



wwPDB EM Validation Summary Report ⓘ

Apr 19, 2023 – 07:31 am BST

PDB ID : 8AVC
EMDB ID : EMD-15678
Title : Mouse leptin:LEP-R complex cryoEM structure (3:3 model)
Authors : Verstraete, K.; Savvides, S.N.; Verschueren, K.G.; Tsigotaki, A.
Deposited on : 2022-08-26
Resolution : 4.60 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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

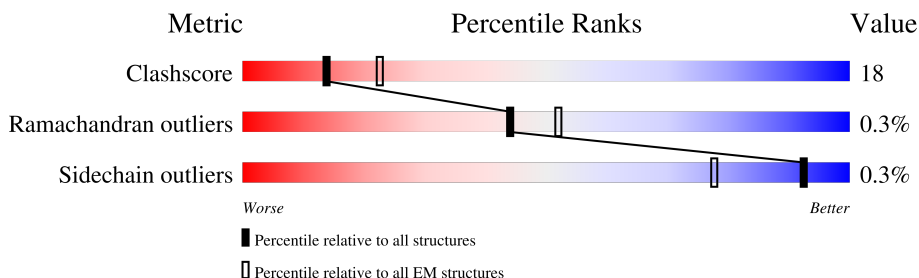
EMDB validation analysis : 0.0.1.dev50
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.32.2

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 4.60 Å.

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



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

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 $\leq 5\%$. 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	174	
1	C	174	
1	E	174	
2	B	868	
2	D	868	
2	F	868	

2 Entry composition i

There are 3 unique types of molecules in this entry. The entry contains 17505 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 Leptin.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	140	1077	676	182	216	3	0	0
1	C	140	1077	676	182	216	3	0	0
1	E	140	1077	676	182	216	3	0	0

There are 84 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-6	MET	-	initiating methionine	UNP P41160
A	-5	GLY	-	expression tag	UNP P41160
A	-4	SER	-	expression tag	UNP P41160
A	-3	SER	-	expression tag	UNP P41160
A	-2	HIS	-	expression tag	UNP P41160
A	-1	HIS	-	expression tag	UNP P41160
A	0	HIS	-	expression tag	UNP P41160
A	1	HIS	-	expression tag	UNP P41160
A	2	HIS	-	expression tag	UNP P41160
A	3	HIS	-	expression tag	UNP P41160
A	4	PRO	-	expression tag	UNP P41160
A	5	GLY	-	expression tag	UNP P41160
A	6	GLY	-	expression tag	UNP P41160
A	7	PRO	-	expression tag	UNP P41160
A	8	GLY	-	expression tag	UNP P41160
A	9	SER	-	expression tag	UNP P41160
A	10	GLU	-	expression tag	UNP P41160
A	11	ASN	-	expression tag	UNP P41160
A	12	LEU	-	expression tag	UNP P41160
A	13	TYR	-	expression tag	UNP P41160
A	14	PHE	-	expression tag	UNP P41160
A	15	GLN	-	expression tag	UNP P41160
A	16	GLY	-	expression tag	UNP P41160
A	17	GLY	-	expression tag	UNP P41160

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Chain	Residue	Modelled	Actual	Comment	Reference
A	18	SER	-	expression tag	UNP P41160
A	19	THR	-	expression tag	UNP P41160
A	20	GLY	-	expression tag	UNP P41160
A	21	GLY	ALA	conflict	UNP P41160
C	-6	MET	-	initiating methionine	UNP P41160
C	-5	GLY	-	expression tag	UNP P41160
C	-4	SER	-	expression tag	UNP P41160
C	-3	SER	-	expression tag	UNP P41160
C	-2	HIS	-	expression tag	UNP P41160
C	-1	HIS	-	expression tag	UNP P41160
C	0	HIS	-	expression tag	UNP P41160
C	1	HIS	-	expression tag	UNP P41160
C	2	HIS	-	expression tag	UNP P41160
C	3	HIS	-	expression tag	UNP P41160
C	4	PRO	-	expression tag	UNP P41160
C	5	GLY	-	expression tag	UNP P41160
C	6	GLY	-	expression tag	UNP P41160
C	7	PRO	-	expression tag	UNP P41160
C	8	GLY	-	expression tag	UNP P41160
C	9	SER	-	expression tag	UNP P41160
C	10	GLU	-	expression tag	UNP P41160
C	11	ASN	-	expression tag	UNP P41160
C	12	LEU	-	expression tag	UNP P41160
C	13	TYR	-	expression tag	UNP P41160
C	14	PHE	-	expression tag	UNP P41160
C	15	GLN	-	expression tag	UNP P41160
C	16	GLY	-	expression tag	UNP P41160
C	17	GLY	-	expression tag	UNP P41160
C	18	SER	-	expression tag	UNP P41160
C	19	THR	-	expression tag	UNP P41160
C	20	GLY	-	expression tag	UNP P41160
C	21	GLY	ALA	conflict	UNP P41160
E	-6	MET	-	initiating methionine	UNP P41160
E	-5	GLY	-	expression tag	UNP P41160
E	-4	SER	-	expression tag	UNP P41160
E	-3	SER	-	expression tag	UNP P41160
E	-2	HIS	-	expression tag	UNP P41160
E	-1	HIS	-	expression tag	UNP P41160
E	0	HIS	-	expression tag	UNP P41160
E	1	HIS	-	expression tag	UNP P41160
E	2	HIS	-	expression tag	UNP P41160
E	3	HIS	-	expression tag	UNP P41160

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Chain	Residue	Modelled	Actual	Comment	Reference
E	4	PRO	-	expression tag	UNP P41160
E	5	GLY	-	expression tag	UNP P41160
E	6	GLY	-	expression tag	UNP P41160
E	7	PRO	-	expression tag	UNP P41160
E	8	GLY	-	expression tag	UNP P41160
E	9	SER	-	expression tag	UNP P41160
E	10	GLU	-	expression tag	UNP P41160
E	11	ASN	-	expression tag	UNP P41160
E	12	LEU	-	expression tag	UNP P41160
E	13	TYR	-	expression tag	UNP P41160
E	14	PHE	-	expression tag	UNP P41160
E	15	GLN	-	expression tag	UNP P41160
E	16	GLY	-	expression tag	UNP P41160
E	17	GLY	-	expression tag	UNP P41160
E	18	SER	-	expression tag	UNP P41160
E	19	THR	-	expression tag	UNP P41160
E	20	GLY	-	expression tag	UNP P41160
E	21	GLY	ALA	conflict	UNP P41160

- Molecule 2 is a protein called Leptin receptor.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	593	Total	C	N	O	S	0	0
			4757	3057	798	878	24		
2	D	593	Total	C	N	O	S	0	0
			4757	3057	798	878	24		
2	F	593	Total	C	N	O	S	0	0
			4757	3057	798	878	24		

There are 150 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	840	SER	-	expression tag	UNP P48356
B	841	THR	-	expression tag	UNP P48356
B	842	GLY	-	expression tag	UNP P48356
B	843	GLY	-	expression tag	UNP P48356
B	844	SER	-	expression tag	UNP P48356
B	845	GLY	-	expression tag	UNP P48356
B	846	GLY	-	expression tag	UNP P48356
B	847	SER	-	expression tag	UNP P48356
B	848	GLY	-	expression tag	UNP P48356
B	849	GLY	-	expression tag	UNP P48356

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Chain	Residue	Modelled	Actual	Comment	Reference
B	850	SER	-	expression tag	UNP P48356
B	851	GLY	-	expression tag	UNP P48356
B	852	GLY	-	expression tag	UNP P48356
B	853	SER	-	expression tag	UNP P48356
B	854	GLY	-	expression tag	UNP P48356
B	855	GLY	-	expression tag	UNP P48356
B	856	SER	-	expression tag	UNP P48356
B	857	ARG	-	expression tag	UNP P48356
B	858	MET	-	expression tag	UNP P48356
B	859	LYS	-	expression tag	UNP P48356
B	860	GLN	-	expression tag	UNP P48356
B	861	ILE	-	expression tag	UNP P48356
B	862	GLU	-	expression tag	UNP P48356
B	863	ASP	-	expression tag	UNP P48356
B	864	LYS	-	expression tag	UNP P48356
B	865	ILE	-	expression tag	UNP P48356
B	866	GLU	-	expression tag	UNP P48356
B	867	GLU	-	expression tag	UNP P48356
B	868	ILE	-	expression tag	UNP P48356
B	869	LEU	-	expression tag	UNP P48356
B	870	SER	-	expression tag	UNP P48356
B	871	LYS	-	expression tag	UNP P48356
B	872	ILE	-	expression tag	UNP P48356
B	873	TYR	-	expression tag	UNP P48356
B	874	HIS	-	expression tag	UNP P48356
B	875	ILE	-	expression tag	UNP P48356
B	876	GLU	-	expression tag	UNP P48356
B	877	ASN	-	expression tag	UNP P48356
B	878	GLU	-	expression tag	UNP P48356
B	879	ILE	-	expression tag	UNP P48356
B	880	ALA	-	expression tag	UNP P48356
B	881	ARG	-	expression tag	UNP P48356
B	882	ILE	-	expression tag	UNP P48356
B	883	LYS	-	expression tag	UNP P48356
B	884	LYS	-	expression tag	UNP P48356
B	885	LEU	-	expression tag	UNP P48356
B	886	ILE	-	expression tag	UNP P48356
B	887	GLY	-	expression tag	UNP P48356
B	888	GLU	-	expression tag	UNP P48356
B	889	ARG	-	expression tag	UNP P48356
D	840	SER	-	expression tag	UNP P48356
D	841	THR	-	expression tag	UNP P48356

