



## Full wwPDB EM Validation Report ⓘ

Nov 11, 2024 – 06:22 PM EST

PDB ID : 9E71  
EMDB ID : EMD-47628  
Title : Cryo-EM structure of the Pyrobaculum calidifontis 70S ribosome  
Authors : Nissley, A.J.; Cate, J.H.D.  
Deposited on : 2024-10-31  
Resolution : 2.36 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:

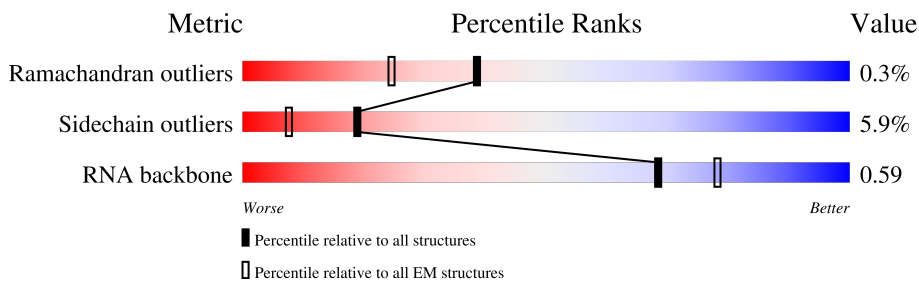
EMDB validation analysis : 0.0.1.dev113  
Mogul : 2022.3.0, CSD as543be (2022)  
MolProbity : 4.02b-467  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.39

# 1 Overall quality at a glance i

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

The reported resolution of this entry is 2.36 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
RNA backbone	6643	2191

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	2	129	
2	1	3024	
3	4	1498	
4	AA	244	
5	AB	338	
6	AC	285	
7	AD	178	
8	AE	196	

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Mol	Chain	Length	Quality of chain
9	AF	149	29% 93%
10	AG	186	8% 95%
11	AH	157	6% 96%
12	AI	144	94%
13	AJ	103	36% 91% 7%
13	AK	103	36% 80% 8% 13%
14	AL	156	16% 92% 6%
15	AM	189	6% 93%
16	AN	178	10% 92% 5%
17	AO	205	96%
18	AP	122	98%
19	AQ	147	6% 95% 5%
20	AR	78	10% 88% 9%
21	AS	99	97%
22	AT	184	96%
23	AU	81	6% 96%
24	AV	128	12% 88% 7% 5%
25	AW	62	6% 89% 10%
26	AX	79	24% 81% 15%
27	AY	179	8% 89% 7%
28	AZ	101	15% 91% 6%
29	Aa	91	9% 95%
30	Ab	153	10% 88% 8%
31	Ac	84	96%
32	Ad	52	98%

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Mol	Chain	Length	Quality of chain
33	Ae	67	19% 99%
34	Af	51	92% 6%
35	Ag	53	21% 94% 6%
36	Ah	91	97%
37	Ai	102	13% 94%
38	Aj	184	18% 95%
39	Ak	93	14% 89% 8%
40	BA	222	26% 77% 6% 16%
41	BB	208	37% 88% 7% 5%
42	BC	216	31% 29% 6% 64%
43	BD	159	12% 94%
44	BE	237	13% 92% 7%
45	BF	202	10% 90% 5%
46	BG	151	52% 88% 5% 7%
47	BH	223	21% 95%
48	BI	130	90% 9%
49	BJ	131	15% 93% 6%
50	BK	142	18% 82% 12% 6%
51	BL	106	30% 28% 8% 64%
52	BM	141	15% 83% 7% 10%
53	BN	147	10% 93% 5%
54	BO	153	33% 88% 5% 7%
55	BP	54	48% 52% 46%
56	BQ	151	17% 92% 7%
57	BR	147	24% 90% 7%

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Mol	Chain	Length	Quality of chain
58	BS	71	<p>72% 87% 10% 5%</p>
59	BT	158	<p>32% 79% 6% 15%</p>
60	BU	158	<p>12% 93% 5% 5%</p>
61	BV	128	<p>38% 86% 10% 5%</p>
62	BW	110	<p>24% 55% 7% 38%</p>
63	BX	100	<p>70% 78% 16% 5%</p>
64	BY	67	<p>19% 93% 5% 5%</p>
65	BZ	77	<p>31% 78% 14% 8%</p>
66	Ba	54	<p>24% 70% 9% 20%</p>
67	Bb	68	<p>69% 76% 12% 12%</p>
68	Bc	65	<p>17% 94% 5% 5%</p>

## 2 Entry composition i

There are 72 unique types of molecules in this entry. The entry contains 171357 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 RNA chain called 5S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	2	129	2769	1231	512	897	129	0	0

- Molecule 2 is a RNA chain called 23S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	1	2849	61386	27335	11453	19749	2849	0	0

- Molecule 3 is a RNA chain called 16S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
3	4	1430	30817	13730	5745	9912	1430	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
4	5	4AC	C	conflict	GB 343200235
4	1318	4AC	C	conflict	GB 343200235

- Molecule 4 is a protein called Large ribosomal subunit protein uL2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	AA	239	1803	1136	354	308	5	0	0

- Molecule 5 is a protein called Large ribosomal subunit protein uL3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	AB	336	2611	1681	476	450	4	0	0

- Molecule 6 is a protein called Large ribosomal subunit protein uL4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	AC	278	2178	1406	395	371	6	0	0

- Molecule 7 is a protein called Large ribosomal subunit protein uL5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	AD	178	1412	894	273	238	7	0	0

- Molecule 8 is a protein called Large ribosomal subunit protein uL6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	AE	195	1520	990	254	272	4	0	0

- Molecule 9 is a protein called Large ribosomal subunit protein eL8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	AF	145	1095	705	187	202	1	0	0

- Molecule 10 is a protein called Large ribosomal subunit protein uL13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	AG	183	1510	979	278	246	7	0	0

- Molecule 11 is a protein called Large ribosomal subunit protein eL13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	AH	155	1244	785	249	209	1	0	0

- Molecule 12 is a protein called Large ribosomal subunit protein uL14.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	AI	138	1068	682	202	181	3	0	0

- Molecule 13 is a protein called Large ribosomal subunit protein eL14.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	AJ	101	Total	C	N	O	S	0	0
			788	500	143	144	1		
13	AK	90	Total	C	N	O	S	0	0
			700	441	130	128	1		

- Molecule 14 is a protein called Large ribosomal subunit protein uL15.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	AL	152	Total	C	N	O	S	0	0
			1198	761	232	202	3		

- Molecule 15 is a protein called 50S ribosomal protein L15e.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	AM	184	Total	C	N	O	S	0	0
			1558	992	315	245	6		

- Molecule 16 is a protein called Large ribosomal subunit protein uL16.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	AN	169	Total	C	N	O	S	0	0
			1336	847	254	227	8		

- Molecule 17 is a protein called Large ribosomal subunit protein uL18.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	AO	200	Total	C	N	O	S	0	0
			1615	1027	309	278	1		

- Molecule 18 is a protein called Large ribosomal subunit protein eL18.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	AP	121	Total	C	N	O	S	0	0
			920	583	181	155	1		

- Molecule 19 is a protein called Large ribosomal subunit protein eL19.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	AQ	146	Total	C	N	O	S	0	0
			1214	759	244	208	3		

- Molecule 20 is a protein called Large ribosomal subunit protein eL20.



Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	AR	76	603	382	109	109	3	0	0

- Molecule 21 is a protein called Large ribosomal subunit protein eL21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	AS	98	788	503	150	134	1	0	0

- Molecule 22 is a protein called Large ribosomal subunit protein uL22.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
22	AT	183	1496	978	268	247	3	0	0

- Molecule 23 is a protein called Large ribosomal subunit protein uL23.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
23	AU	81	651	417	115	117	2	0	0

- Molecule 24 is a protein called Large ribosomal subunit protein uL24.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
24	AV	121	976	619	194	161	2	0	0

- Molecule 25 is a protein called Large ribosomal subunit protein eL24.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
25	AW	56	449	287	86	70	6	0	0

- Molecule 26 is a protein called Large ribosomal subunit protein uL29.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
26	AX	67	554	343	117	92	2	0	0

- Molecule 27 is a protein called Large ribosomal subunit protein uL30.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	AY	172	Total	C	N	O	S	0	0
			1374	888	245	235	6		

- Molecule 28 is a protein called Large ribosomal subunit protein eL30.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	AZ	98	Total	C	N	O	S	0	0
			742	481	128	132	1		

- Molecule 29 is a protein called Large ribosomal subunit protein eL31.

Mol	Chain	Residues	Atoms				AltConf	Trace
29	Aa	88	Total	C	N	O	0	0
			726	460	146	120		

- Molecule 30 is a protein called Large ribosomal subunit protein eL32.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	Ab	140	Total	C	N	O	S	0	0
			1183	757	239	186	1		

- Molecule 31 is a protein called Large ribosomal subunit protein eL34.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	Ac	83	Total	C	N	O	S	0	0
			649	407	138	102	2		

- Molecule 32 is a protein called Large ribosomal subunit protein eL37.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	Ad	52	Total	C	N	O	S	0	0
			429	265	93	65	6		

- Molecule 33 is a protein called LSU ribosomal protein L38E.

Mol	Chain	Residues	Atoms				AltConf	Trace
33	Ae	66	Total	C	N	O	0	0
			552	363	93	96		

- Molecule 34 is a protein called Large ribosomal subunit protein eL39.

Mol	Chain	Residues	Atoms				AltConf	Trace
34	Af	50	Total	C	N	O	0	0
			415	260	96	59		

- Molecule 35 is a protein called Large ribosomal subunit protein eL40.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	Ag	50	Total	C	N	O	S	0	0
			417	259	88	66	4		

- Molecule 36 is a protein called eL42.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	Ah	91	Total	C	N	O	S	0	0
			739	467	142	123	7		

- Molecule 37 is a protein called Large ribosomal subunit protein eL43.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	Ai	99	Total	C	N	O	S	0	0
			769	489	148	127	5		

- Molecule 38 is a protein called DJ-1/PfpI domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	Aj	183	Total	C	N	O	S	0	0
			1469	954	248	265	2		

- Molecule 39 is a protein called PaREP1 domain containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	Ak	90	Total	C	N	O	S	0	0
			743	478	127	136	2		

- Molecule 40 is a protein called Small ribosomal subunit protein eS1.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	BA	187	Total	C	N	O	S	0	0
			1487	965	263	256	3		

- Molecule 41 is a protein called Small ribosomal subunit protein uS2.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	BB	198	Total	C	N	O	S	0	0
			1600	1037	277	279	7		

- Molecule 42 is a protein called Small ribosomal subunit protein uS3.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	BC	77	Total	C	N	O	S	0	0
			611	393	110	107	1		

- Molecule 43 is a protein called Small ribosomal subunit protein uS4.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	BD	157	Total	C	N	O	S	0	0
			1284	831	240	209	4		

- Molecule 44 is a protein called Small ribosomal subunit protein eS4.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	BE	236	Total	C	N	O	S	0	0
			1883	1223	336	322	2		

- Molecule 45 is a protein called Small ribosomal subunit protein uS5.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	BF	194	Total	C	N	O	S	0	0
			1498	951	272	271	4		

- Molecule 46 is a protein called Small ribosomal subunit protein eS6.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	BG	140	Total	C	N	O	S	0	0
			1065	685	190	188	2		

- Molecule 47 is a protein called Small ribosomal subunit protein uS7.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	BH	220	Total	C	N	O	S	0	0
			1773	1128	325	313	7		

- Molecule 48 is a protein called Small ribosomal subunit protein uS8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
48	BI	129	1036	676	177	180	3	0	0

- Molecule 49 is a protein called Small ribosomal subunit protein eS8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
49	BJ	130	1007	636	198	172	1	0	0

- Molecule 50 is a protein called Small ribosomal subunit protein uS9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
50	BK	134	1058	680	191	182	5	0	0

- Molecule 51 is a protein called Small ribosomal subunit protein uS10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
51	BL	38	315	201	64	49	1	0	0

- Molecule 52 is a protein called Small ribosomal subunit protein uS11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
52	BM	127	941	592	182	164	3	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
BM	128	IAS	ASP	conflict	UNP A3MX63

- Molecule 53 is a protein called Small ribosomal subunit protein uS12.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
53	BN	144	1133	730	211	189	3	0	0

- Molecule 54 is a protein called Small ribosomal subunit protein uS13.

Mol	Chain	Residues	Atoms					AltConf	Trace
54	BO	143	Total	C	N	O	S	0	0
			1108	700	211	195	2		

- Molecule 55 is a protein called Small ribosomal subunit protein uS14.

Mol	Chain	Residues	Atoms					AltConf	Trace
55	BP	29	Total	C	N	O	S	0	0
			241	150	51	36	4		

- Molecule 56 is a protein called Small ribosomal subunit protein uS15.

Mol	Chain	Residues	Atoms					AltConf	Trace
56	BQ	149	Total	C	N	O	S	0	0
			1224	782	233	208	1		

- Molecule 57 is a protein called Small ribosomal subunit protein uS17.

Mol	Chain	Residues	Atoms					AltConf	Trace
57	BR	144	Total	C	N	O	S	0	0
			1171	756	216	194	5		

- Molecule 58 is a protein called Small ribosomal subunit protein eS17.

Mol	Chain	Residues	Atoms				AltConf	Trace
58	BS	64	Total	C	N	O	0	0
			517	332	94	91		

- Molecule 59 is a protein called Small ribosomal subunit protein uS19.

Mol	Chain	Residues	Atoms					AltConf	Trace
59	BT	135	Total	C	N	O	S	0	0
			1111	720	203	182	6		

- Molecule 60 is a protein called Small ribosomal subunit protein eS19.

Mol	Chain	Residues	Atoms					AltConf	Trace
60	BU	155	Total	C	N	O	S	0	0
			1225	789	225	209	2		

- Molecule 61 is a protein called Small ribosomal subunit protein eS24.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
61	BV	115	950	597	185	168	0	0

- Molecule 62 is a protein called SSU ribosomal protein S25E.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
62	BW	68	544	351	96	96	1	0	0

- Molecule 63 is a protein called SSU ribosomal protein S26E.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
63	BX	95	772	490	150	128	4	0	0

- Molecule 64 is a protein called Small ribosomal subunit protein eS27.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
64	BY	65	501	317	100	79	5	0	0

- Molecule 65 is a protein called eS28.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
65	BZ	71	552	344	108	99	1	0	0

- Molecule 66 is a protein called SSU ribosomal protein S30E.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
66	Ba	43	357	222	80	55	0	0

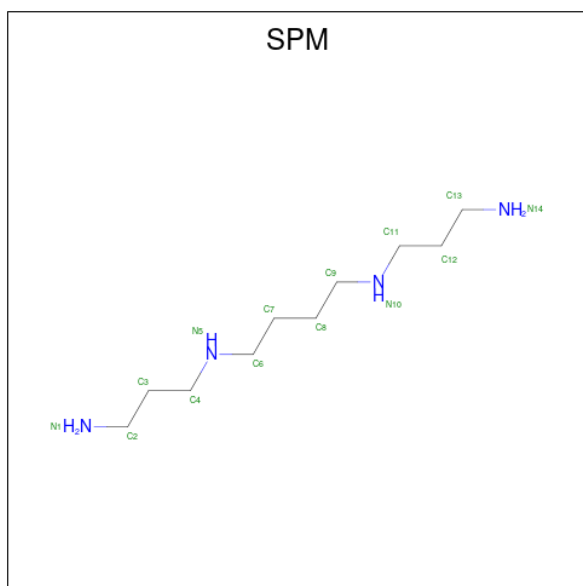
- Molecule 67 is a protein called aS35.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
67	Bb	60	479	301	95	83	0	0

- Molecule 68 is a protein called Small zinc finger protein HVO-2753-like zinc-binding pocket domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
68	Bc	64	477	301	90	82	4	0	0

- Molecule 69 is SPERMINE (three-letter code: SPM) (formula: C<sub>10</sub>H<sub>26</sub>N<sub>4</sub>).



Mol	Chain	Residues	Atoms			AltConf
			Total	C	N	
69	1	1	14	10	4	0
69	1	1	14	10	4	0
69	1	1	14	10	4	0
69	1	1	14	10	4	0
69	1	1	14	10	4	0
69	1	1	14	10	4	0
69	1	1	14	10	4	0
69	1	1	14	10	4	0
69	1	1	14	10	4	0
69	1	1	14	10	4	0
69	1	1	14	10	4	0

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Mol	Chain	Residues	Atoms			AltConf
			Total	C	N	
69	1	1	14	10	4	0
69	1	1	14	10	4	0
69	1	1	14	10	4	0
69	1	1	14	10	4	0
69	1	1	14	10	4	0
69	1	1	14	10	4	0
69	1	1	14	10	4	0
69	1	1	14	10	4	0
69	1	1	14	10	4	0
69	1	1	14	10	4	0
69	1	1	14	10	4	0
69	1	1	14	10	4	0
69	4	1	14	10	4	0
69	4	1	14	10	4	0
69	4	1	14	10	4	0
69	4	1	14	10	4	0
69	4	1	14	10	4	0
69	4	1	14	10	4	0
69	4	1	14	10	4	0
69	4	1	14	10	4	0
69	4	1	14	10	4	0

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Mol	Chain	Residues	Atoms			AltConf
			Total	C	N	
69	4	1	14	10	4	0
69	4	1	14	10	4	0
69	4	1	14	10	4	0
69	4	1	14	10	4	0
69	4	1	14	10	4	0
69	4	1	14	10	4	0
69	4	1	14	10	4	0
69	4	1	14	10	4	0
69	4	1	14	10	4	0
69	AL	1	14	10	4	0
69	Ah	1	14	10	4	0

- Molecule 70 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
70	1	170	170	170	0
70	4	78	78	78	0
70	AA	1	1	1	0
70	AL	2	2	2	0
70	BK	1	1	1	0

- Molecule 71 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
			Total	Zn	
71	AW	1	1	1	0

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Mol	Chain	Residues	Atoms		AltConf
71	Ad	1	Total 1	Zn 1	0
71	Ag	1	Total 1	Zn 1	0
71	Ah	1	Total 1	Zn 1	0
71	Ai	1	Total 1	Zn 1	0
71	BF	1	Total 1	Zn 1	0
71	BP	1	Total 1	Zn 1	0
71	BR	1	Total 1	Zn 1	0
71	BX	1	Total 1	Zn 1	0
71	BY	1	Total 1	Zn 1	0
71	Bc	1	Total 1	Zn 1	0

- Molecule 72 is water.

Mol	Chain	Residues	Atoms		AltConf
72	2	181	Total 181	O 181	0
72	1	5640	Total 5640	O 5640	0
72	4	1487	Total 1487	O 1487	0
72	AA	12	Total 12	O 12	0
72	AB	1	Total 1	O 1	0
72	AC	6	Total 6	O 6	0
72	AG	2	Total 2	O 2	0
72	AH	3	Total 3	O 3	0
72	AL	10	Total 10	O 10	0

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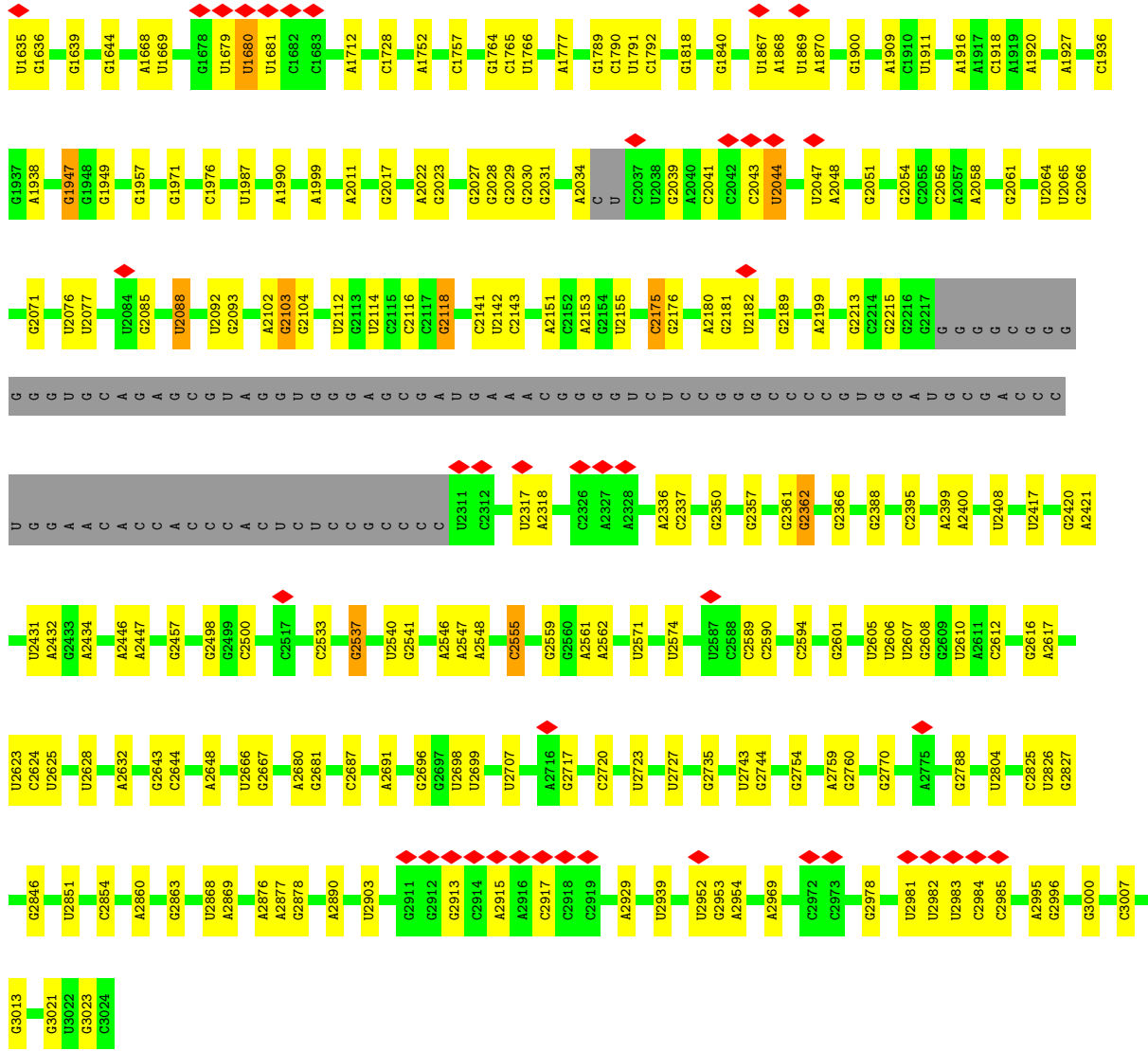
Mol	Chain	Residues	Atoms		AltConf
72	AM	2	Total 2	O 2	0
72	AN	2	Total 2	O 2	0
72	AO	2	Total 2	O 2	0
72	AP	1	Total 1	O 1	0
72	AQ	1	Total 1	O 1	0
72	AT	2	Total 2	O 2	0
72	AU	1	Total 1	O 1	0
72	AX	22	Total 22	O 22	0
72	AY	2	Total 2	O 2	0
72	Aa	1	Total 1	O 1	0
72	Ab	6	Total 6	O 6	0
72	Ad	3	Total 3	O 3	0
72	Ah	1	Total 1	O 1	0
72	BA	18	Total 18	O 18	0
72	BB	18	Total 18	O 18	0
72	BC	9	Total 9	O 9	0
72	BD	28	Total 28	O 28	0
72	BE	23	Total 23	O 23	0
72	BF	32	Total 32	O 32	0
72	BG	19	Total 19	O 19	0
72	BH	26	Total 26	O 26	0

