



## Full wwPDB EM Validation Report ⓘ

Oct 21, 2024 – 11:05 AM JST

PDB ID : 5WVI  
EMDB ID : EMD-6693  
Title : The resting state of yeast proteasome  
Authors : Ding, Z.; Cong, Y.  
Deposited on : 2016-12-25  
Resolution : 6.30 Å(reported)

This is a Full wwPDB EM Validation 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:

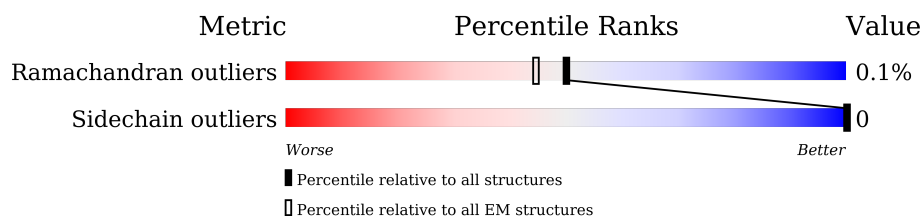
EMDB validation analysis : 0.0.1.dev113  
MolProbity : 4.02b-467  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.39

# 1 Overall quality at a glance

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

The reported resolution of this entry is 6.30 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	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	I	437	<div> <div>24%</div> <div>82%</div> <div>17%</div> </div>
2	K	428	<div> <div>23%</div> <div>89%</div> <div>11%</div> </div>
3	2	261	<div> <div>6%</div> <div>85%</div> <div>15%</div> </div>
3	i	261	<div> <div>6%</div> <div>85%</div> <div>15%</div> </div>
4	A	252	<div> <div>13%</div> <div>96%</div> <div>.</div> </div>
4	c	252	<div> <div>9%</div> <div>96%</div> <div>.</div> </div>
5	3	205	<div> <div>14%</div> <div>100%</div> </div>
5	h	205	<div> <div>10%</div> <div>99%</div> <div>.</div> </div>
6	G	288	<div> <div>12%</div> <div>85%</div> <div>15%</div> </div>

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Mol	Chain	Length	Quality of chain
6	k	288	
7	F	234	
7	l	234	
8	E	260	
8	m	260	
9	D	254	
9	n	254	
10	Y	89	
11	N	945	
12	S	523	
13	T	274	
14	R	429	
15	Q	434	
16	J	405	
17	L	437	
18	M	434	
19	U	338	
20	W	268	
21	O	393	
22	P	445	
23	H	467	
24	C	258	
24	d	258	
25	B	250	
25	j	250	

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Mol	Chain	Length	Quality of chain
26	1	215	
26	b	215	
27	4	198	
27	g	198	
28	5	287	
28	f	287	
29	6	241	
29	e	241	
30	7	266	
30	a	266	
31	X	156	
32	Z	993	
33	V	306	

## 2 Entry composition [i](#)

There are 33 unique types of molecules in this entry. The entry contains 105787 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 26S protease regulatory subunit 4 homolog.

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

- Molecule 2 is a protein called 26S protease regulatory subunit 6B homolog.

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

- Molecule 3 is a protein called Proteasome subunit beta type-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	i	222	Total	C	N	O	S	0	0
			1684	1061	293	323	7		
3	2	222	Total	C	N	O	S	0	0
			1684	1061	293	323	7		

- Molecule 4 is a protein called Proteasome subunit alpha type-1.

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

- Molecule 5 is a protein called Proteasome subunit beta type-3.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	h	204	Total	C	N	O	S	0	0
			1581	1010	258	305	8		
5	3	204	Total	C	N	O	S	0	0
			1581	1010	258	305	8		

- Molecule 6 is a protein called Probable proteasome subunit alpha type-7.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	k	245	Total	C	N	O	S	0	0
			1900	1207	331	358	4		
6	G	245	Total	C	N	O	S	0	0
			1900	1207	331	358	4		

- Molecule 7 is a protein called Proteasome subunit alpha type-6.

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

- Molecule 8 is a protein called Proteasome subunit alpha type-5.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	m	243	Total	C	N	O	S	0	0
			1867	1165	315	380	7		
8	E	243	Total	C	N	O	S	0	0
			1867	1165	315	380	7		

- Molecule 9 is a protein called Proteasome subunit alpha type-4.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	n	242	Total	C	N	O	S	0	0
			1899	1186	333	376	4		
9	D	242	Total	C	N	O	S	0	0
			1899	1186	333	376	4		

- Molecule 10 is a protein called 26S proteasome complex subunit SEM1.

Mol	Chain	Residues	Atoms				AltConf	Trace
10	Y	27	Total	C	N	O	0	0
			236	143	39	54		

- Molecule 11 is a protein called 26S proteasome regulatory subunit RPN2.

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

- Molecule 12 is a protein called 26S proteasome regulatory subunit RPN3.

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

- Molecule 13 is a protein called 26S proteasome regulatory subunit RPN12.

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

- Molecule 14 is a protein called 26S proteasome regulatory subunit RPN7.

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

- Molecule 15 is a protein called 26S proteasome regulatory subunit RPN6.

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

- Molecule 16 is a protein called 26S protease regulatory subunit 8 homolog.

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

- Molecule 17 is a protein called 26S protease subunit RPT4.

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

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

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

- Molecule 19 is a protein called 26S proteasome regulatory subunit RPN8.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	U	282	Total	C	N	O	S	0	0
			2257	1429	387	435	6		

- Molecule 20 is a protein called 26S proteasome regulatory subunit RPN10.

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

- Molecule 21 is a protein called 26S proteasome regulatory subunit RPN9.

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

- Molecule 22 is a protein called 26S proteasome regulatory subunit RPN5.

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

- Molecule 23 is a protein called 26S protease regulatory subunit 7 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	H	370	Total	C	N	O	S	0	0
			2889	1815	515	543	16		

- Molecule 24 is a protein called Proteasome subunit alpha type-3.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	C	245	Total	C	N	O	S	0	0
			1913	1207	323	380	3		
24	d	245	Total	C	N	O	S	0	0
			1913	1207	323	380	3		

- Molecule 25 is a protein called Proteasome subunit alpha type-2.

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



- Molecule 26 is a protein called Proteasome subunit beta type-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	1	205	Total	C	N	O	S	0	0
			1576	996	261	312	7		
26	b	205	Total	C	N	O	S	0	0
			1574	995	261	311	7		

- Molecule 27 is a protein called Proteasome subunit beta type-4.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	4	198	Total	C	N	O	S	0	0
			1585	1005	269	305	6		
27	g	198	Total	C	N	O	S	0	0
			1585	1005	269	305	6		

- Molecule 28 is a protein called Proteasome subunit beta type-5.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	5	212	Total	C	N	O	S	0	0
			1644	1045	280	312	7		
28	f	212	Total	C	N	O	S	0	0
			1644	1045	280	312	7		

- Molecule 29 is a protein called Proteasome subunit beta type-6.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	6	222	Total	C	N	O	S	0	0
			1757	1115	303	335	4		
29	e	222	Total	C	N	O	S	0	0
			1757	1115	303	335	4		

- Molecule 30 is a protein called Proteasome subunit beta type-7.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	7	233	Total	C	N	O	S	0	0
			1824	1154	312	351	7		
30	a	233	Total	C	N	O	S	0	0
			1824	1154	312	351	7		

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

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

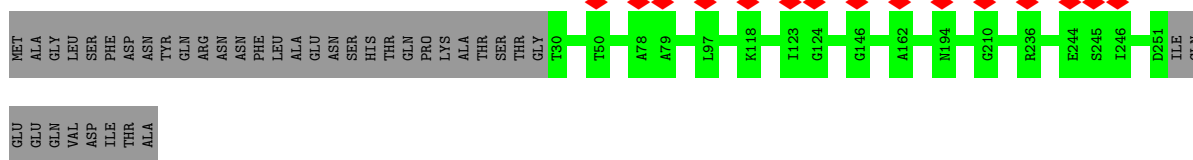
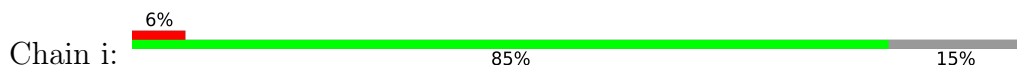
- Molecule 32 is a protein called 26S proteasome regulatory subunit RPN1.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	Z	813	Total	C	N	O	S	0	0
			6289	3995	1029	1236	29		

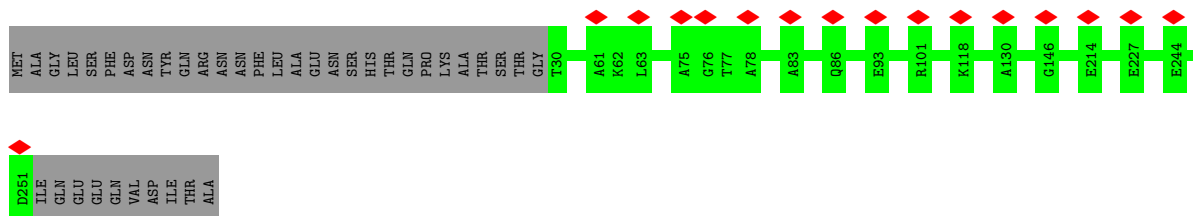
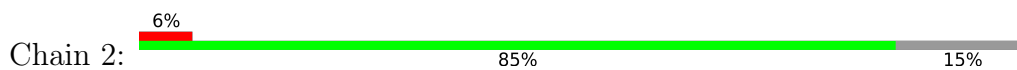
- Molecule 33 is a protein called Ubiquitin carboxyl-terminal hydrolase RPN11.

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

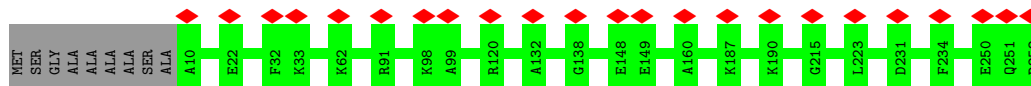




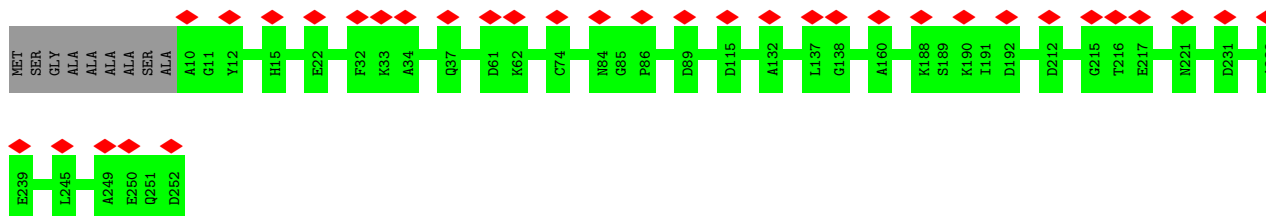
• Molecule 3: Proteasome subunit beta type-2



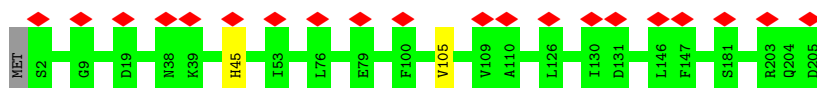
• Molecule 4: Proteasome subunit alpha type-1



• Molecule 4: Proteasome subunit alpha type-1

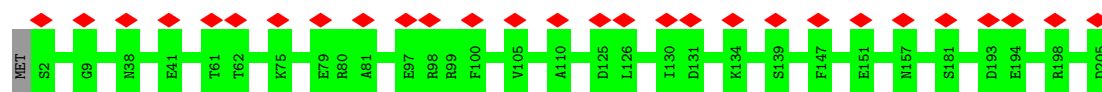


• Molecule 5: Proteasome subunit beta type-3

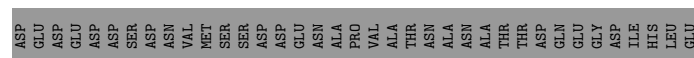
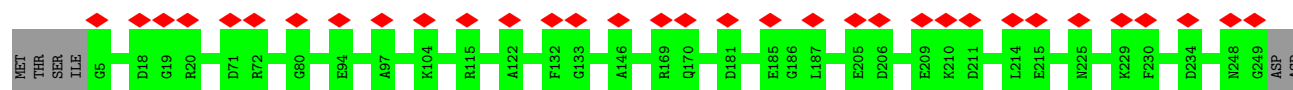
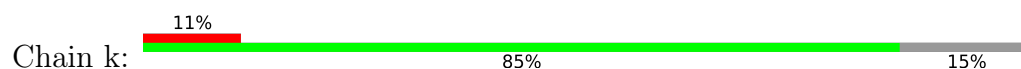


