



wwPDB EM Validation Summary Report ⓘ

May 13, 2023 – 02:25 pm BST

PDB ID : 7ZNL
EMDB ID : EMD-14808
Title : Structure of the human TREX core THO-UAP56 complex
Authors : Pacheco-Fiallos, F.B.; Vorlaender, M.K.; Plaschka, C.
Deposited on : 2022-04-21
Resolution : 3.45 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:

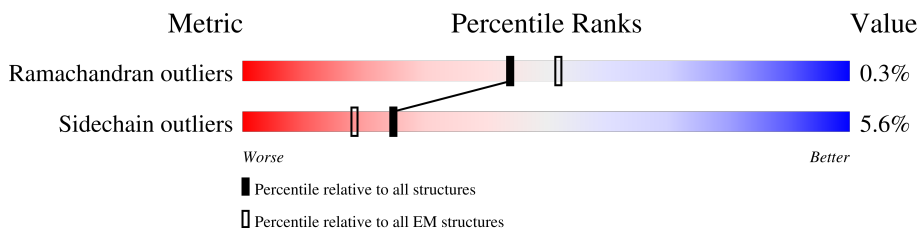
EMDB validation analysis : 0.0.1.dev50
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.32.2

1 Overall quality at a glance i

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

The reported resolution of this entry is 3.45 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)
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	657	<div style="display: flex; align-items: center;"> <div style="width: 42%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="margin-left: 10px;">46%</div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="width: 50%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="margin-left: 10px;">46%</div> </div>
1	I	657	<div style="display: flex; align-items: center;"> <div style="width: 55%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="margin-left: 10px;">45%</div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="width: 54%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="margin-left: 10px;">45%</div> </div>
1	a	657	<div style="display: flex; align-items: center;"> <div style="width: 54%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="margin-left: 10px;">46%</div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="width: 50%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="margin-left: 10px;">46%</div> </div>
1	i	657	<div style="display: flex; align-items: center;"> <div style="width: 55%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="margin-left: 10px;">45%</div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="width: 54%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="margin-left: 10px;">45%</div> </div>
2	B	1593	<div style="display: flex; align-items: center;"> <div style="width: 12%; height: 10px; background: red;"></div> <div style="width: 53%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="width: 5%; height: 10px; background: yellow;"></div> <div style="width: 30%; height: 10px; background: grey;"></div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="width: 53%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="margin-left: 10px;">42%</div> </div>
2	J	1593	<div style="display: flex; align-items: center;"> <div style="width: 57%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="width: 5%; height: 10px; background: yellow;"></div> <div style="width: 38%; height: 10px; background: grey;"></div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="width: 53%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="margin-left: 10px;">43%</div> </div>
2	b	1593	<div style="display: flex; align-items: center;"> <div style="width: 58%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="width: 5%; height: 10px; background: yellow;"></div> <div style="width: 37%; height: 10px; background: grey;"></div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="width: 53%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="margin-left: 10px;">42%</div> </div>
2	j	1593	<div style="display: flex; align-items: center;"> <div style="width: 57%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="width: 5%; height: 10px; background: yellow;"></div> <div style="width: 38%; height: 10px; background: grey;"></div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="width: 53%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="margin-left: 10px;">43%</div> </div>
3	C	351	<div style="display: flex; align-items: center;"> <div style="width: 77%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="width: 11%; height: 10px; background: yellow;"></div> <div style="width: 12%; height: 10px; background: grey;"></div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="width: 77%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green);"></div> <div style="margin-left: 10px;">11%</div> <div style="margin-left: 10px;">12%</div> </div>

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Mol	Chain	Length	Quality of chain
3	K	351	88% 77% 11% 12%
3	c	351	88% 77% 11% 12%
3	k	351	88% 77% 11% 12%
4	E	683	78% 78% 21%
4	M	683	80% 80% 20%
4	e	683	77% 77% 23%
4	m	683	80% 80% 20%
5	F	341	99% 98% ..
5	N	341	99% 98% ..
5	f	341	96% 96% . .
5	n	341	99% 98% ..
6	G	204	75% 79% 21%
6	O	204	80% 80% 20%
6	g	204	79% 79% 21%
6	o	204	80% 80% 20%
7	H	428	32% 40% 60%
7	P	428	40% 40% 60%
7	h	428	40% 40% 60%
7	p	428	40% 40% 60%

2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 84821 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 THO complex subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	356	2889	1864	481	531	13	0	0
1	I	363	2935	1894	489	539	13	0	0
1	a	356	2889	1864	481	531	13	0	0
1	i	363	2936	1894	489	540	13	0	0

- Molecule 2 is a protein called THO complex subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	919	7012	4486	1206	1278	42	0	0
2	J	914	6956	4452	1194	1268	42	0	0
2	b	919	7012	4486	1206	1278	42	0	0
2	j	914	6956	4452	1194	1268	42	0	0

- Molecule 3 is a protein called THO complex subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	309	2433	1538	423	457	15	0	0
3	K	309	2433	1538	423	457	15	0	0
3	c	309	2433	1538	423	457	15	0	0
3	k	309	2433	1538	423	457	15	0	0

- Molecule 4 is a protein called THO complex subunit 5 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	E	538	Total	C	N	O	S	0	0
			3763	2383	663	696	21		
4	M	549	Total	C	N	O	S	0	0
			4134	2634	725	752	23		
4	e	527	Total	C	N	O	S	0	0
			3674	2327	649	679	19		
4	m	549	Total	C	N	O	S	0	0
			4134	2634	725	752	23		

- Molecule 5 is a protein called THO complex subunit 6 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	F	337	Total	C	N	O	S	0	0
			2604	1647	459	483	15		
5	N	337	Total	C	N	O	S	0	0
			2604	1647	459	483	15		
5	f	329	Total	C	N	O	S	0	0
			2537	1604	448	470	15		
5	n	337	Total	C	N	O	S	0	0
			2604	1647	459	483	15		

- Molecule 6 is a protein called THO complex subunit 7 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	G	161	Total	C	N	O		0	0
			800	478	161	161			
6	O	164	Total	C	N	O	S	0	0
			1129	696	210	216	7		
6	g	161	Total	C	N	O		0	0
			800	478	161	161			
6	o	164	Total	C	N	O	S	0	0
			1129	696	210	216	7		

- Molecule 7 is a protein called Spliceosome RNA helicase DDX39B.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	H	170	Total	C	N	O	S	0	0
			1398	888	245	261	4		
7	P	170	Total	C	N	O	S	0	0
			1398	888	245	261	4		
7	h	170	Total	C	N	O	S	0	0
			1398	888	245	261	4		

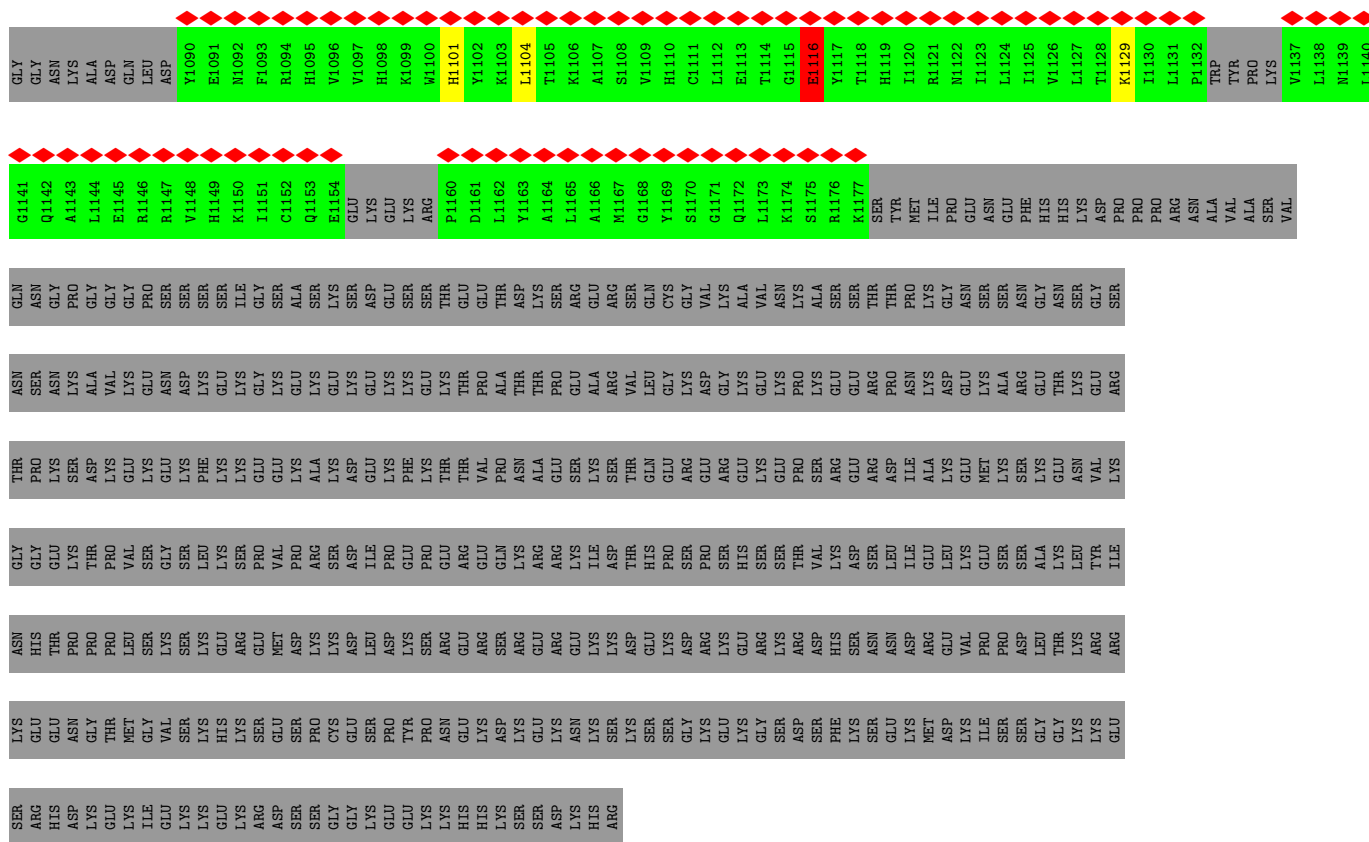
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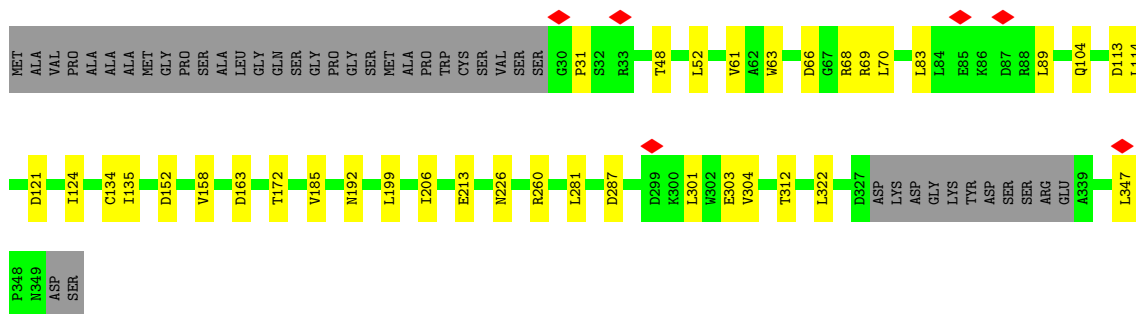
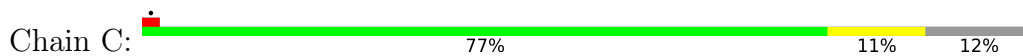
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	p	170	1398	888	245	261	4	0	0