*Continued on next page...*

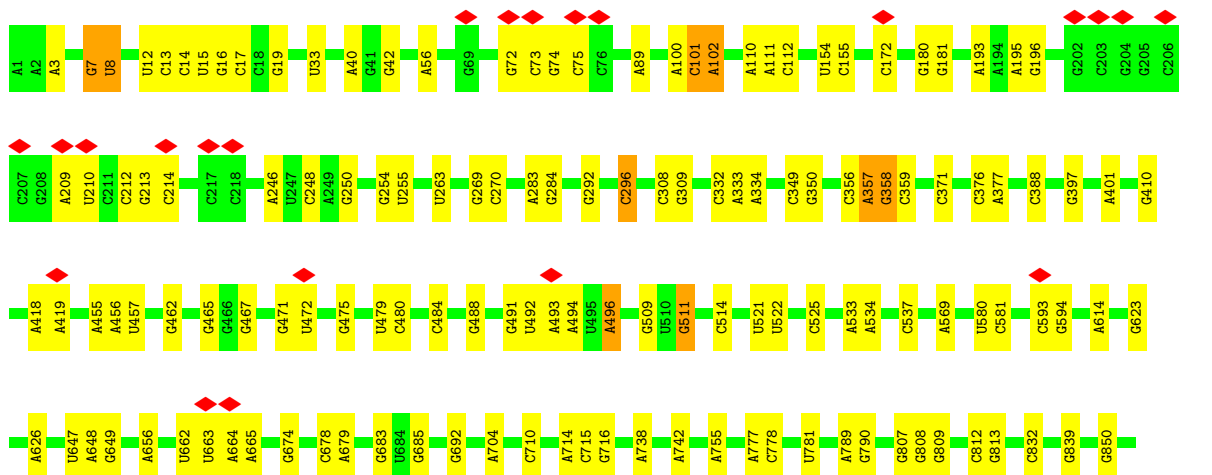
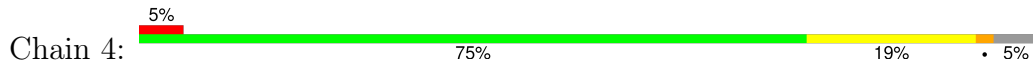
*Continued from previous page...*

Mol	Chain	Residues	Atoms		AltConf
72	BI	20	Total 20	O 20	0
72	BJ	13	Total 13	O 13	0
72	BK	12	Total 12	O 12	0
72	BL	7	Total 7	O 7	0
72	BM	9	Total 9	O 9	0
72	BN	12	Total 12	O 12	0
72	BO	26	Total 26	O 26	0
72	BP	8	Total 8	O 8	0
72	BQ	15	Total 15	O 15	0
72	BR	12	Total 12	O 12	0
72	BS	5	Total 5	O 5	0
72	BT	17	Total 17	O 17	0
72	BU	13	Total 13	O 13	0
72	BV	9	Total 9	O 9	0
72	BW	8	Total 8	O 8	0
72	BX	12	Total 12	O 12	0
72	BY	10	Total 10	O 10	0
72	BZ	12	Total 12	O 12	0
72	Ba	8	Total 8	O 8	0
72	Bb	7	Total 7	O 7	0
72	Bc	16	Total 16	O 16	0

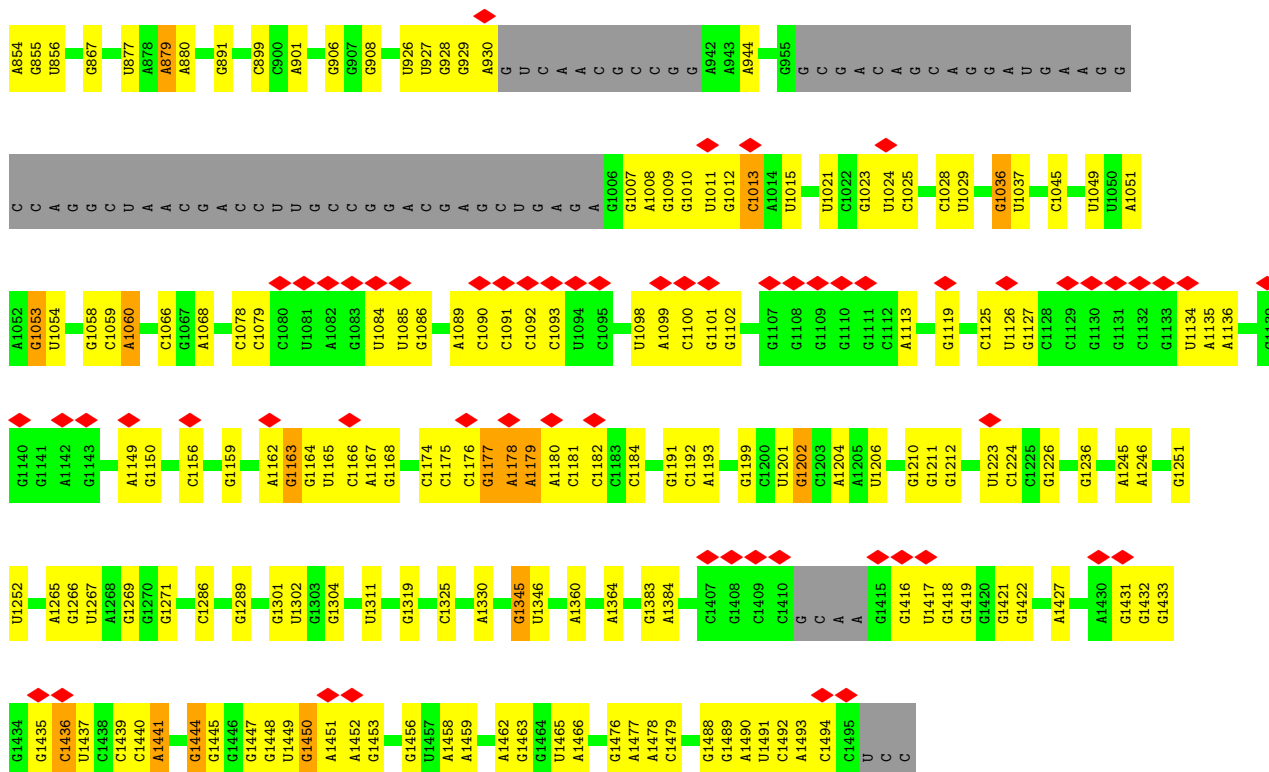




• Molecule 3: 16S rRNA



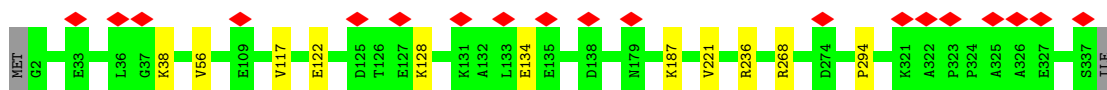




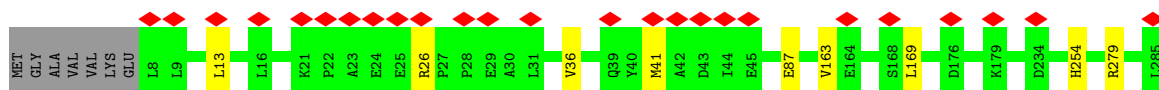
- Molecule 4: Large ribosomal subunit protein uL2



- Molecule 5: Large ribosomal subunit protein uL3



- Molecule 6: Large ribosomal subunit protein uL4



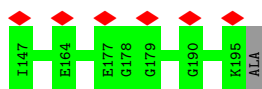
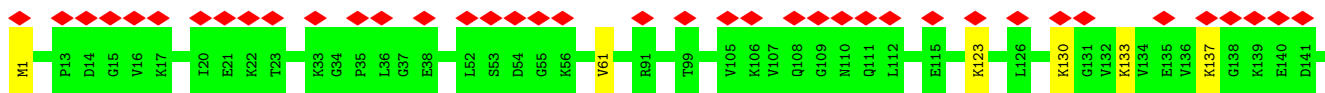
- Molecule 7: Large ribosomal subunit protein uL5





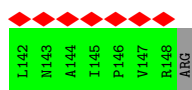
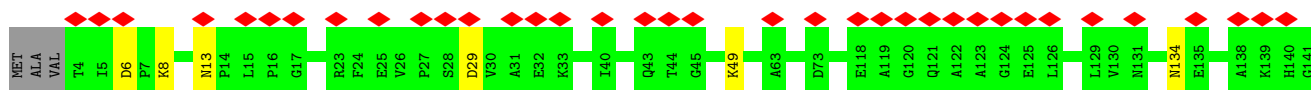
- Molecule 8: Large ribosomal subunit protein uL6

Chain AE: 23% 96%



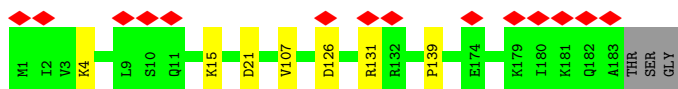
- Molecule 9: Large ribosomal subunit protein eL8

Chain AF: 29% 93%



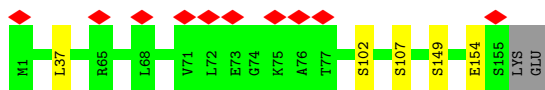
- Molecule 10: Large ribosomal subunit protein uL13

Chain AG: 8% 95%



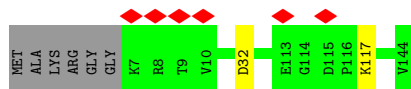
- Molecule 11: Large ribosomal subunit protein eL13

Chain AH: 6% 96%

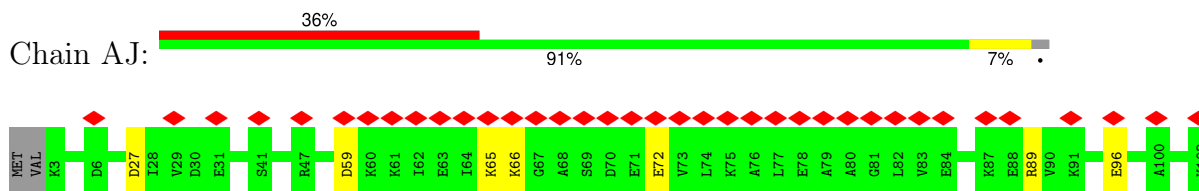


- Molecule 12: Large ribosomal subunit protein uL14

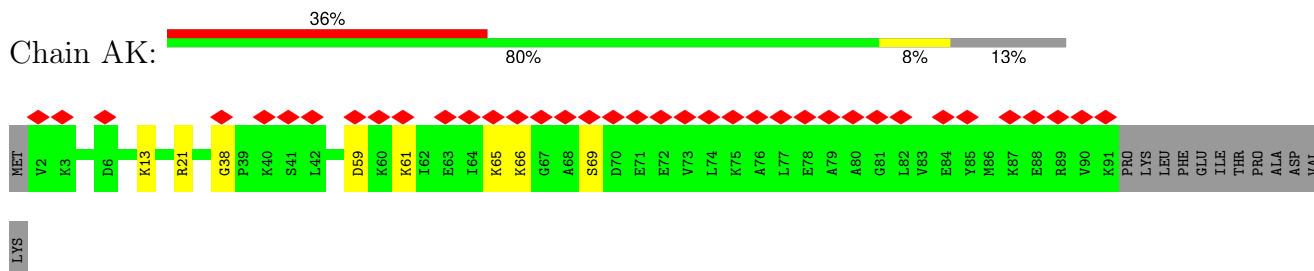
Chain AI: 94%



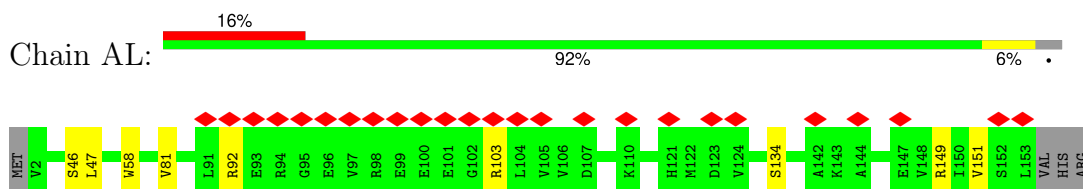
- Molecule 13: Large ribosomal subunit protein eL14



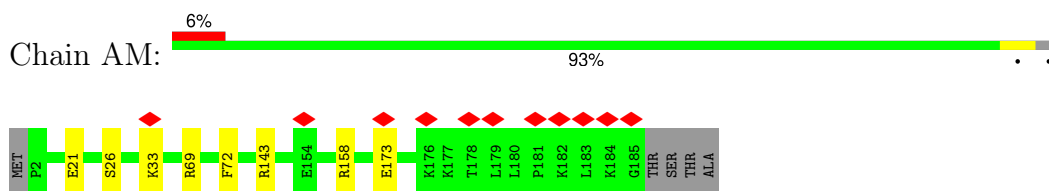
- Molecule 13: Large ribosomal subunit protein eL14



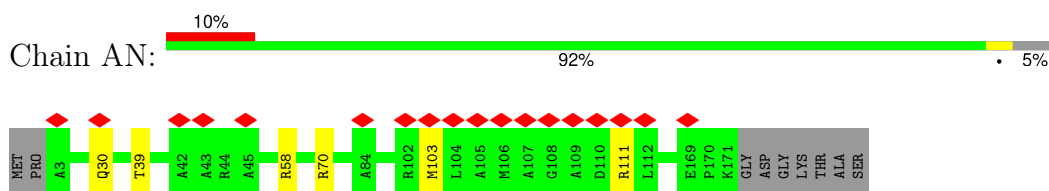
- Molecule 14: Large ribosomal subunit protein uL15



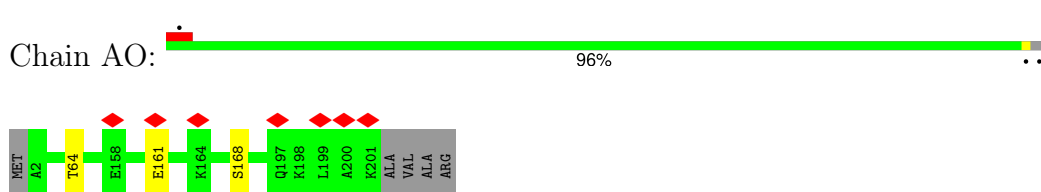
- Molecule 15: 50S ribosomal protein L15e



- Molecule 16: Large ribosomal subunit protein uL16

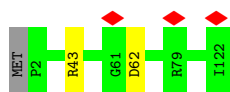


- Molecule 17: Large ribosomal subunit protein uL18



- Molecule 18: Large ribosomal subunit protein eL18

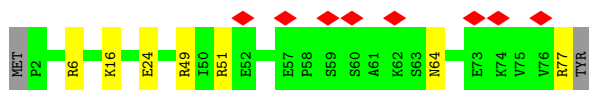
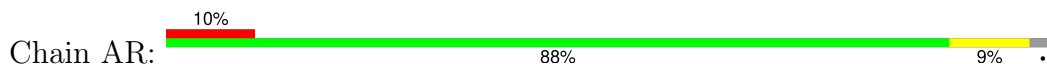




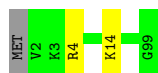
- Molecule 19: Large ribosomal subunit protein eL19



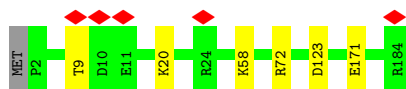
- Molecule 20: Large ribosomal subunit protein eL20



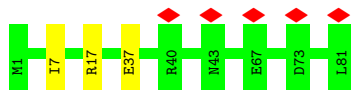
- Molecule 21: Large ribosomal subunit protein eL21



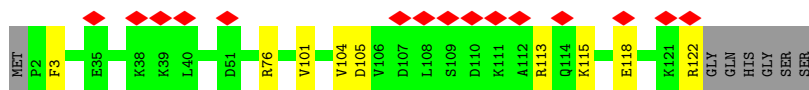
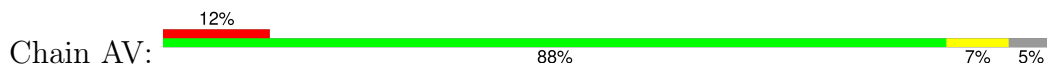
- Molecule 22: Large ribosomal subunit protein uL22



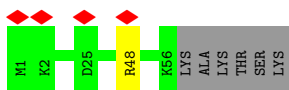
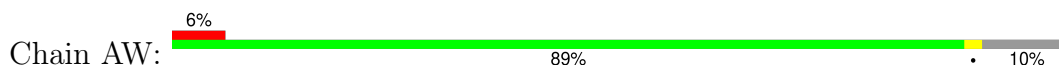
- Molecule 23: Large ribosomal subunit protein uL23



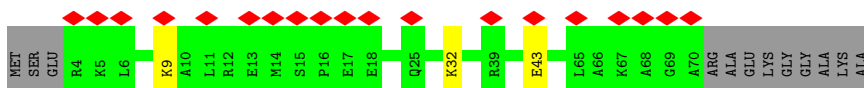
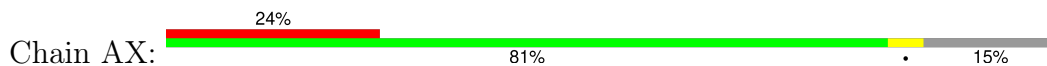
- Molecule 24: Large ribosomal subunit protein uL24



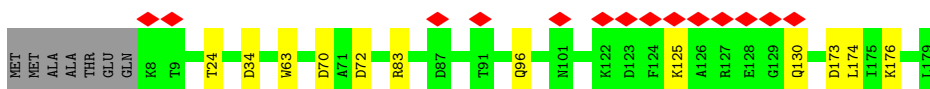
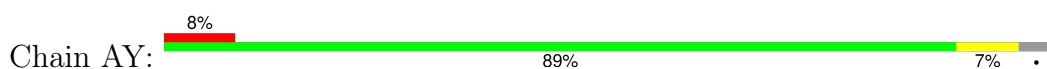
- Molecule 25: Large ribosomal subunit protein eL24



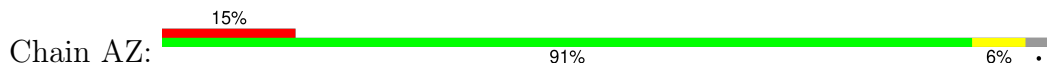
- Molecule 26: Large ribosomal subunit protein uL29



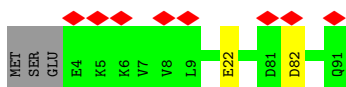
- Molecule 27: Large ribosomal subunit protein uL30



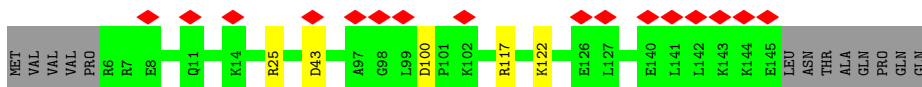
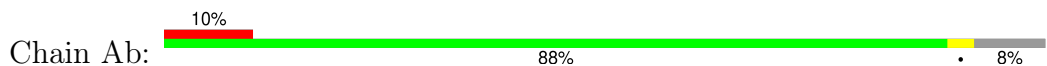
- Molecule 28: Large ribosomal subunit protein eL30



- Molecule 29: Large ribosomal subunit protein eL31



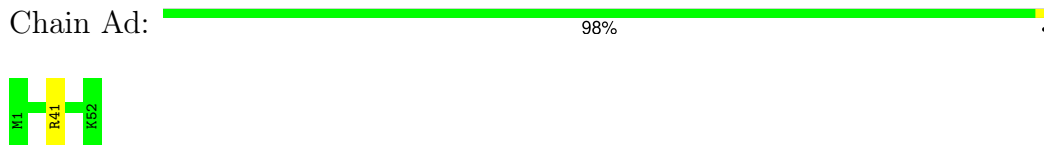
- Molecule 30: Large ribosomal subunit protein eL32



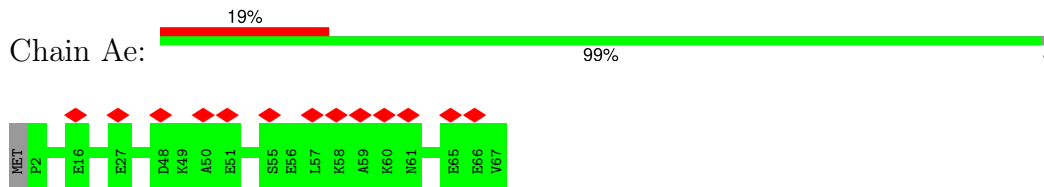
- Molecule 31: Large ribosomal subunit protein eL34



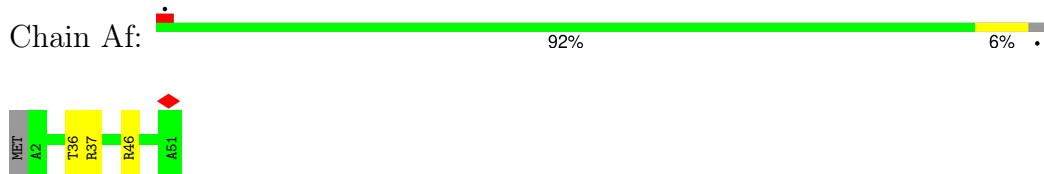
- Molecule 32: Large ribosomal subunit protein eL37



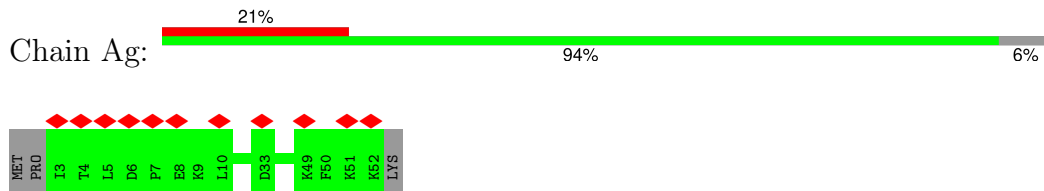
- Molecule 33: LSU ribosomal protein L38E



