# wwPDB EM Validation Summary Report

Nov 23, 2022 – 03:26 PM EST

| | | |
|---|---|---|
| PDB ID | : | 7T4S |
| EMDB ID | : | EMD-25687 |
| Title | : | CryoEM structure of the HCMV Pentamer gH/gL/UL128/UL130/UL131A in complex with NRP2 and neutralizing fabs 8I21 and 13H11 |
| Authors | : | Kschonsak, M.; Johnson, M.C.; Schelling, R.; Green, E.M.; Rouge, L.; Ho, H.; Patel, N.; Kilic, C.; Kraft, E.; Arthur, C.P.; Rohou, A.L.; Comps-Agrar, L.; Martinez-Martin, N.; Perez, L.; Payandeh, J.; Ciferri, C. |
| Deposited on | : | 2021-12-10 |
| Resolution | : | 3.10 Å(reported) |
| Based on initial models | : | 5VOB, 2QQO |

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

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

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

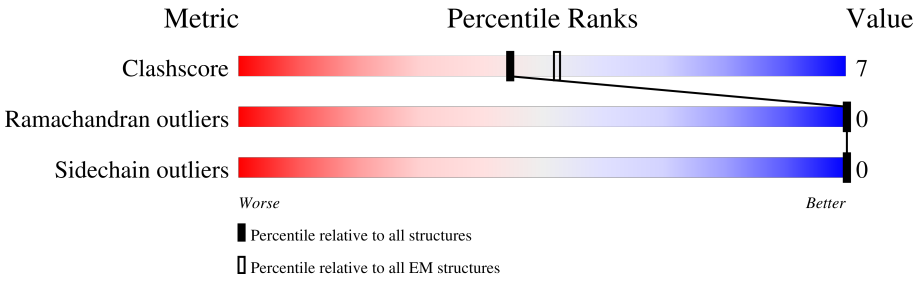
| | | |
|---|---|---|
| EMDB validation analysis | : | 0.0.1.dev43 |
| Mogul | : | 1.8.5 (274361), CSD as541be (2020) |
| MolProbity | : | 4.02b-467 |
| Percentile statistics | : | 20191225.v01 (using entries in the PDB archive December 25th 2019) |
| MapQ | : | 1.9.9 |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.31.3 |

# 1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.10 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 |

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 | A | 767 | 71% 11% 19% |
| 2 | B | 278 | 73% 8% 18% |
| 3 | C | 171 | 49% 17% 35% |
| 4 | D | 254 | 56% 10% 35% |
| 5 | E | 129 | 60% 17% 23% |
| 6 | F | 875 | 34% 7% 59% |
| 7 | H | 249 | 41% 8% 51% |
| 8 | J | 250 | 42% 6% 52% |

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| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 9 | K | 237 | |
| 10 | I | 238 | |

# 2 Entry composition (i)

There are 12 unique types of molecules in this entry. The entry contains 16404 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called Envelope glycoprotein H.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | |
| 1 | A | 624 | 5034 | 3232 | 848 | 930 | 24 | 0 | 0 |

There are 52 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| A | 716 | GLY | - | expression tag | UNP F5H9T3 |
| A | 717 | THR | - | expression tag | UNP F5H9T3 |
| A | 718 | LYS | - | expression tag | UNP F5H9T3 |
| A | 719 | LEU | - | expression tag | UNP F5H9T3 |
| A | 720 | GLY | - | expression tag | UNP F5H9T3 |
| A | 721 | PRO | - | expression tag | UNP F5H9T3 |
| A | 722 | GLU | - | expression tag | UNP F5H9T3 |
| A | 723 | GLN | - | expression tag | UNP F5H9T3 |
| A | 724 | LYS | - | expression tag | UNP F5H9T3 |
| A | 725 | LEU | - | expression tag | UNP F5H9T3 |
| A | 726 | ILE | - | expression tag | UNP F5H9T3 |
| A | 727 | SER | - | expression tag | UNP F5H9T3 |
| A | 728 | GLU | - | expression tag | UNP F5H9T3 |
| A | 729 | GLU | - | expression tag | UNP F5H9T3 |
| A | 730 | ASP | - | expression tag | UNP F5H9T3 |
| A | 731 | LEU | - | expression tag | UNP F5H9T3 |
| A | 732 | ASN | - | expression tag | UNP F5H9T3 |
| A | 733 | SER | - | expression tag | UNP F5H9T3 |
| A | 734 | ALA | - | expression tag | UNP F5H9T3 |
| A | 735 | VAL | - | expression tag | UNP F5H9T3 |
| A | 736 | ASP | - | expression tag | UNP F5H9T3 |
| A | 737 | GLY | - | expression tag | UNP F5H9T3 |
| A | 738 | SER | - | expression tag | UNP F5H9T3 |
| A | 739 | GLY | - | expression tag | UNP F5H9T3 |
| A | 740 | LEU | - | expression tag | UNP F5H9T3 |
| A | 741 | ASN | - | expression tag | UNP F5H9T3 |
| A | 742 | ASP | - | expression tag | UNP F5H9T3 |
| A | 743 | ILE | - | expression tag | UNP F5H9T3 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| A | 744 | PHE | - | expression tag | UNP F5H9T3 |
| A | 745 | GLU | - | expression tag | UNP F5H9T3 |
| A | 746 | ALA | - | expression tag | UNP F5H9T3 |
| A | 747 | GLN | - | expression tag | UNP F5H9T3 |
| A | 748 | LYS | - | expression tag | UNP F5H9T3 |
| A | 749 | ILE | - | expression tag | UNP F5H9T3 |
| A | 750 | GLU | - | expression tag | UNP F5H9T3 |
| A | 751 | TRP | - | expression tag | UNP F5H9T3 |
| A | 752 | HIS | - | expression tag | UNP F5H9T3 |
| A | 753 | GLU | - | expression tag | UNP F5H9T3 |
| A | 754 | ASN | - | expression tag | UNP F5H9T3 |
| A | 755 | LEU | - | expression tag | UNP F5H9T3 |
| A | 756 | TYR | - | expression tag | UNP F5H9T3 |
| A | 757 | PHE | - | expression tag | UNP F5H9T3 |
| A | 758 | GLN | - | expression tag | UNP F5H9T3 |
| A | 759 | GLY | - | expression tag | UNP F5H9T3 |
| A | 760 | HIS | - | expression tag | UNP F5H9T3 |
| A | 761 | HIS | - | expression tag | UNP F5H9T3 |
| A | 762 | HIS | - | expression tag | UNP F5H9T3 |
| A | 763 | HIS | - | expression tag | UNP F5H9T3 |
| A | 764 | HIS | - | expression tag | UNP F5H9T3 |
| A | 765 | HIS | - | expression tag | UNP F5H9T3 |
| A | 766 | HIS | - | expression tag | UNP F5H9T3 |
| A | 767 | HIS | - | expression tag | UNP F5H9T3 |

- Molecule 2 is a protein called Envelope glycoprotein L.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 2 | B | 227 | Total | C | N | O | S | 0 | 0 |
| | | | 1804 | 1149 | 315 | 332 | 8 | | |

- Molecule 3 is a protein called Envelope protein UL128.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 3 | C | 112 | Total | C | N | O | S | 0 | 0 |
| | | | 896 | 562 | 165 | 160 | 9 | | |

- Molecule 4 is a protein called Envelope glycoprotein UL130.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 4 | D | 166 | Total | C | N | O | S | 0 | 0 |
| | | | 1359 | 870 | 239 | 242 | 8 | | |