Q181	D182	L183	SER	GLY	SER	SER	ILE	T188	S189	D190	L191	I192	L193	E194	N195	I196	K197	S198	L199	I200	L201	C202	F203	N204	L205	D206	P207	N208	R209	V210	L211	D212	V213	I214	L215	E216	V217	F218	E219	C220	R221	P222	E223	H224	D225	D226	F227	F228	I229	S230	L231	E233	S234	Y235	M236	S237	M238	C239	E240	
P241	Q242	T243	L244	C245	H246	L247	L248	G249	F250	K251	F252	K253	F254	Y255	Q256	E257	PRO	ASN	GLY	I200	GLU	ASP	T262	P263	S264	S265	L266	Y267	R268	V269	A270	A271	V272	L273	L274	Q275	F276	N277	L278	L279	C220	L281	D282	D283	L284	Y285	V286	H287	L288	L289	P290	A291	D292	N293	C294	I295	M296	D297	H298	K300
R301	E302	I303	A304	E305	A306	K307	Q308	ILE	VAL	ARG	LYS	LEU	THR	MET	VAL	LEU	SER	SER	GLU	GLY	LYS	MET	ASP	ARG	GLU	LYS	GLU	LYS	LYS	PRO	PRO	ASP	N343	Q344	K345	L346	G347	L348	L349	E350	A351	L352	L353	K354	L355	S228	G356	D357	W358	Q359	H360									
A361	Q362	N363	I364	M365	D366	Q367	M368	P369	P370	K371	Y372	A373	A374	S375	H376	K377	L378	I379	A380	A381	L382	I383	C384	K385	L386	I387	H388	I389	Q390	I391	E392	P393	L394	Y395	R396	R397	V398	G399	V400	F401	K402	G403	A404	K405	G406	S407	P408	V409	N410	A411	L412	Q413	N414	K415	R416	A417	P418	K419	Q420	
A421	E422	S423	F424	E425	D426	L427	R428	R429	D430	V431	F432	M433	M434	F435	C436	Y437	L438	G439	P440	H441	L442	S443	H444	D445	P446	I447	L448	F449	A450	K451	V452	V453	V454	I455	G456	K457	S458	F459	M460	K461	E462	F463	Q464	S465	ASP	GLY	SER	LYS	GLN	ASP	K473	E474	K475	T476	E477	V478	I479	L480		
S481	C482	L483	L484	S485	L486	T487	D488	Q489	V490	L491	L492	P493	S494	L495	S496	L497	M498	D499	C500	N501	A502	C503	M504	S505	E506	E507	L508	W509	G510	M511	F512	K513	T514	F515	P516	Y517	Q518	H519	R520	Y521	R522	L523	Y524	G525	G526	W527	K528	M529	E530	T531	Y532	N533	S534	H535	P536	L537	V538	V539	K540	
V541	K542	A543	Q544	T545	L546	D547	R548	A549	K550	V551	L552	M553	K554	R555	L556	T557	K558	E559	N560	V561	K562	P563	S564	G565	R566	Q567	L568	G569	K570	L571	S572	H573	S574	N575	P576	T577	L578	L579	F580	D581	Y582	L583	L584	S585	E586	L587	Q588	K589	Y590	D591	N592	L593	S594	T595	P596	V597	L598	D599	S600	
L601	K602	Y603	L604	T605	S606	L607	N608	Y609	D610	V611	L612	A613	Y614	C615	L616	L617	E618	A619	L620	A621	N622	P623	GLU	LYS	GLU	ARG	MET	K629	D631	D632	T633	T634	I635	S636	S637	M638	L639	Q640	S641	L642	A643	S644	F645	C646	G647	A648	V649	F650	K651	K652	Y653	P654	I655	D656	L657	A658	G659	L660		
L661	Q662	Y663	V664	A665	N666	L668	K669	A670	S671	K672	S673	F674	D675	L676	L677	L678	L679	A679	K680	E681	V682	V683	Q684	K685	M686	A687	G688	L689	I690	L751	THR	GLU	E694	M695	T696	M697	E698	Q699	L700	E701	A702	M703	T704	GLY	GLY	E707	Q708	L709	K710	A711	E712	G713	GLY	T714	PHE	GLY	GLN	ILE	R720	
M721	T722	K723	K724	S725	S726	Q727	R728	L729	K730	D731	A732	L733	L734	D735	H736	D737	L738	A739	L740	P741	L742	C743	L744	L745	M746	A747	Q749	R750	M751	G752	V753	L754	F755	Q756	E757	G758	GLY	GLU	K761	H762	L763	K764	L765	V766	G767	K768	L769	Y770	D771	Q772	C773	H774	D775	L776	L777	V778	Q779	F780		
G781	G782	F783	L784	A785	S786	M787	L788	S789	T790	E791	D792	Y793	L794	K795	R796	V797	S798	F799	I800	D801	V802	L803	C804	H805	E806	F807	H808	T809	P810	H811	D812	A813	R814	F815	F816	L817	S818	R819	P820	M821	A822	HIS	ILE	SER	SER	LYS	TYR	ASP	GLU	LEU	LYS	LYS	SER	GLU	LYS	GLY	SER			
LYS	GLN	GLN	HIS	VAL	HIS	LYS	TYR	THR	THR	SER	CYS	GLU	MET	VAL	ASP	ASN	ALA	PRO	V860	H861	E862	A863	V864	S866	L867	H868	SER	LYS	VAL	TRP	ASP	ILE	S877	Q879	F880	Y881	A882	T883	F884	W885	S886	L887	T888	M889	Y890	D891	L892	A893	V894	P895	HIS	T899	S900	H901	L902	E903				
R903	E904	V905	N906	K907	L908	LYS	VAL	THR	GLN	MET	LYS	ALA	ILE	ASP	ASP	ASN	GLN	PRO	MET	PRO	PRO	ASN	LYS	LYS	LYS	K928	E929	R930	C931	T932	A933	A934	Q935	D936	K937	L938	L939	E940	E941	E942	F943	K944	Q945	M946	E947	H948	V949	Q950	R951	V952	L953	Q954	R955	L956	K957	L958	E959	K960		
D961	N962	W963	L964	LEU	ALA	LYS	SER	THR	LYS	N971	E972	T973	I974	I975	K976	F977	L978	Q979	L980	C981	I982	F983	P984	R985	C986	I987	F988	S989	A990	I991	D992	A993	V994	Y995	C996	A997	R998	F999	V1000	E1001	L1002	V1003	H1004	Q1005	Q1006	THR	PRO	ASN	PHE	S1012	T1013	L1014	L1015	C1016	Y1017	D1018	R1019	V1020		

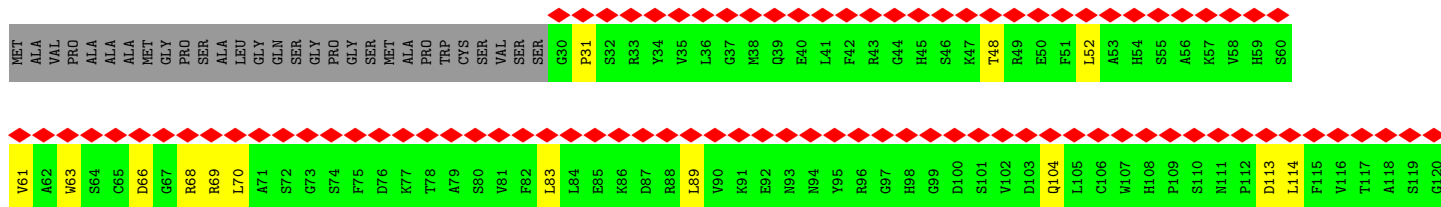
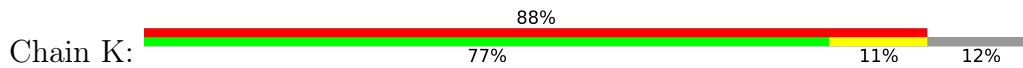
R301	E302	I303	A304	E305	A306	K307	Q308	ILE	VAL	ARG	LEU	THR	MET	VAL	VAL	LEU	SER	SER	GLU	GLY	LYS	MET	ASP	GLU	ARG	GLY	GLU	LYS	GLY	LYS	PRO	PRO	PRO	ASP	N343	Q344	K345	L346	G347	L348	L349	E350	A351	L352	L353	K354	S355	G356	D357	W358	Q359	H360								
A361	Q362	N363	I364	M365	D366	Q367	M368	P369	P370	Y371	Y372	A373	A374	S375	H376	K377	L378	I379	A380	L381	A382	I383	C384	K385	L386	I387	H388	I389	T390	I391	E392	P393	L394	Y395	R396	R397	L398	G399	V400	P401	K402	G403	A404	K405	K406	S407	P408	V409	N410	A411	L412	Q413	N414	K415	R416	A417	P418	K419	Q420	
A421	E422	F423	F424	E425	D426	L427	R428	R429	D430	V431	F432	N433	M434	F435	C436	L437	L438	G439	P440	H441	L442	S443	H444	D445	L446	I447	L448	F449	A450	K451	V452	V453	V454	L455	G456	K457	S458	F459	M460	K461	F462	F463	Q464	S465	ASP	GLY	SER	SER	LYS	GLN	GLU	ASP	K473	E474	K475	T476	E477	V478	I479	L480
S481	C482	L483	L484	S485	I486	T487	D488	Q489	D490	L491	L492	P493	S494	L495	S496	L497	M498	D499	C500	N501	A502	C503	M504	S505	S506	E507	L508	W509	G510	M511	F512	K513	T514	F515	F516	Y517	Q518	H519	R520	Y521	R522	L523	Y524	G525	Q526	W527	K528	N529	E530	T531	Y532	N533	S534	H535	P536	L537	V538	V539	K540	
V541	K542	A543	Q544	T545	I546	D547	R548	A549	K550	Y551	I552	M553	K554	R555	L556	T557	K558	E559	N560	V561	K562	P563	S564	G565	R566	Q567	I568	G569	K570	L571	S572	H573	S574	N575	P576	T577	I578	L579	F580	D581	R582	I583	L584	S585	Q586	I587	Q588	K589	L590	D591	N592	L593	I594	T595	P596	V597	V598	D599	S600	
L601	K602	Y603	L604	T605	S606	L607	N608	Y609	D610	V611	L612	A613	Y614	C615	I616	I617	E618	A619	L620	A621	N622	P623	GLU	GLY	GLU	ARG	MET	K629	H630	D631	D632	T633	T634	I635	S636	S637	W638	L639	Q640	S641	L642	A643	S644	F645	C646	G647	A648	V649	F650	R651	K652	Y653	P654	I655	D656	L657	A658	G659	L660	
L661	Q662	Y663	V664	A665	N666	Q667	L668	K669	A670	G671	K672	S673	F674	D675	L676	L677	L678	L679	K680	E681	V682	V683	Q684	K685	M686	A687	G688	I689	E690	D691	T692	T693	E694	M695	T696	M697	E698	Q699	L700	E701	A702	M703	S704	GLY	GLY	E707	Q708	L709	K710	A711	E712	G713	GLY	T714	PHE	GLY	GLN	I715	R720	
M721	T722	K723	K724	S725	S726	Q727	R728	L729	K730	D731	A732	L733	L734	D735	H736	D737	L738	A739	L740	P741	L742	C743	L744	L745	M746	A747	Q748	Q749	R750	M751	G752	L753	L754	F755	Q756	E757	E758	GLY	GLU	K761	H762	L763	K764	L765	V766	G767	K768	L769	Y770	D771	Q772	C773	H774	D775	T776	L777	V778	Q779	F780	
G781	G782	F783	L784	A785	S786	M787	L788	S789	T790	E791	D792	Y793	L794	K795	R796	V797	L798	S799	I800	D801	V802	L803	C804	N805	E806	F807	H808	T809	P810	H811	D812	A813	L814	F815	F816	L817	S818	R819	P820	M821	A822	HIS	ILE	ILE	SER	SER	LYS	TYR	ASP	GLU	LEU	LYS	LYS	SER	GLU	LYS	GLY	GLY	SER	
LYS	GLN	HIS	LYS	VAL	HIS	LYS	TYR	ILE	THR	SER	CYS	GLU	MET	VAL	ASP	ASN	ALA	PRO	V860	H861	E862	A863	V864	V865	S866	L867	H868	SER	LYS	VAL	TRP	ASP	ILE	S877	P878	K879	F880	F881	A882	T883	F884	W885	S886	L887	T888	M889	Y890	D891	L892	A893	V894	P895	HIS	T899	S900	Y901	E902			
R903	E904	Y905	N906	K907	L908	LYS	VAL	GLN	MET	LYS	ALA	ILE	ASP	ASP	ASN	GLN	GLU	MET	PRO	H978	Q979	L980	C981	I982	F983	P984	R985	C986	I987	F988	S989	A993	L994	Q995	D996	K997	L998	L999	E940	E941	E942	K943	K944	Q945	M946	E947	H948	Y949	Q950	R951	L953	Q954	L955	R956	K957	L958	E959	K960		
D961	N962	W963	L964	LEU	ALA	LYS	SER	THR	THR	LYS	N971	E972	T973	I974	T975	K976	F977	Q979	L980	C981	I982	F983	P984	R985	C986	I987	F988	S989	A993	L994	Q995	D996	K997	L998	L999	E940	E941	E942	K943	K944	Q945	M946	E947	H948	Y949	Q950	R951	L953	Q954	L955	R956	K957	L958	E959	K960					
F1021	S1022	D1023	I1024	I1025	Y1026	T1027	V1028	A1029	S1030	C1031	T1032	E1033	M1034	E1035	A1036	S1037	R1038	Y1039	G1040	R1041	F1042	L1043	C1044	M1045	L1046	L1047	E1048	T1049	V1050	T1051	R1052	W1053	W1054	S1055	ASP	ARG	ALA	THR	THR	TYR	GLU	LYS	CYS	GLY	ASN	TYR	PRO	GLY	PHE	LEU	THR	THR	ILE	ARG	THR	GLY	PHE	ASP		

