W O R L D W I D E
wwPDB
P R O T E I N   D A T A   B A N K

wwPDB EM Validation Summary Report (i)

Nov 2, 2022 – 11:00 PM EDT

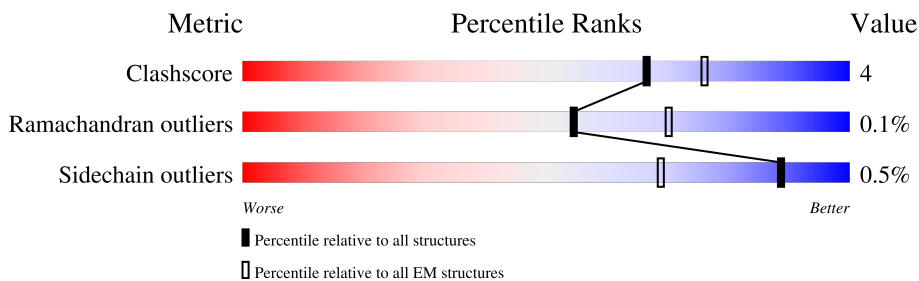|		
PDB ID	:	5UK2
EMDB ID	:	EMD-8564
Title	:	CryoEM structure of an influenza virus receptor-binding site antibody-antigen interface - Class 4
Authors	:	Liu, Y.; Pan, J.; Caradonna, T.; Jenni, S.; Raymond, D.D.; Schmidt, A.G.; Harrison, S.C.; Grigorieff, N.
Deposited on	:	2017-01-19
Resolution	:	4.80 Å(reported)

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 4.80 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.
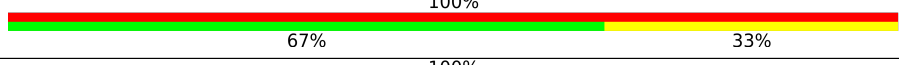
Metric	Percentile Ranks	Value
Clashscore		4
Ramachandran outliers		0.1%
Sidechain outliers		0.5%

Worse   *Better*

▮ Percentile relative to all structures

▯ Percentile relative to all EM structures
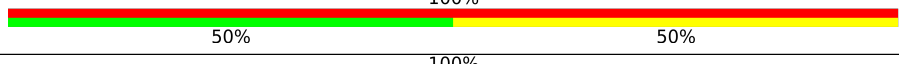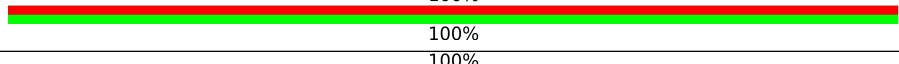
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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	323	41% / 87% 12% •
1	C	323	41% / 86% 12% •
1	E	323	41% / 86% 13% •
2	B	173	42% / 88% 12%
2	D	173	41% / 87% 13%
2	F	173	40% / 86% 14%
3	G	266	62% / 77% 11% 11%
3	H	266	62% / 77% 11% 11%

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Mol	Chain	Length	Quality of chain
3	I	266	63% 77% 11% 11%
4	J	3	67% 33% 67%
4	L	3	67% 67% 33%
4	N	3	100% 67% 33%
5	K	2	100% 50% 50%
5	M	2	100% 100%
5	O	2	100% 50% 50%

2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 34389 atoms, of which 16842 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 Hemagglutinin HA1.

Mol	Chain	Residues	Atoms							AltConf	Trace
1	A	323	Total	C	H	N	O	S		0	0
			4973	1597	2438	441	486	11			
1	C	323	Total	C	H	N	O	S		0	0
			4973	1597	2438	441	486	11			
1	E	323	Total	C	H	N	O	S		0	0
			4973	1597	2438	441	486	11			

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	4	GLU	-	expression tag	UNP A7UPX0
C	4	GLU	-	expression tag	UNP A7UPX0
E	4	GLU	-	expression tag	UNP A7UPX0

- Molecule 2 is a protein called Hemagglutinin HA2.

Mol	Chain	Residues	Atoms							AltConf	Trace
2	B	173	Total	C	H	N	O	S		0	0
			2716	874	1322	238	275	7			
2	D	173	Total	C	H	N	O	S		0	0
			2716	874	1322	238	275	7			
2	F	173	Total	C	H	N	O	S		0	0
			2716	874	1322	238	275	7			

- Molecule 3 is a protein called scFv.

Mol	Chain	Residues	Atoms							AltConf	Trace
3	G	236	Total	C	H	N	O	S		0	0
			3476	1111	1707	306	345	7			
3	H	236	Total	C	H	N	O	S		0	0
			3476	1111	1707	306	345	7			
3	I	236	Total	C	H	N	O	S		0	0
			3476	1111	1707	306	345	7			

- Molecule 4 is an oligosaccharide called beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.
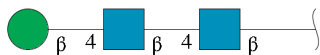
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	H	N	O		
4	J	3	75	22	36	2	15	0	0
4	L	3	Total	C	H	N	O	0	0
			75	22	36	2	15		
4	N	3	Total	C	H	N	O	0	0
			75	22	36	2	15		

- Molecule 5 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	H	N	O		
5	K	2	55	16	27	2	10	0	0
5	M	2	Total	C	H	N	O	0	0
			55	16	27	2	10		
5	O	2	Total	C	H	N	O	0	0
			55	16	27	2	10		

- Molecule 6 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).

Mol	Chain	Residues	Atoms					AltConf
6	A	1	Total	C	H	N	O	0
			140	40	70	5	25	
6	A	1	Total	C	H	N	O	0
			140	40	70	5	25	
6	A	1	Total	C	H	N	O	0
			140	40	70	5	25	
6	A	1	Total	C	H	N	O	0
			140	40	70	5	25	
6	A	1	Total	C	H	N	O	0
			140	40	70	5	25	
6	B	1	Total	C	H	N	O	0
			28	8	14	1	5	
6	C	1	Total	C	H	N	O	0
			140	40	70	5	25	
6	C	1	Total	C	H	N	O	0
			140	40	70	5	25	
6	C	1	Total	C	H	N	O	0
			140	40	70	5	25	
6	C	1	Total	C	H	N	O	0
			140	40	70	5	25	
6	C	1	Total	C	H	N	O	0
			140	40	70	5	25	
6	D	1	Total	C	H	N	O	0
			28	8	14	1	5	
6	E	1	Total	C	H	N	O	0
			140	40	70	5	25	
6	E	1	Total	C	H	N	O	0
			140	40	70	5	25	

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Mol	Chain	Residues	Atoms					AltConf
6	E	1	Total	C	H	N	O	0
			140	40	70	5	25	
6	E	1	Total	C	H	N	O	0
			140	40	70	5	25	
6	E	1	Total	C	H	N	O	0
			140	40	70	5	25	
6	F	1	Total	C	H	N	O	0
			28	8	14	1	5	