There are 40 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| D | 215 | GLY | - | expression tag | UNP Q38M07 |
| D | 216 | SER | - | expression tag | UNP Q38M07 |
| D | 217 | GLU | - | expression tag | UNP Q38M07 |
| D | 218 | ASN | - | expression tag | UNP Q38M07 |
| D | 219 | LEU | - | expression tag | UNP Q38M07 |
| D | 220 | TYR | - | expression tag | UNP Q38M07 |
| D | 221 | PHE | - | expression tag | UNP Q38M07 |
| D | 222 | GLN | - | expression tag | UNP Q38M07 |
| D | 223 | GLY | - | expression tag | UNP Q38M07 |
| D | 224 | SER | - | expression tag | UNP Q38M07 |
| D | 225 | ALA | - | expression tag | UNP Q38M07 |
| D | 226 | TRP | - | expression tag | UNP Q38M07 |
| D | 227 | SER | - | expression tag | UNP Q38M07 |
| D | 228 | HIS | - | expression tag | UNP Q38M07 |
| D | 229 | PRO | - | expression tag | UNP Q38M07 |
| D | 230 | GLN | - | expression tag | UNP Q38M07 |
| D | 231 | PHE | - | expression tag | UNP Q38M07 |
| D | 232 | GLU | - | expression tag | UNP Q38M07 |
| D | 233 | LYS | - | expression tag | UNP Q38M07 |
| D | 234 | GLY | - | expression tag | UNP Q38M07 |
| D | 235 | GLY | - | expression tag | UNP Q38M07 |
| D | 236 | GLY | - | expression tag | UNP Q38M07 |
| D | 237 | SER | - | expression tag | UNP Q38M07 |
| D | 238 | GLY | - | expression tag | UNP Q38M07 |
| D | 239 | GLY | - | expression tag | UNP Q38M07 |
| D | 240 | GLY | - | expression tag | UNP Q38M07 |
| D | 241 | SER | - | expression tag | UNP Q38M07 |
| D | 242 | GLY | - | expression tag | UNP Q38M07 |
| D | 243 | GLY | - | expression tag | UNP Q38M07 |
| D | 244 | GLY | - | expression tag | UNP Q38M07 |
| D | 245 | SER | - | expression tag | UNP Q38M07 |
| D | 246 | ALA | - | expression tag | UNP Q38M07 |
| D | 247 | TRP | - | expression tag | UNP Q38M07 |
| D | 248 | SER | - | expression tag | UNP Q38M07 |
| D | 249 | HIS | - | expression tag | UNP Q38M07 |
| D | 250 | PRO | - | expression tag | UNP Q38M07 |
| D | 251 | GLN | - | expression tag | UNP Q38M07 |
| D | 252 | PHE | - | expression tag | UNP Q38M07 |
| D | 253 | GLU | - | expression tag | UNP Q38M07 |
| D | 254 | LYS | - | expression tag | UNP Q38M07 |

- Molecule 5 is a protein called Envelope protein UL131A.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 5 | E | 99 | Total | C | N | O | S | 0 | 0 |
| | | | 821 | 518 | 147 | 155 | 1 | | |

- Molecule 6 is a protein called Neuropilin-2.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 6 | F | 363 | Total | C | N | O | S | 0 | 0 |
| | | | 2883 | 1843 | 494 | 529 | 17 | | |

There are 11 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| F | 865 | GLY | - | expression tag | UNP O60462 |
| F | 866 | ASN | - | expression tag | UNP O60462 |
| F | 867 | SER | - | expression tag | UNP O60462 |
| F | 868 | ASP | - | expression tag | UNP O60462 |
| F | 869 | TYR | - | expression tag | UNP O60462 |
| F | 870 | LYS | - | expression tag | UNP O60462 |
| F | 871 | ASP | - | expression tag | UNP O60462 |
| F | 872 | ASP | - | expression tag | UNP O60462 |
| F | 873 | ASP | - | expression tag | UNP O60462 |
| F | 874 | ASP | - | expression tag | UNP O60462 |
| F | 875 | LYS | - | expression tag | UNP O60462 |

- Molecule 7 is a protein called Fab 8I21 heavy chain.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 7 | H | 121 | Total | C | N | O | S | 0 | 0 |
| | | | 951 | 602 | 167 | 177 | 5 | | |

- Molecule 8 is a protein called Fab 13H11 heavy chain.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 8 | J | 121 | Total | C | N | O | S | 0 | 0 |
| | | | 924 | 581 | 160 | 178 | 5 | | |

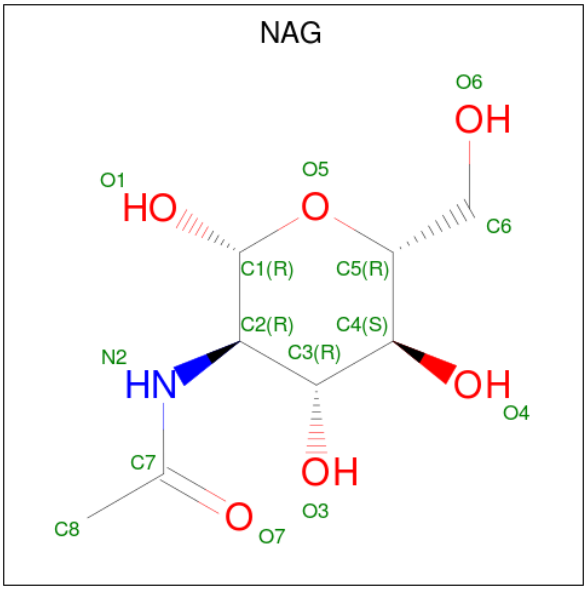
- Molecule 9 is a protein called Fab 13H11 light chain.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 9 | K | 105 | Total | C | N | O | S | 0 | 0 |
| | | | 790 | 500 | 131 | 156 | 3 | | |

- Molecule 10 is a protein called Fab 8I21 light chain.

| Mol | Chain | Residues | Atoms | | | | | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 10 | I | 107 | Total | C | N | O | S | 0 | 0 |
| | | | 815 | 515 | 138 | 159 | 3 | | |

- Molecule 11 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).




| Mol | Chain | Residues | Atoms | | | | AltConf |
|---|---|---|---|---|---|---|---|
| 11 | A | 1 | Total | C | N | O | 0 |
| | | | 56 | 32 | 4 | 20 | |
| 11 | A | 1 | Total | C | N | O | 0 |
| | | | 56 | 32 | 4 | 20 | |
| 11 | A | 1 | Total | C | N | O | 0 |
| | | | 56 | 32 | 4 | 20 | |
| 11 | A | 1 | Total | C | N | O | 0 |
| | | | 56 | 32 | 4 | 20 | |
| 11 | D | 1 | Total | C | N | O | 0 |
| | | | 28 | 16 | 2 | 10 | |
| 11 | D | 1 | Total | C | N | O | 0 |
| | | | 28 | 16 | 2 | 10 | |
| 11 | E | 1 | Total | C | N | O | 0 |
| | | | 14 | 8 | 1 | 5 | |
| 11 | F | 1 | Total | C | N | O | 0 |
| | | | 28 | 16 | 2 | 10 | |
| 11 | F | 1 | Total | C | N | O | 0 |
| | | | 28 | 16 | 2 | 10 | |

- Molecule 12 is CALCIUM ION (three-letter code: CA) (formula: Ca).