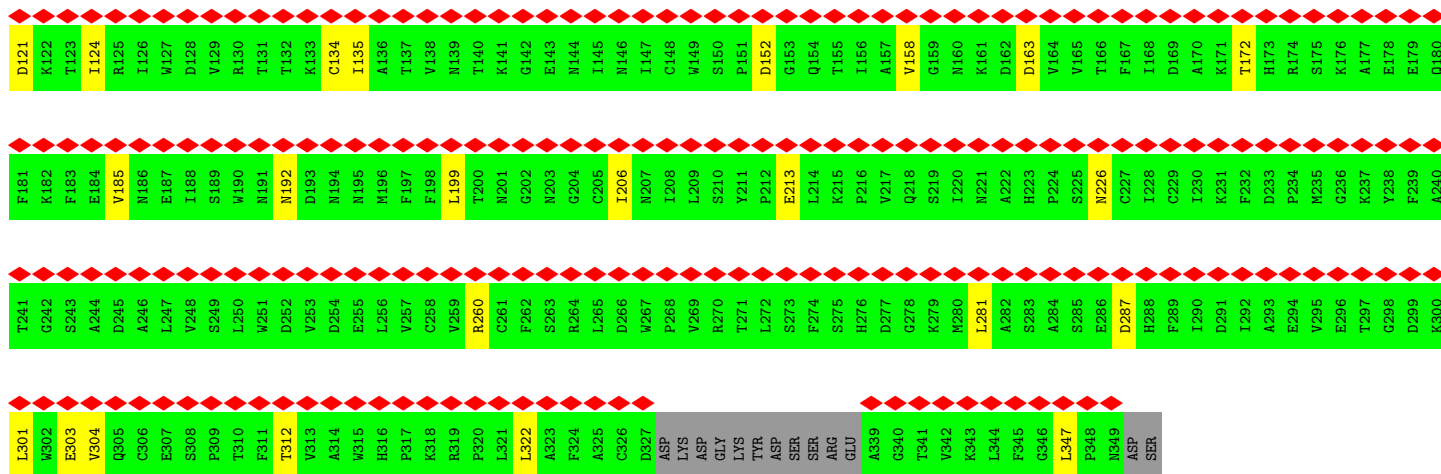


● Molecule 3: THO complex subunit 3

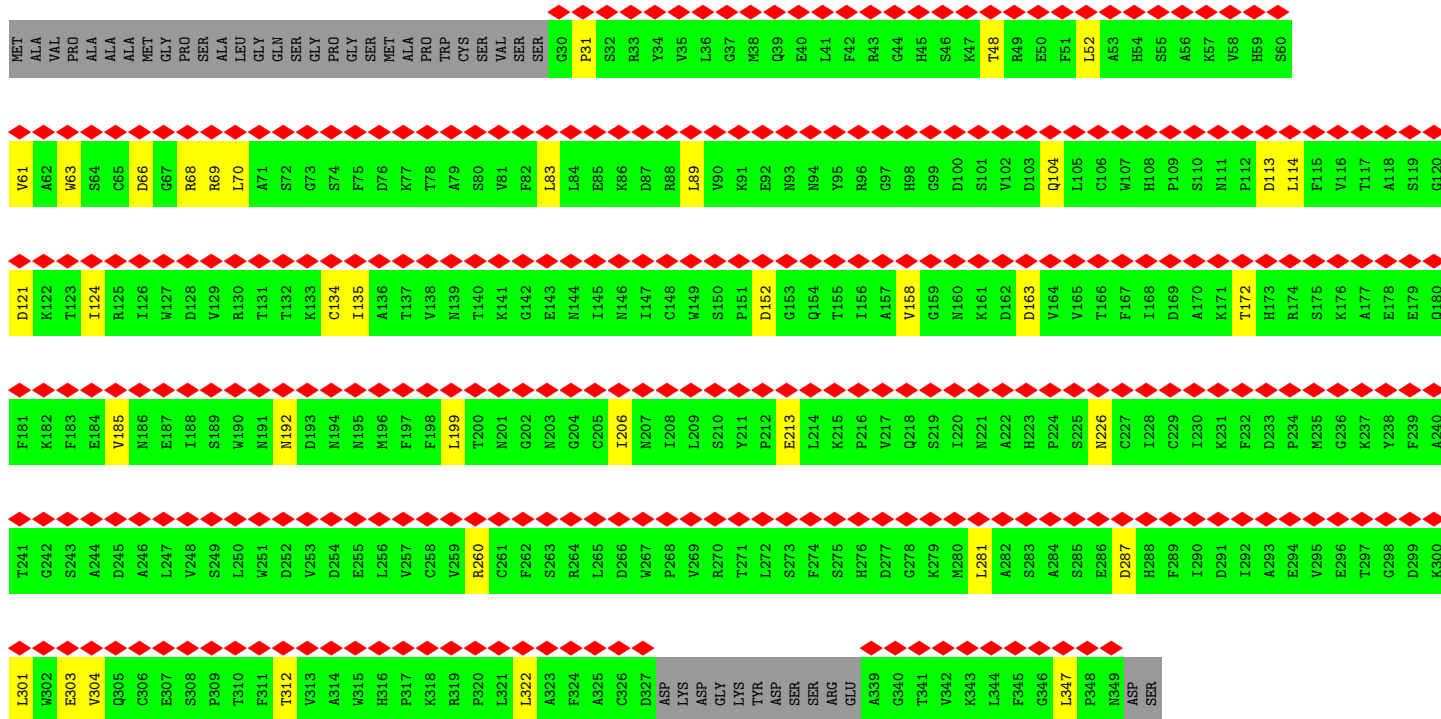
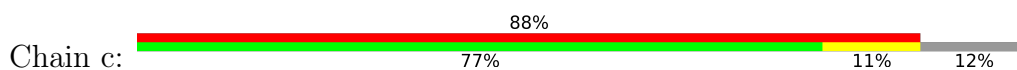


● Molecule 3: THO complex subunit 3

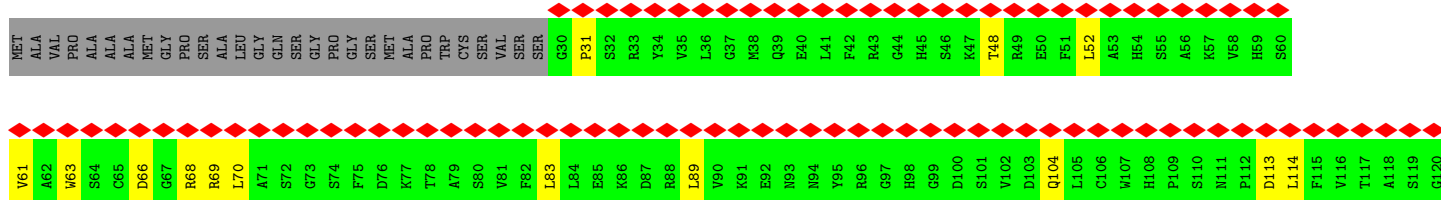
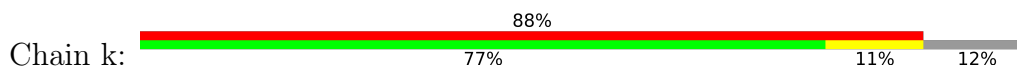




• Molecule 3: THO complex subunit 3

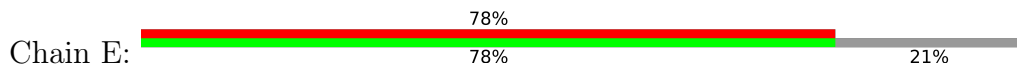


• Molecule 3: THO complex subunit 3

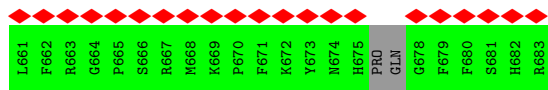


T481	R482	V483	Q484	S485	R486	L487	A488	H489	K491	Q492	F493	A494	S495	L496	E497	H498	G499	I500	V501	P502	V503	T504	S505	D506	C507	Q508	Y509	L510	F511	P512	A513	K514	V515	V516	S517	R518	L519	V520	K521	W522	V523	T524	V525	A526	H527	E528	D529	Y530	M531	E532	L533	H534	F535	T536	L479	K480	V540			
F181	K182	F183	E184	V185	M186	E187	I188	S189	W190	M191	N192	D193	M194	N195	M196	F197	F198	L199	T200	N201	G202	N203	G204	C205	T206	N207	I208	L209	S210	Y211	P212	E213	L214	K215	P216	V217	Q218	S219	I220	N221	A222	H223	P224	S225	N226	C227	I228	C229	I230	A170	K171	T172	H173	R174	S175	K176	A177	E178	F179	A240
T241	G242	S243	A244	D245	A246	L247	V248	S249	L250	W251	D252	V253	D254	E255	L256	V257	C258	V259	R260	C261	F262	S263	R264	L265	D266	W267	P268	V269	R270	T271	L272	S273	F274	S275	H276	D277	G278	K279	M280	L281	S282	S283	A284	S285	E286	D287	H288	F289	I290	D291	I292	A293	E294	V295	E296	T297	G298	D299	K300	
L301	W302	E303	V304	Q305	C306	E307	S308	P309	T310	F311	T312	V313	A314	W315	H316	P317	K318	R319	P320	L321	L322	A323	F324	A325	C326	D327	ASP	LYS	GLY	GLY	LYS	TYR	S38	E39	GLY	ASP	A41	E42	V43	D44	L45	R46	D47	PRO	GLY	ARG	ASP	Y52	E53	L54	Y55	K56	S57	T58	C59	Q60				

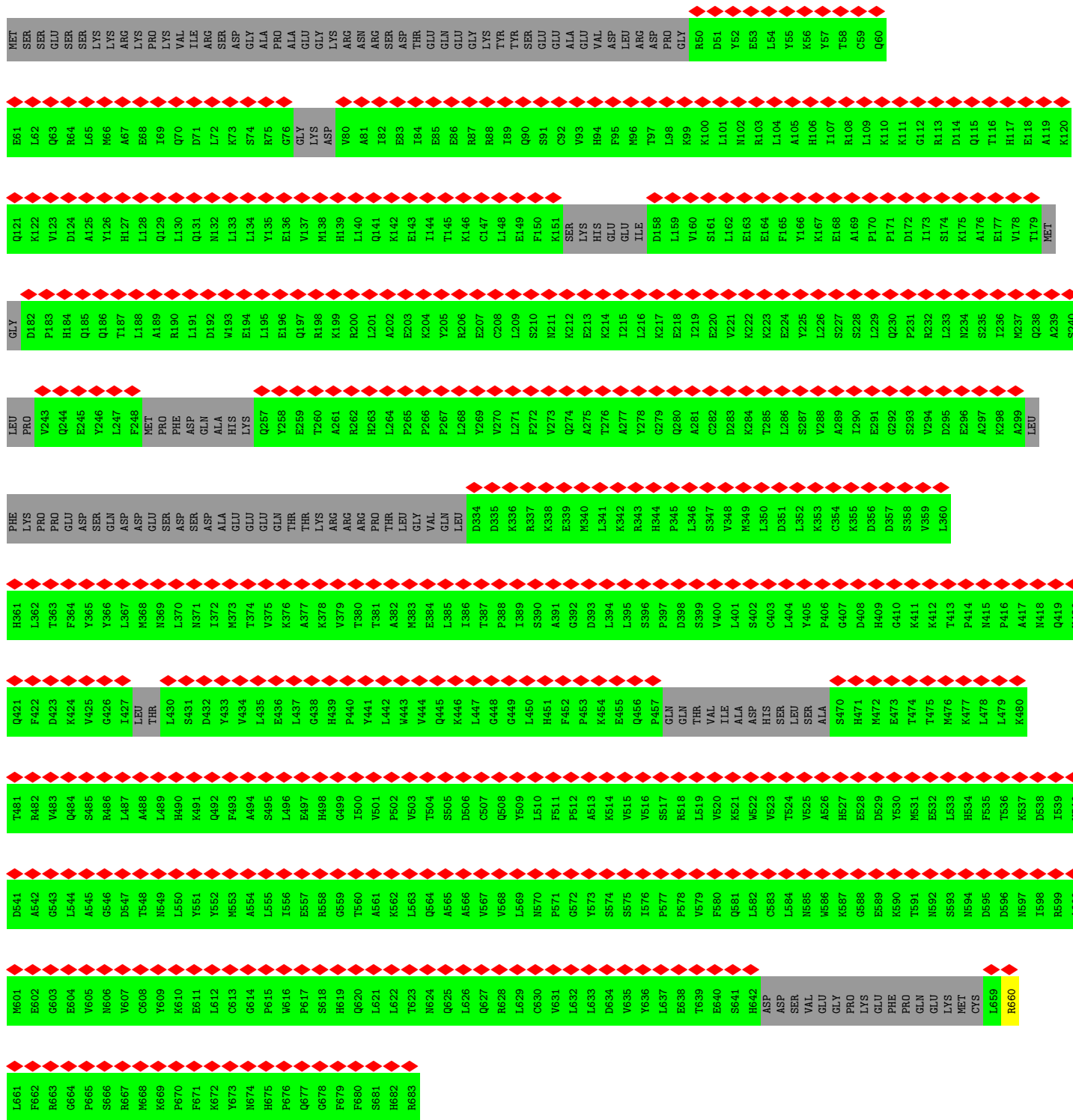
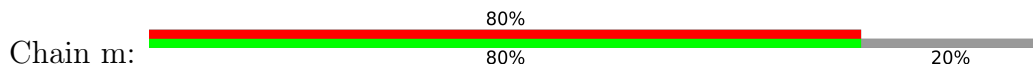
● Molecule 4: THO complex subunit 5 homolog



