1854 | C | OP1-P-OP2 | -6.71 | 109.54 | 119.60 |
| 1 | 1 | 1795 | U | OP1-P-OP2 | -6.70 | 109.55 | 119.60 |
| 1 | 1 | 960 | U | C2-N1-C1' | 6.67 | 125.70 | 117.70 |
| 1 | 1 | 1456 | A | OP1-P-OP2 | -6.66 | 109.60 | 119.60 |
| 3 | 6 | 1 | C | OP1-P-OP2 | -6.65 | 109.63 | 119.60 |
| 1 | 1 | 1560 | G | O4'-C1'-N9 | 6.45 | 113.36 | 108.20 |
| 1 | 1 | 2829 | U | C2-N1-C1' | 6.19 | 125.13 | 117.70 |
| 1 | 1 | 1570 | U | C2-N1-C1' | 5.98 | 124.87 | 117.70 |
| 3 | 6 | 56 | U | C2-N1-C1' | 5.94 | 124.83 | 117.70 |
| 2 | 2 | 156 | U | C2-N1-C1' | 5.65 | 124.48 | 117.70 |
| 1 | 1 | 3155 | U | C2-N1-C1' | 5.55 | 124.36 | 117.70 |
| 1 | 1 | 3306 | U | C2-N1-C1' | 5.54 | 124.35 | 117.70 |
| 1 | 1 | 1107 | C | N3-C2-O2 | -5.40 | 118.12 | 121.90 |
| 1 | 1 | 1254 | C | N1-C2-O2 | 5.37 | 122.12 | 118.90 |
| 1 | 1 | 3058 | U | C2-N1-C1' | 5.29 | 124.05 | 117.70 |
| 1 | 1 | 3163 | A | N1-C6-N6 | -5.27 | 115.44 | 118.60 |
| 1 | 1 | 1745 | C | N3-C2-O2 | -5.16 | 118.28 | 121.90 |

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts (i)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

## 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 | |
|---|---|---|---|---|---|---|---|
| 4 | A | 192/291 (66%) | 185 (96%) | 7 (4%) | 0 | 100 | 100 |
| 5 | B | 337/387 (87%) | 326 (97%) | 10 (3%) | 1 (0%) | 41 | 75 |
| 6 | C | 357/362 (99%) | 344 (96%) | 13 (4%) | 0 | 100 | 100 |
| 7 | D | 433/505 (86%) | 419 (97%) | 14 (3%) | 0 | 100 | 100 |
| 8 | E | 152/176 (86%) | 145 (95%) | 7 (5%) | 0 | 100 | 100 |
| 9 | F | 220/244 (90%) | 212 (96%) | 8 (4%) | 0 | 100 | 100 |
| 10 | G | 180/256 (70%) | 172 (96%) | 8 (4%) | 0 | 100 | 100 |
| 11 | H | 188/191 (98%) | 182 (97%) | 6 (3%) | 0 | 100 | 100 |
| 12 | J | 75/427 (18%) | 75 (100%) | 0 | 0 | 100 | 100 |
| 13 | K | 253/376 (67%) | 245 (97%) | 8 (3%) | 0 | 100 | 100 |
| 14 | L | 115/199 (58%) | 106 (92%) | 9 (8%) | 0 | 100 | 100 |
| 15 | M | 134/138 (97%) | 133 (99%) | 1 (1%) | 0 | 100 | 100 |
| 16 | N | 182/204 (89%) | 176 (97%) | 6 (3%) | 0 | 100 | 100 |
| 17 | O | 195/199 (98%) | 191 (98%) | 4 (2%) | 0 | 100 | 100 |
| 18 | P | 157/184 (85%) | 152 (97%) | 5 (3%) | 0 | 100 | 100 |
| 19 | Q | 132/186 (71%) | 129 (98%) | 3 (2%) | 0 | 100 | 100 |
| 20 | R | 85/189 (45%) | 85 (100%) | 0 | 0 | 100 | 100 |
| 21 | S | 168/172 (98%) | 159 (95%) | 9 (5%) | 0 | 100 | 100 |
| 22 | U | 90/121 (74%) | 87 (97%) | 3 (3%) | 0 | 100 | 100 |
| 23 | V | 120/137 (88%) | 116 (97%) | 4 (3%) | 0 | 100 | 100 |
| 24 | W | 230/236 (98%) | 226 (98%) | 4 (2%) | 0 | 100 | 100 |
| 25 | X | 123/142 (87%) | 119 (97%) | 4 (3%) | 0 | 100 | 100 |
| 26 | Y | 124/127 (98%) | 123 (99%) | 1 (1%) | 0 | 100 | 100 |
| 27 | Z | 126/136 (93%) | 122 (97%) | 4 (3%) | 0 | 100 | 100 |
| 28 | a | 69/149 (46%) | 68 (99%) | 1 (1%) | 0 | 100 | 100 |

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| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 29 | b | 413/647 (64%) | 401 (97%) | 12 (3%) | 0 | 100 | 100 |
| 30 | d | 96/113 (85%) | 96 (100%) | 0 | 0 | 100 | 100 |
| 31 | e | 122/130 (94%) | 120 (98%) | 2 (2%) | 0 | 100 | 100 |
| 32 | f | 104/107 (97%) | 100 (96%) | 4 (4%) | 0 | 100 | 100 |
| 33 | h | 116/120 (97%) | 109 (94%) | 7 (6%) | 0 | 100 | 100 |
| 34 | i | 81/100 (81%) | 74 (91%) | 7 (9%) | 0 | 100 | 100 |
| 35 | j | 71/88 (81%) | 70 (99%) | 1 (1%) | 0 | 100 | 100 |
| 36 | k | 53/78 (68%) | 53 (100%) | 0 | 0 | 100 | 100 |
| 37 | m | 571/807 (71%) | 558 (98%) | 13 (2%) | 0 | 100 | 100 |
| 38 | n | 403/605 (67%) | 394 (98%) | 9 (2%) | 0 | 100 | 100 |
| 39 | o | 131/220 (60%) | 126 (96%) | 5 (4%) | 0 | 100 | 100 |
| 40 | p | 243/460 (53%) | 234 (96%) | 9 (4%) | 0 | 100 | 100 |
| 41 | r | 71/261 (27%) | 66 (93%) | 5 (7%) | 0 | 100 | 100 |
| 42 | t | 280/322 (87%) | 265 (95%) | 15 (5%) | 0 | 100 | 100 |
| 43 | u | 114/199 (57%) | 110 (96%) | 4 (4%) | 0 | 100 | 100 |
| 44 | v | 124/231 (54%) | 120 (97%) | 4 (3%) | 0 | 100 | 100 |
| 45 | w | 61/841 (7%) | 61 (100%) | 0 | 0 | 100 | 100 |
| 46 | y | 223/245 (91%) | 217 (97%) | 6 (3%) | 0 | 100 | 100 |
| All | All | 7714/11308 (68%) | 7471 (97%) | 242 (3%) | 1 (0%) | 100 | 100 |

All (1) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 5 | B | 188 | ILE |

### 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 | |
|---|---|---|---|---|---|---|
| 4 | A | 185/263 (70%) | 182 (98%) | 3 (2%) | 62 | 79 |
| 5 | B | 284/323 (88%) | 274 (96%) | 10 (4%) | 36 | 62 |
| 6 | C | 286/289 (99%) | 280 (98%) | 6 (2%) | 53 | 73 |
| 7 | D | 381/440 (87%) | 374 (98%) | 7 (2%) | 59 | 77 |
| 8 | E | 134/153 (88%) | 134 (100%) | 0 | 100 | 100 |
| 9 | F | 186/205 (91%) | 183 (98%) | 3 (2%) | 62 | 79 |
| 10 | G | 150/208 (72%) | 145 (97%) | 5 (3%) | 38 | 63 |
| 11 | H | 170/171 (99%) | 161 (95%) | 9 (5%) | 22 | 52 |
| 12 | J | 73/383 (19%) | 72 (99%) | 1 (1%) | 67 | 81 |
| 13 | K | 238/346 (69%) | 231 (97%) | 7 (3%) | 42 | 65 |
| 14 | L | 96/159 (60%) | 95 (99%) | 1 (1%) | 76 | 86 |
| 15 | M | 107/109 (98%) | 106 (99%) | 1 (1%) | 78 | 87 |
| 16 | N | 161/176 (92%) | 161 (100%) | 0 | 100 | 100 |
| 17 | O | 160/162 (99%) | 156 (98%) | 4 (2%) | 47 | 69 |
| 18 | P | 131/146 (90%) | 130 (99%) | 1 (1%) | 81 | 89 |
| 19 | Q | 110/151 (73%) | 105 (96%) | 5 (4%) | 27 | 56 |
| 20 | R | 76/154 (49%) | 75 (99%) | 1 (1%) | 69 | 82 |
| 21 | S | 155/156 (99%) | 149 (96%) | 6 (4%) | 32 | 59 |
| 22 | U | 83/107 (78%) | 83 (100%) | 0 | 100 | 100 |
| 23 | V | 96/105 (91%) | 93 (97%) | 3 (3%) | 40 | 64 |
| 24 | W | 209/213 (98%) | 205 (98%) | 4 (2%) | 57 | 75 |
| 25 | X | 107/118 (91%) | 107 (100%) | 0 | 100 | 100 |
| 26 | Y | 109/110 (99%) | 106 (97%) | 3 (3%) | 43 | 66 |
| 27 | Z | 110/116 (95%) | 109 (99%) | 1 (1%) | 78 | 87 |
| 28 | a | 60/119 (50%) | 59 (98%) | 1 (2%) | 60 | 78 |
| 29 | b | 377/573 (66%) | 367 (97%) | 10 (3%) | 44 | 67 |
| 30 | d | 88/97 (91%) | 87 (99%) | 1 (1%) | 73 | 84 |
| 31 | e | 107/111 (96%) | 104 (97%) | 3 (3%) | 43 | 66 |
| 32 | f | 90/91 (99%) | 88 (98%) | 2 (2%) | 52 | 71 |
| 33 | h | 104/105 (99%) | 103 (99%) | 1 (1%) | 76 | 86 |
| 34 | i | 69/82 (84%) | 68 (99%) | 1 (1%) | 67 | 81 |
| 35 | j | 60/71 (84%) | 58 (97%) | 2 (3%) | 38 | 63 |

