# wwPDB EM Validation Summary Report

Oct 28, 2026 – 02:11 AM JST

| | | |
|---|---|---|
| PDB ID | : | 23EA / pdb_000023ea |
| EMDB ID | : | EMD-68898 |
| Title | : | Non-rotated 80S with eRF1(AAQ) and P/P tRNA |
| Authors | : | Wu, M.; Yuan, S. |
| Deposited on | : | 2026-02-03 |
| Resolution | : | 2.59 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:

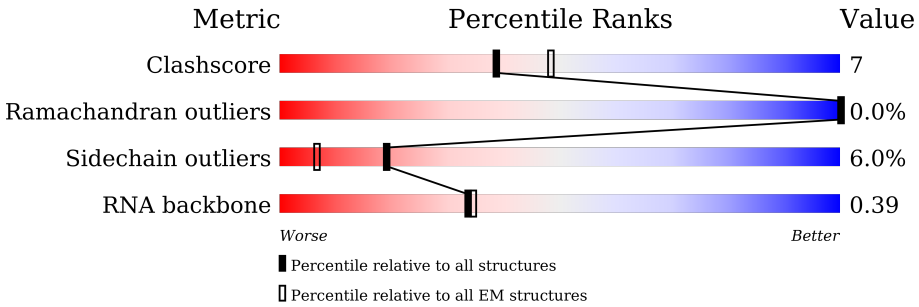
| | | |
|---|---|---|
| EMDB validation analysis | : | 0.0.1.dev133 |
| MolProbity | : | 4-5-2 with Phenix2.2 |
| Percentile statistics | : | 20250101.v01 (using entries in the PDB archive January 1st 2025) |
| EM percentile statistics | : | 202505.v01 (Using data in the EMDB archive up until May 2025) |
| MapQ | : | 1.9.13 |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.51 |

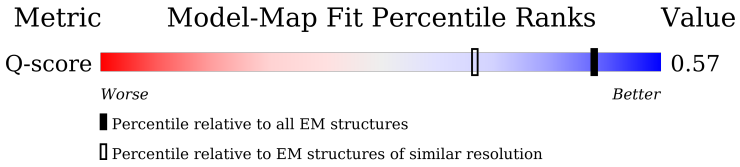
# 1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.59 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) | Similar EM resolution (#Entries, resolution range(Å)) |
|---|---|---|---|
| Clashscore | 229148 | 23984 | - |
| Ramachandran outliers | 224038 | 23583 | - |
| Sidechain outliers | 223484 | 23102 | - |
| RNA backbone | 8273 | 3508 | - |
| Q-score | - | 25397 | 7741 ( 2.09 - 3.09 ) |

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 | S2 | 1800 | 8% 40% 43% 15% |
| 2 | SA | 222 | 8% 80% 19% |
| 3 | SB | 206 | 9% 73% 25% |

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| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 4 | SC | 92 | 5% 64% 33% |
| 5 | SD | 121 | 56% 79% 20% |
| 6 | SE | 117 | 9% 71% 27% |
| 7 | SF | 141 | 67% 32% |
| 8 | SG | 125 | 76% 19% |
| 9 | SH | 145 | 75% 23% |
| 10 | SI | 143 | 7% 76% 21% |
| 11 | SJ | 100 | 66% 33% |
| 12 | SK | 82 | 15% 78% 21% |
| 13 | SL | 63 | 73% 22% 5% |
| 14 | SM | 53 | 85% 15% |
| 15 | SN | 73 | 60% 67% 30% |
| 16 | SO | 312 | 13% 65% 33% |
| 17 | SP | 206 | 79% 20% |
| 18 | SQ | 232 | 69% 26% |
| 19 | SR | 216 | 84% 14% |
| 20 | SS | 258 | 77% 20% |
| 21 | ST | 228 | 72% 26% |
| 22 | SU | 184 | 69% 30% |
| 23 | SV | 198 | 68% 24% 6% |
| 24 | SW | 184 | 5% 74% 24% |
| 25 | SX | 142 | 89% 11% |
| 26 | SY | 150 | 73% 27% |
| 27 | SZ | 127 | 66% 29% 5% |
| 28 | Sa | 87 | 78% 20% |

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| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 29 | Sb | 129 | 80% 19% |
| 30 | Sc | 144 | 78% 20% |
| 31 | Sd | 134 | 74% 25% |
| 32 | Se | 97 | 89% 10% |
| 33 | Sf | 81 | 78% 19% |
| 34 | Sg | 57 | 9% 81% 18% |
| 35 | LA | 3396 | 51% 34% 7% 7% |
| 36 | LB | 121 | 60% 31% 9% |
| 37 | LC | 158 | 47% 41% 11% |
| 38 | LD | 251 | 77% 22% |
| 39 | LE | 386 | 79% 20% |
| 40 | LF | 361 | 82% 17% |
| 41 | LG | 294 | 10% 78% 21% |
| 42 | LH | 175 | 6% 78% 16% 5% |
| 43 | LI | 222 | 82% 18% |
| 44 | LJ | 233 | 76% 22% |
| 45 | LK | 191 | 76% 21% |
| 46 | LL | 218 | 74% 23% |
| 47 | LM | 169 | 76% 23% |
| 48 | LN | 193 | 78% 18% |
| 49 | LO | 136 | 74% 23% |
| 50 | LP | 203 | 82% 17% |
| 51 | LQ | 197 | 84% 15% |
| 52 | LR | 183 | 80% 19% |
| 53 | LS | 185 | 86% 13% |

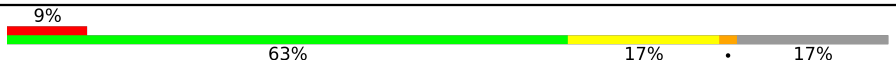
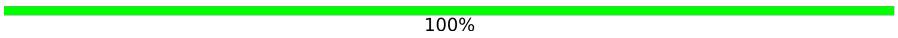
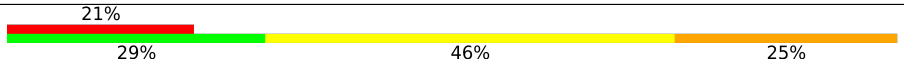
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| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 54 | LT | 188 | 90% 9% |
| 55 | LU | 171 | 74% 23% |
| 56 | LV | 159 | 80% 18% |
| 57 | LW | 100 | 76% 22% |
| 58 | LX | 136 | 77% 21% |
| 59 | LY | 65 | 82% 18% |
| 60 | LZ | 121 | 78% 21% |
| 61 | La | 125 | 7% 67% 26% 6% |
| 62 | Lb | 135 | 71% 26% |
| 63 | Lc | 148 | 76% 23% |
| 64 | Ld | 58 | 83% 16% |
| 65 | Le | 96 | 83% 17% |
| 66 | Lf | 109 | 6% 83% 16% |
| 67 | Lg | 127 | 5% 80% 20% |
| 68 | Lh | 106 | 80% 20% |
| 69 | Li | 112 | 81% 18% |
| 70 | Lj | 119 | 81% 18% |
| 71 | Lk | 99 | 80% 20% |
| 72 | Ll | 81 | 88% 11% |
| 73 | Lm | 77 | 66% 32% |
| 74 | Ln | 50 | 74% 26% |
| 75 | Lo | 52 | 85% 15% |
| 76 | Lp | 25 | 84% 16% |
| 77 | Lq | 103 | 90% 10% |
| 78 | Lr | 91 | 80% 19% |

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| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 79 | eR | 446 |   |
| 80 | mR | 10 |   |
| 81 | Cc | 77 |   |
| 82 | pp | 24 |   |

# 2 Entry composition (i)

There are 82 unique types of molecules in this entry. The entry contains 203511 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a RNA chain called RNA (1800-MER).

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | P | | |
| 1 | S2 | 1771 | 37739 | 16872 | 6683 | 12413 | 1771 | 0 | 0 |

- Molecule 2 is a protein called Small ribosomal subunit protein uS3.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 2 | SA | 222 | 1729 | 1098 | 312 | 313 | 6 | 0 | 0 |

- Molecule 3 is a protein called Small ribosomal subunit protein uS7.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 3 | SB | 206 | 1605 | 1005 | 299 | 298 | 3 | 0 | 0 |

- Molecule 4 is a protein called Small ribosomal subunit protein eS10A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 4 | SC | 92 | 752 | 487 | 122 | 141 | 2 | 0 | 0 |

- Molecule 5 is a protein called Small ribosomal subunit protein eS12.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 5 | SD | 121 | 875 | 551 | 153 | 169 | 2 | 0 | 0 |

- Molecule 6 is a protein called Small ribosomal subunit protein uS19.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 6 | SE | 117 | 916 | 583 | 171 | 155 | 7 | 0 | 0 |

- Molecule 7 is a protein called Small ribosomal subunit protein uS9A.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 7 | SF | 141 | Total | C | N | O | 0 | 0 |
| | | | 1105 | 708 | 203 | 194 | | |

- Molecule 8 is a protein called Small ribosomal subunit protein eS17B.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 8 | SG | 121 | Total | C | N | O | S | 0 | 0 |
| | | | 948 | 596 | 179 | 171 | 2 | | |

- Molecule 9 is a protein called Small ribosomal subunit protein uS13A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 9 | SH | 145 | Total | C | N | O | S | 0 | 0 |
| | | | 1188 | 741 | 237 | 208 | 2 | | |

- Molecule 10 is a protein called Small ribosomal subunit protein eS19A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 10 | SI | 143 | Total | C | N | O | S | 0 | 0 |
| | | | 1112 | 694 | 208 | 208 | 2 | | |

- Molecule 11 is a protein called Small ribosomal subunit protein uS10.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 11 | SJ | 100 | Total | C | N | O | S | 0 | 0 |
| | | | 797 | 506 | 144 | 146 | 1 | | |

- Molecule 12 is a protein called Small ribosomal subunit protein eS25A.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 12 | SK | 82 | Total | C | N | O | 0 | 0 |
| | | | 651 | 416 | 123 | 112 | | |

- Molecule 13 is a protein called Small ribosomal subunit protein eS28A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 13 | SL | 63 | Total | C | N | O | S | 0 | 0 |
| | | | 491 | 303 | 96 | 91 | 1 | | |

- Molecule 14 is a protein called Small ribosomal subunit protein uS14A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 14 | SM | 53 | Total | C | N | O | S | 0 | 0 |
| | | | 442 | 274 | 92 | 72 | 4 | | |

- Molecule 15 is a protein called Small ribosomal subunit protein eS31.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 15 | SN | 73 | Total | C | N | O | S | 0 | 0 |
| | | | 556 | 352 | 105 | 95 | 4 | | |

- Molecule 16 is a protein called Small ribosomal subunit protein RACK1.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 16 | SO | 312 | Total | C | N | O | S | 0 | 0 |
| | | | 2383 | 1514 | 409 | 452 | 8 | | |

- Molecule 17 is a protein called Small ribosomal subunit protein uS2A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 17 | SP | 206 | Total | C | N | O | S | 0 | 0 |
| | | | 1603 | 1030 | 284 | 287 | 2 | | |

- Molecule 18 is a protein called Small ribosomal subunit protein eS1A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 18 | SQ | 226 | Total | C | N | O | S | 0 | 0 |
| | | | 1798 | 1139 | 330 | 325 | 4 | | |

- Molecule 19 is a protein called Small ribosomal subunit protein uS5.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 19 | SR | 216 | Total | C | N | O | S | 0 | 0 |
| | | | 1626 | 1042 | 287 | 295 | 2 | | |

- Molecule 20 is a protein called Small ribosomal subunit protein eS4A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 20 | SS | 258 | Total | C | N | O | S | 0 | 0 |
| | | | 2056 | 1308 | 387 | 358 | 3 | | |

- Molecule 21 is a protein called Small ribosomal subunit protein eS6A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 21 | ST | 228 | Total | C | N | O | S | 0 | 0 |
| | | | 1815 | 1138 | 351 | 323 | 3 | | |

- Molecule 22 is a protein called Small ribosomal subunit protein eS7A.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 22 | SU | 184 | Total | C | N | O | 0 | 0 |
| | | | 1473 | 946 | 263 | 264 | | |

- Molecule 23 is a protein called Small ribosomal subunit protein eS8A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 23 | SV | 187 | Total | C | N | O | S | 0 | 0 |
| | | | 1476 | 916 | 295 | 263 | 2 | | |

- Molecule 24 is a protein called Small ribosomal subunit protein uS4A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 24 | SW | 184 | Total | C | N | O | S | 0 | 0 |
| | | | 1479 | 935 | 285 | 258 | 1 | | |

- Molecule 25 is a protein called Small ribosomal subunit protein uS17A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 25 | SX | 142 | Total | C | N | O | S | 0 | 0 |
| | | | 1142 | 733 | 217 | 189 | 3 | | |

- Molecule 26 is a protein called Small ribosomal subunit protein uS15.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 26 | SY | 150 | Total | C | N | O | S | 0 | 0 |
| | | | 1192 | 759 | 224 | 207 | 2 | | |

- Molecule 27 is a protein called Small ribosomal subunit protein uS11B.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 27 | SZ | 127 | Total | C | N | O | S | 0 | 0 |
| | | | 923 | 568 | 185 | 167 | 3 | | |

- Molecule 28 is a protein called Small ribosomal subunit protein eS21A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 28 | Sa | 87 | Total | C | N | O | S | 0 | 0 |
| | | | 673 | 415 | 125 | 131 | 2 | | |

- Molecule 29 is a protein called Small ribosomal subunit protein uS8A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 29 | Sb | 129 | Total | C | N | O | S | 0 | 0 |
| | | | 1021 | 650 | 188 | 180 | 3 | | |

- Molecule 30 is a protein called Small ribosomal subunit protein uS12A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 30 | Sc | 144 | Total | C | N | O | S | 0 | 0 |
| | | | 1121 | 708 | 220 | 191 | 2 | | |

- Molecule 31 is a protein called Small ribosomal subunit protein eS24A.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 31 | Sd | 134 | Total | C | N | O | 0 | 0 |
| | | | 1032 | 651 | 195 | 186 | | |

- Molecule 32 is a protein called Small ribosomal subunit protein eS26B.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 32 | Se | 97 | Total | C | N | O | S | 0 | 0 |
| | | | 765 | 473 | 160 | 127 | 5 | | |

- Molecule 33 is a protein called Small ribosomal subunit protein eS27A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 33 | Sf | 81 | Total | C | N | O | S | 0 | 0 |
| | | | 610 | 382 | 110 | 113 | 5 | | |

- Molecule 34 is a protein called Small ribosomal subunit protein eS30A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 34 | Sg | 57 | Total | C | N | O | S | 0 | 0 |
| | | | 451 | 284 | 93 | 73 | 1 | | |

- Molecule 35 is a RNA chain called RNA (3393-MER).

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 35 | LA | 3163 | Total | C | N | O | P | 0 | 0 |
| | | | 67653 | 30219 | 12193 | 22078 | 3163 | | |

- Molecule 36 is a RNA chain called RNA (121-MER).

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 36 | LB | 121 | Total | C | N | O | P | 0 | 0 |
| | | | 2579 | 1152 | 461 | 845 | 121 | | |

- Molecule 37 is a RNA chain called RNA (158-MER).

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 37 | LC | 158 | Total | C | N | O | P | 0 | 0 |
| | | | 3353 | 1500 | 586 | 1109 | 158 | | |

- Molecule 38 is a protein called Large ribosomal subunit protein uL2A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 38 | LD | 251 | Total | C | N | O | S | 0 | 0 |
| | | | 1899 | 1182 | 385 | 331 | 1 | | |

- Molecule 39 is a protein called Large ribosomal subunit protein uL3.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 39 | LE | 386 | Total | C | N | O | S | 0 | 0 |
| | | | 3075 | 1950 | 584 | 533 | 8 | | |

- Molecule 40 is a protein called Large ribosomal subunit protein uL4A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 40 | LF | 361 | Total | C | N | O | S | 0 | 0 |
| | | | 2748 | 1729 | 522 | 494 | 3 | | |

- Molecule 41 is a protein called Large ribosomal subunit protein uL18.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 41 | LG | 294 | Total | C | N | O | S | 0 | 0 |
| | | | 2351 | 1484 | 410 | 455 | 2 | | |

- Molecule 42 is a protein called Large ribosomal subunit protein eL6B.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 42 | LH | 167 | Total | C | N | O | 0 | 0 |
| | | | 1307 | 843 | 234 | 230 | | |

- Molecule 43 is a protein called Large ribosomal subunit protein uL30A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 43 | LI | 222 | Total | C | N | O | S | 0 | 0 |
| | | | 1784 | 1151 | 324 | 308 | 1 | | |

- Molecule 44 is a protein called Large ribosomal subunit protein eL8A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 44 | LJ | 233 | Total | C | N | O | S | 0 | 0 |
| | | | 1804 | 1151 | 323 | 327 | 3 | | |

- Molecule 45 is a protein called Large ribosomal subunit protein uL6A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 45 | LK | 191 | Total | C | N | O | S | 0 | 0 |
| | | | 1508 | 957 | 274 | 273 | 4 | | |

- Molecule 46 is a protein called Large ribosomal subunit protein uL16.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 46 | LL | 218 | Total | C | N | O | S | 0 | 0 |
| | | | 1764 | 1117 | 334 | 306 | 7 | | |

- Molecule 47 is a protein called Large ribosomal subunit protein uL5B.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 47 | LM | 169 | Total | C | N | O | S | 0 | 0 |
| | | | 1346 | 843 | 252 | 247 | 4 | | |

- Molecule 48 is a protein called Large ribosomal subunit protein eL13A.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 48 | LN | 193 | Total | C | N | O | 0 | 0 |
| | | | 1543 | 962 | 315 | 266 | | |

- Molecule 49 is a protein called Large ribosomal subunit protein eL14A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 49 | LO | 136 | Total | C | N | O | S | 0 | 0 |
| | | | 1053 | 675 | 199 | 177 | 2 | | |

- Molecule 50 is a protein called Large ribosomal subunit protein eL15A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 50 | LP | 203 | Total | C | N | O | S | 0 | 0 |
| | | | 1720 | 1077 | 361 | 281 | 1 | | |

- Molecule 51 is a protein called Large ribosomal subunit protein uL13A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 51 | LQ | 197 | Total | C | N | O | S | 197 | 0 |
| | | | 1555 | 1003 | 289 | 262 | 1 | | |

- Molecule 52 is a protein called Large ribosomal subunit protein uL22A.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 52 | LR | 183 | Total | C | N | O | 0 | 0 |
| | | | 1416 | 879 | 284 | 253 | | |

- Molecule 53 is a protein called Large ribosomal subunit protein eL18A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 53 | LS | 185 | Total | C | N | O | S | 0 | 0 |
| | | | 1441 | 908 | 290 | 241 | 2 | | |

- Molecule 54 is a protein called Large ribosomal subunit protein eL19A.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 54 | LT | 188 | Total | C | N | O | 0 | 0 |
| | | | 1515 | 932 | 323 | 260 | | |

- Molecule 55 is a protein called Large ribosomal subunit protein eL20A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 55 | LU | 171 | Total | C | N | O | S | 0 | 0 |
| | | | 1437 | 925 | 266 | 243 | 3 | | |

- Molecule 56 is a protein called Large ribosomal subunit protein eL21A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 56 | LV | 159 | Total | C | N | O | S | 0 | 0 |
| | | | 1272 | 802 | 245 | 221 | 4 | | |

- Molecule 57 is a protein called Large ribosomal subunit protein eL22A.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 57 | LW | 100 | Total | C | N | O | 0 | 0 |
| | | | 796 | 516 | 131 | 149 | | |

- Molecule 58 is a protein called Large ribosomal subunit protein uL14A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 58 | LX | 136 | Total | C | N | O | S | 0 | 0 |
| | | | 1003 | 628 | 189 | 179 | 7 | | |

- Molecule 59 is a protein called Large ribosomal subunit protein eL24A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 59 | LY | 65 | Total | C | N | O | S | 0 | 0 |
| | | | 528 | 339 | 104 | 84 | 1 | | |

- Molecule 60 is a protein called Large ribosomal subunit protein uL23.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 60 | LZ | 121 | Total | C | N | O | S | 0 | 0 |
| | | | 964 | 620 | 169 | 173 | 2 | | |

- Molecule 61 is a protein called Large ribosomal subunit protein uL24A.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 61 | La | 125 | Total | C | N | O | 0 | 0 |
| | | | 984 | 620 | 191 | 173 | | |

- Molecule 62 is a protein called Large ribosomal subunit protein eL27A.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 62 | Lb | 135 | Total | C | N | O | 0 | 0 |
| | | | 1080 | 701 | 199 | 180 | | |

- Molecule 63 is a protein called Large ribosomal subunit protein uL15.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 63 | Lc | 148 | Total | C | N | O | S | 0 | 0 |
| | | | 1169 | 747 | 231 | 188 | 3 | | |

- Molecule 64 is a protein called Large ribosomal subunit protein eL29.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 64 | Ld | 58 | Total | C | N | O | 0 | 0 |
| | | | 462 | 289 | 100 | 73 | | |

- Molecule 65 is a protein called Large ribosomal subunit protein eL30.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 65 | Le | 96 | Total | C | N | O | S | 0 | 0 |
| | | | 737 | 476 | 123 | 137 | 1 | | |

- Molecule 66 is a protein called Large ribosomal subunit protein eL31A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 66 | Lf | 109 | Total | C | N | O | S | 0 | 0 |
| | | | 876 | 556 | 167 | 152 | 1 | | |

- Molecule 67 is a protein called Large ribosomal subunit protein eL32.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 67 | Lg | 127 | Total | C | N | O | S | 0 | 0 |
| | | | 1017 | 644 | 205 | 167 | 1 | | |

- Molecule 68 is a protein called Large ribosomal subunit protein eL33A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 68 | Lh | 106 | Total | C | N | O | S | 0 | 0 |
| | | | 850 | 540 | 165 | 144 | 1 | | |

- Molecule 69 is a protein called Large ribosomal subunit protein eL34A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 69 | Li | 112 | Total | C | N | O | S | 0 | 0 |
| | | | 880 | 545 | 179 | 152 | 4 | | |

- Molecule 70 is a protein called Large ribosomal subunit protein uL29A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 70 | Lj | 119 | Total | C | N | O | S | 0 | 0 |
| | | | 969 | 615 | 186 | 167 | 1 | | |

- Molecule 71 is a protein called Large ribosomal subunit protein eL36A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 71 | Lk | 99 | Total | C | N | O | S | 0 | 0 |
| | | | 766 | 478 | 154 | 132 | 2 | | |

- Molecule 72 is a protein called Large ribosomal subunit protein eL37A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 72 | Ll | 81 | Total | C | N | O | S | 0 | 0 |
| | | | 645 | 393 | 141 | 106 | 5 | | |

- Molecule 73 is a protein called Large ribosomal subunit protein eL38.

| Mol | Chain | Residues | Atoms | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|
| 73 | Lm | 77 | Total | C | N | O | 0 | 0 |
| | | | 612 | 391 | 115 | 106 | | |

- Molecule 74 is a protein called Large ribosomal subunit protein eL39.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 74 | Ln | 50 | Total | C | N | O | S | 0 | 0 |
| | | | 436 | 272 | 97 | 65 | 2 | | |

- Molecule 75 is a protein called Large ribosomal subunit protein eL40A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 75 | Lo | 52 | Total | C | N | O | S | 0 | 0 |
| | | | 410 | 254 | 86 | 65 | 5 | | |

- Molecule 76 is a protein called Large ribosomal subunit protein eL41A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 76 | Lp | 25 | Total | C | N | O | S | 0 | 0 |
| | | | 229 | 139 | 62 | 27 | 1 | | |

- Molecule 77 is a protein called Large ribosomal subunit protein eL42A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 77 | Lq | 103 | Total | C | N | O | S | 0 | 0 |
| | | | 824 | 517 | 167 | 135 | 5 | | |

- Molecule 78 is a protein called Large ribosomal subunit protein eL43A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 78 | Lr | 91 | Total | C | N | O | S | 0 | 0 |
| | | | 694 | 429 | 138 | 121 | 6 | | |

- Molecule 79 is a protein called Eukaryotic peptide chain release factor subunit 1.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 79 | eR | 368 | Total | C | N | O | S | 0 | 0 |
| | | | 2881 | 1839 | 494 | 539 | 9 | | |

There are 11 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| eR | -8 | MET | - | initiating methionine | UNP P62495 |
| eR | -7 | HIS | - | expression tag | UNP P62495 |
| eR | -6 | HIS | - | expression tag | UNP P62495 |
| eR | -5 | HIS | - | expression tag | UNP P62495 |
| eR | -4 | HIS | - | expression tag | UNP P62495 |
| eR | -3 | HIS | - | expression tag | UNP P62495 |
| eR | -2 | HIS | - | expression tag | UNP P62495 |
| eR | -1 | GLY | - | expression tag | UNP P62495 |
| eR | 0 | SER | - | expression tag | UNP P62495 |
| eR | 183 | ALA | GLY | engineered mutation | UNP P62495 |
| eR | 184 | ALA | GLY | engineered mutation | UNP P62495 |

- Molecule 80 is a RNA chain called RNA (5'-R(P*GP*AP*CP*CP*CP*UP*UP*AP*AP*C) -3').

