



## wwPDB EM Validation Summary Report ⓘ

Jul 19, 2023 – 08:27 pm BST

PDB ID : 8BD7  
EMDB ID : EMD-15977  
Title : IFTB1 subcomplex of anterograde Intraflagellar transport trains (*Chlamydomonas reinhardtii*)  
Authors : Lacey, S.E.; Foster, H.E.; Pigino, G.  
Deposited on : 2022-10-18  
Resolution : 9.90 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)

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>.

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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.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) : 2.34

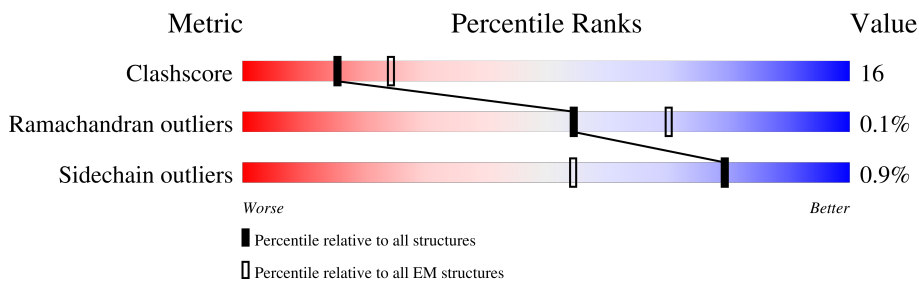
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 9.90 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.



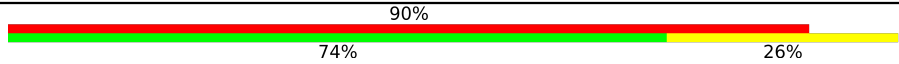






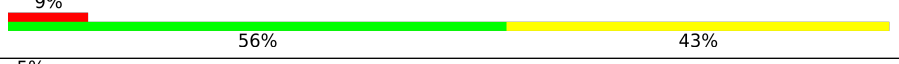
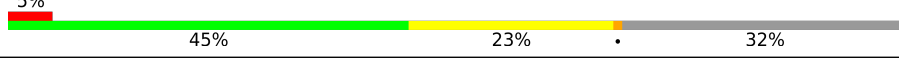
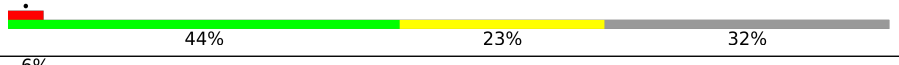


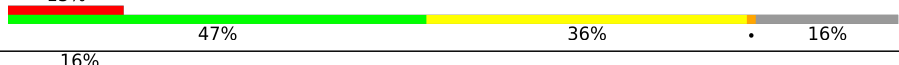
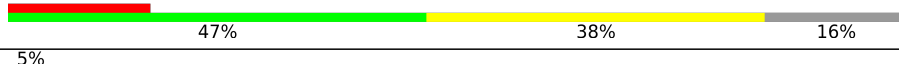
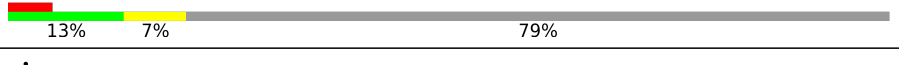

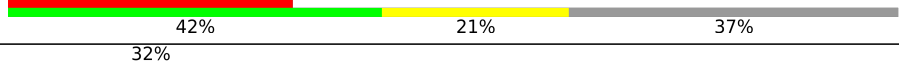
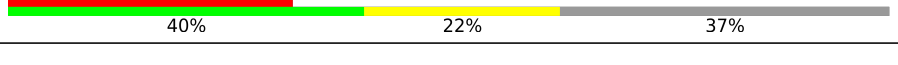
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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	782	10% (Poor fit) 38% (0 outliers), 30% (1 outlier), 31% (2+ outliers) 31% (Not modelled)
1	H	782	10% (Poor fit) 37% (0 outliers), 31% (1 outlier), 31% (2+ outliers) 31% (Not modelled)
2	B	454	34% (0 outliers), 61% (1 outlier), 38% (2+ outliers) 38% (Not modelled)
2	J	454	35% (0 outliers), 64% (1 outlier), 36% (2+ outliers) 36% (Not modelled)
3	C	647	18% (Poor fit) 62% (0 outliers), 33% (1 outlier), 5% (2+ outliers) 5% (Not modelled)
3	K	647	21% (Poor fit) 62% (0 outliers), 34% (1 outlier), 5% (2+ outliers) 5% (Not modelled)
4	D	344	27% (Poor fit) 26% (0 outliers), 13% (1 outlier), 61% (2+ outliers) 61% (Not modelled)
4	N	344	28% (Poor fit) 25% (0 outliers), 13% (1 outlier), 61% (2+ outliers) 61% (Not modelled)

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Mol	Chain	Length	Quality of chain
5	E	555	
5	O	555	
6	F	683	
6	P	683	
7	G	641	
7	Q	641	
8	I	765	
8	R	765	
9	L	443	
9	T	443	
10	M	469	
10	U	469	
11	W	135	
11	Y	135	
12	X	510	
12	Z	510	
13	S	1755	
13	V	1755	

## 2 Entry composition [i](#)

There are 13 unique types of molecules in this entry. The entry contains 86268 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 IFT88.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	539	Total	C	N	O	S	0	0
			4337	2747	762	795	33		
1	H	539	Total	C	N	O	S	0	0
			4337	2747	762	795	33		

- Molecule 2 is a protein called Osm-6-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	454	Total	C	N	O	S	0	0
			3553	2269	591	680	13		
2	J	454	Total	C	N	O	S	0	0
			3553	2269	591	680	13		

- Molecule 3 is a protein called IFT70.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	619	Total	C	N	O	S	0	0
			4978	3171	826	948	33		
3	K	619	Total	C	N	O	S	0	0
			4978	3171	826	948	33		

- Molecule 4 is a protein called Intraflagellar transport protein 46.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	133	Total	C	N	O	S	0	0
			1045	666	172	197	10		
4	N	133	Total	C	N	O	S	0	0
			1045	666	172	197	10		

- Molecule 5 is a protein called Intraflagellar transport protein 56.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	E	555	Total	C	N	O	S	0	0
			4465	2855	763	820	27		
5	O	555	Total	C	N	O	S	0	0
			4465	2855	763	820	27		

- Molecule 6 is a protein called Intraflagellar transport protein 81.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	F	335	Total	C	N	O	S	0	0
			2701	1692	476	526	7		
6	P	335	Total	C	N	O	S	0	0
			2701	1692	476	526	7		

- Molecule 7 is a protein called Intraflagellar transport protein 74.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	205	Total	C	N	O	S	0	0
			1674	1023	302	342	7		
7	Q	205	Total	C	N	O	S	0	0
			1674	1023	302	342	7		

- Molecule 8 is a protein called Intraflagellar transport protein 80.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	I	765	Total	C	N	O	S	0	0
			6025	3807	1053	1132	33		
8	R	765	Total	C	N	O	S	0	0
			6025	3807	1053	1132	33		

- Molecule 9 is a protein called Clusterin-associated protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	L	303	Total	C	N	O	S	0	0
			2472	1547	439	476	10		
9	T	303	Total	C	N	O	S	0	0
			2472	1547	439	476	10		

- Molecule 10 is a protein called Intraflagellar transport protein 57.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	M	164	Total	C	N	O	S	0	0
			1328	812	247	264	5		

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Mol	Chain	Residues	Atoms					AltConf	Trace
10	U	164	Total	C	N	O	S	0	0
			1328	812	247	264	5		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
M	356	ALA	PHE	conflict	UNP Q2XQY7
U	356	ALA	PHE	conflict	UNP Q2XQY7

- Molecule 11 is a protein called Intraflagellar transport particle protein IFT20.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	W	114	Total	C	N	O	S	0	0
			919	562	166	187	4		
11	Y	114	Total	C	N	O	S	0	0
			919	562	166	187	4		

- Molecule 12 is a protein called IFT54.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	X	106	Total	C	N	O	S	0	0
			849	524	155	164	6		
12	Z	106	Total	C	N	O	S	0	0
			849	524	155	164	6		

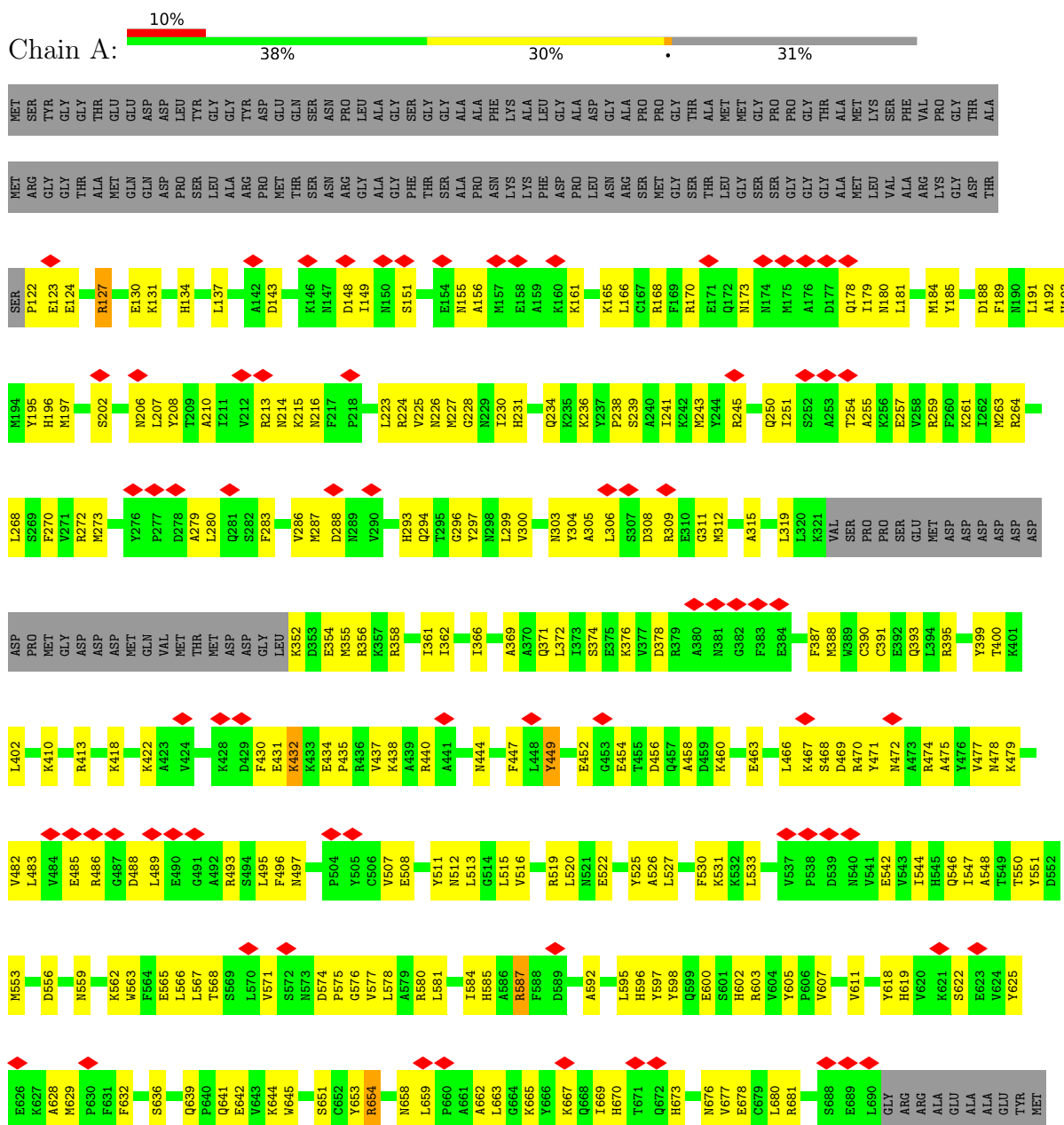
- Molecule 13 is a protein called Intraflagellar transport protein 172.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	S	1104	Total	C	N	O	S	0	0
			8788	5556	1532	1656	44		
13	V	1104	Total	C	N	O	S	0	0
			8788	5556	1532	1656	44		

