# Full wwPDB EM Validation Report ⓘ

Nov 20, 2022 – 12:53 am GMT

| | | |
|---|---|---|
| PDB ID | : | 6G18 |
| EMDB ID | : | EMD-4337 |
| Title | : | Cryo-EM structure of a late human pre-40S ribosomal subunit - State C |
| Authors | : | Ameismeier, M.; Cheng, J.; Berninghausen, O.; Beckmann, R. |
| Deposited on | : | 2018-03-20 |
| Resolution | : | 3.60 Å(reported) |

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ 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:

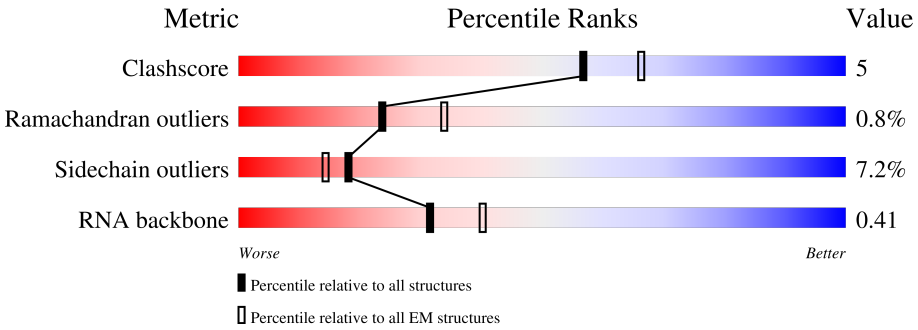
| | | |
|---|---|---|
| EMDB validation analysis | : | 0.0.1.dev43 |
| MolProbity | : | 4.02b-467 |
| Percentile statistics | : | 20191225.v01 (using entries in the PDB archive December 25th 2019) |
| MapQ | : | 1.9.9 |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.31.2 |

# 1 Overall quality at a glance

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

The reported resolution of this entry is 3.60 Å.

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




| Metric | Whole archive (#Entries) | EM structures (#Entries) |
|---|---|---|
| Clashscore | 158937 | 4297 |
| Ramachandran outliers | 154571 | 4023 |
| Sidechain outliers | 154315 | 3826 |
| RNA backbone | 4643 | 859 |

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

| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 1 | 2 | 1873 | 41% 38% 9% 11% |
| 2 | F | 204 | 5% 70% 19% 7% |
| 3 | M | 132 | 58% 77% 16% 7% |
| 4 | P | 145 | 62% 17% 17% |
| 5 | Q | 146 | 68% 15% 16% |
| 6 | R | 135 | 71% 19% 10% |
| 7 | S | 152 | 9% 67% 17% 14% |

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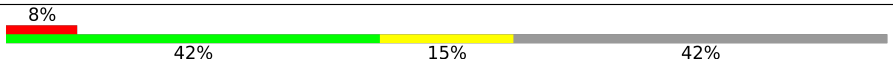
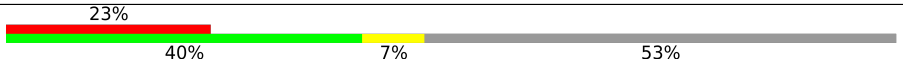
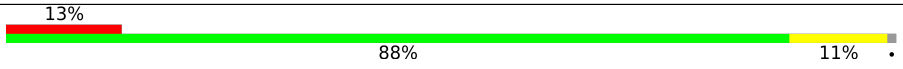
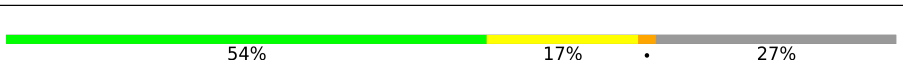
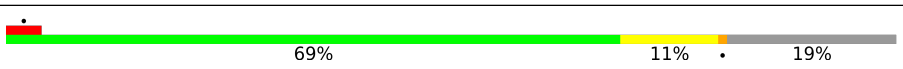
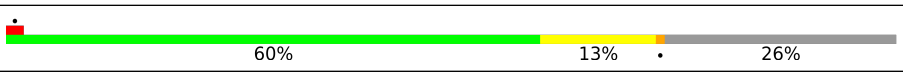
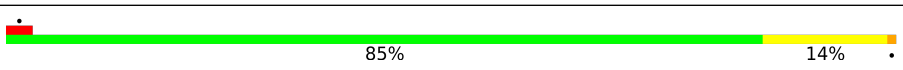
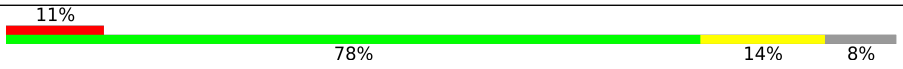
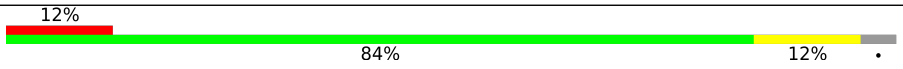
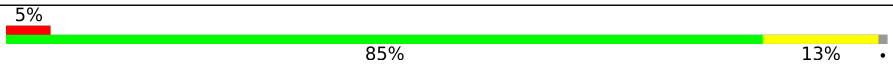
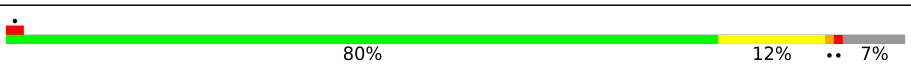
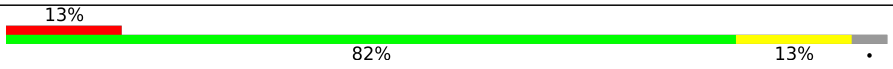
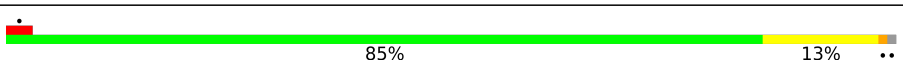
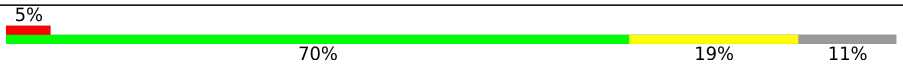
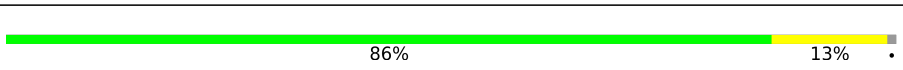
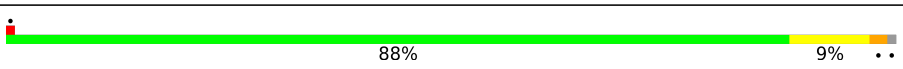
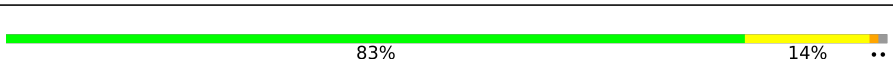
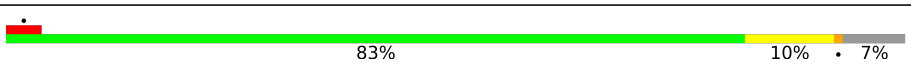
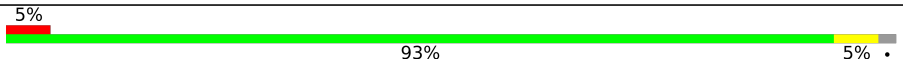
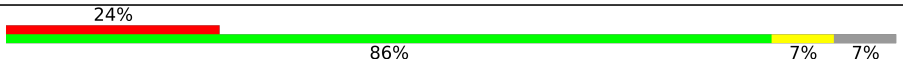
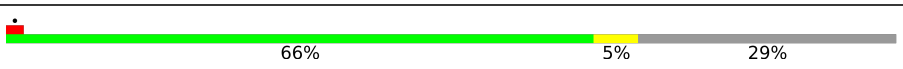
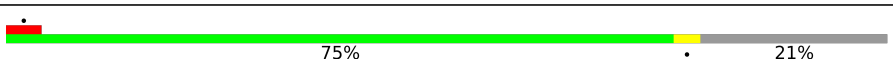
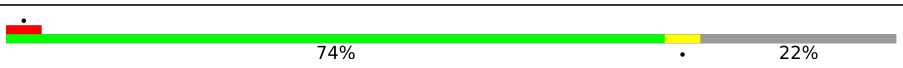
| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 8 | T | 145 |   |
| 9 | Z | 125 |   |
| 10 | c | 69 |   |
| 11 | f | 156 |   |
| 12 | g | 317 |   |
| 13 | A | 295 |   |
| 14 | B | 264 |   |
| 15 | C | 293 |   |
| 16 | E | 263 |   |
| 17 | G | 249 |   |
| 18 | H | 194 |   |
| 19 | I | 208 |   |
| 20 | J | 194 |   |
| 21 | L | 158 |   |
| 22 | N | 151 |   |
| 23 | O | 151 |   |
| 24 | V | 83 |   |
| 25 | W | 130 |   |
| 26 | X | 143 |   |
| 27 | Y | 133 |   |
| 28 | b | 84 |   |
| 29 | e | 59 |   |
| 30 | x | 252 |   |
| 31 | y | 412 |   |
| 32 | u | 804 |   |

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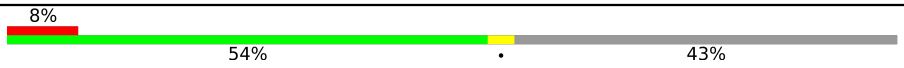
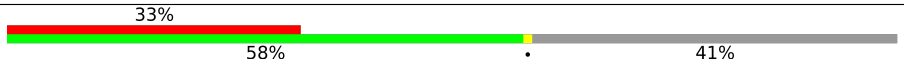
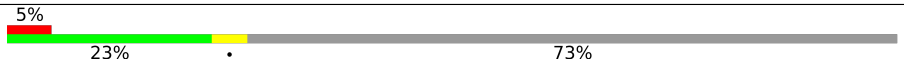
| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 33 | w | 437 |   |
| 34 | v | 552 |   |
| 35 | t | 475 |   |

# 2 Entry composition

There are 36 unique types of molecules in this entry. The entry contains 83819 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 pre-18S ribosomal RNA.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | P | | |
| 1 | 2 | 1658 | 35407 | 15804 | 6362 | 11584 | 1657 | 0 | 0 |

- Molecule 2 is a protein called 40S ribosomal protein S5.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 2 | F | 189 | 1495 | 934 | 284 | 270 | 7 | 0 | 0 |

- Molecule 3 is a protein called 40S ribosomal protein S12.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 3 | M | 123 | 953 | 598 | 169 | 177 | 9 | 0 | 0 |

- Molecule 4 is a protein called 40S ribosomal protein S15.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 4 | P | 120 | 984 | 625 | 184 | 168 | 7 | 0 | 0 |

- Molecule 5 is a protein called 40S ribosomal protein S16.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 5 | Q | 122 | 969 | 616 | 180 | 170 | 3 | 0 | 0 |

- Molecule 6 is a protein called 40S ribosomal protein S17.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 6 | R | 122 | 990 | 621 | 184 | 182 | 3 | 0 | 0 |

- Molecule 7 is a protein called 40S ribosomal protein S18.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 7 | S | 130 | Total | C | N | O | S | 0 | 0 |
| | | | 1083 | 686 | 214 | 182 | 1 | | |

- Molecule 8 is a protein called 40S ribosomal protein S19.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 8 | T | 144 | Total | C | N | O | S | 0 | 0 |
| | | | 1122 | 703 | 217 | 199 | 3 | | |

- Molecule 9 is a protein called 40S ribosomal protein S25.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 9 | Z | 72 | Total | C | N | O | S | 0 | 0 |
| | | | 574 | 368 | 104 | 101 | 1 | | |

- Molecule 10 is a protein called 40S ribosomal protein S28.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 10 | c | 61 | Total | C | N | O | S | 0 | 0 |
| | | | 471 | 288 | 95 | 86 | 2 | | |

- Molecule 11 is a protein called Ubiquitin-40S ribosomal protein S27a.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 11 | f | 73 | Total | C | N | O | S | 0 | 0 |
| | | | 596 | 375 | 115 | 99 | 7 | | |

- Molecule 12 is a protein called Receptor of activated protein C kinase 1.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 12 | g | 313 | Total | C | N | O | S | 0 | 0 |
| | | | 2433 | 1533 | 424 | 464 | 12 | | |

- Molecule 13 is a protein called 40S ribosomal protein SA.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 13 | A | 216 | Total | C | N | O | S | 0 | 0 |
| | | | 1705 | 1083 | 299 | 315 | 8 | | |

- Molecule 14 is a protein called 40S ribosomal protein S3a.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 14 | B | 213 | Total | C | N | O | S | 0 | 0 |
| | | | 1729 | 1098 | 309 | 308 | 14 | | |

- Molecule 15 is a protein called 40S ribosomal protein S2.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 15 | C | 218 | Total | C | N | O | S | 0 | 0 |
| | | | 1690 | 1094 | 289 | 297 | 10 | | |

- Molecule 16 is a protein called 40S ribosomal protein S4, X isoform.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 16 | E | 262 | Total | C | N | O | S | 0 | 0 |
| | | | 2076 | 1324 | 386 | 358 | 8 | | |

- Molecule 17 is a protein called 40S ribosomal protein S6.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 17 | G | 230 | Total | C | N | O | S | 0 | 0 |
| | | | 1862 | 1164 | 371 | 320 | 7 | | |

- Molecule 18 is a protein called 40S ribosomal protein S7.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 18 | H | 186 | Total | C | N | O | S | 0 | 0 |
| | | | 1501 | 957 | 276 | 267 | 1 | | |

- Molecule 19 is a protein called 40S ribosomal protein S8.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 19 | I | 205 | Total | C | N | O | S | 0 | 0 |
| | | | 1682 | 1056 | 331 | 290 | 5 | | |

- Molecule 20 is a protein called 40S ribosomal protein S9.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 20 | J | 180 | Total | C | N | O | S | 0 | 0 |
| | | | 1499 | 955 | 300 | 242 | 2 | | |

- Molecule 21 is a protein called 40S ribosomal protein S11.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 21 | L | 151 | Total | C | N | O | S | 0 | 0 |
| | | | 1229 | 782 | 230 | 211 | 6 | | |

- Molecule 22 is a protein called 40S ribosomal protein S13.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 22 | N | 149 | Total | C | N | O | S | 0 | 0 |
| | | | 1202 | 770 | 228 | 203 | 1 | | |

- Molecule 23 is a protein called 40S ribosomal protein S14.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 23 | O | 135 | Total | C | N | O | S | 0 | 0 |
| | | | 1009 | 618 | 198 | 187 | 6 | | |

- Molecule 24 is a protein called 40S ribosomal protein S21.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 24 | V | 82 | Total | C | N | O | S | 0 | 0 |
| | | | 625 | 384 | 116 | 120 | 5 | | |

- Molecule 25 is a protein called 40S ribosomal protein S15a.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 25 | W | 129 | Total | C | N | O | S | 0 | 0 |
| | | | 1034 | 659 | 193 | 176 | 6 | | |

- Molecule 26 is a protein called 40S ribosomal protein S23.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 26 | X | 141 | Total | C | N | O | S | 0 | 0 |
| | | | 1098 | 693 | 219 | 183 | 3 | | |

- Molecule 27 is a protein called 40S ribosomal protein S24.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 27 | Y | 124 | Total | C | N | O | S | 0 | 0 |
| | | | 1014 | 641 | 198 | 170 | 5 | | |

- Molecule 28 is a protein called 40S ribosomal protein S27.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 28 | b | 82 | Total | C | N | O | S | 0 | 0 |
| | | | 640 | 402 | 118 | 113 | 7 | | |

- Molecule 29 is a protein called 40S ribosomal protein S30.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 29 | e | 55 | Total | C | N | O | S | 0 | 0 |
| | | | 438 | 271 | 95 | 71 | 1 | | |

- Molecule 30 is a protein called RNA-binding protein PNO1.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 30 | x | 178 | Total | C | N | O | S | 0 | 0 |
| | | | 1391 | 891 | 252 | 244 | 4 | | |

- Molecule 31 is a protein called RNA-binding protein NOB1.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 31 | y | 325 | Total | C | N | O | S | 0 | 0 |
| | | | 2568 | 1622 | 473 | 463 | 10 | | |

- Molecule 32 is a protein called Pre-rRNA-processing protein TSR1 homolog.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 32 | u | 629 | Total | C | N | O | S | 0 | 0 |
| | | | 5062 | 3249 | 902 | 887 | 24 | | |

- Molecule 33 is a protein called Bystin.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 33 | w | 249 | Total | C | N | O | S | 0 | 0 |
| | | | 2027 | 1322 | 354 | 342 | 9 | | |

- Molecule 34 is a protein called Serine/threonine-protein kinase RIO2.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 34 | v | 325 | Total | C | N | O | S | 0 | 0 |
| | | | 2593 | 1649 | 460 | 470 | 14 | | |

- Molecule 35 is a protein called Protein LTV1 homolog.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 35 | t | 127 | Total | C | N | O | S | 0 | 0 |
| | | | 1066 | 661 | 204 | 199 | 2 | | |

- Molecule 36 is ZINC ION (three-letter code: ZN) (formula: Zn).

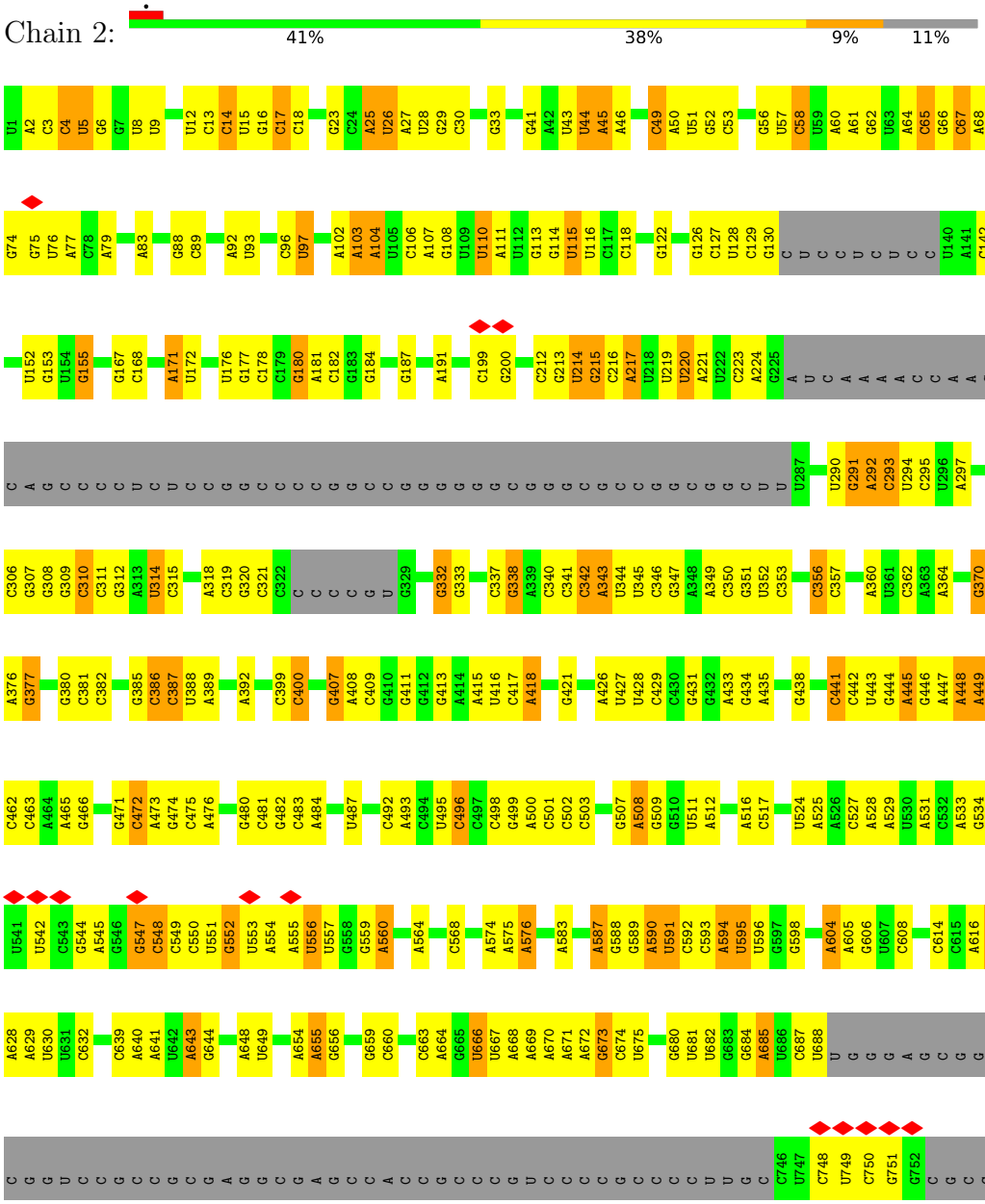
| Mol | Chain | Residues | Atoms | | AltConf |
|---|---|---|---|---|---|
| 36 | f | 1 | Total | Zn | 0 |
| | | | 1 | 1 | |
| 36 | y | 1 | Total | Zn | 0 |
| | | | 1 | 1 | |

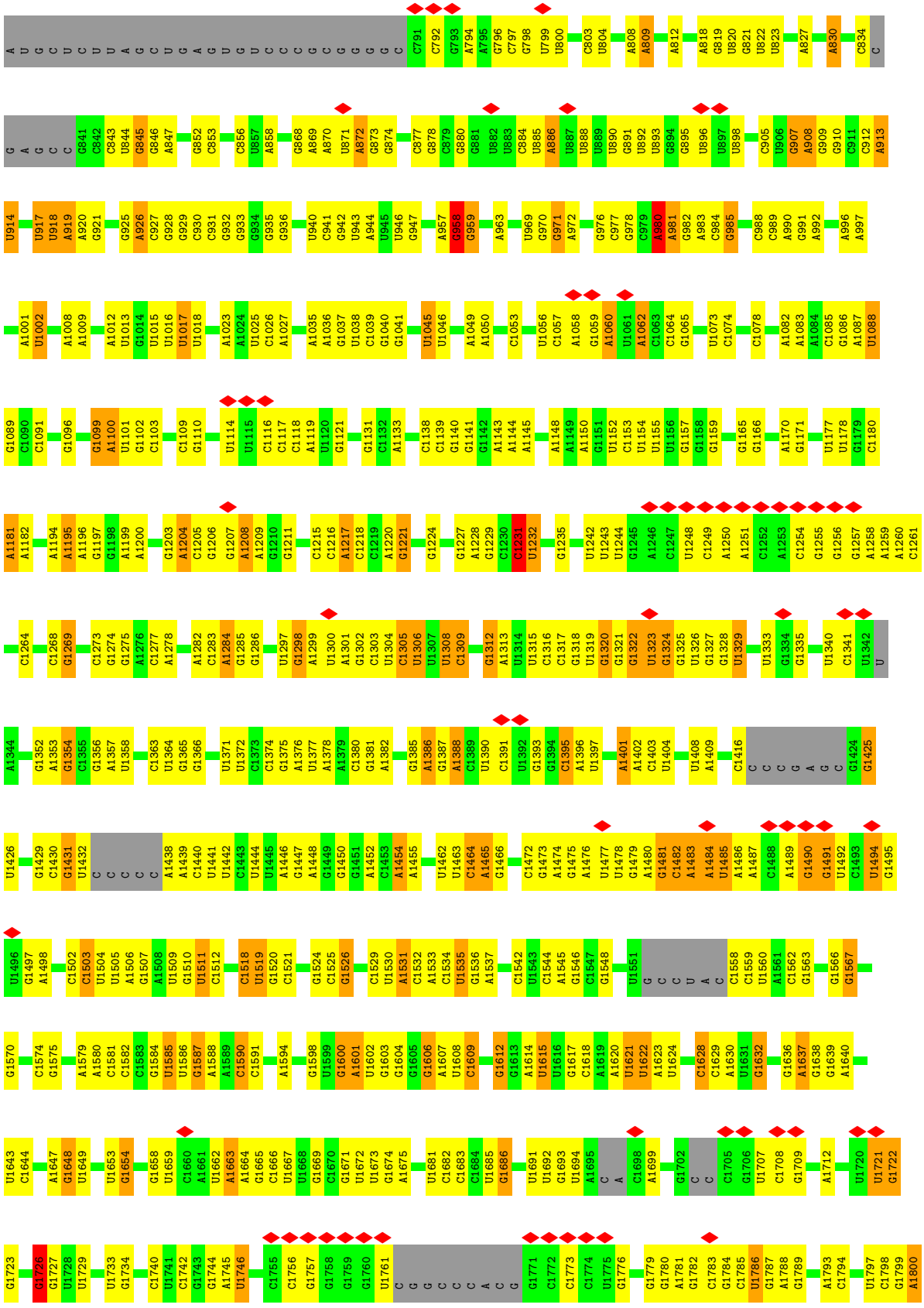
# 3 Residue-property plots (i)

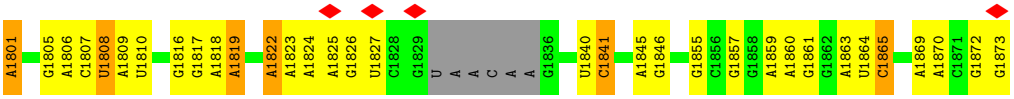
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion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

- Molecule 1: pre-18S ribosomal RNA

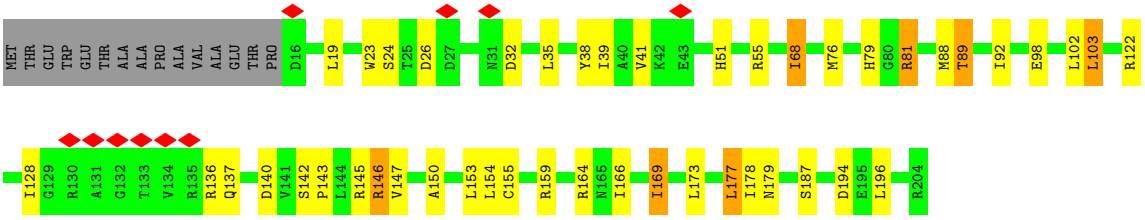
Chain 2:



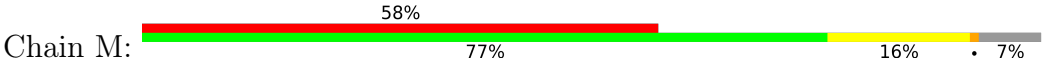


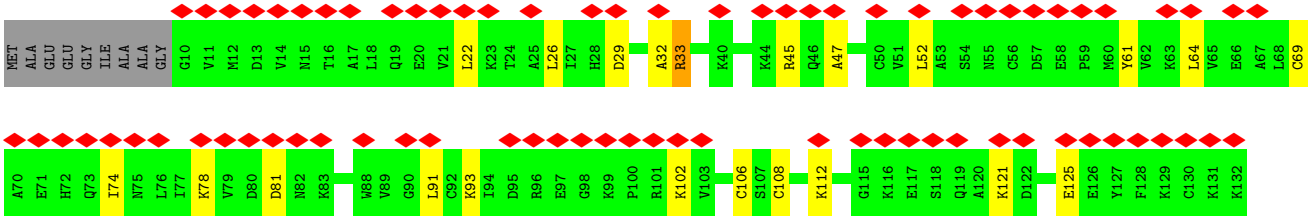



• Molecule 2: 40S ribosomal protein S5

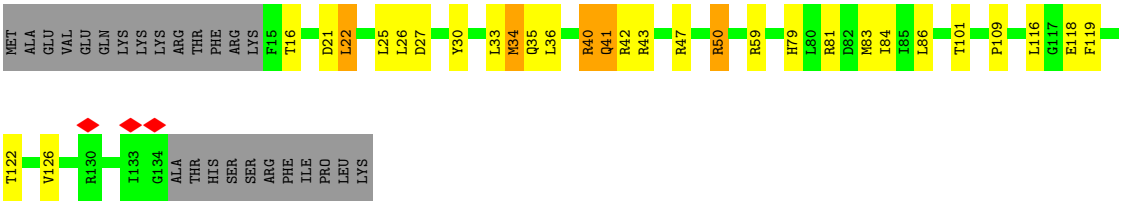




• Molecule 3: 40S ribosomal protein S12

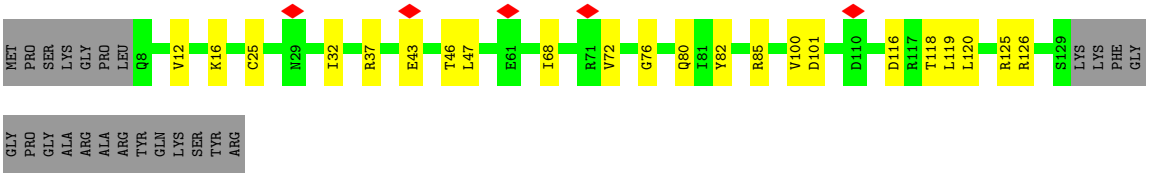


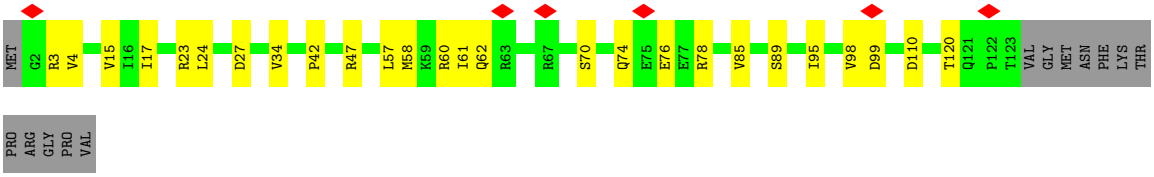

• Molecule 4: 40S ribosomal protein S15

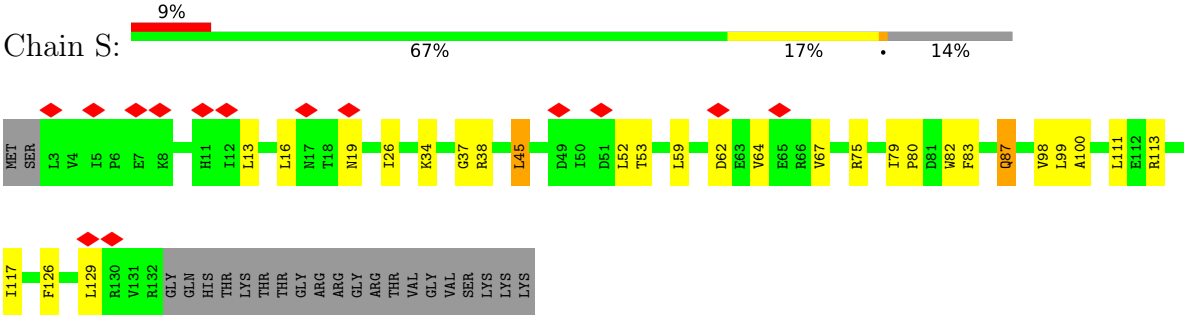

• Molecule 5: 40S ribosomal protein S16

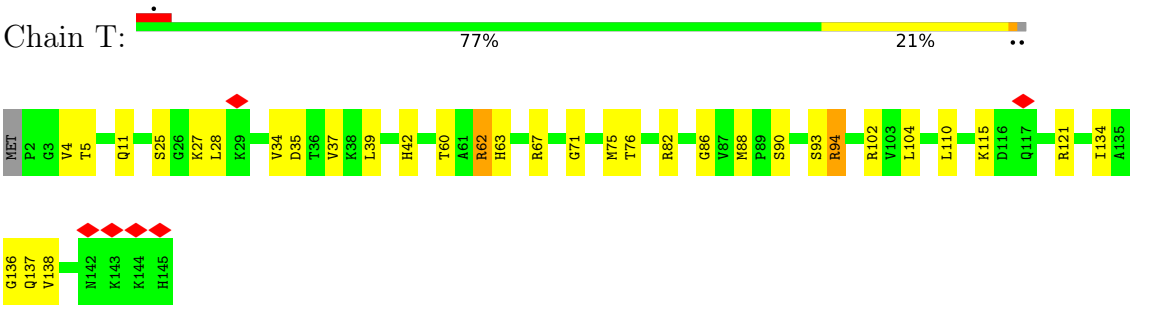

• Molecule 6: 40S ribosomal protein S17



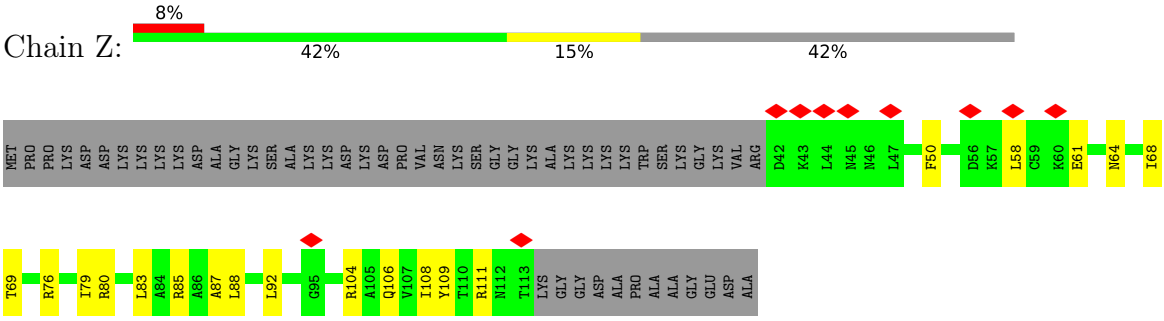

• Molecule 7: 40S ribosomal protein S18



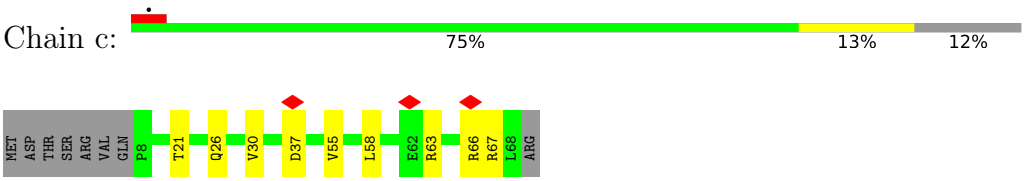

• Molecule 8: 40S ribosomal protein S19



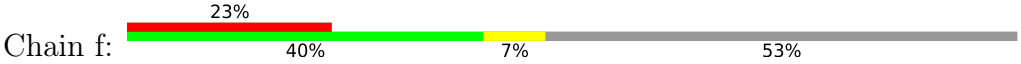

• Molecule 9: 40S ribosomal protein S25

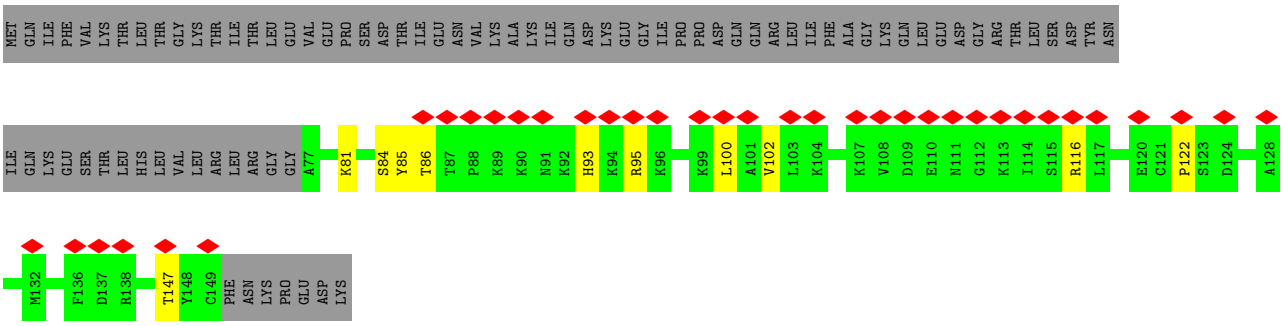



• Molecule 10: 40S ribosomal protein S28



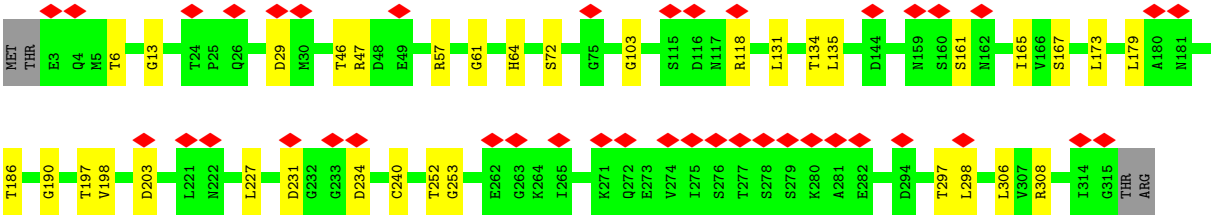

• Molecule 11: Ubiquitin-40S ribosomal protein S27a





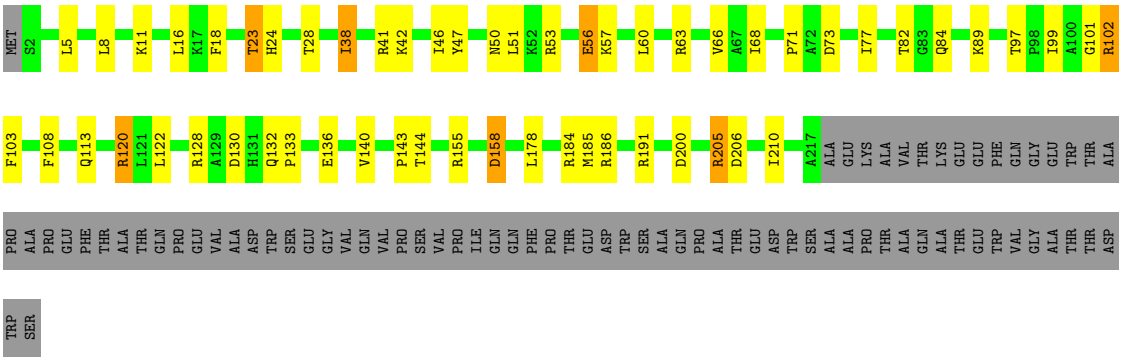
• Molecule 12: Receptor of activated protein C kinase 1

Chain g:

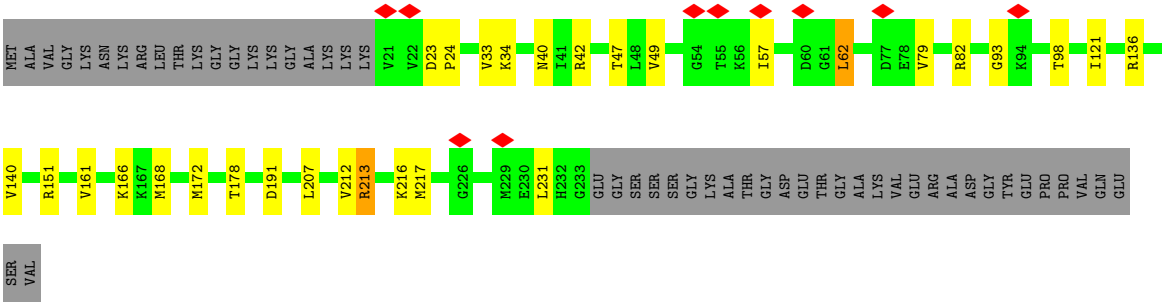
• Molecule 13: 40S ribosomal protein SA

Chain A:

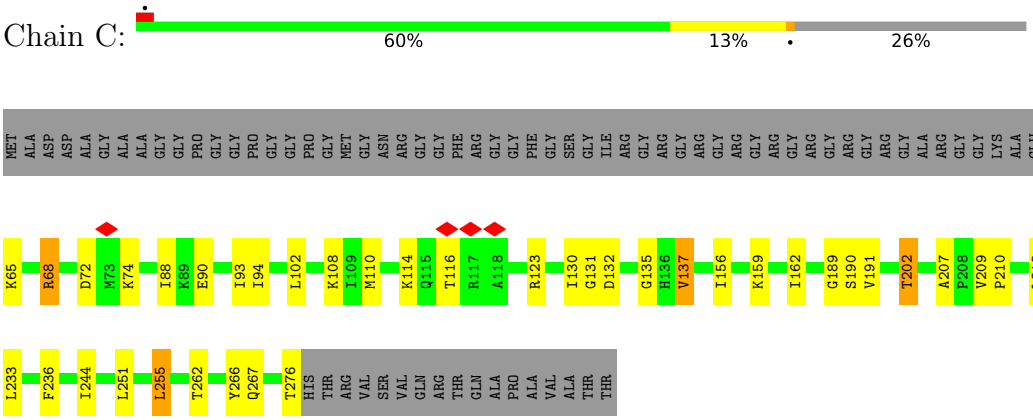
• Molecule 14: 40S ribosomal protein S3a

Chain B:

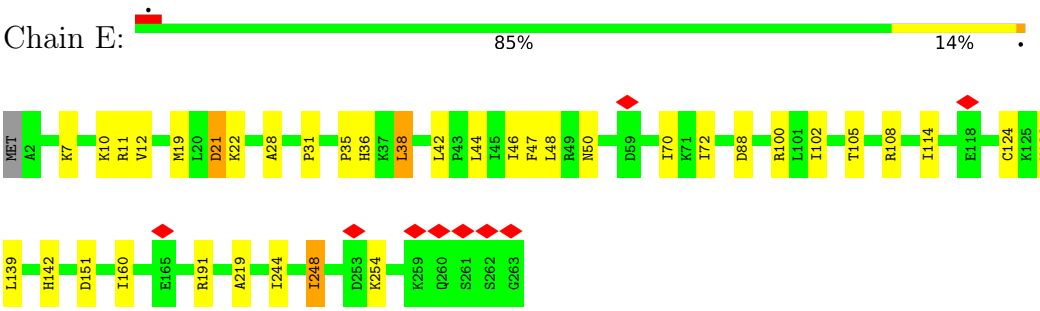
• Molecule 15: 40S ribosomal protein S2

Chain C:



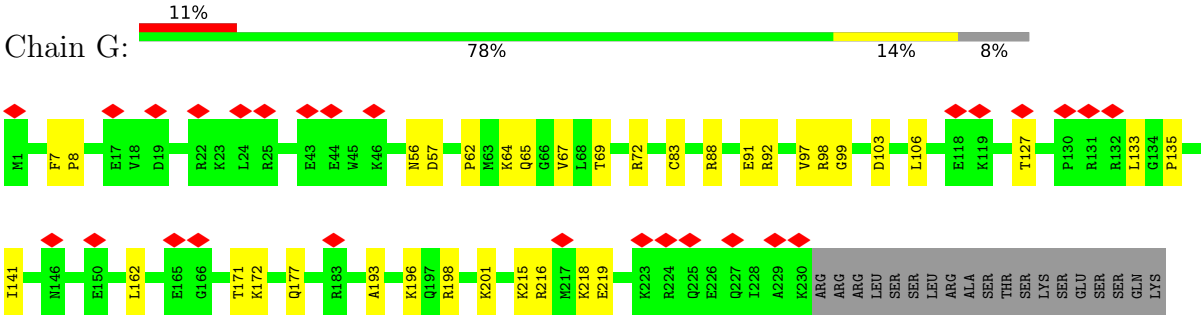

• Molecule 16: 40S ribosomal protein S4, X isoform

Chain E:



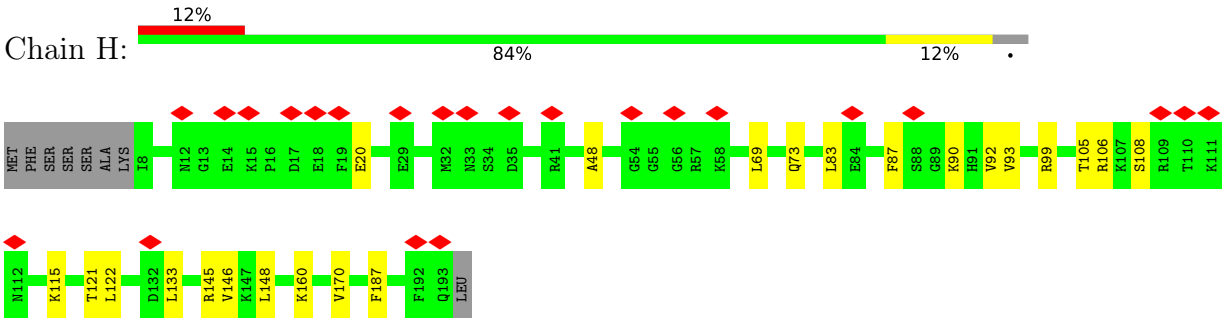

• Molecule 17: 40S ribosomal protein S6

Chain G:



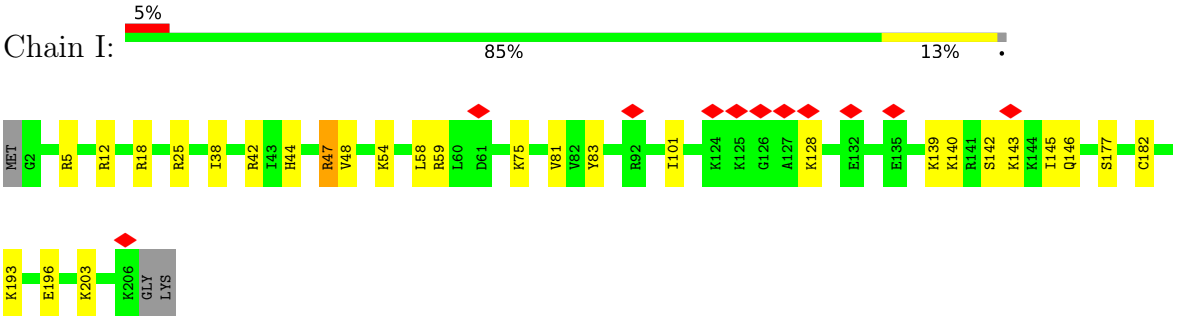

• Molecule 18: 40S ribosomal protein S7

Chain H:



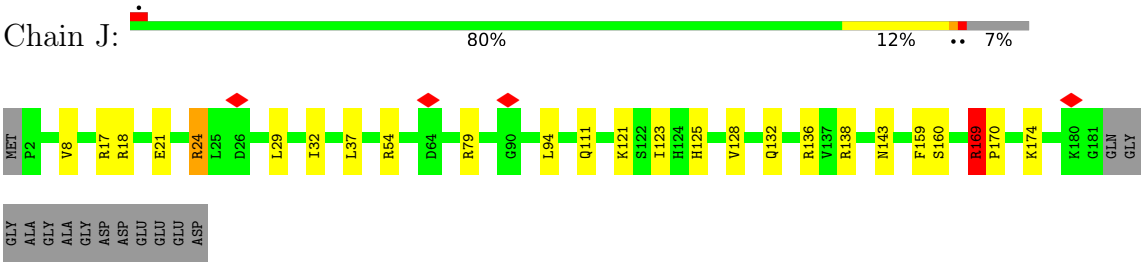

• Molecule 19: 40S ribosomal protein S8

Chain I:



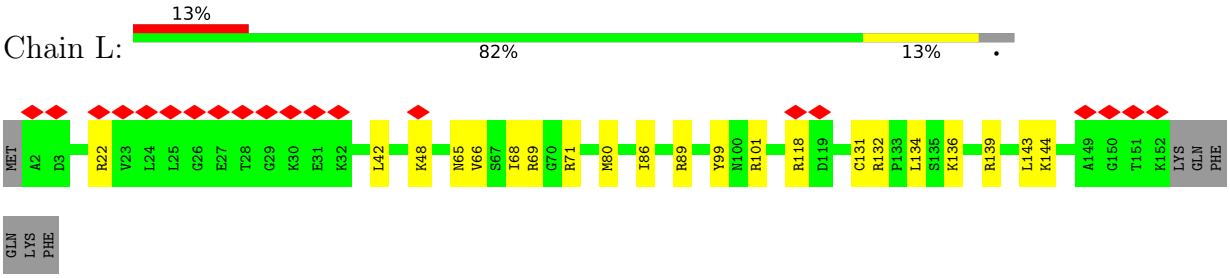

• Molecule 20: 40S ribosomal protein S9

Chain J:



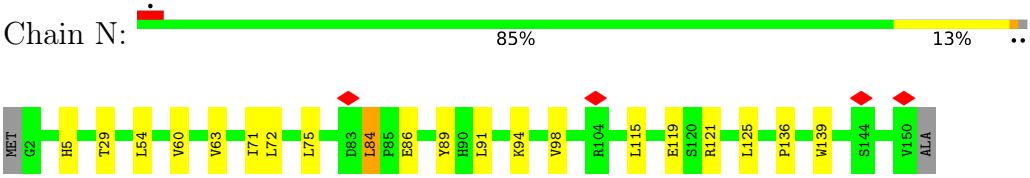

• Molecule 21: 40S ribosomal protein S11

Chain L:



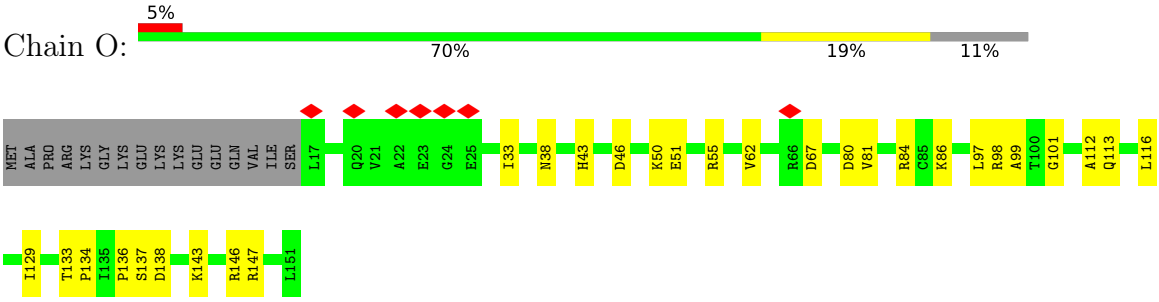

• Molecule 22: 40S ribosomal protein S13

Chain N:



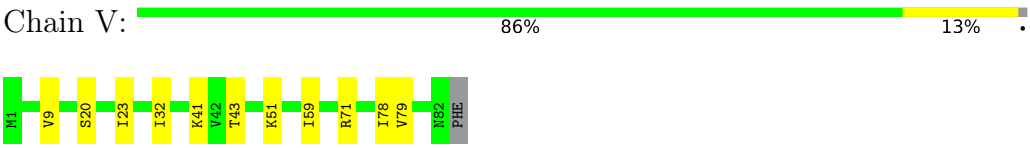

• Molecule 23: 40S ribosomal protein S14

Chain O:



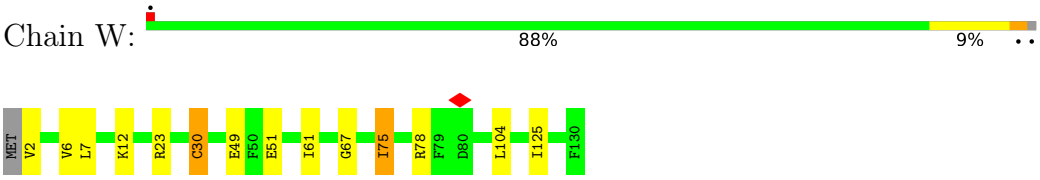

• Molecule 24: 40S ribosomal protein S21

Chain V:



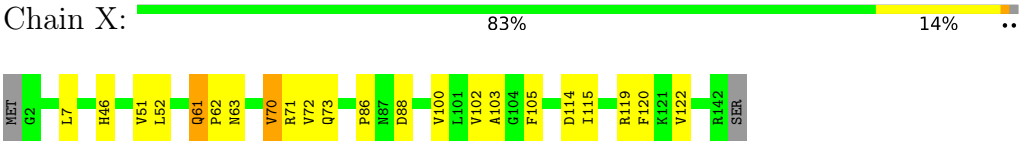

• Molecule 25: 40S ribosomal protein S15a

Chain W:



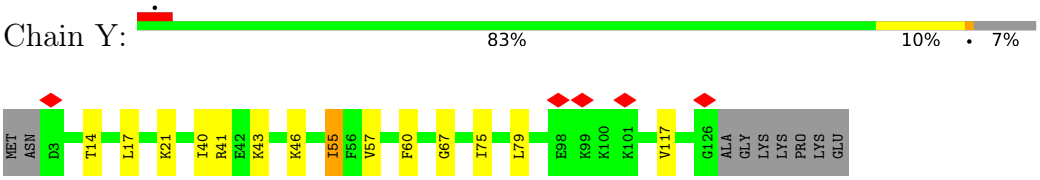

• Molecule 26: 40S ribosomal protein S23

Chain X:



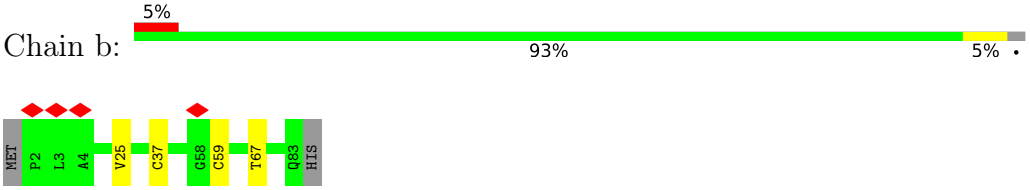

• Molecule 27: 40S ribosomal protein S24

Chain Y:



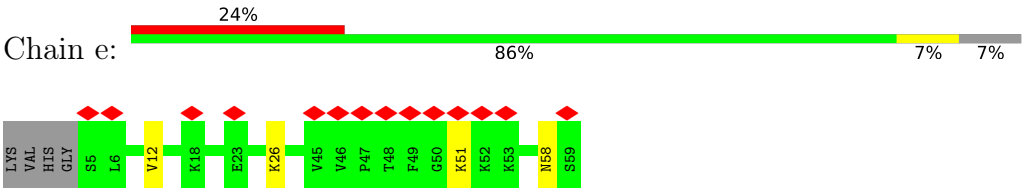

• Molecule 28: 40S ribosomal protein S27

Chain b:



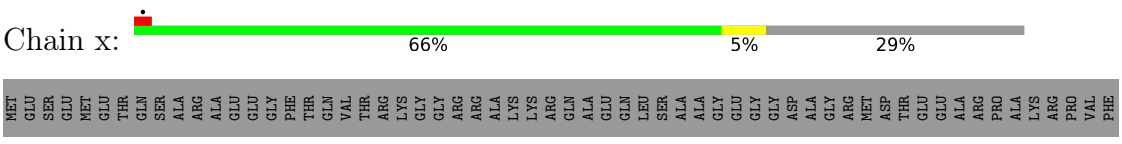

• Molecule 29: 40S ribosomal protein S30

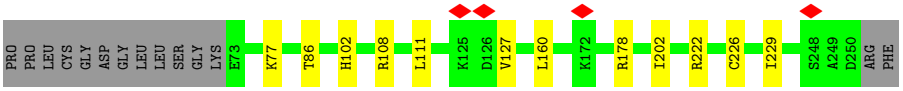
Chain e:




• Molecule 30: RNA-binding protein PNO1

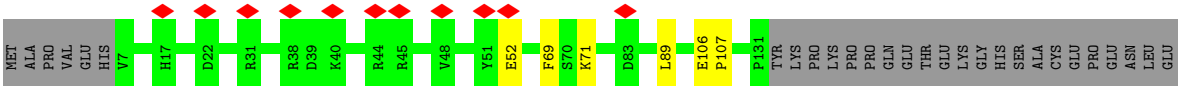
Chain x:

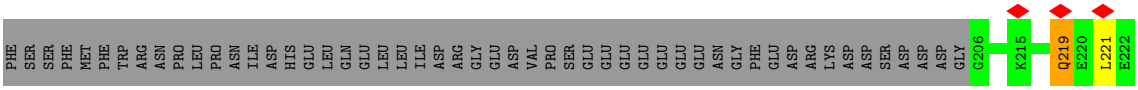


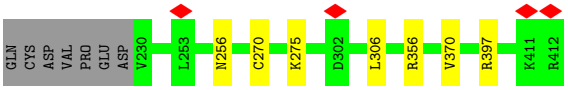


• Molecule 31: RNA-binding protein NOB1

Chain y:

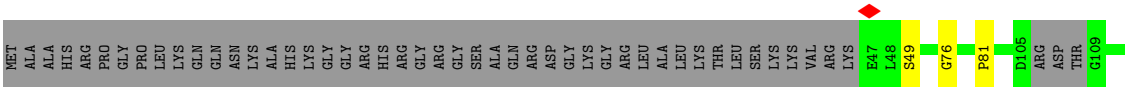



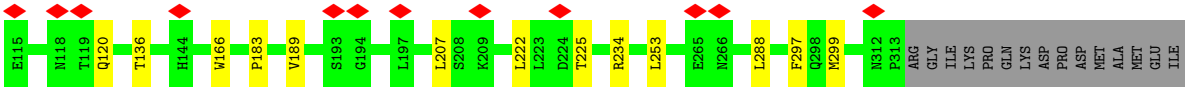


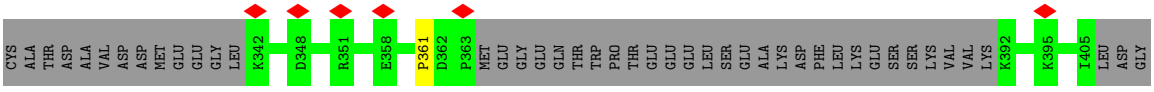


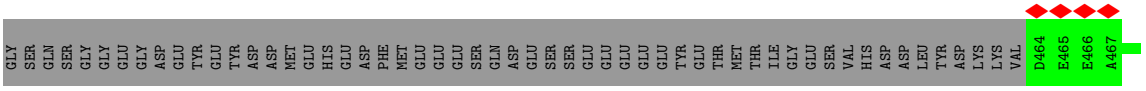
• Molecule 32: Pre-rRNA-processing protein TSR1 homolog