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 80 | mR | 10 | Total | C | N | O | P | 0 | 0 |
| | | | 209 | 94 | 36 | 69 | 10 | | |

- Molecule 81 is a RNA chain called RNA (77-MER).

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 81 | Cc | 77 | Total | C | N | O | P | 0 | 0 |
| | | | 1638 | 733 | 296 | 533 | 76 | | |

- Molecule 82 is a protein called PRO-GLN-ARG-HIS-ASP-GLU-LYS-THR-LEU-VAL-GLN-SER-GLN-VAL-ASN-ALA-TYR-ASN-ALA-ASP-MET-ILE-ASP-PRO.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 82 | pp | 24 | Total | C | N | O | S | 0 | 0 |
| | | | 184 | 112 | 33 | 38 | 1 | | |

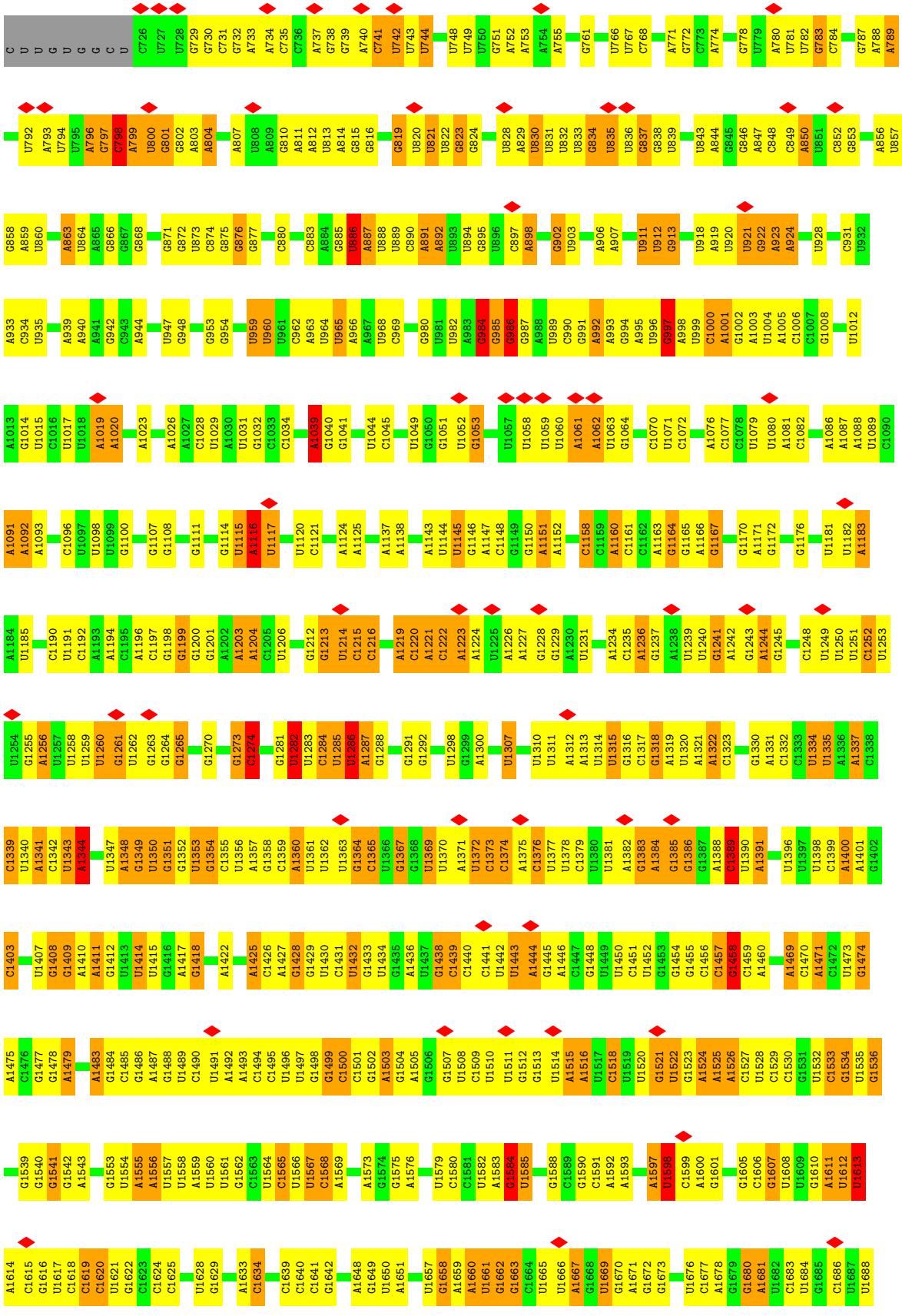
# 3 Residue-property plots (i)

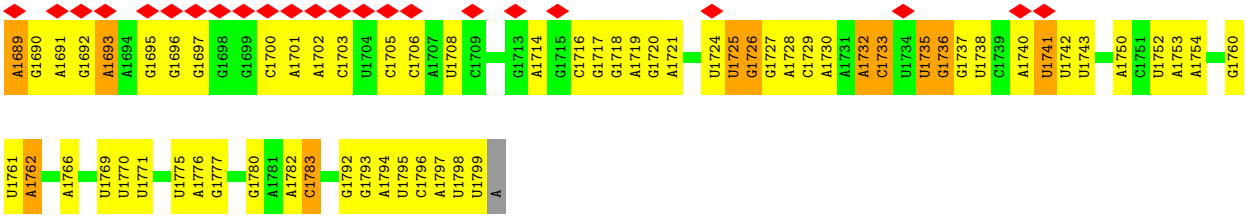
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: RNA (1800-MER)

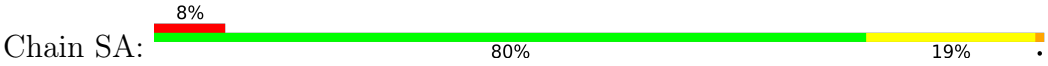
Chain S2:

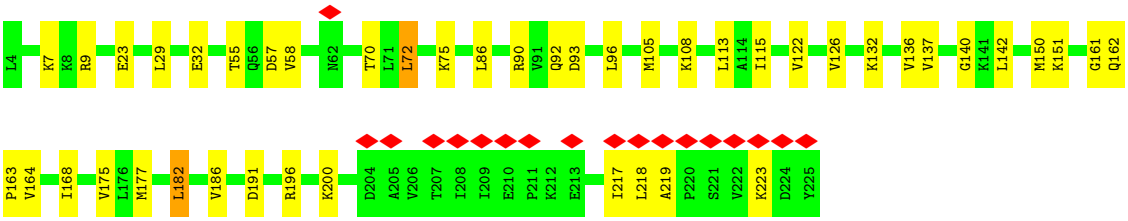




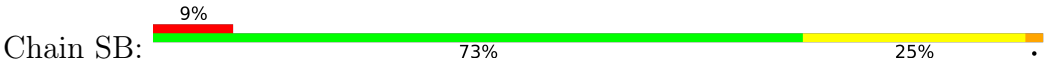


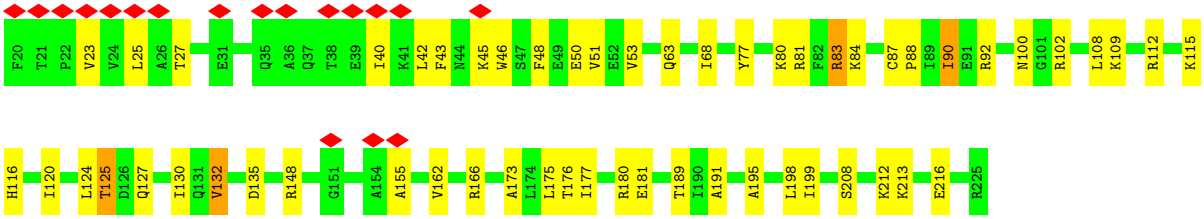

• Molecule 2: Small ribosomal subunit protein uS3



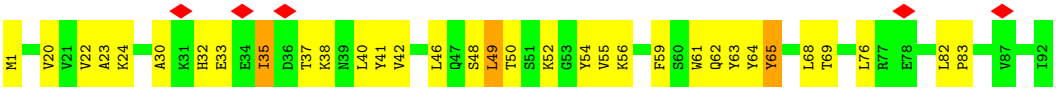

• Molecule 3: Small ribosomal subunit protein uS7



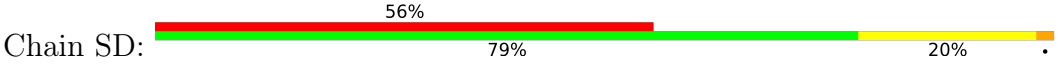



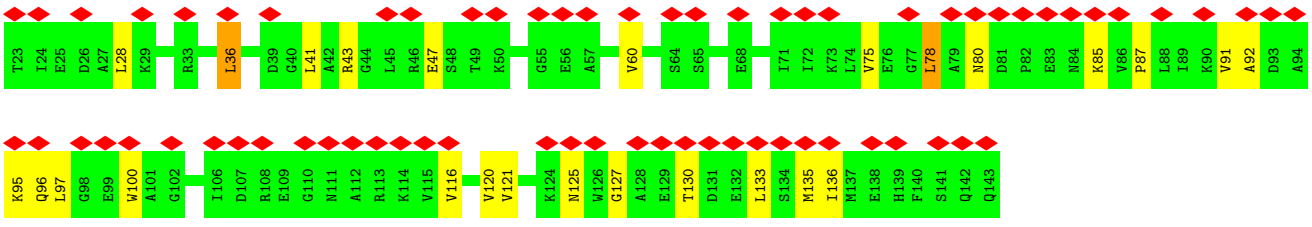

• Molecule 4: Small ribosomal subunit protein eS10A



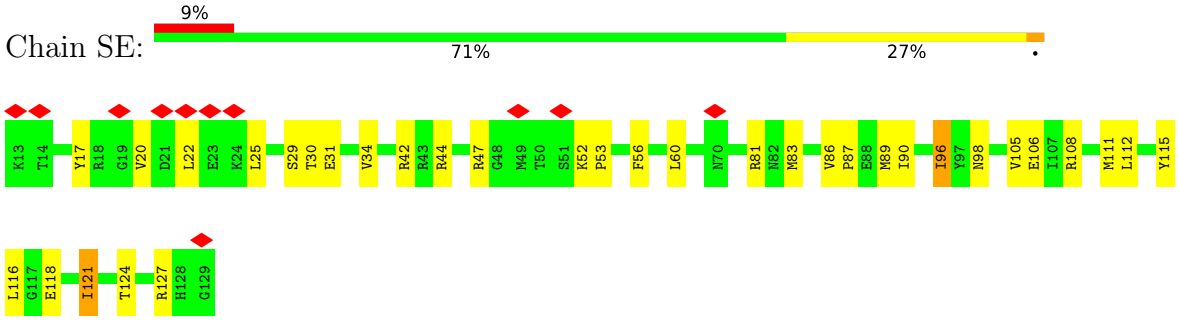

• Molecule 5: Small ribosomal subunit protein eS12



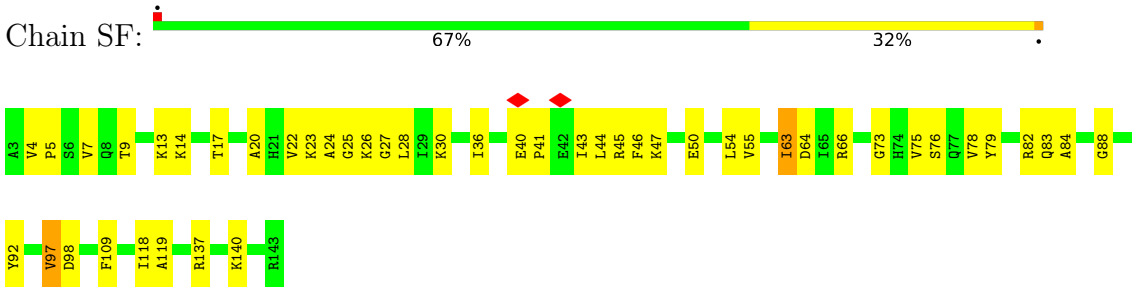

• Molecule 6: Small ribosomal subunit protein uS19

Chain SE:



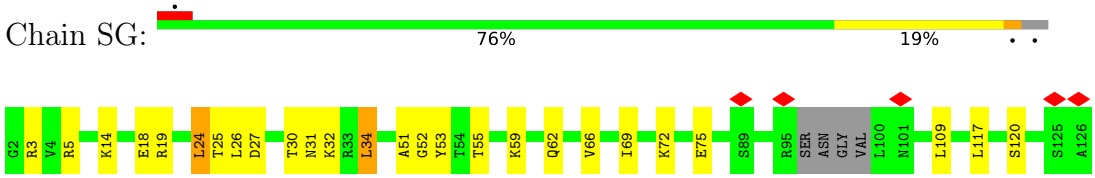

• Molecule 7: Small ribosomal subunit protein uS9A

Chain SF:



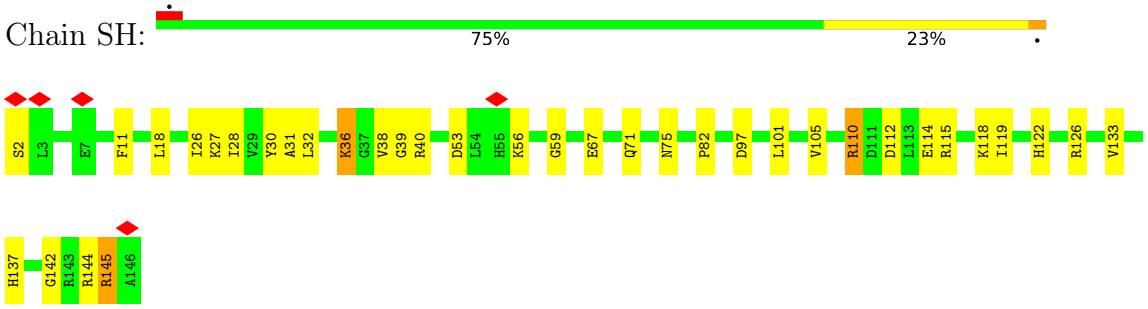

• Molecule 8: Small ribosomal subunit protein eS17B

Chain SG:



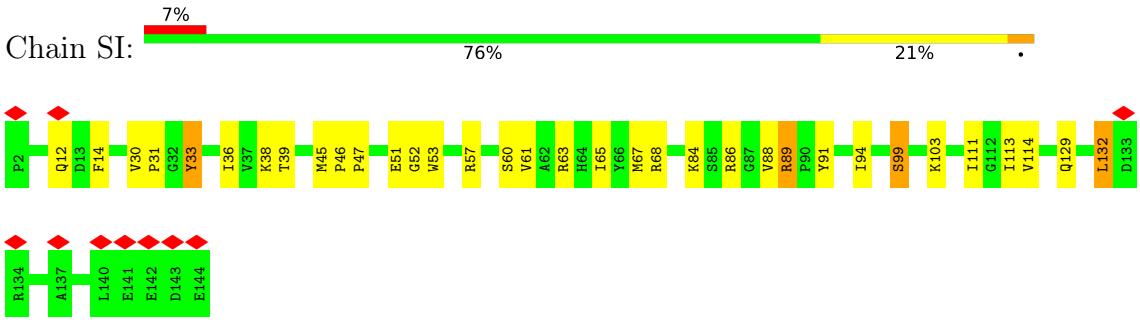

• Molecule 9: Small ribosomal subunit protein uS13A

Chain SH:




• Molecule 10: Small ribosomal subunit protein eS19A

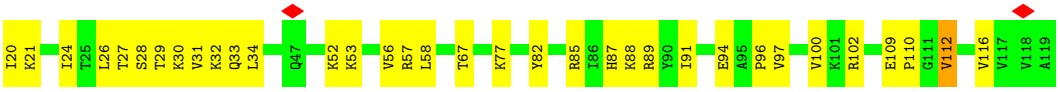
Chain SI:



• Molecule 11: Small ribosomal subunit protein uS10

Chain SJ:

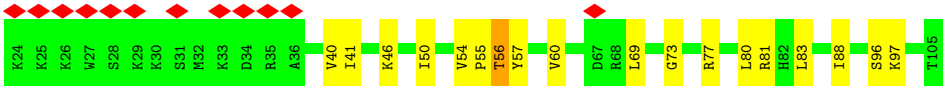



• Molecule 12: Small ribosomal subunit protein eS25A

Chain SK:

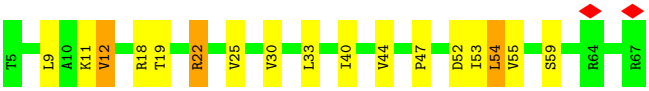



• Molecule 13: Small ribosomal subunit protein eS28A

Chain SL:

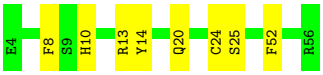



• Molecule 14: Small ribosomal subunit protein uS14A

Chain SM:

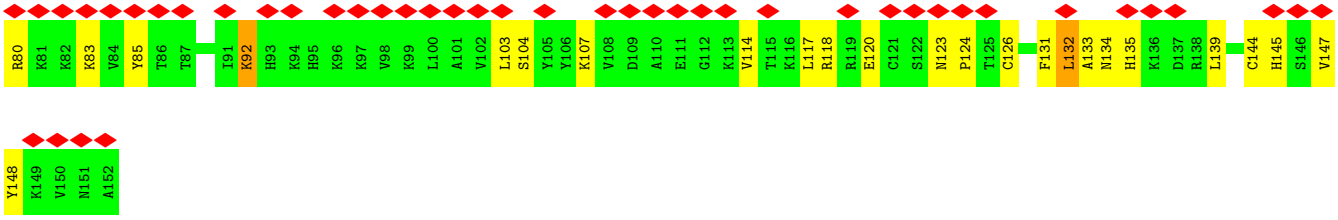



• Molecule 15: Small ribosomal subunit protein eS31

Chain SN:

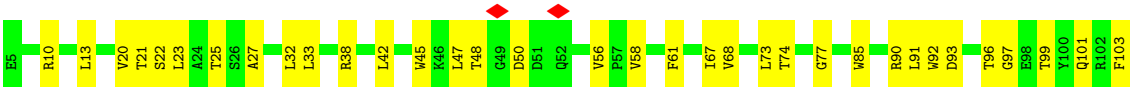


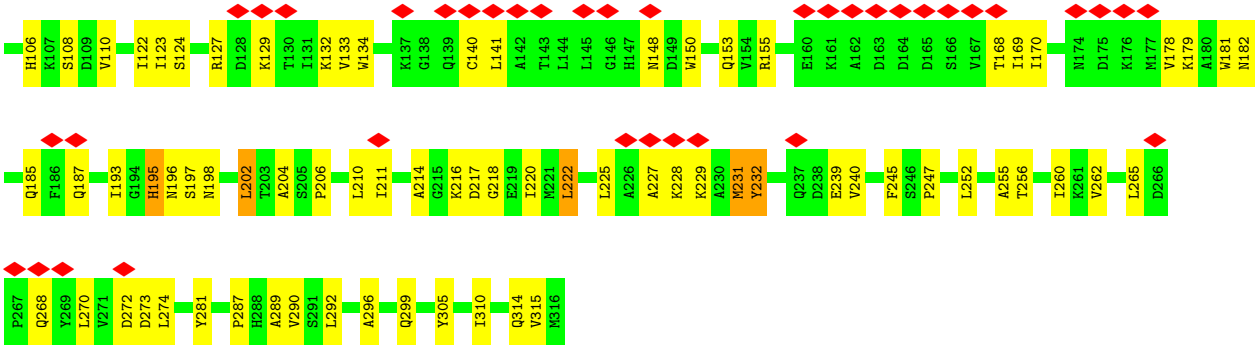




• Molecule 16: Small ribosomal subunit protein RACK1

Chain SO:






• Molecule 17: Small ribosomal subunit protein uS2A

Chain SP:



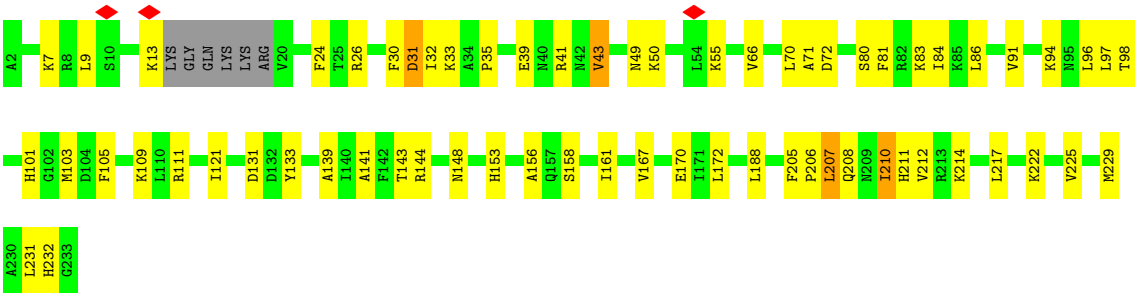




• Molecule 18: Small ribosomal subunit protein eS1A

Chain SQ:

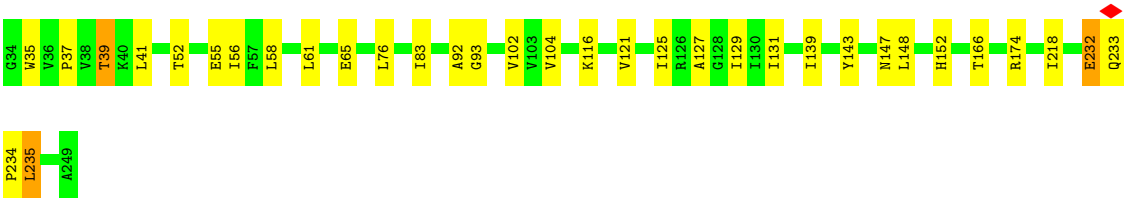



• Molecule 19: Small ribosomal subunit protein uS5

Chain SR:

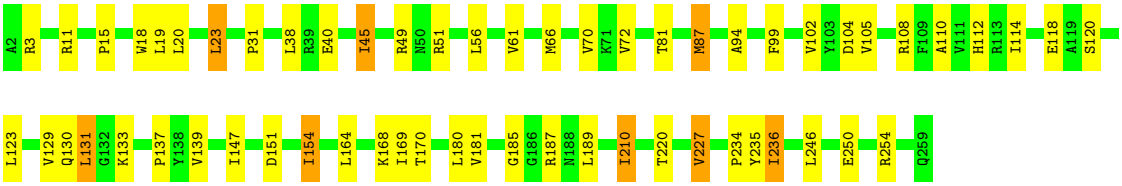


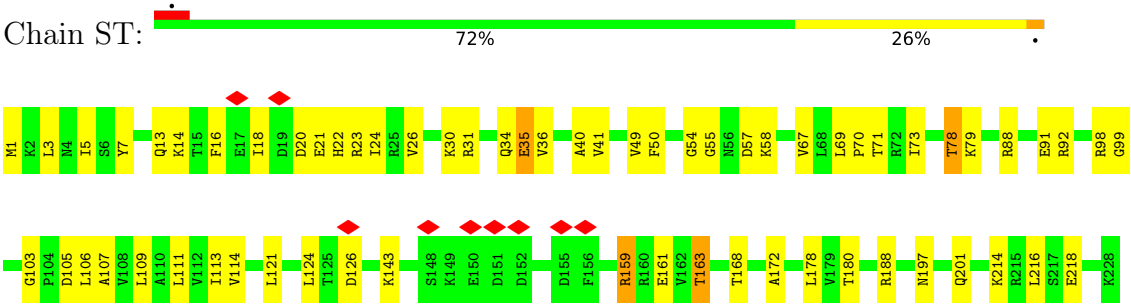

• Molecule 20: Small ribosomal subunit protein eS4A

Chain SS:

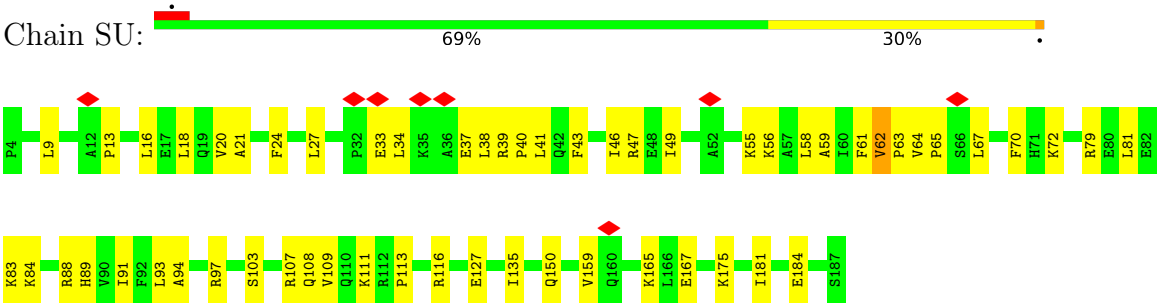




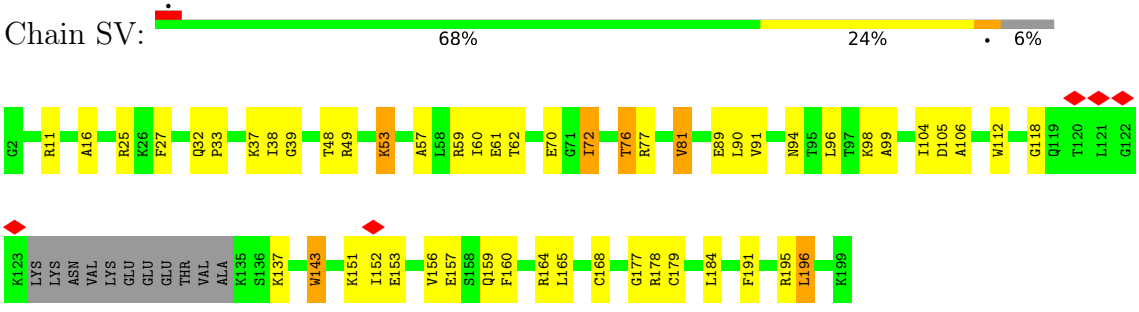

• Molecule 21: Small ribosomal subunit protein eS6A



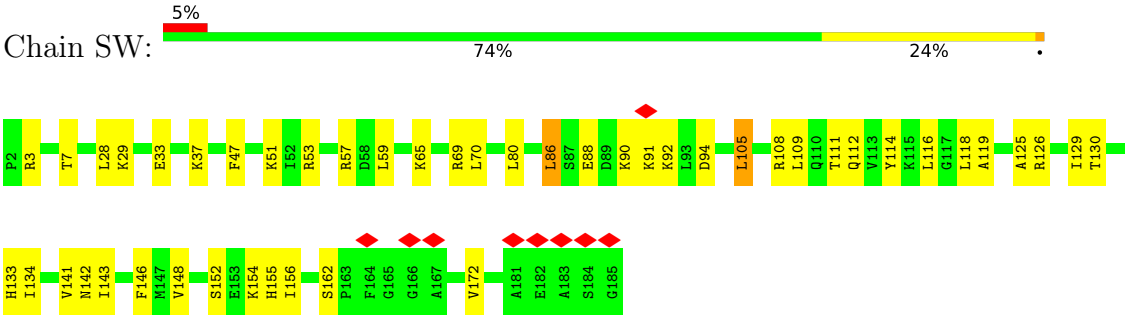

• Molecule 22: Small ribosomal subunit protein eS7A




• Molecule 23: Small ribosomal subunit protein eS8A




• Molecule 24: Small ribosomal subunit protein uS4A



• Molecule 25: Small ribosomal subunit protein uS17A

Chain SX:



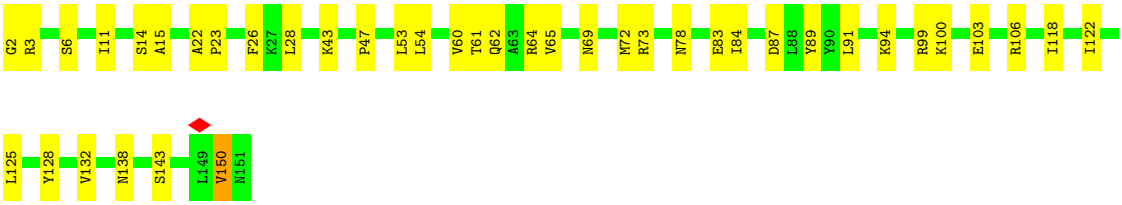




• Molecule 26: Small ribosomal subunit protein uS15

Chain SY:

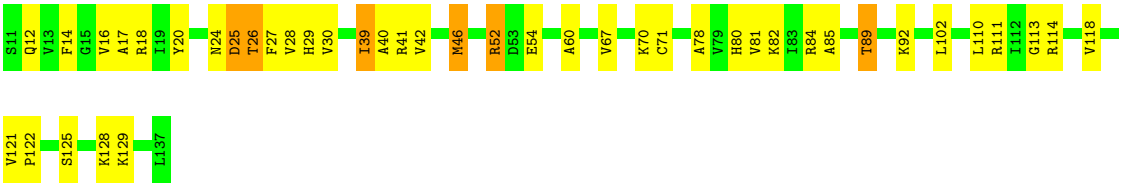



• Molecule 27: Small ribosomal subunit protein uS11B

Chain SZ:

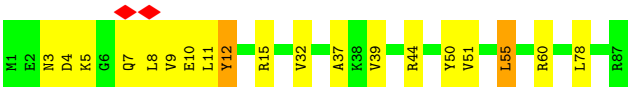



• Molecule 28: Small ribosomal subunit protein eS21A

Chain Sa:

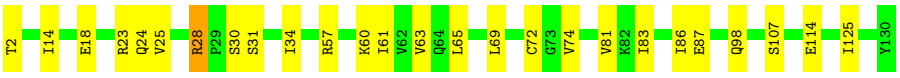



• Molecule 29: Small ribosomal subunit protein uS8A

Chain Sb:

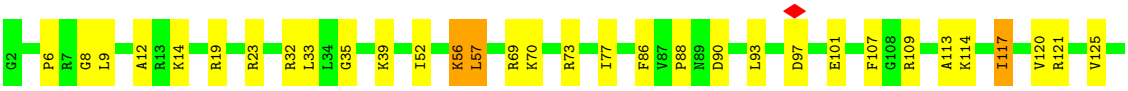



• Molecule 30: Small ribosomal subunit protein uS12A

Chain Sc:



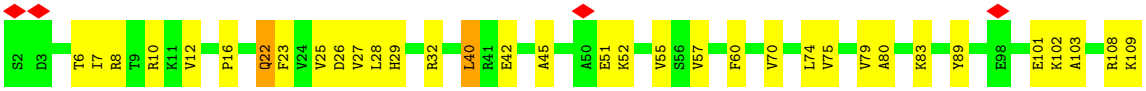



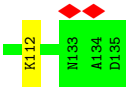



• Molecule 31: Small ribosomal subunit protein eS24A

Chain Sd:



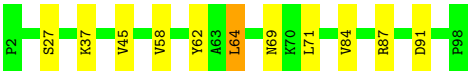




• Molecule 32: Small ribosomal subunit protein eS26B

Chain Se:

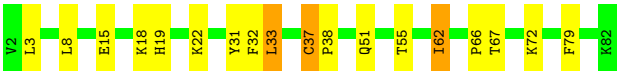



• Molecule 33: Small ribosomal subunit protein eS27A

Chain Sf:

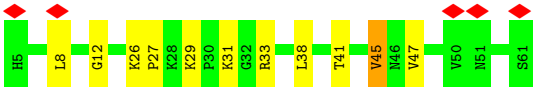



• Molecule 34: Small ribosomal subunit protein eS30A

Chain Sg:

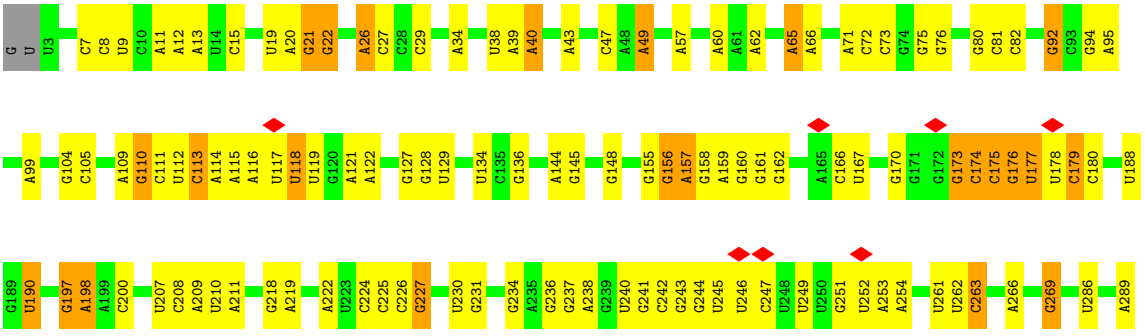


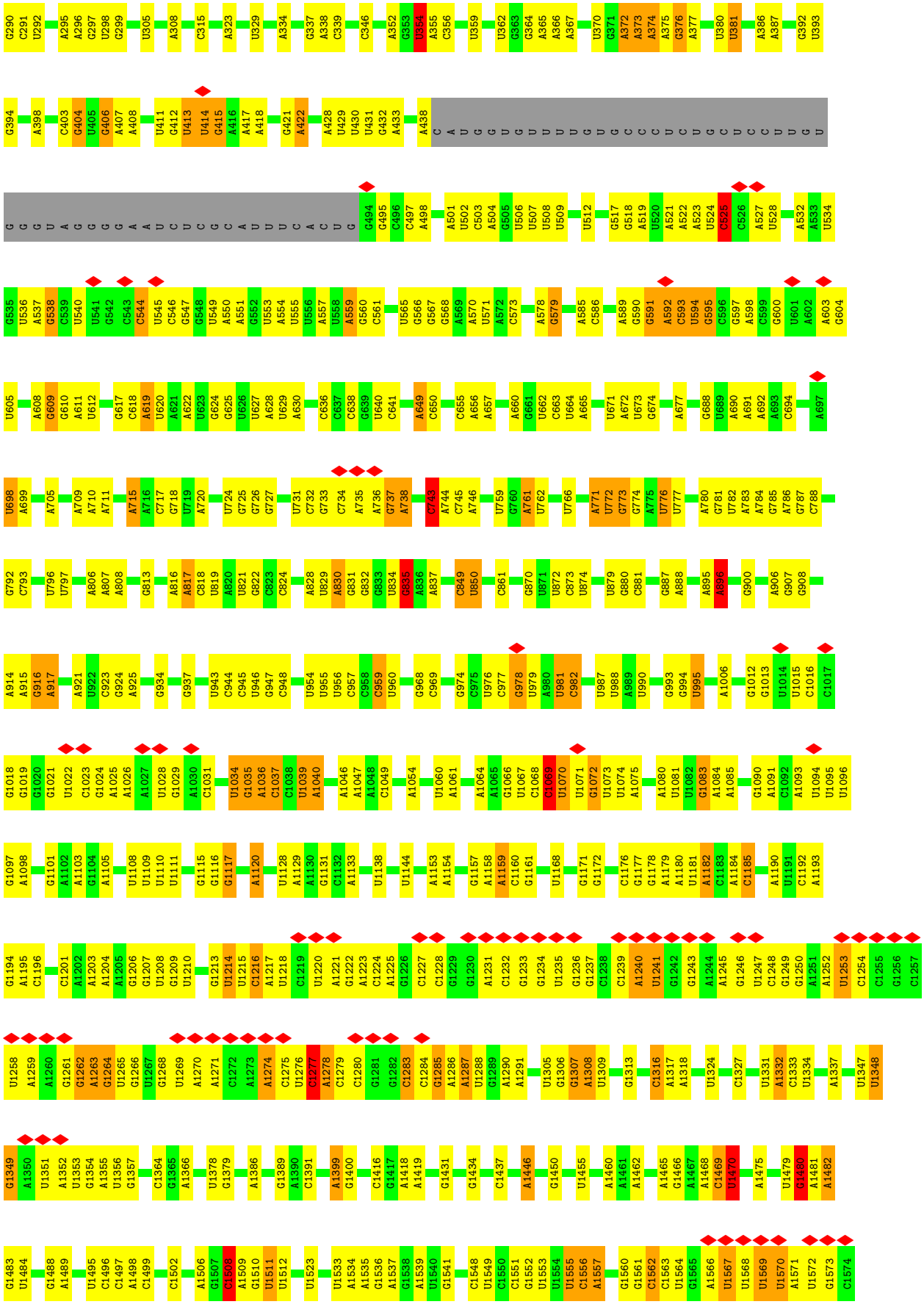



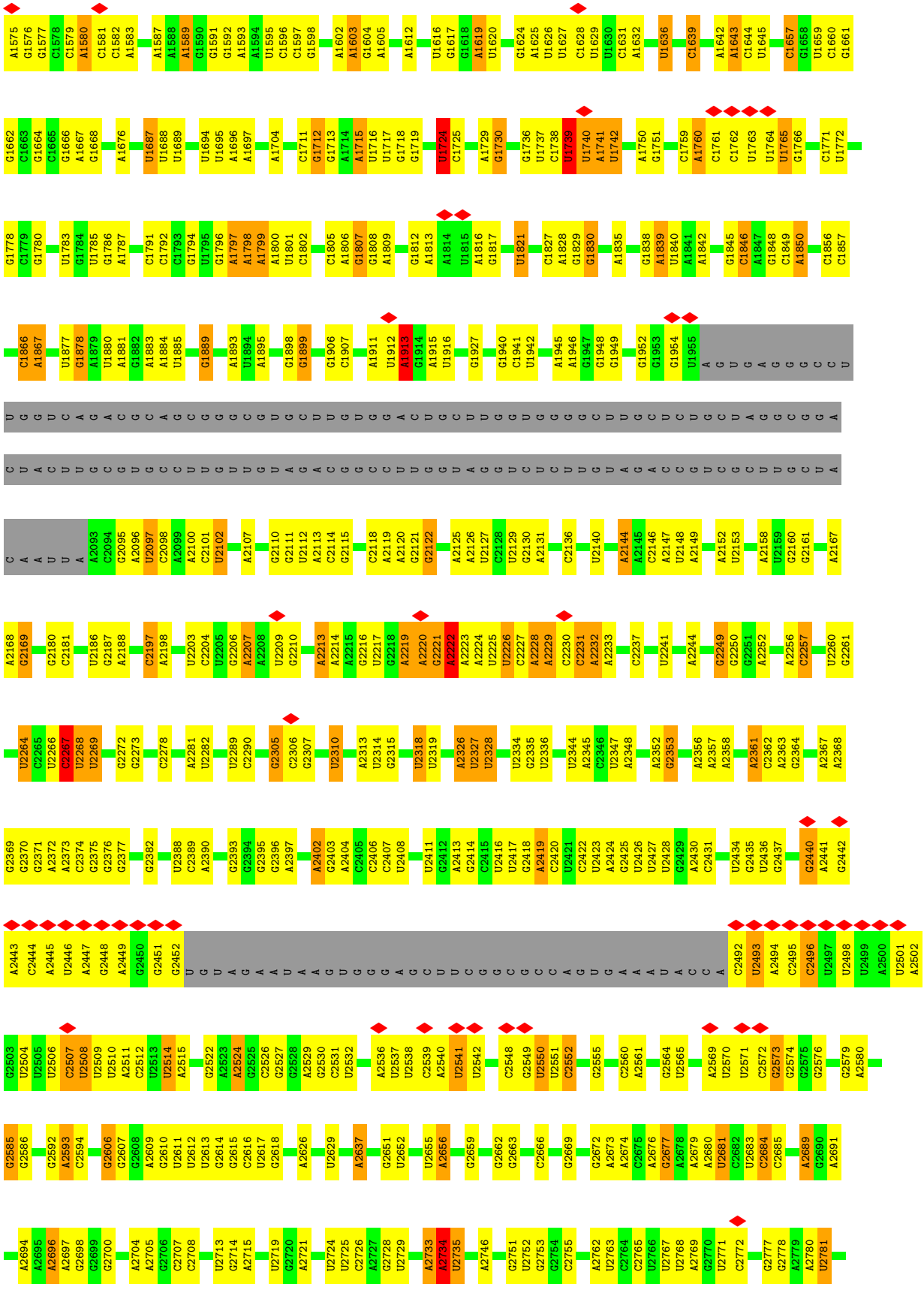

• Molecule 35: RNA (3393-MER)

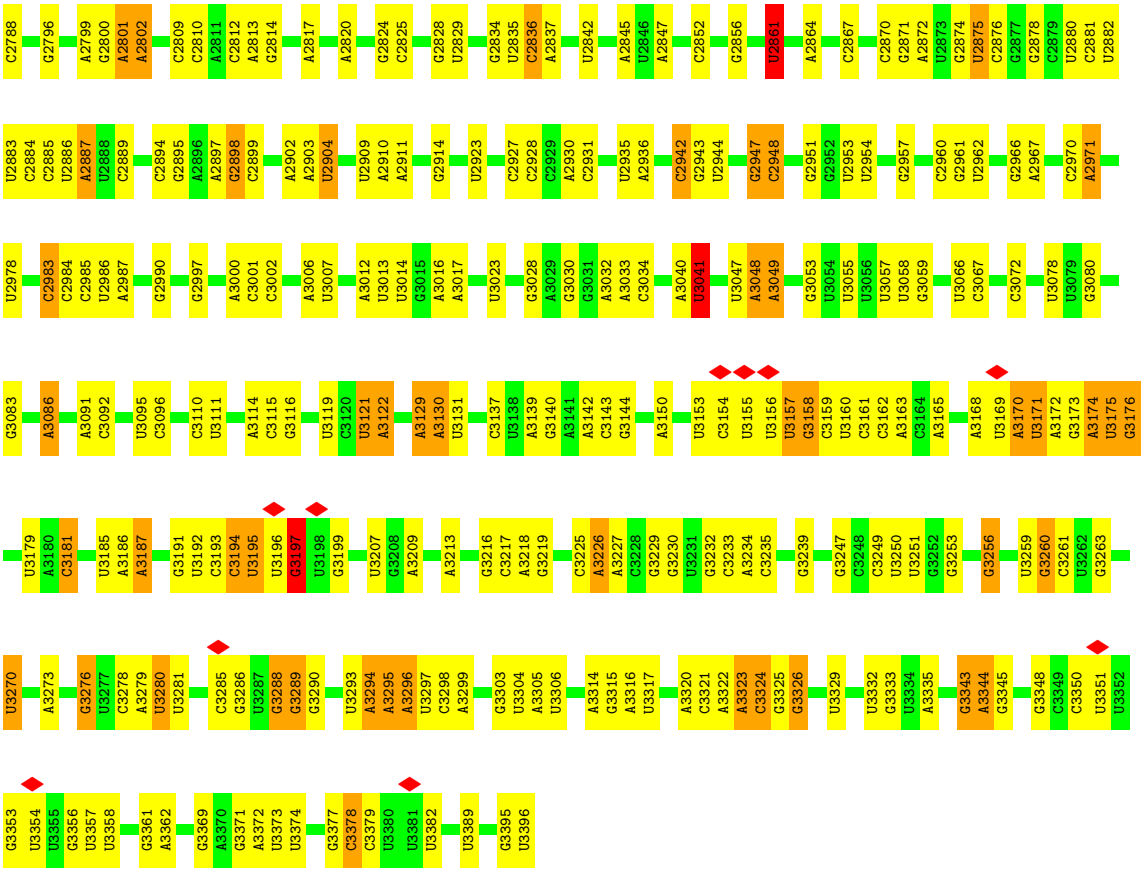
Chain LA:





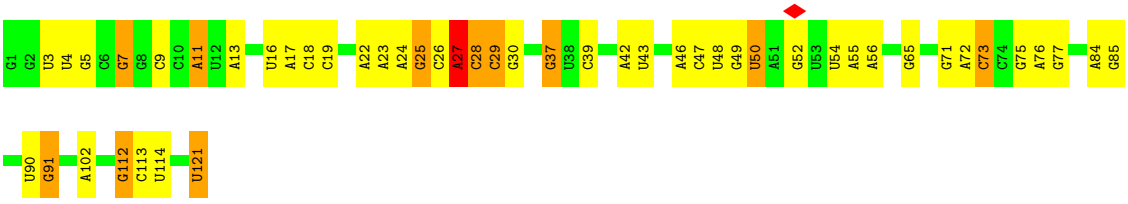




• Molecule 36: RNA (121-MER)

Chain LB:

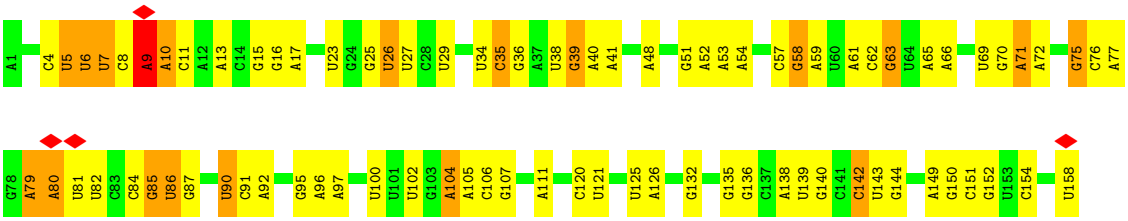


• Molecule 37: RNA (158-MER)

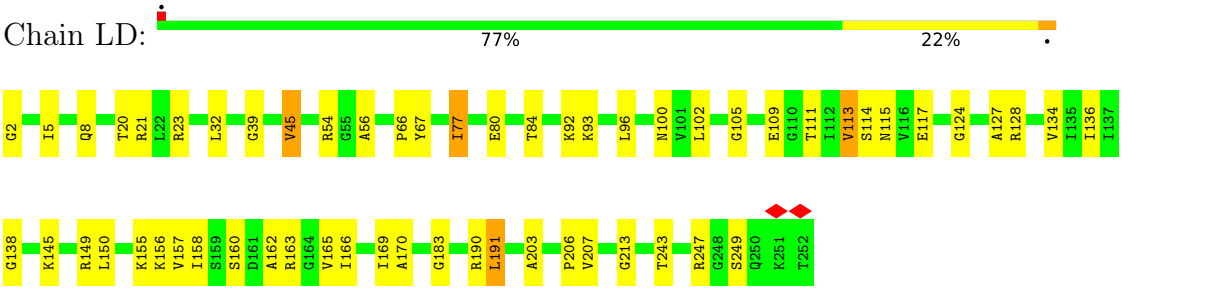
Chain LC:



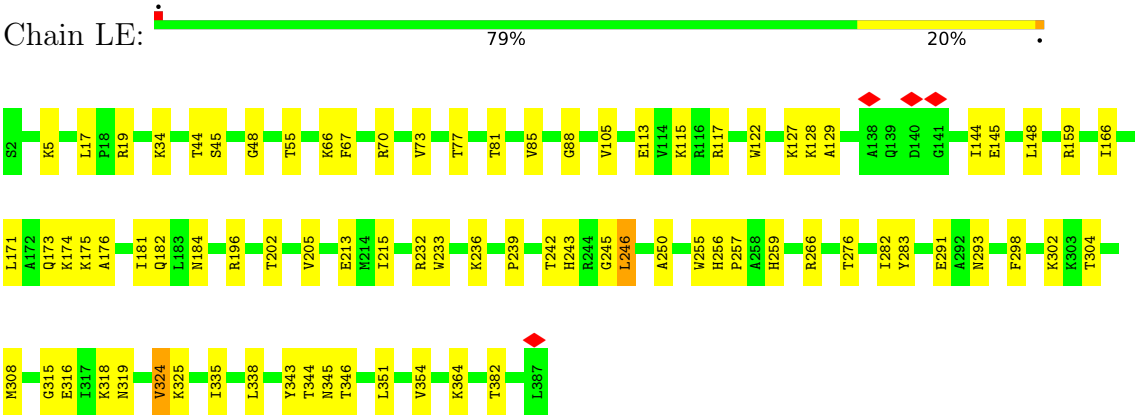
• Molecule 38: Large ribosomal subunit protein uL2A

Chain LD:



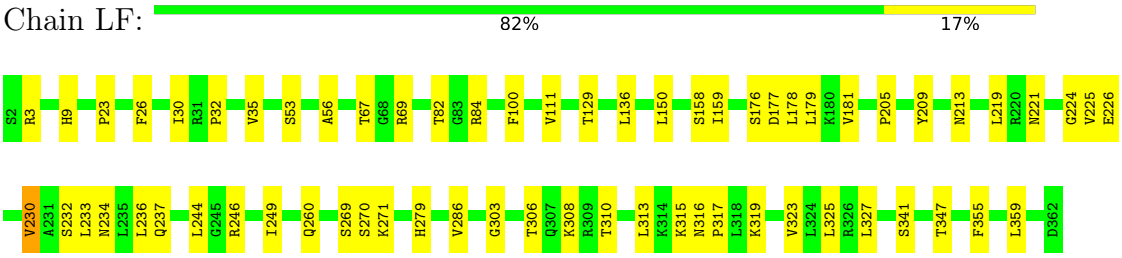

• Molecule 39: Large ribosomal subunit protein uL3

Chain LE:



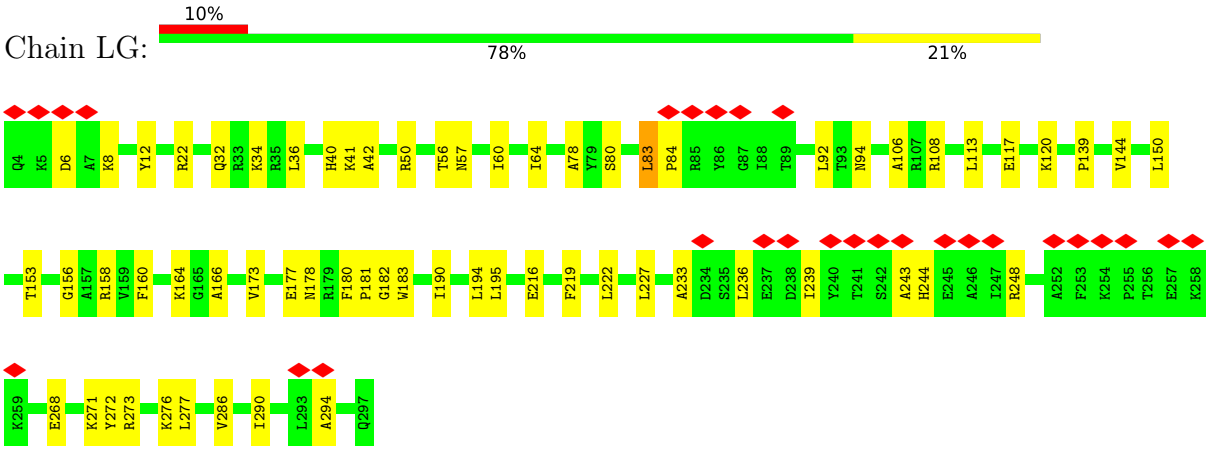

• Molecule 40: Large ribosomal subunit protein uL4A

Chain LF:



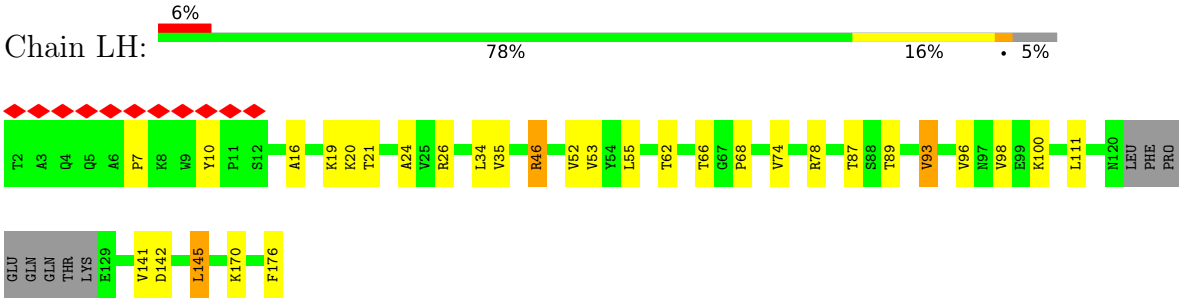

• Molecule 41: Large ribosomal subunit protein uL18

Chain LG:



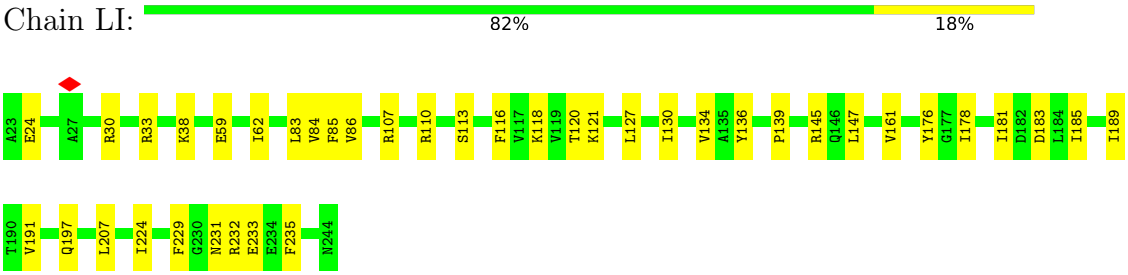

• Molecule 42: Large ribosomal subunit protein eL6B

Chain LH:



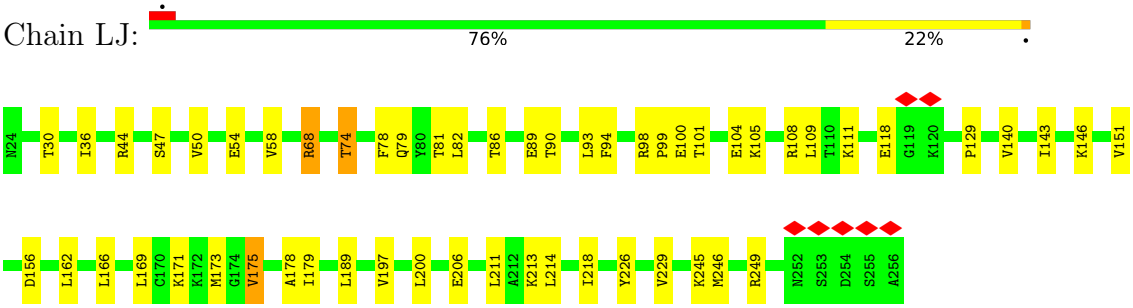

• Molecule 43: Large ribosomal subunit protein uL30A

Chain LI:



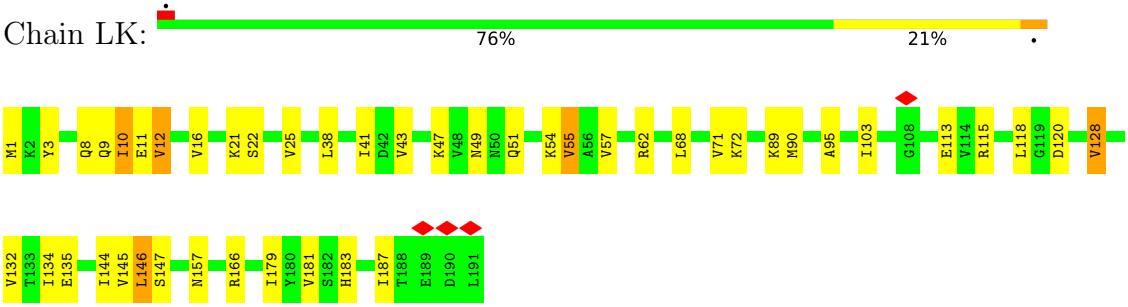

• Molecule 44: Large ribosomal subunit protein eL8A

Chain LJ:



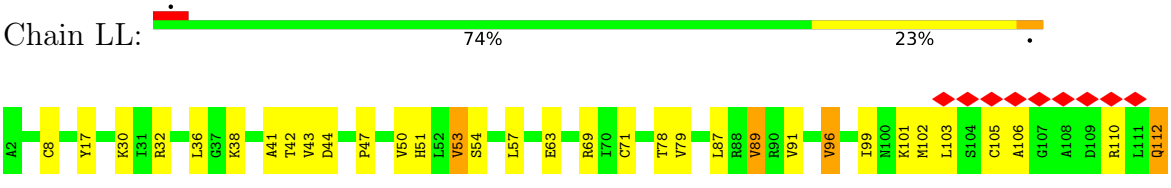

• Molecule 45: Large ribosomal subunit protein uL6A

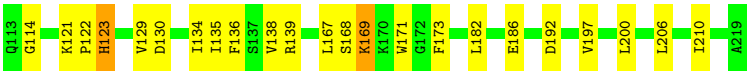
Chain LK:




• Molecule 46: Large ribosomal subunit protein uL16

Chain LL:





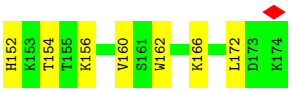

• Molecule 47: Large ribosomal subunit protein uL5B

Chain LM:





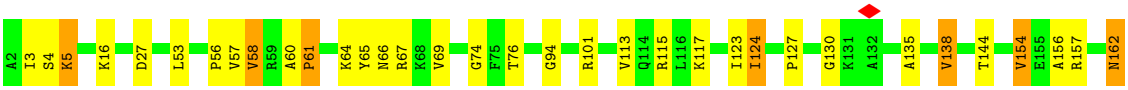


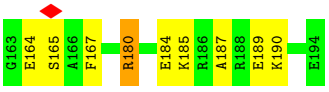



• Molecule 48: Large ribosomal subunit protein eL13A

Chain LN:



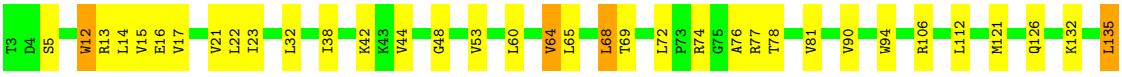




• Molecule 49: Large ribosomal subunit protein eL14A

Chain LO:



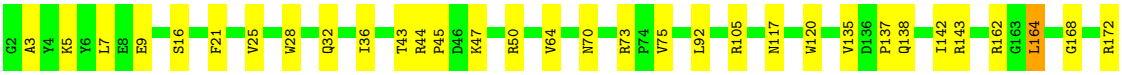


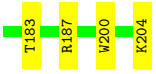


• Molecule 50: Large ribosomal subunit protein eL15A

Chain LP:



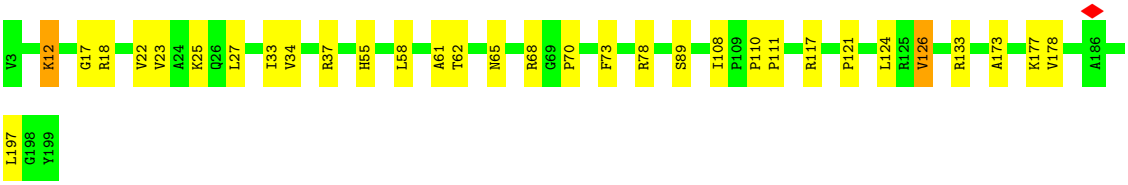



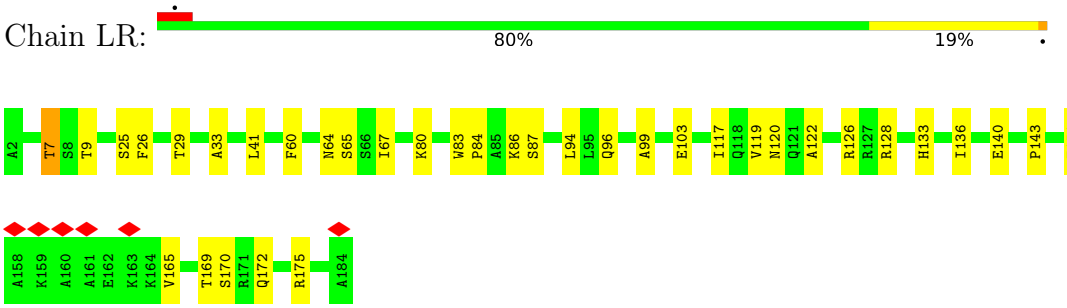

• Molecule 51: Large ribosomal subunit protein uL13A

Chain LQ:

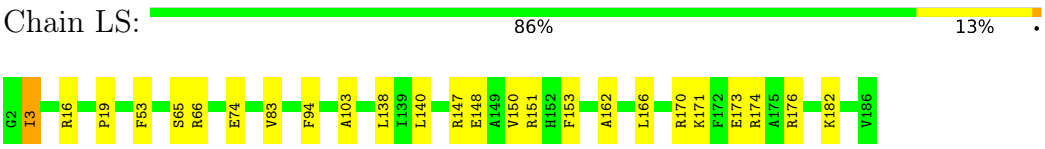




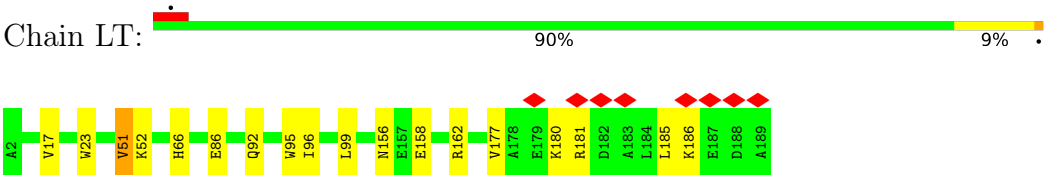

• Molecule 52: Large ribosomal subunit protein uL22A



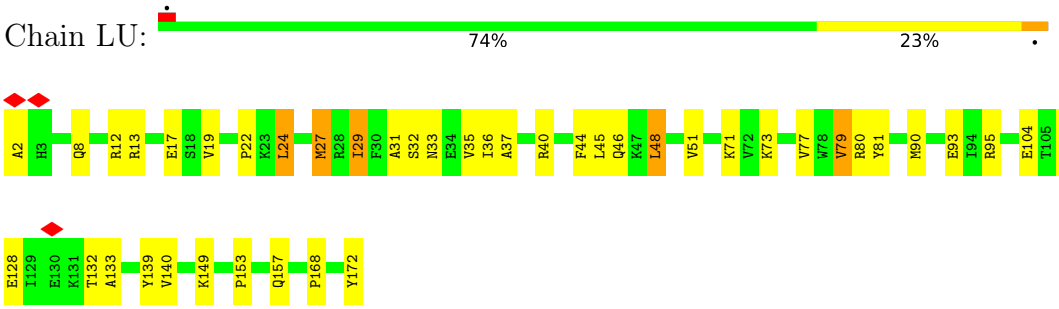

• Molecule 53: Large ribosomal subunit protein eL18A



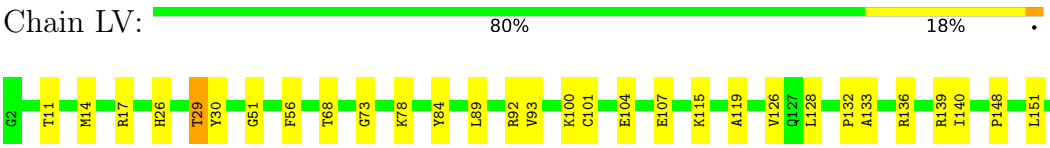

• Molecule 54: Large ribosomal subunit protein eL19A




• Molecule 55: Large ribosomal subunit protein eL20A

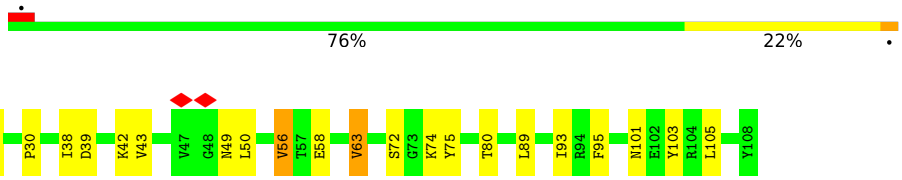



• Molecule 56: Large ribosomal subunit protein eL21A



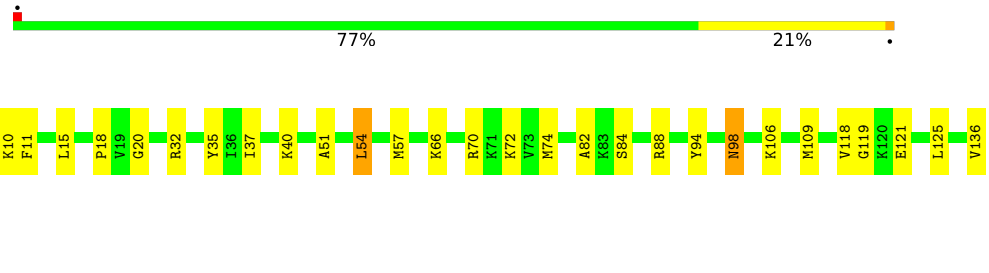
• Molecule 57: Large ribosomal subunit protein eL22A

Chain LW:



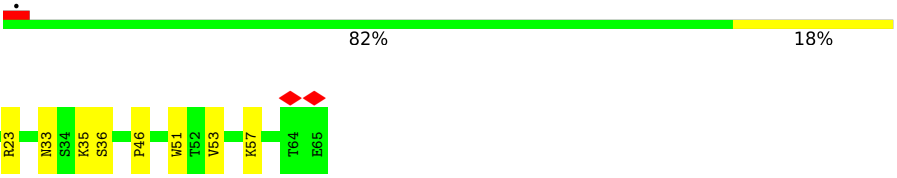

• Molecule 58: Large ribosomal subunit protein uL14A

Chain LX:



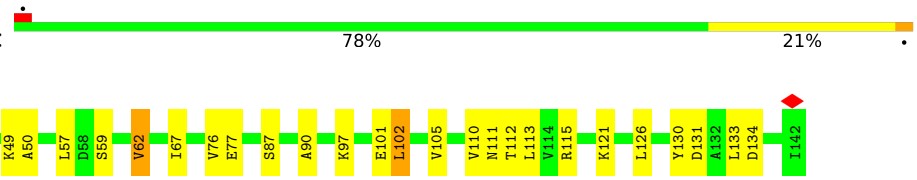

• Molecule 59: Large ribosomal subunit protein eL24A

Chain LY:



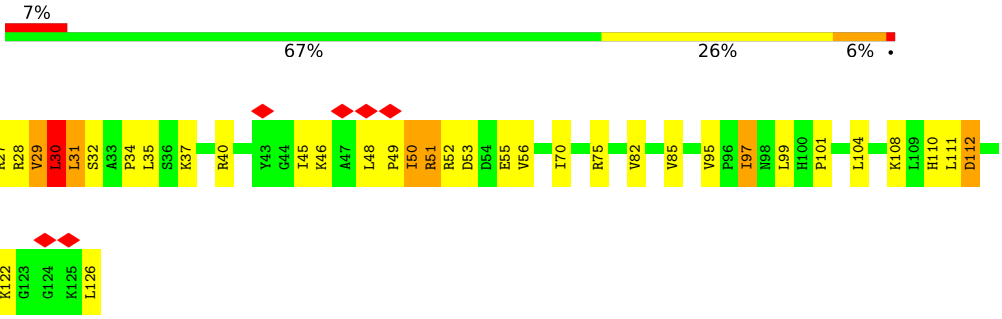

• Molecule 60: Large ribosomal subunit protein uL23

Chain LZ:




• Molecule 61: Large ribosomal subunit protein uL24A

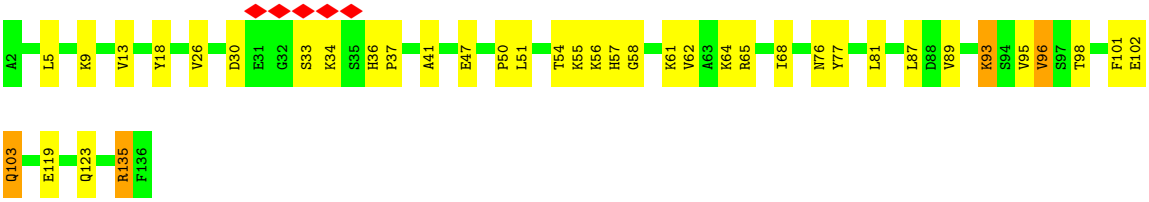
Chain La:



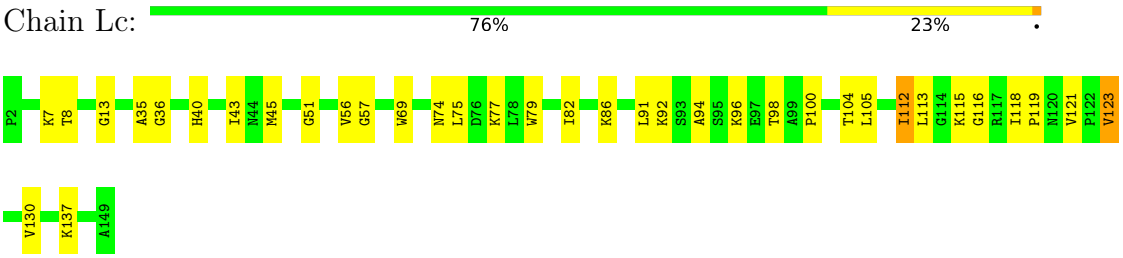

• Molecule 62: Large ribosomal subunit protein eL27A

Chain Lb:

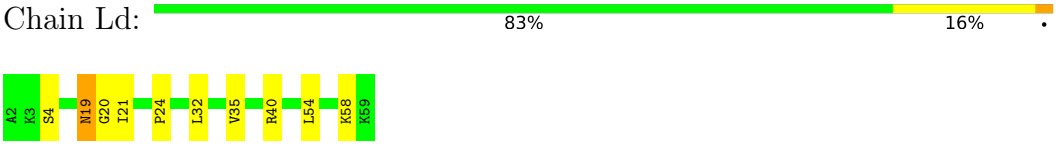




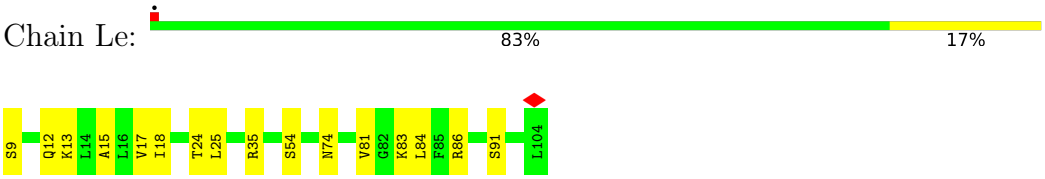

• Molecule 63: Large ribosomal subunit protein uL15



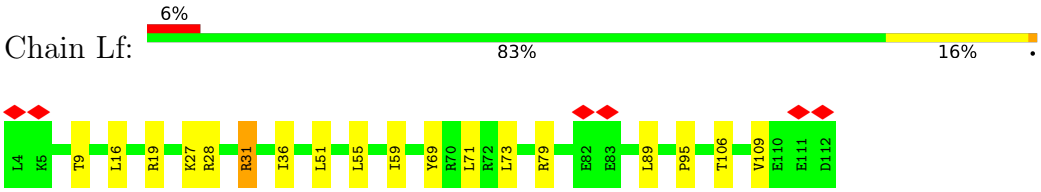

• Molecule 64: Large ribosomal subunit protein eL29



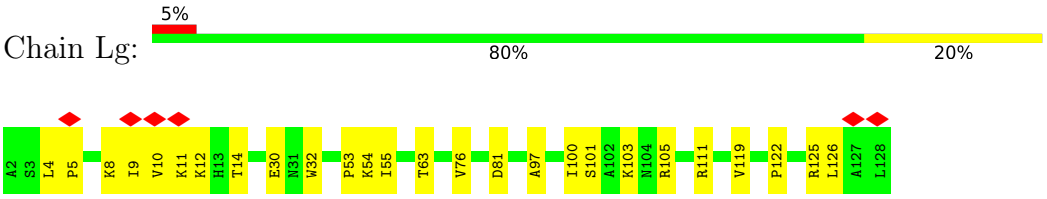

• Molecule 65: Large ribosomal subunit protein eL30



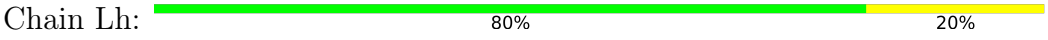

• Molecule 66: Large ribosomal subunit protein eL31A

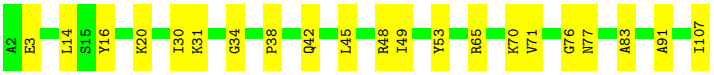



• Molecule 67: Large ribosomal subunit protein eL32




• Molecule 68: Large ribosomal subunit protein eL33A

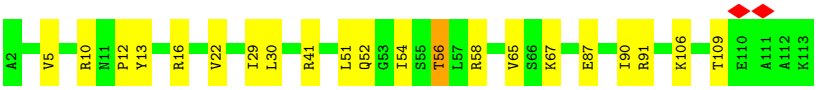





• Molecule 69: Large ribosomal subunit protein eL34A

Chain Li:

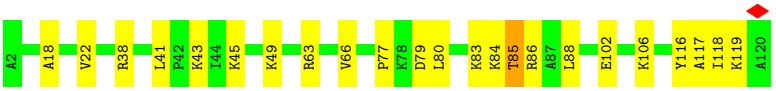



• Molecule 70: Large ribosomal subunit protein uL29A

Chain Lj:

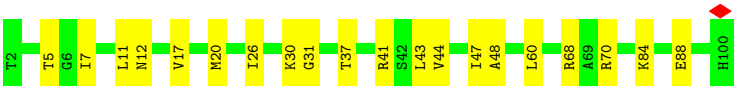



• Molecule 71: Large ribosomal subunit protein eL36A

Chain Lk:

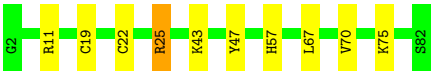



• Molecule 72: Large ribosomal subunit protein eL37A

Chain Ll:

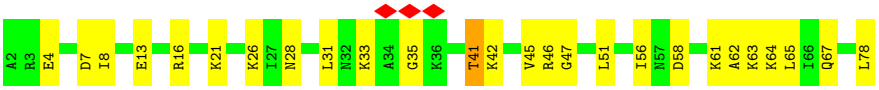



• Molecule 73: Large ribosomal subunit protein eL38

Chain Lm:




• Molecule 74: Large ribosomal subunit protein eL39

Chain Ln:

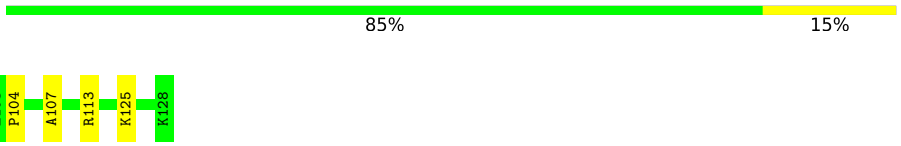






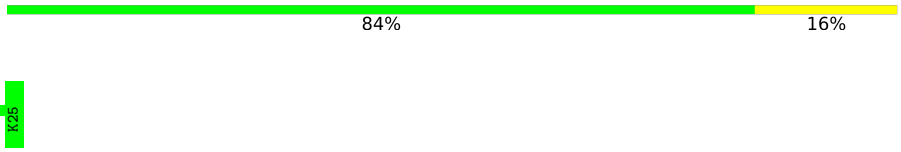
• Molecule 75: Large ribosomal subunit protein eL40A

Chain Lo:



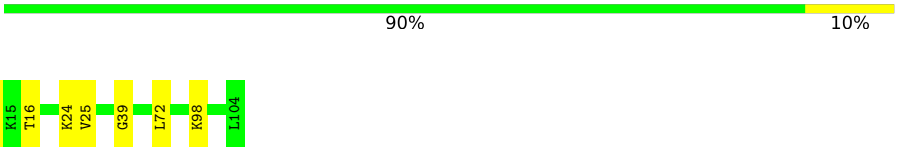

• Molecule 76: Large ribosomal subunit protein eL41A

Chain Lp:



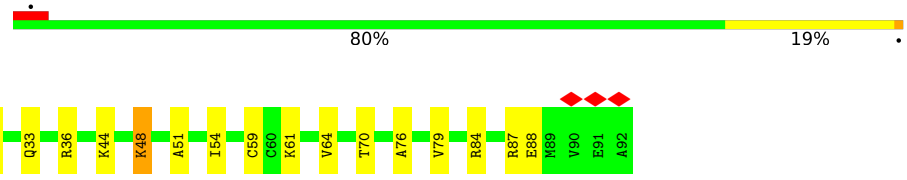

• Molecule 77: Large ribosomal subunit protein eL42A

Chain Lq:



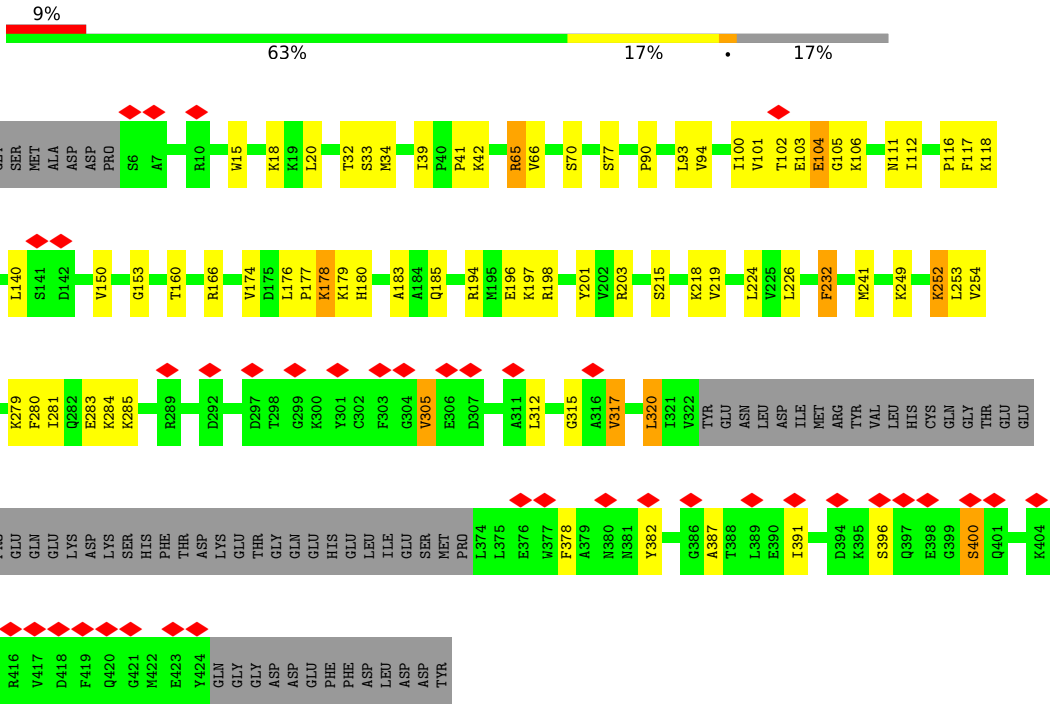

• Molecule 78: Large ribosomal subunit protein eL43A

Chain Lr:




• Molecule 79: Eukaryotic peptide chain release factor subunit 1

Chain eR:




• Molecule 80: RNA (5'-R(P*GP*AP*CP*CP*CP*UP*UP*AP*AP*C)-3')

Chain mR:

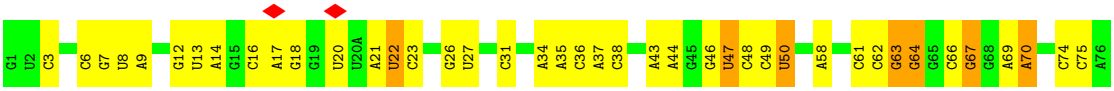



There are no outlier residues recorded for this chain.

• Molecule 81: RNA (77-MER)

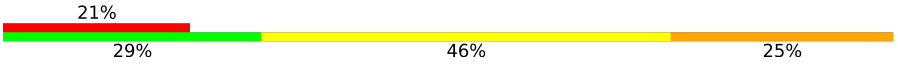
Chain Cc:

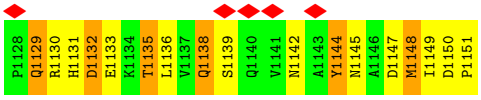



• Molecule 82: PRO-GLN-ARG-HIS-ASP-GLU-LYS-THR-LEU-VAL-GLN-SER-GLN-VAL-ASN-ALA-TYR-ASN-ALA-ASP-MET-ILE-ASP-PRO

Chain pp:



# 4 Experimental information (i)

| Property | Value | Source |
|---|---|---|
| EM reconstruction method | SINGLE PARTICLE | Depositor |
| Imposed symmetry | POINT, Not provided | |
| Number of particles used | 53954 | Depositor |
| Resolution determination method | FSC 0.143 CUT-OFF | Depositor |
| CTF correction method | PHASE FLIPPING AND AMPLITUDE CORRECTION | Depositor |
| Microscope | JEOL CRYO ARM 300 | Depositor |
| Voltage (kV) | 300 | Depositor |
| Electron dose ($e^-/Å^2$) | 50 | 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 | 3.803 | Depositor |
| Minimum map value | -1.905 | Depositor |
| Average map value | -0.002 | Depositor |
| Map value standard deviation | 0.099 | Depositor |
| Recommended contour level | 0.16 | Depositor |
| Map size (Å) | 570.0, 570.0, 570.0 | wwPDB |
| Map dimensions | 600, 600, 600 | wwPDB |
| Map angles (°) | 90.0, 90.0, 90.0 | wwPDB |
| Pixel spacing (Å) | 0.95, 0.95, 0.95 | 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 | S2 | 0.69 | 4/42211 (0.0%) | 0.91 | 81/65773 (0.1%) |
| 2 | SA | 0.23 | 0/1754 | 0.34 | 0/2361 |
| 3 | SB | 0.24 | 0/1625 | 0.41 | 0/2197 |
| 4 | SC | 0.19 | 0/769 | 0.42 | 0/1039 |
| 5 | SD | 0.15 | 0/883 | 0.41 | 0/1199 |
| 6 | SE | 0.22 | 0/936 | 0.38 | 0/1259 |
| 7 | SF | 0.26 | 0/1125 | 0.38 | 0/1510 |
| 8 | SG | 0.21 | 0/957 | 0.32 | 0/1283 |
| 9 | SH | 0.22 | 0/1207 | 0.37 | 0/1623 |
| 10 | SI | 0.23 | 0/1130 | 0.39 | 0/1517 |
| 11 | SJ | 0.24 | 0/807 | 0.36 | 0/1091 |
| 12 | SK | 0.19 | 0/661 | 0.34 | 0/888 |
| 13 | SL | 0.25 | 0/493 | 0.35 | 0/663 |
| 14 | SM | 0.27 | 0/452 | 0.33 | 0/600 |
| 15 | SN | 0.13 | 0/567 | 0.35 | 0/764 |
| 16 | SO | 0.18 | 0/2436 | 0.39 | 0/3318 |
| 17 | SP | 0.26 | 0/1644 | 0.41 | 0/2249 |
| 18 | SQ | 0.27 | 0/1823 | 0.43 | 0/2447 |
| 19 | SR | 0.29 | 0/1656 | 0.45 | 0/2251 |
| 20 | SS | 0.26 | 0/2097 | 0.40 | 0/2823 |
| 21 | ST | 0.20 | 0/1839 | 0.31 | 0/2460 |
| 22 | SU | 0.22 | 0/1498 | 0.36 | 0/2019 |
| 23 | SV | 0.29 | 0/1501 | 0.39 | 0/2006 |
| 24 | SW | 0.26 | 0/1504 | 0.36 | 0/2016 |
| 25 | SX | 0.30 | 0/1168 | 0.33 | 0/1575 |
| 26 | SY | 0.29 | 0/1215 | 0.36 | 0/1638 |
| 27 | SZ | 0.32 | 0/934 | 0.43 | 0/1257 |
| 28 | Sa | 0.25 | 0/682 | 0.38 | 0/921 |
| 29 | Sb | 0.34 | 0/1038 | 0.40 | 0/1395 |
| 30 | Sc | 0.31 | 0/1139 | 0.37 | 0/1518 |
| 31 | Sd | 0.22 | 0/1046 | 0.35 | 0/1401 |
| 32 | Se | 0.31 | 0/778 | 0.41 | 0/1042 |
| 33 | Sf | 0.27 | 0/620 | 0.38 | 0/838 |
| 34 | Sg | 0.23 | 0/459 | 0.40 | 0/611 |

| Mol | Chain | Bond lengths | | Bond angles | |
|---|---|---|---|---|---|
| | | RMSZ | #\|Z\| >5 | RMSZ | #\|Z\| >5 |
| 35 | LA | 0.83 | 0/75727 | 0.86 | 81/118064 (0.1%) |
| 36 | LB | 0.72 | 0/2883 | 0.80 | 2/4491 (0.0%) |
| 37 | LC | 0.80 | 0/3746 | 0.89 | 10/5832 (0.2%) |
| 38 | LD | 0.38 | 0/1933 | 0.39 | 0/2598 |
| 39 | LE | 0.33 | 0/3146 | 0.36 | 0/4228 |
| 40 | LF | 0.32 | 0/2800 | 0.41 | 0/3790 |
| 41 | LG | 0.25 | 0/2400 | 0.35 | 0/3239 |
| 42 | LH | 0.26 | 0/1329 | 0.35 | 0/1794 |
| 43 | LI | 0.34 | 0/1821 | 0.38 | 0/2451 |
| 44 | LJ | 0.27 | 0/1836 | 0.40 | 0/2481 |
| 45 | LK | 0.28 | 0/1529 | 0.40 | 0/2060 |
| 46 | LL | 0.30 | 0/1801 | 0.37 | 0/2416 |
| 47 | LM | 0.25 | 0/1367 | 0.35 | 0/1834 |
| 48 | LN | 0.32 | 0/1568 | 0.40 | 0/2106 |
| 49 | LO | 0.27 | 0/1068 | 0.38 | 0/1438 |
| 50 | LP | 0.36 | 0/1757 | 0.36 | 0/2354 |
| 51 | LQ | 0.33 | 0/1585 | 0.37 | 0/2128 |
| 52 | LR | 0.34 | 0/1439 | 0.37 | 0/1938 |
| 53 | LS | 0.33 | 0/1465 | 0.38 | 0/1965 |
| 54 | LT | 0.28 | 0/1532 | 0.32 | 0/2043 |
| 55 | LU | 0.32 | 0/1473 | 0.36 | 0/1980 |
| 56 | LV | 0.31 | 0/1296 | 0.36 | 0/1739 |
| 57 | LW | 0.21 | 0/812 | 0.41 | 1/1099 (0.1%) |
| 58 | LX | 0.33 | 0/1018 | 0.38 | 0/1369 |
| 59 | LY | 0.32 | 0/540 | 0.34 | 0/717 |
| 60 | LZ | 0.29 | 0/979 | 0.36 | 0/1321 |
| 61 | La | 0.31 | 0/995 | 0.48 | 0/1329 |
| 62 | Lb | 0.27 | 0/1106 | 0.37 | 0/1485 |
| 63 | Lc | 0.35 | 0/1200 | 0.38 | 0/1607 |
| 64 | Ld | 0.32 | 0/473 | 0.40 | 0/629 |
| 65 | Le | 0.29 | 0/745 | 0.30 | 0/1001 |
| 66 | Lf | 0.29 | 0/890 | 0.32 | 0/1196 |
| 67 | Lg | 0.31 | 0/1038 | 0.37 | 0/1390 |
| 68 | Lh | 0.35 | 0/868 | 0.38 | 0/1168 |
| 69 | Li | 0.32 | 0/890 | 0.33 | 0/1189 |
| 70 | Lj | 0.27 | 0/978 | 0.31 | 0/1301 |
| 71 | Lk | 0.27 | 0/772 | 0.37 | 0/1026 |
| 72 | Ll | 0.37 | 0/660 | 0.41 | 0/875 |
| 73 | Lm | 0.24 | 0/618 | 0.37 | 0/826 |
| 74 | Ln | 0.35 | 0/443 | 0.33 | 0/588 |
| 75 | Lo | 0.29 | 0/416 | 0.32 | 0/553 |
| 76 | Lp | 0.31 | 0/230 | 0.30 | 0/296 |
| 77 | Lq | 0.32 | 0/836 | 0.37 | 0/1104 |

| Mol | Chain | Bond lengths | | Bond angles | |
|---|---|---|---|---|---|
| | | RMSZ | #\|Z\| >5 | RMSZ | #\|Z\| >5 |
| 78 | Lr | 0.31 | 0/701 | 0.35 | 0/934 |
| 79 | eR | 0.21 | 0/2925 | 0.33 | 0/3931 |
| 81 | Cc | 0.56 | 0/1831 | 0.89 | 2/2852 (0.1%) |
| 82 | pp | 0.41 | 0/187 | 0.95 | 1/253 (0.4%) |
| All | All | 0.62 | 4/218306 (0.0%) | 0.72 | 178/320560 (0.1%) |

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 |
|---|---|---|---|
| 19 | SR | 0 | 1 |
| 44 | LJ | 0 | 1 |
| 61 | La | 0 | 1 |
| 64 | Ld | 0 | 2 |
| 70 | Lj | 0 | 1 |
| All | All | 0 | 6 |

All (4) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 1 | S2 | 992 | A | N9-C4 | -5.96 | 1.34 | 1.37 |
| 1 | S2 | 1344 | A | N9-C4 | -5.83 | 1.34 | 1.37 |
| 1 | S2 | 992 | A | C2-N3 | -5.75 | 1.28 | 1.33 |
| 1 | S2 | 992 | A | N3-C4 | -5.23 | 1.31 | 1.34 |

The worst 5 of 178 bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 1 | S2 | 986 | G | N3-C4-N9 | -9.27 | 120.44 | 126.00 |
| 35 | LA | 2734 | A | O4'-C1'-N9 | 8.86 | 115.29 | 108.20 |
| 1 | S2 | 986 | G | C6-C5-N7 | 8.85 | 135.71 | 130.40 |
| 37 | LC | 6 | U | O5'-C5'-C4' | 8.73 | 116.39 | 109.40 |
| 1 | S2 | 986 | G | C4-N9-C1' | -8.60 | 115.33 | 126.50 |

There are no chirality outliers.