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| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles |
|---|---|---|---|---|---|
| 36 | k | 59/69 (86%) | 58 (98%) | 1 (2%) | 60 78 |
| 37 | m | 529/723 (73%) | 521 (98%) | 8 (2%) | 65 80 |
| 38 | n | 371/548 (68%) | 361 (97%) | 10 (3%) | 44 67 |
| 39 | o | 118/199 (59%) | 117 (99%) | 1 (1%) | 81 89 |
| 40 | p | 229/413 (55%) | 226 (99%) | 3 (1%) | 69 82 |
| 41 | r | 65/229 (28%) | 64 (98%) | 1 (2%) | 65 80 |
| 42 | t | 256/287 (89%) | 248 (97%) | 8 (3%) | 40 64 |
| 43 | u | 101/180 (56%) | 97 (96%) | 4 (4%) | 31 58 |
| 44 | v | 116/205 (57%) | 114 (98%) | 2 (2%) | 60 78 |
| 45 | w | 58/745 (8%) | 57 (98%) | 1 (2%) | 60 78 |
| 46 | y | 193/211 (92%) | 190 (98%) | 3 (2%) | 62 79 |
| All | All | 6847/9821 (70%) | 6703 (98%) | 144 (2%) | 56 73 |

All (144) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 4 | A | 137 | LEU |
| 4 | A | 146 | SER |
| 4 | A | 225 | LEU |
| 5 | B | 28 | ARG |
| 5 | B | 37 | ARG |
| 5 | B | 70 | ARG |
| 5 | B | 136 | LYS |
| 5 | B | 174 | LYS |
| 5 | B | 187 | SER |
| 5 | B | 266 | ARG |
| 5 | B | 297 | SER |
| 5 | B | 332 | ARG |
| 5 | B | 375 | GLU |
| 6 | C | 93 | MET |
| 6 | C | 120 | TYR |
| 6 | C | 150 | LEU |
| 6 | C | 177 | ASP |
| 6 | C | 182 | LEU |
| 6 | C | 312 | VAL |
| 7 | D | 81 | ASP |
| 7 | D | 96 | PHE |
| 7 | D | 112 | ARG |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 7 | D | 113 | ASN |
| 7 | D | 166 | ASN |
| 7 | D | 319 | LEU |
| 7 | D | 337 | ASN |
| 9 | F | 46 | GLU |
| 9 | F | 82 | LYS |
| 9 | F | 179 | LEU |
| 10 | G | 79 | GLN |
| 10 | G | 84 | ARG |
| 10 | G | 100 | GLU |
| 10 | G | 136 | LEU |
| 10 | G | 228 | GLU |
| 11 | H | 1 | MET |
| 11 | H | 16 | VAL |
| 11 | H | 47 | LYS |
| 11 | H | 69 | ARG |
| 11 | H | 70 | THR |
| 11 | H | 157 | ASN |
| 11 | H | 161 | LEU |
| 11 | H | 162 | GLN |
| 11 | H | 180 | TYR |
| 12 | J | 249 | GLN |
| 13 | K | 48 | THR |
| 13 | K | 80 | LEU |
| 13 | K | 108 | LYS |
| 13 | K | 141 | PHE |
| 13 | K | 253 | TRP |
| 13 | K | 261 | ASP |
| 13 | K | 285 | ARG |
| 14 | L | 21 | ARG |
| 15 | M | 105 | GLN |
| 17 | O | 47 | PHE |
| 17 | O | 74 | ARG |
| 17 | O | 94 | ARG |
| 17 | O | 125 | ARG |
| 18 | P | 97 | ASN |
| 19 | Q | 38 | ARG |
| 19 | Q | 41 | ASP |
| 19 | Q | 92 | ARG |
| 19 | Q | 105 | ARG |
| 19 | Q | 147 | ARG |
| 20 | R | 21 | LYS |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 21 | S | 12 | ARG |
| 21 | S | 103 | VAL |
| 21 | S | 117 | ARG |
| 21 | S | 155 | ARG |
| 21 | S | 171 | PHE |
| 21 | S | 172 | TYR |
| 23 | V | 25 | CYS |
| 23 | V | 93 | LEU |
| 23 | V | 122 | CYS |
| 24 | W | 49 | ARG |
| 24 | W | 96 | CYS |
| 24 | W | 113 | LYS |
| 24 | W | 139 | GLU |
| 26 | Y | 51 | ARG |
| 26 | Y | 74 | TYR |
| 26 | Y | 87 | LYS |
| 27 | Z | 17 | ARG |
| 28 | a | 117 | ARG |
| 29 | b | 48 | ARG |
| 29 | b | 129 | LYS |
| 29 | b | 170 | LEU |
| 29 | b | 175 | TYR |
| 29 | b | 180 | LYS |
| 29 | b | 277 | LEU |
| 29 | b | 301 | GLU |
| 29 | b | 306 | LEU |
| 29 | b | 427 | TRP |
| 29 | b | 428 | LYS |
| 30 | d | 61 | LYS |
| 31 | e | 33 | ARG |
| 31 | e | 98 | HIS |
| 31 | e | 120 | THR |
| 32 | f | 60 | ARG |
| 32 | f | 106 | ASN |
| 33 | h | 38 | ARG |
| 34 | i | 29 | LYS |
| 35 | j | 45 | ARG |
| 35 | j | 67 | LEU |
| 36 | k | 43 | PHE |
| 37 | m | 139 | GLU |
| 37 | m | 243 | LEU |
| 37 | m | 322 | MET |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 37 | m | 382 | GLU |
| 37 | m | 387 | ARG |
| 37 | m | 428 | ARG |
| 37 | m | 768 | LYS |
| 37 | m | 800 | ASN |
| 38 | n | 13 | ARG |
| 38 | n | 77 | LEU |
| 38 | n | 86 | PHE |
| 38 | n | 196 | GLU |
| 38 | n | 199 | TRP |
| 38 | n | 203 | PHE |
| 38 | n | 229 | LEU |
| 38 | n | 409 | HIS |
| 38 | n | 417 | LEU |
| 38 | n | 551 | GLU |
| 39 | o | 102 | PHE |
| 40 | p | 229 | ASN |
| 40 | p | 331 | SER |
| 40 | p | 409 | SER |
| 41 | r | 4 | ASN |
| 42 | t | 158 | LYS |
| 42 | t | 160 | PHE |
| 42 | t | 187 | LEU |
| 42 | t | 264 | CYS |
| 42 | t | 271 | PHE |
| 42 | t | 275 | ARG |
| 42 | t | 291 | GLN |
| 42 | t | 303 | ASN |
| 43 | u | 27 | LYS |
| 43 | u | 40 | PHE |
| 43 | u | 43 | ARG |
| 43 | u | 81 | TYR |
| 44 | v | 157 | GLU |
| 44 | v | 180 | ARG |
| 45 | w | 671 | LEU |
| 46 | y | 51 | THR |
| 46 | y | 100 | ARG |
| 46 | y | 215 | LEU |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (29) such sidechains are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 4 | A | 148 | HIS |
| 5 | B | 293 | ASN |
| 6 | C | 114 | ASN |
| 7 | D | 413 | ASN |
| 9 | F | 186 | HIS |
| 10 | G | 59 | GLN |
| 10 | G | 95 | ASN |
| 11 | H | 139 | ASN |
| 12 | J | 228 | ASN |
| 13 | K | 84 | ASN |
| 13 | K | 143 | GLN |
| 18 | P | 96 | GLN |
| 18 | P | 118 | GLN |
| 21 | S | 122 | HIS |
| 22 | U | 87 | ASN |
| 23 | V | 98 | ASN |
| 26 | Y | 4 | GLN |
| 27 | Z | 40 | HIS |
| 29 | b | 177 | ASN |
| 30 | d | 57 | GLN |
| 31 | e | 35 | GLN |
| 31 | e | 52 | GLN |
| 31 | e | 98 | HIS |
| 35 | j | 76 | ASN |
| 37 | m | 307 | GLN |
| 38 | n | 11 | ASN |
| 42 | t | 269 | GLN |
| 46 | y | 33 | ASN |
| 46 | y | 170 | GLN |