### 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: IFT88



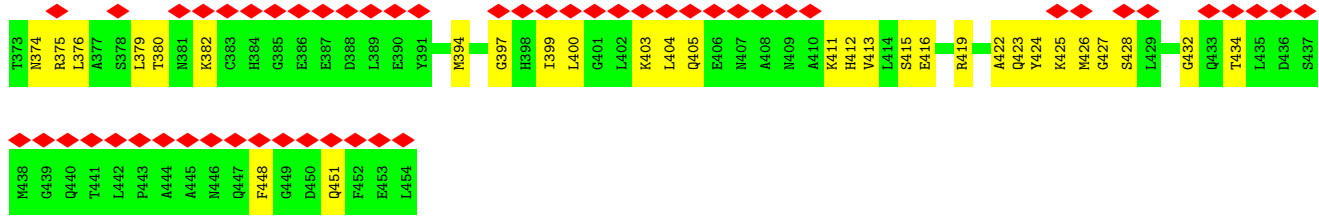




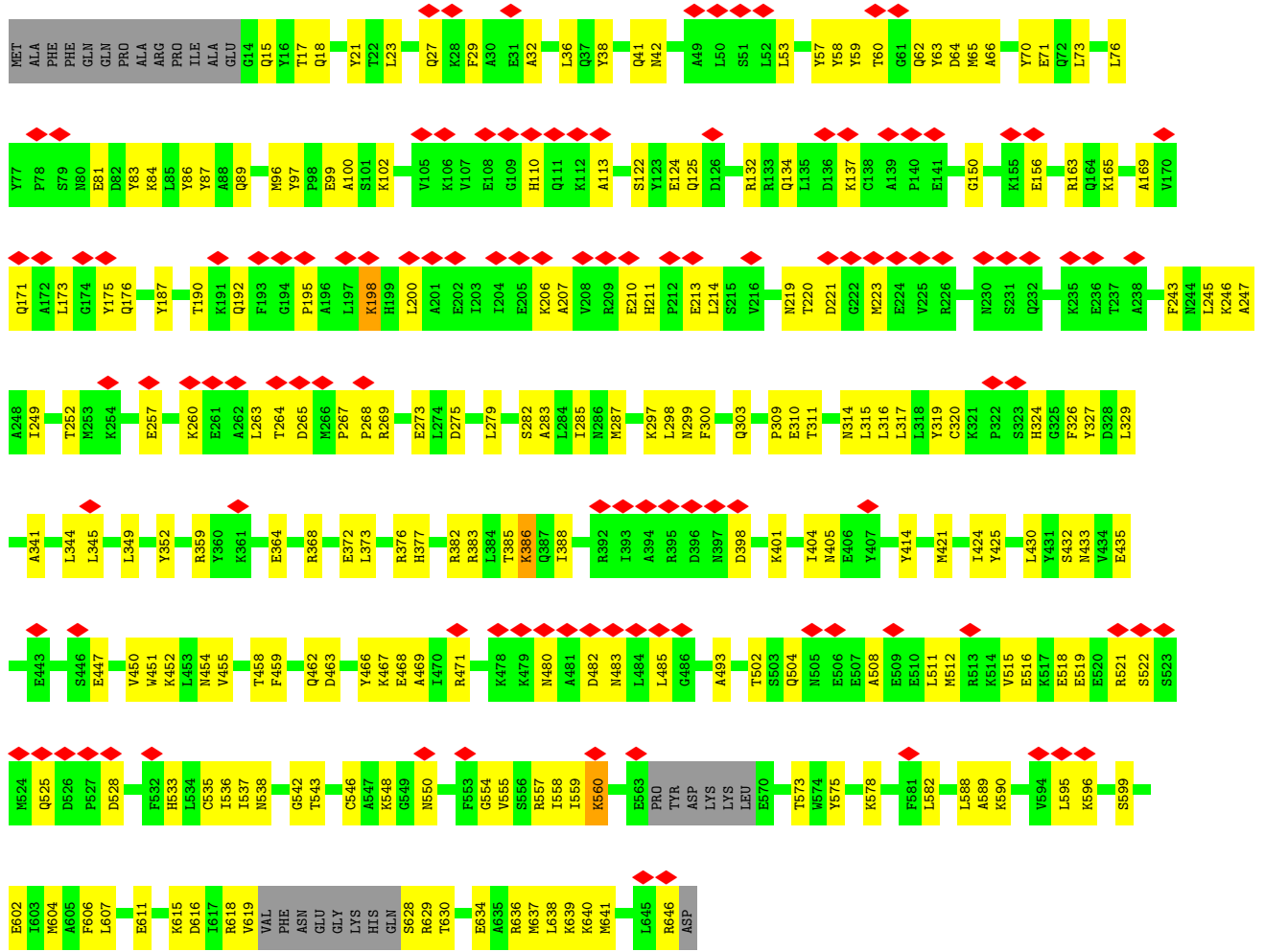


• Molecule 2: Osm-6-like protein

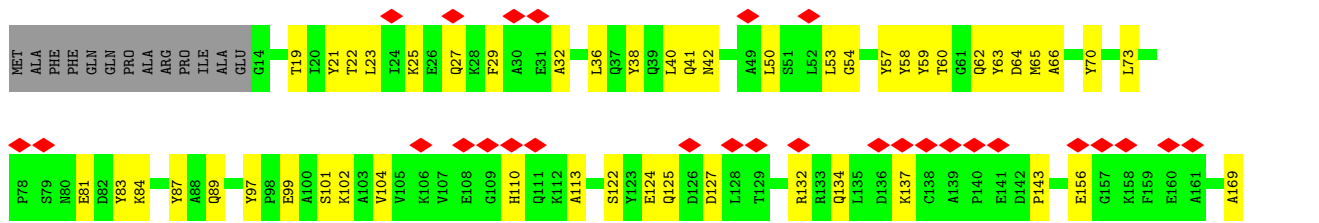


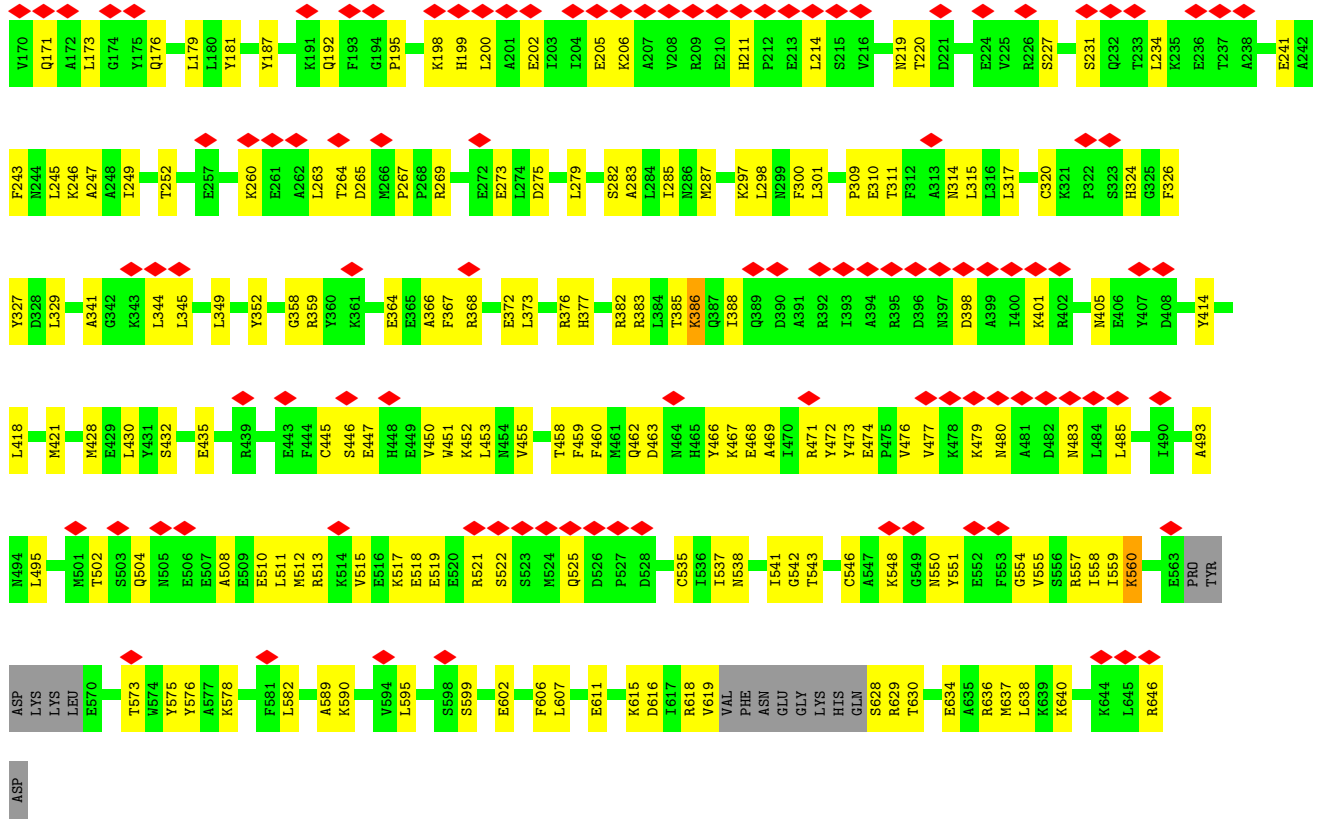


• Molecule 3: IFT70

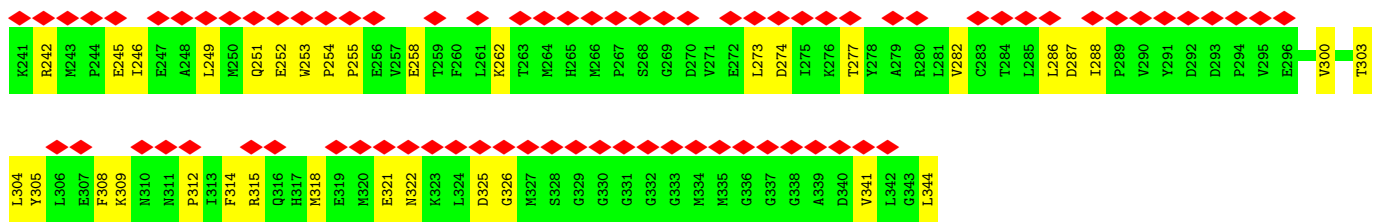
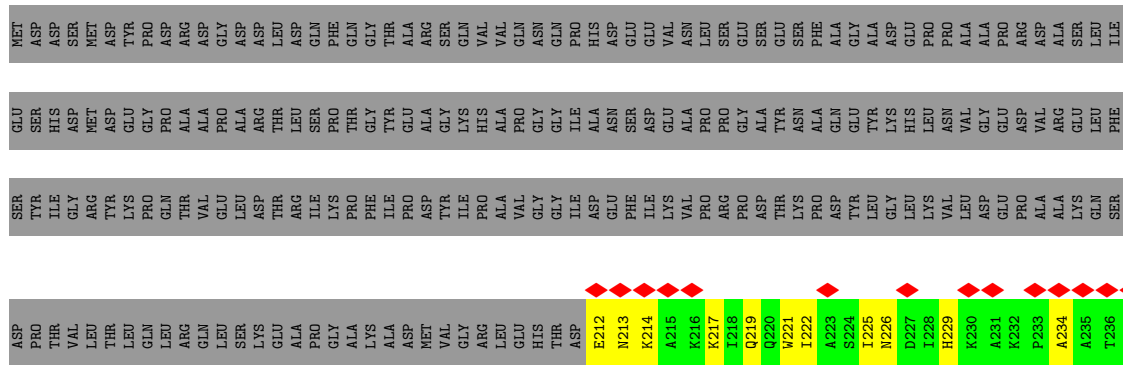


• Molecule 3: IFT70





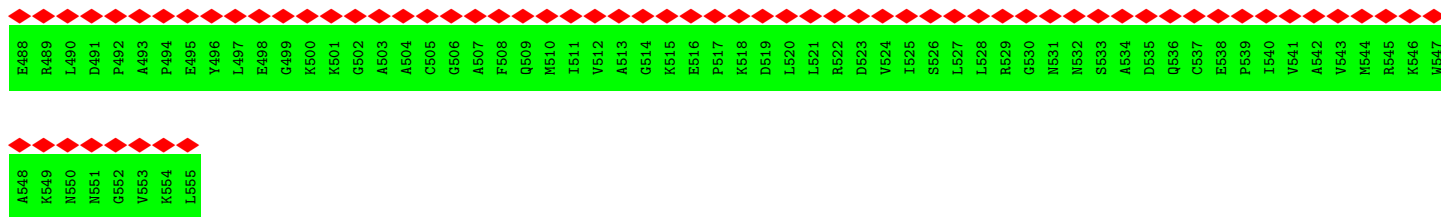
• Molecule 4: Intraflagellar transport protein 46



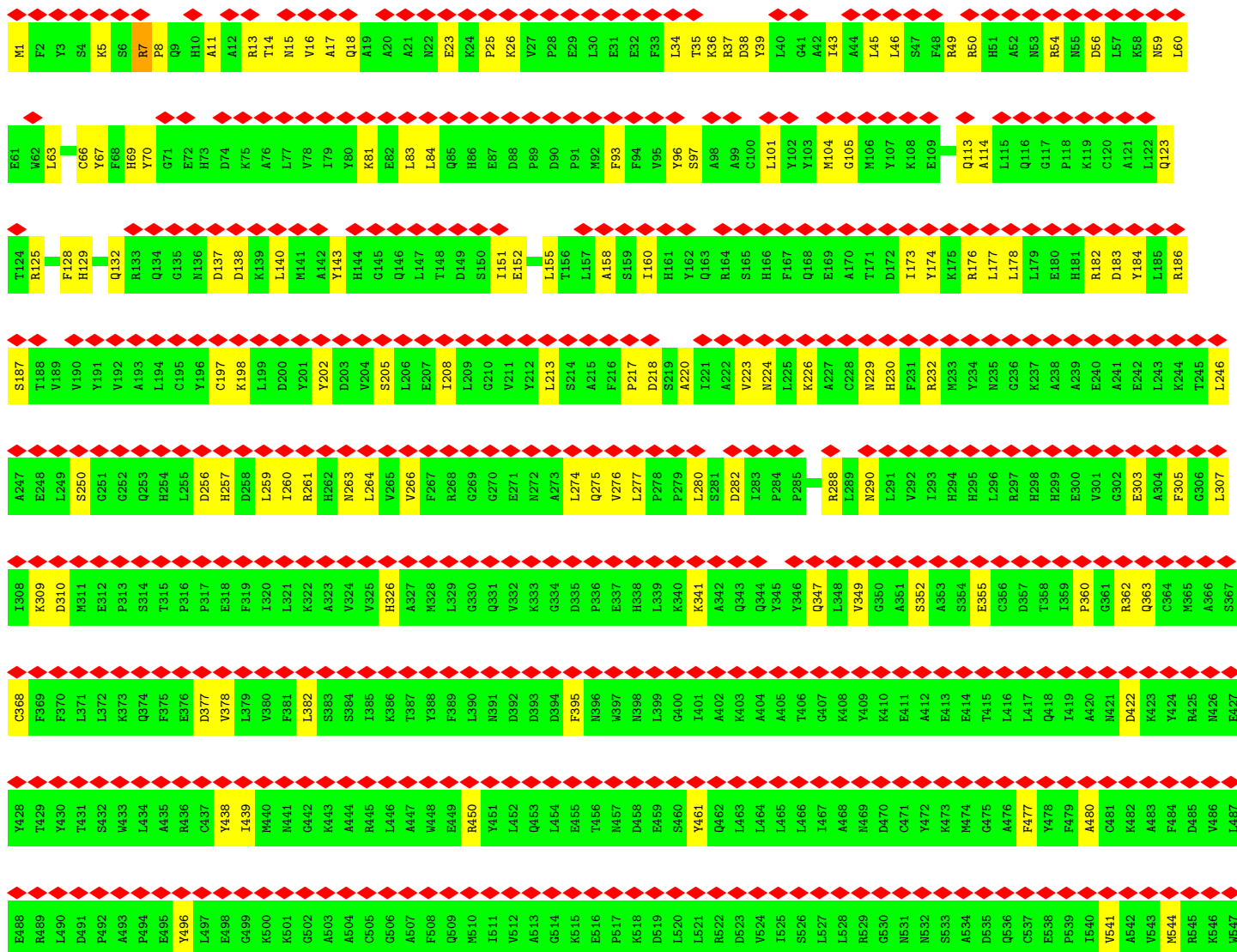
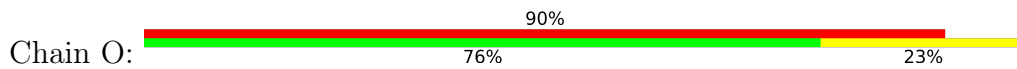
• Molecule 4: Intraflagellar transport protein 46



