Full wwPDB EM Validation Report ⓘ

Nov 25, 2024 – 12:52 PM EST

PDB ID	:	9E8L
EMDB ID	:	EMD-47724
Title	:	Nub1/Fat10-processing human 26S proteasome bound to Txnl1 with Rpt4 at top of spiral staircase
Authors	:	Arkinson, C.; Gee, C.L.; Martin, A.
Deposited on	:	2024-11-05
Resolution	:	3.59 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*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

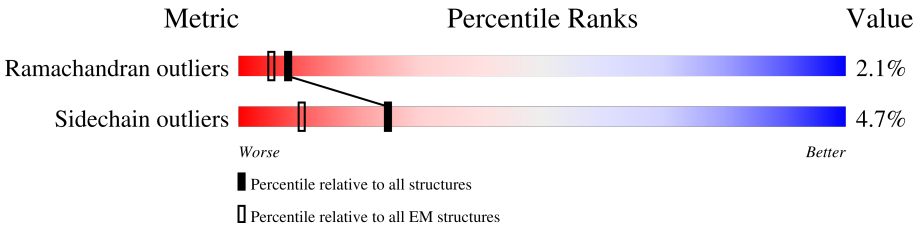
EMDB validation analysis	:	0.0.1.dev113
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.40

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.59 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 >=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 <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	433	21% 83% 8% • 7%
2	B	440	25% 75% 9% • 16%
3	C	406	36% 82% 11% • 5%
4	D	418	29% 77% 6% • 15%
5	E	389	29% 86% 8% 5%
6	F	439	19% 73% 10% • 16%
7	G	246	64% 91% 5% •
8	H	234	65% 95% • •
9	I	261	75% 88% 7% 5%

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Mol	Chain	Length	Quality of chain
10	J	248	69% 86% 10%
11	K	241	76% 88% 6% 5%
12	L	263	75% 83% 7% 10%
13	M	255	73% 85% 8% 6%
14	U	953	17% 82% 5% 12%
15	V	534	35% 73% 8% 18%
16	W	456	33% 91% 5%
17	X	422	24% 82% 6% 10%
18	Y	389	17% 90% 6%
19	Z	324	9% 79% 9% 12%
20	a	376	33% 89% 9%
21	b	377	17% 46% 5% 49%
22	c	424	8% 58% 6% 36%
23	d	350	40% 72% 5% 23%
24	e	70	21% 59% 40%
25	f	908	48% 86% 6% 7%
26	g	601	16% 15% 84%
27	u	289	16% 52% 7% 40%
28	v	14	50% 93% 7%

2 Entry composition

There are 32 unique types of molecules in this entry. The entry contains 70392 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 proteasome regulatory subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	401	3144	1978	554	595	17	0	0

- Molecule 2 is a protein called 26S proteasome regulatory subunit 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	371	2917	1840	498	565	14	0	0

- Molecule 3 is a protein called 26S protease regulatory subunit 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	386	3053	1921	547	567	18	0	0

- Molecule 4 is a protein called 26S proteasome regulatory subunit 6B.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	354	2811	1778	491	531	11	0	0

- Molecule 5 is a protein called 26S protease regulatory subunit 10B.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	E	368	2932	1846	522	548	16	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	F	367	2877	1818	498	544	17	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	239	Total	C	N	O	S	0	0
			1820	1157	304	346	13		

- Molecule 8 is a protein called Proteasome subunit alpha type-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	H	230	Total	C	N	O	S	0	0
			1717	1091	291	330	5		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
H	163	HIS	MET	conflict	UNP P25787

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

Mol	Chain	Residues	Atoms					AltConf	Trace
9	I	248	Total	C	N	O	S	0	0
			1895	1195	324	368	8		

- Molecule 10 is a protein called Proteasome subunit alpha type-7.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	J	239	Total	C	N	O	S	0	0
			1704	1056	308	335	5		

- Molecule 11 is a protein called Proteasome subunit alpha type-5.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	K	228	Total	C	N	O	S	0	0
			1729	1086	284	349	10		

- Molecule 12 is a protein called Proteasome subunit alpha type-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	L	238	Total	C	N	O	S	0	0
			1850	1159	334	346	11		

- Molecule 13 is a protein called Proteasome subunit alpha type-3.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	M	240	Total	C	N	O	S	0	0
			1856	1178	314	353	11		

- Molecule 14 is a protein called 26S proteasome non-ATPase regulatory subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	U	839	Total	C	N	O	S	0	0
			6538	4150	1111	1233	44		

- Molecule 15 is a protein called 26S proteasome non-ATPase regulatory subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	V	439	Total	C	N	O	S	0	0
			3525	2239	623	650	13		

- Molecule 16 is a protein called 26S proteasome non-ATPase regulatory subunit 12.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	W	438	Total	C	N	O	S	0	0
			3570	2261	609	677	23		

- Molecule 17 is a protein called 26S proteasome non-ATPase regulatory subunit 11.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	X	378	Total	C	N	O	S	0	0
			2994	1909	507	566	12		

- Molecule 18 is a protein called 26S proteasome non-ATPase regulatory subunit 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	Y	380	Total	C	N	O	S	0	0
			3127	1995	535	580	17		

- Molecule 19 is a protein called 26S proteasome non-ATPase regulatory subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	Z	286	Total	C	N	O	S	0	0
			2281	1457	392	427	5		

- Molecule 20 is a protein called 26S proteasome non-ATPase regulatory subunit 13.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	a	373	Total	C	N	O	S	0	0
			2995	1911	510	559	15		

- Molecule 21 is a protein called 26S proteasome non-ATPase regulatory subunit 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	b	191	Total	C	N	O	S	0	0
			1458	910	261	279	8		

- Molecule 22 is a protein called 26S proteasome non-ATPase regulatory subunit 14.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	c	272	Total	C	N	O	S	0	0
			2153	1363	370	403	17		

There are 114 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
c	311	LEU	-	expression tag	UNP O00487
c	312	ILE	-	expression tag	UNP O00487
c	313	ASN	-	expression tag	UNP O00487
c	314	HIS	-	expression tag	UNP O00487
c	315	HIS	-	expression tag	UNP O00487
c	316	HIS	-	expression tag	UNP O00487
c	317	HIS	-	expression tag	UNP O00487
c	318	HIS	-	expression tag	UNP O00487
c	319	HIS	-	expression tag	UNP O00487
c	320	ASP	-	expression tag	UNP O00487
c	321	TYR	-	expression tag	UNP O00487
c	322	ASP	-	expression tag	UNP O00487
c	323	ILE	-	expression tag	UNP O00487
c	324	PRO	-	expression tag	UNP O00487
c	325	THR	-	expression tag	UNP O00487
c	326	THR	-	expression tag	UNP O00487
c	327	ALA	-	expression tag	UNP O00487
c	328	SER	-	expression tag	UNP O00487
c	329	GLU	-	expression tag	UNP O00487
c	330	ASN	-	expression tag	UNP O00487
c	331	LEU	-	expression tag	UNP O00487
c	332	TYR	-	expression tag	UNP O00487
c	333	PHE	-	expression tag	UNP O00487
c	334	GLN	-	expression tag	UNP O00487
c	335	GLY	-	expression tag	UNP O00487

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Chain	Residue	Modelled	Actual	Comment	Reference
c	336	GLU	-	expression tag	UNP O00487
c	337	LEU	-	expression tag	UNP O00487
c	338	GLY	-	expression tag	UNP O00487
c	339	MET	-	expression tag	UNP O00487
c	340	ARG	-	expression tag	UNP O00487
c	341	GLY	-	expression tag	UNP O00487
c	342	SER	-	expression tag	UNP O00487
c	343	ALA	-	expression tag	UNP O00487
c	344	GLY	-	expression tag	UNP O00487
c	345	LYS	-	expression tag	UNP O00487
c	346	ALA	-	expression tag	UNP O00487
c	347	GLY	-	expression tag	UNP O00487
c	348	GLU	-	expression tag	UNP O00487
c	349	GLY	-	expression tag	UNP O00487
c	350	GLU	-	expression tag	UNP O00487
c	351	ILE	-	expression tag	UNP O00487
c	352	PRO	-	expression tag	UNP O00487
c	353	ALA	-	expression tag	UNP O00487
c	354	PRO	-	expression tag	UNP O00487
c	355	LEU	-	expression tag	UNP O00487
c	356	ALA	-	expression tag	UNP O00487
c	357	GLY	-	expression tag	UNP O00487
c	358	THR	-	expression tag	UNP O00487
c	359	VAL	-	expression tag	UNP O00487
c	360	SER	-	expression tag	UNP O00487
c	361	LYS	-	expression tag	UNP O00487
c	362	ILE	-	expression tag	UNP O00487
c	363	LEU	-	expression tag	UNP O00487
c	364	VAL	-	expression tag	UNP O00487
c	365	LYS	-	expression tag	UNP O00487
c	366	GLU	-	expression tag	UNP O00487
c	367	GLY	-	expression tag	UNP O00487
c	368	ASP	-	expression tag	UNP O00487
c	369	THR	-	expression tag	UNP O00487
c	370	VAL	-	expression tag	UNP O00487
c	371	LYS	-	expression tag	UNP O00487
c	372	ALA	-	expression tag	UNP O00487
c	373	GLY	-	expression tag	UNP O00487
c	374	GLN	-	expression tag	UNP O00487
c	375	THR	-	expression tag	UNP O00487
c	376	VAL	-	expression tag	UNP O00487
c	377	LEU	-	expression tag	UNP O00487

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Chain	Residue	Modelled	Actual	Comment	Reference
c	378	VAL	-	expression tag	UNP O00487
c	379	LEU	-	expression tag	UNP O00487
c	380	GLU	-	expression tag	UNP O00487
c	381	ALA	-	expression tag	UNP O00487
c	382	MET	-	expression tag	UNP O00487
c	383	LYS	-	expression tag	UNP O00487
c	384	MET	-	expression tag	UNP O00487
c	385	GLU	-	expression tag	UNP O00487
c	386	THR	-	expression tag	UNP O00487
c	387	GLU	-	expression tag	UNP O00487
c	388	ILE	-	expression tag	UNP O00487
c	389	ASN	-	expression tag	UNP O00487
c	390	ALA	-	expression tag	UNP O00487
c	391	PRO	-	expression tag	UNP O00487
c	392	THR	-	expression tag	UNP O00487
c	393	ASP	-	expression tag	UNP O00487
c	394	GLY	-	expression tag	UNP O00487
c	395	LYS	-	expression tag	UNP O00487
c	396	VAL	-	expression tag	UNP O00487
c	397	GLU	-	expression tag	UNP O00487
c	398	LYS	-	expression tag	UNP O00487
c	399	VAL	-	expression tag	UNP O00487
c	400	LEU	-	expression tag	UNP O00487
c	401	VAL	-	expression tag	UNP O00487
c	402	LYS	-	expression tag	UNP O00487
c	403	GLU	-	expression tag	UNP O00487
c	404	ARG	-	expression tag	UNP O00487
c	405	ASP	-	expression tag	UNP O00487
c	406	ALA	-	expression tag	UNP O00487
c	407	VAL	-	expression tag	UNP O00487
c	408	GLN	-	expression tag	UNP O00487
c	409	GLY	-	expression tag	UNP O00487
c	410	GLY	-	expression tag	UNP O00487
c	411	GLN	-	expression tag	UNP O00487
c	412	GLY	-	expression tag	UNP O00487
c	413	LEU	-	expression tag	UNP O00487
c	414	ILE	-	expression tag	UNP O00487
c	415	LYS	-	expression tag	UNP O00487
c	416	ILE	-	expression tag	UNP O00487
c	417	GLY	-	expression tag	UNP O00487
c	418	VAL	-	expression tag	UNP O00487
c	419	HIS	-	expression tag	UNP O00487

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Chain	Residue	Modelled	Actual	Comment	Reference
c	420	HIS	-	expression tag	UNP O00487
c	421	HIS	-	expression tag	UNP O00487
c	422	HIS	-	expression tag	UNP O00487
c	423	HIS	-	expression tag	UNP O00487
c	424	HIS	-	expression tag	UNP O00487

- Molecule 23 is a protein called 26S proteasome non-ATPase regulatory subunit 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	d	269	Total	C	N	O	S	0	0
			2188	1414	359	406	9		

- Molecule 24 is a protein called 26S proteasome complex subunit SEM1.

Mol	Chain	Residues	Atoms				AltConf	Trace
24	e	42	Total	C	N	O	0	0
			361	221	56	84		

- Molecule 25 is a protein called 26S proteasome non-ATPase regulatory subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	f	842	Total	C	N	O	S	0	0
			6511	4117	1105	1244	45		

- Molecule 26 is a protein called Isoform 2 of NEDD8 ultimate buster 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	g	95	Total	C	N	O	S	0	0
			771	487	139	144	1		

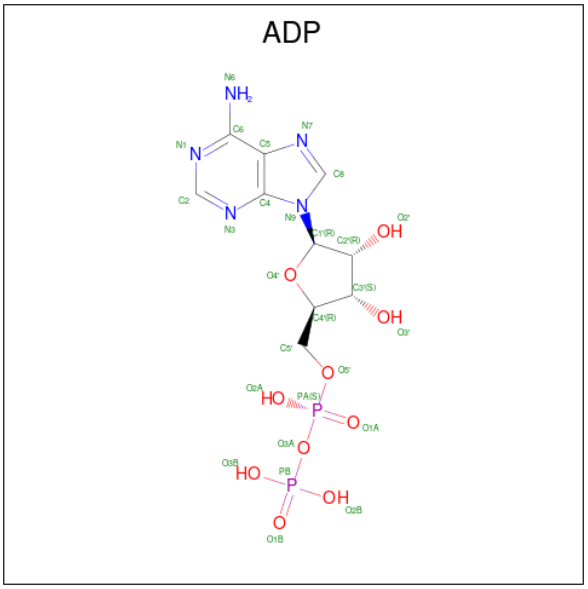
- Molecule 27 is a protein called Thioredoxin-like protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	u	172	Total	C	N	O	S	0	0
			1376	865	226	276	9		

- Molecule 28 is a protein called substrate peptide.

Mol	Chain	Residues	Atoms				AltConf	Trace
28	v	13	Total	C	N	O	0	0
			65	39	13	13		

- Molecule 29 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$) (labeled as "Ligand of Interest" by depositor).

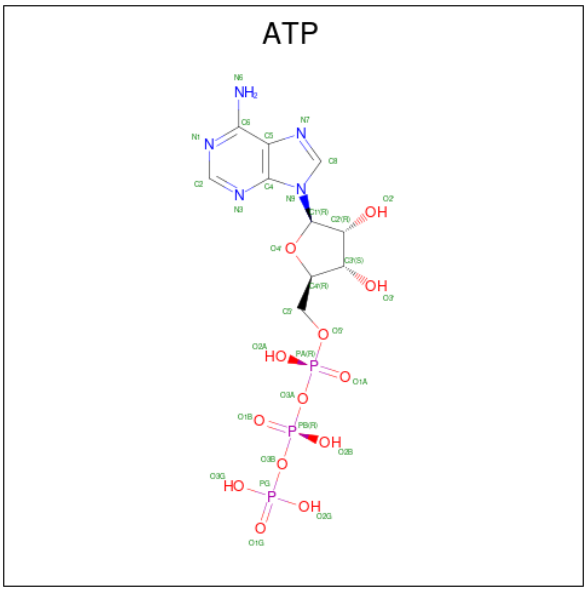


Mol	Chain	Residues	Atoms					AltConf
29	A	1	Total	C	N	O	P	0
			27	10	5	10	2	
29	B	1	Total	C	N	O	P	0
			27	10	5	10	2	
29	C	1	Total	C	N	O	P	0
			27	10	5	10	2	
29	D	1	Total	C	N	O	P	0
			27	10	5	10	2	

- Molecule 30 is MAGNESIUM ION (three-letter code: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
30	C	1	Total	Mg	0
			1	1	
30	E	1	Total	Mg	0
			1	1	
30	F	1	Total	Mg	0
			1	1	

- Molecule 31 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
31	E	1	Total	C	N	O	P	0
			31	10	5	13	3	
31	F	1	Total	C	N	O	P	0
			31	10	5	13	3	

- Molecule 32 is ZINC ION (three-letter code: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

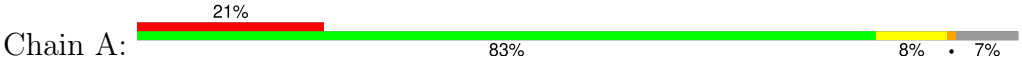
Mol	Chain	Residues	Atoms		AltConf
32	c	1	Total	Zn	0
			1	1	

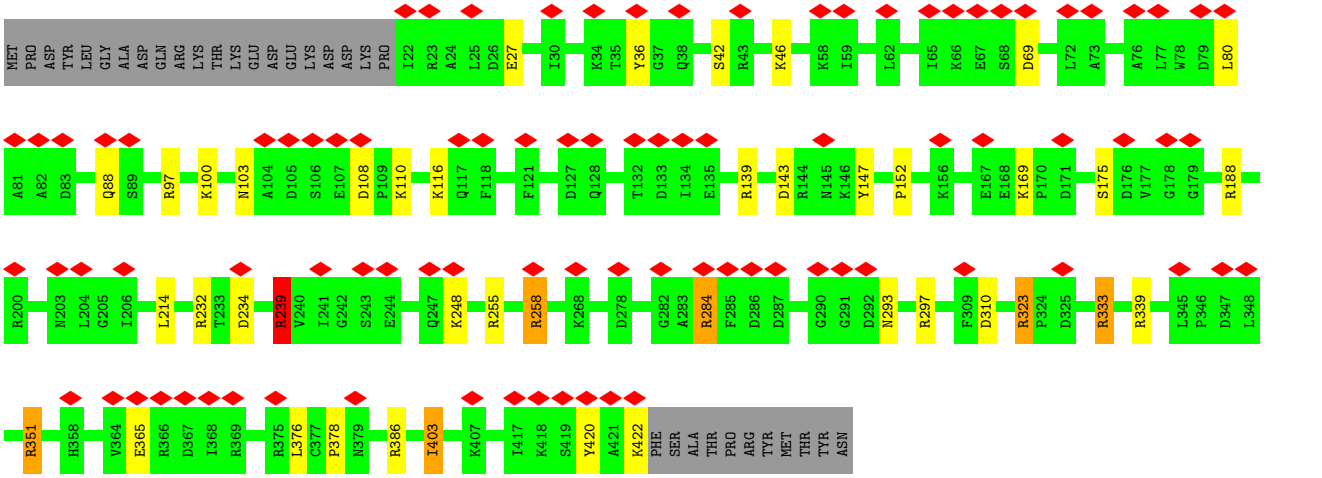
3 Residue-property plots (i)

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: 26S proteasome regulatory subunit 7

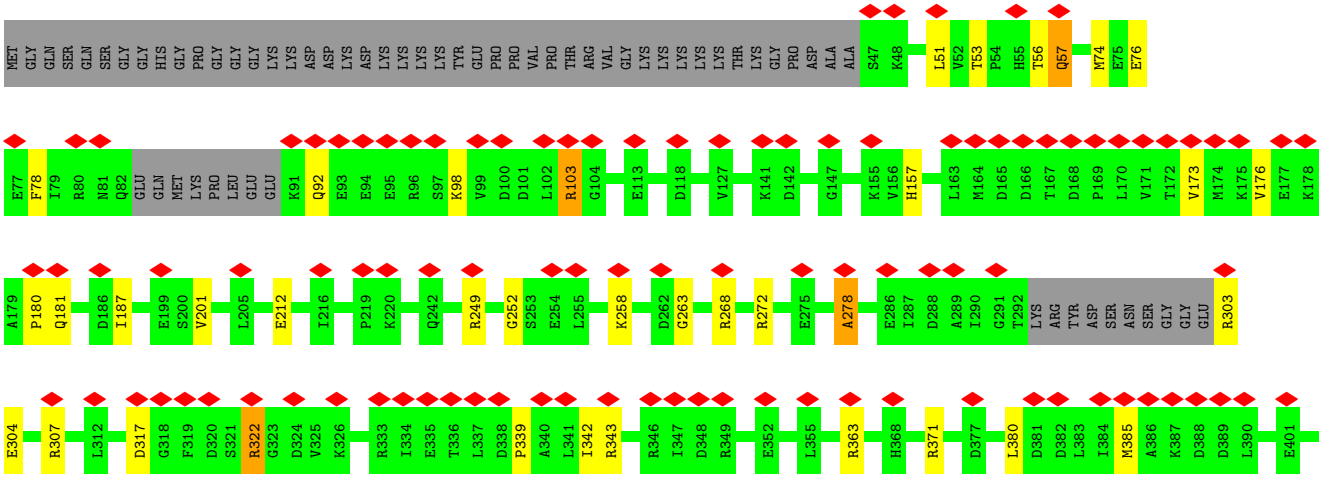
Chain A:

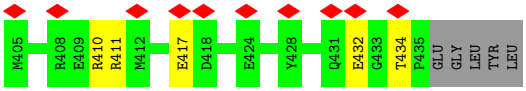




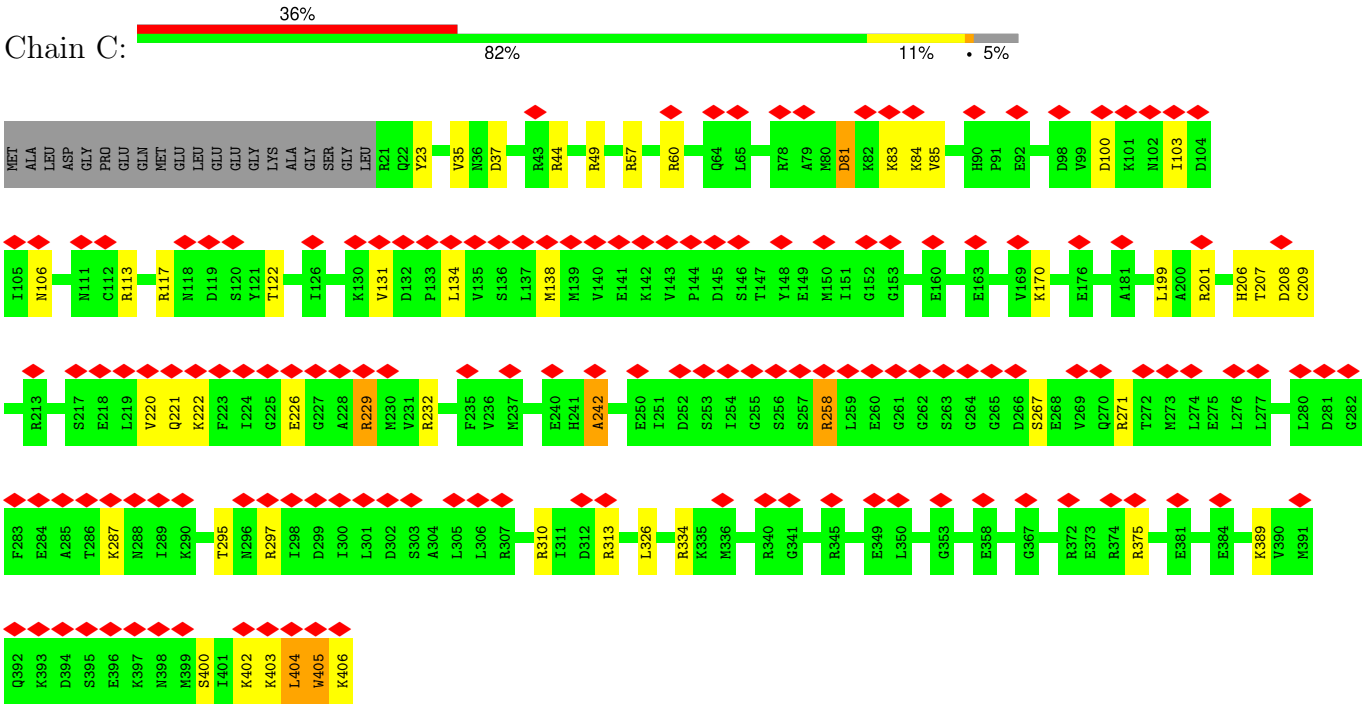
• Molecule 2: 26S proteasome regulatory subunit 4

