



## wwPDB EM Validation Summary Report ⓘ

Jun 25, 2025 – 11:14 PM JST

PDB ID : 5WVK / pdb\_00005wvk  
EMDB ID : EMD-6694  
Title : Yeast proteasome-ADP-AIFx  
Authors : Ding, Z.; Cong, Y.  
Deposited on : 2016-12-25  
Resolution : 4.20 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.dev118  
MolProbity : 4-5-2 with Phenix2.0rc1  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.44

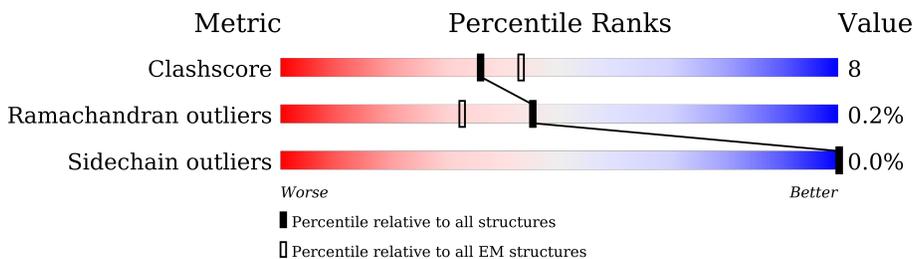
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 4.20 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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	1	215	
1	b	215	
2	2	261	
2	i	261	
3	3	205	
3	h	205	
4	4	198	
4	g	198	

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Mol	Chain	Length	Quality of chain
5	5	287	6% 57% 16% 26%
5	f	287	7% 56% 17% 26%
6	6	241	18% 76% 16% 8%
6	e	241	12% 74% 18% 8%
7	7	266	6% 70% 18% 12%
7	a	266	6% 65% 23% 12%
8	A	252	15% 76% 21% •
8	c	252	9% 76% 20% •
9	B	250	14% 84% 16%
9	j	250	12% 84% 16%
10	C	258	14% 72% 22% 5%
10	d	258	11% 67% 27% 5%
11	D	254	11% 75% 20% 5%
11	n	254	• 70% 24% 5%
12	E	260	14% 78% 15% 7%
12	m	260	10% 80% 13% 7%
13	F	234	15% 82% 17%
13	l	234	8% 84% 15%
14	G	288	10% 70% 15% 15%
14	k	288	6% 73% 12% 15%
15	H	467	33% 63% 14% 23%
16	I	437	52% 64% 18% 17%
17	J	405	57% 69% 23% 8%
18	K	428	33% 66% 23% 11%
19	L	437	28% 63% 19% 17%

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Mol	Chain	Length	Quality of chain
20	M	434	
21	N	945	
22	O	393	
23	P	445	
24	Q	434	
25	R	429	
26	S	523	
27	T	274	
28	U	338	
29	V	306	
30	W	268	
31	X	156	
32	Y	89	
33	Z	993	

## 2 Entry composition [i](#)

There are 33 unique types of molecules in this entry. The entry contains 105261 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 Proteasome subunit beta type-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	1	196	Total	C	N	O	S	0	0
			1512	955	250	300	7		
1	b	196	Total	C	N	O	S	0	0
			1512	955	250	300	7		

- Molecule 2 is a protein called Proteasome subunit beta type-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	2	223	Total	C	N	O	S	0	0
			1692	1067	294	324	7		
2	i	223	Total	C	N	O	S	0	0
			1692	1067	294	324	7		

- Molecule 3 is a protein called Proteasome subunit beta type-3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	3	204	Total	C	N	O	S	0	0
			1581	1010	258	305	8		
3	h	204	Total	C	N	O	S	0	0
			1581	1010	258	305	8		

- Molecule 4 is a protein called Proteasome subunit beta type-4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	4	198	Total	C	N	O	S	0	0
			1585	1005	269	305	6		
4	g	198	Total	C	N	O	S	0	0
			1585	1005	269	305	6		

- Molecule 5 is a protein called Proteasome subunit beta type-5.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	5	212	Total	C	N	O	S	0	0
			1644	1045	280	312	7		
5	f	212	Total	C	N	O	S	0	0
			1644	1045	280	312	7		

- Molecule 6 is a protein called Proteasome subunit beta type-6.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	6	222	Total	C	N	O	S	0	0
			1757	1115	303	335	4		
6	e	222	Total	C	N	O	S	0	0
			1757	1115	303	335	4		

- Molecule 7 is a protein called Proteasome subunit beta type-7.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	7	233	Total	C	N	O	S	0	0
			1824	1154	312	351	7		
7	a	233	Total	C	N	O	S	0	0
			1824	1154	312	351	7		

- Molecule 8 is a protein called Proteasome subunit alpha type-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	A	243	Total	C	N	O	S	0	0
			1921	1221	322	370	8		
8	c	243	Total	C	N	O	S	0	0
			1921	1221	322	370	8		

- Molecule 9 is a protein called Proteasome subunit alpha type-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	B	250	Total	C	N	O	S	0	0
			1915	1219	315	377	4		
9	j	250	Total	C	N	O	S	0	0
			1915	1219	315	377	4		

- Molecule 10 is a protein called Proteasome subunit alpha type-3.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	C	244	Total	C	N	O	S	0	0
			1904	1201	321	379	3		

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Mol	Chain	Residues	Atoms					AltConf	Trace
10	d	244	Total	C	N	O	S	0	0
			1904	1201	321	379	3		

- Molecule 11 is a protein called Proteasome subunit alpha type-4.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	D	241	Total	C	N	O	S	0	0
			1890	1181	331	374	4		
11	n	241	Total	C	N	O	S	0	0
			1890	1181	331	374	4		

- Molecule 12 is a protein called Proteasome subunit alpha type-5.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	E	242	Total	C	N	O	S	0	0
			1861	1162	314	378	7		
12	m	242	Total	C	N	O	S	0	0
			1861	1162	314	378	7		

- Molecule 13 is a protein called Proteasome subunit alpha type-6.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	F	233	Total	C	N	O	S	0	0
			1795	1129	312	350	4		
13	l	233	Total	C	N	O	S	0	0
			1795	1129	312	350	4		

- Molecule 14 is a protein called Probable proteasome subunit alpha type-7.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	G	244	Total	C	N	O	S	0	0
			1896	1205	330	357	4		
14	k	244	Total	C	N	O	S	0	0
			1896	1205	330	357	4		

- Molecule 15 is a protein called 26S protease regulatory subunit 7 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	H	359	Total	C	N	O	S	0	0
			2792	1755	499	523	15		

- Molecule 16 is a protein called 26S protease regulatory subunit 4 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	I	362	2822	1773	471	563	15	0	0

- Molecule 17 is a protein called 26S protease regulatory subunit 8 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	J	373	2928	1837	527	547	17	0	0

- Molecule 18 is a protein called 26S protease regulatory subunit 6B homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	K	381	3019	1898	530	581	10	0	0

- Molecule 19 is a protein called 26S protease subunit RPT4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	L	361	2853	1798	507	536	12	0	0

- Molecule 20 is a protein called 26S protease regulatory subunit 6A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	M	367	2866	1799	503	553	11	0	0

- Molecule 21 is a protein called 26S proteasome regulatory subunit RPN2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	N	849	6562	4174	1099	1261	28	0	0

- Molecule 22 is a protein called 26S proteasome regulatory subunit RPN9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
22	O	387	3182	2047	520	606	9	0	0

- Molecule 23 is a protein called 26S proteasome regulatory subunit RPN5.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	P	432	Total	C	N	O	S	0	0
			3545	2260	592	684	9		

- Molecule 24 is a protein called 26S proteasome regulatory subunit RPN6.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	Q	431	Total	C	N	O	S	0	0
			3471	2205	574	676	16		

- Molecule 25 is a protein called 26S proteasome regulatory subunit RPN7.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	R	400	Total	C	N	O	S	0	0
			3218	2051	527	630	10		

- Molecule 26 is a protein called 26S proteasome regulatory subunit RPN3.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	S	353	Total	C	N	O	S	0	0
			2893	1857	482	541	13		

- Molecule 27 is a protein called 26S proteasome regulatory subunit RPN12.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	T	272	Total	C	N	O	S	0	0
			2235	1432	355	441	7		

- Molecule 28 is a protein called 26S proteasome regulatory subunit RPN8.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	U	255	Total	C	N	O	S	0	0
			2061	1312	352	391	6		

- Molecule 29 is a protein called Ubiquitin carboxyl-terminal hydrolase RPN11.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	V	284	Total	C	N	O	S	0	0
			2236	1405	381	436	14		

- Molecule 30 is a protein called 26S proteasome regulatory subunit RPN10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
30	W	197	1534	962	269	300	3	0	0

- Molecule 31 is a protein called 26S proteasome regulatory subunit RPN13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
31	X	127	1032	664	169	195	4	0	0

- Molecule 32 is a protein called 26S proteasome complex subunit SEM1.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
32	Y	19	168	101	30	37	0	0

- Molecule 33 is a protein called 26S proteasome regulatory subunit RPN1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	Z	813	6290	3995	1029	1237	29	0	0

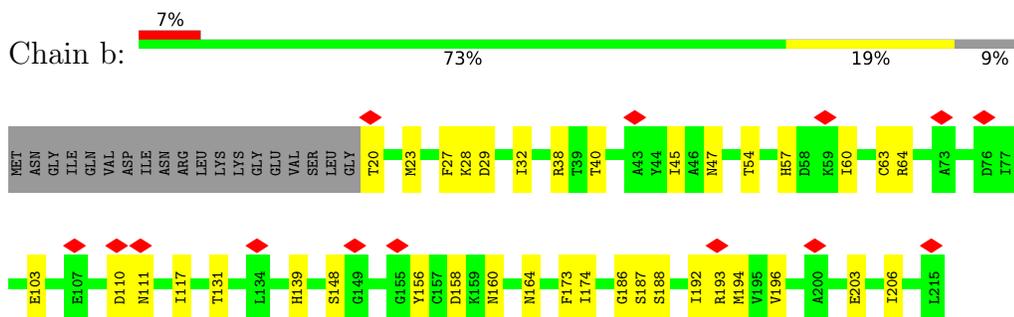
### 3 Residue-property plots [i](#)

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.

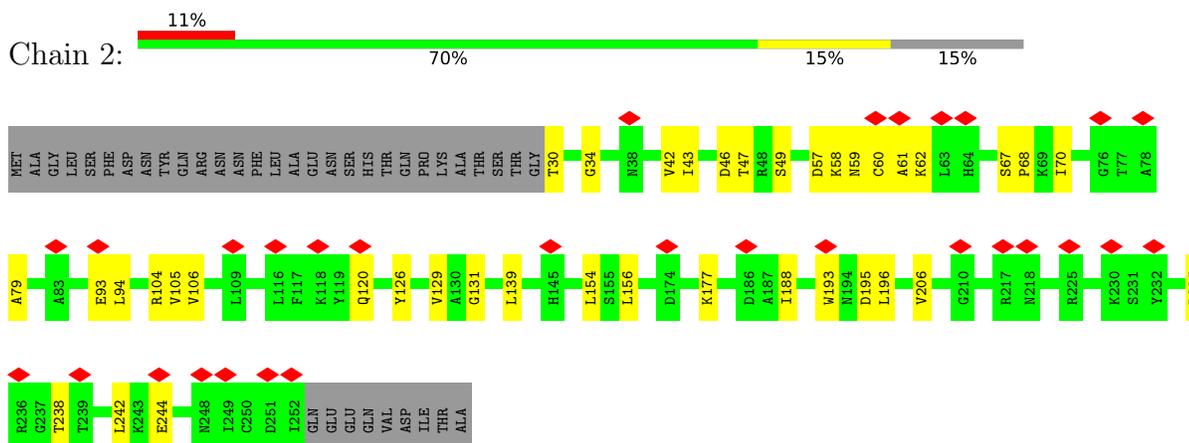
- Molecule 1: Proteasome subunit beta type-1



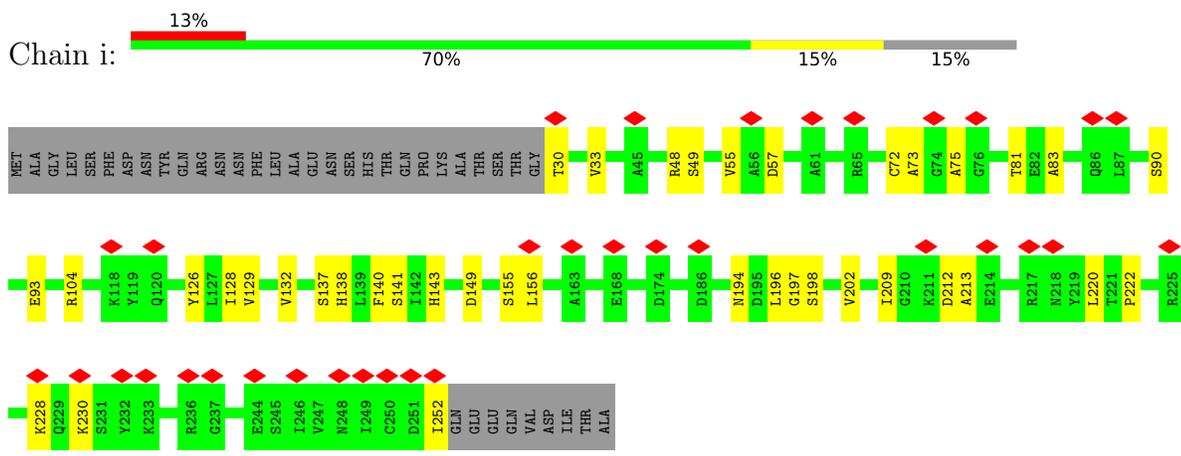
- Molecule 1: Proteasome subunit beta type-1