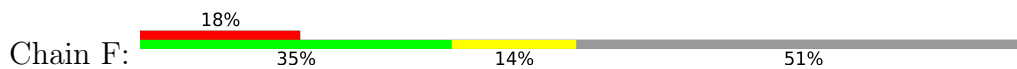


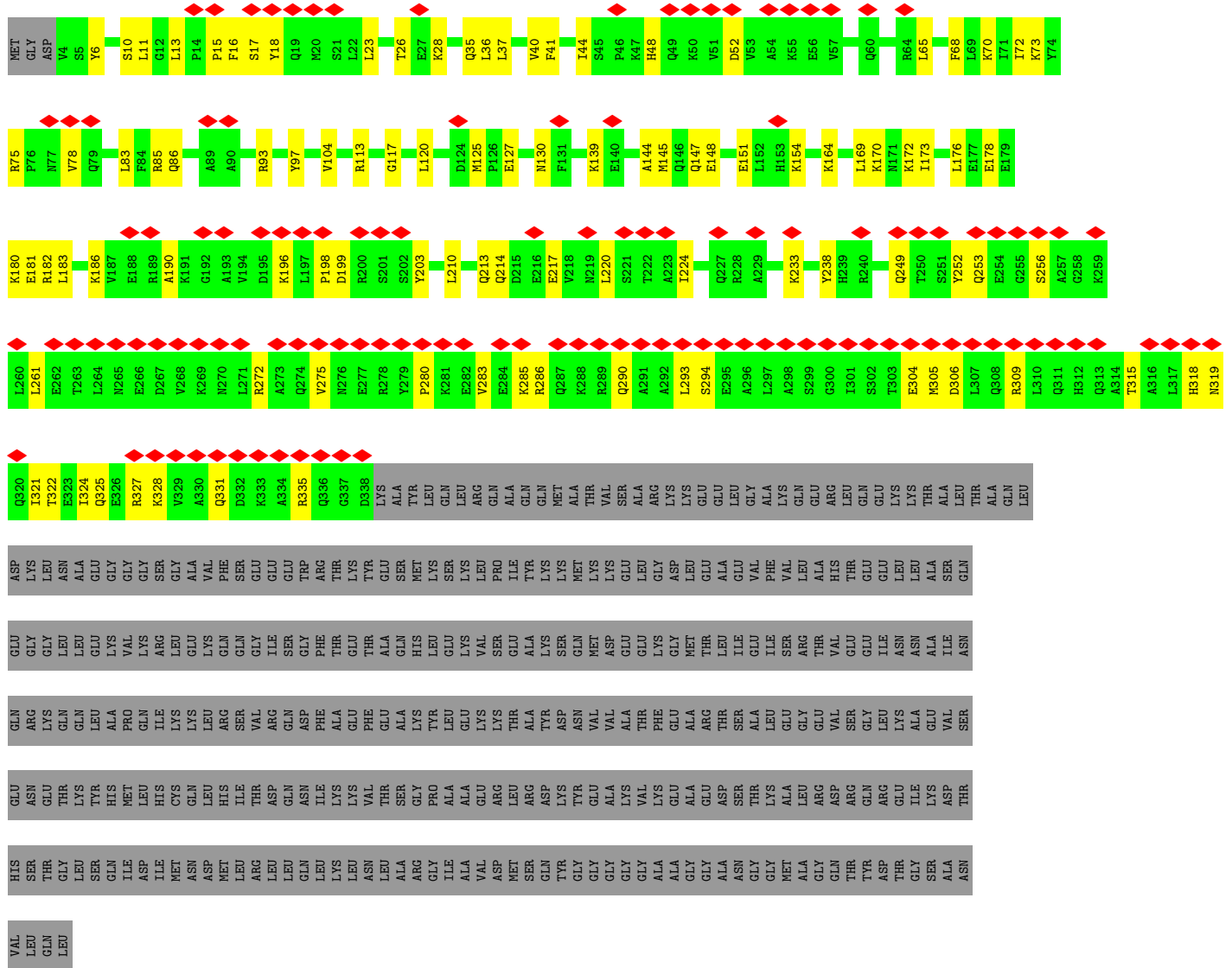


• Molecule 5: Intraflagellar transport protein 56

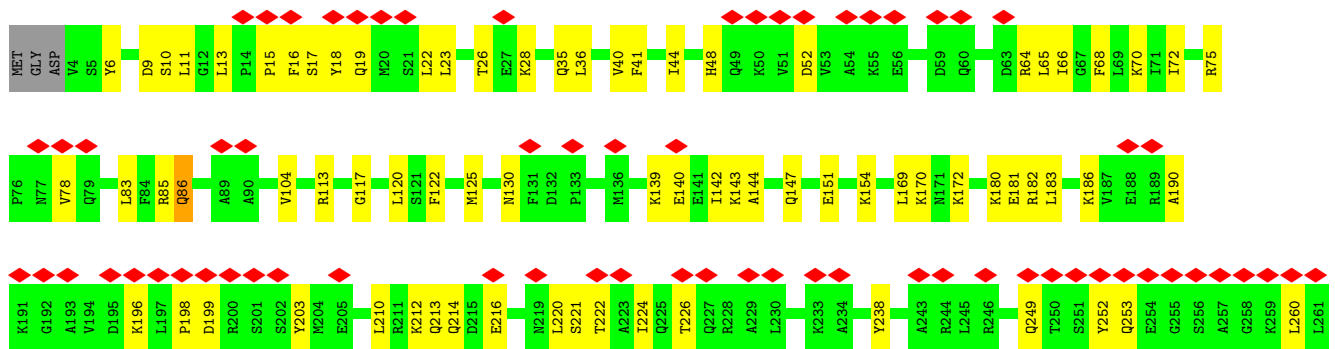
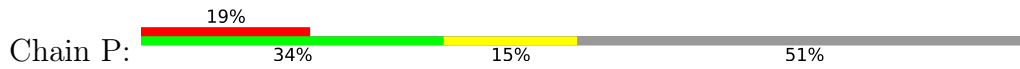


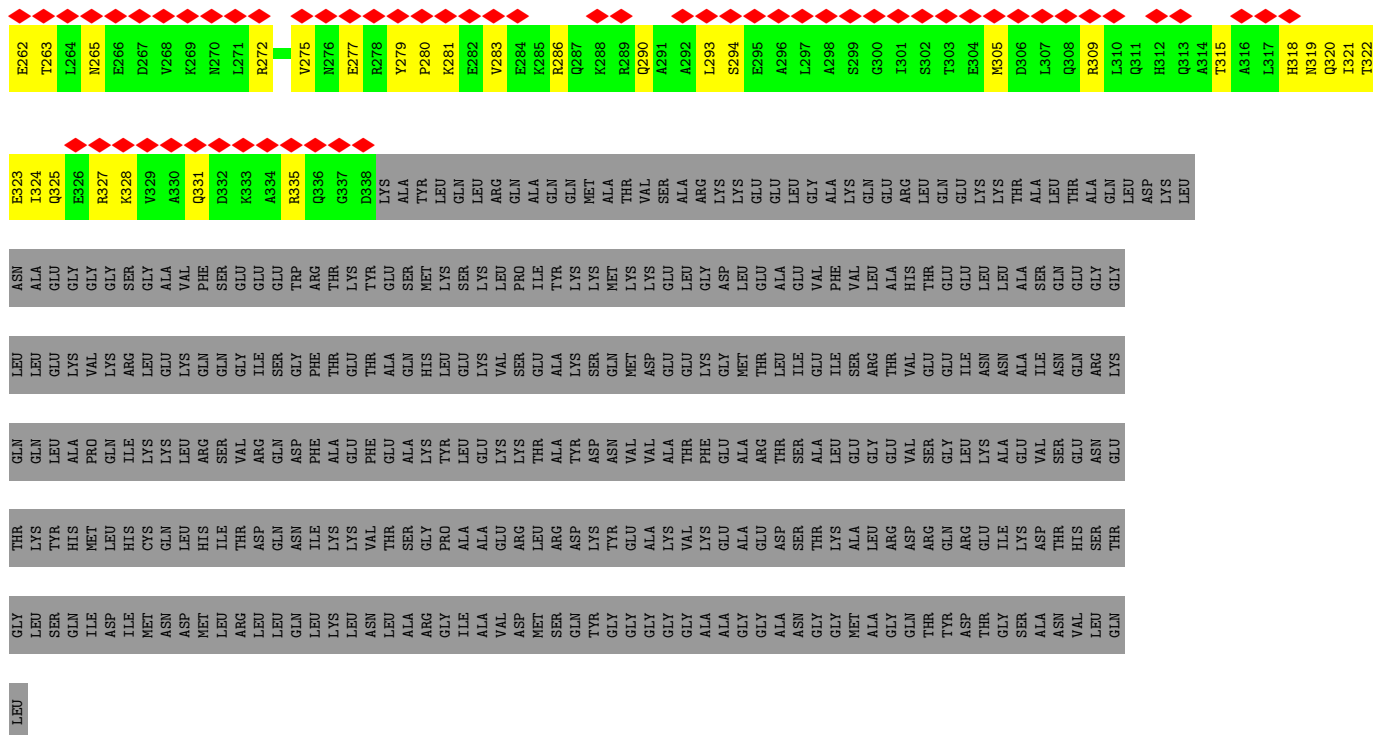
• Molecule 6: Intraflagellar transport protein 81