3 Residue-property plots ⓘ

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.
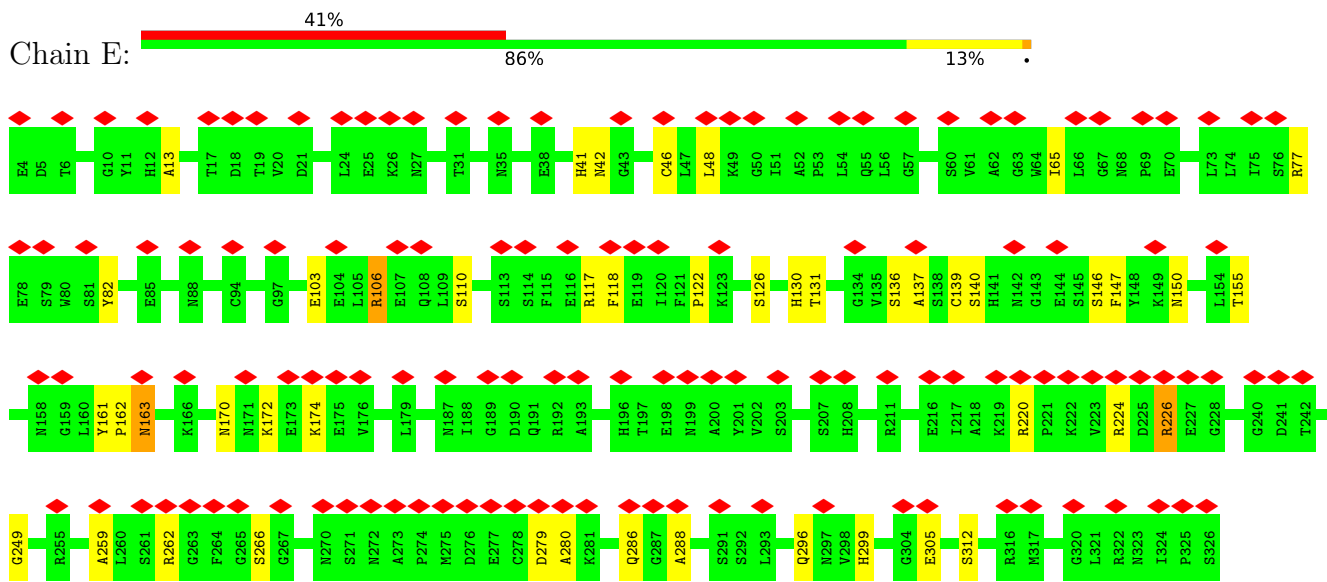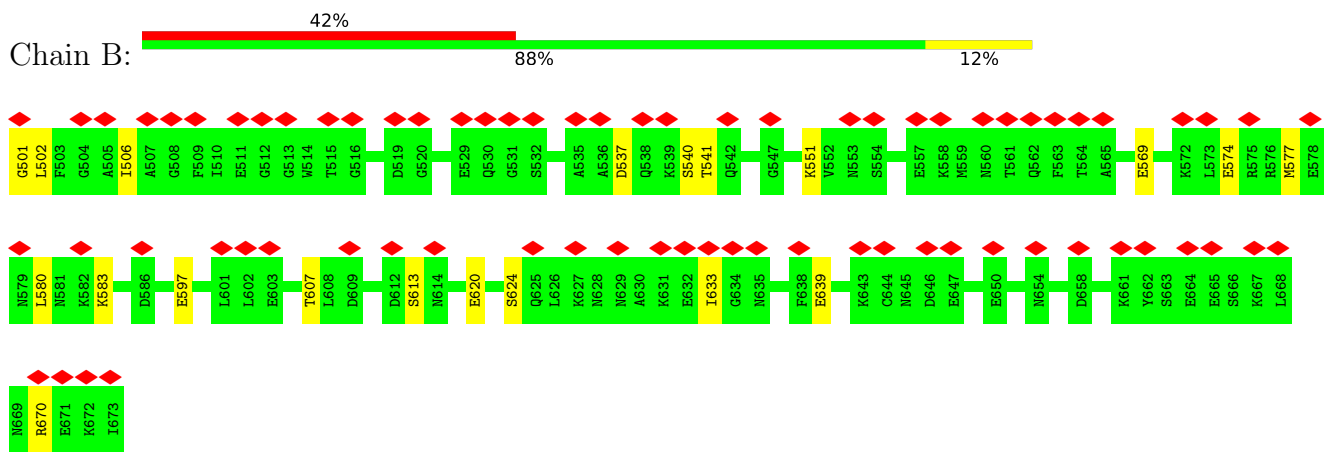
• Molecule 1: Hemagglutinin HA1
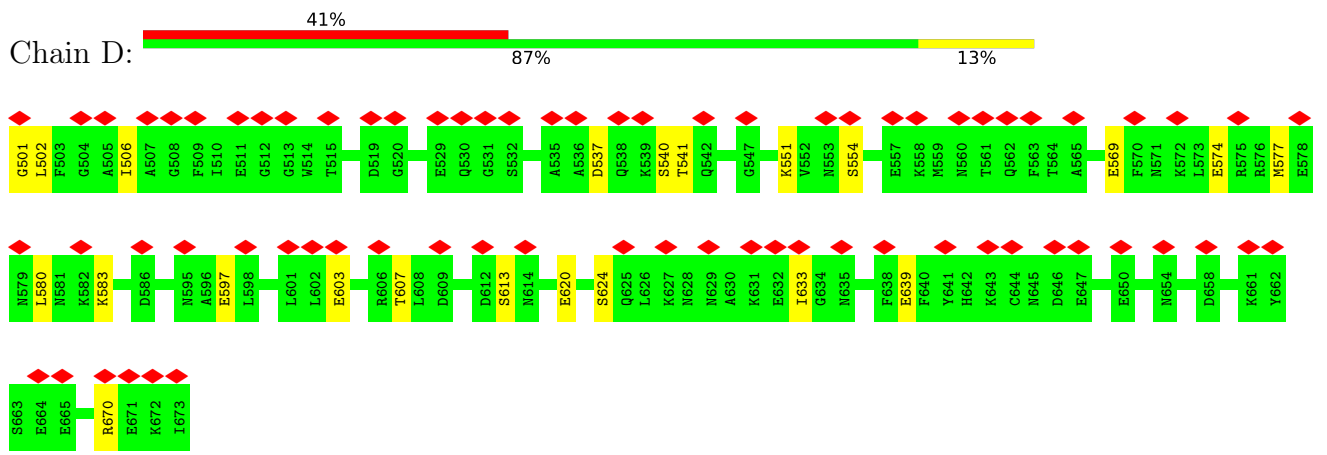
Chain A:

• Molecule 1: Hemagglutinin HA1

Chain C:

• Molecule 1: Hemagglutinin HA1

Chain E:

41%

86%

13%

E4 D5 T6 G10 Y11 H12 A13 T17 D18 T19 V20 D21 L24 E25 K26 N27 T31 N35 E38 H41 N42 G43 C46 L47 L48 K49 G50 I51 A52 P53 L54 Q55 L56 G57 S60 V61 A62 G63 W64 I65 L66 G67 N68 P69 E70 L73 L74 I75 S76 R77

E78 S79 W80 S81 Y82 E85 N88 C94 G97 E103 E104 L105 R106 E107 Q108 L109 S110 S113 S114 F115 E116 R117 F118 E119 I120 F121 P122 K123 S126 H130 T131 G134 V135 S136 A137 S138 C139 S140 H141 N142 G143 E144 S145 S146 F147 Y148 K149 N150 L154 T155

N158 G159 L160 Y161 P162 N163 K166 N170 N171 K172 E173 K174 E175 V176 L179 N187 I188 G189 D190 Q191 R192 A193 H196 T197 E198 N199 A200 Y201 V202 S203 S207 H208 R211 E216 I217 A218 K219 R220 P221 K222 V223 R224 D225 R226 E227 G228 G240 D241 T242

G249 R255 A259 L260 S261 R262 G263 F264 G265 S266 G267 N270 S271 N272 A273 P274 M275 D276 E277 C278 D279 A280 K281 Q286 Q287 A288 S291 S292 L293 Q296 N297 V298 H299 G304 E305 S312 R316 M317 G320 L321 R322 N323 I324 P325 S326

• Molecule 2: Hemagglutinin HA2

Chain B:

42%

88%

12%

G501 L502 F503 G504 A505 I506 A507 G508 F509 I510 E511 G512 G513 W514 T515 G516 D519 G520 E529 Q530 G531 S532 A535 A536 D537 Q538 K539 S540 T541 Q542 G547 K551 V552 N553 S554 E557 K558 M559 N560 T561 Q562 F563 T564 A565 E569 K572 L573 E574 R575 R576 M577 E578

