wwPDB EM Validation Summary Report ⓘ

Nov 20, 2022 – 10:19 AM EST

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PDB ID	:	7MD5
EMDB ID	:	EMD-23767
Title	:	Insulin receptor ectodomain dimer complexed with two IRPA-9 partial agonists
Authors	:	Gomez-Llorente, Y.; Zhou, H.; Scapin, G.
Deposited on	:	2021-04-03
Resolution	:	5.20 Å(reported)

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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 5.20 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.
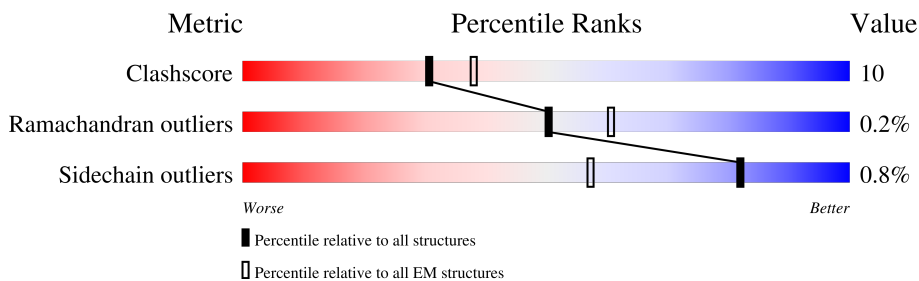
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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	927	23% / 55% 18% • 26%
1	B	927	10% / 45% 16% 39%
2	M	30	7% / 83% 13% •
2	N	30	17% / 83% 13% •
3	O	21	24% / 62% 38%
3	Q	21	24% / 67% 33%
3	S	21	52% / 57% 43%
3	U	21	67% / 62% 38%

Continued from previous page...

Mol	Chain	Length	Quality of chain
4	P	30	30% 70% 27%
4	R	30	37% 77% 23%
4	T	30	80% 80% 17%
4	V	30	97% 77% 20%
5	D	3	33% 100%
5	H	3	33% 67% 33%
5	X	3	67% 67% 33%
5	Y	3	67% 67% 33%
6	C	3	100%
6	G	3	33% 67%
7	E	2	50% 50% 50%
7	I	2	50% 50% 50%
8	F	2	50% 50% 50%
8	J	2	50% 100%

2 Entry composition ⓘ

There are 9 unique types of molecules in this entry. The entry contains 12530 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 Isoform Short of Insulin receptor.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	682	Total 5502	C 3490	N 948	O 1020	S 44	0	0
1	B	562	Total 4542	C 2885	N 783	O 834	S 40	0	0

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	918	HIS	-	expression tag	UNP P06213
A	919	HIS	-	expression tag	UNP P06213
A	920	HIS	-	expression tag	UNP P06213
A	921	HIS	-	expression tag	UNP P06213
A	922	HIS	-	expression tag	UNP P06213
A	923	HIS	-	expression tag	UNP P06213
A	924	HIS	-	expression tag	UNP P06213
A	925	HIS	-	expression tag	UNP P06213
A	926	HIS	-	expression tag	UNP P06213
A	927	HIS	-	expression tag	UNP P06213
B	918	HIS	-	expression tag	UNP P06213
B	919	HIS	-	expression tag	UNP P06213
B	920	HIS	-	expression tag	UNP P06213
B	921	HIS	-	expression tag	UNP P06213
B	922	HIS	-	expression tag	UNP P06213
B	923	HIS	-	expression tag	UNP P06213
B	924	HIS	-	expression tag	UNP P06213
B	925	HIS	-	expression tag	UNP P06213
B	926	HIS	-	expression tag	UNP P06213
B	927	HIS	-	expression tag	UNP P06213

- Molecule 2 is a protein called Isoform Short of Insulin receptor alpha.

Mol	Chain	Residues	Atoms				AltConf	Trace
2	M	30	Total 244	C 156	N 41	O 47	0	0
2	N	30	Total 244	C 156	N 41	O 47	0	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
M	691	ALA	-	expression tag	UNP P06213
M	692	ALA	-	expression tag	UNP P06213
M	693	ALA	-	expression tag	UNP P06213
M	717	SER	ARG	conflict	UNP P06213
N	691	ALA	-	expression tag	UNP P06213
N	692	ALA	-	expression tag	UNP P06213
N	693	ALA	-	expression tag	UNP P06213
N	717	SER	ARG	conflict	UNP P06213

- Molecule 3 is a protein called Insulin chain A.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	S	21	Total 163	C 99	N 25	O 35	S 4	0	0
3	O	21	Total 163	C 99	N 25	O 35	S 4	0	0
3	Q	21	Total 163	C 99	N 25	O 35	S 4	0	0
3	U	21	Total 163	C 99	N 25	O 35	S 4	0	0

- Molecule 4 is a protein called Insulin B chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	T	30	Total 239	C 157	N 40	O 40	S 2	0	0
4	P	30	Total 239	C 157	N 40	O 40	S 2	0	0
4	R	30	Total 239	C 157	N 40	O 40	S 2	0	0
4	V	30	Total 239	C 157	N 40	O 40	S 2	0	0

- Molecule 5 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose.

Mol	Chain	Residues	Atoms				AltConf	Trace
5	X	3	Total	C	N	O	0	0
			38	22	2	14		
5	D	3	Total	C	N	O	0	0
			38	22	2	14		
5	Y	3	Total	C	N	O	0	0
			38	22	2	14		
5	H	3	Total	C	N	O	0	0
			38	22	2	14		
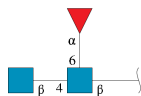
- Molecule 6 is an oligosaccharide called beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.
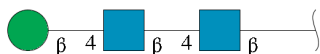
Mol	Chain	Residues	Atoms				AltConf	Trace
6	C	3	Total	C	N	O	0	0
			39	22	2	15		
6	G	3	Total	C	N	O	0	0
			39	22	2	15		

- Molecule 7 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
7	E	2	Total	C	N	O	0	0
			28	16	2	10		
7	I	2	Total	C	N	O	0	0
			28	16	2	10		

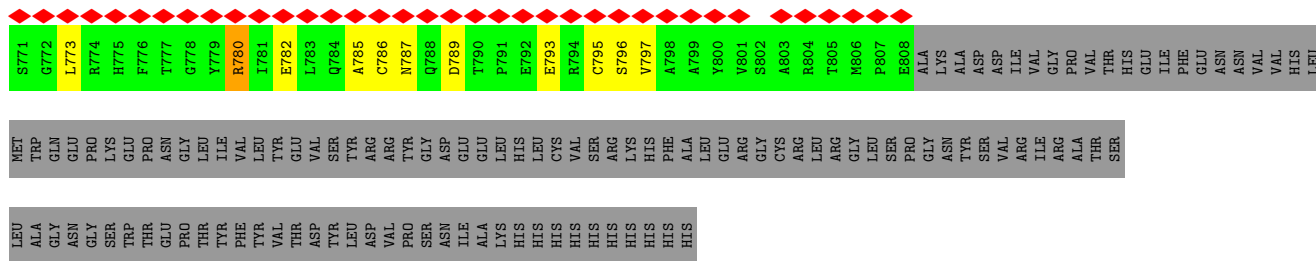- Molecule 8 is an oligosaccharide called alpha-L-fucopyranose-(1-6)-2-acetamido-2-deoxy-beta-D-glucopyranose.