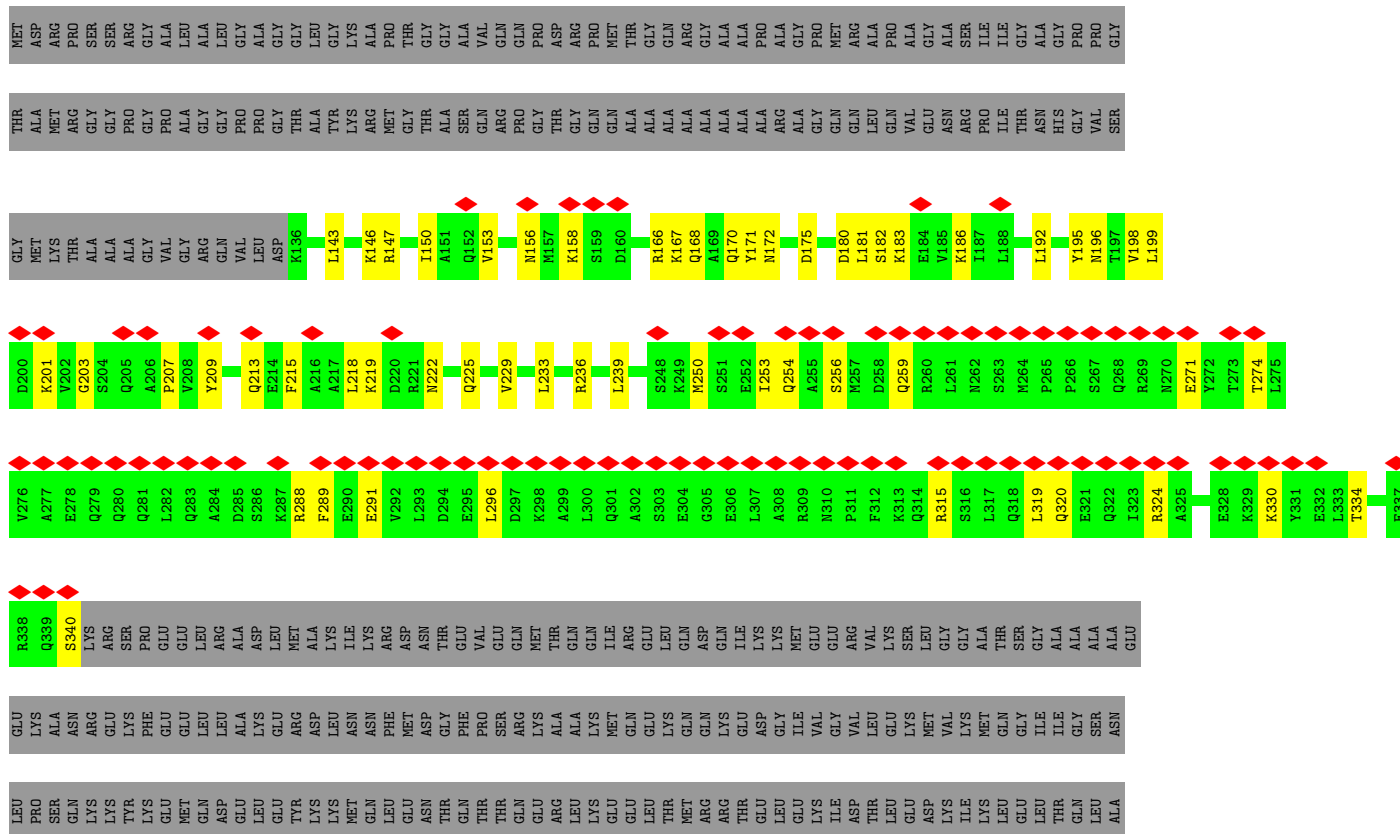


● Molecule 6: Intraflagellar transport protein 81



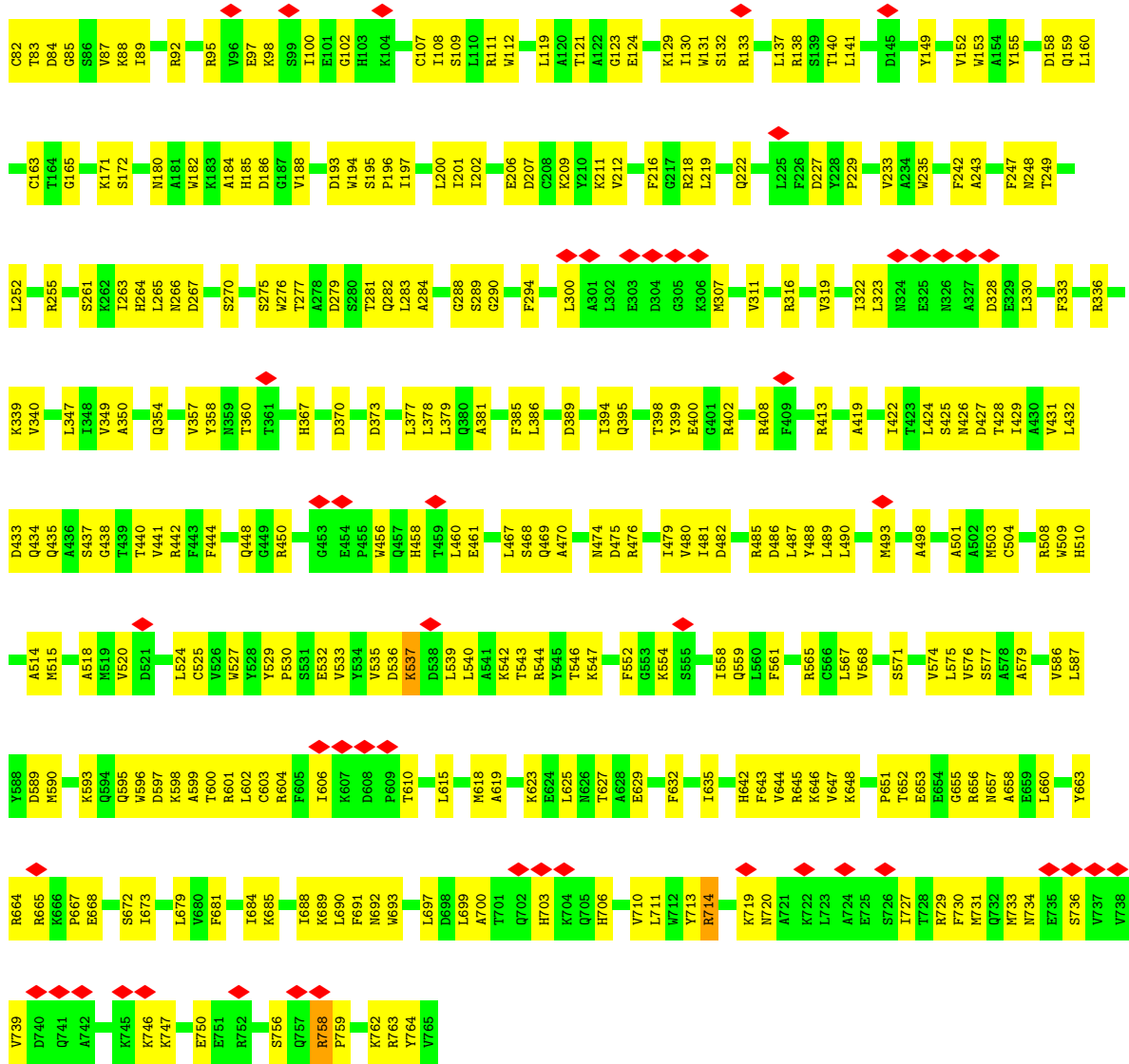


● Molecule 7: Intraflagellar transport protein 74

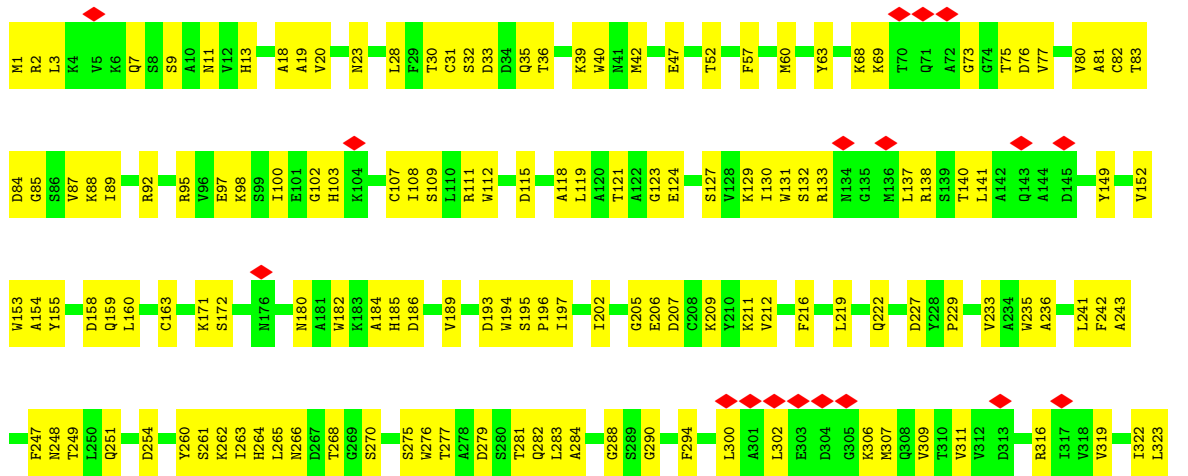


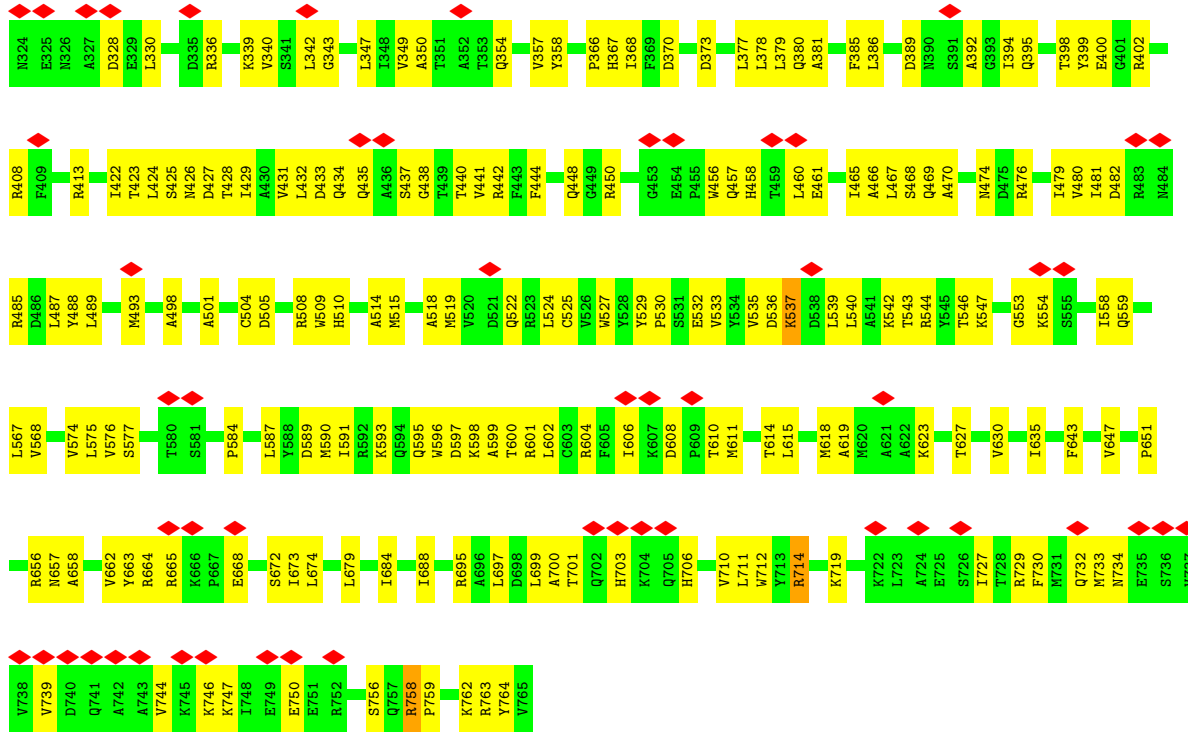




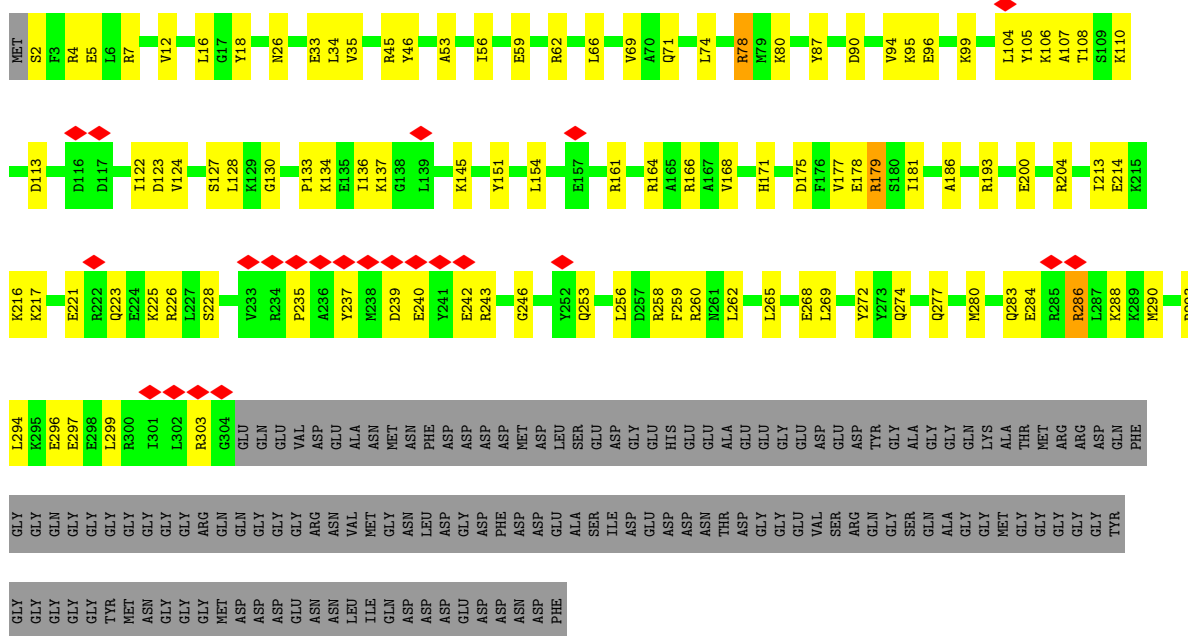


● Molecule 8: Intraflagellar transport protein 80



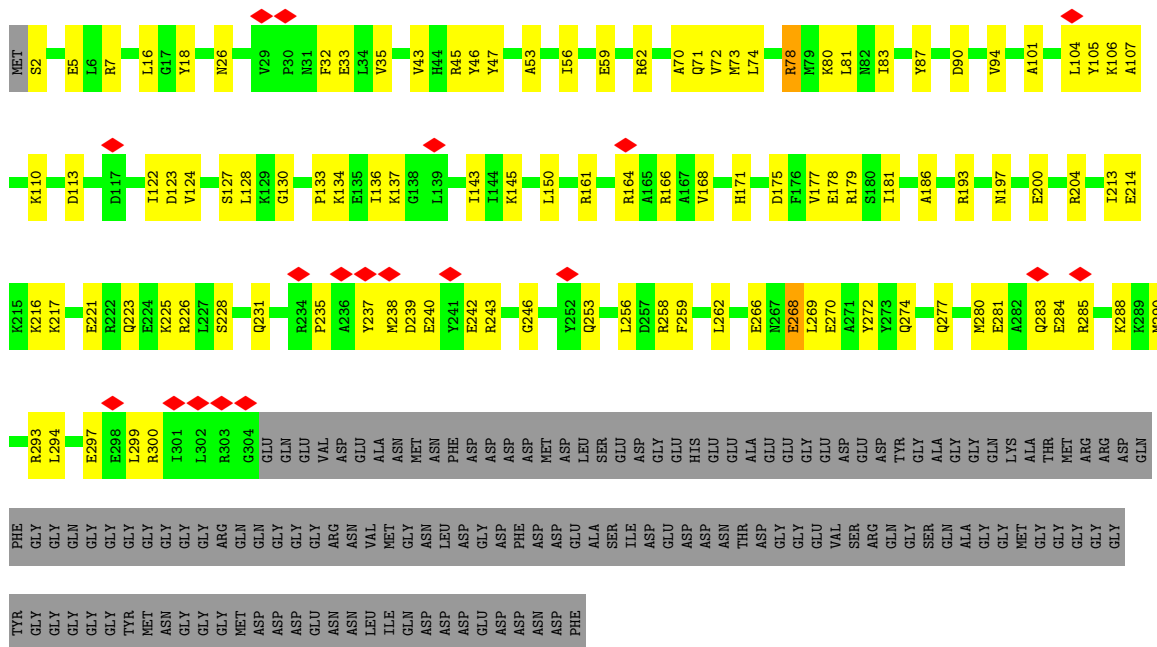


• Molecule 9: Clusterin-associated protein 1

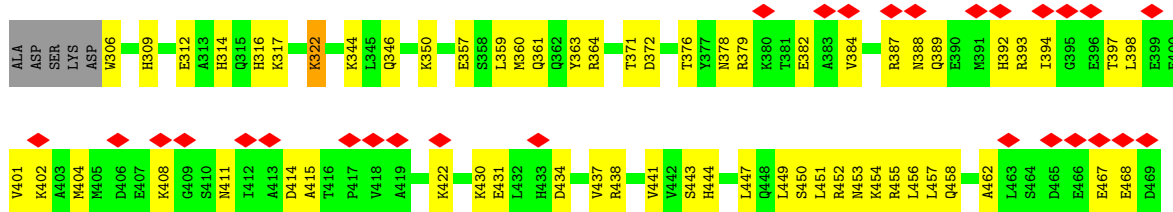
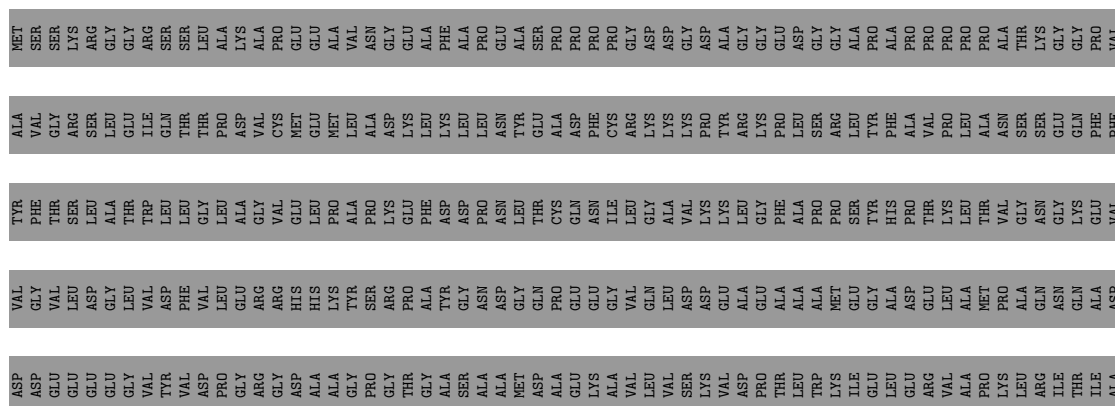