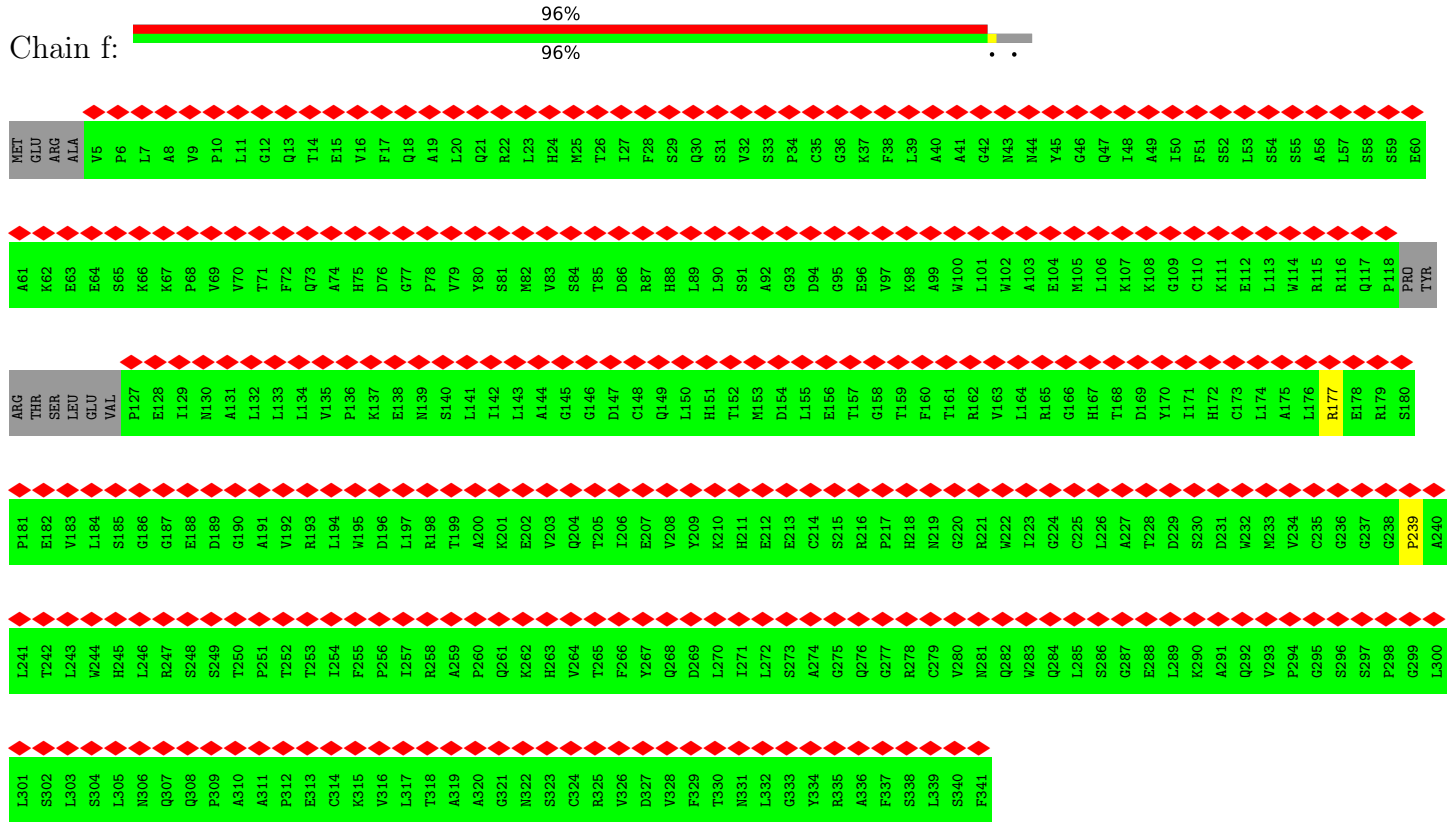
MET	SER	GLU	SER	SER	LYS	LYS	ARG	LYS	PRO	LYS	LYS	VAL	ILE	ARG	ASP	GLY	ALA	PRO	ALA	GLY	GLY	LYS	ASP	GLY	GLY	LYS	TYR	S38	E39	GLY	ASP	A41	E42	V43	D44	L45	R46	D47	PRO	GLY	ARG	ASP	Y52	E53	L54	Y55	K56	S57	T58	C59	Q60									
E61	L62	Q63	R64	L65	M66	A67	E68	I69	L70	D71	L72	K73	S74	R75	GLY	GLY	LYS	ASP	W80	A81	I82	E83	I84	E85	E86	H87	R88	I89	Q90	S91	C92	V93	H94	F95	M96	T97	L98	K99	K100	L101	N102	R103	L104	A105	H106	I107	R108	L109	K110	K111	G112	R113	D114	Q115	T116	H117	E118	A119	K120	
Q121	K122	V123	D124	A125	V126	H127	L128	Q129	L130	Q131	M132	L133	L134	V135	L136	V137	M138	H139	L140	A202	R203	K204	L205	R206	E207	C208	L209	S210	N211	K212	E213	K214	L215	L216	K217	E218	L219	E220	V221	K222	K223	E224	Y225	L226	S227	S228	L229	Q230	P231	R232	L233	M234	S235	L236	M237	Q238	A239	S240		
L241	P242	V243	Q244	E245	Y246	L247	PHE	PRO	PRO	PHE	D252	Q253	A254	H255	K256	Q257	Y258	E259	T260	A261	R262	H263	L264	P265	P266	P267	L268	Y269	V270	L271	F272	V273	Q274	A275	T276	A277	Y278	G279	Q280	A281	C282	D283	K284	T285	L286	S287	V288	A289	I290	E291	G292	S293	V294	D295	E296	A297	K298	A299	LEU	
PHE	LYS	PRO	PRO	ASP	GLN	GLN	ASP	GLN	ASP	ASP	ASP	ALA	GLU	GLU	GLN	THR	THR	LYS	ARG	ARG	ARG	THR	LEU	VAL	L333	D334	D335	K336	R337	S338	A339	G339	D339	L341	L341	L341	L341	R343	H344	P345	L346	S347	V348	M349	L350	D351	L352	K353	C354	R355	D356	D357	S358	V359	L360					
H361	L362	T363	F364	Y365	Y366	L367	M368	R369	L370	M371	I372	M373	T374	V375	K376	A377	K378	V379	T380	T381	A382	M383	E384	L385	I386	T387	P388	I389	S390	A391	G392	D393	L394	L394	L395	S396	P397	D398	S399	V400	L401	S402	C403	L404	Y405	P406	G407	D408	H409	Q410	K411	K412	T413	P414	M415	P416	A417	M418	Q419	Y420
Q421	F422	D423	K424	V425	GLY	ILE	LEU	THR	L430	S431	D432	Y433	V434	L435	E436	L437	G438	H439	P440	Y441	W442	W443	V444	Q445	K446	L447	G448	G449	L450	H451	F452	L453	LYS	GLU	GLN	PRO	GLN	GLN	THR	VAL	I462	A463	D464	H465	S466	L467	S468	A469	S470	H471	M472	E473	T474	T475	M476	K477	L478	L479	K480	
T481	R482	V483	Q484	S485	R486	L487	A488	H489	K491	Q492	F493	A494	S495	L496	E497	H498	G499	I500	V501	P502	V503	T504	S505	D506	C507	Q508	Y509	L510	F511	P512	A513	K514	V515	V516	S517	R518	L519	V520	K521	W522	V523	T524	V525	A526	H527	E528	D529	Y530	M531	E532	L533	H534	F535	T536	L479	K480	V540			



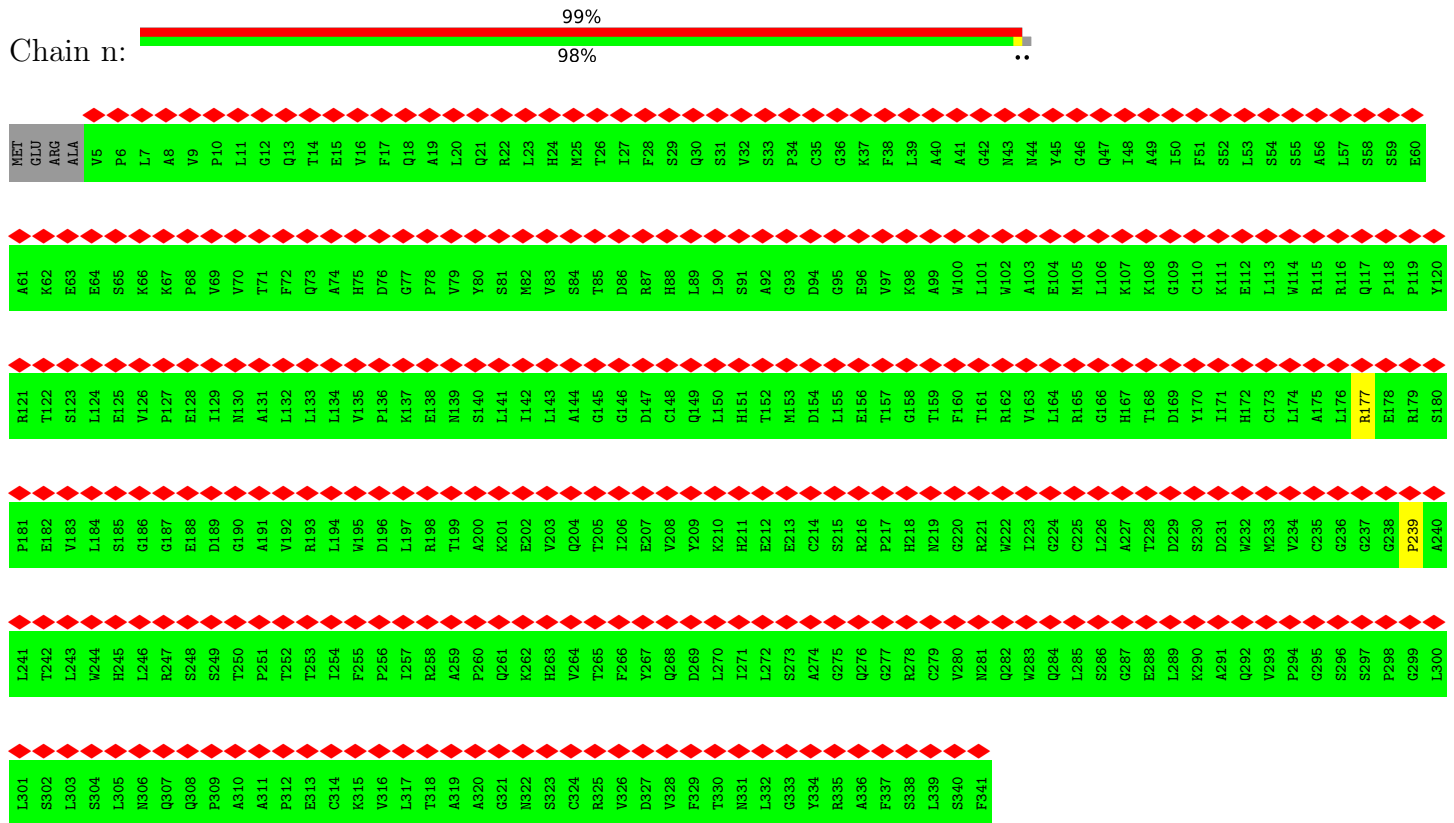
• Molecule 4: THO complex subunit 5 homolog