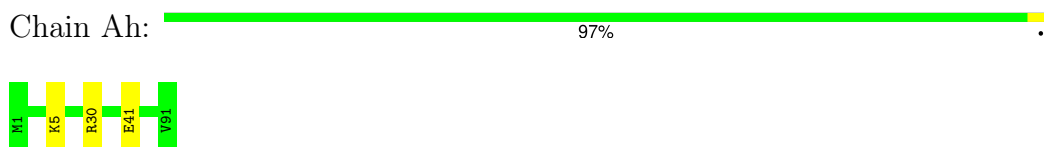
- Molecule 34: Large ribosomal subunit protein eL39



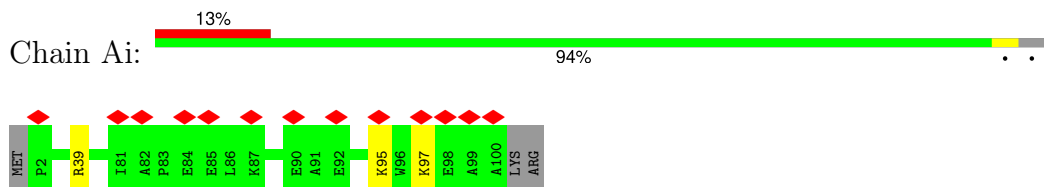
- Molecule 35: Large ribosomal subunit protein eL40



- Molecule 36: eL42

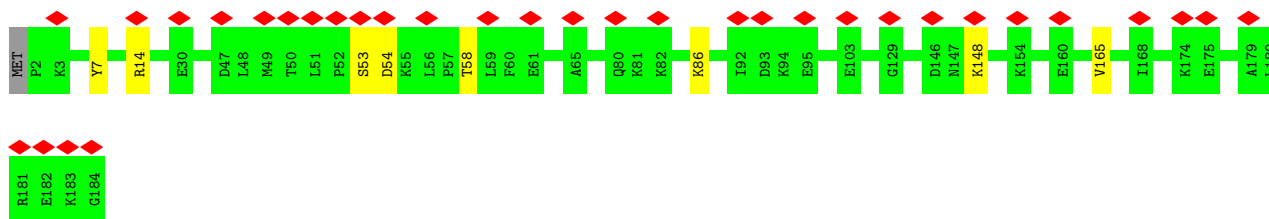


- Molecule 37: Large ribosomal subunit protein eL43

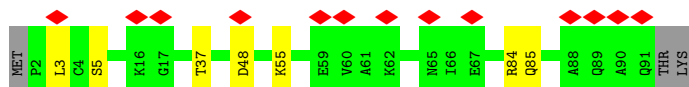
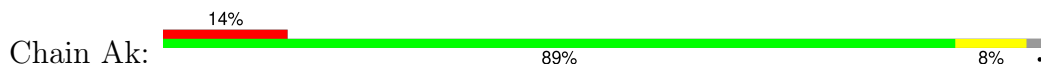


- Molecule 38: DJ-1/PfpI domain-containing protein

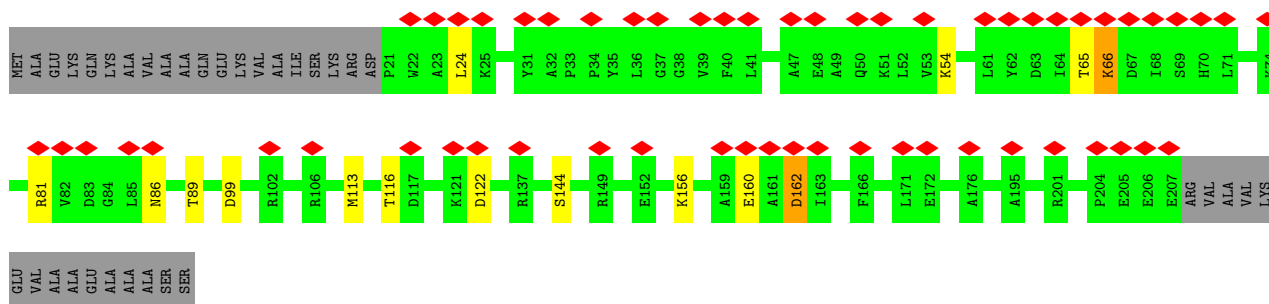
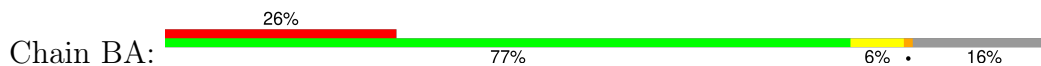




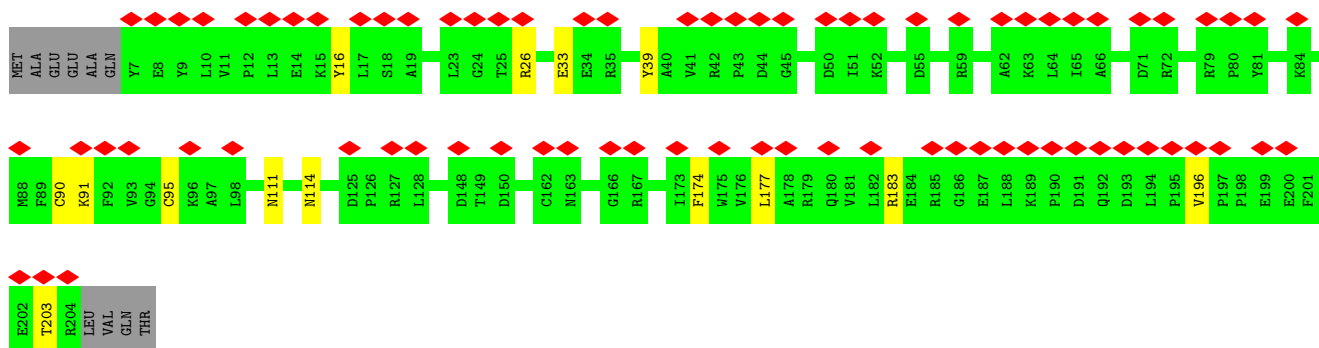
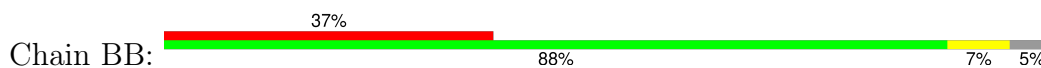
• Molecule 39: PaREP1 domain containing protein



• Molecule 40: Small ribosomal subunit protein eS1



• Molecule 41: Small ribosomal subunit protein uS2

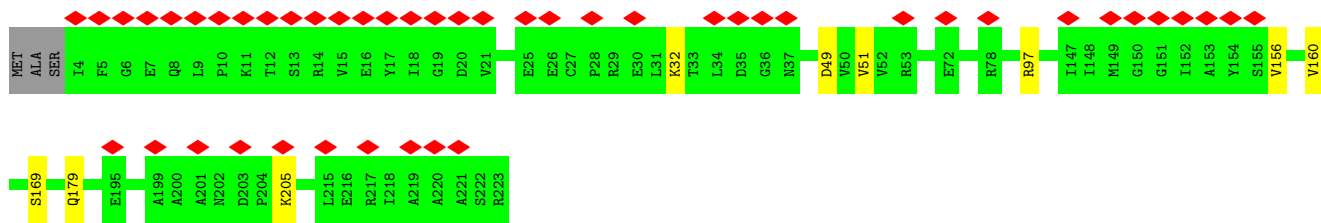


• Molecule 42: Small ribosomal subunit protein uS3

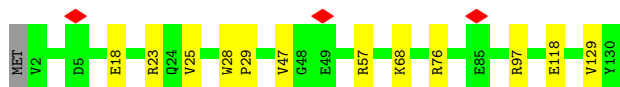
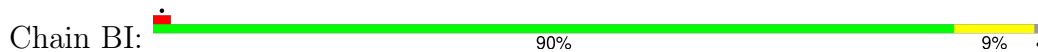








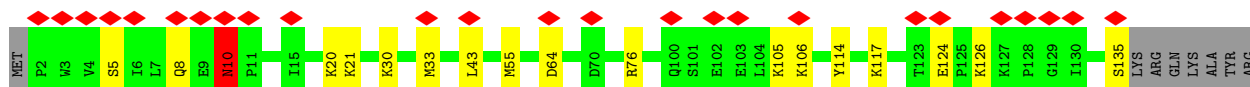
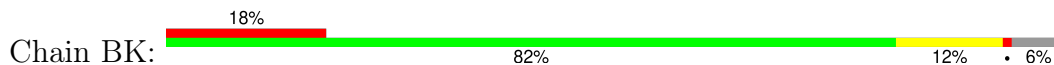
• Molecule 48: Small ribosomal subunit protein uS8



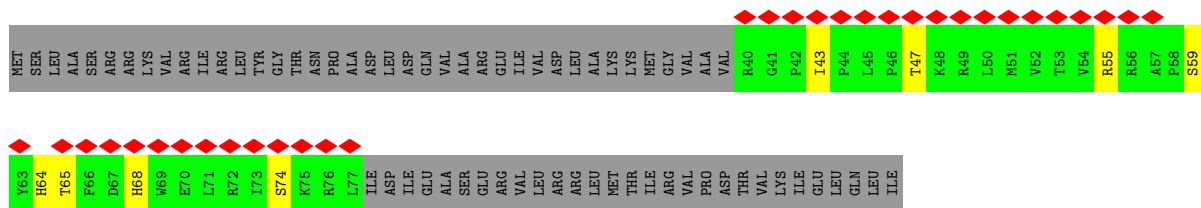
• Molecule 49: Small ribosomal subunit protein eS8



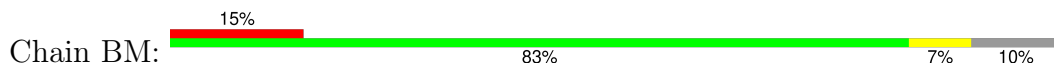
• Molecule 50: Small ribosomal subunit protein uS9



• Molecule 51: Small ribosomal subunit protein uS10



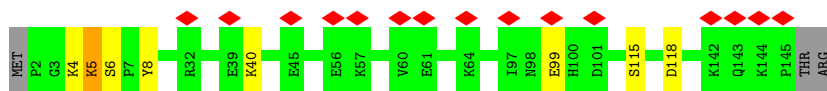
• Molecule 52: Small ribosomal subunit protein uS11



◆  
V141

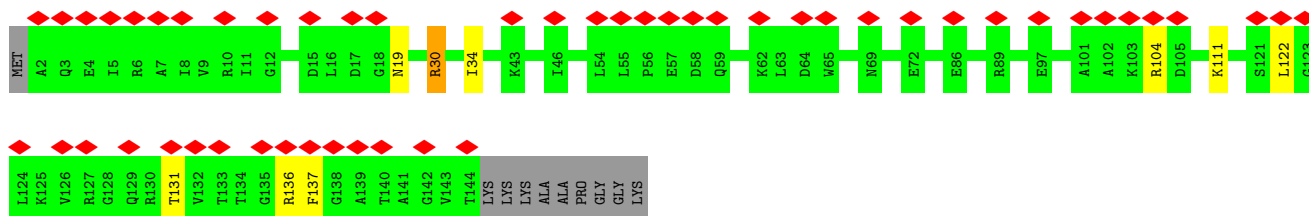
- Molecule 53: Small ribosomal subunit protein uS12

Chain BN: 10% 93% 5% ..



- Molecule 54: Small ribosomal subunit protein uS13

Chain BO: 33% 88% 5% • 7%



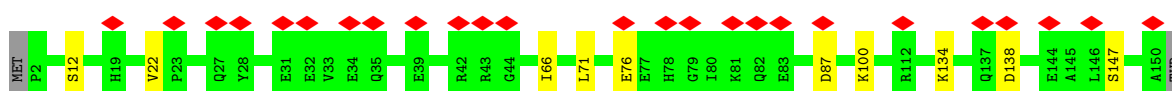
- Molecule 55: Small ribosomal subunit protein uS14

Chain BP: 48% 52% 46%



- Molecule 56: Small ribosomal subunit protein uS15

Chain BQ: 17% 92% 7% ..



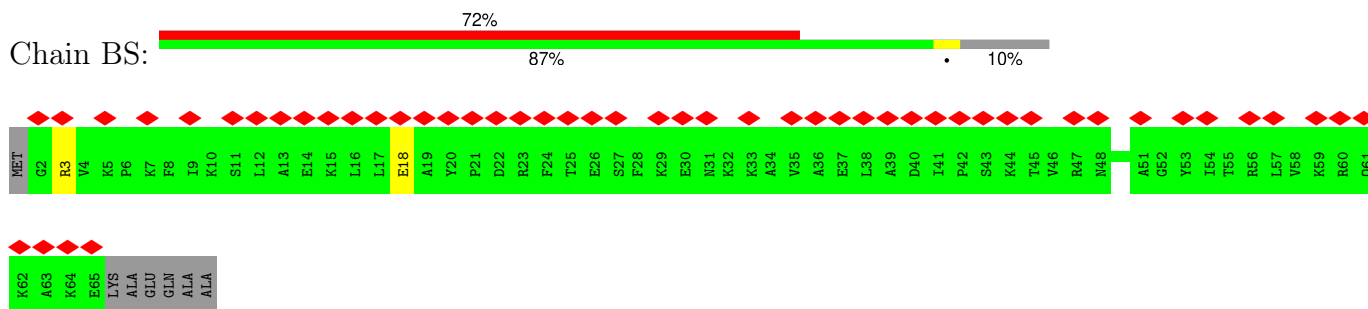
- Molecule 57: Small ribosomal subunit protein uS17

Chain BR: 24% 90% 7% ..

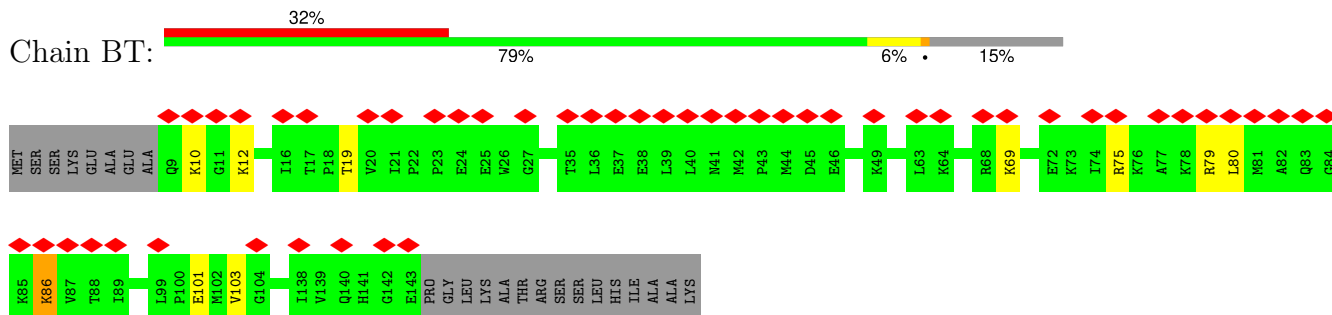


◆◆  
L144  
P145  
SER  
VAL

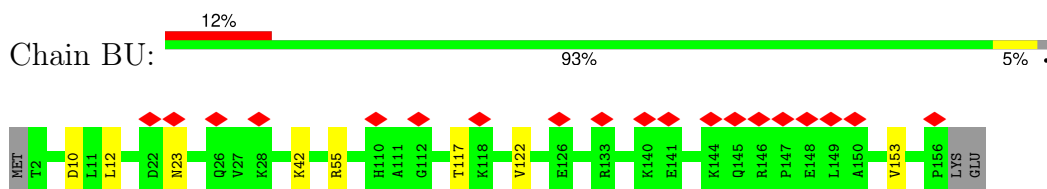
- Molecule 58: Small ribosomal subunit protein eS17



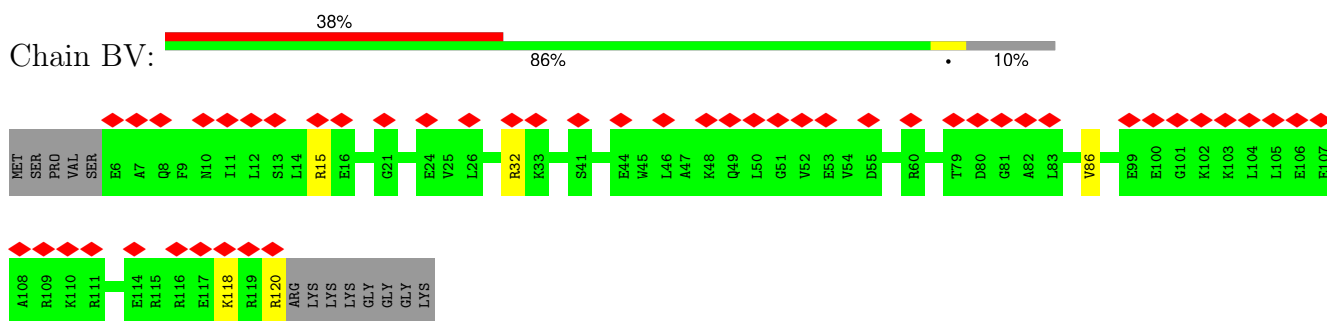
• Molecule 59: Small ribosomal subunit protein uS19



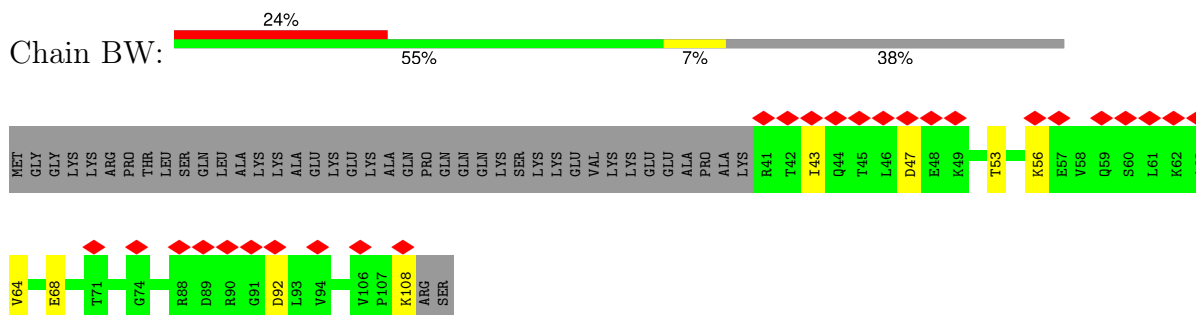
• Molecule 60: Small ribosomal subunit protein eS19



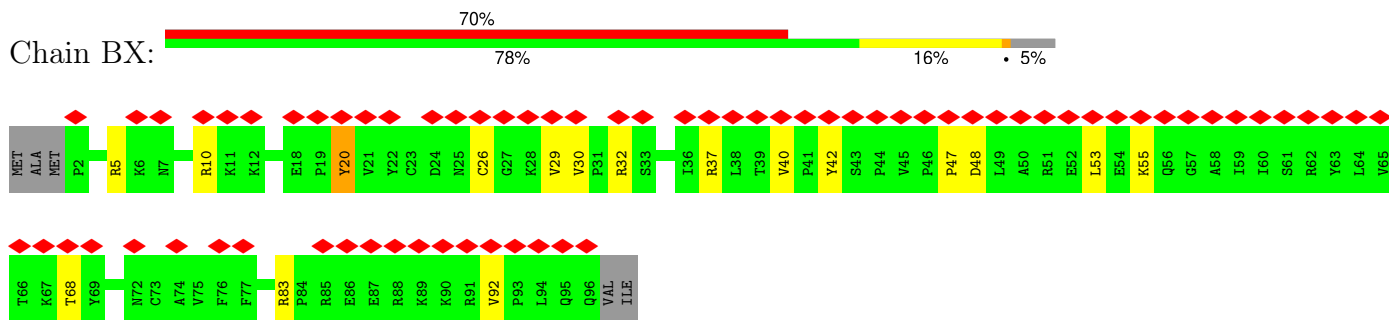
• Molecule 61: Small ribosomal subunit protein eS24



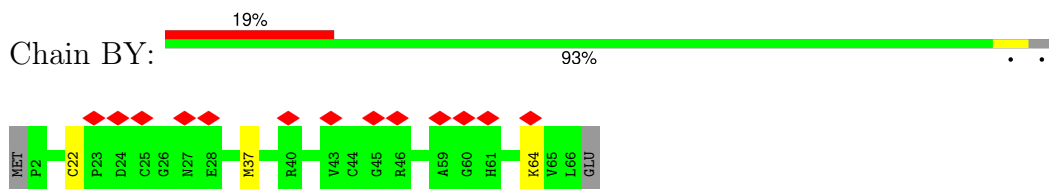
• Molecule 62: SSU ribosomal protein S25E



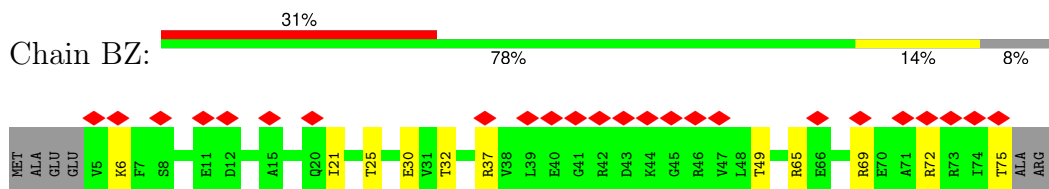
• Molecule 63: SSU ribosomal protein S26E



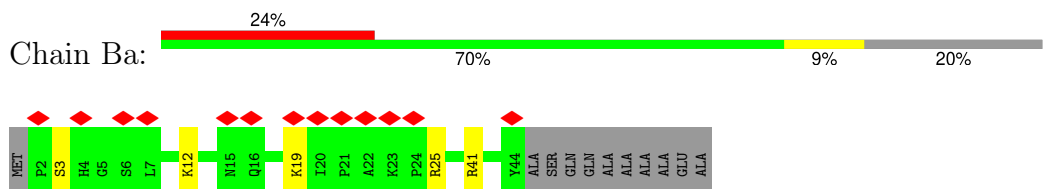
• Molecule 64: Small ribosomal subunit protein eS27