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Chain	Residue	Modelled	Actual	Comment	Reference
D	842	GLY	-	expression tag	UNP P48356
D	843	GLY	-	expression tag	UNP P48356
D	844	SER	-	expression tag	UNP P48356
D	845	GLY	-	expression tag	UNP P48356
D	846	GLY	-	expression tag	UNP P48356
D	847	SER	-	expression tag	UNP P48356
D	848	GLY	-	expression tag	UNP P48356
D	849	GLY	-	expression tag	UNP P48356
D	850	SER	-	expression tag	UNP P48356
D	851	GLY	-	expression tag	UNP P48356
D	852	GLY	-	expression tag	UNP P48356
D	853	SER	-	expression tag	UNP P48356
D	854	GLY	-	expression tag	UNP P48356
D	855	GLY	-	expression tag	UNP P48356
D	856	SER	-	expression tag	UNP P48356
D	857	ARG	-	expression tag	UNP P48356
D	858	MET	-	expression tag	UNP P48356
D	859	LYS	-	expression tag	UNP P48356
D	860	GLN	-	expression tag	UNP P48356
D	861	ILE	-	expression tag	UNP P48356
D	862	GLU	-	expression tag	UNP P48356
D	863	ASP	-	expression tag	UNP P48356
D	864	LYS	-	expression tag	UNP P48356
D	865	ILE	-	expression tag	UNP P48356
D	866	GLU	-	expression tag	UNP P48356
D	867	GLU	-	expression tag	UNP P48356
D	868	ILE	-	expression tag	UNP P48356
D	869	LEU	-	expression tag	UNP P48356
D	870	SER	-	expression tag	UNP P48356
D	871	LYS	-	expression tag	UNP P48356
D	872	ILE	-	expression tag	UNP P48356
D	873	TYR	-	expression tag	UNP P48356
D	874	HIS	-	expression tag	UNP P48356
D	875	ILE	-	expression tag	UNP P48356
D	876	GLU	-	expression tag	UNP P48356
D	877	ASN	-	expression tag	UNP P48356
D	878	GLU	-	expression tag	UNP P48356
D	879	ILE	-	expression tag	UNP P48356
D	880	ALA	-	expression tag	UNP P48356
D	881	ARG	-	expression tag	UNP P48356
D	882	ILE	-	expression tag	UNP P48356
D	883	LYS	-	expression tag	UNP P48356

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Chain	Residue	Modelled	Actual	Comment	Reference
D	884	LYS	-	expression tag	UNP P48356
D	885	LEU	-	expression tag	UNP P48356
D	886	ILE	-	expression tag	UNP P48356
D	887	GLY	-	expression tag	UNP P48356
D	888	GLU	-	expression tag	UNP P48356
D	889	ARG	-	expression tag	UNP P48356
F	840	SER	-	expression tag	UNP P48356
F	841	THR	-	expression tag	UNP P48356
F	842	GLY	-	expression tag	UNP P48356
F	843	GLY	-	expression tag	UNP P48356
F	844	SER	-	expression tag	UNP P48356
F	845	GLY	-	expression tag	UNP P48356
F	846	GLY	-	expression tag	UNP P48356
F	847	SER	-	expression tag	UNP P48356
F	848	GLY	-	expression tag	UNP P48356
F	849	GLY	-	expression tag	UNP P48356
F	850	SER	-	expression tag	UNP P48356
F	851	GLY	-	expression tag	UNP P48356
F	852	GLY	-	expression tag	UNP P48356
F	853	SER	-	expression tag	UNP P48356
F	854	GLY	-	expression tag	UNP P48356
F	855	GLY	-	expression tag	UNP P48356
F	856	SER	-	expression tag	UNP P48356
F	857	ARG	-	expression tag	UNP P48356
F	858	MET	-	expression tag	UNP P48356
F	859	LYS	-	expression tag	UNP P48356
F	860	GLN	-	expression tag	UNP P48356
F	861	ILE	-	expression tag	UNP P48356
F	862	GLU	-	expression tag	UNP P48356
F	863	ASP	-	expression tag	UNP P48356
F	864	LYS	-	expression tag	UNP P48356
F	865	ILE	-	expression tag	UNP P48356
F	866	GLU	-	expression tag	UNP P48356
F	867	GLU	-	expression tag	UNP P48356
F	868	ILE	-	expression tag	UNP P48356
F	869	LEU	-	expression tag	UNP P48356
F	870	SER	-	expression tag	UNP P48356
F	871	LYS	-	expression tag	UNP P48356
F	872	ILE	-	expression tag	UNP P48356
F	873	TYR	-	expression tag	UNP P48356
F	874	HIS	-	expression tag	UNP P48356
F	875	ILE	-	expression tag	UNP P48356

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Chain	Residue	Modelled	Actual	Comment	Reference
F	876	GLU	-	expression tag	UNP P48356
F	877	ASN	-	expression tag	UNP P48356
F	878	GLU	-	expression tag	UNP P48356
F	879	ILE	-	expression tag	UNP P48356
F	880	ALA	-	expression tag	UNP P48356
F	881	ARG	-	expression tag	UNP P48356
F	882	ILE	-	expression tag	UNP P48356
F	883	LYS	-	expression tag	UNP P48356
F	884	LYS	-	expression tag	UNP P48356
F	885	LEU	-	expression tag	UNP P48356
F	886	ILE	-	expression tag	UNP P48356
F	887	GLY	-	expression tag	UNP P48356
F	888	GLU	-	expression tag	UNP P48356
F	889	ARG	-	expression tag	UNP P48356

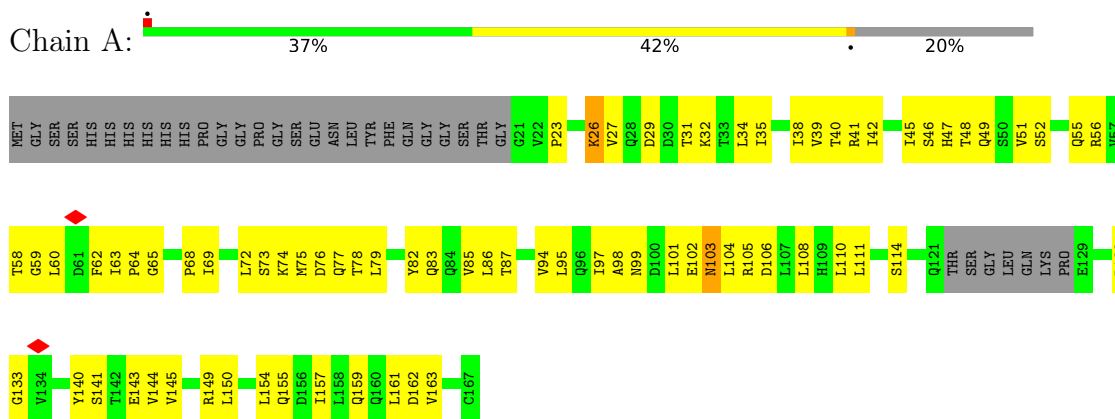
- Molecule 3 is NICKEL (II) ION (three-letter code: NI) (formula: Ni).

Mol	Chain	Residues	Atoms	AltConf
3	B	1	Total Ni 1 1	0
3	D	1	Total Ni 1 1	0
3	F	1	Total Ni 1 1	0