Chain B:

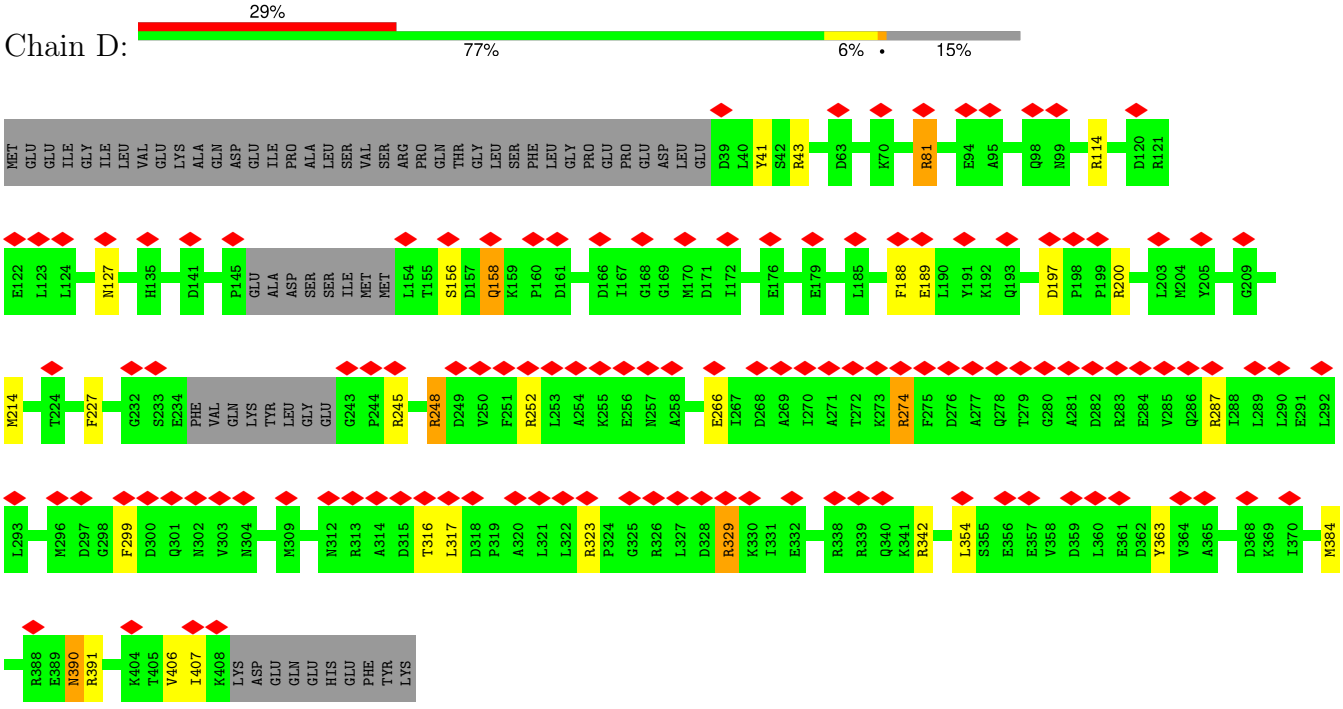




• Molecule 3: 26S protease regulatory subunit 8

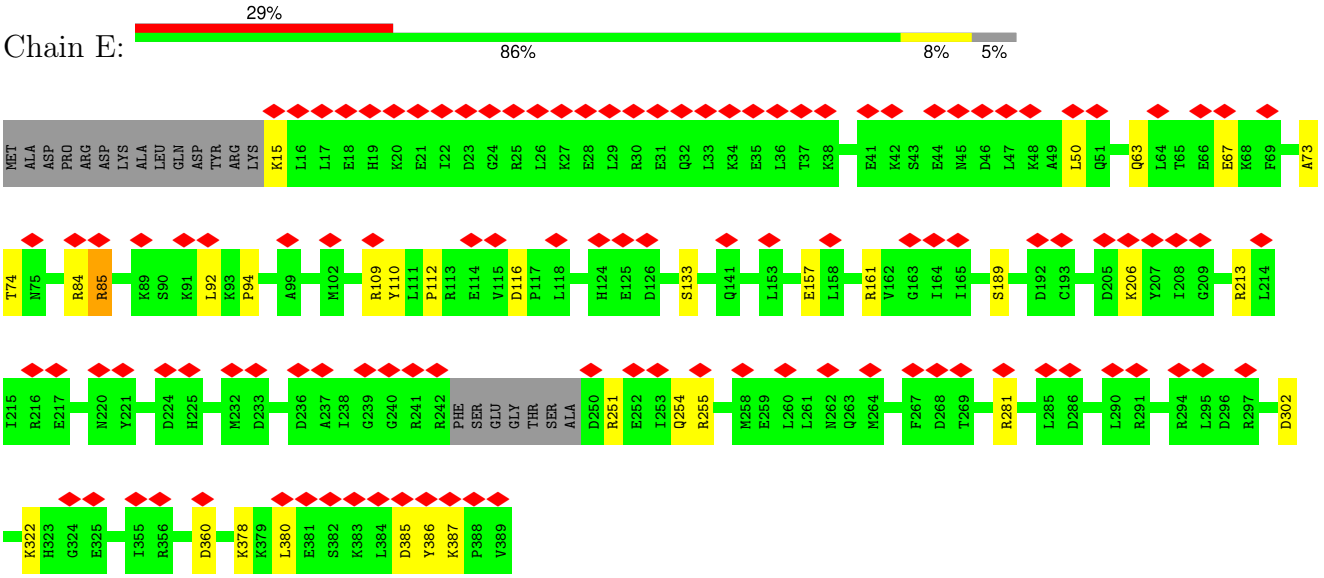


• Molecule 4: 26S proteasome regulatory subunit 6B



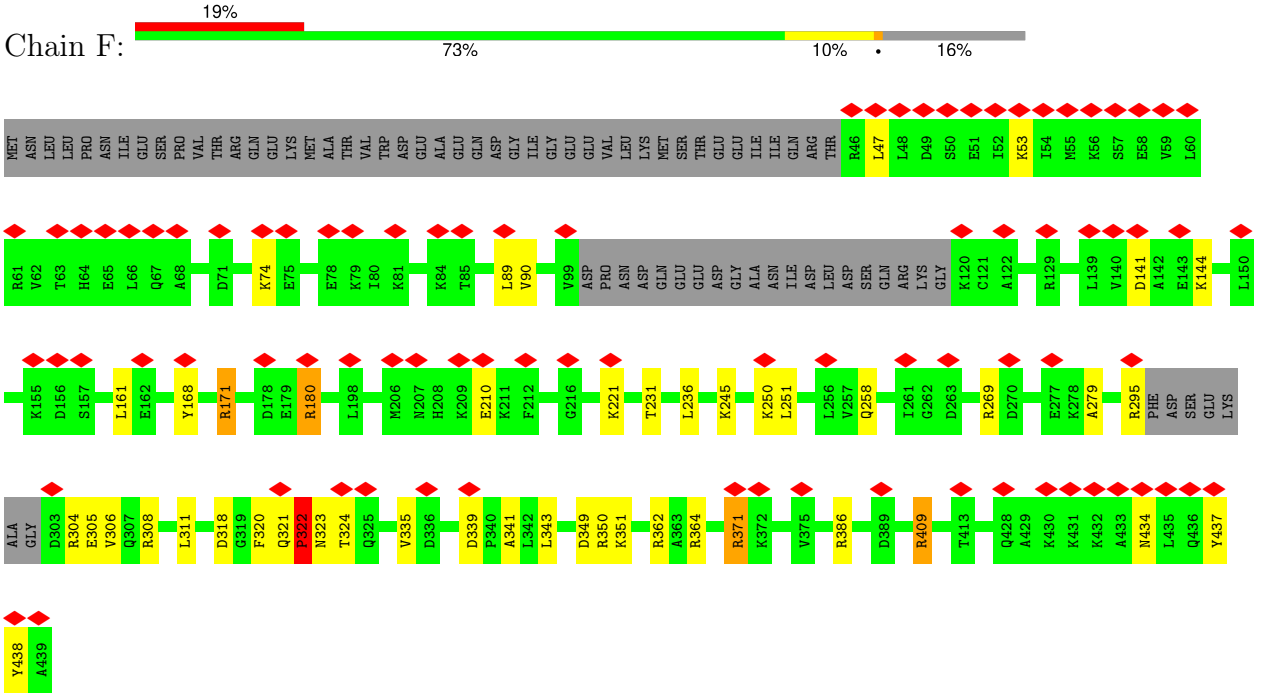
• Molecule 5: 26S protease regulatory subunit 10B

Chain E:



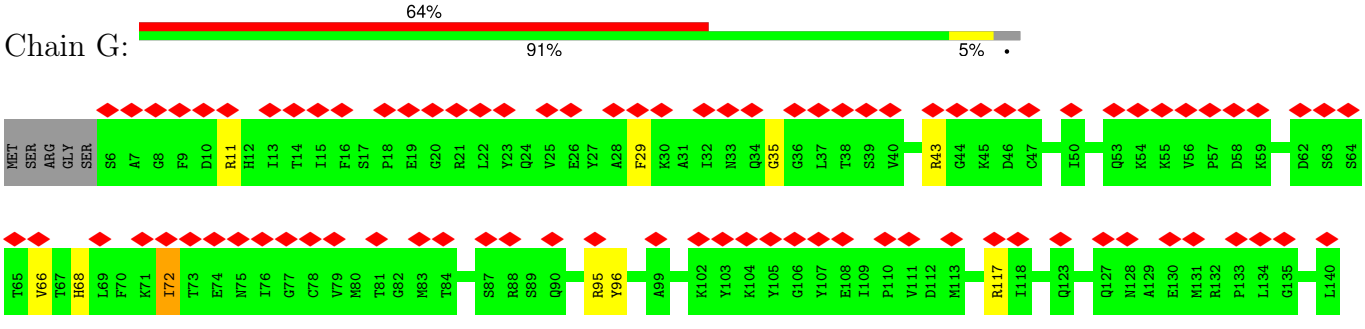
• Molecule 6: 26S proteasome regulatory subunit 6A

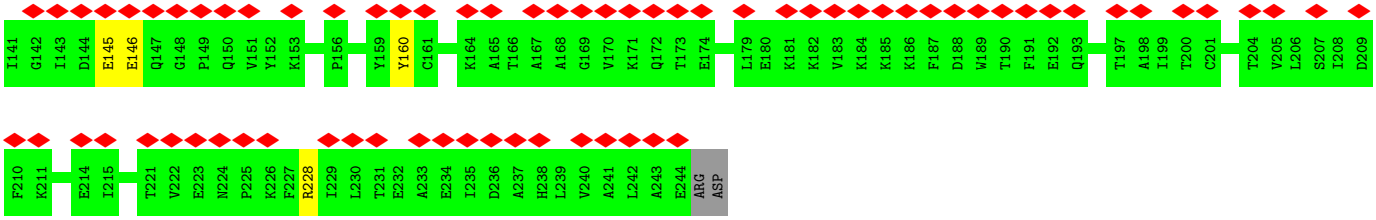
Chain F:



• Molecule 7: Proteasome subunit alpha type-6

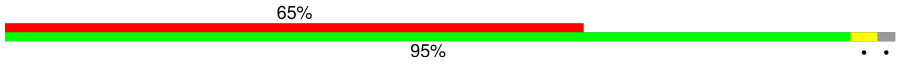
Chain G:

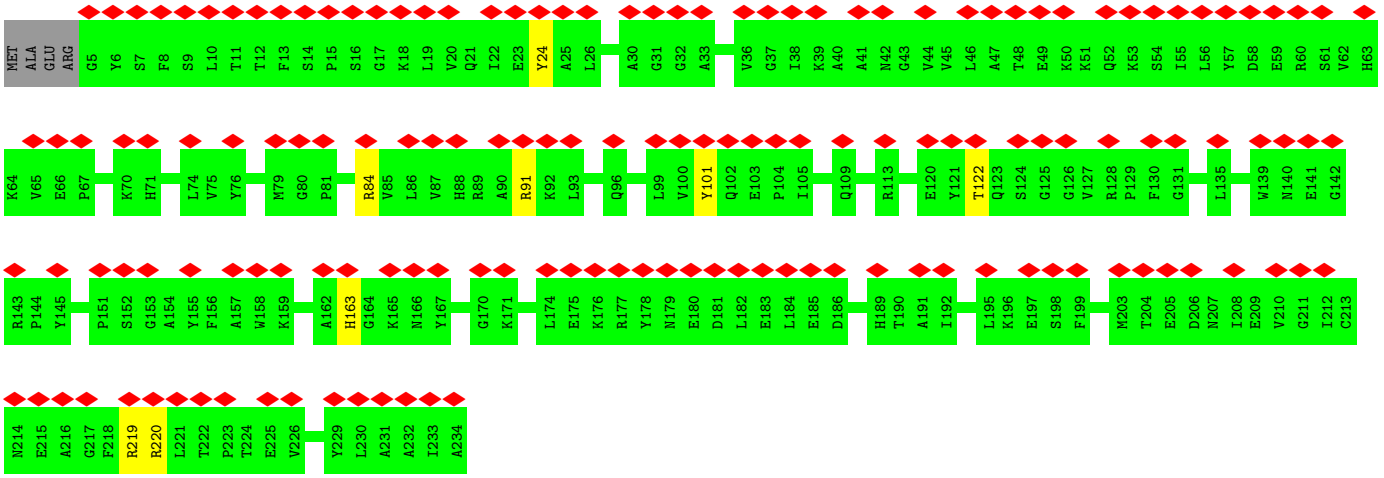




• Molecule 8: Proteasome subunit alpha type-2

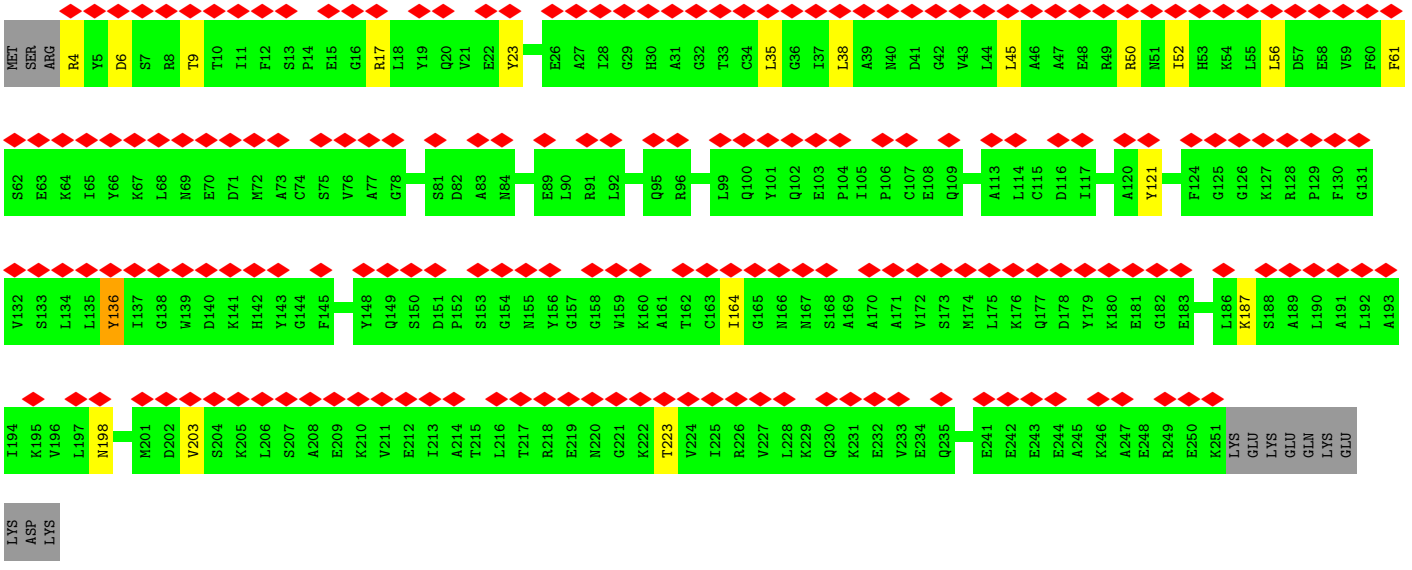
Chain H:





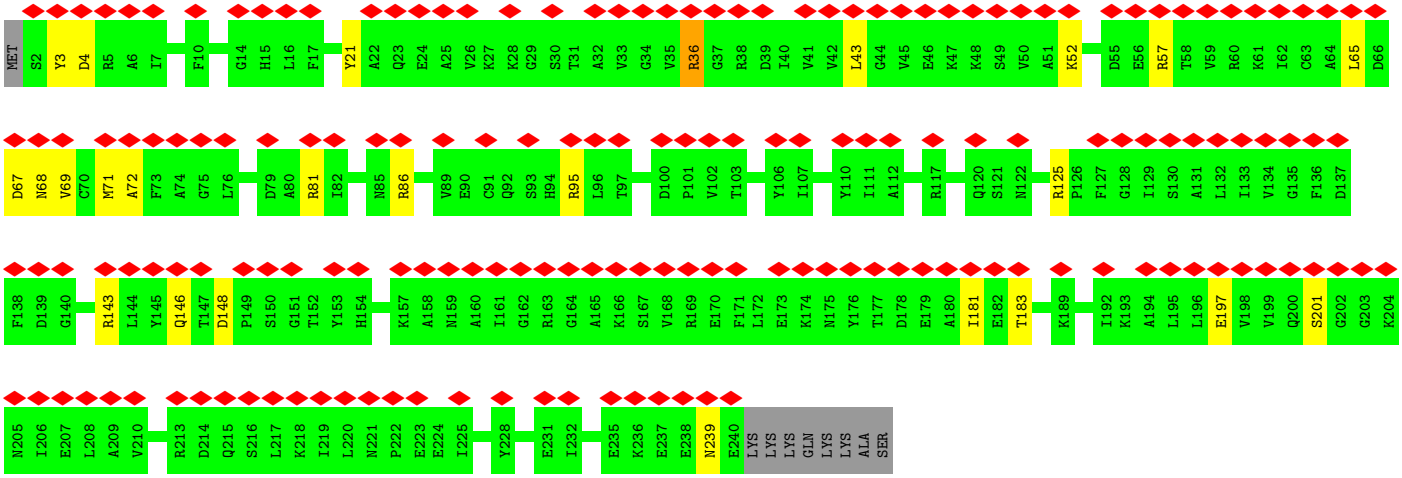
• Molecule 9: Proteasome subunit alpha type-4

Chain I:



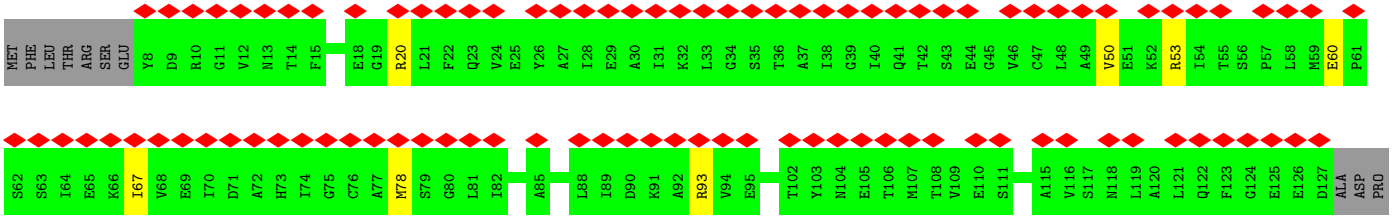
• Molecule 10: Proteasome subunit alpha type-7

Chain J:



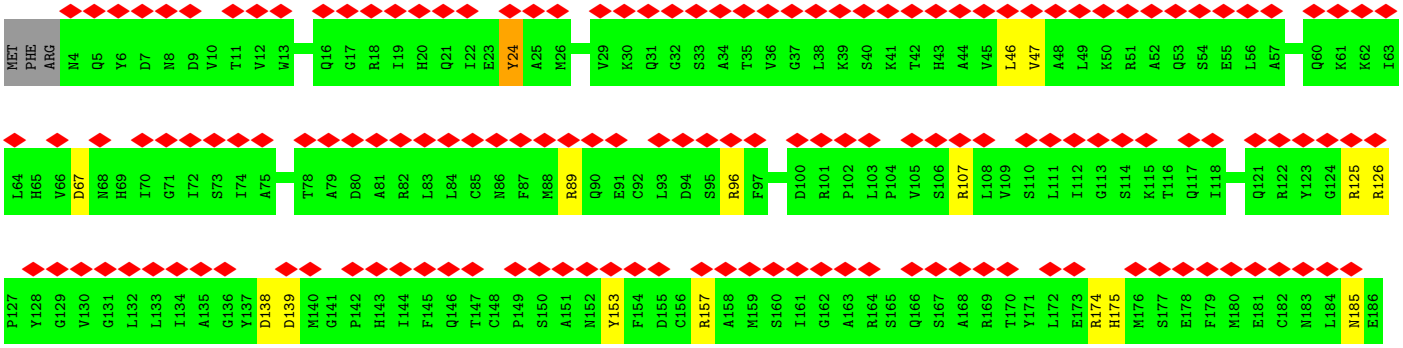
• Molecule 11: Proteasome subunit alpha type-5

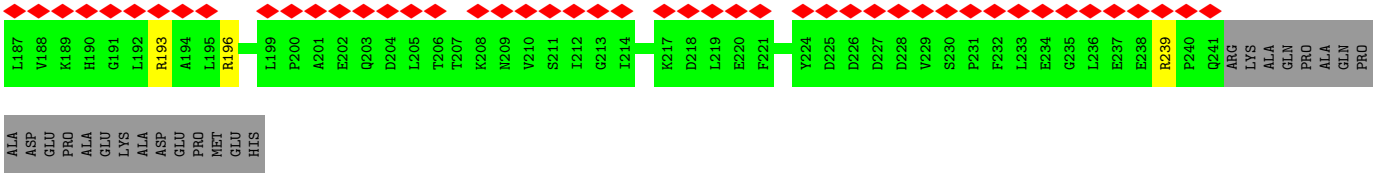
Chain K:



• Molecule 12: Proteasome subunit alpha type-1

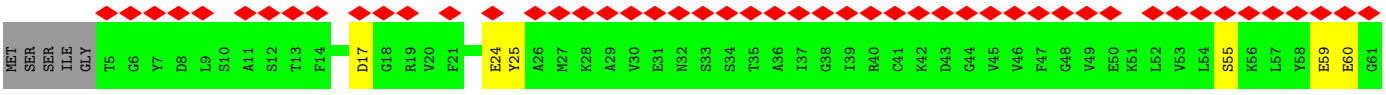
Chain L:

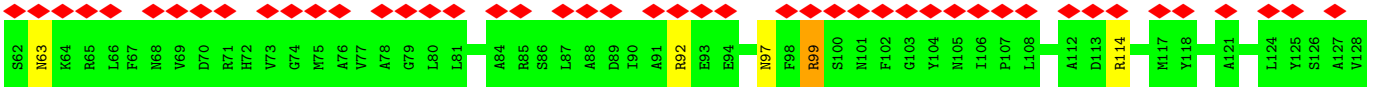


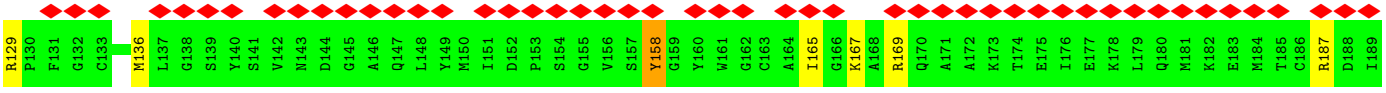


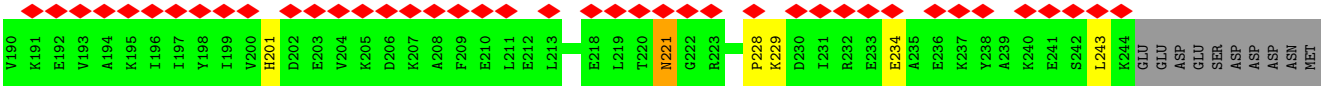
• Molecule 13: Proteasome subunit alpha type-3