### 5.3.3 RNA (i)

| Mol | Chain | Analysed | Backbone Outliers | Pucker Outliers |
|---|---|---|---|---|
| 1 | 1 | 2115/3396 (62%) | 372 (17%) | 42 (1%) |
| 2 | 2 | 153/158 (96%) | 27 (17%) | 2 (1%) |
| 3 | 6 | 64/232 (27%) | 20 (31%) | 4 (6%) |
| All | All | 2332/3786 (61%) | 419 (17%) | 48 (2%) |

All (419) RNA backbone outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 1 | 2 | U |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 1 | 7 | C |
| 1 | 1 | 14 | U |
| 1 | 1 | 16 | A |
| 1 | 1 | 26 | A |
| 1 | 1 | 40 | A |
| 1 | 1 | 41 | G |
| 1 | 1 | 42 | C |
| 1 | 1 | 49 | A |
| 1 | 1 | 59 | G |
| 1 | 1 | 60 | A |
| 1 | 1 | 65 | A |
| 1 | 1 | 66 | A |
| 1 | 1 | 73 | C |
| 1 | 1 | 76 | G |
| 1 | 1 | 92 | G |
| 1 | 1 | 94 | G |
| 1 | 1 | 108 | A |
| 1 | 1 | 110 | G |
| 1 | 1 | 111 | C |
| 1 | 1 | 116 | A |
| 1 | 1 | 117 | U |
| 1 | 1 | 122 | A |
| 1 | 1 | 134 | U |
| 1 | 1 | 135 | C |
| 1 | 1 | 136 | G |
| 1 | 1 | 156 | G |
| 1 | 1 | 165 | A |
| 1 | 1 | 166 | C |
| 1 | 1 | 170 | G |
| 1 | 1 | 190 | U |
| 1 | 1 | 191 | U |
| 1 | 1 | 200 | C |
| 1 | 1 | 207 | U |
| 1 | 1 | 210 | U |
| 1 | 1 | 218 | G |
| 1 | 1 | 219 | A |
| 1 | 1 | 220 | G |
| 1 | 1 | 231 | G |
| 1 | 1 | 240 | U |
| 1 | 1 | 241 | G |
| 1 | 1 | 249 | U |
| 1 | 1 | 250 | U |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 1 | 251 | G |
| 1 | 1 | 252 | U |
| 1 | 1 | 265 | A |
| 1 | 1 | 268 | A |
| 1 | 1 | 269 | G |
| 1 | 1 | 283 | G |
| 1 | 1 | 284 | A |
| 1 | 1 | 285 | A |
| 1 | 1 | 295 | A |
| 1 | 1 | 298 | U |
| 1 | 1 | 305 | U |
| 1 | 1 | 311 | C |
| 1 | 1 | 315 | C |
| 1 | 1 | 323 | A |
| 1 | 1 | 324 | A |
| 1 | 1 | 329 | U |
| 1 | 1 | 339 | C |
| 1 | 1 | 351 | A |
| 1 | 1 | 352 | A |
| 1 | 1 | 368 | G |
| 1 | 1 | 370 | U |
| 1 | 1 | 375 | A |
| 1 | 1 | 376 | G |
| 1 | 1 | 398 | A |
| 1 | 1 | 401 | U |
| 1 | 1 | 402 | A |
| 1 | 1 | 403 | C |
| 1 | 1 | 404 | G |
| 1 | 1 | 421 | G |
| 1 | 1 | 422 | A |
| 1 | 1 | 440 | A |
| 1 | 1 | 495 | G |
| 1 | 1 | 517 | G |
| 1 | 1 | 521 | A |
| 1 | 1 | 523 | A |
| 1 | 1 | 533 | A |
| 1 | 1 | 535 | G |
| 1 | 1 | 544 | C |
| 1 | 1 | 546 | C |
| 1 | 1 | 547 | G |
| 1 | 1 | 548 | G |
| 1 | 1 | 550 | A |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 1 | 552 | G |
| 1 | 1 | 557 | A |
| 1 | 1 | 559 | A |
| 1 | 1 | 578 | A |
| 1 | 1 | 579 | G |
| 1 | 1 | 592 | A |
| 1 | 1 | 597 | G |
| 1 | 1 | 604 | G |
| 1 | 1 | 609 | G |
| 1 | 1 | 611 | A |
| 1 | 1 | 620 | U |
| 1 | 1 | 621 | A |
| 1 | 1 | 636 | C |
| 1 | 1 | 637 | C |
| 1 | 1 | 638 | C |
| 1 | 1 | 645 | A |
| 1 | 1 | 648 | C |
| 1 | 1 | 650 | C |
| 1 | 1 | 660 | A |
| 1 | 1 | 677 | A |
| 1 | 1 | 681 | U |
| 1 | 1 | 691 | A |
| 1 | 1 | 705 | A |
| 1 | 1 | 706 | A |
| 1 | 1 | 710 | A |
| 1 | 1 | 715 | A |
| 1 | 1 | 721 | G |
| 1 | 1 | 722 | G |
| 1 | 1 | 735 | A |
| 1 | 1 | 742 | G |
| 1 | 1 | 743 | C |
| 1 | 1 | 757 | C |
| 1 | 1 | 760 | G |
| 1 | 1 | 761 | A |
| 1 | 1 | 770 | G |
| 1 | 1 | 776 | U |
| 1 | 1 | 779 | G |
| 1 | 1 | 781 | G |
| 1 | 1 | 784 | A |
| 1 | 1 | 785 | G |
| 1 | 1 | 787 | G |
| 1 | 1 | 801 | A |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 1 | 930 | U |
| 1 | 1 | 933 | A |
| 1 | 1 | 936 | A |
| 1 | 1 | 937 | G |
| 1 | 1 | 944 | C |
| 1 | 1 | 958 | C |
| 1 | 1 | 959 | C |
| 1 | 1 | 963 | G |
| 1 | 1 | 965 | A |
| 1 | 1 | 971 | G |
| 1 | 1 | 976 | U |
| 1 | 1 | 978 | G |
| 1 | 1 | 979 | U |
| 1 | 1 | 980 | A |
| 1 | 1 | 981 | U |
| 1 | 1 | 982 | C |
| 1 | 1 | 1103 | A |
| 1 | 1 | 1104 | G |
| 1 | 1 | 1105 | A |
| 1 | 1 | 1111 | U |
| 1 | 1 | 1112 | A |
| 1 | 1 | 1116 | G |
| 1 | 1 | 1123 | U |
| 1 | 1 | 1127 | G |
| 1 | 1 | 1129 | A |
| 1 | 1 | 1130 | A |
| 1 | 1 | 1135 | A |
| 1 | 1 | 1138 | U |
| 1 | 1 | 1144 | U |
| 1 | 1 | 1153 | A |
| 1 | 1 | 1155 | C |
| 1 | 1 | 1159 | A |
| 1 | 1 | 1174 | G |
| 1 | 1 | 1180 | A |
| 1 | 1 | 1181 | U |
| 1 | 1 | 1189 | C |
| 1 | 1 | 1192 | C |
| 1 | 1 | 1204 | A |
| 1 | 1 | 1218 | U |
| 1 | 1 | 1220 | U |
| 1 | 1 | 1221 | A |
| 1 | 1 | 1222 | G |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 1 | 1228 | C |
| 1 | 1 | 1242 | G |
| 1 | 1 | 1245 | A |
| 1 | 1 | 1246 | G |
| 1 | 1 | 1251 | A |
| 1 | 1 | 1252 | A |
| 1 | 1 | 1253 | U |
| 1 | 1 | 1254 | C |
| 1 | 1 | 1258 | U |
| 1 | 1 | 1263 | A |
| 1 | 1 | 1265 | U |
| 1 | 1 | 1278 | A |
| 1 | 1 | 1279 | C |
| 1 | 1 | 1284 | C |
| 1 | 1 | 1286 | A |
| 1 | 1 | 1287 | A |
| 1 | 1 | 1308 | A |
| 1 | 1 | 1330 | A |
| 1 | 1 | 1348 | U |
| 1 | 1 | 1349 | G |
| 1 | 1 | 1350 | A |
| 1 | 1 | 1351 | U |
| 1 | 1 | 1352 | A |
| 1 | 1 | 1353 | U |
| 1 | 1 | 1354 | G |
| 1 | 1 | 1355 | A |
| 1 | 1 | 1356 | U |
| 1 | 1 | 1357 | G |
| 1 | 1 | 1386 | A |
| 1 | 1 | 1392 | G |
| 1 | 1 | 1397 | C |
| 1 | 1 | 1399 | A |
| 1 | 1 | 1400 | G |