3 Residue-property plots [i](#)

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

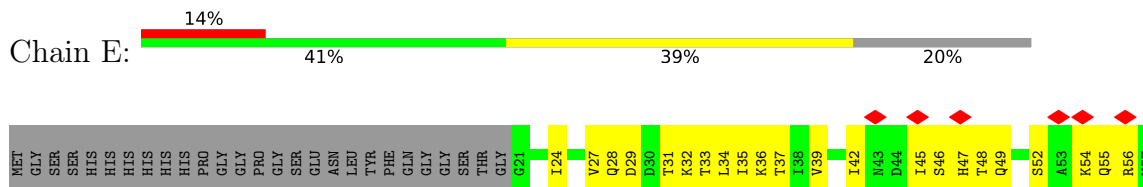
- Molecule 1: Leptin

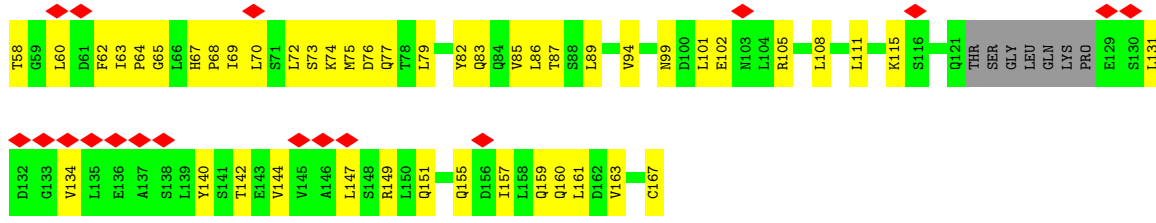


- Molecule 1: Leptin

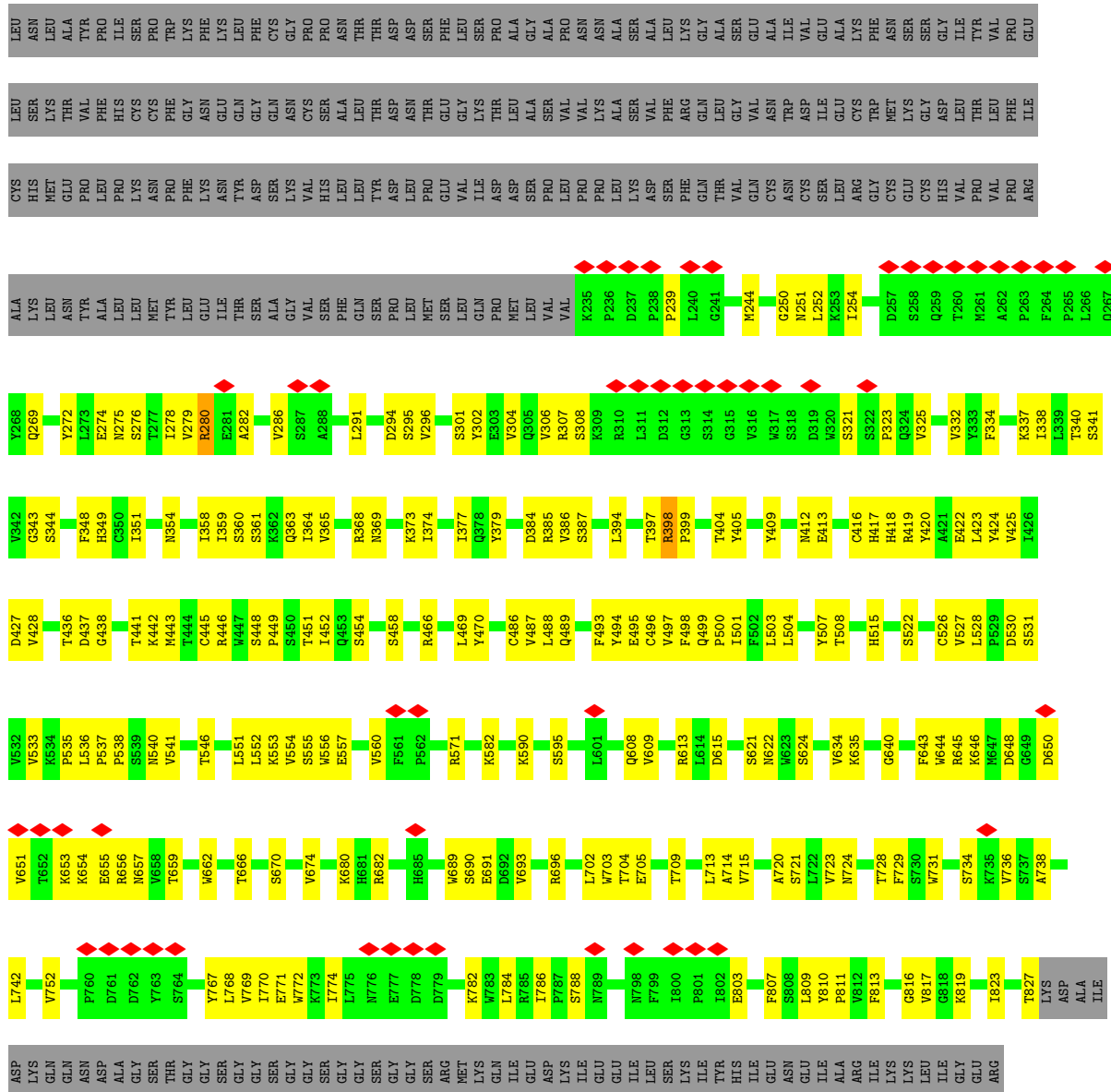
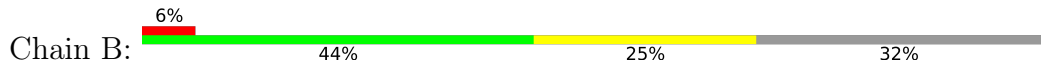