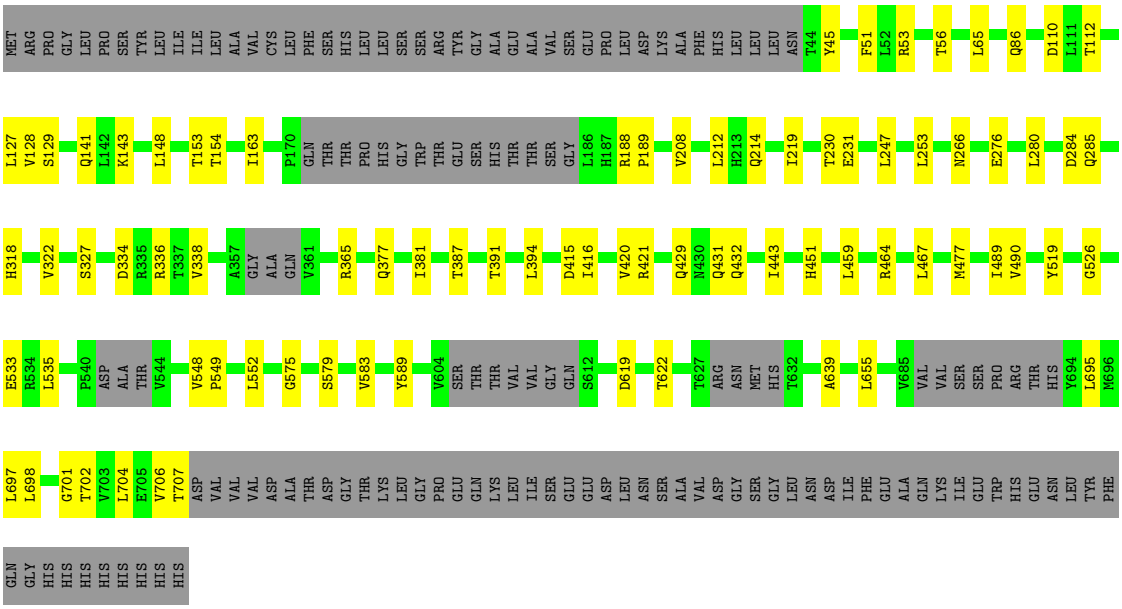
| Mol | Chain | Residues | Atoms | | AltConf |
|---|---|---|---|---|---|
| | | | Total | Ca | |
| 12 | F | 1 | 1 | 1 | 0 |

# 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.

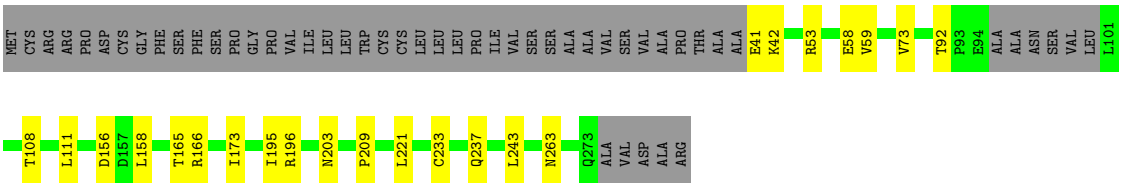
• Molecule 1: Envelope glycoprotein H

Chain A:



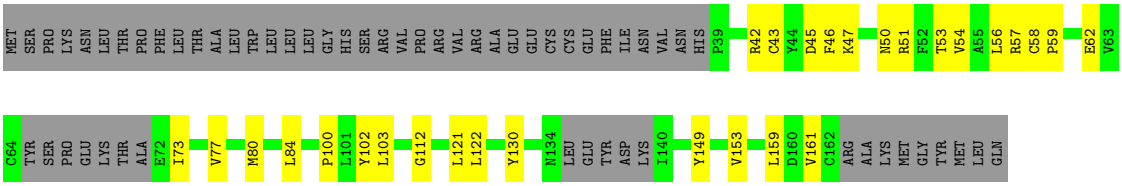

• Molecule 2: Envelope glycoprotein L

Chain B:



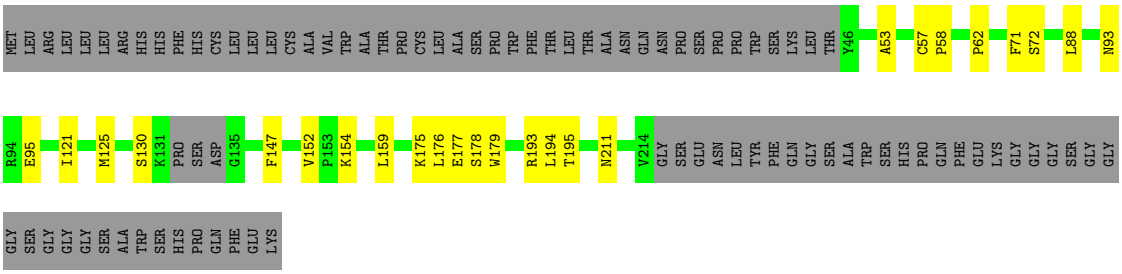

• Molecule 3: Envelope protein UL128

Chain C:




• Molecule 4: Envelope glycoprotein UL130

Chain D:

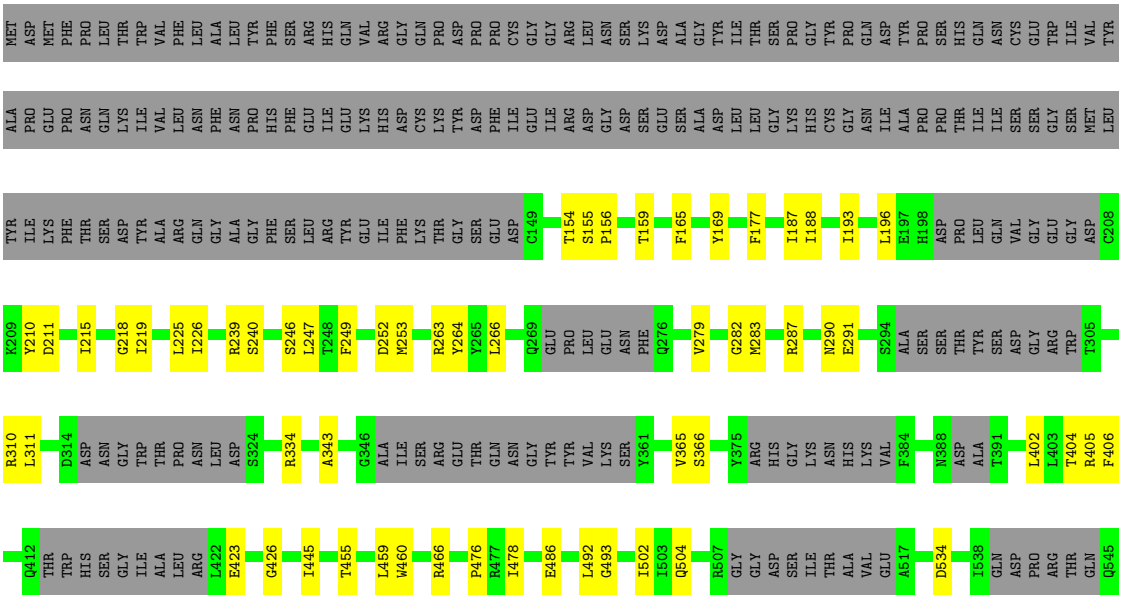


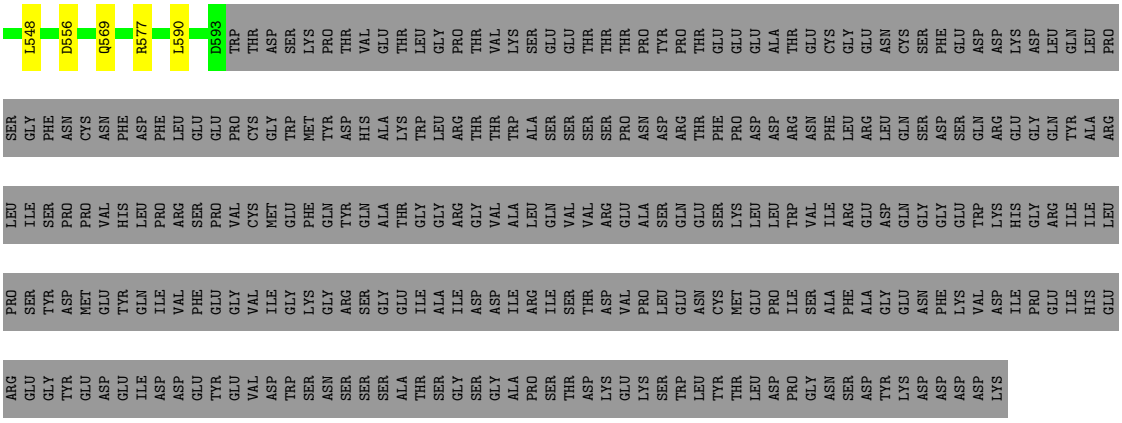

• Molecule 5: Envelope protein UL131A

Chain E:

• Molecule 6: Neuropilin-2

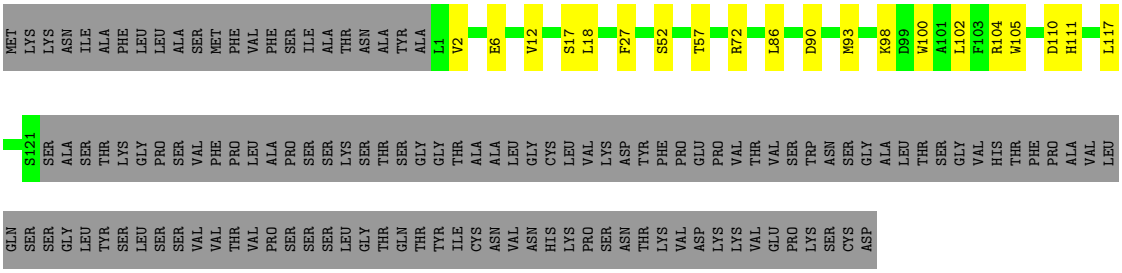
Chain F:





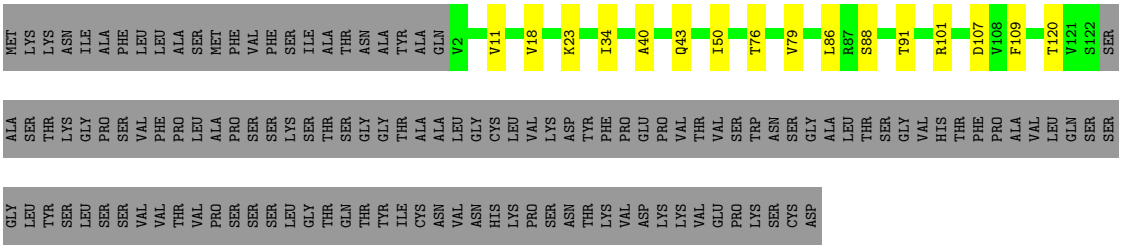

• Molecule 7: Fab 8I21 heavy chain

Chain H:



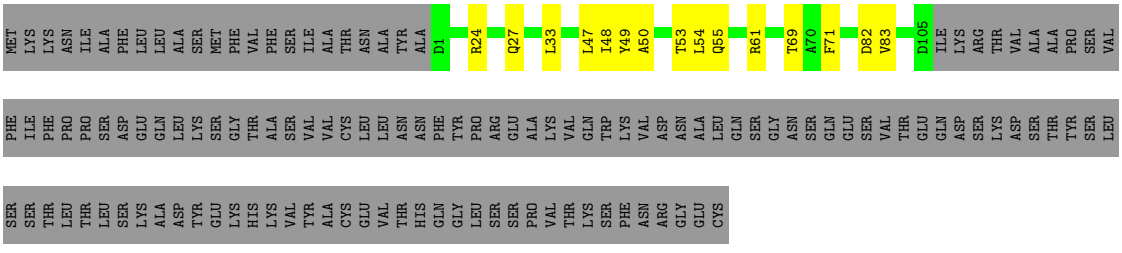

• Molecule 8: Fab 13H11 heavy chain

Chain J:



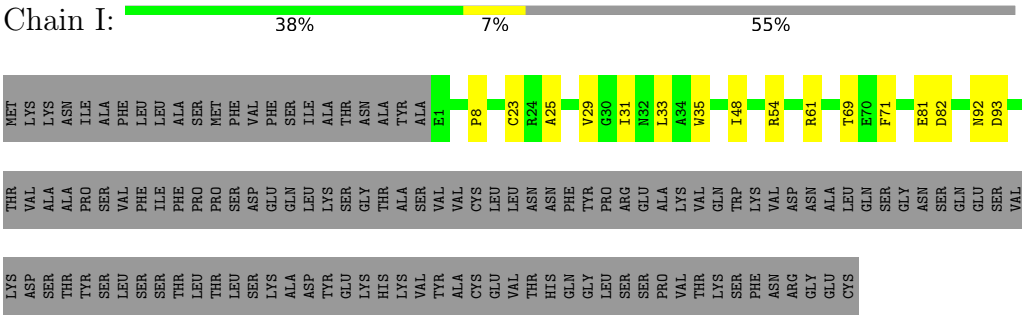

• Molecule 9: Fab 13H11 light chain

Chain K:




• Molecule 10: Fab 8I21 light chain

Chain I:


38%
7%
55%
MET LYS LYS ASN ILE ALA PHE LEU LEU ALA SER MET PHE VAL PHE SER ILE ALA THR ASN ALA TYR ALA E1 P8 C23 R24 A25 V29 C30 I31 N32 L33 A34 W35 I48 R54 R61 T69 E70 F71 E81 D82 N92 D93 T103 I107 LYS ARG
THR VAL ALA ALA PRO SER VAL PHE ILE PHE PRO PRO SER ASP GLU GLN LEU LYS SER GLY THR ALA SER VAL VAL CYS LEU LEU ASN ASN PHE TYR PRO ARG GLU ALA LYS VAL GLN TRP LYS VAL ASP ASN ALA LEU GLN SER GLY ASN SER GLN GLU SER VAL THR GLU GLN ASP SER
LYS ASP SER THR TYR SER LEU SER SER THR LEU THR LEU SER LYS ALA ASP TYR GLU LYS HIS LYS VAL TYR ALA CYS GLU VAL THR HIS GLN GLY LEU SER SER PRO VAL THR LYS SER PHE ASN ARG GLY GLU CYS

# 4 Experimental information (i)

| Property | Value | Source |
|---|---|---|
| EM reconstruction method | SINGLE PARTICLE | Depositor |
| Imposed symmetry | POINT, C1 | Depositor |
| Number of particles used | 2252924 | 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 ($e^-/Å^2$) | 52 | Depositor |
| Minimum defocus (nm) | 500 | Depositor |
| Maximum defocus (nm) | 1500 | Depositor |
| Magnification | 165000 | Depositor |
| Image detector | GATAN K2 SUMMIT (4k x 4k) | Depositor |
| Maximum map value | 15.305 | Depositor |
| Minimum map value | 0.000 | Depositor |
| Average map value | 0.012 | Depositor |
| Map value standard deviation | 0.182 | Depositor |
| Recommended contour level | 0.8 | Depositor |
| Map size (Å) | 383.7976, 383.7976, 383.7976 | wwPDB |
| Map dimensions | 284, 284, 284 | wwPDB |
| Map angles (°) | 90.0, 90.0, 90.0 | wwPDB |
| Pixel spacing (Å) | 1.3514, 1.3514, 1.3514 | Depositor |

# 5 Model quality

## 5.1 Standard geometry

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

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 | A | 0.28 | 0/5149 | 0.51 | 0/7007 |
| 2 | B | 0.30 | 0/1848 | 0.55 | 0/2520 |
| 3 | C | 0.29 | 0/911 | 0.58 | 0/1227 |
| 4 | D | 0.29 | 0/1397 | 0.55 | 0/1896 |
| 5 | E | 0.30 | 0/840 | 0.55 | 0/1138 |
| 6 | F | 0.28 | 0/2950 | 0.55 | 0/3991 |
| 7 | H | 0.30 | 0/976 | 0.57 | 0/1322 |
| 8 | J | 0.31 | 0/944 | 0.53 | 0/1280 |
| 9 | K | 0.33 | 0/808 | 0.53 | 0/1100 |
| 10 | I | 0.31 | 0/837 | 0.53 | 0/1141 |
| All | All | 0.29 | 0/16660 | 0.54 | 0/22622 |

