



## wwPDB EM Validation Summary Report ⓘ

Nov 12, 2022 – 01:09 PM EST

PDB ID : 6UM1  
EMDB ID : EMD-20815  
Title : Structure of M-6-P/IGFII Receptor at pH 4.5  
Authors : Wang, R.; Qi, X.; Li, X.  
Deposited on : 2019-10-08  
Resolution : 3.46 Å(reported)

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

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

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<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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The following versions of software and data (see [references ⓘ](#)) 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) : 2.31.2

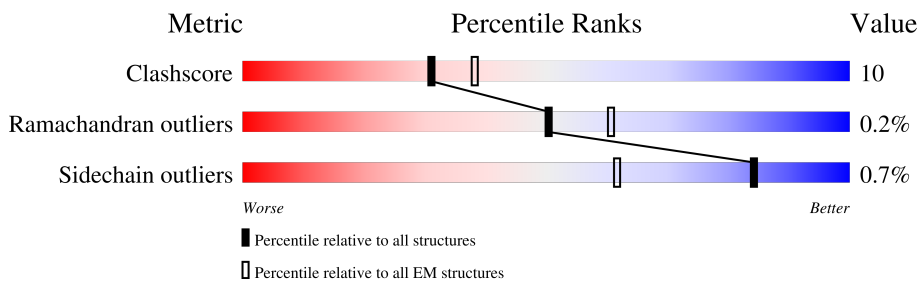
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.46 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  $\geq 3$ , 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  $\leq 5\%$ . 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	2499	
2	B	2	
3	C	3	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	NAG	A	2508	-	-	X	-

## 2 Entry composition [i](#)

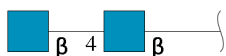
There are 4 unique types of molecules in this entry. The entry contains 17134 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Cation-independent mannose-6-phosphate receptor.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	2208	17025	10631	2916	3342	136	0	0

- Molecule 2 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	N	O		
2	B	2	28	16	2	10	0	0

- Molecule 3 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	N	O		
3	C	3	39	22	2	15	0	0

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>).

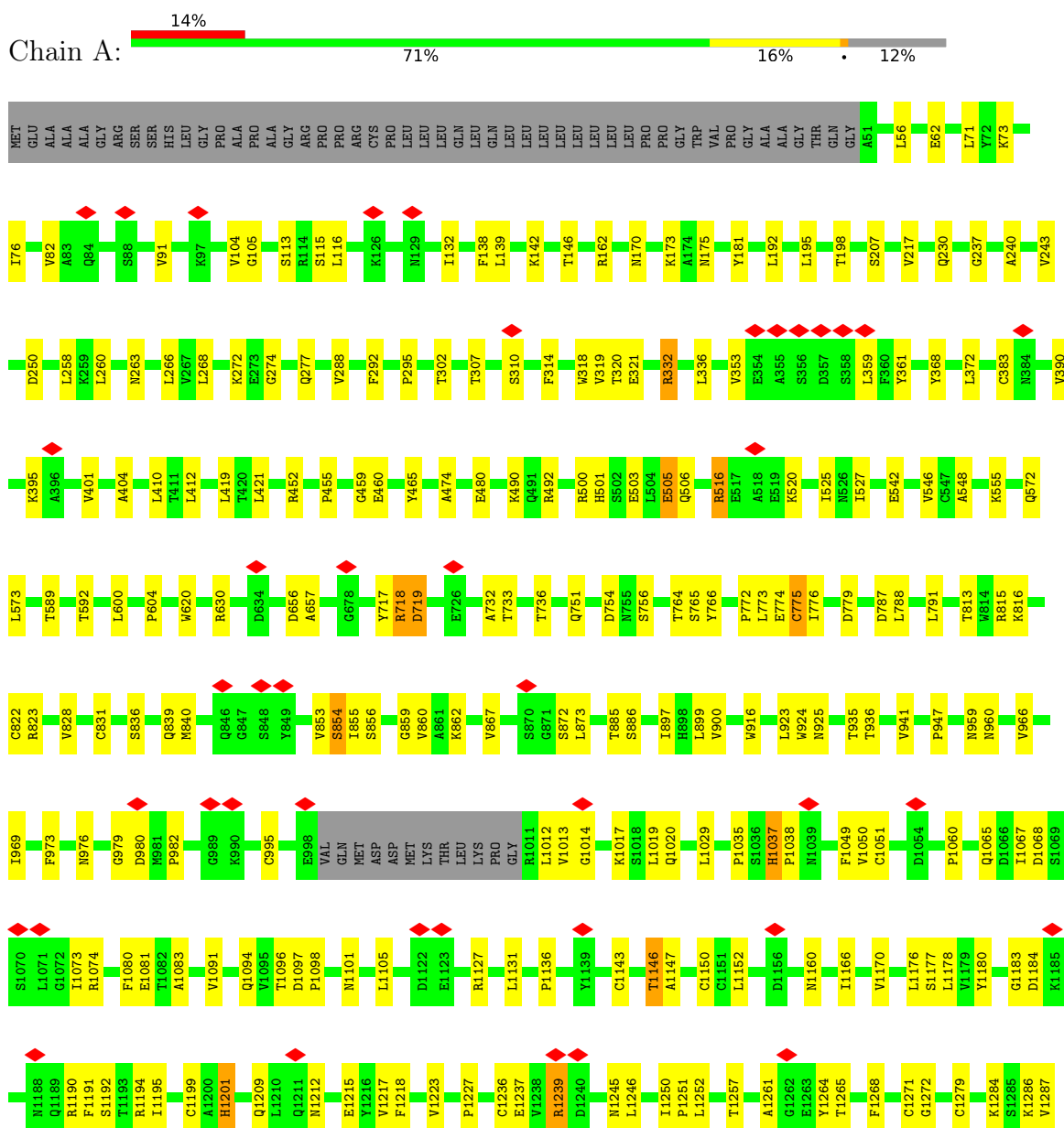


Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
4	A	1	Total	C	N	O	0
			42	24	3	15	
4	A	1	Total	C	N	O	0
			42	24	3	15	
4	A	1	Total	C	N	O	0
			42	24	3	15	