- Molecule 1: Leptin

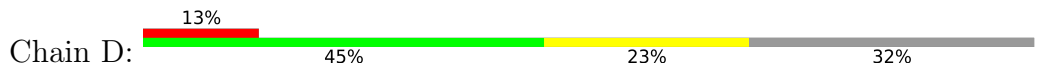


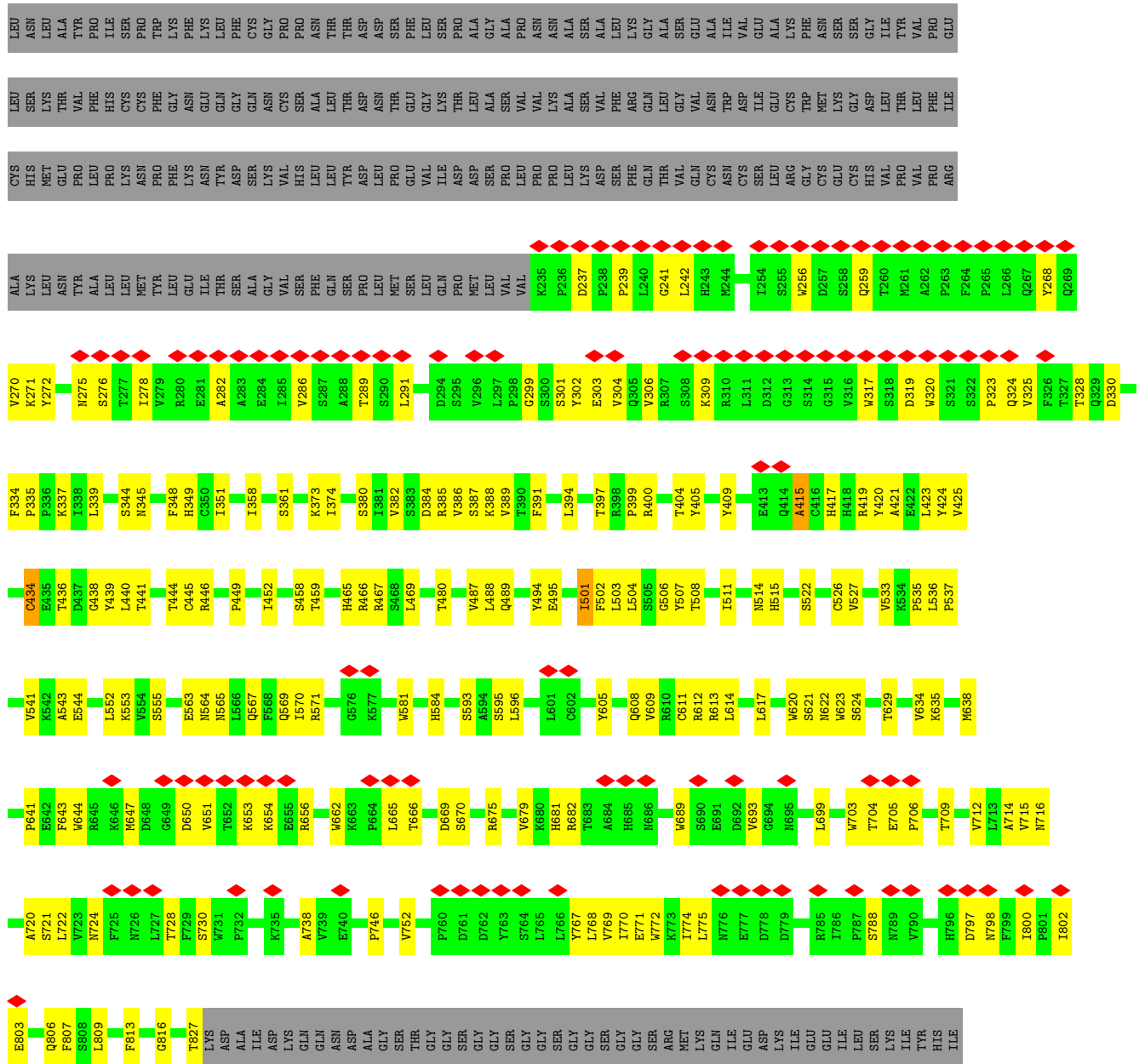


• Molecule 2: Leptin receptor

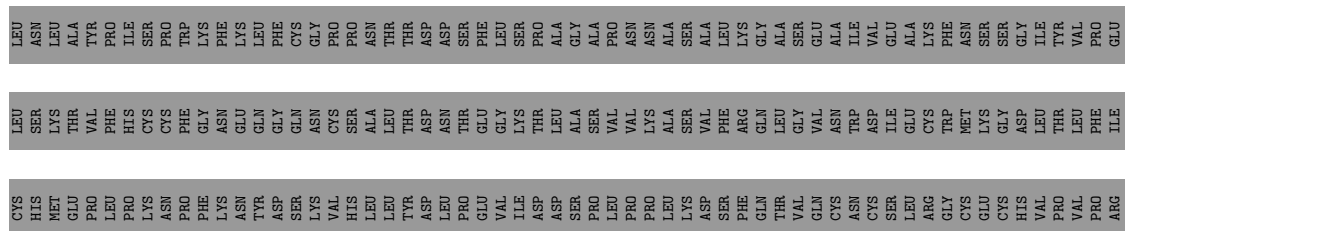


• Molecule 2: Leptin receptor





● Molecule 2: Leptin receptor



ALA	LYS	GLN	ILE	GLU	ASP	ASP	LYS	LYS	GLY	ILE	THR	SER	SER	ALA	ALA	GLY	VAL	VAL	SER	PHE	GLN	SER	PRO	LEU	MET	SER	LEU	GLN	PRO	MET	LEU	VAL	VAL	K235	P236	D237	P238	P239	L240	H243	M244	E245	V246	T247	D248	D249	G250	N251	L254	D257	S258	Q259	T260	M261	A262	P263	F264	P265	L266	Q267	V270	K271	Y272	L273	E274	N275	S276	I277	I278	E281	A282	A283	E284	I285	V286	S287	A288	T289	S290	L291	L292	V293	S295	V296	S380	L297	P298	S301	V304	Q305	V306	F307	S308	K309	R310	L311	D312	G313	S314	G315	V316	W317	S318	D319	W320	S321	S322	P323	T327	T328	Q329	D330	V331	V332	F333	F334	K337	G343	S344	S347	F348	H349	C350	I351	Y352	K353	N356	S360	Q363	I364	V365	W366	E372	K373	I374	Q378	T379	I381	V386	S387	K388	V389	T390	F391	S392	N393	L394	T397	R400	F403	T404	Y405	Y409	Y409	M412	W510	A415	C416	H417	H418	R419	Y420	A421	L423	Y424	Y425	I426	D427	V428	C434	E435	T436	L440	C445	R446	S448	L452	Q453	S454	S458	T459	V460	Q461	L462	R463	Y464	H465	R466	I477	H478	P479	V487	L488	Q489	D491	G492	F493	Y494	E495	I501	Y507	T508	M509	W510	I511	R512	I513	N514	H515	S516	L517	S522	V533	P537	P538	S539	N540	V541	K542	E543	E544	I545	T546	V547	N548	T549	G550	L551	L552	S555	W556	E557	K558	F561	P562	E563	N564	N565	L566	Q567	F568	Q569	I570	R571	Y572	G573	L574	S575	G576	K577	E578	I579	Q580	W581	H584	F587	D588	A589	K590	S591	K592	S595	S599	D600	L601	C602	A603	V606	V609	R610	C611	R612	R613	L614	D615	G616	L617	W620	S621	M622	W623	Y628	T629	L630	V631	M632	D633	M638	R639	G640	P641	W644	R645	K646	M647	D648	G649	D650	V651	T652	K653	K654	E655	R656	N657	V658	T659	W662	K663	P664	L665	T666	K667	N668	D669	S670	L671	S673	V674	R675	R676	V679	K680	H681	R682	T683	A684	H685	N686	G687	T688	W689	S690	E691	D692	V693	G694	H695	R696	T697	N698	L699	T700	F701	L702	W703	T704	E705	A707	H708	T709	W712	S717	L718	S721	L722	V723	N724	F725	N726	L727	T728	F729	S730	W731	F732	W733	S734	K735	V736	S737	A738	W739	E740	S741	L742	S743	A744	Y745	P746	L747	S748	S749	S750	T757	L758	S759	P760	D761	D762	V763	S764	L765	L766	Y767	L768	W769	I770	E771	K773	W774	L775	N776	E777	D778	D779	G780	M781	K782	W783	L786	F787	S788	N789	V790	K791	K792	F793	Y794	I795	H796	D797	S798	L799	S800	L801	E803	Q806	F807	S808	L809	Y810	F811	H812	F813	ASW	GLY	ILE	ALA	ARG	ILE	LYS	LEU	ILE	GLY	GLU	ARG	LYS	ASP	ALA	ILE	ASP	LYS	GLN	GLN	ASN	ALA	ALA	GLY	SER	THR	GLY	SER	SER	GLY	GLY	GLY	GLY	SER	GLY	GLY	SER	SER	GLY	GLY	GLY	SER	SER	ARG	MET
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4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	37530	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	45	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	105000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	1.927	Depositor
Minimum map value	-0.383	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.025	Depositor
Recommended contour level	0.178	Depositor
Map size (Å)	371.392, 371.392, 371.392	wwPDB
Map dimensions	224, 224, 224	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.658, 1.658, 1.658	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: NI

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	0.32	0/1088	0.77	1/1477 (0.1%)
1	C	0.36	0/1088	0.73	1/1477 (0.1%)
1	E	0.28	0/1088	0.63	0/1477
2	B	0.27	0/4890	0.51	0/6668
2	D	0.26	0/4890	0.51	1/6668 (0.0%)
2	F	0.25	0/4890	0.49	0/6668
All	All	0.27	0/17934	0.55	3/24435 (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
2	D	0	3

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	434	CYS	CA-CB-SG	6.83	126.30	114.00
1	C	96	GLN	CB-CG-CD	-6.40	94.95	111.60
1	A	103	ASN	CB-CA-C	5.20	120.80	110.40

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	D	415	ALA	Peptide

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Mol	Chain	Res	Type	Group
2	D	467	ARG	Peptide
2	D	501	ILE	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	1077	0	1109	74	0
1	C	1077	0	1109	81	0
1	E	1077	0	1109	49	0
2	B	4757	0	4708	159	0
2	D	4757	0	4709	146	0
2	F	4757	0	4709	149	0
3	B	1	0	0	0	0
3	D	1	0	0	0	0
3	F	1	0	0	0	0
All	All	17505	0	17453	620	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 18.

The worst 5 of 620 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:103:ASN:ND2	2:B:504:LEU:H	1.25	1.30
2:B:409:TYR:OH	1:C:141:SER:HB3	1.34	1.21
1:A:103:ASN:ND2	2:B:504:LEU:N	1.99	1.11
1:A:34:LEU:HD11	1:A:104:LEU:HD13	1.39	1.03
1:C:83:GLN:HE22	1:C:102:GLU:HG2	1.27	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	136/174 (78%)	122 (90%)	12 (9%)	2 (2%)	10	46
1	C	136/174 (78%)	122 (90%)	12 (9%)	2 (2%)	10	46
1	E	136/174 (78%)	122 (90%)	12 (9%)	2 (2%)	10	46
2	B	591/868 (68%)	570 (96%)	21 (4%)	0	100	100
2	D	591/868 (68%)	571 (97%)	20 (3%)	0	100	100
2	F	591/868 (68%)	573 (97%)	17 (3%)	1 (0%)	47	81
All	All	2181/3126 (70%)	2080 (95%)	94 (4%)	7 (0%)	44	76

5 of 7 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	68	PRO
1	C	68	PRO
1	E	68	PRO
2	F	671	LEU
1	A	163	VAL

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	129/155 (83%)	128 (99%)	1 (1%)	81	89
1	C	129/155 (83%)	128 (99%)	1 (1%)	81	89
1	E	129/155 (83%)	127 (98%)	2 (2%)	62	79

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	B	546/781 (70%)	543 (100%)	3 (0%)	88	93
2	D	546/781 (70%)	546 (100%)	0	100	100
2	F	546/781 (70%)	546 (100%)	0	100	100
All	All	2025/2808 (72%)	2018 (100%)	7 (0%)	92	95

5 of 7 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	590	LYS
1	C	54	LYS
1	E	56	ARG
1	E	54	LYS
2	B	398	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 14 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	159	GLN
2	D	354	ASN
2	F	478	HIS
1	E	160	GLN
2	F	461	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](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 3 ligands modelled in this entry, 3 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

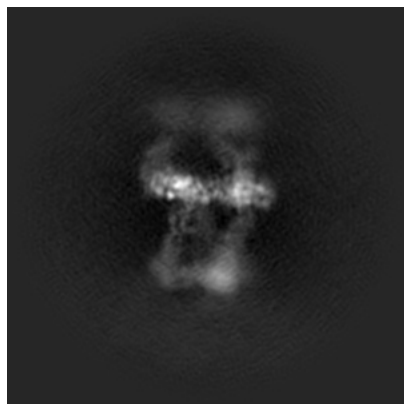
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-15678. These allow visual inspection of the internal detail of the map and identification of artifacts.

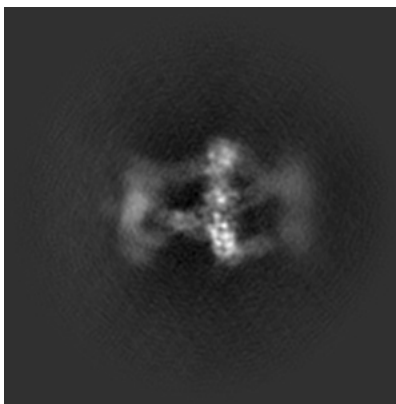
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

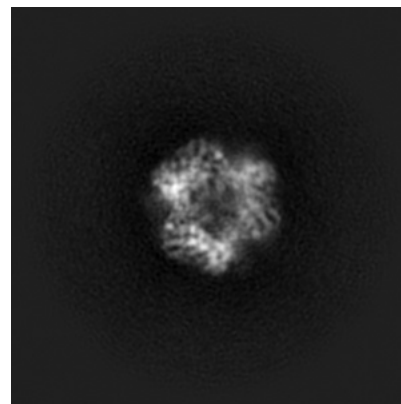
6.1.1 Primary map



X

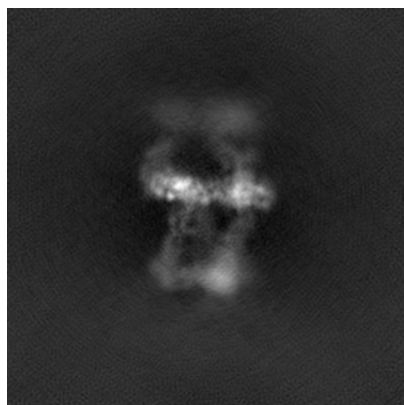


Y

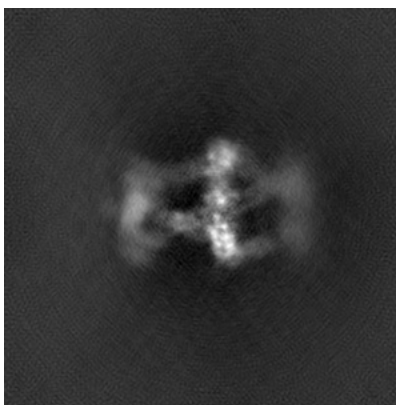


Z

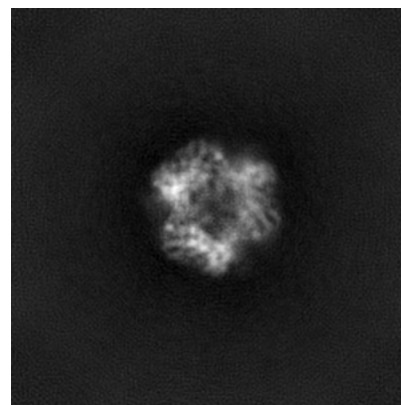
6.1.2 Raw map



X



Y

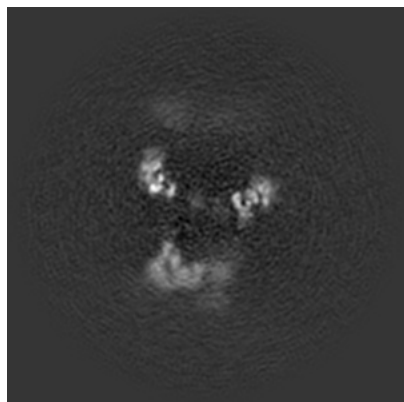


Z

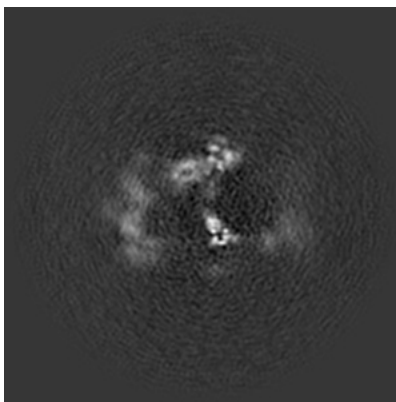
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