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts

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

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|---|---|---|---|---|---|---|
| 1 | A | 5034 | 0 | 5000 | 54 | 0 |
| 2 | B | 1804 | 0 | 1793 | 19 | 0 |
| 3 | C | 896 | 0 | 902 | 23 | 0 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|---|---|---|---|---|---|---|
| 4 | D | 1359 | 0 | 1332 | 21 | 0 |
| 5 | E | 821 | 0 | 781 | 20 | 0 |
| 6 | F | 2883 | 0 | 2826 | 51 | 0 |
| 7 | H | 951 | 0 | 910 | 18 | 0 |
| 8 | J | 924 | 0 | 900 | 14 | 0 |
| 9 | K | 790 | 0 | 780 | 18 | 0 |
| 10 | I | 815 | 0 | 781 | 10 | 0 |
| 11 | A | 56 | 0 | 52 | 0 | 0 |
| 11 | D | 28 | 0 | 26 | 2 | 0 |
| 11 | E | 14 | 0 | 13 | 2 | 0 |
| 11 | F | 28 | 0 | 26 | 0 | 0 |
| 12 | F | 1 | 0 | 0 | 0 | 0 |
| All | All | 16404 | 0 | 16122 | 221 | 0 |

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 7.

The worst 5 of 221 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) |
|---|---|---|---|
| 9:K:47:LEU:O | 9:K:48:ILE:HD13 | 1.84 | 0.78 |
| 2:B:158:LEU:HD21 | 7:H:105:TRP:CH2 | 2.20 | 0.76 |
| 9:K:50:ALA:HB3 | 9:K:53:THR:CB | 2.17 | 0.75 |
| 1:A:464:ARG:NH1 | 1:A:519:TYR:O | 2.26 | 0.67 |
| 6:F:365:VAL:HG21 | 6:F:402:LEU:CD2 | 2.25 | 0.67 |

There are no symmetry-related clashes.

## 5.3 Torsion angles (i)

### 5.3.1 Protein backbone (i)

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

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

| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 1 | A | 610/767 (80%) | 595 (98%) | 15 (2%) | 0 | 100 | 100 |
| 2 | B | 223/278 (80%) | 215 (96%) | 8 (4%) | 0 | 100 | 100 |
| 3 | C | 106/171 (62%) | 100 (94%) | 6 (6%) | 0 | 100 | 100 |
| 4 | D | 162/254 (64%) | 162 (100%) | 0 | 0 | 100 | 100 |
| 5 | E | 95/129 (74%) | 94 (99%) | 1 (1%) | 0 | 100 | 100 |
| 6 | F | 341/875 (39%) | 327 (96%) | 14 (4%) | 0 | 100 | 100 |
| 7 | H | 119/249 (48%) | 116 (98%) | 3 (2%) | 0 | 100 | 100 |
| 8 | J | 119/250 (48%) | 117 (98%) | 2 (2%) | 0 | 100 | 100 |
| 9 | K | 103/237 (44%) | 97 (94%) | 6 (6%) | 0 | 100 | 100 |
| 10 | I | 105/238 (44%) | 98 (93%) | 7 (7%) | 0 | 100 | 100 |
| All | All | 1983/3448 (58%) | 1921 (97%) | 62 (3%) | 0 | 100 | 100 |

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains (i)

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

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

| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles | |
|---|---|---|---|---|---|---|
| 1 | A | 569/692 (82%) | 569 (100%) | 0 | 100 | 100 |
| 2 | B | 198/238 (83%) | 198 (100%) | 0 | 100 | 100 |
| 3 | C | 100/153 (65%) | 100 (100%) | 0 | 100 | 100 |
| 4 | D | 152/223 (68%) | 152 (100%) | 0 | 100 | 100 |
| 5 | E | 88/114 (77%) | 88 (100%) | 0 | 100 | 100 |
| 6 | F | 316/764 (41%) | 316 (100%) | 0 | 100 | 100 |
| 7 | H | 101/210 (48%) | 101 (100%) | 0 | 100 | 100 |
| 8 | J | 101/211 (48%) | 101 (100%) | 0 | 100 | 100 |
| 9 | K | 88/204 (43%) | 88 (100%) | 0 | 100 | 100 |
| 10 | I | 87/202 (43%) | 87 (100%) | 0 | 100 | 100 |
| All | All | 1800/3011 (60%) | 1800 (100%) | 0 | 100 | 100 |

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

#### 5.3.3 RNA (i)

There are no RNA molecules in this entry.

### 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 10 ligands modelled in this entry, 1 is monoatomic - leaving 9 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Counts | RMSZ | $\#\|Z\| > 2$ | Counts | RMSZ | $\#\|Z\| > 2$ |
| 11 | NAG | A | 801 | 1 | 14,14,15 | 0.22 | 0 | 17,19,21 | 0.57 | 0 |
| 11 | NAG | F | 901 | 6 | 14,14,15 | 0.32 | 0 | 17,19,21 | 0.52 | 0 |
| 11 | NAG | A | 802 | 1 | 14,14,15 | 0.30 | 0 | 17,19,21 | 0.64 | 1 (5%) |
| 11 | NAG | D | 302 | 4 | 14,14,15 | 0.20 | 0 | 17,19,21 | 0.46 | 0 |
| 11 | NAG | D | 301 | 4 | 14,14,15 | 0.17 | 0 | 17,19,21 | 0.39 | 0 |
| 11 | NAG | F | 902 | 6 | 14,14,15 | 0.18 | 0 | 17,19,21 | 0.37 | 0 |
| 11 | NAG | A | 804 | 1 | 14,14,15 | 0.27 | 0 | 17,19,21 | 0.69 | 1 (5%) |
| 11 | NAG | A | 803 | - | 14,14,15 | 0.20 | 0 | 17,19,21 | 0.46 | 0 |
| 11 | NAG | E | 201 | 5 | 14,14,15 | 0.33 | 0 | 17,19,21 | 0.62 | 0 |

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the

Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

| Mol | Type | Chain | Res | Link | Chirals | Torsions | Rings |
|---|---|---|---|---|---|---|---|
| 11 | NAG | A | 801 | 1 | - | 1/6/23/26 | 0/1/1/1 |
| 11 | NAG | F | 901 | 6 | - | 0/6/23/26 | 0/1/1/1 |
| 11 | NAG | A | 802 | 1 | - | 2/6/23/26 | 0/1/1/1 |
| 11 | NAG | D | 302 | 4 | - | 2/6/23/26 | 0/1/1/1 |
| 11 | NAG | D | 301 | 4 | - | 0/6/23/26 | 0/1/1/1 |
| 11 | NAG | F | 902 | 6 | - | 0/6/23/26 | 0/1/1/1 |
| 11 | NAG | A | 804 | 1 | - | 1/6/23/26 | 0/1/1/1 |
| 11 | NAG | A | 803 | - | - | 2/6/23/26 | 0/1/1/1 |
| 11 | NAG | E | 201 | 5 | - | 2/6/23/26 | 0/1/1/1 |

There are no bond length outliers.

All (2) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 11 | A | 804 | NAG | C1-O5-C5 | 2.44 | 115.50 | 112.19 |
| 11 | A | 802 | NAG | C1-O5-C5 | 2.29 | 115.29 | 112.19 |

There are no chirality outliers.