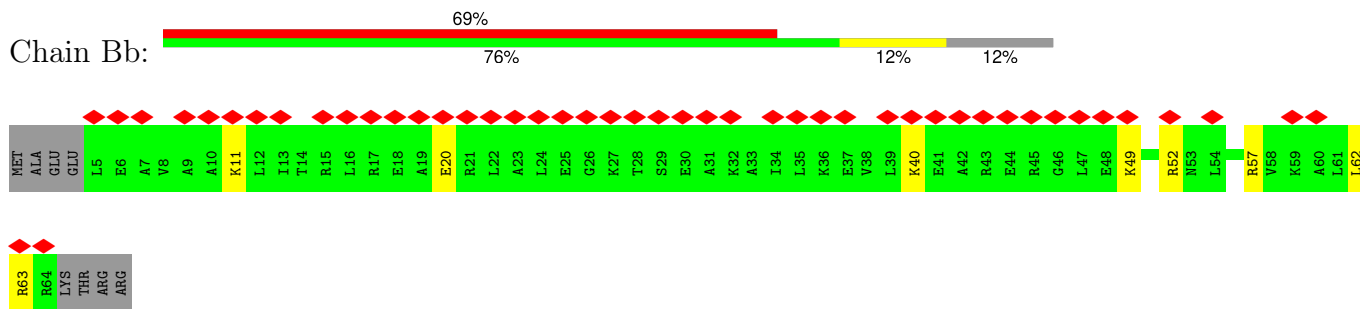
• Molecule 65: eS28



• Molecule 66: SSU ribosomal protein S30E

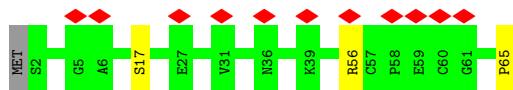


• Molecule 67: aS35



• Molecule 68: Small zinc finger protein HVO-2753-like zinc-binding pocket domain-containing protein





## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	129829	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 ( $e^-/\text{\AA}^2$ )	40	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	1500	Depositor
Magnification	105000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	1.526	Depositor
Minimum map value	-0.618	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.049	Depositor
Recommended contour level	0.215	Depositor
Map size ( $\text{\AA}$ )	504.2144, 504.2144, 504.2144	wwPDB
Map dimensions	608, 608, 608	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	0.8293, 0.8293, 0.8293	Depositor

## 5 Model quality i

### 5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: MA6, 6MZ, IAS, PSU, A2M, 4AC, OMC, B8T, OMU, MG, UR3, M7A, SPM, 5MC, G7M, ZN, OMG

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	2	0.73	0/3096	0.90	1/4830 (0.0%)
2	1	0.60	0/67134	0.88	29/104802 (0.0%)
3	4	0.51	1/33464 (0.0%)	0.92	53/52215 (0.1%)
4	AA	0.37	0/1847	0.61	0/2489
5	AB	0.34	0/2678	0.56	0/3643
6	AC	0.32	0/2234	0.57	1/3024 (0.0%)
7	AD	0.36	0/1431	0.58	0/1913
8	AE	0.34	0/1548	0.55	0/2087
9	AF	0.32	0/1114	0.55	1/1513 (0.1%)
10	AG	0.32	0/1542	0.56	2/2076 (0.1%)
11	AH	0.30	0/1265	0.57	0/1692
12	AI	0.36	0/1093	0.66	1/1487 (0.1%)
13	AJ	0.35	0/795	0.68	1/1068 (0.1%)
13	AK	0.31	0/704	0.60	0/944
14	AL	0.34	0/1225	0.58	0/1639
15	AM	0.33	0/1594	0.58	0/2138
16	AN	0.34	0/1365	0.60	0/1841
17	AO	0.38	0/1647	0.58	0/2212
18	AP	0.30	0/933	0.57	0/1263
19	AQ	0.32	0/1233	0.68	2/1645 (0.1%)
20	AR	0.38	0/610	0.63	0/817
21	AS	0.43	0/805	0.61	0/1081
22	AT	0.32	0/1536	0.57	1/2075 (0.0%)
23	AU	0.30	0/655	0.58	1/877 (0.1%)
24	AV	0.34	0/990	0.67	1/1325 (0.1%)
25	AW	0.36	0/460	0.57	0/613
26	AX	0.36	0/557	0.66	0/738
27	AY	0.35	0/1407	0.62	1/1905 (0.1%)
28	AZ	0.33	0/754	0.58	0/1021
29	Aa	0.32	0/735	0.64	1/986 (0.1%)
30	Ab	0.32	0/1209	0.63	2/1621 (0.1%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
31	Ac	0.32	0/663	0.60	0/889
32	Ad	0.34	0/442	0.59	0/587
33	Ae	0.30	0/562	0.49	0/753
34	Af	0.30	0/423	0.63	0/566
35	Ag	0.31	0/424	0.59	0/564
36	Ah	0.40	0/753	0.59	0/1001
37	Ai	0.35	0/788	0.62	0/1057
38	Aj	0.35	0/1497	0.56	0/2029
39	Ak	0.35	0/754	0.49	0/1005
40	BA	0.32	0/1515	0.69	2/2043 (0.1%)
41	BB	0.37	1/1638 (0.1%)	0.62	0/2221
42	BC	0.30	0/620	0.73	1/831 (0.1%)
43	BD	0.30	0/1308	0.57	0/1755
44	BE	0.35	0/1929	0.63	1/2621 (0.0%)
45	BF	0.34	0/1522	0.60	3/2059 (0.1%)
46	BG	0.32	0/1087	0.66	1/1465 (0.1%)
47	BH	0.32	0/1809	0.59	1/2444 (0.0%)
48	BI	0.36	0/1055	0.57	0/1425
49	BJ	0.33	0/1023	0.61	1/1370 (0.1%)
50	BK	0.32	0/1079	0.59	0/1452
51	BL	0.29	0/324	0.66	0/437
52	BM	0.33	0/951	0.63	0/1288
53	BN	0.38	0/1157	0.63	1/1551 (0.1%)
54	BO	0.30	0/1125	0.61	1/1518 (0.1%)
55	BP	0.29	0/244	0.70	0/324
56	BQ	0.30	0/1254	0.53	0/1692
57	BR	0.33	0/1200	0.58	1/1629 (0.1%)
58	BS	0.31	0/524	0.57	0/698
59	BT	0.31	0/1139	0.60	0/1533
60	BU	0.32	0/1253	0.56	0/1695
61	BV	0.32	0/960	0.59	0/1280
62	BW	0.36	0/551	0.58	0/741
63	BX	0.32	0/787	0.69	0/1054
64	BY	0.33	0/511	0.62	0/689
65	BZ	0.37	0/555	0.71	0/745
66	Ba	0.27	0/364	0.59	0/486
67	Bb	0.30	0/478	0.67	0/634
68	Bc	0.37	0/491	0.62	0/670
All	All	0.49	2/172419 (0.0%)	0.80	111/254381 (0.0%)

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



sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
7	AD	0	2
13	AK	0	1
48	BI	0	3
50	BK	0	1
All	All	0	7

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
41	BB	90	CYS	CB-SG	-6.38	1.71	1.82
3	4	1345	G	P-O5'	5.56	1.65	1.59

All (111) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	4	102	A	OP1-P-OP2	14.34	141.12	119.60
3	4	812	C	OP1-P-O3'	-14.14	74.10	105.20
3	4	101	C	OP1-P-O3'	-14.12	74.14	105.20
3	4	812	C	OP2-P-O3'	-11.60	79.69	105.20
2	1	1603	G	OP1-P-O3'	-11.16	80.64	105.20
2	1	1679	U	OP1-P-O3'	-11.16	80.65	105.20
3	4	1078	C	OP1-P-O3'	-11.15	80.68	105.20
3	4	1177	G	OP2-P-O3'	-10.93	81.16	105.20
3	4	808	G	OP1-P-O3'	-10.63	81.82	105.20
3	4	808	G	OP2-P-O3'	-10.36	82.41	105.20
3	4	101	C	OP2-P-O3'	-10.03	83.13	105.20
40	BA	162	ASP	CB-CG-OD1	9.99	127.29	118.30
3	4	1177	G	OP1-P-O3'	-9.95	83.31	105.20
3	4	1078	C	OP2-P-O3'	-9.87	83.49	105.20
2	1	1679	U	OP2-P-O3'	-9.83	83.57	105.20
2	1	2903	U	P-O3'-C3'	-9.81	107.92	119.70
40	BA	99	ASP	CB-CG-OD1	9.64	126.98	118.30
3	4	1156	C	N1-C2-O2	9.61	124.67	118.90
19	AQ	3	ASP	CB-CG-OD1	9.46	126.82	118.30
3	4	1156	C	C2-N1-C1'	9.42	129.17	118.80
22	AT	123	ASP	CB-CG-OD2	9.39	126.75	118.30
27	AY	34	ASP	CB-CG-OD1	9.37	126.73	118.30
2	1	1603	G	OP2-P-O3'	-9.13	85.11	105.20
2	1	1564	G	P-O3'-C3'	-9.03	108.86	119.70
46	BG	10	ASP	CB-CG-OD1	9.01	126.41	118.30
12	AI	32	ASP	CB-CG-OD1	8.95	126.35	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	4	296	C	P-O3'-C3'	-8.85	109.09	119.70
24	AV	105	ASP	CB-CG-OD1	8.65	126.08	118.30
3	4	1013	C	N1-C2-O2	8.40	123.94	118.90
2	1	2571	PSU	P-O3'-C3'	-8.40	109.62	119.70
19	AQ	110	ASP	CB-CG-OD1	8.39	125.86	118.30
13	AJ	59	ASP	CB-CG-OD2	8.31	125.78	118.30
2	1	2143	OMC	P-O3'-C3'	-8.26	109.79	119.70
1	2	1	G	P-O3'-C3'	-8.16	109.90	119.70
29	Aa	82	ASP	CB-CG-OD1	8.07	125.56	118.30
3	4	813	G	OP1-P-OP2	7.62	131.03	119.60
3	4	809	G	OP1-P-OP2	7.55	130.92	119.60
2	1	1680	U	OP1-P-OP2	7.53	130.89	119.60
3	4	1383	G	P-O3'-C3'	-7.50	110.70	119.70
3	4	1079	C	OP1-P-OP2	7.46	130.79	119.60
3	4	1156	C	N3-C2-O2	-7.45	116.68	121.90
53	BN	118	ASP	CB-CG-OD1	7.44	125.00	118.30
3	4	1440	C	P-O3'-C3'	-7.43	110.78	119.70
3	4	357	A	P-O3'-C3'	-7.38	110.85	119.70
9	AF	6	ASP	CB-CG-OD1	7.20	124.78	118.30
44	BE	148	ASP	CB-CG-OD2	7.14	124.73	118.30
3	4	1178	A	OP1-P-OP2	7.14	130.31	119.60
47	BH	49	ASP	CB-CG-OD1	7.12	124.71	118.30
2	1	1604	C	OP1-P-OP2	7.12	130.27	119.60
3	4	1013	C	N3-C2-O2	-7.07	116.95	121.90
42	BC	183	PRO	N-CA-CB	-7.04	94.85	103.30
2	1	2175	C	C2-N1-C1'	6.97	126.46	118.80
3	4	1436	C	C5-C6-N1	6.96	124.48	121.00
3	4	1013	C	C2-N1-C1'	6.90	126.39	118.80
3	4	8	U	C2-N1-C1'	6.88	125.96	117.70
2	1	1442	U	C2-N1-C1'	6.83	125.90	117.70
2	1	2118	G	O5'-P-OP2	-6.76	99.61	105.70
2	1	1549	U	N3-C2-O2	-6.75	117.47	122.20
3	4	715	C	C2-N1-C1'	6.73	126.20	118.80
2	1	1549	U	N1-C2-O2	6.70	127.49	122.80
2	1	541	G	O4'-C1'-N9	6.68	113.55	108.20
3	4	1156	C	C6-N1-C1'	-6.66	112.81	120.80
3	4	480	C	C2-N1-C1'	6.63	126.09	118.80
30	Ab	43	ASP	CB-CG-OD1	6.47	124.12	118.30
2	1	2175	C	N1-C2-O2	6.38	122.73	118.90
23	AU	7	ILE	CG1-CB-CG2	-6.30	97.54	111.40
3	4	1384	A	P-O3'-C3'	-6.29	112.16	119.70
3	4	1179	A	OP1-P-O3'	6.26	118.98	105.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	4	480	C	N3-C2-O2	-6.26	117.52	121.90
3	4	1436	C	C6-N1-C2	-6.25	117.80	120.30
3	4	1053	G	OP2-P-O3'	6.01	118.43	105.20
2	1	903	A	O5'-P-OP1	-6.01	100.29	105.70
3	4	1441	A	P-O3'-C3'	-5.98	112.52	119.70
2	1	1549	U	C2-N1-C1'	5.96	124.86	117.70
57	BR	42	ASP	CB-CG-OD1	5.94	123.65	118.30
3	4	1191	G	C4-N9-C1'	5.92	134.20	126.50
3	4	1156	C	C6-N1-C2	-5.88	117.95	120.30
3	4	1444	G	P-O3'-C3'	5.77	126.62	119.70
3	4	480	C	N1-C2-O2	5.67	122.30	118.90
3	4	1179	A	P-O3'-C3'	5.66	126.49	119.70
54	BO	30	ARG	O-C-N	-5.65	113.60	123.20
3	4	1036	G	P-O3'-C3'	5.64	126.47	119.70
3	4	8	U	N1-C2-O2	5.58	126.71	122.80
2	1	2533	C	N3-C2-O2	-5.58	118.00	121.90
3	4	255	U	C2-N1-C1'	5.54	124.35	117.70
2	1	391	U	C2-N1-C1'	5.53	124.33	117.70
3	4	480	C	C6-N1-C2	-5.53	118.09	120.30
2	1	1442	U	N1-C2-O2	5.50	126.65	122.80
10	AG	126	ASP	CB-CG-OD1	5.45	123.20	118.30
2	1	1102	A	N1-C6-N6	-5.43	115.34	118.60
2	1	2917	C	N3-C2-O2	-5.43	118.10	121.90
3	4	1450	G	C8-N9-C1'	-5.39	119.99	127.00
2	1	1102	A	N3-C4-N9	-5.39	123.09	127.40
2	1	2175	C	C6-N1-C1'	-5.38	114.34	120.80
3	4	1156	C	C5-C6-N1	5.36	123.68	121.00
45	BF	11	PRO	CA-N-CD	-5.31	104.07	111.50
2	1	391	U	N1-C2-O2	5.31	126.52	122.80
45	BF	10	GLU	C-N-CD	-5.24	109.06	120.60
6	AC	13	LEU	CA-CB-CG	5.24	127.36	115.30
2	1	1075	G	C4-N9-C1'	5.24	133.31	126.50
3	4	1053	G	P-O3'-C3'	5.24	125.99	119.70
3	4	1450	G	C4-N9-C1'	5.23	133.30	126.50
3	4	358	G	C4'-C3'-C2'	-5.23	97.37	102.60
3	4	7	OMG	P-O3'-C3'	5.21	125.95	119.70
10	AG	21	ASP	CB-CG-OD1	5.21	122.98	118.30
45	BF	13	THR	C-N-CA	5.19	134.66	121.70
49	BJ	93	ASP	CB-CG-OD1	5.16	122.94	118.30
30	Ab	100	ASP	CB-CG-OD1	5.09	122.88	118.30
3	4	358	G	C2'-C3'-O3'	5.08	121.83	113.70
3	4	8	U	N3-C2-O2	-5.07	118.65	122.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	1	1173	G	C4-N9-C1'	5.04	133.06	126.50

There are no chirality outliers.

All (7) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
7	AD	77	ARG	Sidechain
7	AD	78	ARG	Sidechain
13	AK	38	GLY	Peptide
48	BI	28	TRP	Peptide
48	BI	76	ARG	Peptide,Sidechain
50	BK	10	ASN	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	
4	AA	237/244 (97%)	228 (96%)	9 (4%)	0	100	100
5	AB	334/338 (99%)	326 (98%)	8 (2%)	0	100	100
6	AC	276/285 (97%)	271 (98%)	5 (2%)	0	100	100
7	AD	176/178 (99%)	169 (96%)	7 (4%)	0	100	100
8	AE	193/196 (98%)	189 (98%)	4 (2%)	0	100	100
9	AF	143/149 (96%)	141 (99%)	2 (1%)	0	100	100
10	AG	181/186 (97%)	177 (98%)	4 (2%)	0	100	100
11	AH	153/157 (98%)	151 (99%)	2 (1%)	0	100	100
12	AI	136/144 (94%)	134 (98%)	2 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
13	AJ	99/103 (96%)	95 (96%)	4 (4%)	0	100	100
13	AK	88/103 (85%)	83 (94%)	5 (6%)	0	100	100
14	AL	150/156 (96%)	144 (96%)	6 (4%)	0	100	100
15	AM	182/189 (96%)	178 (98%)	4 (2%)	0	100	100
16	AN	167/178 (94%)	162 (97%)	5 (3%)	0	100	100
17	AO	198/205 (97%)	198 (100%)	0	0	100	100
18	AP	119/122 (98%)	118 (99%)	1 (1%)	0	100	100
19	AQ	144/147 (98%)	143 (99%)	1 (1%)	0	100	100
20	AR	74/78 (95%)	74 (100%)	0	0	100	100
21	AS	96/99 (97%)	89 (93%)	7 (7%)	0	100	100
22	AT	181/184 (98%)	180 (99%)	1 (1%)	0	100	100
23	AU	79/81 (98%)	76 (96%)	3 (4%)	0	100	100
24	AV	119/128 (93%)	117 (98%)	1 (1%)	1 (1%)	16	17
25	AW	54/62 (87%)	53 (98%)	1 (2%)	0	100	100
26	AX	65/79 (82%)	65 (100%)	0	0	100	100
27	AY	170/179 (95%)	161 (95%)	8 (5%)	1 (1%)	22	24
28	AZ	96/101 (95%)	93 (97%)	3 (3%)	0	100	100
29	Aa	86/91 (94%)	85 (99%)	1 (1%)	0	100	100
30	Ab	138/153 (90%)	137 (99%)	1 (1%)	0	100	100
31	Ac	81/84 (96%)	80 (99%)	1 (1%)	0	100	100
32	Ad	50/52 (96%)	48 (96%)	2 (4%)	0	100	100
33	Ae	64/67 (96%)	63 (98%)	1 (2%)	0	100	100
34	Af	48/51 (94%)	45 (94%)	3 (6%)	0	100	100
35	Ag	48/53 (91%)	48 (100%)	0	0	100	100
36	Ah	89/91 (98%)	89 (100%)	0	0	100	100
37	Ai	97/102 (95%)	89 (92%)	8 (8%)	0	100	100
38	Aj	181/184 (98%)	172 (95%)	9 (5%)	0	100	100
39	Ak	88/93 (95%)	87 (99%)	1 (1%)	0	100	100
40	BA	185/222 (83%)	180 (97%)	4 (2%)	1 (0%)	25	28
41	BB	196/208 (94%)	187 (95%)	9 (5%)	0	100	100
42	BC	75/216 (35%)	58 (77%)	16 (21%)	1 (1%)	10	8

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
43	BD	155/159 (98%)	153 (99%)	2 (1%)	0	100	100
44	BE	234/237 (99%)	219 (94%)	13 (6%)	2 (1%)	14	14
45	BF	192/202 (95%)	180 (94%)	11 (6%)	1 (0%)	25	28
46	BG	138/151 (91%)	130 (94%)	8 (6%)	0	100	100
47	BH	218/223 (98%)	206 (94%)	12 (6%)	0	100	100
48	BI	127/130 (98%)	121 (95%)	5 (4%)	1 (1%)	16	17
49	BJ	128/131 (98%)	124 (97%)	4 (3%)	0	100	100
50	BK	132/142 (93%)	119 (90%)	11 (8%)	2 (2%)	8	7
51	BL	36/106 (34%)	30 (83%)	5 (14%)	1 (3%)	4	2
52	BM	123/141 (87%)	116 (94%)	7 (6%)	0	100	100
53	BN	142/147 (97%)	130 (92%)	10 (7%)	2 (1%)	9	7
54	BO	141/153 (92%)	129 (92%)	12 (8%)	0	100	100
55	BP	27/54 (50%)	21 (78%)	5 (18%)	1 (4%)	2	1
56	BQ	147/151 (97%)	146 (99%)	1 (1%)	0	100	100
57	BR	142/147 (97%)	139 (98%)	3 (2%)	0	100	100
58	BS	62/71 (87%)	57 (92%)	5 (8%)	0	100	100
59	BT	133/158 (84%)	128 (96%)	4 (3%)	1 (1%)	16	17
60	BU	153/158 (97%)	146 (95%)	7 (5%)	0	100	100
61	BV	113/128 (88%)	111 (98%)	2 (2%)	0	100	100
62	BW	66/110 (60%)	64 (97%)	1 (2%)	1 (2%)	8	7
63	BX	93/100 (93%)	69 (74%)	18 (19%)	6 (6%)	1	0
64	BY	63/67 (94%)	57 (90%)	6 (10%)	0	100	100
65	BZ	69/77 (90%)	63 (91%)	6 (9%)	0	100	100
66	Ba	41/54 (76%)	41 (100%)	0	0	100	100
67	Bb	58/68 (85%)	57 (98%)	1 (2%)	0	100	100
68	Bc	62/65 (95%)	59 (95%)	3 (5%)	0	100	100
All	All	8331/9068 (92%)	7998 (96%)	311 (4%)	22 (0%)	38	43

All (22) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
44	BE	185	GLY
44	BE	186	GLY

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Mol	Chain	Res	Type
50	BK	10	ASN
53	BN	5	LYS
53	BN	6	SER
63	BX	29	VAL
63	BX	47	PRO
42	BC	183	PRO
45	BF	13	THR
27	AY	24	THR
40	BA	66	LYS
48	BI	29	PRO
51	BL	59	SER
63	BX	42	TYR
24	AV	3	PHE
63	BX	20	TYR
63	BX	53	LEU
50	BK	21	LYS
55	BP	29	ILE
62	BW	43	ILE
59	BT	86	LYS
63	BX	5	ARG

### 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
4	AA	181/186 (97%)	174 (96%)	7 (4%)	27 36
5	AB	280/282 (99%)	269 (96%)	11 (4%)	27 36
6	AC	226/231 (98%)	218 (96%)	8 (4%)	31 40
7	AD	149/149 (100%)	138 (93%)	11 (7%)	11 11
8	AE	165/165 (100%)	159 (96%)	6 (4%)	30 39
9	AF	115/118 (98%)	110 (96%)	5 (4%)	25 31
10	AG	163/165 (99%)	158 (97%)	5 (3%)	35 44
11	AH	133/135 (98%)	128 (96%)	5 (4%)	28 37