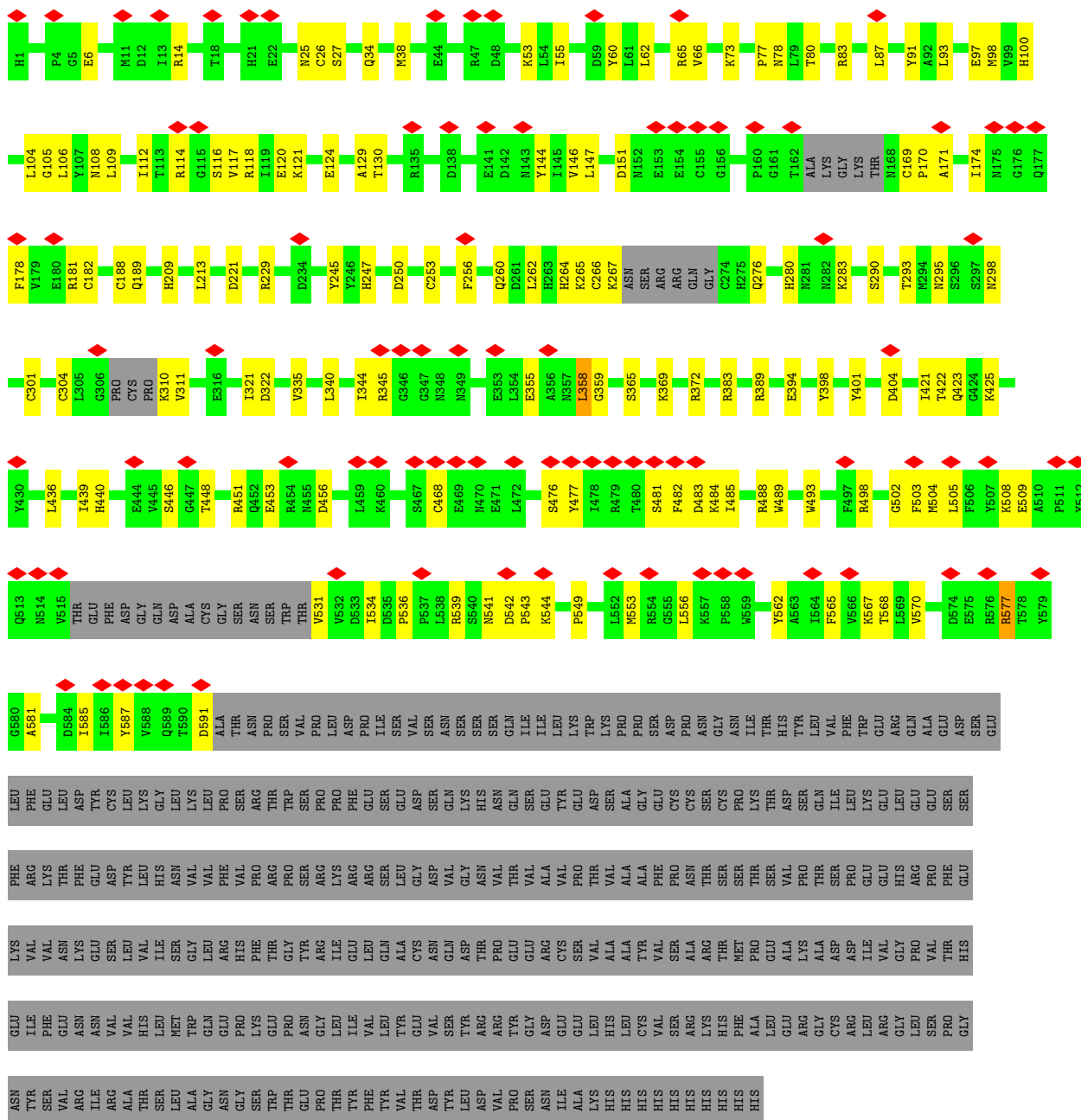| Mol	Chain	Residues	Atoms				AltConf	Trace
8	F	2	Total	C	N	O	0	0
			24	14	1	9		
8	J	2	Total	C	N	O	0	0
			24	14	1	9		

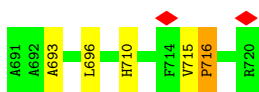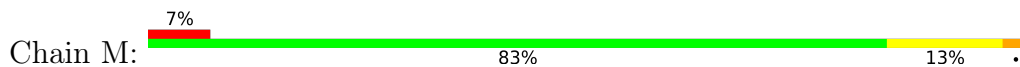- Molecule 9 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).

Mol	Chain	Residues	Atoms				AltConf
9	A	1	Total	C	N	O	0
			28	16	2	10	
9	A	1	Total	C	N	O	0
			28	16	2	10	
9	B	1	Total	C	N	O	0
			28	16	2	10	
9	B	1	Total	C	N	O	0
			28	16	2	10	

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: Isoform Short of Insulin receptor

S771 G772 L773 R774 H775 F776 T777 G778 Y779 R780 I781 E782 L783 Q784 A785 C786 N787 Q788 D789 T790 P791 E792 E793 R794 C795 S796 V797 A798 A799 Y800 V801 S802 A803 R804 T805 M806 P807 E808 ALA LYS ALA ASP ASP ILE VAL GLY PRO VAL THR HIS GLU ILE PHE GLU ASN VAL HIS LEU

MET TRP GLN GLU PRO LYS GLU PRO ASN GLY LEU ILE VAL LEU TYR GLU VAL SER TYR ARG ARG TYR GLY ASP GLU GLU LEU HIS LEU CYS VAL PRO SER ASN ILE ALA LYS HIS PHE ALA LEU GLU ARG GLY CYS ARG LEU ARG GLY LEU SER PRO GLY ASN TYR SER VAL ARG ILE ARG ALA THR SER

LEU ALA GLY ASN GLY SER TRP THR GLU GLU PRO THR TYR PHE TYR VAL THR ASP TYR LEU ASP VAL PRO SER ASN ILE ALA LYS HIS HIS HIS HIS HIS HIS HIS HIS HIS HIS

• Molecule 1: Isoform Short of Insulin receptor

Chain B:

10%

45% 16% 39%

H1 P4 G5 E6 M11 D12 I13 R14 T18 H21 E22 N25 C26 S27 Q34 M38 E44 R47 D48 K53 L54 I55 D59 Y60 L61 L62 R65 V66 K73 P77 N78 L79 T80 R83 L87 Y91 A92 L93 E97 M98 V99 H100

L104 G105 L106 Y107 N108 L109 I112 T113 R114 G115 S116 V117 R118 I119 E120 K121 E124 A129 T130 R135 D138 E141 D142 N143 Y144 I145 V146 L147 D151 N152 E153 E154 C155 G156 P160 G161 T162 ALA LYS GLY LYS THR N168 C169 P170 A171 I174 N175 G176 Q177

F178 V179 E180 R181 C182 C188 Q189 H209 L213 D221 R229 D234 Y245 Y246 H247 D250 C253 F256 Q260 D261 L262 H263 H264 K265 C266 K267 ASN SER ARG ARG GLN GLY C274 H275 Q276 H280 N281 N282 K283 S290 T293 M294 N295 S296 S297 N298

C301 C304 L305 G306 PRO CYS PRO K310 V311 E316 I321 D322 V335 L340 I344 R345 G346 G347 N348 N349 E353 L354 E355 A356 N357 L358 G359 S365 K369 R372 R383 R389 E394 Y398 Y401 D404 I421 T422 Q423 G424 K425

Y430 L436 I439 H440 E444 V445 S446 G447 T448 R451 Q452 E453 R454 N455 D456 L459 K460 S467 C468 E469 N470 E471 L472 S476 Y477 I478 R479 T480 S481 F482 D483 K484 I485 R488 W489 W493 F497 R498 G502 F503 M504 L505 F506 Y507 K508 E509 A510 P511 Y512

Q513 N514 V515 THR GLU PHE ASP GLY GLN ASP ALA CYS GLY SER ASN SER TRP THR V531 V532 D533 I534 D535 P536 P537 L538 R539 S540 N541 D542 P543 K544 P549 L552 M553 R554 G555 L556 K557 P558 W559 Y562 A563 I564 F565 V566 K567 T568 L569 V570 D574 E575 R576 R577 T578 Y579

G580 A581 D584 I585 I586 Y587 V588 Q589 T590 D591 ALA THR ASN PRO SER VAL PRO LEU ASP PRO ILE SER VAL SER ASN SER SER SER GLN ILE ILE LEU LYS TRP LYS PRO PRO SER ASP PRO ASN GLY ASN ILE THR HIS TYR LEU VAL PHE TRP GLU ARG GLN ALA GLU ASP SER GLU

LEU PHE GLU LEU ASP TYR CYS LEU LYS GLY LEU LYS LEU PRO SER ARG THR TRP SER PRO PRO PHE GLU SER GLU ASP SER GLN LYS HIS ASN GLN SER GLU TYR GLU ASP SER ALA GLY GLU CYS CYS SER CYS PRO LYS THR ASP SER GLN ILE LEU LYS GLU LEU GLU GLU SER SER

PHE ARG LYS THR PHE GLU ASP TYR LEU HIS ASN VAL VAL PHE VAL PRO ARG PRO SER ARG LYS ARG ARG SER LEU GLY ASP VAL GLY ASN VAL THR VAL ALA VAL PRO THR VAL ALA ALA PHE PRO ASN THR SER SER THR SER VAL PRO THR SER PRO GLU GLU HIS ARG PRO PHE GLU

LYS VAL VAL ASN LYS GLU SER LEU VAL ILE SER GLY LEU ARG HIS PHE THR GLY TYR ARG ILE GLU LEU GLN ALA CYS ASN GLN ASP THR PRO GLU GLU ARG CYS SER VAL ALA ALA TYR VAL SER ALA ARG THR MET PRO GLU ALA LYS ALA ASP ASP ILE VAL GLY PRO VAL THR HIS

GLU ILE PHE GLU ASN ASN VAL VAL HIS LEU MET TRP GLN GLU PRO LYS GLU PRO ASN GLY LEU ILE VAL LEU TYR GLU VAL SER TYR ARG ARG TYR GLY ASP GLU GLU LEU HIS LEU CYS VAL SER ARG LYS HIS PHE ALA LEU GLU ARG GLY CYS ARG LEU ARG GLY LEU SER PRO GLY

ASN TYR SER VAL ARG ILE ALA ALA THR SER LEU ALA GLY ASN GLY SER TRP THR GLU PRO THR TYR PHE TYR VAL THR ASP TYR LEU ASP VAL PRO SER ASN ILE ALA LYS HIS HIS HIS HIS HIS HIS HIS HIS HIS HIS

• Molecule 2: Isoform Short of Insulin receptor alpha

Chain M:

7%

83%   13%

A691 A692 A693 L696 H710 F714 V715 P716 R720

• Molecule 2: Isoform Short of Insulin receptor alpha

Chain N:

17%

83%   13%

A691 A692 A693 L696 H710 F714 V715 P716 S719 R720

• Molecule 3: Insulin chain A

Chain S:

52%

57%   43%

G1701 I1702 V1703 E1704 Q1705 C1706 C1707 T1708 S1709 I1710 C1711 S1712 L1713 Y1714 Q1715 L1716 E1717 N1718 Y1719 C1720 N1721

• Molecule 3: Insulin chain A

Chain O:

24%

62%   38%

G1101 I1102 V1103 E1104 C1107 T1108 S1109 I1110 Y1114 E1117 N1118 Y1119 C1120 N1121

• Molecule 3: Insulin chain A

Chain Q:

24%

67%   33%

G1301 I1302 V1303 E1304 T1308 S1309 I1310 Y1314 E1317 N1318 Y1319 C1320 N1321

• Molecule 3: Insulin chain A

Chain U:

67%

62%   38%

G1501 I1502 V1503 E1504 C1507 T1508 S1509 I1510 C1511 S1512 L1513 Y1514 Q1515 L1516 E1517 N1518 Y1519 C1520 N1521

• Molecule 4: Insulin B chain

Chain T:

80%

80%   17%

F1801 V1802 N1803 Q1804 H1805 L1806 C1807 G1808 S1809 H1810 L1811 V1812 L1815 Y1816 L1817 V1818 C1819 G1820 E1821 R1822 G1823 F1824 F1825 Y1826 T1827 P1828 K1829 T1830

• Molecule 4: Insulin B chain

Chain P:

F1201 V1202 N1203 Q1204 H1205 G1208 A1214 L1217 E1221 R1222 G1223 F1224 F1225 Y1226 T1227 P1228 K1229 T1230

• Molecule 4: Insulin B chain

Chain R:

F1401 V1402 N1403 G1408 S1409 H1410 A1414 L1417 V1418 E1421 R1422 G1423 F1424 F1425 Y1426 T1427 P1428 K1429 T1430

• Molecule 4: Insulin B chain

Chain V:

F1601 V1602 N1603 Q1604 H1605 L1606 C1607 G1608 S1609 H1610 L1611 V1612 E1613 A1614 L1615 Y1616 L1617 V1618 C1619 G1620 E1621 R1622 G1623 F1624 F1625 Y1626 T1627 P1628 K1629 T1630

• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain X:

NAG1 NAG2 FUC3

• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain D:

NAG1 NAG2 FUC3

• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain Y:

- Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain H:

- Molecule 6: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain C:

- Molecule 6: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain G:

- Molecule 7: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain E:

- Molecule 7: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain I:

- Molecule 8: alpha-L-fucopyranose-(1-6)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain F:

NAG1 FUC2

• Molecule 8: alpha-L-fucopyranose-(1-6)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain J:

50%

100%

NAG1 FUC2

4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	54293	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 $(e^-/\text{Å}^2)$	45	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	1.028	Depositor
Minimum map value	-0.409	Depositor
Average map value	0.005	Depositor
Map value standard deviation	0.041	Depositor
Recommended contour level	0.33	Depositor
Map size (Å)	299.52, 299.52, 299.52	wwPDB
Map dimensions	288, 288, 288	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.04, 1.04, 1.04	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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

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	0.34	0/5631	0.56	0/7628
1	B	0.34	0/4648	0.57	0/6293
2	M	0.40	0/250	0.60	0/337
2	N	0.40	0/250	0.60	0/337
3	O	0.37	0/164	0.55	0/220
3	Q	0.37	0/164	0.55	0/220
3	S	0.37	0/164	0.55	0/220
3	U	0.36	0/164	0.55	0/220
4	P	0.33	0/246	0.58	0/332
4	R	0.34	0/246	0.58	0/332
4	T	0.34	0/246	0.58	0/332
4	V	0.34	0/246	0.58	0/332
All	All	0.35	0/12419	0.57	0/16803

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	3
1	B	0	3
2	M	0	1
2	N	0	1
3	O	0	1
3	Q	0	1
3	S	0	1
3	U	0	1
4	P	0	1
4	R	0	1
4	T	0	1

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Mol	Chain	#Chirality outliers	#Planarity outliers
4	V	0	1
All	All	0	16

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

5 of 16 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	358	LEU	Peptide
1	A	468	CYS	Peptide
1	A	541	ASN	Peptide
1	B	358	LEU	Peptide
1	B	468	CYS	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	5502	0	5358	108	0
1	B	4542	0	4425	96	0
2	M	244	0	233	3	0
2	N	244	0	233	3	0
3	O	163	0	148	6	0
3	Q	163	0	148	4	0
3	S	163	0	148	14	0
3	U	163	0	148	6	0
4	P	239	0	226	15	0
4	R	239	0	226	4	0
4	T	239	0	224	9	0
4	V	239	0	226	16	0
5	D	38	0	34	0	0
5	H	38	0	34	0	0
5	X	38	0	34	0	0
5	Y	38	0	34	0	0
6	C	39	0	34	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	G	39	0	34	0	0
7	E	28	0	25	0	0
7	I	28	0	25	0	0
8	F	24	0	22	0	0
8	J	24	0	22	0	0
9	A	28	0	26	0	0
9	B	28	0	26	0	0
All	All	12530	0	12093	240	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 10.

The worst 5 of 240 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:B:544:LYS:NZ	4:V:1601:PHE:CD2	1.79	1.50
1:B:544:LYS:NZ	4:V:1601:PHE:HD2	0.90	1.36
3:S:1714:TYR:CE2	4:P:1201:PHE:CD1	2.01	1.28
3:S:1714:TYR:CZ	4:P:1201:PHE:CG	2.33	1.03
3:S:1715:GLN:NE2	4:P:1217:LEU:HD11	1.71	1.02

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	668/927 (72%)	594 (89%)	73 (11%)	1 (0%)	51	85
1	B	552/927 (60%)	478 (87%)	74 (13%)	0	100	100
2	M	28/30 (93%)	25 (89%)	2 (7%)	1 (4%)	3	27
2	N	28/30 (93%)	25 (89%)	2 (7%)	1 (4%)	3	27

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	O	19/21 (90%)	18 (95%)	1 (5%)	0	100	100
3	Q	19/21 (90%)	18 (95%)	1 (5%)	0	100	100
3	S	19/21 (90%)	18 (95%)	1 (5%)	0	100	100
3	U	19/21 (90%)	18 (95%)	1 (5%)	0	100	100
4	P	28/30 (93%)	24 (86%)	4 (14%)	0	100	100
4	R	28/30 (93%)	24 (86%)	4 (14%)	0	100	100
4	T	28/30 (93%)	24 (86%)	4 (14%)	0	100	100
4	V	28/30 (93%)	24 (86%)	4 (14%)	0	100	100
All	All	1464/2118 (69%)	1290 (88%)	171 (12%)	3 (0%)	50	81

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	359	GLY
2	M	716	PRO
2	N	716	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	623/841 (74%)	619 (99%)	4 (1%)	86	91
1	B	513/841 (61%)	510 (99%)	3 (1%)	86	91
2	M	27/27 (100%)	27 (100%)	0	100	100
2	N	27/27 (100%)	27 (100%)	0	100	100
3	O	20/20 (100%)	20 (100%)	0	100	100
3	Q	20/20 (100%)	20 (100%)	0	100	100
3	S	20/20 (100%)	20 (100%)	0	100	100
3	U	20/20 (100%)	20 (100%)	0	100	100
4	P	25/26 (96%)	24 (96%)	1 (4%)	31	56

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
4	R	25/26 (96%)	24 (96%)	1 (4%)	31	56
4	T	25/26 (96%)	24 (96%)	1 (4%)	31	56
4	V	25/26 (96%)	24 (96%)	1 (4%)	31	56
All	All	1370/1920 (71%)	1359 (99%)	11 (1%)	82	89

5 of 11 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	T	1803	ASN
4	P	1203	ASN
4	V	1603	ASN
4	R	1403	ASN
1	B	345	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 12 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	276	GLN
3	S	1715	GLN
4	R	1410	HIS
4	P	1203	ASN
1	A	417	HIS