5 of 10 torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms |
|---|---|---|---|---|
| 11 | A | 803 | NAG | O5-C5-C6-O6 |
| 11 | E | 201 | NAG | C4-C5-C6-O6 |
| 11 | E | 201 | NAG | O5-C5-C6-O6 |
| 11 | D | 302 | NAG | O5-C5-C6-O6 |
| 11 | A | 802 | NAG | O5-C5-C6-O6 |

There are no ring outliers.

2 monomers are involved in 4 short contacts:

| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|---|---|---|---|---|---|
| 11 | D | 302 | NAG | 2 | 0 |
| 11 | E | 201 | NAG | 2 | 0 |

## 5.7 Other polymers

There are no such residues in this entry.

## 5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

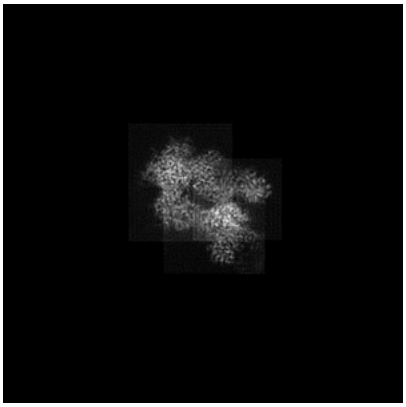
# 6 Map visualisation

This section contains visualisations of the EMDB entry EMD-25687. These allow visual inspection of the internal detail of the map and identification of artifacts.

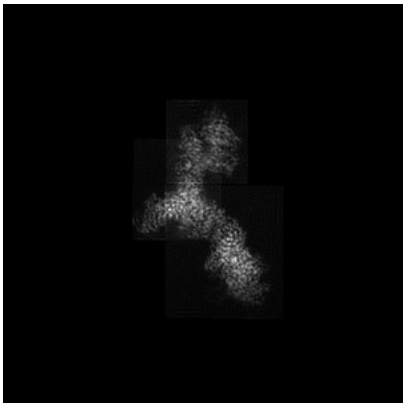
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

## 6.1 Orthogonal projections

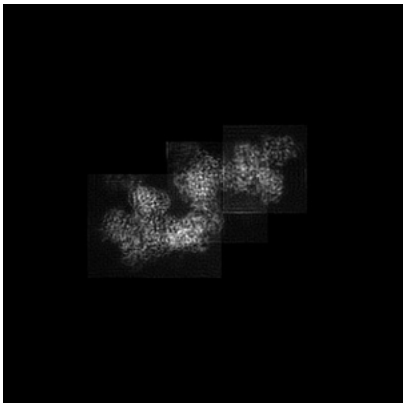
### 6.1.1 Primary map



X



Y

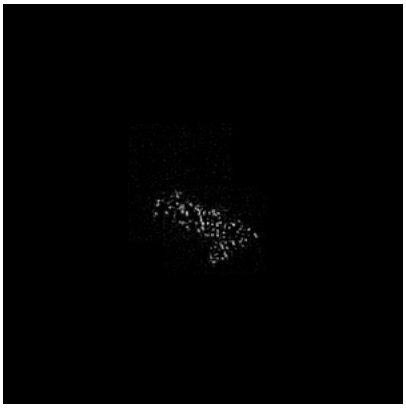


Z

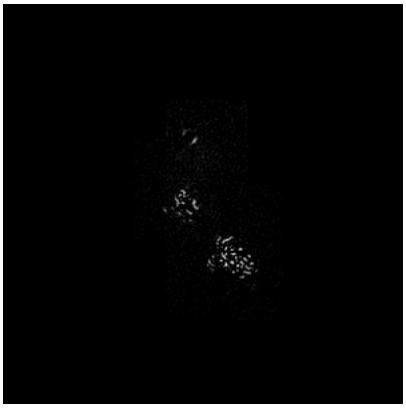
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices

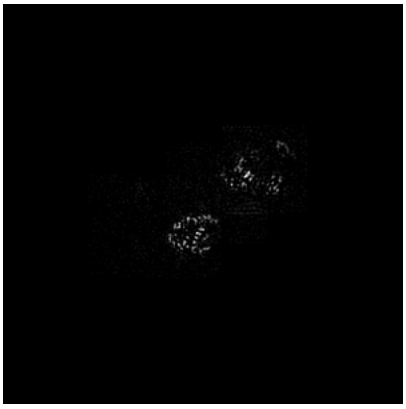
### 6.2.1 Primary map



X Index: 142



Y Index: 142

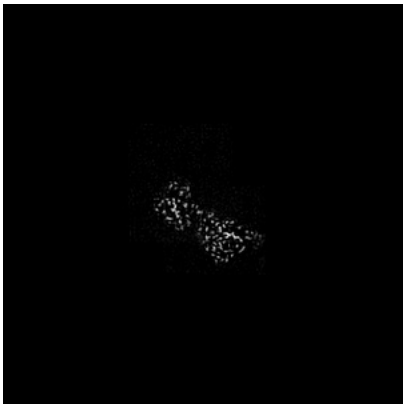


Z Index: 142

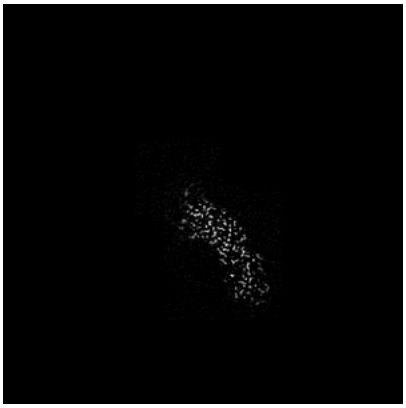
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices (i)

### 6.3.1 Primary map



X Index: 137



Y Index: 120

Z Index: 159

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 0.8. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

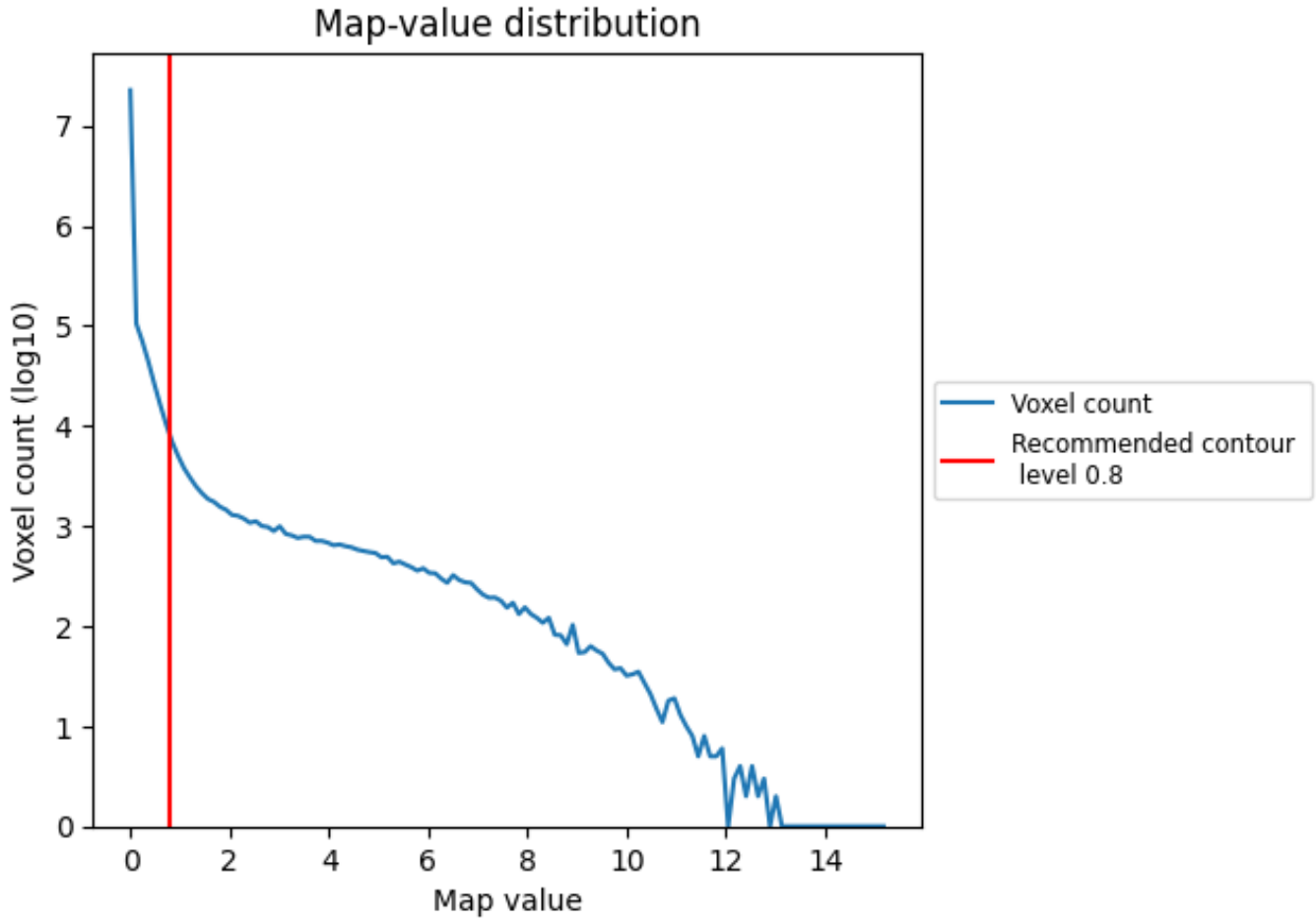
## 6.5 Mask visualisation (i)