• Molecule 9: Clusterin-associated protein 1

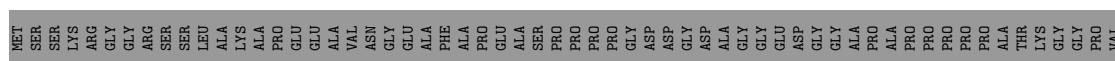




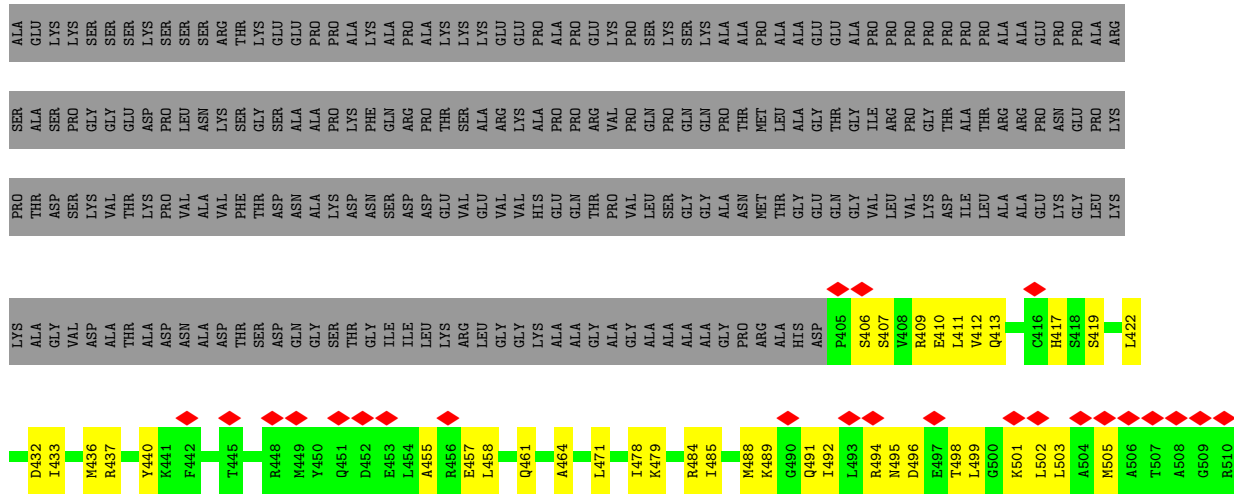
• Molecule 10: Intraflagellar transport protein 57



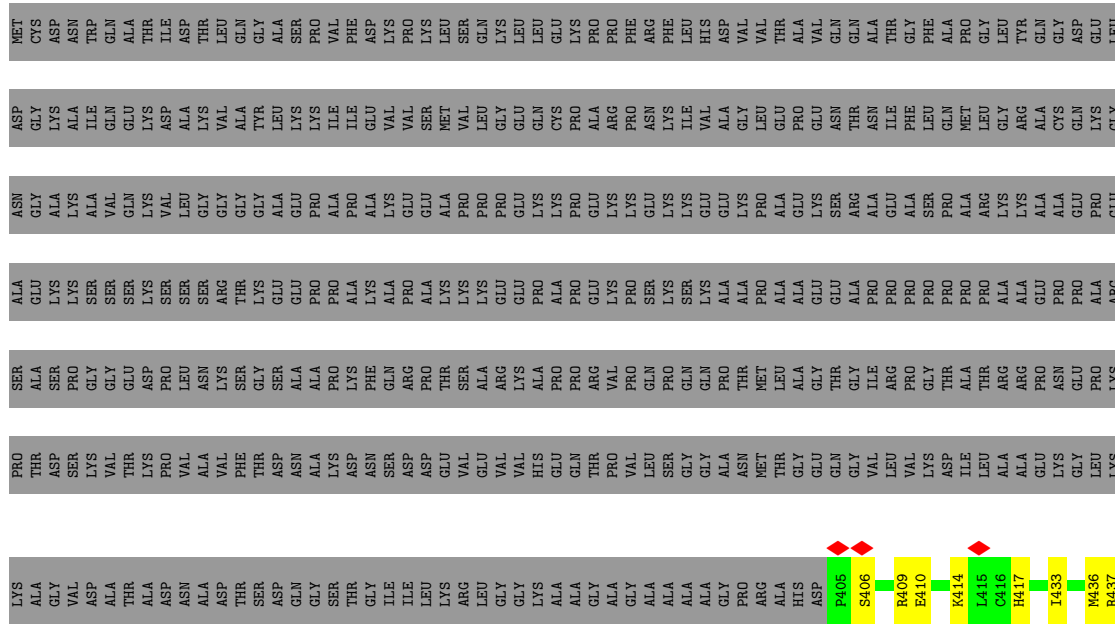
• Molecule 10: Intraflagellar transport protein 57



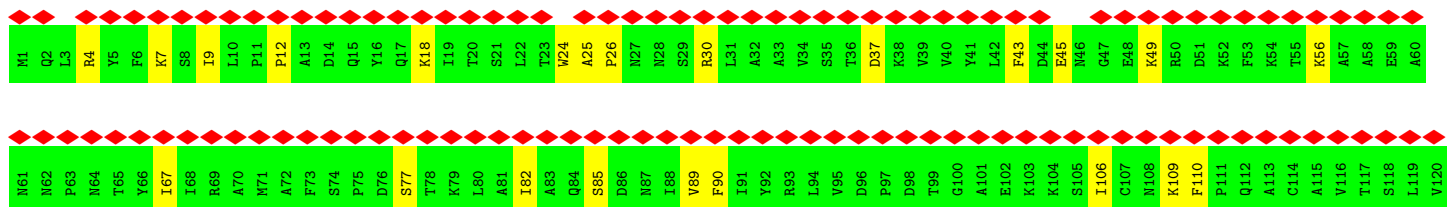




• Molecule 12: IFT54



• Molecule 13: Intraflagellar transport protein 172



A987	A988	B989	K990	E993	A994	E995	K996	A997	Y998	L999	A1000	G1001	G1002	D1004	D1005	Y1006	Y1007	K1008	A1011	M1012	Y1013	K1014	R1015	M1016	M1017	M1018	Y1019	D1020	Q1021	M1022	I1023	R1024	L1025	V1026	T1027	Q1028	K1031	E1032	K1033	Y1034	P1035	E1036	A1037	H1038	T1041	A1042	Q1043	Q1044	E1046	E1048	L1051								
M916	F917	Y918	F919	R920	R921	A922	R923	R924	R925	Y926	E927	F928	T929	G930	L931	E932	E933	E934	R937	Y938	Y939	A942	A945	R946	D947	E950	R954	A955	G956	K957	W958	E959	A960	A961	Q962	R963	V964	A965	R966	G967	Y968	L969	T970	E971	E972	Y973	M974	K981	A982	A983	E984	F985	E986						
B850	R851	A855	E856	W857	L858	L860	E861	E862	E863	W864	W867	L868	Y869	T870	Y871	Y872	Y873	K874	Q875	D876	M877	D878	A876	A877	L878	R879	H880	F881	L882	E883	S884	G885	A886	T887	L888	K889	K892	T895	D896	C897	R898	Q899	F900	A901	K902	A903	A904	G905	I906	I907	E908	Y909	L910	D911	A912	A913	A914	A915	
G780	G781	L782	R785	Q788	V789	W790	M791	S792	V793	H794	Y795	V796	W797	W798	D799	P800	A801	L802	L803	D804	L807	A808	S809	L810	A811	K812	A813	C814	L815	Y816	E817	Y823	M826	S827	R828	S829	S830	Q834	S835	Y836	R837	R838	G839	H840	A841	Y842	R843	K844	A845	T846	D847	L848	A849						
F621	L624	T625	P626	E627	D631	W632	L635	A636	E637	D638	M639	L642	W643	Q644	L645	W646	T647	A648	E649	R650	C651	Y652	L655	L658	F663	L664	V667	Q673	A676	E677	F678	G679	G680	D681	G682	T683	D684	A685	A690	M691	M692	A693	Q694	K697	L698	L699	W699												
L527	C530	D531	V536	P537	W541	Q545	S546	W547	W548	N549	L550	V554	S555	M564	F565	P566	I567	K568	U571	R576	H577	N578	H579	R580	T581	E582	D586	E587	G588	L589	N590	L596	D597	E598	L600	L601	Q610	D611	L513	H514	L515	S519	G520	L617	T618	L619	E620												
S445	V448	Q449	E450	A451	R452	G453	L454	S458	D466	L467	Q468	T469	W470	R471	L472	Q473	D474	L475	W476	A477	P478	T482	L483	A484	M487	H488	D489	T490	D493	W494	L495	M498	Q499	R500	G501	H503	B507	D508	H511	H512	L513	H514	L515	S519	G520	R523													
L373	I374	A375	R376	Y379	T380	L381	M382	G384	D385	L386	D387	T388	G389	L391	S392	P395	W396	D397	S398	D399	G400	S401	E402	H405	F406	A407	M408	E409	R410	V411	C412	M413	V414	H415	Y416	L420	H421	I422	V423	G426	R427	M428	L431	R435	M440	P441	Y442	G443	L444	I444									
P301	M306	T307	V308	G309	S310	M311	T312	G313	A314	V315	D316	M317	Y318	D319	A320	C321	V322	K323	R324	H325	G329	E332	F333	T334	Y335	V336	S337	K338	S339	A340	V341	I342	V343	K344	K347	T348	G349	M350	R351	I352	L353	L354	K355	S356	V357	Y358	G359	Y360	E361	I362	E363	K364	R371	Y372					
N241	N242	D243	E244	R245	R246	E247	F248	T249	T250	C251	A252	F253	N254	P255	S256	G257	D258	T259	V260	V261	H262	S263	C264	Y265	P266	R267	F268	Y269	M270	Y271	G272	S273	F274	I275	Q276	R277	N278	D279	W280	E281	N282	A283	G284	V285	H286	Q287	D288	L289	N290	F291	Y292	A293	V294	S295	A296	A297	S298	W299	K300
I181	W182	K183	F184	M185	F186	P187	A188	E189	E190	G191	G192	T193	P194	T195	S196	S197	Q198	L199	V200	V201	H202	S203	C204	Y205	P206	Y207	S208	L209	G210	W211	G212	S213	C214	I215	A216	A217	A218	G219	N220	D221	N222	R223	Y224	V225	F226	Y227	D228	L229	N230	G231	R232	E233	L234	R235	S236	F237	D238	Y239	S240
W121	P122	K123	D124	R125	P126	N127	E128	V129	V130	F131	G132	L133	A134	D135	G136	K137	V138	R139	L140	G141	M142	L143	K144	N145	M146	K147	S148	Y149	T150	C151	Y152	A153	H154	P155	E156	M157	S158	Y159	V160	V161	A162	L163	A164	S165	S166	L167	N168	G169	Q170	N171	V172	L173	S174	G175	H176	M177	D178	G179	A180