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
12	AI	115/118 (98%)	114 (99%)	1 (1%)	75	85
13	AJ	87/89 (98%)	81 (93%)	6 (7%)	13	13
13	AK	77/89 (86%)	70 (91%)	7 (9%)	7	7
14	AL	121/125 (97%)	112 (93%)	9 (7%)	11	11
15	AM	161/165 (98%)	153 (95%)	8 (5%)	20	25
16	AN	134/140 (96%)	128 (96%)	6 (4%)	23	29
17	AO	166/169 (98%)	163 (98%)	3 (2%)	54	67
18	AP	99/100 (99%)	97 (98%)	2 (2%)	50	63
19	AQ	127/128 (99%)	122 (96%)	5 (4%)	27	36
20	AR	69/71 (97%)	62 (90%)	7 (10%)	6	5
21	AS	84/85 (99%)	82 (98%)	2 (2%)	44	55
22	AT	157/158 (99%)	152 (97%)	5 (3%)	34	43
23	AU	71/71 (100%)	69 (97%)	2 (3%)	38	49
24	AV	107/112 (96%)	100 (94%)	7 (6%)	14	15
25	AW	48/53 (91%)	47 (98%)	1 (2%)	48	61
26	AX	58/65 (89%)	55 (95%)	3 (5%)	19	23
27	AY	147/152 (97%)	137 (93%)	10 (7%)	13	14
28	AZ	77/79 (98%)	71 (92%)	6 (8%)	10	10
29	Aa	78/81 (96%)	77 (99%)	1 (1%)	65	77
30	Ab	125/137 (91%)	122 (98%)	3 (2%)	44	55
31	Ac	67/68 (98%)	65 (97%)	2 (3%)	36	46
32	Ad	44/44 (100%)	43 (98%)	1 (2%)	45	56
33	Ae	60/61 (98%)	60 (100%)	0	100	100
34	Af	42/43 (98%)	39 (93%)	3 (7%)	12	12
35	Ag	46/49 (94%)	46 (100%)	0	100	100
36	Ah	82/82 (100%)	79 (96%)	3 (4%)	29	38
37	Ai	77/80 (96%)	74 (96%)	3 (4%)	27	36
38	Aj	161/162 (99%)	153 (95%)	8 (5%)	20	25
39	Ak	79/82 (96%)	72 (91%)	7 (9%)	8	7
40	BA	157/181 (87%)	143 (91%)	14 (9%)	8	7
41	BB	174/182 (96%)	161 (92%)	13 (8%)	11	11

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
42	BC	63/183 (34%)	49 (78%)	14 (22%)	1	0
43	BD	136/138 (99%)	129 (95%)	7 (5%)	20	24
44	BE	203/204 (100%)	189 (93%)	14 (7%)	13	13
45	BF	161/169 (95%)	151 (94%)	10 (6%)	15	17
46	BG	114/121 (94%)	108 (95%)	6 (5%)	19	23
47	BH	191/193 (99%)	183 (96%)	8 (4%)	25	32
48	BI	109/110 (99%)	100 (92%)	9 (8%)	9	9
49	BJ	105/106 (99%)	98 (93%)	7 (7%)	13	14
50	BK	110/117 (94%)	93 (84%)	17 (16%)	2	2
51	BL	34/94 (36%)	27 (79%)	7 (21%)	1	1
52	BM	93/106 (88%)	84 (90%)	9 (10%)	6	6
53	BN	117/120 (98%)	111 (95%)	6 (5%)	20	24
54	BO	113/119 (95%)	104 (92%)	9 (8%)	10	10
55	BP	25/48 (52%)	25 (100%)	0	100	100
56	BQ	135/137 (98%)	125 (93%)	10 (7%)	11	11
57	BR	131/134 (98%)	121 (92%)	10 (8%)	11	11
58	BS	55/59 (93%)	53 (96%)	2 (4%)	30	39
59	BT	120/137 (88%)	110 (92%)	10 (8%)	9	9
60	BU	127/130 (98%)	119 (94%)	8 (6%)	15	16
61	BV	101/111 (91%)	96 (95%)	5 (5%)	20	25
62	BW	59/94 (63%)	52 (88%)	7 (12%)	4	4
63	BX	85/89 (96%)	73 (86%)	12 (14%)	3	2
64	BY	55/57 (96%)	52 (94%)	3 (6%)	18	20
65	BZ	59/63 (94%)	48 (81%)	11 (19%)	1	1
66	Ba	39/44 (89%)	34 (87%)	5 (13%)	3	3
67	Bb	49/56 (88%)	41 (84%)	8 (16%)	2	1
68	Bc	51/52 (98%)	48 (94%)	3 (6%)	16	18
All	All	7149/7643 (94%)	6726 (94%)	423 (6%)	19	18

All (423) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	AA	79	GLN

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
4	AA	98	PRO
4	AA	119	SER
4	AA	130	ARG
4	AA	133	GLU
4	AA	169	PHE
4	AA	230	CYS
5	AB	38	LYS
5	AB	56	VAL
5	AB	117	VAL
5	AB	122	GLU
5	AB	128	LYS
5	AB	134	GLU
5	AB	187	LYS
5	AB	221	VAL
5	AB	236	ARG
5	AB	268	ARG
5	AB	294	PRO
6	AC	26	ARG
6	AC	36	VAL
6	AC	41	MET
6	AC	87	GLU
6	AC	163	VAL
6	AC	169	LEU
6	AC	254	HIS
6	AC	279	ARG
7	AD	9	VAL
7	AD	61	ASP
7	AD	65	ARG
7	AD	86	MET
7	AD	102	ASP
7	AD	112	LYS
7	AD	122	TYR
7	AD	136	ARG
7	AD	152	SER
7	AD	153	LYS
7	AD	163	GLU
8	AE	1	MET
8	AE	61	VAL
8	AE	123	LYS
8	AE	130	LYS
8	AE	133	LYS
8	AE	137	LYS

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
9	AF	8	LYS
9	AF	13	ASN
9	AF	29	ASP
9	AF	49	LYS
9	AF	134	ASN
10	AG	4	LYS
10	AG	15	LYS
10	AG	107	VAL
10	AG	131	ARG
10	AG	139	PRO
11	AH	37	LEU
11	AH	102	SER
11	AH	107	SER
11	AH	149	SER
11	AH	154	GLU
12	AI	117	LYS
13	AJ	27	ASP
13	AJ	65	LYS
13	AJ	66	LYS
13	AJ	72	GLU
13	AJ	89	ARG
13	AJ	96	GLU
13	AK	13	LYS
13	AK	21	ARG
13	AK	59	ASP
13	AK	61	LYS
13	AK	65	LYS
13	AK	66	LYS
13	AK	69	SER
14	AL	46	SER
14	AL	47	LEU
14	AL	58	TRP
14	AL	81	VAL
14	AL	92	ARG
14	AL	103	ARG
14	AL	134	SER
14	AL	149	ARG
14	AL	151	VAL
15	AM	21	GLU
15	AM	26	SER
15	AM	33	LYS
15	AM	69	ARG

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
15	AM	72	PHE
15	AM	143	ARG
15	AM	158	ARG
15	AM	173	GLU
16	AN	30	GLN
16	AN	39	THR
16	AN	58	ARG
16	AN	70	ARG
16	AN	103	MET
16	AN	111	ARG
17	AO	64	THR
17	AO	161	GLU
17	AO	168	SER
18	AP	43	ARG
18	AP	62	ASP
19	AQ	2	VAL
19	AQ	43	ASP
19	AQ	113	THR
19	AQ	119	ARG
19	AQ	128	ASP
20	AR	6	ARG
20	AR	16	LYS
20	AR	24	GLU
20	AR	49	ARG
20	AR	51	ARG
20	AR	64	ASN
20	AR	77	ARG
21	AS	4	ARG
21	AS	14	LYS
22	AT	9	THR
22	AT	20	LYS
22	AT	58	LYS
22	AT	72	ARG
22	AT	171	GLU
23	AU	17	ARG
23	AU	37	GLU
24	AV	76	ARG
24	AV	101	VAL
24	AV	104	VAL
24	AV	113	ARG
24	AV	115	LYS
24	AV	118	GLU

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
24	AV	122	ARG
25	AW	48	ARG
26	AX	9	LYS
26	AX	32	LYS
26	AX	43	GLU
27	AY	63	TRP
27	AY	70	ASP
27	AY	72	ASP
27	AY	83	ARG
27	AY	96	GLN
27	AY	125	LYS
27	AY	130	GLN
27	AY	173	ASP
27	AY	174	LEU
27	AY	176	LYS
28	AZ	6	ARG
28	AZ	25	LYS
28	AZ	34	LYS
28	AZ	44	ARG
28	AZ	69	ILE
28	AZ	92	SER
29	Aa	22	GLU
30	Ab	25	ARG
30	Ab	117	ARG
30	Ab	122	LYS
31	Ac	49	SER
31	Ac	57	SER
32	Ad	41	ARG
34	Af	36	THR
34	Af	37	ARG
34	Af	46	ARG
36	Ah	5	LYS
36	Ah	30	ARG
36	Ah	41	GLU
37	Ai	39	ARG
37	Ai	95	LYS
37	Ai	97	LYS
38	Aj	7	TYR
38	Aj	14	ARG
38	Aj	53	SER
38	Aj	54	ASP
38	Aj	58	THR

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
38	Aj	86	LYS
38	Aj	148	LYS
38	Aj	165	VAL
39	Ak	3	LEU
39	Ak	5	SER
39	Ak	37	THR
39	Ak	48	ASP
39	Ak	55	LYS
39	Ak	84	ARG
39	Ak	85	GLN
40	BA	24	LEU
40	BA	54	LYS
40	BA	65	THR
40	BA	66	LYS
40	BA	81	ARG
40	BA	86	ASN
40	BA	89	THR
40	BA	113	MET
40	BA	116	THR
40	BA	122	ASP
40	BA	144	SER
40	BA	156	LYS
40	BA	160	GLU
40	BA	162	ASP
41	BB	16	TYR
41	BB	26	ARG
41	BB	33	GLU
41	BB	39	TYR
41	BB	91	LYS
41	BB	95	CYS
41	BB	111	ASN
41	BB	114	ASN
41	BB	174	PHE
41	BB	177	LEU
41	BB	183	ARG
41	BB	196	VAL
41	BB	203	THR
42	BC	131	MET
42	BC	150	ARG
42	BC	164	ILE
42	BC	166	TYR
42	BC	171	ARG

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
42	BC	173	ARG
42	BC	177	VAL
42	BC	181	LEU
42	BC	182	LYS
42	BC	183	PRO
42	BC	185	ILE
42	BC	198	ARG
42	BC	199	TYR
42	BC	200	SER
43	BD	5	LYS
43	BD	22	LYS
43	BD	30	GLN
43	BD	64	THR
43	BD	126	GLN
43	BD	146	LEU
43	BD	152	GLU
44	BE	2	VAL
44	BE	6	LYS
44	BE	33	SER
44	BE	46	ASP
44	BE	66	ILE
44	BE	79	PRO
44	BE	121	ARG
44	BE	151	ARG
44	BE	152	GLN
44	BE	174	LEU
44	BE	202	LYS
44	BE	214	GLU
44	BE	215	GLU
44	BE	218	ARG
45	BF	12	LYS
45	BF	13	THR
45	BF	44	ASP
45	BF	70	ASN
45	BF	82	ASP
45	BF	92	SER
45	BF	95	VAL
45	BF	117	CYS
45	BF	132	PHE
45	BF	171	ASP
46	BG	13	SER
46	BG	17	ARG

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
46	BG	19	PHE
46	BG	63	VAL
46	BG	68	MET
46	BG	102	ARG
47	BH	32	LYS
47	BH	51	VAL
47	BH	97	ARG
47	BH	156	VAL
47	BH	160	VAL
47	BH	169	SER
47	BH	179	GLN
47	BH	205	LYS
48	BI	18	GLU
48	BI	23	ARG
48	BI	25	VAL
48	BI	47	VAL
48	BI	57	ARG
48	BI	68	LYS
48	BI	97	ARG
48	BI	118	GLU
48	BI	129	VAL
49	BJ	19	LYS
49	BJ	48	TYR
49	BJ	60	ARG
49	BJ	75	ARG
49	BJ	76	ARG
49	BJ	81	LYS
49	BJ	114	VAL
50	BK	5	SER
50	BK	8	GLN
50	BK	10	ASN
50	BK	20	LYS
50	BK	30	LYS
50	BK	33	MET
50	BK	43	LEU
50	BK	55	MET
50	BK	64	ASP
50	BK	76	ARG
50	BK	105	LYS
50	BK	106	LYS
50	BK	114	TYR
50	BK	117	LYS

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
50	BK	124	GLU
50	BK	126	LYS
50	BK	135	SER
51	BL	43	ILE
51	BL	47	THR
51	BL	55	ARG
51	BL	64	HIS
51	BL	65	THR
51	BL	68	HIS
51	BL	74	SER
52	BM	24	TYR
52	BM	36	ASP
52	BM	47	SER
52	BM	56	LYS
52	BM	73	GLN
52	BM	93	TYR
52	BM	96	LYS
52	BM	114	LEU
52	BM	139	ARG
53	BN	4	LYS
53	BN	5	LYS
53	BN	8	TYR
53	BN	40	LYS
53	BN	99	GLU
53	BN	115	SER
54	BO	19	ASN
54	BO	30	ARG
54	BO	34	ILE
54	BO	104	ARG
54	BO	111	LYS
54	BO	122	LEU
54	BO	131	THR
54	BO	136	ARG
54	BO	137	PHE
56	BQ	12	SER
56	BQ	22	VAL
56	BQ	66	ILE
56	BQ	71	LEU
56	BQ	76	GLU
56	BQ	87	ASP
56	BQ	100	LYS
56	BQ	134	LYS

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
56	BQ	138	ASP
56	BQ	147	SER
57	BR	16	VAL
57	BR	22	LYS
57	BR	24	VAL
57	BR	62	THR
57	BR	75	THR
57	BR	96	ARG
57	BR	102	CYS
57	BR	110	LYS
57	BR	116	THR
57	BR	140	LYS
58	BS	3	ARG
58	BS	18	GLU
59	BT	10	LYS
59	BT	12	LYS
59	BT	19	THR
59	BT	69	LYS
59	BT	75	ARG
59	BT	79	ARG
59	BT	80	LEU
59	BT	86	LYS
59	BT	101	GLU
59	BT	103	VAL
60	BU	10	ASP
60	BU	12	LEU
60	BU	23	ASN
60	BU	42	LYS
60	BU	55	ARG
60	BU	117	THR
60	BU	122	VAL
60	BU	153	VAL
61	BV	15	ARG
61	BV	32	ARG
61	BV	86	VAL
61	BV	118	LYS
61	BV	120	ARG
62	BW	47	ASP
62	BW	53	THR
62	BW	56	LYS
62	BW	64	VAL
62	BW	68	GLU

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
62	BW	92	ASP
62	BW	108	LYS
63	BX	10	ARG
63	BX	20	TYR
63	BX	26	CYS
63	BX	30	VAL
63	BX	32	ARG
63	BX	37	ARG
63	BX	40	VAL
63	BX	48	ASP
63	BX	55	LYS
63	BX	68	THR
63	BX	83	ARG
63	BX	92	VAL
64	BY	22	CYS
64	BY	37	MET
64	BY	64	LYS
65	BZ	6	LYS
65	BZ	21	ILE
65	BZ	25	THR
65	BZ	30	GLU
65	BZ	32	THR
65	BZ	37	ARG
65	BZ	49	THR
65	BZ	65	ARG
65	BZ	69	ARG
65	BZ	72	ARG
65	BZ	75	THR
66	Ba	3	SER
66	Ba	12	LYS
66	Ba	19	LYS
66	Ba	25	ARG
66	Ba	41	ARG
67	Bb	11	LYS
67	Bb	20	GLU
67	Bb	40	LYS
67	Bb	49	LYS
67	Bb	52	ARG
67	Bb	57	ARG
67	Bb	62	LEU
67	Bb	63	ARG
68	Bc	17	SER

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Mol	Chain	Res	Type
68	Bc	56	ARG
68	Bc	65	PRO

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
8	AE	111	GLN
23	AU	50	ASN
29	Aa	74	HIS
38	Aj	131	HIS
38	Aj	150	ASN
42	BC	178	HIS
45	BF	33	ASN
45	BF	61	GLN
48	BI	108	GLN

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	2	129/129 (100%)	10 (7%)	2 (1%)
2	1	2841/3024 (93%)	341 (12%)	28 (0%)
3	4	1418/1498 (94%)	258 (18%)	38 (2%)
All	All	4388/4651 (94%)	609 (13%)	68 (1%)

All (609) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	2	2	C
1	2	8	A
1	2	28	G
1	2	48	A
1	2	54	G
1	2	59	U
1	2	60	A
1	2	76	U
1	2	98	G
1	2	117	G
2	1	2	A
2	1	38	5MC
2	1	43	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	1	63	A
2	1	66	A
2	1	67	G
2	1	75	U
2	1	76	A
2	1	77	G
2	1	83	G
2	1	93	G
2	1	109	A
2	1	110	A
2	1	111	U
2	1	118	U
2	1	134	U
2	1	135	A
2	1	154	G
2	1	158	C
2	1	162	A
2	1	177	A
2	1	196	G
2	1	197	A
2	1	203	A
2	1	204	G
2	1	211	G
2	1	229	G
2	1	230	C
2	1	233	C
2	1	247	G
2	1	258	A
2	1	269	A
2	1	270	C
2	1	292	U
2	1	294	G
2	1	303	C
2	1	304	A
2	1	305	A
2	1	328	G
2	1	329	U
2	1	330	G
2	1	358	A
2	1	359	U
2	1	366	G
2	1	373	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	1	374	A
2	1	389	A
2	1	390	G
2	1	399	U
2	1	422	U
2	1	423	U
2	1	435	G
2	1	442	C
2	1	457	G
2	1	488	A
2	1	489	G
2	1	504	G
2	1	512	G
2	1	523	G
2	1	534	A
2	1	535	G
2	1	536	A
2	1	537	G
2	1	558	G
2	1	575	G
2	1	576	G
2	1	578	U
2	1	579	G
2	1	606	C
2	1	613	G
2	1	614	U
2	1	629	C
2	1	644	A
2	1	655	C
2	1	656	A
2	1	668	G
2	1	669	U
2	1	684	A
2	1	685	G
2	1	698	A
2	1	723	C
2	1	724	A
2	1	725	G
2	1	772	A
2	1	803	U
2	1	826	G
2	1	833	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	1	834	A
2	1	835	G
2	1	836	C
2	1	847	C
2	1	860	U
2	1	865	U
2	1	881	G
2	1	882	A
2	1	893	G
2	1	900	A
2	1	902	OMG
2	1	903	A
2	1	907	A
2	1	910	A
2	1	923	G
2	1	930	C
2	1	945	C
2	1	946	U
2	1	965	G
2	1	968	G
2	1	978	G
2	1	989	A
2	1	1021	C
2	1	1029	A
2	1	1031	C
2	1	1067	G
2	1	1074	U
2	1	1075	G
2	1	1082	G
2	1	1095	G
2	1	1101	A
2	1	1104	A
2	1	1132	U
2	1	1133	G
2	1	1141	A
2	1	1147	A
2	1	1160	G
2	1	1171	A
2	1	1172	A
2	1	1173	G
2	1	1174	A
2	1	1176	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	1	1177	G
2	1	1237	A
2	1	1238	G
2	1	1254	G
2	1	1255	A
2	1	1256	U
2	1	1259	A
2	1	1260	C
2	1	1262	G
2	1	1268	A
2	1	1300	G
2	1	1301	U
2	1	1302	U
2	1	1303	G
2	1	1312	G
2	1	1322	G
2	1	1338	A
2	1	1354	G
2	1	1365	C
2	1	1382	U
2	1	1383	C
2	1	1389	G
2	1	1393	G
2	1	1402	A
2	1	1403	A
2	1	1417	C
2	1	1428	G
2	1	1429	A
2	1	1430	A
2	1	1431	A
2	1	1474	C
2	1	1483	G
2	1	1500	A
2	1	1510	A
2	1	1514	A
2	1	1515	A
2	1	1526	A
2	1	1527	U
2	1	1549	U
2	1	1550	C
2	1	1559	C
2	1	1562	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	1	1564	G
2	1	1577	C
2	1	1632	G
2	1	1633	A
2	1	1635	U
2	1	1636	G
2	1	1639	G
2	1	1644	G
2	1	1668	A
2	1	1669	U
2	1	1680	U
2	1	1681	U
2	1	1712	A
2	1	1728	C
2	1	1752	A
2	1	1757	C
2	1	1764	G
2	1	1765	C
2	1	1766	U
2	1	1777	A
2	1	1789	G
2	1	1790	C
2	1	1791	U
2	1	1792	C
2	1	1818	G
2	1	1840	G
2	1	1867	U
2	1	1868	A
2	1	1869	U
2	1	1870	A
2	1	1900	G
2	1	1909	A
2	1	1916	A
2	1	1918	C
2	1	1920	A
2	1	1927	A
2	1	1936	C
2	1	1938	A
2	1	1947	OMG
2	1	1999	A
2	1	2022	A
2	1	2023	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	1	2027	G
2	1	2028	G
2	1	2029	G
2	1	2030	G
2	1	2031	G
2	1	2034	A
2	1	2039	G
2	1	2041	C
2	1	2043	C
2	1	2044	PSU
2	1	2047	U
2	1	2048	A
2	1	2051	G
2	1	2054	G
2	1	2058	A
2	1	2061	G
2	1	2065	U
2	1	2076	U
2	1	2085	G
2	1	2088	OMU
2	1	2092	U
2	1	2093	G
2	1	2103	OMG
2	1	2112	U
2	1	2114	U
2	1	2116	OMC
2	1	2118	G
2	1	2141	C
2	1	2142	U
2	1	2151	A
2	1	2153	A
2	1	2175	C
2	1	2180	A
2	1	2181	G
2	1	2182	U
2	1	2189	G
2	1	2199	A
2	1	2213	G
2	1	2215	G
2	1	2317	U
2	1	2318	A
2	1	2336	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	1	2337	C
2	1	2350	G
2	1	2357	G
2	1	2361	G
2	1	2362	OMG
2	1	2395	C
2	1	2399	A
2	1	2400	A
2	1	2417	U
2	1	2421	A
2	1	2432	A
2	1	2434	A
2	1	2446	A
2	1	2447	A
2	1	2457	G
2	1	2498	G
2	1	2500	C
2	1	2537	OMG
2	1	2540	U
2	1	2541	G
2	1	2546	A
2	1	2547	A
2	1	2548	A
2	1	2555	OMC
2	1	2559	G
2	1	2561	A
2	1	2562	A
2	1	2589	C
2	1	2590	C
2	1	2594	C
2	1	2606	U
2	1	2612	C
2	1	2616	G
2	1	2617	A
2	1	2632	A
2	1	2643	G
2	1	2644	C
2	1	2648	A
2	1	2680	A
2	1	2681	G
2	1	2687	C
2	1	2696	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	1	2699	U
2	1	2717	G
2	1	2723	U
2	1	2727	U
2	1	2735	G
2	1	2743	U
2	1	2744	G
2	1	2754	G
2	1	2759	A
2	1	2760	G
2	1	2770	G
2	1	2788	G
2	1	2804	U
2	1	2825	C
2	1	2826	U
2	1	2827	G
2	1	2846	G
2	1	2854	C
2	1	2860	A
2	1	2863	G
2	1	2869	A
2	1	2876	A
2	1	2877	A
2	1	2878	G
2	1	2890	A
2	1	2913	G
2	1	2915	A
2	1	2929	A
2	1	2939	U
2	1	2952	U
2	1	2953	G
2	1	2954	A
2	1	2969	A
2	1	2978	G
2	1	2981	U
2	1	2982	U
2	1	2983	U
2	1	2985	C
2	1	2995	A
2	1	2996	G
2	1	3000	G
2	1	3007	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	1	3013	G
2	1	3021	G
3	4	3	A
3	4	8	U
3	4	12	U
3	4	13	C
3	4	14	C
3	4	16	G
3	4	17	C
3	4	33	U
3	4	42	G
3	4	56	A
3	4	72	G
3	4	73	C
3	4	74	G
3	4	75	C
3	4	89	A
3	4	100	A
3	4	101	C
3	4	102	A
3	4	110	A
3	4	111	A
3	4	112	C
3	4	154	U
3	4	155	C
3	4	172	C
3	4	180	G
3	4	181	G
3	4	193	A
3	4	195	A
3	4	196	G
3	4	209	A
3	4	210	U
3	4	212	C
3	4	213	G
3	4	214	C
3	4	246	A
3	4	248	C
3	4	250	G
3	4	254	G
3	4	269	G
3	4	270	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
3	4	283	A
3	4	284	G
3	4	292	G
3	4	296	C
3	4	308	C
3	4	309	G
3	4	332	C
3	4	333	A
3	4	334	A
3	4	349	C
3	4	350	G
3	4	356	C
3	4	357	A
3	4	358	G
3	4	359	C
3	4	371	C
3	4	376	C
3	4	377	A
3	4	388	C
3	4	397	G
3	4	401	A
3	4	410	G
3	4	418	A
3	4	419	A
3	4	455	A
3	4	456	A
3	4	457	U
3	4	471	G
3	4	472	U
3	4	479	U
3	4	484	C
3	4	488	G
3	4	491	G
3	4	492	U
3	4	493	A
3	4	494	A
3	4	496	A2M
3	4	509	G
3	4	511	OMG
3	4	521	U
3	4	522	U
3	4	525	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
3	4	533	A
3	4	534	A
3	4	537	C
3	4	580	U
3	4	581	C
3	4	594	G
3	4	614	A
3	4	623	G
3	4	626	A
3	4	647	U
3	4	648	A
3	4	649	G
3	4	656	A
3	4	662	U
3	4	664	A
3	4	665	A
3	4	679	A
3	4	683	G
3	4	685	G
3	4	692	G
3	4	704	A
3	4	710	C
3	4	714	A
3	4	716	G
3	4	738	A
3	4	742	A
3	4	755	A
3	4	777	A
3	4	778	C
3	4	781	U
3	4	789	A
3	4	790	G
3	4	807	G
3	4	832	C
3	4	839	G
3	4	850	G
3	4	855	G
3	4	856	U
3	4	867	G
3	4	879	A2M
3	4	891	G
3	4	899	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
3	4	901	A
3	4	926	U
3	4	927	U
3	4	928	G
3	4	929	G
3	4	930	A
3	4	944	A
3	4	1007	G
3	4	1008	A
3	4	1009	G
3	4	1010	G
3	4	1011	U
3	4	1012	G
3	4	1013	C
3	4	1015	U
3	4	1021	U
3	4	1024	U
3	4	1025	C
3	4	1029	U
3	4	1036	G
3	4	1037	U
3	4	1045	OMC
3	4	1049	U
3	4	1051	A
3	4	1053	G
3	4	1054	U
3	4	1058	G
3	4	1059	C
3	4	1060	A2M
3	4	1066	C
3	4	1068	A
3	4	1084	U
3	4	1085	U
3	4	1086	G
3	4	1089	A
3	4	1090	C
3	4	1091	C
3	4	1092	C
3	4	1093	C
3	4	1099	A
3	4	1100	C
3	4	1101	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
3	4	1102	G
3	4	1113	A
3	4	1119	G
3	4	1125	C
3	4	1126	U
3	4	1127	G
3	4	1135	A
3	4	1136	A
3	4	1149	A
3	4	1150	G
3	4	1159	G
3	4	1162	A
3	4	1163	OMG
3	4	1164	G
3	4	1165	U
3	4	1166	C
3	4	1167	A
3	4	1168	G
3	4	1174	C
3	4	1175	C
3	4	1177	G
3	4	1178	A
3	4	1179	A
3	4	1180	A
3	4	1181	C
3	4	1182	C
3	4	1192	C
3	4	1193	A
3	4	1199	G
3	4	1201	U
3	4	1202	OMG
3	4	1204	A
3	4	1206	U
3	4	1223	U
3	4	1224	C
3	4	1226	G
3	4	1236	G
3	4	1245	A
3	4	1246	A
3	4	1252	U
3	4	1265	A
3	4	1266	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
3	4	1267	U
3	4	1269	G
3	4	1271	G
3	4	1286	C
3	4	1301	G
3	4	1302	U
3	4	1304	G
3	4	1311	U
3	4	1319	G
3	4	1325	C
3	4	1330	A
3	4	1345	G
3	4	1346	U
3	4	1360	A
3	4	1364	A
3	4	1416	G
3	4	1417	U
3	4	1418	G
3	4	1419	G
3	4	1422	G
3	4	1427	A
3	4	1431	G
3	4	1432	G
3	4	1433	G
3	4	1436	C
3	4	1437	U
3	4	1439	C
3	4	1441	A
3	4	1444	G
3	4	1445	G
3	4	1447	G
3	4	1449	U
3	4	1450	G
3	4	1451	A
3	4	1452	A
3	4	1453	G
3	4	1456	G
3	4	1458	A
3	4	1463	G
3	4	1465	U
3	4	1466	A
3	4	1476	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
3	4	1479	C
3	4	1488	G
3	4	1489	G
3	4	1490	A
3	4	1491	U
3	4	1492	C
3	4	1493	A
3	4	1494	C