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

# 7 Map analysis

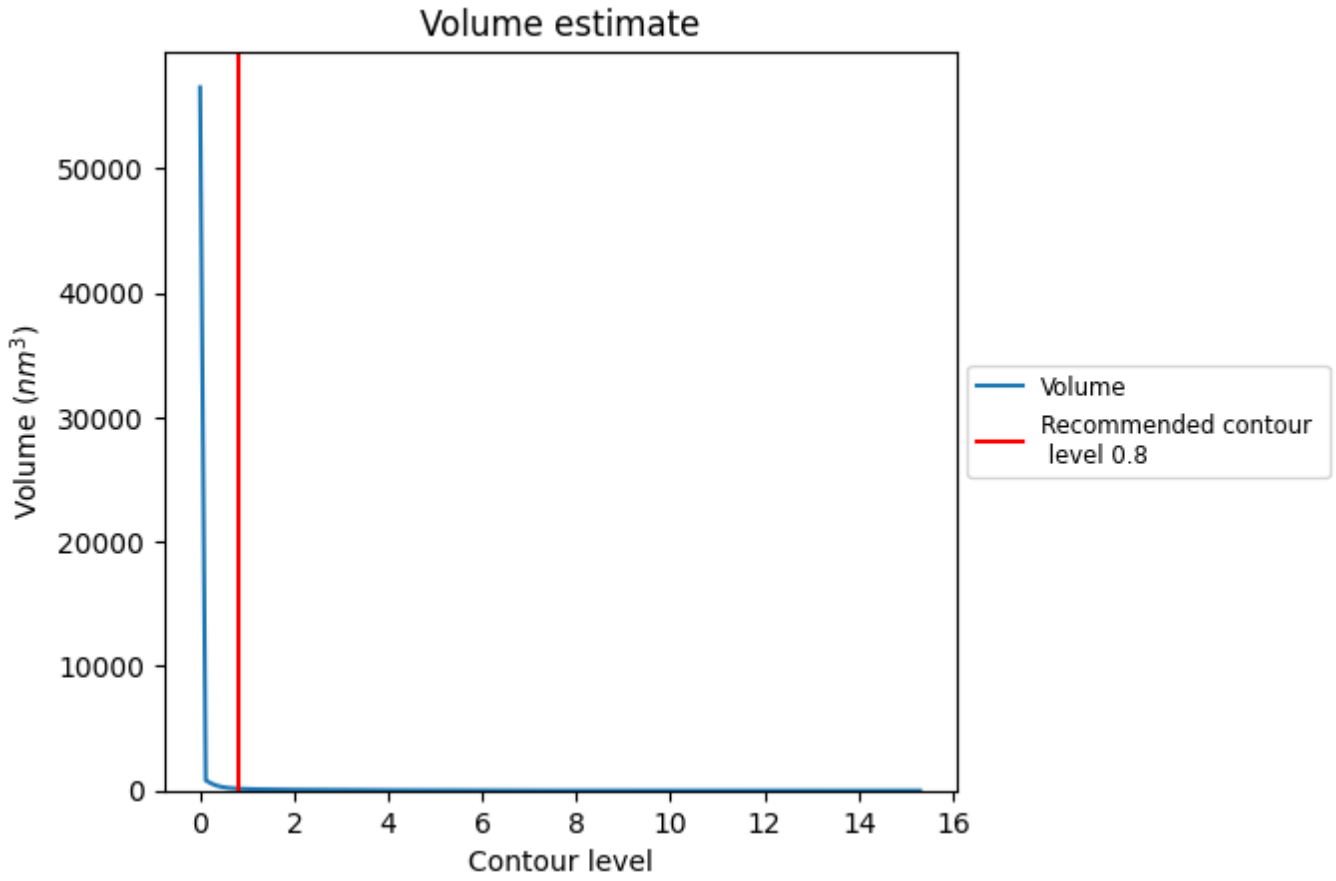
This section contains the results of statistical analysis of the map.