| 1 | 1 | 1406 | A |
| 1 | 1 | 1408 | G |
| 1 | 1 | 1417 | G |
| 1 | 1 | 1419 | A |
| 1 | 1 | 1434 | G |
| 1 | 1 | 1436 | U |
| 1 | 1 | 1437 | C |
| 1 | 1 | 1457 | U |
| 1 | 1 | 1470 | U |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 1 | 1496 | C |
| 1 | 1 | 1507 | G |
| 1 | 1 | 1508 | C |
| 1 | 1 | 1536 | G |
| 1 | 1 | 1549 | U |
| 1 | 1 | 1561 | G |
| 1 | 1 | 1562 | C |
| 1 | 1 | 1566 | A |
| 1 | 1 | 1567 | U |
| 1 | 1 | 1568 | U |
| 1 | 1 | 1569 | U |
| 1 | 1 | 1571 | A |
| 1 | 1 | 1572 | U |
| 1 | 1 | 1573 | G |
| 1 | 1 | 1574 | C |
| 1 | 1 | 1575 | A |
| 1 | 1 | 1580 | A |
| 1 | 1 | 1581 | C |
| 1 | 1 | 1582 | C |
| 1 | 1 | 1589 | A |
| 1 | 1 | 1593 | A |
| 1 | 1 | 1602 | A |
| 1 | 1 | 1603 | A |
| 1 | 1 | 1605 | A |
| 1 | 1 | 1608 | C |
| 1 | 1 | 1619 | A |
| 1 | 1 | 1620 | U |
| 1 | 1 | 1628 | C |
| 1 | 1 | 1631 | C |
| 1 | 1 | 1633 | C |
| 1 | 1 | 1639 | C |
| 1 | 1 | 1642 | A |
| 1 | 1 | 1643 | A |
| 1 | 1 | 1647 | A |
| 1 | 1 | 1656 | A |
| 1 | 1 | 1685 | C |
| 1 | 1 | 1705 | U |
| 1 | 1 | 1713 | G |
| 1 | 1 | 1724 | U |
| 1 | 1 | 1725 | C |
| 1 | 1 | 1728 | G |
| 1 | 1 | 1741 | A |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 1 | 1742 | U |
| 1 | 1 | 1750 | A |
| 1 | 1 | 1751 | G |
| 1 | 1 | 1766 | G |
| 1 | 1 | 1770 | G |
| 1 | 1 | 1775 | G |
| 1 | 1 | 1791 | C |
| 1 | 1 | 1792 | C |
| 1 | 1 | 1796 | G |
| 1 | 1 | 1797 | A |
| 1 | 1 | 1808 | G |
| 1 | 1 | 1813 | A |
| 1 | 1 | 1814 | A |
| 1 | 1 | 1815 | U |
| 1 | 1 | 1816 | A |
| 1 | 1 | 1817 | G |
| 1 | 1 | 1821 | U |
| 1 | 1 | 1857 | C |
| 1 | 1 | 1862 | U |
| 1 | 1 | 1867 | A |
| 1 | 1 | 1869 | C |
| 1 | 1 | 1879 | A |
| 1 | 1 | 1880 | U |
| 1 | 1 | 1884 | A |
| 1 | 1 | 1886 | A |
| 1 | 1 | 2363 | A |
| 1 | 1 | 2366 | C |
| 1 | 1 | 2371 | G |
| 1 | 1 | 2372 | A |
| 1 | 1 | 2373 | A |
| 1 | 1 | 2374 | C |
| 1 | 1 | 2376 | G |
| 1 | 1 | 2391 | G |
| 1 | 1 | 2434 | U |
| 1 | 1 | 2825 | C |
| 1 | 1 | 2836 | C |
| 1 | 1 | 2837 | A |
| 1 | 1 | 2857 | C |
| 1 | 1 | 2858 | U |
| 1 | 1 | 2888 | U |
| 1 | 1 | 2889 | C |
| 1 | 1 | 2898 | G |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 1 | 2935 | U |
| 1 | 1 | 2936 | A |
| 1 | 1 | 2987 | A |
| 1 | 1 | 2996 | U |
| 1 | 1 | 2997 | G |
| 1 | 1 | 3006 | A |
| 1 | 1 | 3012 | A |
| 1 | 1 | 3017 | A |
| 1 | 1 | 3019 | U |
| 1 | 1 | 3021 | A |
| 1 | 1 | 3022 | G |
| 1 | 1 | 3032 | A |
| 1 | 1 | 3056 | U |
| 1 | 1 | 3057 | U |
| 1 | 1 | 3059 | G |
| 1 | 1 | 3080 | G |
| 1 | 1 | 3086 | A |
| 1 | 1 | 3092 | C |
| 1 | 1 | 3099 | C |
| 1 | 1 | 3101 | G |
| 1 | 1 | 3129 | A |
| 1 | 1 | 3130 | A |
| 1 | 1 | 3131 | U |
| 1 | 1 | 3142 | A |
| 1 | 1 | 3143 | C |
| 1 | 1 | 3153 | U |
| 1 | 1 | 3155 | U |
| 1 | 1 | 3156 | U |
| 1 | 1 | 3157 | U |
| 1 | 1 | 3158 | G |
| 1 | 1 | 3162 | C |
| 1 | 1 | 3165 | A |
| 1 | 1 | 3170 | A |
| 1 | 1 | 3171 | U |
| 1 | 1 | 3173 | G |
| 1 | 1 | 3174 | A |
| 1 | 1 | 3176 | G |
| 1 | 1 | 3179 | U |
| 1 | 1 | 3181 | C |
| 1 | 1 | 3187 | A |
| 1 | 1 | 3195 | U |
| 1 | 1 | 3207 | U |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 1 | 3217 | C |
| 1 | 1 | 3218 | A |
| 1 | 1 | 3219 | G |
| 1 | 1 | 3229 | G |
| 1 | 1 | 3238 | G |
| 1 | 1 | 3245 | A |
| 1 | 1 | 3247 | G |
| 1 | 1 | 3252 | G |
| 1 | 1 | 3259 | U |
| 1 | 1 | 3260 | G |
| 1 | 1 | 3270 | U |
| 1 | 1 | 3273 | A |
| 1 | 1 | 3276 | G |
| 1 | 1 | 3281 | U |
| 1 | 1 | 3288 | G |
| 1 | 1 | 3289 | G |
| 1 | 1 | 3304 | U |
| 1 | 1 | 3316 | A |
| 1 | 1 | 3317 | U |
| 1 | 1 | 3319 | U |
| 1 | 1 | 3320 | A |
| 1 | 1 | 3334 | U |
| 1 | 1 | 3335 | A |
| 1 | 1 | 3341 | U |
| 1 | 1 | 3344 | A |
| 1 | 1 | 3349 | C |
| 1 | 1 | 3353 | G |
| 1 | 1 | 3356 | G |
| 1 | 1 | 3357 | U |
| 1 | 1 | 3369 | G |
| 1 | 1 | 3375 | A |
| 1 | 1 | 3378 | C |
| 1 | 1 | 3382 | U |
| 1 | 1 | 3390 | G |
| 1 | 1 | 3396 | U |
| 2 | 2 | 13 | A |
| 2 | 2 | 15 | G |
| 2 | 2 | 16 | G |
| 2 | 2 | 34 | U |
| 2 | 2 | 35 | C |
| 2 | 2 | 39 | G |
| 2 | 2 | 40 | A |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 2 | 2 | 51 | G |
| 2 | 2 | 52 | A |
| 2 | 2 | 59 | A |
| 2 | 2 | 63 | G |
| 2 | 2 | 72 | A |
| 2 | 2 | 80 | A |
| 2 | 2 | 81 | U |
| 2 | 2 | 82 | U |
| 2 | 2 | 84 | C |
| 2 | 2 | 86 | U |
| 2 | 2 | 87 | G |
| 2 | 2 | 89 | A |
| 2 | 2 | 90 | U |
| 2 | 2 | 95 | G |
| 2 | 2 | 104 | A |
| 2 | 2 | 106 | C |
| 2 | 2 | 107 | G |
| 2 | 2 | 124 | G |
| 2 | 2 | 125 | U |
| 2 | 2 | 128 | U |
| 3 | 6 | 2 | C |
| 3 | 6 | 4 | U |
| 3 | 6 | 5 | C |
| 3 | 6 | 6 | U |
| 3 | 6 | 7 | C |
| 3 | 6 | 8 | A |
| 3 | 6 | 14 | U |
| 3 | 6 | 15 | C |
| 3 | 6 | 16 | U |
| 3 | 6 | 17 | G |
| 3 | 6 | 26 | U |
| 3 | 6 | 34 | A |
| 3 | 6 | 40 | U |
| 3 | 6 | 42 | G |
| 3 | 6 | 43 | A |
| 3 | 6 | 54 | A |
| 3 | 6 | 56 | U |
| 3 | 6 | 59 | C |
| 3 | 6 | 229 | U |
| 3 | 6 | 230 | A |