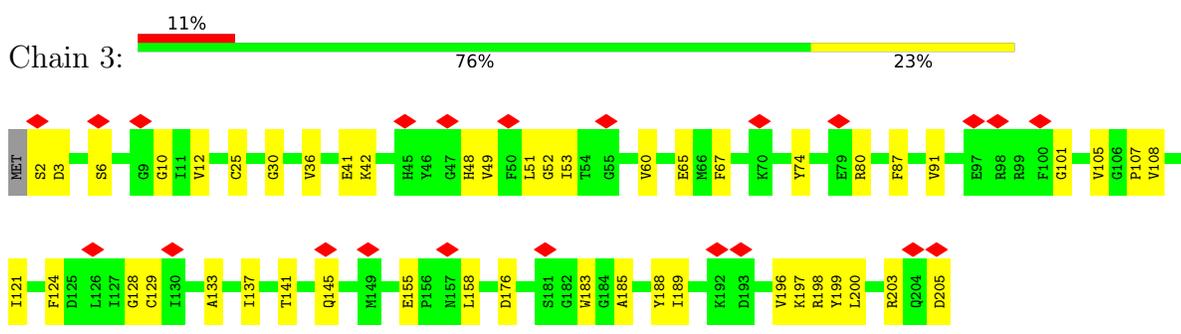
- Molecule 2: Proteasome subunit beta type-2



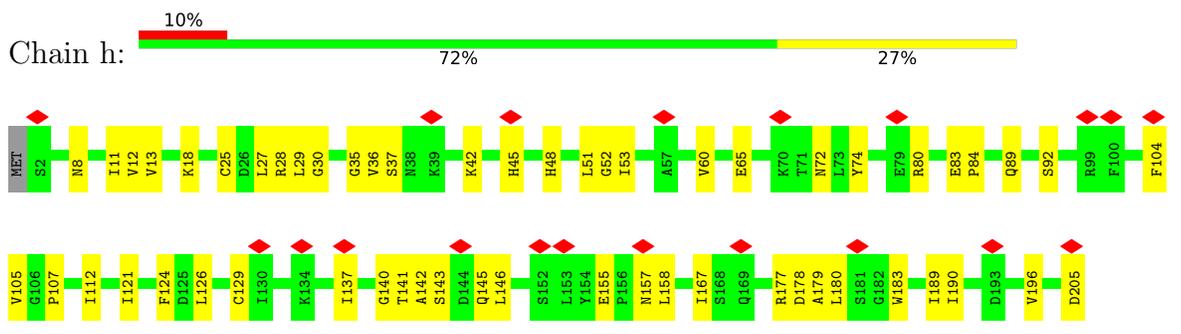
• Molecule 2: Proteasome subunit beta type-2



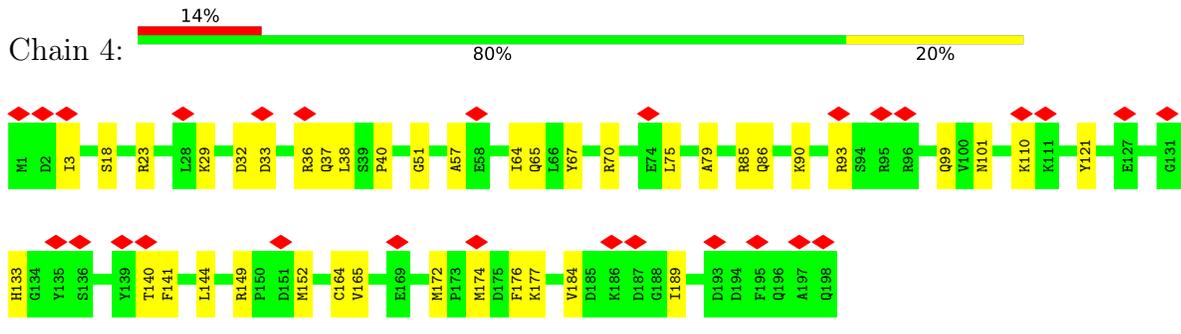
• Molecule 3: Proteasome subunit beta type-3



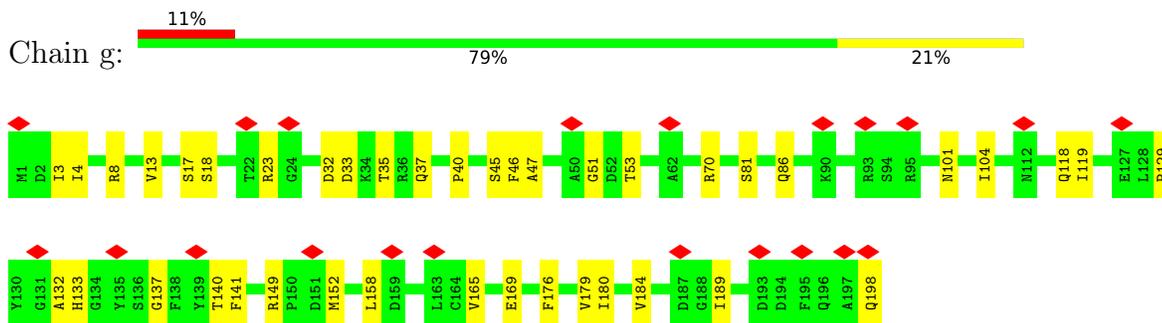
• Molecule 3: Proteasome subunit beta type-3



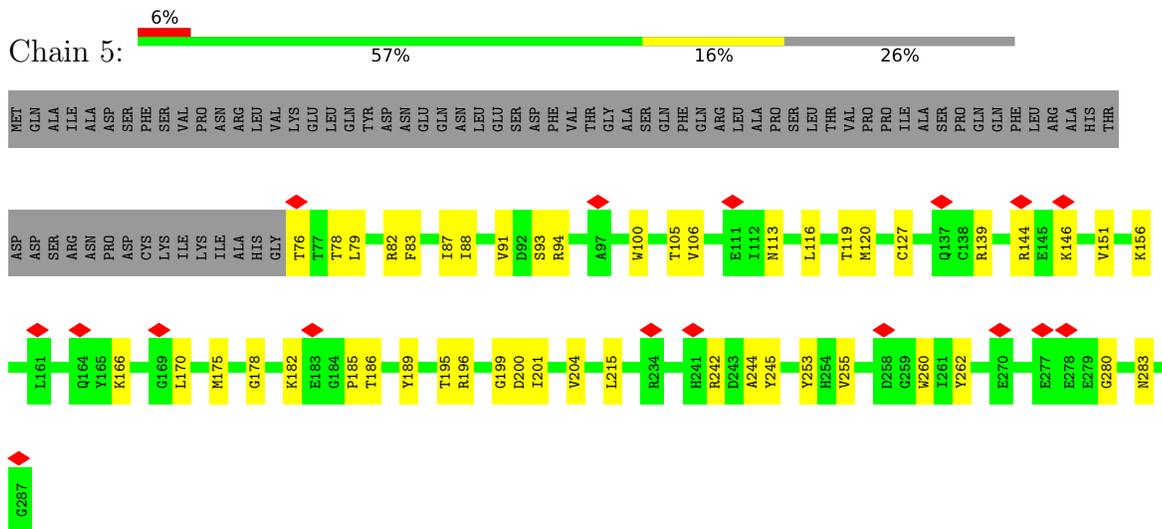
• Molecule 4: Proteasome subunit beta type-4



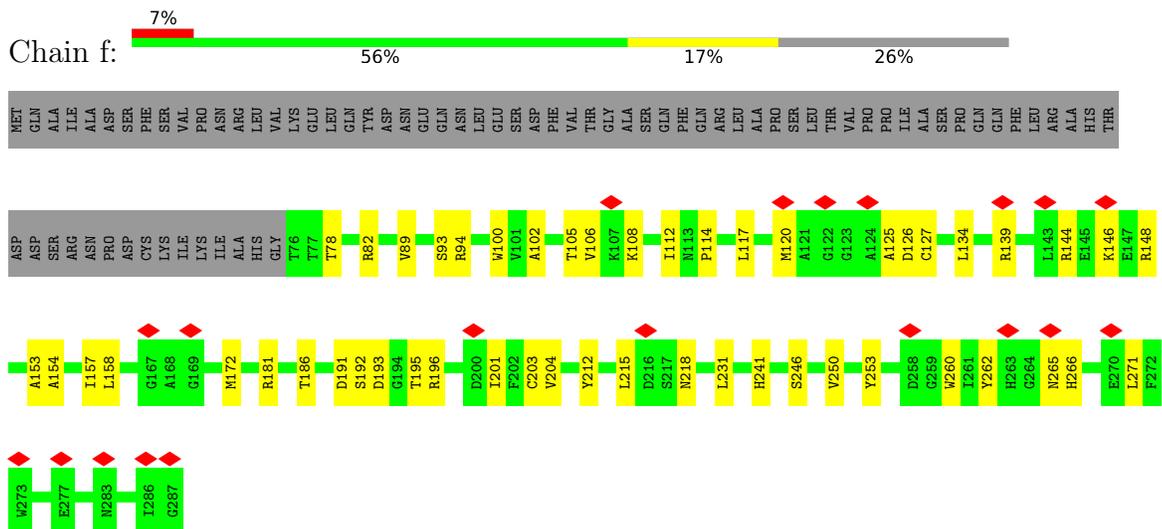
• Molecule 4: Proteasome subunit beta type-4



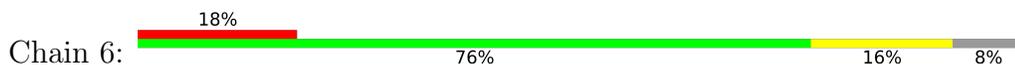
• Molecule 5: Proteasome subunit beta type-5