## 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.

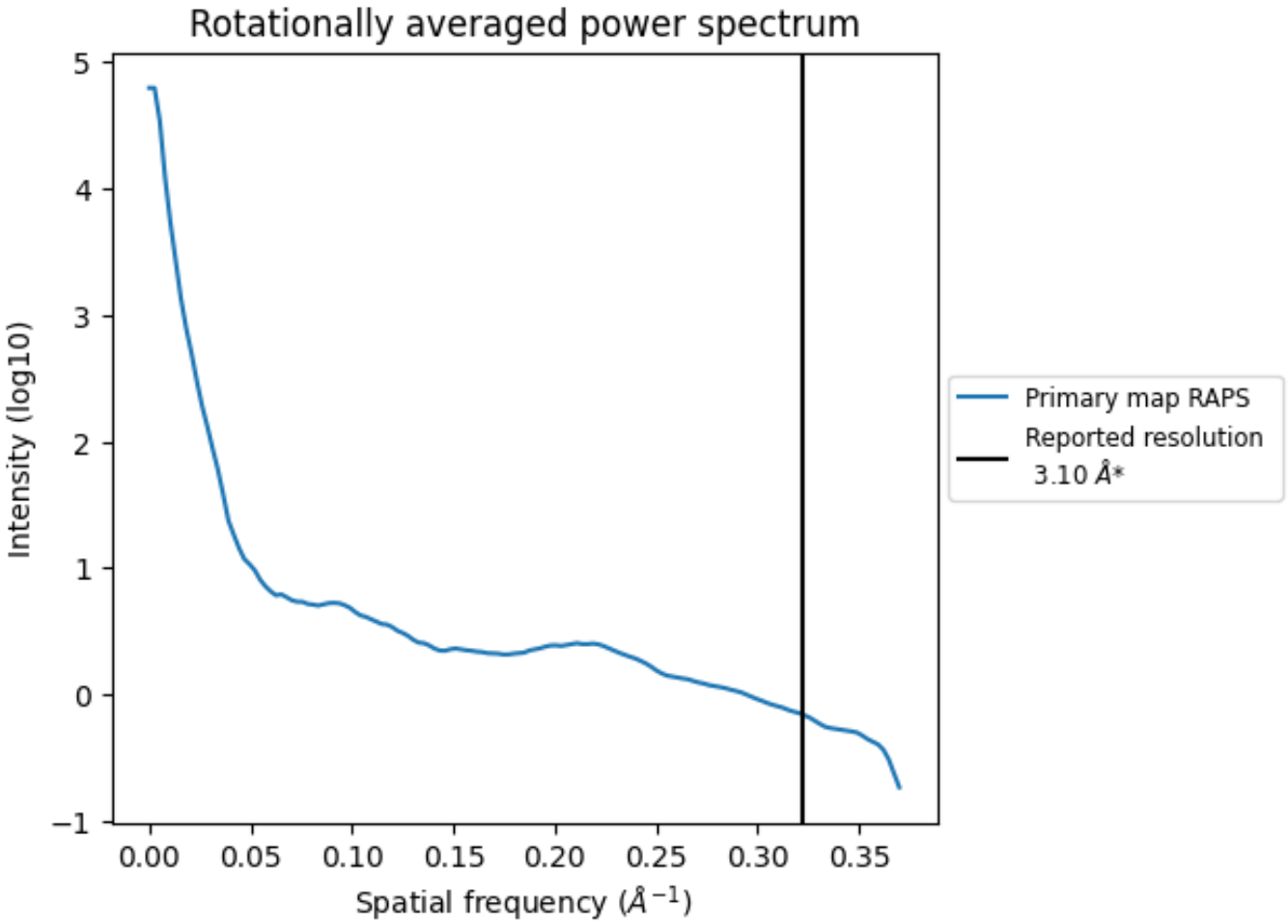
## 7.2 Volume estimate




The volume at the recommended contour level is 156 $nm^3$; this corresponds to an approximate mass of 141 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 0.323 Å$^{-1}$

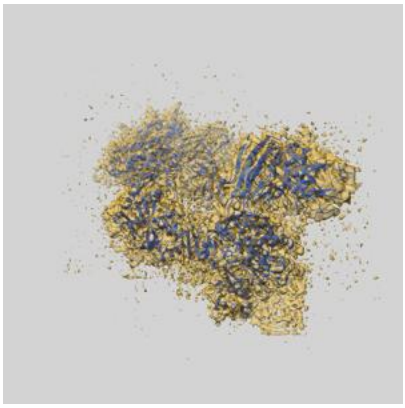
# 8 Fourier-Shell correlation (i)

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

# 9 Map-model fit

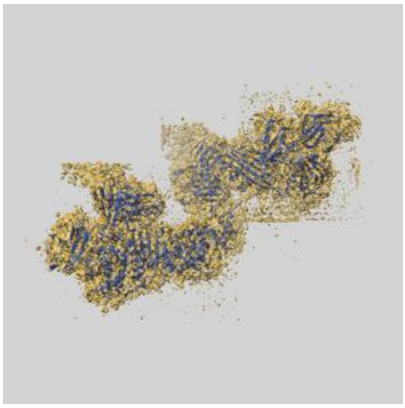
This section contains information regarding the fit between EMDB map EMD-25687 and PDB model 7T4S. Per-residue inclusion information can be found in section 3 on page 10.

## 9.1 Map-model overlay



X

Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.8 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

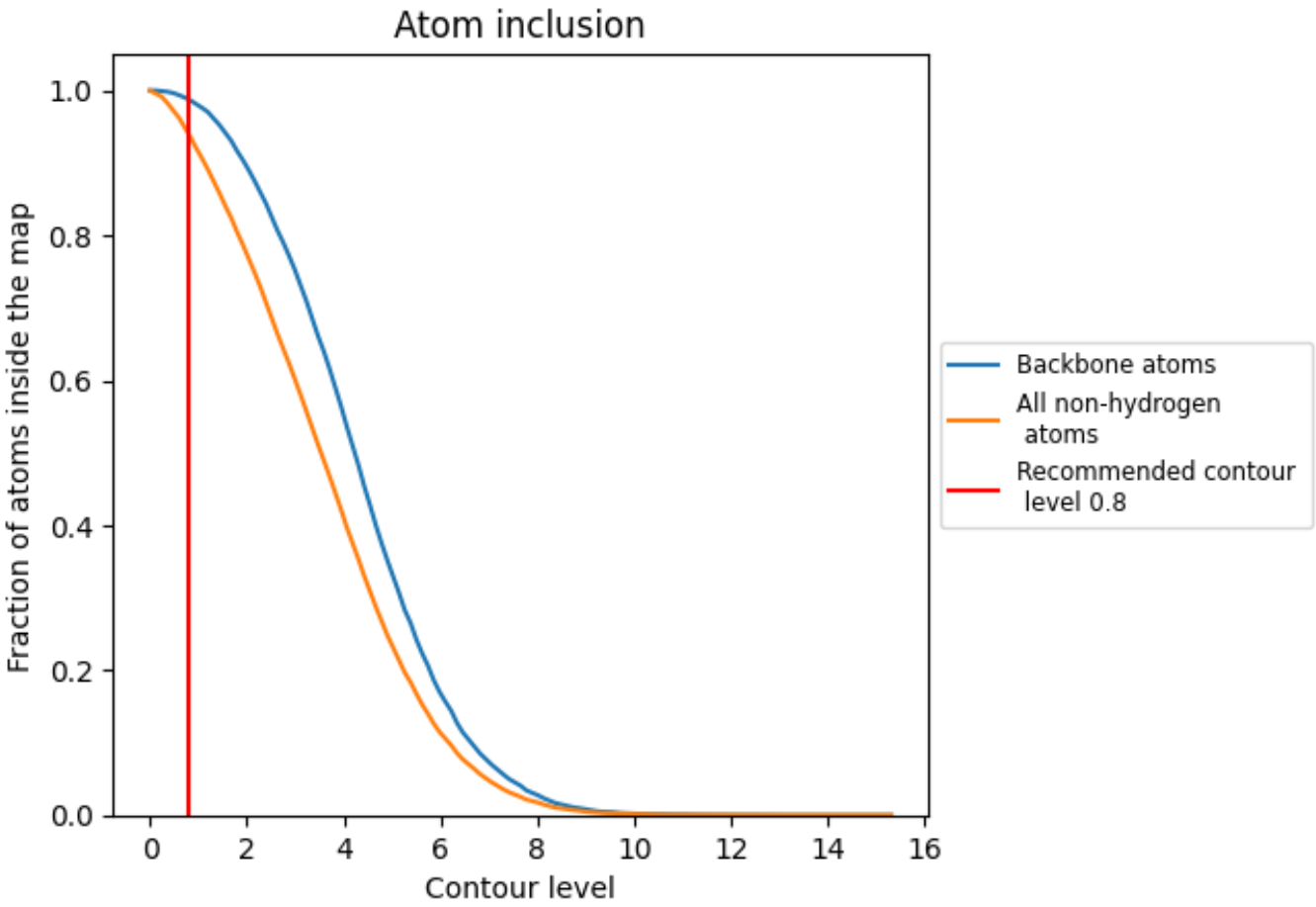
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.8).

## 9.4 Atom inclusion (i)




At the recommended contour level, 99% of all backbone atoms, 94% 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 (0.8) and Q-score for the entire model and for each chain.

| Chain | Atom inclusion | Q-score |
|---|---|---|
| All | 0.9396 | 0.5700 |
| A | 0.9389 | 0.5810 |
| B | 0.9474 | 0.5480 |
| C | 0.8895 | 0.4990 |
| D | 0.9704 | 0.5860 |
| E | 0.9493 | 0.5550 |
| F | 0.9021 | 0.5360 |
| H | 0.9578 | 0.5930 |
| I | 0.9774 | 0.6160 |
| J | 0.9767 | 0.6250 |
| K | 0.9524 | 0.5980 |