• Molecule 5: Proteasome subunit beta type-3

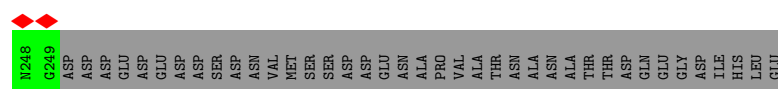
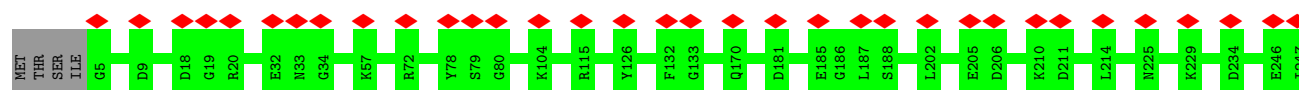
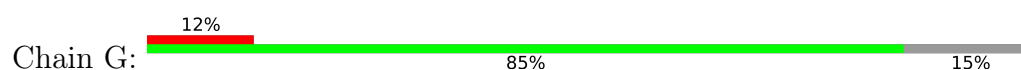




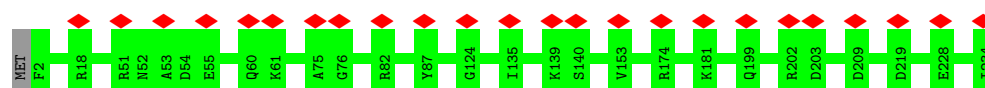
- Molecule 6: Probable proteasome subunit alpha type-7



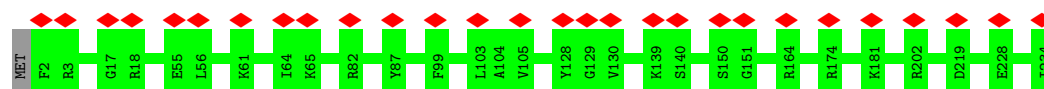
- Molecule 6: Probable proteasome subunit alpha type-7



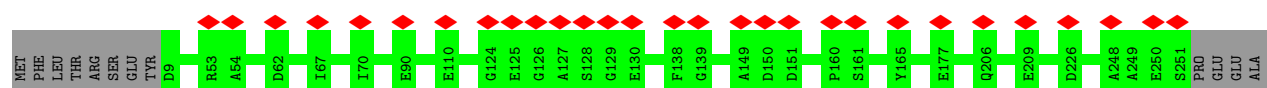
- Molecule 7: Proteasome subunit alpha type-6



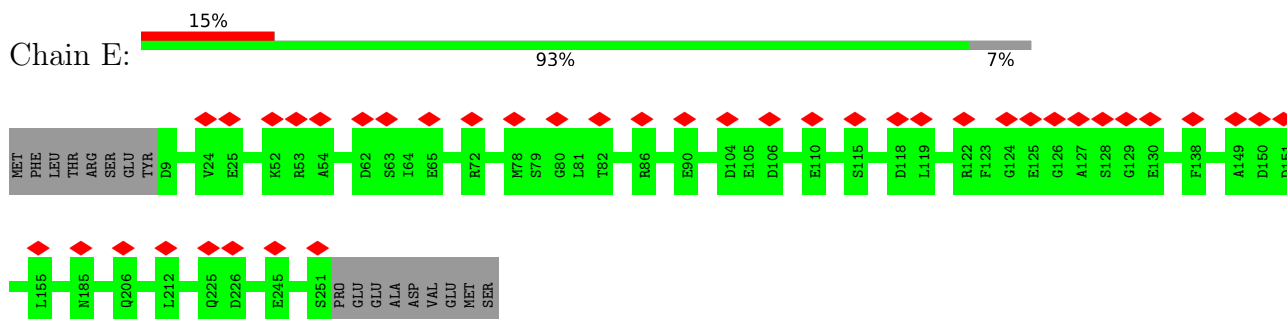
- Molecule 7: Proteasome subunit alpha type-6



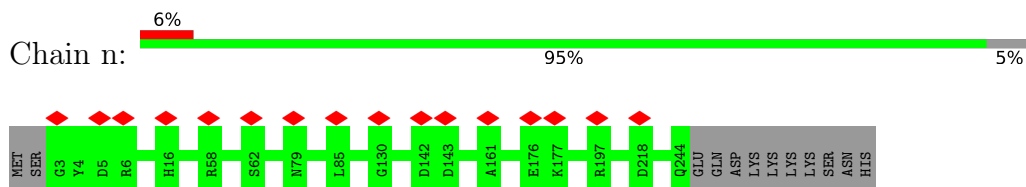
- Molecule 8: Proteasome subunit alpha type-5



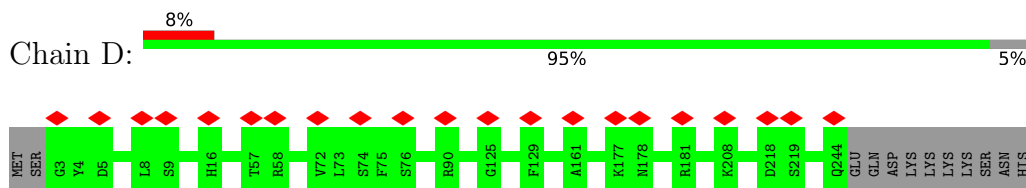
- Molecule 8: Proteasome subunit alpha type-5



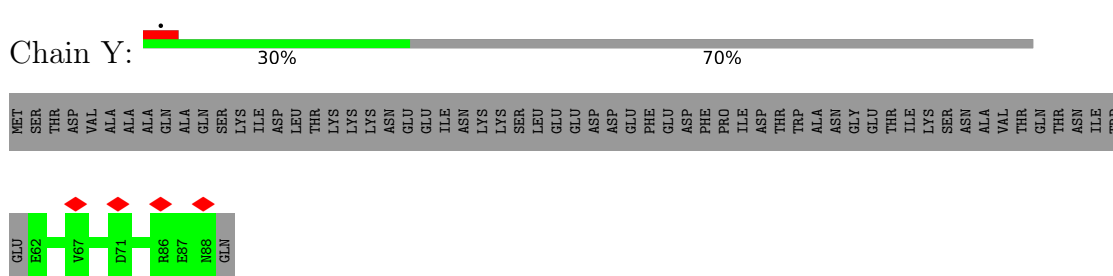
- Molecule 9: Proteasome subunit alpha type-4



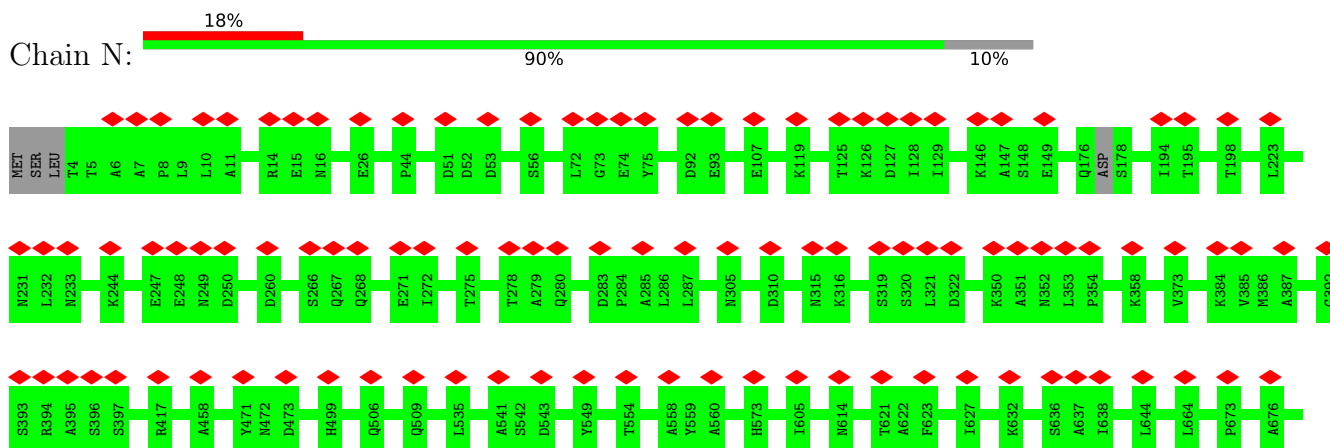
- Molecule 9: Proteasome subunit alpha type-4



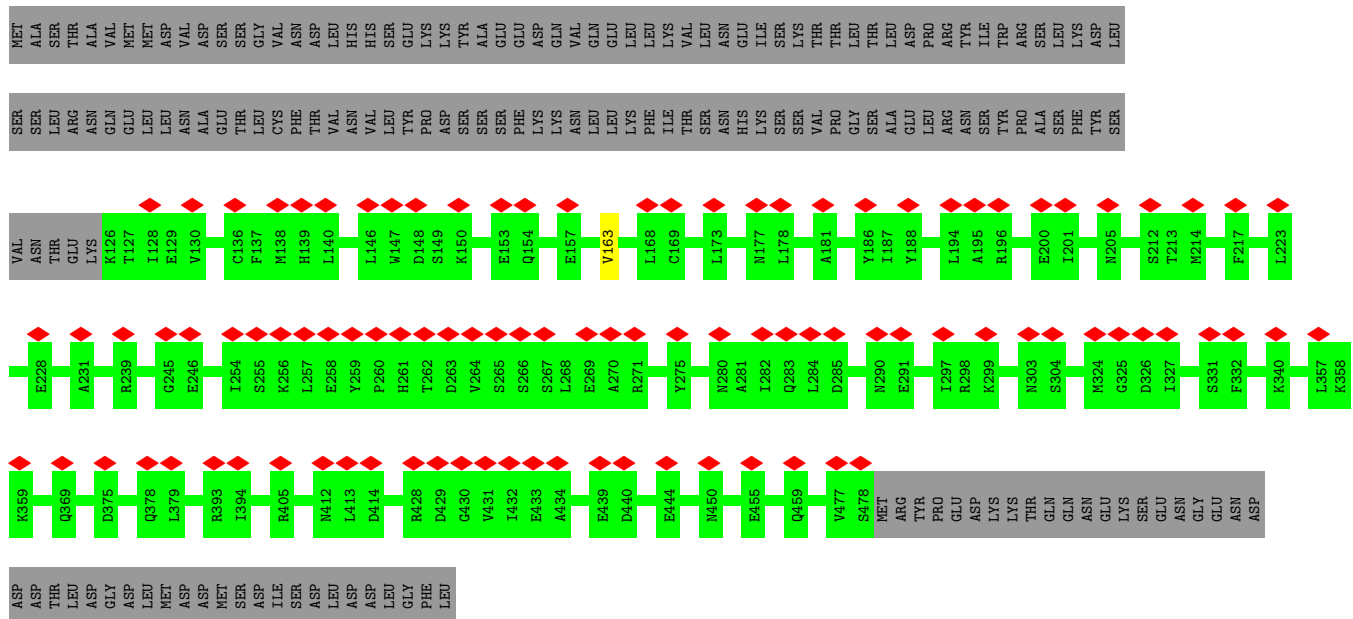
- Molecule 10: 26S proteasome complex subunit SEM1



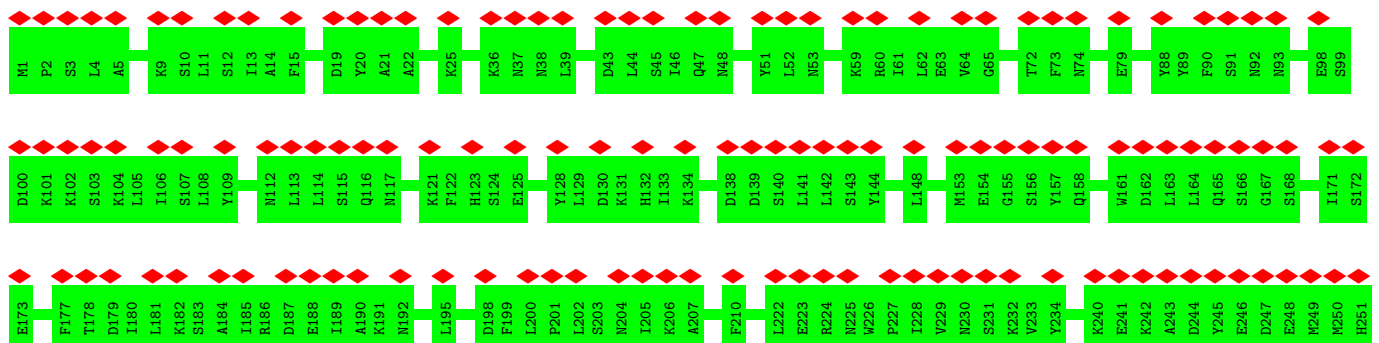
- Molecule 11: 26S proteasome regulatory subunit RPN2