• Molecule 5: THO complex subunit 6 homolog



• Molecule 5: THO complex subunit 6 homolog



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	246457	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 ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	400	Depositor
Maximum defocus (nm)	3700	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	6.605	Depositor
Minimum map value	-4.523	Depositor
Average map value	0.003	Depositor
Map value standard deviation	0.048	Depositor
Recommended contour level	0.9	Depositor
Map size (\AA)	589.60004, 589.60004, 589.60004	wwPDB
Map dimensions	440, 440, 440	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	1.34, 1.34, 1.34	Depositor

5 Model quality i

5.1 Standard geometry i

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	0.26	0/2942	0.38	0/3969
1	I	0.28	0/2989	0.46	0/4034
1	a	0.26	0/2942	0.38	0/3969
1	i	0.28	0/2990	0.45	0/4035
2	B	0.28	0/7129	0.43	1/9633 (0.0%)
2	J	0.28	1/7071 (0.0%)	0.43	1/9556 (0.0%)
2	b	0.28	0/7129	0.43	1/9633 (0.0%)
2	j	0.28	1/7071 (0.0%)	0.43	1/9556 (0.0%)
3	C	0.32	0/2494	0.49	0/3384
3	K	0.32	0/2494	0.49	0/3384
3	c	0.32	0/2494	0.49	0/3384
3	k	0.31	0/2494	0.49	0/3384
4	E	0.34	1/3830 (0.0%)	0.49	0/5225
4	M	0.29	0/4215	0.49	0/5717
4	e	0.34	1/3737 (0.0%)	0.49	0/5098
4	m	0.29	0/4215	0.49	0/5717
5	F	0.32	0/2666	0.57	0/3623
5	N	0.32	0/2666	0.56	0/3623
5	f	0.33	0/2596	0.57	0/3524
5	n	0.32	0/2666	0.57	0/3623
6	G	0.24	0/796	0.30	0/1105
6	O	0.27	0/1138	0.39	0/1536
6	g	0.24	0/796	0.30	0/1105
6	o	0.27	0/1138	0.39	0/1536
7	H	0.24	0/1421	0.39	0/1915
7	P	0.24	0/1421	0.39	0/1915
7	h	0.24	0/1421	0.39	0/1915
7	p	0.24	0/1421	0.39	0/1915
All	All	0.29	4/86382 (0.0%)	0.46	4/117013 (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	B	0	5
2	J	0	4
2	b	0	5
2	j	0	4
3	C	0	1
3	K	0	1
3	c	0	1
3	k	0	1
4	M	0	1
4	m	0	1
All	All	0	24

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	e	86	GLU	C-N	-10.02	1.11	1.34
4	E	86	GLU	C-N	-10.00	1.11	1.34
2	j	234	SER	C-N	-5.83	1.20	1.34
2	J	234	SER	C-N	-5.79	1.20	1.34

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	b	593	LEU	CA-CB-CG	6.33	129.86	115.30
2	J	593	LEU	CA-CB-CG	6.31	129.81	115.30
2	j	593	LEU	CA-CB-CG	6.31	129.80	115.30
2	B	593	LEU	CA-CB-CG	6.30	129.79	115.30

There are no chirality outliers.

5 of 24 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	B	1116	GLU	Peptide
2	B	163	ASN	Peptide
2	B	557	THR	Peptide
2	B	562	LYS	Peptide
2	B	788	LEU	Peptide

5.2 Too-close contacts [i](#)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

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	330/657 (50%)	309 (94%)	19 (6%)	2 (1%)	25	62
1	I	335/657 (51%)	309 (92%)	23 (7%)	3 (1%)	17	54
1	a	330/657 (50%)	309 (94%)	19 (6%)	2 (1%)	25	62
1	i	335/657 (51%)	309 (92%)	23 (7%)	3 (1%)	17	54
2	B	871/1593 (55%)	805 (92%)	62 (7%)	4 (0%)	29	66
2	J	864/1593 (54%)	802 (93%)	59 (7%)	3 (0%)	41	75
2	b	871/1593 (55%)	805 (92%)	62 (7%)	4 (0%)	29	66
2	j	864/1593 (54%)	802 (93%)	59 (7%)	3 (0%)	41	75
3	C	305/351 (87%)	267 (88%)	37 (12%)	1 (0%)	41	75
3	K	305/351 (87%)	268 (88%)	36 (12%)	1 (0%)	41	75
3	c	305/351 (87%)	267 (88%)	37 (12%)	1 (0%)	41	75
3	k	305/351 (87%)	267 (88%)	37 (12%)	1 (0%)	41	75
4	E	520/683 (76%)	494 (95%)	25 (5%)	1 (0%)	47	80
4	M	529/683 (78%)	504 (95%)	25 (5%)	0	100	100
4	e	507/683 (74%)	485 (96%)	22 (4%)	0	100	100
4	m	529/683 (78%)	503 (95%)	26 (5%)	0	100	100
5	F	335/341 (98%)	305 (91%)	29 (9%)	1 (0%)	41	75
5	N	335/341 (98%)	306 (91%)	28 (8%)	1 (0%)	41	75
5	f	325/341 (95%)	298 (92%)	26 (8%)	1 (0%)	41	75
5	n	335/341 (98%)	305 (91%)	29 (9%)	1 (0%)	41	75
6	G	153/204 (75%)	153 (100%)	0	0	100	100
6	O	158/204 (78%)	158 (100%)	0	0	100	100
6	g	153/204 (75%)	153 (100%)	0	0	100	100
6	o	158/204 (78%)	158 (100%)	0	0	100	100
7	H	168/428 (39%)	162 (96%)	6 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
7	P	168/428 (39%)	162 (96%)	6 (4%)	0	100	100
7	h	168/428 (39%)	162 (96%)	6 (4%)	0	100	100
7	p	168/428 (39%)	162 (96%)	6 (4%)	0	100	100
All	All	10729/17028 (63%)	9989 (93%)	707 (7%)	33 (0%)	44	75

5 of 33 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	789	SER
2	J	789	SER
2	b	789	SER
2	j	789	SER
2	B	557	THR

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	310/601 (52%)	287 (93%)	23 (7%)	13	43
1	I	312/601 (52%)	307 (98%)	5 (2%)	62	83
1	a	310/601 (52%)	287 (93%)	23 (7%)	13	43
1	i	313/601 (52%)	308 (98%)	5 (2%)	62	83
2	B	704/1442 (49%)	632 (90%)	72 (10%)	7	30
2	J	697/1442 (48%)	632 (91%)	65 (9%)	9	34
2	b	704/1442 (49%)	633 (90%)	71 (10%)	7	30
2	j	697/1442 (48%)	632 (91%)	65 (9%)	9	34
3	C	268/300 (89%)	233 (87%)	35 (13%)	4	20
3	K	268/300 (89%)	233 (87%)	35 (13%)	4	20
3	c	268/300 (89%)	233 (87%)	35 (13%)	4	20
3	k	268/300 (89%)	233 (87%)	35 (13%)	4	20
4	E	322/615 (52%)	321 (100%)	1 (0%)	92	98

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
4	M	404/615 (66%)	404 (100%)	0	100	100
4	e	312/615 (51%)	312 (100%)	0	100	100
4	m	404/615 (66%)	404 (100%)	0	100	100
5	F	284/287 (99%)	283 (100%)	1 (0%)	91	97
5	N	284/287 (99%)	283 (100%)	1 (0%)	91	97
5	f	276/287 (96%)	275 (100%)	1 (0%)	91	97
5	n	284/287 (99%)	283 (100%)	1 (0%)	91	97
6	O	85/184 (46%)	85 (100%)	0	100	100
6	o	85/184 (46%)	85 (100%)	0	100	100
7	H	153/381 (40%)	153 (100%)	0	100	100
7	P	153/381 (40%)	153 (100%)	0	100	100
7	h	153/381 (40%)	153 (100%)	0	100	100
7	p	153/381 (40%)	153 (100%)	0	100	100
All	All	8471/14872 (57%)	7997 (94%)	474 (6%)	25	53

5 of 474 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	K	301	LEU
3	k	68	ARG
2	b	435	PHE
3	k	48	THR
5	n	177	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 189 such sidechains are listed below:

Mol	Chain	Res	Type
2	b	586	GLN
7	h	404	GLN
2	b	727	GLN
3	c	203	ASN
2	j	256	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](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
4	E	1
4	e	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	E	86:GLU	C	87:ARG	N	1.11
1	e	86:GLU	C	87:ARG	N	1.11

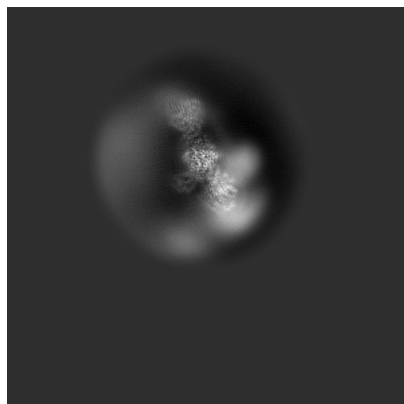
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-14808. These allow visual inspection of the internal detail of the map and identification of artifacts.

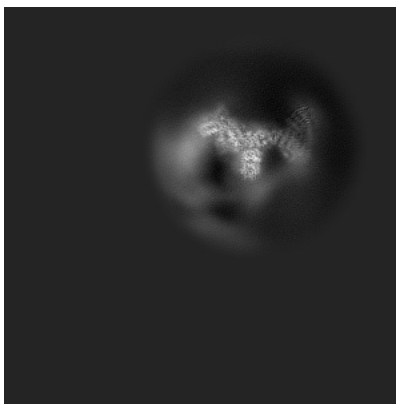
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

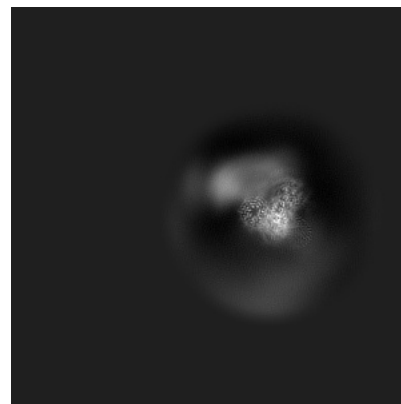
6.1.1 Primary map



X

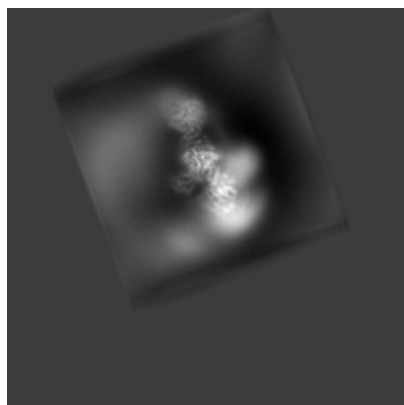


Y

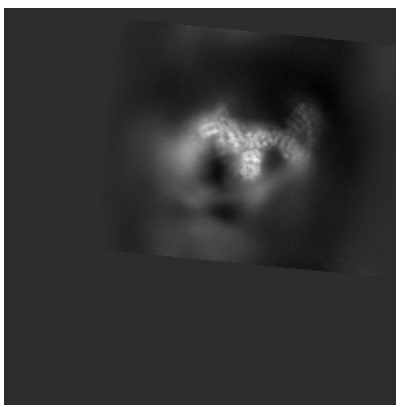


Z

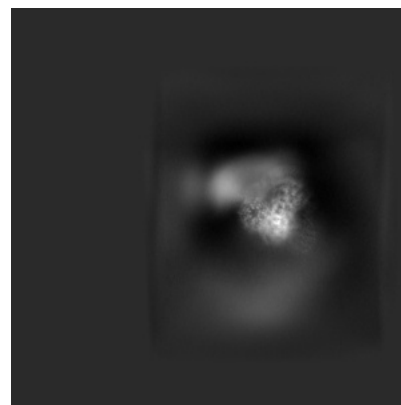
6.1.2 Raw map



X



Y

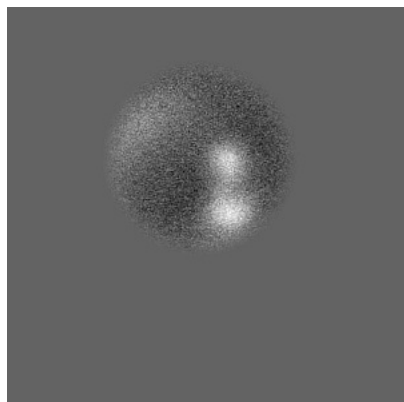


Z

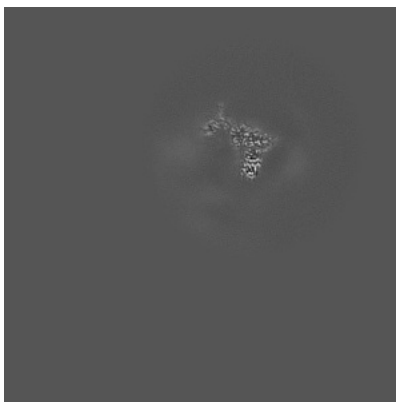
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