N579 L580 N581 K582 K583 D586 E597 L601 L602 E603 T607 L608 D609 D612 S613 N614 E620 S624 Q625 L626 K627 N628 N629 A630 K631 E632 I633 G634 N635 F638 E639 K643 C644 N645 D646 E647 E650 N654 D658 K661 Y662 S663 E664 E665 S666 K667 L668

N669 R670 E671 K672 I673

• Molecule 2: Hemagglutinin HA2

Chain D:

41%

87%

13%

G501 L502 F503 G504 A505 I506 A507 G508 F509 I510 E511 G512 G513 W514 T515 D519 G520 E529 Q530 G531 S532 A535 A536 D537 Q538 K539 S540 T541 Q542 G547 K551 V552 N553 S554 E557 K558 M559 N560 T561 Q562 F563 T564 A565 E569 F570 N571 K572 L573 E574 R575 R576 M577 E578

N579 L580 N581 K582 K583 D586 N595 A596 E597 L598 L601 L602 E603 R606 T607 L608 D609 D612 S613 N614 E620 S624 Q625 L626 K627 N628 N629 A630 K631 E632 I633 G634 N635 F638 E639 F640 Y641 H642 K643 C644 N645 D646 E647 E650 N654 D658 K661 Y662

S663 E664 E665 R670 E671 K672 I673

• Molecule 2: Hemagglutinin HA2

Chain F:

40%

86%

14%

• Molecule 3: scFv

Chain G:

62%

77% 11% 11%

• Molecule 3: scFv

Chain H:

62%

77% 11% 11%

HIS HIS HIS HIS HIS

• Molecule 3: scFv

Chain I:

63%

77%   11%   11%

E1 I2 V3 L4 T5 Q6 S7 P8 G9 T10 L11 S12 L13 S14 P15 G16 E17 R18 A19 T20 L21 S22 C23 R24 A25 S26 Q27 S28 I29 S30 G31 Y32 Y33 L34 T35 W36 Y37 Q38 Q39 K40 P41 G42 L48 I49 A52 S53 S54 R55 A56 T57 G58 I59 P60 D61 R62 F63 S64 G65

S66 G67 S68 G69 T70 D71 F72 T73 L74 T75 I76 S77 R78 L79 E80 P81 E82 D83 F84 A85 V86 Y87 Y88 C89 Q90 Q91 Y92 G93 I94 S95 P96 V97 I98 T99 F100 G101 G102 G103 T104 N105 V106 E107 I108 K109 G110 GLY GLY GLY GLY SER GLY GLY GLY SER GLY GLY GLY SER

GLU V127 Q128 L129 V130 E131 S132 G133 G134 G135 L136 V137 Q138 P139 G140 G141 S142 L143 R144 L145 S146 C147 A148 A149 S150 G151 F152 D158 M159 H160 W161 V162 R163 Q164 A165 P166 G167 K168 G169 L170 E171 S174 G175 L176 G179 G180 D181 T182 S183 G186 S187 V188 R189 G190 R191 F192

S193 R196 E197 N198 A199 K200 N201 S202 L203 N208 N209 L210 R211 A212 G213 D214 T215 A216 A217 C220 V221 R222 G223 V224 R225 E226 A229 T230 G231 G232 D233 Y236 Y237 A238 M239 A240 G243 Q244 G245 T246 T247 V248 T249 V250 S251 S252 ALA SER GLY SER SER GLY SER GLY

HIS HIS HIS HIS HIS HIS

• Molecule 4: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-ac etamido-2-deoxy-beta-D-glucopyranose

Chain J:

67%

33%   67%

NAG1 NAG2 BMA3

• Molecule 4: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-ac etamido-2-deoxy-beta-D-glucopyranose

Chain L:

67%

67%   33%

NAG1 NAG2 BMA3

• Molecule 4: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-ac etamido-2-deoxy-beta-D-glucopyranose

Chain N:

100%

67%   33%

NAG1 NAG2 BMA3

• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-gluc
opyranose

Chain K:

• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-gluc
opyranose

Chain M:

• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-gluc
opyranose

Chain O:

4   Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	142314	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 $(e^-/\text{Å}^2)$	40	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	9000	Depositor
Magnification	30444	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	8.258	Depositor
Minimum map value	-3.741	Depositor
Average map value	0.071	Depositor
Map value standard deviation	0.458	Depositor
Recommended contour level	2.52	Depositor
Map size (Å)	196.8, 196.8, 196.8	wwPDB
Map dimensions	120, 120, 120	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.64, 1.64, 1.64	Depositor

5   Model quality ⓘ

5.1   Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section:
BMA, 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	0.56	0/2601	0.83	7/3540 (0.2%)
1	C	0.56	0/2601	0.83	7/3540 (0.2%)
1	E	0.56	0/2601	0.83	8/3540 (0.2%)
2	B	0.53	0/1421	0.75	1/1909 (0.1%)
2	D	0.53	0/1421	0.75	1/1909 (0.1%)
2	F	0.53	0/1421	0.75	1/1909 (0.1%)
3	G	0.55	0/1808	0.96	4/2452 (0.2%)
3	H	0.55	0/1808	0.96	4/2452 (0.2%)
3	I	0.55	0/1808	0.96	4/2452 (0.2%)
All	All	0.55	0/17490	0.85	37/23703 (0.2%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if
the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected
by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a
sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2
1	C	0	2
1	E	0	2
3	G	0	6
3	H	0	6
3	I	0	6
All	All	0	24

There are no bond length outliers.

The worst 5 of 37 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	I	191	ARG	NE-CZ-NH1	6.70	123.65	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	H	191	ARG	NE-CZ-NH1	6.59	123.59	120.30
3	G	191	ARG	NE-CZ-NH1	6.50	123.55	120.30
3	G	196	ARG	NE-CZ-NH1	6.27	123.44	120.30
3	H	196	ARG	NE-CZ-NH1	6.27	123.44	120.30

There are no chirality outliers.

5 of 24 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	305	GLU	Peptide
1	A	48	LEU	Peptide
1	C	305	GLU	Peptide
1	C	48	LEU	Peptide
1	E	48	LEU	Peptide

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	2535	2438	2438	24	0
1	C	2535	2438	2438	24	0
1	E	2535	2438	2438	25	0
2	B	1394	1322	1322	12	0
2	D	1394	1322	1322	14	0
2	F	1394	1322	1322	16	0
3	G	1769	1707	1711	12	0
3	H	1769	1707	1711	11	0
3	I	1769	1707	1711	11	0
4	J	39	36	34	0	0
4	L	39	36	34	0	0
4	N	39	36	34	0	0
5	K	28	27	25	0	0
5	M	28	27	25	0	0
5	O	28	27	25	0	0
6	A	70	70	65	0	0
6	B	14	14	13	0	0
6	C	70	70	65	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	D	14	14	13	0	0
6	E	70	70	65	0	0
6	F	14	14	13	0	0
All	All	17547	16842	16824	137	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 4.