All (68) RNA pucker outliers are listed below:

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	2	1	G
1	2	7	A
2	1	117	U
2	1	134	U
2	1	230	C
2	1	434	C
2	1	456	G
2	1	488	A
2	1	533	A
2	1	575	G
2	1	613	G
2	1	668	G
2	1	724	A
2	1	880	U
2	1	902	OMG
2	1	1253	A
2	1	1337	C
2	1	1514	A
2	1	1526	A
2	1	1868	A
2	1	2022	A
2	1	2064	U
2	1	2102	A
2	1	2361	G
2	1	2420	G
2	1	2431	U
2	1	2605	U
2	1	2868	U
2	1	2984	C
2	1	2995	A

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Mol	Chain	Res	Type
3	4	7	OMG
3	4	16	G
3	4	73	C
3	4	101	C
3	4	180	G
3	4	212	C
3	4	213	G
3	4	358	G
3	4	471	G
3	4	521	U
3	4	593	C
3	4	663	U
3	4	664	A
3	4	678	C
3	4	854	A
3	4	855	G
3	4	928	G
3	4	1007	G
3	4	1023	G
3	4	1028	C
3	4	1036	G
3	4	1053	G
3	4	1090	C
3	4	1091	C
3	4	1098	U
3	4	1100	C
3	4	1134	U
3	4	1162	A
3	4	1176	C
3	4	1178	A
3	4	1179	A
3	4	1251	G
3	4	1417	U
3	4	1421	G
3	4	1435	G
3	4	1444	G
3	4	1448	G
3	4	1462	A

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

106 non-standard protein/DNA/RNA residues are modelled in this entry.

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
3	M7A	4	508	3	19,25,26	0.29	0	25,37,40	0.57	0
3	OMG	4	462	3	19,26,27	0.93	1 (5%)	21,38,41	1.12	2 (9%)
3	OMG	4	674	3	19,26,27	0.89	1 (5%)	21,38,41	1.05	2 (9%)
3	4AC	4	1318	3	21,24,25	0.39	0	28,34,37	0.70	0
3	A2M	4	1060	3	18,25,26	0.67	0	20,36,39	0.85	1 (5%)
2	OMC	1	2018	2	19,22,23	0.79	0	25,31,34	0.75	0
2	OMC	1	2624	2	19,22,23	0.80	0	25,31,34	0.85	1 (4%)
2	OMC	1	2555	2	19,22,23	0.80	0	25,31,34	0.86	1 (4%)
2	OMG	1	2366	2	19,26,27	0.93	1 (5%)	21,38,41	1.07	2 (9%)
3	OMG	4	1289	3,70	19,26,27	0.90	1 (5%)	21,38,41	1.03	2 (9%)
2	PSU	1	1911	2	18,21,22	0.93	1 (5%)	21,30,33	0.78	0
2	OMC	1	492	2	19,22,23	0.77	0	25,31,34	0.82	0
3	A2M	4	569	3,70	18,25,26	0.67	0	20,36,39	0.72	1 (5%)
2	G7M	1	3023	2	20,26,27	2.36	3 (15%)	16,39,42	0.59	0
2	OMU	1	2574	2	19,22,23	1.25	3 (15%)	25,31,34	1.76	4 (16%)
2	OMG	1	1949	2	19,26,27	0.90	1 (5%)	21,38,41	1.05	2 (9%)
2	OMG	1	2066	2	19,26,27	0.91	1 (5%)	21,38,41	1.08	2 (9%)
2	OMC	1	2704	2	19,22,23	0.80	0	25,31,34	0.88	0
3	PSU	4	263	3	18,21,22	0.93	1 (5%)	21,30,33	0.63	0
2	OMU	1	2077	2	19,22,23	1.32	3 (15%)	25,31,34	1.78	5 (20%)
3	B8T	4	1469	3	19,22,23	0.43	0	25,31,34	0.42	0
2	OMC	1	1816	2	19,22,23	0.80	0	25,31,34	0.71	0
3	OMC	4	572	3	19,22,23	0.80	0	25,31,34	0.79	0
2	OMG	1	2362	2	19,26,27	0.91	1 (5%)	21,38,41	1.07	2 (9%)
2	B8T	1	2937	2	19,22,23	0.41	0	25,31,34	0.32	0
2	OMU	1	875	2	19,22,23	1.27	3 (15%)	25,31,34	1.87	5 (20%)
3	OMU	4	15	3	19,22,23	1.33	4 (21%)	25,31,34	1.82	4 (16%)
2	OMC	1	2720	2	19,22,23	0.79	0	25,31,34	0.93	1 (4%)
2	PSU	1	1987	2	18,21,22	0.91	1 (5%)	21,30,33	0.68	0
3	A2M	4	880	3	18,25,26	0.69	0	20,36,39	0.80	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	OMG	1	1957	2	19,26,27	0.93	1 (5%)	21,38,41	1.09	2 (9%)
2	OMC	1	2538	2	19,22,23	0.78	0	25,31,34	0.79	0
3	B8T	4	1035	3	19,22,23	0.41	0	25,31,34	0.56	0
2	OMU	1	2628	2	19,22,23	1.27	3 (15%)	25,31,34	1.81	5 (20%)
3	OMC	4	1045	3	19,22,23	0.76	0	25,31,34	0.80	0
2	OMG	1	2176	2,70	19,26,27	0.92	1 (5%)	21,38,41	1.09	2 (9%)
2	5MC	1	2056	2,70	19,22,23	1.52	3 (15%)	26,32,35	1.16	3 (11%)
2	OMU	1	2851	2	19,22,23	1.28	4 (21%)	25,31,34	1.84	4 (16%)
2	OMG	1	2103	2	19,26,27	0.94	1 (5%)	21,38,41	1.06	2 (9%)
3	OMG	4	1211	3	19,26,27	0.93	1 (5%)	21,38,41	1.09	1 (4%)
3	OMG	4	908	3	19,26,27	0.90	1 (5%)	21,38,41	1.09	2 (9%)
2	PSU	1	2607	2	18,21,22	0.96	1 (5%)	21,30,33	0.81	0
2	OMC	1	872	2	19,22,23	0.78	0	25,31,34	0.83	1 (4%)
2	OMG	1	2388	2	19,26,27	0.91	1 (5%)	21,38,41	1.18	2 (9%)
3	OMG	4	7	3	19,26,27	0.93	1 (5%)	21,38,41	1.36	3 (14%)
2	A2M	1	2691	2,70	18,25,26	0.66	0	20,36,39	0.73	1 (5%)
2	A2M	1	1990	2	18,25,26	0.69	0	20,36,39	0.86	1 (5%)
3	OMG	4	1163	3	19,26,27	0.90	1 (5%)	21,38,41	1.12	2 (9%)
3	OMG	4	465	3	19,26,27	0.94	1 (5%)	21,38,41	1.05	2 (9%)
3	OMG	4	1210	3	19,26,27	0.91	1 (5%)	21,38,41	1.04	1 (4%)
2	OMC	1	2143	2	19,22,23	0.27	0	25,31,34	0.30	0
3	OMG	4	1212	3	19,26,27	0.93	1 (5%)	21,38,41	1.11	2 (9%)
2	OMU	1	2408	2	19,22,23	1.33	4 (21%)	25,31,34	1.92	4 (16%)
2	OMC	1	2116	2	19,22,23	0.81	0	25,31,34	0.72	0
2	A2M	1	2011	2	18,25,26	0.67	0	20,36,39	0.71	1 (5%)
2	B8T	1	79	2	19,22,23	0.41	0	25,31,34	0.37	0
2	OMU	1	2623	2	19,22,23	1.26	3 (15%)	25,31,34	1.85	5 (20%)
2	OMC	1	493	2	19,22,23	0.79	0	25,31,34	0.81	0
3	OMG	4	19	3	19,26,27	0.95	1 (5%)	21,38,41	1.13	2 (9%)
3	A2M	4	40	3	18,25,26	0.67	0	20,36,39	0.73	1 (5%)
3	OMC	4	1184	3	19,22,23	0.80	0	25,31,34	0.85	1 (4%)
3	OMG	4	906	3	19,26,27	0.89	1 (5%)	21,38,41	1.11	2 (9%)
2	PSU	1	2625	2	18,21,22	0.92	1 (5%)	21,30,33	0.71	0
2	OMC	1	673	2	19,22,23	0.79	0	25,31,34	0.83	0
3	MA6	4	1478	3	19,26,27	0.92	1 (5%)	18,38,41	0.83	1 (5%)
2	A2M	1	2059	2,70	18,25,26	0.71	0	20,36,39	0.91	0
2	4AC	1	2016	2	21,24,25	0.39	0	28,34,37	0.60	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	OMG	4	511	3	19,26,27	0.89	1 (5%)	21,38,41	1.06	2 (9%)
3	MA6	4	1477	3	19,26,27	0.93	1 (5%)	18,38,41	0.82	1 (5%)
2	OMU	1	2155	2	19,22,23	1.26	3 (15%)	25,31,34	1.86	5 (20%)
2	OMG	1	902	2,70	19,26,27	0.87	1 (5%)	21,38,41	1.14	2 (9%)
2	OMG	1	1971	2	19,26,27	0.92	1 (5%)	21,38,41	1.08	2 (9%)
3	OMG	4	475	3	19,26,27	0.94	1 (5%)	21,38,41	1.06	2 (9%)
3	4AC	4	5	3	21,24,25	0.43	0	28,34,37	0.66	0
2	OMG	1	2667	2	19,26,27	0.91	1 (5%)	21,38,41	1.08	2 (9%)
3	A2M	4	879	3	18,25,26	0.66	0	20,36,39	0.73	1 (5%)
2	OMG	1	2104	2	19,26,27	0.93	1 (5%)	21,38,41	1.14	2 (9%)
3	OMC	4	1034	3	19,22,23	0.80	0	25,31,34	0.81	0
3	OMG	4	1202	3,70	19,26,27	0.91	1 (5%)	21,38,41	1.12	2 (9%)
2	UR3	1	2698	2	19,22,23	0.93	0	26,32,35	1.72	2 (7%)
3	A2M	4	496	3	18,25,26	0.67	0	20,36,39	0.82	1 (5%)
2	OMG	1	2071	2	19,26,27	0.90	1 (5%)	21,38,41	1.05	2 (9%)
2	OMG	1	2017	2	19,26,27	0.90	1 (5%)	21,38,41	1.04	2 (9%)
2	OMU	1	908	2,70	19,22,23	1.32	4 (21%)	25,31,34	1.96	7 (28%)
2	OMG	1	2601	2,70	19,26,27	0.92	1 (5%)	21,38,41	1.08	2 (9%)
3	6MZ	4	1459	3,70	17,25,26	0.82	0	15,36,39	1.96	2 (13%)
2	OMU	1	2707	2	19,22,23	1.28	4 (21%)	25,31,34	1.88	5 (20%)
3	OMC	4	1368	3	19,22,23	0.79	0	25,31,34	0.79	0
3	OMC	4	489	3	19,22,23	0.81	0	25,31,34	0.88	0
2	PSU	1	2571	2	18,21,22	0.94	1 (5%)	21,30,33	0.73	0
2	PSU	1	2044	2	18,21,22	0.90	1 (5%)	21,30,33	0.67	0
2	OMG	1	2608	2	19,26,27	0.92	1 (5%)	21,38,41	1.12	2 (9%)
2	OMC	1	1976	2	19,22,23	0.83	0	25,31,34	0.91	1 (4%)
2	PSU	1	2610	2	18,21,22	0.90	1 (5%)	21,30,33	0.79	0
2	OMC	1	2885	2	19,22,23	0.81	0	25,31,34	0.78	0
52	IAS	BM	128	52	6,7,8	1.32	1 (16%)	3,8,10	1.47	1 (33%)
2	OMC	1	2115	2	19,22,23	0.80	0	25,31,34	0.80	0
2	OMG	1	2537	2	19,26,27	0.91	1 (5%)	21,38,41	1.08	2 (9%)
3	OMU	4	877	3	19,22,23	1.26	3 (15%)	25,31,34	1.84	5 (20%)
2	5MC	1	38	2	19,22,23	1.46	3 (15%)	26,32,35	1.21	3 (11%)
3	OMG	4	467	3	19,26,27	0.84	1 (5%)	21,38,41	1.06	1 (4%)
2	OMC	1	2884	2	19,22,23	0.79	0	25,31,34	0.81	0
3	OMC	4	514	3	19,22,23	0.82	0	25,31,34	0.91	1 (4%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	OMU	1	2666	2	19,22,23	1.26	3 (15%)	25,31,34	1.85	5 (20%)
2	OMU	1	2088	2	19,22,23	1.28	3 (15%)	25,31,34	1.80	4 (16%)
2	OMG	1	1947	2	19,26,27	0.90	1 (5%)	21,38,41	1.22	2 (9%)

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
3	M7A	4	508	3	-	3/7/37/38	0/3/3/3
3	OMG	4	462	3	-	1/5/27/28	0/3/3/3
3	OMG	4	674	3	-	0/5/27/28	0/3/3/3
3	4AC	4	1318	3	-	0/11/29/30	0/2/2/2
3	A2M	4	1060	3	-	3/5/27/28	0/3/3/3
2	OMC	1	2018	2	-	0/9/27/28	0/2/2/2
2	OMC	1	2624	2	-	0/9/27/28	0/2/2/2
2	OMC	1	2555	2	-	2/9/27/28	0/2/2/2
2	OMG	1	2366	2	-	0/5/27/28	0/3/3/3
3	OMG	4	1289	3,70	-	0/5/27/28	0/3/3/3
2	PSU	1	1911	2	-	0/7/25/26	0/2/2/2
2	OMC	1	492	2	-	2/9/27/28	0/2/2/2
3	A2M	4	569	3,70	-	0/5/27/28	0/3/3/3
2	G7M	1	3023	2	-	1/3/25/26	0/3/3/3
2	OMU	1	2574	2	-	0/9/27/28	0/2/2/2
2	OMG	1	1949	2	-	0/5/27/28	0/3/3/3
2	OMG	1	2066	2	-	0/5/27/28	0/3/3/3
2	OMC	1	2704	2	-	0/9/27/28	0/2/2/2
3	PSU	4	263	3	-	0/7/25/26	0/2/2/2
2	OMU	1	2077	2	-	1/9/27/28	0/2/2/2
3	B8T	4	1469	3	-	0/7/27/28	0/2/2/2
2	OMC	1	1816	2	-	0/9/27/28	0/2/2/2
3	OMC	4	572	3	-	1/9/27/28	0/2/2/2
2	OMG	1	2362	2	-	1/5/27/28	0/3/3/3
2	B8T	1	2937	2	-	1/7/27/28	0/2/2/2
2	OMU	1	875	2	-	1/9/27/28	0/2/2/2
3	OMU	4	15	3	-	0/9/27/28	0/2/2/2
2	OMC	1	2720	2	-	0/9/27/28	0/2/2/2
2	PSU	1	1987	2	-	0/7/25/26	0/2/2/2
3	A2M	4	880	3	-	0/5/27/28	0/3/3/3
2	OMG	1	1957	2	-	0/5/27/28	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	OMC	1	2538	2	-	0/9/27/28	0/2/2/2
3	B8T	4	1035	3	-	0/7/27/28	0/2/2/2
2	OMU	1	2628	2	-	0/9/27/28	0/2/2/2
3	OMC	4	1045	3	-	2/9/27/28	0/2/2/2
2	OMG	1	2176	2,70	-	0/5/27/28	0/3/3/3
2	5MC	1	2056	2,70	-	1/7/25/26	0/2/2/2
2	OMU	1	2851	2	-	2/9/27/28	0/2/2/2
2	OMG	1	2103	2	-	0/5/27/28	0/3/3/3
3	OMG	4	1211	3	-	2/5/27/28	0/3/3/3
3	OMG	4	908	3	-	4/5/27/28	0/3/3/3
2	PSU	1	2607	2	-	0/7/25/26	0/2/2/2
2	OMC	1	872	2	-	0/9/27/28	0/2/2/2
2	OMG	1	2388	2	-	2/5/27/28	0/3/3/3
3	OMG	4	7	3	-	0/5/27/28	0/3/3/3
2	A2M	1	2691	2,70	-	1/5/27/28	0/3/3/3
2	A2M	1	1990	2	-	0/5/27/28	0/3/3/3
3	OMG	4	1163	3	-	3/5/27/28	0/3/3/3
3	OMG	4	465	3	-	2/5/27/28	0/3/3/3
3	OMG	4	1210	3	-	1/5/27/28	0/3/3/3
2	OMC	1	2143	2	-	0/9/27/28	0/2/2/2
3	OMG	4	1212	3	-	0/5/27/28	0/3/3/3
2	OMU	1	2408	2	-	0/9/27/28	0/2/2/2
2	OMC	1	2116	2	-	2/9/27/28	0/2/2/2
2	A2M	1	2011	2	-	0/5/27/28	0/3/3/3
2	B8T	1	79	2	-	0/7/27/28	0/2/2/2
2	OMU	1	2623	2	-	2/9/27/28	0/2/2/2
2	OMC	1	493	2	-	1/9/27/28	0/2/2/2
3	OMG	4	19	3	-	1/5/27/28	0/3/3/3
3	A2M	4	40	3	-	1/5/27/28	0/3/3/3
3	OMC	4	1184	3	-	1/9/27/28	0/2/2/2
3	OMG	4	906	3	-	0/5/27/28	0/3/3/3
2	PSU	1	2625	2	-	2/7/25/26	0/2/2/2
2	OMC	1	673	2	-	0/9/27/28	0/2/2/2
3	MA6	4	1478	3	-	2/7/29/30	0/3/3/3
2	A2M	1	2059	2,70	-	1/5/27/28	0/3/3/3
2	4AC	1	2016	2	-	0/11/29/30	0/2/2/2
3	OMG	4	511	3	-	3/5/27/28	0/3/3/3
3	MA6	4	1477	3	-	0/7/29/30	0/3/3/3
2	OMU	1	2155	2	-	2/9/27/28	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	OMG	1	902	2,70	-	0/5/27/28	0/3/3/3
2	OMG	1	1971	2	-	0/5/27/28	0/3/3/3
3	OMG	4	475	3	-	0/5/27/28	0/3/3/3
3	4AC	4	5	3	-	2/11/29/30	0/2/2/2
2	OMG	1	2667	2	-	0/5/27/28	0/3/3/3
3	A2M	4	879	3	-	4/5/27/28	0/3/3/3
2	OMG	1	2104	2	-	0/5/27/28	0/3/3/3
3	OMC	4	1034	3	-	0/9/27/28	0/2/2/2
3	OMG	4	1202	3,70	-	3/5/27/28	0/3/3/3
2	UR3	1	2698	2	-	0/7/25/26	0/2/2/2
3	A2M	4	496	3	-	3/5/27/28	0/3/3/3
2	OMG	1	2071	2	-	0/5/27/28	0/3/3/3
2	OMG	1	2017	2	-	1/5/27/28	0/3/3/3
2	OMU	1	908	2,70	-	4/9/27/28	0/2/2/2
2	OMG	1	2601	2,70	-	0/5/27/28	0/3/3/3
3	6MZ	4	1459	3,70	-	0/5/27/28	0/3/3/3
2	OMU	1	2707	2	-	0/9/27/28	0/2/2/2
3	OMC	4	1368	3	-	1/9/27/28	0/2/2/2
3	OMC	4	489	3	-	1/9/27/28	0/2/2/2
2	PSU	1	2571	2	-	0/7/25/26	0/2/2/2
2	PSU	1	2044	2	-	2/7/25/26	0/2/2/2
2	OMG	1	2608	2	-	2/5/27/28	0/3/3/3
2	OMC	1	1976	2	-	1/9/27/28	0/2/2/2
2	PSU	1	2610	2	-	0/7/25/26	0/2/2/2
2	OMC	1	2885	2	-	0/9/27/28	0/2/2/2
52	IAS	BM	128	52	-	1/7/7/8	-
2	OMC	1	2115	2	-	0/9/27/28	0/2/2/2
2	OMG	1	2537	2	-	2/5/27/28	0/3/3/3
3	OMU	4	877	3	-	0/9/27/28	0/2/2/2
2	5MC	1	38	2	-	1/7/25/26	0/2/2/2
3	OMG	4	467	3	-	0/5/27/28	0/3/3/3
2	OMC	1	2884	2	-	0/9/27/28	0/2/2/2
3	OMC	4	514	3	-	1/9/27/28	0/2/2/2
2	OMU	1	2666	2	-	0/9/27/28	0/2/2/2
2	OMU	1	2088	2	-	0/9/27/28	0/2/2/2
2	OMG	1	1947	2	-	2/5/27/28	0/3/3/3