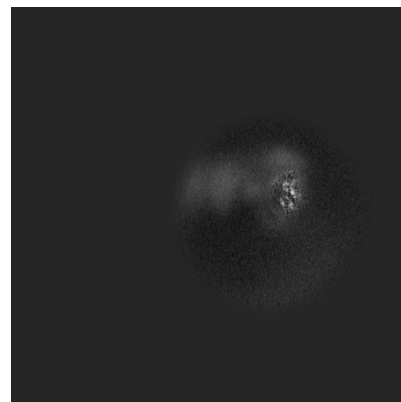
6.2.1 Primary map



X Index: 220

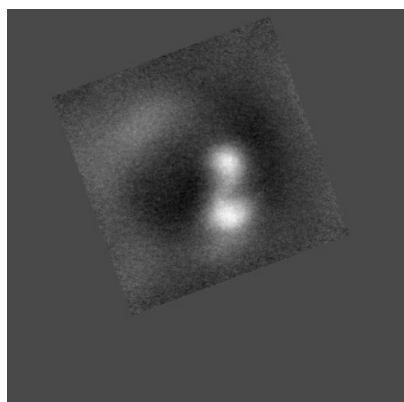


Y Index: 220

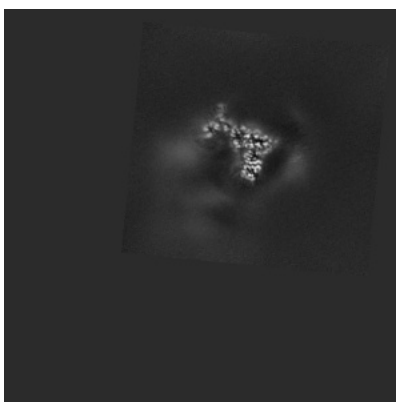


Z Index: 220

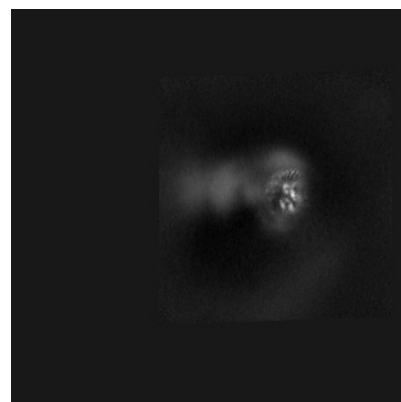
6.2.2 Raw map



X Index: 220



Y Index: 220

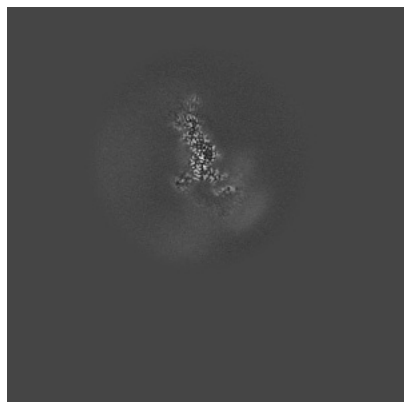


Z Index: 220

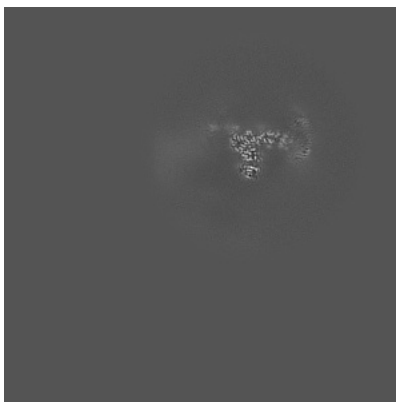
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

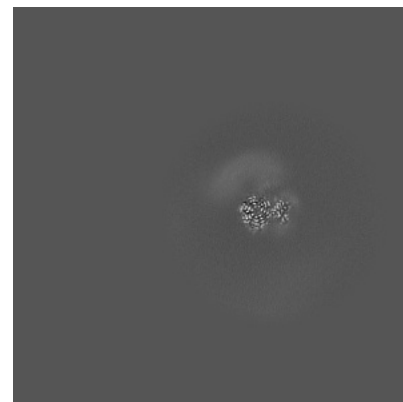
6.3.1 Primary map



X Index: 295

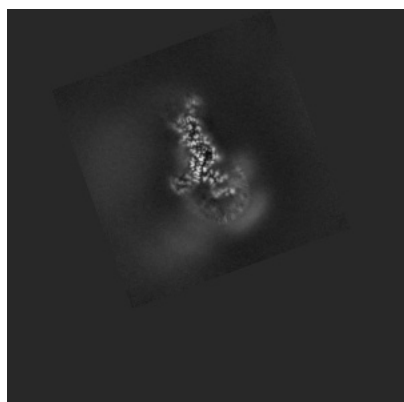


Y Index: 211

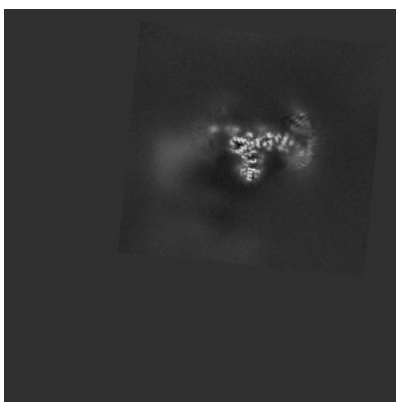


Z Index: 272

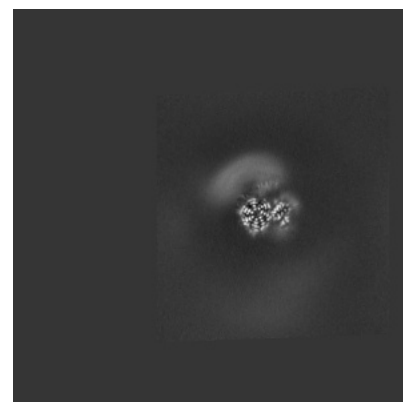
6.3.2 Raw map



X Index: 295



Y Index: 210

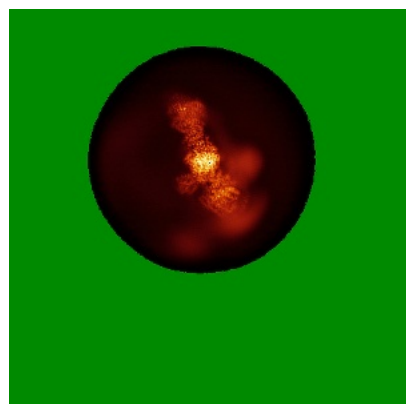


Z Index: 272

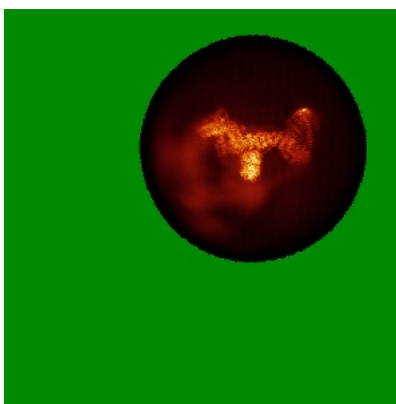
The images above show the largest variance slices of the map in three orthogonal directions.

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

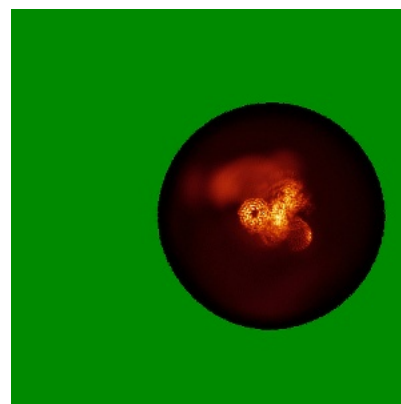
6.4.1 Primary map



X

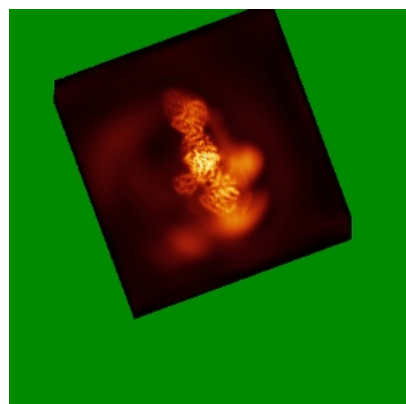


Y

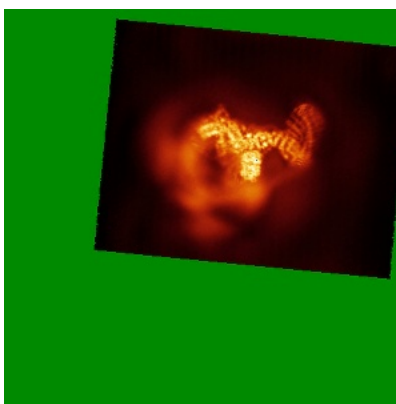


Z

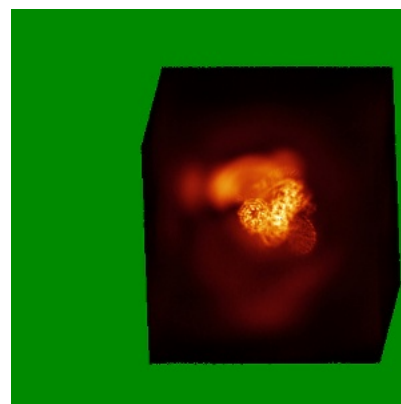
6.4.2 Raw map



X



Y

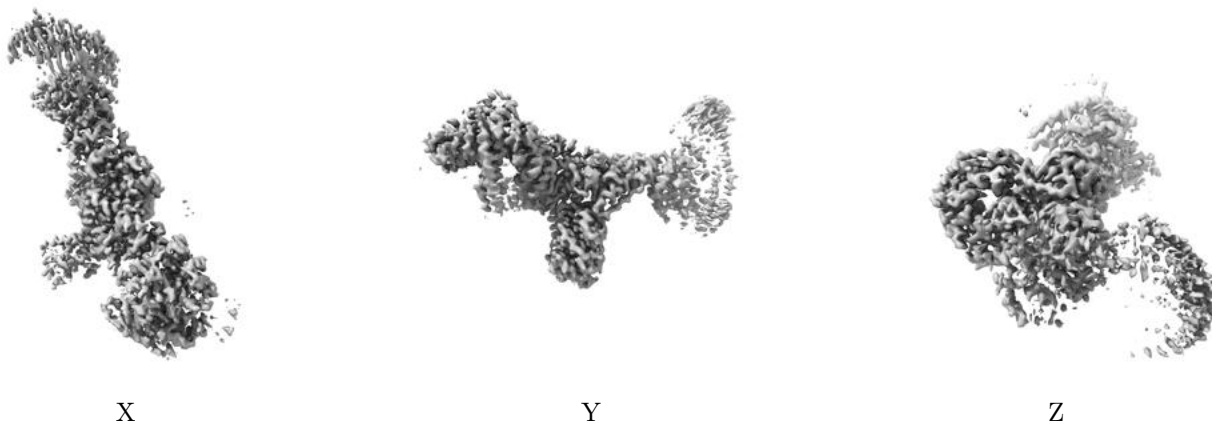


Z

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



The images above show the 3D surface view of the map at the recommended contour level 0.9. 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



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.