The worst 5 of 137 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)
3:I:28:SER:HG	3:I:70:THR:HG1	1.22	0.75
3:G:28:SER:HG	3:G:70:THR:HG1	1.32	0.74
2:B:502:LEU:O	2:D:613:SER:OG	2.08	0.71
1:A:106:ARG:NH2	2:B:569:GLU:OE2	2.22	0.71
1:C:296:GLN:NE2	1:C:299:HIS:O	2.24	0.71

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	321/323 (99%)	302 (94%)	19 (6%)	0	100	100
1	C	321/323 (99%)	302 (94%)	19 (6%)	0	100	100
1	E	321/323 (99%)	302 (94%)	19 (6%)	0	100	100
2	B	171/173 (99%)	155 (91%)	16 (9%)	0	100	100
2	D	171/173 (99%)	155 (91%)	16 (9%)	0	100	100
2	F	171/173 (99%)	155 (91%)	16 (9%)	0	100	100
3	G	232/266 (87%)	203 (88%)	28 (12%)	1 (0%)	34	72

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	H	232/266 (87%)	202 (87%)	29 (12%)	1 (0%)	34	72
3	I	232/266 (87%)	203 (88%)	28 (12%)	1 (0%)	34	72
All	All	2172/2286 (95%)	1979 (91%)	190 (9%)	3 (0%)	54	85

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	G	60	PRO
3	H	60	PRO
3	I	60	PRO

5.3.2   Protein sidechains ⓘ

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	283/283 (100%)	282 (100%)	1 (0%)	91	94
1	C	283/283 (100%)	282 (100%)	1 (0%)	91	94
1	E	283/283 (100%)	282 (100%)	1 (0%)	91	94
2	B	149/149 (100%)	149 (100%)	0	100	100
2	D	149/149 (100%)	149 (100%)	0	100	100
2	F	149/149 (100%)	149 (100%)	0	100	100
3	G	186/200 (93%)	184 (99%)	2 (1%)	73	85
3	H	186/200 (93%)	184 (99%)	2 (1%)	73	85
3	I	186/200 (93%)	184 (99%)	2 (1%)	73	85
All	All	1854/1896 (98%)	1845 (100%)	9 (0%)	89	93

5 of 9 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	I	225	ARG
3	I	239	MET
3	G	225	ARG

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Mol	Chain	Res	Type
3	G	239	MET
3	H	225	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
2	B	550	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

15 monosaccharides are modelled in this entry.

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	$\#|Z| > 2$
4	NAG	J	1	4,1	14,14,15	0.36	0	17,19,21	0.69	1 (5%)
4	NAG	J	2	4	14,14,15	0.51	0	17,19,21	0.77	0
4	BMA	J	3	4	11,11,12	0.97	1 (9%)	15,15,17	0.94	1 (6%)
5	NAG	K	1	1,5	14,14,15	0.48	0	17,19,21	0.72	1 (5%)
5	NAG	K	2	5	14,14,15	0.21	0	17,19,21	0.61	0
4	NAG	L	1	4,1	14,14,15	0.38	0	17,19,21	0.65	0
4	NAG	L	2	4	14,14,15	0.51	0	17,19,21	0.76	0
4	BMA	L	3	4	11,11,12	0.96	1 (9%)	15,15,17	0.95	1 (6%)
5	NAG	M	1	1,5	14,14,15	0.40	0	17,19,21	0.70	0
5	NAG	M	2	5	14,14,15	0.31	0	17,19,21	0.63	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
4	NAG	N	1	4,1	14,14,15	0.33	0	17,19,21	0.64	0
4	NAG	N	2	4	14,14,15	0.54	0	17,19,21	0.79	0
4	BMA	N	3	4	11,11,12	0.92	1 (9%)	15,15,17	0.94	1 (6%)
5	NAG	O	1	1,5	14,14,15	0.38	0	17,19,21	0.75	1 (5%)
5	NAG	O	2	5	14,14,15	0.27	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
4	NAG	J	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	J	2	4	-	1/6/23/26	0/1/1/1
4	BMA	J	3	4	-	0/2/19/22	0/1/1/1
5	NAG	K	1	1,5	-	2/6/23/26	0/1/1/1
5	NAG	K	2	5	-	0/6/23/26	0/1/1/1
4	NAG	L	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	L	2	4	-	1/6/23/26	0/1/1/1
4	BMA	L	3	4	-	0/2/19/22	0/1/1/1
5	NAG	M	1	1,5	-	2/6/23/26	0/1/1/1
5	NAG	M	2	5	-	0/6/23/26	0/1/1/1
4	NAG	N	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	N	2	4	-	1/6/23/26	0/1/1/1
4	BMA	N	3	4	-	0/2/19/22	0/1/1/1
5	NAG	O	1	1,5	-	2/6/23/26	0/1/1/1
5	NAG	O	2	5	-	0/6/23/26	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	J	3	BMA	O5-C1	-2.47	1.39	1.43
4	L	3	BMA	O5-C1	-2.38	1.39	1.43
4	N	3	BMA	O5-C1	-2.32	1.40	1.43

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	O	1	NAG	C1-O5-C5	2.23	115.21	112.19
4	L	3	BMA	C1-C2-C3	-2.11	107.07	109.67
4	J	3	BMA	C1-C2-C3	-2.11	107.08	109.67

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	J	1	NAG	C1-O5-C5	2.06	114.98	112.19
4	N	3	BMA	C1-C2-C3	-2.05	107.14	109.67

There are no chirality outliers.

5 of 9 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	K	1	NAG	O5-C5-C6-O6
5	M	1	NAG	O5-C5-C6-O6
5	O	1	NAG	O5-C5-C6-O6
5	K	1	NAG	C4-C5-C6-O6
5	O	1	NAG	C4-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

Oligosaccharide Chain J

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain L

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain N

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain K

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain M

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain O

Bond lengths

Bond angles

Torsions

Rings

5.6 Ligand geometry ⓘ

18 ligands are modelled in this entry.

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	$\#|Z| > 2$
6	NAG	A	408	1	14,14,15	0.44	0	17,19,21	0.71	0
6	NAG	A	410	1	14,14,15	0.52	0	17,19,21	0.58	0
6	NAG	B	701	2	14,14,15	0.29	0	17,19,21	0.54	0
6	NAG	A	407	1	14,14,15	0.40	0	17,19,21	0.51	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
6	NAG	E	409	1	14,14,15	0.41	0	17,19,21	0.65	0
6	NAG	E	410	1	14,14,15	0.52	0	17,19,21	0.59	0
6	NAG	A	406	1	14,14,15	0.27	0	17,19,21	0.60	0
6	NAG	E	406	1	14,14,15	0.32	0	17,19,21	0.66	0
6	NAG	F	701	2	14,14,15	0.31	0	17,19,21	0.53	0
6	NAG	A	409	1	14,14,15	0.34	0	17,19,21	0.67	0
6	NAG	C	406	1	14,14,15	0.28	0	17,19,21	0.61	0
6	NAG	C	409	1	14,14,15	0.35	0	17,19,21	0.64	0
6	NAG	D	701	2	14,14,15	0.30	0	17,19,21	0.52	0
6	NAG	C	408	1	14,14,15	0.44	0	17,19,21	0.66	0
6	NAG	C	407	1	14,14,15	0.40	0	17,19,21	0.48	0
6	NAG	E	408	1	14,14,15	0.44	0	17,19,21	0.65	0
6	NAG	C	410	1	14,14,15	0.56	0	17,19,21	0.68	1 (5%)
6	NAG	E	407	1	14,14,15	0.43	0	17,19,21	0.52	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
6	NAG	A	408	1	-	1/6/23/26	0/1/1/1
6	NAG	A	410	1	-	2/6/23/26	0/1/1/1
6	NAG	B	701	2	-	2/6/23/26	0/1/1/1
6	NAG	A	407	1	-	2/6/23/26	0/1/1/1
6	NAG	E	409	1	-	1/6/23/26	0/1/1/1
6	NAG	E	410	1	-	1/6/23/26	0/1/1/1
6	NAG	A	406	1	-	2/6/23/26	0/1/1/1
6	NAG	E	406	1	-	2/6/23/26	0/1/1/1
6	NAG	F	701	2	-	2/6/23/26	0/1/1/1
6	NAG	A	409	1	-	1/6/23/26	0/1/1/1
6	NAG	C	406	1	-	2/6/23/26	0/1/1/1
6	NAG	C	409	1	-	1/6/23/26	0/1/1/1
6	NAG	D	701	2	-	2/6/23/26	0/1/1/1
6	NAG	C	408	1	-	1/6/23/26	0/1/1/1
6	NAG	C	407	1	-	2/6/23/26	0/1/1/1
6	NAG	E	408	1	-	1/6/23/26	0/1/1/1
6	NAG	C	410	1	-	2/6/23/26	0/1/1/1
6	NAG	E	407	1	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	C	410	NAG	C1-O5-C5	2.05	114.97	112.19

There are no chirality outliers.