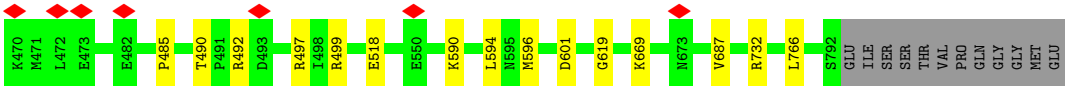
Chain u:



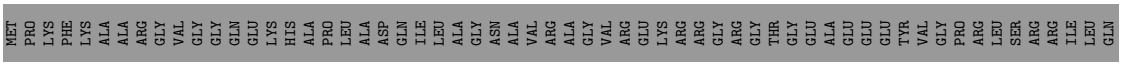


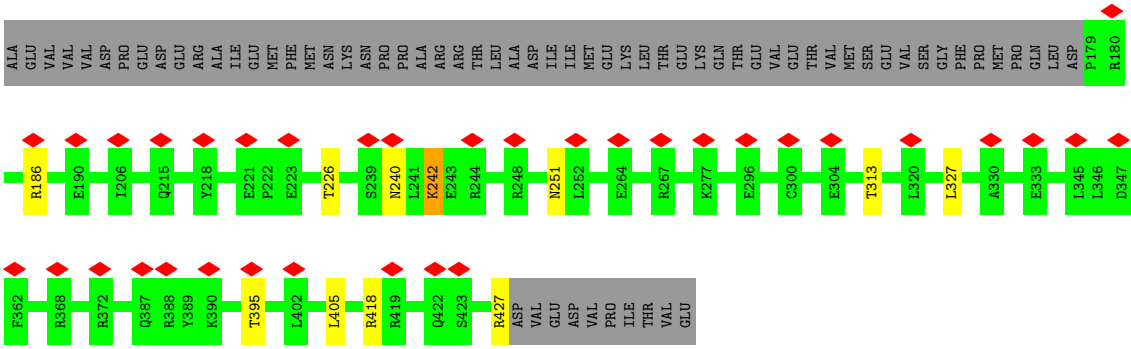




• Molecule 33: Bystin

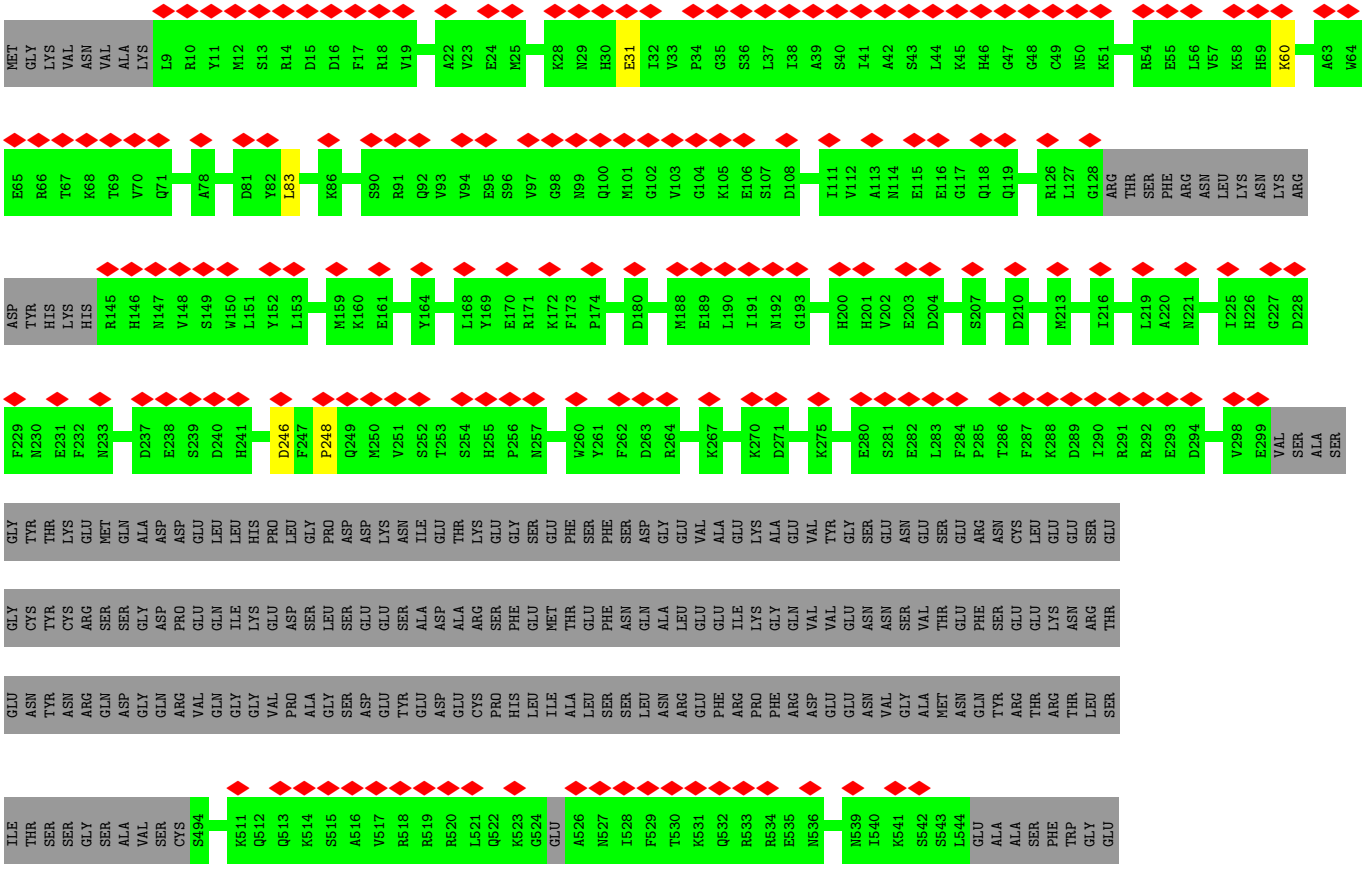
Chain w:



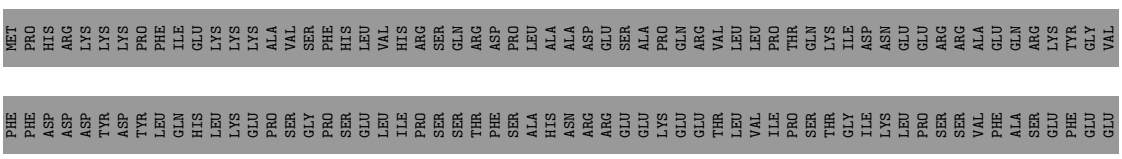
• Molecule 34: Serine/threonine-protein kinase RIO2

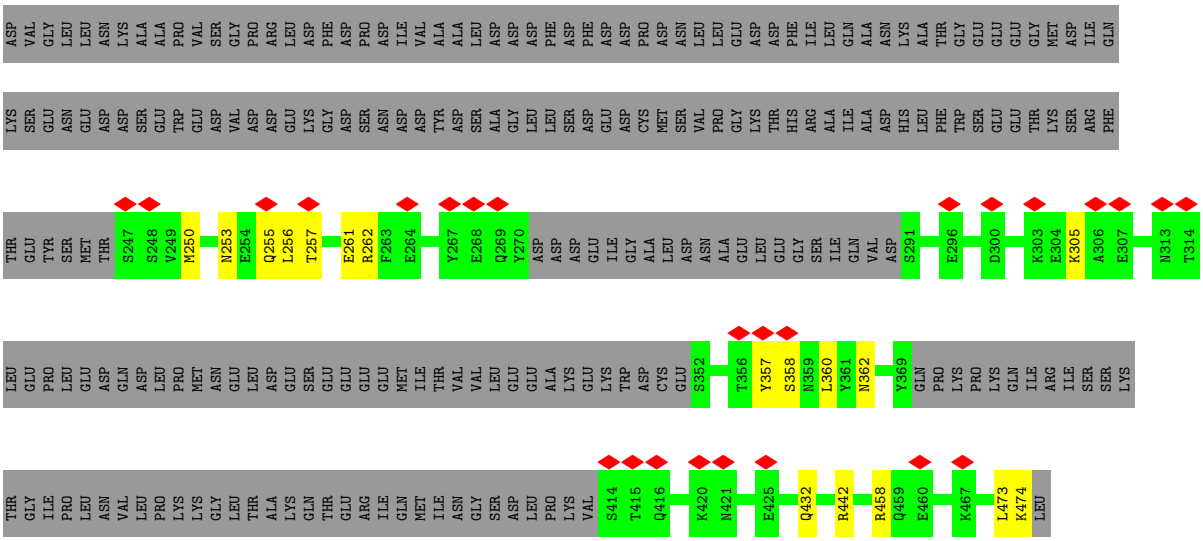
Chain v:

• Molecule 35: Protein LTV1 homolog

Chain t:


ASP VAL GLY LEU LEU ASN LYS ALA ALA PRO VAL SER GLY PRO ARG LEU ASP PHE ASP PRO ASP ILE VAL ALA ALA LEU ASP ASP ASP PHE ASP PHE ASP ASP PRO ASP ASN LEU LEU GLU ASP ASP PHE ILE LEU GLN ALA ASN LYS ALA THR GLY GLU GLU GLY MET ASP ILE GLN
LYS SER GLU ASN GLU ASP ASP SER GLU TRP GLU ASP VAL ASP ASP GLU LYS GLY ASP SER ASN ASP ASP TYR ASP SER ALA GLY LEU LEU SER ASP GLU ASP CYS MET SER VAL PRO GLY LYS THR HIS ARG ALA ILE ALA ASP HIS LEU PHE TRP SER GLU GLU THR LYS SER ARG PHE
THR GLU TYR SER MET THR S247 S248 V249 M250 N253 E254 Q255 L256 T257 E261 R262 F263 E264 Y267 E268 Q269 Y270 ASP ASP ASP GLU ILE GLY ALA LEU ASP ASN ALA GLU LEU GLU GLY SER ILE GLN VAL ASP S291 E296 D300 K303 E304 K305 A306 E307 N313 T314
LEU GLU PRO LEU GLU ASP GLN ASP LEU PRO MET ASN GLU LEU ASP GLU SER GLU GLU GLU GLU MET ILE THR VAL VAL LEU GLU GLU GLU ALA LYS GLU LYS TRP ASP CYS GLU S352 T356 Y357 S358 N359 L360 Y361 N362 Y369 GLN PRO LYS PRO LYS GLN ILE ARG ILE SER SER LYS
THR GLY ILE PRO LEU ASN VAL LEU PRO LYS LYS GLY LEU THR ALA LYS GLN THR GLU ARG ILE GLN MET ILE ASN GLY SER ASP LEU PRO LYS VAL S414 T415 Q416 K420 N421 E425 Q432 R442 R458 Q459 E460 K467 L473 K474 LEU

# 4 Experimental information (i)

| Property | Value | Source |
|---|---|---|
| EM reconstruction method | SINGLE PARTICLE | Depositor |
| Imposed symmetry | POINT, C1 | Depositor |
| Number of particles used | 287847 | Depositor |
| Resolution determination method | FSC 0.143 CUT-OFF | Depositor |
| CTF correction method | PHASE FLIPPING AND AMPLITUDE CORRECTION | Depositor |
| Microscope | FEI TITAN KRIOS | Depositor |
| Voltage (kV) | 300 | Depositor |
| Electron dose ($e^-/Å^2$) | 2.5 | Depositor |
| Minimum defocus (nm) | Not provided | |
| Maximum defocus (nm) | Not provided | |
| Magnification | Not provided | |
| Image detector | FEI FALCON II (4k x 4k) | Depositor |
| Maximum map value | 0.470 | Depositor |
| Minimum map value | -0.211 | Depositor |
| Average map value | 0.001 | Depositor |
| Map value standard deviation | 0.013 | Depositor |
| Recommended contour level | 0.0583 | Depositor |
| Map size (Å) | 390.24, 390.24, 390.24 | wwPDB |
| Map dimensions | 360, 360, 360 | wwPDB |
| Map angles (°) | 90.0, 90.0, 90.0 | wwPDB |
| Pixel spacing (Å) | 1.084, 1.084, 1.084 | Depositor |

# 5 Model quality

## 5.1 Standard geometry

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

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

| Mol | Chain | Bond lengths | | Bond angles | |
|---|---|---|---|---|---|
| | | RMSZ | #$\|Z\|>5$ | RMSZ | #$\|Z\|>5$ |
| 1 | 2 | 0.30 | 0/39590 | 0.68 | 13/61690 (0.0%) |
| 2 | F | 0.40 | 0/1516 | 0.74 | 0/2037 |
| 3 | M | 0.38 | 0/963 | 0.64 | 0/1291 |
| 4 | P | 0.41 | 0/1003 | 0.71 | 0/1341 |
| 5 | Q | 0.43 | 0/982 | 0.72 | 0/1318 |
| 6 | R | 0.41 | 0/1002 | 0.71 | 0/1345 |
| 7 | S | 0.41 | 0/1100 | 0.70 | 0/1475 |
| 8 | T | 0.45 | 0/1142 | 0.75 | 0/1530 |
| 9 | Z | 0.39 | 0/580 | 0.69 | 0/780 |
| 10 | c | 0.35 | 0/473 | 0.75 | 0/633 |
| 11 | f | 0.40 | 0/607 | 0.63 | 0/802 |
| 12 | g | 0.38 | 0/2490 | 0.59 | 0/3389 |
| 13 | A | 0.46 | 0/1742 | 0.72 | 0/2367 |
| 14 | B | 0.41 | 0/1756 | 0.67 | 0/2350 |
| 15 | C | 0.47 | 0/1726 | 0.67 | 1/2332 (0.0%) |
| 16 | E | 0.40 | 0/2118 | 0.65 | 0/2849 |
| 17 | G | 0.38 | 0/1885 | 0.69 | 0/2510 |
| 18 | H | 0.39 | 0/1524 | 0.64 | 0/2042 |
| 19 | I | 0.39 | 0/1711 | 0.66 | 0/2282 |
| 20 | J | 0.45 | 0/1524 | 0.73 | 0/2035 |
| 21 | L | 0.44 | 0/1250 | 0.65 | 0/1673 |
| 22 | N | 0.44 | 0/1226 | 0.71 | 0/1649 |
| 23 | O | 0.43 | 0/1022 | 0.73 | 0/1372 |
| 24 | V | 0.42 | 0/631 | 0.68 | 0/844 |
| 25 | W | 0.46 | 0/1051 | 0.71 | 0/1406 |
| 26 | X | 0.45 | 0/1116 | 0.71 | 0/1490 |
| 27 | Y | 0.42 | 0/1031 | 0.64 | 0/1370 |
| 28 | b | 0.39 | 0/653 | 0.61 | 0/876 |
| 29 | e | 0.44 | 0/443 | 0.66 | 0/582 |
| 30 | x | 0.46 | 0/1413 | 0.69 | 0/1906 |
| 31 | y | 0.40 | 0/2618 | 0.66 | 0/3536 |
| 32 | u | 0.41 | 0/5187 | 0.62 | 0/7011 |

| Mol | Chain | Bond lengths | | Bond angles | |
|---|---|---|---|---|---|
| | | RMSZ | $\#\|Z\| > 5$ | RMSZ | $\#\|Z\| > 5$ |
| 33 | w | 0.40 | 0/2074 | 0.61 | 0/2806 |
| 34 | v | 0.39 | 0/2644 | 0.55 | 0/3562 |
| 35 | t | 0.40 | 0/1075 | 0.79 | 3/1424 (0.2%) |
| All | All | 0.37 | 0/88868 | 0.68 | 17/127905 (0.0%) |

There are no bond length outliers.

All (17) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 35 | t | 357 | TYR | CB-CA-C | -10.34 | 89.73 | 110.40 |
| 35 | t | 357 | TYR | N-CA-C | -10.08 | 83.79 | 111.00 |
| 1 | 2 | 1494 | U | C2'-C3'-O3' | 7.60 | 126.22 | 109.50 |
| 1 | 2 | 1511 | U | C2'-C3'-O3' | 7.04 | 124.98 | 109.50 |
| 1 | 2 | 604 | A | C2'-C3'-O3' | 6.67 | 124.37 | 113.70 |
| 1 | 2 | 1231 | C | C2'-C3'-O3' | 6.63 | 124.31 | 113.70 |
| 1 | 2 | 958 | G | C2'-C3'-O3' | 6.55 | 124.17 | 113.70 |
| 35 | t | 358 | SER | N-CA-CB | -6.54 | 100.68 | 110.50 |
| 1 | 2 | 980 | A | C2'-C3'-O3' | 6.50 | 124.11 | 113.70 |
| 1 | 2 | 1726 | G | C2'-C3'-O3' | 6.26 | 123.72 | 113.70 |
| 1 | 2 | 1431 | G | C2'-C3'-O3' | 6.05 | 123.38 | 113.70 |
| 1 | 2 | 547 | G | C2'-C3'-O3' | 5.96 | 123.24 | 113.70 |
| 15 | C | 255 | LEU | CA-CB-CG | 5.83 | 128.72 | 115.30 |
| 1 | 2 | 1425 | G | C2'-C3'-O3' | 5.74 | 122.88 | 113.70 |
| 1 | 2 | 314 | U | C2'-C3'-O3' | 5.68 | 122.79 | 113.70 |
| 1 | 2 | 1648 | G | C4'-C3'-O3' | 5.32 | 123.64 | 113.00 |
| 1 | 2 | 1601 | A | C2'-C3'-O3' | 5.25 | 122.11 | 113.70 |

There are no chirality outliers.

There are no planarity outliers.

## 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 | 2 | 35407 | 0 | 17876 | 421 | 0 |
| 2 | F | 1495 | 0 | 1549 | 23 | 0 |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|---|---|---|---|---|---|---|
| 3 | M | 953 | 0 | 990 | 8 | 0 |
| 4 | P | 984 | 0 | 1028 | 13 | 0 |
| 5 | Q | 969 | 0 | 1030 | 8 | 0 |
| 6 | R | 990 | 0 | 1037 | 6 | 0 |
| 7 | S | 1083 | 0 | 1140 | 10 | 0 |
| 8 | T | 1122 | 0 | 1153 | 21 | 0 |
| 9 | Z | 574 | 0 | 627 | 6 | 0 |
| 10 | c | 471 | 0 | 499 | 0 | 0 |
| 11 | f | 596 | 0 | 627 | 0 | 0 |
| 12 | g | 2433 | 0 | 2389 | 0 | 0 |
| 13 | A | 1705 | 0 | 1706 | 25 | 0 |
| 14 | B | 1729 | 0 | 1803 | 9 | 0 |
| 15 | C | 1690 | 0 | 1777 | 19 | 0 |
| 16 | E | 2076 | 0 | 2177 | 17 | 0 |
| 17 | G | 1862 | 0 | 2018 | 20 | 0 |
| 18 | H | 1501 | 0 | 1593 | 14 | 0 |
| 19 | I | 1682 | 0 | 1769 | 15 | 0 |
| 20 | J | 1499 | 0 | 1618 | 11 | 0 |
| 21 | L | 1229 | 0 | 1302 | 6 | 0 |
| 22 | N | 1202 | 0 | 1289 | 8 | 0 |
| 23 | O | 1009 | 0 | 1034 | 17 | 0 |
| 24 | V | 625 | 0 | 628 | 9 | 0 |
| 25 | W | 1034 | 0 | 1080 | 7 | 0 |
| 26 | X | 1098 | 0 | 1167 | 10 | 0 |
| 27 | Y | 1014 | 0 | 1082 | 6 | 0 |
| 28 | b | 640 | 0 | 665 | 0 | 0 |
| 29 | e | 438 | 0 | 484 | 0 | 0 |
| 30 | x | 1391 | 0 | 1467 | 0 | 0 |
| 31 | y | 2568 | 0 | 2624 | 0 | 0 |
| 32 | u | 5062 | 0 | 5113 | 0 | 0 |
| 33 | w | 2027 | 0 | 2126 | 0 | 0 |
| 34 | v | 2593 | 0 | 2551 | 0 | 0 |
| 35 | t | 1066 | 0 | 1070 | 0 | 0 |
| 36 | f | 1 | 0 | 0 | 0 | 0 |
| 36 | y | 1 | 0 | 0 | 0 | 0 |
| All | All | 83819 | 0 | 68088 | 620 | 0 |