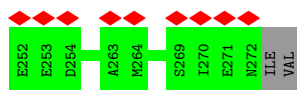


- Molecule 12: 26S proteasome regulatory subunit RPN3

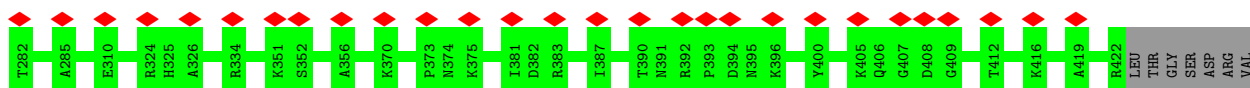
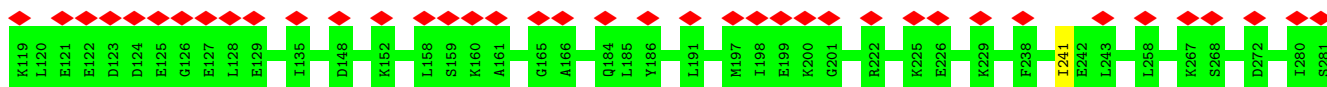
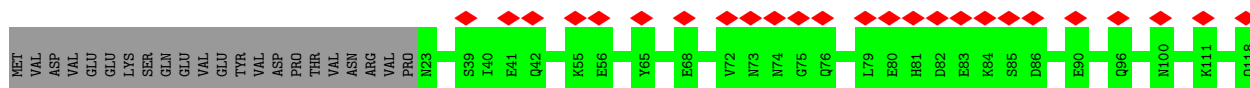
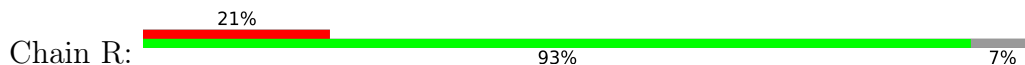


- Molecule 13: 26S proteasome regulatory subunit RPN12

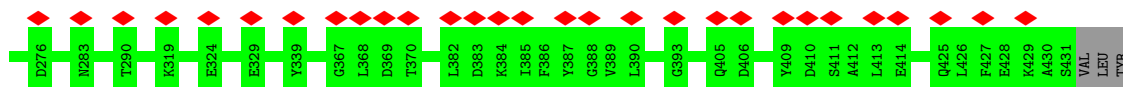
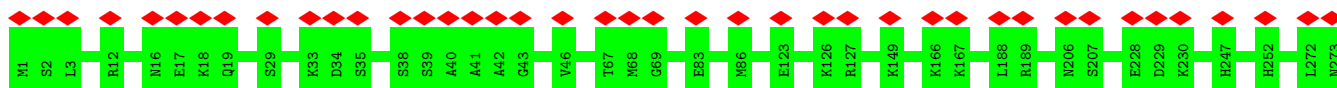




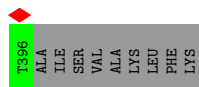
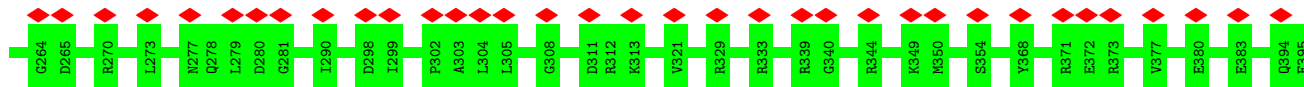
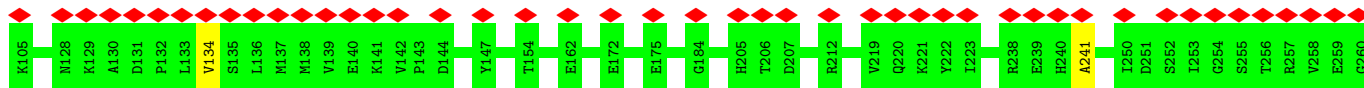
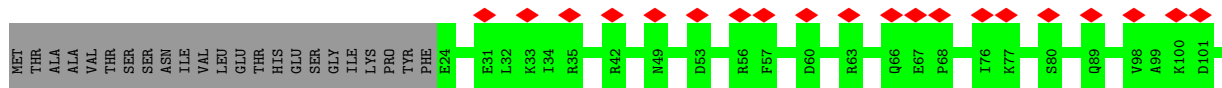
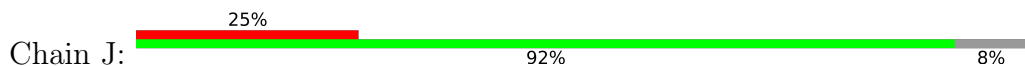
- Molecule 14: 26S proteasome regulatory subunit RPN7



- Molecule 15: 26S proteasome regulatory subunit RPN6

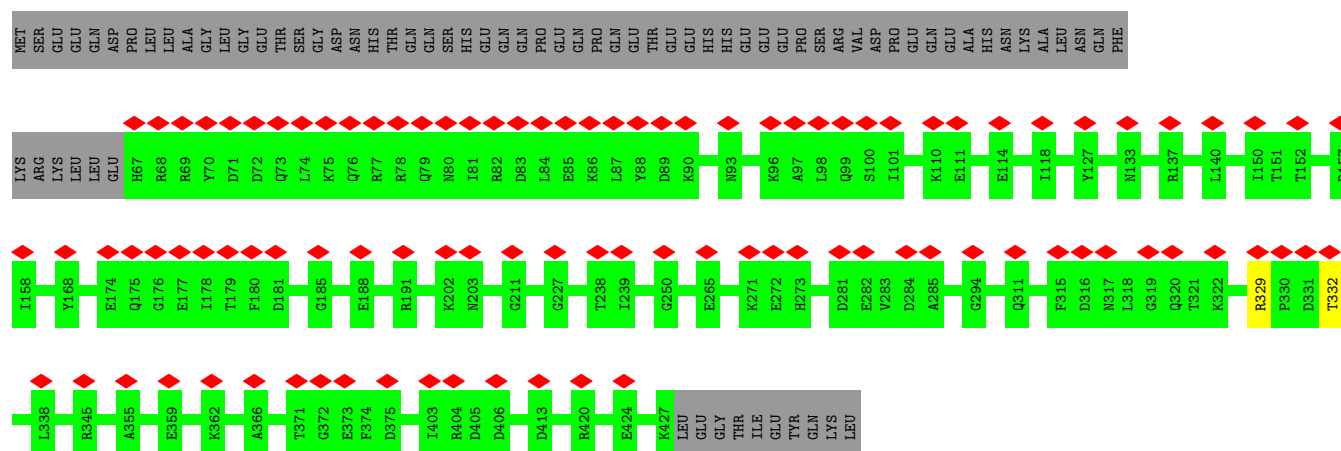
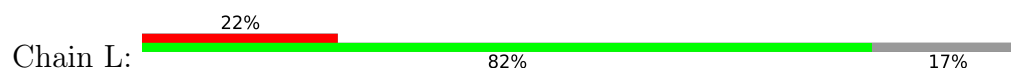


- Molecule 16: 26S protease regulatory subunit 8 homolog

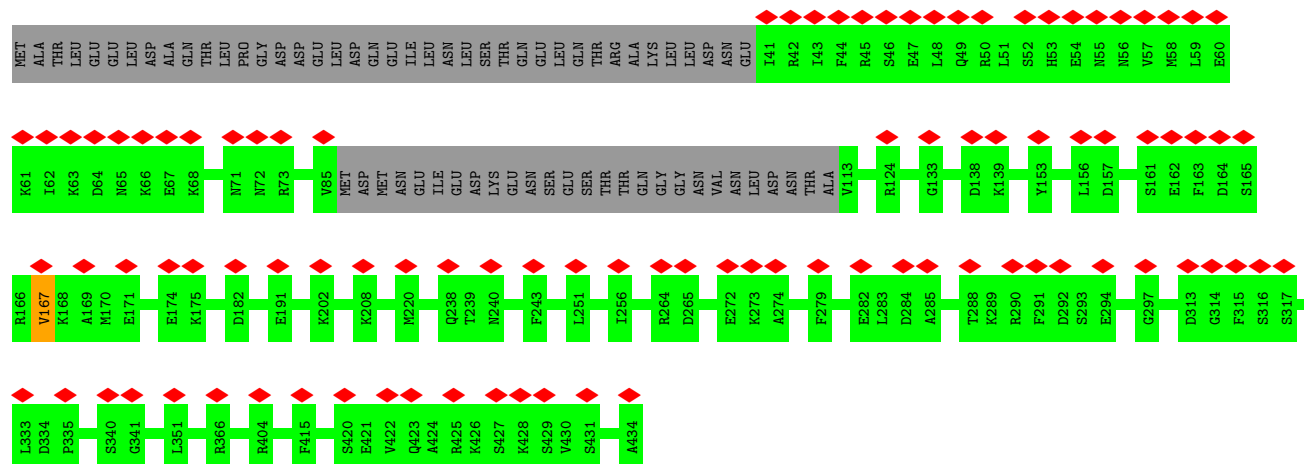
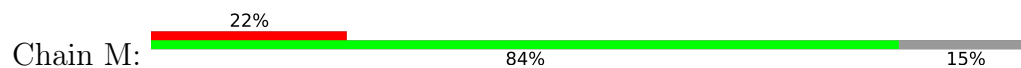


- Molecule 17: 26S protease subunit RPT4

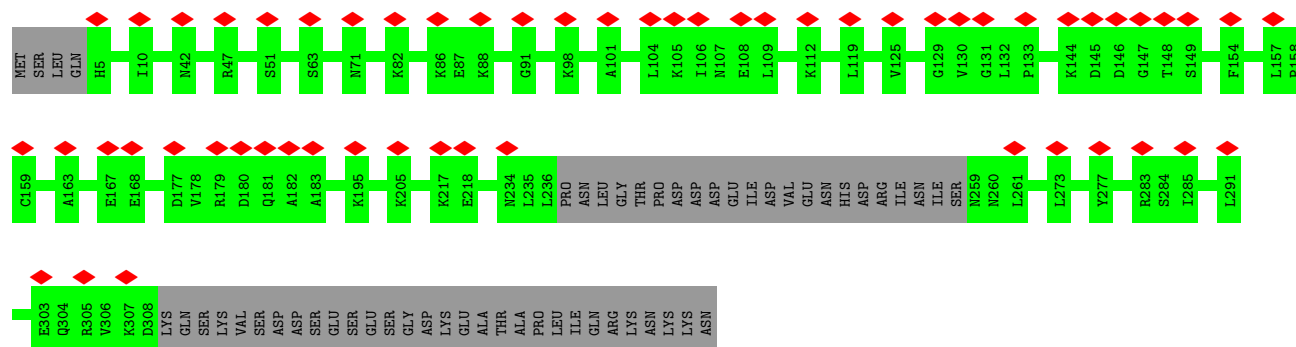
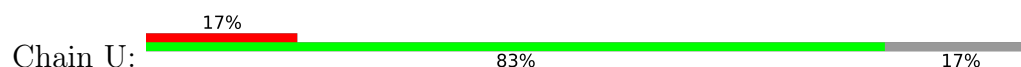




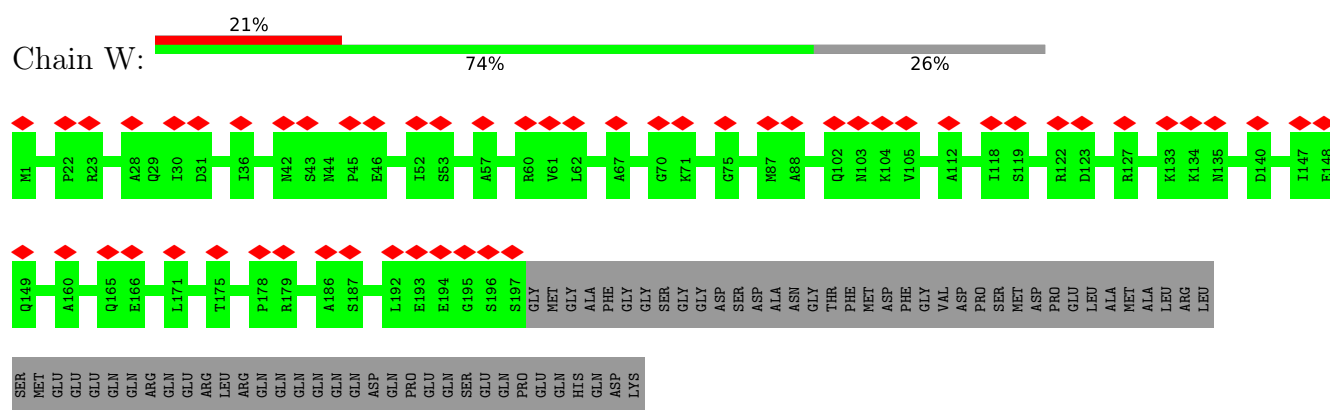
• Molecule 18: 26S protease regulatory subunit 6A