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 ⓘ

26 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	#$|Z| > 2$
6	NAG	C	1	6,1	14,14,15	0.34	0	17,19,21	0.97	1 (5%)
6	NAG	C	2	6	14,14,15	0.33	0	17,19,21	0.64	1 (5%)
6	BMA	C	3	6	11,11,12	0.83	0	15,15,17	0.86	1 (6%)
5	NAG	D	1	5,1	14,14,15	0.24	0	17,19,21	0.49	0
5	NAG	D	2	5	14,14,15	0.33	0	17,19,21	0.43	0
5	FUC	D	3	5	10,10,11	0.69	0	14,14,16	0.87	0
7	NAG	E	1	1,7	14,14,15	0.71	1 (7%)	17,19,21	0.73	0
7	NAG	E	2	7	14,14,15	0.27	0	17,19,21	0.53	0
8	NAG	F	1	8,1	14,14,15	0.45	0	17,19,21	0.79	0
8	FUC	F	2	8	10,10,11	1.13	0	14,14,16	1.33	3 (21%)
6	NAG	G	1	6,1	14,14,15	0.24	0	17,19,21	0.83	1 (5%)
6	NAG	G	2	6	14,14,15	0.28	0	17,19,21	0.57	0
6	BMA	G	3	6	11,11,12	0.79	0	15,15,17	0.93	1 (6%)
5	NAG	H	1	5,1	14,14,15	0.25	0	17,19,21	0.69	1 (5%)
5	NAG	H	2	5	14,14,15	0.31	0	17,19,21	0.41	0
5	FUC	H	3	5	10,10,11	0.78	0	14,14,16	0.90	0
7	NAG	I	1	1,7	14,14,15	0.76	1 (7%)	17,19,21	0.72	0
7	NAG	I	2	7	14,14,15	0.26	0	17,19,21	0.49	0
8	NAG	J	1	8,1	14,14,15	0.49	0	17,19,21	0.93	2 (11%)
8	FUC	J	2	8	10,10,11	1.00	0	14,14,16	1.23	3 (21%)
5	NAG	X	1	5,1	14,14,15	0.24	0	17,19,21	0.78	1 (5%)
5	NAG	X	2	5	14,14,15	0.28	0	17,19,21	0.48	0
5	FUC	X	3	5	10,10,11	0.73	0	14,14,16	0.81	0
5	NAG	Y	1	5,1	14,14,15	0.25	0	17,19,21	0.88	1 (5%)
5	NAG	Y	2	5	14,14,15	0.31	0	17,19,21	0.50	0
5	FUC	Y	3	5	10,10,11	0.79	0	14,14,16	0.78	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	C	1	6,1	-	2/6/23/26	0/1/1/1
6	NAG	C	2	6	-	0/6/23/26	0/1/1/1
6	BMA	C	3	6	-	0/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	D	1	5,1	-	0/6/23/26	0/1/1/1
5	NAG	D	2	5	-	2/6/23/26	0/1/1/1
5	FUC	D	3	5	-	-	0/1/1/1
7	NAG	E	1	1,7	-	2/6/23/26	0/1/1/1
7	NAG	E	2	7	-	2/6/23/26	0/1/1/1
8	NAG	F	1	8,1	-	0/6/23/26	0/1/1/1
8	FUC	F	2	8	-	-	0/1/1/1
6	NAG	G	1	6,1	-	2/6/23/26	0/1/1/1
6	NAG	G	2	6	-	0/6/23/26	0/1/1/1
6	BMA	G	3	6	-	0/2/19/22	0/1/1/1
5	NAG	H	1	5,1	-	0/6/23/26	0/1/1/1
5	NAG	H	2	5	-	2/6/23/26	0/1/1/1
5	FUC	H	3	5	-	-	0/1/1/1
7	NAG	I	1	1,7	-	0/6/23/26	0/1/1/1
7	NAG	I	2	7	-	2/6/23/26	0/1/1/1
8	NAG	J	1	8,1	-	0/6/23/26	0/1/1/1
8	FUC	J	2	8	-	-	0/1/1/1
5	NAG	X	1	5,1	-	2/6/23/26	0/1/1/1
5	NAG	X	2	5	-	2/6/23/26	0/1/1/1
5	FUC	X	3	5	-	-	0/1/1/1
5	NAG	Y	1	5,1	-	2/6/23/26	0/1/1/1
5	NAG	Y	2	5	-	2/6/23/26	0/1/1/1
5	FUC	Y	3	5	-	-	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	I	1	NAG	O5-C1	-2.62	1.39	1.43
7	E	1	NAG	O5-C1	-2.41	1.39	1.43

The worst 5 of 16 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	Y	1	NAG	C1-O5-C5	3.16	116.48	112.19
6	C	1	NAG	C1-O5-C5	3.00	116.25	112.19
5	X	1	NAG	C1-O5-C5	2.87	116.08	112.19
8	F	2	FUC	O5-C5-C4	2.75	114.45	109.52
6	G	1	NAG	C1-O5-C5	2.65	115.78	112.19

There are no chirality outliers.

5 of 22 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	E	2	NAG	O5-C5-C6-O6
7	I	2	NAG	O5-C5-C6-O6
6	C	1	NAG	C4-C5-C6-O6
6	G	1	NAG	C4-C5-C6-O6
5	D	2	NAG	O5-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 X

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain D

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain Y

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain H

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain C

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain G

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain E

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain I

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain F

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain J

Bond lengths　　　Bond angles

Torsions　　　Rings

5.6 Ligand geometry ⓘ

4 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	$\#|Z| > 2$
9	NAG	B	1001	1	14,14,15	0.28	0	17,19,21	0.54	0
9	NAG	A	1002	-	14,14,15	0.33	0	17,19,21	0.47	0
9	NAG	B	1002	-	14,14,15	0.29	0	17,19,21	0.43	0
9	NAG	A	1001	1	14,14,15	0.25	0	17,19,21	0.48	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
9	NAG	B	1001	1	-	2/6/23/26	0/1/1/1
9	NAG	A	1002	-	-	2/6/23/26	0/1/1/1
9	NAG	B	1002	-	-	1/6/23/26	0/1/1/1
9	NAG	A	1001	1	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
9	B	1001	NAG	O5-C5-C6-O6
9	A	1002	NAG	O5-C5-C6-O6
9	B	1001	NAG	C4-C5-C6-O6
9	A	1002	NAG	C4-C5-C6-O6
9	B	1002	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 ⓘ

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	A	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	591:ASP	C	592:ALA	N	3.14

6   Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-23767. 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 |
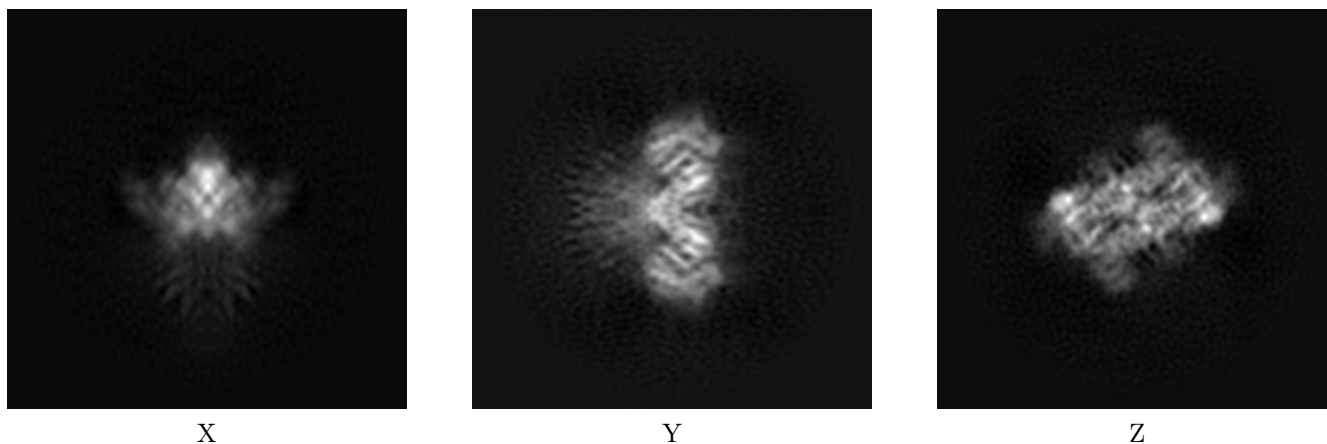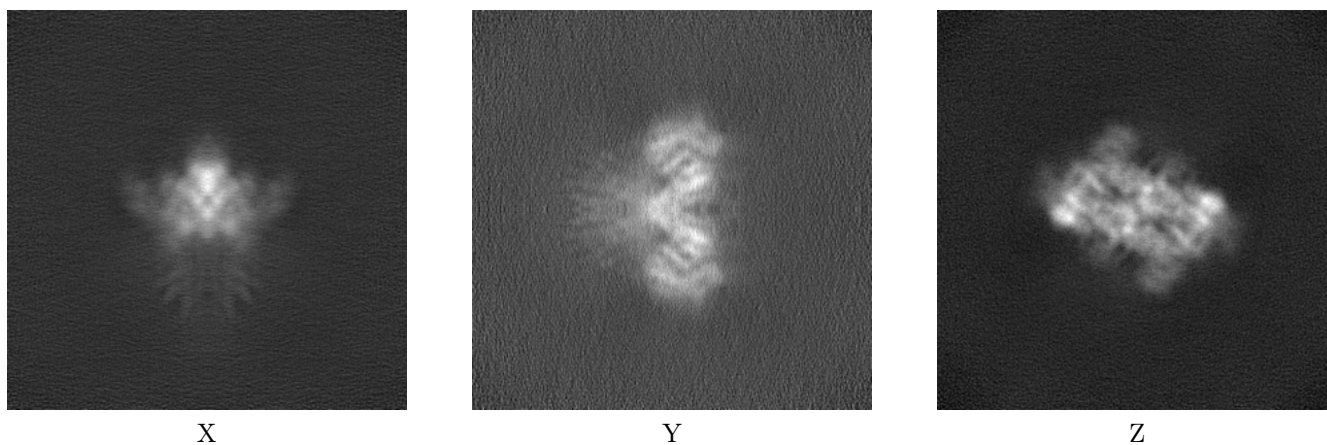
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