All (48) RNA pucker outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 1 | 13 | A |
| 1 | 1 | 58 | G |
| 1 | 1 | 75 | G |
| 1 | 1 | 116 | A |
| 1 | 1 | 165 | A |
| 1 | 1 | 239 | G |
| 1 | 1 | 294 | U |
| 1 | 1 | 304 | G |
| 1 | 1 | 494 | G |
| 1 | 1 | 649 | A |
| 1 | 1 | 709 | A |
| 1 | 1 | 720 | A |
| 1 | 1 | 734 | C |
| 1 | 1 | 769 | G |
| 1 | 1 | 1128 | U |
| 1 | 1 | 1129 | A |
| 1 | 1 | 1227 | C |
| 1 | 1 | 1241 | U |
| 1 | 1 | 1283 | C |
| 1 | 1 | 1307 | G |
| 1 | 1 | 1329 | U |
| 1 | 1 | 1355 | A |
| 1 | 1 | 1405 | U |
| 1 | 1 | 1456 | A |
| 1 | 1 | 1560 | G |
| 1 | 1 | 1574 | C |
| 1 | 1 | 1581 | C |
| 1 | 1 | 1712 | G |
| 1 | 1 | 1765 | U |
| 1 | 1 | 1807 | G |
| 1 | 1 | 1861 | G |
| 1 | 1 | 2857 | C |
| 1 | 1 | 2887 | A |
| 1 | 1 | 2986 | U |
| 1 | 1 | 2995 | A |
| 1 | 1 | 3079 | U |
| 1 | 1 | 3157 | U |
| 1 | 1 | 3228 | C |
| 1 | 1 | 3269 | U |
| 1 | 1 | 3352 | U |
| 1 | 1 | 3355 | U |
| 1 | 1 | 3389 | U |
| 2 | 2 | 14 | C |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 2 | 2 | 123 | G |
| 3 | 6 | 1 | C |
| 3 | 6 | 15 | C |
| 3 | 6 | 16 | U |
| 3 | 6 | 33 | U |

## 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)

Of 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 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.

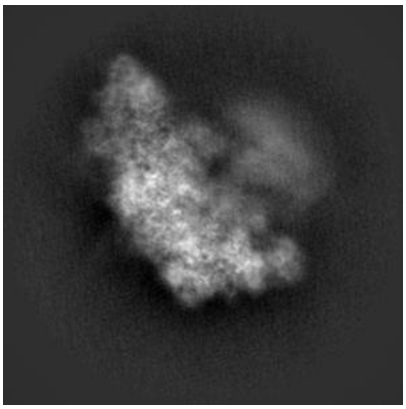
# 6 Map visualisation

This section contains visualisations of the EMDB entry EMD-12910. These allow visual inspection of the internal detail of the map and identification of artifacts.

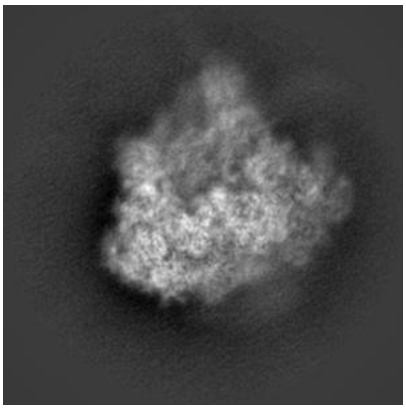
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

## 6.1 Orthogonal projections

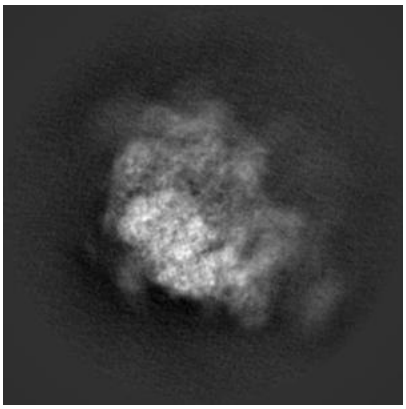
### 6.1.1 Primary map



X

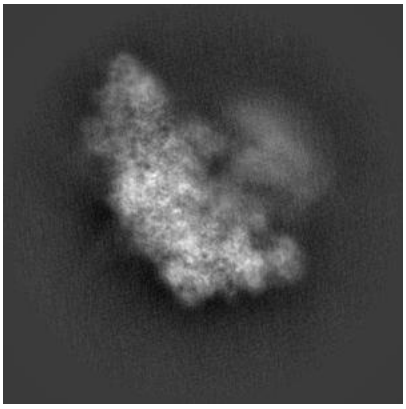


Y

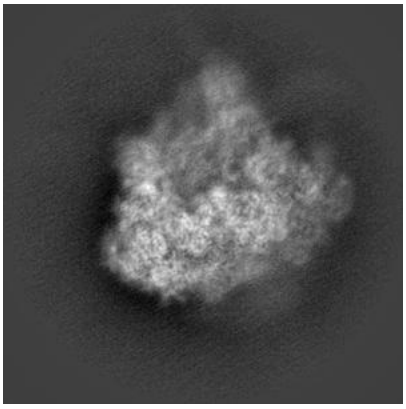


Z

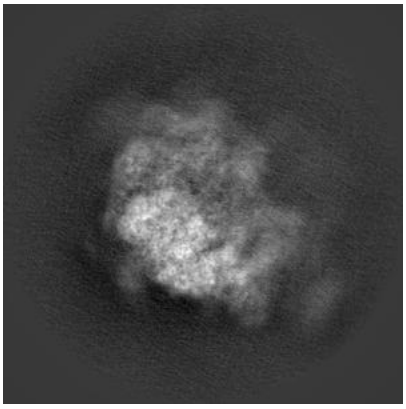
### 6.1.2 Raw map



X



Y

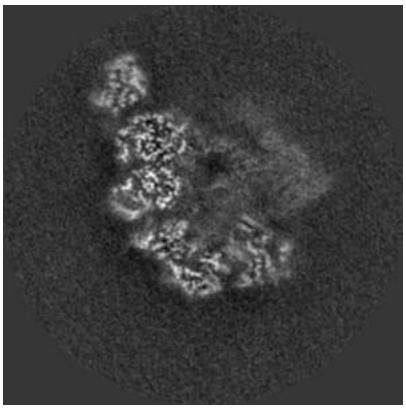


Z

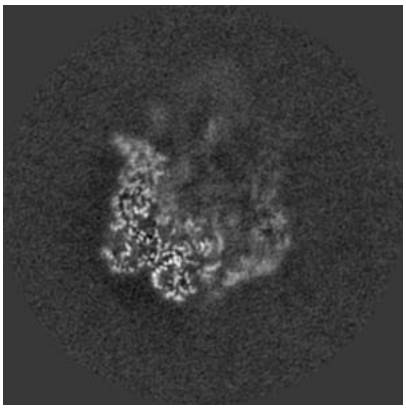
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices (i)

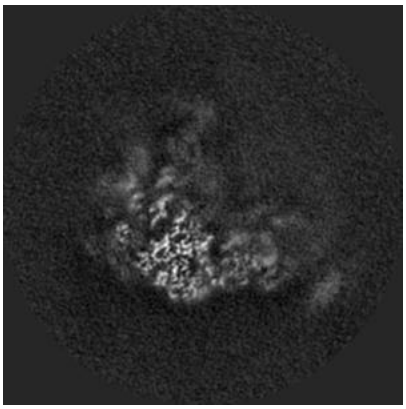
### 6.2.1 Primary map



X Index: 200

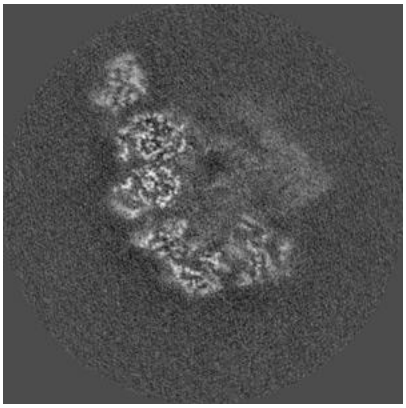


Y Index: 200

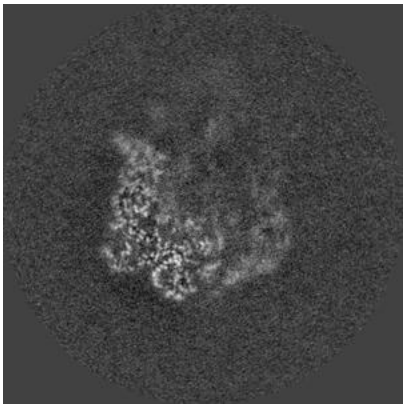


Z Index: 200

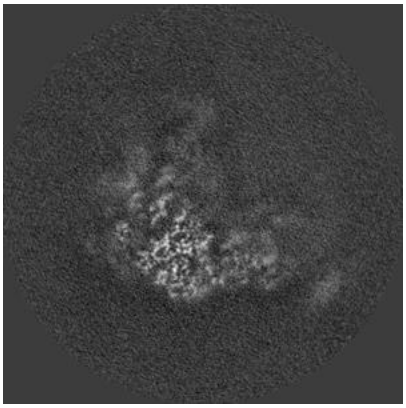
### 6.2.2 Raw map



X Index: 200



Y Index: 200

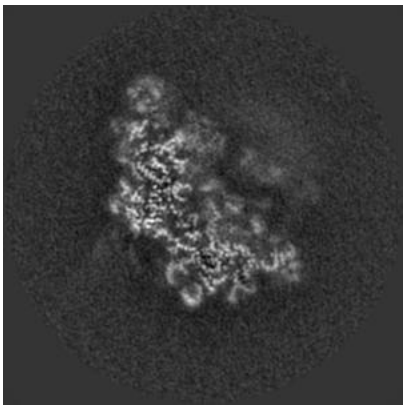


Z Index: 200

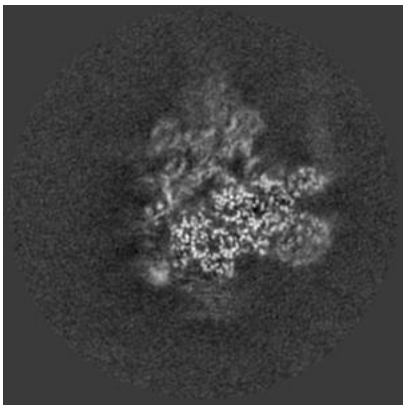
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices (i)