5 of 29 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	A	407	NAG	O5-C5-C6-O6
6	C	407	NAG	O5-C5-C6-O6
6	C	406	NAG	O5-C5-C6-O6
6	E	406	NAG	O5-C5-C6-O6
6	E	407	NAG	O5-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-8564. 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 |
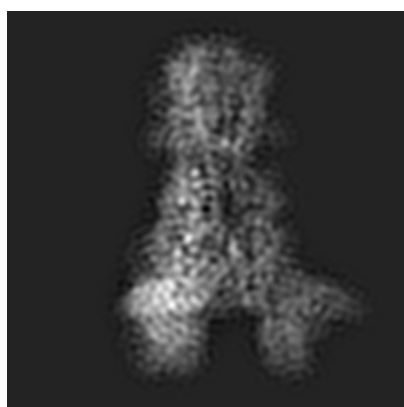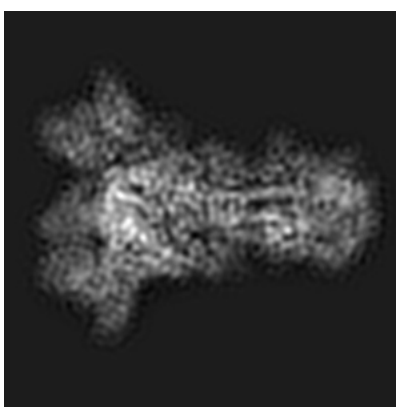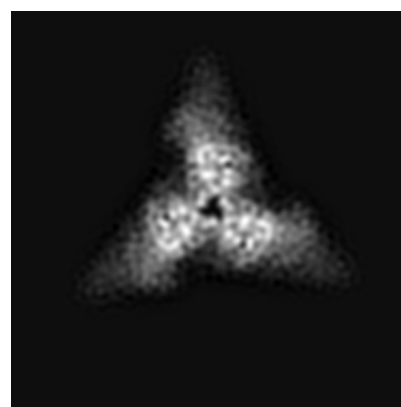
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ

6.2.1 Primary map
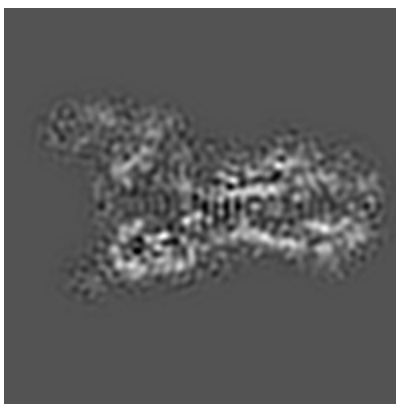
| X Index: 60 | Y Index: 60 | Z Index: 60 |

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

6.3 Largest variance slices (i)

6.3.1 Primary map
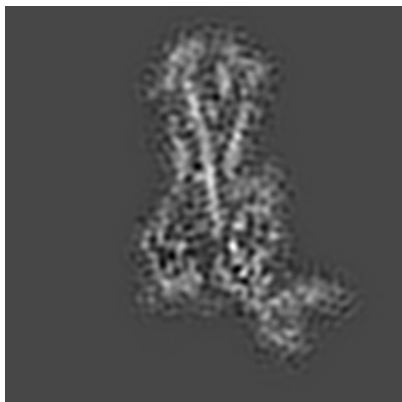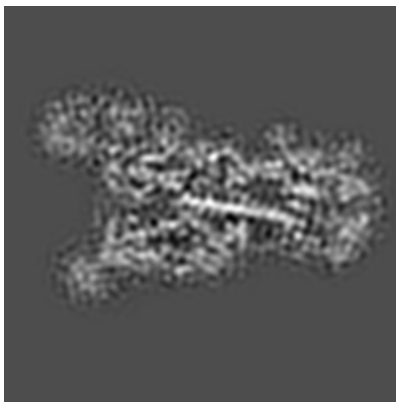
X Index: 64   Y Index: 56   Z Index: 32

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
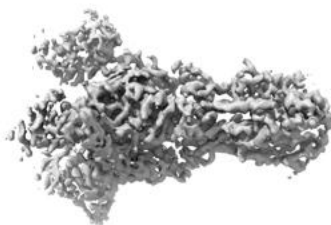
The images above show the 3D surface view of the map at the recommended contour level 2.52. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5 Mask visualisation ⓘ