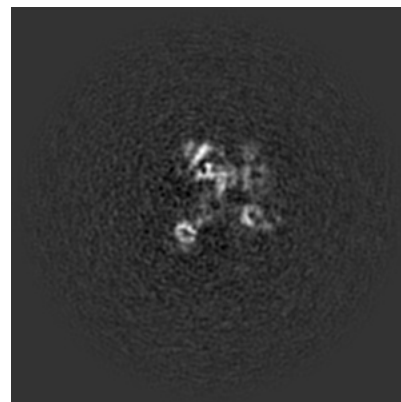
6.2.1 Primary map



X Index: 112

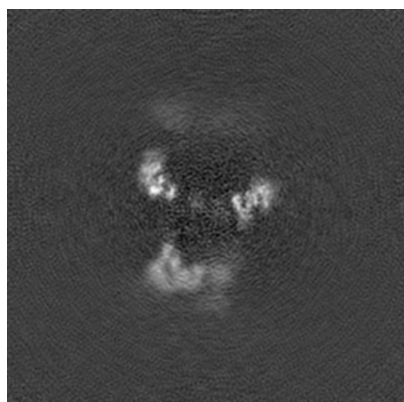


Y Index: 112

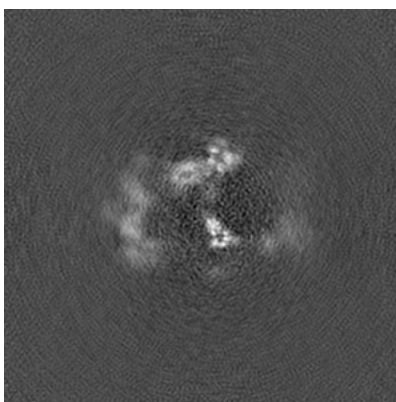


Z Index: 112

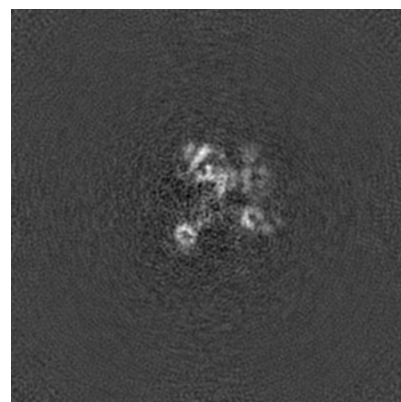
6.2.2 Raw map



X Index: 112



Y Index: 112

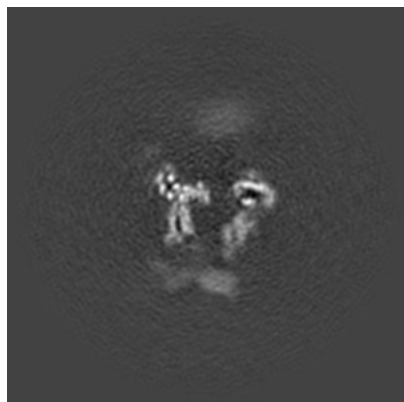


Z Index: 112

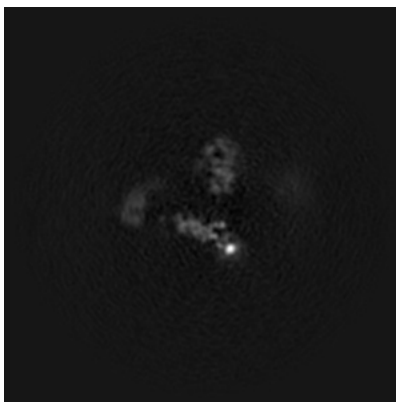
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

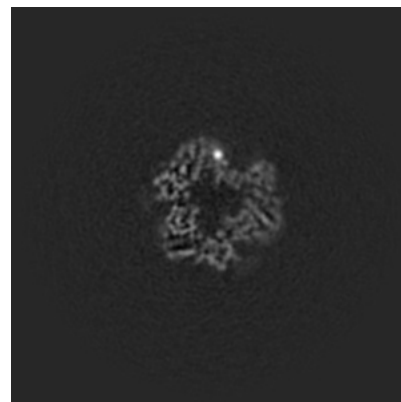
6.3.1 Primary map



X Index: 101

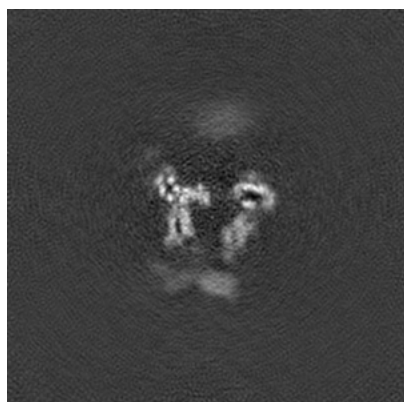


Y Index: 100

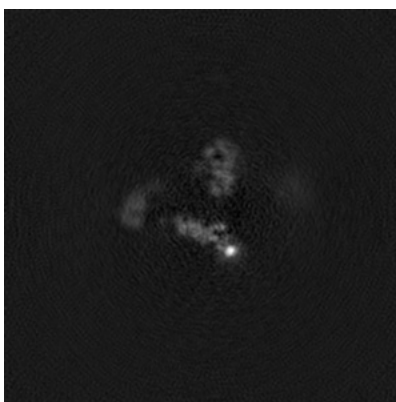


Z Index: 121

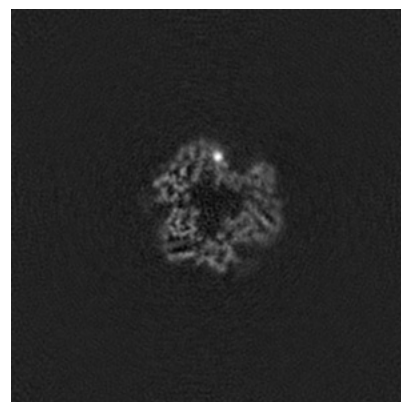
6.3.2 Raw map



X Index: 101



Y Index: 100

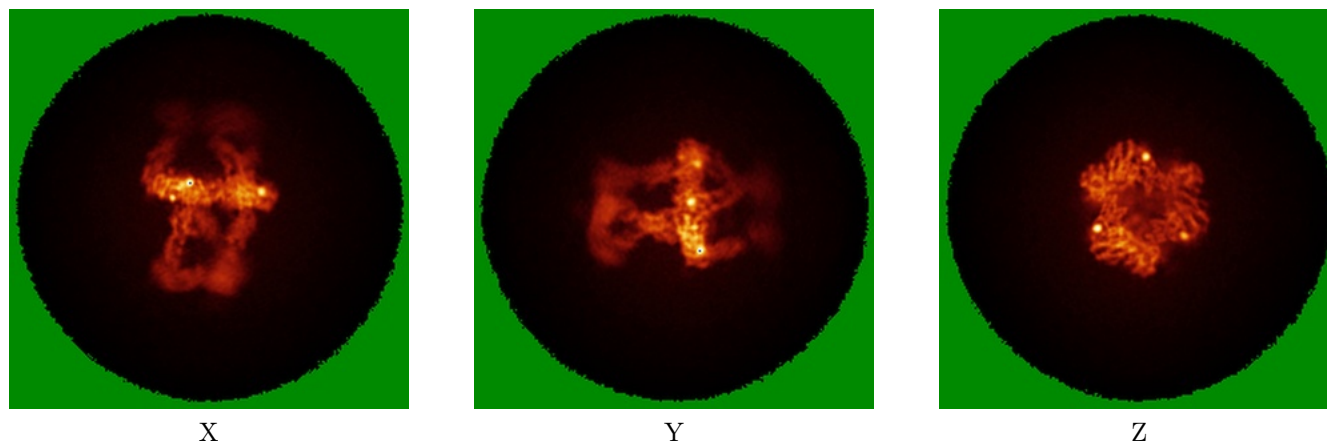


Z Index: 121

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

6.4 Orthogonal standard-deviation projections (False-color) [i](#)

6.4.1 Primary map

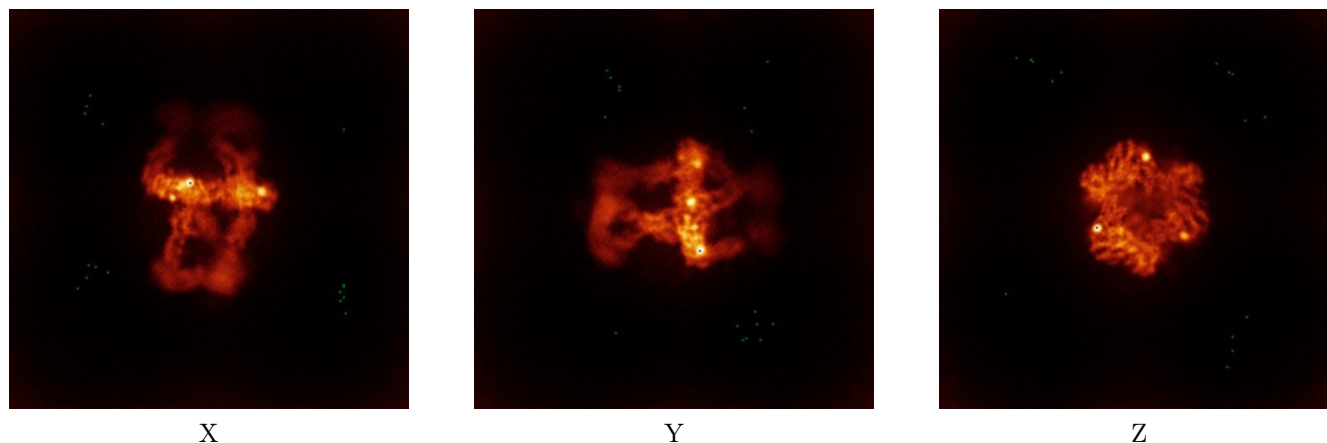


X

Y

Z

6.4.2 Raw map



X

Y

Z

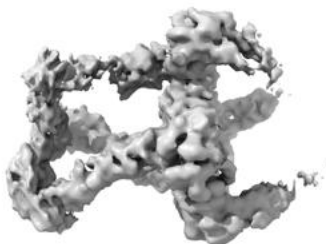
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views [i](#)