5 of 6 planarity outliers are listed below:

| Mol | Chain | Res | Type | Group |
|---|---|---|---|---|
| 44 | LJ | 30 | THR | Peptide |

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| Mol | Chain | Res | Type | Group |
|---|---|---|---|---|
| 61 | La | 30 | LEU | Peptide |
| 64 | Ld | 19 | ASN | Peptide |
| 64 | Ld | 20 | GLY | Peptide |
| 19 | SR | 233 | GLN | 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 | S2 | 37739 | 0 | 18988 | 530 | 0 |
| 2 | SA | 1729 | 0 | 1812 | 31 | 0 |
| 3 | SB | 1605 | 0 | 1669 | 32 | 0 |
| 4 | SC | 752 | 0 | 719 | 28 | 0 |
| 5 | SD | 875 | 0 | 878 | 17 | 0 |
| 6 | SE | 916 | 0 | 941 | 22 | 0 |
| 7 | SF | 1105 | 0 | 1166 | 33 | 0 |
| 8 | SG | 948 | 0 | 990 | 14 | 0 |
| 9 | SH | 1188 | 0 | 1218 | 25 | 0 |
| 10 | SI | 1112 | 0 | 1124 | 20 | 0 |
| 11 | SJ | 797 | 0 | 863 | 24 | 0 |
| 12 | SK | 651 | 0 | 682 | 11 | 0 |
| 13 | SL | 491 | 0 | 524 | 12 | 0 |
| 14 | SM | 442 | 0 | 432 | 8 | 0 |
| 15 | SN | 556 | 0 | 549 | 20 | 0 |
| 16 | SO | 2383 | 0 | 2332 | 65 | 0 |
| 17 | SP | 1603 | 0 | 1610 | 25 | 0 |
| 18 | SQ | 1798 | 0 | 1890 | 36 | 0 |
| 19 | SR | 1626 | 0 | 1715 | 22 | 0 |
| 20 | SS | 2056 | 0 | 2140 | 41 | 0 |
| 21 | ST | 1815 | 0 | 1894 | 42 | 0 |
| 22 | SU | 1473 | 0 | 1555 | 35 | 0 |
| 23 | SV | 1476 | 0 | 1501 | 30 | 0 |
| 24 | SW | 1479 | 0 | 1556 | 25 | 0 |
| 25 | SX | 1142 | 0 | 1209 | 12 | 0 |
| 26 | SY | 1192 | 0 | 1255 | 22 | 0 |
| 27 | SZ | 923 | 0 | 948 | 32 | 0 |
| 28 | Sa | 673 | 0 | 662 | 13 | 0 |
| 29 | Sb | 1021 | 0 | 1060 | 14 | 0 |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|---|---|---|---|---|---|---|
| 30 | Sc | 1121 | 0 | 1196 | 23 | 0 |
| 31 | Sd | 1032 | 0 | 1044 | 22 | 0 |
| 32 | Se | 765 | 0 | 814 | 8 | 0 |
| 33 | Sf | 610 | 0 | 633 | 8 | 0 |
| 34 | Sg | 451 | 0 | 494 | 6 | 0 |
| 35 | LA | 67653 | 0 | 33997 | 671 | 0 |
| 36 | LB | 2579 | 0 | 1304 | 42 | 0 |
| 37 | LC | 3353 | 0 | 1695 | 46 | 0 |
| 38 | LD | 1899 | 0 | 1957 | 36 | 0 |
| 39 | LE | 3075 | 0 | 3142 | 51 | 0 |
| 40 | LF | 2748 | 0 | 2859 | 34 | 0 |
| 41 | LG | 2351 | 0 | 2294 | 42 | 0 |
| 42 | LH | 1307 | 0 | 1377 | 18 | 0 |
| 43 | LI | 1784 | 0 | 1862 | 22 | 0 |
| 44 | LJ | 1804 | 0 | 1877 | 30 | 0 |
| 45 | LK | 1508 | 0 | 1572 | 28 | 0 |
| 46 | LL | 1764 | 0 | 1802 | 35 | 0 |
| 47 | LM | 1346 | 0 | 1370 | 18 | 0 |
| 48 | LN | 1543 | 0 | 1608 | 30 | 0 |
| 49 | LO | 1053 | 0 | 1149 | 28 | 0 |
| 50 | LP | 1720 | 0 | 1779 | 25 | 0 |
| 51 | LQ | 1555 | 0 | 1659 | 19 | 0 |
| 52 | LR | 1416 | 0 | 1433 | 20 | 0 |
| 53 | LS | 1441 | 0 | 1543 | 18 | 0 |
| 54 | LT | 1515 | 0 | 1606 | 8 | 0 |
| 55 | LU | 1437 | 0 | 1475 | 37 | 0 |
| 56 | LV | 1272 | 0 | 1312 | 25 | 0 |
| 57 | LW | 796 | 0 | 812 | 11 | 0 |
| 58 | LX | 1003 | 0 | 1048 | 19 | 0 |
| 59 | LY | 528 | 0 | 546 | 5 | 0 |
| 60 | LZ | 964 | 0 | 1025 | 17 | 0 |
| 61 | La | 984 | 0 | 1075 | 35 | 0 |
| 62 | Lb | 1080 | 0 | 1122 | 23 | 0 |
| 63 | Lc | 1169 | 0 | 1211 | 23 | 0 |
| 64 | Ld | 462 | 0 | 491 | 4 | 0 |
| 65 | Le | 737 | 0 | 792 | 11 | 0 |
| 66 | Lf | 876 | 0 | 912 | 8 | 0 |
| 67 | Lg | 1017 | 0 | 1081 | 15 | 0 |
| 68 | Lh | 850 | 0 | 880 | 13 | 0 |
| 69 | Li | 880 | 0 | 945 | 15 | 0 |
| 70 | Lj | 969 | 0 | 1078 | 20 | 0 |
| 71 | Lk | 766 | 0 | 844 | 12 | 0 |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|---|---|---|---|---|---|---|
| 72 | Ll | 645 | 0 | 649 | 7 | 0 |
| 73 | Lm | 612 | 0 | 682 | 12 | 0 |
| 74 | Ln | 436 | 0 | 475 | 8 | 0 |
| 75 | Lo | 410 | 0 | 446 | 7 | 0 |
| 76 | Lp | 229 | 0 | 273 | 4 | 0 |
| 77 | Lq | 824 | 0 | 892 | 8 | 0 |
| 78 | Lr | 694 | 0 | 738 | 10 | 0 |
| 79 | eR | 2881 | 0 | 2947 | 52 | 0 |
| 80 | mR | 209 | 0 | 0 | 0 | 0 |
| 81 | Cc | 1638 | 0 | 834 | 19 | 0 |
| 82 | pp | 184 | 0 | 162 | 15 | 0 |
| All | All | 203511 | 0 | 150695 | 2586 | 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 7.

The worst 5 of 2586 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) |
|---|---|---|---|
| 1:S2:1673:G:N1 | 1:S2:1728:A:H2 | 1.49 | 1.09 |
| 1:S2:1673:G:N1 | 1:S2:1728:A:C2 | 2.24 | 1.03 |
| 1:S2:1483:A:H8 | 1:S2:1607:G:HO2' | 1.06 | 1.00 |
| 81:Cc:50:U:H3 | 81:Cc:64:G:H1 | 1.08 | 0.98 |
| 37:LC:48:A:H61 | 37:LC:54:A:H61 | 1.13 | 0.96 |

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 | |
|---|---|---|---|---|---|---|---|
| 2 | SA | 220/222 (99%) | 212 (96%) | 8 (4%) | 0 | 100 | 100 |

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| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 3 | SB | 204/206 (99%) | 187 (92%) | 17 (8%) | 0 | 100 | 100 |
| 4 | SC | 90/92 (98%) | 81 (90%) | 9 (10%) | 0 | 100 | 100 |
| 5 | SD | 119/121 (98%) | 100 (84%) | 19 (16%) | 0 | 100 | 100 |
| 6 | SE | 115/117 (98%) | 108 (94%) | 7 (6%) | 0 | 100 | 100 |
| 7 | SF | 139/141 (99%) | 127 (91%) | 12 (9%) | 0 | 100 | 100 |
| 8 | SG | 117/125 (94%) | 116 (99%) | 1 (1%) | 0 | 100 | 100 |
| 9 | SH | 143/145 (99%) | 137 (96%) | 6 (4%) | 0 | 100 | 100 |
| 10 | SI | 141/143 (99%) | 132 (94%) | 9 (6%) | 0 | 100 | 100 |
| 11 | SJ | 98/100 (98%) | 95 (97%) | 3 (3%) | 0 | 100 | 100 |
| 12 | SK | 80/82 (98%) | 74 (92%) | 6 (8%) | 0 | 100 | 100 |
| 13 | SL | 61/63 (97%) | 57 (93%) | 4 (7%) | 0 | 100 | 100 |
| 14 | SM | 51/53 (96%) | 50 (98%) | 1 (2%) | 0 | 100 | 100 |
| 15 | SN | 71/73 (97%) | 57 (80%) | 14 (20%) | 0 | 100 | 100 |
| 16 | SO | 310/312 (99%) | 283 (91%) | 27 (9%) | 0 | 100 | 100 |
| 17 | SP | 204/206 (99%) | 183 (90%) | 21 (10%) | 0 | 100 | 100 |
| 18 | SQ | 222/232 (96%) | 198 (89%) | 24 (11%) | 0 | 100 | 100 |
| 19 | SR | 214/216 (99%) | 198 (92%) | 16 (8%) | 0 | 100 | 100 |
| 20 | SS | 256/258 (99%) | 233 (91%) | 23 (9%) | 0 | 100 | 100 |
| 21 | ST | 226/228 (99%) | 215 (95%) | 11 (5%) | 0 | 100 | 100 |
| 22 | SU | 182/184 (99%) | 171 (94%) | 11 (6%) | 0 | 100 | 100 |
| 23 | SV | 183/198 (92%) | 173 (94%) | 10 (6%) | 0 | 100 | 100 |
| 24 | SW | 182/184 (99%) | 174 (96%) | 8 (4%) | 0 | 100 | 100 |
| 25 | SX | 140/142 (99%) | 134 (96%) | 6 (4%) | 0 | 100 | 100 |
| 26 | SY | 148/150 (99%) | 142 (96%) | 6 (4%) | 0 | 100 | 100 |
| 27 | SZ | 125/127 (98%) | 113 (90%) | 12 (10%) | 0 | 100 | 100 |
| 28 | Sa | 85/87 (98%) | 77 (91%) | 8 (9%) | 0 | 100 | 100 |
| 29 | Sb | 127/129 (98%) | 121 (95%) | 6 (5%) | 0 | 100 | 100 |
| 30 | Sc | 142/144 (99%) | 130 (92%) | 12 (8%) | 0 | 100 | 100 |
| 31 | Sd | 132/134 (98%) | 127 (96%) | 5 (4%) | 0 | 100 | 100 |
| 32 | Se | 95/97 (98%) | 89 (94%) | 6 (6%) | 0 | 100 | 100 |
| 33 | Sf | 79/81 (98%) | 72 (91%) | 7 (9%) | 0 | 100 | 100 |

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| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 34 | Sg | 55/57 (96%) | 47 (86%) | 8 (14%) | 0 | 100 | 100 |
| 38 | LD | 249/251 (99%) | 235 (94%) | 14 (6%) | 0 | 100 | 100 |
| 39 | LE | 384/386 (100%) | 362 (94%) | 22 (6%) | 0 | 100 | 100 |
| 40 | LF | 359/361 (99%) | 339 (94%) | 20 (6%) | 0 | 100 | 100 |
| 41 | LG | 292/294 (99%) | 273 (94%) | 19 (6%) | 0 | 100 | 100 |
| 42 | LH | 163/175 (93%) | 154 (94%) | 9 (6%) | 0 | 100 | 100 |
| 43 | LI | 220/222 (99%) | 207 (94%) | 13 (6%) | 0 | 100 | 100 |
| 44 | LJ | 231/233 (99%) | 218 (94%) | 13 (6%) | 0 | 100 | 100 |
| 45 | LK | 189/191 (99%) | 170 (90%) | 19 (10%) | 0 | 100 | 100 |
| 46 | LL | 216/218 (99%) | 201 (93%) | 15 (7%) | 0 | 100 | 100 |
| 47 | LM | 167/169 (99%) | 157 (94%) | 10 (6%) | 0 | 100 | 100 |
| 48 | LN | 191/193 (99%) | 173 (91%) | 17 (9%) | 1 (0%) | 24 | 46 |
| 49 | LO | 134/136 (98%) | 128 (96%) | 6 (4%) | 0 | 100 | 100 |
| 50 | LP | 201/203 (99%) | 190 (94%) | 11 (6%) | 0 | 100 | 100 |
| 51 | LQ | 195/197 (99%) | 192 (98%) | 3 (2%) | 0 | 100 | 100 |
| 52 | LR | 181/183 (99%) | 169 (93%) | 12 (7%) | 0 | 100 | 100 |
| 53 | LS | 183/185 (99%) | 173 (94%) | 10 (6%) | 0 | 100 | 100 |
| 54 | LT | 186/188 (99%) | 181 (97%) | 5 (3%) | 0 | 100 | 100 |
| 55 | LU | 169/171 (99%) | 162 (96%) | 7 (4%) | 0 | 100 | 100 |
| 56 | LV | 157/159 (99%) | 148 (94%) | 9 (6%) | 0 | 100 | 100 |
| 57 | LW | 98/100 (98%) | 93 (95%) | 5 (5%) | 0 | 100 | 100 |
| 58 | LX | 134/136 (98%) | 129 (96%) | 5 (4%) | 0 | 100 | 100 |
| 59 | LY | 63/65 (97%) | 62 (98%) | 1 (2%) | 0 | 100 | 100 |
| 60 | LZ | 119/121 (98%) | 117 (98%) | 2 (2%) | 0 | 100 | 100 |
| 61 | La | 123/125 (98%) | 112 (91%) | 10 (8%) | 1 (1%) | 16 | 34 |
| 62 | Lb | 133/135 (98%) | 122 (92%) | 11 (8%) | 0 | 100 | 100 |
| 63 | Lc | 146/148 (99%) | 134 (92%) | 12 (8%) | 0 | 100 | 100 |
| 64 | Ld | 56/58 (97%) | 49 (88%) | 7 (12%) | 0 | 100 | 100 |
| 65 | Le | 94/96 (98%) | 93 (99%) | 1 (1%) | 0 | 100 | 100 |
| 66 | Lf | 107/109 (98%) | 100 (94%) | 7 (6%) | 0 | 100 | 100 |
| 67 | Lg | 125/127 (98%) | 113 (90%) | 12 (10%) | 0 | 100 | 100 |

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| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 68 | Lh | 104/106 (98%) | 101 (97%) | 3 (3%) | 0 | 100 | 100 |
| 69 | Li | 110/112 (98%) | 107 (97%) | 3 (3%) | 0 | 100 | 100 |
| 70 | Lj | 117/119 (98%) | 112 (96%) | 5 (4%) | 0 | 100 | 100 |
| 71 | Lk | 97/99 (98%) | 92 (95%) | 5 (5%) | 0 | 100 | 100 |
| 72 | Ll | 79/81 (98%) | 77 (98%) | 2 (2%) | 0 | 100 | 100 |
| 73 | Lm | 75/77 (97%) | 74 (99%) | 1 (1%) | 0 | 100 | 100 |
| 74 | Ln | 48/50 (96%) | 46 (96%) | 2 (4%) | 0 | 100 | 100 |
| 75 | Lo | 50/52 (96%) | 48 (96%) | 2 (4%) | 0 | 100 | 100 |
| 76 | Lp | 23/25 (92%) | 23 (100%) | 0 | 0 | 100 | 100 |
| 77 | Lq | 101/103 (98%) | 92 (91%) | 9 (9%) | 0 | 100 | 100 |
| 78 | Lr | 89/91 (98%) | 85 (96%) | 4 (4%) | 0 | 100 | 100 |
| 79 | eR | 364/446 (82%) | 342 (94%) | 20 (6%) | 2 (0%) | 24 | 46 |
| 82 | pp | 22/24 (92%) | 6 (27%) | 16 (73%) | 0 | 100 | 100 |
| All | All | 11300/11569 (98%) | 10574 (94%) | 722 (6%) | 4 (0%) | 100 | 100 |

All (4) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 79 | eR | 317 | VAL |
| 61 | La | 31 | LEU |
| 79 | eR | 179 | LYS |
| 48 | LN | 61 | PRO |

### 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 | |
|---|---|---|---|---|---|---|
| 2 | SA | 182/182 (100%) | 173 (95%) | 9 (5%) | 22 | 47 |
| 3 | SB | 172/173 (99%) | 154 (90%) | 18 (10%) | 6 | 14 |
| 4 | SC | 77/85 (91%) | 74 (96%) | 3 (4%) | 28 | 55 |

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| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles |
|---|---|---|---|---|---|
| 5 | SD | 88/98 (90%) | 83 (94%) | 5 (6%) | 18 40 |
| 6 | SE | 95/98 (97%) | 86 (90%) | 9 (10%) | 8 18 |
| 7 | SF | 117/117 (100%) | 110 (94%) | 7 (6%) | 17 37 |
| 8 | SG | 101/113 (89%) | 92 (91%) | 9 (9%) | 9 20 |
| 9 | SH | 127/128 (99%) | 117 (92%) | 10 (8%) | 11 26 |
| 10 | SI | 115/115 (100%) | 106 (92%) | 9 (8%) | 11 26 |
| 11 | SJ | 93/93 (100%) | 87 (94%) | 6 (6%) | 15 35 |
| 12 | SK | 67/73 (92%) | 64 (96%) | 3 (4%) | 24 50 |
| 13 | SL | 55/56 (98%) | 52 (94%) | 3 (6%) | 19 41 |
| 14 | SM | 47/47 (100%) | 46 (98%) | 1 (2%) | 47 73 |
| 15 | SN | 56/64 (88%) | 50 (89%) | 6 (11%) | 6 14 |
| 16 | SO | 250/257 (97%) | 229 (92%) | 21 (8%) | 10 23 |
| 17 | SP | 170/173 (98%) | 164 (96%) | 6 (4%) | 32 59 |
| 18 | SQ | 200/205 (98%) | 186 (93%) | 14 (7%) | 14 31 |
| 19 | SR | 175/175 (100%) | 169 (97%) | 6 (3%) | 32 60 |
| 20 | SS | 220/220 (100%) | 204 (93%) | 16 (7%) | 13 29 |
| 21 | ST | 189/195 (97%) | 177 (94%) | 12 (6%) | 16 36 |
| 22 | SU | 163/165 (99%) | 151 (93%) | 12 (7%) | 13 29 |
| 23 | SV | 148/159 (93%) | 132 (89%) | 16 (11%) | 6 13 |
| 24 | SW | 156/157 (99%) | 146 (94%) | 10 (6%) | 16 35 |
| 25 | SX | 126/127 (99%) | 122 (97%) | 4 (3%) | 34 62 |
| 26 | SY | 127/127 (100%) | 119 (94%) | 8 (6%) | 16 36 |
| 27 | SZ | 90/96 (94%) | 82 (91%) | 8 (9%) | 9 20 |
| 28 | Sa | 71/74 (96%) | 67 (94%) | 4 (6%) | 19 40 |
| 29 | Sb | 110/110 (100%) | 104 (94%) | 6 (6%) | 19 41 |
| 30 | Sc | 119/119 (100%) | 113 (95%) | 6 (5%) | 22 46 |
| 31 | Sd | 102/112 (91%) | 96 (94%) | 6 (6%) | 18 38 |
| 32 | Se | 82/83 (99%) | 80 (98%) | 2 (2%) | 43 70 |
| 33 | Sf | 70/70 (100%) | 63 (90%) | 7 (10%) | 7 16 |
| 34 | Sg | 48/49 (98%) | 43 (90%) | 5 (10%) | 7 14 |
| 38 | LD | 190/193 (98%) | 185 (97%) | 5 (3%) | 40 68 |

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| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles |
|---|---|---|---|---|---|
| 39 | LE | 318/322 (99%) | 307 (96%) | 11 (4%) | 32 59 |
| 40 | LF | 288/288 (100%) | 271 (94%) | 17 (6%) | 18 38 |
| 41 | LG | 241/243 (99%) | 230 (95%) | 11 (5%) | 24 49 |
| 42 | LH | 139/154 (90%) | 129 (93%) | 10 (7%) | 13 30 |
| 43 | LI | 186/186 (100%) | 182 (98%) | 4 (2%) | 45 72 |
| 44 | LJ | 187/191 (98%) | 172 (92%) | 15 (8%) | 11 25 |
| 45 | LK | 168/171 (98%) | 153 (91%) | 15 (9%) | 9 20 |
| 46 | LL | 185/185 (100%) | 173 (94%) | 12 (6%) | 15 35 |
| 47 | LM | 145/147 (99%) | 134 (92%) | 11 (8%) | 12 27 |
| 48 | LN | 154/154 (100%) | 144 (94%) | 10 (6%) | 15 35 |
| 49 | LO | 107/107 (100%) | 97 (91%) | 10 (9%) | 8 18 |
| 50 | LP | 175/175 (100%) | 172 (98%) | 3 (2%) | 53 78 |
| 51 | LQ | 160/160 (100%) | 153 (96%) | 7 (4%) | 25 50 |
| 52 | LR | 138/145 (95%) | 130 (94%) | 8 (6%) | 18 39 |
| 53 | LS | 150/150 (100%) | 146 (97%) | 4 (3%) | 39 67 |
| 54 | LT | 152/153 (99%) | 147 (97%) | 5 (3%) | 33 61 |
| 55 | LU | 155/155 (100%) | 145 (94%) | 10 (6%) | 15 35 |
| 56 | LV | 135/136 (99%) | 129 (96%) | 6 (4%) | 25 50 |
| 57 | LW | 87/87 (100%) | 81 (93%) | 6 (7%) | 14 32 |
| 58 | LX | 104/104 (100%) | 99 (95%) | 5 (5%) | 23 47 |
| 59 | LY | 54/57 (95%) | 51 (94%) | 3 (6%) | 19 40 |
| 60 | LZ | 104/105 (99%) | 98 (94%) | 6 (6%) | 18 39 |
| 61 | La | 108/108 (100%) | 94 (87%) | 14 (13%) | 4 8 |
| 62 | Lb | 112/115 (97%) | 101 (90%) | 11 (10%) | 7 17 |
| 63 | Lc | 117/118 (99%) | 111 (95%) | 6 (5%) | 21 45 |
| 64 | Ld | 46/46 (100%) | 43 (94%) | 3 (6%) | 15 35 |
| 65 | Le | 81/81 (100%) | 81 (100%) | 0 | 100 100 |
| 66 | Lf | 92/96 (96%) | 86 (94%) | 6 (6%) | 15 35 |
| 67 | Lg | 108/109 (99%) | 103 (95%) | 5 (5%) | 24 49 |
| 68 | Lh | 90/90 (100%) | 88 (98%) | 2 (2%) | 45 72 |
| 69 | Li | 95/95 (100%) | 91 (96%) | 4 (4%) | 26 52 |

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| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles |
|---|---|---|---|---|---|
| 70 | Lj | 104/104 (100%) | 103 (99%) | 1 (1%) | 68 86 |
| 71 | Lk | 80/81 (99%) | 73 (91%) | 7 (9%) | 9 21 |
| 72 | Ll | 67/67 (100%) | 63 (94%) | 4 (6%) | 17 37 |
| 73 | Lm | 68/68 (100%) | 60 (88%) | 8 (12%) | 5 10 |
| 74 | Ln | 45/45 (100%) | 41 (91%) | 4 (9%) | 9 20 |
| 75 | Lo | 45/47 (96%) | 44 (98%) | 1 (2%) | 45 72 |
| 76 | Lp | 22/23 (96%) | 21 (96%) | 1 (4%) | 24 50 |
| 77 | Lq | 87/88 (99%) | 87 (100%) | 0 | 100 100 |
| 78 | Lr | 71/71 (100%) | 67 (94%) | 4 (6%) | 19 40 |
| 79 | eR | 312/384 (81%) | 292 (94%) | 20 (6%) | 16 35 |
| 82 | pp | 19/22 (86%) | 12 (63%) | 7 (37%) | 0 0 |
| All | All | 9499/9741 (98%) | 8930 (94%) | 569 (6%) | 19 37 |

5 of 569 residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 61 | La | 29 | VAL |
| 62 | Lb | 13 | VAL |
| 61 | La | 24 | SER |
| 72 | Ll | 11 | ARG |
| 23 | SV | 90 | LEU |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 75 such sidechains are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 58 | LX | 98 | ASN |
| 79 | eR | 61 | ASN |
| 60 | LZ | 111 | ASN |
| 67 | Lg | 104 | ASN |
| 20 | SS | 197 | HIS |

### 5.3.3 RNA (i)

| Mol | Chain | Analysed | Backbone Outliers | Pucker Outliers |
|---|---|---|---|---|
| 1 | S2 | 1768/1800 (98%) | 716 (40%) | 28 (1%) |
| 35 | LA | 3159/3396 (93%) | 772 (24%) | 29 (0%) |

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| Mol | Chain | Analysed | Backbone Outliers | Pucker Outliers |
|---|---|---|---|---|
| 36 | LB | 120/121 (99%) | 23 (19%) | 1 (0%) |
| 37 | LC | 157/158 (99%) | 47 (29%) | 1 (0%) |
| 80 | mR | 0/10 | - | - |
| 81 | Cc | 76/77 (98%) | 22 (28%) | 0 |
| All | All | 5280/5562 (94%) | 1580 (29%) | 59 (1%) |

5 of 1580 RNA backbone outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | S2 | 3 | U |
| 1 | S2 | 4 | C |
| 1 | S2 | 17 | C |
| 1 | S2 | 25 | C |
| 1 | S2 | 26 | A |

5 of 59 RNA pucker outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 35 | LA | 161 | G |
| 35 | LA | 3343 | G |
| 35 | LA | 1307 | G |
| 35 | LA | 3323 | A |
| 35 | LA | 2707 | C |

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

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

## 5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry (i)

There are no ligands in this entry.