TYR	K1094	Y1029	A960	I896	Y823	T754	T683	E608	R523	L443	R371	S304	N241
ALA	Q1095	R1030	A961	D896	E824	G755	D684	D609	L527	I444	Y372	S304	N242
MET	V1096	K1031	R962	C897	H825	Q756	A685	A446	C530	A446	L373	T307	D243
PHE	A1097	E1032	R963	R898	G826	E757	V688	V447	Q531	V447	I374	V308	E244
LEU	A1098	K1033	V964	Q899	R828	E758	V689	V448	Q449	V448	A375	V309	E245
GLY	A1099	V1034	S829	F900	S829	Q759	R689	Q449	V536	Q449	R376	G309	R246
ASP	W1100	P1035	Q834	A901	Q834	V763	A690	A450	A615	E450	Y379	S310	V246
GLY	A1101	G967	Y836	K902	S835	R766	M691	A451	A615	A451	T380	M311	E247
ARG	L1102	Y968	R837	A903	Y836	E767	M692	A452	A616	A452	L381	M312	F248
PHE	L1103	T970	R838	A904	R837	E768	A694	G453	A616	A453	L382	T312	T249
ALA	T1104	E971	R839	I906	R838	Q768	L694	G454	A617	G453	M383	G313	T250
ALA	L1104	S972	Q839	I907	R839	Q769	M696	I464	A618	I464	D385	A314	C251
GLY	GLY	Y978	H840	E908	H840	Y770	K697	A455	A619	A455	L386	V315	A252
ALA	GLY	Y979	A841	V909	A841	L774	Q698	S456	A620	S456	D387	D316	A253
GLU	GLY	Q1043	R842	V910	R842	L775	S702	R547	A621	E457	T388	M317	F253
PHE	ASP	Q1044	R843	L910	R843	L776	L706	R548	A622	A458	T389	Y318	N254
ILE	ASP	L1045	K844	D911	K844	G775	L707	R549	A623	K459	C389	D319	P255
SER	GLY	E1046	A845	P912	A845	L776	A708	L550	A624	A459	K390	A320	S256
ALA	ALA	V1047	Y846	A915	Y846	Y777	A709	C551	A625	A467	L391	A321	G257
GLY	LEU	L1048	D847	M916	D847	L778	Q631	V552	A626	R471	P395	K323	D258
LEU	LEU	E1048	R848	M917	R848	L779	A632	V553	A627	Q474	M396	R324	T259
PRO	LEU	E1048	A849	P917	A849	L780	L635	V554	A628	L475	D397	H325	V260
LYS	LYS	E1053	R850	F918	R850	G781	Q638	Y555	A629	L476	M398	K328	F262
LYS	LYS	A1054	R851	F919	R851	L782	L640	Y556	A630	A477	G400	G329	G263
GLU	GLY	E1055	E852	R920	E852	L783	A641	Y557	A631	A478	S401	F331	T264
ALA	GLY	E1055	F853	R921	F853	P783	T642	Y558	A632	P478	E402	F332	Y265
ASP	LEU	K1056	R854	R922	R854	A787	M643	Y559	A633	V479	H405	F333	Y266
MET	LEU	H1057	V857	A923	V857	A788	V646	Y560	A634	T482	M408	T334	N266
TYR	ASP	F1058	I858	Q924	I858	Q788	A643	Y561	A635	L483	E409	Y335	R267
MET	ALA	V1059	R859	Y925	R859	V789	E649	Y562	A636	A484	R410	V336	F268
MET	ALA	V1059	R860	Y926	R860	V790	V646	Y563	A637	A484	R411	V337	Y269
HIS	ALA	E1060	E861	Y927	E861	M791	A643	Y564	A638	D489	R412	V338	M270
ASN	GLY	V1060	E862	T928	E862	S792	A643	Y565	A639	T490	R413	V339	Y271
ASN	GLY	A1061	E863	Y929	E863	M792	E649	Y566	A640	D493	C412	V340	T272
GLN	TRP	K1062	E864	Q930	E864	V793	Y652	Y567	A641	W494	M413	V341	F273
ASP	VAL	D1063	W864	G931	W864	H794	A653	Y568	A642	L495	C413	V342	F274
ASP	GLY	A1064	W865	A931	W865	H795	A653	Y569	A643	M496	L420	V343	N274
ALA	SER	K1065	W866	A932	W866	M796	A653	Y570	A644	Q499	L421	V344	L275
ALA	SER	L1066	W867	Y933	W867	V796	A653	Y571	A645	R500	H421	V345	Q276
MET	ALA	A1000	W868	E934	W868	M797	A653	Y572	A646	G501	R422	V346	R277
ARG	PHE	A1067	W869	E934	W869	L798	A653	Y573	A647	H503	I422	V347	N278
ALA	ALA	V1068	W870	R937	W870	W798	A653	Y574	A648	H503	V423	V348	D279
GLU	ALA	Q1069	W871	Y938	W871	D799	A653	Y575	A649	H503	G426	V349	E281
ARG	GLY	M1070	W872	Y939	W872	F800	A653	Y576	A650	H503	R427	V350	E282
TYR	THR	Y1071	W873	A942	W873	L802	A653	Y577	A651	H503	M428	V351	G284
PRO	THR	R1072	W874	D943	W874	A808	A653	Y578	A652	H503	L431	V352	H285
THR	ARG	Q1073	W875	M944	W875	L810	A653	Y579	A653	H503	L346	V353	K286
MET	ALA	Y1074	W876	A945	W876	L811	A653	Y580	A654	H503	H421	V354	K287
VAL	VAL	K1014	W877	R946	W877	L812	A653	Y581	A655	H503	R427	V355	I288
SER	ALA	R1015	W878	D947	W878	L813	A653	Y582	A656	H503	M428	V356	D289
SER	ALA	M1016	W879	D947	W879	L814	A653	Y583	A657	H503	L431	V357	N290
ILE	HIS	Y1077	W880	E950	W880	L815	A653	Y584	A658	H503	L431	V358	F291
LEU	LEU	D1079	W881	E951	W881	L816	A653	Y585	A659	H503	L431	V359	Y292
PRO	PRO	A1080	W882	S953	W882	L817	A653	Y586	A660	H503	L431	V360	A293
SER	GLN	L1081	W883	R954	W883	L818	A653	Y587	A661	H503	L431	V361	V294
VAL	VAL	R1082	W884	A955	W884	L819	A653	Y588	A662	H503	L431	V362	S295
ALA	ALA	Y1083	W885	A956	W885	L820	A653	Y589	A663	H503	L431	V363	A296
LEU	LEU	A1084	W886	K957	W886	L821	A653	Y590	A664	H503	L431	V364	A297
LYS	LYS	K1085	W887	W958	W887	L822	A653	Y591	A665	H503	L431	V365	S298
		V1086	W888	E959	W888	L823	A653	Y592	A666	H503	L431	V366	S299
		Y1087	W889	E959	W889	L824	A653	Y593	A667	H503	L431	V367	P301
		G1088	W890	E959	W890	L825	A653	Y594	A668	H503	L431	V368	
		G1089	W891	E959	W891	L826	A653	Y595	A669	H503	L431	V369	
		N1090	W892	E959	W892	L827	A653	Y596	A670	H503	L431	V370	
		A1092	W893	E959	W893	L828	A653	Y597	A671	H503	L431	V371	
		S1093	W894	E959	W894	L829	A653	Y598	A672	H503	L431	V372	





## 4 Experimental information

Property	Value	Source
EM reconstruction method	SUBTOMOGRAM AVERAGING	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of subtomograms used	18216	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION; Warp/Relion/M - CTF Refinement in M	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	104	Depositor
Minimum defocus (nm)	2500	Depositor
Maximum defocus (nm)	5000	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	1.372	Depositor
Minimum map value	-0.388	Depositor
Average map value	0.004	Depositor
Map value standard deviation	0.045	Depositor
Recommended contour level	0.466	Depositor
Map size ( $\text{\AA}$ )	775.68, 775.68, 775.68	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	3.03, 3.03, 3.03	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	0.30	0/4423	0.60	0/5956
1	H	0.32	1/4423 (0.0%)	0.62	0/5956
2	B	0.28	0/3635	0.57	0/4918
2	J	0.28	0/3635	0.59	0/4918
3	C	0.28	0/5080	0.56	0/6863
3	K	0.27	0/5080	0.57	0/6863
4	D	0.29	0/1068	0.61	0/1441
4	N	0.29	0/1068	0.62	0/1441
5	E	0.26	0/4570	0.52	0/6180
5	O	0.25	0/4570	0.51	0/6180
6	F	0.29	0/2740	0.62	0/3688
6	P	0.29	0/2740	0.64	0/3688
7	G	0.30	0/1687	0.65	0/2257
7	Q	0.33	0/1687	0.66	0/2257
8	I	0.28	0/6147	0.57	0/8333
8	R	0.27	0/6147	0.58	0/8333
9	L	0.28	0/2504	0.63	0/3356
9	T	0.35	2/2504 (0.1%)	0.65	0/3356
10	M	0.25	0/1343	0.59	0/1804
10	U	0.27	0/1343	0.60	0/1804
11	W	0.42	1/922 (0.1%)	0.64	0/1226
11	Y	0.33	0/922	0.62	0/1226
12	X	0.32	0/857	0.66	0/1144
12	Z	0.32	0/857	0.65	0/1144
13	S	0.27	0/8979	0.55	0/12160
13	V	0.28	0/8979	0.55	0/12160
All	All	0.29	4/87910 (0.0%)	0.58	0/118652

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
11	W	56	ASP	C-N	8.35	1.53	1.34
9	T	72	VAL	C-N	6.69	1.49	1.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	T	268	GLU	C-N	-5.12	1.22	1.34
1	H	262	ILE	C-N	5.06	1.45	1.34

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

## 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	4337	0	4306	191	0
1	H	4337	0	4306	201	0
2	B	3553	0	3523	158	0
2	J	3553	0	3523	146	0
3	C	4978	0	4912	161	0
3	K	4978	0	4912	154	0
4	D	1045	0	1039	44	0
4	N	1045	0	1039	44	0
5	E	4465	0	4396	109	0
5	O	4465	0	4396	93	0
6	F	2701	0	2731	81	0
6	P	2701	0	2731	80	0
7	G	1674	0	1673	46	0
7	Q	1674	0	1673	52	0
8	I	6025	0	5988	279	0
8	R	6025	0	5988	255	0
9	L	2472	0	2484	109	0
9	T	2472	0	2484	100	0
10	M	1328	0	1322	50	0
10	U	1328	0	1322	50	0
11	W	919	0	936	67	0
11	Y	919	0	936	52	0
12	X	849	0	863	49	0
12	Z	849	0	863	40	0
13	S	8788	0	8605	238	0
13	V	8788	0	8605	287	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	86268	0	85556	2793	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 16.

The worst 5 of 2793 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)
9:L:136:ILE:HG21	12:X:410:GLU:CD	1.18	1.45
9:L:136:ILE:CG2	12:X:410:GLU:CD	1.98	1.30
9:L:136:ILE:HG21	12:X:410:GLU:OE2	1.21	1.27
9:L:136:ILE:CG2	12:X:410:GLU:OE1	2.02	1.07
9:T:133:PRO:HA	9:T:136:ILE:HG22	1.32	1.06

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	535/782 (68%)	472 (88%)	61 (11%)	2 (0%)	34	72
1	H	535/782 (68%)	474 (89%)	57 (11%)	4 (1%)	22	63
2	B	452/454 (100%)	391 (86%)	60 (13%)	1 (0%)	47	81
2	J	452/454 (100%)	393 (87%)	58 (13%)	1 (0%)	47	81
3	C	613/647 (95%)	580 (95%)	33 (5%)	0	100	100
3	K	613/647 (95%)	582 (95%)	31 (5%)	0	100	100
4	D	131/344 (38%)	116 (88%)	15 (12%)	0	100	100
4	N	131/344 (38%)	117 (89%)	14 (11%)	0	100	100
5	E	553/555 (100%)	508 (92%)	45 (8%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
5	O	553/555 (100%)	513 (93%)	40 (7%)	0	100	100
6	F	333/683 (49%)	324 (97%)	9 (3%)	0	100	100
6	P	333/683 (49%)	323 (97%)	10 (3%)	0	100	100
7	G	203/641 (32%)	192 (95%)	11 (5%)	0	100	100
7	Q	203/641 (32%)	191 (94%)	12 (6%)	0	100	100
8	I	763/765 (100%)	697 (91%)	65 (8%)	1 (0%)	51	86
8	R	763/765 (100%)	704 (92%)	58 (8%)	1 (0%)	51	86
9	L	301/443 (68%)	279 (93%)	22 (7%)	0	100	100
9	T	301/443 (68%)	276 (92%)	25 (8%)	0	100	100
10	M	162/469 (34%)	158 (98%)	4 (2%)	0	100	100
10	U	162/469 (34%)	158 (98%)	4 (2%)	0	100	100
11	W	112/135 (83%)	112 (100%)	0	0	100	100
11	Y	112/135 (83%)	112 (100%)	0	0	100	100
12	X	104/510 (20%)	104 (100%)	0	0	100	100
12	Z	104/510 (20%)	102 (98%)	2 (2%)	0	100	100
13	S	1102/1755 (63%)	1034 (94%)	67 (6%)	1 (0%)	51	86
13	V	1102/1755 (63%)	1030 (94%)	72 (6%)	0	100	100
All	All	10728/16366 (66%)	9942 (93%)	775 (7%)	11 (0%)	54	86

5 of 11 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	629	MET
1	H	629	MET
1	A	431	GLU
1	H	304	TYR
1	H	305	ALA

### 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	457/627 (73%)	451 (99%)	6 (1%)	69	81
1	H	457/627 (73%)	451 (99%)	6 (1%)	69	81
2	B	388/388 (100%)	384 (99%)	4 (1%)	76	86
2	J	388/388 (100%)	386 (100%)	2 (0%)	88	93
3	C	534/558 (96%)	529 (99%)	5 (1%)	78	87
3	K	534/558 (96%)	530 (99%)	4 (1%)	84	90
4	D	114/288 (40%)	114 (100%)	0	100	100
4	N	114/288 (40%)	114 (100%)	0	100	100
5	E	469/469 (100%)	467 (100%)	2 (0%)	91	94
5	O	469/469 (100%)	467 (100%)	2 (0%)	91	94
6	F	296/581 (51%)	294 (99%)	2 (1%)	84	90
6	P	296/581 (51%)	294 (99%)	2 (1%)	84	90
7	G	185/526 (35%)	185 (100%)	0	100	100
7	Q	185/526 (35%)	185 (100%)	0	100	100
8	I	648/648 (100%)	641 (99%)	7 (1%)	73	84
8	R	648/648 (100%)	642 (99%)	6 (1%)	78	87
9	L	261/358 (73%)	258 (99%)	3 (1%)	73	84
9	T	261/358 (73%)	258 (99%)	3 (1%)	73	84
10	M	144/380 (38%)	139 (96%)	5 (4%)	36	59
10	U	144/380 (38%)	139 (96%)	5 (4%)	36	59
11	W	101/120 (84%)	100 (99%)	1 (1%)	76	86
11	Y	101/120 (84%)	101 (100%)	0	100	100
12	X	90/401 (22%)	89 (99%)	1 (1%)	73	84
12	Z	90/401 (22%)	89 (99%)	1 (1%)	73	84
13	S	915/1431 (64%)	905 (99%)	10 (1%)	73	84
13	V	915/1431 (64%)	906 (99%)	9 (1%)	76	86
All	All	9204/13550 (68%)	9118 (99%)	86 (1%)	79	87

5 of 86 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	K	560	LYS
10	U	322	LYS
5	O	362	ARG

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Mol	Chain	Res	Type
8	R	719	LYS
10	U	430	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 43 such sidechains are listed below:

Mol	Chain	Res	Type
4	N	322	ASN
8	R	595	GLN
5	O	224	ASN
6	P	214	GLN
9	T	274	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](#)

There are no chain breaks in this entry.