### 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: Cation-independent mannose-6-phosphate receptor



LEU	I1288	T1406	V1572	P1697	F1796	L1883	R1982	V2065	C2134	F2195	L2260	ILE	GLU
VAL	S1289	T1406	F1576	D1698	F1796	D1884	K2000	L2066	ALA	A2196	V2261	GLN	GLY
ALA	S1290	H1411	F1576	P1706	V1803	Q1888	V2006	G2067	VAL	C2197	K2262	PRO	PRO
THR	C1291	H1411	T1579	L1707	D1806	D1889	K2007	L2068	PRO	S2198	D2263	PRO	PRO
ALA	Q1292	Y1412	T1579	M1708	D1806	E1890	Q2007	L2074	PRO	G2264	G2264	LEU	LEU
CYS	R1295	L1413	V1583	M1708	D1806	E1890	H2009	D2076	GLN	A2200	I2265	ARG	ARG
LEU	G1296	L1414	V1583	H1711	D1811	L1894	R2010	V2076	VAL	S2201	P2266	PRO	PRO
THR	F1300	Y1414	L1597	H1711	D1811	L1894	R2010	V2076	GLN	I2202	E2267	THR	THR
LEU	Q1301	Q1423	V1600	A1717	G1812	C1902	R2014	V2077	GLN	C2203	F2268	LEU	LEU
LEU	Q1302	A1424	V1600	A1717	C1813	P1903	R2015	D2078	LEU	Q2204	S2269	GLY	GLY
LEU	V1303	G1425	P1608	V1726	THR	P1904	R2016	D2079	LEU	Q2204	H2270	GLN	GLN
ALA	A1304	S1426	P1608	D1727	ASP	P1904	L2017	D2079	LEU	R2205	E2271	THR	THR
ARG	V1307	A1427	V1618	D1727	THR	P1904	L2017	R2080	LEU	K2206	H2271	LEU	LEU
ARG	F1307	P1428	V1618	D1727	ASP	E1907	L2017	R2081	LEU	A2207	T2272	LEU	LEU
GLU	L1311	C1429	F1621	I1731	LEU	D1908	L2017	I2082	LEU	A2207	A2273	LEU	LEU
ARG	L1311	C1429	F1621	I1731	LEU	D1908	L2017	I2082	LEU	A2207	A2273	LEU	LEU
ALA	E1314	V1435	F1622	I1732	TYR	F1914	S2018	T2084	LEU	D2209	C2275	ARG	ARG
ASP	N1315	V1435	C1623	I1733	TYR	F1914	S2018	T2084	LEU	D2209	C2275	ARG	ARG
ASP	N1315	V1435	R1624	G1734	TYR	F1914	S2019	Y2085	LEU	Q2210	Q2210	LEU	LEU
ASP	G1316	L1438	R1624	G1734	TYR	F1914	S2019	Y2085	LEU	Q2210	Q2210	LEU	LEU
ARG	V1317	G1439	P1625	R1735	PHE	M1919	L2020	S2086	LEU	H2211	Q2276	VAL	VAL
ARG	L1318	G1440	P1625	R1735	PHE	M1919	L2020	S2086	LEU	H2211	Q2276	VAL	VAL
LEU	M1321	G1441	V1627	V1736	ASN	K1921	G2022	G2088	LEU	F2212	F2278	GLY	GLY
LEU	Y1322	P1441	V1627	V1736	ASN	K1921	G2022	G2088	LEU	F2212	F2278	GLY	GLY
THR	T1323	P1441	G1628	A1737	LEU	S1922	W2024	H2089	LEU	R2214	S2280	LEU	LEU
ARG	Y1322	P1441	G1628	A1737	LEU	S1922	W2024	H2089	LEU	R2214	S2280	LEU	LEU
ARG	T1323	R1450	P1629	G1738	LEU	E1924	W2024	Y2090	LEU	C2091	F2157	THR	THR
ARG	T1323	R1450	P1629	G1738	LEU	E1924	W2024	Y2090	LEU	C2091	F2157	THR	THR
ARG	I1338	Q1457	T1630	L1742	S1830	V1927	F2026	G2092	LEU	G2092	L2159	THR	THR
ARG	I1338	Q1457	T1630	L1742	S1830	V1927	F2026	G2092	LEU	G2092	L2159	THR	THR
ARG	F1339	Q1457	L1635	F1744	V1845	V1927	N2029	D2093	LEU	D2093	L2162	THR	THR
ARG	F1339	Q1457	L1635	F1744	V1845	V1927	N2029	D2093	LEU	D2093	L2162	THR	THR
ARG	F1340	V1465	D1639	I1745	C1848	V1928	N2029	H2094	LEU	H2094	Y2163	THR	THR
ARG	F1340	V1465	D1639	I1745	C1848	V1928	N2029	H2094	LEU	H2094	Y2163	THR	THR
ARG	Q1347	D1466	L1645	A1746	T1849	S1930	S2032	T2096	LEU	T2096	F2164	THR	THR
ARG	Q1347	D1466	L1645	A1746	T1849	S1930	S2032	T2096	LEU	T2096	F2164	THR	THR
ARG	V1350	I1474	H1650	E1749	A1851	R1931	Y2033	A2097	LEU	K2165	R2166	THR	THR
ARG	V1350	I1474	H1650	E1749	A1851	R1931	Y2033	A2097	LEU	K2165	R2166	THR	THR
ARG	F1351	I1474	H1650	E1749	A1851	R1931	Y2033	A2097	LEU	K2165	R2166	THR	THR
ARG	F1351	I1474	H1650	E1749	A1851	R1931	Y2033	A2097	LEU	K2165	R2166	THR	THR
ARG	L1352	T1479	Q1657	S1756	G1853	L1934	I2035	F2167	LEU	F2167	S2168	THR	THR
ARG	L1352	T1479	Q1657	S1756	G1853	L1934	I2035	F2167	LEU	F2167	S2168	THR	THR
ARG	T1355	P1494	Q1657	S1756	G1853	L1934	I2035	F2167	LEU	F2167	S2168	THR	THR
ARG	T1355	P1494	Q1657	S1756	G1853	L1934	I2035	F2167	LEU	F2167	S2168	THR	THR
ARG	S1356	M1495	T1659	T1757	E1856	M1941	Q2039	A2169	LEU	Q2227	Q2227	THR	THR
ARG	S1356	M1495	T1659	T1757	E1856	M1941	Q2039	A2169	LEU	Q2227	Q2227	THR	THR
ARG	L1361	W1509	V1663	P1758	G1857	M1941	Q2039	A2169	LEU	Q2227	Q2227	THR	THR
ARG	L1361	W1509	V1663	P1758	G1857	M1941	Q2039	A2169	LEU	Q2227	Q2227	THR	THR
ARG	F1362	P1510	V1663	P1758	G1857	M1941	Q2039	A2169	LEU	Q2227	Q2227	THR	THR
ARG	F1362	P1510	V1663	P1758	G1857	M1941	Q2039	A2169	LEU	Q2227	Q2227	THR	THR
ARG	M1364	T1511	V1663	P1758	G1857	M1941	Q2039	A2169	LEU	Q2227	Q2227	THR	THR
ARG	M1364	T1511	V1663	P1758	G1857	M1941	Q2039	A2169	LEU	Q2227	Q2227	THR	THR
ARG	Y1368	V1517	V1663	P1758	G1857	M1941	Q2039	A2169	LEU	Q2227	Q2227	THR	THR
ARG	Y1368	V1517	V1663	P1758	G1857	M1941	Q2039	A2169	LEU	Q2227	Q2227	THR	THR
ARG	P1372	D1523	I1670	A1761	C1859	L1944	Y2042	L2104	LEU	C2105	A2106	THR	THR
ARG	P1372	D1523	I1670	A1761	C1859	L1944	Y2042	L2104	LEU	C2105	A2106	THR	THR
ARG	G1385	F1536	I1670	A1761	C1859	L1944	Y2042	L2104	LEU	C2105	A2106	THR	THR
ARG	G1385	F1536	I1670	A1761	C1859	L1944	Y2042	L2104	LEU	C2105	A2106	THR	THR
ARG	E1386	D1537	L1672	H1764	D1861	H1946	K2043	T2108	LEU	V2109	G2110	THR	THR
ARG	E1386	D1537	L1672	H1764	D1861	H1946	K2043	T2108	LEU	V2109	G2110	THR	THR
ARG	T1387	A1531	L1672	H1764	D1861	H1946	K2043	T2108	LEU	V2109	G2110	THR	THR
ARG	T1387	A1531	L1672	H1764	D1861	H1946	K2043	T2108	LEU	V2109	G2110	THR	THR
ARG	L1393	L1535	L1675	I1771	G1866	H1953	R2051	T2115	LEU	R2111	R2111	THR	THR
ARG	L1393	L1535	L1675	I1771	G1866	H1953	R2051	T2115	LEU	R2111	R2111	THR	THR
ARG	Y1396	F1536	L1675	I1771	G1866	H1953	R2051	T2115	LEU	R2111	R2111	THR	THR
ARG	Y1396	F1536	L1675	I1771	G1866	H1953	R2051	T2115	LEU	R2111	R2111	THR	THR
ARG	A1402	D1537	D1686	F1773	S1870	S1955	S2049	F2114	LEU	S2113	F2114	THR	THR
ARG	A1402	D1537	D1686	F1773	S1870	S1955	S2049	F2114	LEU	S2113	F2114	THR	THR
ARG	G1385	L1535	L1675	I1771	G1866	H1953	R2051	T2115	LEU	R2111	R2111	THR	THR
ARG	G1385	L1535	L1675	I1771	G1866	H1953	R2051	T2115	LEU	R2111	R2111	THR	THR
ARG	E1386	D1537	L1672	H1764	D1861	H1946	K2043	T2108	LEU	V2109	G2110	THR	THR
ARG	E1386	D1537	L1672	H1764	D1861	H1946	K2043	T2108	LEU	V2109	G2110	THR	THR
ARG	T1387	A1531	L1672	H1764	D1861	H1946	K2043	T2108	LEU	V2109	G2110	THR	THR
ARG	T1387	A1531	L1672	H1764	D1861	H1946	K2043	T2108	LEU	V2109	G2110	THR	THR
ARG	L1393	L1535	L1675	I1771	G1866	H1953	R2051	T2115	LEU	R2111	R2111	THR	THR
ARG	L1393	L1535	L1675	I1771	G1866	H1953	R2051	T2115	LEU	R2111	R2111	THR	THR
ARG	Y1396	F1536	L1675	I1771	G1866	H1953	R2051	T2115	LEU	R2111	R2111	THR	THR
ARG	Y1396	F1536	L1675	I1771	G1866	H1953	R2051	T2115	LEU	R2111	R2111	THR	THR
ARG	A1402	D1537	D1686	F1773	S1870	S1955	S2049	F2114	LEU	S2113	F2114	THR	THR
ARG	A1402	D1537	D1686	F1773	S1870	S1955	S2049	F2114	LEU	S2113	F2114	THR	THR
ARG	G1385	L1535	L1675	I1771	G1866	H1953	R2051	T2115	LEU	R2111	R2111	THR	THR
ARG	G1385	L1535	L1675	I1771	G1866	H1953	R2051	T2115	LEU	R2111	R2111	THR	THR
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ARG	T1387	A1531	L1672	H1764	D1861	H1946	K2043	T2108	LEU	V2109	G2110	THR	THR
ARG	T1387	A1531	L1672	H1764	D1861	H1946	K2043	T2108	LEU	V2109	G2110	THR	THR
ARG	L1393	L1535	L1675	I1771	G1866	H1953	R2051	T2115	LEU	R2111	R2111	THR	THR
ARG	L1393	L1535	L1675	I1771	G1866	H1953	R2051	T2115	LEU	R2111	R2111	THR	THR
ARG	Y1396	F1536	L1675	I1771	G1866	H1953	R2051	T2115	LEU	R2111	R2111	THR	THR
ARG	Y1396	F1536	L1675	I1771	G1866	H1953	R2051	T2115	LEU	R2111	R2111	THR	THR
ARG	A1402	D1537	D1686	F1773	S1870	S1955	S2049	F2114	LEU	S2113	F2114	THR	THR
ARG	A1402	D1537	D1686	F1773	S1870	S1955	S2049	F2114	LEU	S2113	F2114	THR	THR
ARG	G1385	L1535	L1675	I1771	G1866	H1953	R2051	T2115	LEU	R2111	R2111	THR	THR
ARG	G1385	L1535	L1675	I1771	G1866	H1953	R2051	T2115	LEU	R2111	R2111	THR	THR
ARG	E1386	D1537	L1672	H1764	D1861	H1946	K2043	T2108	LEU	V2109	G2110	THR	THR
ARG	E1386	D1537	L1672	H1764	D1861	H1946	K2043	T2108	LEU	V2109	G2110	THR	THR
ARG	T1387	A1531	L1672	H1764	D1861	H1946	K2043	T2108	LEU	V2109	G2110	THR	THR
ARG	T1387	A1531	L1672	H1764	D1861	H1946	K2043	T2108	LEU	V2109	G2110	THR	THR
ARG	L1393	L1535	L1675	I1771	G1866	H1953	R2051	T2115	LEU	R2111	R2111	THR	THR
ARG	L1393	L1535	L1675	I1771	G1866	H1953	R2051	T2115	LEU	R2111	R2111	THR	THR
ARG	Y1396	F1536	L1675	I1771	G1866	H1953	R2051	T2115	LEU	R2111	R2111	THR	THR
ARG	Y1396	F1536											