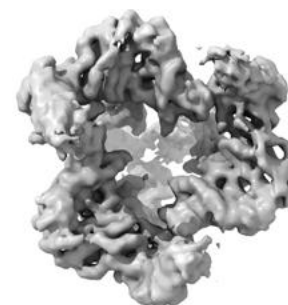
6.5.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.178. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

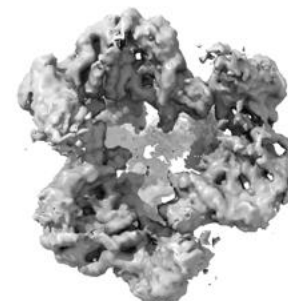
6.5.2 Raw map



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.

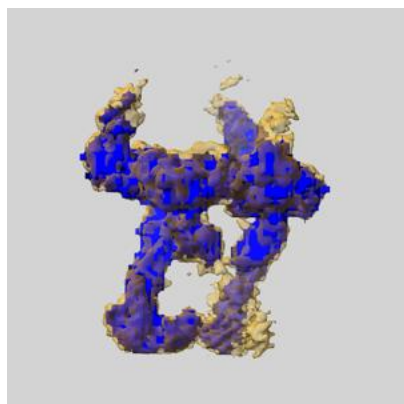
6.6 Mask visualisation [i](#)

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

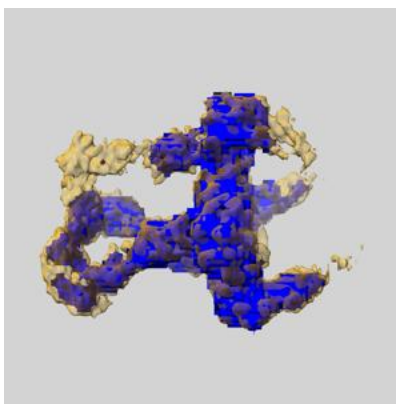
A mask typically either:

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

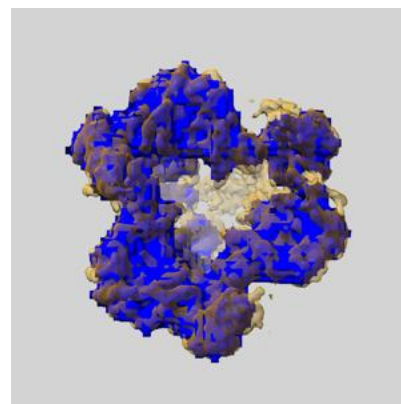
6.6.1 emd_15678_msk_1.map [i](#)



X



Y

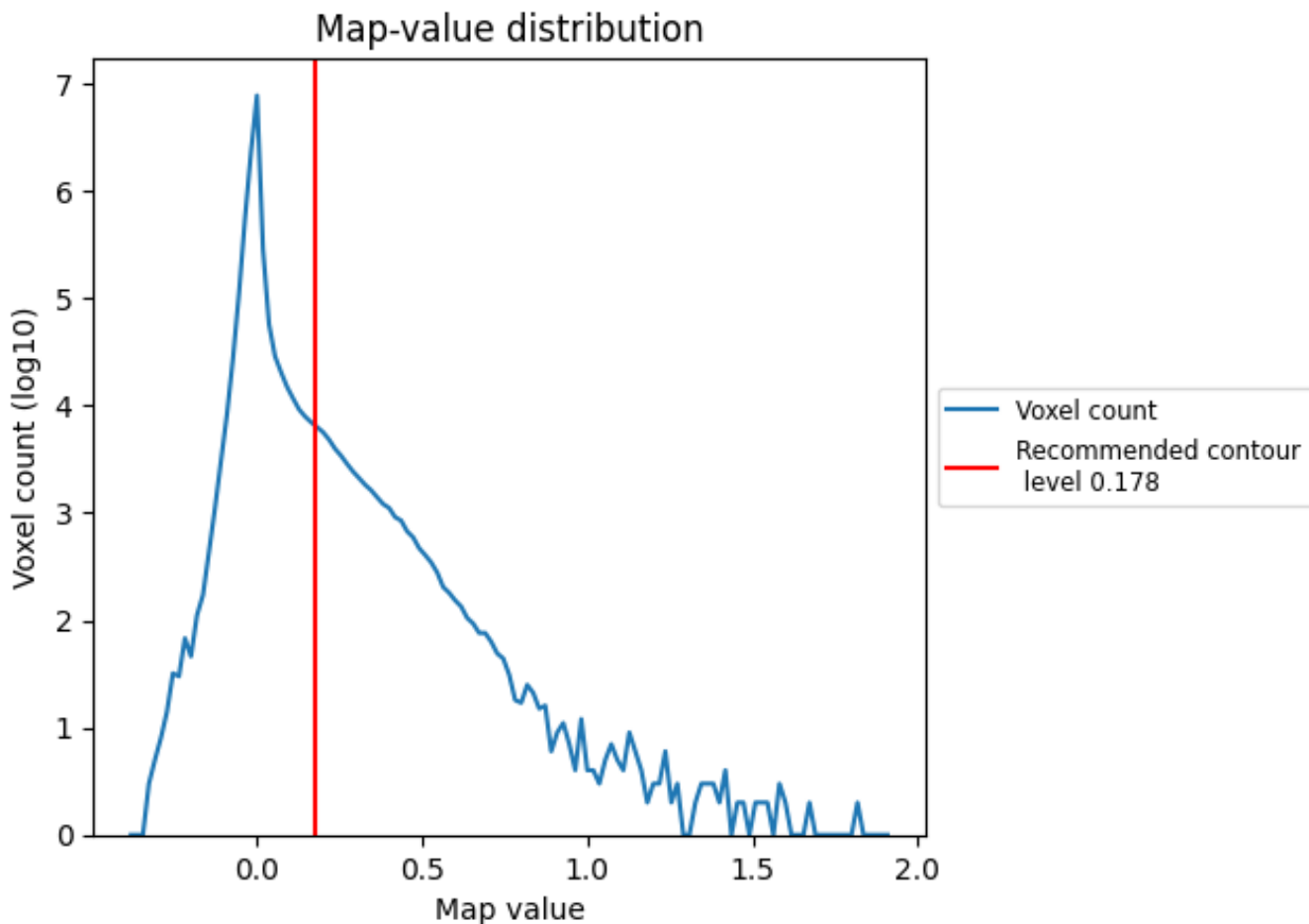


Z

7 Map analysis [i](#)

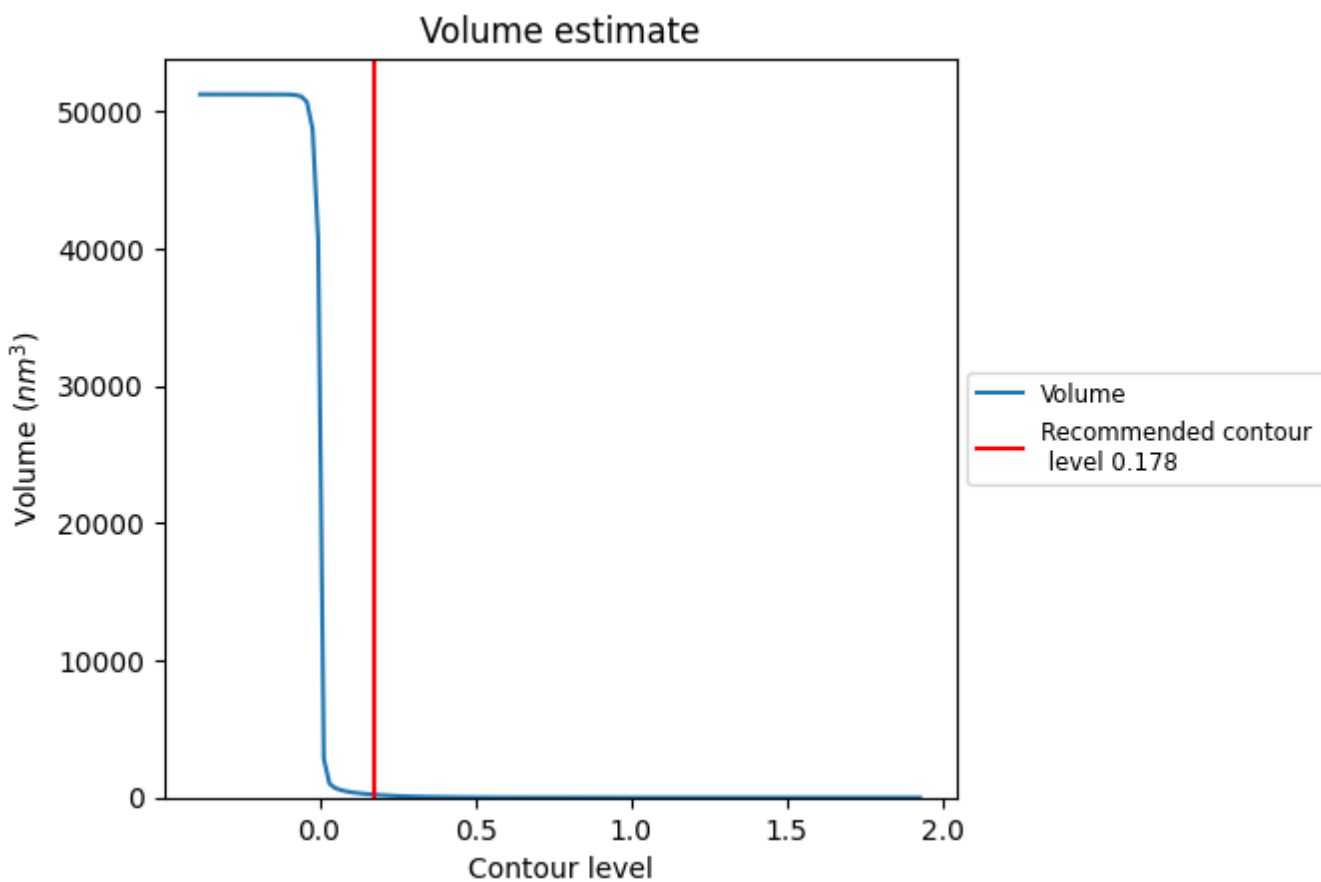
This section contains the results of statistical analysis of the map.