6.2.1 Primary map
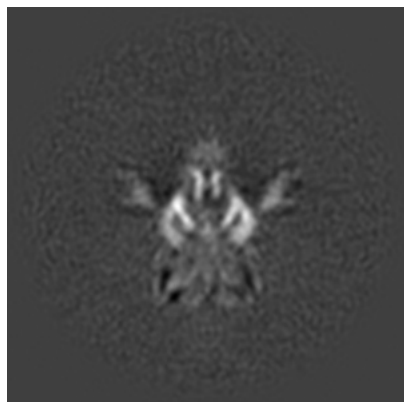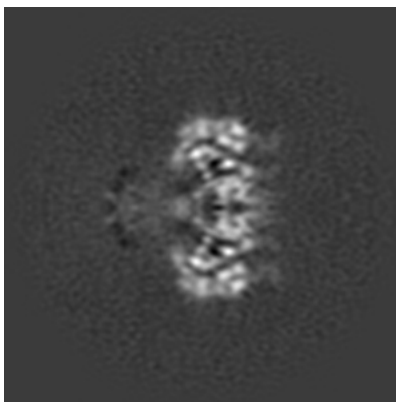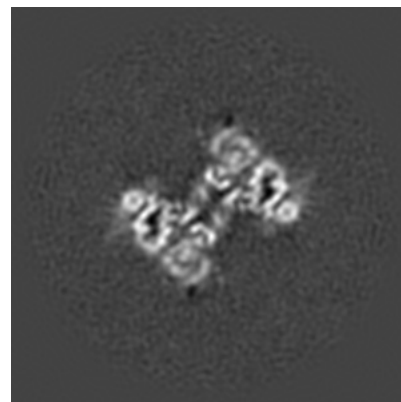
| X Index: 144 | Y Index: 144 | Z Index: 144 |

6.2.2 Raw map
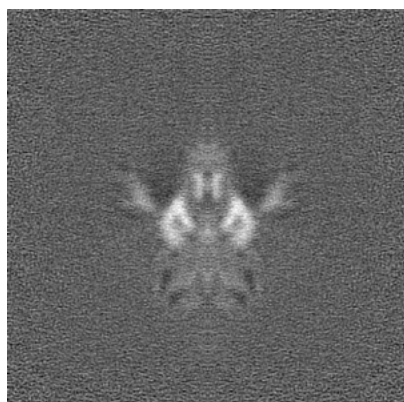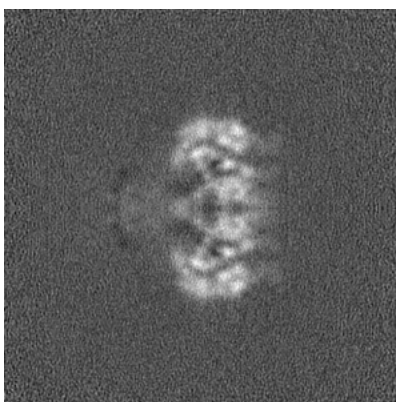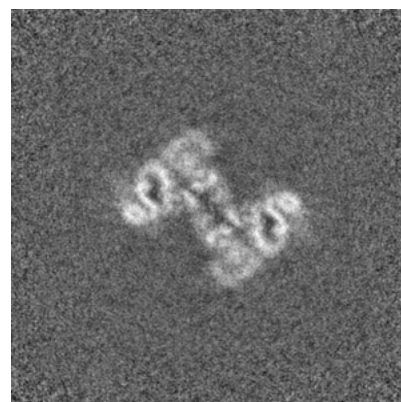
| X Index: 144 | Y Index: 144 | Z Index: 144 |

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

6.3 Largest variance slices ⓘ
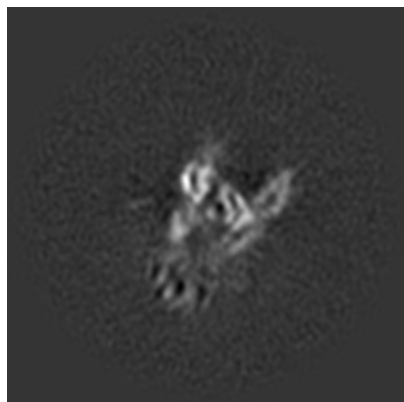
6.3.1 Primary map
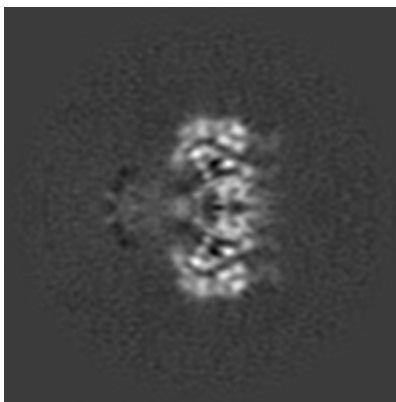
| X Index: 151 | Y Index: 144 | Z Index: 157 |
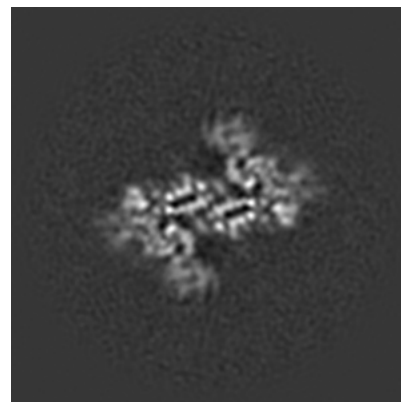
6.3.2 Raw map
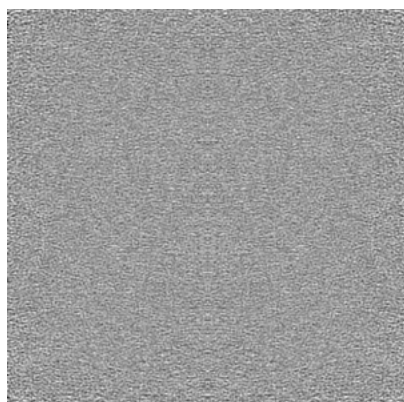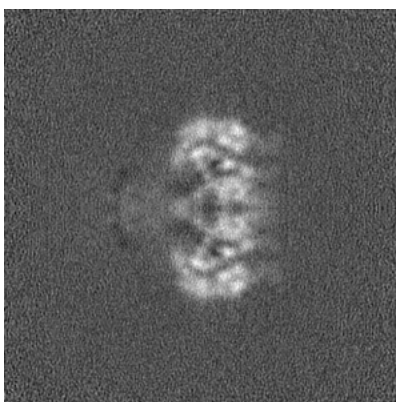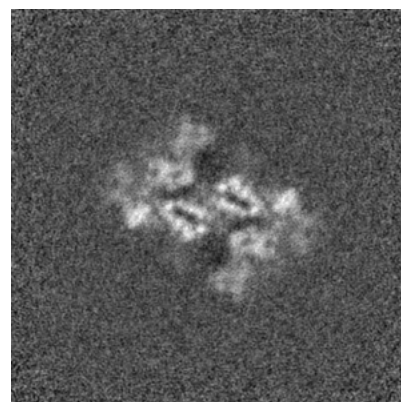
| X Index: 0 | Y Index: 144 | Z Index: 160 |

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

6.4   Orthogonal surface views ⓘ

6.4.1   Primary map

| X | Y | Z |
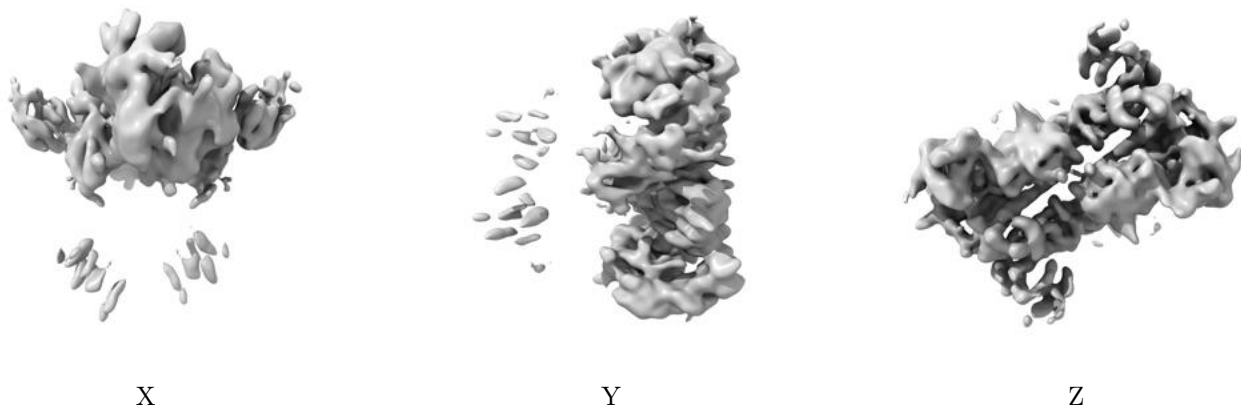
The images above show the 3D surface view of the map at the recommended contour level 0.33. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

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 shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

A mask typically either:

- Encompasses the whole structure

- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

6.5.1   emd_23767_msk_1.map (i)