All (101) bond length outliers are listed below:

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	1	3023	G7M	C8-N9	7.19	1.46	1.33
2	1	3023	G7M	C8-N7	6.72	1.45	1.33
2	1	2056	5MC	C5-C4	5.34	1.48	1.44
2	1	38	5MC	C5-C4	5.00	1.47	1.44
2	1	2607	PSU	C6-C5	3.62	1.39	1.35
2	1	2571	PSU	C6-C5	3.61	1.39	1.35
3	4	263	PSU	C6-C5	3.60	1.39	1.35
2	1	2625	PSU	C6-C5	3.57	1.39	1.35
2	1	1911	PSU	C6-C5	3.54	1.39	1.35
2	1	2610	PSU	C6-C5	3.49	1.39	1.35
2	1	2044	PSU	C6-C5	3.46	1.39	1.35
2	1	1987	PSU	C6-C5	3.43	1.39	1.35
2	1	2408	OMU	C4-N3	-3.12	1.33	1.38
3	4	15	OMU	C4-N3	-3.07	1.33	1.38
2	1	2077	OMU	C4-N3	-3.04	1.33	1.38
2	1	875	OMU	C4-N3	-3.01	1.33	1.38
2	1	2707	OMU	C4-N3	-2.99	1.33	1.38
2	1	2088	OMU	C4-N3	-2.98	1.33	1.38
2	1	2666	OMU	C4-N3	-2.98	1.33	1.38
2	1	2628	OMU	C4-N3	-2.94	1.33	1.38
2	1	2574	OMU	C4-N3	-2.94	1.33	1.38
2	1	2623	OMU	C4-N3	-2.91	1.33	1.38
2	1	2155	OMU	C4-N3	-2.91	1.33	1.38
2	1	2103	OMG	C6-N1	-2.90	1.33	1.37
3	4	877	OMU	C4-N3	-2.89	1.33	1.38
2	1	2851	OMU	C4-N3	-2.86	1.33	1.38
2	1	2066	OMG	C6-N1	-2.83	1.33	1.37
2	1	2408	OMU	C2-N3	-2.81	1.33	1.38
2	1	1957	OMG	C6-N1	-2.80	1.33	1.37
2	1	2104	OMG	C6-N1	-2.80	1.33	1.37
2	1	2366	OMG	C6-N1	-2.80	1.33	1.37
3	4	7	OMG	C6-N1	-2.79	1.33	1.37
3	4	465	OMG	C6-N1	-2.79	1.33	1.37
2	1	908	OMU	C4-N3	-2.78	1.33	1.38
2	1	1971	OMG	C6-N1	-2.77	1.33	1.37
2	1	1949	OMG	C6-N1	-2.77	1.33	1.37
2	1	2388	OMG	C6-N1	-2.77	1.33	1.37
2	1	2601	OMG	C6-N1	-2.76	1.33	1.37
2	1	2176	OMG	C6-N1	-2.75	1.33	1.37
2	1	2537	OMG	C6-N1	-2.74	1.33	1.37
3	4	1212	OMG	C6-N1	-2.73	1.33	1.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	4	19	OMG	C6-N1	-2.73	1.33	1.37
2	1	2017	OMG	C6-N1	-2.71	1.33	1.37
3	4	15	OMU	C2-N3	-2.70	1.33	1.38
2	1	2155	OMU	C2-N3	-2.70	1.33	1.38
3	4	462	OMG	C6-N1	-2.69	1.33	1.37
2	1	2362	OMG	C6-N1	-2.69	1.33	1.37
2	1	2608	OMG	C6-N1	-2.68	1.33	1.37
2	1	902	OMG	C6-N1	-2.68	1.33	1.37
3	4	1211	OMG	C6-N1	-2.67	1.33	1.37
2	1	2071	OMG	C6-N1	-2.67	1.33	1.37
2	1	2667	OMG	C6-N1	-2.67	1.33	1.37
2	1	1947	OMG	C6-N1	-2.67	1.33	1.37
3	4	877	OMU	C2-N3	-2.67	1.33	1.38
3	4	1289	OMG	C6-N1	-2.65	1.33	1.37
3	4	1202	OMG	C6-N1	-2.65	1.33	1.37
3	4	908	OMG	C6-N1	-2.62	1.33	1.37
2	1	2707	OMU	C2-N3	-2.61	1.33	1.38
3	4	475	OMG	C6-N1	-2.61	1.33	1.37
2	1	2077	OMU	C2-N3	-2.61	1.33	1.38
3	4	1210	OMG	C6-N1	-2.61	1.33	1.37
2	1	2056	5MC	C6-N1	-2.58	1.33	1.38
3	4	511	OMG	C6-N1	-2.56	1.33	1.37
2	1	2666	OMU	C2-N3	-2.52	1.33	1.38
2	1	38	5MC	C6-N1	-2.52	1.33	1.38
2	1	875	OMU	C2-N3	-2.51	1.33	1.38
2	1	38	5MC	C6-C5	2.50	1.38	1.34
2	1	2088	OMU	C2-N3	-2.50	1.33	1.38
3	4	906	OMG	C6-N1	-2.50	1.34	1.37
2	1	908	OMU	C2-N3	-2.48	1.33	1.38
2	1	2623	OMU	C2-N3	-2.48	1.33	1.38
2	1	2056	5MC	C6-C5	2.47	1.38	1.34
3	4	674	OMG	C6-N1	-2.47	1.34	1.37
3	4	1163	OMG	C6-N1	-2.46	1.34	1.37
3	4	467	OMG	C6-N1	-2.46	1.34	1.37
2	1	2851	OMU	C2-N3	-2.45	1.33	1.38
2	1	2574	OMU	C2-N3	-2.42	1.33	1.38
2	1	2628	OMU	C2-N3	-2.36	1.33	1.38
2	1	2408	OMU	C5-C4	-2.35	1.38	1.43
2	1	2088	OMU	C5-C4	-2.35	1.38	1.43
2	1	2623	OMU	C5-C4	-2.32	1.38	1.43
2	1	908	OMU	C5-C4	-2.31	1.38	1.43
2	1	2628	OMU	C5-C4	-2.27	1.38	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	1	2574	OMU	C5-C4	-2.27	1.38	1.43
3	4	15	OMU	C5-C4	-2.25	1.38	1.43
2	1	908	OMU	C2-N1	2.24	1.42	1.38
3	4	1477	MA6	C6-N1	2.24	1.35	1.32
2	1	2077	OMU	C5-C4	-2.23	1.38	1.43
2	1	875	OMU	C5-C4	-2.23	1.38	1.43
2	1	2851	OMU	C5-C4	-2.23	1.38	1.43
2	1	2707	OMU	C5-C4	-2.22	1.38	1.43
2	1	3023	G7M	C6-N1	2.21	1.41	1.37
2	1	2666	OMU	C5-C4	-2.17	1.39	1.43
3	4	1478	MA6	C6-N1	2.16	1.35	1.32
52	BM	128	IAS	CB-CG	2.15	1.55	1.50
2	1	2155	OMU	C5-C4	-2.13	1.39	1.43
3	4	877	OMU	C5-C4	-2.11	1.39	1.43
2	1	2408	OMU	C6-N1	-2.08	1.33	1.38
2	1	2851	OMU	C6-N1	-2.04	1.33	1.38
2	1	2707	OMU	C6-N1	-2.01	1.33	1.38
3	4	15	OMU	C6-N1	-2.01	1.33	1.38

All (162) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	1	2698	UR3	C4-N3-C2	-6.86	119.06	124.58
3	4	1459	6MZ	C2-N1-C6	6.07	121.31	116.60
2	1	2408	OMU	C4-N3-C2	-5.28	120.06	126.61
2	1	2155	OMU	C4-N3-C2	-5.07	120.31	126.61
3	4	877	OMU	C4-N3-C2	-5.02	120.38	126.61
2	1	2707	OMU	C4-N3-C2	-5.01	120.39	126.61
2	1	875	OMU	C4-N3-C2	-5.00	120.40	126.61
2	1	2851	OMU	C4-N3-C2	-4.93	120.49	126.61
2	1	2666	OMU	C4-N3-C2	-4.93	120.50	126.61
2	1	2623	OMU	C4-N3-C2	-4.91	120.52	126.61
3	4	15	OMU	C4-N3-C2	-4.86	120.58	126.61
2	1	2408	OMU	C5-C4-N3	4.73	121.43	114.80
2	1	2628	OMU	C4-N3-C2	-4.70	120.78	126.61
2	1	2088	OMU	C4-N3-C2	-4.66	120.83	126.61
2	1	2574	OMU	C4-N3-C2	-4.62	120.88	126.61
2	1	908	OMU	C1'-N1-C2	4.54	125.74	117.59
2	1	2077	OMU	C4-N3-C2	-4.35	121.22	126.61
2	1	2155	OMU	C5-C4-N3	4.28	120.80	114.80
2	1	2707	OMU	N3-C2-N1	4.28	120.47	114.89
2	1	2666	OMU	N3-C2-N1	4.26	120.44	114.89

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	4	15	OMU	N3-C2-N1	4.24	120.41	114.89
3	4	877	OMU	C5-C4-N3	4.22	120.72	114.80
2	1	875	OMU	N3-C2-N1	4.21	120.37	114.89
2	1	2851	OMU	C5-C4-N3	4.19	120.67	114.80
2	1	2628	OMU	N3-C2-N1	4.19	120.34	114.89
2	1	2155	OMU	N3-C2-N1	4.18	120.33	114.89
2	1	2666	OMU	C5-C4-N3	4.14	120.60	114.80
2	1	2088	OMU	N3-C2-N1	4.13	120.27	114.89
2	1	908	OMU	C4-N3-C2	-4.12	121.50	126.61
2	1	875	OMU	C5-C4-N3	4.12	120.57	114.80
3	4	15	OMU	C5-C4-N3	4.11	120.56	114.80
2	1	2574	OMU	N3-C2-N1	4.06	120.18	114.89
3	4	877	OMU	N3-C2-N1	4.06	120.18	114.89
2	1	2707	OMU	C5-C4-N3	4.05	120.48	114.80
2	1	2623	OMU	C5-C4-N3	4.03	120.44	114.80
2	1	2088	OMU	C5-C4-N3	3.99	120.39	114.80
2	1	2077	OMU	N3-C2-N1	3.95	120.04	114.89
2	1	2623	OMU	N3-C2-N1	3.95	120.04	114.89
2	1	2574	OMU	C5-C4-N3	3.90	120.26	114.80
2	1	2408	OMU	N3-C2-N1	3.88	119.94	114.89
2	1	2077	OMU	C5-C4-N3	3.85	120.20	114.80
2	1	2628	OMU	C5-C4-N3	3.85	120.19	114.80
2	1	908	OMU	C5-C4-N3	3.83	120.17	114.80
2	1	2851	OMU	N3-C2-N1	3.82	119.86	114.89
2	1	908	OMU	N3-C2-N1	3.82	119.86	114.89
2	1	38	5MC	C5-C6-N1	-3.80	119.19	123.31
3	4	1459	6MZ	N3-C2-N1	-3.52	123.89	128.67
2	1	2056	5MC	C5-C6-N1	-3.36	119.66	123.31
2	1	2698	UR3	C5-C4-N3	3.34	119.44	115.04
2	1	2623	OMU	O4-C4-C5	-3.23	119.59	125.16
2	1	2851	OMU	O4-C4-C5	-3.22	119.62	125.16
2	1	2408	OMU	O4-C4-C5	-3.20	119.64	125.16
3	4	7	OMG	O3'-C3'-C2'	3.20	120.13	111.19
2	1	908	OMU	O4-C4-C5	-3.11	119.80	125.16
2	1	875	OMU	O4-C4-C5	-3.09	119.83	125.16
2	1	2088	OMU	O4-C4-C5	-3.06	119.89	125.16
2	1	2155	OMU	O4-C4-C5	-3.02	119.95	125.16
2	1	2628	OMU	O4-C4-C5	-3.01	119.97	125.16
2	1	2574	OMU	O4-C4-C5	-3.01	119.98	125.16
2	1	2608	OMG	C8-N7-C5	2.99	107.64	102.55
2	1	2666	OMU	O4-C4-C5	-2.99	120.01	125.16
2	1	902	OMG	C8-N7-C5	2.96	107.59	102.55

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	1	2707	OMU	O4-C4-C5	-2.95	120.07	125.16
3	4	467	OMG	C8-N7-C5	2.94	107.55	102.55
3	4	906	OMG	C8-N7-C5	2.93	107.54	102.55
3	4	1211	OMG	C8-N7-C5	2.92	107.53	102.55
2	1	2104	OMG	C8-N7-C5	2.91	107.50	102.55
3	4	877	OMU	O4-C4-C5	-2.91	120.15	125.16
2	1	2103	OMG	C8-N7-C5	2.91	107.50	102.55
2	1	1947	OMG	C8-N7-C5	2.90	107.49	102.55
2	1	1949	OMG	C8-N7-C5	2.89	107.48	102.55
2	1	2362	OMG	C8-N7-C5	2.89	107.47	102.55
3	4	1212	OMG	C8-N7-C5	2.89	107.46	102.55
3	4	15	OMU	O4-C4-C5	-2.88	120.19	125.16
2	1	2601	OMG	C8-N7-C5	2.88	107.46	102.55
3	4	462	OMG	C8-N7-C5	2.88	107.45	102.55
3	4	908	OMG	C8-N7-C5	2.88	107.45	102.55
2	1	2077	OMU	O4-C4-C5	-2.87	120.20	125.16
3	4	465	OMG	C8-N7-C5	2.85	107.41	102.55
2	1	2388	OMG	C8-N7-C5	2.85	107.40	102.55
3	4	1210	OMG	C8-N7-C5	2.84	107.38	102.55
3	4	674	OMG	C8-N7-C5	2.82	107.35	102.55
2	1	1957	OMG	C8-N7-C5	2.82	107.35	102.55
2	1	2366	OMG	C8-N7-C5	2.82	107.35	102.55
2	1	2017	OMG	C8-N7-C5	2.82	107.35	102.55
2	1	1971	OMG	C8-N7-C5	2.81	107.34	102.55
3	4	1289	OMG	C8-N7-C5	2.81	107.33	102.55
2	1	2537	OMG	C8-N7-C5	2.81	107.33	102.55
2	1	2071	OMG	C8-N7-C5	2.80	107.31	102.55
2	1	2667	OMG	C8-N7-C5	2.78	107.29	102.55
3	4	7	OMG	C8-N7-C5	2.77	107.26	102.55
3	4	511	OMG	C8-N7-C5	2.73	107.20	102.55
2	1	2066	OMG	C8-N7-C5	2.72	107.18	102.55
3	4	1202	OMG	C8-N7-C5	2.71	107.16	102.55
2	1	2056	5MC	C5-C4-N3	-2.71	118.98	121.75
3	4	19	OMG	C8-N7-C5	2.70	107.15	102.55
3	4	475	OMG	C8-N7-C5	2.70	107.15	102.55
2	1	2176	OMG	C8-N7-C5	2.65	107.06	102.55
2	1	2077	OMU	C1 <sup>2</sup> -N1-C2	2.62	122.30	117.59
3	4	1163	OMG	C8-N7-C5	2.60	106.97	102.55
2	1	38	5MC	C5-C4-N3	-2.54	119.16	121.75
3	4	1477	MA6	C2-N1-C6	2.52	119.31	116.84
2	1	2155	OMU	O2-C2-N1	-2.50	119.54	122.80
3	4	879	A2M	C5-C6-N6	2.48	124.08	120.31

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	1	908	OMU	C1'-N1-C6	-2.47	115.49	120.78
3	4	880	A2M	C5-C6-N6	2.43	124.02	120.31
3	4	1478	MA6	C2-N1-C6	2.42	119.21	116.84
2	1	2691	A2M	C5-C6-N6	2.41	123.98	120.31
2	1	2388	OMG	C5-C6-N1	2.41	118.66	114.07
2	1	1976	OMC	O2-C2-N3	-2.39	118.57	122.33
2	1	2623	OMU	O2-C2-N1	-2.38	119.70	122.80
3	4	569	A2M	C5-C6-N6	2.32	123.84	120.31
2	1	2666	OMU	O2-C2-N1	-2.31	119.79	122.80
2	1	875	OMU	O2-C2-N1	-2.29	119.81	122.80
3	4	1060	A2M	C5-C6-N6	2.29	123.79	120.31
3	4	877	OMU	O2-C2-N1	-2.28	119.83	122.80
2	1	902	OMG	C5-C6-N1	2.28	118.41	114.07
3	4	19	OMG	C5-C6-N1	2.25	118.36	114.07
2	1	2104	OMG	C5-C6-N1	2.24	118.35	114.07
2	1	1990	A2M	C5-C6-N6	2.22	123.69	120.31
2	1	2011	A2M	C5-C6-N6	2.21	123.68	120.31
2	1	908	OMU	O2-C2-N3	-2.21	117.42	121.49
3	4	496	A2M	C5-C6-N6	2.20	123.67	120.31
3	4	40	A2M	C5-C6-N6	2.18	123.63	120.31
2	1	1947	OMG	C5-C6-N1	2.18	118.23	114.07
3	4	465	OMG	C5-C6-N1	2.17	118.22	114.07
2	1	1971	OMG	C5-C6-N1	2.17	118.22	114.07
2	1	2056	5MC	O2-C2-N3	-2.17	118.91	122.33
3	4	1202	OMG	C5-C6-N1	2.17	118.21	114.07
2	1	1957	OMG	C5-C6-N1	2.17	118.21	114.07
2	1	2601	OMG	C5-C6-N1	2.16	118.20	114.07
2	1	2103	OMG	C5-C6-N1	2.15	118.18	114.07
2	1	2066	OMG	C5-C6-N1	2.15	118.16	114.07
2	1	2707	OMU	O2-C2-N1	-2.15	120.00	122.80
3	4	674	OMG	C5-C6-N1	2.14	118.16	114.07
3	4	475	OMG	C5-C6-N1	2.14	118.15	114.07
3	4	906	OMG	C5-C6-N1	2.13	118.14	114.07
2	1	2017	OMG	C5-C6-N1	2.13	118.13	114.07
3	4	7	OMG	C5-C6-N1	2.11	118.10	114.07
3	4	908	OMG	C5-C6-N1	2.10	118.08	114.07
2	1	2624	OMC	O2-C2-N3	-2.10	119.02	122.33
2	1	2176	OMG	C5-C6-N1	2.10	118.07	114.07
3	4	1163	OMG	C5-C6-N1	2.10	118.07	114.07
2	1	2555	OMC	O2-C2-N3	-2.09	119.03	122.33
2	1	2537	OMG	C5-C6-N1	2.09	118.06	114.07
2	1	38	5MC	O2-C2-N3	-2.08	119.05	122.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	4	1289	OMG	C5-C6-N1	2.07	118.03	114.07
3	4	1184	OMC	O2-C2-N3	-2.07	119.07	122.33
52	BM	128	IAS	OD1-CG-CB	-2.07	119.36	125.38
2	1	2362	OMG	C5-C6-N1	2.06	118.00	114.07
3	4	511	OMG	C5-C6-N1	2.05	117.99	114.07
2	1	2608	OMG	C5-C6-N1	2.05	117.98	114.07
3	4	1212	OMG	C5-C6-N1	2.05	117.98	114.07
3	4	514	OMC	O2-C2-N3	-2.05	119.10	122.33
2	1	2628	OMU	O2-C2-N1	-2.04	120.14	122.80
3	4	462	OMG	C5-C6-N1	2.04	117.96	114.07
2	1	2071	OMG	C5-C6-N1	2.04	117.96	114.07
2	1	2366	OMG	C5-C6-N1	2.04	117.95	114.07
2	1	1949	OMG	C5-C6-N1	2.03	117.94	114.07
2	1	2720	OMC	C2'-C1'-N1	-2.01	110.43	114.24
2	1	2667	OMG	C5-C6-N1	2.00	117.89	114.07
2	1	872	OMC	O2-C2-N3	-2.00	119.18	122.33

There are no chirality outliers.