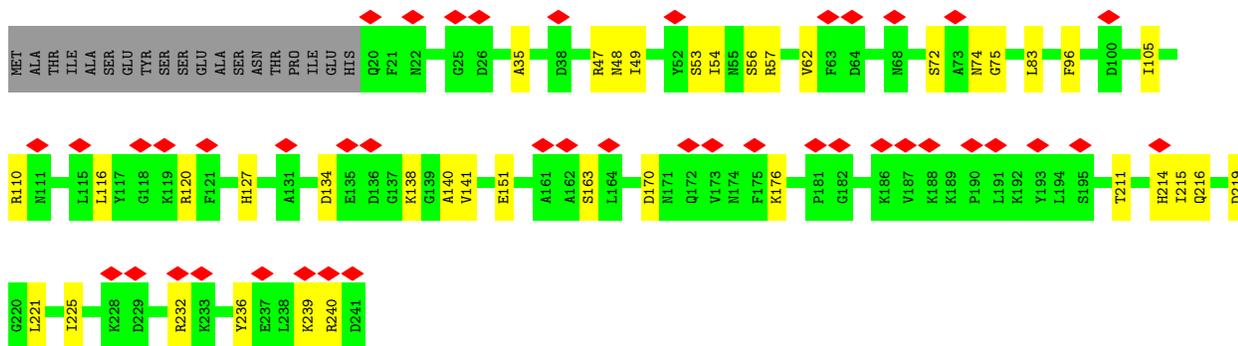


• Molecule 5: Proteasome subunit beta type-5

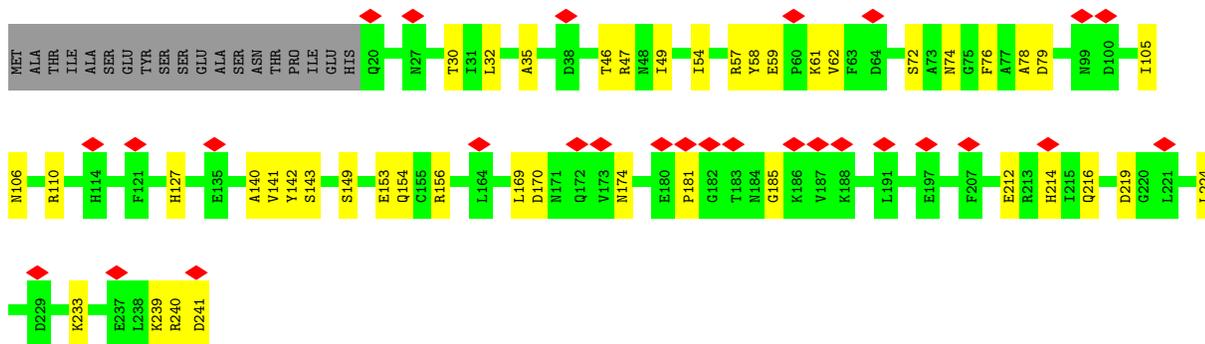


• Molecule 6: Proteasome subunit beta type-6

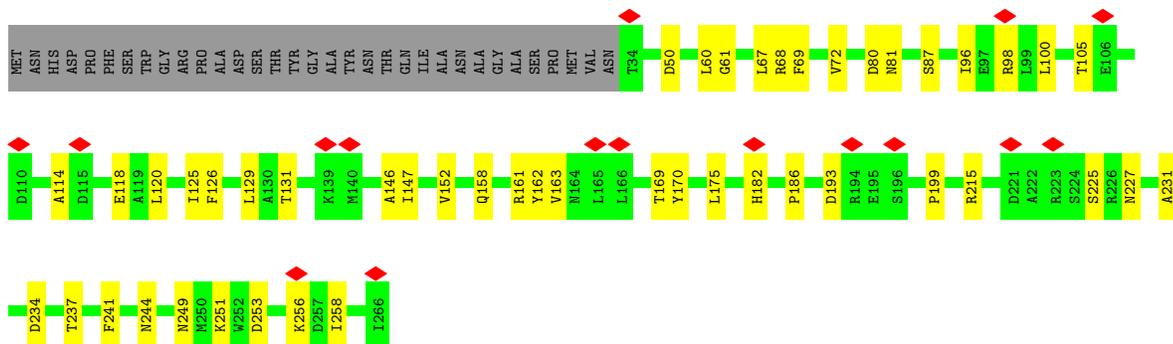




• Molecule 6: Proteasome subunit beta type-6

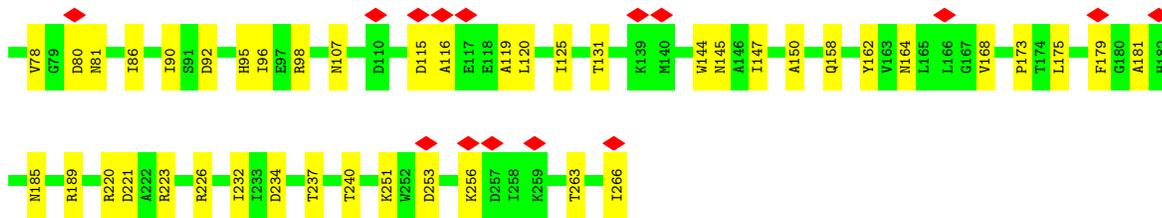


• Molecule 7: Proteasome subunit beta type-7

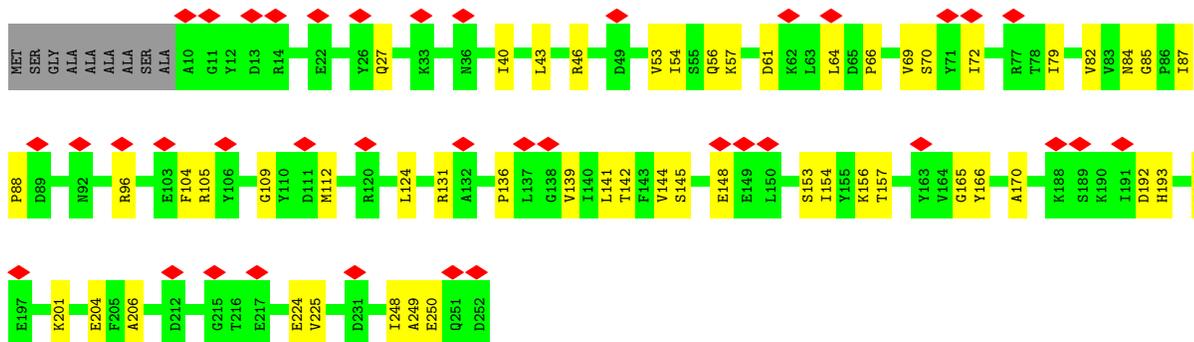
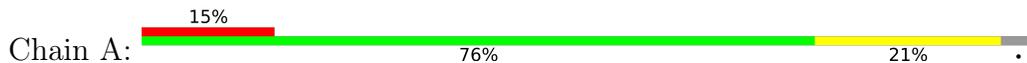


• Molecule 7: Proteasome subunit beta type-7

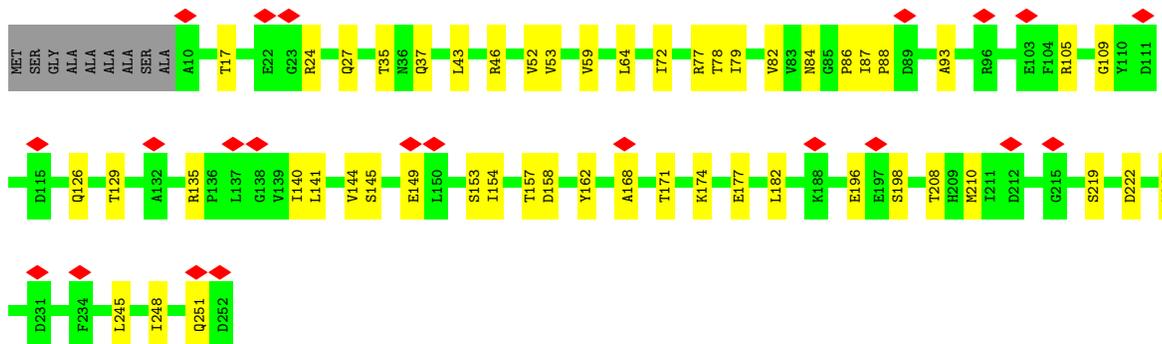




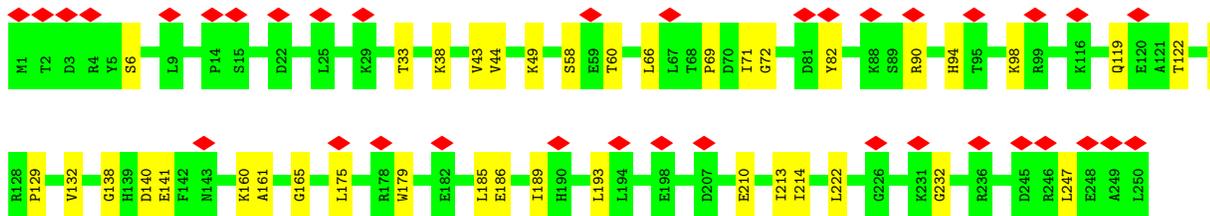
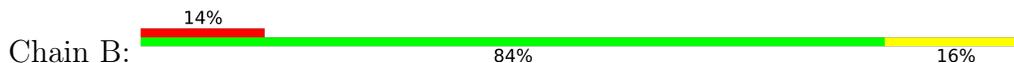
• Molecule 8: Proteasome subunit alpha type-1



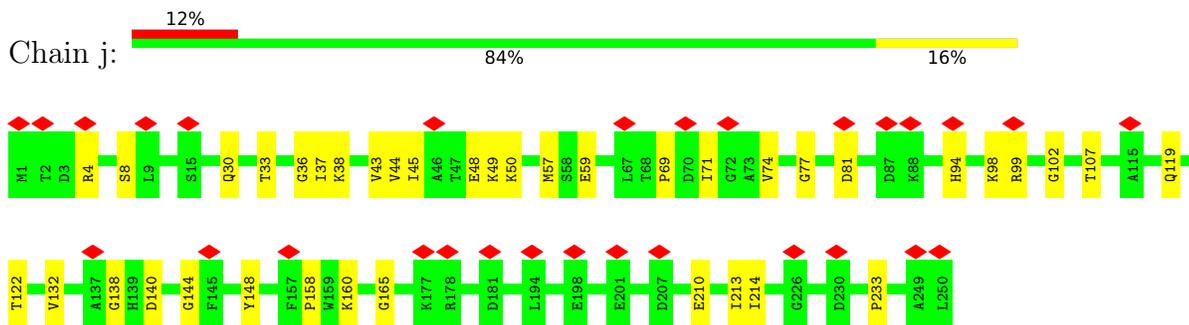
• Molecule 8: Proteasome subunit alpha type-1



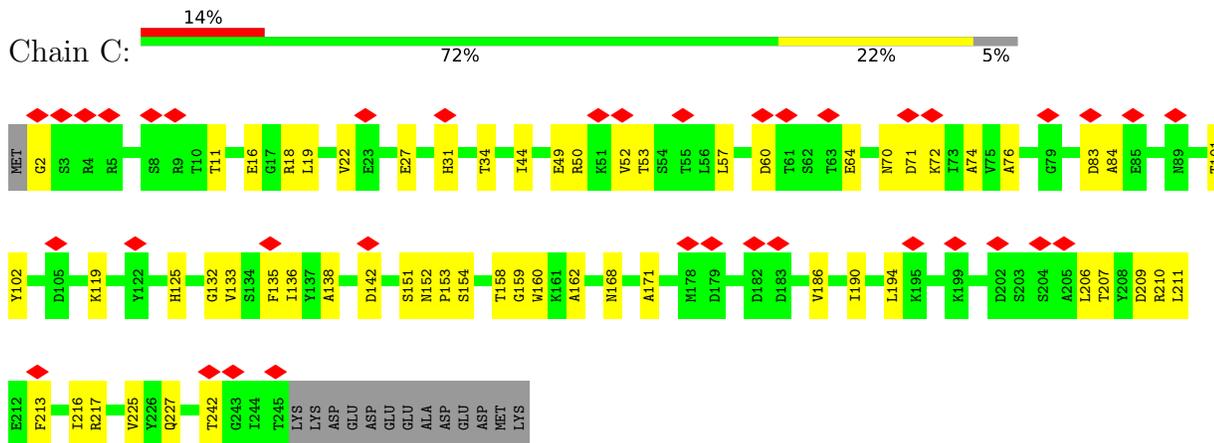
• Molecule 9: Proteasome subunit alpha type-2



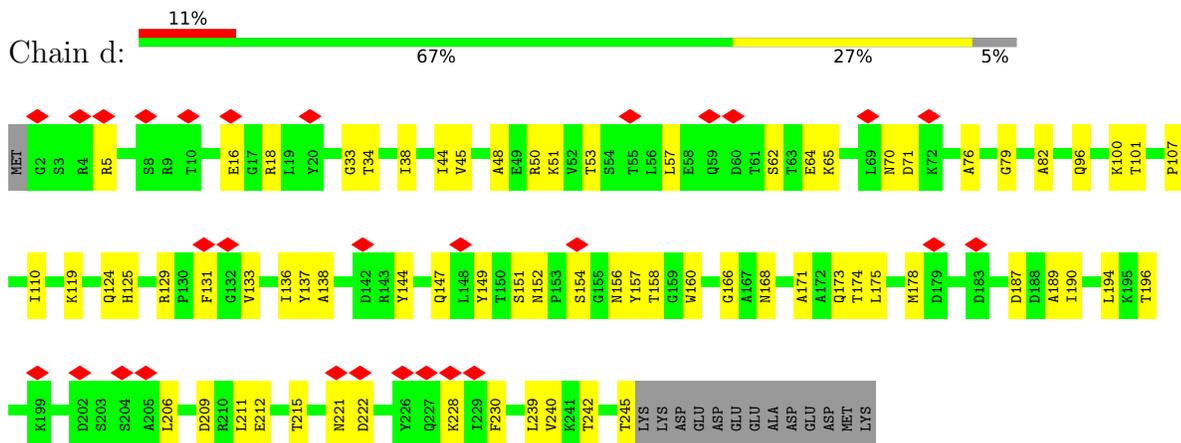
• Molecule 9: Proteasome subunit alpha type-2



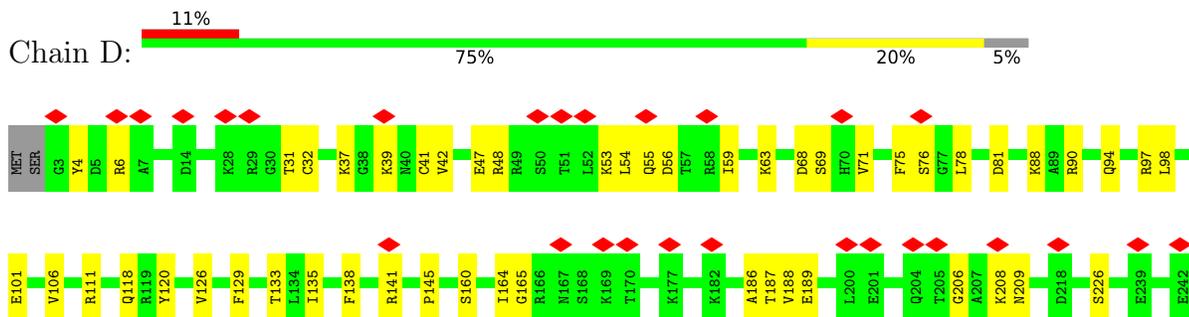
• Molecule 10: Proteasome subunit alpha type-3



• Molecule 10: Proteasome subunit alpha type-3



• Molecule 11: Proteasome subunit alpha type-4



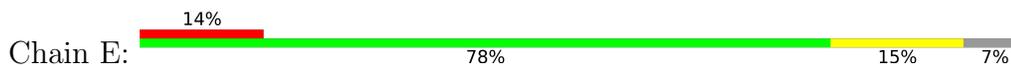
Q243  
GLN  
GLU  
GLN  
ASP  
LYS  
LYS  
LYS  
SER  
SER  
ASN  
HIS

• Molecule 11: Proteasome subunit alpha type-4



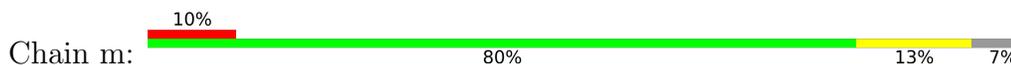
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• Molecule 12: Proteasome subunit alpha type-5