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

All (620) 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) |
|---|---|---|---|
| 1:2:872:A:N6 | 1:2:914:U:H3 | 1.01 | 1.43 |
| 1:2:830:A:N6 | 1:2:844:U:H3 | 0.85 | 1.32 |
| 1:2:1144:A:H2' | 1:2:1145:A:C8 | 1.74 | 1.23 |
| 1:2:872:A:N1 | 1:2:914:U:O4 | 1.82 | 1.11 |
| 1:2:1542:C:H5" | 8:T:62:ARG:NH2 | 1.68 | 1.07 |
| 1:2:1542:C:H5" | 8:T:62:ARG:HH21 | 1.21 | 1.03 |
| 1:2:943:U:H2' | 1:2:944:A:C8 | 1.96 | 1.00 |
| 1:2:1356:G:H2' | 1:2:1357:A:C8 | 1.98 | 0.97 |
| 1:2:1335:G:H1 | 1:2:1492:U:H3 | 1.12 | 0.96 |
| 1:2:830:A:N1 | 1:2:844:U:O4 | 2.04 | 0.89 |
| 1:2:1144:A:H2' | 1:2:1145:A:H8 | 1.34 | 0.84 |
| 1:2:981:A:H2' | 1:2:982:G:C8 | 2.12 | 0.84 |
| 1:2:666:U:H2' | 1:2:667:U:C6 | 2.12 | 0.84 |
| 1:2:830:A:N6 | 1:2:844:U:C2 | 2.42 | 0.84 |
| 1:2:1144:A:H1' | 1:2:1199:A:O2' | 1.78 | 0.83 |
| 1:2:1585:U:C5 | 8:T:67:ARG:HD2 | 2.15 | 0.81 |
| 1:2:1518:C:H5" | 1:2:1519:U:H5" | 1.61 | 0.81 |
| 20:J:128:VAL:O | 20:J:132:GLN:HG2 | 1.81 | 0.80 |
| 23:O:43:HIS:HD2 | 23:O:55:ARG:HB2 | 1.49 | 0.77 |
| 1:2:913:A:H2 | 18:H:99:ARG:H | 1.32 | 0.75 |
| 1:2:830:A:N6 | 1:2:844:U:N3 | 1.65 | 0.75 |
| 1:2:943:U:H2' | 1:2:944:A:H8 | 1.46 | 0.75 |
| 1:2:145:G:H2' | 1:2:146:G:C8 | 2.21 | 0.74 |
| 1:2:380:G:H22 | 1:2:382:C:H3' | 1.51 | 0.74 |
| 8:T:76:THR:HG22 | 8:T:94:ARG:HB3 | 1.69 | 0.73 |
| 1:2:925:G:H1 | 1:2:1017:U:H3 | 1.35 | 0.73 |
| 1:2:1857:G:H3' | 23:O:146:ARG:NH2 | 2.03 | 0.73 |
| 1:2:386:C:H2' | 1:2:387:C:C6 | 2.23 | 0.73 |
| 1:2:1630:A:H5" | 7:S:37:GLY:H | 1.54 | 0.72 |
| 14:B:82:ARG:HH12 | 14:B:191:ASP:HB2 | 1.52 | 0.72 |
| 17:G:135:PRO:HG2 | 17:G:141:ILE:HD13 | 1.70 | 0.72 |
| 21:L:80:MET:HB3 | 21:L:86:ILE:HG22 | 1.71 | 0.72 |
| 1:2:380:G:N2 | 1:2:382:C:H3' | 2.03 | 0.72 |
| 1:2:12:U:H2' | 1:2:13:C:C6 | 2.24 | 0.71 |
| 1:2:1817:G:H2' | 1:2:1818:A:C8 | 2.25 | 0.71 |
| 1:2:1857:G:H3' | 23:O:146:ARG:HH22 | 1.55 | 0.71 |
| 1:2:1217:A:H2' | 1:2:1218:C:C6 | 2.26 | 0.70 |
| 14:B:140:VAL:HG23 | 14:B:213:ARG:HG2 | 1.75 | 0.69 |
| 22:N:63:VAL:HG21 | 22:N:71:ILE:HD11 | 1.74 | 0.69 |
| 1:2:64:A:H2 | 1:2:83:A:H62 | 1.38 | 0.68 |
| 1:2:996:A:H2' | 1:2:997:A:C8 | 2.29 | 0.68 |
| 1:2:552:G:H2' | 1:2:553:U:C6 | 2.29 | 0.67 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:2:617:G:H4' | 26:X:88:ASP:HB3 | 1.75 | 0.67 |
| 1:2:1545:A:H2' | 1:2:1546:G:C8 | 2.29 | 0.67 |
| 1:2:16:G:H2' | 1:2:17:C:C6 | 2.29 | 0.67 |
| 1:2:1464:C:O2' | 1:2:1465:A:C8 | 2.46 | 0.67 |
| 1:2:595:U:H2' | 1:2:596:U:C6 | 2.30 | 0.67 |
| 1:2:931:C:H2' | 1:2:932:G:C8 | 2.30 | 0.67 |
| 1:2:1091:C:HO2' | 25:W:2:VAL:N | 1.93 | 0.66 |
| 18:H:93:VAL:HG11 | 18:H:133:LEU:HD12 | 1.77 | 0.66 |
| 1:2:118:C:H1' | 1:2:445:A:C5 | 2.30 | 0.66 |
| 19:I:12:ARG:HE | 19:I:18:ARG:HD3 | 1.60 | 0.66 |
| 1:2:1231:C:H2' | 1:2:1232:U:O4' | 1.96 | 0.66 |
| 1:2:872:A:N6 | 1:2:914:U:N3 | 1.83 | 0.65 |
| 1:2:624:C:H41 | 26:X:63:ASN:HD22 | 1.45 | 0.64 |
| 1:2:1374:C:H2' | 1:2:1375:G:O4' | 1.97 | 0.64 |
| 1:2:1726:G:H1 | 1:2:1808:U:H3 | 1.45 | 0.64 |
| 1:2:1797:U:H2' | 1:2:1798:C:C6 | 2.32 | 0.64 |
| 1:2:1530:U:H2' | 1:2:1531:A:O4' | 1.98 | 0.64 |
| 1:2:12:U:H2' | 1:2:13:C:H6 | 1.63 | 0.64 |
| 13:A:5:LEU:HD21 | 24:V:41:LYS:HA | 1.80 | 0.64 |
| 1:2:1628:C:H2' | 1:2:1629:C:C6 | 2.33 | 0.64 |
| 1:2:619:A:N1 | 26:X:114:ASP:HB2 | 2.13 | 0.63 |
| 1:2:1600:G:H2' | 1:2:1600:G:N3 | 2.13 | 0.63 |
| 1:2:1228:A:H2' | 1:2:1229:G:C8 | 2.34 | 0.63 |
| 1:2:808:A:HO2' | 1:2:809:A:H8 | 1.47 | 0.63 |
| 1:2:1037:G:H4' | 1:2:1845:A:H4' | 1.79 | 0.63 |
| 1:2:926:A:H2' | 1:2:927:C:O4' | 1.98 | 0.63 |
| 1:2:872:A:N1 | 1:2:914:U:C4 | 2.66 | 0.62 |
| 1:2:297:A:H5' | 16:E:132:GLY:HA2 | 1.82 | 0.62 |
| 1:2:1567:G:O2' | 8:T:37:VAL:HG23 | 1.99 | 0.62 |
| 23:O:62:VAL:HG11 | 23:O:67:ASP:HB2 | 1.82 | 0.62 |
| 1:2:980:A:H2' | 1:2:981:A:C8 | 2.35 | 0.61 |
| 1:2:1217:A:H2' | 1:2:1218:C:H6 | 1.64 | 0.61 |
| 1:2:1196:A:O5' | 1:2:1196:A:H8 | 1.83 | 0.61 |
| 23:O:99:ALA:H | 23:O:133:THR:HG22 | 1.64 | 0.61 |
| 1:2:495:U:H2' | 1:2:496:C:O4' | 2.01 | 0.61 |
| 1:2:51:U:H2' | 1:2:52:G:C8 | 2.35 | 0.61 |
| 13:A:84:GLN:HE22 | 13:A:101:GLY:H | 1.49 | 0.61 |
| 1:2:983:A:H2' | 1:2:984:C:O4' | 2.01 | 0.61 |
| 24:V:20:SER:HB3 | 24:V:59:ILE:HD11 | 1.82 | 0.61 |
| 1:2:51:U:H2' | 1:2:52:G:H8 | 1.66 | 0.60 |
| 1:2:444:G:N2 | 1:2:446:G:H3' | 2.17 | 0.60 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 19:I:83:TYR:HD2 | 19:I:101:ILE:HD13 | 1.67 | 0.60 |
| 1:2:1681:U:H2' | 1:2:1682:C:C6 | 2.36 | 0.60 |
| 7:S:26:ILE:HD12 | 7:S:59:LEU:HD11 | 1.84 | 0.60 |
| 1:2:1587:G:N2 | 8:T:63:HIS:HD2 | 2.00 | 0.60 |
| 1:2:1585:U:H5 | 8:T:67:ARG:HD2 | 1.64 | 0.59 |
| 1:2:1606:G:H22 | 1:2:1632:G:H2' | 1.68 | 0.59 |
| 27:Y:41:ARG:HA | 27:Y:55:ILE:HD11 | 1.83 | 0.59 |
| 1:2:29:G:H2' | 1:2:30:C:C6 | 2.37 | 0.59 |
| 1:2:808:A:O2' | 1:2:809:A:H8 | 1.85 | 0.59 |
| 1:2:1606:G:N2 | 1:2:1632:G:H2' | 2.17 | 0.59 |
| 13:A:66:VAL:HG21 | 13:A:185:MET:HB3 | 1.85 | 0.59 |
| 1:2:1144:A:H1' | 1:2:1199:A:HO2' | 1.66 | 0.59 |
| 22:N:84:LEU:HD13 | 22:N:89:TYR:HB2 | 1.84 | 0.59 |
| 1:2:441:C:H2' | 1:2:442:C:C6 | 2.38 | 0.58 |
| 1:2:1480:A:H2' | 1:2:1481:G:C8 | 2.37 | 0.58 |
| 1:2:301:A:H2' | 1:2:302:A:O4' | 2.03 | 0.58 |
| 1:2:1520:G:N3 | 1:2:1520:G:H2' | 2.18 | 0.58 |
| 3:M:32:ALA:HB2 | 3:M:112:LYS:HE3 | 1.85 | 0.58 |
| 1:2:293:C:O2 | 1:2:293:C:H2' | 2.04 | 0.58 |
| 1:2:1639:G:H2' | 1:2:1640:A:C8 | 2.39 | 0.58 |
| 1:2:220:U:H5' | 19:I:177:SER:HB2 | 1.86 | 0.58 |
| 1:2:346:C:H5" | 16:E:38:LEU:HD23 | 1.84 | 0.58 |
| 1:2:1502:C:H2' | 1:2:1503:C:C6 | 2.39 | 0.58 |
| 6:R:58:MET:HA | 6:R:61:ILE:HG22 | 1.85 | 0.57 |
| 14:B:136:ARG:HB3 | 14:B:216:LYS:HB2 | 1.86 | 0.57 |
| 1:2:171:A:C5' | 17:G:177:GLN:HG2 | 2.33 | 0.57 |
| 1:2:1798:C:H2' | 1:2:1799:G:O4' | 2.04 | 0.57 |
| 1:2:639:C:H2' | 1:2:640:A:C8 | 2.39 | 0.57 |
| 1:2:1268:C:H2' | 1:2:1269:G:O4' | 2.05 | 0.57 |
| 13:A:38:ILE:HD11 | 13:A:47:TYR:HB3 | 1.86 | 0.57 |
| 1:2:666:U:H2' | 1:2:667:U:H6 | 1.65 | 0.57 |
| 1:2:1143:A:H2' | 1:2:1144:A:C8 | 2.39 | 0.57 |
| 17:G:62:PRO:HG2 | 17:G:83:CYS:HB2 | 1.86 | 0.57 |
| 1:2:104:A:H62 | 1:2:356:C:H5 | 1.53 | 0.57 |
| 1:2:107:A:H2' | 1:2:108:G:C8 | 2.39 | 0.57 |
| 1:2:441:C:H2' | 1:2:442:C:H6 | 1.69 | 0.57 |
| 1:2:551:U:H2' | 1:2:552:G:C8 | 2.40 | 0.57 |
| 1:2:1144:A:C2' | 1:2:1145:A:C8 | 2.68 | 0.57 |
| 14:B:49:VAL:HG21 | 14:B:62:LEU:HD22 | 1.87 | 0.57 |
| 15:C:137:VAL:HG21 | 15:C:244:ILE:HD12 | 1.87 | 0.57 |
| 1:2:1628:C:H2' | 1:2:1629:C:H6 | 1.69 | 0.56 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:2:1779:G:H2' | 1:2:1780:G:C8 | 2.40 | 0.56 |
| 25:W:30:CYS:HB2 | 25:W:61:ILE:HD11 | 1.87 | 0.56 |
| 1:2:386:C:H2' | 1:2:387:C:H6 | 1.70 | 0.56 |
| 1:2:594:A:H61 | 1:2:643:A:H5" | 1.70 | 0.56 |
| 1:2:928:G:H1 | 1:2:1013:U:H3 | 1.51 | 0.56 |
| 9:Z:50:PHE:HZ | 9:Z:87:ALA:HB2 | 1.70 | 0.56 |
| 1:2:1139:C:H2' | 1:2:1140:G:O4' | 2.05 | 0.56 |
| 1:2:1144:A:C2 | 1:2:1145:A:C6 | 2.94 | 0.56 |
| 13:A:77:ILE:HG12 | 13:A:99:ILE:HB | 1.88 | 0.56 |
| 1:2:1746:U:H4' | 17:G:65:GLN:HE21 | 1.71 | 0.56 |
| 8:T:62:ARG:NH1 | 8:T:62:ARG:HG3 | 2.22 | 0.55 |
| 13:A:143:PRO:HG3 | 24:V:32:ILE:HG23 | 1.88 | 0.55 |
| 4:P:43:ARG:O | 4:P:47:ARG:HG2 | 2.07 | 0.55 |
| 14:B:121:ILE:HG12 | 14:B:161:VAL:HG13 | 1.88 | 0.55 |
| 19:I:143:LYS:O | 19:I:146:GLN:HG2 | 2.06 | 0.55 |
| 1:2:332:G:H5' | 17:G:193:ALA:HB2 | 1.89 | 0.55 |
| 1:2:1636:G:H1' | 2:F:164:ARG:NH2 | 2.22 | 0.55 |
| 1:2:375:U:H2' | 1:2:376:A:C8 | 2.41 | 0.55 |
| 1:2:533:A:H61 | 1:2:550:C:H42 | 1.55 | 0.55 |
| 5:Q:100:VAL:HG12 | 5:Q:101:ASP:N | 2.22 | 0.55 |
| 1:2:448:A:H4' | 1:2:449:A:H5' | 1.88 | 0.55 |
| 1:2:1319:U:H2' | 1:2:1320:G:O4' | 2.06 | 0.55 |
| 1:2:1781:A:H2' | 1:2:1782:G:C8 | 2.41 | 0.55 |
| 1:2:14:C:H2' | 1:2:15:U:C6 | 2.41 | 0.54 |
| 1:2:501:C:O2 | 1:2:501:C:H2' | 2.08 | 0.54 |
| 1:2:1277:C:H2' | 1:2:1278:A:C8 | 2.42 | 0.54 |
| 5:Q:100:VAL:HG12 | 5:Q:101:ASP:H | 1.72 | 0.54 |
| 1:2:93:U:H1' | 16:E:7:LYS:HE2 | 1.89 | 0.54 |
| 1:2:1144:A:C2' | 1:2:1145:A:H8 | 2.15 | 0.54 |
| 1:2:1196:A:O5' | 1:2:1196:A:C8 | 2.60 | 0.54 |
| 15:C:94:ILE:HG13 | 15:C:159:LYS:O | 2.08 | 0.54 |
| 13:A:56:GLU:HG2 | 24:V:79:VAL:HG13 | 1.89 | 0.54 |
| 1:2:1322:G:N2 | 1:2:1324:G:O4' | 2.40 | 0.54 |
| 1:2:1408:U:H2' | 1:2:1409:A:C8 | 2.42 | 0.54 |
| 15:C:202:THR:HG23 | 20:J:54:ARG:HH22 | 1.71 | 0.54 |
| 1:2:103:A:OP2 | 1:2:356:C:N4 | 2.41 | 0.54 |
| 1:2:913:A:H2 | 18:H:99:ARG:N | 2.04 | 0.54 |
| 1:2:575:A:H2' | 1:2:576:A:O4' | 2.08 | 0.54 |
| 1:2:1788:A:H2' | 1:2:1789:G:O4' | 2.08 | 0.54 |
| 15:C:131:GLY:HA3 | 15:C:216:MET:HB3 | 1.90 | 0.54 |
| 1:2:1865:C:O4' | 1:2:1865:C:O2 | 2.24 | 0.54 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:2:1099:G:O2' | 1:2:1100:A:H8 | 1.91 | 0.53 |
| 1:2:1502:C:H2' | 1:2:1503:C:H6 | 1.72 | 0.53 |
| 1:2:501:C:O2 | 1:2:501:C:C2' | 2.56 | 0.53 |
| 1:2:595:U:H2' | 1:2:596:U:H6 | 1.72 | 0.53 |
| 1:2:15:U:H2' | 1:2:16:G:O4' | 2.08 | 0.53 |
| 1:2:45:A:N6 | 1:2:481:C:H4' | 2.23 | 0.53 |
| 1:2:370:G:H4' | 1:2:371:A:OP1 | 2.09 | 0.53 |
| 7:S:80:PRO:HB2 | 7:S:82:TRP:CZ3 | 2.44 | 0.53 |
| 2:F:154:LEU:HD22 | 2:F:177:LEU:HD12 | 1.91 | 0.53 |
| 27:Y:57:VAL:HB | 27:Y:60:PHE:HE2 | 1.73 | 0.53 |
| 1:2:349:A:H2' | 1:2:350:C:C6 | 2.44 | 0.53 |
| 15:C:209:VAL:HB | 15:C:210:PRO:CD | 2.38 | 0.53 |
| 1:2:57:U:H1' | 1:2:499:G:O2' | 2.08 | 0.53 |
| 13:A:120:ARG:HH21 | 15:C:267:GLN:HA | 1.72 | 0.53 |
| 1:2:528:A:H2' | 1:2:529:A:C8 | 2.44 | 0.53 |
| 1:2:1203:G:H22 | 1:2:1694:U:H2' | 1.72 | 0.53 |
| 1:2:1606:G:HO2' | 1:2:1607:A:H8 | 1.55 | 0.53 |
| 1:2:1608:U:H2' | 1:2:1609:C:O4' | 2.09 | 0.53 |
| 6:R:74:GLN:O | 6:R:78:ARG:HB2 | 2.09 | 0.53 |
| 1:2:44:U:O2' | 1:2:45:A:H2' | 2.08 | 0.53 |
| 3:M:33:ARG:H | 3:M:33:ARG:HD3 | 1.74 | 0.53 |
| 8:T:11:GLN:HB3 | 8:T:62:ARG:HH22 | 1.74 | 0.53 |
| 1:2:853:C:O4' | 1:2:853:C:O2 | 2.28 | 0.52 |
| 1:2:1485:U:H2' | 1:2:1486:A:H8 | 1.74 | 0.52 |
| 1:2:1536:G:H2' | 1:2:1537:A:C8 | 2.45 | 0.52 |
| 1:2:1045:U:H2' | 1:2:1046:U:C6 | 2.45 | 0.52 |
| 16:E:42:LEU:HD13 | 16:E:47:PHE:HB2 | 1.92 | 0.52 |
| 1:2:1204:A:N3 | 1:2:1204:A:H2' | 2.25 | 0.52 |
| 2:F:81:ARG:HG3 | 2:F:81:ARG:HH11 | 1.75 | 0.52 |
| 3:M:93:LYS:H | 3:M:102:LYS:HB3 | 1.73 | 0.52 |
| 8:T:62:ARG:HG3 | 8:T:62:ARG:HH11 | 1.74 | 0.52 |
| 2:F:76:MET:HB3 | 2:F:89:THR:CG2 | 2.39 | 0.52 |
| 1:2:980:A:H2' | 1:2:981:A:H8 | 1.72 | 0.52 |
| 1:2:4:C:H4' | 15:C:207:ALA:HB2 | 1.90 | 0.52 |
| 1:2:1228:A:H2' | 1:2:1229:G:H8 | 1.74 | 0.52 |
| 1:2:1305:C:C2 | 1:2:1306:U:H5 | 2.28 | 0.52 |
| 9:Z:79:ILE:HG23 | 9:Z:83:LEU:HD23 | 1.91 | 0.52 |
| 1:2:171:A:H5" | 17:G:177:GLN:HG2 | 1.92 | 0.52 |
| 20:J:121:LYS:H | 20:J:125:HIS:HD2 | 1.58 | 0.52 |
| 1:2:639:C:H2' | 1:2:640:A:H8 | 1.75 | 0.51 |
| 1:2:212:C:H2' | 1:2:213:G:C8 | 2.45 | 0.51 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:2:291:G:H2' | 1:2:292:A:C8 | 2.46 | 0.51 |
| 1:2:1195:A:H2' | 1:2:1196:A:C8 | 2.45 | 0.51 |
| 23:O:50:LYS:HB3 | 23:O:51:GLU:OE1 | 2.09 | 0.51 |
| 1:2:928:G:H2' | 1:2:929:G:C8 | 2.45 | 0.51 |
| 1:2:1025:U:H2' | 1:2:1026:C:O4' | 2.10 | 0.51 |
| 1:2:1779:G:H2' | 1:2:1780:G:H8 | 1.75 | 0.51 |
| 1:2:126:G:OP1 | 17:G:198:ARG:NH1 | 2.44 | 0.51 |
| 2:F:38:TYR:HD2 | 2:F:143:PRO:HB2 | 1.76 | 0.51 |
| 23:O:97:LEU:HD11 | 23:O:112:ALA:HB1 | 1.92 | 0.51 |
| 1:2:1102:G:H2' | 1:2:1103:C:C6 | 2.45 | 0.51 |
| 1:2:1353:A:N6 | 1:2:1354:G:C6 | 2.79 | 0.51 |
| 1:2:1797:U:H2' | 1:2:1798:C:H6 | 1.73 | 0.51 |
| 19:I:193:LYS:O | 19:I:196:GLU:HG2 | 2.11 | 0.51 |
| 1:2:483:C:H2' | 1:2:484:A:C8 | 2.46 | 0.51 |
| 1:2:1587:G:H22 | 8:T:63:HIS:HD2 | 1.57 | 0.51 |
| 8:T:60:THR:HG23 | 8:T:75:MET:SD | 2.51 | 0.51 |
| 16:E:19:MET:SD | 16:E:108:ARG:HD2 | 2.51 | 0.51 |
| 1:2:946:U:H2' | 1:2:947:G:O4' | 2.11 | 0.50 |
| 1:2:1322:G:H21 | 1:2:1323:U:H2' | 1.76 | 0.50 |
| 1:2:1365:G:H2' | 1:2:1366:G:C8 | 2.45 | 0.50 |
| 1:2:1017:U:H2' | 1:2:1018:U:C6 | 2.46 | 0.50 |
| 1:2:685:A:N6 | 1:2:917:U:N3 | 2.58 | 0.50 |
| 1:2:808:A:H5" | 16:E:219:ALA:O | 2.11 | 0.50 |
| 13:A:132:GLN:N | 13:A:133:PRO:HD2 | 2.26 | 0.50 |
| 1:2:1390:U:H2' | 1:2:1391:C:O4' | 2.12 | 0.50 |
| 1:2:1659:U:N3 | 1:2:1664:A:N6 | 2.60 | 0.50 |
| 2:F:128:ILE:HD12 | 2:F:137:GLN:HB3 | 1.93 | 0.50 |
| 21:L:66:VAL:HG11 | 21:L:134:LEU:HD21 | 1.94 | 0.50 |
| 1:2:1397:U:H3 | 5:Q:12:VAL:HA | 1.76 | 0.50 |
| 1:2:1600:G:N3 | 1:2:1600:G:C2' | 2.75 | 0.50 |
| 7:S:26:ILE:HD13 | 7:S:45:LEU:HD21 | 1.92 | 0.50 |
| 15:C:68:ARG:HD3 | 15:C:276:THR:HG21 | 1.93 | 0.50 |
| 15:C:88:ILE:HD13 | 15:C:94:ILE:HD11 | 1.93 | 0.50 |
| 21:L:66:VAL:HB | 21:L:131:CYS:SG | 2.51 | 0.50 |
| 1:2:957:A:H3' | 1:2:958:G:H21 | 1.77 | 0.50 |
| 1:2:1143:A:H5' | 15:C:190:SER:HB3 | 1.93 | 0.50 |
| 1:2:1474:A:H2' | 1:2:1475:G:C8 | 2.47 | 0.50 |
| 1:2:1733:U:H2' | 1:2:1734:G:O4' | 2.12 | 0.50 |
| 18:H:83:LEU:HD23 | 18:H:92:VAL:HG11 | 1.92 | 0.50 |
| 1:2:446:G:OP2 | 19:I:47:ARG:NH2 | 2.44 | 0.49 |
| 1:2:640:A:H2' | 1:2:641:A:C8 | 2.47 | 0.49 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:2:798:G:H4' | 18:H:108:SER:HB2 | 1.93 | 0.49 |
| 1:2:1606:G:H5' | 8:T:86:GLY:HA2 | 1.93 | 0.49 |
| 22:N:54:LEU:HB3 | 22:N:60:VAL:HB | 1.94 | 0.49 |
| 1:2:830:A:N1 | 1:2:844:U:C4 | 2.80 | 0.49 |
| 1:2:1298:G:H2' | 1:2:1298:G:N3 | 2.28 | 0.49 |
| 1:2:1308:U:H1' | 1:2:1309:C:C5 | 2.48 | 0.49 |
| 1:2:1818:A:H2' | 1:2:1819:A:O4' | 2.11 | 0.49 |
| 1:2:1395:C:H2' | 1:2:1396:A:N3 | 2.27 | 0.49 |
| 1:2:1478:U:H2' | 1:2:1479:G:C8 | 2.48 | 0.49 |
| 1:2:26:U:H2' | 1:2:27:A:O4' | 2.12 | 0.49 |
| 1:2:145:G:H2' | 1:2:146:G:H8 | 1.71 | 0.49 |
| 1:2:1045:U:H2' | 1:2:1046:U:H6 | 1.78 | 0.49 |
| 1:2:1535:U:H5' | 2:F:169:ILE:HD11 | 1.94 | 0.49 |
| 2:F:92:ILE:HG12 | 2:F:169:ILE:HD13 | 1.95 | 0.49 |
| 1:2:508:A:H3' | 1:2:509:G:H8 | 1.78 | 0.49 |
| 8:T:42:HIS:HB3 | 8:T:93:SER:HB2 | 1.94 | 0.49 |
| 27:Y:55:ILE:HG22 | 27:Y:75:ILE:HG23 | 1.94 | 0.49 |
| 4:P:33:LEU:C | 4:P:35:GLN:H | 2.16 | 0.49 |
| 13:A:18:PHE:HD1 | 13:A:23:THR:HG1 | 1.59 | 0.49 |
| 16:E:124:CYS:HA | 16:E:142:HIS:HE1 | 1.78 | 0.49 |
| 1:2:443:U:H2' | 1:2:444:G:O4' | 2.12 | 0.49 |
| 17:G:98:ARG:HH22 | 17:G:103:ASP:HB2 | 1.78 | 0.49 |
| 20:J:111:GLN:HE21 | 20:J:123:ILE:HG13 | 1.78 | 0.49 |
| 1:2:349:A:H2' | 1:2:350:C:H6 | 1.76 | 0.48 |
| 1:2:1653:U:H2' | 1:2:1654:G:C8 | 2.48 | 0.48 |
| 1:2:58:C:H5" | 1:2:499:G:N2 | 2.28 | 0.48 |
| 1:2:591:U:O2' | 1:2:592:C:H3' | 2.13 | 0.48 |
| 1:2:1464:C:O2' | 1:2:1465:A:H8 | 1.93 | 0.48 |
| 22:N:5:HIS:CE1 | 22:N:121:ARG:HG3 | 2.48 | 0.48 |
| 1:2:1845:A:H2' | 1:2:1846:G:C8 | 2.48 | 0.48 |
| 13:A:140:VAL:CG1 | 13:A:140:VAL:O | 2.61 | 0.48 |
| 1:2:1691:U:H2' | 1:2:1692:U:O4' | 2.13 | 0.48 |
| 8:T:134:ILE:O | 8:T:138:VAL:HG23 | 2.13 | 0.48 |
| 23:O:43:HIS:CD2 | 23:O:55:ARG:HB2 | 2.39 | 0.48 |
| 1:2:1324:G:N2 | 1:2:1504:U:H2' | 2.28 | 0.48 |
| 1:2:212:C:H2' | 1:2:213:G:H8 | 1.77 | 0.48 |
| 1:2:399:C:H3' | 1:2:400:C:H5' | 1.95 | 0.48 |
| 1:2:1073:U:H2' | 1:2:1074:C:C6 | 2.48 | 0.48 |
| 1:2:213:G:H2' | 1:2:214:U:O4' | 2.14 | 0.48 |
| 1:2:49:C:H41 | 1:2:472:C:H2' | 1.78 | 0.48 |
| 1:2:1377:U:H3' | 13:A:102:ARG:HH21 | 1.78 | 0.48 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:2:942:G:H2' | 1:2:943:U:C6 | 2.49 | 0.48 |
| 1:2:1454:A:C8 | 6:R:3:ARG:HD2 | 2.49 | 0.48 |
| 1:2:673:G:H2' | 1:2:674:C:C6 | 2.49 | 0.48 |
| 1:2:1143:A:H2' | 1:2:1144:A:O4' | 2.14 | 0.48 |
| 1:2:1385:G:OP1 | 1:2:1484:A:H5' | 2.14 | 0.48 |
| 1:2:70:G:O5' | 1:2:70:G:H8 | 1.97 | 0.47 |
| 1:2:1324:G:H22 | 1:2:1504:U:H2' | 1.79 | 0.47 |
| 16:E:44:LEU:HD13 | 16:E:72:ILE:HD11 | 1.95 | 0.47 |
| 23:O:98:ARG:HH21 | 23:O:134:PRO:HG3 | 1.78 | 0.47 |
| 1:2:219:U:H4' | 19:I:182:CYS:SG | 2.54 | 0.47 |
| 1:2:940:U:H3 | 1:2:1002:U:H3 | 1.60 | 0.47 |
| 2:F:35:LEU:HD21 | 2:F:146:ARG:HD3 | 1.96 | 0.47 |
| 1:2:941:C:H2' | 1:2:942:G:C8 | 2.49 | 0.47 |
| 1:2:1536:G:H2' | 1:2:1537:A:H8 | 1.79 | 0.47 |
| 4:P:83:MET:HB3 | 4:P:116:LEU:HD12 | 1.96 | 0.47 |
| 22:N:136:PRO:HG2 | 22:N:139:TRP:HB2 | 1.95 | 0.47 |
| 1:2:434:G:H2' | 1:2:435:A:C8 | 2.49 | 0.47 |
| 1:2:872:A:N6 | 1:2:914:U:C2 | 2.65 | 0.47 |
| 5:Q:116:ASP:HB3 | 5:Q:119:LEU:HD12 | 1.96 | 0.47 |
| 1:2:29:G:H2' | 1:2:30:C:H6 | 1.79 | 0.47 |
| 1:2:106:C:H5" | 1:2:431:G:O2' | 2.15 | 0.47 |
| 1:2:337:C:H3' | 1:2:338:G:H5" | 1.96 | 0.47 |
| 1:2:798:G:O2' | 18:H:106:ARG:HA | 2.14 | 0.47 |
| 1:2:1139:C:O4' | 1:2:1139:C:O2 | 2.32 | 0.47 |
| 1:2:1220:A:H2' | 1:2:1221:G:O4' | 2.15 | 0.47 |
| 1:2:1707:U:H2' | 1:2:1708:C:C6 | 2.50 | 0.47 |
| 27:Y:43:LYS:O | 27:Y:46:LYS:HG2 | 2.15 | 0.47 |
| 1:2:996:A:H2' | 1:2:997:A:H8 | 1.77 | 0.47 |
| 1:2:1532:C:H4' | 1:2:1604:G:H21 | 1.79 | 0.47 |
| 1:2:1624:U:O2 | 1:2:1624:U:O4' | 2.30 | 0.47 |
| 1:2:427:U:O4' | 1:2:427:U:O2 | 2.32 | 0.47 |
| 1:2:872:A:N3 | 1:2:872:A:H2' | 2.28 | 0.47 |
| 1:2:925:G:H2' | 1:2:926:A:H5" | 1.97 | 0.47 |
| 1:2:1614:A:P | 4:P:42:ARG:HH22 | 2.38 | 0.47 |
| 1:2:1630:A:H5" | 7:S:37:GLY:N | 2.26 | 0.47 |
| 26:X:100:VAL:HG13 | 26:X:122:VAL:HG13 | 1.95 | 0.47 |
| 1:2:352:U:H2' | 1:2:353:C:C6 | 2.50 | 0.47 |
| 1:2:374:G:H2' | 1:2:375:U:C6 | 2.50 | 0.47 |
| 1:2:415:A:H2' | 1:2:416:U:O4' | 2.15 | 0.47 |
| 1:2:886:A:N3 | 1:2:886:A:H2' | 2.30 | 0.47 |
| 1:2:1181:A:H2' | 1:2:1182:A:C8 | 2.50 | 0.47 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:2:25:A:N6 | 1:2:26:U:O4 | 2.48 | 0.47 |
| 1:2:560:A:H5' | 20:J:174:LYS:HE3 | 1.96 | 0.47 |
| 1:2:587:A:H5' | 1:2:592:C:H41 | 1.79 | 0.47 |
| 1:2:1144:A:H2' | 1:2:1145:A:N7 | 2.22 | 0.47 |
| 1:2:1542:C:H5" | 8:T:62:ARG:HH22 | 1.71 | 0.47 |
| 18:H:20:GLU:HG2 | 18:H:48:ALA:HB3 | 1.97 | 0.47 |
| 19:I:48:VAL:HG11 | 19:I:54:LYS:HD2 | 1.96 | 0.47 |
| 1:2:433:A:H5" | 19:I:25:ARG:HH22 | 1.80 | 0.46 |
| 1:2:433:A:N6 | 1:2:434:G:O6 | 2.48 | 0.46 |
| 1:2:1662:U:H2' | 1:2:1663:A:O4' | 2.15 | 0.46 |
| 1:2:1781:A:H2' | 1:2:1782:G:H8 | 1.80 | 0.46 |
| 13:A:103:PHE:HE2 | 13:A:136:GLU:HG3 | 1.80 | 0.46 |
| 18:H:121:THR:HG23 | 18:H:122:LEU:N | 2.30 | 0.46 |
| 18:H:145:ARG:HD3 | 25:W:51:GLU:HG3 | 1.97 | 0.46 |
| 21:L:68:ILE:HG13 | 21:L:143:LEU:HD21 | 1.97 | 0.46 |
| 23:O:116:LEU:HD11 | 23:O:129:ILE:HD12 | 1.97 | 0.46 |
| 1:2:556:U:H2' | 1:2:557:U:O4' | 2.15 | 0.46 |
| 1:2:1590:C:H5' | 1:2:1591:C:OP2 | 2.16 | 0.46 |
| 6:R:17:ILE:HG13 | 6:R:57:LEU:HD23 | 1.96 | 0.46 |
| 1:2:1038:U:O2' | 1:2:1180:C:N3 | 2.49 | 0.46 |
| 1:2:1447:G:H2' | 1:2:1448:A:C8 | 2.51 | 0.46 |
| 1:2:1612:G:H1' | 7:S:87:GLN:HG3 | 1.96 | 0.46 |
| 6:R:23:ARG:HB3 | 6:R:34:VAL:HG21 | 1.96 | 0.46 |
| 17:G:64:LYS:HB2 | 17:G:97:VAL:HG11 | 1.97 | 0.46 |
| 24:V:71:ARG:HH22 | 25:W:23:ARG:HH21 | 1.63 | 0.46 |
| 1:2:303:C:H5" | 19:I:75:LYS:HD3 | 1.98 | 0.46 |
| 1:2:823:U:H5 | 20:J:143:ASN:HB3 | 1.79 | 0.46 |
| 1:2:918:U:O2' | 1:2:919:A:O4' | 2.34 | 0.46 |
| 1:2:943:U:HO2' | 23:O:136:PRO:HA | 1.79 | 0.46 |
| 1:2:1614:A:OP2 | 4:P:42:ARG:NH2 | 2.48 | 0.46 |
| 16:E:44:LEU:HD11 | 16:E:70:ILE:HG21 | 1.97 | 0.46 |
| 19:I:42:ARG:HH12 | 19:I:59:ARG:HE | 1.64 | 0.46 |
| 1:2:223:C:H2' | 1:2:224:A:C8 | 2.50 | 0.46 |
| 1:2:680:G:H2' | 1:2:681:U:C6 | 2.50 | 0.46 |
| 4:P:41:GLN:H | 4:P:41:GLN:HG2 | 1.50 | 0.46 |
| 1:2:674:C:H2' | 1:2:675:U:C6 | 2.50 | 0.46 |
| 1:2:1064:C:H2' | 1:2:1065:G:H8 | 1.80 | 0.46 |
| 1:2:1632:G:OP2 | 7:S:34:LYS:HG3 | 2.16 | 0.46 |
| 1:2:1806:A:H2' | 1:2:1807:C:C6 | 2.51 | 0.46 |
| 18:H:69:LEU:O | 18:H:73:GLN:HG2 | 2.16 | 0.46 |
| 1:2:171:A:H5' | 17:G:177:GLN:HG2 | 1.97 | 0.46 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:2:115:U:H2' | 1:2:116:U:C6 | 2.51 | 0.46 |
| 1:2:340:C:H2' | 1:2:341:C:O4' | 2.16 | 0.46 |
| 1:2:594:A:H1' | 1:2:595:U:C6 | 2.51 | 0.46 |
| 1:2:1447:G:H2' | 1:2:1448:A:H8 | 1.81 | 0.46 |
| 2:F:76:MET:CE | 2:F:173:LEU:HD13 | 2.46 | 0.46 |
| 1:2:27:A:H2' | 1:2:28:U:O4' | 2.16 | 0.46 |
| 1:2:199:C:H3' | 1:2:200:G:H8 | 1.81 | 0.46 |
| 1:2:1073:U:H2' | 1:2:1074:C:H6 | 1.81 | 0.46 |
| 13:A:140:VAL:O | 13:A:140:VAL:HG12 | 2.16 | 0.46 |
| 1:2:5:U:H2' | 1:2:6:G:H8 | 1.81 | 0.45 |
| 1:2:155:G:H21 | 17:G:56:ASN:HD21 | 1.65 | 0.45 |
| 1:2:375:U:H2' | 1:2:376:A:H8 | 1.79 | 0.45 |
| 1:2:941:C:H2' | 1:2:942:G:H8 | 1.82 | 0.45 |
| 19:I:142:SER:HB2 | 19:I:145:ILE:HD12 | 1.97 | 0.45 |
| 1:2:215:G:H2' | 1:2:216:C:C6 | 2.52 | 0.45 |
| 1:2:376:A:H2' | 1:2:377:G:O4' | 2.16 | 0.45 |
| 13:A:68:ILE:HG23 | 13:A:120:ARG:NH1 | 2.31 | 0.45 |
| 26:X:51:VAL:HG13 | 26:X:70:VAL:HG13 | 1.99 | 0.45 |
| 1:2:498:C:H2' | 1:2:499:G:O4' | 2.17 | 0.45 |
| 1:2:616:A:H2' | 1:2:617:G:O4' | 2.15 | 0.45 |
| 1:2:1284:A:O4' | 1:2:1312:G:N2 | 2.50 | 0.45 |
| 1:2:1793:A:C2 | 1:2:1794:C:C5 | 3.05 | 0.45 |
| 3:M:121:LYS:O | 3:M:125:GLU:HB2 | 2.17 | 0.45 |
| 1:2:524:U:H5" | 1:2:525:A:O4' | 2.16 | 0.45 |
| 1:2:1088:U:H4' | 1:2:1089:G:OP2 | 2.17 | 0.45 |
| 5:Q:32:ILE:HG12 | 5:Q:68:ILE:HD12 | 1.99 | 0.45 |
| 18:H:170:VAL:HG13 | 18:H:187:PHE:HB2 | 1.99 | 0.45 |
| 1:2:307:G:C2 | 19:I:44:HIS:HB3 | 2.51 | 0.45 |
| 1:2:926:A:H5" | 1:2:926:A:H8 | 1.82 | 0.45 |
| 1:2:1060:A:O2' | 1:2:1062:A:N6 | 2.40 | 0.45 |
| 1:2:1598:G:H3' | 9:Z:80:ARG:HG2 | 1.98 | 0.45 |
| 2:F:155:CYS:O | 2:F:159:ARG:HD2 | 2.16 | 0.45 |
| 17:G:216:ARG:HA | 17:G:219:GLU:HG2 | 1.97 | 0.45 |
| 20:J:32:ILE:HA | 20:J:37:LEU:HD12 | 1.99 | 0.45 |
| 1:2:146:G:H2' | 1:2:147:A:O4' | 2.17 | 0.45 |
| 1:2:548:C:H2' | 1:2:549:C:H6 | 1.82 | 0.45 |
| 1:2:1203:G:H21 | 1:2:1204:A:H62 | 1.65 | 0.45 |
| 13:A:42:LYS:HE3 | 13:A:46:ILE:HB | 1.99 | 0.45 |
| 13:A:122:LEU:HB3 | 13:A:144:THR:HG23 | 1.99 | 0.45 |
| 16:E:126:VAL:HG11 | 16:E:139:LEU:HD22 | 1.98 | 0.45 |
| 17:G:88:ARG:HB2 | 17:G:91:GLU:HG2 | 1.99 | 0.45 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:2:845:G:H3' | 1:2:846:G:H8 | 1.82 | 0.45 |
| 1:2:1786:U:H2' | 1:2:1787:G:C8 | 2.52 | 0.45 |
| 2:F:89:THR:HA | 2:F:92:ILE:HD12 | 1.99 | 0.45 |
| 1:2:1485:U:H2' | 1:2:1486:A:C8 | 2.51 | 0.45 |
| 1:2:1637:A:H4' | 1:2:1638:G:O5' | 2.17 | 0.45 |
| 1:2:1672:U:H2' | 1:2:1673:U:C6 | 2.52 | 0.45 |
| 2:F:19:LEU:HB3 | 2:F:23:TRP:HB2 | 1.99 | 0.45 |
| 1:2:527:C:O3' | 20:J:121:LYS:HD2 | 2.18 | 0.44 |
| 1:2:1636:G:H1' | 2:F:164:ARG:HH22 | 1.82 | 0.44 |
| 16:E:11:ARG:HA | 16:E:28:ALA:HB2 | 1.99 | 0.44 |
| 25:W:75:ILE:HD13 | 25:W:125:ILE:HG12 | 1.99 | 0.44 |
| 1:2:673:G:H2' | 1:2:674:C:H6 | 1.81 | 0.44 |
| 2:F:179:ASN:HB3 | 2:F:187:SER:HB2 | 1.99 | 0.44 |
| 3:M:47:ALA:HA | 3:M:112:LYS:HA | 2.00 | 0.44 |
| 14:B:47:THR:HG23 | 23:O:46:ASP:OD2 | 2.17 | 0.44 |
| 22:N:91:LEU:HD12 | 22:N:125:LEU:HD12 | 1.99 | 0.44 |
| 1:2:511:U:H2' | 1:2:512:A:O4' | 2.17 | 0.44 |
| 1:2:909:G:H2' | 1:2:910:G:H8 | 1.83 | 0.44 |
| 1:2:1482:C:H2' | 1:2:1482:C:O2 | 2.16 | 0.44 |
| 2:F:142:SER:HB2 | 2:F:145:ARG:HB3 | 1.98 | 0.44 |
| 9:Z:69:THR:HG23 | 9:Z:106:GLN:HE22 | 1.81 | 0.44 |
| 1:2:343:A:H2' | 1:2:343:A:N3 | 2.31 | 0.44 |
| 1:2:528:A:H2' | 1:2:529:A:H8 | 1.81 | 0.44 |
| 1:2:1177:U:H2' | 1:2:1178:U:C6 | 2.53 | 0.44 |
| 1:2:1639:G:H2' | 1:2:1640:A:H8 | 1.82 | 0.44 |
| 15:C:102:LEU:HD22 | 15:C:130:ILE:HG12 | 1.99 | 0.44 |
| 1:2:122:G:H1 | 1:2:342:C:H42 | 1.66 | 0.44 |
| 4:P:119:PHE:HE1 | 7:S:117:ILE:HG23 | 1.83 | 0.44 |
| 22:N:115:LEU:O | 22:N:119:GLU:HG2 | 2.17 | 0.44 |
| 1:2:388:U:H2' | 1:2:389:A:C8 | 2.52 | 0.44 |
| 1:2:442:C:H2' | 1:2:443:U:C6 | 2.52 | 0.44 |
| 1:2:907:G:H2' | 1:2:908:A:C8 | 2.52 | 0.44 |
| 1:2:983:A:H2' | 1:2:984:C:C6 | 2.52 | 0.44 |
| 1:2:1356:G:H2' | 1:2:1357:A:H8 | 1.72 | 0.44 |
| 1:2:1685:U:C4 | 1:2:1686:G:N7 | 2.86 | 0.44 |
| 4:P:22:LEU:HD11 | 4:P:109:PRO:HB3 | 1.98 | 0.44 |
| 1:2:659:G:H2' | 1:2:663:C:C5 | 2.53 | 0.44 |
| 7:S:99:LEU:HB3 | 7:S:100:ALA:H | 1.61 | 0.44 |
| 14:B:168:MET:O | 14:B:172:MET:HG2 | 2.18 | 0.44 |
| 20:J:21:GLU:HG3 | 20:J:24:ARG:HB2 | 2.00 | 0.44 |
| 26:X:72:VAL:HG21 | 26:X:102:VAL:HG21 | 1.99 | 0.44 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:2:803:C:H2' | 1:2:804:U:C6 | 2.53 | 0.44 |
| 13:A:158:ASP:OD1 | 24:V:32:ILE:HG21 | 2.18 | 0.44 |
| 16:E:11:ARG:HH21 | 16:E:21:ASP:H | 1.65 | 0.44 |
| 1:2:152:U:H2' | 1:2:153:G:O4' | 2.18 | 0.44 |
| 1:2:493:A:N6 | 1:2:509:G:N2 | 2.66 | 0.44 |
| 1:2:685:A:N6 | 1:2:917:U:H3 | 2.16 | 0.44 |
| 15:C:90:GLU:HB2 | 15:C:93:ILE:HD12 | 1.99 | 0.44 |
| 1:2:1012:A:H2' | 1:2:1013:U:O4' | 2.17 | 0.43 |
| 1:2:1275:G:H22 | 1:2:1324:G:H1' | 1.82 | 0.43 |
| 2:F:35:LEU:HD22 | 2:F:147:VAL:HG23 | 2.00 | 0.43 |
| 8:T:4:VAL:HG21 | 8:T:136:GLY:HA2 | 2.00 | 0.43 |
| 21:L:99:TYR:O | 21:L:101:ARG:HD2 | 2.18 | 0.43 |
| 1:2:96:C:H2' | 1:2:97:U:O4' | 2.18 | 0.43 |
| 1:2:1017:U:H2' | 1:2:1018:U:H6 | 1.83 | 0.43 |
| 1:2:590:A:N3 | 1:2:590:A:H2' | 2.33 | 0.43 |
| 1:2:1365:G:H2' | 1:2:1366:G:H8 | 1.83 | 0.43 |
| 7:S:79:ILE:HA | 7:S:80:PRO:HD3 | 1.89 | 0.43 |
| 22:N:94:LYS:O | 22:N:98:VAL:HG23 | 2.18 | 0.43 |
| 1:2:548:C:H2' | 1:2:549:C:C6 | 2.54 | 0.43 |
| 1:2:823:U:O2 | 1:2:823:U:O4' | 2.36 | 0.43 |
| 6:R:17:ILE:HD13 | 6:R:24:LEU:HD13 | 2.01 | 0.43 |
| 15:C:108:LYS:HE3 | 15:C:110:MET:HB3 | 2.01 | 0.43 |
| 1:2:5:U:H2' | 1:2:6:G:C8 | 2.53 | 0.43 |
| 1:2:53:C:O2' | 1:2:507:G:N7 | 2.43 | 0.43 |
| 1:2:971:G:HO2' | 1:2:972:A:H8 | 1.65 | 0.43 |
| 1:2:977:C:H2' | 1:2:978:G:O4' | 2.18 | 0.43 |
| 1:2:1562:C:H5" | 8:T:71:GLY:HA3 | 2.00 | 0.43 |
| 2:F:79:HIS:H | 2:F:159:ARG:HH22 | 1.66 | 0.43 |
| 2:F:103:LEU:HD22 | 2:F:178:ILE:HD13 | 2.01 | 0.43 |
| 2:F:150:ALA:HA | 2:F:153:LEU:HD12 | 2.00 | 0.43 |
| 13:A:63:ARG:NH1 | 24:V:78:ILE:HG23 | 2.33 | 0.43 |
| 17:G:215:LYS:O | 17:G:218:LYS:HG2 | 2.19 | 0.43 |
| 1:2:25:A:C6 | 1:2:26:U:C4 | 3.06 | 0.43 |
| 1:2:843:C:H2' | 1:2:844:U:O4' | 2.18 | 0.43 |
| 1:2:959:G:H5" | 23:O:38:ASN:HD21 | 1.83 | 0.43 |
| 15:C:130:ILE:HG23 | 15:C:162:ILE:HD11 | 2.00 | 0.43 |
| 1:2:909:G:H2' | 1:2:910:G:C8 | 2.52 | 0.43 |
| 1:2:1734:G:O2' | 1:2:1800:A:N6 | 2.52 | 0.43 |
| 16:E:46:ILE:HG23 | 16:E:50:ASN:HD22 | 1.83 | 0.43 |
| 17:G:57:ASP:HA | 17:G:106:LEU:HA | 1.99 | 0.43 |
| 1:2:985:G:H1' | 23:O:138:ASP:CG | 2.38 | 0.43 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 3:M:52:LEU:HD23 | 3:M:78:LYS:HE3 | 2.00 | 0.43 |
| 3:M:61:TYR:OH | 3:M:108:CYS:HB2 | 2.19 | 0.43 |
| 16:E:35:PRO:HG2 | 16:E:36:HIS:CD2 | 2.54 | 0.43 |
| 1:2:1387:G:C2 | 1:2:1388:A:H1' | 2.54 | 0.43 |
| 23:O:33:ILE:HB | 23:O:97:LEU:HD12 | 2.00 | 0.43 |
| 1:2:126:G:C6 | 17:G:196:LYS:HG2 | 2.53 | 0.43 |
| 1:2:1621:U:O2' | 4:P:118:GLU:HB3 | 2.19 | 0.43 |
| 1:2:1840:U:H2' | 1:2:1841:C:O4' | 2.19 | 0.43 |
| 24:V:51:LYS:HD2 | 24:V:78:ILE:HD11 | 2.01 | 0.43 |
| 1:2:110:U:O2 | 1:2:110:U:H2' | 2.19 | 0.42 |
| 1:2:823:U:C5 | 20:J:143:ASN:HB3 | 2.53 | 0.42 |
| 1:2:1386:A:C2 | 1:2:1387:G:H1' | 2.54 | 0.42 |
| 1:2:65:C:H4' | 17:G:172:LYS:HD3 | 2.02 | 0.42 |
| 1:2:417:C:H2' | 1:2:418:A:H5" | 2.01 | 0.42 |
| 1:2:480:G:H2' | 1:2:481:C:O4' | 2.19 | 0.42 |
| 1:2:1208:A:H2' | 1:2:1209:A:C8 | 2.54 | 0.42 |
| 1:2:1532:C:H4' | 1:2:1604:G:N2 | 2.34 | 0.42 |
| 13:A:71:PRO:HB3 | 13:A:186:ARG:HH22 | 1.84 | 0.42 |
| 26:X:52:LEU:HD11 | 26:X:73:GLN:HB2 | 2.01 | 0.42 |
| 1:2:176:U:H2' | 1:2:177:G:O4' | 2.18 | 0.42 |
| 1:2:552:G:H2' | 1:2:553:U:H6 | 1.78 | 0.42 |
| 1:2:929:G:H2' | 1:2:930:C:O4' | 2.19 | 0.42 |
| 1:2:1380:C:H2' | 1:2:1381:G:O4' | 2.19 | 0.42 |
| 1:2:1482:C:H3' | 1:2:1483:A:C8 | 2.54 | 0.42 |
| 1:2:126:G:H21 | 1:2:180:G:H21 | 1.68 | 0.42 |
| 1:2:681:U:H2' | 1:2:682:U:O4' | 2.19 | 0.42 |
| 1:2:1328:G:H2' | 1:2:1329:U:O4' | 2.20 | 0.42 |
| 1:2:1401:A:H2' | 1:2:1402:A:C8 | 2.54 | 0.42 |
| 1:2:680:G:H2' | 1:2:681:U:H6 | 1.83 | 0.42 |
| 1:2:1408:U:H2' | 1:2:1409:A:H8 | 1.82 | 0.42 |
| 1:2:1525:C:H2' | 1:2:1526:G:O4' | 2.19 | 0.42 |
| 4:P:50:ARG:HA | 4:P:50:ARG:HD3 | 1.91 | 0.42 |
| 14:B:82:ARG:NH1 | 14:B:191:ASP:HB2 | 2.28 | 0.42 |
| 16:E:248:ILE:H | 16:E:248:ILE:HG13 | 1.71 | 0.42 |
| 1:2:1620:A:H2' | 4:P:40:ARG:CZ | 2.49 | 0.42 |
| 2:F:39:ILE:HG23 | 2:F:68:ILE:HD13 | 2.02 | 0.42 |
| 17:G:7:PHE:HA | 17:G:8:PRO:HD3 | 1.84 | 0.42 |
| 1:2:88:G:H2' | 1:2:89:C:O4' | 2.20 | 0.42 |
| 1:2:1277:C:H2' | 1:2:1278:A:H8 | 1.85 | 0.42 |
| 1:2:1490:G:H2' | 1:2:1491:G:H4' | 2.02 | 0.42 |
| 9:Z:58:LEU:HD21 | 9:Z:87:ALA:HB1 | 2.00 | 0.42 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 14:B:23:ASP:HA | 14:B:24:PRO:HD3 | 1.88 | 0.42 |
| 1:2:976:G:H2' | 1:2:977:C:C6 | 2.55 | 0.42 |
| 15:C:114:LYS:HD2 | 15:C:123:ARG:HH11 | 1.85 | 0.42 |
| 26:X:102:VAL:HG12 | 26:X:120:PHE:HB3 | 2.02 | 0.42 |
| 27:Y:14:THR:HG22 | 27:Y:21:LYS:HG2 | 2.02 | 0.42 |
| 1:2:17:C:C2 | 1:2:18:C:C5 | 3.08 | 0.42 |
| 1:2:1100:A:H2' | 1:2:1101:U:O4' | 2.20 | 0.42 |
| 1:2:1102:G:H2' | 1:2:1103:C:H6 | 1.83 | 0.42 |
| 1:2:1622:U:H3 | 4:P:122:THR:HG1 | 1.68 | 0.42 |
| 13:A:108:PHE:HB2 | 13:A:136:GLU:HB3 | 2.02 | 0.42 |
| 16:E:31:PRO:HG2 | 16:E:38:LEU:HB2 | 2.02 | 0.42 |
| 27:Y:57:VAL:HB | 27:Y:60:PHE:CE2 | 2.54 | 0.42 |
| 1:2:1822:A:H2' | 1:2:1823:A:C8 | 2.55 | 0.41 |
| 3:M:69:CYS:HA | 3:M:74:ILE:HB | 2.02 | 0.41 |
| 5:Q:100:VAL:CG1 | 5:Q:101:ASP:H | 2.31 | 0.41 |
| 15:C:191:VAL:HG11 | 15:C:236:PHE:HA | 2.02 | 0.41 |
| 19:I:38:ILE:HD11 | 19:I:81:VAL:HG23 | 2.01 | 0.41 |
| 26:X:46:HIS:CD2 | 26:X:103:ALA:HB2 | 2.55 | 0.41 |
| 1:2:178:C:H2' | 1:2:178:C:O2 | 2.20 | 0.41 |
| 1:2:926:A:H61 | 1:2:1015:U:H3 | 1.68 | 0.41 |
| 1:2:969:U:H1' | 1:2:971:G:C2 | 2.55 | 0.41 |
| 1:2:1666:C:H2' | 1:2:1667:U:C6 | 2.55 | 0.41 |
| 1:2:1740:C:H5" | 19:I:58:LEU:HD11 | 2.01 | 0.41 |
| 1:2:1809:A:H2' | 1:2:1810:U:O4' | 2.20 | 0.41 |
| 13:A:24:HIS:HB3 | 13:A:51:LEU:HD11 | 2.03 | 0.41 |
| 13:A:184:ARG:HD3 | 13:A:191:ARG:HG2 | 2.02 | 0.41 |
| 1:2:407:G:N3 | 1:2:407:G:H2' | 2.35 | 0.41 |
| 1:2:462:C:H2' | 1:2:463:C:O4' | 2.21 | 0.41 |
| 1:2:475:C:C4 | 1:2:476:A:N7 | 2.88 | 0.41 |
| 1:2:493:A:C8 | 1:2:574:A:C8 | 3.08 | 0.41 |
| 1:2:943:U:H1' | 23:O:137:SER:CB | 2.50 | 0.41 |
| 1:2:14:C:OP1 | 15:C:189:GLY:O | 2.37 | 0.41 |
| 1:2:818:A:H2' | 1:2:819:G:O4' | 2.21 | 0.41 |
| 1:2:868:G:C4 | 18:H:115:LYS:HB3 | 2.54 | 0.41 |
| 1:2:1643:U:H2' | 1:2:1644:C:C6 | 2.55 | 0.41 |
| 1:2:1672:U:O3' | 5:Q:76:GLY:HA3 | 2.20 | 0.41 |
| 1:2:1721:U:H3' | 1:2:1722:G:H5' | 2.02 | 0.41 |
| 1:2:493:A:H61 | 1:2:509:G:N2 | 2.18 | 0.41 |
| 1:2:1529:C:H2' | 1:2:1530:U:C6 | 2.55 | 0.41 |
| 1:2:1563:G:H4' | 8:T:115:LYS:HE3 | 2.02 | 0.41 |
| 1:2:1607:A:N6 | 1:2:1632:G:O2' | 2.53 | 0.41 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:2:935:G:H2' | 1:2:936:G:H8 | 1.85 | 0.41 |
| 1:2:49:C:N4 | 1:2:472:C:H2' | 2.36 | 0.41 |
| 1:2:373:G:C2 | 1:2:374:G:C8 | 3.08 | 0.41 |
| 1:2:1817:G:H2' | 1:2:1818:A:H8 | 1.83 | 0.41 |
| 1:2:1152:U:H2' | 25:W:12:LYS:NZ | 2.36 | 0.41 |
| 16:E:100:ARG:HD2 | 16:E:102:ILE:HD11 | 2.02 | 0.41 |
| 20:J:169:ARG:HA | 20:J:170:PRO:HD2 | 1.94 | 0.41 |
| 23:O:101:GLY:HA3 | 23:O:134:PRO:HD2 | 2.03 | 0.41 |
| 1:2:654:A:H5' | 1:2:655:A:H3' | 2.02 | 0.41 |
| 1:2:1472:C:H2' | 1:2:1473:G:O4' | 2.21 | 0.41 |
| 1:2:1845:A:H2' | 1:2:1846:G:H8 | 1.86 | 0.41 |
| 8:T:75:MET:HG3 | 8:T:104:LEU:HD11 | 2.03 | 0.41 |
| 18:H:87:PHE:HB3 | 18:H:90:LYS:HE2 | 2.02 | 0.41 |
| 26:X:61:GLN:HB3 | 26:X:62:PRO:HD3 | 2.02 | 0.41 |
| 1:2:310:C:H2' | 1:2:311:C:O4' | 2.20 | 0.41 |
| 1:2:344:U:H2' | 1:2:345:U:C6 | 2.56 | 0.41 |
| 1:2:345:U:H2' | 1:2:346:C:C6 | 2.56 | 0.41 |
| 9:Z:68:ILE:HB | 9:Z:109:TYR:HB2 | 2.03 | 0.41 |
| 1:2:67:C:H5" | 17:G:162:LEU:HD11 | 2.03 | 0.40 |
| 1:2:353:C:H1' | 21:L:71:ARG:NE | 2.36 | 0.40 |
| 1:2:454:U:C2 | 1:2:455:A:C8 | 3.10 | 0.40 |
| 1:2:1674:G:OP1 | 2:F:51:HIS:NE2 | 2.53 | 0.40 |
| 1:2:1708:C:H2' | 1:2:1709:G:C8 | 2.56 | 0.40 |
| 1:2:1800:A:C2 | 1:2:1801:A:H1' | 2.56 | 0.40 |
| 13:A:89:LYS:HD3 | 13:A:89:LYS:HA | 1.79 | 0.40 |
| 1:2:1035:A:H2' | 1:2:1036:A:O4' | 2.21 | 0.40 |
| 1:2:1614:A:H2' | 1:2:1615:U:C6 | 2.55 | 0.40 |
| 17:G:67:VAL:HB | 17:G:99:GLY:HA2 | 2.03 | 0.40 |
| 1:2:217:A:H2' | 1:2:217:A:N3 | 2.37 | 0.40 |
| 1:2:1177:U:H2' | 1:2:1178:U:H6 | 1.85 | 0.40 |
| 13:A:205:ARG:HG3 | 13:A:210:ILE:HG12 | 2.03 | 0.40 |
| 1:2:320:G:H2' | 1:2:321:C:C6 | 2.57 | 0.40 |
| 1:2:648:A:H2' | 1:2:649:U:O4' | 2.22 | 0.40 |
| 1:2:1036:A:H4' | 1:2:1855:G:N2 | 2.35 | 0.40 |
| 1:2:1340:U:H2' | 1:2:1341:C:C6 | 2.57 | 0.40 |
| 1:2:1479:G:H2' | 1:2:1480:A:H8 | 1.85 | 0.40 |
| 1:2:1614:A:H2' | 1:2:1615:U:H6 | 1.87 | 0.40 |
| 1:2:1787:G:H2' | 1:2:1788:A:C8 | 2.56 | 0.40 |
| 2:F:51:HIS:CE1 | 5:Q:82:TYR:HH | 2.40 | 0.40 |
| 15:C:251:LEU:HD12 | 24:V:23:ILE:HG13 | 2.03 | 0.40 |
| 18:H:146:VAL:O | 25:W:49:GLU:HB2 | 2.22 | 0.40 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:2:674:C:H2' | 1:2:675:U:H6 | 1.85 | 0.40 |
| 1:2:1520:G:H21 | 4:P:126:VAL:HG21 | 1.86 | 0.40 |
| 8:T:104:LEU:HD22 | 8:T:121:ARG:HD3 | 2.03 | 0.40 |
| 15:C:65:LYS:HB2 | 15:C:266:TYR:HE1 | 1.86 | 0.40 |