## 5.7 Other polymers (i)

There are no such residues in this entry.

## 5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

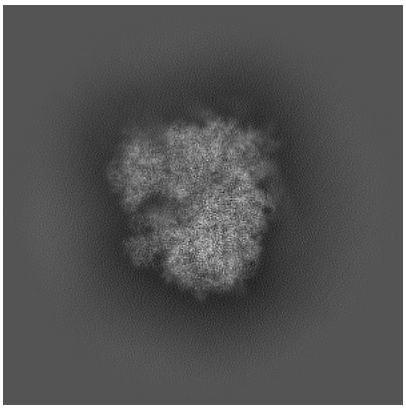
# 6 Map visualisation

This section contains visualisations of the EMDB entry EMD-68898. These allow visual inspection of the internal detail of the map and identification of artifacts.

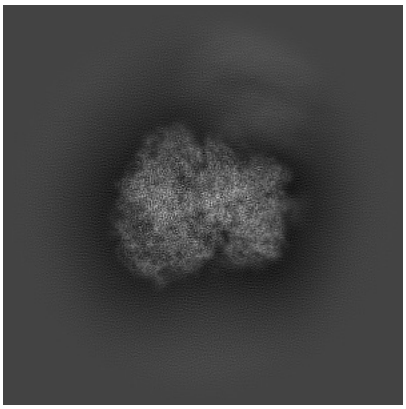
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

## 6.1 Orthogonal projections

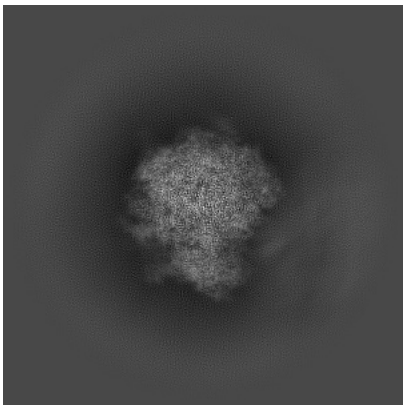
### 6.1.1 Primary map



X

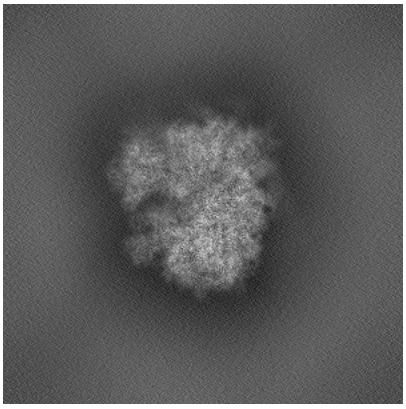


Y

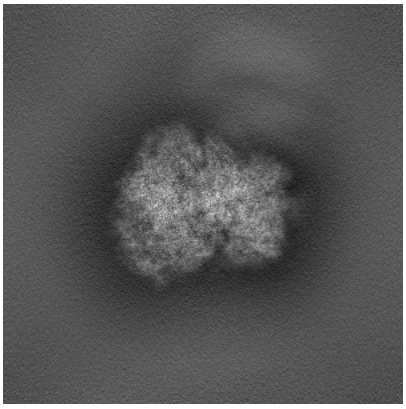


Z

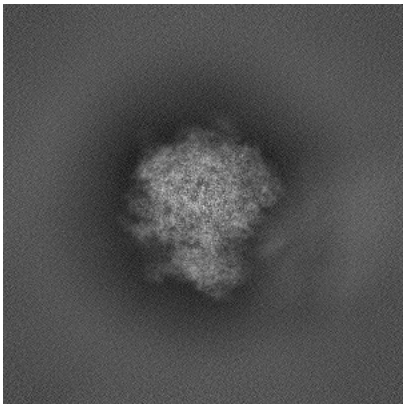
### 6.1.2 Raw map



X



Y

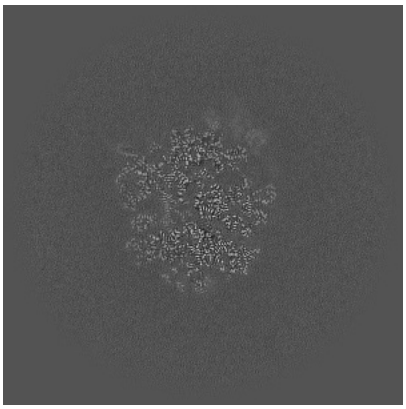


Z

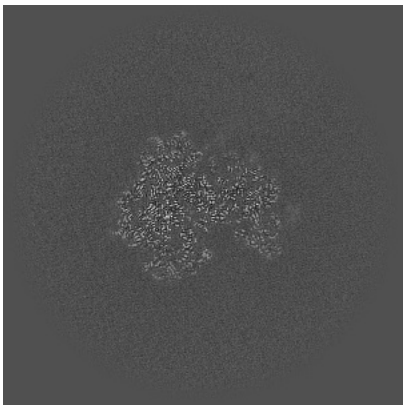
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices (i)

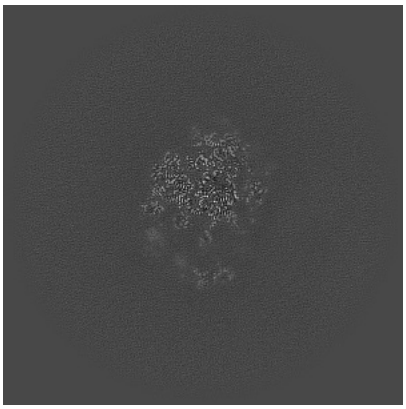
### 6.2.1 Primary map



X Index: 300

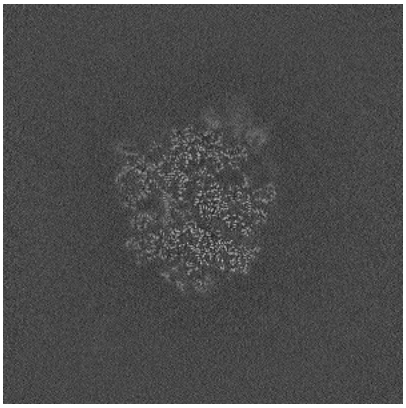


Y Index: 300

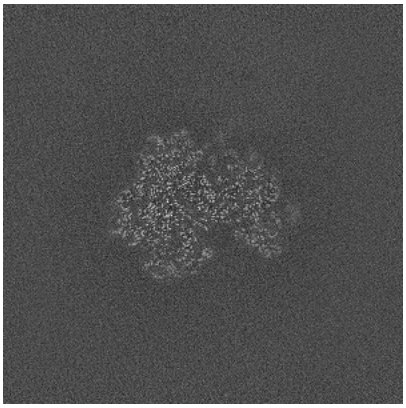


Z Index: 300

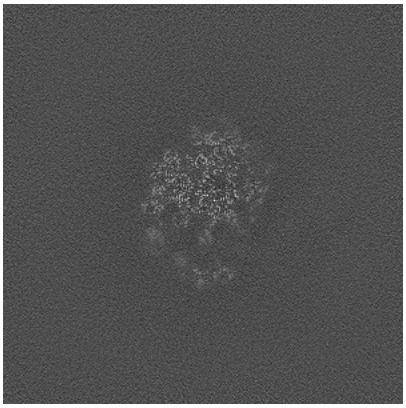
### 6.2.2 Raw map



X Index: 300



Y Index: 300

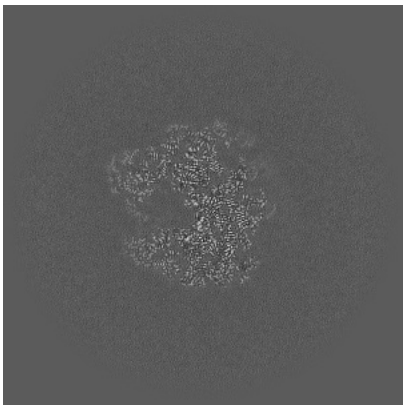


Z Index: 300

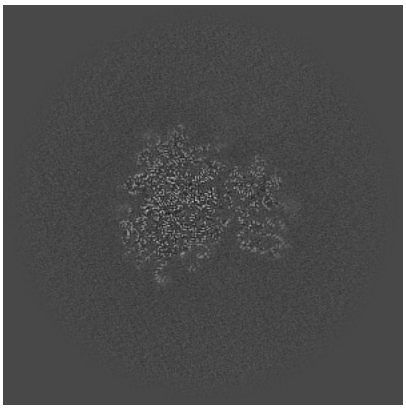
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices (i)

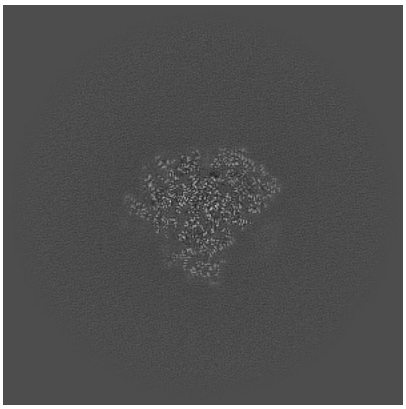
### 6.3.1 Primary map



X Index: 318

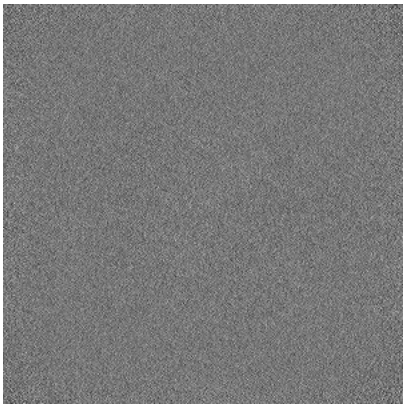


Y Index: 311

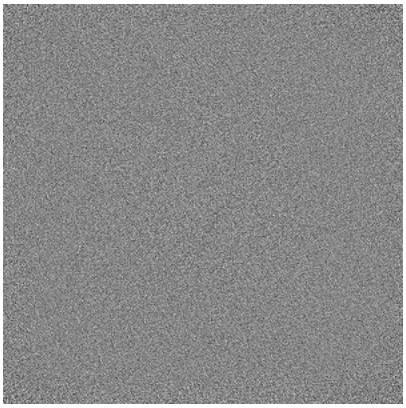


Z Index: 246

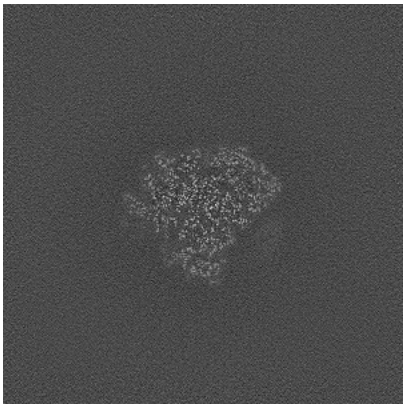
### 6.3.2 Raw map



X Index: 0



Y Index: 0

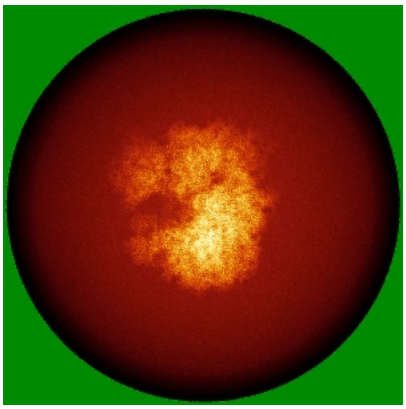


Z Index: 246

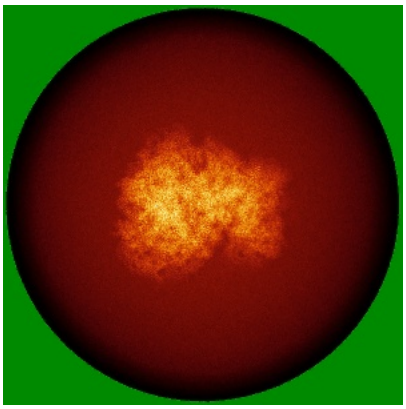
The images above show the largest variance slices of the map in three orthogonal directions.

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

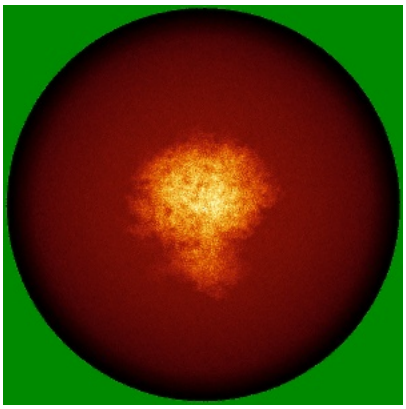
### 6.4.1 Primary map



X

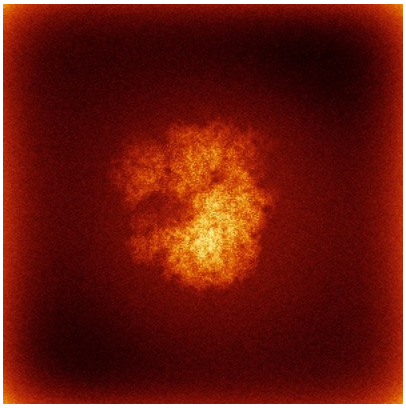


Y

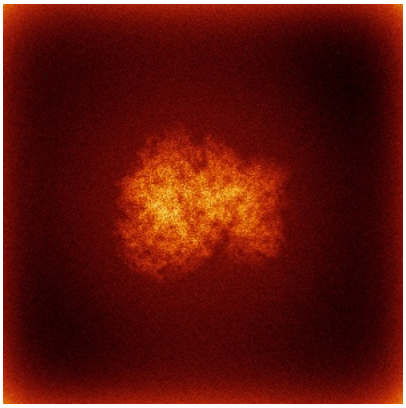


Z

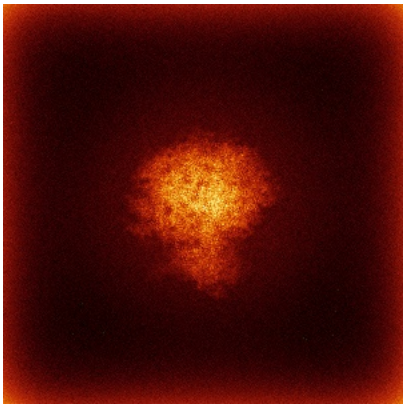
### 6.4.2 Raw map



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)

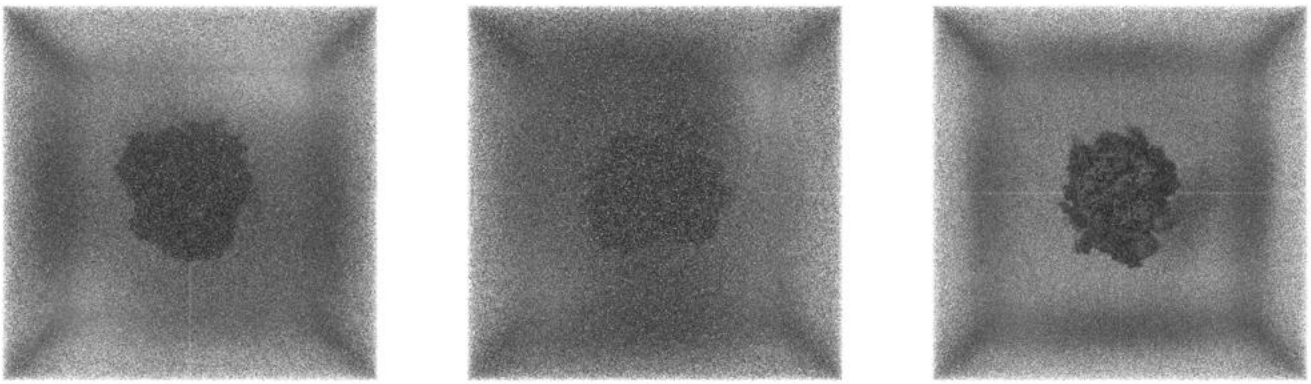
### 6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.16. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2 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.

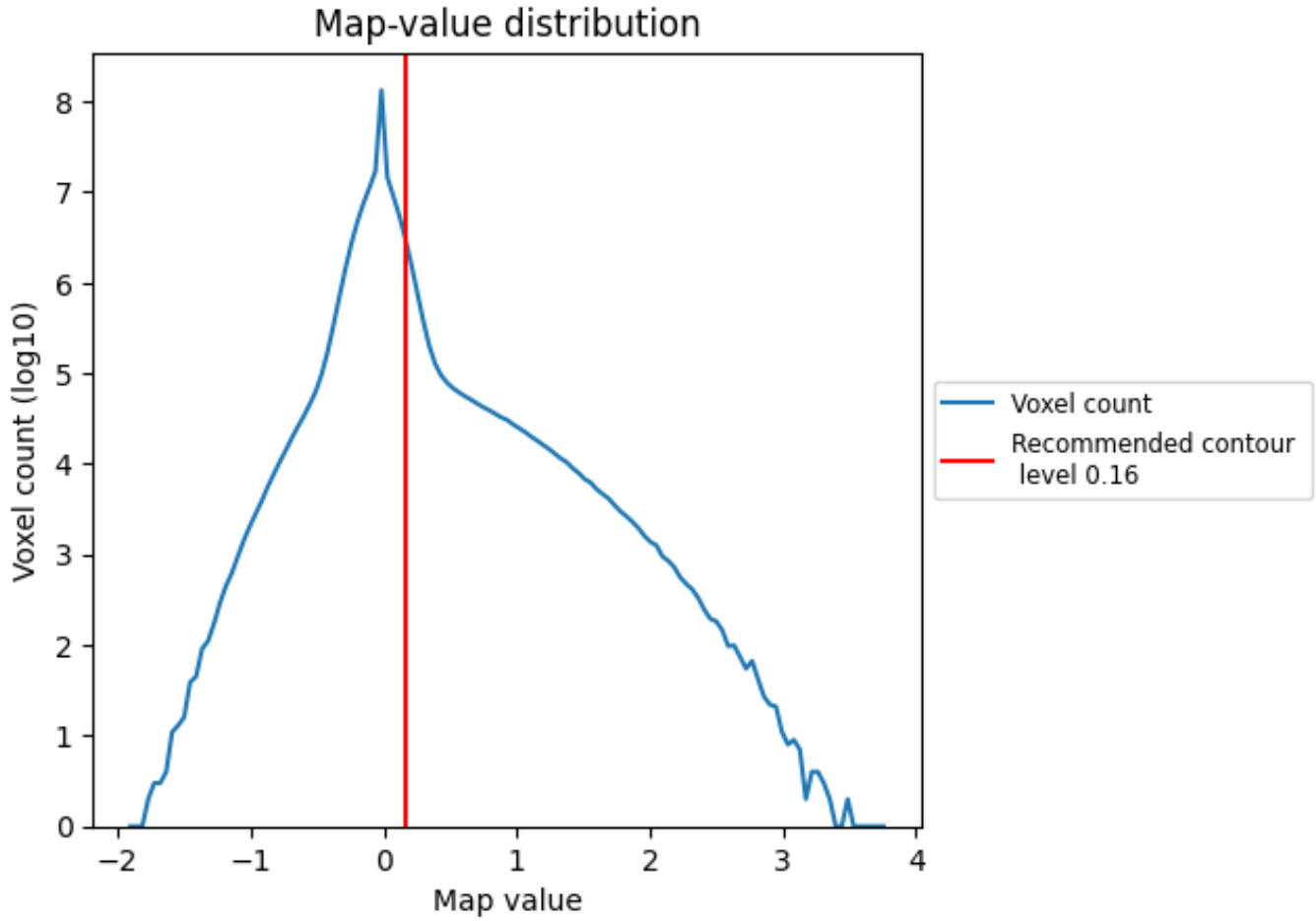
## 6.6 Mask visualisation (i)

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

# 7 Map analysis

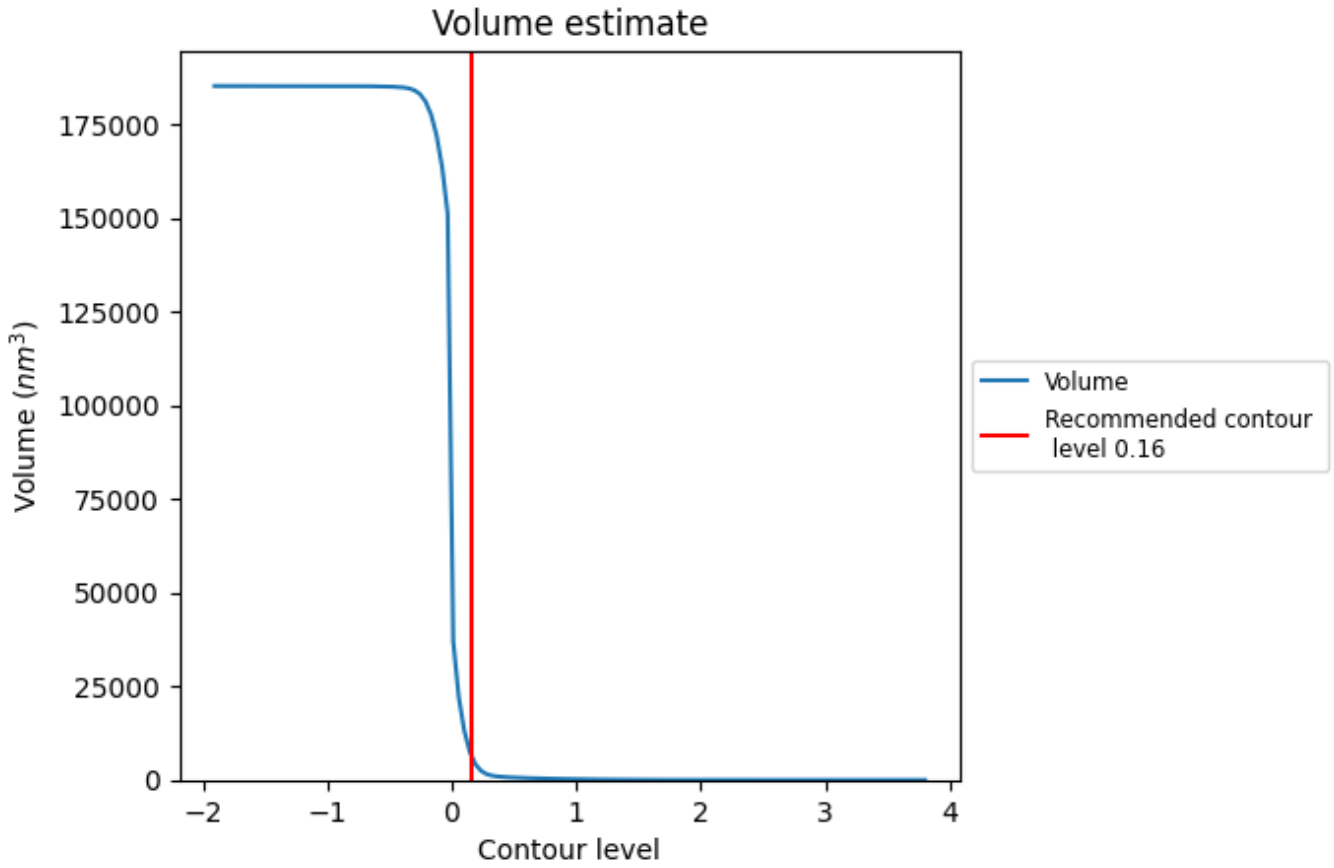
This section contains the results of statistical analysis of the map.