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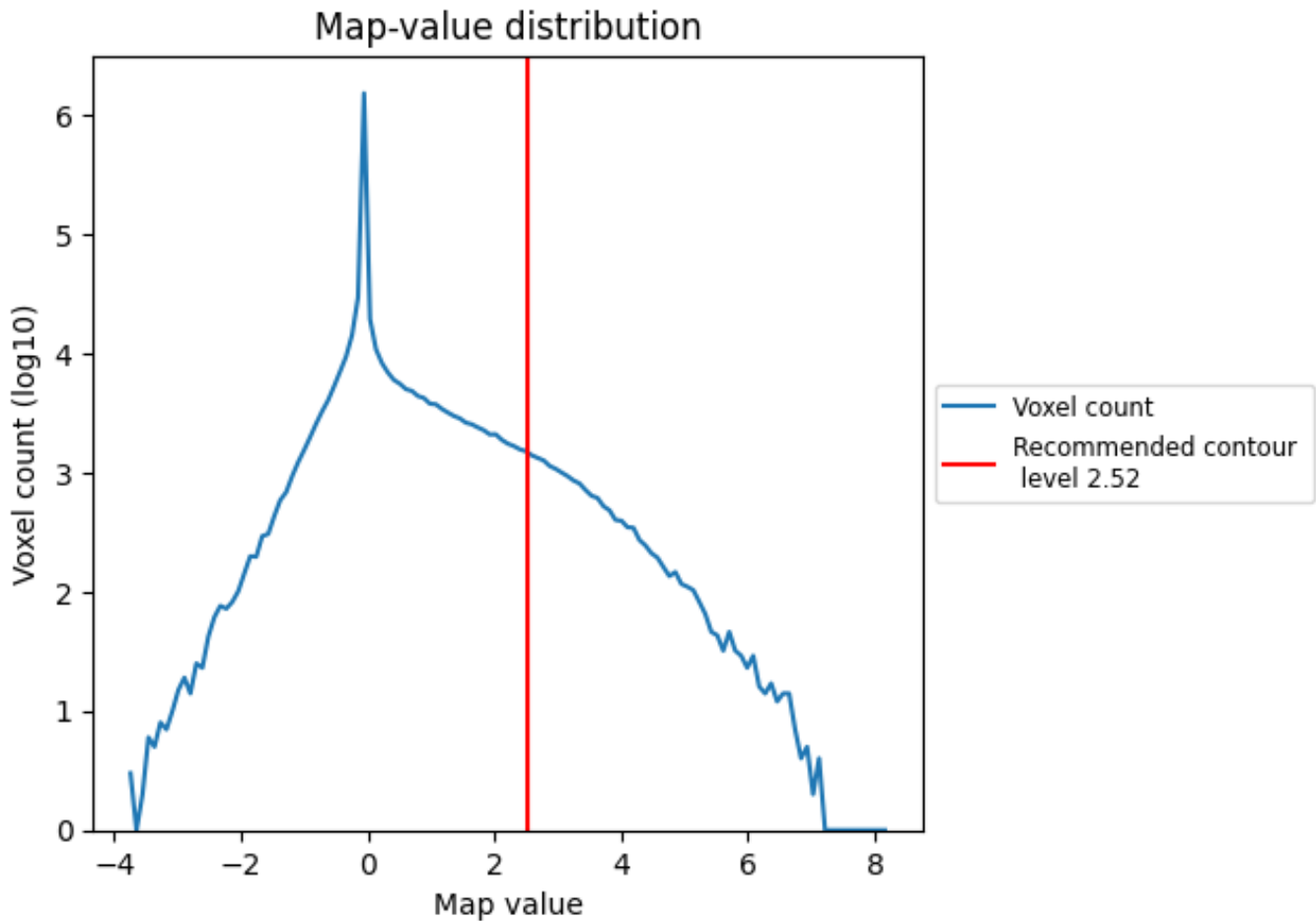
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2　Volume estimate ⓘ
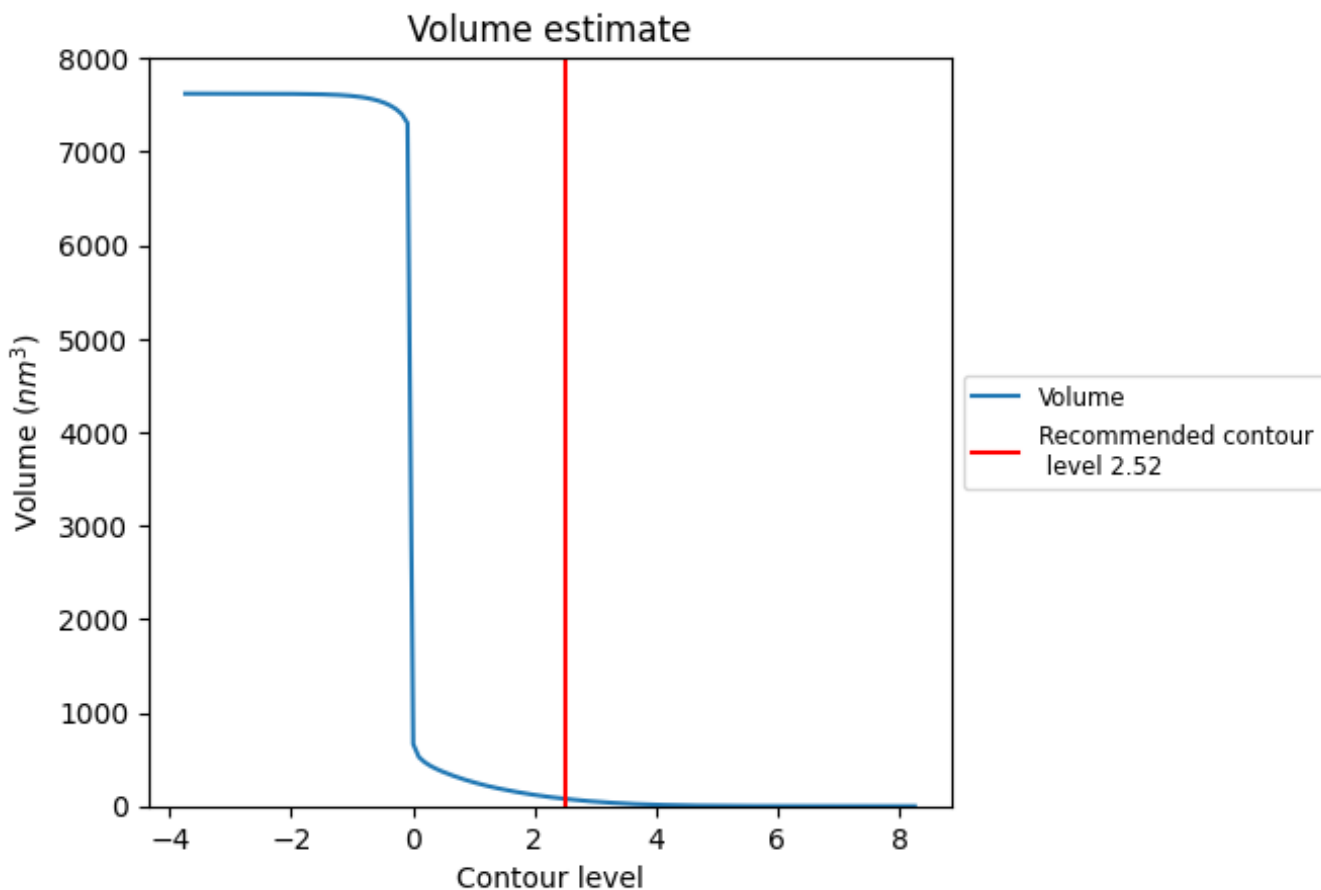
The volume at the recommended contour level is 77 nm^3; this corresponds to an approximate mass of 70 kDa.

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 ⓘ
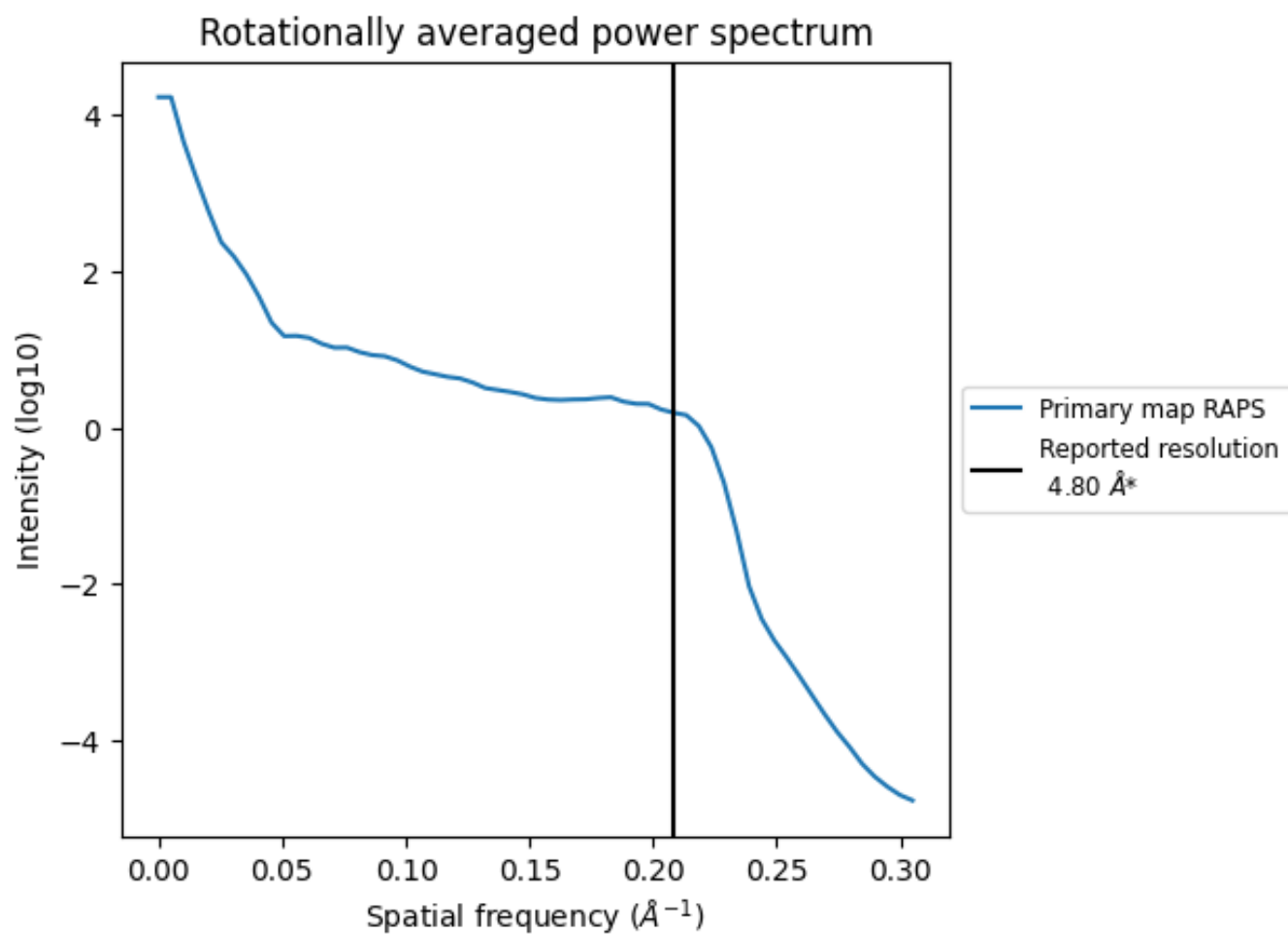
*Reported resolution corresponds to spatial frequency of 0.208 Å^{-1}