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

Chain B:  100%

MAG1  
MAG2

- Molecule 3: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain C:  33% 67%

MAG1  
MAG2  
BMA3

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	128789	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	80	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	0.137	Depositor
Minimum map value	-0.096	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.003	Depositor
Recommended contour level	0.0145	Depositor
Map size ( $\text{\AA}$ )	280.0, 280.0, 280.0	wwPDB
Map dimensions	280, 280, 280	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.0, 1.0, 1.0	Depositor



## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: 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	0.69	0/17415	0.87	7/23648 (0.0%)

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	20

There are no bond length outliers.

The worst 5 of 7 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
1	A	656	ASP	CB-CA-C	-8.75	92.90	110.40
1	A	1425	GLY	N-CA-C	-8.25	92.48	113.10
1	A	1037	HIS	C-N-CD	-6.15	107.07	120.60
1	A	1914	PHE	CB-CA-C	6.07	122.53	110.40
1	A	1423	GLN	N-CA-C	-5.92	95.00	111.00

There are no chirality outliers.

5 of 20 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	310	SER	Peptide
1	A	505	GLU	Peptide
1	A	813	THR	Peptide
1	A	823	ARG	Peptide
1	A	854	SER	Peptide

## 5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	17025	0	16238	323	0
2	B	28	0	25	0	0
3	C	39	0	34	0	0
4	A	42	0	37	8	0
All	All	17134	0	16334	323	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 323 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:A:1239:ARG:NH2	1:A:1424:ALA:HB2	1.59	1.17
1:A:718:ARG:HB3	1:A:732:ALA:HB1	1.28	1.13
1:A:1239:ARG:HH22	1:A:1424:ALA:CB	1.71	1.02
1:A:1663:VAL:HG13	1:A:1670:ILE:HG23	1.44	1.00
1:A:718:ARG:HB3	1:A:732:ALA:CB	1.93	0.98

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	2200/2499 (88%)	2044 (93%)	151 (7%)	5 (0%)	47 80

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	263	ASN
1	A	657	ALA
1	A	719	ASP
1	A	1038	PRO
1	A	775	CYS

### 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	1904/2142 (89%)	1891 (99%)	13 (1%)	<a href="#">84</a> <a href="#">93</a>

5 of 13 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1279	CYS
1	A	1423	GLN
1	A	2083	VAL
1	A	1427	ASP
1	A	1902	CYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 24 such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1329	HIS
1	A	1708	ASN
1	A	1567	ASN
1	A	1887	HIS
1	A	839	GLN

### 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](#)

5 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
2	NAG	B	1	2,1	14,14,15	0.37	0	17,19,21	0.71	0
2	NAG	B	2	2	14,14,15	0.34	0	17,19,21	0.78	0
3	NAG	C	1	3,1	14,14,15	0.29	0	17,19,21	1.00	1 (5%)
3	NAG	C	2	3	14,14,15	0.31	0	17,19,21	1.05	2 (11%)
3	BMA	C	3	3	11,11,12	0.40	0	15,15,17	0.75	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
2	NAG	B	1	2,1	-	0/6/23/26	0/1/1/1
2	NAG	B	2	2	-	0/6/23/26	0/1/1/1
3	NAG	C	1	3,1	-	4/6/23/26	0/1/1/1
3	NAG	C	2	3	-	2/6/23/26	0/1/1/1
3	BMA	C	3	3	-	0/2/19/22	0/1/1/1

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	2	NAG	C8-C7-N2	2.27	119.95	116.10
3	C	1	NAG	C8-C7-N2	2.25	119.90	116.10
3	C	2	NAG	C2-N2-C7	2.23	126.08	122.90

There are no chirality outliers.