## 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.

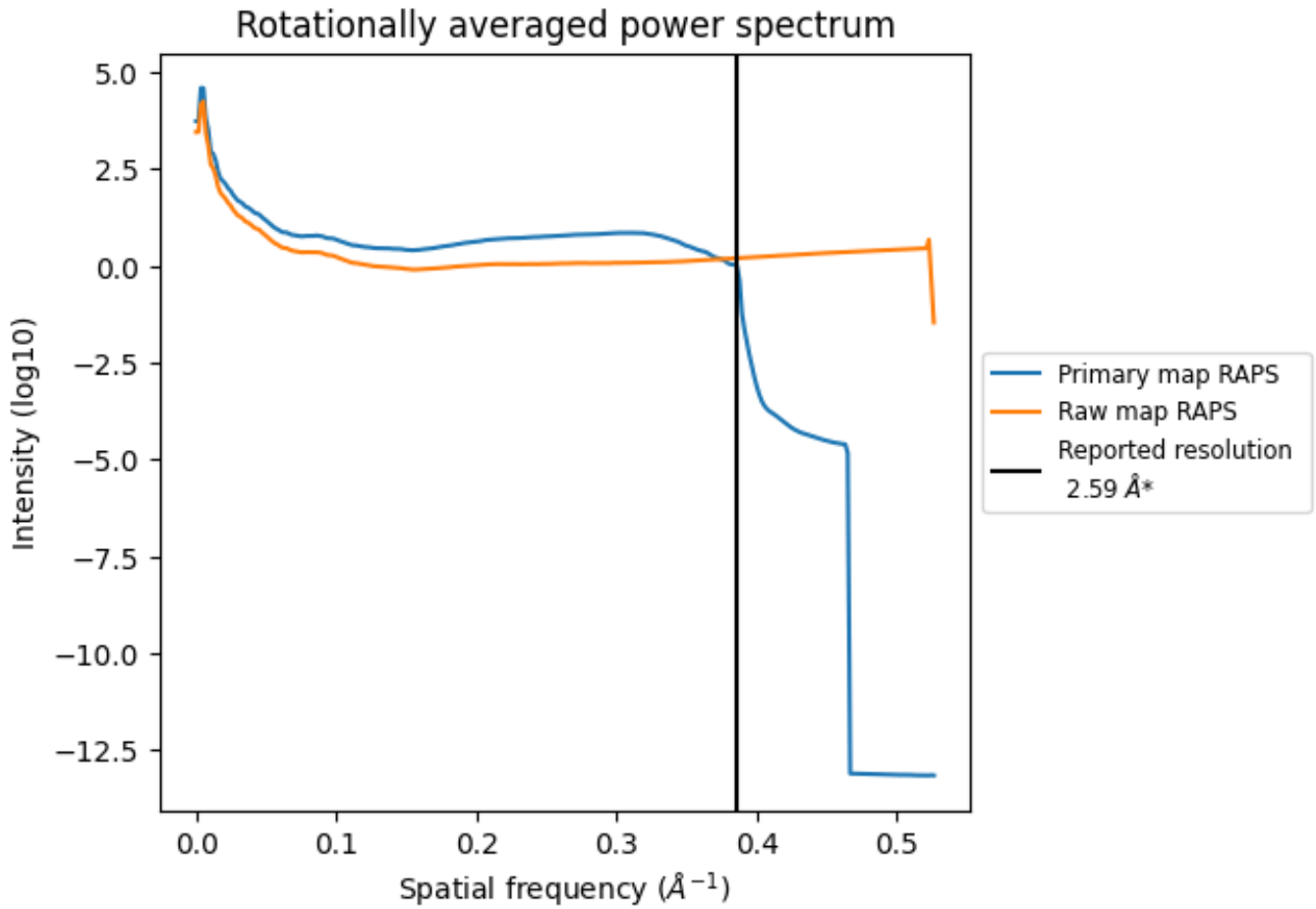
## 7.2 Volume estimate (i)




The volume at the recommended contour level is 6444 $nm^3$; this corresponds to an approximate mass of 5821 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)

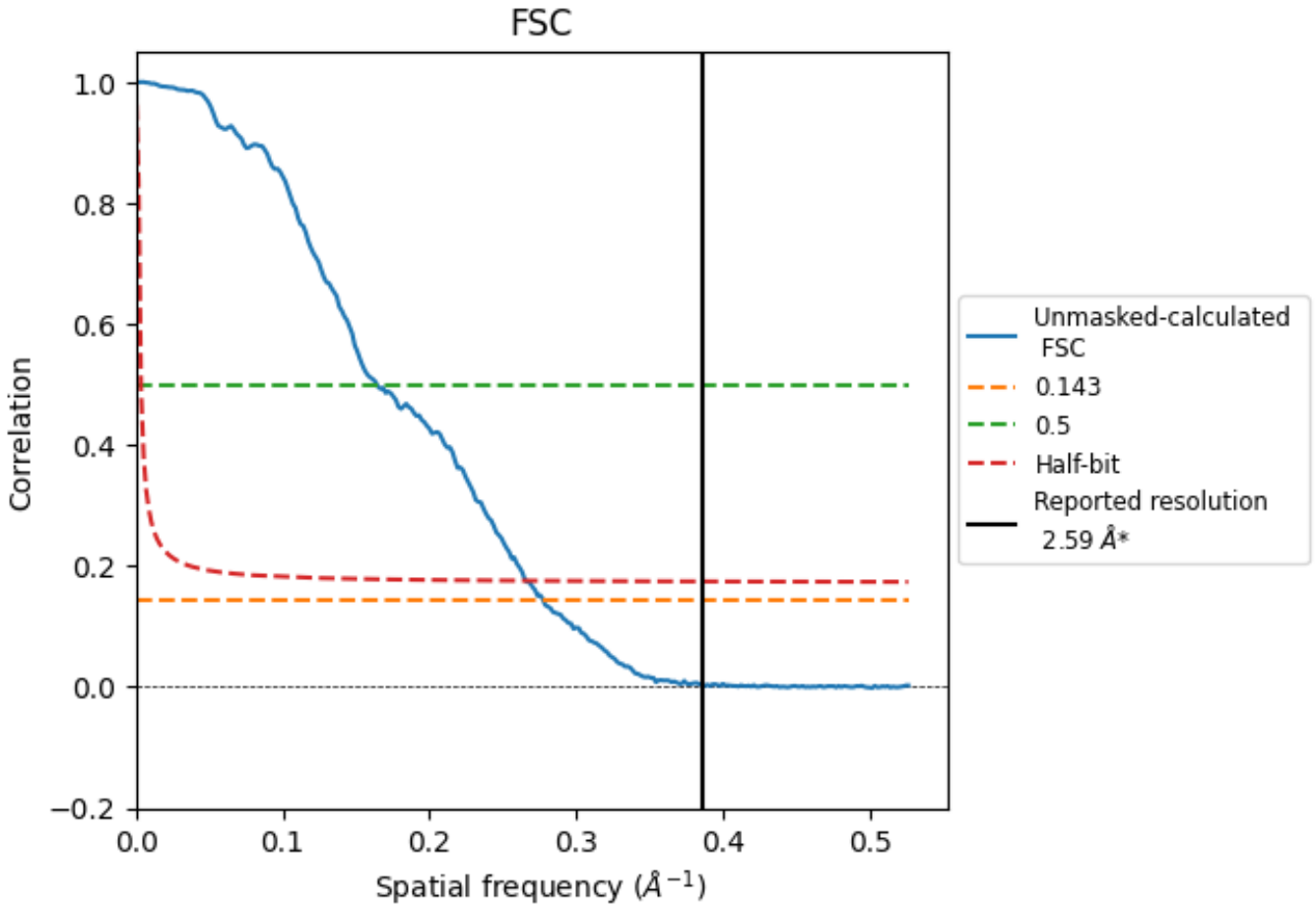



*Reported resolution corresponds to spatial frequency of 0.386 $Å^{-1}$

# 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 0.386 Å$^{-1}$

## 8.2 Resolution estimates (i)

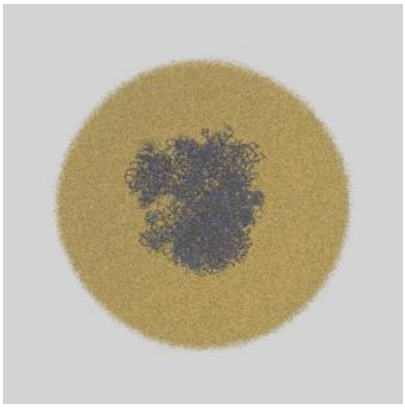
| Resolution estimate (Å) | Estimation criterion (FSC cut-off) | | |
|---|---|---|---|
| | 0.143 | 0.5 | Half-bit |
| Reported by author | 2.59 | - | - |
| Author-provided FSC curve | - | - | - |
| Unmasked-calculated* | 3.60 | 6.09 | 3.76 |

*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 3.60 differs from the reported value 2.59 by more than 10 %

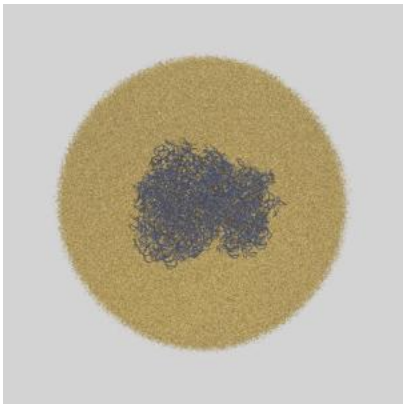
# 9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-68898 and PDB model 23EA. Per-residue inclusion information can be found in section 3 on page 20.

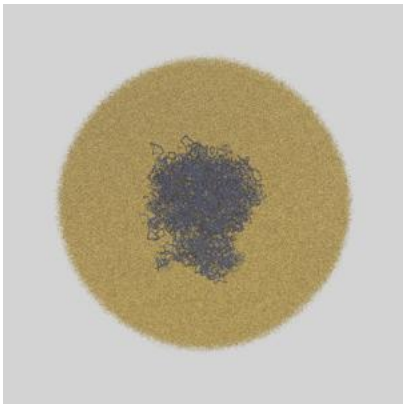
## 9.1 Map-model overlay



X



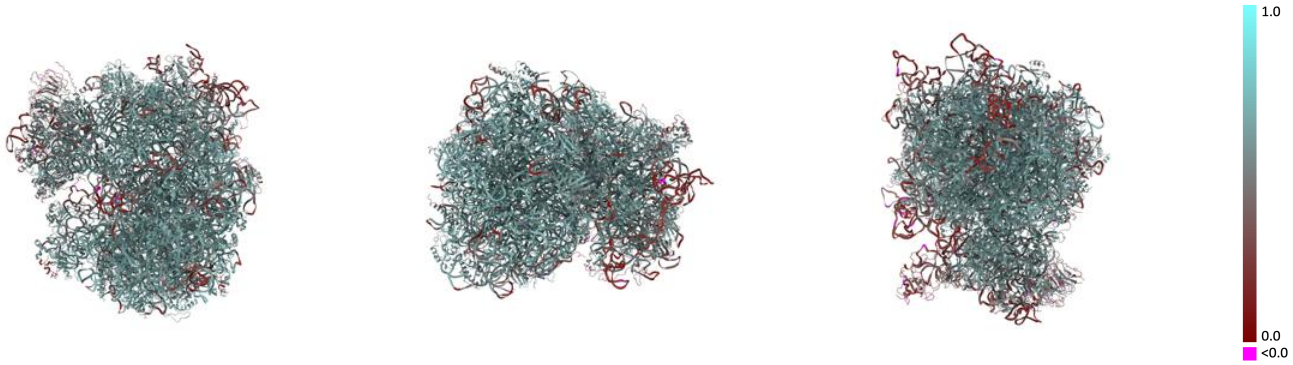
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.16 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

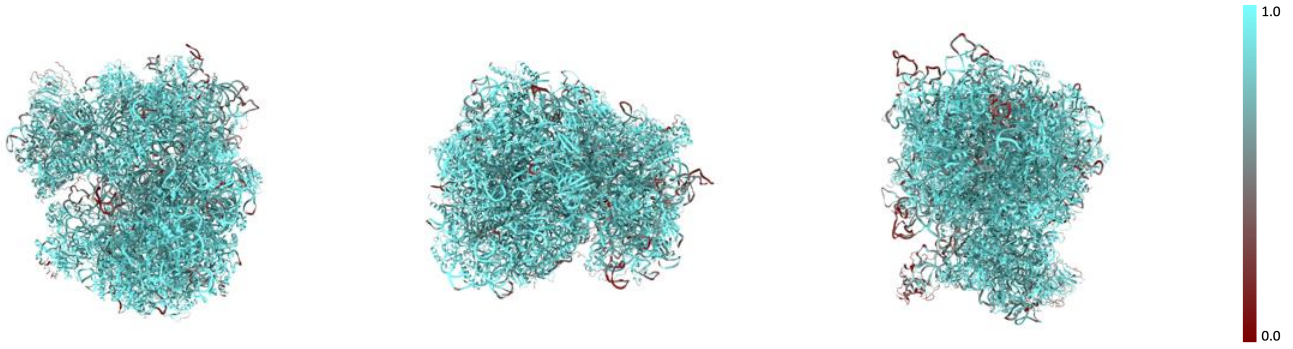
## 9.2 Q-score mapped to coordinate model (i)




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.

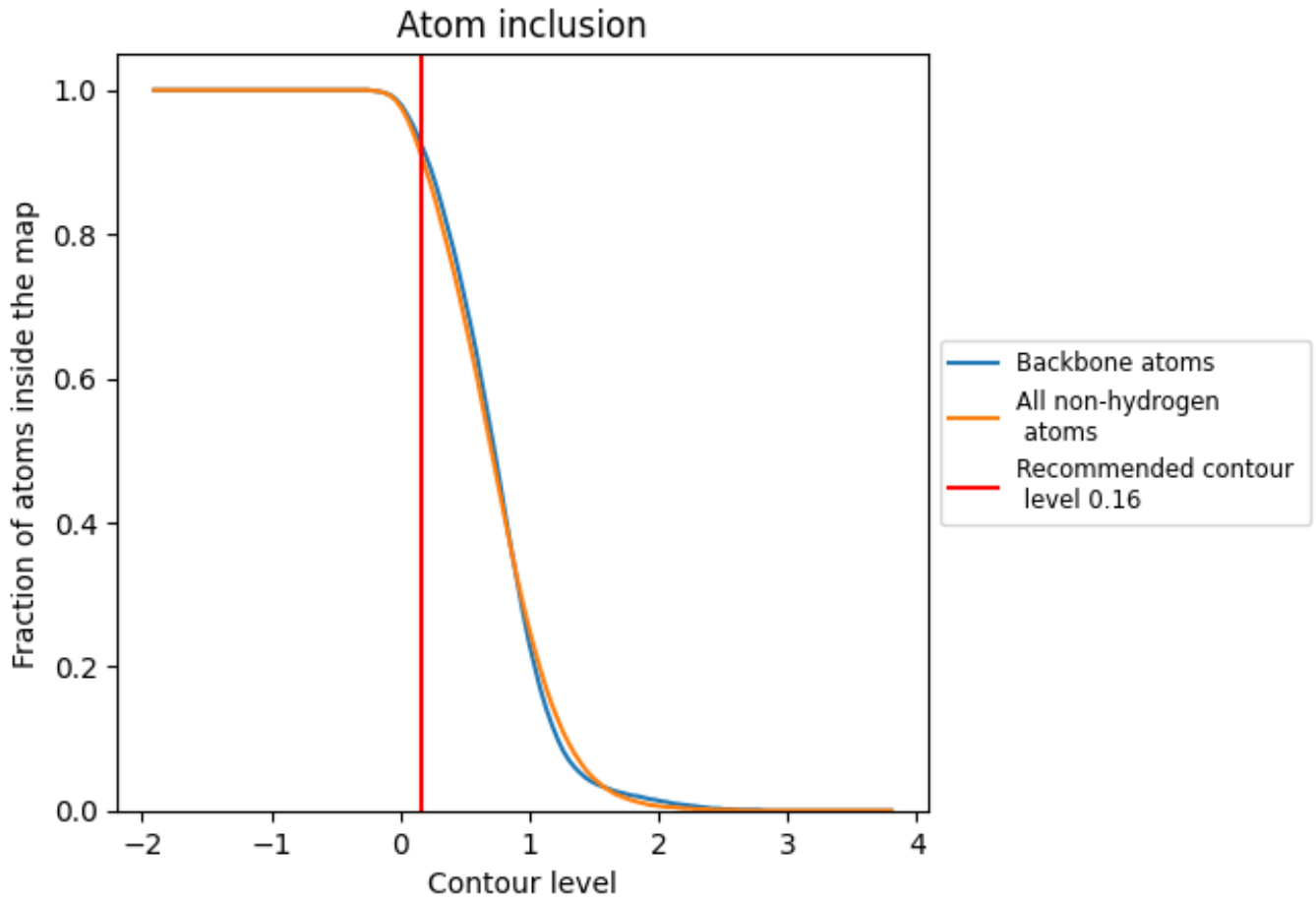
## 9.3 Atom inclusion mapped to coordinate model (i)




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 (0.16).

## 9.4 Atom inclusion (i)




At the recommended contour level, 92% of all backbone atoms, 91% 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 (0.16) and Q-score for the entire model and for each chain.

| Chain | Atom inclusion | Q-score |
|---|---|---|
| All | 0.9110 | 0.5700 |
| Cc | 0.9350 | 0.5430 |
| LA | 0.9330 | 0.5910 |
| LB | 0.9610 | 0.5940 |
| LC | 0.9640 | 0.6120 |
| LD | 0.9810 | 0.6620 |
| LE | 0.9730 | 0.6390 |
| LF | 0.9660 | 0.6290 |
| LG | 0.8670 | 0.5520 |
| LH | 0.9050 | 0.5720 |
| LI | 0.9670 | 0.6340 |
| LJ | 0.9260 | 0.5810 |
| LK | 0.9450 | 0.6020 |
| LL | 0.9470 | 0.6170 |
| LM | 0.9400 | 0.5800 |
| LN | 0.9540 | 0.6150 |
| LO | 0.9570 | 0.6100 |
| LP | 0.9900 | 0.6630 |
| LQ | 0.9690 | 0.6330 |
| LR | 0.9610 | 0.6340 |
| LS | 0.9760 | 0.6480 |
| LT | 0.9190 | 0.6040 |
| LU | 0.9650 | 0.6330 |
| LV | 0.9750 | 0.6360 |
| LW | 0.8990 | 0.5290 |
| LX | 0.9640 | 0.6410 |
| LY | 0.9710 | 0.6440 |
| LZ | 0.9610 | 0.6190 |
| La | 0.8660 | 0.5320 |
| Lb | 0.9310 | 0.5870 |
| Lc | 0.9780 | 0.6500 |
| Ld | 0.9710 | 0.6250 |
| Le | 0.9640 | 0.6280 |
| Lf | 0.9220 | 0.6010 |
| Lg | 0.9200 | 0.6070 |




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| Chain | Atom inclusion | Q-score |
|---|---|---|
| Lh | 0.9790 | 0.6570 |
| Li | 0.9530 | 0.6210 |
| Lj | 0.9720 | 0.6250 |
| Lk | 0.9360 | 0.5970 |
| Ll | 0.9900 | 0.6600 |
| Lm | 0.8530 | 0.5170 |
| Ln | 0.9690 | 0.6310 |
| Lo | 0.9770 | 0.6290 |
| Lp | 0.9950 | 0.6630 |
| Lq | 0.9640 | 0.6340 |
| Lr | 0.9430 | 0.6380 |
| S2 | 0.8550 | 0.5000 |
| SA | 0.8490 | 0.5270 |
| SB | 0.8660 | 0.5300 |
| SC | 0.8400 | 0.4660 |
| SD | 0.4000 | 0.2330 |
| SE | 0.8250 | 0.4700 |
| SF | 0.9020 | 0.5630 |
| SG | 0.8930 | 0.5570 |
| SH | 0.8850 | 0.5420 |
| SI | 0.8400 | 0.5040 |
| SJ | 0.8400 | 0.4950 |
| SK | 0.7550 | 0.4510 |
| SL | 0.8730 | 0.5390 |
| SM | 0.9570 | 0.5950 |
| SN | 0.3260 | 0.2100 |
| SO | 0.7530 | 0.4150 |
| SP | 0.9530 | 0.5990 |
| SQ | 0.9180 | 0.5890 |
| SR | 0.9610 | 0.6220 |
| SS | 0.9570 | 0.5960 |
| ST | 0.8600 | 0.4940 |
| SU | 0.8770 | 0.5230 |
| SV | 0.9500 | 0.6050 |
| SW | 0.9070 | 0.5610 |
| SX | 0.9450 | 0.6260 |
| SY | 0.9580 | 0.6210 |
| SZ | 0.9570 | 0.6080 |
| Sa | 0.9400 | 0.5970 |
| Sb | 0.9730 | 0.6440 |
| Sc | 0.9550 | 0.6270 |
| Sd | 0.8850 | 0.5300 |

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| Chain | Atom inclusion | Q-score |
|---|---|---|
| Se | 0.9660 | 0.6320 |
| Sf | 0.9280 | 0.5800 |
| Sg | 0.8410 | 0.5250 |
| eR | 0.8130 | 0.5080 |
| mR | 0.9710 | 0.6140 |
| pp | 0.6190 | 0.3830 |