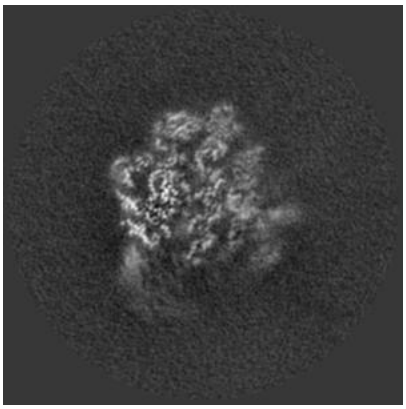
### 6.3.1 Primary map



X Index: 167

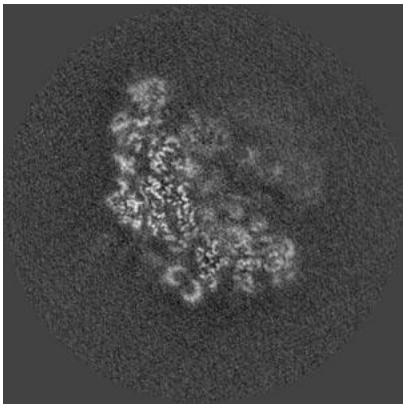


Y Index: 150

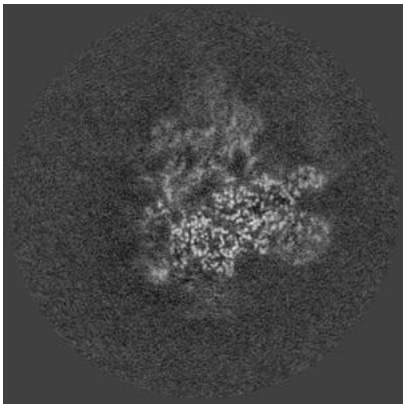


Z Index: 151

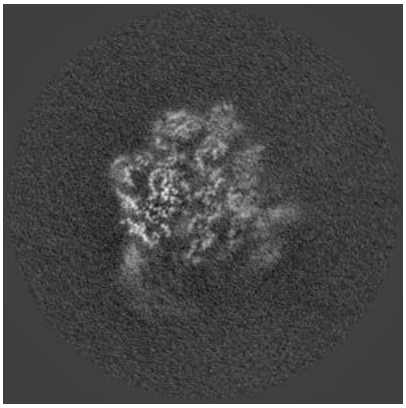
### 6.3.2 Raw map



X Index: 172



Y Index: 151

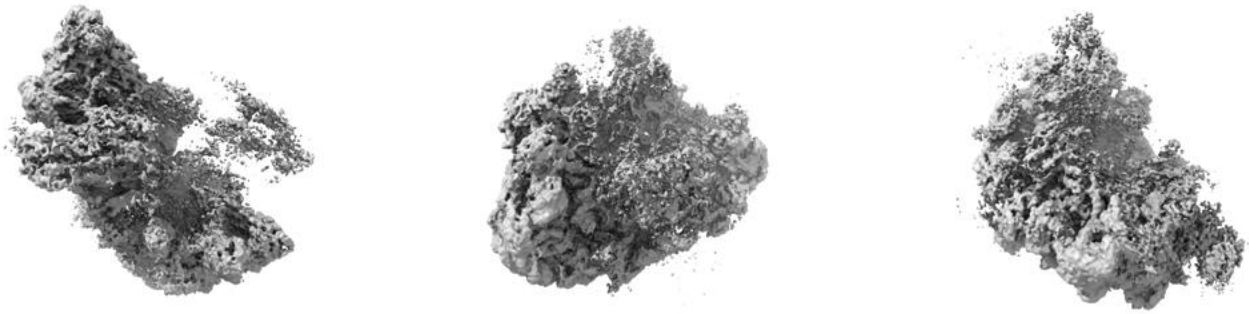


Z Index: 151

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

## 6.4 Orthogonal surface views (i)

### 6.4.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.021. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.4.2 Raw map

X Y Z

These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

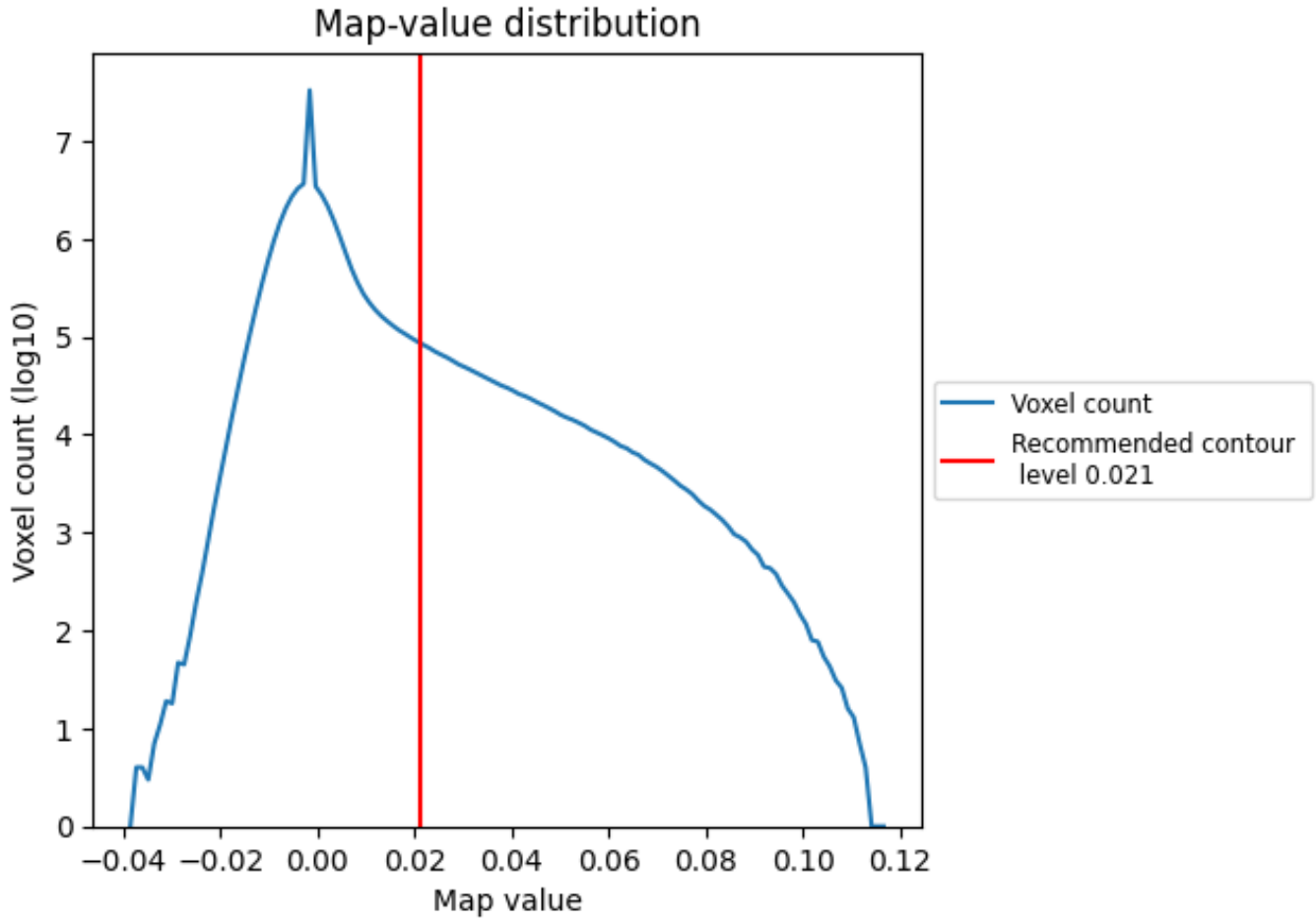
## 6.5 Mask visualisation (i)