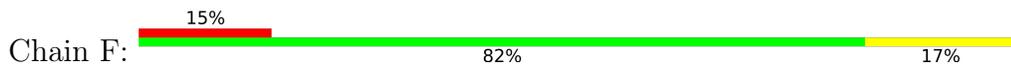


ALA  
ASP  
VAL  
GLU  
MET  
SER

• Molecule 12: Proteasome subunit alpha type-5



• Molecule 13: Proteasome subunit alpha type-6

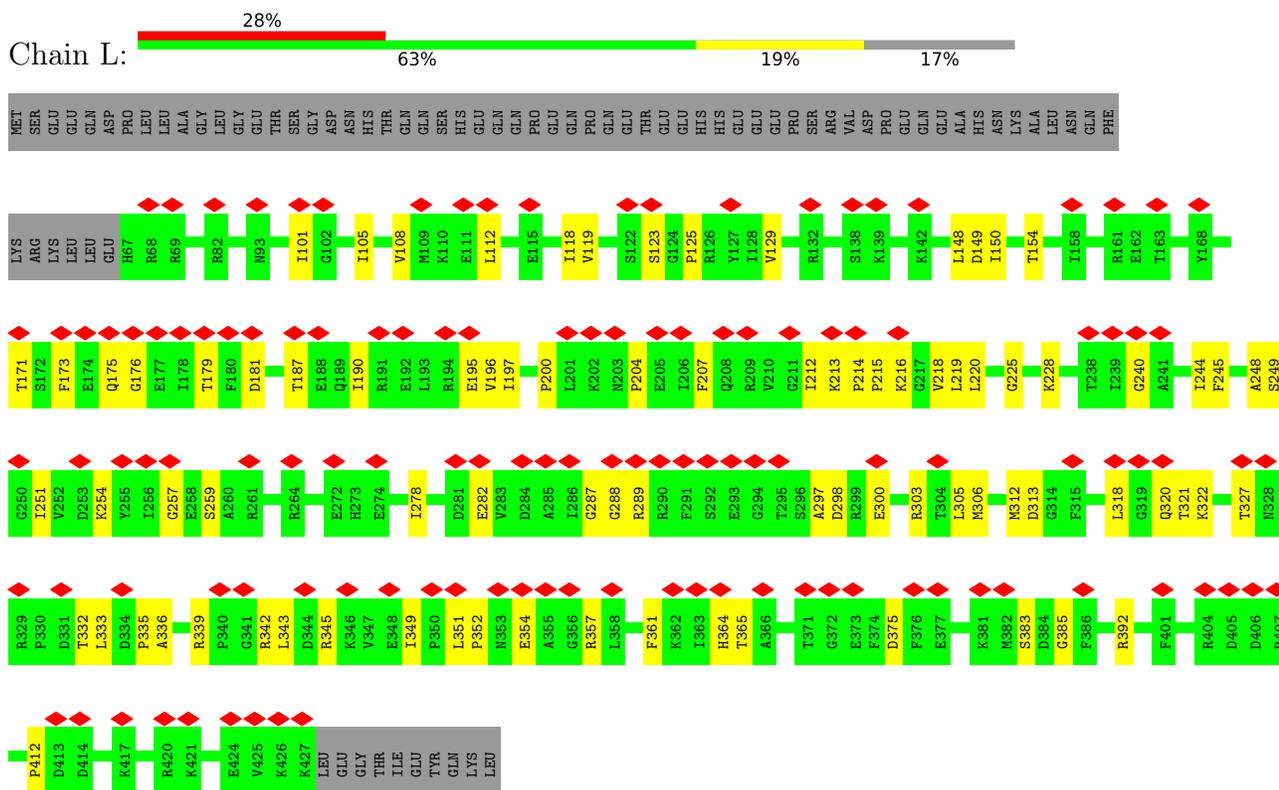




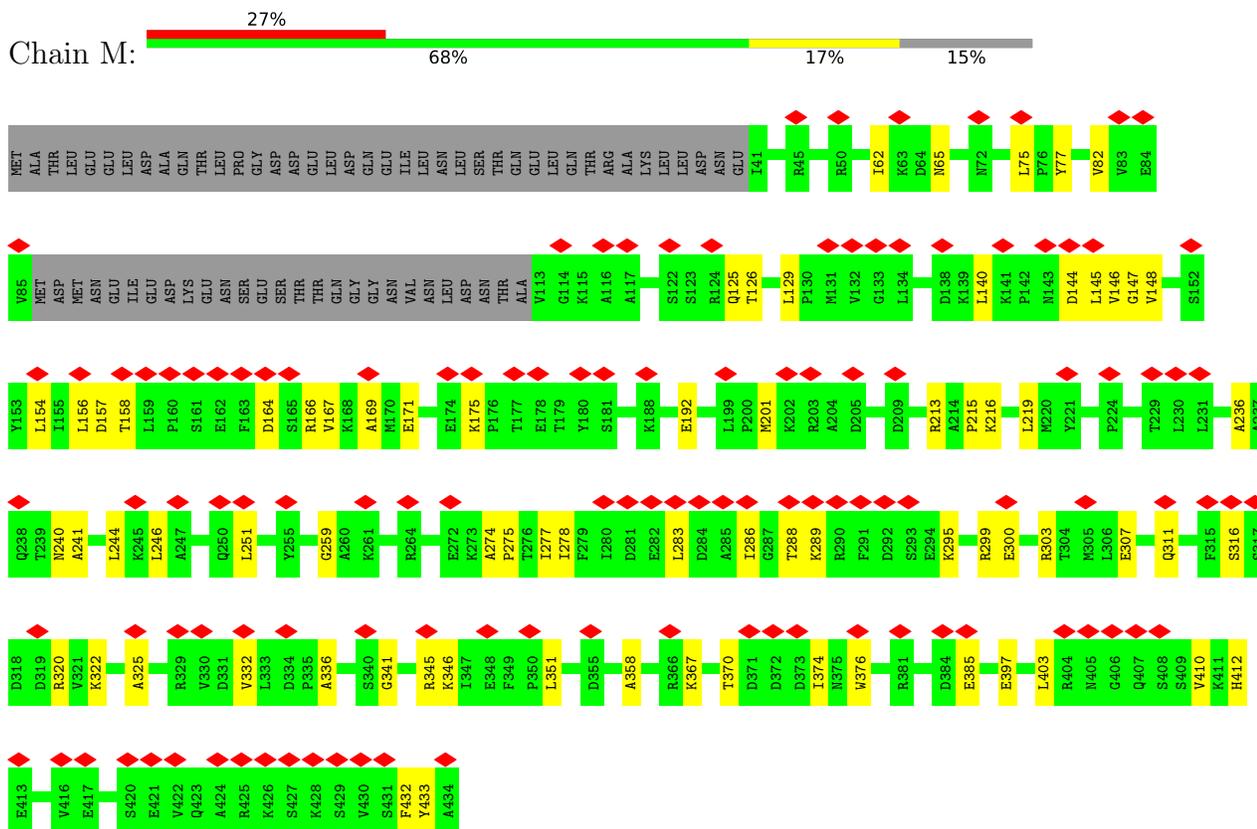




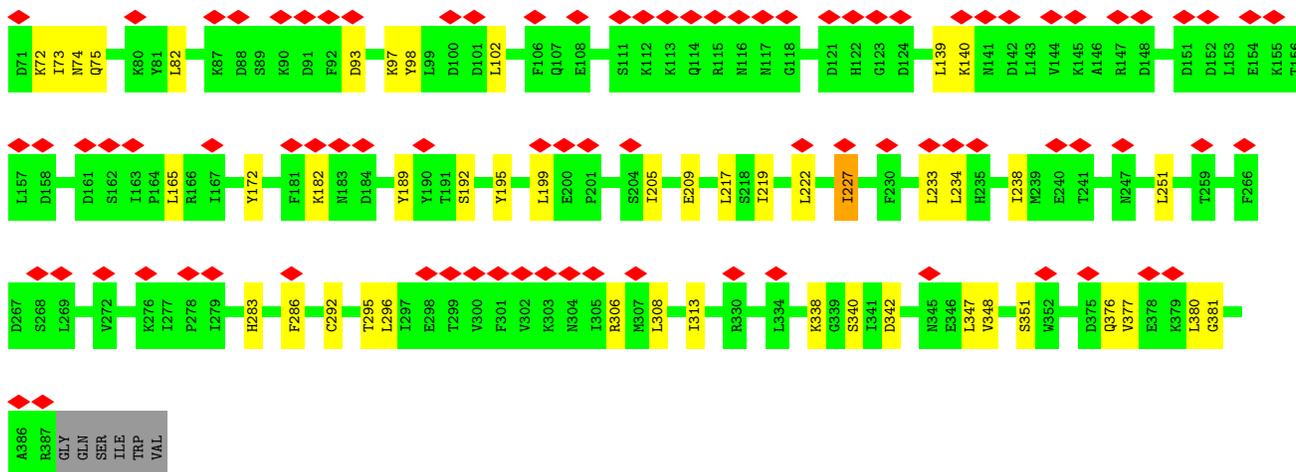
- Molecule 19: 26S protease subunit RPT4



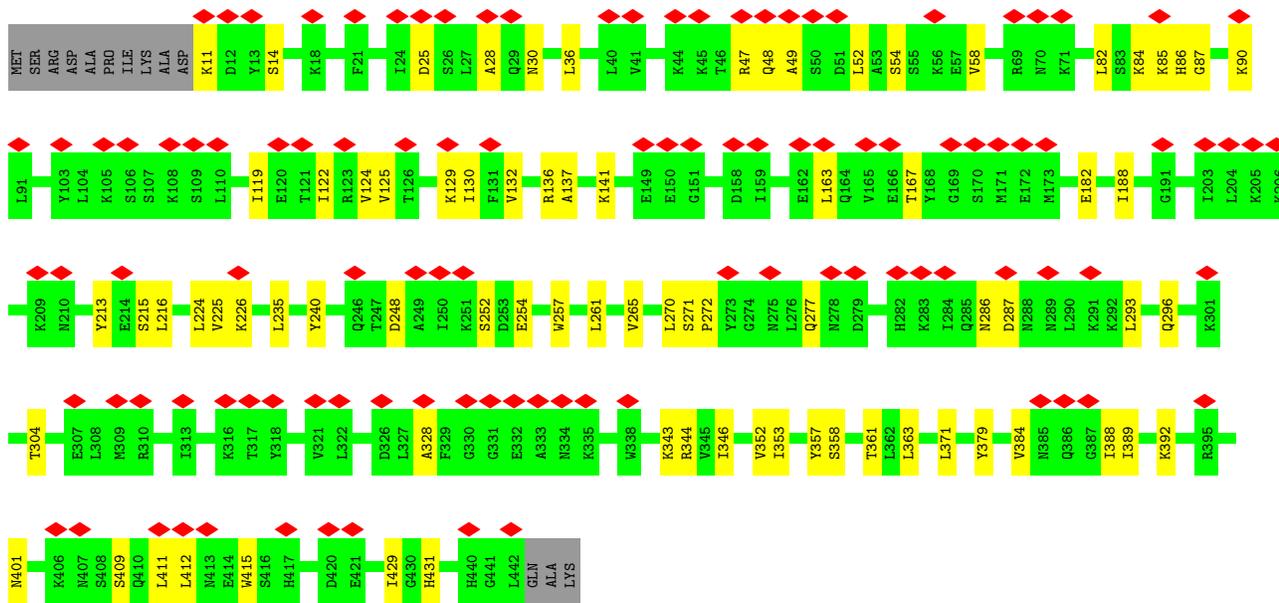
- Molecule 20: 26S protease regulatory subunit 6A



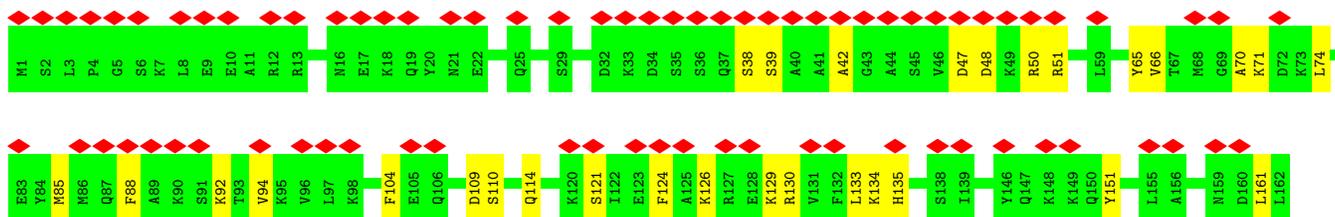
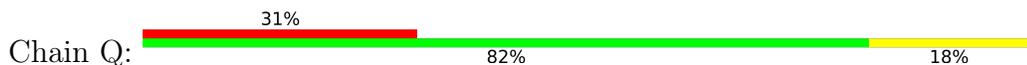




• Molecule 23: 26S proteasome regulatory subunit RPN5



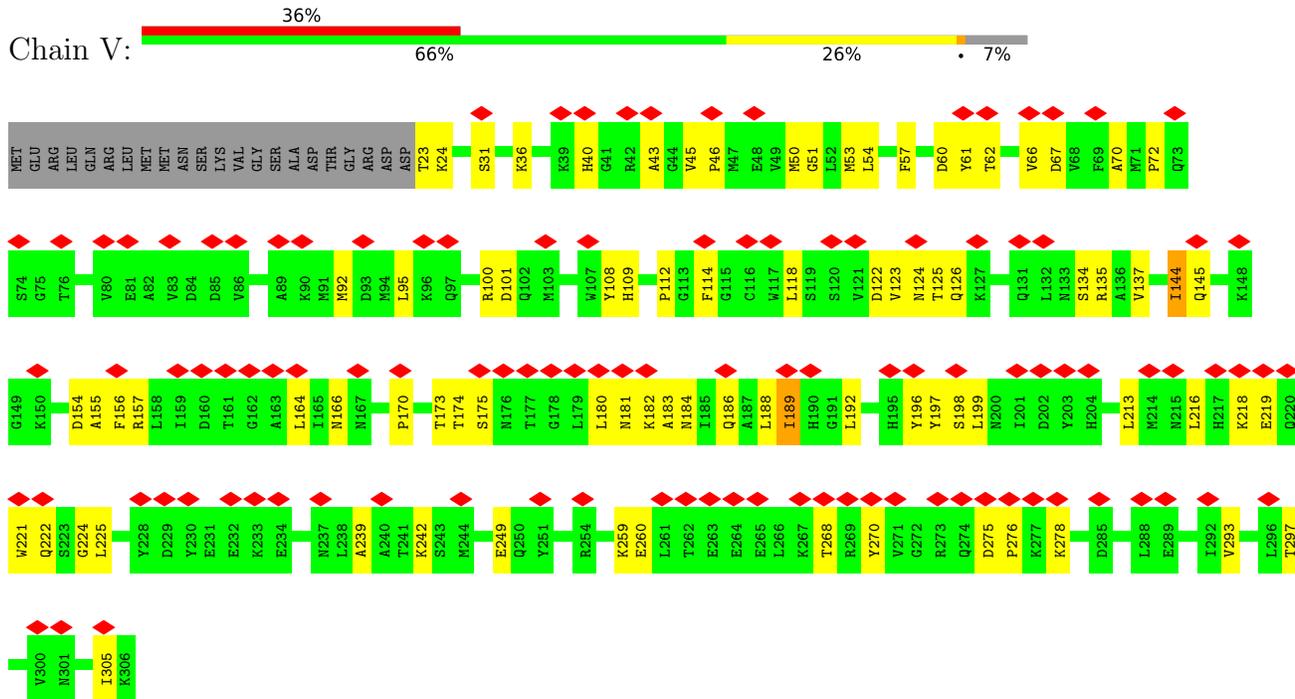
• Molecule 24: 26S proteasome regulatory subunit RPN6