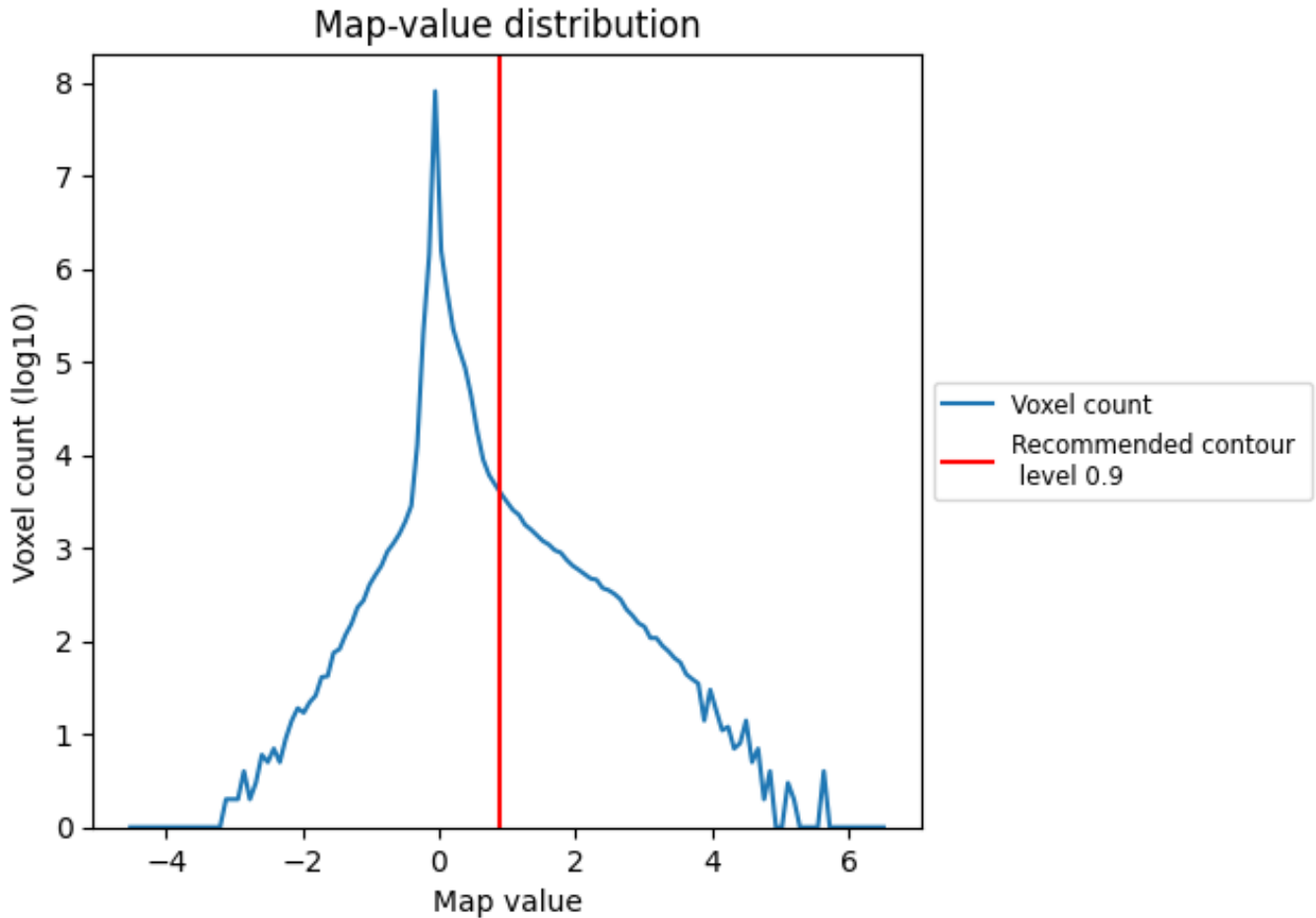
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

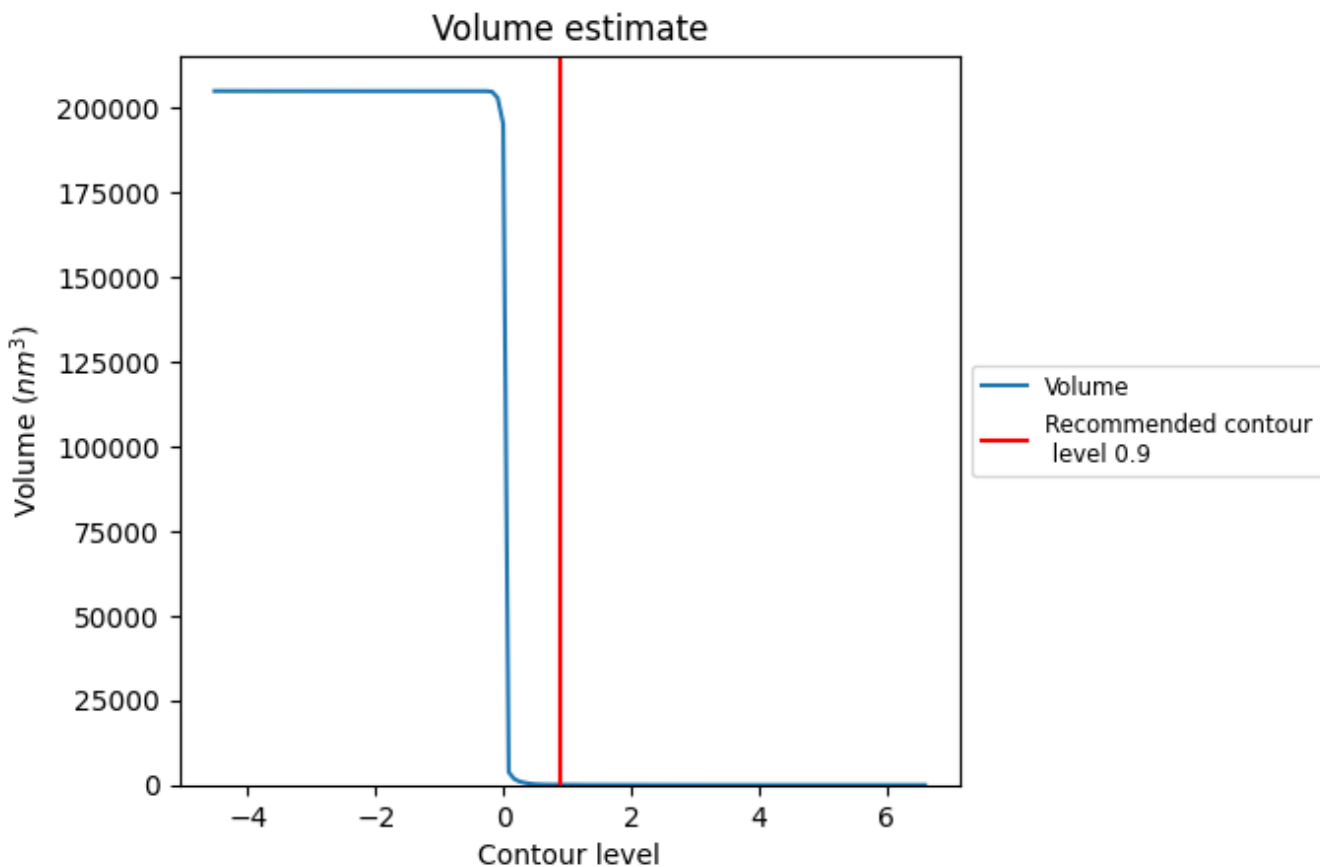
This section contains the results of statistical analysis of the map.

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.

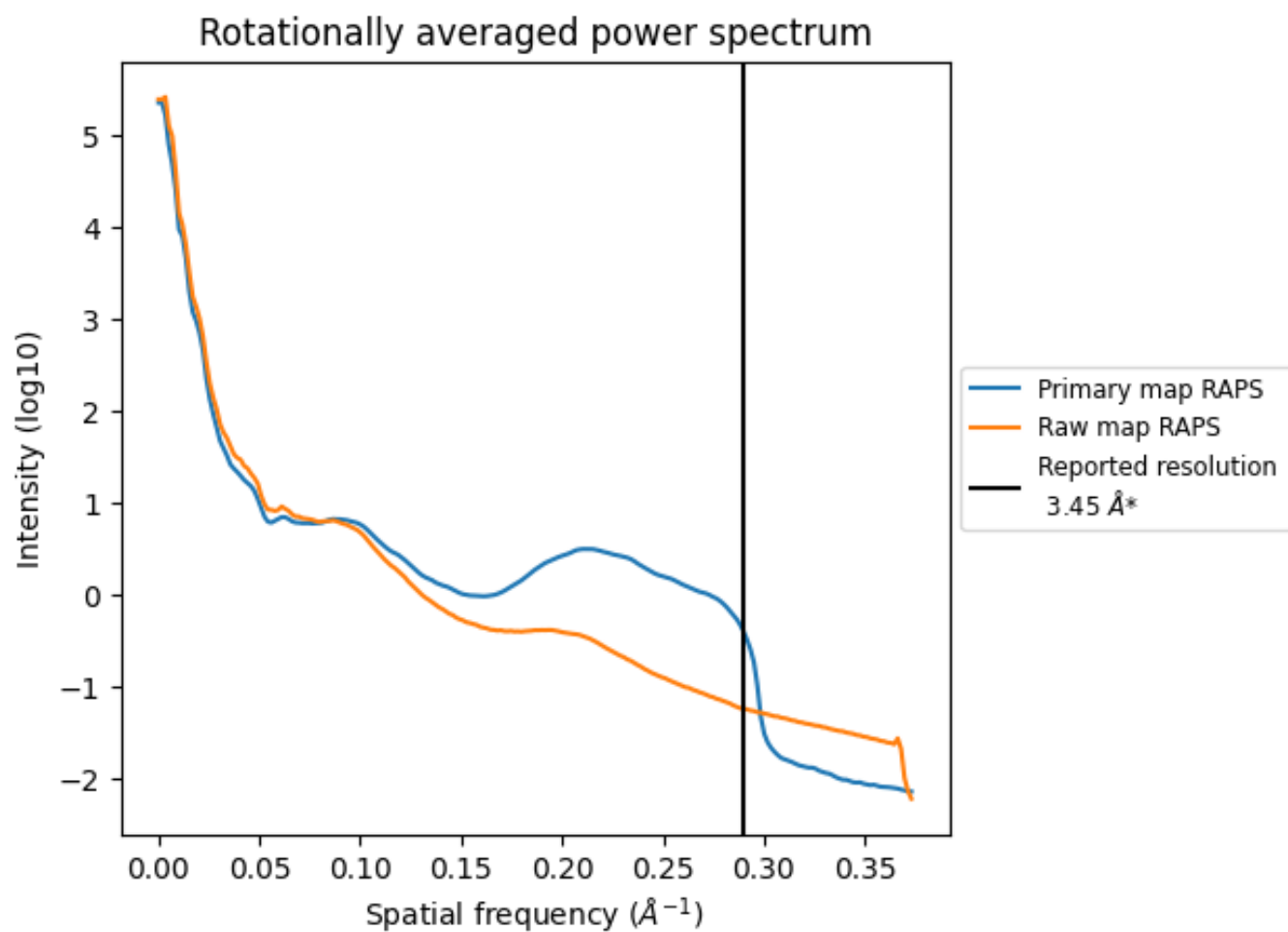
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 66 nm³; this corresponds to an approximate mass of 60 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](#)