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 | F | 187/204 (92%) | 173 (92%) | 13 (7%) | 1 (0%) | 29 68 |
| 3 | M | 121/132 (92%) | 112 (93%) | 9 (7%) | 0 | 100 100 |
| 4 | P | 118/145 (81%) | 111 (94%) | 6 (5%) | 1 (1%) | 19 59 |
| 5 | Q | 120/146 (82%) | 115 (96%) | 5 (4%) | 0 | 100 100 |
| 6 | R | 120/135 (89%) | 110 (92%) | 9 (8%) | 1 (1%) | 19 59 |
| 7 | S | 128/152 (84%) | 118 (92%) | 9 (7%) | 1 (1%) | 19 59 |
| 8 | T | 142/145 (98%) | 131 (92%) | 11 (8%) | 0 | 100 100 |
| 9 | Z | 70/125 (56%) | 65 (93%) | 5 (7%) | 0 | 100 100 |
| 10 | c | 59/69 (86%) | 54 (92%) | 4 (7%) | 1 (2%) | 9 45 |
| 11 | f | 71/156 (46%) | 58 (82%) | 10 (14%) | 3 (4%) | 3 25 |
| 12 | g | 311/317 (98%) | 282 (91%) | 23 (7%) | 6 (2%) | 8 42 |
| 13 | A | 214/295 (72%) | 201 (94%) | 12 (6%) | 1 (0%) | 29 68 |
| 14 | B | 211/264 (80%) | 198 (94%) | 12 (6%) | 1 (0%) | 29 68 |
| 15 | C | 216/293 (74%) | 203 (94%) | 11 (5%) | 2 (1%) | 17 57 |
| 16 | E | 260/263 (99%) | 246 (95%) | 13 (5%) | 1 (0%) | 34 71 |
| 17 | G | 228/249 (92%) | 218 (96%) | 9 (4%) | 1 (0%) | 34 71 |