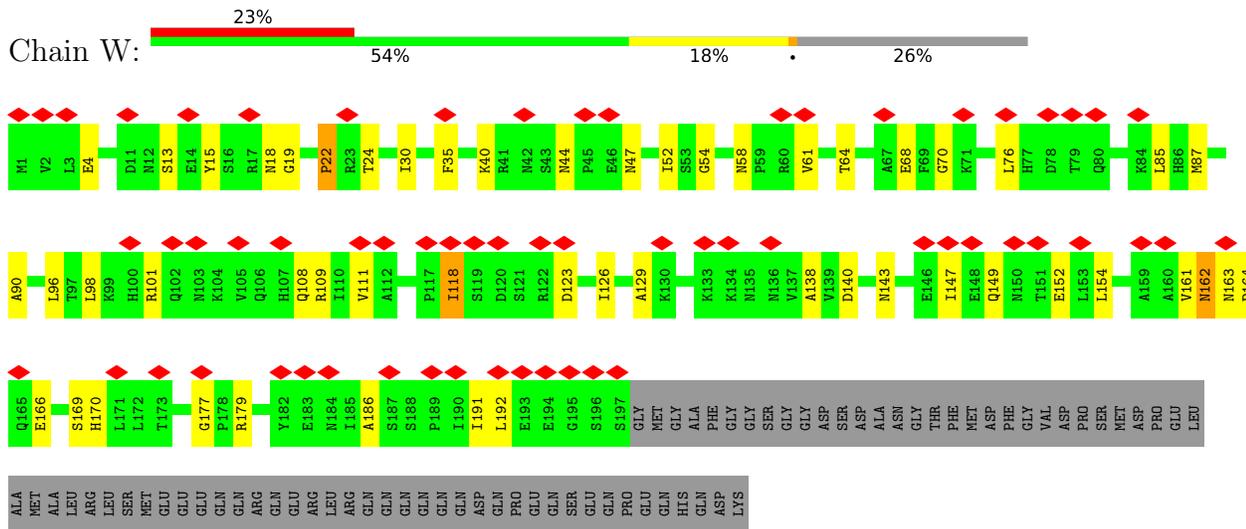




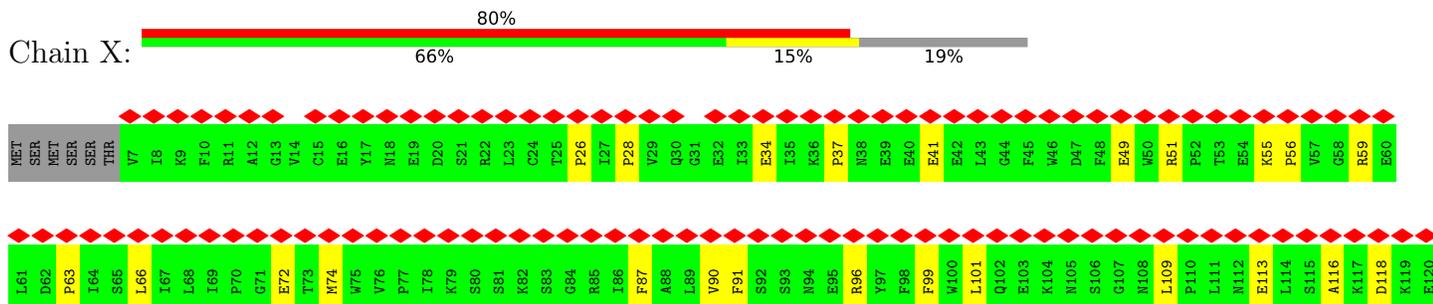
• Molecule 29: Ubiquitin carboxyl-terminal hydrolase RPN11



• Molecule 30: 26S proteasome regulatory subunit RPN10



• Molecule 31: 26S proteasome regulatory subunit RPN13





N549	F550	L551	E552	R553	T554	A555	I556	E557	L558	K559	T560	D561	V562	V563	R564	F565	L566	A567	L568	A569	L570	G571	I572	L573	Y574	M575	G576	Q577	G578	E579	Q580	V581	D582	D583	V584	L585	E586	T587	I588	S589	A590	I591	H593	P594	M595	T596	S597	A598	I599	E600	V601	L602	V603	G604	S605	C606	A607	Y608																																																																				
T609	G610	T611	G612	D613	V614	L615	L616	I617	Q618	D619	L620	H621	R623	L624	T625	PRO	LYS	ASN	ASN	VAL	VAL	LYS	GLY	GLU	GLU	ALA	ASP	GLU	GLU	THR	ALA	GLY	GLY	GLN	THR	ASN	SER	SER	ILE	SER	ASP	ALA	PHE	LEU	GLY	GLY	GLN	VAL	ASN	ASN	PRO	THR	LYS	ASN	P594	M595	T596	S597	A598	I599	E600	V601	L602	V603	G604	S605	C606	A607	Y608																																																									
VAL	ASP	GLU	MET	VAL	ASP	ALA	GLY	GLU	VAL	GLU	VAL	LYS	ALA	ILE	THR	LYS	LYS	ASN	GLY	GLU	SER	LEU	GLY	GLU	GLU	ALA	ILE	LYS	SER	SER	ASP	LYS	ASP	ALA	THR	THR	THR	ASP	GLY	GLY	ASN	VAL	ASN	ASP	GLU	GLU	GLU	GLU	LYS	VAL	ASP	GLU	ILE	GLU	VAL	ASP	GLU	ILE	GLU	VAL	ASP	GLU	MET	VAL	ASP	GLU	VAL	ASP	ALA	GLY	GLU	VAL	GLU	VAL	LYS	ALA	ILE	THR	LYS	LYS	ASN	GLY	GLU	SER	LEU	GLY	GLU	GLU	ALA	ILE	LYS	SER	SER	ASP	LYS	ASP	ALA	THR	THR	THR	ASP	GLY	GLY	GLN	VAL	ASN	ASN	PRO	THR	LYS	ASN	P594	M595	T596	S597	A598	I599	E600	V601	L602	V603	G604	S605	C606	A607	Y608
GLU	ALA	ILE	VAL	ASP	GLU	L736	A737	T738	A739	V740	L741	G742	I743	A744	L745	I746	A747	G749	E750	D751	I752	G753	K754	E755	M756	S757	L758	R759	H760	F761	G762	H763	L764	H765	H766	Y767	G768	N769	E770	H771	I772	R773	R774	H775	P777	A779	R780	G781	I782	V783	S784	V785	S786	D787	P788	T848																																																																						
Q789	M790	K791	V792	F793	D794	T795	L796	T797	R798	F799	S800	H801	D802	A803	D804	L805	E806	V807	S808	M809	M810	S811	I812	F813	A814	M815	G816	L817	C818	G819	A820	G821	T822	M823	M824	A825	R826	L827	A828	Q829	L830	L831	R832	Q833	L834	A835	S836	Y837	Y838	S839	R840	E841	Q842	D843	A844	L845	F846	I847	T848																																																																			
R849	L850	A851	Q852	G853	L854	L855	H856	L857	G858	R859	G860	T861	M862	T863	M864	D865	V866	F867	N868	D869	A870	H871	V872	L873	N874	R875	V876	T877	L878	A879	S880	I881	L882	T883	T884	A885	V886	G887	L888	W889	S890	P891	S892	F893	M894	L895	K896	H897	H898	Q899	L900	F901	Y902	M903	L904	M905	A906	G907	I908																																																																			
R909	P910	K911	F912	I913	L914	A915	L916	N917	D918	E919	G920	E921	P922	I923	K924	V925	N926	V927	R928	V929	G930	Q931	ALA	VAL	GLU	THR	VAL	GLY	GLN	ALA	GLY	ARG	PRO	LYS	LYS	ILE	THR	GLY	TRP	ILE	THR	GLN	SER	THR	P954	V955	L956	L957	N958	H959	G960	F961	R962	A963	E964	L965	E966	T967	D968																																																																			
E969	Y970	I971	S972	Y973	T974	S975	H976	I977	E978	G979	V980	V981	I982	L983	K984	K985	N986	P987	D988	Y989	R990	E991	E992	E993	VAL	GLU	THR	VAL	GLY	GLN	ALA	GLY	ARG	PRO	LYS	LYS	ILE	THR	GLY	TRP	ILE	THR	GLN	SER	THR	P954	V955	L956	L957	N958	H959	G960	F961	R962	A963	E964	L965	E966	T967	D968																																																																		

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	178576	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 ( $e^-/\text{\AA}^2$ )	38	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	1.666	Depositor
Minimum map value	-0.738	Depositor
Average map value	0.008	Depositor
Map value standard deviation	0.082	Depositor
Recommended contour level	0.543	Depositor
Map size (Å)	474.47998, 474.47998, 474.47998	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.318, 1.318, 1.318	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	1	0.06	0/1541	0.22	0/2087
1	b	0.06	0/1541	0.21	0/2087
2	2	0.06	0/1723	0.20	0/2337
2	i	0.06	0/1723	0.20	0/2337
3	3	0.07	0/1611	0.26	0/2174
3	h	0.07	0/1611	0.25	0/2174
4	4	0.07	0/1613	0.22	0/2173
4	g	0.07	0/1613	0.22	0/2173
5	5	0.06	0/1681	0.21	0/2274
5	f	0.07	0/1681	0.23	0/2274
6	6	0.07	0/1795	0.23	0/2420
6	e	0.07	0/1795	0.22	0/2420
7	7	0.07	0/1855	0.23	0/2514
7	a	0.07	0/1855	0.24	0/2514
8	A	0.07	0/1959	0.23	0/2652
8	c	0.07	0/1959	0.22	0/2652
9	B	0.07	0/1952	0.22	0/2642
9	j	0.08	0/1952	0.22	0/2642
10	C	0.07	0/1934	0.26	0/2618
10	d	0.08	0/1934	0.25	0/2618
11	D	0.07	0/1919	0.24	0/2598
11	n	0.07	0/1919	0.24	0/2598
12	E	0.06	0/1886	0.23	0/2541
12	m	0.06	0/1886	0.20	0/2541
13	F	0.07	0/1823	0.25	0/2463
13	l	0.07	0/1823	0.24	0/2463
14	G	0.07	0/1936	0.21	0/2614
14	k	0.07	0/1936	0.22	0/2614
15	H	0.09	0/2831	0.30	0/3808
16	I	0.22	1/2860 (0.0%)	0.29	0/3856
17	J	0.08	0/2964	0.27	0/3981
18	K	0.12	0/3062	0.31	0/4132
19	L	0.08	0/2896	0.25	0/3895
20	M	0.23	2/2903 (0.1%)	0.27	0/3909

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
21	N	0.11	1/6670 (0.0%)	0.26	0/9023
22	O	0.09	0/3243	0.28	0/4374
23	P	0.07	0/3599	0.23	0/4854
24	Q	0.07	0/3527	0.24	0/4748
25	R	0.07	0/3272	0.24	0/4412
26	S	0.08	0/2945	0.28	0/3976
27	T	0.07	0/2279	0.24	0/3077
28	U	0.07	0/2087	0.21	0/2811
29	V	0.11	0/2271	0.41	0/3064
30	W	0.12	0/1557	0.31	0/2111
31	X	0.13	0/1058	0.30	0/1432
32	Y	0.06	0/169	0.18	0/223
33	Z	0.11	1/6404 (0.0%)	0.26	0/8686
All	All	0.10	5/107053 (0.0%)	0.25	0/144586

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
15	H	0	1
16	I	0	1
29	V	0	3
30	W	0	1
33	Z	0	1
All	All	0	7

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
16	I	102	ASN	C-N	10.78	1.59	1.33
20	M	274	ALA	C-N	8.80	1.54	1.33
20	M	75	LEU	C-N	7.65	1.51	1.33
21	N	217	MET	C-N	6.13	1.48	1.33
33	Z	468	GLU	C-N	5.78	1.47	1.33

There are no bond angle outliers.

There are no chirality outliers.