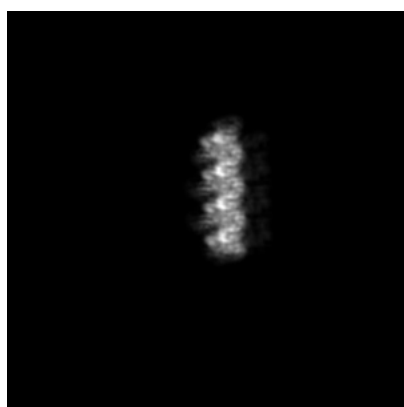
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-15977. These allow visual inspection of the internal detail of the map and identification of artifacts.

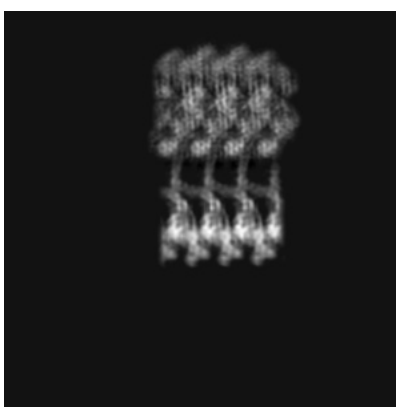
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

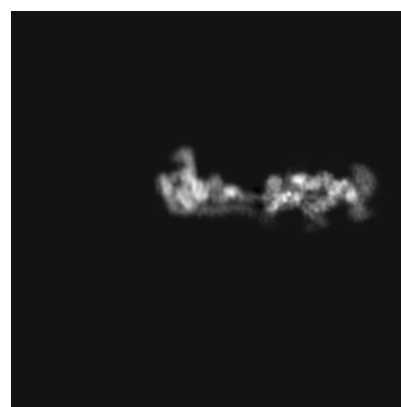
#### 6.1.1 Primary map



X



Y

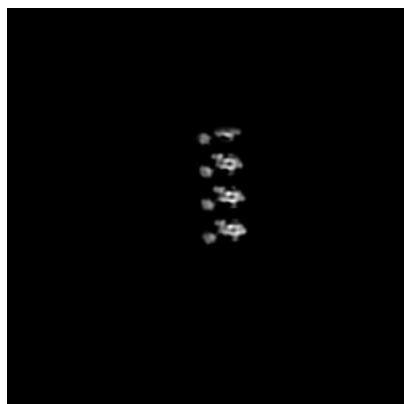


Z

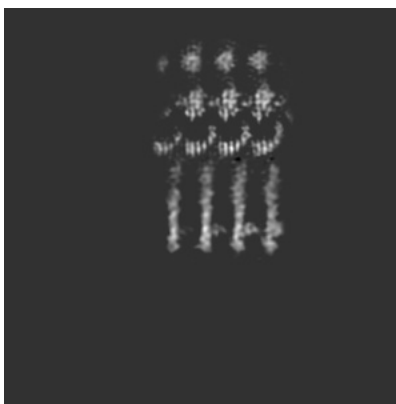
The images above show the map projected in three orthogonal directions.

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

#### 6.2.1 Primary map



X Index: 128



Y Index: 128



Z Index: 128

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

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

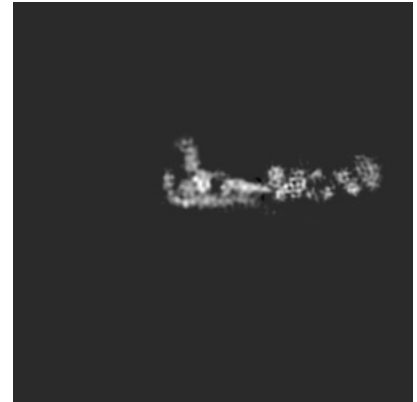
### 6.3.1 Primary map



X Index: 113



Y Index: 138

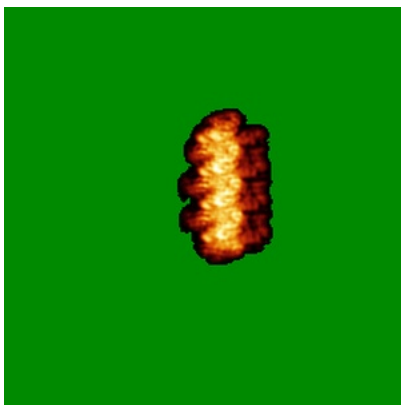


Z Index: 130

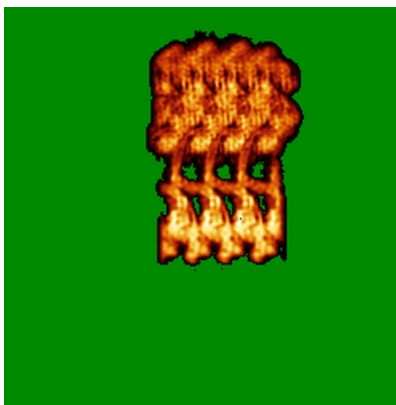
The images above show the largest variance slices of the map in three orthogonal directions.

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

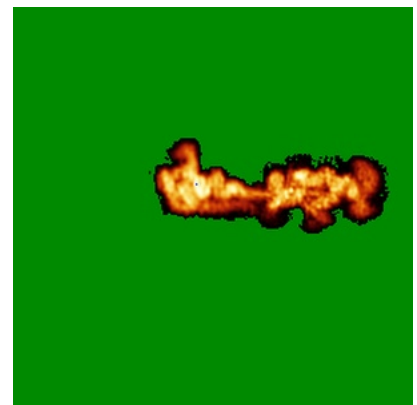
### 6.4.1 Primary map



X



Y



Z

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

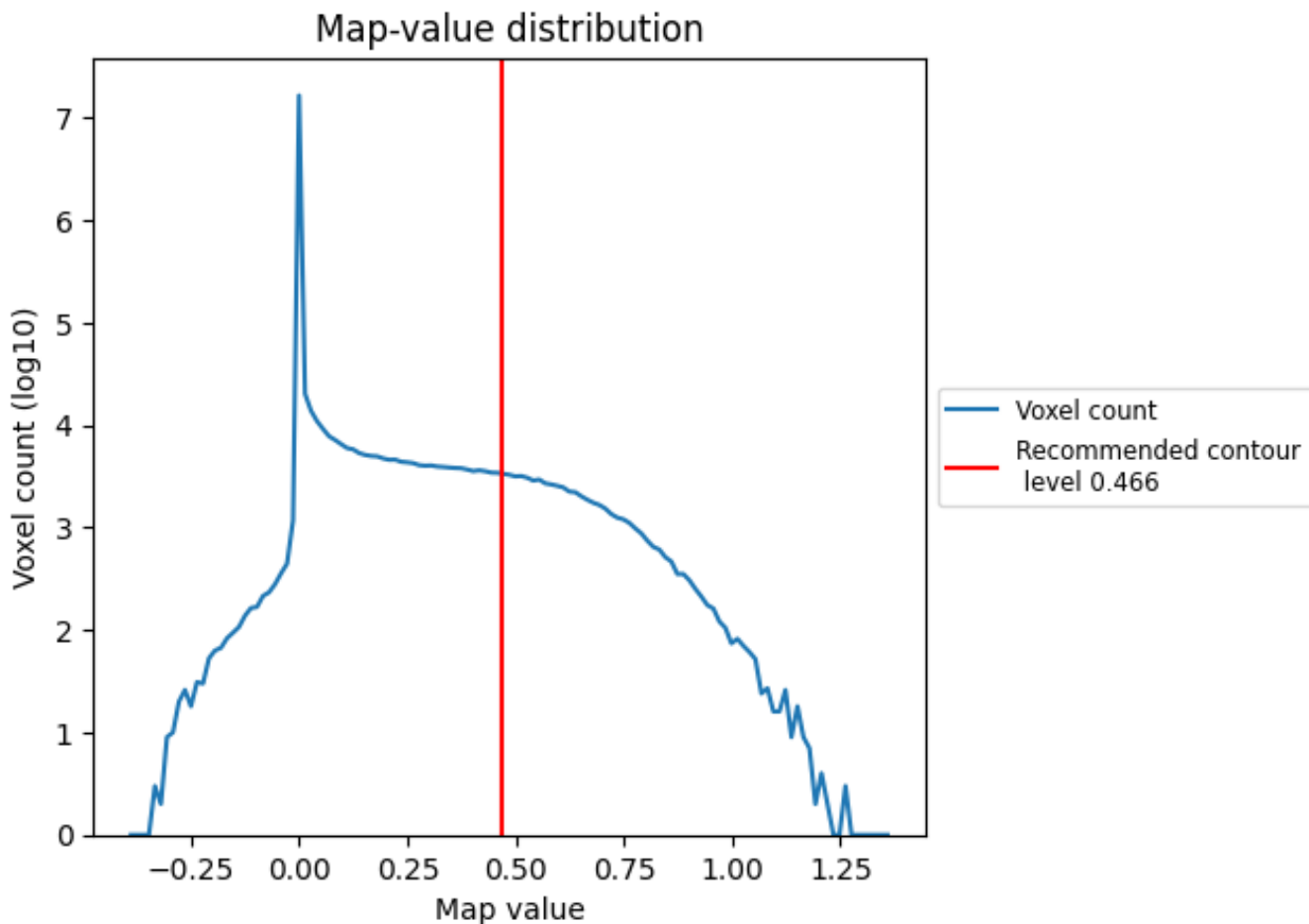
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

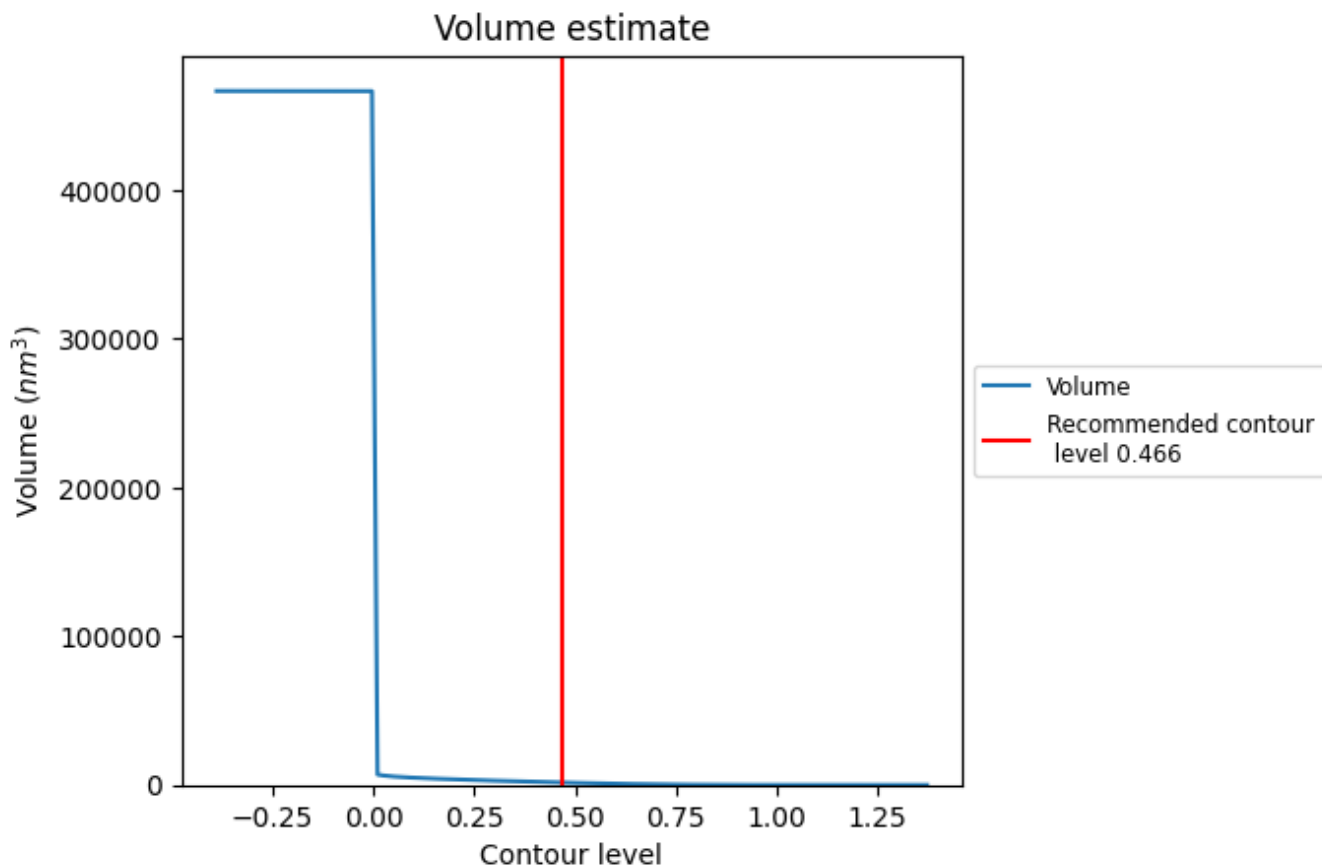
This section contains the results of statistical analysis of the map.