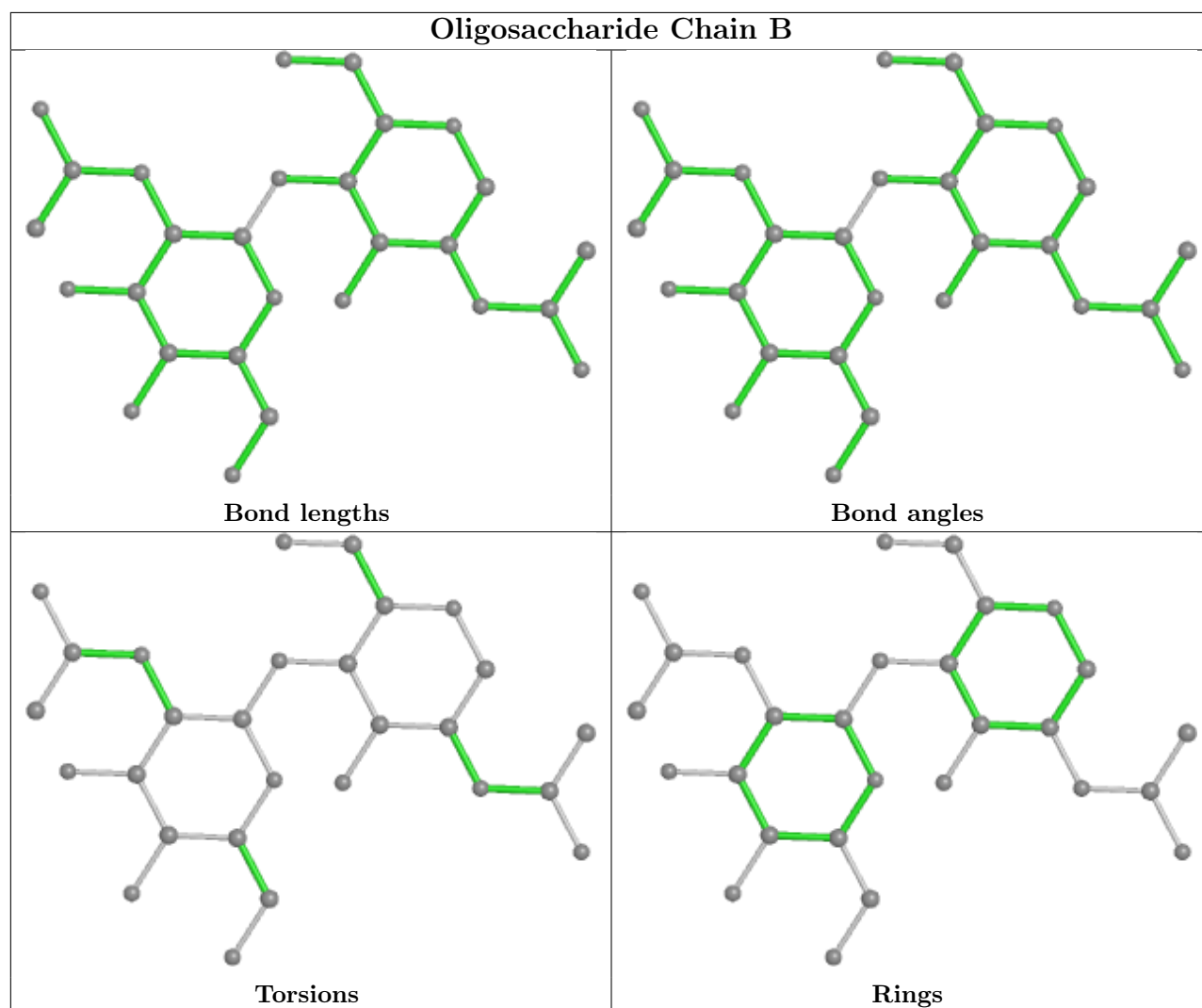
5 of 6 torsion outliers are listed below:

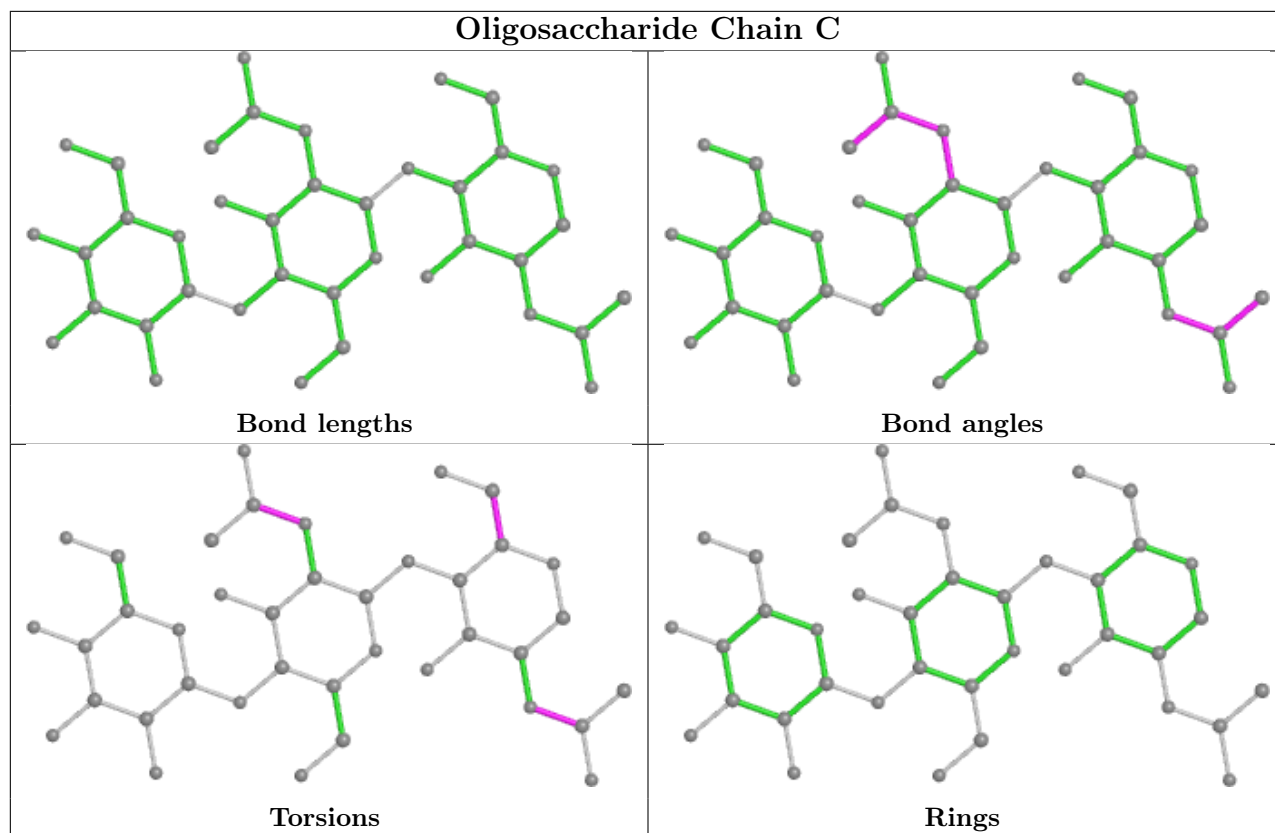
Mol	Chain	Res	Type	Atoms
3	C	1	NAG	O5-C5-C6-O6
3	C	1	NAG	C4-C5-C6-O6
3	C	1	NAG	C8-C7-N2-C2
3	C	1	NAG	O7-C7-N2-C2
3	C	2	NAG	C8-C7-N2-C2

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.