Chain M:



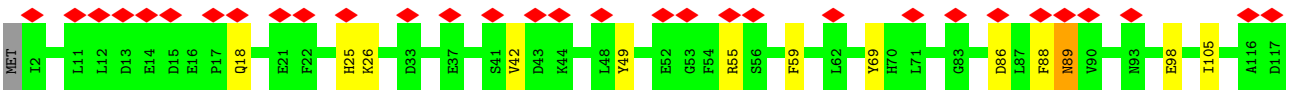


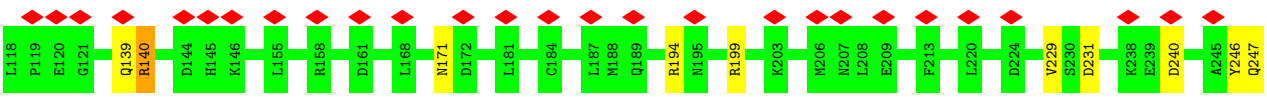


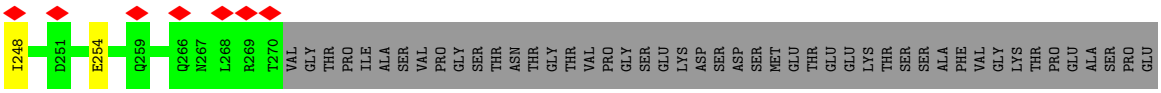


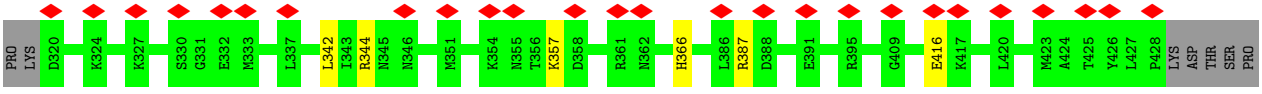
• Molecule 14: 26S proteasome non-ATPase regulatory subunit 1

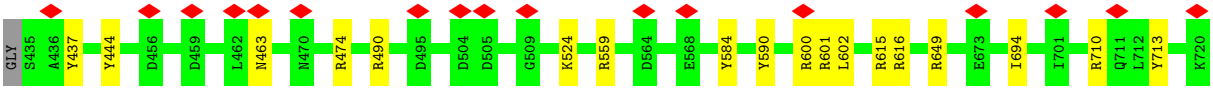
Chain U:

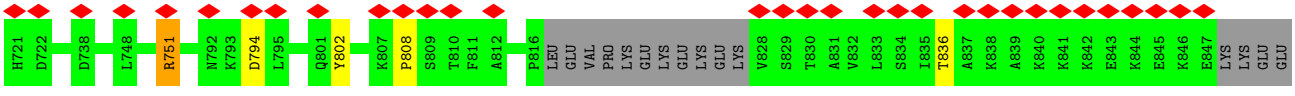


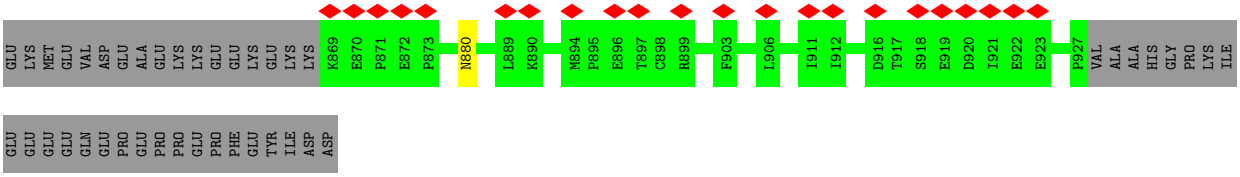






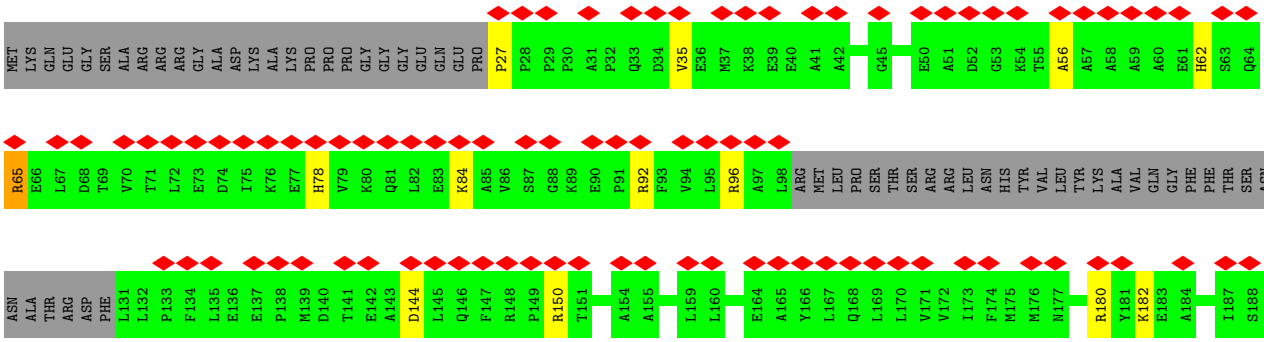


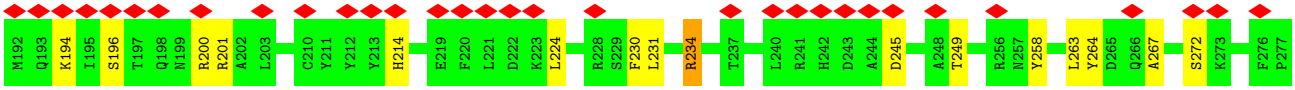


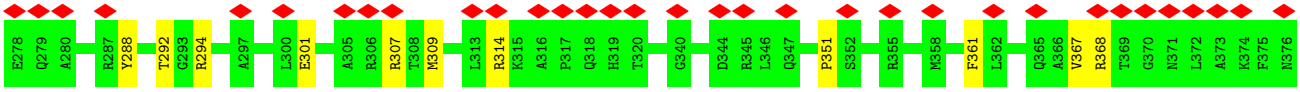


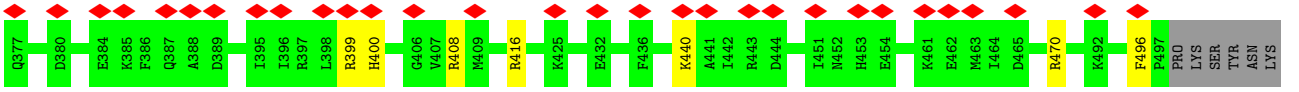
• Molecule 15: 26S proteasome non-ATPase regulatory subunit 3

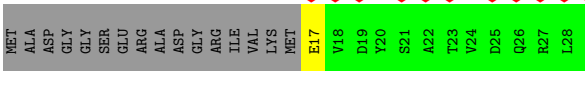
Chain V:





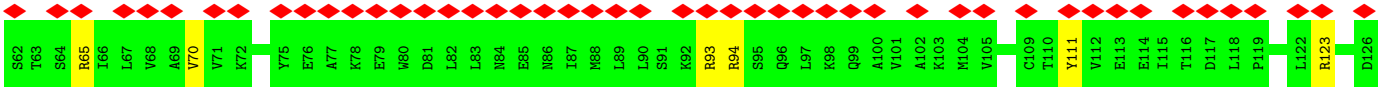


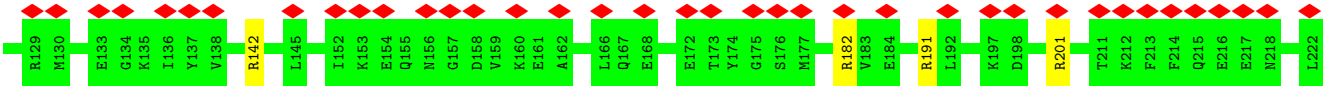


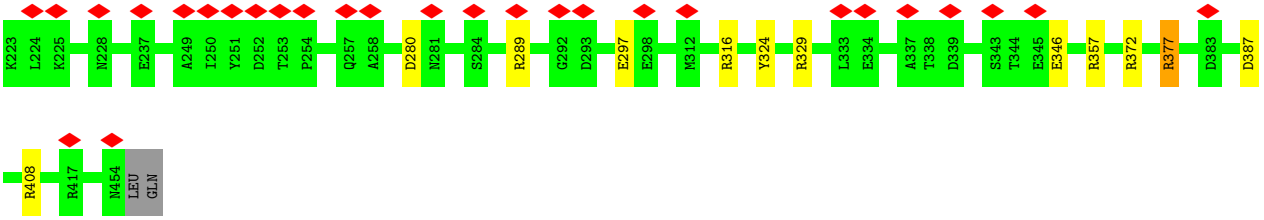


• Molecule 16: 26S proteasome non-ATPase regulatory subunit 12

Chain W:

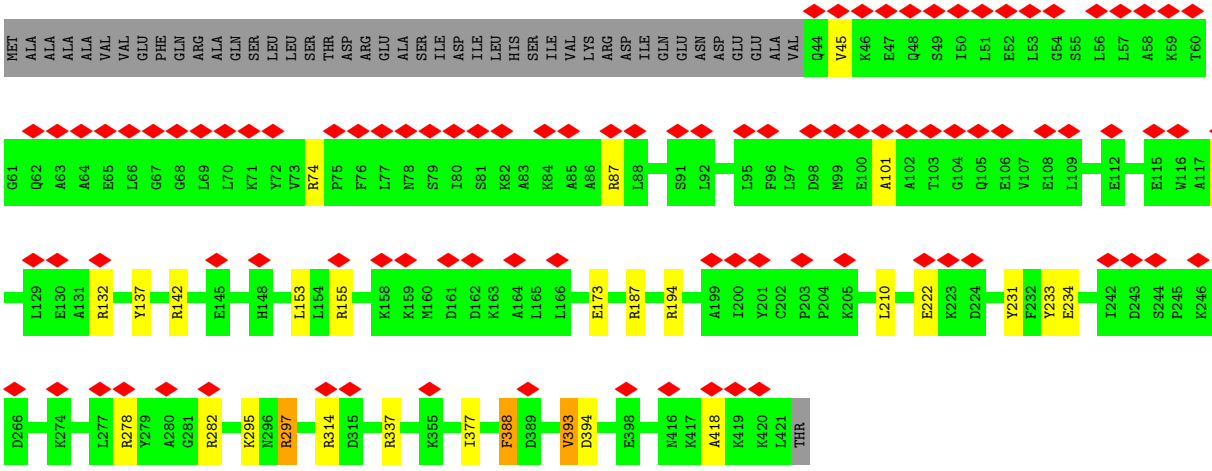






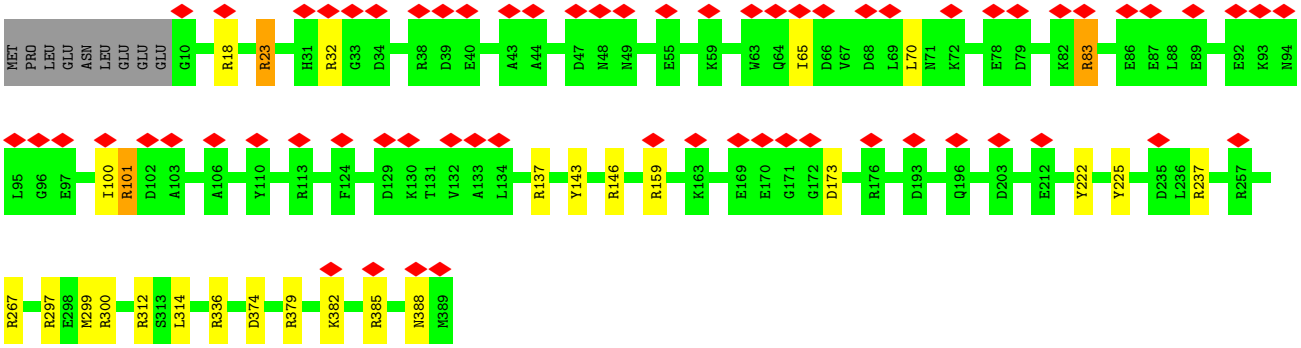
• Molecule 17: 26S proteasome non-ATPase regulatory subunit 11

Chain X:



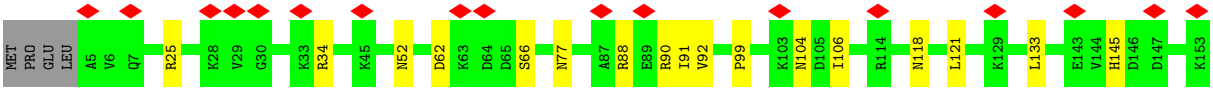
• Molecule 18: 26S proteasome non-ATPase regulatory subunit 6

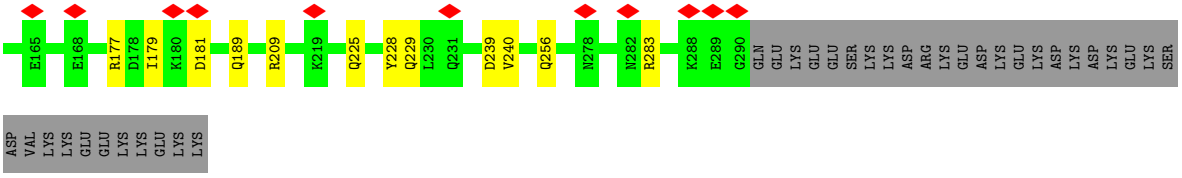
Chain Y:



• Molecule 19: 26S proteasome non-ATPase regulatory subunit 7

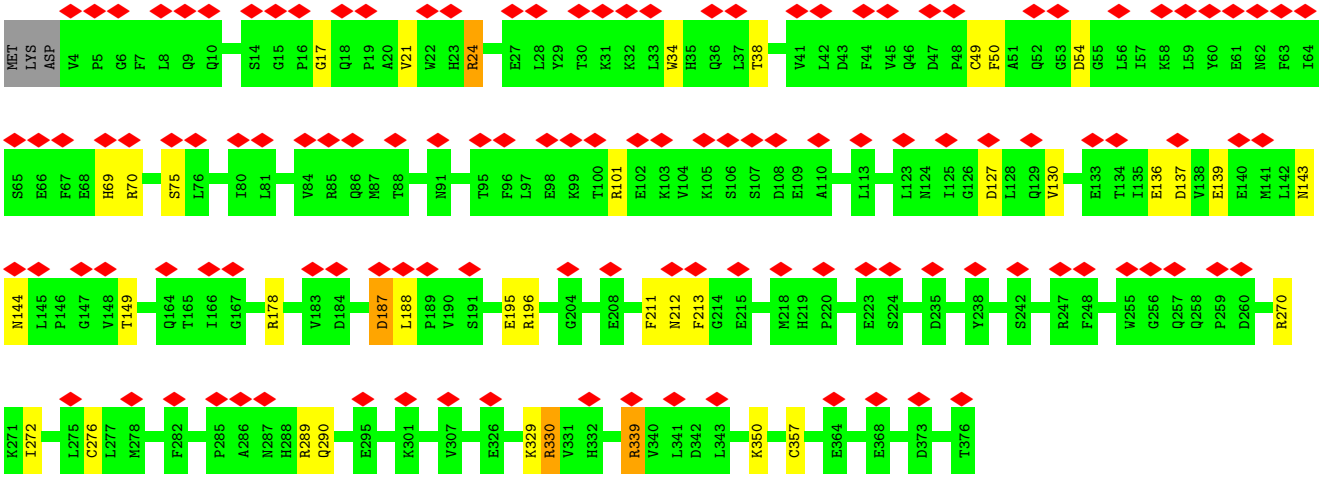
Chain Z:





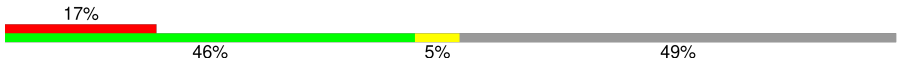
• Molecule 20: 26S proteasome non-ATPase regulatory subunit 13

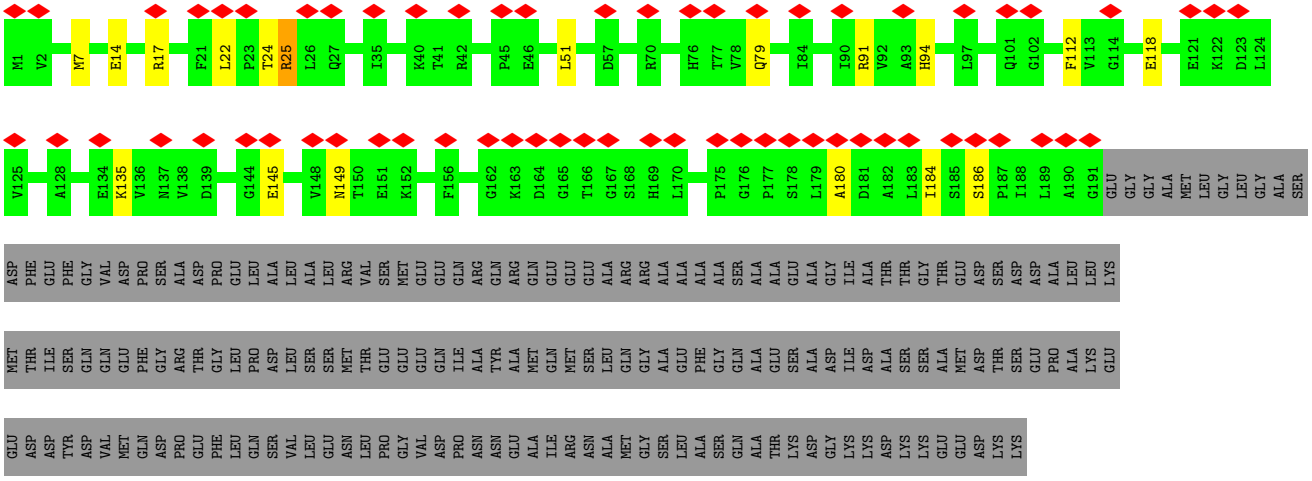
Chain a:



• Molecule 21: 26S proteasome non-ATPase regulatory subunit 4

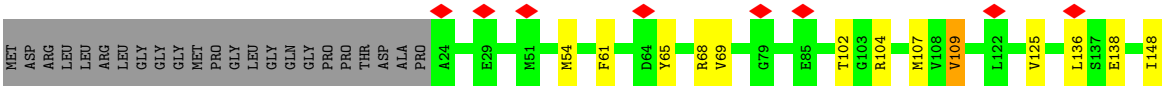
Chain b:

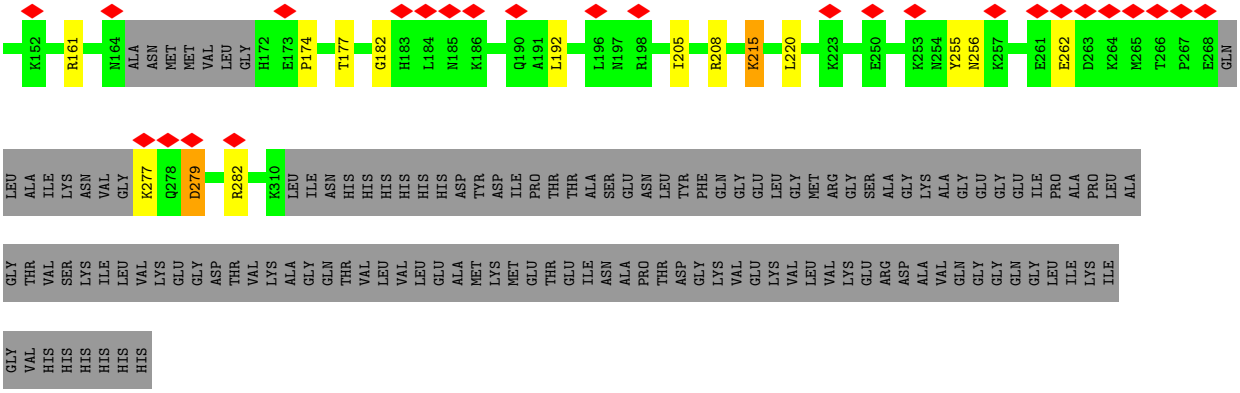




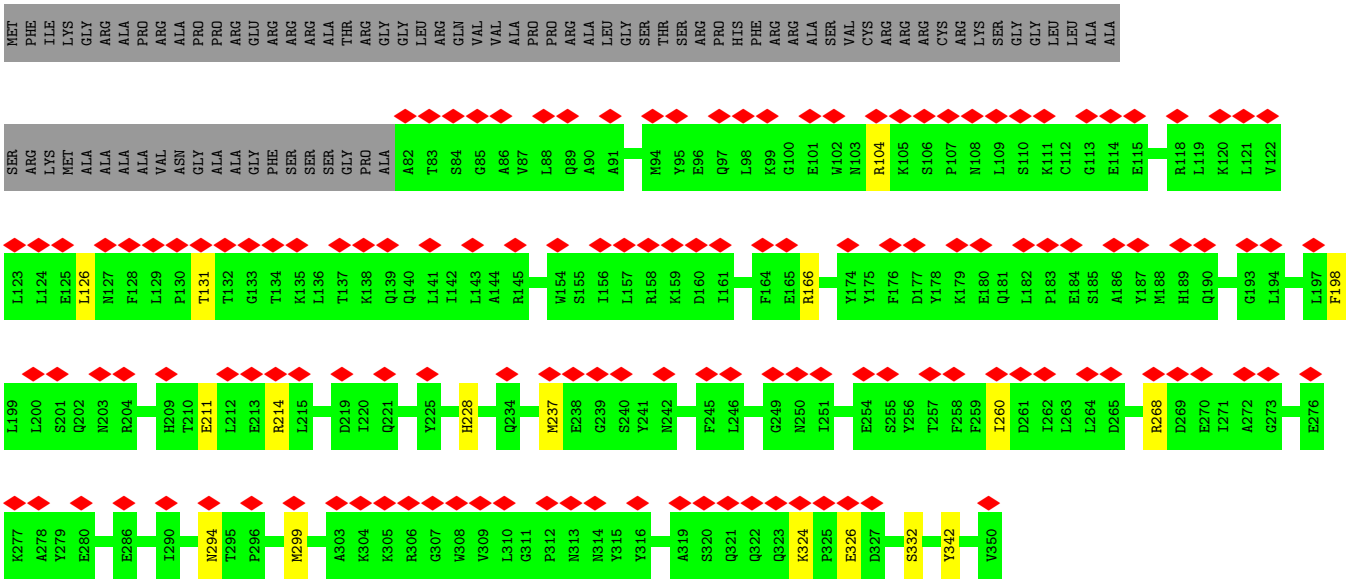
• Molecule 22: 26S proteasome non-ATPase regulatory subunit 14

Chain c:

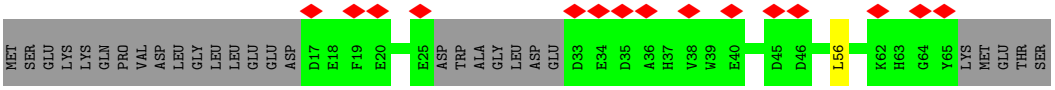




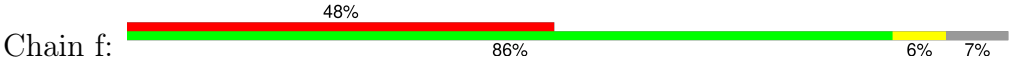
• Molecule 23: 26S proteasome non-ATPase regulatory subunit 8