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 ⓘ
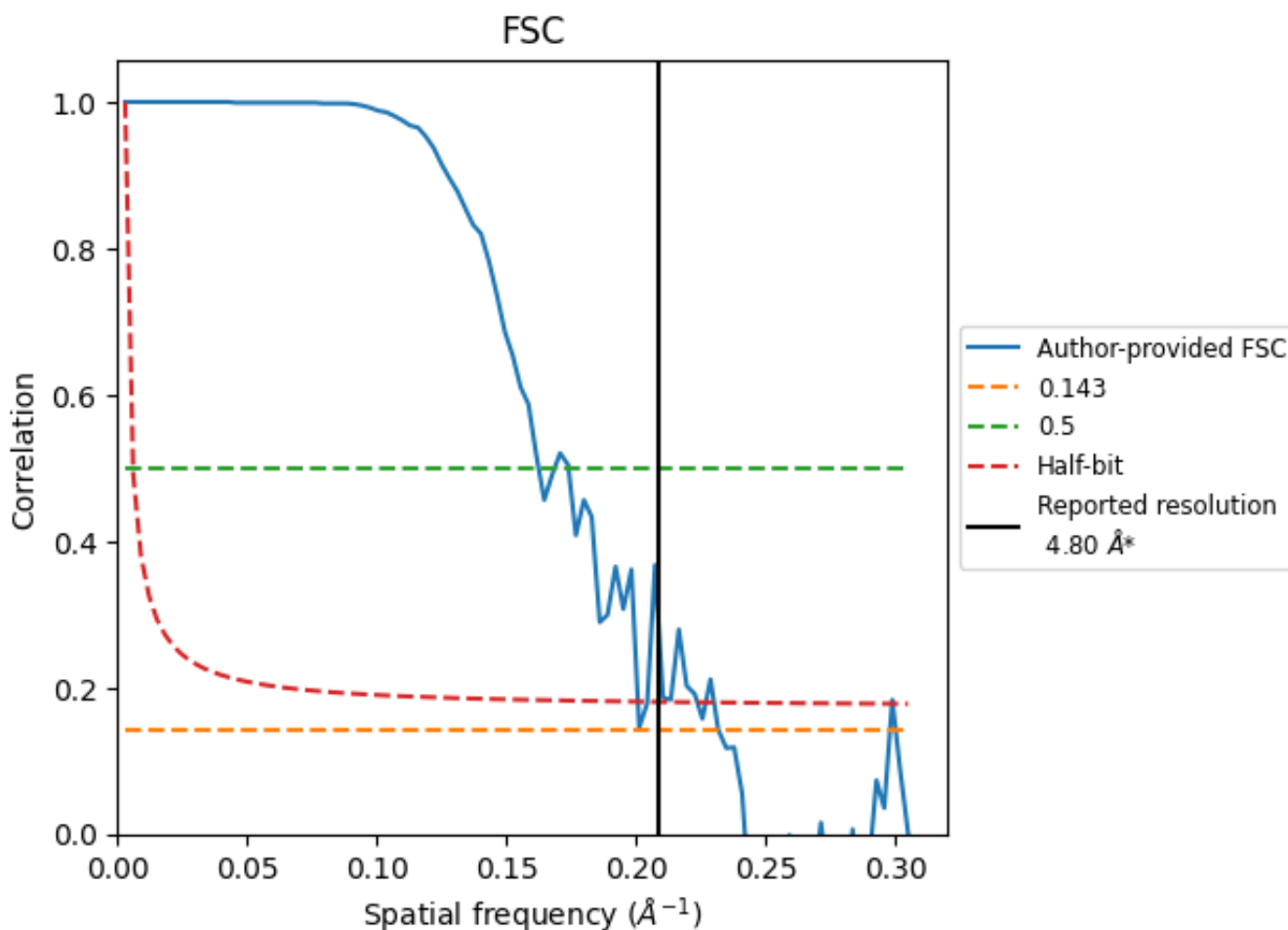
*Reported resolution corresponds to spatial frequency of 0.208 Å^{-1}

8.2 Resolution estimates (i)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.80	-	-
Author-provided FSC curve	4.32	6.16	4.98
Unmasked-calculated*	-	-	-

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

9 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-8564 and PDB model 5UK2. Per-residue inclusion information can be found in section 3 on page 8.