## 5.6 Ligand geometry [i](#)

3 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	$\# Z  > 2$
4	NAG	A	2501	1	14,14,15	0.55	0	17,19,21	0.95	1 (5%)
4	NAG	A	2508	-	14,14,15	0.41	0	17,19,21	1.24	2 (11%)
4	NAG	A	2507	1	14,14,15	0.44	0	17,19,21	1.27	3 (17%)

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	A	2501	1	-	0/6/23/26	0/1/1/1
4	NAG	A	2508	-	-	3/6/23/26	0/1/1/1
4	NAG	A	2507	1	-	3/6/23/26	0/1/1/1

There are no bond length outliers.

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	2507	NAG	C1-O5-C5	3.03	116.30	112.19
4	A	2508	NAG	O5-C5-C6	2.75	111.51	107.20
4	A	2508	NAG	C4-C3-C2	-2.44	107.44	111.02
4	A	2507	NAG	O5-C1-C2	-2.38	107.53	111.29
4	A	2507	NAG	C2-N2-C7	2.35	126.25	122.90

There are no chirality outliers.

5 of 6 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	2507	NAG	O5-C5-C6-O6
4	A	2507	NAG	C4-C5-C6-O6
4	A	2508	NAG	C1-C2-N2-C7
4	A	2508	NAG	O5-C5-C6-O6
4	A	2508	NAG	C4-C5-C6-O6

There are no ring outliers.

1 monomer is involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	2508	NAG	8	0

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

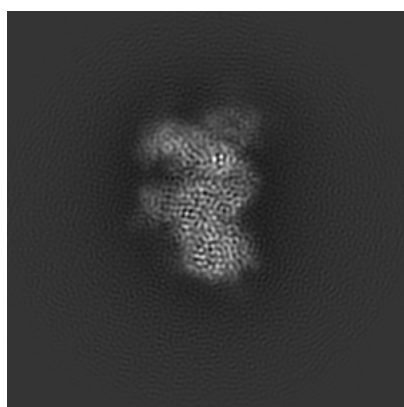
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-20815. These allow visual inspection of the internal detail of the map and identification of artifacts.

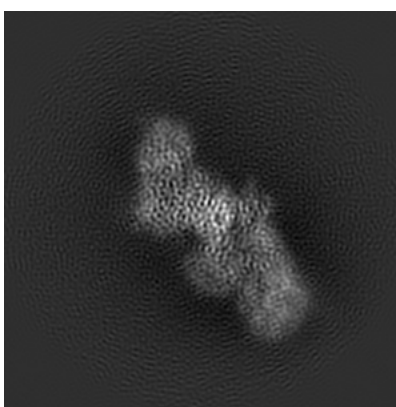
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections [i](#)

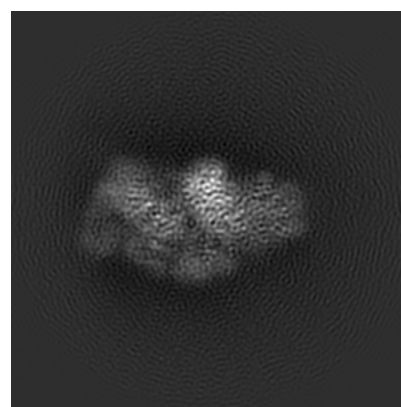
#### 6.1.1 Primary map



X



Y

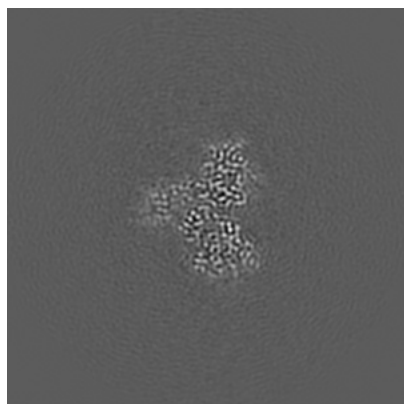


Z

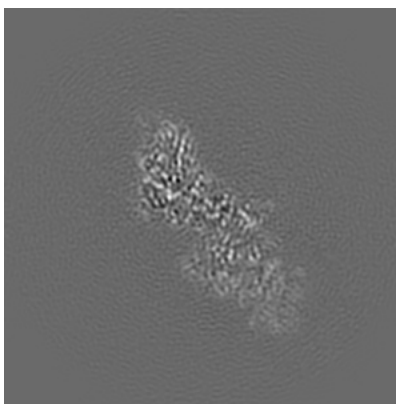
The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

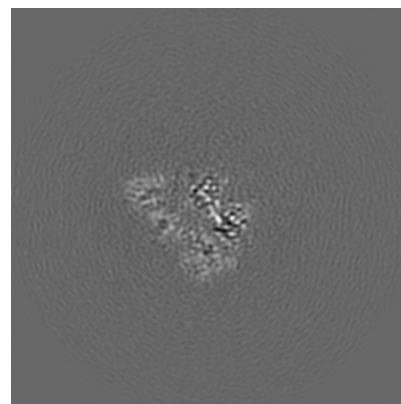
#### 6.2.1 Primary map



X Index: 140



Y Index: 140



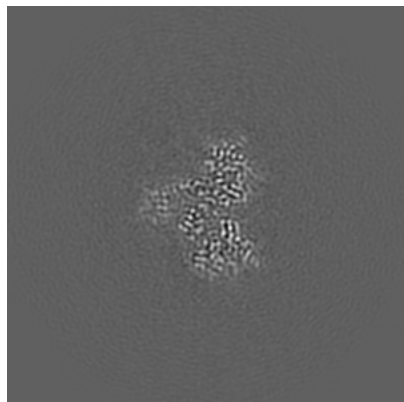
Z Index: 140



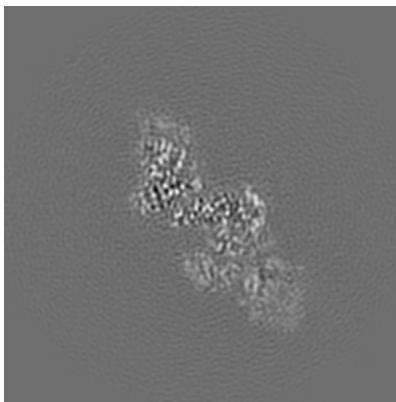
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