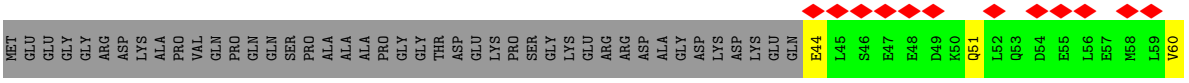


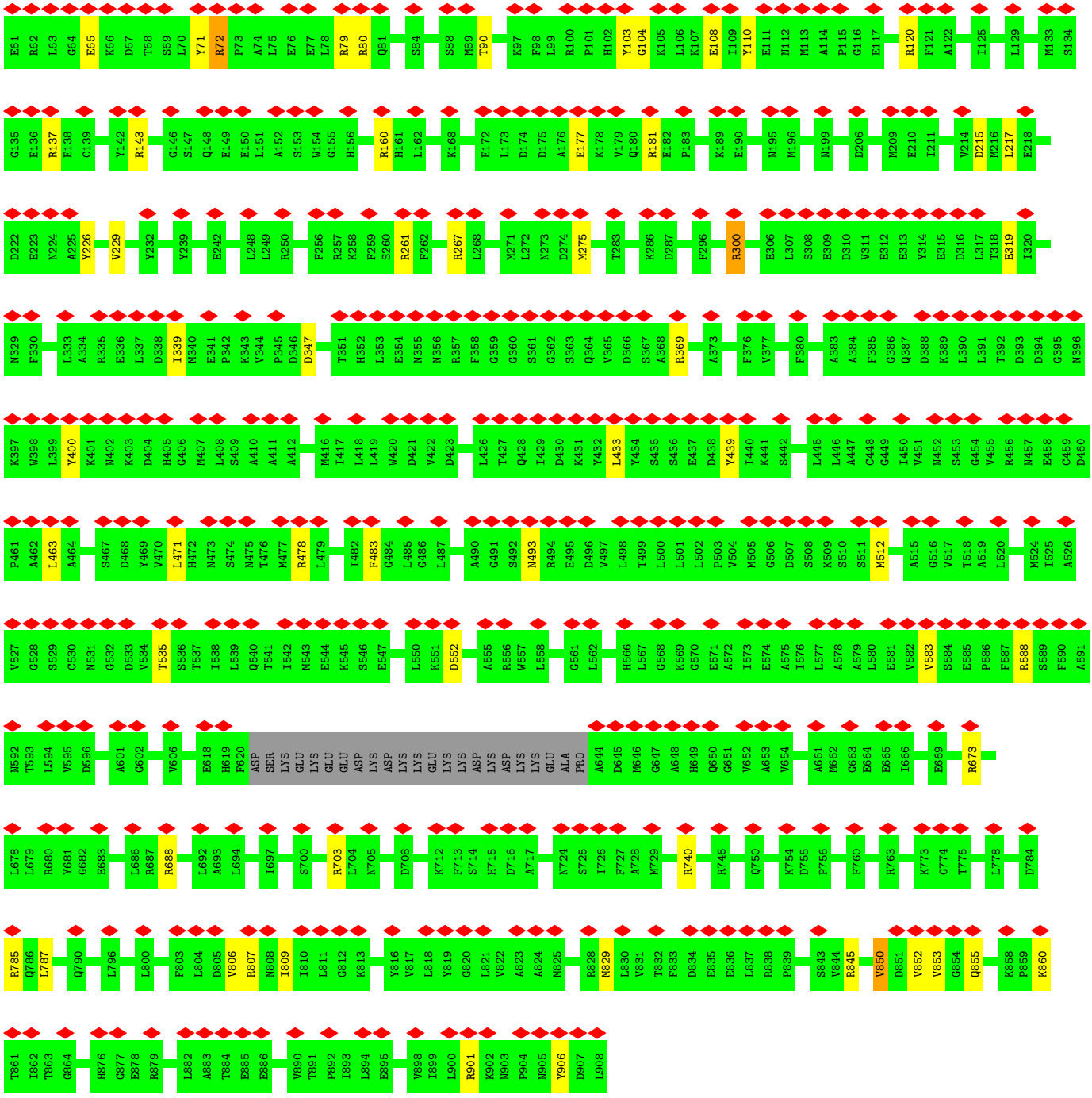
• Molecule 24: 26S proteasome complex subunit SEM1



• Molecule 25: 26S proteasome non-ATPase regulatory subunit 2

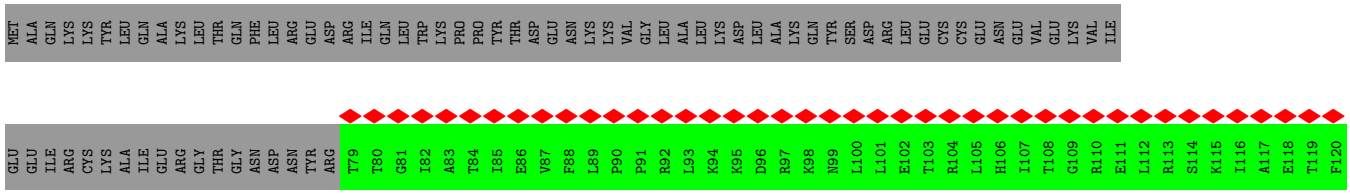


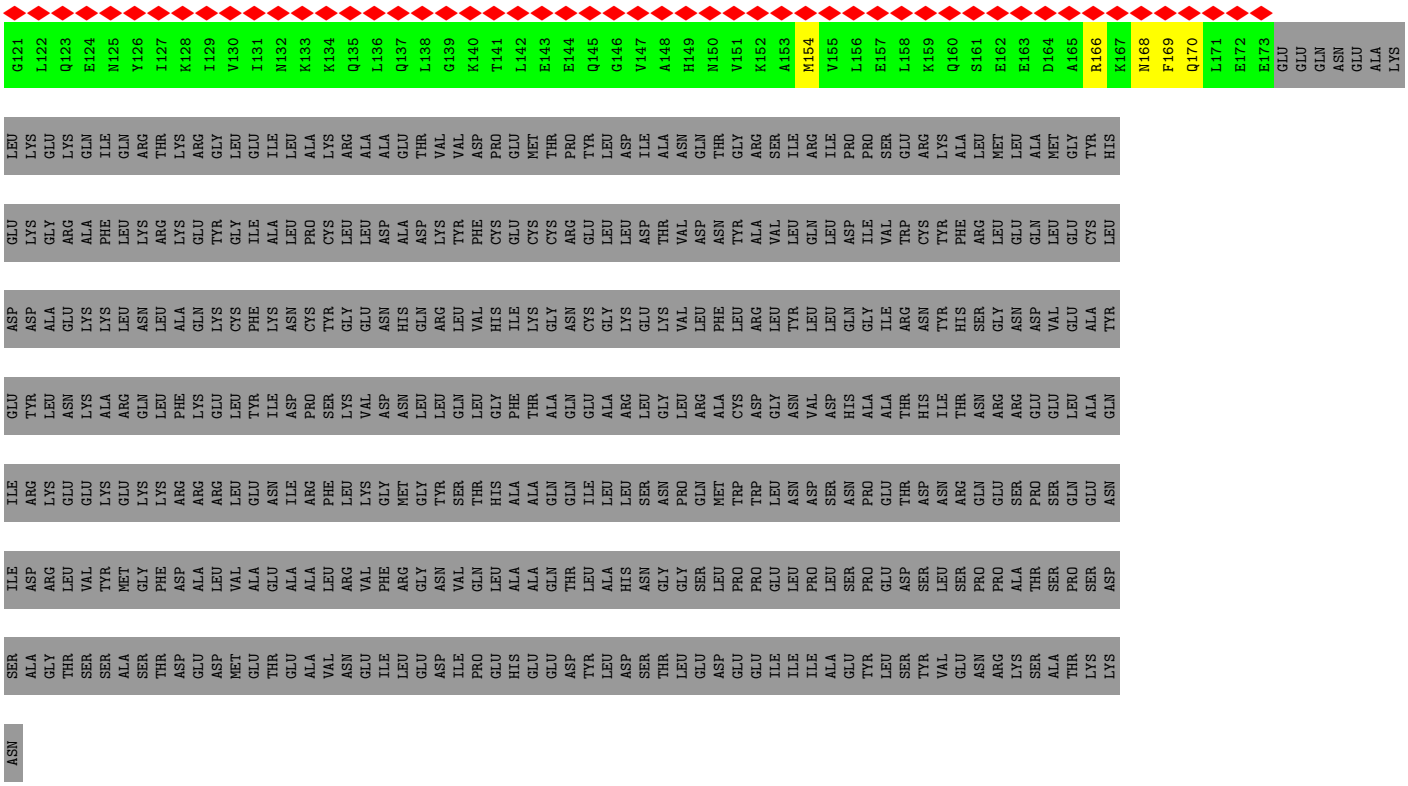




• Molecule 26: Isoform 2 of NEDD8 ultimate buster 1

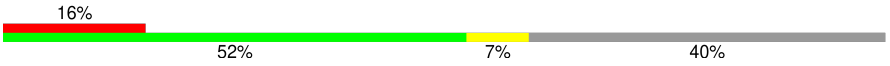
Chain g:

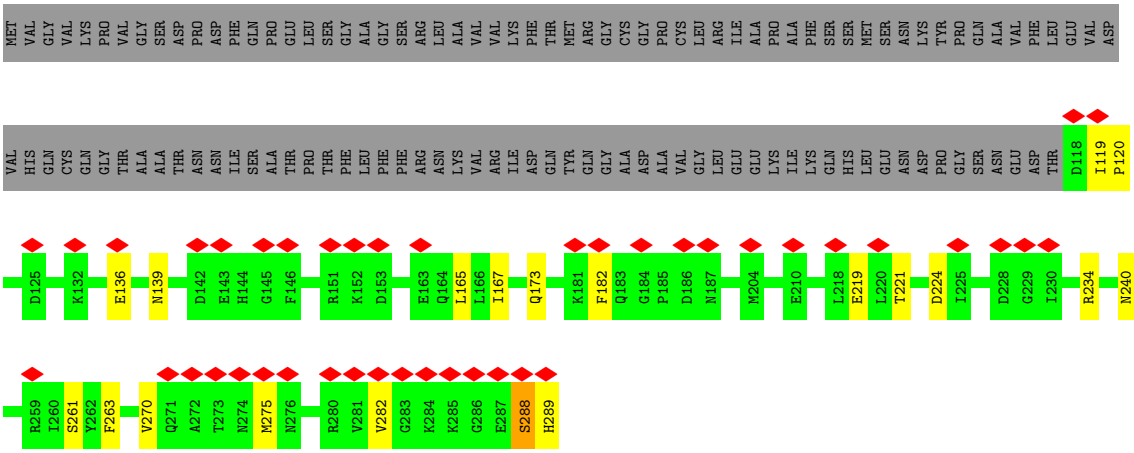




- Molecule 27: Thioredoxin-like protein 1

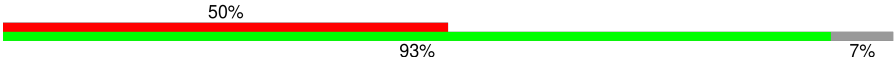
Chain u:

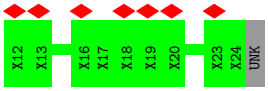




- Molecule 28: substrate peptide

Chain v:





4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	29525	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	1700	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.517	Depositor
Minimum map value	-0.222	Depositor
Average map value	0.003	Depositor
Map value standard deviation	0.028	Depositor
Recommended contour level	0.15	Depositor
Map size (Å)	356.32, 356.32, 356.32	wwPDB
Map dimensions	340, 340, 340	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.048, 1.048, 1.048	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MG, ZN, ADP, ATP

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\#\|Z\| > 5$	RMSZ	$\#\|Z\| > 5$
1	A	0.63	0/3193	1.09	15/4309 (0.3%)
2	B	0.58	0/2958	0.98	10/3991 (0.3%)
3	C	0.63	0/3094	1.07	15/4158 (0.4%)
4	D	0.63	0/2854	1.04	9/3852 (0.2%)
5	E	0.60	0/2976	0.91	4/4004 (0.1%)
6	F	0.60	0/2914	1.07	12/3925 (0.3%)
7	G	0.64	0/1853	0.99	7/2515 (0.3%)
8	H	0.67	0/1754	0.97	5/2384 (0.2%)
9	I	0.66	0/1925	0.98	4/2606 (0.2%)
10	J	0.67	0/1728	1.10	9/2358 (0.4%)
11	K	0.62	0/1755	0.95	3/2375 (0.1%)
12	L	0.66	0/1885	1.08	11/2552 (0.4%)
13	M	0.68	0/1891	1.10	8/2552 (0.3%)
14	U	0.62	0/6650	1.04	20/8993 (0.2%)
15	V	0.69	0/3591	1.09	18/4849 (0.4%)
16	W	0.64	0/3618	1.02	18/4868 (0.4%)
17	X	0.62	0/3038	1.05	17/4095 (0.4%)
18	Y	0.68	0/3185	1.04	17/4290 (0.4%)
19	Z	0.61	0/2324	1.06	10/3150 (0.3%)
20	a	0.65	0/3053	1.07	8/4133 (0.2%)
21	b	0.60	0/1478	1.02	4/2001 (0.2%)
22	c	0.60	0/2193	0.98	6/2962 (0.2%)
23	d	0.70	0/2234	1.00	5/3018 (0.2%)
24	e	0.71	0/370	1.03	0/501
25	f	0.62	0/6622	1.00	21/8965 (0.2%)
26	g	0.33	0/778	0.54	0/1041
27	u	0.59	0/1403	0.60	0/1892
All	All	0.63	0/71317	1.02	256/96339 (0.3%)

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	A	0	7
2	B	0	3
3	C	0	2
4	D	0	6
5	E	0	1
6	F	0	5
8	H	0	1
9	I	0	1
12	L	0	2
14	U	0	3
15	V	0	2
16	W	0	2
18	Y	0	1
20	a	0	1
21	b	0	2
22	c	0	3
23	d	0	1
25	f	0	5
All	All	0	48

There are no bond length outliers.