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

# 7 Map analysis

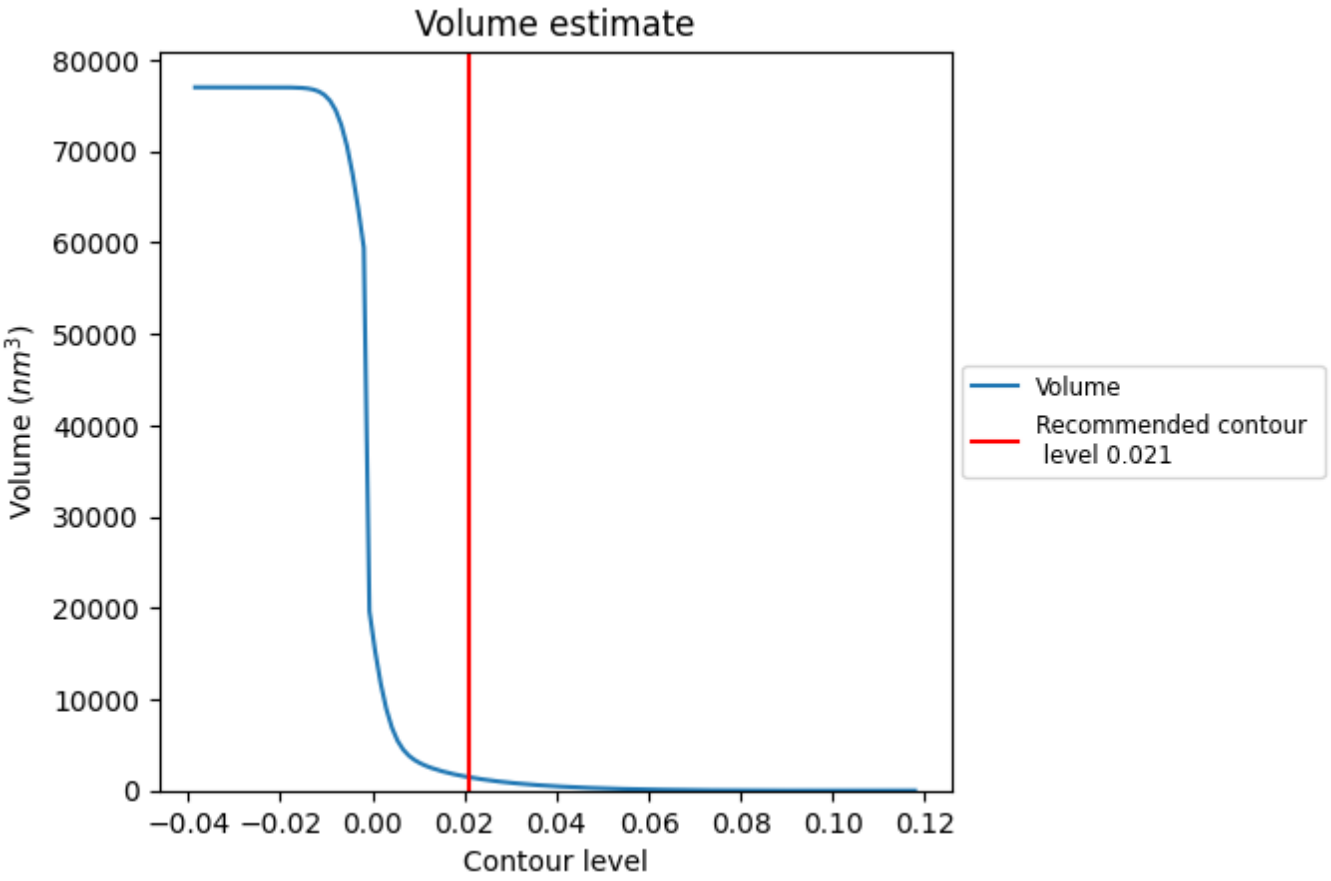
This section contains the results of statistical analysis of the map.

## 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.

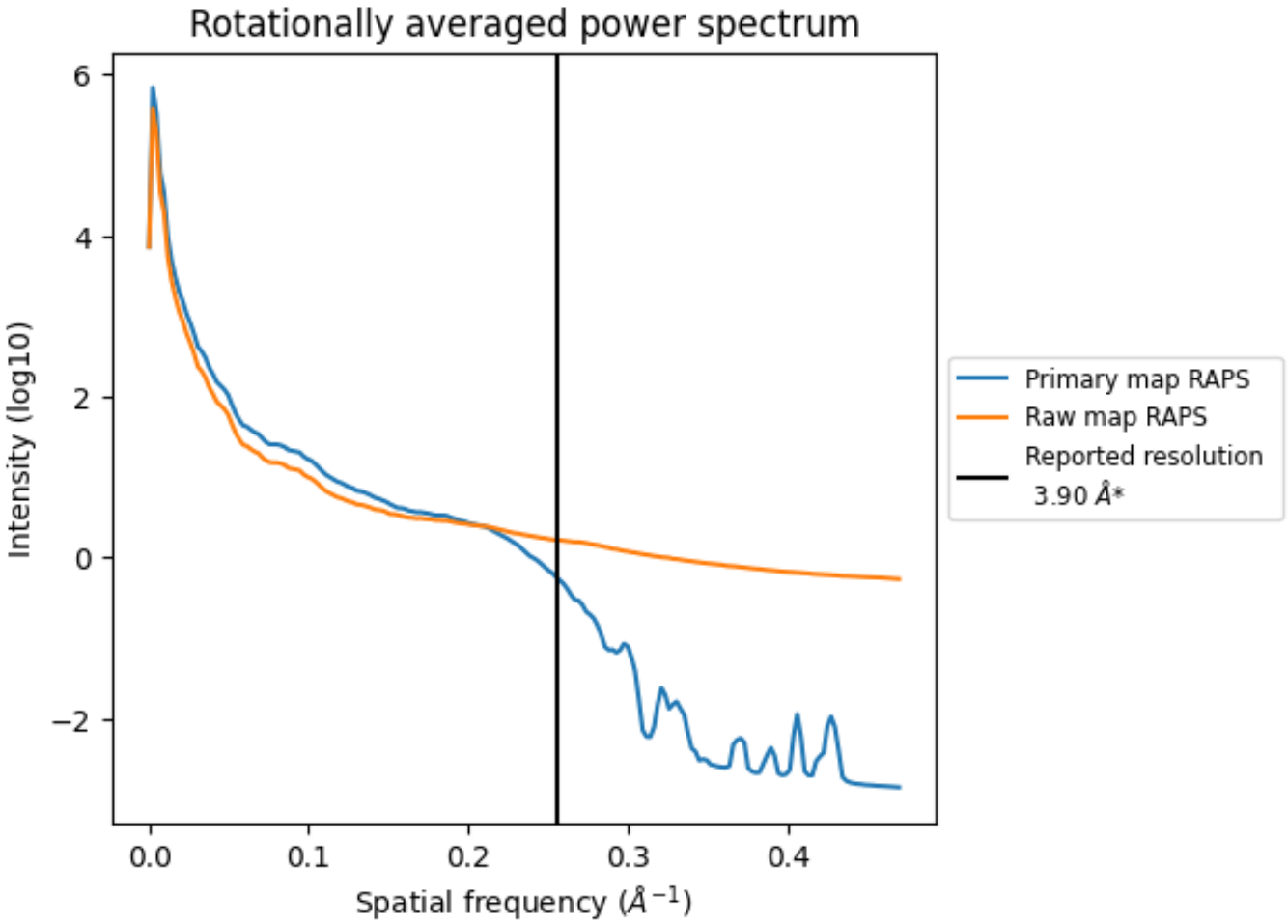
## 7.2 Volume estimate




The volume at the recommended contour level is 1465 $nm^3$; this corresponds to an approximate mass of 1324 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)