X   Y   Z
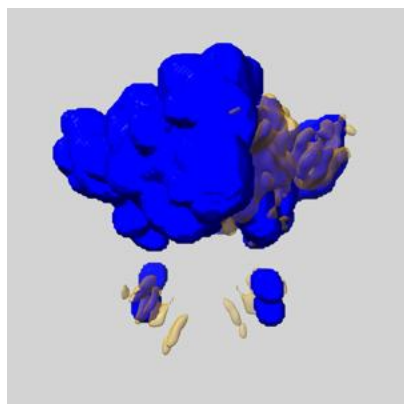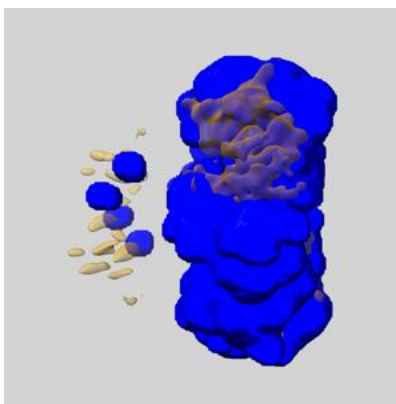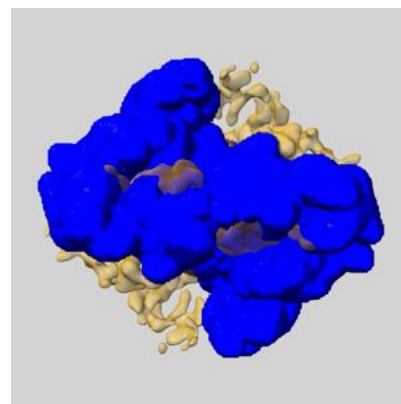
7 Map analysis ⓘ

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

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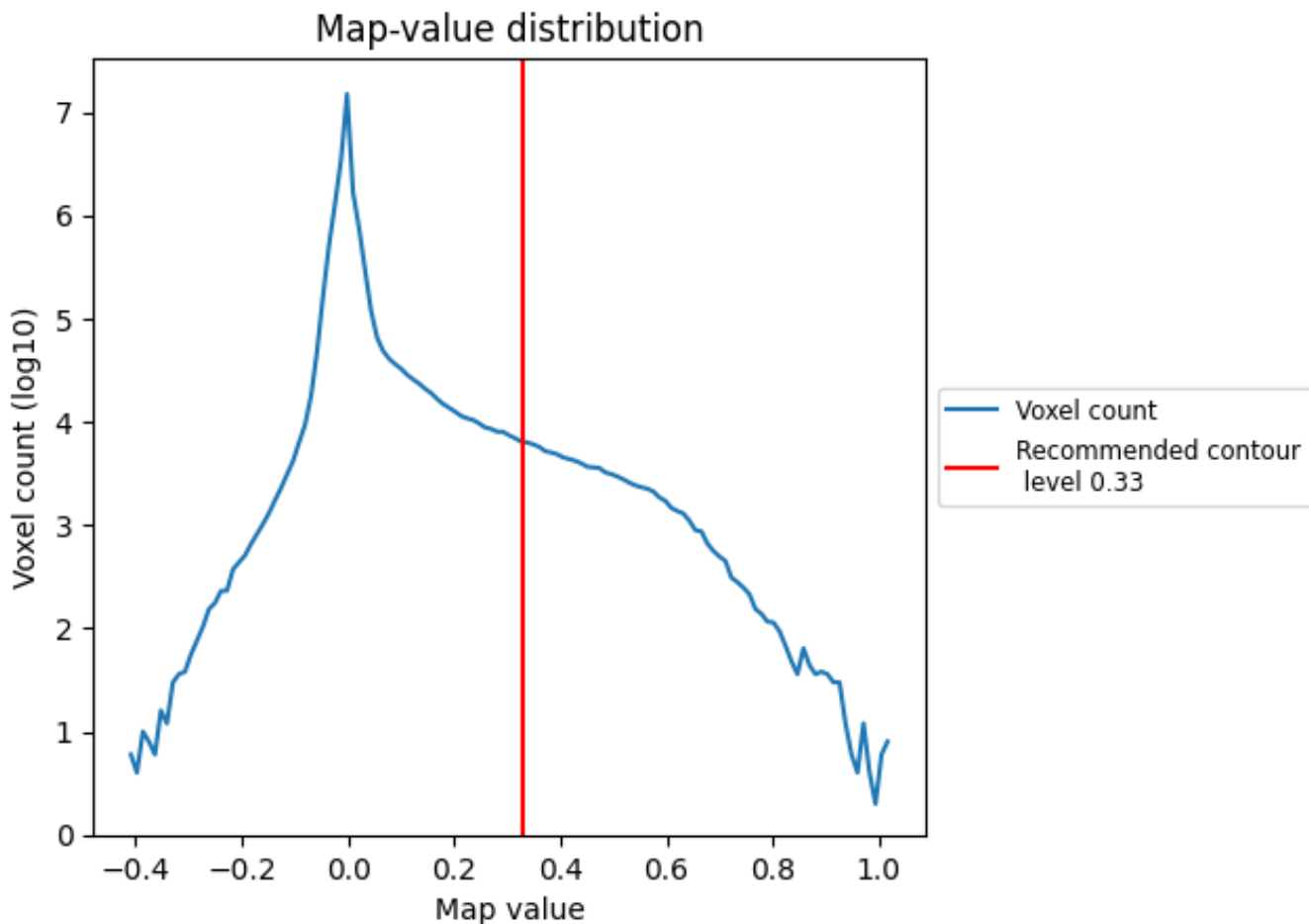
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2   Volume estimate ⓘ
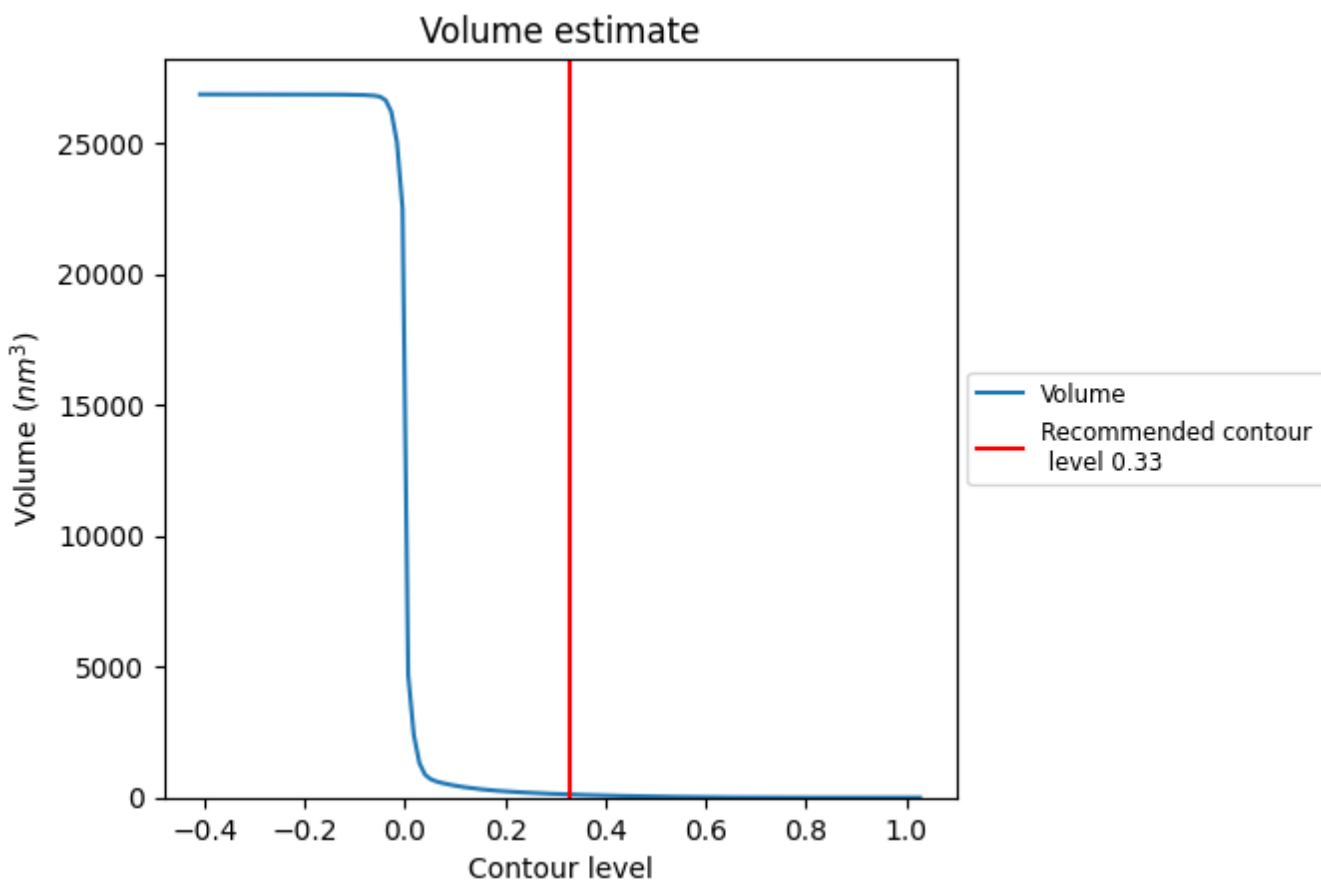
The volume at the recommended contour level is 117 nm^3; this corresponds to an approximate mass of 106 kDa.