All (256) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	239	ARG	NE-CZ-NH2	13.35	126.97	120.30
1	A	255	ARG	NE-CZ-NH2	10.69	125.64	120.30
17	X	132	ARG	NE-CZ-NH2	10.35	125.47	120.30
3	C	229	ARG	NE-CZ-NH2	10.15	125.38	120.30
6	F	171	ARG	NE-CZ-NH2	9.72	125.16	120.30
13	M	99	ARG	NE-CZ-NH2	9.72	125.16	120.30
6	F	350	ARG	NE-CZ-NH2	9.38	124.99	120.30
1	A	403	ILE	CA-CB-CG1	9.21	128.50	111.00
17	X	194	ARG	NE-CZ-NH2	8.82	124.71	120.30
1	A	333	ARG	NE-CZ-NH2	8.79	124.70	120.30
4	D	342	ARG	NE-CZ-NH2	8.75	124.68	120.30
20	a	270	ARG	NE-CZ-NH2	8.54	124.57	120.30
1	A	297	ARG	NE-CZ-NH2	8.53	124.57	120.30
18	Y	137	ARG	NE-CZ-NH2	8.36	124.48	120.30
23	d	166	ARG	NE-CZ-NH2	8.28	124.44	120.30
10	J	57	ARG	NE-CZ-NH2	8.24	124.42	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	258	ARG	NE-CZ-NH1	-8.15	116.22	120.30
3	C	60	ARG	NE-CZ-NH2	8.12	124.36	120.30
25	f	72	ARG	NE-CZ-NH2	8.03	124.32	120.30
25	f	369	ARG	NE-CZ-NH2	7.97	124.29	120.30
15	V	65	ARG	NE-CZ-NH2	7.97	124.28	120.30
3	C	242	ALA	CB-CA-C	7.96	122.04	110.10
22	c	161	ARG	NE-CZ-NH2	7.96	124.28	120.30
21	b	25	ARG	NE-CZ-NH2	7.94	124.27	120.30
1	A	323	ARG	NE-CZ-NH2	7.86	124.23	120.30
2	B	410	ARG	NE-CZ-NH2	7.83	124.22	120.30
2	B	272	ARG	NE-CZ-NH2	7.83	124.21	120.30
17	X	282	ARG	NE-CZ-NH2	7.74	124.17	120.30
3	C	271	ARG	NE-CZ-NH2	7.72	124.16	120.30
25	f	703	ARG	NE-CZ-NH2	7.72	124.16	120.30
10	J	36	ARG	NE-CZ-NH2	7.69	124.14	120.30
5	E	213	ARG	NE-CZ-NH2	7.67	124.13	120.30
10	J	81	ARG	NE-CZ-NH2	7.60	124.10	120.30
13	M	187	ARG	NE-CZ-NH2	7.55	124.08	120.30
6	F	322	PRO	N-CA-CB	-7.48	94.32	103.30
14	U	616	ARG	NE-CZ-NH2	7.48	124.04	120.30
25	f	807	ARG	NE-CZ-NH2	7.47	124.03	120.30
18	Y	297	ARG	NE-CZ-NH2	7.46	124.03	120.30
7	G	43	ARG	NE-CZ-NH2	7.45	124.02	120.30
9	I	17	ARG	NE-CZ-NH2	7.44	124.02	120.30
12	L	174	ARG	NE-CZ-NH2	7.42	124.01	120.30
4	D	81	ARG	NE-CZ-NH2	7.41	124.01	120.30
3	C	44	ARG	NE-CZ-NH2	7.40	124.00	120.30
17	X	122	ARG	NE-CZ-NH2	7.38	123.99	120.30
20	a	196	ARG	NE-CZ-NH2	7.35	123.98	120.30
6	F	305	GLU	N-CA-CB	7.35	123.83	110.60
17	X	74	ARG	NE-CZ-NH2	7.32	123.96	120.30
2	B	322	ARG	NE-CZ-NH2	7.31	123.96	120.30
14	U	601	ARG	NE-CZ-NH2	7.30	123.95	120.30
17	X	142	ARG	NE-CZ-NH2	7.20	123.90	120.30
16	W	357	ARG	NE-CZ-NH2	7.18	123.89	120.30
6	F	371	ARG	NE-CZ-NH2	7.08	123.84	120.30
4	D	274	ARG	NE-CZ-NH2	7.04	123.82	120.30
20	a	24	ARG	NE-CZ-NH2	7.04	123.82	120.30
16	W	182	ARG	NE-CZ-NH2	7.02	123.81	120.30
1	A	258	ARG	NE-CZ-NH2	7.00	123.80	120.30
1	A	351	ARG	NE-CZ-NH2	6.99	123.79	120.30
18	Y	379	ARG	NE-CZ-NH2	6.98	123.79	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
20	a	70	ARG	NE-CZ-NH2	6.92	123.76	120.30
15	V	27	PRO	CA-N-CD	-6.91	101.82	111.50
8	H	84	ARG	NE-CZ-NH2	6.90	123.75	120.30
25	f	261	ARG	NE-CZ-NH2	6.89	123.75	120.30
16	W	55	ARG	NE-CZ-NH2	6.87	123.73	120.30
23	d	268	ARG	NE-CZ-NH2	6.86	123.73	120.30
15	V	200	ARG	NE-CZ-NH2	6.83	123.72	120.30
12	L	125	ARG	NE-CZ-NH2	6.83	123.71	120.30
4	D	114	ARG	NE-CZ-NH2	6.80	123.70	120.30
15	V	180	ARG	NE-CZ-NH2	6.76	123.68	120.30
20	a	101	ARG	NE-CZ-NH2	6.76	123.68	120.30
22	c	161	ARG	NE-CZ-NH1	-6.75	116.92	120.30
14	U	140	ARG	NE-CZ-NH2	6.74	123.67	120.30
10	J	65	LEU	C-N-CA	6.74	138.55	121.70
18	Y	312	ARG	NE-CZ-NH2	6.73	123.67	120.30
19	Z	177	ARG	NE-CZ-NH2	6.71	123.66	120.30
25	f	845	ARG	NE-CZ-NH2	6.68	123.64	120.30
25	f	478	ARG	NE-CZ-NH2	6.67	123.63	120.30
25	f	160	ARG	NE-CZ-NH2	6.62	123.61	120.30
16	W	372	ARG	NE-CZ-NH2	6.61	123.60	120.30
9	I	4	ARG	NE-CZ-NH1	-6.59	117.00	120.30
14	U	444	TYR	CB-CG-CD2	-6.58	117.05	121.00
25	f	785	ARG	NE-CZ-NH2	6.58	123.59	120.30
1	A	239	ARG	CD-NE-CZ	6.57	132.79	123.60
16	W	94	ARG	NE-CZ-NH2	6.56	123.58	120.30
25	f	137	ARG	NE-CZ-NH2	6.53	123.56	120.30
4	D	391	ARG	NE-CZ-NH2	6.52	123.56	120.30
14	U	584	TYR	CB-CG-CD2	-6.52	117.09	121.00
8	H	91	ARG	NE-CZ-NH2	6.49	123.55	120.30
3	C	229	ARG	CD-NE-CZ	6.48	132.68	123.60
14	U	199	ARG	NE-CZ-NH2	6.48	123.54	120.30
14	U	751	ARG	NE-CZ-NH2	6.48	123.54	120.30
1	A	284	ARG	NE-CZ-NH2	6.47	123.54	120.30
18	Y	146	ARG	NE-CZ-NH2	6.47	123.54	120.30
15	V	470	ARG	NE-CZ-NH2	6.47	123.53	120.30
13	M	25	TYR	CB-CG-CD2	-6.46	117.12	121.00
11	K	93	ARG	NE-CZ-NH2	6.45	123.52	120.30
16	W	93	ARG	NE-CZ-NH2	6.44	123.52	120.30
6	F	364	ARG	NE-CZ-NH2	6.44	123.52	120.30
14	U	194	ARG	NE-CZ-NH2	6.43	123.52	120.30
2	B	363	ARG	NE-CZ-NH2	6.43	123.51	120.30
18	Y	267	ARG	NE-CZ-NH2	6.40	123.50	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
18	Y	83	ARG	NE-CZ-NH2	6.37	123.48	120.30
6	F	362	ARG	NE-CZ-NH2	6.35	123.47	120.30
3	C	57	ARG	NE-CZ-NH2	6.33	123.47	120.30
17	X	155	ARG	NE-CZ-NH2	6.31	123.46	120.30
12	L	89	ARG	NE-CZ-NH2	6.31	123.45	120.30
14	U	649	ARG	NE-CZ-NH2	6.31	123.45	120.30
23	d	342	TYR	CB-CG-CD2	-6.30	117.22	121.00
18	Y	32	ARG	NE-CZ-NH2	6.29	123.45	120.30
15	V	307	ARG	NE-CZ-NH2	6.29	123.45	120.30
16	W	123	ARG	NE-CZ-NH2	6.28	123.44	120.30
25	f	120	ARG	NE-CZ-NH2	6.28	123.44	120.30
16	W	289	ARG	NE-CZ-NH2	6.27	123.44	120.30
8	H	220	ARG	NE-CZ-NH2	6.26	123.43	120.30
6	F	311	LEU	CB-CG-CD2	6.23	121.60	111.00
2	B	278	ALA	CB-CA-C	6.21	119.41	110.10
20	a	178	ARG	NE-CZ-NH2	6.17	123.39	120.30
14	U	710	ARG	NE-CZ-NH2	6.16	123.38	120.30
25	f	673	ARG	NE-CZ-NH2	6.15	123.38	120.30
1	A	188	ARG	NE-CZ-NH2	6.09	123.35	120.30
12	L	157	ARG	NE-CZ-NH2	6.09	123.35	120.30
13	M	114	ARG	NE-CZ-NH2	6.08	123.34	120.30
15	V	96	ARG	NE-CZ-NH2	6.06	123.33	120.30
5	E	161	ARG	NE-CZ-NH2	6.00	123.30	120.30
18	Y	18	ARG	NE-CZ-NH2	6.00	123.30	120.30
25	f	80	ARG	NE-CZ-NH2	6.00	123.30	120.30
2	B	411	ARG	NE-CZ-NH2	5.99	123.30	120.30
3	C	375	ARG	NE-CZ-NH2	5.97	123.29	120.30
10	J	125	ARG	NE-CZ-NH2	5.97	123.29	120.30
20	a	330	ARG	NE-CZ-NH2	5.96	123.28	120.30
16	W	316	ARG	NE-CZ-NH2	5.96	123.28	120.30
15	V	314	ARG	NE-CZ-NH2	5.95	123.28	120.30
13	M	92	ARG	NE-CZ-NH2	5.94	123.27	120.30
17	X	87	ARG	NE-CZ-NH2	5.92	123.26	120.30
14	U	246	TYR	CB-CG-CD2	-5.91	117.45	121.00
19	Z	90	ARG	NE-CZ-NH2	5.91	123.26	120.30
4	D	287	ARG	NE-CZ-NH2	5.91	123.25	120.30
16	W	377	ARG	NE-CZ-NH2	5.90	123.25	120.30
19	Z	25	ARG	NE-CZ-NH2	5.90	123.25	120.30
13	M	129	ARG	NE-CZ-NH2	5.89	123.25	120.30
6	F	386	ARG	NE-CZ-NH2	5.88	123.24	120.30
3	C	232	ARG	NE-CZ-NH2	5.86	123.23	120.30
7	G	117	ARG	NE-CZ-NH2	5.86	123.23	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
17	X	137	TYR	CB-CG-CD2	-5.86	117.49	121.00
9	I	4	ARG	NE-CZ-NH2	5.84	123.22	120.30
19	Z	92	VAL	CG1-CB-CG2	-5.83	101.58	110.90
22	c	68	ARG	NE-CZ-NH2	5.83	123.21	120.30
2	B	268	ARG	NE-CZ-NH2	5.82	123.21	120.30
14	U	344	ARG	NE-CZ-NH2	5.82	123.21	120.30
15	V	294	ARG	NE-CZ-NH2	5.81	123.20	120.30
18	Y	385	ARG	NE-CZ-NH2	5.79	123.20	120.30
12	L	239	ARG	NE-CZ-NH2	5.79	123.19	120.30
10	J	72	ALA	C-N-CA	-5.78	107.24	121.70
19	Z	283	ARG	NE-CZ-NH2	5.78	123.19	120.30
2	B	249	ARG	NE-CZ-NH2	5.75	123.18	120.30
16	W	65	ARG	NE-CZ-NH2	5.75	123.18	120.30
17	X	337	ARG	NE-CZ-NH2	5.75	123.18	120.30
3	C	117	ARG	NE-CZ-NH2	5.75	123.17	120.30
16	W	408	ARG	NE-CZ-NH1	-5.75	117.43	120.30
11	K	20	ARG	NE-CZ-NH2	5.75	123.17	120.30
18	Y	300	ARG	NE-CZ-NH2	5.75	123.17	120.30
1	A	239	ARG	NE-CZ-NH1	-5.74	117.43	120.30
19	Z	34	ARG	NE-CZ-NH2	5.73	123.17	120.30
1	A	386	ARG	NE-CZ-NH2	5.72	123.16	120.30
4	D	329	ARG	NE-CZ-NH2	5.72	123.16	120.30
25	f	181	ARG	NE-CZ-NH2	5.72	123.16	120.30
15	V	201	ARG	NE-CZ-NH2	5.71	123.15	120.30
17	X	187	ARG	NE-CZ-NH2	5.70	123.15	120.30
12	L	96	ARG	NE-CZ-NH2	5.69	123.14	120.30
12	L	24	TYR	CB-CG-CD2	-5.69	117.59	121.00
14	U	559	ARG	NE-CZ-NH2	5.69	123.14	120.30
25	f	267	ARG	NE-CZ-NH2	5.68	123.14	120.30
7	G	228	ARG	NE-CZ-NH2	5.67	123.14	120.30
18	Y	159	ARG	NE-CZ-NH2	5.67	123.14	120.30
7	G	95	ARG	NE-CZ-NH2	5.66	123.13	120.30
17	X	233	TYR	CB-CG-CD2	-5.66	117.61	121.00
22	c	208	ARG	NE-CZ-NH2	5.65	123.13	120.30
3	C	201	ARG	NE-CZ-NH2	5.65	123.12	120.30
6	F	180	ARG	NE-CZ-NH2	5.61	123.10	120.30
16	W	201	ARG	NE-CZ-NH2	5.60	123.10	120.30
15	V	368	ARG	NE-CZ-NH2	5.60	123.10	120.30
16	W	408	ARG	NE-CZ-NH2	5.59	123.09	120.30
23	d	214	ARG	NE-CZ-NH2	5.56	123.08	120.30
7	G	72	ILE	C-N-CA	5.55	135.57	121.70
8	H	24	TYR	CB-CG-CD2	-5.55	117.67	121.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
18	Y	336	ARG	NE-CZ-NH2	5.54	123.07	120.30
15	V	258	TYR	CB-CG-CD2	-5.52	117.69	121.00
14	U	387	ARG	NE-CZ-NH2	5.51	123.06	120.30
3	C	49	ARG	NE-CZ-NH2	5.48	123.04	120.30
2	B	307	ARG	NE-CZ-NH2	5.48	123.04	120.30
17	X	132	ARG	NH1-CZ-NH2	-5.48	113.38	119.40
19	Z	88	ARG	NE-CZ-NH2	5.46	123.03	120.30
25	f	688	ARG	NE-CZ-NH2	5.45	123.02	120.30
21	b	17	ARG	NE-CZ-NH2	5.44	123.02	120.30
14	U	713	TYR	CB-CG-CD2	-5.43	117.74	121.00
11	K	53	ARG	NE-CZ-NH2	5.41	123.00	120.30
8	H	91	ARG	NE-CZ-NH1	-5.40	117.60	120.30
10	J	95	ARG	NE-CZ-NH2	5.40	123.00	120.30
4	D	43	ARG	NE-CZ-NH2	5.39	122.99	120.30
13	M	169	ARG	NE-CZ-NH2	5.38	122.99	120.30
14	U	490	ARG	NE-CZ-NH2	5.38	122.99	120.30
14	U	615	ARG	NE-CZ-NH2	5.38	122.99	120.30
20	a	339	ARG	NE-CZ-NH2	5.35	122.98	120.30
12	L	107	ARG	NE-CZ-NH2	5.35	122.97	120.30
25	f	79	ARG	NE-CZ-NH2	5.34	122.97	120.30
5	E	85	ARG	NE-CZ-NH2	5.33	122.96	120.30
3	C	258	ARG	NE-CZ-NH2	5.33	122.96	120.30
23	d	104	ARG	NE-CZ-NH2	5.32	122.96	120.30
19	Z	209	ARG	NE-CZ-NH2	5.30	122.95	120.30
15	V	150	ARG	NE-CZ-NH2	5.25	122.93	120.30
17	X	297	ARG	NE-CZ-NH2	5.25	122.93	120.30
9	I	23	TYR	CB-CG-CD2	-5.25	117.85	121.00
18	Y	23	ARG	NE-CZ-NH2	5.25	122.92	120.30
16	W	191	ARG	NE-CZ-NH2	5.23	122.92	120.30
15	V	408	ARG	NE-CZ-NH2	5.22	122.91	120.30
19	Z	91	ILE	CB-CA-C	-5.22	101.16	111.60
17	X	278	ARG	NE-CZ-NH2	5.22	122.91	120.30
3	C	310	ARG	NE-CZ-NH2	5.21	122.90	120.30
17	X	314	ARG	NE-CZ-NH2	5.20	122.90	120.30
18	Y	222	TYR	CB-CG-CD2	-5.20	117.88	121.00
15	V	92	ARG	NE-CZ-NH2	5.20	122.90	120.30
15	V	399	ARG	NE-CZ-NH2	5.20	122.90	120.30
14	U	474	ARG	NE-CZ-NH2	5.19	122.90	120.30
4	D	323	ARG	NE-CZ-NH2	5.19	122.89	120.30
18	Y	225	TYR	CB-CG-CD2	-5.18	117.89	121.00
12	L	193	ARG	NE-CZ-NH2	5.18	122.89	120.30
6	F	409	ARG	NE-CZ-NH2	5.18	122.89	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
12	L	67	ASP	N-CA-CB	5.17	119.91	110.60
19	Z	62	ASP	CB-CG-OD2	5.17	122.95	118.30
10	J	143	ARG	NE-CZ-NH2	5.16	122.88	120.30
5	E	281	ARG	NE-CZ-NH2	5.15	122.88	120.30
25	f	400	TYR	CB-CG-CD2	-5.15	117.91	121.00
7	G	11	ARG	NE-CZ-NH2	5.14	122.87	120.30
25	f	901	ARG	NE-CZ-NH2	5.14	122.87	120.30
14	U	600	ARG	NE-CZ-NH2	5.14	122.87	120.30
16	W	329	ARG	NE-CZ-NH2	5.13	122.87	120.30
16	W	142	ARG	NE-CZ-NH2	5.12	122.86	120.30
22	c	279	ASP	CB-CA-C	5.12	120.65	110.40
2	B	103	ARG	NE-CZ-NH2	5.12	122.86	120.30
18	Y	237	ARG	NE-CZ-NH2	5.12	122.86	120.30
15	V	416	ARG	NE-CZ-NH2	5.11	122.85	120.30
15	V	234	ARG	NE-CZ-NH2	5.09	122.85	120.30
17	X	388	PHE	CB-CG-CD2	-5.09	117.24	120.80
21	b	112	PHE	CB-CG-CD2	-5.09	117.24	120.80
13	M	158	TYR	CB-CG-CD2	-5.08	117.95	121.00
21	b	91	ARG	NE-CZ-NH2	5.08	122.84	120.30
16	W	55	ARG	NE-CZ-NH1	-5.08	117.76	120.30
25	f	300	ARG	NE-CZ-NH2	5.07	122.83	120.30
7	G	96	TYR	CB-CG-CD2	-5.05	117.97	121.00
1	A	339	ARG	NE-CZ-NH2	5.04	122.82	120.30
12	L	175	HIS	CB-CA-C	5.04	120.47	110.40
6	F	269	ARG	NE-CZ-NH2	5.03	122.81	120.30
10	J	21	TYR	CB-CG-CD2	-5.02	117.99	121.00
14	U	751	ARG	NE-CZ-NH1	-5.02	117.79	120.30
3	C	334	ARG	NE-CZ-NH2	5.02	122.81	120.30
25	f	740	ARG	NE-CZ-NH2	5.01	122.80	120.30
22	c	255	TYR	CB-CG-CD2	-5.00	118.00	121.00

There are no chirality outliers.

All (48) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	147	TYR	Sidechain
1	A	239	ARG	Sidechain
1	A	258	ARG	Sidechain
1	A	284	ARG	Sidechain
1	A	323	ARG	Sidechain
1	A	333	ARG	Sidechain
1	A	351	ARG	Sidechain

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Mol	Chain	Res	Type	Group
2	B	303	ARG	Sidechain
2	B	322	ARG	Sidechain
2	B	53	THR	Peptide
3	C	113	ARG	Sidechain
3	C	23	TYR	Sidechain
4	D	245	ARG	Sidechain
4	D	248	ARG	Sidechain
4	D	274	ARG	Sidechain
4	D	329	ARG	Sidechain
4	D	363	TYR	Sidechain
4	D	41	TYR	Sidechain
5	E	251	ARG	Sidechain
6	F	171	ARG	Sidechain
6	F	295	ARG	Sidechain
6	F	308	ARG	Sidechain
6	F	371	ARG	Sidechain
6	F	409	ARG	Sidechain
8	H	101	TYR	Sidechain
9	I	136	TYR	Sidechain
12	L	126	ARG	Sidechain
12	L	24	TYR	Sidechain
14	U	140	ARG	Sidechain
14	U	49	TYR	Sidechain
14	U	590	TYR	Sidechain
15	V	288	TYR	Sidechain
15	V	62	HIS	Sidechain
16	W	111	TYR	Sidechain
16	W	324	TYR	Sidechain
18	Y	101	ARG	Sidechain
20	a	289	ARG	Sidechain
21	b	22	LEU	Peptide
21	b	25	ARG	Sidechain
22	c	282	ARG	Sidechain
22	c	61	PHE	Sidechain
22	c	65	TYR	Sidechain
23	d	228	HIS	Sidechain
25	f	103	TYR	Sidechain
25	f	110	TYR	Sidechain
25	f	588	ARG	Sidechain
25	f	71	TYR	Sidechain
25	f	906	TYR	Sidechain

5.2 Too-close contacts (i)

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

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	399/433 (92%)	343 (86%)	46 (12%)	10 (2%)	4 29
2	B	365/440 (83%)	311 (85%)	40 (11%)	14 (4%)	2 22
3	C	384/406 (95%)	326 (85%)	42 (11%)	16 (4%)	2 20
4	D	348/418 (83%)	308 (88%)	31 (9%)	9 (3%)	4 28
5	E	364/389 (94%)	312 (86%)	41 (11%)	11 (3%)	3 26
6	F	361/439 (82%)	311 (86%)	36 (10%)	14 (4%)	2 21
7	G	237/246 (96%)	216 (91%)	17 (7%)	4 (2%)	7 37
8	H	228/234 (97%)	210 (92%)	17 (8%)	1 (0%)	30 63
9	I	246/261 (94%)	230 (94%)	15 (6%)	1 (0%)	30 63
10	J	237/248 (96%)	208 (88%)	19 (8%)	10 (4%)	2 20
11	K	224/241 (93%)	207 (92%)	15 (7%)	2 (1%)	14 48
12	L	236/263 (90%)	224 (95%)	11 (5%)	1 (0%)	30 63
13	M	238/255 (93%)	212 (89%)	17 (7%)	9 (4%)	2 22
14	U	829/953 (87%)	753 (91%)	66 (8%)	10 (1%)	11 43
15	V	435/534 (82%)	370 (85%)	53 (12%)	12 (3%)	4 27
16	W	436/456 (96%)	417 (96%)	18 (4%)	1 (0%)	44 73
17	X	376/422 (89%)	349 (93%)	21 (6%)	6 (2%)	8 38
18	Y	378/389 (97%)	363 (96%)	14 (4%)	1 (0%)	37 67
19	Z	284/324 (88%)	258 (91%)	20 (7%)	6 (2%)	5 33
20	a	371/376 (99%)	323 (87%)	35 (9%)	13 (4%)	3 24
21	b	189/377 (50%)	164 (87%)	21 (11%)	4 (2%)	5 33

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
22	c	266/424 (63%)	233 (88%)	26 (10%)	7 (3%)	4 28
23	d	267/350 (76%)	253 (95%)	9 (3%)	5 (2%)	6 35
24	e	38/70 (54%)	34 (90%)	4 (10%)	0	100 100
25	f	838/908 (92%)	764 (91%)	65 (8%)	9 (1%)	12 45
26	g	93/601 (16%)	86 (92%)	5 (5%)	2 (2%)	5 32
27	u	170/289 (59%)	140 (82%)	23 (14%)	7 (4%)	2 20
All	All	8837/10746 (82%)	7925 (90%)	727 (8%)	185 (2%)	8 33

All (185) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	176	VAL
2	B	180	PRO
2	B	278	ALA
2	B	385	MET
3	C	103	ILE
3	C	220	VAL
3	C	242	ALA
3	C	402	LYS
3	C	405	TRP
4	D	354	LEU
4	D	390	ASN
5	E	73	ALA
5	E	112	PRO
5	E	360	ASP
6	F	279	ALA
6	F	304	ARG
6	F	322	PRO
6	F	323	ASN
6	F	324	THR
6	F	339	ASP
7	G	29	PHE
10	J	71	MET
15	V	196	SER
15	V	496	PHE
17	X	393	VAL
20	a	69	HIS
20	a	143	ASN
21	b	186	SER
22	c	279	ASP

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Mol	Chain	Res	Type
25	f	72	ARG
25	f	850	VAL
25	f	853	VAL
26	g	170	GLN
27	u	136	GLU
27	u	282	VAL
1	A	378	PRO
2	B	57	GLN
2	B	92	GLN
2	B	157	HIS
2	B	252	GLY
2	B	263	GLY
3	C	84	LYS
3	C	85	VAL
3	C	122	THR
3	C	131	VAL
3	C	297	ARG
3	C	404	LEU
4	D	407	ILE
5	E	85	ARG
5	E	92	LEU
5	E	94	PRO
6	F	89	LEU
10	J	4	ASP
10	J	181	ILE
10	J	183	THR
12	L	139	ASP
13	M	60	GLU
13	M	167	LYS
13	M	243	LEU
14	U	86	ASP
14	U	171	ASN
15	V	56	ALA
15	V	78	HIS
15	V	224	LEU
16	W	40	LEU
17	X	45	VAL
19	Z	66	SER
20	a	187	ASP
20	a	213	PHE
21	b	180	ALA
22	c	138	GLU

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Mol	Chain	Res	Type
22	c	262	GLU
23	d	131	THR
23	d	332	SER
25	f	90	THR
25	f	809	ILE
27	u	234	ARG
27	u	248	VAL
27	u	288	SER
1	A	42	SER
1	A	110	LYS
2	B	78	PHE
2	B	371	ARG
2	B	432	GLU
3	C	81	ASP
3	C	138	MET
4	D	156	SER
4	D	158	GLN
4	D	316	THR
4	D	317	LEU
5	E	74	THR
5	E	109	ARG
6	F	231	THR
6	F	258	GLN
6	F	343	LEU
8	H	122	THR
10	J	201	SER
13	M	24	GLU
13	M	201	HIS
13	M	221	ASN
14	U	42	VAL
14	U	55	ARG
14	U	88	PHE
14	U	89	ASN
15	V	264	TYR
17	X	394	ASP
19	Z	133	LEU
19	Z	239	ASP
20	a	144	ASN
20	a	149	THR
22	c	215	LYS
25	f	104	GLY
25	f	852	VAL

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Mol	Chain	Res	Type
26	g	168	ASN
1	A	69	ASP
1	A	80	LEU
1	A	139	ARG
1	A	293	ASN
3	C	83	LYS
3	C	267	SER
3	C	400	SER
4	D	197	ASP
5	E	84	ARG
5	E	116	ASP
5	E	189	SER
6	F	180	ARG
6	F	245	LYS
6	F	321	GLN
10	J	3	TYR
10	J	67	ASP
11	K	228	MET
14	U	794	ASP
15	V	245	ASP
20	a	49	CYS
20	a	75	SER
20	a	130	VAL
20	a	329	LYS
21	b	79	GLN
23	d	126	LEU
23	d	326	GLU
25	f	493	ASN
1	A	36	TYR
2	B	98	LYS
2	B	434	THR
7	G	145	GLU
7	G	146	GLU
10	J	52	LYS
10	J	197	GLU
11	K	207	GLU
13	M	17	ASP
13	M	55	SER
14	U	240	ASP
15	V	84	LYS
15	V	267	ALA
15	V	272	SER

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Mol	Chain	Res	Type
17	X	222	GLU
17	X	418	ALA
19	Z	145	HIS
20	a	50	PHE
20	a	212	ASN
22	c	174	PRO
27	u	120	PRO
27	u	139	ASN
6	F	341	ALA
7	G	35	GLY
10	J	239	ASN
14	U	416	GLU
14	U	808	PRO
17	X	101	ALA
21	b	149	ASN
23	d	294	ASN
1	A	152	PRO
1	A	310	ASP
20	a	17	GLY
19	Z	240	VAL
22	c	109	VAL
25	f	339	ILE
4	D	406	VAL
9	I	52	ILE
22	c	182	GLY
15	V	35	VAL
15	V	351	PRO
18	Y	65	ILE
19	Z	99	PRO
13	M	228	PRO

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	343/372 (92%)	322 (94%)	21 (6%)	15 44

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
2	B	328/385 (85%)	309 (94%)	19 (6%)	17 46
3	C	338/352 (96%)	312 (92%)	26 (8%)	10 36
4	D	306/366 (84%)	292 (95%)	14 (5%)	23 52
5	E	324/341 (95%)	307 (95%)	17 (5%)	19 49
6	F	315/379 (83%)	292 (93%)	23 (7%)	11 38
7	G	192/210 (91%)	188 (98%)	4 (2%)	48 71
8	H	168/191 (88%)	166 (99%)	2 (1%)	67 82
9	I	191/221 (86%)	176 (92%)	15 (8%)	10 35
10	J	152/211 (72%)	145 (95%)	7 (5%)	23 52
11	K	187/203 (92%)	177 (95%)	10 (5%)	19 48
12	L	198/224 (88%)	192 (97%)	6 (3%)	36 63
13	M	192/212 (91%)	182 (95%)	10 (5%)	19 49
14	U	713/816 (87%)	687 (96%)	26 (4%)	30 59
15	V	379/460 (82%)	362 (96%)	17 (4%)	23 53
16	W	403/416 (97%)	396 (98%)	7 (2%)	56 75
17	X	325/362 (90%)	314 (97%)	11 (3%)	32 60
18	Y	335/344 (97%)	323 (96%)	12 (4%)	30 59
19	Z	257/295 (87%)	244 (95%)	13 (5%)	20 49
20	a	333/336 (99%)	313 (94%)	20 (6%)	16 45
21	b	167/312 (54%)	158 (95%)	9 (5%)	18 48
22	c	241/359 (67%)	225 (93%)	16 (7%)	14 42
23	d	237/294 (81%)	231 (98%)	6 (2%)	42 66
24	e	38/63 (60%)	37 (97%)	1 (3%)	41 65
25	f	709/763 (93%)	679 (96%)	30 (4%)	25 54
26	g	85/527 (16%)	82 (96%)	3 (4%)	31 60
27	u	156/253 (62%)	141 (90%)	15 (10%)	7 29
All	All	7612/9267 (82%)	7252 (95%)	360 (5%)	24 51

All (360) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	27	GLU
1	A	46	LYS

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Mol	Chain	Res	Type
1	A	88	GLN
1	A	97	ARG
1	A	100	LYS
1	A	103	ASN
1	A	108	ASP
1	A	116	LYS
1	A	143	ASP
1	A	169	LYS
1	A	175	SER
1	A	214	LEU
1	A	232	ARG
1	A	234	ASP
1	A	239	ARG
1	A	248	LYS
1	A	365	GLU
1	A	376	LEU
1	A	403	ILE
1	A	420	TYR
1	A	422	LYS
2	B	51	LEU
2	B	56	THR
2	B	57	GLN
2	B	74	MET
2	B	76	GLU
2	B	103	ARG
2	B	173	VAL
2	B	181	GLN
2	B	187	ILE
2	B	201	VAL
2	B	212	GLU
2	B	258	LYS
2	B	304	GLU
2	B	317	ASP
2	B	339	PRO
2	B	342	ILE
2	B	343	ARG
2	B	380	LEU
2	B	417	GLU
3	C	35	VAL
3	C	37	ASP
3	C	81	ASP
3	C	100	ASP

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Mol	Chain	Res	Type
3	C	106	ASN
3	C	134	LEU
3	C	170	LYS
3	C	199	LEU
3	C	206	HIS
3	C	207	THR
3	C	208	ASP
3	C	209	CYS
3	C	221	GLN
3	C	222	LYS
3	C	226	GLU
3	C	229	ARG
3	C	258	ARG
3	C	287	LYS
3	C	295	THR
3	C	313	ARG
3	C	326	LEU
3	C	389	LYS
3	C	403	LYS
3	C	404	LEU
3	C	405	TRP
3	C	406	LYS
4	D	81	ARG
4	D	127	ASN
4	D	158	GLN
4	D	188	PHE
4	D	189	GLU
4	D	200	ARG
4	D	214	MET
4	D	227	PHE
4	D	248	ARG
4	D	252	ARG
4	D	266	GLU
4	D	299	PHE
4	D	384	MET
4	D	390	ASN
5	E	15	LYS
5	E	50	LEU
5	E	63	GLN
5	E	67	GLU
5	E	110	TYR
5	E	133	SER