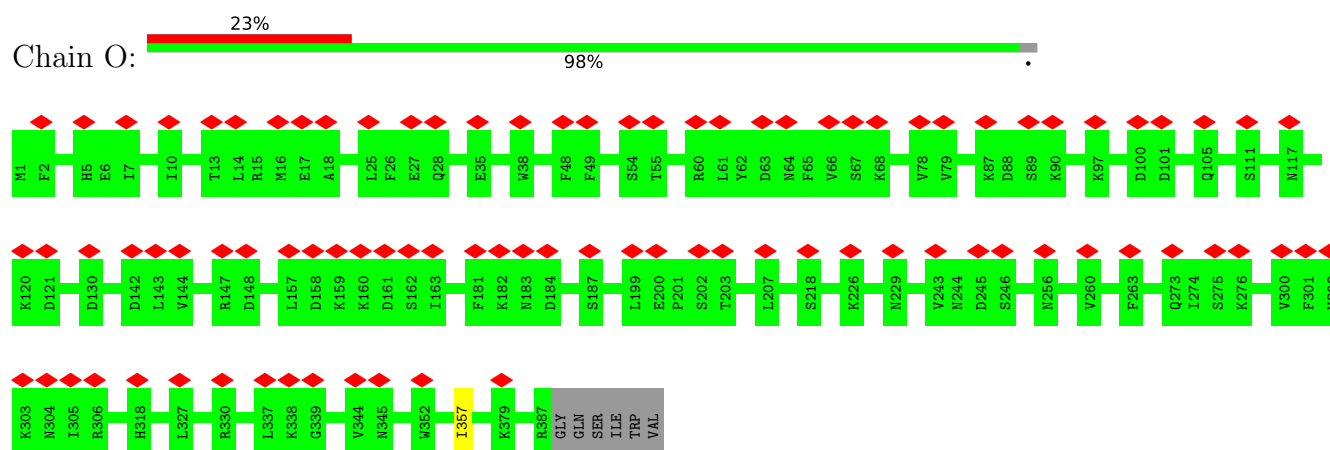
• Molecule 19: 26S proteasome regulatory subunit RPN8



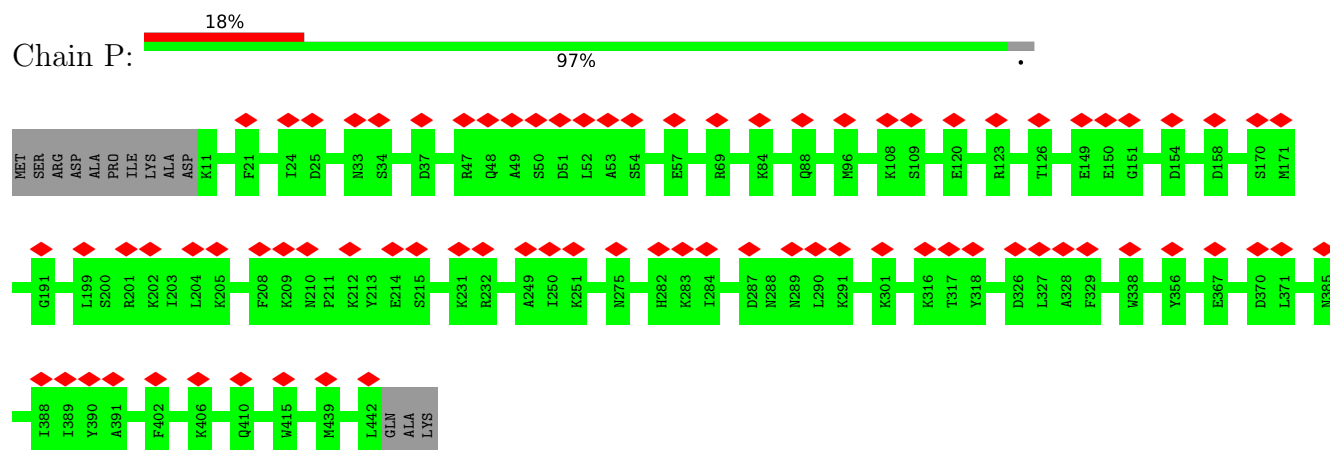
• Molecule 20: 26S proteasome regulatory subunit RPN10



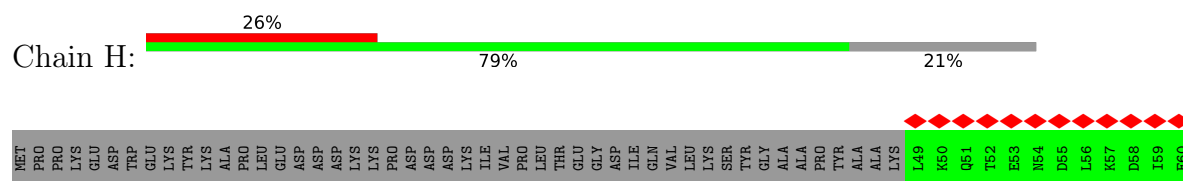
- Molecule 21: 26S proteasome regulatory subunit RPN9



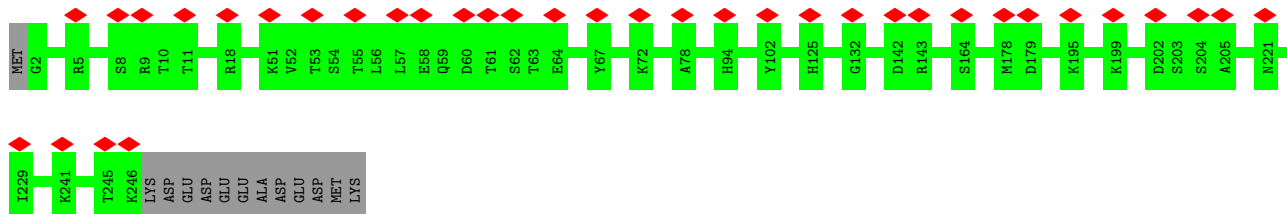
- Molecule 22: 26S proteasome regulatory subunit RPN5



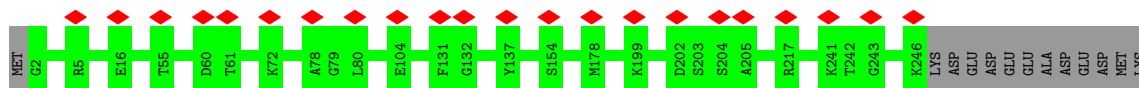
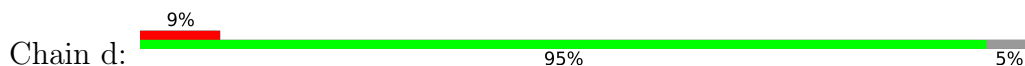
- Molecule 23: 26S protease regulatory subunit 7 homolog



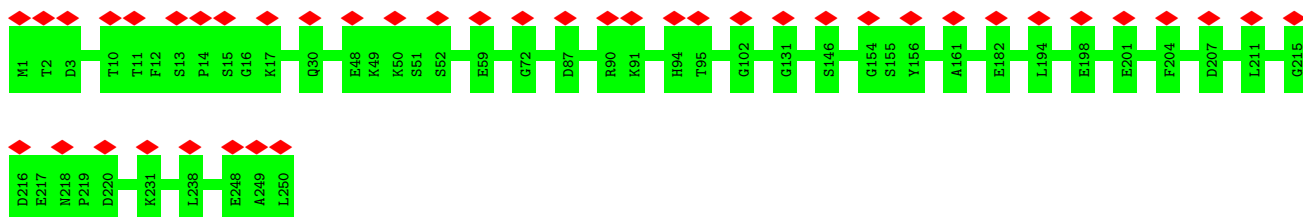
- Molecule 24: Proteasome subunit alpha type-3



- Molecule 24: Proteasome subunit alpha type-3

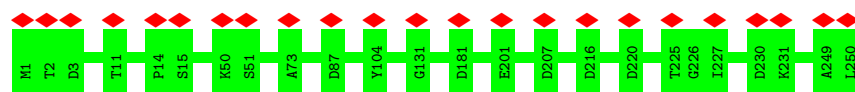


- Molecule 25: Proteasome subunit alpha type-2

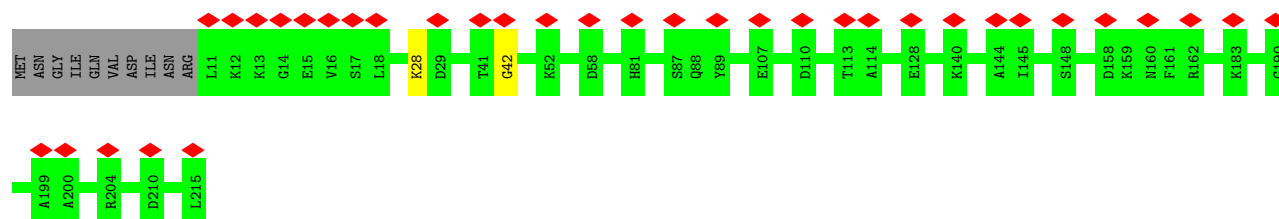


- Molecule 25: Proteasome subunit alpha type-2

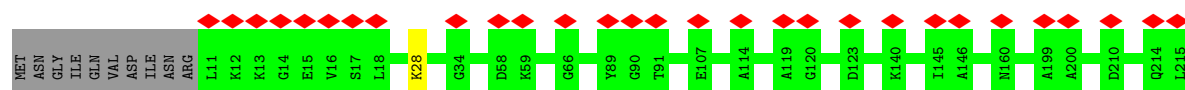




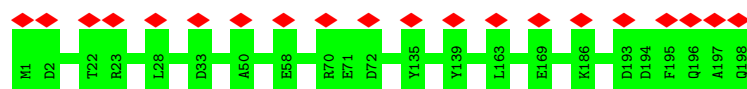
• Molecule 26: Proteasome subunit beta type-1



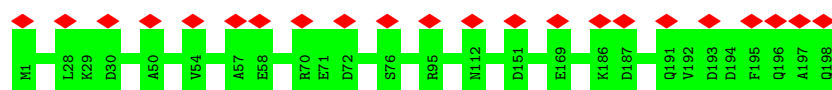
• Molecule 26: Proteasome subunit beta type-1



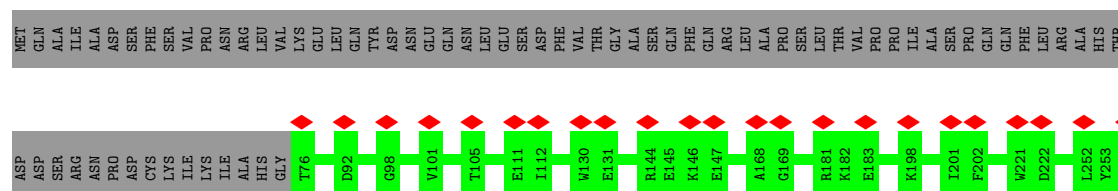
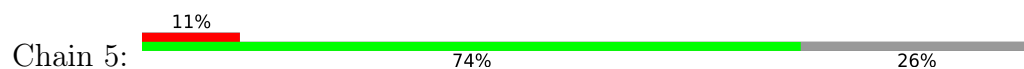
• Molecule 27: Proteasome subunit beta type-4

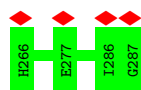


• Molecule 27: Proteasome subunit beta type-4

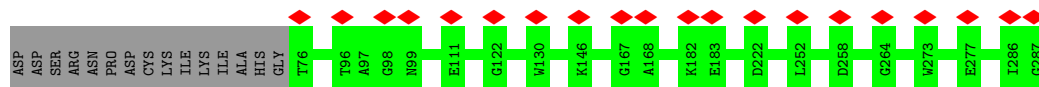


• Molecule 28: Proteasome subunit beta type-5

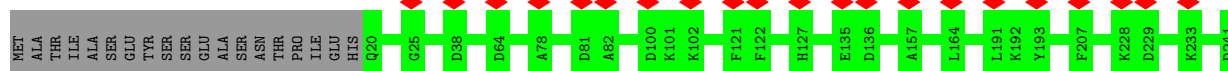
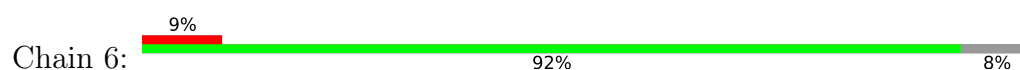




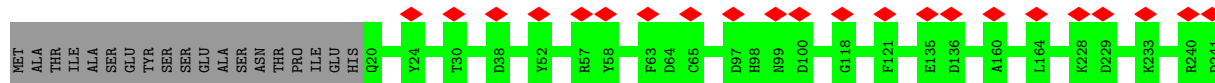
- Molecule 28: Proteasome subunit beta type-5