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| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles |
|---|---|---|---|---|---|---|
| 18 | H | 184/194 (95%) | 175 (95%) | 9 (5%) | 0 | 100 100 |
| 19 | I | 203/208 (98%) | 195 (96%) | 8 (4%) | 0 | 100 100 |
| 20 | J | 178/194 (92%) | 164 (92%) | 11 (6%) | 3 (2%) | 9 45 |
| 21 | L | 149/158 (94%) | 144 (97%) | 5 (3%) | 0 | 100 100 |
| 22 | N | 147/151 (97%) | 139 (95%) | 8 (5%) | 0 | 100 100 |
| 23 | O | 133/151 (88%) | 123 (92%) | 10 (8%) | 0 | 100 100 |
| 24 | V | 80/83 (96%) | 79 (99%) | 1 (1%) | 0 | 100 100 |
| 25 | W | 127/130 (98%) | 120 (94%) | 6 (5%) | 1 (1%) | 19 59 |
| 26 | X | 139/143 (97%) | 131 (94%) | 6 (4%) | 2 (1%) | 11 48 |
| 27 | Y | 122/133 (92%) | 115 (94%) | 6 (5%) | 1 (1%) | 19 59 |
| 28 | b | 80/84 (95%) | 73 (91%) | 7 (9%) | 0 | 100 100 |
| 29 | e | 53/59 (90%) | 47 (89%) | 5 (9%) | 1 (2%) | 8 42 |
| 30 | x | 176/252 (70%) | 170 (97%) | 6 (3%) | 0 | 100 100 |
| 31 | y | 319/412 (77%) | 295 (92%) | 20 (6%) | 4 (1%) | 12 50 |
| 32 | u | 619/804 (77%) | 573 (93%) | 38 (6%) | 8 (1%) | 12 50 |
| 33 | w | 247/437 (56%) | 236 (96%) | 10 (4%) | 1 (0%) | 34 71 |
| 34 | v | 317/552 (57%) | 297 (94%) | 17 (5%) | 3 (1%) | 17 57 |
| 35 | t | 119/475 (25%) | 101 (85%) | 15 (13%) | 3 (2%) | 5 36 |
| All | All | 5968/7710 (77%) | 5572 (93%) | 349 (6%) | 47 (1%) | 24 59 |

All (47) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 10 | c | 66 | ARG |
| 26 | X | 61 | GLN |
| 26 | X | 86 | PRO |
| 31 | y | 370 | VAL |
| 12 | g | 190 | GLY |
| 20 | J | 160 | SER |
| 32 | u | 81 | PRO |
| 32 | u | 183 | PRO |
| 32 | u | 518 | GLU |
| 32 | u | 619 | GLY |
| 34 | v | 31 | GLU |
| 4 | P | 34 | MET |
| 11 | f | 84 | SER |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 11 | f | 85 | TYR |
| 15 | C | 72 | ASP |
| 16 | E | 133 | THR |
| 17 | G | 133 | LEU |
| 31 | y | 106 | GLU |
| 31 | y | 219 | GLN |
| 32 | u | 49 | SER |
| 35 | t | 256 | LEU |
| 12 | g | 161 | SER |
| 13 | A | 206 | ASP |
| 15 | C | 135 | GLY |
| 20 | J | 138 | ARG |
| 29 | e | 51 | LYS |
| 34 | v | 246 | ASP |
| 6 | R | 42 | PRO |
| 12 | g | 13 | GLY |
| 12 | g | 103 | GLY |
| 33 | w | 242 | LYS |
| 35 | t | 253 | ASN |
| 35 | t | 255 | GLN |
| 2 | F | 41 | VAL |
| 7 | S | 87 | GLN |
| 20 | J | 169 | ARG |
| 27 | Y | 67 | GLY |
| 34 | v | 248 | PRO |
| 31 | y | 107 | PRO |
| 12 | g | 61 | GLY |
| 14 | B | 93 | GLY |
| 25 | W | 67 | GLY |
| 11 | f | 122 | PRO |
| 32 | u | 76 | GLY |
| 32 | u | 361 | PRO |
| 32 | u | 485 | PRO |
| 12 | g | 253 | GLY |

### 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 | F | 159/170 (94%) | 139 (87%) | 20 (13%) | 4 | 24 |
| 3 | M | 104/108 (96%) | 95 (91%) | 9 (9%) | 10 | 41 |
| 4 | P | 107/130 (82%) | 89 (83%) | 18 (17%) | 2 | 14 |
| 5 | Q | 103/121 (85%) | 90 (87%) | 13 (13%) | 4 | 24 |
| 6 | R | 110/122 (90%) | 95 (86%) | 15 (14%) | 3 | 22 |
| 7 | S | 114/132 (86%) | 97 (85%) | 17 (15%) | 3 | 19 |
| 8 | T | 114/115 (99%) | 99 (87%) | 15 (13%) | 4 | 23 |
| 9 | Z | 64/103 (62%) | 55 (86%) | 9 (14%) | 3 | 21 |
| 10 | c | 52/62 (84%) | 44 (85%) | 8 (15%) | 2 | 18 |
| 11 | f | 65/140 (46%) | 57 (88%) | 8 (12%) | 4 | 26 |
| 12 | g | 271/275 (98%) | 243 (90%) | 28 (10%) | 7 | 34 |
| 13 | A | 180/243 (74%) | 155 (86%) | 25 (14%) | 3 | 22 |
| 14 | B | 194/231 (84%) | 178 (92%) | 16 (8%) | 11 | 42 |
| 15 | C | 184/225 (82%) | 172 (94%) | 12 (6%) | 17 | 51 |
| 16 | E | 224/225 (100%) | 209 (93%) | 15 (7%) | 16 | 50 |
| 17 | G | 200/218 (92%) | 194 (97%) | 6 (3%) | 41 | 71 |
| 18 | H | 167/174 (96%) | 164 (98%) | 3 (2%) | 59 | 81 |
| 19 | I | 178/180 (99%) | 172 (97%) | 6 (3%) | 37 | 69 |
| 20 | J | 160/168 (95%) | 150 (94%) | 10 (6%) | 18 | 53 |
| 21 | L | 135/142 (95%) | 124 (92%) | 11 (8%) | 11 | 43 |
| 22 | N | 130/131 (99%) | 125 (96%) | 5 (4%) | 33 | 66 |
| 23 | O | 105/119 (88%) | 98 (93%) | 7 (7%) | 16 | 50 |
| 24 | V | 66/67 (98%) | 64 (97%) | 2 (3%) | 41 | 71 |
| 25 | W | 112/113 (99%) | 106 (95%) | 6 (5%) | 22 | 57 |
| 26 | X | 113/115 (98%) | 107 (95%) | 6 (5%) | 22 | 58 |
| 27 | Y | 108/115 (94%) | 103 (95%) | 5 (5%) | 27 | 61 |
| 28 | b | 74/76 (97%) | 70 (95%) | 4 (5%) | 22 | 57 |
| 29 | e | 45/48 (94%) | 42 (93%) | 3 (7%) | 16 | 50 |
| 30 | x | 150/208 (72%) | 138 (92%) | 12 (8%) | 12 | 43 |
| 31 | y | 285/367 (78%) | 273 (96%) | 12 (4%) | 30 | 63 |
| 32 | u | 550/705 (78%) | 526 (96%) | 24 (4%) | 28 | 63 |
| 33 | w | 217/370 (59%) | 205 (94%) | 12 (6%) | 21 | 57 |

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| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles |
|---|---|---|---|---|---|
| 34 | v | 274/489 (56%) | 272 (99%) | 2 (1%) | 84 93 |
| 35 | t | 113/434 (26%) | 101 (89%) | 12 (11%) | 6 32 |
| All | All | 5227/6641 (79%) | 4851 (93%) | 376 (7%) | 18 47 |

All (376) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 2 | F | 24 | SER |
| 2 | F | 26 | ASP |
| 2 | F | 32 | ASP |
| 2 | F | 55 | ARG |
| 2 | F | 68 | ILE |
| 2 | F | 81 | ARG |
| 2 | F | 88 | MET |
| 2 | F | 89 | THR |
| 2 | F | 98 | GLU |
| 2 | F | 102 | LEU |
| 2 | F | 103 | LEU |
| 2 | F | 122 | ARG |
| 2 | F | 136 | ARG |
| 2 | F | 140 | ASP |
| 2 | F | 146 | ARG |
| 2 | F | 166 | ILE |
| 2 | F | 169 | ILE |
| 2 | F | 177 | LEU |
| 2 | F | 194 | ASP |
| 2 | F | 196 | LEU |
| 3 | M | 22 | LEU |
| 3 | M | 26 | LEU |
| 3 | M | 29 | ASP |
| 3 | M | 33 | ARG |
| 3 | M | 45 | ARG |
| 3 | M | 64 | LEU |
| 3 | M | 81 | ASP |
| 3 | M | 91 | LEU |
| 3 | M | 106 | CYS |
| 4 | P | 16 | THR |
| 4 | P | 21 | ASP |
| 4 | P | 22 | LEU |
| 4 | P | 25 | LEU |
| 4 | P | 26 | LEU |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 4 | P | 27 | ASP |
| 4 | P | 30 | TYR |
| 4 | P | 34 | MET |
| 4 | P | 36 | LEU |
| 4 | P | 40 | ARG |
| 4 | P | 41 | GLN |
| 4 | P | 50 | ARG |
| 4 | P | 59 | ARG |
| 4 | P | 79 | HIS |
| 4 | P | 81 | ARG |
| 4 | P | 84 | ILE |
| 4 | P | 86 | LEU |
| 4 | P | 101 | THR |
| 5 | Q | 16 | LYS |
| 5 | Q | 25 | CYS |
| 5 | Q | 37 | ARG |
| 5 | Q | 43 | GLU |
| 5 | Q | 46 | THR |
| 5 | Q | 47 | LEU |
| 5 | Q | 72 | VAL |
| 5 | Q | 80 | GLN |
| 5 | Q | 85 | ARG |
| 5 | Q | 118 | THR |
| 5 | Q | 120 | LEU |
| 5 | Q | 125 | ARG |
| 5 | Q | 126 | ARG |
| 6 | R | 4 | VAL |
| 6 | R | 15 | VAL |
| 6 | R | 27 | ASP |
| 6 | R | 47 | ARG |
| 6 | R | 60 | ARG |
| 6 | R | 62 | GLN |
| 6 | R | 70 | SER |
| 6 | R | 76 | GLU |
| 6 | R | 85 | VAL |
| 6 | R | 89 | SER |
| 6 | R | 95 | ILE |
| 6 | R | 98 | VAL |
| 6 | R | 99 | ASP |
| 6 | R | 110 | ASP |
| 6 | R | 120 | THR |
| 7 | S | 13 | LEU |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 7 | S | 16 | LEU |
| 7 | S | 19 | ASN |
| 7 | S | 38 | ARG |
| 7 | S | 45 | LEU |
| 7 | S | 52 | LEU |
| 7 | S | 53 | THR |
| 7 | S | 62 | ASP |
| 7 | S | 64 | VAL |
| 7 | S | 67 | VAL |
| 7 | S | 75 | ARG |
| 7 | S | 83 | PHE |
| 7 | S | 98 | VAL |
| 7 | S | 111 | LEU |
| 7 | S | 113 | ARG |
| 7 | S | 126 | PHE |
| 7 | S | 129 | LEU |
| 8 | T | 5 | THR |
| 8 | T | 25 | SER |
| 8 | T | 27 | LYS |
| 8 | T | 28 | LEU |
| 8 | T | 34 | VAL |
| 8 | T | 35 | ASP |
| 8 | T | 39 | LEU |
| 8 | T | 62 | ARG |
| 8 | T | 82 | ARG |
| 8 | T | 88 | MET |
| 8 | T | 90 | SER |
| 8 | T | 94 | ARG |
| 8 | T | 102 | ARG |
| 8 | T | 110 | LEU |
| 8 | T | 137 | GLN |
| 9 | Z | 61 | GLU |
| 9 | Z | 64 | ASN |
| 9 | Z | 76 | ARG |
| 9 | Z | 85 | ARG |
| 9 | Z | 88 | LEU |
| 9 | Z | 92 | LEU |
| 9 | Z | 104 | ARG |
| 9 | Z | 108 | ILE |
| 9 | Z | 111 | ARG |
| 10 | c | 21 | THR |
| 10 | c | 26 | GLN |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 10 | c | 30 | VAL |
| 10 | c | 37 | ASP |
| 10 | c | 55 | VAL |
| 10 | c | 58 | LEU |
| 10 | c | 63 | ARG |
| 10 | c | 67 | ARG |
| 11 | f | 81 | LYS |
| 11 | f | 86 | THR |
| 11 | f | 93 | HIS |
| 11 | f | 95 | ARG |
| 11 | f | 100 | LEU |
| 11 | f | 102 | VAL |
| 11 | f | 116 | ARG |
| 11 | f | 147 | THR |
| 12 | g | 6 | THR |
| 12 | g | 29 | ASP |
| 12 | g | 46 | THR |
| 12 | g | 47 | ARG |
| 12 | g | 57 | ARG |
| 12 | g | 64 | HIS |
| 12 | g | 72 | SER |
| 12 | g | 118 | ARG |
| 12 | g | 131 | LEU |
| 12 | g | 134 | THR |
| 12 | g | 135 | LEU |
| 12 | g | 165 | ILE |
| 12 | g | 167 | SER |
| 12 | g | 173 | LEU |
| 12 | g | 179 | LEU |
| 12 | g | 186 | THR |
| 12 | g | 197 | THR |
| 12 | g | 198 | VAL |
| 12 | g | 203 | ASP |
| 12 | g | 227 | LEU |
| 12 | g | 231 | ASP |
| 12 | g | 234 | ASP |
| 12 | g | 240 | CYS |
| 12 | g | 252 | THR |
| 12 | g | 297 | THR |
| 12 | g | 298 | LEU |
| 12 | g | 306 | LEU |
| 12 | g | 308 | ARG |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 13 | A | 8 | LEU |
| 13 | A | 11 | LYS |
| 13 | A | 16 | LEU |
| 13 | A | 23 | THR |
| 13 | A | 28 | THR |
| 13 | A | 38 | ILE |
| 13 | A | 41 | ARG |
| 13 | A | 50 | ASN |
| 13 | A | 53 | ARG |
| 13 | A | 56 | GLU |
| 13 | A | 57 | LYS |
| 13 | A | 60 | LEU |
| 13 | A | 73 | ASP |
| 13 | A | 82 | THR |
| 13 | A | 97 | THR |
| 13 | A | 102 | ARG |
| 13 | A | 113 | GLN |
| 13 | A | 120 | ARG |
| 13 | A | 128 | ARG |
| 13 | A | 130 | ASP |
| 13 | A | 155 | ARG |
| 13 | A | 158 | ASP |
| 13 | A | 178 | LEU |
| 13 | A | 200 | ASP |
| 13 | A | 205 | ARG |
| 14 | B | 33 | VAL |
| 14 | B | 34 | LYS |
| 14 | B | 40 | ASN |
| 14 | B | 42 | ARG |
| 14 | B | 57 | ILE |
| 14 | B | 62 | LEU |
| 14 | B | 79 | VAL |
| 14 | B | 98 | THR |
| 14 | B | 151 | ARG |
| 14 | B | 166 | LYS |
| 14 | B | 178 | THR |
| 14 | B | 207 | LEU |
| 14 | B | 212 | VAL |
| 14 | B | 213 | ARG |
| 14 | B | 217 | MET |
| 14 | B | 231 | LEU |
| 15 | C | 68 | ARG |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 15 | C | 74 | LYS |
| 15 | C | 116 | THR |
| 15 | C | 132 | ASP |
| 15 | C | 137 | VAL |
| 15 | C | 156 | ILE |
| 15 | C | 202 | THR |
| 15 | C | 213 | LEU |
| 15 | C | 221 | ASP |
| 15 | C | 233 | LEU |
| 15 | C | 255 | LEU |
| 15 | C | 262 | THR |
| 16 | E | 10 | LYS |
| 16 | E | 12 | VAL |
| 16 | E | 21 | ASP |
| 16 | E | 22 | LYS |
| 16 | E | 38 | LEU |
| 16 | E | 48 | LEU |
| 16 | E | 88 | ASP |
| 16 | E | 105 | THR |
| 16 | E | 114 | ILE |
| 16 | E | 151 | ASP |
| 16 | E | 160 | ILE |
| 16 | E | 191 | ARG |
| 16 | E | 244 | ILE |
| 16 | E | 248 | ILE |
| 16 | E | 254 | LYS |
| 17 | G | 69 | THR |
| 17 | G | 72 | ARG |
| 17 | G | 92 | ARG |
| 17 | G | 127 | THR |
| 17 | G | 171 | THR |
| 17 | G | 201 | LYS |
| 18 | H | 105 | THR |
| 18 | H | 148 | LEU |
| 18 | H | 160 | LYS |
| 19 | I | 5 | ARG |
| 19 | I | 47 | ARG |
| 19 | I | 128 | LYS |
| 19 | I | 139 | LYS |
| 19 | I | 140 | LYS |
| 19 | I | 203 | LYS |
| 20 | J | 8 | VAL |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 20 | J | 17 | ARG |
| 20 | J | 18 | ARG |
| 20 | J | 24 | ARG |
| 20 | J | 29 | LEU |
| 20 | J | 79 | ARG |
| 20 | J | 94 | LEU |
| 20 | J | 136 | ARG |
| 20 | J | 159 | PHE |
| 20 | J | 169 | ARG |
| 21 | L | 22 | ARG |
| 21 | L | 42 | LEU |
| 21 | L | 48 | LYS |
| 21 | L | 65 | ASN |
| 21 | L | 69 | ARG |
| 21 | L | 89 | ARG |
| 21 | L | 118 | ARG |
| 21 | L | 132 | ARG |
| 21 | L | 136 | LYS |
| 21 | L | 139 | ARG |
| 21 | L | 144 | LYS |
| 22 | N | 29 | THR |
| 22 | N | 72 | LEU |
| 22 | N | 75 | LEU |
| 22 | N | 84 | LEU |
| 22 | N | 86 | GLU |
| 23 | O | 80 | ASP |
| 23 | O | 81 | VAL |
| 23 | O | 84 | ARG |
| 23 | O | 86 | LYS |
| 23 | O | 113 | GLN |
| 23 | O | 143 | LYS |
| 23 | O | 147 | ARG |
| 24 | V | 9 | VAL |
| 24 | V | 43 | THR |
| 25 | W | 6 | VAL |
| 25 | W | 7 | LEU |
| 25 | W | 30 | CYS |
| 25 | W | 75 | ILE |
| 25 | W | 78 | ARG |
| 25 | W | 104 | LEU |
| 26 | X | 7 | LEU |
| 26 | X | 70 | VAL |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 26 | X | 71 | ARG |
| 26 | X | 105 | PHE |
| 26 | X | 115 | ILE |
| 26 | X | 119 | ARG |
| 27 | Y | 17 | LEU |
| 27 | Y | 40 | ILE |
| 27 | Y | 55 | ILE |
| 27 | Y | 79 | LEU |
| 27 | Y | 117 | VAL |
| 28 | b | 25 | VAL |
| 28 | b | 37 | CYS |
| 28 | b | 59 | CYS |
| 28 | b | 67 | THR |
| 29 | e | 12 | VAL |
| 29 | e | 26 | LYS |
| 29 | e | 58 | ASN |
| 30 | x | 77 | LYS |
| 30 | x | 86 | THR |
| 30 | x | 102 | HIS |
| 30 | x | 108 | ARG |
| 30 | x | 111 | LEU |
| 30 | x | 127 | VAL |
| 30 | x | 160 | LEU |
| 30 | x | 178 | ARG |
| 30 | x | 202 | ILE |
| 30 | x | 222 | ARG |
| 30 | x | 226 | CYS |
| 30 | x | 229 | ILE |
| 31 | y | 52 | GLU |
| 31 | y | 69 | PHE |
| 31 | y | 71 | LYS |
| 31 | y | 89 | LEU |
| 31 | y | 219 | GLN |
| 31 | y | 221 | LEU |
| 31 | y | 256 | ASN |
| 31 | y | 270 | CYS |
| 31 | y | 275 | LYS |
| 31 | y | 306 | LEU |
| 31 | y | 356 | ARG |
| 31 | y | 397 | ARG |
| 32 | u | 120 | GLN |
| 32 | u | 136 | THR |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 32 | u | 166 | TRP |
| 32 | u | 189 | VAL |
| 32 | u | 207 | LEU |
| 32 | u | 222 | LEU |
| 32 | u | 225 | THR |
| 32 | u | 234 | ARG |
| 32 | u | 253 | LEU |
| 32 | u | 288 | LEU |
| 32 | u | 297 | PHE |
| 32 | u | 299 | MET |
| 32 | u | 490 | THR |
| 32 | u | 492 | ARG |
| 32 | u | 497 | ARG |
| 32 | u | 499 | ARG |
| 32 | u | 590 | LYS |
| 32 | u | 594 | LEU |
| 32 | u | 596 | MET |
| 32 | u | 601 | ASP |
| 32 | u | 669 | LYS |
| 32 | u | 687 | VAL |
| 32 | u | 732 | ARG |
| 32 | u | 766 | LEU |
| 33 | w | 186 | ARG |
| 33 | w | 226 | THR |
| 33 | w | 240 | ASN |
| 33 | w | 242 | LYS |
| 33 | w | 251 | ASN |
| 33 | w | 313 | THR |
| 33 | w | 327 | LEU |
| 33 | w | 355 | ARG |
| 33 | w | 395 | THR |
| 33 | w | 405 | LEU |
| 33 | w | 418 | ARG |
| 33 | w | 427 | ARG |
| 34 | v | 60 | LYS |
| 34 | v | 83 | LEU |
| 35 | t | 250 | MET |
| 35 | t | 257 | THR |
| 35 | t | 261 | GLU |
| 35 | t | 262 | ARG |
| 35 | t | 305 | LYS |
| 35 | t | 360 | LEU |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 35 | t | 362 | ASN |
| 35 | t | 432 | GLN |
| 35 | t | 442 | ARG |
| 35 | t | 458 | ARG |
| 35 | t | 473 | LEU |
| 35 | t | 474 | LYS |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (59) such sidechains are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 2 | F | 31 | ASN |
| 2 | F | 83 | ASN |
| 2 | F | 114 | ASN |
| 4 | P | 103 | ASN |
| 5 | Q | 86 | GLN |
| 7 | S | 19 | ASN |
| 8 | T | 63 | HIS |
| 9 | Z | 103 | HIS |
| 10 | c | 26 | GLN |
| 11 | f | 135 | HIS |
| 12 | g | 64 | HIS |
| 12 | g | 159 | ASN |
| 12 | g | 226 | HIS |
| 13 | A | 84 | GLN |
| 14 | B | 40 | ASN |
| 16 | E | 50 | ASN |
| 16 | E | 98 | ASN |
| 16 | E | 179 | ASN |
| 16 | E | 209 | HIS |
| 16 | E | 224 | ASN |
| 17 | G | 56 | ASN |
| 17 | G | 65 | GLN |
| 17 | G | 81 | HIS |
| 17 | G | 105 | ASN |
| 18 | H | 76 | GLN |
| 18 | H | 157 | HIS |
| 19 | I | 87 | ASN |
| 19 | I | 116 | HIS |
| 21 | L | 18 | GLN |
| 21 | L | 65 | ASN |
| 22 | N | 5 | HIS |
| 22 | N | 105 | ASN |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 23 | O | 38 | ASN |
| 23 | O | 43 | HIS |
| 23 | O | 103 | ASN |
| 24 | V | 21 | ASN |
| 26 | X | 63 | ASN |
| 28 | b | 49 | HIS |
| 28 | b | 51 | GLN |
| 30 | x | 210 | HIS |
| 30 | x | 217 | ASN |
| 31 | y | 118 | HIS |
| 31 | y | 271 | HIS |
| 31 | y | 290 | ASN |
| 31 | y | 318 | ASN |
| 31 | y | 344 | GLN |
| 32 | u | 53 | GLN |
| 32 | u | 55 | HIS |
| 32 | u | 190 | GLN |
| 33 | w | 232 | GLN |
| 33 | w | 240 | ASN |
| 33 | w | 251 | ASN |
| 33 | w | 397 | GLN |
| 34 | v | 46 | HIS |
| 34 | v | 182 | ASN |
| 34 | v | 222 | HIS |
| 35 | t | 362 | ASN |
| 35 | t | 365 | GLN |
| 35 | t | 469 | ASN |

### 5.3.3 RNA

| Mol | Chain | Analysed | Backbone Outliers | Pucker Outliers |
|---|---|---|---|---|
| 1 | 2 | 1645/1873 (87%) | 536 (32%) | 61 (3%) |