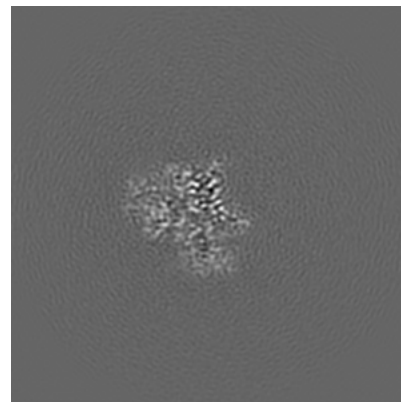
### 6.3.1 Primary map



X Index: 141



Y Index: 145

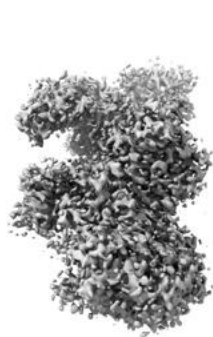


Z Index: 149

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 0.0145. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

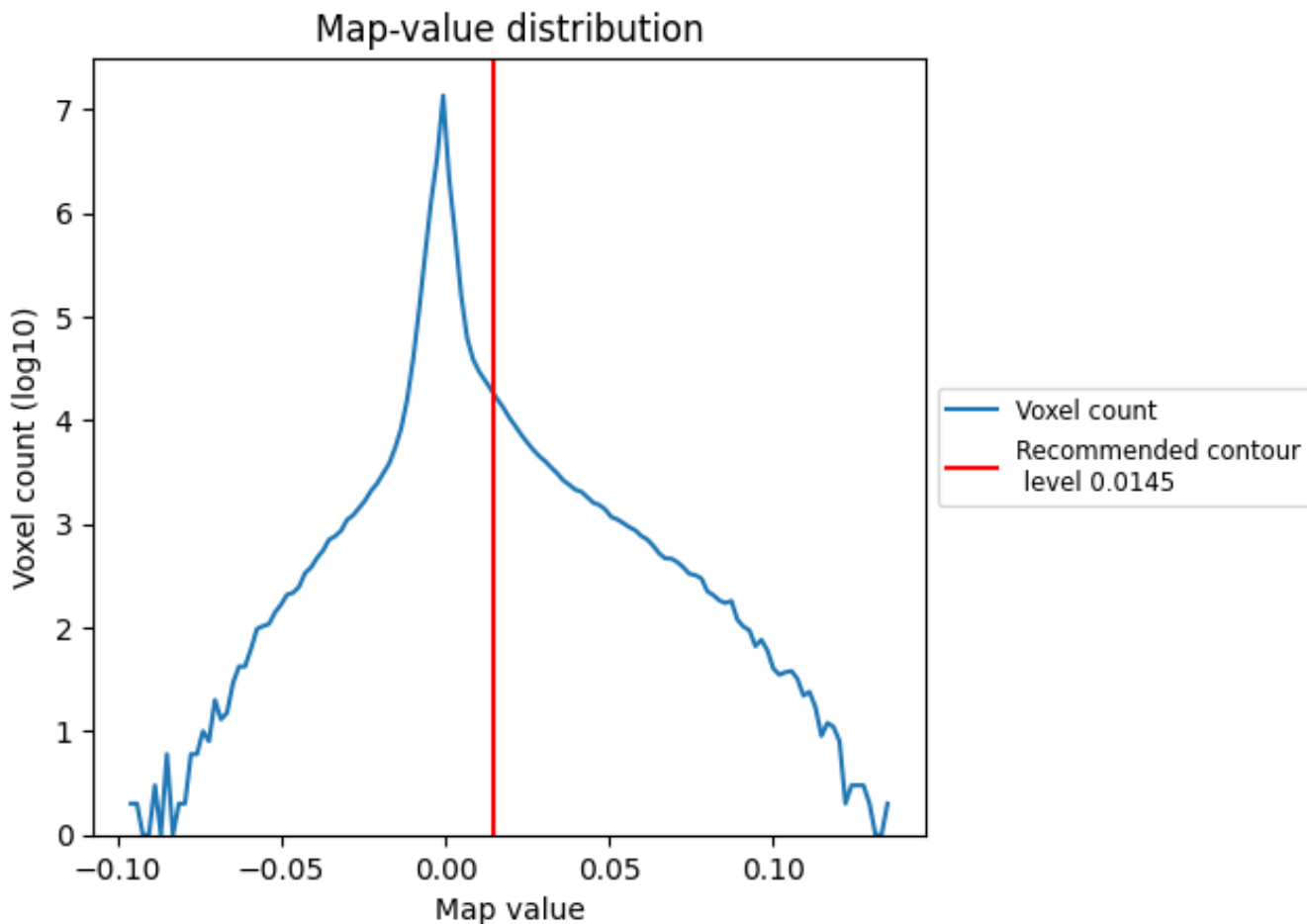
## 6.5 Mask visualisation

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

## 7 Map analysis [i](#)

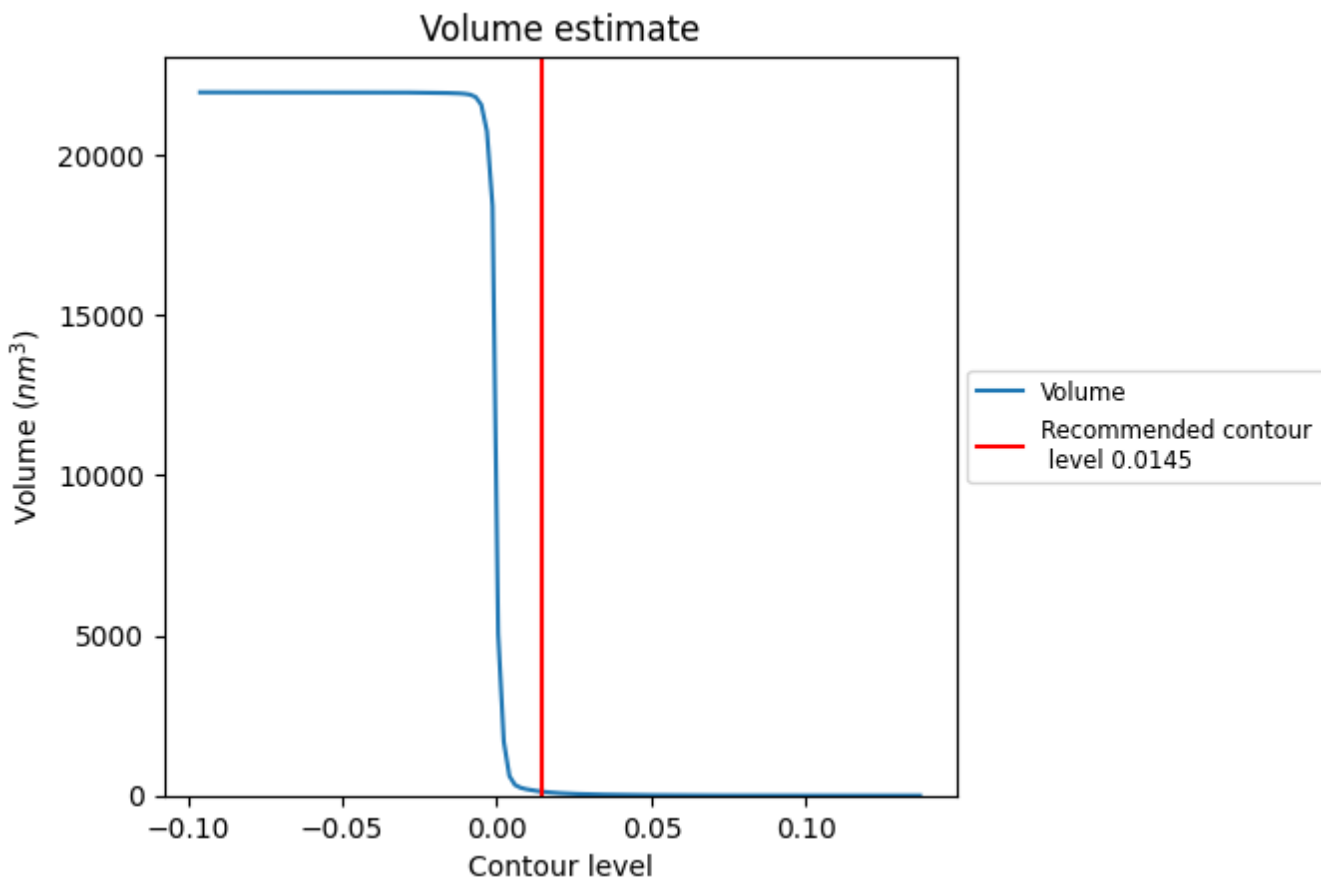
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution [i](#)