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.

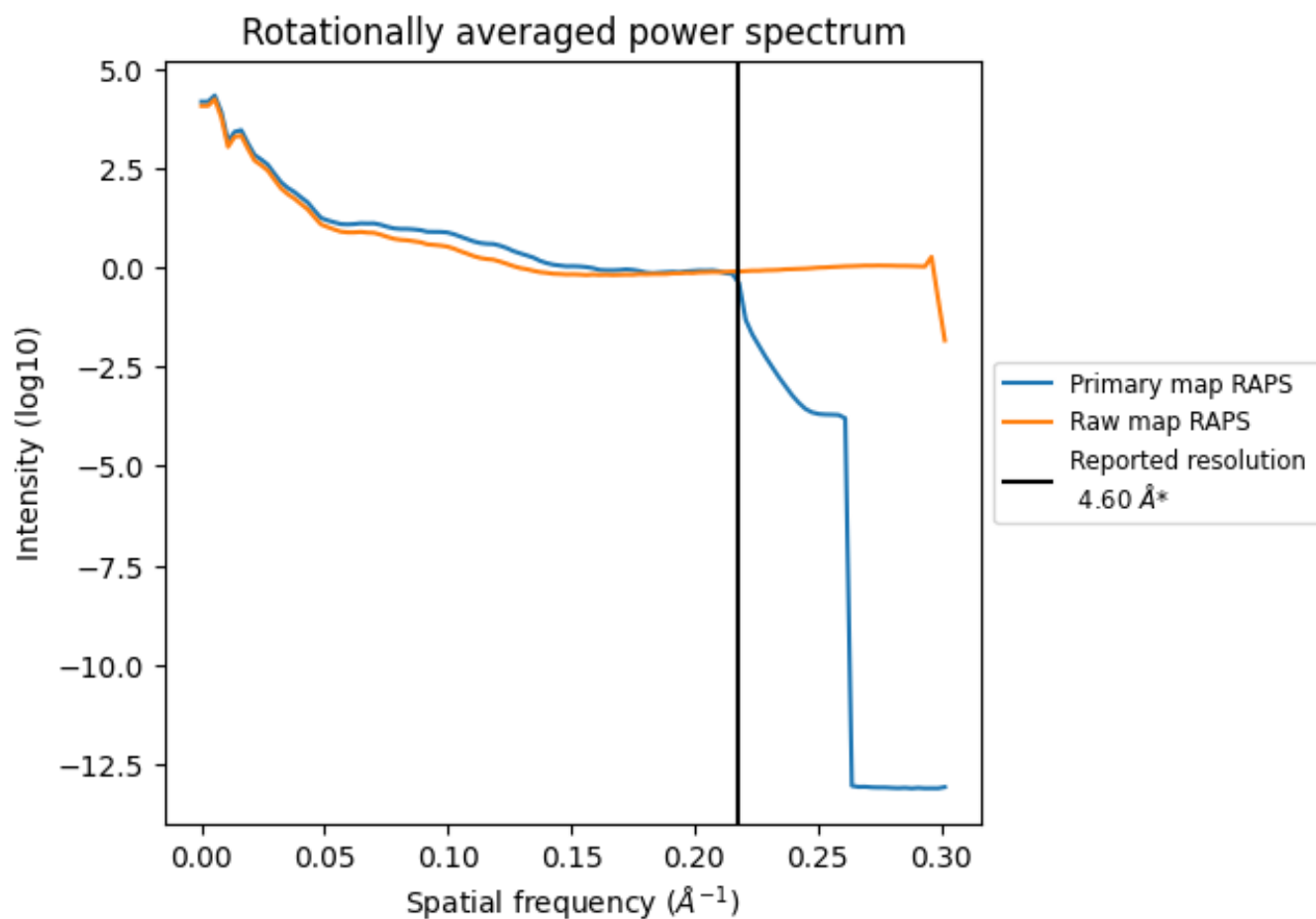
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 209 nm³; this corresponds to an approximate mass of 189 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](#)

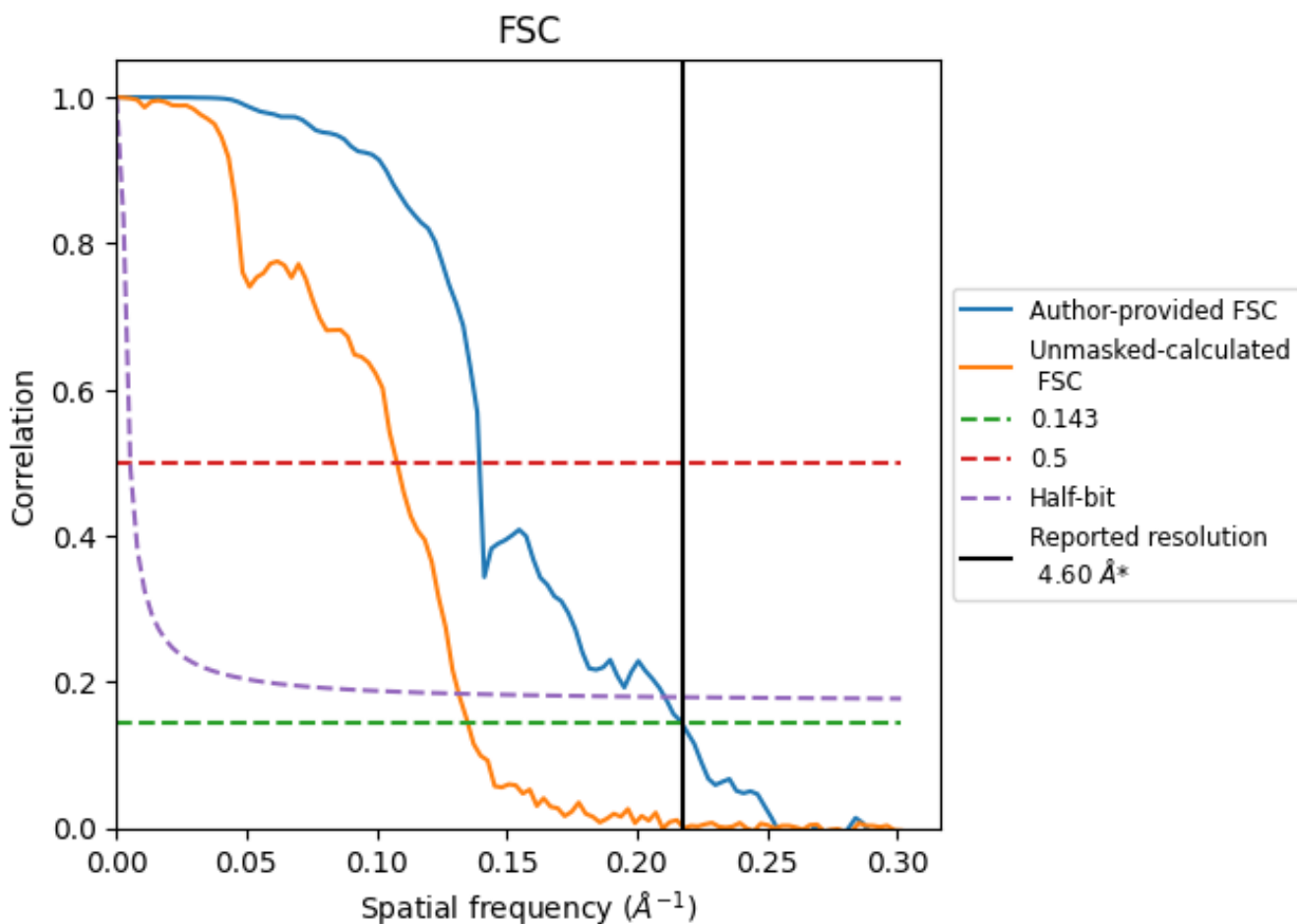


*Reported resolution corresponds to spatial frequency of 0.217 Å⁻¹

8 Fourier-Shell correlation [i](#)

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 [i](#)