All (536) RNA backbone outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 2 | 2 | A |
| 1 | 2 | 3 | C |
| 1 | 2 | 4 | C |
| 1 | 2 | 5 | U |
| 1 | 2 | 9 | U |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 2 | 14 | C |
| 1 | 2 | 17 | C |
| 1 | 2 | 23 | G |
| 1 | 2 | 25 | A |
| 1 | 2 | 26 | U |
| 1 | 2 | 33 | G |
| 1 | 2 | 41 | G |
| 1 | 2 | 44 | U |
| 1 | 2 | 45 | A |
| 1 | 2 | 46 | A |
| 1 | 2 | 49 | C |
| 1 | 2 | 50 | A |
| 1 | 2 | 56 | G |
| 1 | 2 | 58 | C |
| 1 | 2 | 60 | A |
| 1 | 2 | 61 | A |
| 1 | 2 | 62 | G |
| 1 | 2 | 65 | C |
| 1 | 2 | 66 | G |
| 1 | 2 | 67 | C |
| 1 | 2 | 68 | A |
| 1 | 2 | 69 | C |
| 1 | 2 | 70 | G |
| 1 | 2 | 72 | C |
| 1 | 2 | 73 | C |
| 1 | 2 | 74 | G |
| 1 | 2 | 75 | G |
| 1 | 2 | 76 | U |
| 1 | 2 | 77 | A |
| 1 | 2 | 79 | A |
| 1 | 2 | 92 | A |
| 1 | 2 | 97 | U |
| 1 | 2 | 103 | A |
| 1 | 2 | 104 | A |
| 1 | 2 | 110 | U |
| 1 | 2 | 111 | A |
| 1 | 2 | 113 | G |
| 1 | 2 | 114 | G |
| 1 | 2 | 115 | U |
| 1 | 2 | 127 | C |
| 1 | 2 | 128 | U |
| 1 | 2 | 129 | C |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 2 | 130 | G |
| 1 | 2 | 143 | U |
| 1 | 2 | 144 | U |
| 1 | 2 | 155 | G |
| 1 | 2 | 167 | G |
| 1 | 2 | 168 | C |
| 1 | 2 | 171 | A |
| 1 | 2 | 172 | U |
| 1 | 2 | 181 | A |
| 1 | 2 | 182 | C |
| 1 | 2 | 184 | G |
| 1 | 2 | 187 | G |
| 1 | 2 | 191 | A |
| 1 | 2 | 214 | U |
| 1 | 2 | 215 | G |
| 1 | 2 | 217 | A |
| 1 | 2 | 220 | U |
| 1 | 2 | 221 | A |
| 1 | 2 | 290 | U |
| 1 | 2 | 291 | G |
| 1 | 2 | 292 | A |
| 1 | 2 | 294 | U |
| 1 | 2 | 295 | C |
| 1 | 2 | 302 | A |
| 1 | 2 | 305 | U |
| 1 | 2 | 306 | C |
| 1 | 2 | 308 | G |
| 1 | 2 | 309 | G |
| 1 | 2 | 310 | C |
| 1 | 2 | 312 | G |
| 1 | 2 | 315 | C |
| 1 | 2 | 318 | A |
| 1 | 2 | 319 | C |
| 1 | 2 | 332 | G |
| 1 | 2 | 333 | G |
| 1 | 2 | 338 | G |
| 1 | 2 | 342 | C |
| 1 | 2 | 343 | A |
| 1 | 2 | 347 | G |
| 1 | 2 | 351 | G |
| 1 | 2 | 356 | C |
| 1 | 2 | 357 | C |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 2 | 360 | A |
| 1 | 2 | 362 | C |
| 1 | 2 | 364 | A |
| 1 | 2 | 370 | G |
| 1 | 2 | 371 | A |
| 1 | 2 | 377 | G |
| 1 | 2 | 381 | C |
| 1 | 2 | 385 | G |
| 1 | 2 | 386 | C |
| 1 | 2 | 387 | C |
| 1 | 2 | 392 | A |
| 1 | 2 | 400 | C |
| 1 | 2 | 407 | G |
| 1 | 2 | 408 | A |
| 1 | 2 | 409 | C |
| 1 | 2 | 411 | G |
| 1 | 2 | 413 | G |
| 1 | 2 | 418 | A |
| 1 | 2 | 421 | G |
| 1 | 2 | 426 | A |
| 1 | 2 | 428 | U |
| 1 | 2 | 429 | C |
| 1 | 2 | 438 | G |
| 1 | 2 | 441 | C |
| 1 | 2 | 445 | A |
| 1 | 2 | 448 | A |
| 1 | 2 | 449 | A |
| 1 | 2 | 450 | C |
| 1 | 2 | 455 | A |
| 1 | 2 | 465 | A |
| 1 | 2 | 466 | G |
| 1 | 2 | 471 | G |
| 1 | 2 | 472 | C |
| 1 | 2 | 473 | A |
| 1 | 2 | 474 | G |
| 1 | 2 | 482 | G |
| 1 | 2 | 487 | U |
| 1 | 2 | 492 | C |
| 1 | 2 | 496 | C |
| 1 | 2 | 500 | A |
| 1 | 2 | 502 | C |
| 1 | 2 | 503 | C |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 2 | 508 | A |
| 1 | 2 | 517 | C |
| 1 | 2 | 531 | A |
| 1 | 2 | 534 | G |
| 1 | 2 | 537 | C |
| 1 | 2 | 539 | C |
| 1 | 2 | 542 | U |
| 1 | 2 | 544 | G |
| 1 | 2 | 545 | A |
| 1 | 2 | 547 | G |
| 1 | 2 | 548 | C |
| 1 | 2 | 552 | G |
| 1 | 2 | 554 | A |
| 1 | 2 | 555 | A |
| 1 | 2 | 556 | U |
| 1 | 2 | 559 | G |
| 1 | 2 | 560 | A |
| 1 | 2 | 564 | A |
| 1 | 2 | 568 | C |
| 1 | 2 | 576 | A |
| 1 | 2 | 583 | A |
| 1 | 2 | 587 | A |
| 1 | 2 | 588 | G |
| 1 | 2 | 589 | G |
| 1 | 2 | 590 | A |
| 1 | 2 | 591 | U |
| 1 | 2 | 593 | C |
| 1 | 2 | 594 | A |
| 1 | 2 | 595 | U |
| 1 | 2 | 598 | G |
| 1 | 2 | 604 | A |
| 1 | 2 | 605 | A |
| 1 | 2 | 606 | G |
| 1 | 2 | 608 | C |
| 1 | 2 | 614 | C |
| 1 | 2 | 617 | G |
| 1 | 2 | 627 | U |
| 1 | 2 | 628 | A |
| 1 | 2 | 629 | A |
| 1 | 2 | 630 | U |
| 1 | 2 | 632 | C |
| 1 | 2 | 643 | A |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 2 | 644 | G |
| 1 | 2 | 655 | A |
| 1 | 2 | 660 | C |
| 1 | 2 | 664 | A |
| 1 | 2 | 666 | U |
| 1 | 2 | 668 | A |
| 1 | 2 | 669 | A |
| 1 | 2 | 670 | A |
| 1 | 2 | 671 | A |
| 1 | 2 | 672 | A |
| 1 | 2 | 673 | G |
| 1 | 2 | 684 | G |
| 1 | 2 | 685 | A |
| 1 | 2 | 687 | C |
| 1 | 2 | 688 | U |
| 1 | 2 | 748 | C |
| 1 | 2 | 749 | U |
| 1 | 2 | 750 | C |
| 1 | 2 | 751 | G |
| 1 | 2 | 792 | C |
| 1 | 2 | 794 | A |
| 1 | 2 | 796 | G |
| 1 | 2 | 797 | C |
| 1 | 2 | 799 | U |
| 1 | 2 | 800 | U |
| 1 | 2 | 809 | A |
| 1 | 2 | 812 | A |
| 1 | 2 | 821 | G |
| 1 | 2 | 822 | U |
| 1 | 2 | 827 | A |
| 1 | 2 | 830 | A |
| 1 | 2 | 834 | C |
| 1 | 2 | 845 | G |
| 1 | 2 | 847 | A |
| 1 | 2 | 852 | G |
| 1 | 2 | 856 | C |
| 1 | 2 | 858 | A |
| 1 | 2 | 869 | A |
| 1 | 2 | 870 | A |
| 1 | 2 | 871 | U |
| 1 | 2 | 872 | A |
| 1 | 2 | 873 | G |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 2 | 874 | G |
| 1 | 2 | 877 | C |
| 1 | 2 | 878 | G |
| 1 | 2 | 880 | G |
| 1 | 2 | 884 | C |
| 1 | 2 | 885 | U |
| 1 | 2 | 886 | A |
| 1 | 2 | 888 | U |
| 1 | 2 | 890 | U |
| 1 | 2 | 891 | G |
| 1 | 2 | 892 | U |
| 1 | 2 | 893 | U |
| 1 | 2 | 895 | G |
| 1 | 2 | 896 | U |
| 1 | 2 | 898 | U |
| 1 | 2 | 905 | C |
| 1 | 2 | 907 | G |
| 1 | 2 | 908 | A |
| 1 | 2 | 912 | C |
| 1 | 2 | 913 | A |
| 1 | 2 | 914 | U |
| 1 | 2 | 917 | U |
| 1 | 2 | 918 | U |
| 1 | 2 | 919 | A |
| 1 | 2 | 920 | A |
| 1 | 2 | 921 | G |
| 1 | 2 | 926 | A |
| 1 | 2 | 933 | G |
| 1 | 2 | 958 | G |
| 1 | 2 | 959 | G |
| 1 | 2 | 963 | A |
| 1 | 2 | 970 | G |
| 1 | 2 | 971 | G |
| 1 | 2 | 981 | A |
| 1 | 2 | 985 | G |
| 1 | 2 | 988 | C |
| 1 | 2 | 989 | C |
| 1 | 2 | 990 | A |
| 1 | 2 | 991 | G |
| 1 | 2 | 992 | A |
| 1 | 2 | 1001 | A |
| 1 | 2 | 1002 | U |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 2 | 1008 | A |
| 1 | 2 | 1009 | A |
| 1 | 2 | 1016 | U |
| 1 | 2 | 1017 | U |
| 1 | 2 | 1023 | A |
| 1 | 2 | 1027 | A |
| 1 | 2 | 1039 | C |
| 1 | 2 | 1040 | G |
| 1 | 2 | 1041 | G |
| 1 | 2 | 1045 | U |
| 1 | 2 | 1049 | A |
| 1 | 2 | 1050 | A |
| 1 | 2 | 1053 | C |
| 1 | 2 | 1056 | U |
| 1 | 2 | 1057 | C |
| 1 | 2 | 1058 | A |
| 1 | 2 | 1059 | G |
| 1 | 2 | 1060 | A |
| 1 | 2 | 1062 | A |
| 1 | 2 | 1078 | C |
| 1 | 2 | 1082 | A |
| 1 | 2 | 1083 | A |
| 1 | 2 | 1085 | C |
| 1 | 2 | 1086 | G |
| 1 | 2 | 1087 | A |
| 1 | 2 | 1088 | U |
| 1 | 2 | 1096 | G |
| 1 | 2 | 1099 | G |
| 1 | 2 | 1100 | A |
| 1 | 2 | 1109 | C |
| 1 | 2 | 1110 | G |
| 1 | 2 | 1114 | U |
| 1 | 2 | 1116 | C |
| 1 | 2 | 1117 | C |
| 1 | 2 | 1118 | C |
| 1 | 2 | 1119 | A |
| 1 | 2 | 1121 | G |
| 1 | 2 | 1131 | G |
| 1 | 2 | 1133 | A |
| 1 | 2 | 1138 | C |
| 1 | 2 | 1141 | G |
| 1 | 2 | 1148 | A |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 2 | 1150 | A |
| 1 | 2 | 1153 | C |
| 1 | 2 | 1154 | U |
| 1 | 2 | 1155 | U |
| 1 | 2 | 1157 | G |
| 1 | 2 | 1159 | G |
| 1 | 2 | 1165 | G |
| 1 | 2 | 1166 | G |
| 1 | 2 | 1170 | A |
| 1 | 2 | 1171 | G |
| 1 | 2 | 1181 | A |
| 1 | 2 | 1194 | A |
| 1 | 2 | 1195 | A |
| 1 | 2 | 1197 | G |
| 1 | 2 | 1200 | A |
| 1 | 2 | 1204 | A |
| 1 | 2 | 1205 | C |
| 1 | 2 | 1206 | G |
| 1 | 2 | 1207 | G |
| 1 | 2 | 1208 | A |
| 1 | 2 | 1211 | G |
| 1 | 2 | 1215 | C |
| 1 | 2 | 1216 | C |
| 1 | 2 | 1217 | A |
| 1 | 2 | 1221 | G |
| 1 | 2 | 1224 | G |
| 1 | 2 | 1227 | G |
| 1 | 2 | 1231 | C |
| 1 | 2 | 1232 | U |
| 1 | 2 | 1235 | G |
| 1 | 2 | 1242 | U |
| 1 | 2 | 1243 | U |
| 1 | 2 | 1244 | U |
| 1 | 2 | 1248 | U |
| 1 | 2 | 1249 | C |
| 1 | 2 | 1250 | A |
| 1 | 2 | 1251 | A |
| 1 | 2 | 1254 | C |
| 1 | 2 | 1255 | G |
| 1 | 2 | 1256 | G |
| 1 | 2 | 1257 | G |
| 1 | 2 | 1258 | A |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 2 | 1259 | A |
| 1 | 2 | 1260 | A |
| 1 | 2 | 1261 | C |
| 1 | 2 | 1264 | C |
| 1 | 2 | 1269 | G |
| 1 | 2 | 1273 | C |
| 1 | 2 | 1274 | G |
| 1 | 2 | 1282 | A |
| 1 | 2 | 1283 | C |
| 1 | 2 | 1284 | A |
| 1 | 2 | 1285 | G |
| 1 | 2 | 1286 | G |
| 1 | 2 | 1297 | U |
| 1 | 2 | 1298 | G |
| 1 | 2 | 1299 | A |
| 1 | 2 | 1300 | U |
| 1 | 2 | 1301 | A |
| 1 | 2 | 1302 | G |
| 1 | 2 | 1303 | C |
| 1 | 2 | 1304 | U |
| 1 | 2 | 1305 | C |
| 1 | 2 | 1306 | U |
| 1 | 2 | 1308 | U |
| 1 | 2 | 1309 | C |
| 1 | 2 | 1313 | A |
| 1 | 2 | 1315 | U |
| 1 | 2 | 1316 | C |
| 1 | 2 | 1317 | C |
| 1 | 2 | 1318 | G |
| 1 | 2 | 1320 | G |
| 1 | 2 | 1321 | G |
| 1 | 2 | 1322 | G |
| 1 | 2 | 1323 | U |
| 1 | 2 | 1324 | G |
| 1 | 2 | 1325 | G |
| 1 | 2 | 1326 | U |
| 1 | 2 | 1327 | G |
| 1 | 2 | 1329 | U |
| 1 | 2 | 1333 | U |
| 1 | 2 | 1354 | G |
| 1 | 2 | 1358 | U |
| 1 | 2 | 1363 | C |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 2 | 1364 | U |
| 1 | 2 | 1371 | U |
| 1 | 2 | 1372 | U |
| 1 | 2 | 1376 | A |
| 1 | 2 | 1378 | A |
| 1 | 2 | 1382 | A |
| 1 | 2 | 1386 | A |
| 1 | 2 | 1388 | A |
| 1 | 2 | 1393 | G |
| 1 | 2 | 1395 | C |
| 1 | 2 | 1401 | A |
| 1 | 2 | 1403 | C |
| 1 | 2 | 1404 | U |
| 1 | 2 | 1416 | C |
| 1 | 2 | 1425 | G |
| 1 | 2 | 1426 | U |
| 1 | 2 | 1429 | G |
| 1 | 2 | 1430 | C |
| 1 | 2 | 1431 | G |
| 1 | 2 | 1432 | U |
| 1 | 2 | 1439 | A |
| 1 | 2 | 1440 | C |
| 1 | 2 | 1441 | U |
| 1 | 2 | 1442 | U |
| 1 | 2 | 1444 | U |
| 1 | 2 | 1446 | A |
| 1 | 2 | 1450 | G |
| 1 | 2 | 1452 | A |
| 1 | 2 | 1454 | A |
| 1 | 2 | 1455 | A |
| 1 | 2 | 1462 | U |
| 1 | 2 | 1463 | U |
| 1 | 2 | 1464 | C |
| 1 | 2 | 1465 | A |
| 1 | 2 | 1466 | G |
| 1 | 2 | 1477 | U |
| 1 | 2 | 1481 | G |
| 1 | 2 | 1482 | C |
| 1 | 2 | 1483 | A |
| 1 | 2 | 1484 | A |
| 1 | 2 | 1485 | U |
| 1 | 2 | 1487 | A |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 2 | 1489 | A |
| 1 | 2 | 1490 | G |
| 1 | 2 | 1491 | G |
| 1 | 2 | 1494 | U |
| 1 | 2 | 1495 | G |
| 1 | 2 | 1498 | A |
| 1 | 2 | 1503 | C |
| 1 | 2 | 1505 | U |
| 1 | 2 | 1506 | A |
| 1 | 2 | 1507 | G |
| 1 | 2 | 1509 | U |
| 1 | 2 | 1510 | G |
| 1 | 2 | 1511 | U |
| 1 | 2 | 1512 | C |
| 1 | 2 | 1518 | C |
| 1 | 2 | 1519 | U |
| 1 | 2 | 1521 | C |
| 1 | 2 | 1524 | G |
| 1 | 2 | 1526 | G |
| 1 | 2 | 1531 | A |
| 1 | 2 | 1533 | A |
| 1 | 2 | 1534 | C |
| 1 | 2 | 1535 | U |
| 1 | 2 | 1544 | C |
| 1 | 2 | 1548 | G |
| 1 | 2 | 1559 | C |
| 1 | 2 | 1560 | U |
| 1 | 2 | 1566 | G |
| 1 | 2 | 1567 | G |
| 1 | 2 | 1570 | G |
| 1 | 2 | 1574 | C |
| 1 | 2 | 1575 | G |
| 1 | 2 | 1579 | A |
| 1 | 2 | 1580 | A |
| 1 | 2 | 1581 | C |
| 1 | 2 | 1582 | C |
| 1 | 2 | 1584 | G |
| 1 | 2 | 1585 | U |
| 1 | 2 | 1586 | U |
| 1 | 2 | 1587 | G |
| 1 | 2 | 1588 | A |
| 1 | 2 | 1590 | C |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 2 | 1594 | A |
| 1 | 2 | 1600 | G |
| 1 | 2 | 1601 | A |
| 1 | 2 | 1602 | U |
| 1 | 2 | 1606 | G |
| 1 | 2 | 1609 | C |
| 1 | 2 | 1612 | G |
| 1 | 2 | 1615 | U |
| 1 | 2 | 1617 | G |
| 1 | 2 | 1618 | C |
| 1 | 2 | 1621 | U |
| 1 | 2 | 1622 | U |
| 1 | 2 | 1623 | A |
| 1 | 2 | 1628 | C |
| 1 | 2 | 1632 | G |
| 1 | 2 | 1637 | A |
| 1 | 2 | 1647 | A |
| 1 | 2 | 1648 | G |
| 1 | 2 | 1649 | U |
| 1 | 2 | 1654 | G |
| 1 | 2 | 1658 | G |
| 1 | 2 | 1663 | A |
| 1 | 2 | 1665 | G |
| 1 | 2 | 1669 | G |
| 1 | 2 | 1671 | G |
| 1 | 2 | 1675 | A |
| 1 | 2 | 1683 | C |
| 1 | 2 | 1686 | G |
| 1 | 2 | 1693 | G |
| 1 | 2 | 1699 | A |
| 1 | 2 | 1712 | A |
| 1 | 2 | 1721 | U |
| 1 | 2 | 1722 | G |
| 1 | 2 | 1723 | G |
| 1 | 2 | 1727 | G |
| 1 | 2 | 1729 | U |
| 1 | 2 | 1742 | C |
| 1 | 2 | 1744 | G |
| 1 | 2 | 1745 | A |
| 1 | 2 | 1746 | U |
| 1 | 2 | 1756 | C |
| 1 | 2 | 1757 | G |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 2 | 1761 | U |
| 1 | 2 | 1773 | C |
| 1 | 2 | 1776 | G |
| 1 | 2 | 1783 | C |
| 1 | 2 | 1784 | G |
| 1 | 2 | 1786 | U |
| 1 | 2 | 1800 | A |
| 1 | 2 | 1801 | A |
| 1 | 2 | 1805 | G |
| 1 | 2 | 1808 | U |
| 1 | 2 | 1816 | G |
| 1 | 2 | 1819 | A |
| 1 | 2 | 1822 | A |
| 1 | 2 | 1824 | A |
| 1 | 2 | 1825 | A |
| 1 | 2 | 1826 | G |
| 1 | 2 | 1827 | U |
| 1 | 2 | 1841 | C |
| 1 | 2 | 1859 | A |
| 1 | 2 | 1861 | G |
| 1 | 2 | 1863 | A |
| 1 | 2 | 1864 | U |
| 1 | 2 | 1865 | C |
| 1 | 2 | 1869 | A |
| 1 | 2 | 1870 | A |
| 1 | 2 | 1872 | G |
| 1 | 2 | 1873 | G |

All (61) RNA pucker outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 2 | 8 | U |
| 1 | 2 | 43 | U |
| 1 | 2 | 44 | U |
| 1 | 2 | 72 | C |
| 1 | 2 | 102 | A |
| 1 | 2 | 114 | G |
| 1 | 2 | 142 | C |
| 1 | 2 | 143 | U |
| 1 | 2 | 171 | A |
| 1 | 2 | 180 | G |
| 1 | 2 | 220 | U |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 2 | 291 | G |
| 1 | 2 | 293 | C |
| 1 | 2 | 314 | U |
| 1 | 2 | 332 | G |
| 1 | 2 | 407 | G |
| 1 | 2 | 447 | A |
| 1 | 2 | 465 | A |
| 1 | 2 | 516 | A |
| 1 | 2 | 547 | G |
| 1 | 2 | 554 | A |
| 1 | 2 | 559 | G |
| 1 | 2 | 594 | A |
| 1 | 2 | 604 | A |
| 1 | 2 | 656 | G |
| 1 | 2 | 820 | U |
| 1 | 2 | 870 | A |
| 1 | 2 | 912 | C |
| 1 | 2 | 918 | U |
| 1 | 2 | 958 | G |
| 1 | 2 | 980 | A |
| 1 | 2 | 1016 | U |
| 1 | 2 | 1165 | G |
| 1 | 2 | 1207 | G |
| 1 | 2 | 1231 | C |
| 1 | 2 | 1308 | U |
| 1 | 2 | 1312 | G |
| 1 | 2 | 1316 | C |
| 1 | 2 | 1325 | G |
| 1 | 2 | 1352 | G |
| 1 | 2 | 1403 | C |
| 1 | 2 | 1425 | G |
| 1 | 2 | 1430 | C |
| 1 | 2 | 1431 | G |
| 1 | 2 | 1438 | A |
| 1 | 2 | 1440 | C |
| 1 | 2 | 1476 | A |
| 1 | 2 | 1494 | U |
| 1 | 2 | 1497 | G |
| 1 | 2 | 1511 | U |
| 1 | 2 | 1534 | C |
| 1 | 2 | 1558 | C |
| 1 | 2 | 1581 | C |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | 2 | 1587 | G |
| 1 | 2 | 1601 | A |
| 1 | 2 | 1603 | G |
| 1 | 2 | 1648 | G |
| 1 | 2 | 1726 | G |
| 1 | 2 | 1744 | G |
| 1 | 2 | 1785 | C |
| 1 | 2 | 1860 | A |

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

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

## 5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry (i)

Of 2 ligands modelled in this entry, 2 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 5.7 Other polymers (i)

There are no such residues in this entry.

## 5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

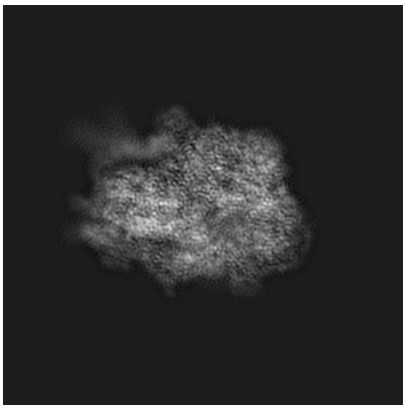
# 6 Map visualisation

This section contains visualisations of the EMDB entry EMD-4337. These allow visual inspection of the internal detail of the map and identification of artifacts.

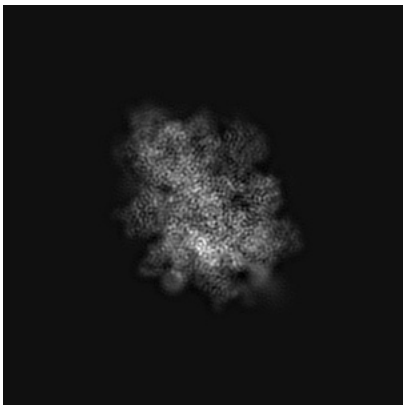
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

## 6.1 Orthogonal projections

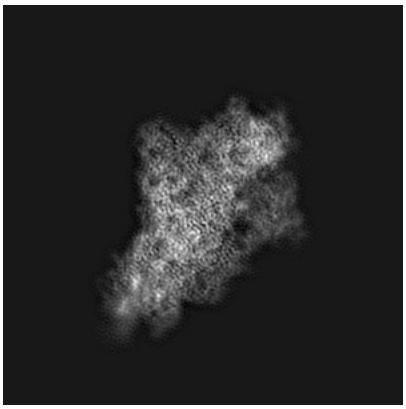
### 6.1.1 Primary map



X

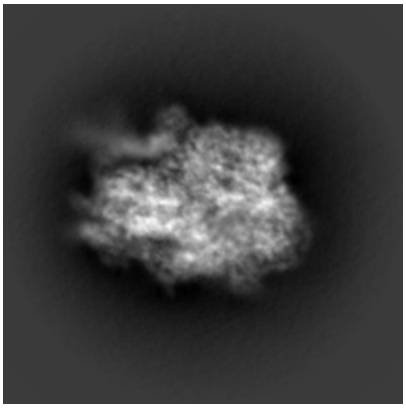


Y

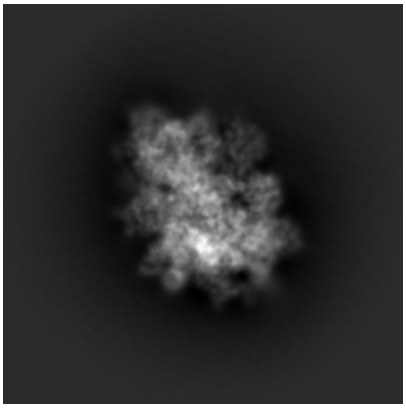


Z

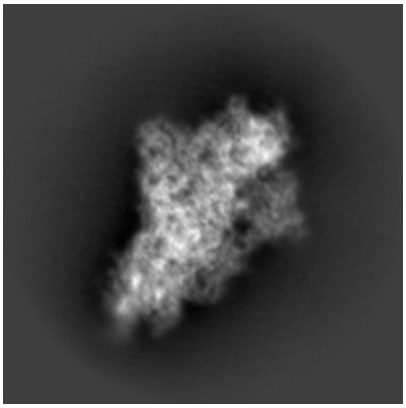
### 6.1.2 Raw map



X



Y

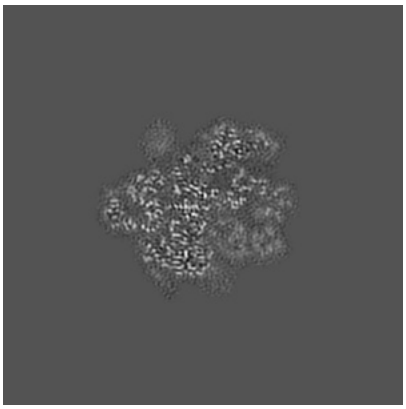


Z

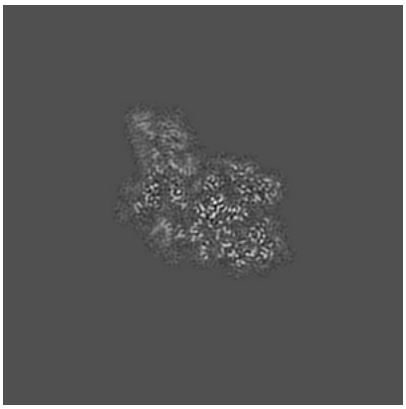
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices (i)

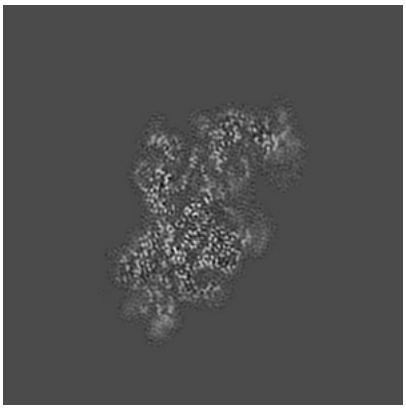
### 6.2.1 Primary map



X Index: 180

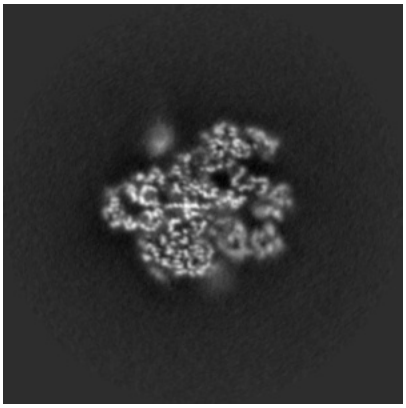


Y Index: 180

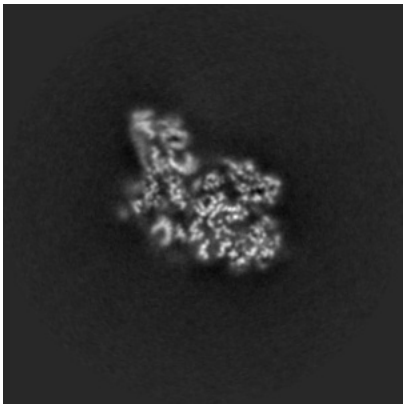


Z Index: 180

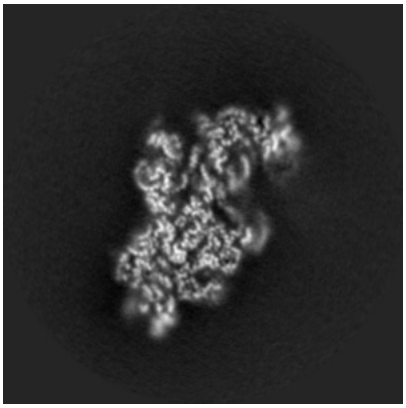
### 6.2.2 Raw map



X Index: 180



Y Index: 180

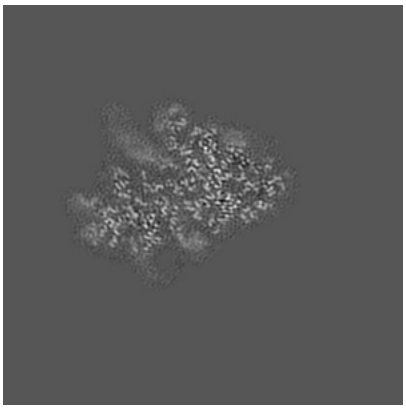


Z Index: 180

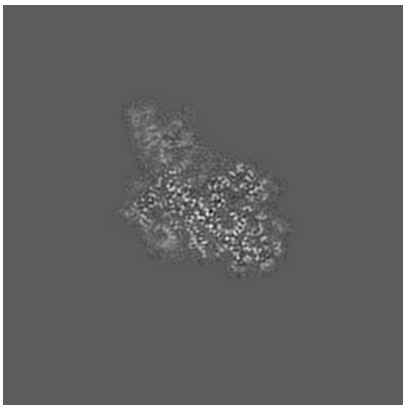
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices (i)