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Mol	Chain	Res	Type
5	E	157	GLU
5	E	206	LYS
5	E	254	GLN
5	E	255	ARG
5	E	302	ASP
5	E	322	LYS
5	E	378	LYS
5	E	380	LEU
5	E	385	ASP
5	E	386	TYR
5	E	387	LYS
6	F	47	LEU
6	F	53	LYS
6	F	74	LYS
6	F	90	VAL
6	F	141	ASP
6	F	144	LYS
6	F	161	LEU
6	F	168	TYR
6	F	210	GLU
6	F	221	LYS
6	F	236	LEU
6	F	250	LYS
6	F	251	LEU
6	F	306	VAL
6	F	318	ASP
6	F	320	PHE
6	F	322	PRO
6	F	335	VAL
6	F	349	ASP
6	F	351	LYS
6	F	434	ASN
6	F	437	TYR
6	F	438	TYR
7	G	66	VAL
7	G	68	HIS
7	G	72	ILE
7	G	160	TYR
8	H	163	HIS
8	H	219	ARG
9	I	6	ASP
9	I	9	THR

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Mol	Chain	Res	Type
9	I	35	LEU
9	I	38	LEU
9	I	45	LEU
9	I	50	ARG
9	I	56	LEU
9	I	61	PHE
9	I	121	TYR
9	I	136	TYR
9	I	164	ILE
9	I	187	LYS
9	I	198	ASN
9	I	203	VAL
9	I	223	THR
10	J	36	ARG
10	J	43	LEU
10	J	68	ASN
10	J	69	VAL
10	J	86	ARG
10	J	146	GLN
10	J	148	ASP
11	K	50	VAL
11	K	60	GLU
11	K	67	ILE
11	K	78	MET
11	K	153	LEU
11	K	157	ASP
11	K	161	THR
11	K	206	MET
11	K	229	PHE
11	K	233	GLU
12	L	46	LEU
12	L	47	VAL
12	L	138	ASP
12	L	153	TYR
12	L	185	ASN
12	L	196	ARG
13	M	59	GLU
13	M	63	ASN
13	M	97	ASN
13	M	99	ARG
13	M	136	MET
13	M	158	TYR

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Mol	Chain	Res	Type
13	M	165	ILE
13	M	221	ASN
13	M	229	LYS
13	M	234	GLU
14	U	18	GLN
14	U	25	HIS
14	U	26	LYS
14	U	59	PHE
14	U	69	TYR
14	U	89	ASN
14	U	98	GLU
14	U	105	ILE
14	U	139	GLN
14	U	229	VAL
14	U	231	ASP
14	U	247	GLN
14	U	248	ILE
14	U	254	GLU
14	U	342	LEU
14	U	357	LYS
14	U	366	HIS
14	U	437	TYR
14	U	463	ASN
14	U	524	LYS
14	U	602	LEU
14	U	694	ILE
14	U	751	ARG
14	U	802	TYR
14	U	836	THR
14	U	880	ASN
15	V	65	ARG
15	V	144	ASP
15	V	182	LYS
15	V	194	LYS
15	V	214	HIS
15	V	230	PHE
15	V	231	LEU
15	V	234	ARG
15	V	249	THR
15	V	263	LEU
15	V	292	THR
15	V	301	GLU

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Mol	Chain	Res	Type
15	V	309	MET
15	V	361	PHE
15	V	367	VAL
15	V	400	HIS
15	V	440	LYS
16	W	17	GLU
16	W	70	VAL
16	W	280	ASP
16	W	297	GLU
16	W	346	GLU
16	W	377	ARG
16	W	387	ASP
17	X	118	LYS
17	X	153	LEU
17	X	173	GLU
17	X	210	LEU
17	X	231	TYR
17	X	234	GLU
17	X	295	LYS
17	X	297	ARG
17	X	377	ILE
17	X	388	PHE
17	X	393	VAL
18	Y	23	ARG
18	Y	70	LEU
18	Y	83	ARG
18	Y	100	ILE
18	Y	101	ARG
18	Y	143	TYR
18	Y	173	ASP
18	Y	299	MET
18	Y	314	LEU
18	Y	374	ASP
18	Y	382	LYS
18	Y	388	ASN
19	Z	52	ASN
19	Z	77	ASN
19	Z	104	ASN
19	Z	106	ILE
19	Z	118	ASN
19	Z	121	LEU
19	Z	179	ILE

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Mol	Chain	Res	Type
19	Z	181	ASP
19	Z	189	GLN
19	Z	225	GLN
19	Z	228	TYR
19	Z	229	GLN
19	Z	256	GLN
20	a	21	VAL
20	a	24	ARG
20	a	34	TRP
20	a	38	THR
20	a	54	ASP
20	a	127	ASP
20	a	136	GLU
20	a	137	ASP
20	a	139	GLU
20	a	187	ASP
20	a	188	LEU
20	a	195	GLU
20	a	211	PHE
20	a	272	ILE
20	a	276	CYS
20	a	290	GLN
20	a	330	ARG
20	a	339	ARG
20	a	350	LYS
20	a	357	CYS
21	b	7	MET
21	b	14	GLU
21	b	24	THR
21	b	51	LEU
21	b	94	HIS
21	b	118	GLU
21	b	135	LYS
21	b	145	GLU
21	b	184	ILE
22	c	54	MET
22	c	69	VAL
22	c	102	THR
22	c	104	ARG
22	c	107	MET
22	c	109	VAL
22	c	125	VAL

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Mol	Chain	Res	Type
22	c	136	LEU
22	c	148	ILE
22	c	177	THR
22	c	192	LEU
22	c	205	ILE
22	c	215	LYS
22	c	220	LEU
22	c	256	ASN
22	c	277	LYS
23	d	198	PHE
23	d	211	GLU
23	d	237	MET
23	d	260	ILE
23	d	299	MET
23	d	324	LYS
24	e	56	LEU
25	f	44	GLU
25	f	51	GLN
25	f	60	VAL
25	f	65	GLU
25	f	108	GLU
25	f	143	ARG
25	f	177	GLU
25	f	215	ASP
25	f	217	LEU
25	f	226	TYR
25	f	229	VAL
25	f	275	MET
25	f	300	ARG
25	f	319	GLU
25	f	347	ASP
25	f	433	LEU
25	f	439	TYR
25	f	463	LEU
25	f	471	LEU
25	f	483	PHE
25	f	512	MET
25	f	535	THR
25	f	552	ASP
25	f	583	VAL
25	f	787	LEU
25	f	806	VAL

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Mol	Chain	Res	Type
25	f	829	MET
25	f	850	VAL
25	f	855	GLN
25	f	860	LYS
26	g	154	MET
26	g	166	ARG
26	g	169	PHE
27	u	119	ILE
27	u	165	LEU
27	u	167	ILE
27	u	173	GLN
27	u	182	PHE
27	u	219	GLU
27	u	221	THR
27	u	224	ASP
27	u	240	ASN
27	u	261	SER
27	u	263	PHE
27	u	270	VAL
27	u	275	MET
27	u	288	SER
27	u	289	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (37) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	88	GLN
1	A	247	GLN
2	B	55	HIS
2	B	181	GLN
3	C	221	GLN
3	C	278	ASN
4	D	221	HIS
5	E	75	ASN
5	E	194	ASN
5	E	254	GLN
5	E	262	ASN
5	E	345	ASN
5	E	359	HIS
6	F	436	GLN
7	G	33	ASN
12	L	4	ASN

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Mol	Chain	Res	Type
13	M	97	ASN
13	M	120	HIS
14	U	89	ASN
14	U	697	GLN
17	X	44	GLN
18	Y	154	ASN
18	Y	388	ASN
21	b	142	ASN
22	c	92	GLN
22	c	128	ASN
22	c	131	GLN
22	c	176	GLN
22	c	183	HIS
25	f	198	HIS
25	f	855	GLN
26	g	135	GLN
27	u	144	HIS
27	u	199	ASN
27	u	240	ASN
27	u	276	ASN
27	u	289	HIS

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry

Of 10 ligands modelled in this entry, 4 are monoatomic - leaving 6 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The

Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
29	ADP	A	501	-	24,29,29	1.33	3 (12%)	29,45,45	1.40	5 (17%)
29	ADP	B	501	-	24,29,29	1.34	2 (8%)	29,45,45	1.32	2 (6%)
29	ADP	D	501	-	24,29,29	0.74	0	29,45,45	0.81	1 (3%)
31	ATP	E	501	30	28,33,33	0.82	1 (3%)	34,52,52	0.85	1 (2%)
29	ADP	C	501	30	24,29,29	1.38	4 (16%)	29,45,45	1.41	4 (13%)
31	ATP	F	501	30	28,33,33	2.02	4 (14%)	34,52,52	1.29	2 (5%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
29	ADP	A	501	-	-	2/12/32/32	0/3/3/3
29	ADP	B	501	-	-	0/12/32/32	0/3/3/3
29	ADP	D	501	-	-	2/12/32/32	0/3/3/3
31	ATP	E	501	30	-	2/18/38/38	0/3/3/3
29	ADP	C	501	30	-	0/12/32/32	0/3/3/3
31	ATP	F	501	30	-	4/18/38/38	0/3/3/3

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
31	F	501	ATP	PA-O3A	-6.31	1.52	1.59
31	F	501	ATP	PB-O3A	-4.68	1.54	1.59
31	F	501	ATP	PB-O3B	-4.29	1.54	1.59
29	A	501	ADP	PA-O3A	-3.69	1.55	1.59
29	B	501	ADP	PA-O3A	-3.36	1.55	1.59
29	C	501	ADP	PA-O3A	-3.15	1.56	1.59
29	C	501	ADP	O4'-C1'	2.76	1.44	1.40
31	E	501	ATP	C1'-N9	-2.52	1.43	1.49
29	B	501	ADP	O4'-C1'	2.40	1.44	1.40
29	A	501	ADP	C4-N3	-2.26	1.32	1.35
31	F	501	ATP	PG-O2G	-2.21	1.46	1.54
29	A	501	ADP	C1'-N9	-2.07	1.44	1.49

Continued on next page...

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
29	C	501	ADP	PB-O3B	-2.05	1.47	1.54
29	C	501	ADP	PB-O2B	-2.01	1.47	1.54

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
29	C	501	ADP	C4-C5-N7	4.83	114.44	109.34
29	B	501	ADP	C4-C5-N7	4.54	114.13	109.34
31	F	501	ATP	C4-C5-N7	4.49	114.08	109.34
29	A	501	ADP	C4-C5-N7	4.06	113.62	109.34
29	A	501	ADP	O2A-PA-O3A	3.68	117.21	107.27
31	F	501	ATP	O2B-PB-O3A	3.06	115.55	107.27
29	C	501	ADP	O2B-PB-O1B	-2.90	99.54	110.83
29	B	501	ADP	O2A-PA-O3A	2.63	114.39	107.27
29	C	501	ADP	O3B-PB-O3A	2.56	113.22	104.64
29	D	501	ADP	C5-C6-N6	2.24	123.73	120.31
29	A	501	ADP	C5-C6-N6	2.08	123.48	120.31
31	E	501	ATP	C5-C6-N6	2.08	123.48	120.31
29	A	501	ADP	O3B-PB-O3A	2.08	111.61	104.64
29	C	501	ADP	O2B-PB-O3A	2.02	111.41	104.64
29	A	501	ADP	N6-C6-N1	-2.00	114.05	118.33

There are no chirality outliers.

All (10) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
29	A	501	ADP	C5'-O5'-PA-O2A
29	A	501	ADP	C5'-O5'-PA-O3A
29	D	501	ADP	C5'-O5'-PA-O1A
31	F	501	ATP	PG-O3B-PB-O2B
29	D	501	ADP	C4'-C5'-O5'-PA
31	E	501	ATP	PG-O3B-PB-O2B
31	F	501	ATP	PG-O3B-PB-O1B
31	F	501	ATP	PA-O3A-PB-O2B
31	E	501	ATP	PG-O3B-PB-O1B
31	F	501	ATP	PA-O3A-PB-O1B

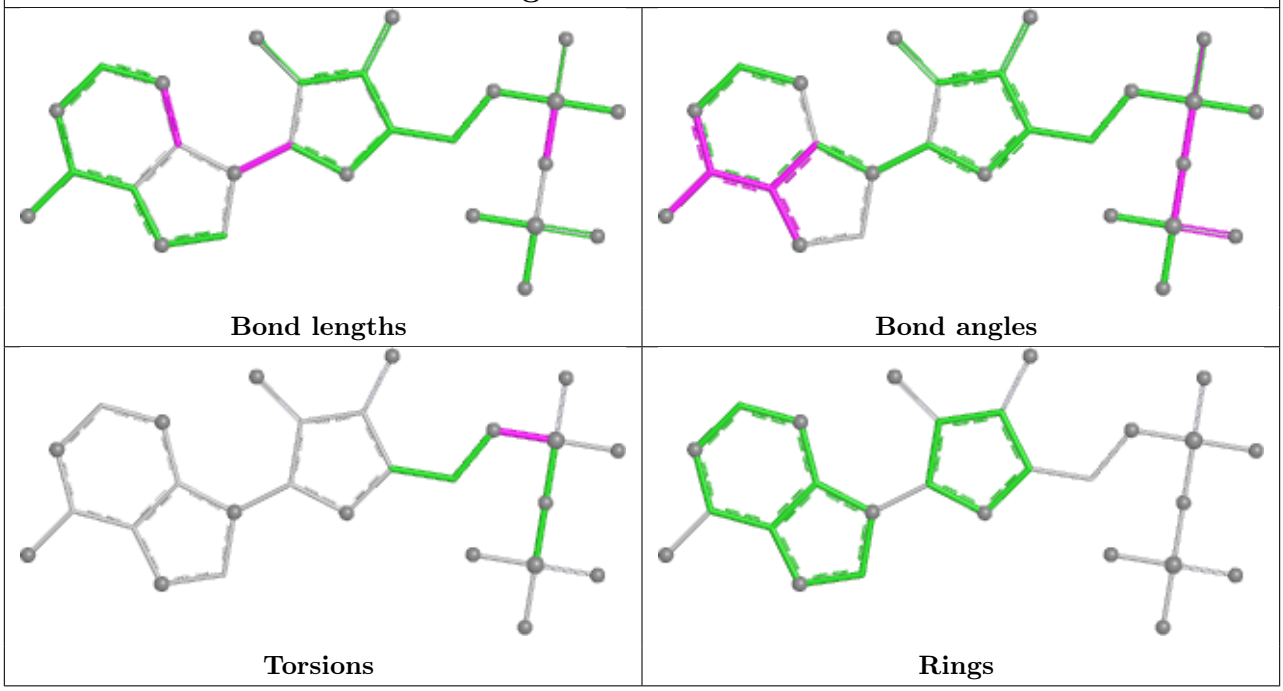
There are no ring outliers.

No monomer is involved in short contacts.

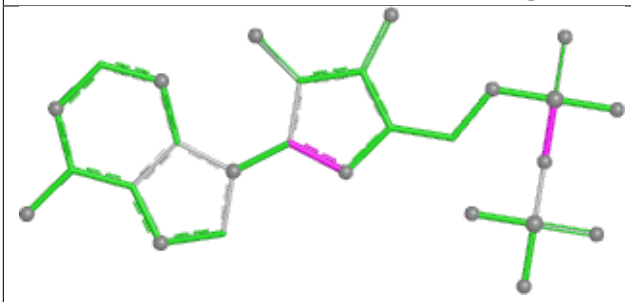
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In

addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

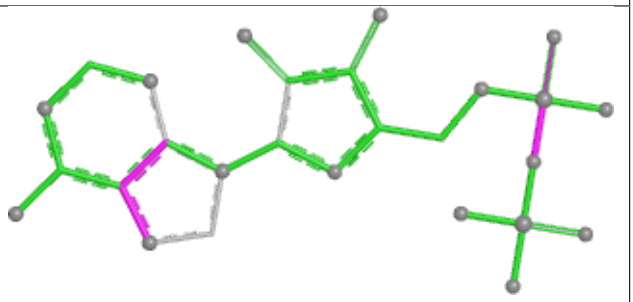
Ligand ADP A 501



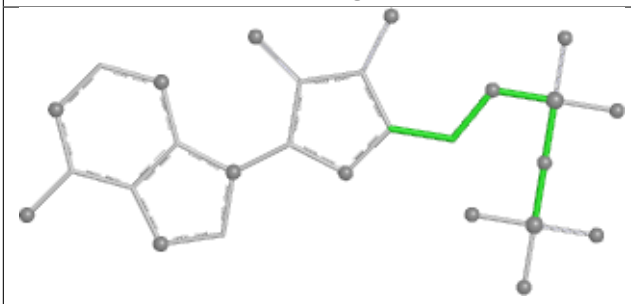
Ligand ADP B 501



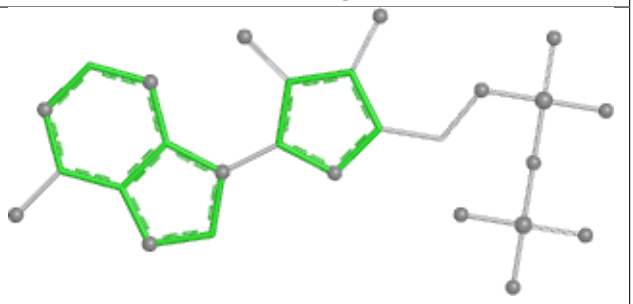
Bond lengths



Bond angles

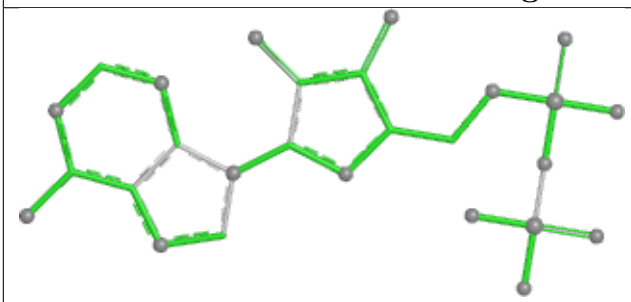


Torsions

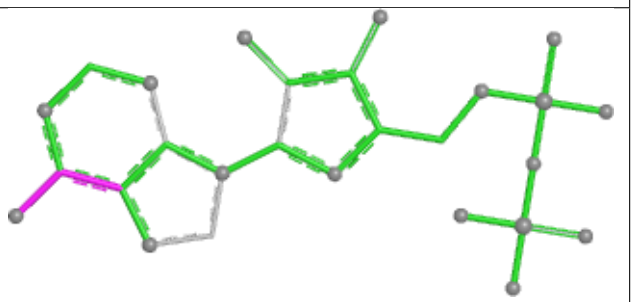


Rings

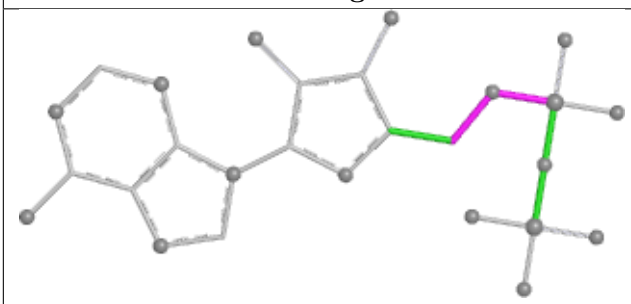
Ligand ADP D 501



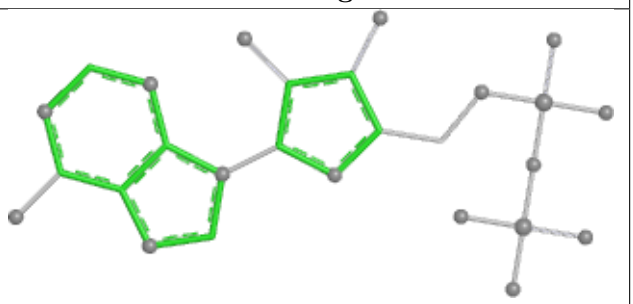
Bond lengths



Bond angles

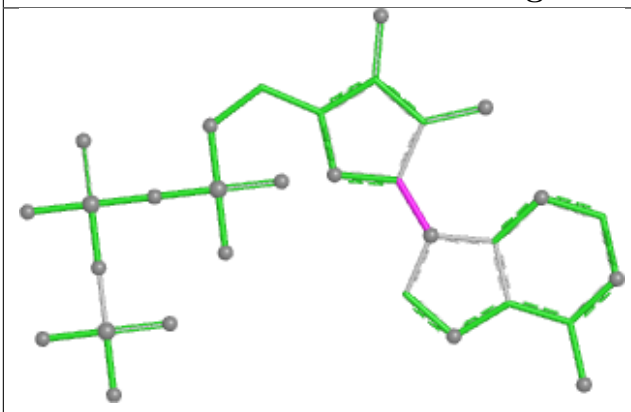


Torsions

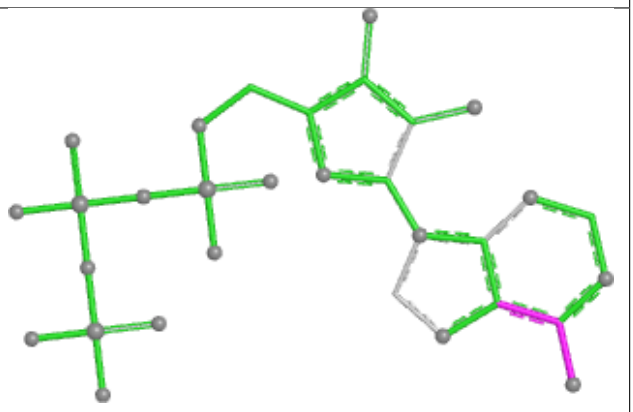


Rings

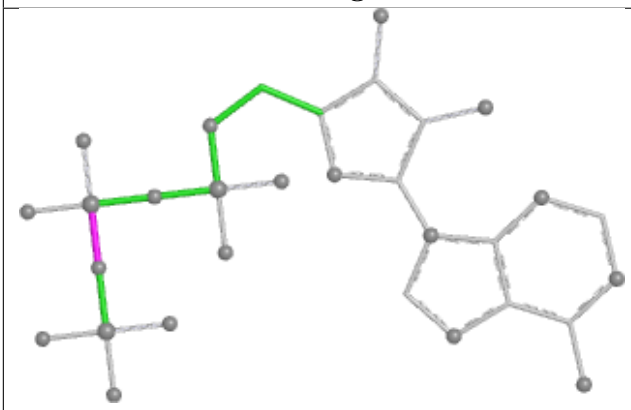
Ligand ATP E 501



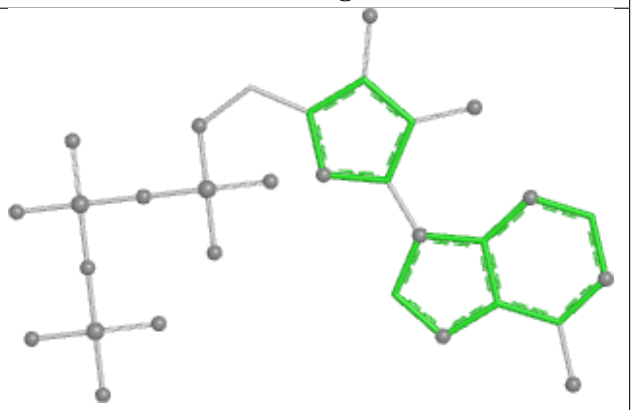
Bond lengths



Bond angles

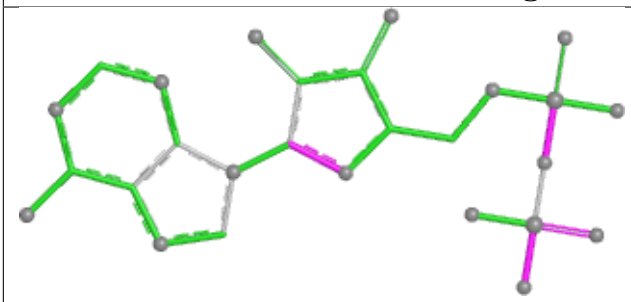


Torsions

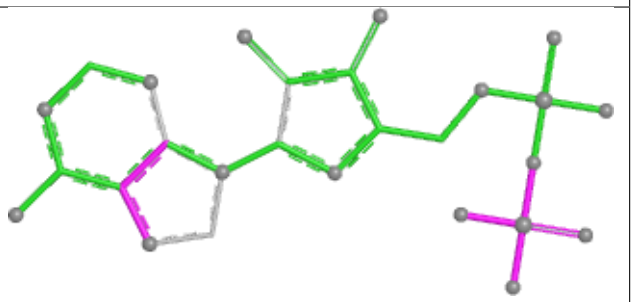


Rings

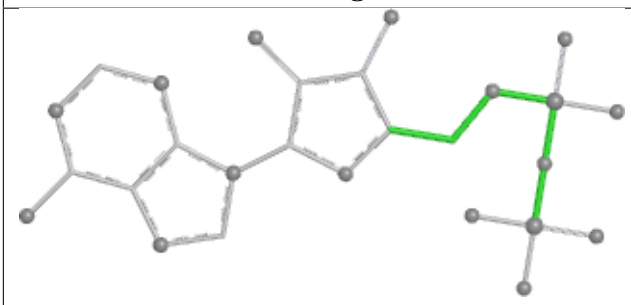
Ligand ADP C 501



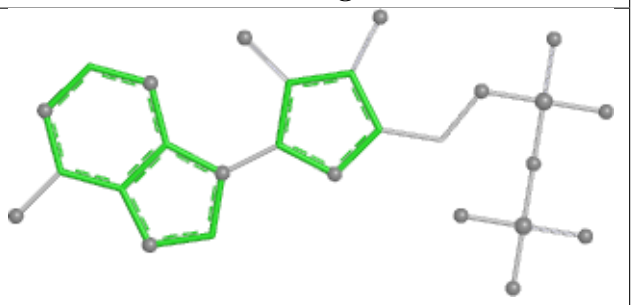
Bond lengths



Bond angles

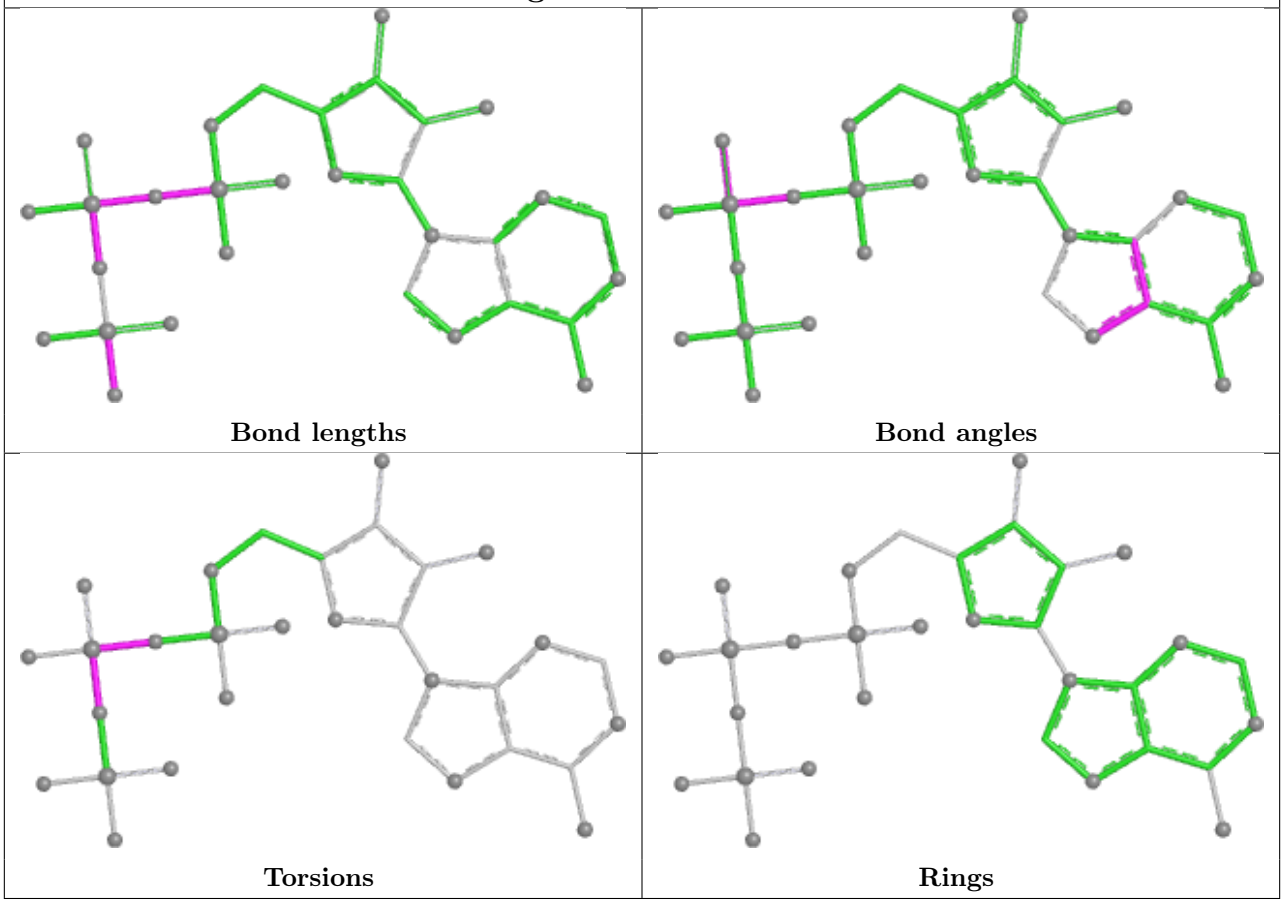


Torsions



Rings

Ligand ATP F 501



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.

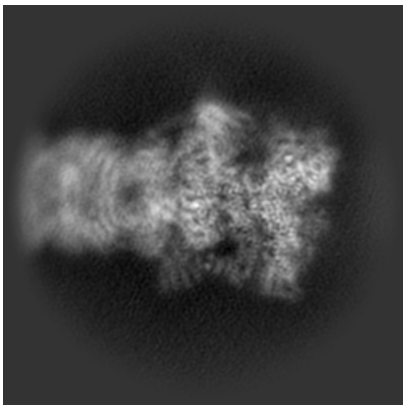
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-47724. These allow visual inspection of the internal detail of the map and identification of artifacts.

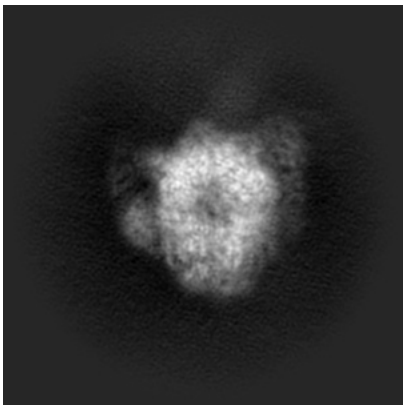
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

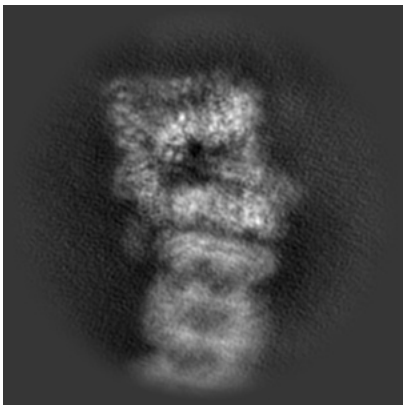
6.1.1 Primary map



X

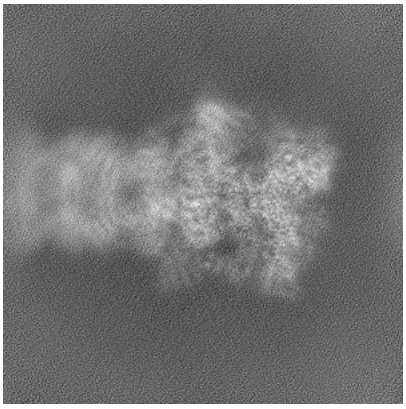


Y

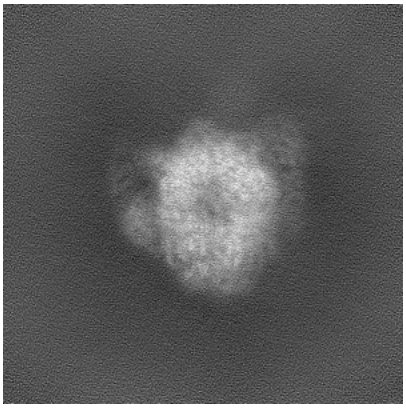


Z

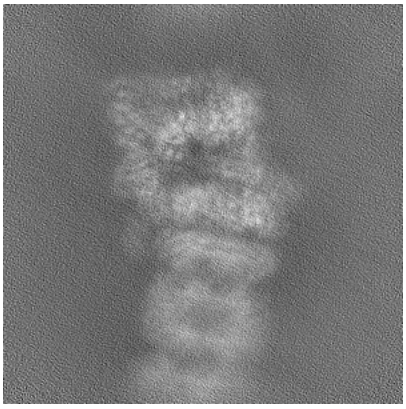
6.1.2 Raw map



X



Y

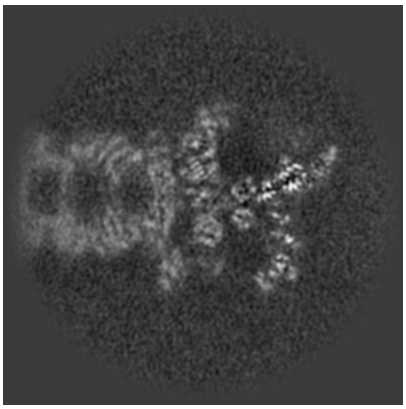


Z

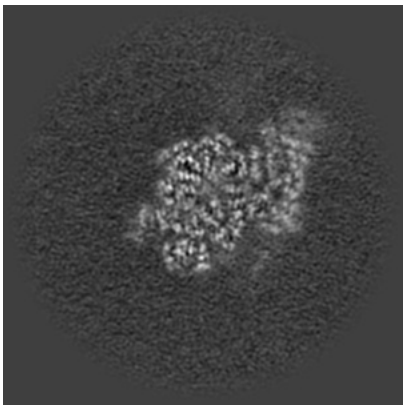
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

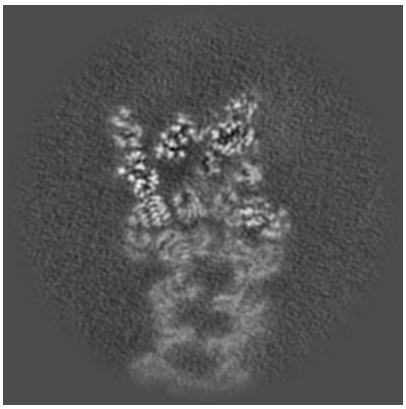
6.2.1 Primary map



X Index: 170

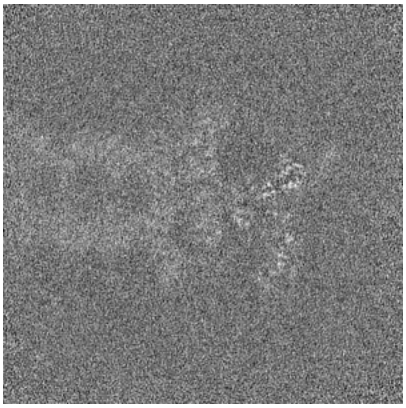


Y Index: 170

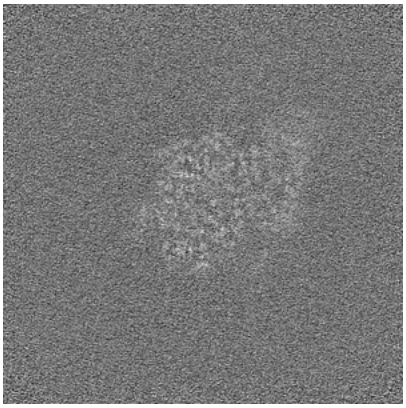


Z Index: 170

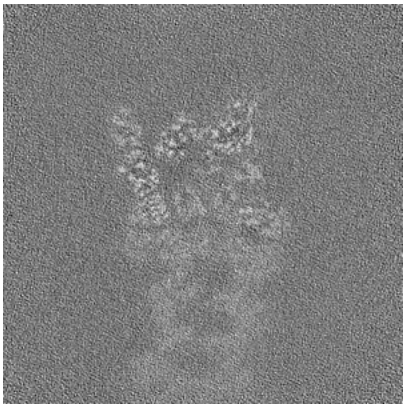
6.2.2 Raw map



X Index: 170



Y Index: 170

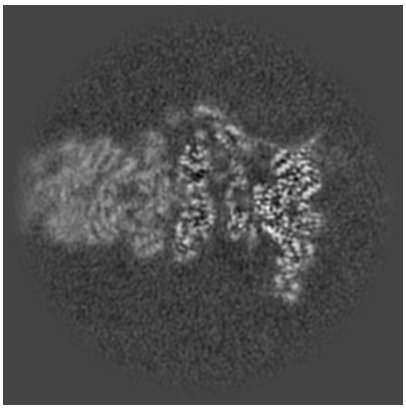


Z Index: 170

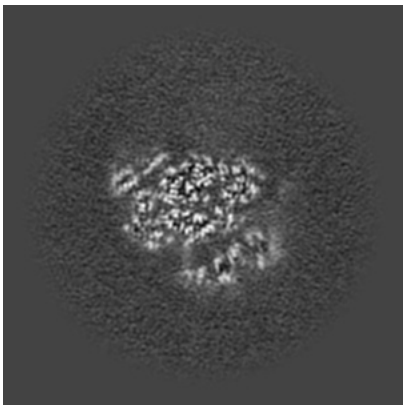
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

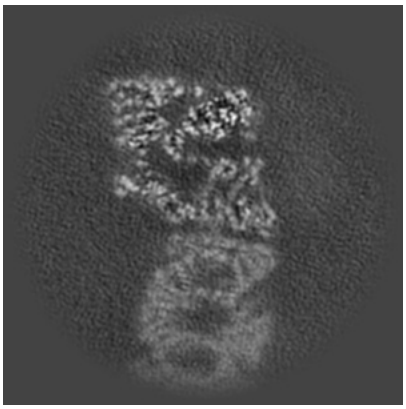
6.3.1 Primary map



X Index: 198

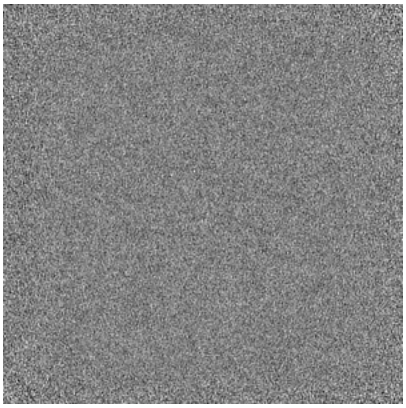


Y Index: 234

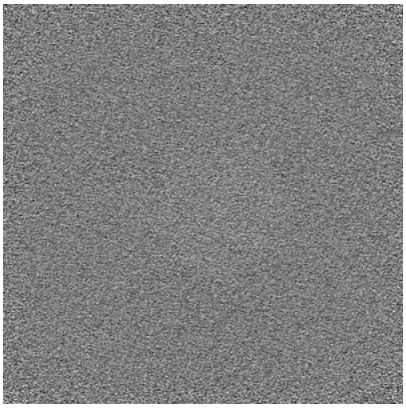


Z Index: 193

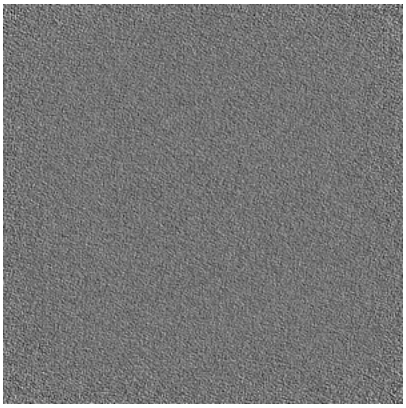
6.3.2 Raw map



X Index: 0



Y Index: 0

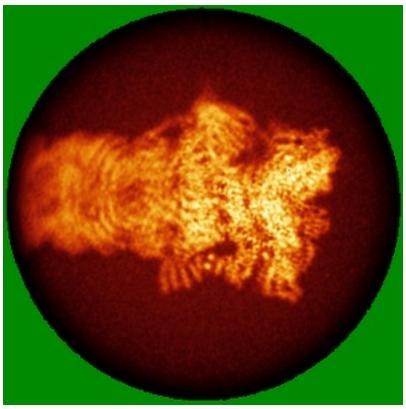


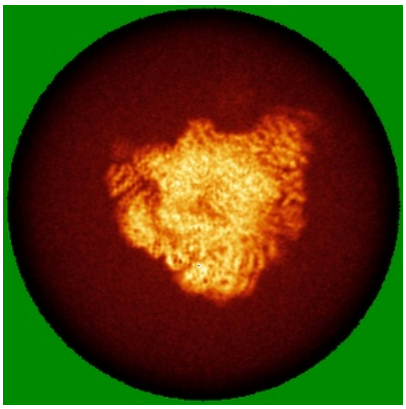
Z Index: 0

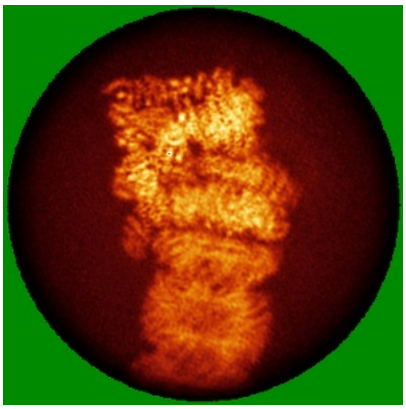
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

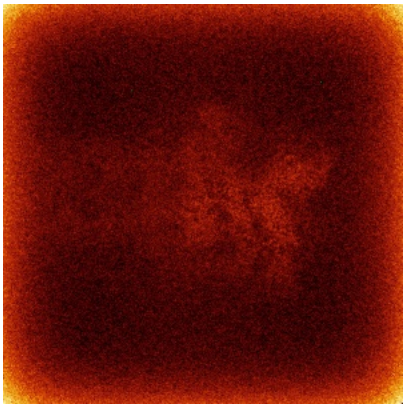
6.4.1 Primary map

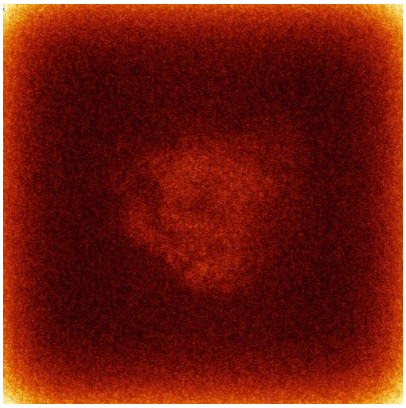

X

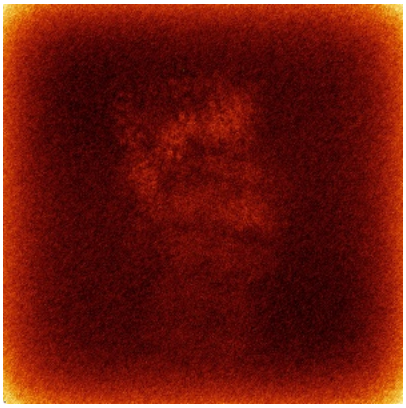

Y


Z

6.4.2 Raw map


X

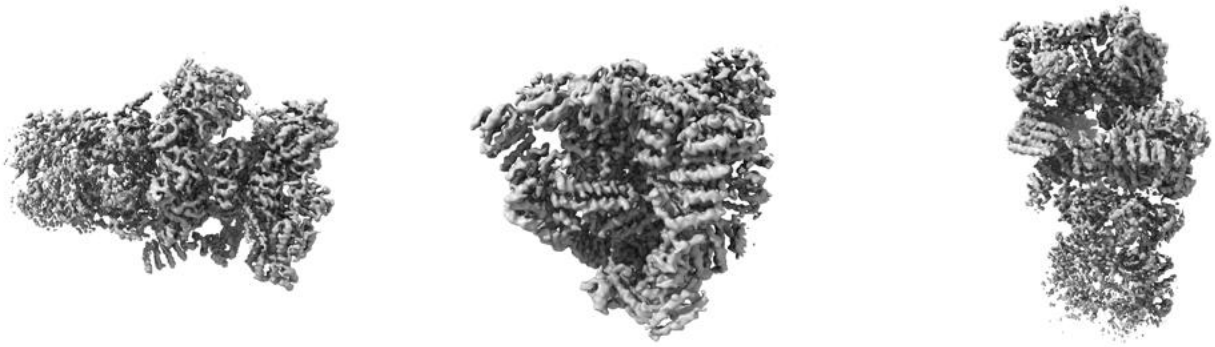

Y


Z

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

6.5 Orthogonal surface views (i)

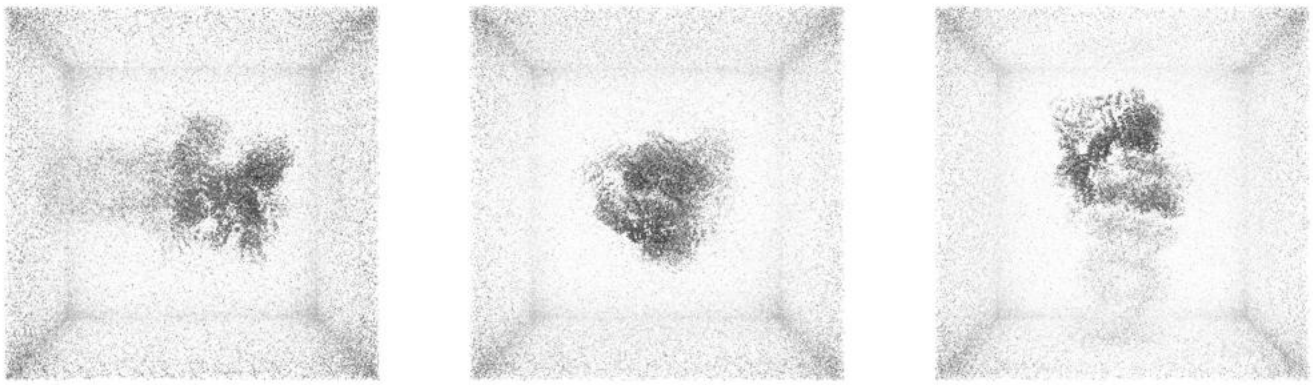
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.15. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