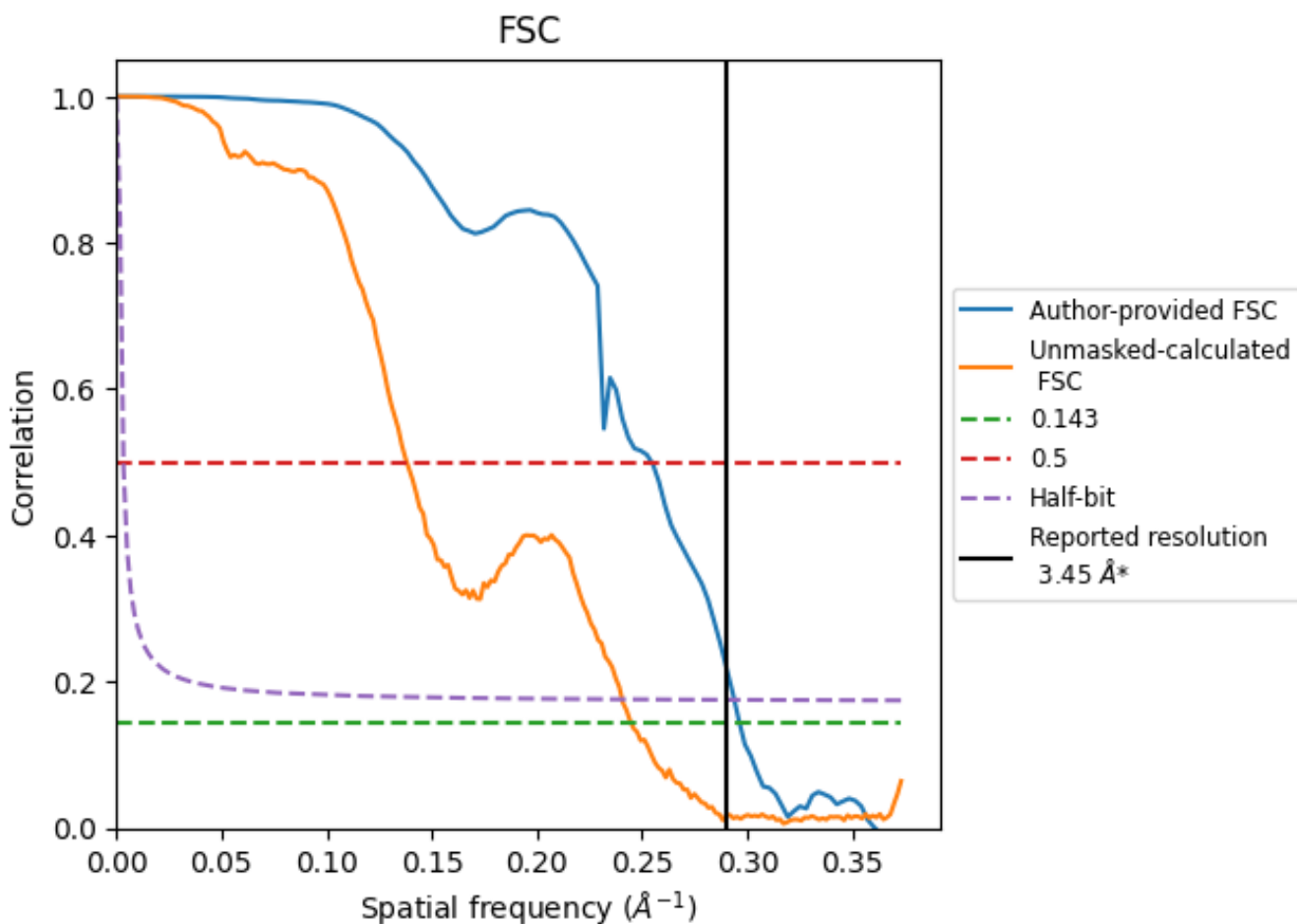


*Reported resolution corresponds to spatial frequency of 0.290 \AA^{-1}

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 0.290 Å⁻¹

8.2 Resolution estimates [i](#)

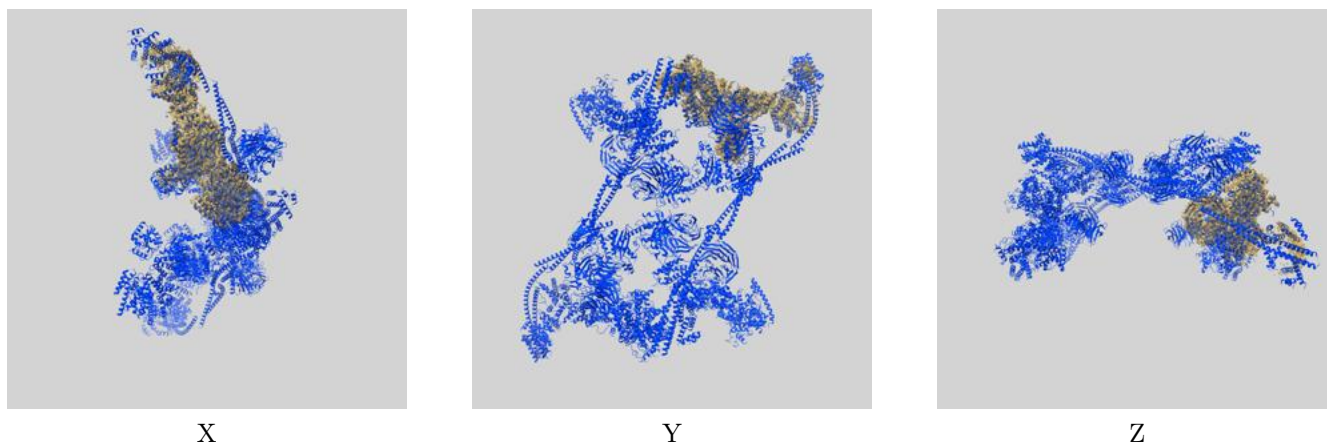
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.45	-	-
Author-provided FSC curve	3.37	3.93	3.41
Unmasked-calculated*	4.08	7.25	4.16

*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 4.08 differs from the reported value 3.45 by more than 10 %

9 Map-model fit [i](#)

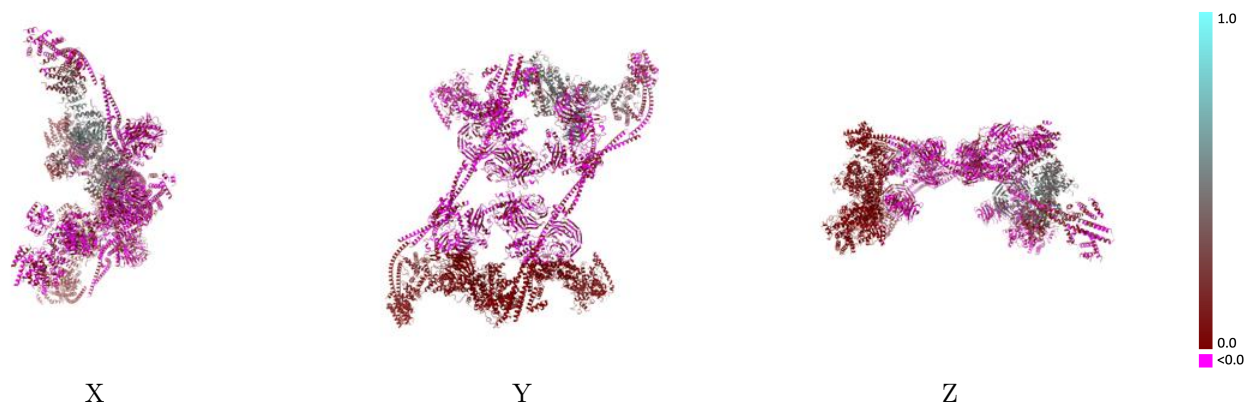
This section contains information regarding the fit between EMDB map EMD-14808 and PDB model 7ZNL. Per-residue inclusion information can be found in section 3 on page 7.

9.1 Map-model overlay [i](#)



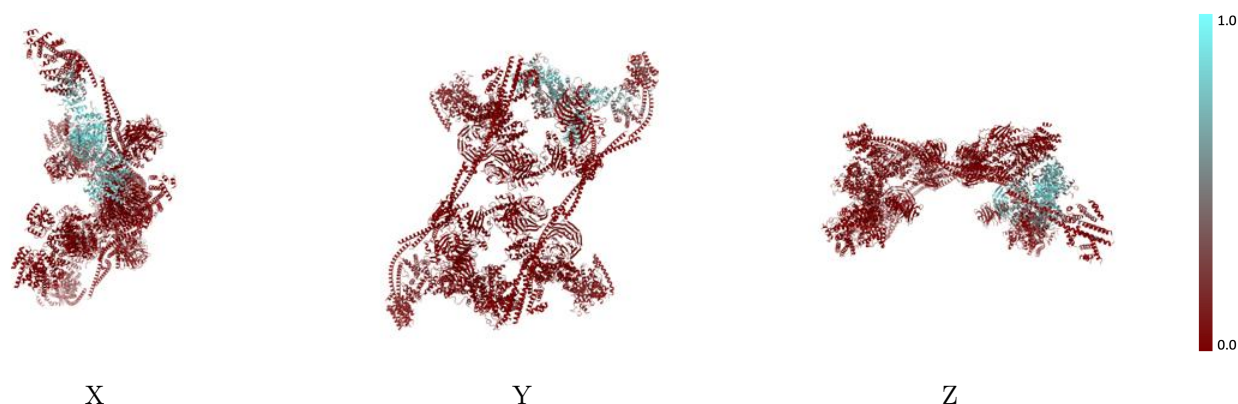
The images above show the 3D surface view of the map at the recommended contour level 0.9 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



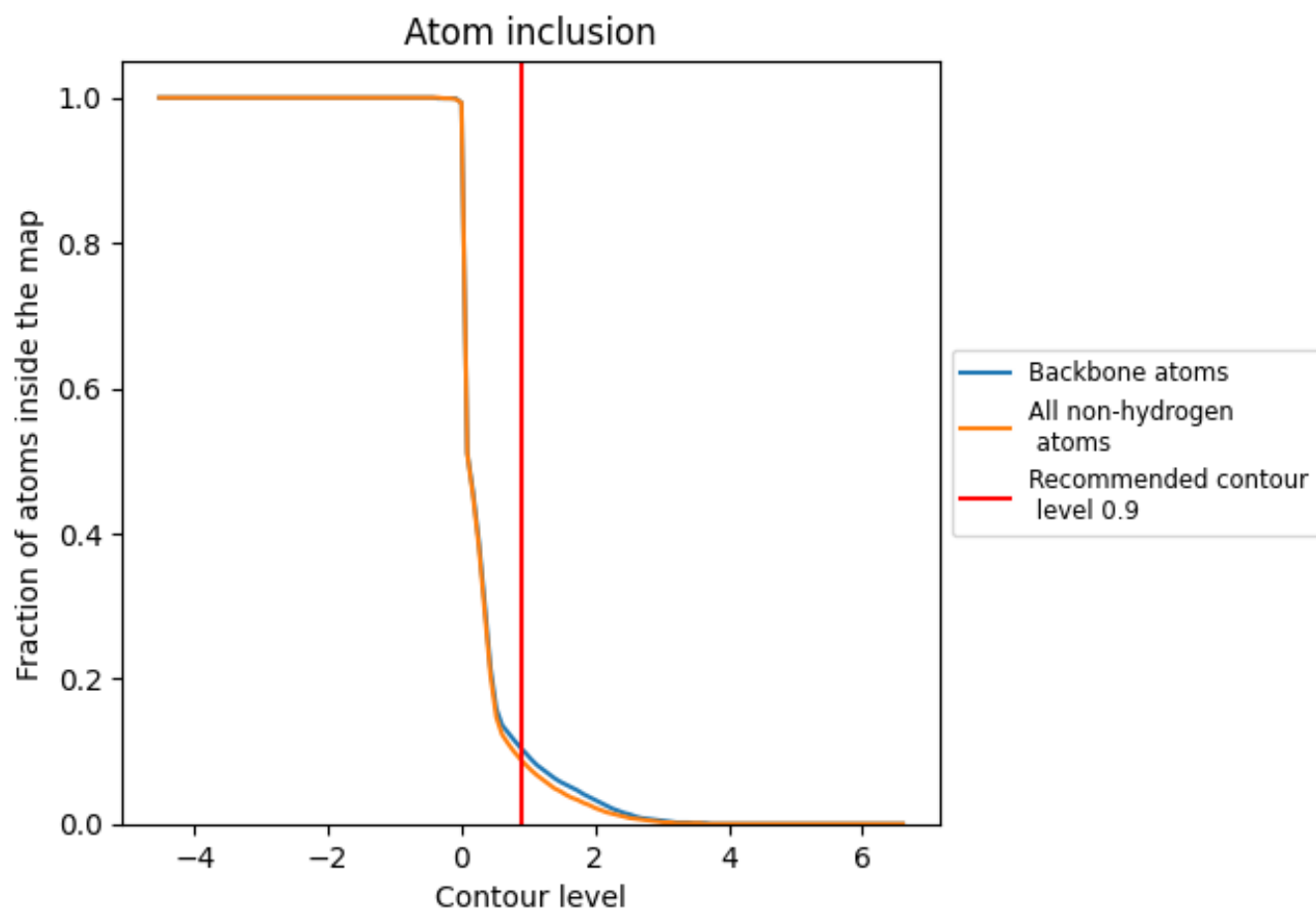
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.9).



























































9.4 Atom inclusion [i](#)



At the recommended contour level, 10% of all backbone atoms, 9% 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 (0.9) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.0870	 0.0690
A	 0.2270	 0.2380
B	 0.6300	 0.4210
C	 0.7970	 0.5090
E	 0.0090	 0.0360
F	 0.0000	 0.0190
G	 0.0750	 0.0590
H	 0.1960	 0.3320
I	 0.0000	 -0.0080
J	 0.0000	 0.0010
K	 0.0000	 -0.0070
M	 0.0000	 0.0170
N	 0.0000	 0.0240
O	 0.0000	 -0.0040
P	 0.0000	 -0.0000
a	 0.0000	 0.0000
b	 0.0000	 0.0000
c	 0.0000	 0.0080
e	 0.0000	 0.0040
f	 0.0000	 0.0200
g	 0.0000	 -0.0010
h	 0.0000	 0.0000
i	 0.0000	 0.0180
j	 0.0000	 0.0040
k	 0.0000	 0.0140
m	 0.0000	 -0.0070
n	 0.0000	 -0.0030
o	 0.0000	 0.0020
p	 0.0000	 -0.0130