5 of 7 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
15	H	185	LEU	Peptide
16	I	254	GLN	Peptide
29	V	222	GLN	Peptide
29	V	268	THR	Peptide
29	V	61	TYR	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	1	1512	0	1478	28	0
1	b	1512	0	1478	28	0
2	2	1692	0	1696	28	0
2	i	1692	0	1696	26	0
3	3	1581	0	1571	34	0
3	h	1581	0	1571	42	0
4	4	1585	0	1590	28	0
4	g	1585	0	1590	30	0
5	5	1644	0	1592	34	0
5	f	1644	0	1592	34	0
6	6	1757	0	1708	29	0
6	e	1757	0	1708	30	0
7	7	1824	0	1829	32	0
7	a	1824	0	1829	45	0
8	A	1921	0	1910	34	0
8	c	1921	0	1910	33	0
9	B	1915	0	1929	25	0
9	j	1915	0	1929	30	0
10	C	1904	0	1901	39	0
10	d	1904	0	1901	46	0
11	D	1890	0	1900	41	0
11	n	1890	0	1900	42	0
12	E	1861	0	1836	26	0
12	m	1861	0	1836	23	0
13	F	1795	0	1797	29	0
13	l	1795	0	1797	24	0
14	G	1896	0	1886	29	0
14	k	1896	0	1886	22	0
15	H	2792	0	2879	43	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
16	I	2822	0	2870	56	0
17	J	2928	0	3057	65	0
18	K	3019	0	3084	76	0
19	L	2853	0	2926	53	0
20	M	2866	0	2938	48	0
21	N	6562	0	6625	112	0
22	O	3182	0	3207	30	0
23	P	3545	0	3629	52	0
24	Q	3471	0	3495	48	0
25	R	3218	0	3216	66	0
26	S	2893	0	2937	50	0
27	T	2235	0	2207	29	0
28	U	2061	0	2116	35	0
29	V	2236	0	2242	58	0
30	W	1534	0	1542	30	0
31	X	1032	0	1017	14	0
32	Y	168	0	153	0	0
33	Z	6290	0	6236	74	0
All	All	105261	0	105622	1595	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 8.

The worst 5 of 1595 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)
29:V:180:LEU:HD23	29:V:181:ASN:H	1.40	0.86
18:K:90:GLN:O	18:K:93:PRO:HD2	1.75	0.85
17:J:121:MET:SD	29:V:181:ASN:ND2	2.54	0.80
3:3:107:PRO:HD2	3:3:124:PHE:HB2	1.65	0.79
21:N:176:GLN:HE22	21:N:181:GLU:HB2	1.50	0.76

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	1	194/215 (90%)	186 (96%)	8 (4%)	0	100	100
1	b	194/215 (90%)	185 (95%)	9 (5%)	0	100	100
2	2	221/261 (85%)	208 (94%)	13 (6%)	0	100	100
2	i	221/261 (85%)	209 (95%)	12 (5%)	0	100	100
3	3	202/205 (98%)	192 (95%)	9 (4%)	1 (0%)	25	62
3	h	202/205 (98%)	192 (95%)	9 (4%)	1 (0%)	25	62
4	4	196/198 (99%)	183 (93%)	13 (7%)	0	100	100
4	g	196/198 (99%)	186 (95%)	10 (5%)	0	100	100
5	5	210/287 (73%)	198 (94%)	12 (6%)	0	100	100
5	f	210/287 (73%)	198 (94%)	12 (6%)	0	100	100
6	6	220/241 (91%)	211 (96%)	9 (4%)	0	100	100
6	e	220/241 (91%)	206 (94%)	14 (6%)	0	100	100
7	7	231/266 (87%)	220 (95%)	11 (5%)	0	100	100
7	a	231/266 (87%)	218 (94%)	13 (6%)	0	100	100
8	A	241/252 (96%)	230 (95%)	11 (5%)	0	100	100
8	c	241/252 (96%)	229 (95%)	12 (5%)	0	100	100
9	B	248/250 (99%)	237 (96%)	11 (4%)	0	100	100
9	j	248/250 (99%)	235 (95%)	13 (5%)	0	100	100
10	C	242/258 (94%)	224 (93%)	16 (7%)	2 (1%)	16	54
10	d	242/258 (94%)	228 (94%)	14 (6%)	0	100	100
11	D	239/254 (94%)	230 (96%)	9 (4%)	0	100	100
11	n	239/254 (94%)	224 (94%)	15 (6%)	0	100	100
12	E	240/260 (92%)	230 (96%)	10 (4%)	0	100	100
12	m	240/260 (92%)	231 (96%)	9 (4%)	0	100	100
13	F	231/234 (99%)	220 (95%)	11 (5%)	0	100	100
13	l	231/234 (99%)	221 (96%)	10 (4%)	0	100	100
14	G	242/288 (84%)	235 (97%)	7 (3%)	0	100	100
14	k	242/288 (84%)	232 (96%)	10 (4%)	0	100	100
15	H	353/467 (76%)	321 (91%)	32 (9%)	0	100	100
16	I	360/437 (82%)	334 (93%)	25 (7%)	1 (0%)	37	71

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
17	J	371/405 (92%)	351 (95%)	20 (5%)	0	100	100
18	K	379/428 (89%)	345 (91%)	33 (9%)	1 (0%)	37	71
19	L	359/437 (82%)	334 (93%)	25 (7%)	0	100	100
20	M	363/434 (84%)	343 (94%)	19 (5%)	1 (0%)	37	71
21	N	843/945 (89%)	796 (94%)	43 (5%)	4 (0%)	25	62
22	O	385/393 (98%)	339 (88%)	45 (12%)	1 (0%)	37	71
23	P	430/445 (97%)	387 (90%)	42 (10%)	1 (0%)	44	77
24	Q	429/434 (99%)	400 (93%)	29 (7%)	0	100	100
25	R	398/429 (93%)	366 (92%)	29 (7%)	3 (1%)	16	54
26	S	351/523 (67%)	320 (91%)	30 (8%)	1 (0%)	37	71
27	T	270/274 (98%)	244 (90%)	26 (10%)	0	100	100
28	U	245/338 (72%)	237 (97%)	7 (3%)	1 (0%)	30	67
29	V	282/306 (92%)	242 (86%)	37 (13%)	3 (1%)	12	46
30	W	195/268 (73%)	170 (87%)	22 (11%)	3 (2%)	8	40
31	X	125/156 (80%)	100 (80%)	25 (20%)	0	100	100
32	Y	17/89 (19%)	17 (100%)	0	0	100	100
33	Z	807/993 (81%)	736 (91%)	71 (9%)	0	100	100
All	All	13276/15139 (88%)	12380 (93%)	872 (7%)	24 (0%)	45	77

5 of 24 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
10	C	52	VAL
16	I	255	LYS
21	N	874	ILE
28	U	130	VAL
3	3	105	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	1	162/178 (91%)	162 (100%)	0	100	100
1	b	162/178 (91%)	162 (100%)	0	100	100
2	2	182/214 (85%)	182 (100%)	0	100	100
2	i	182/214 (85%)	182 (100%)	0	100	100
3	3	172/173 (99%)	172 (100%)	0	100	100
3	h	172/173 (99%)	172 (100%)	0	100	100
4	4	175/175 (100%)	175 (100%)	0	100	100
4	g	175/175 (100%)	175 (100%)	0	100	100
5	5	169/235 (72%)	169 (100%)	0	100	100
5	f	169/235 (72%)	169 (100%)	0	100	100
6	6	185/201 (92%)	185 (100%)	0	100	100
6	e	185/201 (92%)	185 (100%)	0	100	100
7	7	199/224 (89%)	199 (100%)	0	100	100
7	a	199/224 (89%)	199 (100%)	0	100	100
8	A	207/210 (99%)	207 (100%)	0	100	100
8	c	207/210 (99%)	207 (100%)	0	100	100
9	B	209/209 (100%)	209 (100%)	0	100	100
9	j	209/209 (100%)	209 (100%)	0	100	100
10	C	203/216 (94%)	203 (100%)	0	100	100
10	d	203/216 (94%)	203 (100%)	0	100	100
11	D	213/226 (94%)	213 (100%)	0	100	100
11	n	213/226 (94%)	213 (100%)	0	100	100
12	E	198/215 (92%)	198 (100%)	0	100	100
12	m	198/215 (92%)	198 (100%)	0	100	100
13	F	192/193 (100%)	192 (100%)	0	100	100
13	l	192/193 (100%)	192 (100%)	0	100	100
14	G	201/239 (84%)	201 (100%)	0	100	100
14	k	201/239 (84%)	201 (100%)	0	100	100
15	H	303/399 (76%)	303 (100%)	0	100	100
16	I	319/385 (83%)	319 (100%)	0	100	100
17	J	325/352 (92%)	325 (100%)	0	100	100
18	K	334/374 (89%)	333 (100%)	1 (0%)	91	92

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
19	L	308/377 (82%)	308 (100%)	0	100	100
20	M	315/375 (84%)	315 (100%)	0	100	100
21	N	713/797 (90%)	713 (100%)	0	100	100
22	O	363/368 (99%)	363 (100%)	0	100	100
23	P	405/415 (98%)	405 (100%)	0	100	100
24	Q	388/391 (99%)	388 (100%)	0	100	100
25	R	351/379 (93%)	351 (100%)	0	100	100
26	S	330/489 (68%)	330 (100%)	0	100	100
27	T	254/256 (99%)	254 (100%)	0	100	100
28	U	234/308 (76%)	234 (100%)	0	100	100
29	V	249/268 (93%)	249 (100%)	0	100	100
30	W	171/230 (74%)	171 (100%)	0	100	100
31	X	116/144 (81%)	116 (100%)	0	100	100
32	Y	18/81 (22%)	18 (100%)	0	100	100
33	Z	692/850 (81%)	692 (100%)	0	100	100
All	All	11522/13054 (88%)	11521 (100%)	1 (0%)	100	100

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
18	K	91	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 132 such sidechains are listed below:

Mol	Chain	Res	Type
29	V	97	GLN
29	V	184	ASN
33	Z	833	GLN
11	n	55	GLN
10	d	173	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 oligosaccharides 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.

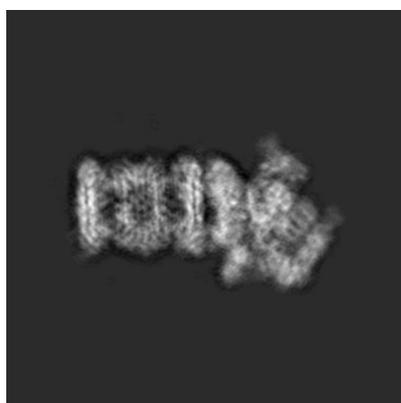
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-6694. These allow visual inspection of the internal detail of the map and identification of artifacts.

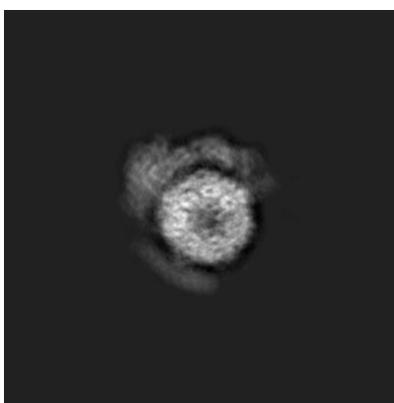
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

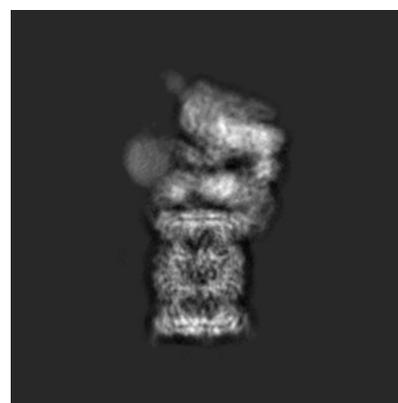
#### 6.1.1 Primary map



X



Y

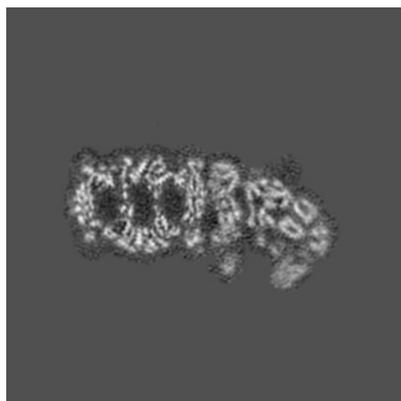


Z

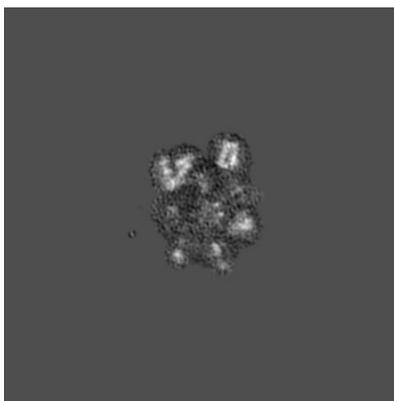
The images above show the map projected in three orthogonal directions.

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

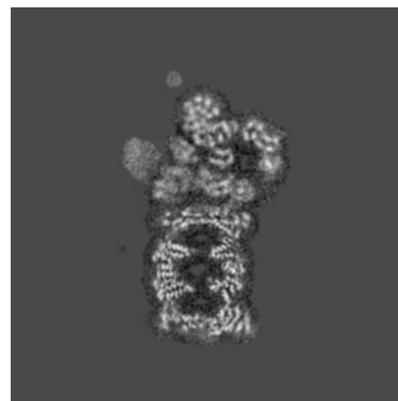
#### 6.2.1 Primary map



X Index: 180



Y Index: 180

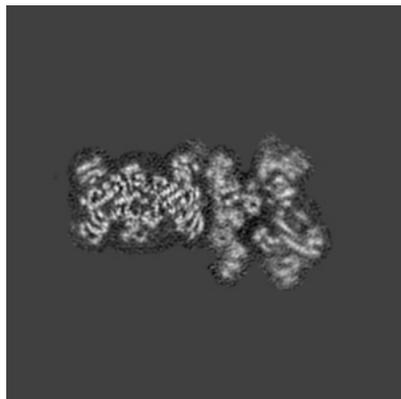


Z Index: 180

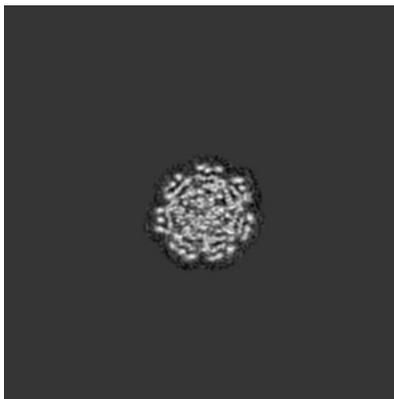
The images above show central slices of the map in three orthogonal directions.