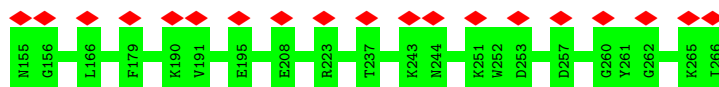
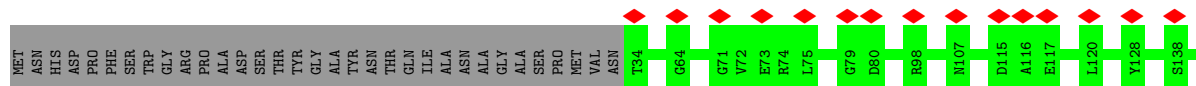
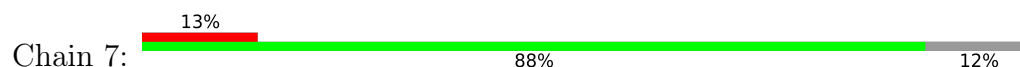
- Molecule 29: Proteasome subunit beta type-6



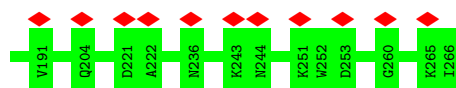
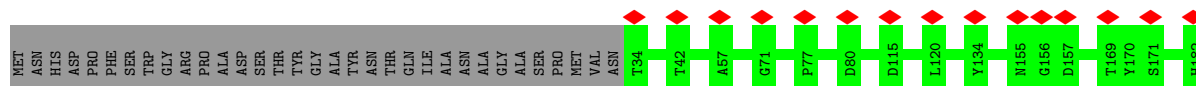
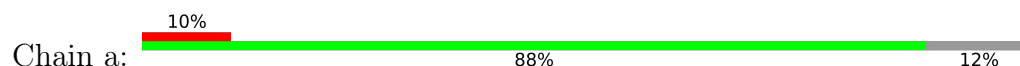
- Molecule 29: Proteasome subunit beta type-6



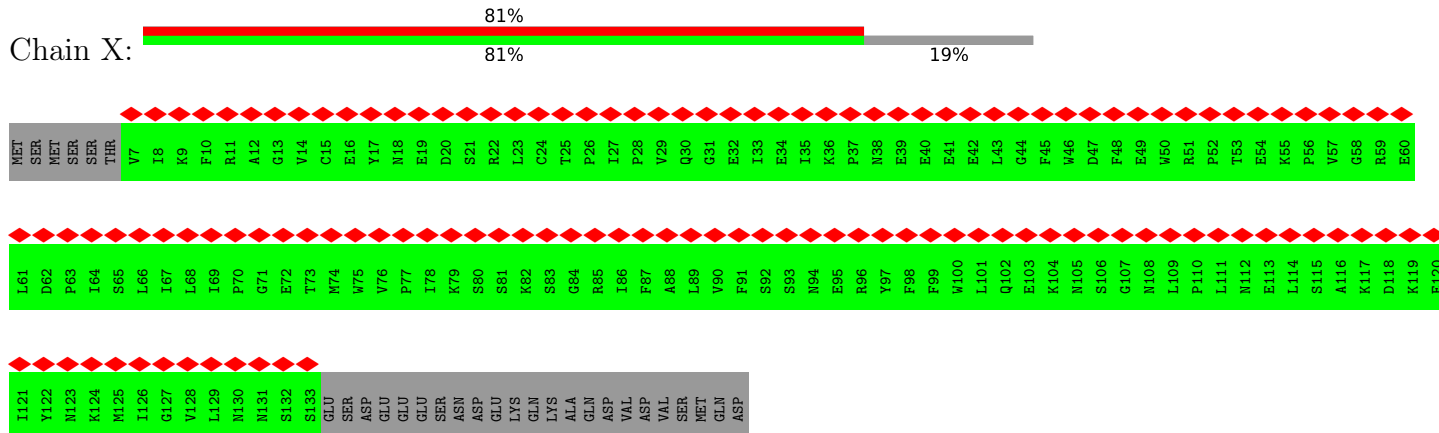
- Molecule 30: Proteasome subunit beta type-7



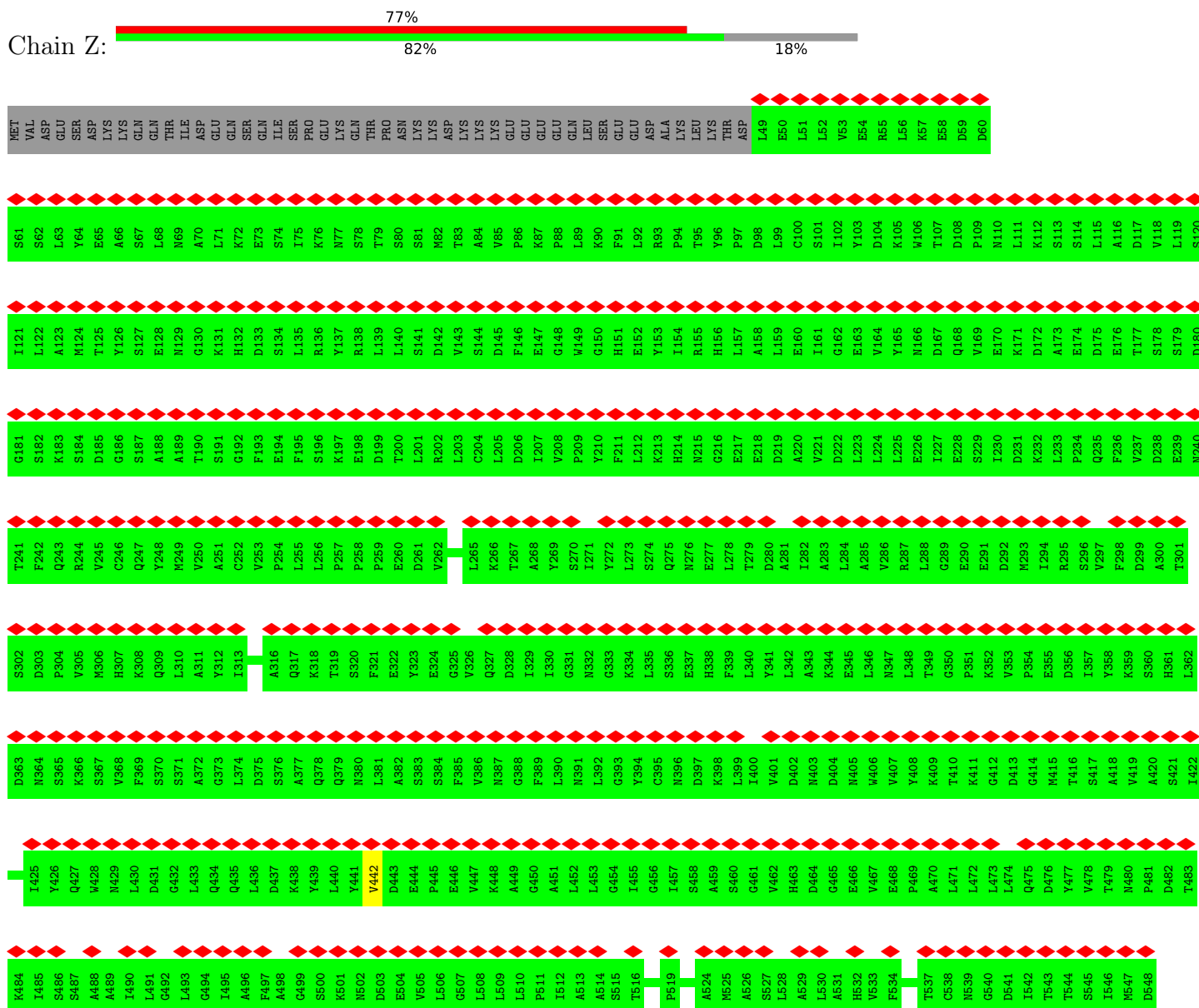
- Molecule 30: Proteasome subunit beta type-7



• Molecule 31: 26S proteasome regulatory subunit RPN13



• Molecule 32: 26S proteasome regulatory subunit RPN1





## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	26000	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 ( $e^-/\text{\AA}^2$ )	25	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	FEI FALCON II (4k x 4k)	Depositor
Maximum map value	2.237	Depositor
Minimum map value	-1.142	Depositor
Average map value	0.012	Depositor
Map value standard deviation	0.123	Depositor
Recommended contour level	0.755	Depositor
Map size ( $\text{\AA}$ )	474.47998, 474.47998, 474.47998	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.318, 1.318, 1.318	Depositor



## 5 Model quality

### 5.1 Standard geometry

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	I	0.24	0/2860	0.44	0/3856
2	K	0.24	0/3062	0.42	0/4132
3	2	0.23	0/1715	0.41	0/2326
3	i	0.23	0/1715	0.42	0/2326
4	A	0.24	0/1959	0.39	0/2652
4	c	0.24	0/1959	0.39	0/2652
5	3	0.24	0/1611	0.41	0/2174
5	h	0.25	0/1611	0.42	0/2174
6	G	0.24	0/1940	0.38	0/2619
6	k	0.24	0/1940	0.39	0/2619
7	F	0.23	0/1823	0.42	0/2463
7	l	0.23	0/1823	0.41	0/2463
8	E	0.23	0/1892	0.40	0/2549
8	m	0.23	0/1892	0.40	0/2549
9	D	0.23	0/1928	0.41	0/2610
9	n	0.23	0/1928	0.40	0/2610
10	Y	0.21	0/239	0.32	0/322
11	N	0.24	0/6670	0.39	0/9023
12	S	0.23	0/2945	0.37	0/3976
13	T	0.23	0/2279	0.38	0/3077
14	R	0.23	0/3272	0.38	0/4412
15	Q	0.23	0/3527	0.37	0/4748
16	J	0.33	1/2964 (0.0%)	0.40	0/3981
17	L	0.28	1/2896 (0.0%)	0.40	0/3895
18	M	0.23	0/2903	0.41	0/3909
19	U	0.23	0/2287	0.40	0/3087
20	W	0.24	0/1557	0.40	0/2111
21	O	0.23	0/3243	0.38	0/4374
22	P	0.22	0/3599	0.38	0/4854
23	H	0.35	1/2931 (0.0%)	0.46	0/3941
24	C	0.23	0/1943	0.40	0/2629
24	d	0.23	0/1943	0.41	0/2629
25	B	0.24	0/1952	0.41	0/2642
25	j	0.24	0/1952	0.42	0/2642

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
26	1	0.23	0/1605	0.44	0/2171
26	b	0.23	0/1603	0.43	0/2168
27	4	0.23	0/1613	0.39	0/2173
27	g	0.23	0/1613	0.41	0/2173
28	5	0.24	0/1681	0.41	0/2274
28	f	0.23	0/1681	0.41	0/2274
29	6	0.24	0/1795	0.40	0/2420
29	e	0.24	0/1795	0.40	0/2420
30	7	0.24	0/1855	0.41	0/2514
30	a	0.24	0/1855	0.42	0/2514
31	X	0.23	0/1058	0.40	0/1432
32	Z	0.23	0/6403	0.41	0/8686
33	V	0.24	0/2271	0.47	0/3064
All	All	0.24	3/107588 (0.0%)	0.40	0/145309

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	I	0	1
5	h	0	1
18	M	0	1
26	1	0	1
33	V	0	2
All	All	0	6

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
23	H	185	LEU	C-N	12.79	1.58	1.34
16	J	241	ALA	C-N	12.54	1.58	1.34
17	L	329	ARG	C-N	8.34	1.50	1.34

There are no bond angle outliers.

There are no chirality outliers.