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

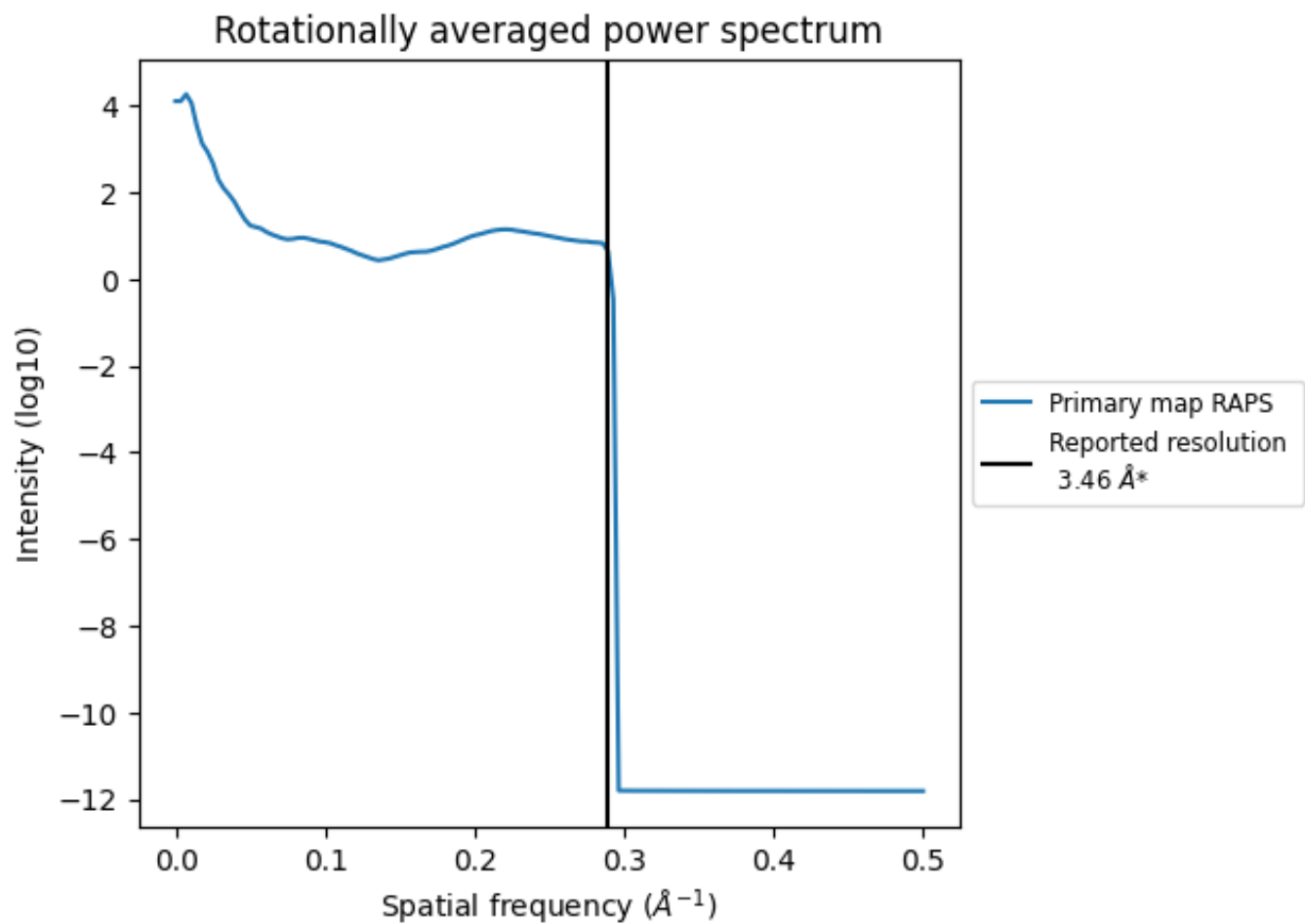
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 124 nm<sup>3</sup>; this corresponds to an approximate mass of 112 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 0.289 Å<sup>-1</sup>