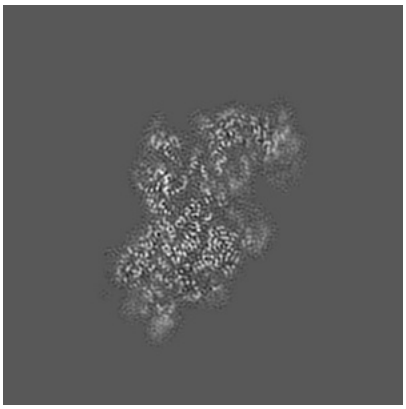
### 6.3.1 Primary map



X Index: 145

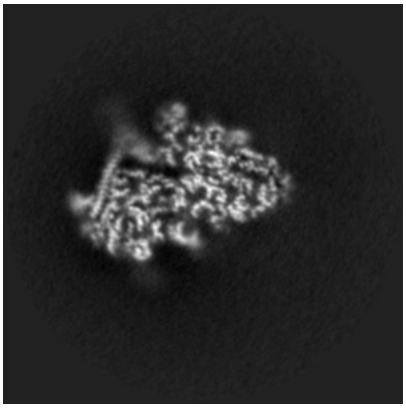


Y Index: 174

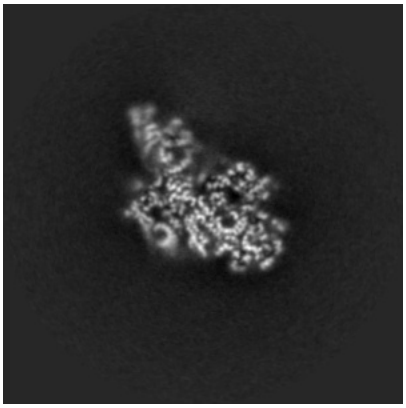


Z Index: 181

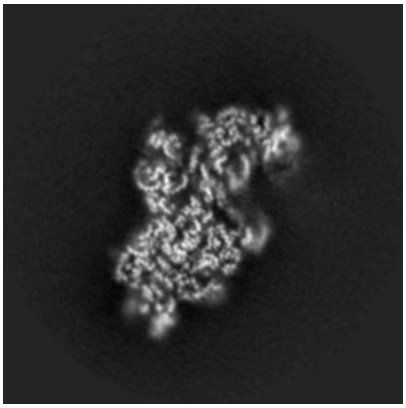
### 6.3.2 Raw map



X Index: 141



Y Index: 174

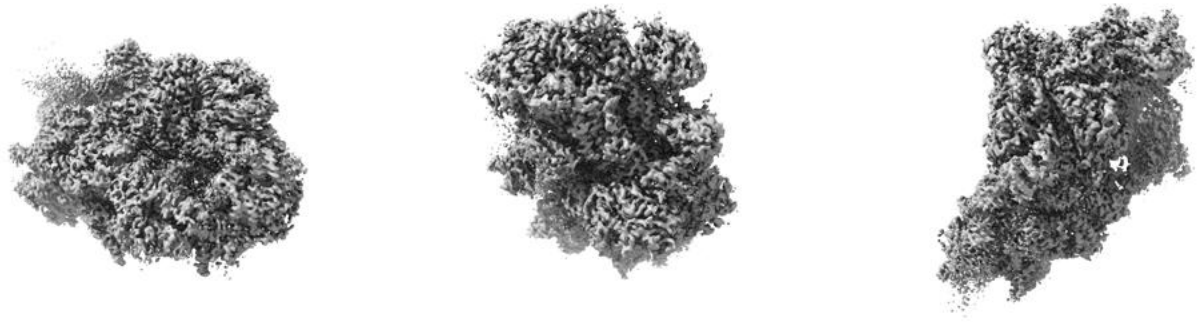


Z Index: 181

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

## 6.4 Orthogonal surface views (i)

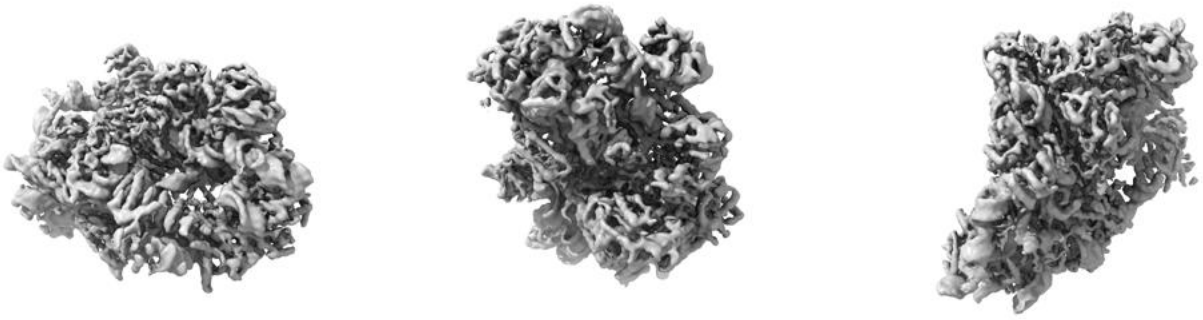
### 6.4.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.0583. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.4.2 Raw map



X Y Z

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

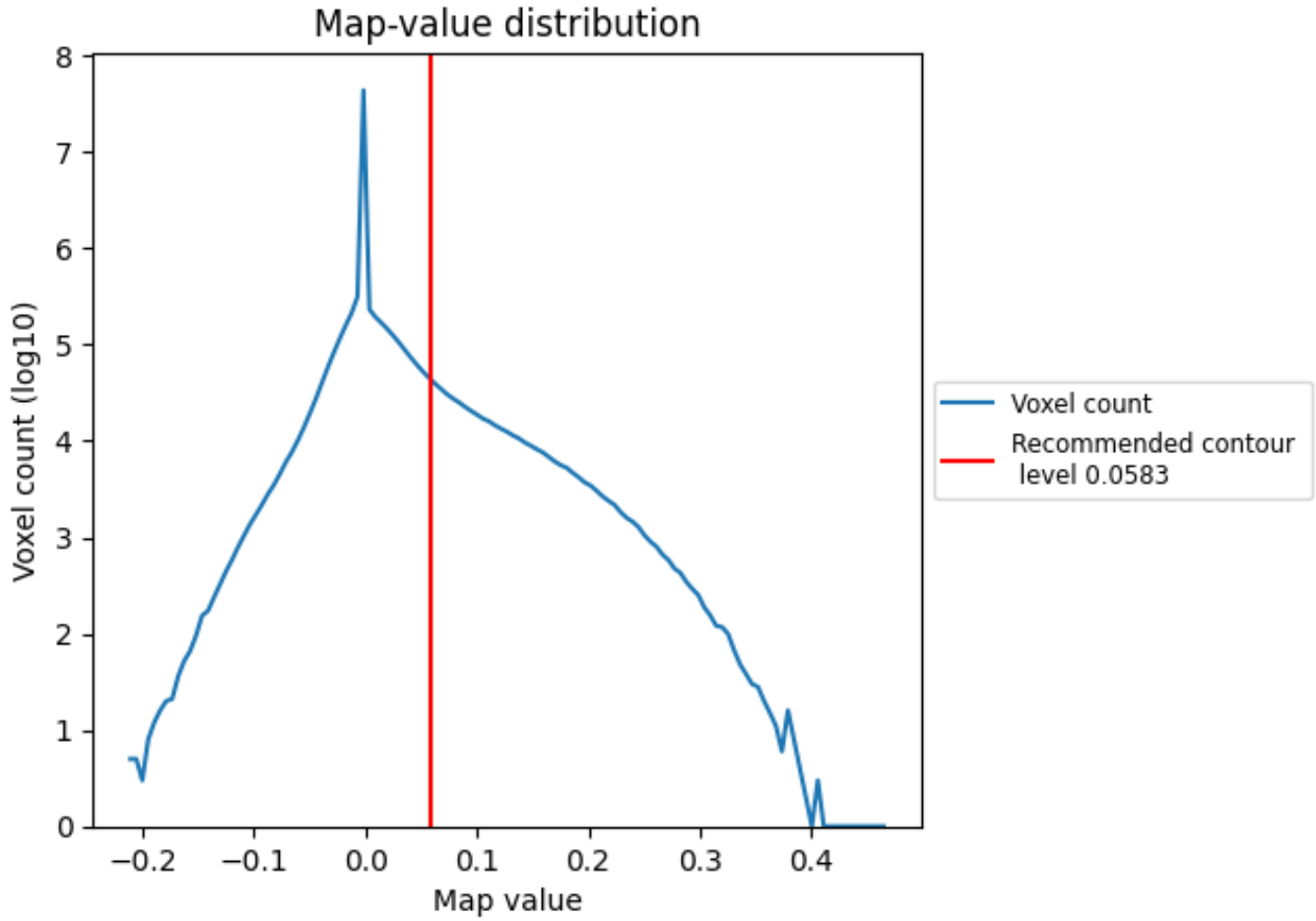
## 6.5 Mask visualisation (i)

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

# 7 Map analysis

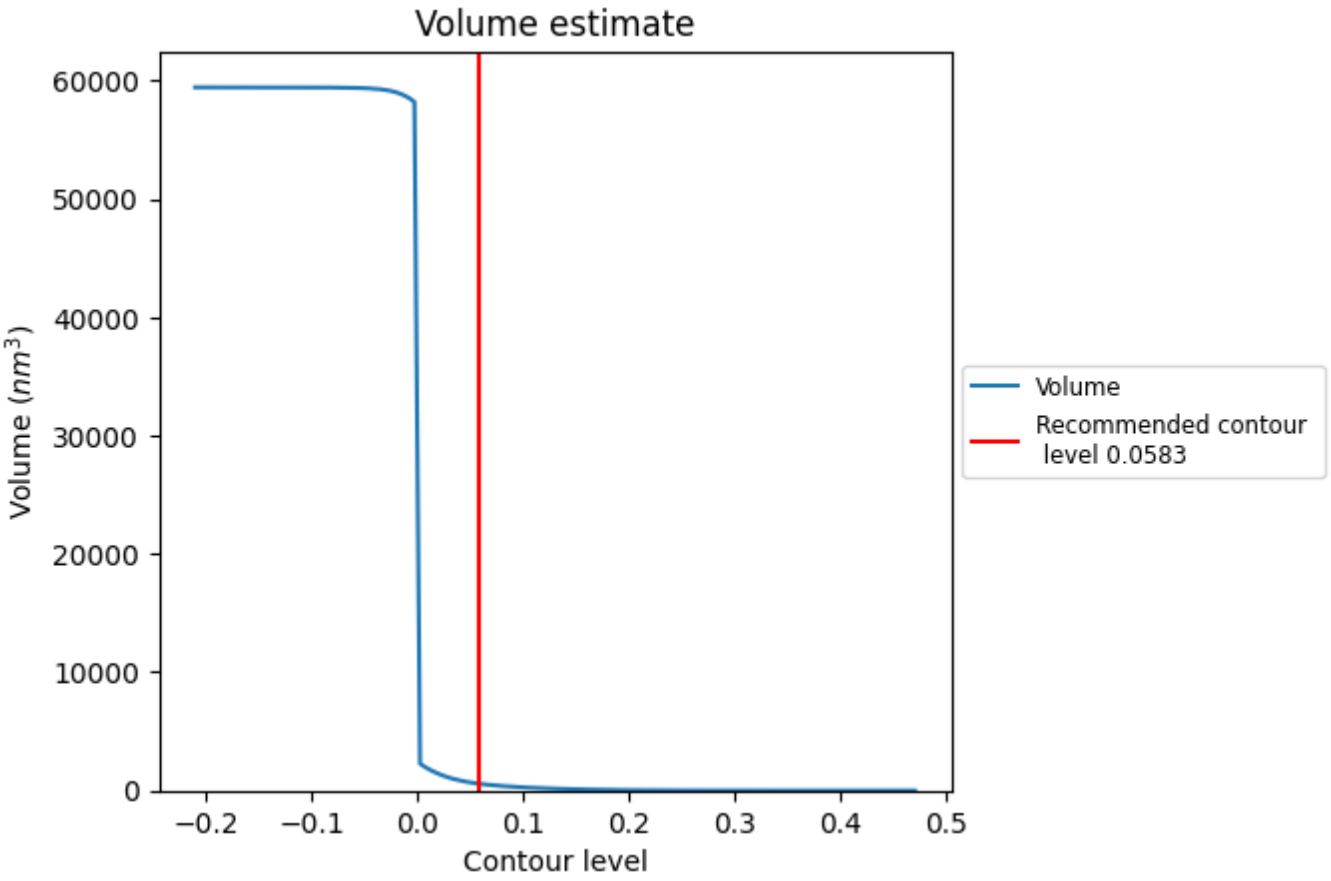
This section contains the results of statistical analysis of the map.

## 7.1 Map-value distribution




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

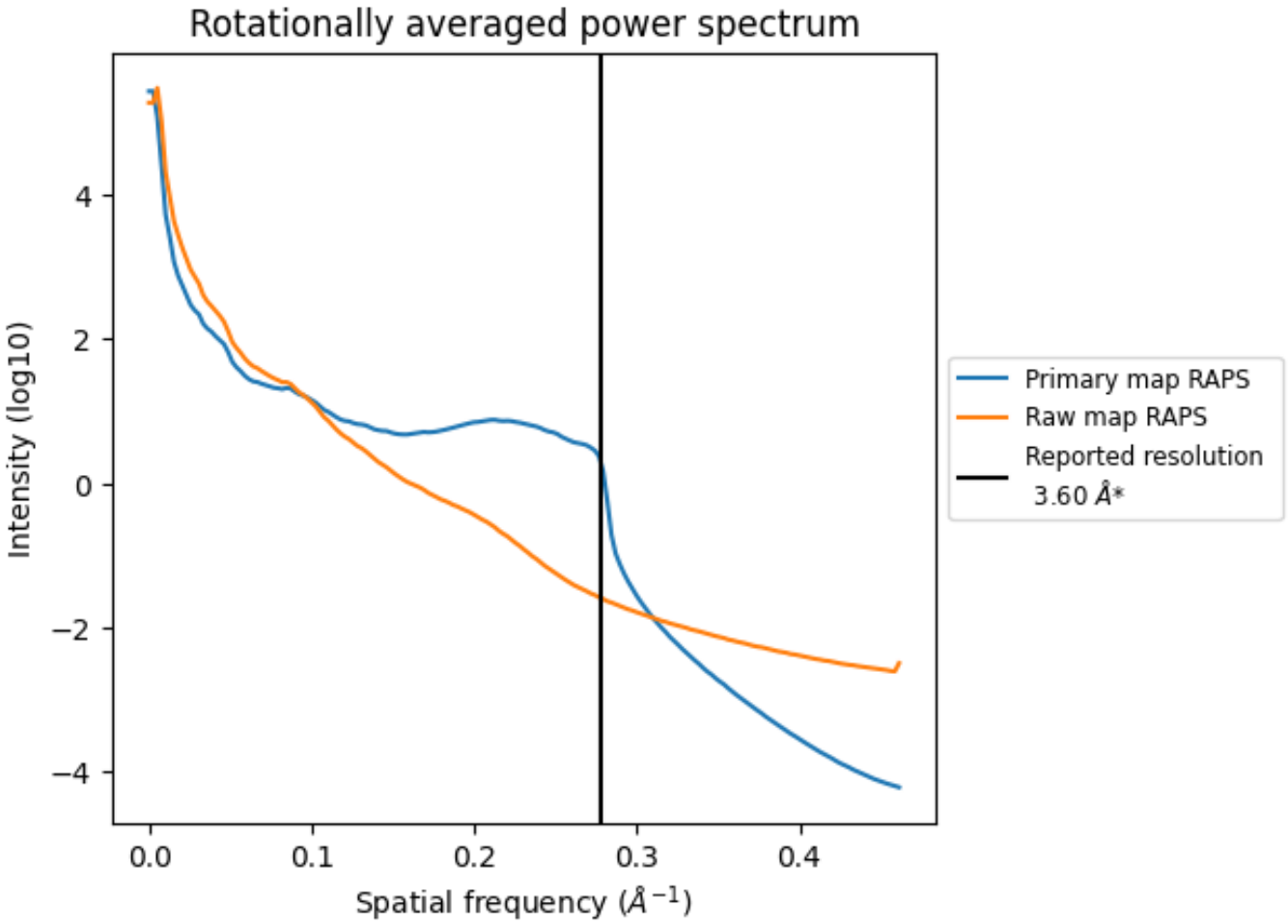
## 7.2 Volume estimate




The volume at the recommended contour level is 573 $nm^3$; this corresponds to an approximate mass of 518 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)

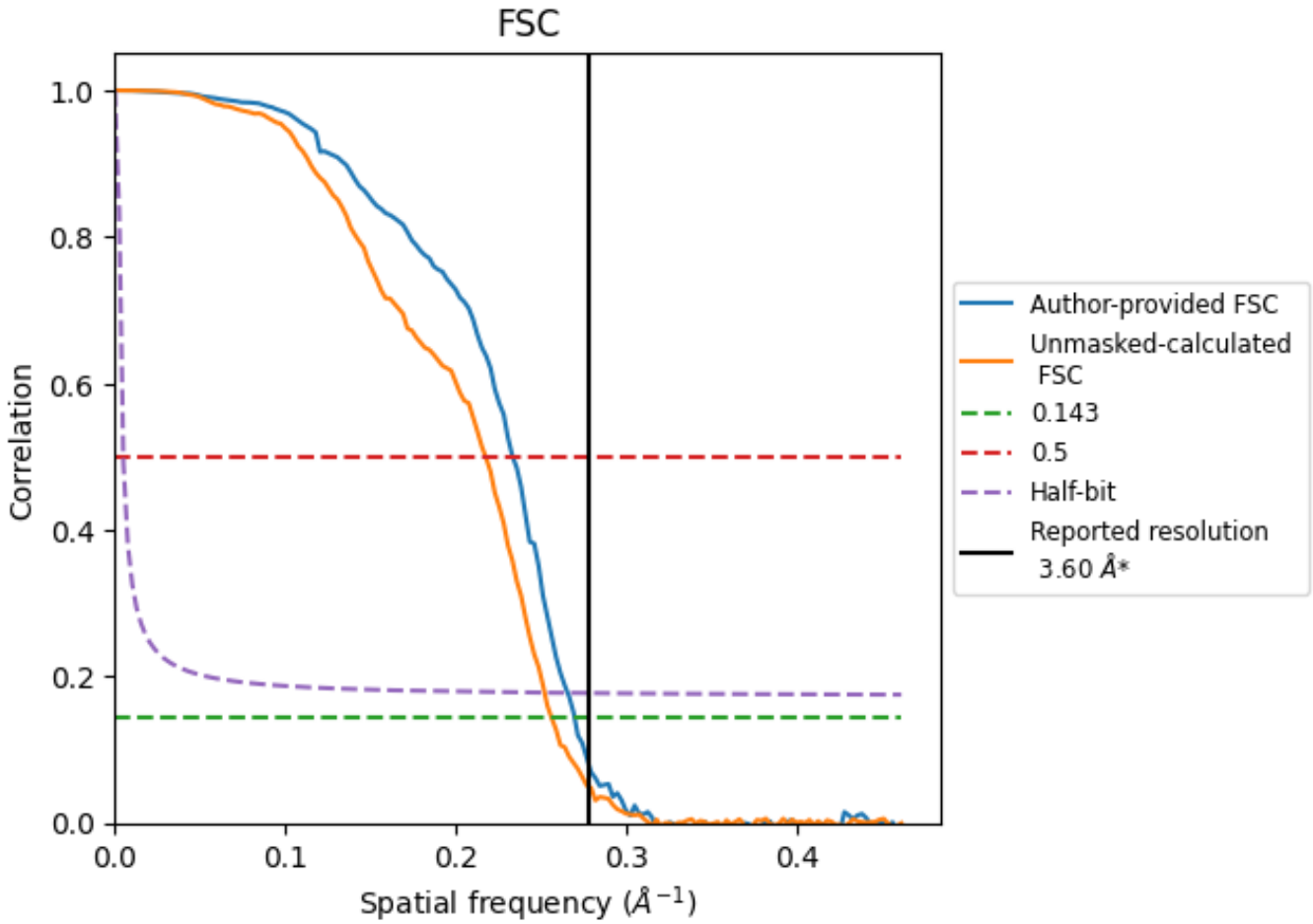



*Reported resolution corresponds to spatial frequency of 0.278 $Å^{-1}$

# 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 0.278 Å$^{-1}$

## 8.2 Resolution estimates (i)

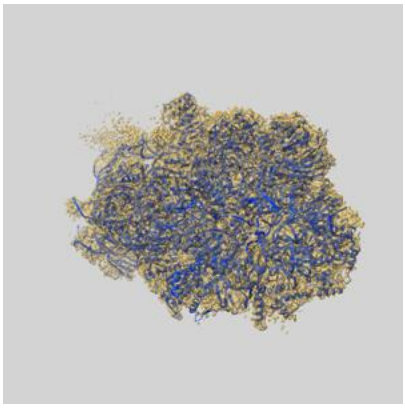
| Resolution estimate (Å) | Estimation criterion (FSC cut-off) | | |
|---|---|---|---|
| | 0.143 | 0.5 | Half-bit |
| Reported by author | 3.60 | - | - |
| Author-provided FSC curve | 3.71 | 4.29 | 3.76 |
| Unmasked-calculated* | 3.90 | 4.60 | 3.97 |

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

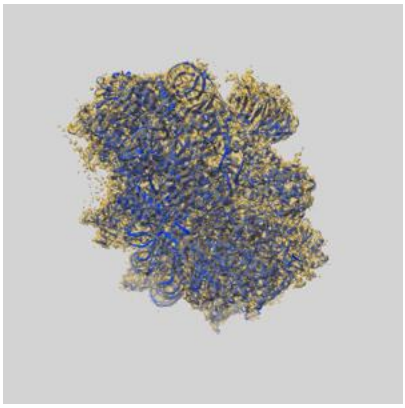
# 9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-4337 and PDB model 6G18. Per-residue inclusion information can be found in section 3 on page 11.

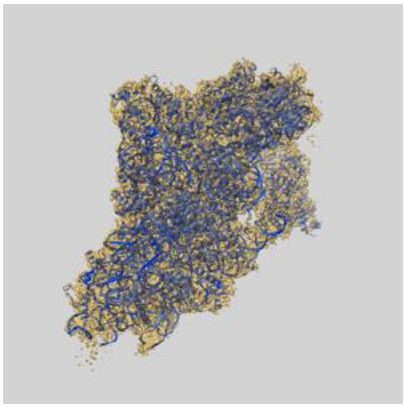
## 9.1 Map-model overlay



X



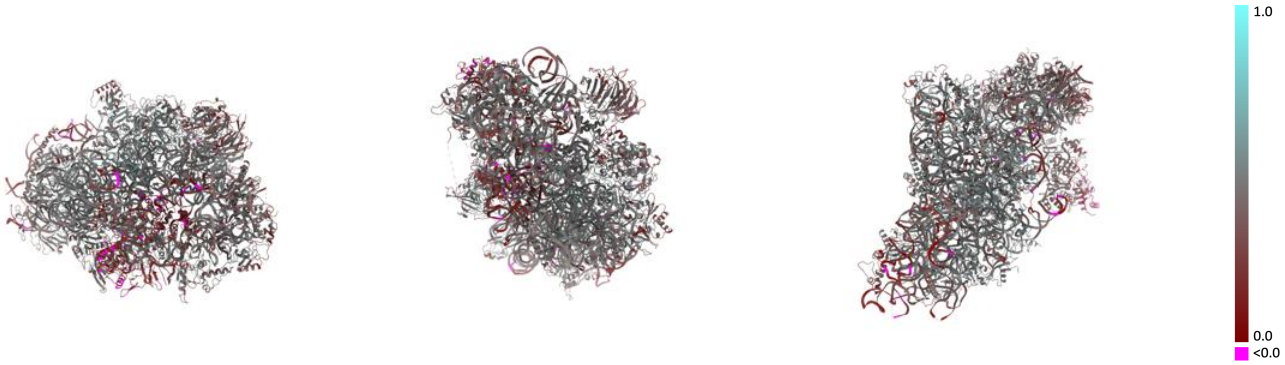
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.0583 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.

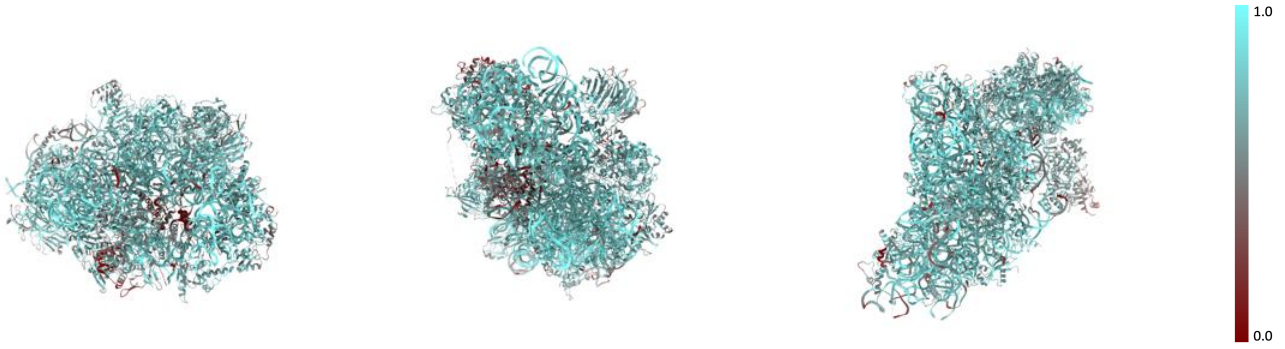
## 9.2 Q-score mapped to coordinate model (i)




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.

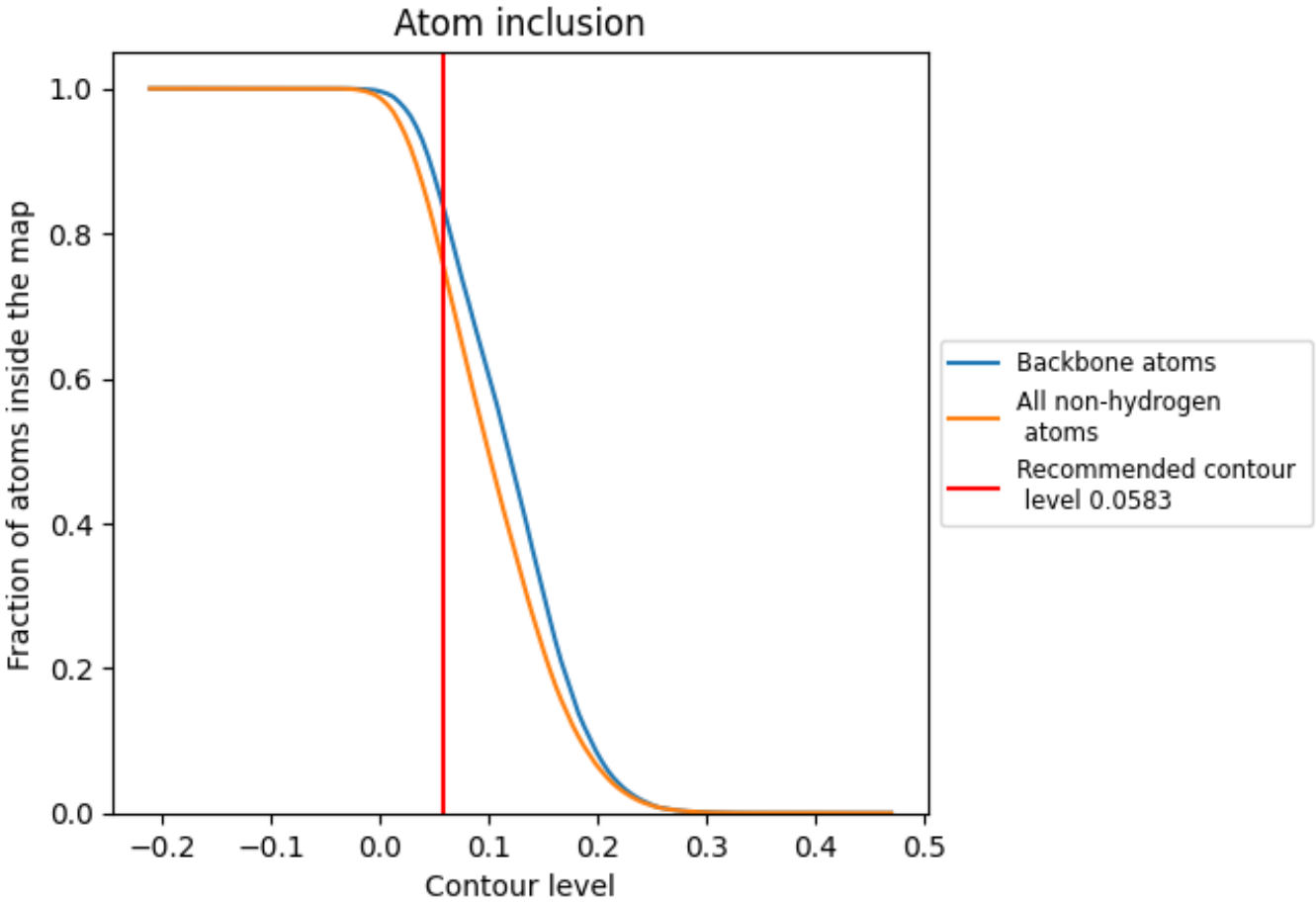
## 9.3 Atom inclusion mapped to coordinate model (i)




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 (0.0583).

## 9.4 Atom inclusion (i)




At the recommended contour level, 84% of all backbone atoms, 76% 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 (0.0583) and Q-score for the entire model and for each chain.

| Chain | Atom inclusion | Q-score |
|---|---|---|
| All | 0.7594 | 0.4160 |
| 2 | 0.8436 | 0.4090 |
| A | 0.8095 | 0.4940 |
| B | 0.7510 | 0.4600 |
| C | 0.7660 | 0.4910 |
| E | 0.7452 | 0.4680 |
| F | 0.7270 | 0.4420 |
| G | 0.6928 | 0.3970 |
| H | 0.6583 | 0.3950 |
| I | 0.7406 | 0.4350 |
| J | 0.7880 | 0.4820 |
| L | 0.7270 | 0.4580 |
| M | 0.3301 | 0.1480 |
| N | 0.7830 | 0.4590 |
| O | 0.7347 | 0.4600 |
| P | 0.7474 | 0.4540 |
| Q | 0.7301 | 0.4380 |
| R | 0.6798 | 0.4020 |
| S | 0.6820 | 0.4030 |
| T | 0.7454 | 0.4290 |
| V | 0.7758 | 0.4800 |
| W | 0.7921 | 0.4960 |
| X | 0.7983 | 0.5010 |
| Y | 0.7571 | 0.4650 |
| Z | 0.6061 | 0.3680 |
| b | 0.7548 | 0.4570 |
| c | 0.7086 | 0.4600 |
| e | 0.6076 | 0.4170 |
| f | 0.4155 | 0.2360 |
| g | 0.6579 | 0.3690 |
| t | 0.6274 | 0.3700 |
| u | 0.7433 | 0.4570 |
| v | 0.3768 | 0.2450 |
| w | 0.6247 | 0.3510 |
| x | 0.7717 | 0.4910 |
| y | 0.7170 | 0.4240 |