*Reported resolution corresponds to spatial frequency of 0.217 Å⁻¹

8.2 Resolution estimates [i](#)

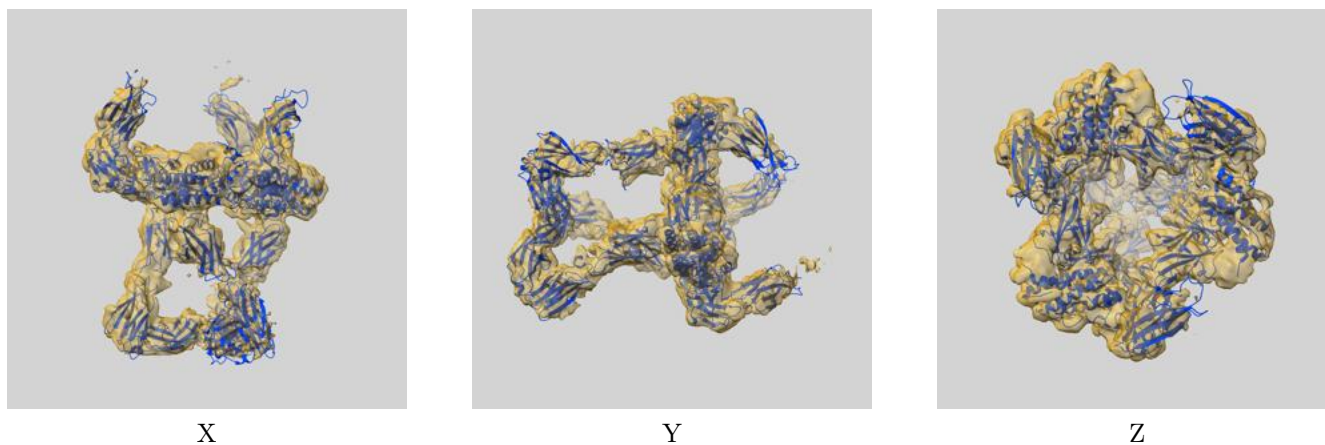
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.60	-	-
Author-provided FSC curve	4.60	7.17	4.75
Unmasked-calculated*	7.40	9.28	7.60

*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 7.40 differs from the reported value 4.6 by more than 10 %

9 Map-model fit [i](#)

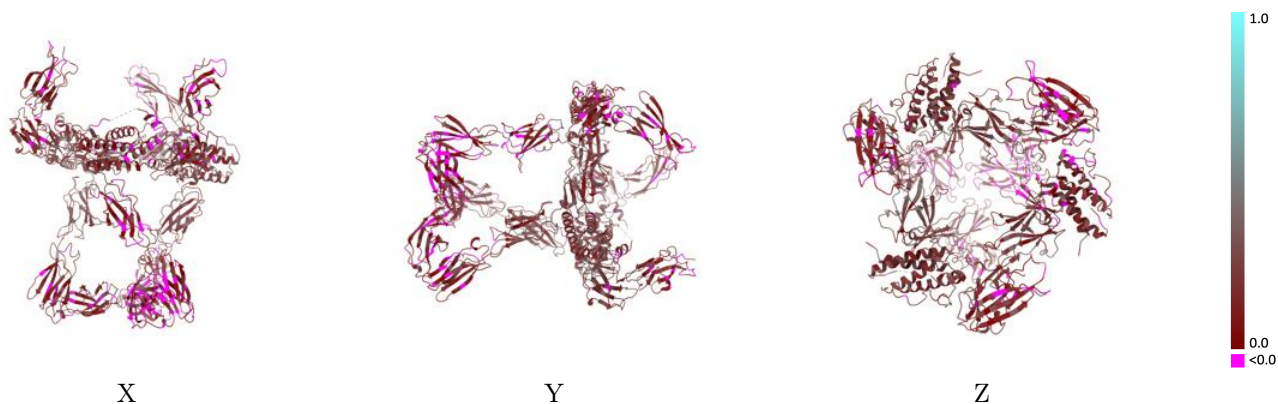
This section contains information regarding the fit between EMDB map EMD-15678 and PDB model 8AVC. Per-residue inclusion information can be found in section 3 on page 10.

9.1 Map-model overlay [i](#)



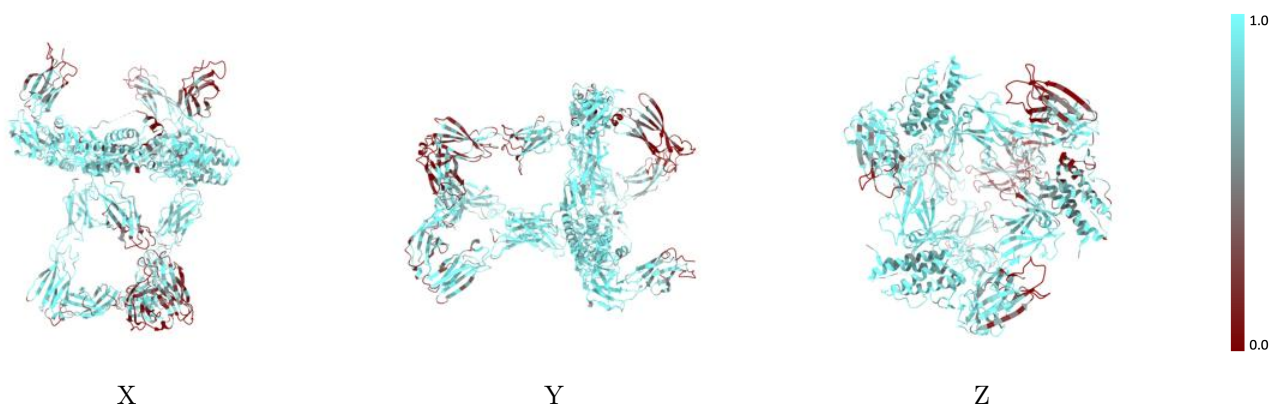
The images above show the 3D surface view of the map at the recommended contour level 0.178 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



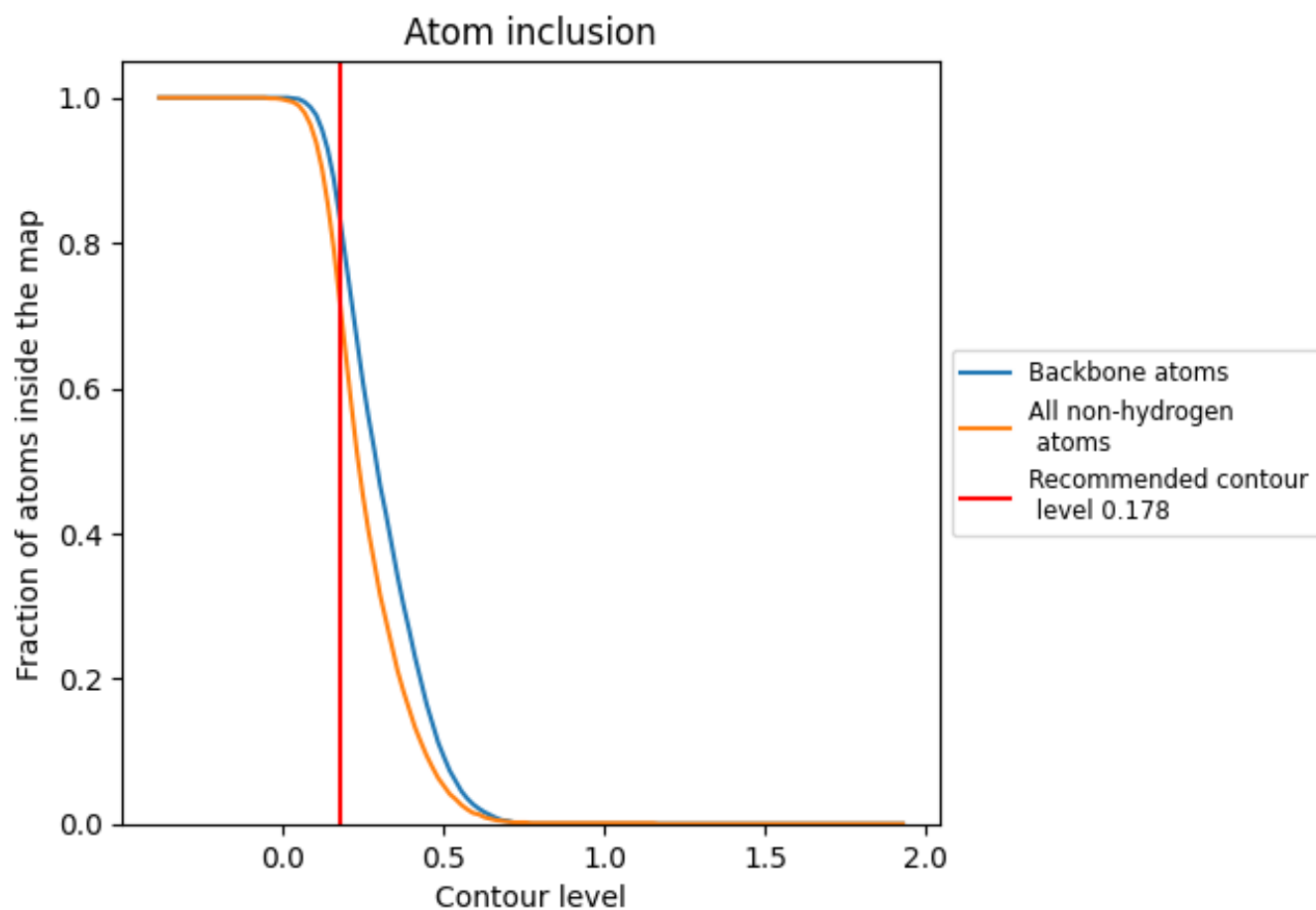
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.178).















9.4 Atom inclusion [i](#)



At the recommended contour level, 83% of all backbone atoms, 72% 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 (0.178) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7190	 0.1840
A	 0.8280	 0.2210
B	 0.8120	 0.2110
C	 0.8190	 0.2270
D	 0.7060	 0.1760
E	 0.6780	 0.1760
F	 0.6010	 0.1500