All (6) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
26	1	42	GLY	Peptide

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Mol	Chain	Res	Type	Group
1	I	102	ASN	Peptide
18	M	167	VAL	Peptide
33	V	162	GLY	Peptide
33	V	273	ARG	Peptide
5	h	45	HIS	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	I	360/437 (82%)	315 (88%)	44 (12%)	1 (0%)	37	72
2	K	379/428 (89%)	326 (86%)	53 (14%)	0	100	100
3	2	220/261 (84%)	210 (96%)	10 (4%)	0	100	100
3	i	220/261 (84%)	209 (95%)	11 (5%)	0	100	100
4	A	241/252 (96%)	228 (95%)	13 (5%)	0	100	100
4	c	241/252 (96%)	227 (94%)	14 (6%)	0	100	100
5	3	202/205 (98%)	190 (94%)	12 (6%)	0	100	100
5	h	202/205 (98%)	188 (93%)	13 (6%)	1 (0%)	25	64
6	G	243/288 (84%)	235 (97%)	8 (3%)	0	100	100
6	k	243/288 (84%)	233 (96%)	10 (4%)	0	100	100
7	F	231/234 (99%)	221 (96%)	10 (4%)	0	100	100
7	l	231/234 (99%)	221 (96%)	10 (4%)	0	100	100
8	E	241/260 (93%)	226 (94%)	15 (6%)	0	100	100
8	m	241/260 (93%)	227 (94%)	14 (6%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
9	D	240/254 (94%)	222 (92%)	18 (8%)	0	100	100
9	n	240/254 (94%)	226 (94%)	14 (6%)	0	100	100
10	Y	25/89 (28%)	23 (92%)	2 (8%)	0	100	100
11	N	843/945 (89%)	786 (93%)	57 (7%)	0	100	100
12	S	351/523 (67%)	313 (89%)	37 (10%)	1 (0%)	37	72
13	T	270/274 (98%)	231 (86%)	39 (14%)	0	100	100
14	R	398/429 (93%)	357 (90%)	40 (10%)	1 (0%)	37	72
15	Q	429/434 (99%)	393 (92%)	36 (8%)	0	100	100
16	J	371/405 (92%)	335 (90%)	35 (9%)	1 (0%)	37	72
17	L	359/437 (82%)	320 (89%)	38 (11%)	1 (0%)	37	72
18	M	363/434 (84%)	331 (91%)	31 (8%)	1 (0%)	37	72
19	U	278/338 (82%)	260 (94%)	18 (6%)	0	100	100
20	W	195/268 (73%)	182 (93%)	13 (7%)	0	100	100
21	O	385/393 (98%)	341 (89%)	43 (11%)	1 (0%)	37	72
22	P	430/445 (97%)	386 (90%)	44 (10%)	0	100	100
23	H	364/467 (78%)	311 (85%)	52 (14%)	1 (0%)	37	72
24	C	243/258 (94%)	228 (94%)	15 (6%)	0	100	100
24	d	243/258 (94%)	227 (93%)	16 (7%)	0	100	100
25	B	248/250 (99%)	234 (94%)	14 (6%)	0	100	100
25	j	248/250 (99%)	232 (94%)	16 (6%)	0	100	100
26	1	203/215 (94%)	185 (91%)	17 (8%)	1 (0%)	25	64
26	b	203/215 (94%)	184 (91%)	18 (9%)	1 (0%)	25	64
27	4	196/198 (99%)	186 (95%)	10 (5%)	0	100	100
27	g	196/198 (99%)	182 (93%)	14 (7%)	0	100	100
28	5	210/287 (73%)	200 (95%)	10 (5%)	0	100	100
28	f	210/287 (73%)	198 (94%)	12 (6%)	0	100	100
29	6	220/241 (91%)	204 (93%)	16 (7%)	0	100	100
29	e	220/241 (91%)	205 (93%)	15 (7%)	0	100	100
30	7	231/266 (87%)	215 (93%)	16 (7%)	0	100	100
30	a	231/266 (87%)	216 (94%)	15 (6%)	0	100	100
31	X	125/156 (80%)	113 (90%)	12 (10%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
32	Z	807/993 (81%)	716 (89%)	90 (11%)	1 (0%)	48	83
33	V	282/306 (92%)	234 (83%)	45 (16%)	3 (1%)	12	47
All	All	13352/15139 (88%)	12232 (92%)	1105 (8%)	15 (0%)	50	83

All (15) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
17	L	332	THR
5	h	105	VAL
14	R	241	ILE
33	V	305	ILE
16	J	134	VAL
32	Z	442	VAL
33	V	273	ARG
26	l	28	LYS
26	b	28	LYS
18	M	167	VAL
1	I	168	VAL
21	O	357	ILE
12	S	163	VAL
23	H	105	ILE
33	V	303	VAL

### 5.3.2 Protein sidechains ⓘ

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	I	319/385 (83%)	319 (100%)	0	100	100
2	K	334/374 (89%)	334 (100%)	0	100	100
3	2	181/214 (85%)	181 (100%)	0	100	100
3	i	181/214 (85%)	181 (100%)	0	100	100
4	A	207/210 (99%)	207 (100%)	0	100	100
4	c	207/210 (99%)	207 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
5	3	172/173 (99%)	172 (100%)	0	100	100
5	h	172/173 (99%)	172 (100%)	0	100	100
6	G	201/239 (84%)	201 (100%)	0	100	100
6	k	201/239 (84%)	201 (100%)	0	100	100
7	F	192/193 (100%)	192 (100%)	0	100	100
7	l	192/193 (100%)	192 (100%)	0	100	100
8	E	199/215 (93%)	199 (100%)	0	100	100
8	m	199/215 (93%)	199 (100%)	0	100	100
9	D	214/226 (95%)	214 (100%)	0	100	100
9	n	214/226 (95%)	214 (100%)	0	100	100
10	Y	26/81 (32%)	26 (100%)	0	100	100
11	N	713/797 (90%)	713 (100%)	0	100	100
12	S	330/489 (68%)	330 (100%)	0	100	100
13	T	254/256 (99%)	254 (100%)	0	100	100
14	R	351/379 (93%)	351 (100%)	0	100	100
15	Q	388/391 (99%)	388 (100%)	0	100	100
16	J	325/352 (92%)	325 (100%)	0	100	100
17	L	308/377 (82%)	308 (100%)	0	100	100
18	M	315/375 (84%)	315 (100%)	0	100	100
19	U	256/308 (83%)	256 (100%)	0	100	100
20	W	171/230 (74%)	171 (100%)	0	100	100
21	O	363/368 (99%)	363 (100%)	0	100	100
22	P	405/415 (98%)	405 (100%)	0	100	100
23	H	314/399 (79%)	314 (100%)	0	100	100
24	C	204/216 (94%)	204 (100%)	0	100	100
24	d	204/216 (94%)	204 (100%)	0	100	100
25	B	209/209 (100%)	209 (100%)	0	100	100
25	j	209/209 (100%)	209 (100%)	0	100	100
26	1	169/178 (95%)	169 (100%)	0	100	100
26	b	168/178 (94%)	168 (100%)	0	100	100
27	4	175/175 (100%)	175 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
27	g	175/175 (100%)	175 (100%)	0	100	100
28	5	169/235 (72%)	169 (100%)	0	100	100
28	f	169/235 (72%)	169 (100%)	0	100	100
29	6	185/201 (92%)	185 (100%)	0	100	100
29	e	185/201 (92%)	185 (100%)	0	100	100
30	7	199/224 (89%)	199 (100%)	0	100	100
30	a	199/224 (89%)	199 (100%)	0	100	100
31	X	116/144 (81%)	116 (100%)	0	100	100
32	Z	692/850 (81%)	692 (100%)	0	100	100
33	V	249/268 (93%)	249 (100%)	0	100	100
All	All	11580/13054 (89%)	11580 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (129) such sidechains are listed below:

Mol	Chain	Res	Type
1	I	151	HIS
1	I	238	ASN
1	I	303	GLN
1	I	431	ASN
2	K	83	GLN
2	K	228	ASN
2	K	244	HIS
2	K	388	GLN
2	K	414	GLN
2	K	419	ASN
3	i	110	GLN
4	c	92	ASN
4	c	185	HIS
5	h	145	GLN
5	h	169	GLN
5	h	173	ASN
5	h	204	GLN
6	k	121	GLN
6	k	183	HIS
6	k	207	ASN
6	k	225	ASN

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Mol	Chain	Res	Type
6	k	228	HIS
7	l	60	GLN
7	l	93	ASN
7	l	117	GLN
8	m	157	HIS
9	n	118	GLN
9	n	162	GLN
11	N	34	GLN
11	N	71	ASN
11	N	111	GLN
11	N	256	GLN
11	N	306	ASN
11	N	340	HIS
11	N	360	GLN
11	N	529	GLN
11	N	703	GLN
12	S	235	ASN
12	S	290	ASN
12	S	314	ASN
12	S	469	ASN
13	T	80	ASN
13	T	127	GLN
13	T	132	HIS
13	T	255	GLN
14	R	76	GLN
14	R	323	ASN
14	R	378	ASN
14	R	397	ASN
15	Q	114	GLN
15	Q	226	HIS
15	Q	361	HIS
16	J	28	GLN
17	L	311	GLN
18	M	310	ASN
18	M	387	ASN
19	U	21	HIS
19	U	107	ASN
19	U	127	GLN
20	W	12	ASN
20	W	100	HIS
20	W	102	GLN
20	W	163	ASN

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Mol	Chain	Res	Type
21	O	114	GLN
21	O	326	HIS
21	O	376	GLN
22	P	76	ASN
22	P	128	ASN
22	P	282	HIS
22	P	425	HIS
23	H	51	GLN
23	H	151	GLN
23	H	217	GLN
23	H	281	GLN
23	H	467	ASN
6	G	182	HIS
6	G	183	HIS
6	G	225	ASN
6	G	228	HIS
4	A	37	GLN
4	A	92	ASN
4	A	130	GLN
4	A	185	HIS
7	F	21	GLN
7	F	60	GLN
7	F	93	ASN
7	F	117	GLN
9	D	118	GLN
24	C	21	GLN
25	B	119	GLN
25	B	123	GLN
26	1	57	HIS
3	2	114	GLN
5	3	169	GLN
5	3	173	ASN
27	4	86	GLN
28	5	104	GLN
28	5	241	HIS
28	5	254	HIS
29	6	55	ASN
29	6	89	ASN
29	6	171	ASN
29	6	172	GLN
30	7	36	GLN
31	X	94	ASN

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Mol	Chain	Res	Type
32	Z	77	ASN
32	Z	307	HIS
32	Z	309	GLN
32	Z	338	HIS
32	Z	396	ASN
32	Z	898	HIS
24	d	177	GLN
24	d	227	GLN
25	j	119	GLN
25	j	123	GLN
30	a	36	GLN
26	b	57	HIS
26	b	180	GLN
29	e	55	ASN
29	e	89	ASN
29	e	127	HIS
29	e	171	ASN
29	e	172	GLN
28	f	104	GLN
28	f	254	HIS
27	g	86	GLN
33	V	200	ASN
33	V	274	GLN
33	V	301	ASN

### 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-6693. These allow visual inspection of the internal detail of the map and identification of artifacts.

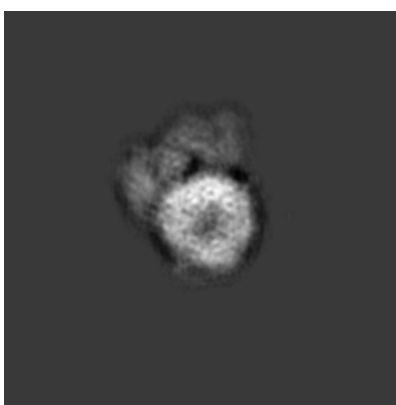
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

#### 6.1.1 Primary map



X



Y

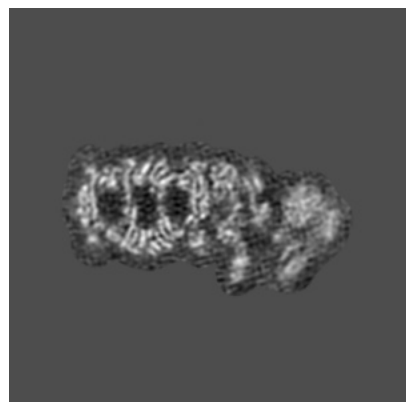


Z

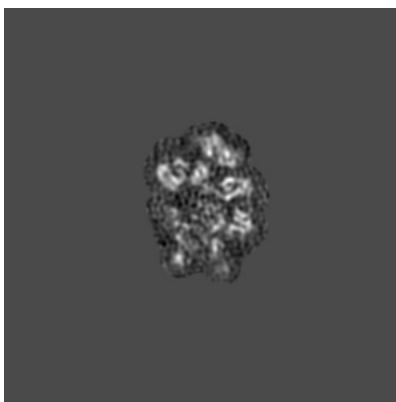
The images above show the map projected in three orthogonal directions.

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

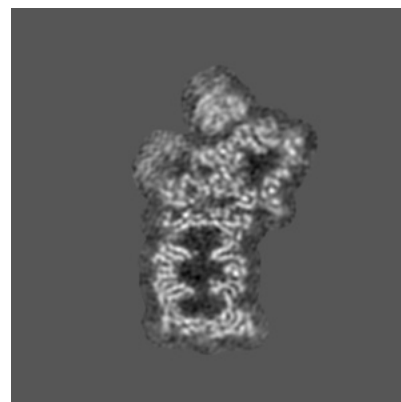
#### 6.2.1 Primary map



X Index: 180



Y Index: 180

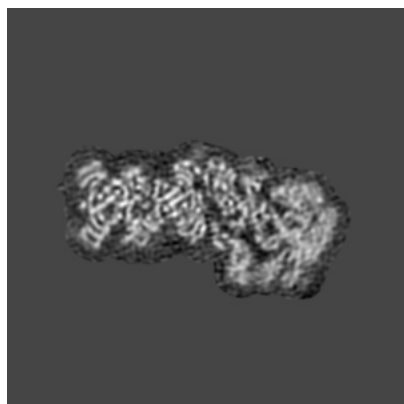


Z Index: 180

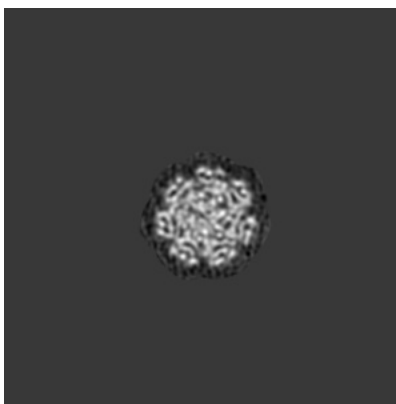
The images above show central slices of the map in three orthogonal directions.