9.1 Map-model overlay (i)

| X | Y | Z |
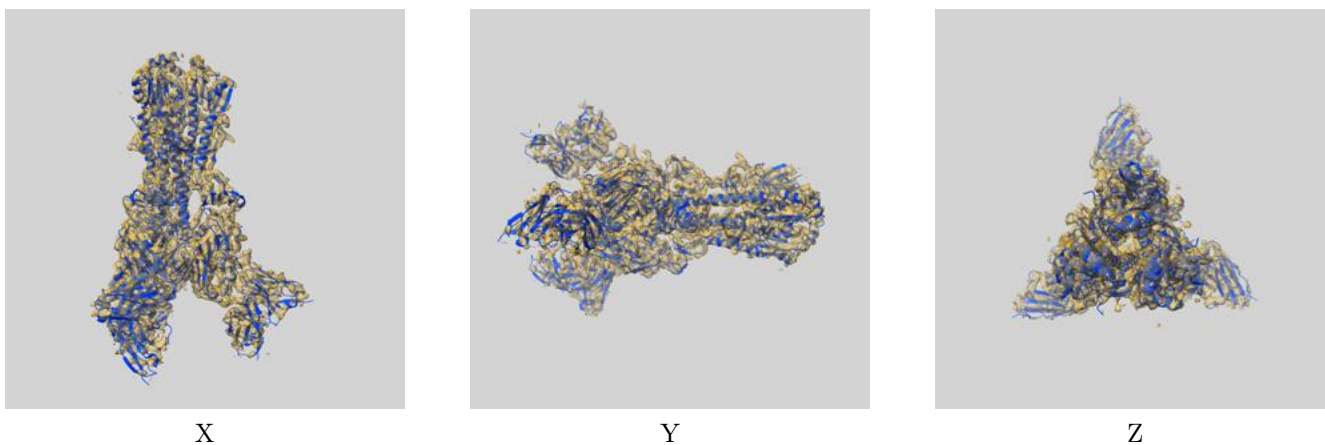
The images above show the 3D surface view of the map at the recommended contour level 2.52 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2   Q-score mapped to coordinate model ⓘ
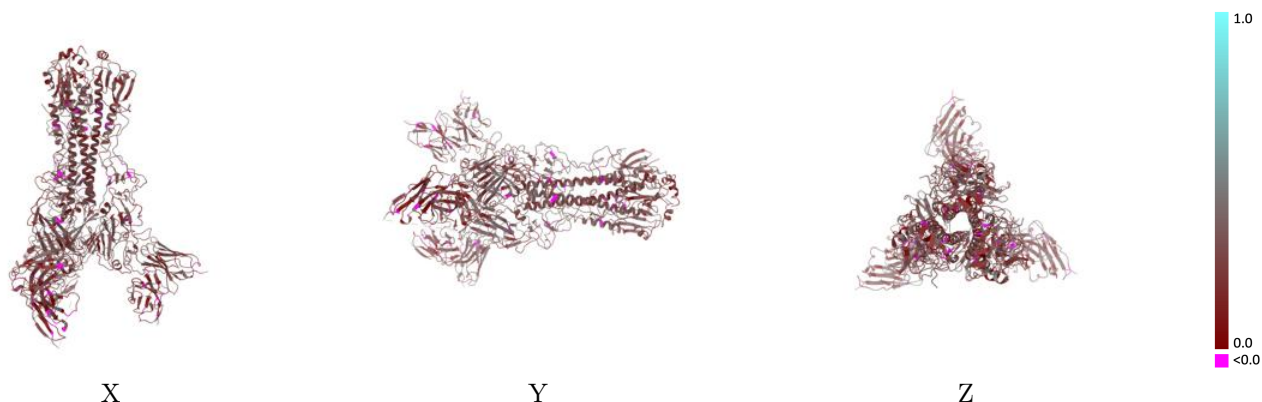
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 ⓘ
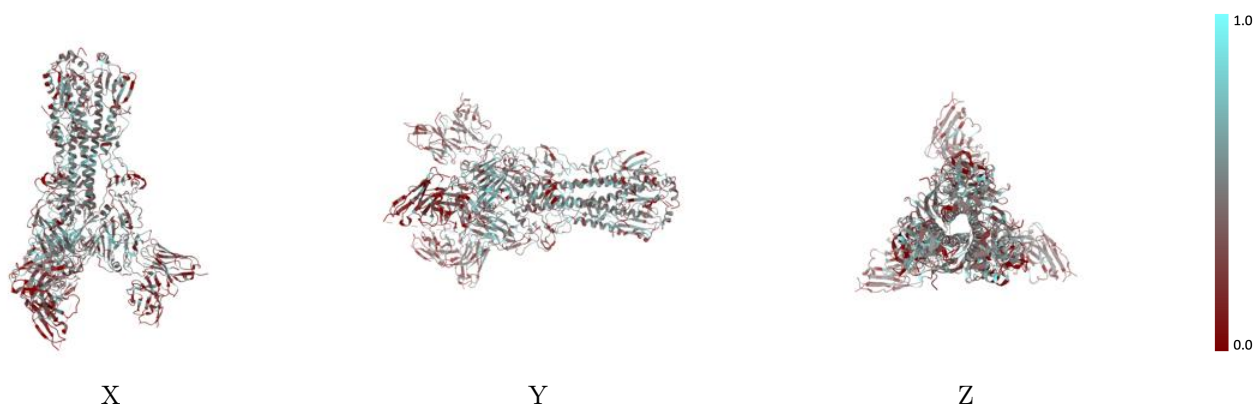
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (2.52).

9.4 Atom inclusion (i)
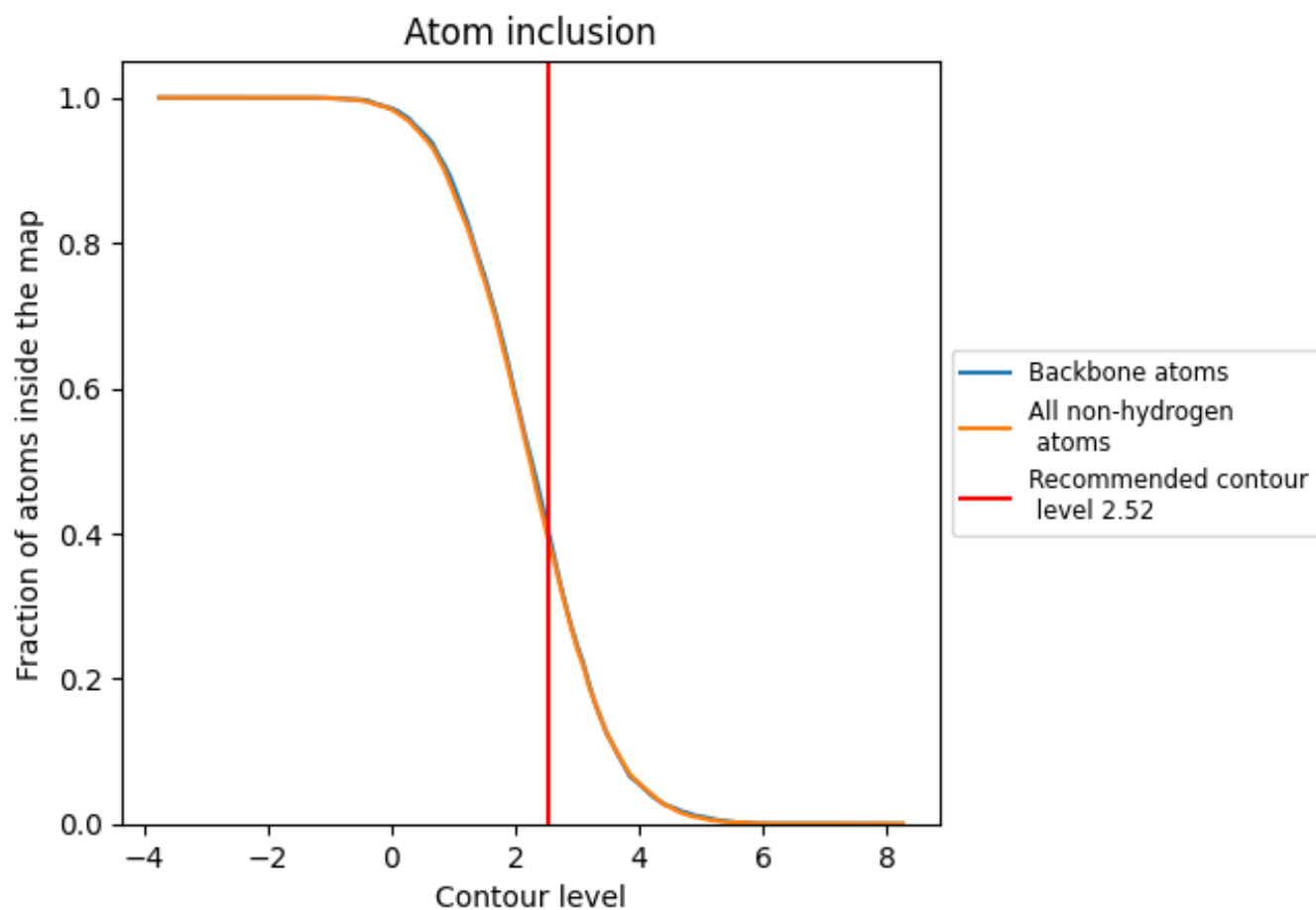
At the recommended contour level, 41% of all backbone atoms, 40% of all non-hydrogen atoms, are inside the map.

9.5   Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (2.52) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.3976	0.2710
A	0.4623	0.2960
B	0.4359	0.2660
C	0.4713	0.2990
D	0.4352	0.2680
E	0.4697	0.2980
F	0.4380	0.2650
G	0.2894	0.2360
H	0.2918	0.2360
I	0.2923	0.2330
J	0.3077	0.3210
K	0.0357	0.3140
L	0.3077	0.3180
M	0.0357	0.3280
N	0.2821	0.2940
O	0.0357	0.3500

1.0

0.0
<0.0