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

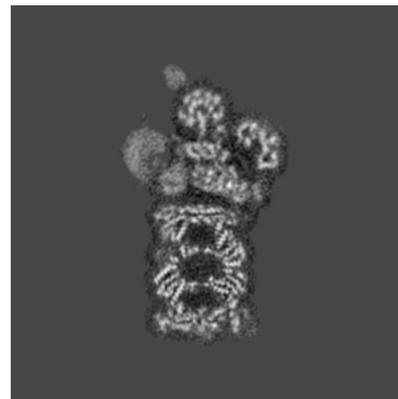
### 6.3.1 Primary map



X Index: 192



Y Index: 77

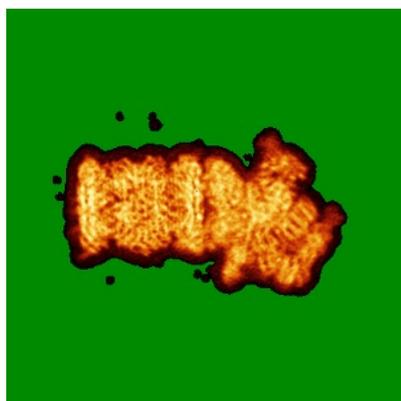


Z Index: 173

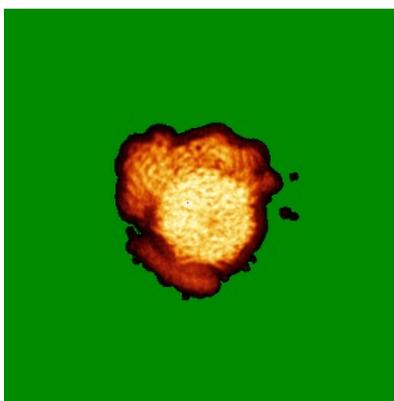
The images above show the largest variance slices of the map in three orthogonal directions.

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

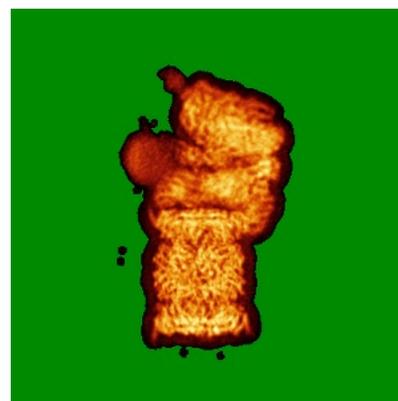
### 6.4.1 Primary map



X



Y

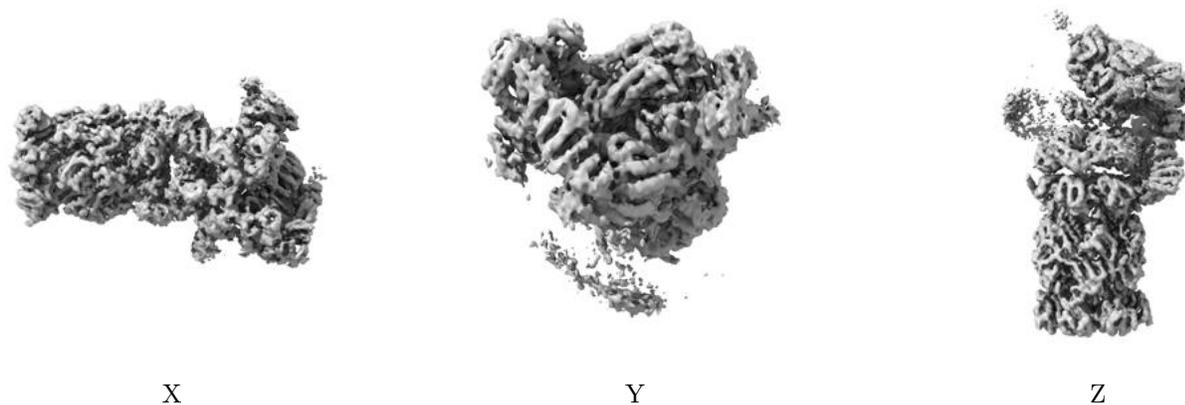


Z

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



The images above show the 3D surface view of the map at the recommended contour level 0.543. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

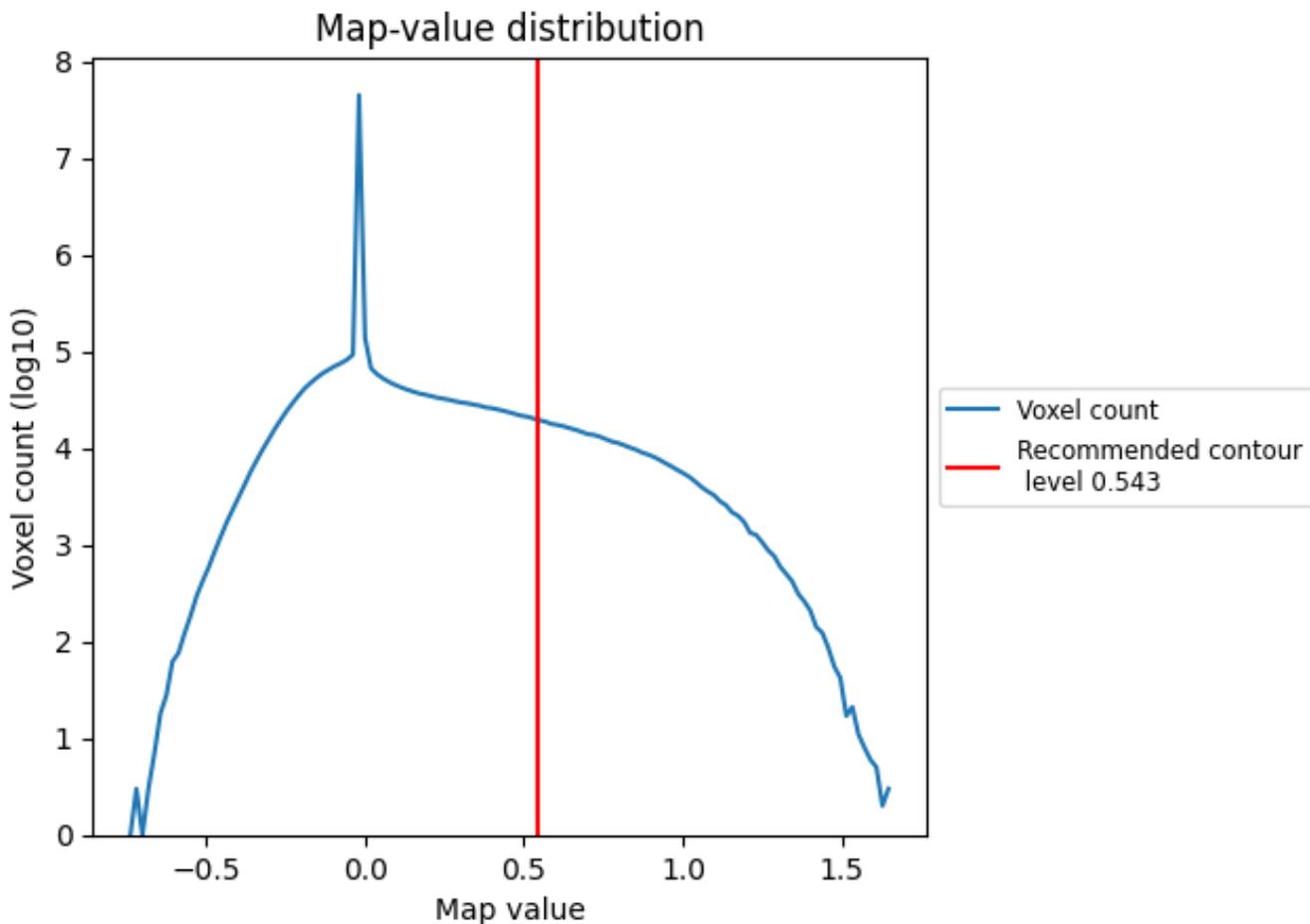
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

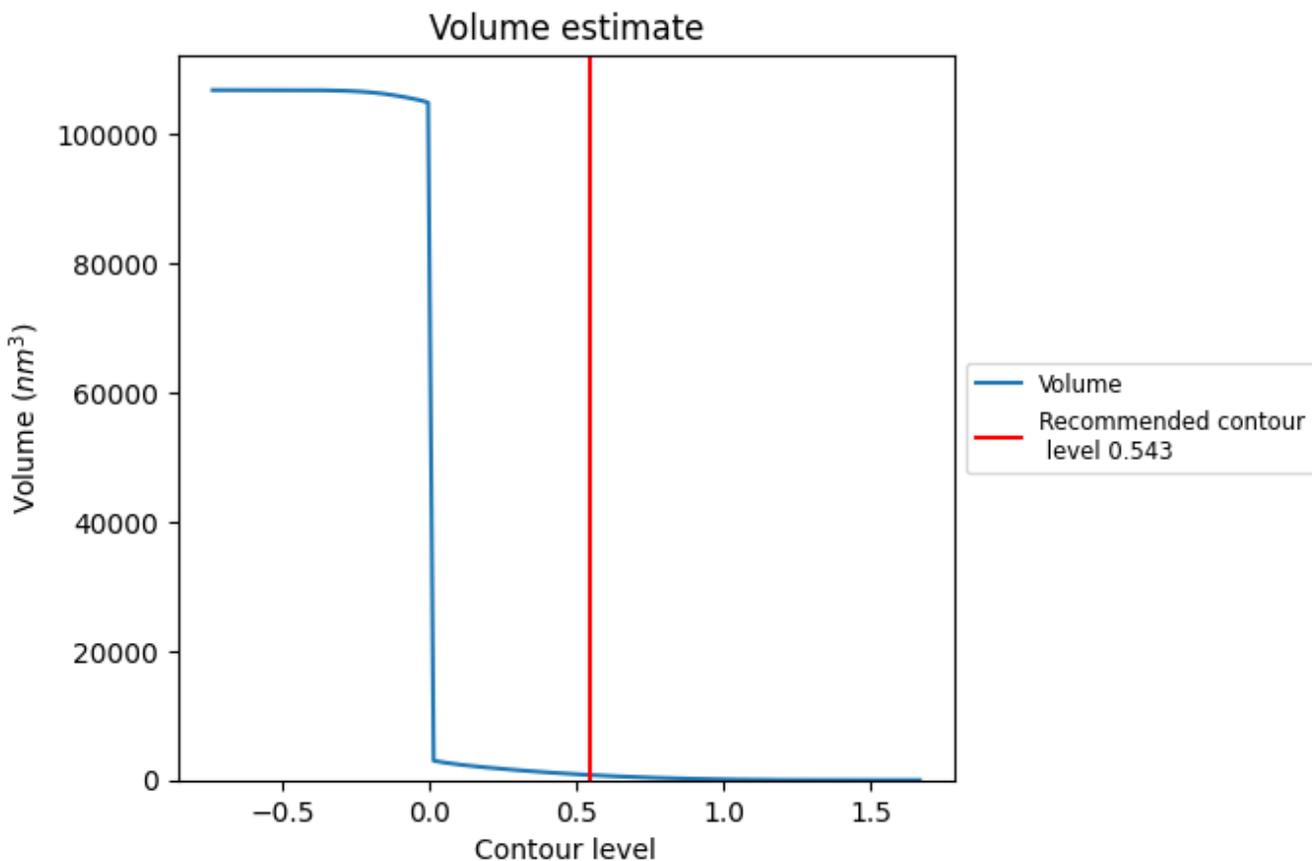
This section contains the results of statistical analysis of the map.