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 ⓘ
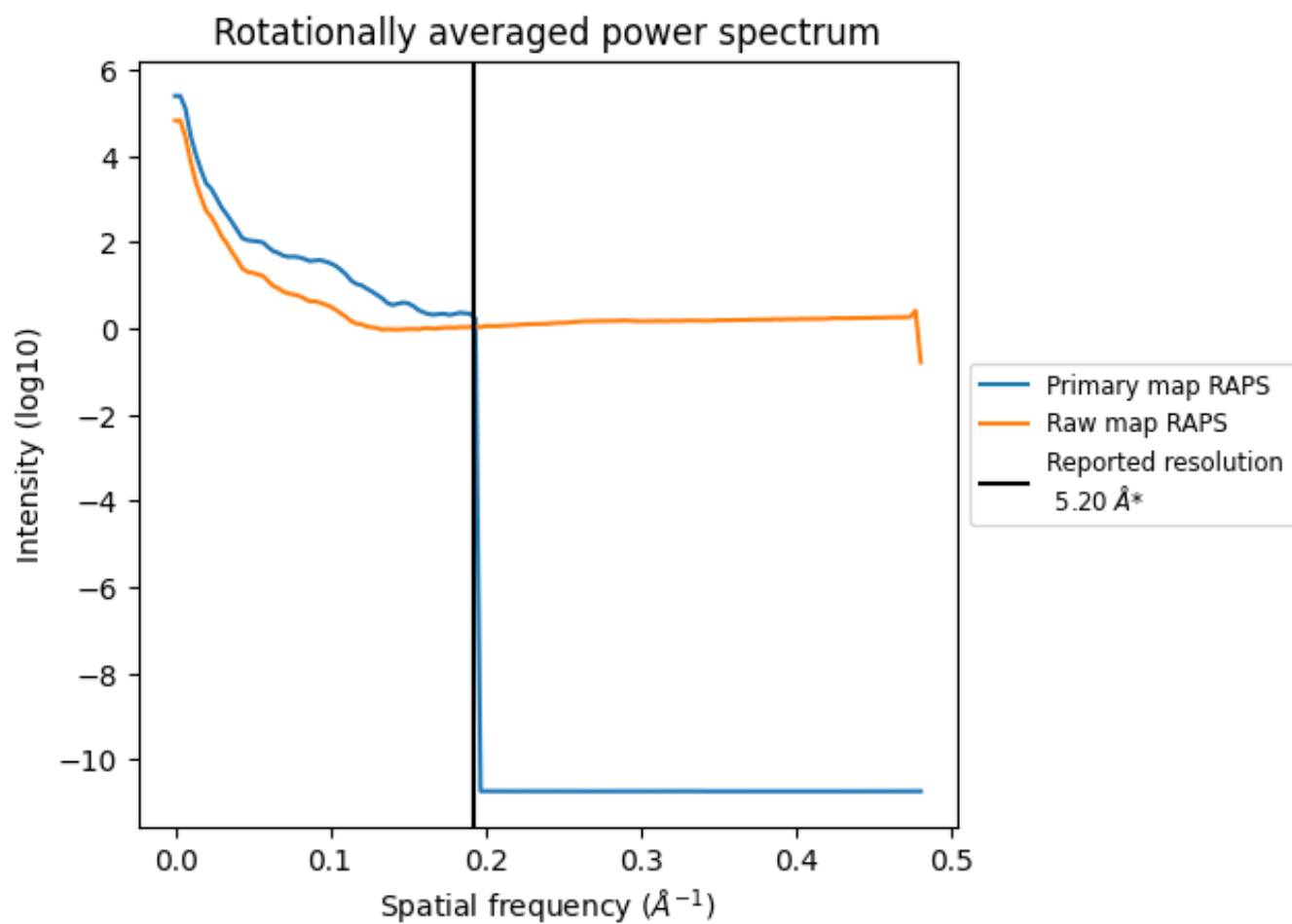
*Reported resolution corresponds to spatial frequency of 0.192 Å^{-1}

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 ⓘ
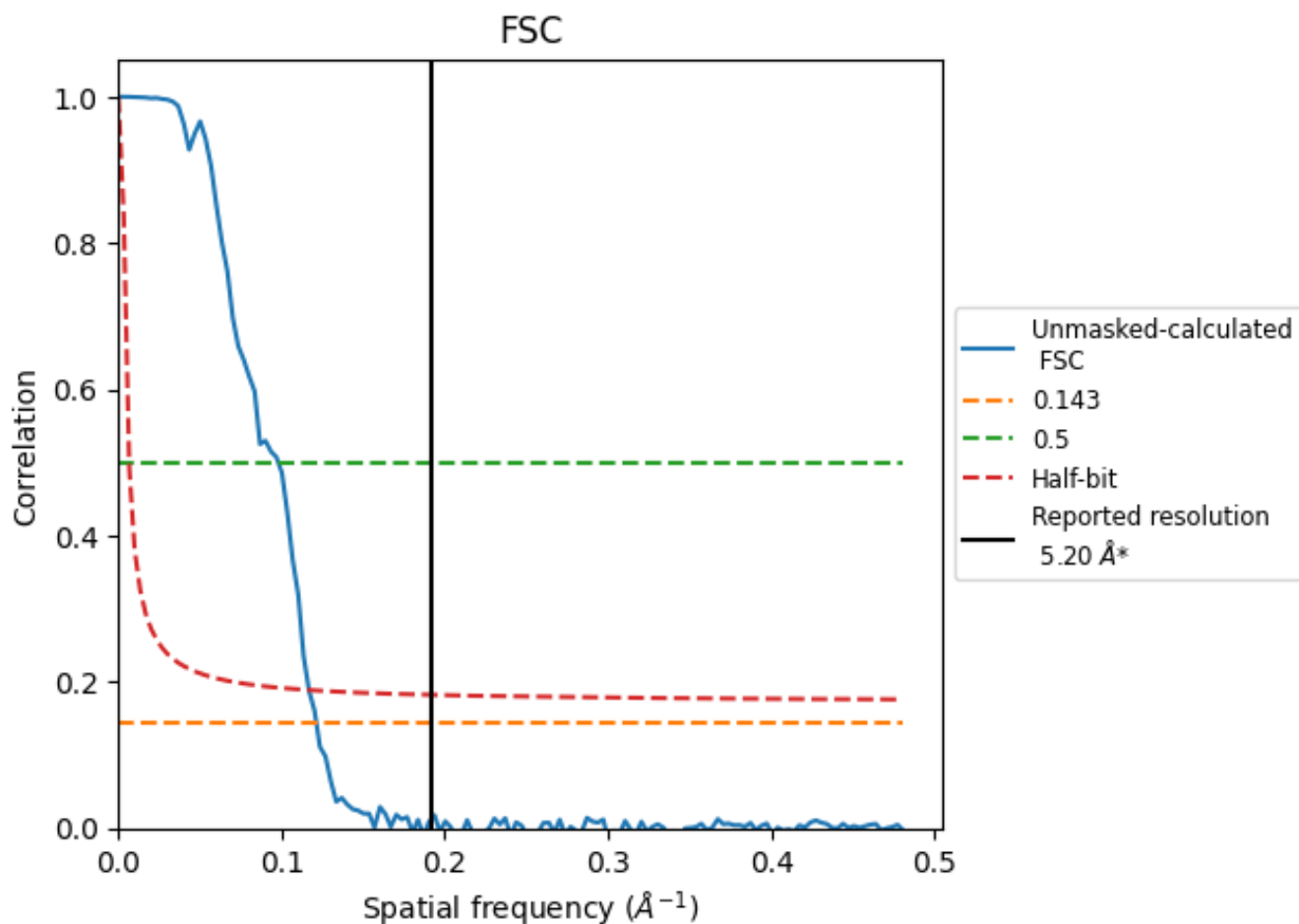
*Reported resolution corresponds to spatial frequency of 0.192 Å^{-1}

8.2 Resolution estimates ⓘ

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	5.20	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	8.24	10.21	8.57

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 8.24 differs from the reported value 5.2 by more than 10 %

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-23767 and PDB model 7MD5. Per-residue inclusion information can be found in section 3 on page 8.