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

### 6.3.1 Primary map



X Index: 192



Y Index: 77

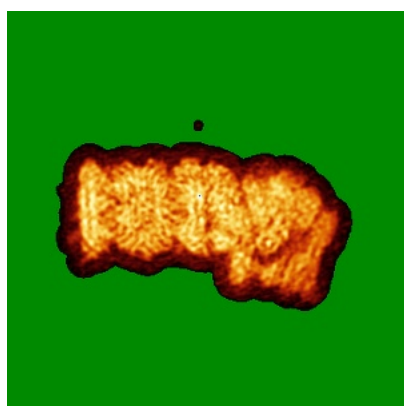


Z Index: 182

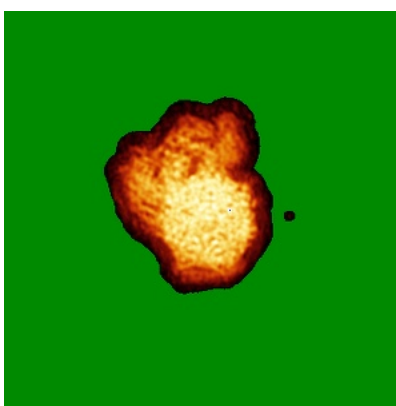
The images above show the largest variance slices of the map in three orthogonal directions.

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

### 6.4.1 Primary map



X



Y

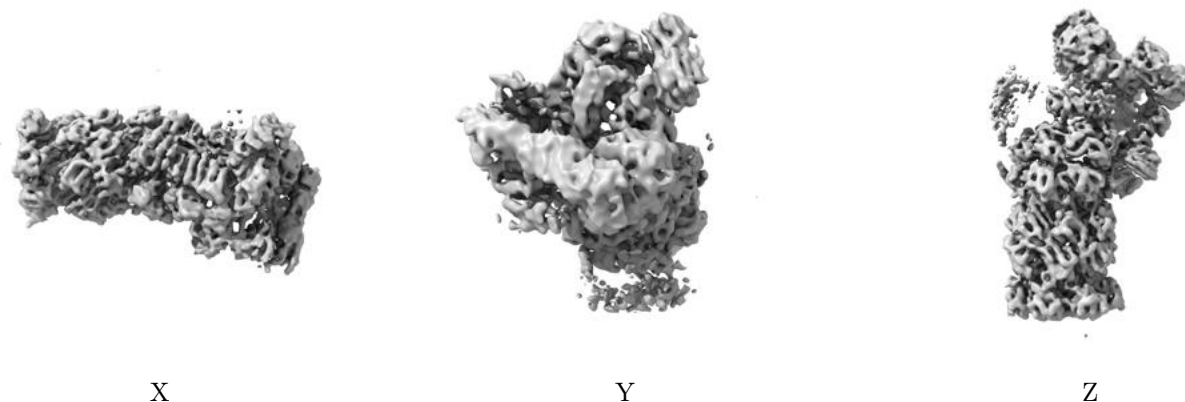


Z

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

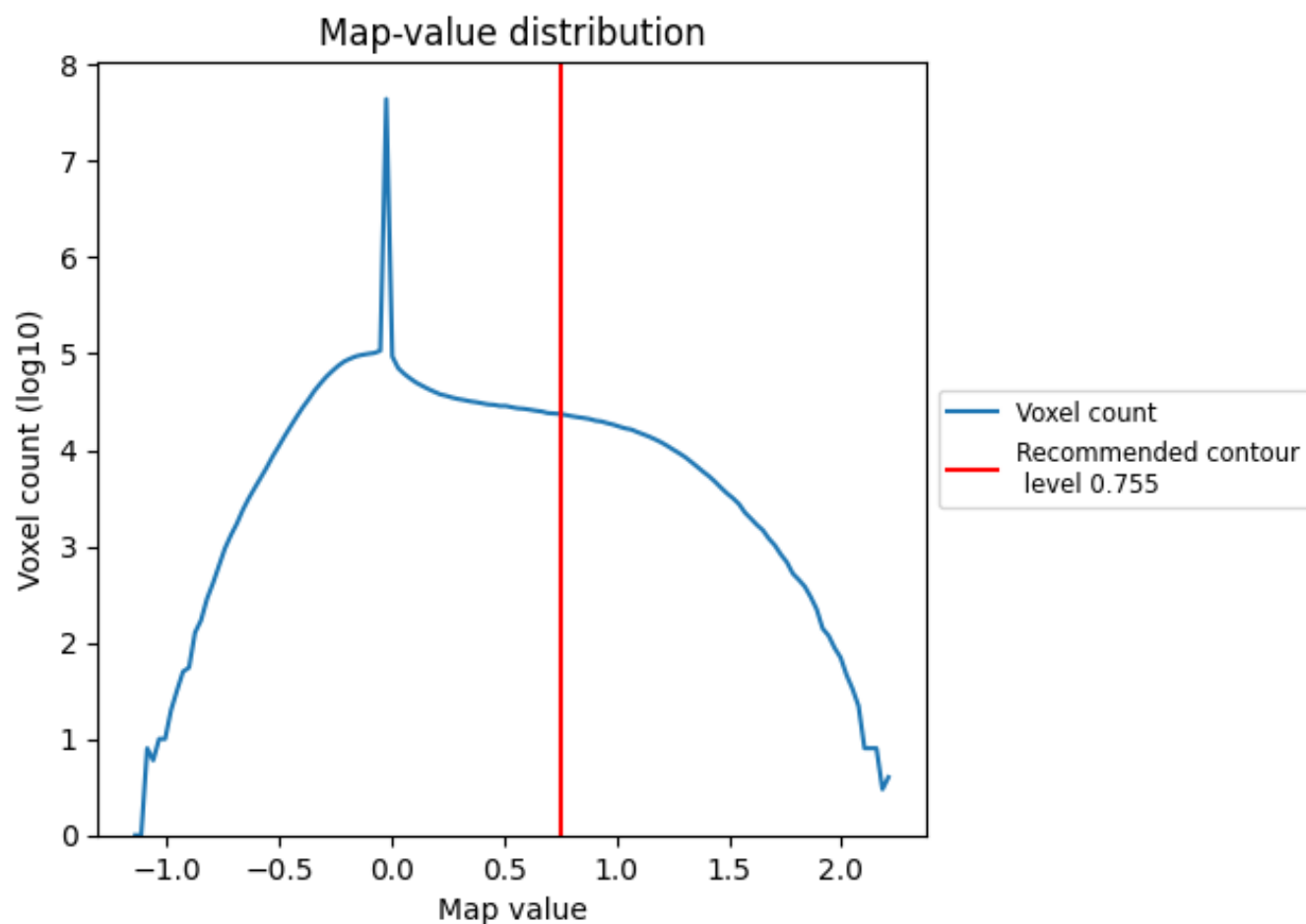
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

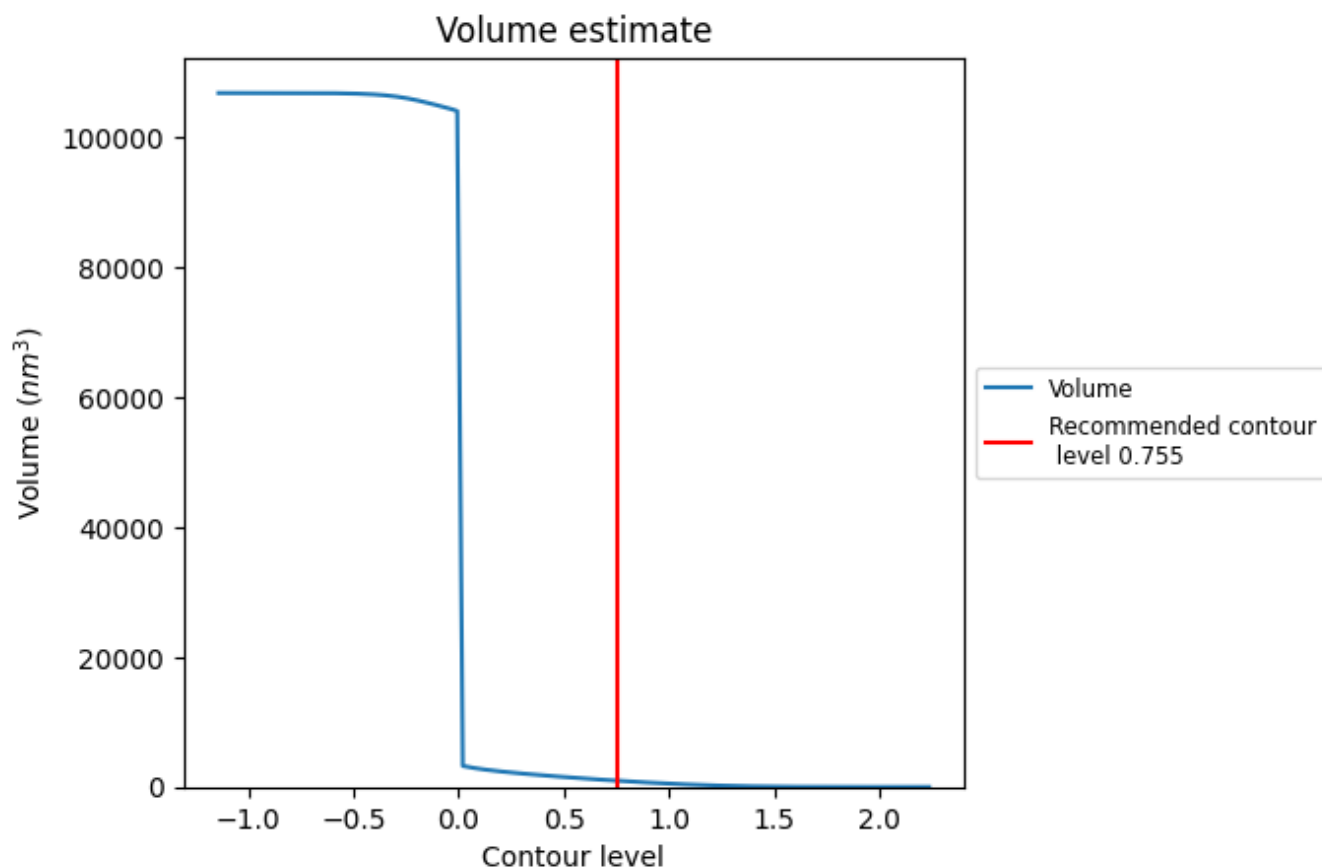
This section contains the results of statistical analysis of the map.

### 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](#)

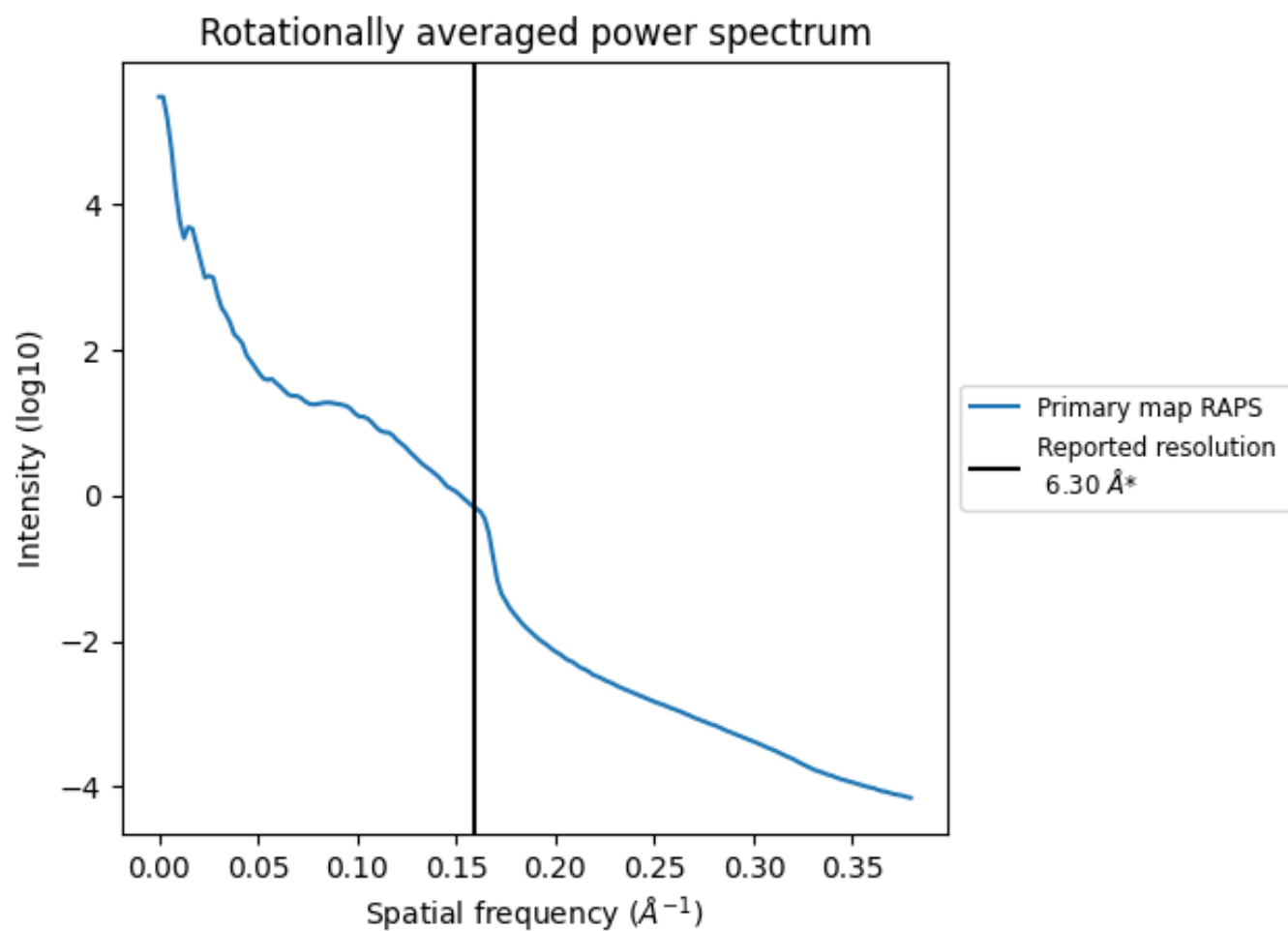


The volume at the recommended contour level is 959 nm<sup>3</sup>; this corresponds to an approximate mass of 866 kDa.