### 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.

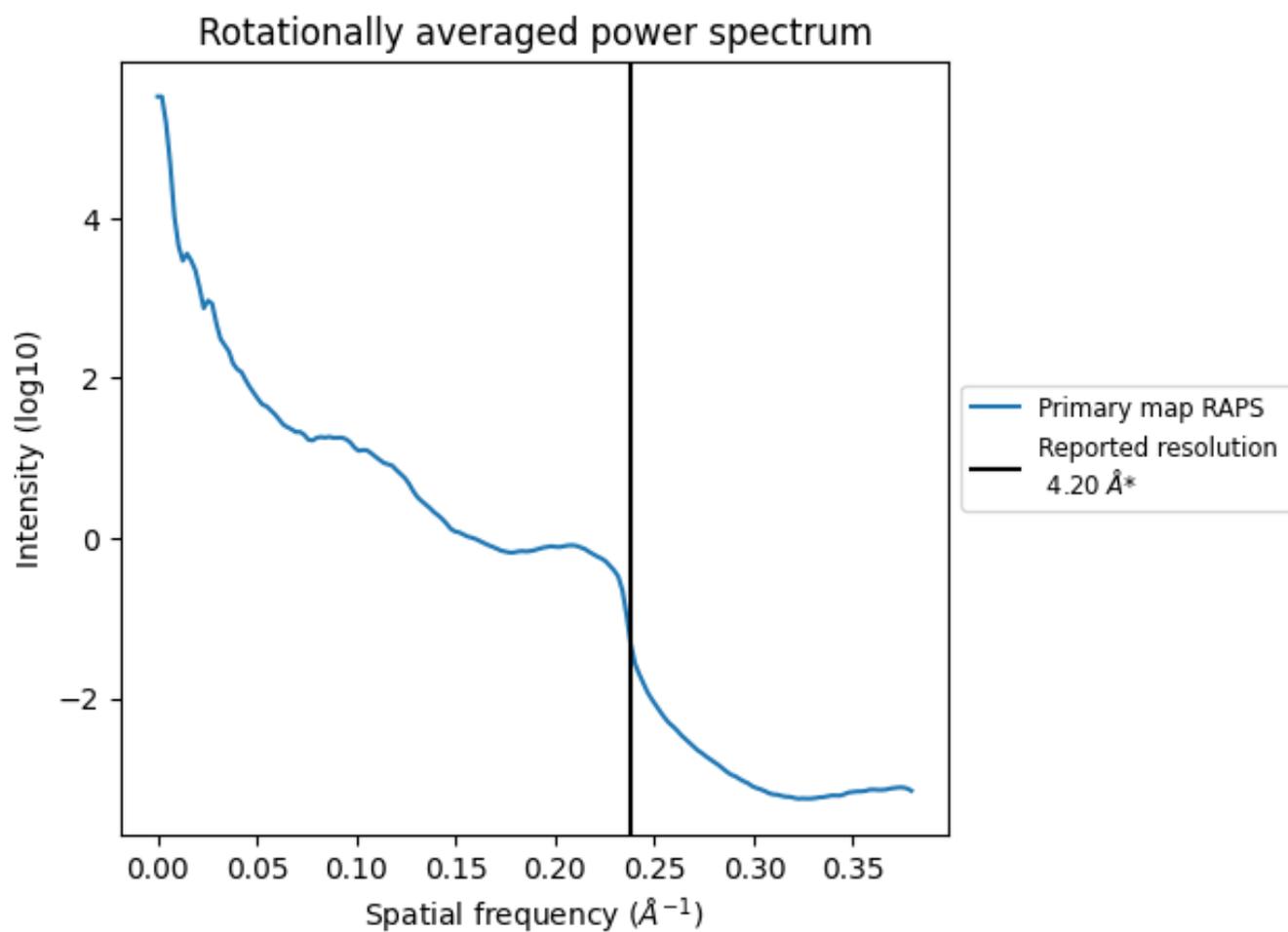
## 7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 792 nm<sup>3</sup>; this corresponds to an approximate mass of 715 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  $0.238 \text{\AA}^{-1}$

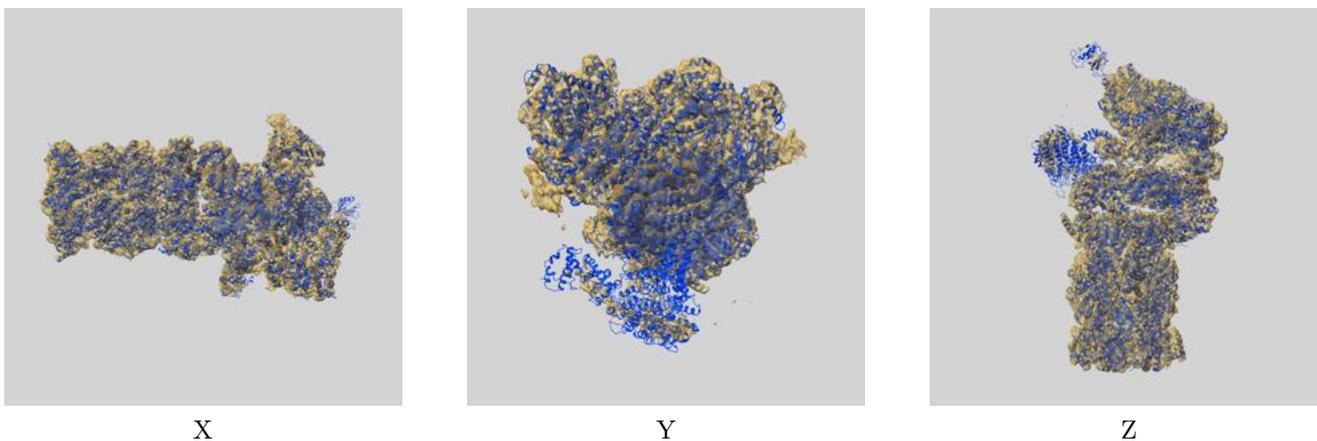
## 8 Fourier-Shell correlation

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

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

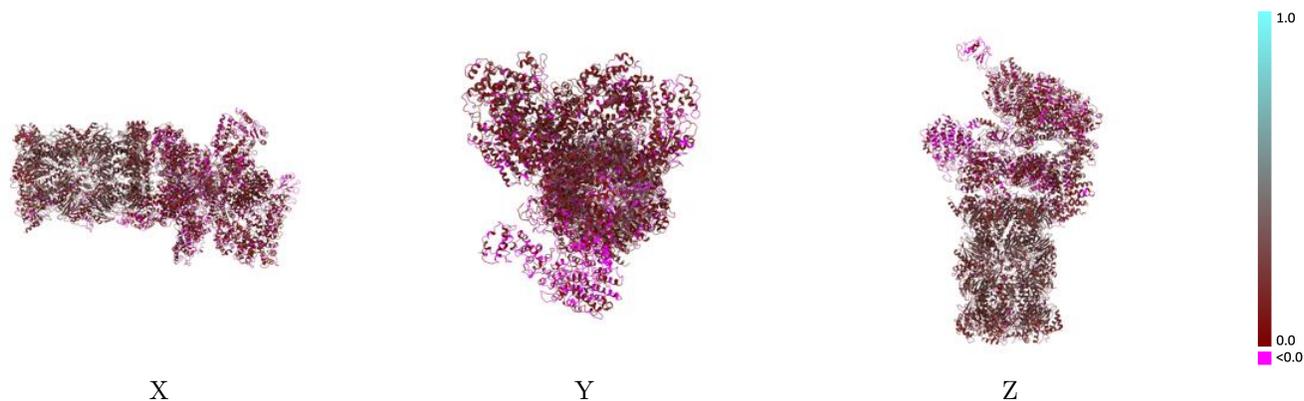
This section contains information regarding the fit between EMDB map EMD-6694 and PDB model 5WVK. Per-residue inclusion information can be found in section 3 on page 11.

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



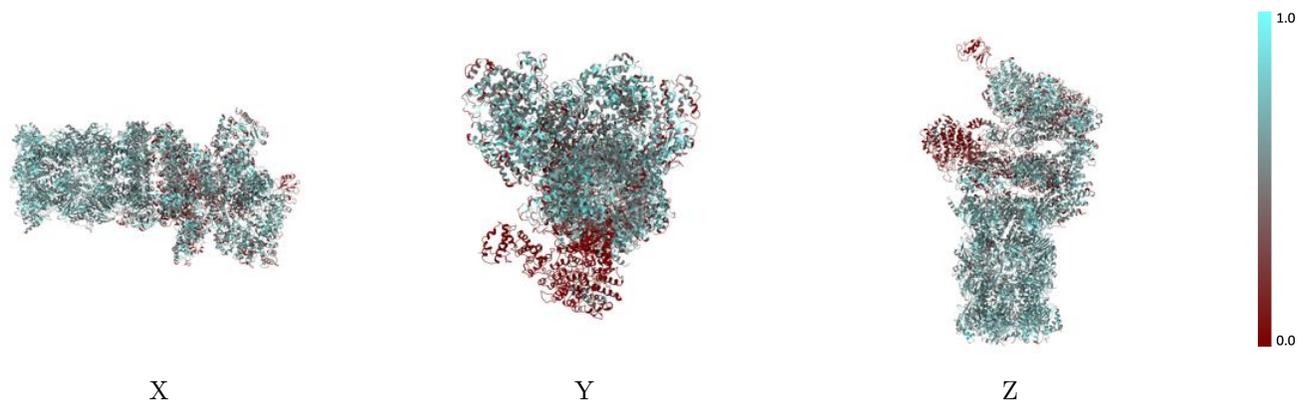
The images above show the 3D surface view of the map at the recommended contour level 0.543 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



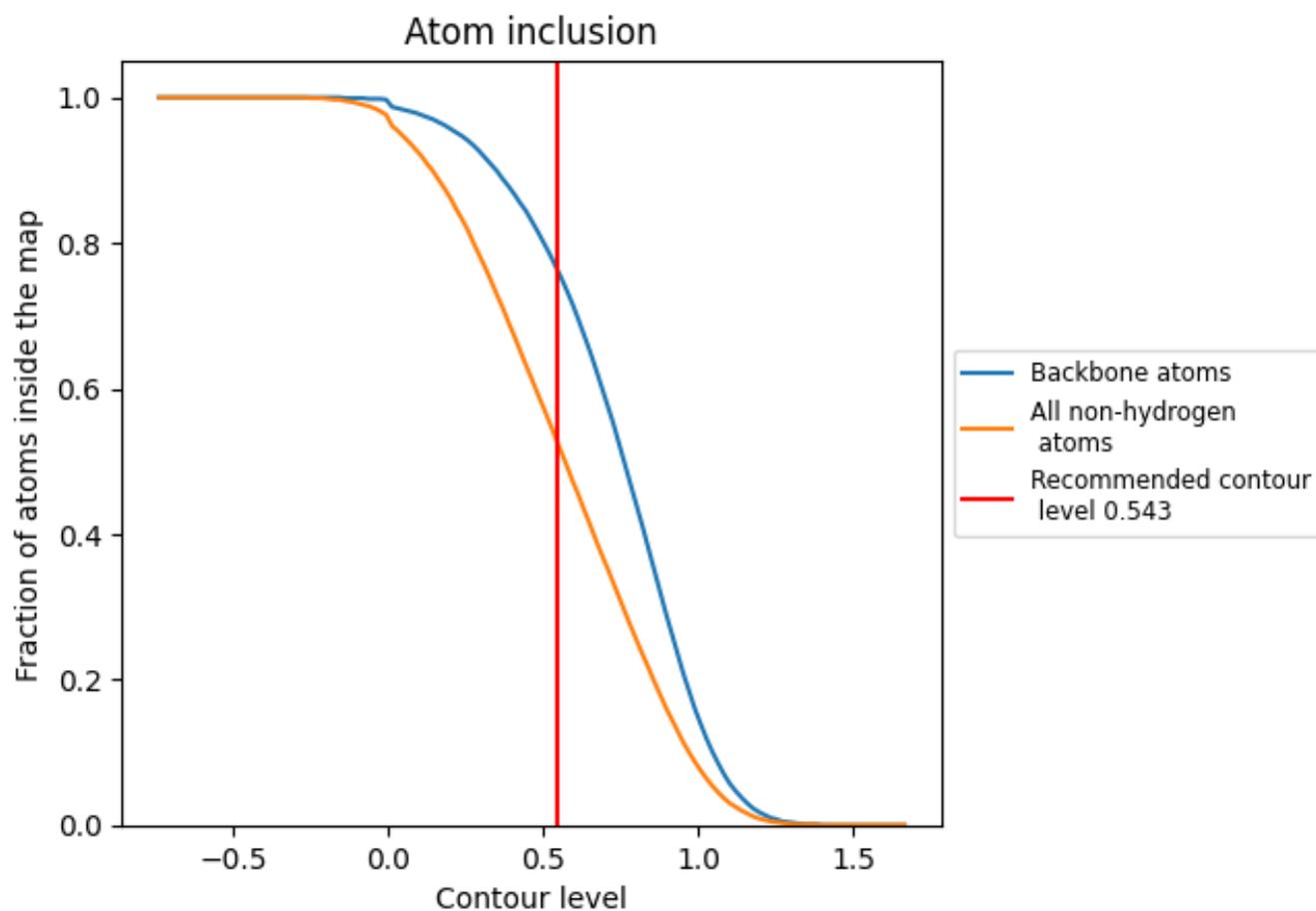
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.543).

## 9.4 Atom inclusion [i](#)



At the recommended contour level, 77% of all backbone atoms, 53% 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 (0.543) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.5290	 0.1690
1	 0.6540	 0.2880
2	 0.6190	 0.2380
3	 0.6190	 0.2580
4	 0.6090	 0.2530
5	 0.6320	 0.2570
6	 0.5800	 0.2350
7	 0.6320	 0.2730
A	 0.6000	 0.2470
B	 0.5950	 0.2350
C	 0.5960	 0.2100
D	 0.6140	 0.2250
E	 0.6080	 0.2210
F	 0.6080	 0.2210
G	 0.6190	 0.2380
H	 0.4700	 0.1010
I	 0.2980	 0.1050
J	 0.3150	 0.1100
K	 0.4830	 0.1280
L	 0.4950	 0.1090
M	 0.5340	 0.1160
N	 0.5850	 0.1410
O	 0.5110	 0.1140
P	 0.5450	 0.1280
Q	 0.5450	 0.1160
R	 0.5780	 0.1210
S	 0.5380	 0.1170
T	 0.4650	 0.1310
U	 0.5920	 0.1770
V	 0.4650	 0.1180
W	 0.5480	 0.1080
X	 0.0210	 -0.0290
Y	 0.5520	 0.1430
Z	 0.0500	 0.0070
a	 0.6470	 0.2620



*Continued on next page...*

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Chain	Atom inclusion	Q-score
b	 0.6490	 0.2850
c	 0.6430	 0.2330
d	 0.6410	 0.2160
e	 0.6140	 0.2250
f	 0.6360	 0.2320
g	 0.6280	 0.2620
h	 0.6070	 0.2550
i	 0.5980	 0.2350
j	 0.6400	 0.2250
k	 0.6610	 0.2330
l	 0.6600	 0.2140
m	 0.6320	 0.2110
n	 0.6600	 0.2240