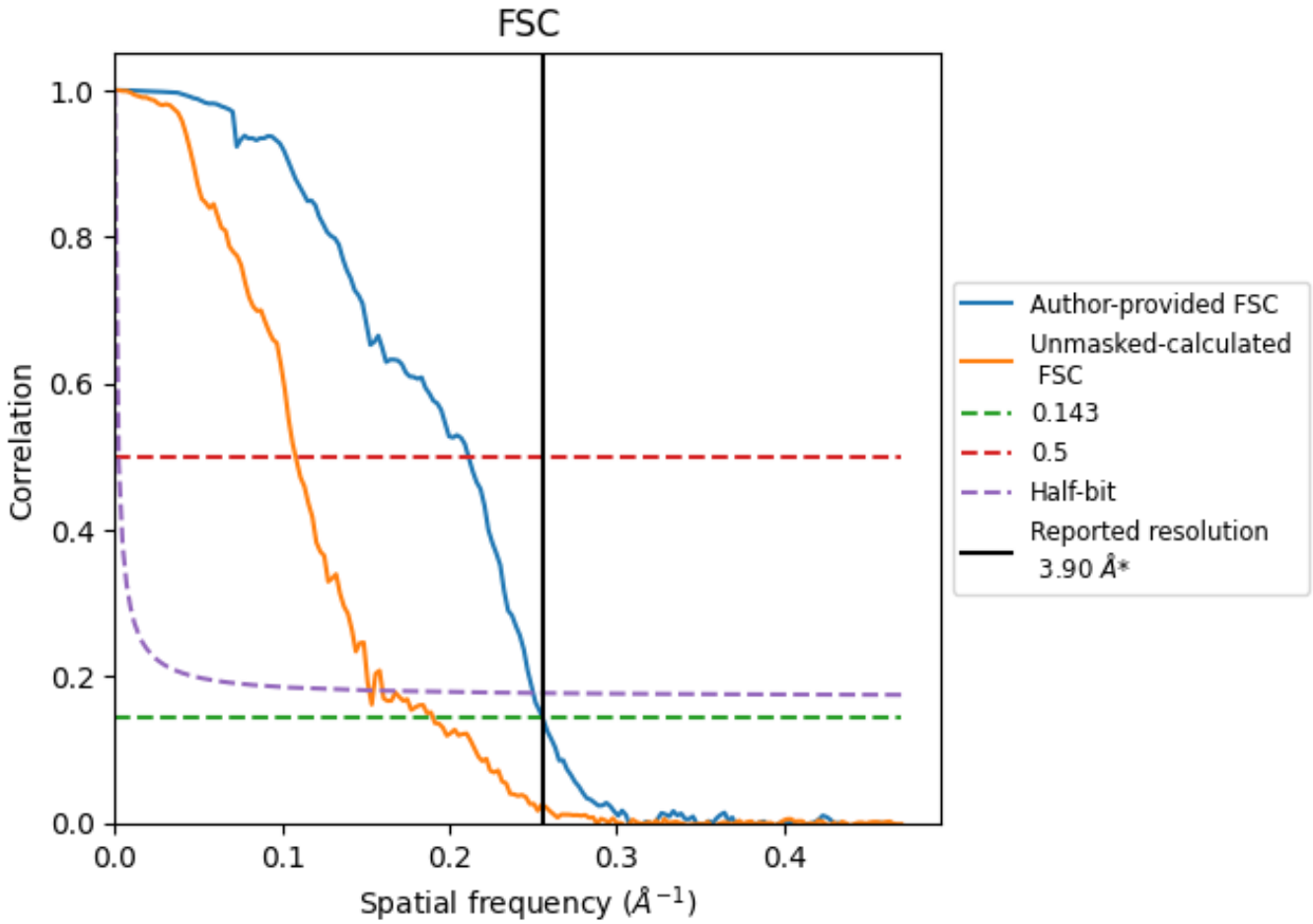



*Reported resolution corresponds to spatial frequency of 0.256 $Å^{-1}$

# 8 Fourier-Shell correlation

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

## 8.1 FSC




*Reported resolution corresponds to spatial frequency of 0.256 Å$^{-1}$

## 8.2 Resolution estimates (i)

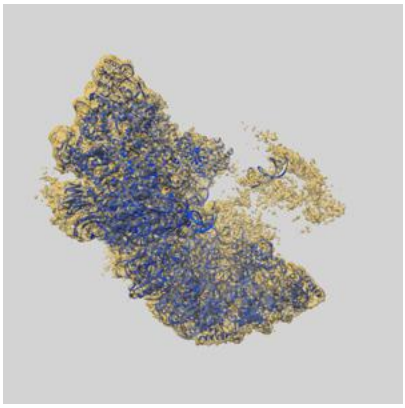
| Resolution estimate (Å) | Estimation criterion (FSC cut-off) | | |
|---|---|---|---|
| | 0.143 | 0.5 | Half-bit |
| Reported by author | 3.90 | - | - |
| Author-provided FSC curve | 3.91 | 4.73 | 4.00 |
| Unmasked-calculated* | 5.26 | 9.25 | 6.58 |

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 5.26 differs from the reported value 3.9 by more than 10 %

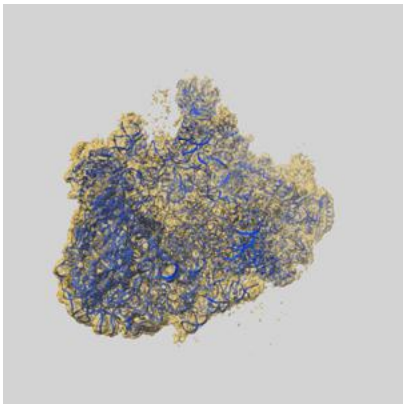
# 9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-12910 and PDB model 7OHV. Per-residue inclusion information can be found in section 3 on page 12.

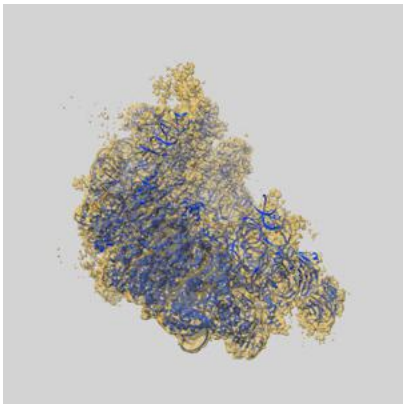
## 9.1 Map-model overlay



X



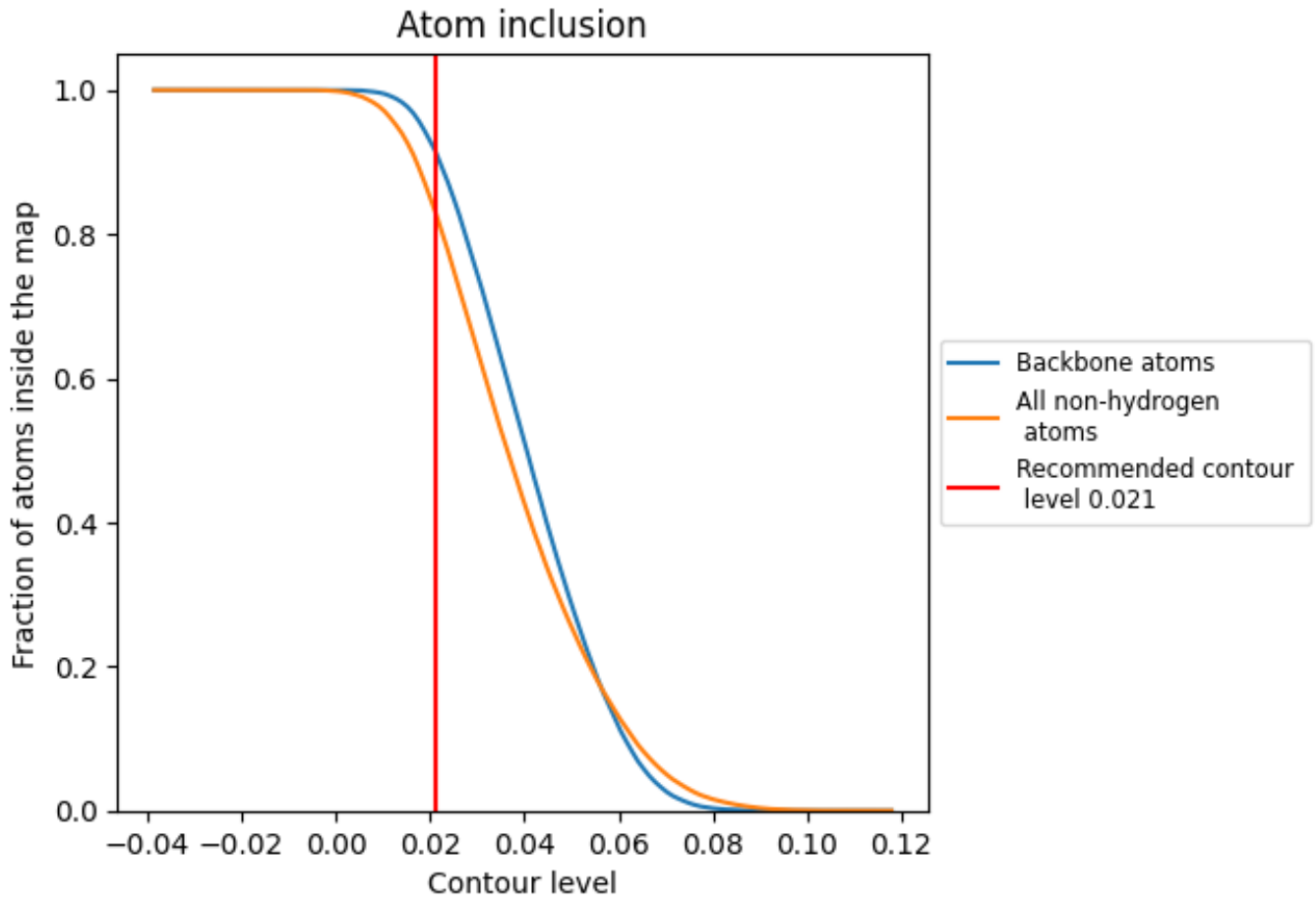
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.021 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 Atom inclusion (i)




At the recommended contour level, 92% of all backbone atoms, 83% of all non-hydrogen atoms, are inside the map.