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 ⓘ



\*Reported resolution corresponds to spatial frequency of 0.159 Å<sup>-1</sup>

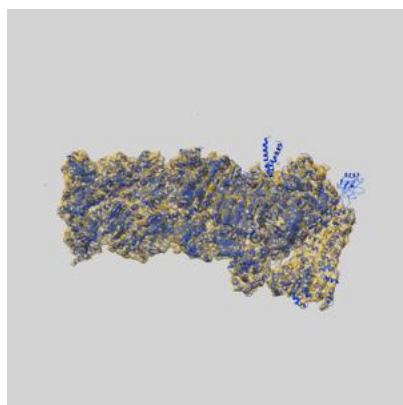
## 8 Fourier-Shell correlation

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

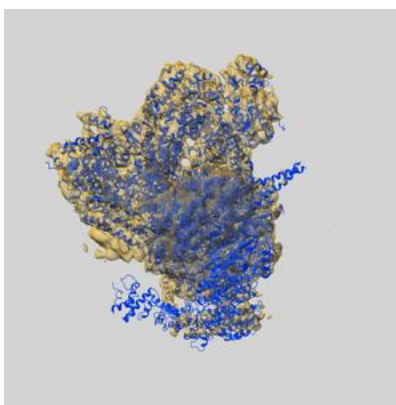
## 9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-6693 and PDB model 5WVI. Per-residue inclusion information can be found in section 3 on page 11.

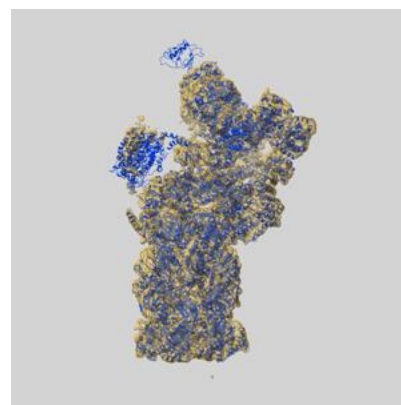
### 9.1 Map-model overlay [i](#)



X



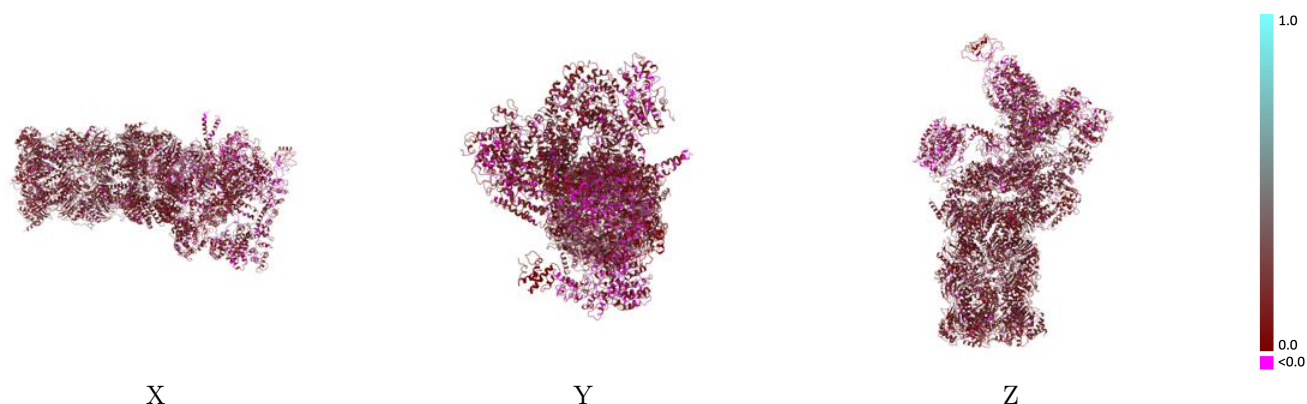
Y



Z

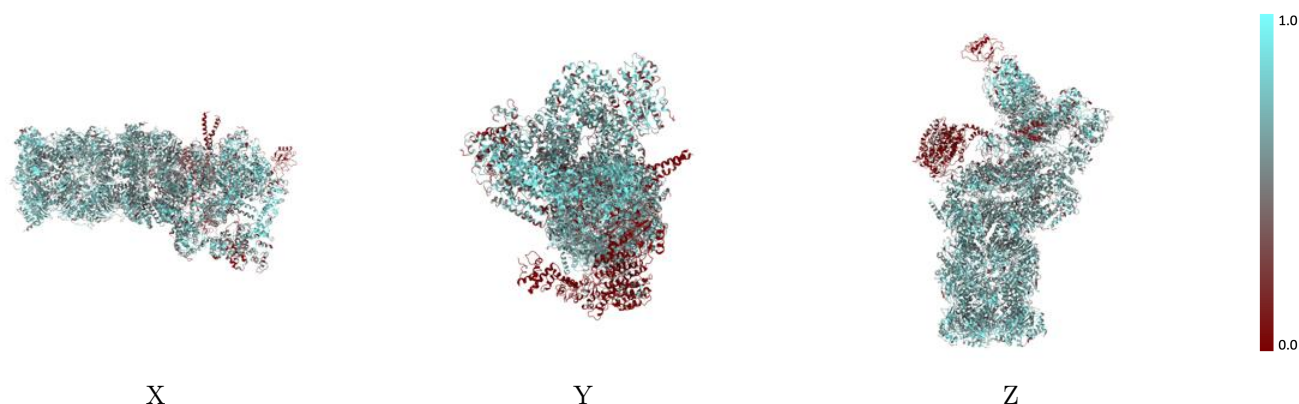
The images above show the 3D surface view of the map at the recommended contour level 0.755 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



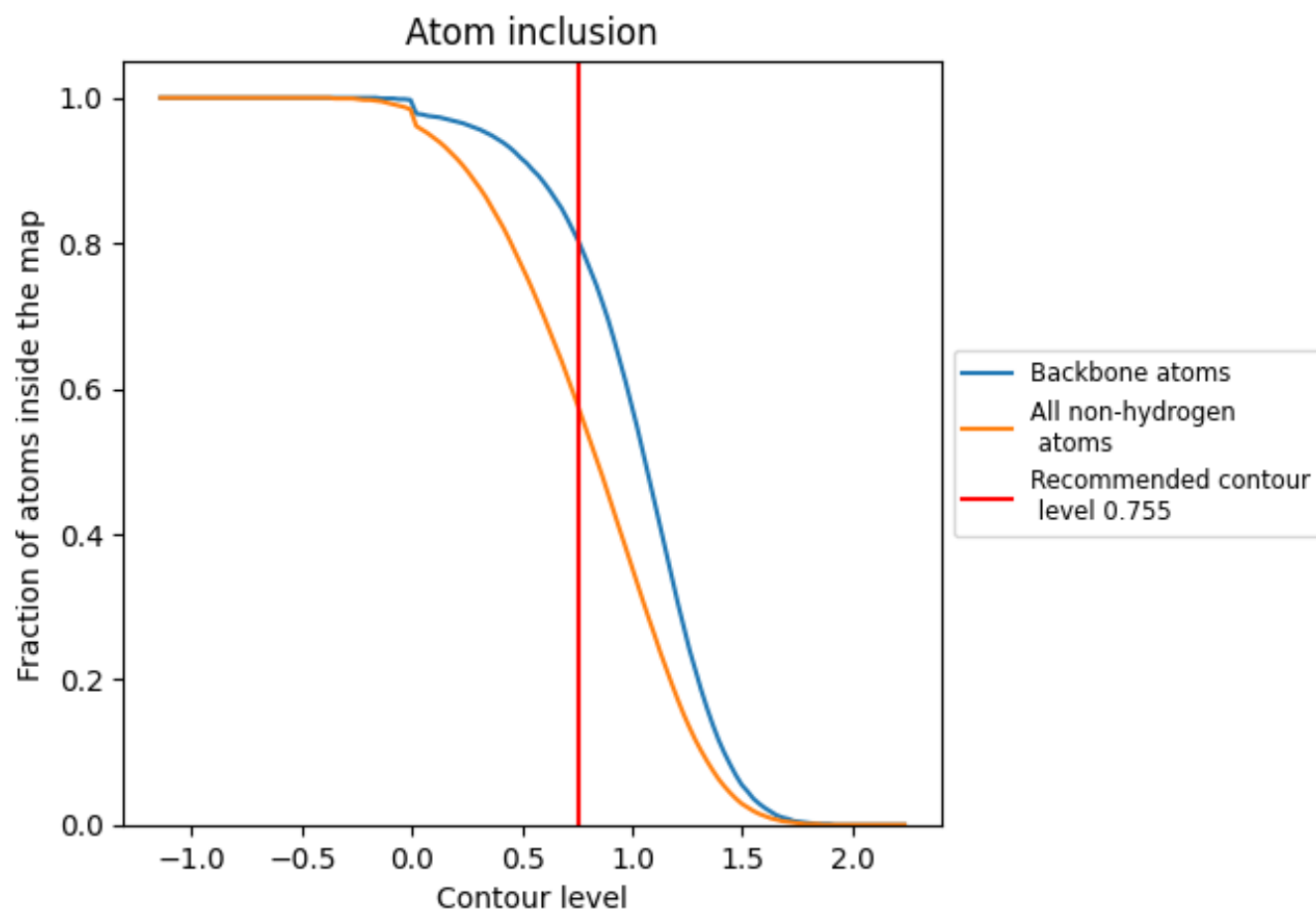
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.755).







































































## 9.4 Atom inclusion ⓘ



At the recommended contour level, 80% of all backbone atoms, 57% 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 (0.755) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.5750	 0.1400
1	 0.6150	 0.1510
2	 0.6520	 0.1760
3	 0.6420	 0.1510
4	 0.6490	 0.1670
5	 0.6430	 0.1550
6	 0.6460	 0.1600
7	 0.6290	 0.1730
A	 0.6070	 0.1720
B	 0.5830	 0.1580
C	 0.6190	 0.1490
D	 0.6500	 0.1610
E	 0.6190	 0.1520
F	 0.6280	 0.1530
G	 0.6110	 0.1600
H	 0.5320	 0.1330
I	 0.5360	 0.1430
J	 0.5500	 0.1370
K	 0.5560	 0.1460
L	 0.5420	 0.1380
M	 0.5480	 0.1460
N	 0.6810	 0.1050
O	 0.6000	 0.1270
P	 0.5960	 0.1430
Q	 0.6190	 0.1520
R	 0.6010	 0.1280
S	 0.5630	 0.1330
T	 0.3940	 0.1160
U	 0.6130	 0.1370
V	 0.5800	 0.1280
W	 0.6060	 0.1200
X	 0.0000	 0.0040
Y	 0.5830	 0.1600
Z	 0.0600	 0.0640
a	 0.6350	 0.1700



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Chain	Atom inclusion	Q-score
b	 0.6300	 0.1500
c	 0.6810	 0.1640
d	 0.6780	 0.1490
e	 0.6680	 0.1670
f	 0.6680	 0.1560
g	 0.6530	 0.1580
h	 0.6710	 0.1500
i	 0.6710	 0.1860
j	 0.6740	 0.1650
k	 0.6660	 0.1550
l	 0.6720	 0.1540
m	 0.6670	 0.1530
n	 0.6880	 0.1530