9.1 Map-model overlay ⓘ

| X | Y | Z |
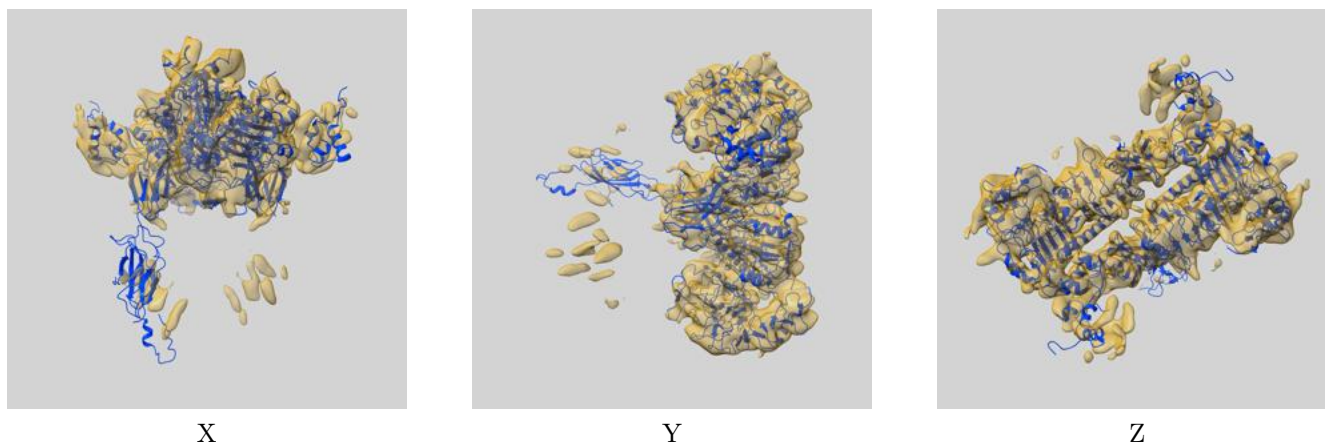
The images above show the 3D surface view of the map at the recommended contour level 0.33 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2   Q-score mapped to coordinate model ⓘ
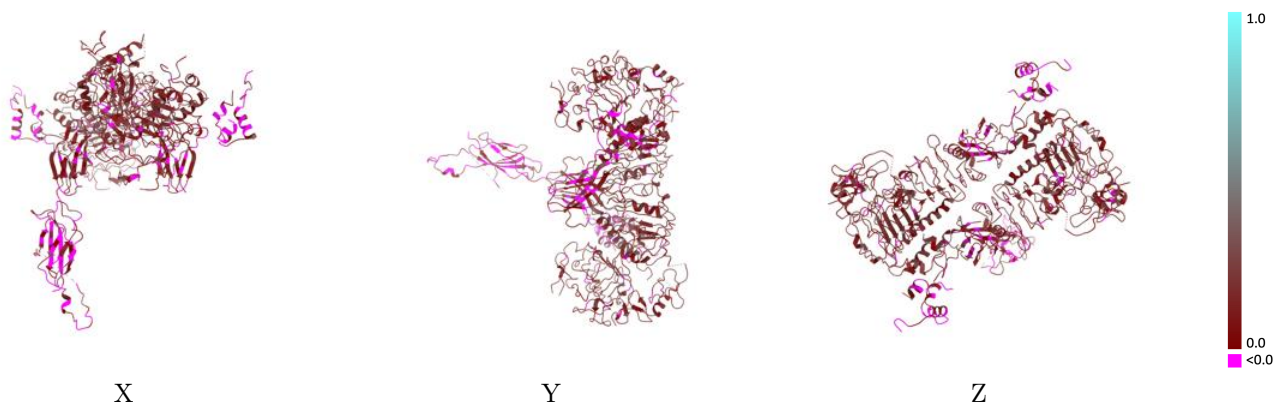
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 ⓘ
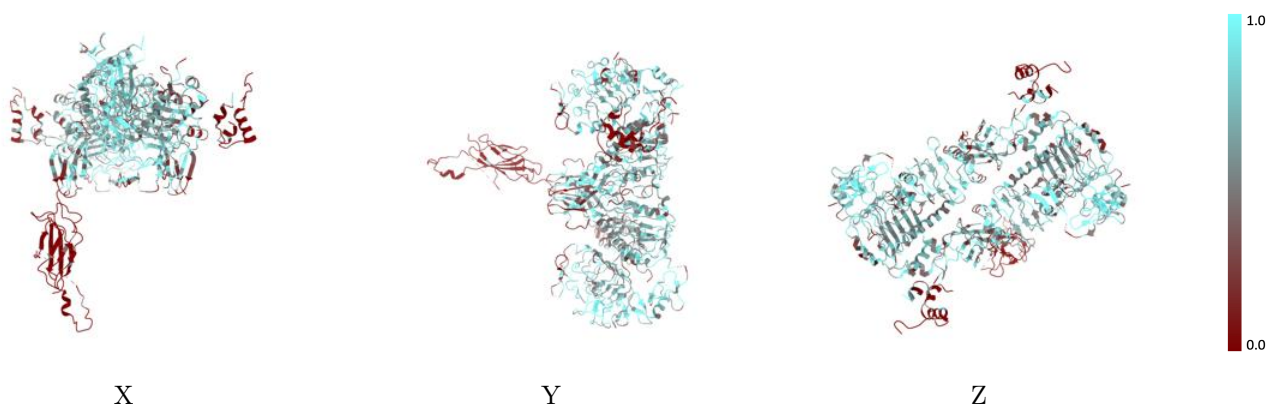
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.33).

9.4 Atom inclusion ⓘ
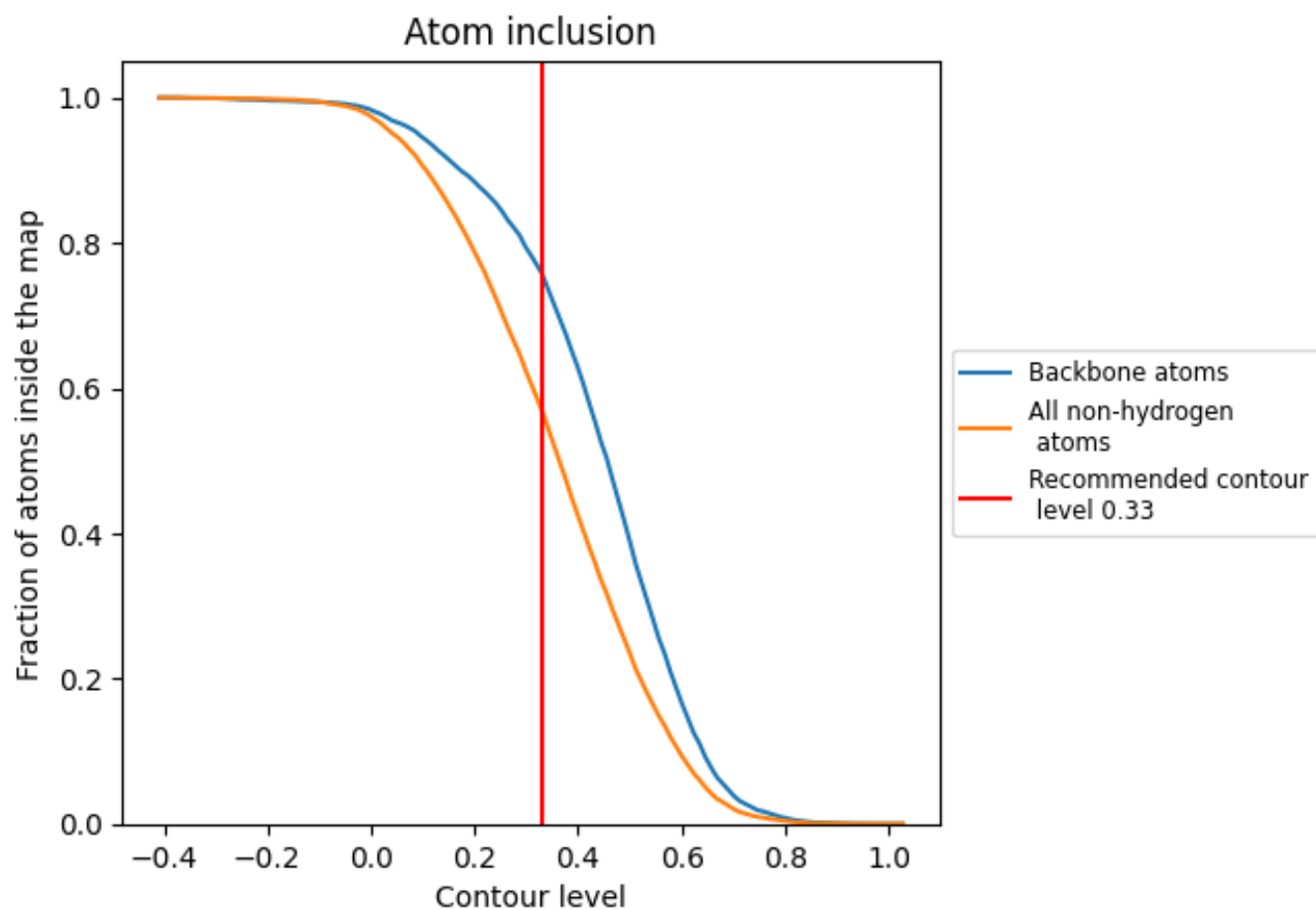
At the recommended contour level, 76% of all backbone atoms, 57% of all non-hydrogen atoms, are inside the map.

9.5   Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.33) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.5702	0.1460
A	0.5538	0.1390
B	0.6637	0.1620
C	0.7179	0.3430
D	0.5000	0.1820
E	0.3214	0.2620
F	0.4167	0.1920
G	0.7179	0.3190
H	0.4211	0.1900
I	0.3214	0.2570
J	0.2500	0.2060
M	0.6067	0.1660
N	0.5774	0.1650
O	0.5776	0.1750
P	0.5830	0.2000
Q	0.5714	0.1720
R	0.5702	0.1960
S	0.3354	0.0540
T	0.1277	-0.0360
U	0.3230	0.0290
V	0.0511	0.0030
X	0.3158	0.2300
Y	0.3158	0.2390

1.0

0.0
<0.0