X Y Z

These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

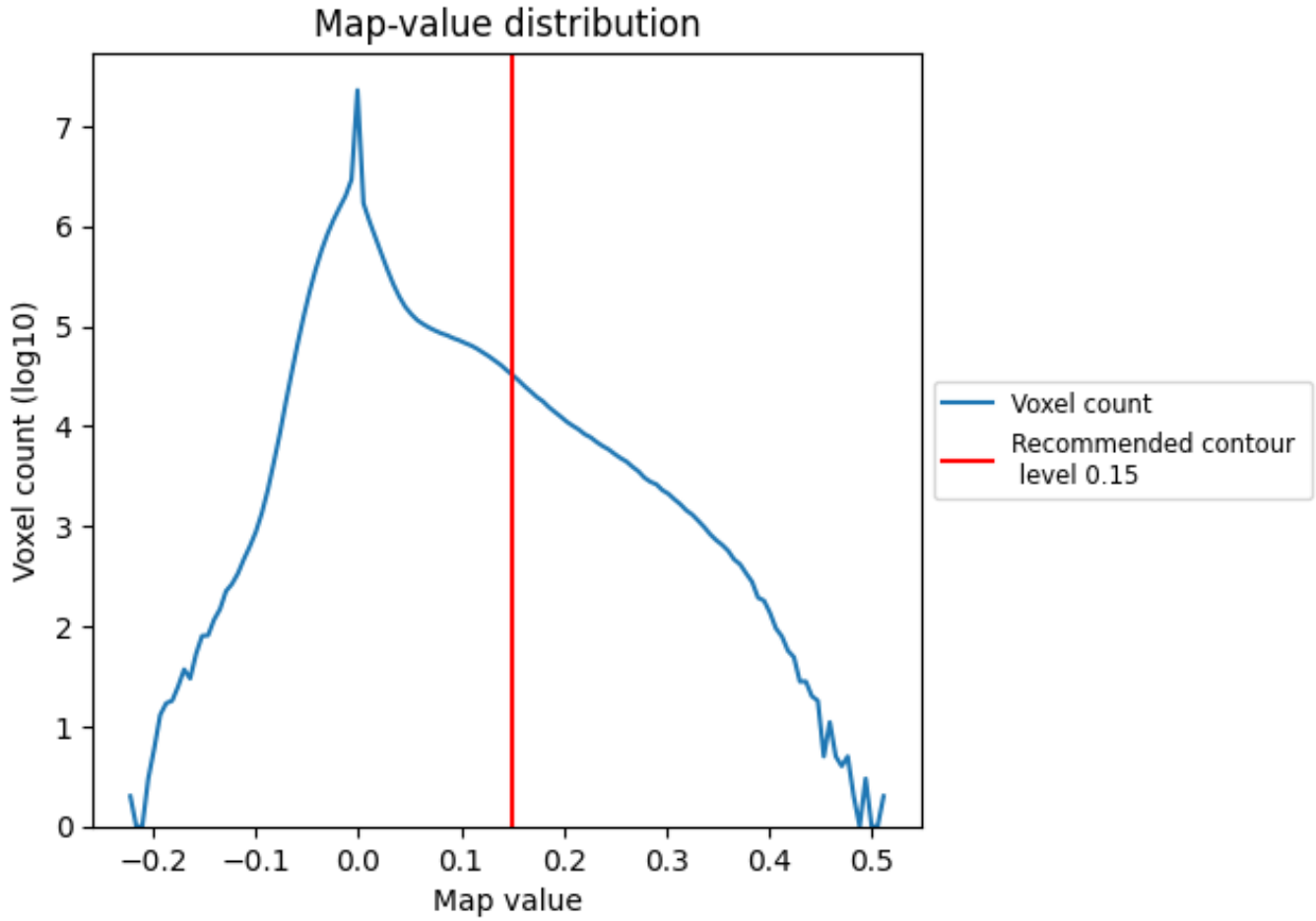
6.6 Mask visualisation (i)

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

7 Map analysis

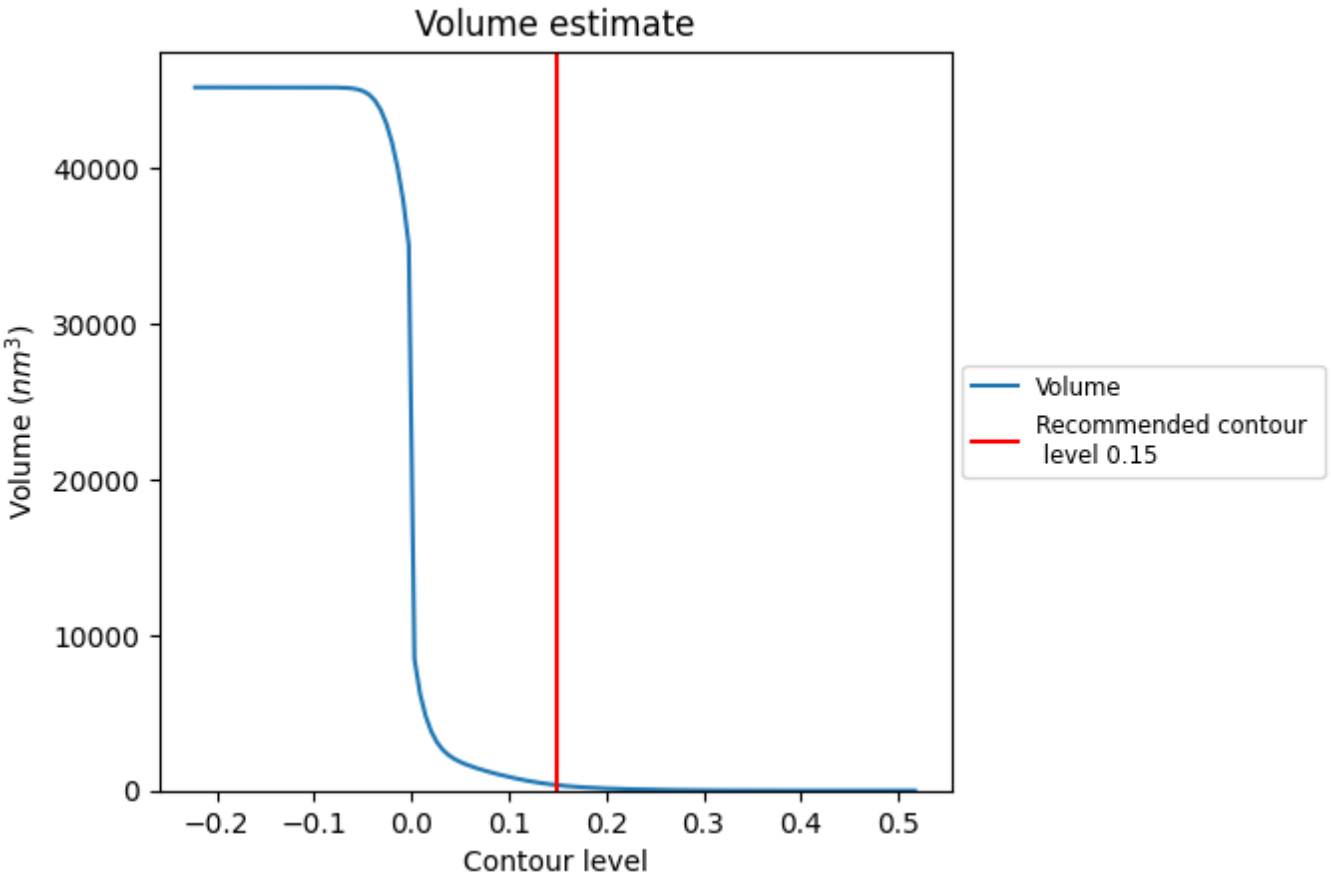
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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.

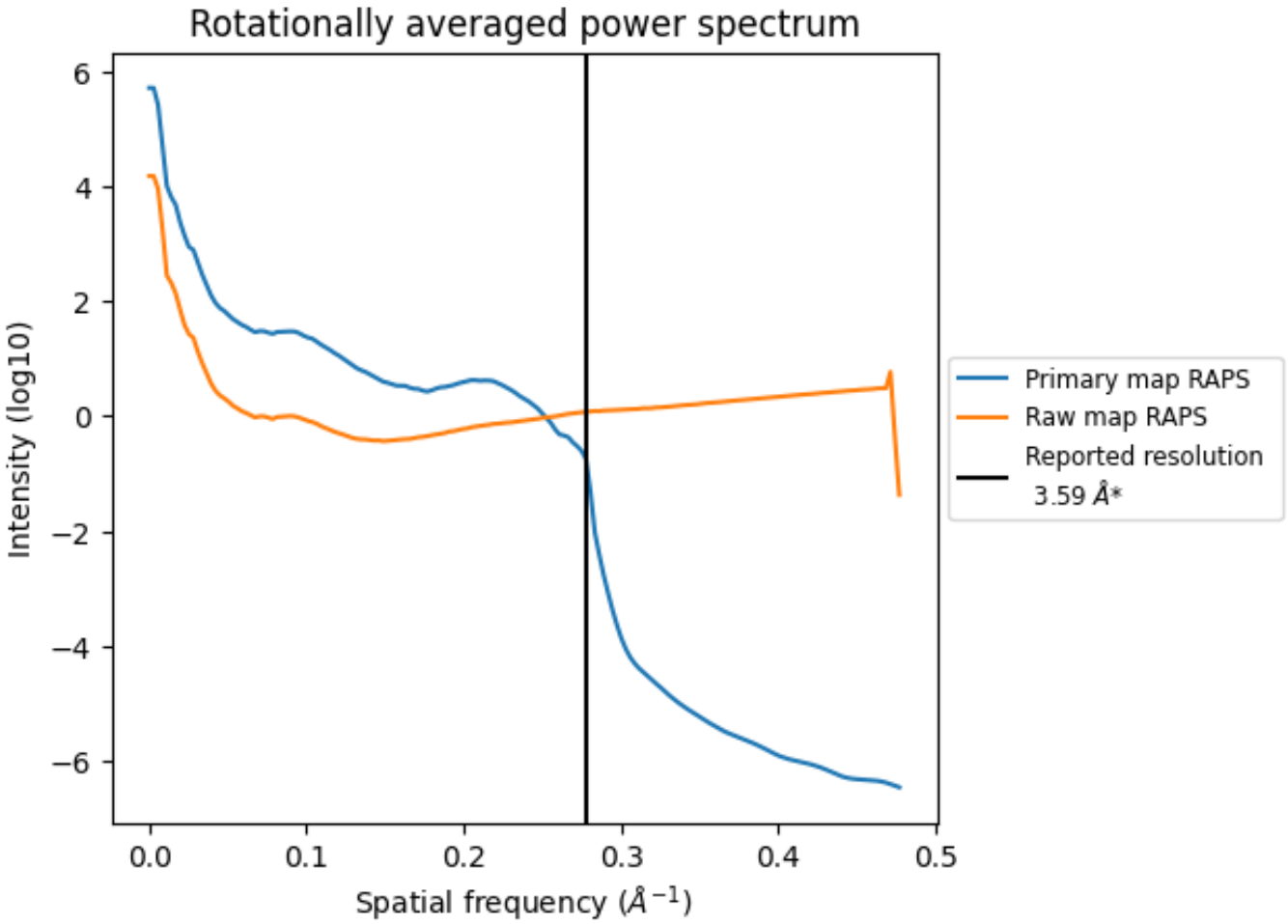
7.2 Volume estimate



The volume at the recommended contour level is 349 nm^3; this corresponds to an approximate mass of 316 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)

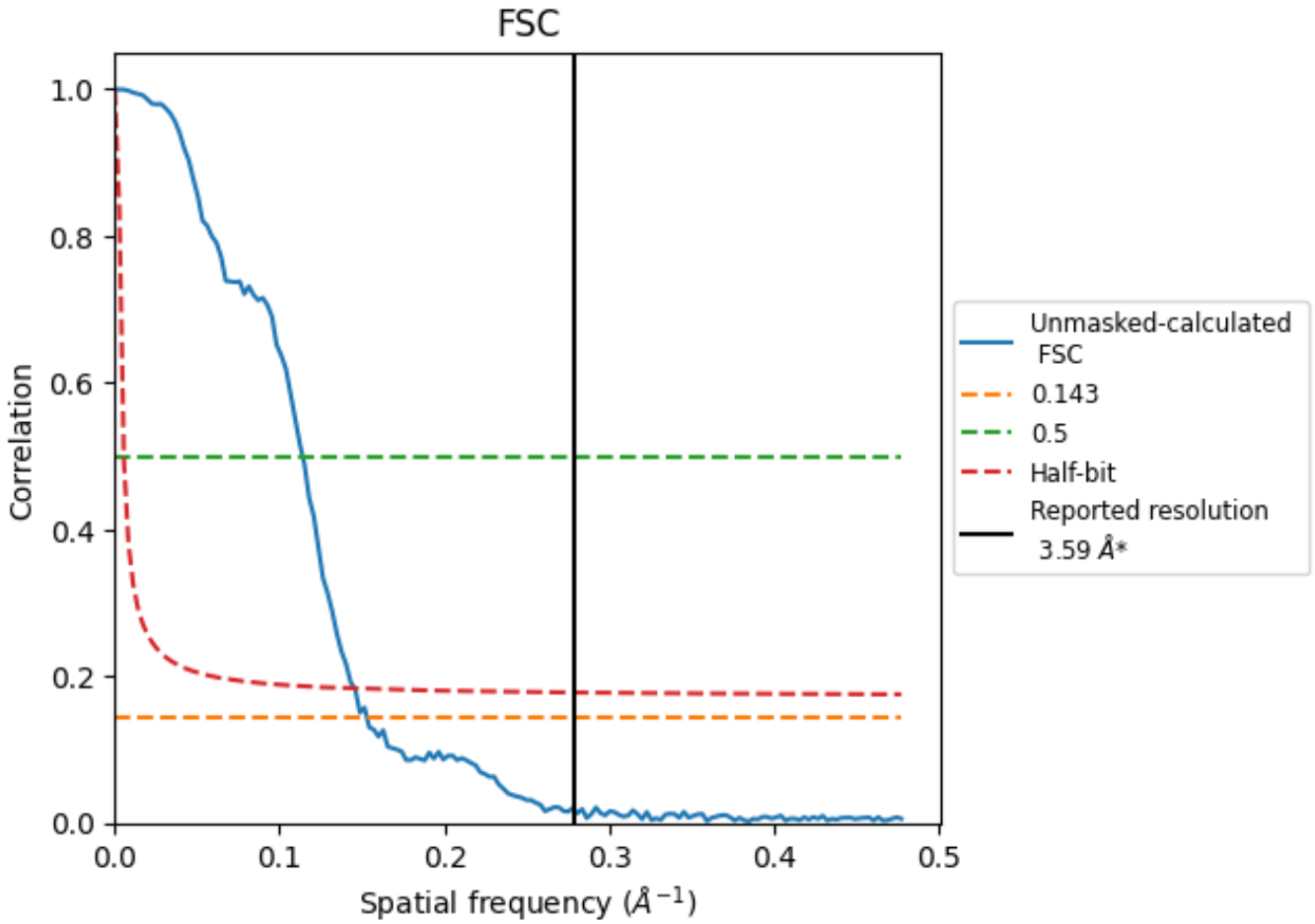


*Reported resolution corresponds to spatial frequency of 0.279 Å^{-1}

8 Fourier-Shell correlation

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC



*Reported resolution corresponds to spatial frequency of 0.279 $Å^{-1}$

8.2 Resolution estimates (i)

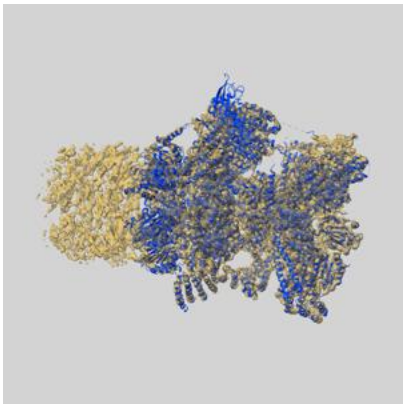
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.59	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	6.54	8.78	6.87

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 6.54 differs from the reported value 3.59 by more than 10 %

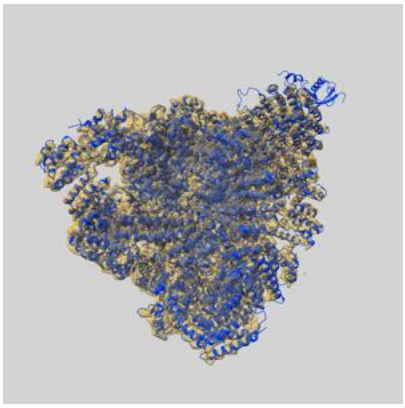
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-47724 and PDB model 9E8L. Per-residue inclusion information can be found in section 3 on page 13.

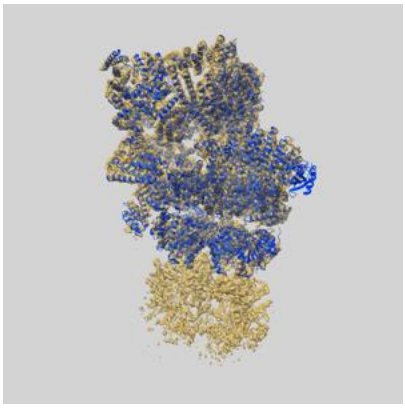
9.1 Map-model overlay



X



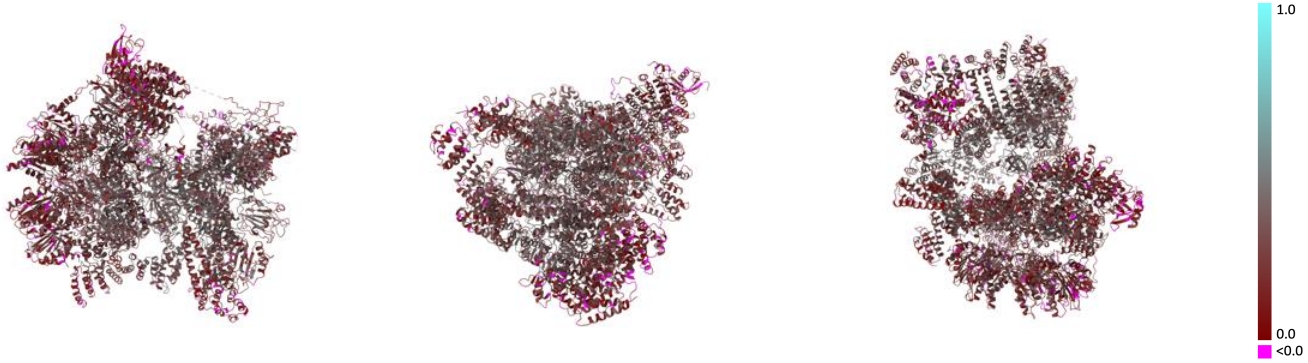
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.15 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.

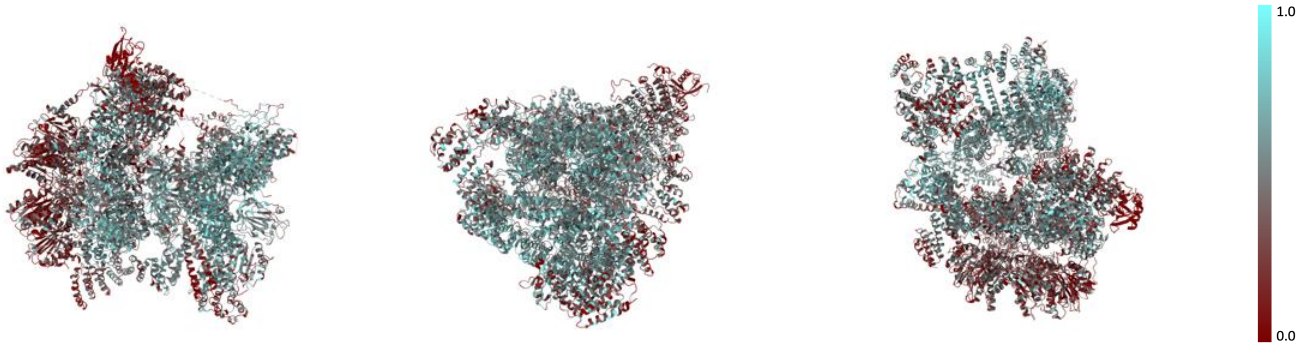
9.2 Q-score mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according 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.

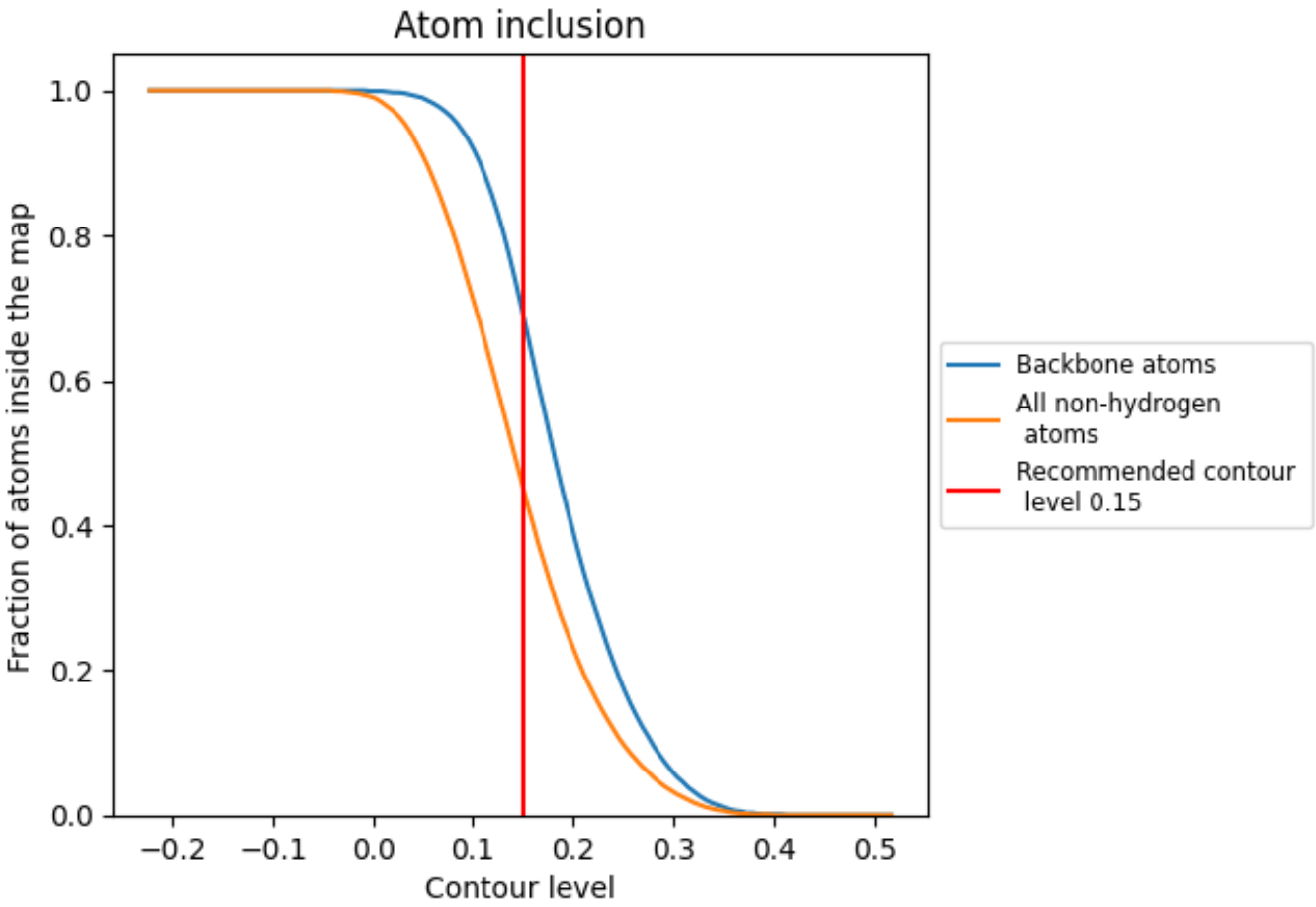
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

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 (0.15).

9.4 Atom inclusion (i)



At the recommended contour level, 69% of all backbone atoms, 45% 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 (0.15) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.4510	0.2700
A	0.5390	0.3230
B	0.5000	0.3110
C	0.4550	0.2940
D	0.4710	0.3240
E	0.4920	0.2960
F	0.5310	0.3210
G	0.2870	0.2230
H	0.3050	0.2180
I	0.2480	0.2110
J	0.2890	0.2160
K	0.2010	0.1760
L	0.2170	0.2090
M	0.2540	0.2170
U	0.5730	0.3050
V	0.4380	0.2100
W	0.4740	0.2610
X	0.5280	0.3030
Y	0.6010	0.2970
Z	0.6390	0.3650
a	0.5030	0.2400
b	0.4820	0.2680
c	0.6170	0.3660
d	0.3910	0.2040
e	0.4770	0.2400
f	0.3770	0.2310
g	0.0000	0.0690
u	0.4900	0.3290
v	0.3850	0.3380