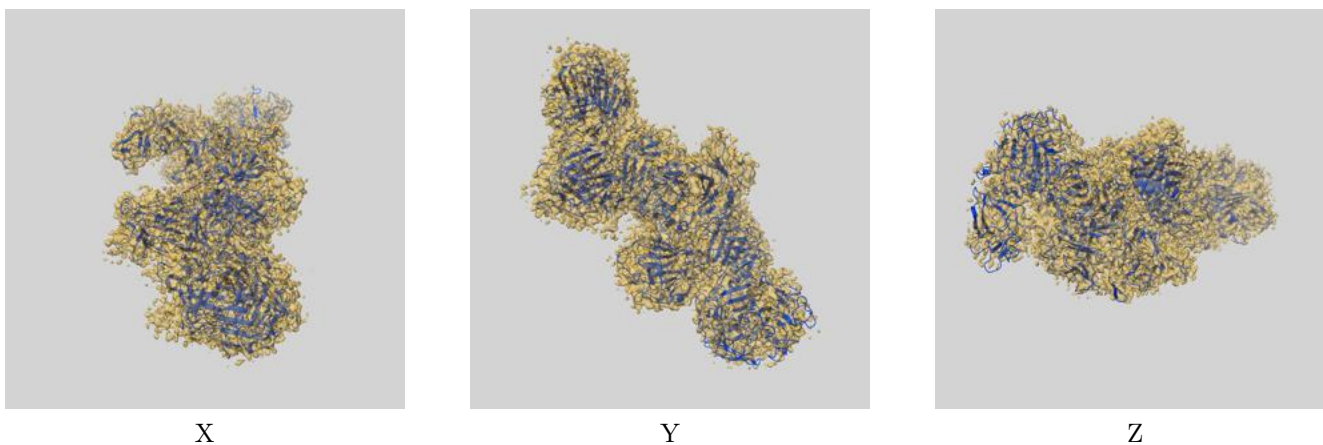
## 8 Fourier-Shell correlation

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

## 9 Map-model fit [i](#)

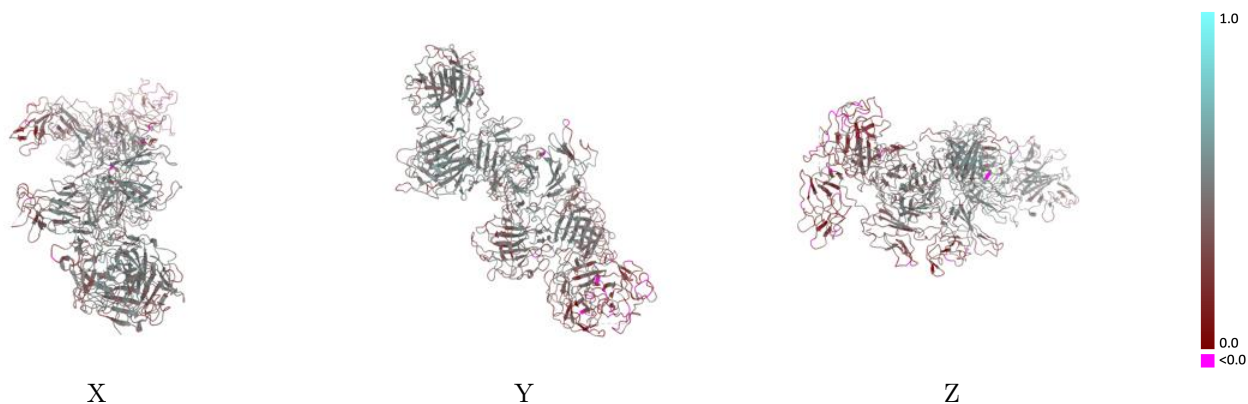
This section contains information regarding the fit between EMDB map EMD-20815 and PDB model 6UM1. Per-residue inclusion information can be found in section 3 on page 5.

### 9.1 Map-model overlay [i](#)



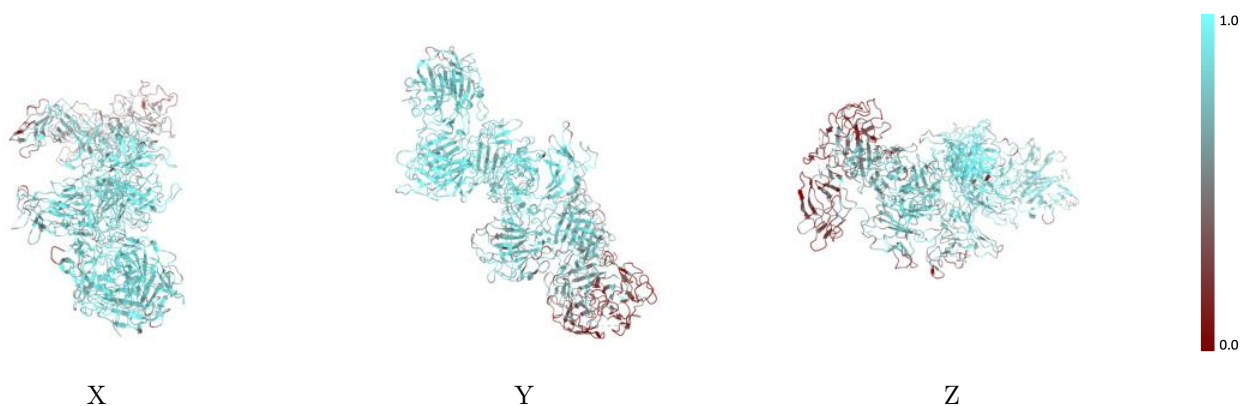
The images above show the 3D surface view of the map at the recommended contour level 0.0145 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



The images above show the model with each residue coloured according to 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.

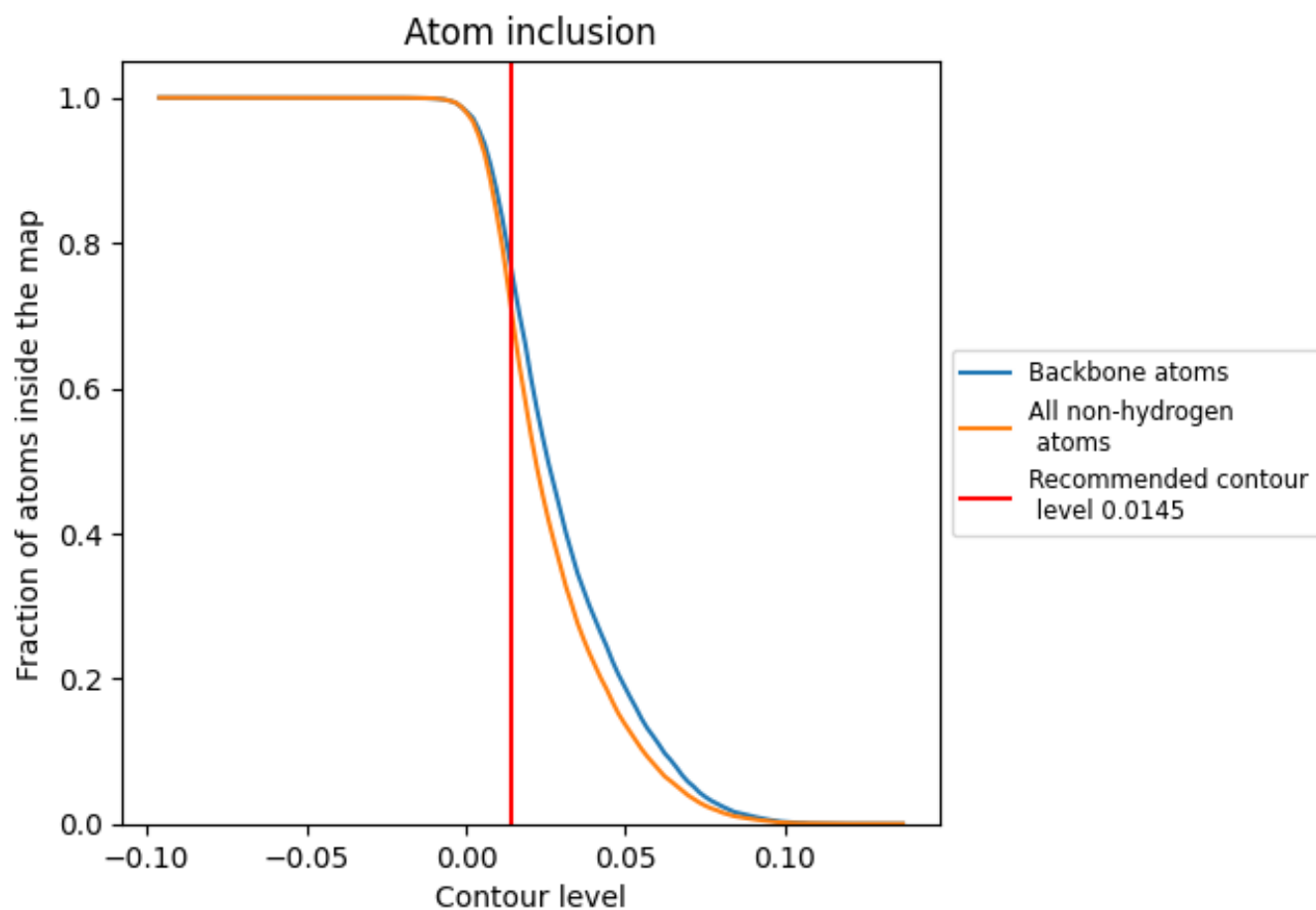
## 9.3 Atom inclusion mapped to coordinate model [i](#)



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 (0.0145).








## 9.4 Atom inclusion [i](#)



At the recommended contour level, 76% of all backbone atoms, 70% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary [i](#)

The table lists the average atom inclusion at the recommended contour level (0.0145) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6992	 0.4010
A	 0.6997	 0.4010
B	 0.5714	 0.3220
C	 0.5897	 0.3430