### 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.

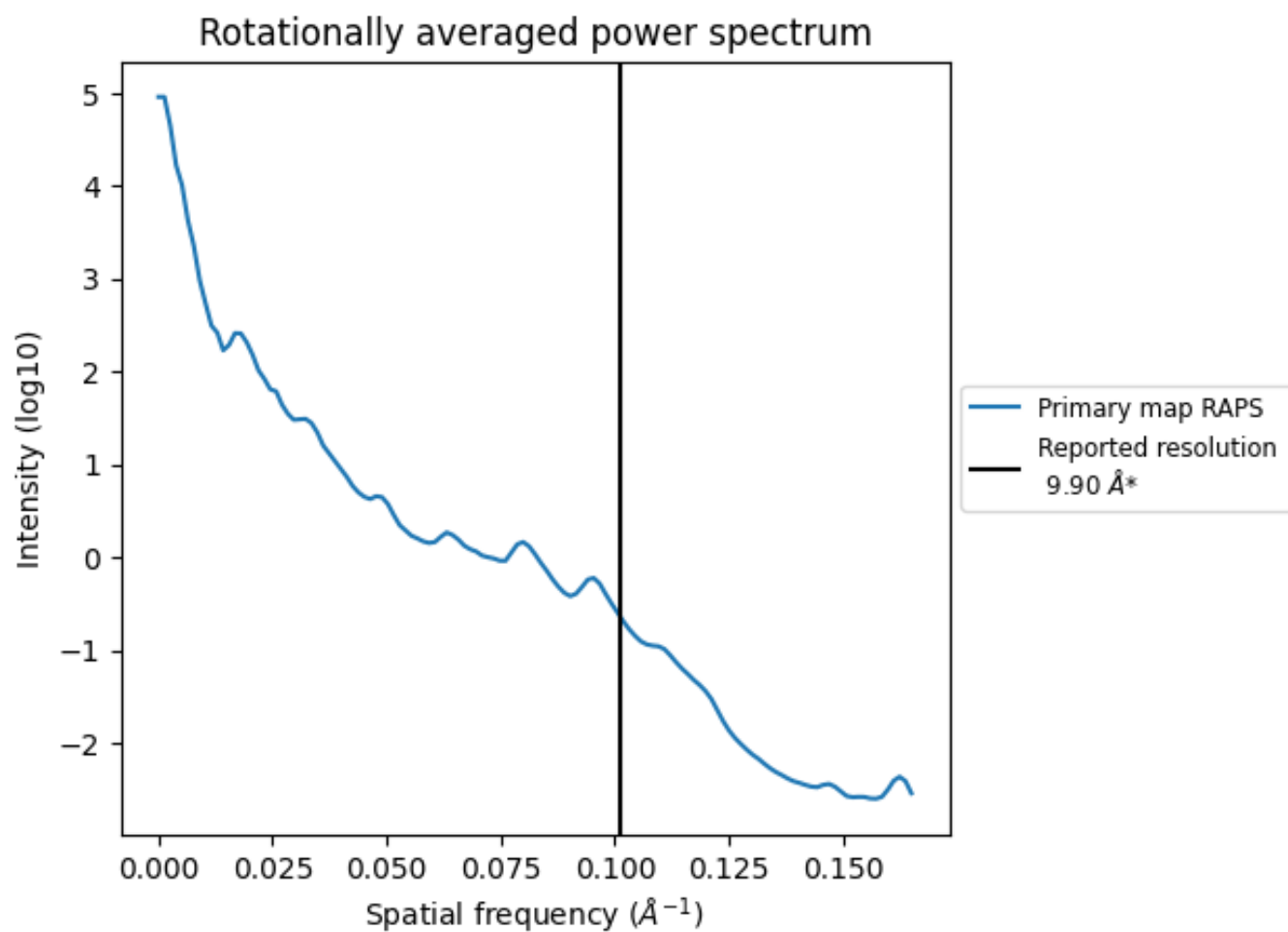
## 7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 1645 nm<sup>3</sup>; this corresponds to an approximate mass of 1486 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 0.101 Å<sup>-1</sup>

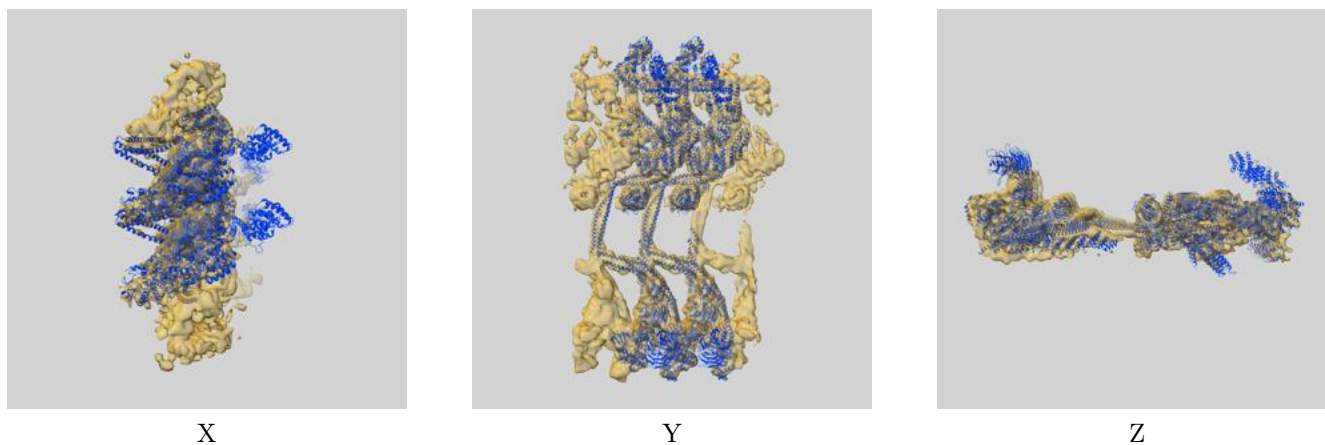
## 8 Fourier-Shell correlation

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-15977 and PDB model 8BD7. Per-residue inclusion information can be found in section 3 on page 7.

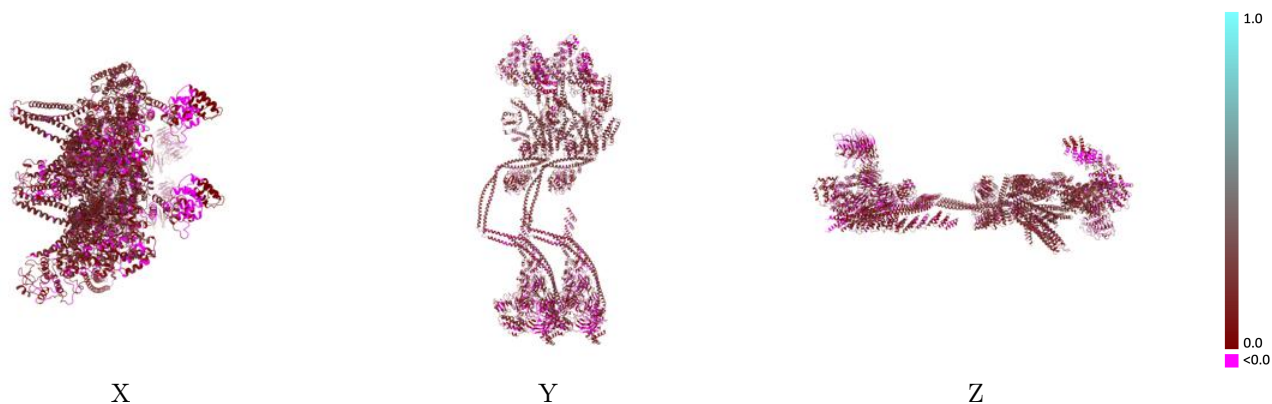
### 9.1 Map-model overlay [i](#)



The images above show the 3D surface view of the map at the recommended contour level 0.466 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.

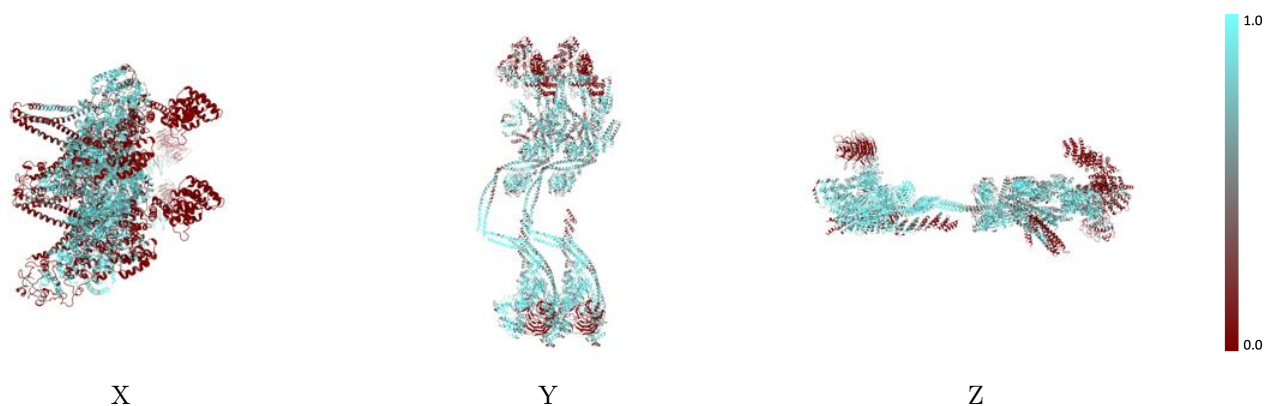


## 9.2 Q-score mapped to coordinate model [\(i\)](#)



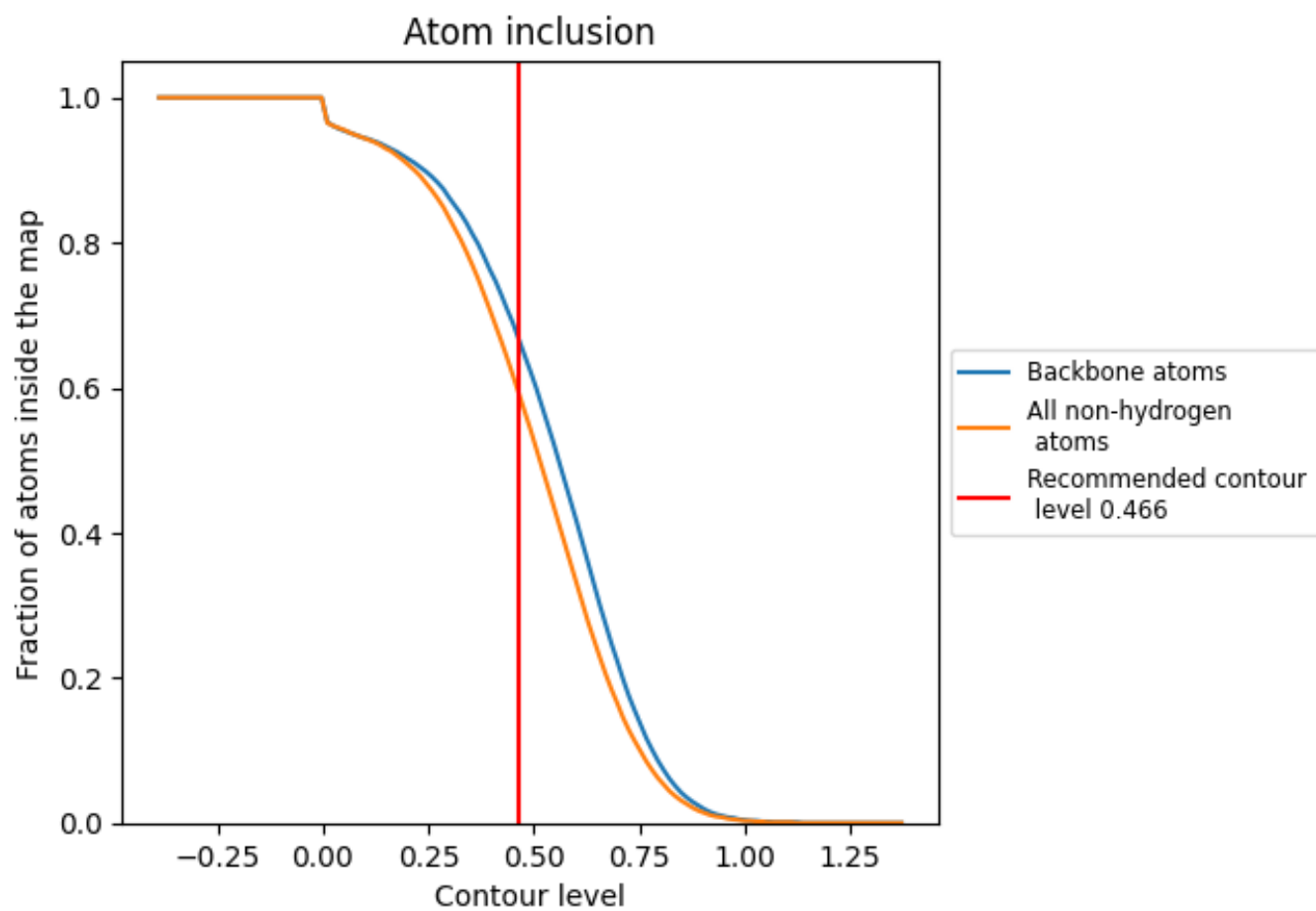
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.466).























































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 66% of all backbone atoms, 59% 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 (0.466) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.5900	 0.1160
A	 0.7580	 0.1590
B	 0.5930	 0.1360
C	 0.7070	 0.1610
D	 0.2980	 0.0960
E	 0.1130	 0.0420
F	 0.5210	 0.1690
G	 0.4670	 0.1840
H	 0.7500	 0.1580
I	 0.8760	 0.1030
J	 0.5710	 0.1220
K	 0.6770	 0.1590
L	 0.8300	 0.1370
M	 0.7730	 0.1540
N	 0.2730	 0.0760
O	 0.0990	 0.0410
P	 0.5200	 0.1620
Q	 0.4430	 0.1720
R	 0.8590	 0.0980
S	 0.4670	 0.0810
T	 0.8340	 0.1350
U	 0.7860	 0.1600
V	 0.4690	 0.0790
W	 0.7630	 0.1070
X	 0.6990	 0.1260
Y	 0.7600	 0.1010
Z	 0.7260	 0.1260