All (86) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	4	40	A2M	C1'-C2'-O2'-CM'
3	4	496	A2M	C1'-C2'-O2'-CM'
3	4	879	A2M	C3'-C4'-C5'-O5'
3	4	879	A2M	C1'-C2'-O2'-CM'
3	4	1045	OMC	O4'-C4'-C5'-O5'
3	4	1060	A2M	C1'-C2'-O2'-CM'
3	4	1202	OMG	O4'-C4'-C5'-O5'
2	1	1947	OMG	O4'-C4'-C5'-O5'
2	1	1947	OMG	C3'-C4'-C5'-O5'
3	4	5	4AC	O4'-C4'-C5'-O5'
3	4	511	OMG	O4'-C4'-C5'-O5'
3	4	879	A2M	O4'-C4'-C5'-O5'
3	4	1163	OMG	C3'-C4'-C5'-O5'
3	4	1202	OMG	C3'-C4'-C5'-O5'
3	4	1478	MA6	O4'-C4'-C5'-O5'
2	1	2537	OMG	O4'-C4'-C5'-O5'
3	4	5	4AC	C3'-C4'-C5'-O5'
2	1	38	5MC	C4'-C5'-O5'-P
3	4	496	A2M	O4'-C4'-C5'-O5'
3	4	511	OMG	C3'-C4'-C5'-O5'
3	4	1060	A2M	C3'-C4'-C5'-O5'

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Mol	Chain	Res	Type	Atoms
2	1	2116	OMC	O4'-C4'-C5'-O5'
2	1	2608	OMG	O4'-C4'-C5'-O5'
3	4	465	OMG	O4'-C4'-C5'-O5'
3	4	508	M7A	C3'-C4'-C5'-O5'
3	4	1045	OMC	C3'-C4'-C5'-O5'
3	4	508	M7A	O4'-C4'-C5'-O5'
3	4	908	OMG	C3'-C4'-C5'-O5'
3	4	1478	MA6	C3'-C4'-C5'-O5'
3	4	1163	OMG	O4'-C4'-C5'-O5'
2	1	2044	PSU	O4'-C4'-C5'-O5'
2	1	2537	OMG	C3'-C4'-C5'-O5'
3	4	1060	A2M	O4'-C4'-C5'-O5'
2	1	2044	PSU	C3'-C4'-C5'-O5'
3	4	496	A2M	C3'-C4'-C5'-O5'
2	1	2555	OMC	C4'-C5'-O5'-P
3	4	908	OMG	O4'-C4'-C5'-O5'
2	1	492	OMC	O4'-C4'-C5'-O5'
2	1	2056	5MC	O4'-C4'-C5'-O5'
2	1	2388	OMG	C4'-C5'-O5'-P
2	1	2691	A2M	C1'-C2'-O2'-CM'
3	4	1368	OMC	O4'-C4'-C5'-O5'
3	4	1163	OMG	C4'-C5'-O5'-P
2	1	2851	OMU	C3'-C2'-O2'-CM2
2	1	2851	OMU	C3'-C4'-C5'-O5'
3	4	508	M7A	C4'-C5'-O5'-P
3	4	1211	OMG	C3'-C4'-C5'-O5'
2	1	2077	OMU	C3'-C2'-O2'-CM2
2	1	2555	OMC	C3'-C2'-O2'-CM2
3	4	511	OMG	C4'-C5'-O5'-P
3	4	879	A2M	C4'-C5'-O5'-P
2	1	2625	PSU	O4'-C1'-C5-C4
2	1	2116	OMC	C3'-C4'-C5'-O5'
2	1	2608	OMG	C3'-C4'-C5'-O5'
2	1	908	OMU	O4'-C1'-N1-C2
2	1	908	OMU	O4'-C1'-N1-C6
3	4	19	OMG	C3'-C4'-C5'-O5'
2	1	908	OMU	C2'-C1'-N1-C2
3	4	1202	OMG	C4'-C5'-O5'-P
2	1	2362	OMG	C4'-C5'-O5'-P
3	4	489	OMC	C3'-C2'-O2'-CM2
3	4	572	OMC	C3'-C2'-O2'-CM2
3	4	1184	OMC	C3'-C2'-O2'-CM2

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Mol	Chain	Res	Type	Atoms
2	1	2059	A2M	C3'-C2'-O2'-CM'
2	1	908	OMU	C2'-C1'-N1-C6
3	4	462	OMG	O4'-C4'-C5'-O5'
2	1	2017	OMG	C3'-C4'-C5'-O5'
2	1	3023	G7M	O4'-C4'-C5'-O5'
2	1	2625	PSU	O4'-C1'-C5-C6
2	1	492	OMC	C3'-C2'-O2'-CM2
2	1	493	OMC	C3'-C2'-O2'-CM2
2	1	2623	OMU	C3'-C2'-O2'-CM2
2	1	2155	OMU	O4'-C1'-N1-C6
2	1	2937	B8T	C3'-C4'-C5'-O5'
2	1	2155	OMU	C2'-C1'-N1-C6
3	4	465	OMG	C3'-C4'-C5'-O5'
3	4	908	OMG	C3'-C2'-O2'-CM2
3	4	1211	OMG	C3'-C2'-O2'-CM2
2	1	875	OMU	C3'-C2'-O2'-CM2
3	4	1210	OMG	C3'-C4'-C5'-O5'
3	4	908	OMG	C4'-C5'-O5'-P
3	4	514	OMC	C2'-C1'-N1-C2
2	1	1976	OMC	C2'-C1'-N1-C2
52	BM	128	IAS	CA-CB-CG-OD1
2	1	2388	OMG	C3'-C4'-C5'-O5'
2	1	2623	OMU	O4'-C4'-C5'-O5'

There are no ring outliers.

No monomer is involved in short contacts.

## 5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 327 ligands modelled in this entry, 263 are monoatomic - leaving 64 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
69	SPM	1	3109	-	13,13,13	0.17	0	12,12,12	0.36	0
69	SPM	1	3115	-	13,13,13	0.18	0	12,12,12	0.45	0
69	SPM	1	3116	-	13,13,13	0.15	0	12,12,12	0.26	0
69	SPM	4	3017	-	13,13,13	0.21	0	12,12,12	1.70	1 (8%)
69	SPM	AL	201	-	13,13,13	0.16	0	12,12,12	0.40	0
69	SPM	1	3108	-	13,13,13	0.19	0	12,12,12	0.66	0
69	SPM	1	3121	-	13,13,13	0.24	0	12,12,12	0.30	0
69	SPM	1	3135	-	13,13,13	0.16	0	12,12,12	0.64	0
69	SPM	1	3138	-	13,13,13	0.17	0	12,12,12	0.82	0
69	SPM	1	3132	-	13,13,13	0.16	0	12,12,12	0.40	0
69	SPM	1	3129	-	13,13,13	0.17	0	12,12,12	0.37	0
69	SPM	1	3101	-	13,13,13	0.18	0	12,12,12	0.66	0
69	SPM	1	3133	-	13,13,13	0.17	0	12,12,12	0.37	0
69	SPM	4	3007	-	13,13,13	0.24	0	12,12,12	0.53	0
69	SPM	1	3111	-	13,13,13	0.15	0	12,12,12	0.25	0
69	SPM	1	3117	-	13,13,13	0.17	0	12,12,12	0.36	0
69	SPM	1	3105	-	13,13,13	0.15	0	12,12,12	0.16	0
69	SPM	1	3126	-	13,13,13	0.17	0	12,12,12	0.59	0
69	SPM	1	3144	-	13,13,13	0.16	0	12,12,12	0.40	0
69	SPM	4	3010	-	13,13,13	0.15	0	12,12,12	0.69	0
69	SPM	1	3127	-	13,13,13	0.17	0	12,12,12	0.30	0
69	SPM	1	3120	-	13,13,13	0.18	0	12,12,12	0.22	0
69	SPM	1	3103	-	13,13,13	0.16	0	12,12,12	0.44	0
69	SPM	1	3122	-	13,13,13	0.18	0	12,12,12	0.25	0
69	SPM	1	3102	-	13,13,13	0.16	0	12,12,12	0.43	0
69	SPM	4	3014	-	13,13,13	0.19	0	12,12,12	0.57	0
69	SPM	4	3011	-	13,13,13	0.16	0	12,12,12	0.43	0
69	SPM	Ah	101	-	13,13,13	0.17	0	12,12,12	0.19	0
69	SPM	4	3009	-	13,13,13	0.17	0	12,12,12	0.35	0
69	SPM	1	3130	-	13,13,13	0.14	0	12,12,12	0.18	0
69	SPM	4	3016	-	13,13,13	0.16	0	12,12,12	0.22	0
69	SPM	1	3113	-	13,13,13	0.18	0	12,12,12	0.19	0
69	SPM	1	3125	-	13,13,13	0.17	0	12,12,12	0.29	0
69	SPM	1	3128	-	13,13,13	0.18	0	12,12,12	0.21	0
69	SPM	1	3136	-	13,13,13	0.14	0	12,12,12	0.29	0
69	SPM	1	3106	-	13,13,13	0.17	0	12,12,12	0.19	0
69	SPM	4	3003	-	13,13,13	0.18	0	12,12,12	0.38	0
69	SPM	4	3013	-	13,13,13	0.16	0	12,12,12	0.28	0
69	SPM	1	3123	-	13,13,13	0.16	0	12,12,12	0.36	0
69	SPM	1	3110	-	13,13,13	0.16	0	12,12,12	0.29	0
69	SPM	1	3119	-	13,13,13	0.21	0	12,12,12	0.26	0
69	SPM	1	3114	-	13,13,13	0.16	0	12,12,12	0.19	0
69	SPM	1	3137	-	13,13,13	0.17	0	12,12,12	0.43	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
69	SPM	1	3104	-	13,13,13	0.16	0	12,12,12	0.31	0
69	SPM	4	3001	-	13,13,13	0.16	0	12,12,12	0.33	0
69	SPM	4	3002	-	13,13,13	0.21	0	12,12,12	0.47	0
69	SPM	4	3008	-	13,13,13	0.15	0	12,12,12	0.27	0
69	SPM	4	3005	-	13,13,13	0.14	0	12,12,12	0.16	0
69	SPM	1	3131	-	13,13,13	0.16	0	12,12,12	0.34	0
69	SPM	1	3112	-	13,13,13	0.17	0	12,12,12	0.32	0
69	SPM	1	3134	-	13,13,13	0.15	0	12,12,12	0.43	0
69	SPM	1	3118	-	13,13,13	0.15	0	12,12,12	0.17	0
69	SPM	1	3107	-	13,13,13	0.18	0	12,12,12	0.19	0
69	SPM	1	3124	-	13,13,13	0.15	0	12,12,12	0.23	0
69	SPM	4	3006	-	13,13,13	0.15	0	12,12,12	0.24	0
69	SPM	1	3140	-	13,13,13	0.15	0	12,12,12	0.39	0
69	SPM	1	3142	-	13,13,13	0.18	0	12,12,12	0.34	0
69	SPM	4	3012	-	13,13,13	0.19	0	12,12,12	0.20	0
69	SPM	1	3143	-	13,13,13	0.21	0	12,12,12	0.46	0
69	SPM	4	3004	-	13,13,13	0.16	0	12,12,12	0.26	0
69	SPM	4	3018	-	13,13,13	0.15	0	12,12,12	0.32	0
69	SPM	1	3141	-	13,13,13	0.20	0	12,12,12	0.62	0
69	SPM	1	3139	-	13,13,13	0.16	0	12,12,12	0.25	0
69	SPM	4	3015	-	13,13,13	0.15	0	12,12,12	0.35	0

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
69	SPM	1	3109	-	-	1/11/11/11	-
69	SPM	1	3115	-	-	1/11/11/11	-
69	SPM	1	3116	-	-	2/11/11/11	-
69	SPM	4	3017	-	-	4/11/11/11	-
69	SPM	AL	201	-	-	1/11/11/11	-
69	SPM	1	3108	-	-	3/11/11/11	-
69	SPM	1	3121	-	-	1/11/11/11	-
69	SPM	1	3135	-	-	2/11/11/11	-
69	SPM	1	3138	-	-	6/11/11/11	-
69	SPM	1	3132	-	-	3/11/11/11	-
69	SPM	1	3129	-	-	2/11/11/11	-
69	SPM	1	3101	-	-	4/11/11/11	-
69	SPM	1	3133	-	-	3/11/11/11	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
69	SPM	4	3007	-	-	5/11/11/11	-
69	SPM	1	3111	-	-	0/11/11/11	-
69	SPM	1	3117	-	-	2/11/11/11	-
69	SPM	1	3105	-	-	1/11/11/11	-
69	SPM	1	3126	-	-	3/11/11/11	-
69	SPM	1	3144	-	-	3/11/11/11	-
69	SPM	4	3010	-	-	2/11/11/11	-
69	SPM	1	3127	-	-	0/11/11/11	-
69	SPM	1	3120	-	-	1/11/11/11	-
69	SPM	1	3103	-	-	0/11/11/11	-
69	SPM	1	3122	-	-	1/11/11/11	-
69	SPM	1	3102	-	-	0/11/11/11	-
69	SPM	4	3014	-	-	2/11/11/11	-
69	SPM	4	3011	-	-	2/11/11/11	-
69	SPM	Ah	101	-	-	2/11/11/11	-
69	SPM	4	3009	-	-	2/11/11/11	-
69	SPM	1	3130	-	-	0/11/11/11	-
69	SPM	4	3016	-	-	1/11/11/11	-
69	SPM	1	3113	-	-	4/11/11/11	-
69	SPM	1	3125	-	-	1/11/11/11	-
69	SPM	1	3128	-	-	2/11/11/11	-
69	SPM	1	3136	-	-	2/11/11/11	-
69	SPM	1	3106	-	-	5/11/11/11	-
69	SPM	4	3003	-	-	5/11/11/11	-
69	SPM	4	3013	-	-	1/11/11/11	-
69	SPM	1	3123	-	-	1/11/11/11	-
69	SPM	1	3110	-	-	1/11/11/11	-
69	SPM	1	3119	-	-	4/11/11/11	-
69	SPM	1	3114	-	-	4/11/11/11	-
69	SPM	1	3137	-	-	2/11/11/11	-
69	SPM	1	3104	-	-	3/11/11/11	-
69	SPM	4	3001	-	-	0/11/11/11	-
69	SPM	4	3002	-	-	4/11/11/11	-
69	SPM	4	3008	-	-	0/11/11/11	-
69	SPM	4	3005	-	-	1/11/11/11	-
69	SPM	1	3131	-	-	4/11/11/11	-
69	SPM	1	3112	-	-	1/11/11/11	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
69	SPM	1	3134	-	-	3/11/11/11	-
69	SPM	1	3118	-	-	0/11/11/11	-
69	SPM	1	3107	-	-	1/11/11/11	-
69	SPM	1	3124	-	-	0/11/11/11	-
69	SPM	4	3006	-	-	2/11/11/11	-
69	SPM	1	3140	-	-	1/11/11/11	-
69	SPM	1	3142	-	-	3/11/11/11	-
69	SPM	4	3012	-	-	4/11/11/11	-
69	SPM	1	3143	-	-	1/11/11/11	-
69	SPM	4	3004	-	-	3/11/11/11	-
69	SPM	4	3018	-	-	0/11/11/11	-
69	SPM	1	3141	-	-	4/11/11/11	-
69	SPM	1	3139	-	-	1/11/11/11	-
69	SPM	4	3015	-	-	2/11/11/11	-

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
69	4	3017	SPM	C7-C8-C9	5.69	139.82	113.56

There are no chirality outliers.

All (130) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
69	1	3106	SPM	C12-C11-N10-C9
69	4	3017	SPM	C6-C7-C8-C9
69	1	3101	SPM	C7-C8-C9-N10
69	4	3007	SPM	C7-C8-C9-N10
69	1	3134	SPM	N5-C6-C7-C8
69	4	3017	SPM	C7-C8-C9-N10
69	1	3137	SPM	C7-C8-C9-N10
69	4	3003	SPM	C7-C8-C9-N10
69	1	3141	SPM	N5-C6-C7-C8
69	AL	201	SPM	N10-C11-C12-C13
69	4	3005	SPM	N5-C6-C7-C8
69	1	3128	SPM	C2-C3-C4-N5
69	1	3138	SPM	N10-C11-C12-C13
69	1	3133	SPM	N5-C6-C7-C8

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Mol	Chain	Res	Type	Atoms
69	1	3142	SPM	N5-C6-C7-C8
69	1	3108	SPM	N5-C6-C7-C8
69	1	3141	SPM	C7-C8-C9-N10
69	1	3132	SPM	N5-C6-C7-C8
69	1	3106	SPM	C7-C8-C9-N10
69	1	3121	SPM	C7-C8-C9-N10
69	1	3132	SPM	C7-C8-C9-N10
69	1	3101	SPM	C12-C11-N10-C9
69	1	3120	SPM	C7-C6-N5-C4
69	1	3143	SPM	C6-C7-C8-C9
69	1	3106	SPM	N1-C2-C3-C4
69	1	3131	SPM	N10-C11-C12-C13
69	1	3133	SPM	N10-C11-C12-C13
69	1	3134	SPM	C12-C11-N10-C9
69	1	3113	SPM	N10-C11-C12-C13
69	1	3138	SPM	C7-C8-C9-N10
69	1	3101	SPM	C8-C9-N10-C11
69	4	3014	SPM	C12-C11-N10-C9
69	1	3116	SPM	N5-C6-C7-C8
69	4	3014	SPM	C2-C3-C4-N5
69	4	3015	SPM	N10-C11-C12-C13
69	1	3144	SPM	N5-C6-C7-C8
69	1	3114	SPM	C6-C7-C8-C9
69	1	3141	SPM	C2-C3-C4-N5
69	1	3104	SPM	C6-C7-C8-C9
69	1	3119	SPM	C7-C8-C9-N10
69	1	3128	SPM	N5-C6-C7-C8
69	1	3135	SPM	C11-C12-C13-N14
69	4	3012	SPM	C8-C9-N10-C11
69	4	3016	SPM	C11-C12-C13-N14
69	1	3113	SPM	C6-C7-C8-C9
69	1	3136	SPM	N10-C11-C12-C13
69	1	3101	SPM	C7-C6-N5-C4
69	1	3117	SPM	C12-C11-N10-C9
69	1	3129	SPM	C12-C11-N10-C9
69	1	3131	SPM	C8-C9-N10-C11
69	Ah	101	SPM	C7-C6-N5-C4
69	4	3002	SPM	C7-C8-C9-N10
69	1	3131	SPM	C7-C8-C9-N10
69	1	3109	SPM	N10-C11-C12-C13
69	4	3009	SPM	C7-C8-C9-N10
69	1	3133	SPM	C6-C7-C8-C9

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Mol	Chain	Res	Type	Atoms
69	1	3126	SPM	C7-C8-C9-N10
69	4	3002	SPM	C6-C7-C8-C9
69	1	3107	SPM	C6-C7-C8-C9
69	4	3007	SPM	C2-C3-C4-N5
69	4	3010	SPM	N10-C11-C12-C13
69	1	3108	SPM	C6-C7-C8-C9
69	1	3117	SPM	C7-C8-C9-N10
69	1	3114	SPM	N5-C6-C7-C8
69	Ah	101	SPM	C6-C7-C8-C9
69	4	3012	SPM	N10-C11-C12-C13
69	1	3110	SPM	C7-C6-N5-C4
69	1	3122	SPM	N1-C2-C3-C4
69	1	3129	SPM	N1-C2-C3-C4
69	1	3132	SPM	C3-C4-N5-C6
69	1	3134	SPM	N1-C2-C3-C4
69	1	3138	SPM	C7-C6-N5-C4
69	1	3138	SPM	C11-C12-C13-N14
69	4	3002	SPM	N10-C11-C12-C13
69	1	3119	SPM	C12-C11-N10-C9
69	1	3144	SPM	C7-C6-N5-C4
69	1	3114	SPM	N10-C11-C12-C13
69	4	3007	SPM	C6-C7-C8-C9
69	1	3138	SPM	C8-C9-N10-C11
69	4	3012	SPM	C3-C4-N5-C6
69	4	3004	SPM	C6-C7-C8-C9
69	1	3125	SPM	C6-C7-C8-C9
69	1	3123	SPM	C2-C3-C4-N5
69	1	3106	SPM	C8-C9-N10-C11
69	1	3108	SPM	C3-C4-N5-C6
69	1	3126	SPM	C7-C6-N5-C4
69	4	3010	SPM	C7-C6-N5-C4
69	4	3017	SPM	C8-C9-N10-C11
69	1	3106	SPM	N5-C6-C7-C8
69	1	3135	SPM	N5-C6-C7-C8
69	1	3105	SPM	C8-C9-N10-C11
69	4	3006	SPM	C6-C7-C8-C9
69	4	3017	SPM	C3-C4-N5-C6
69	4	3003	SPM	N5-C6-C7-C8
69	4	3004	SPM	N10-C11-C12-C13
69	1	3119	SPM	C7-C6-N5-C4
69	1	3138	SPM	C3-C4-N5-C6
69	4	3002	SPM	C3-C4-N5-C6

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Mol	Chain	Res	Type	Atoms
69	1	3136	SPM	C6-C7-C8-C9
69	1	3115	SPM	C12-C11-N10-C9
69	4	3004	SPM	C8-C9-N10-C11
69	1	3112	SPM	C8-C9-N10-C11
69	1	3137	SPM	C12-C11-N10-C9
69	1	3140	SPM	C3-C4-N5-C6
69	1	3141	SPM	C12-C11-N10-C9
69	1	3142	SPM	C7-C6-N5-C4
69	1	3142	SPM	C8-C9-N10-C11
69	4	3003	SPM	C12-C11-N10-C9
69	4	3007	SPM	C8-C9-N10-C11
69	4	3009	SPM	C12-C11-N10-C9
69	4	3013	SPM	C3-C4-N5-C6
69	1	3144	SPM	C6-C7-C8-C9
69	1	3104	SPM	N10-C11-C12-C13
69	4	3012	SPM	C6-C7-C8-C9
69	4	3011	SPM	C7-C8-C9-N10
69	4	3003	SPM	C7-C6-N5-C4
69	4	3003	SPM	C6-C7-C8-C9
69	1	3113	SPM	C7-C8-C9-N10
69	1	3113	SPM	C3-C4-N5-C6
69	4	3006	SPM	C8-C9-N10-C11
69	4	3007	SPM	C11-C12-C13-N14
69	4	3011	SPM	C12-C11-N10-C9
69	1	3126	SPM	C2-C3-C4-N5
69	1	3131	SPM	C6-C7-C8-C9
69	1	3104	SPM	C8-C9-N10-C11
69	1	3114	SPM	C8-C9-N10-C11
69	1	3119	SPM	C8-C9-N10-C11
69	4	3015	SPM	C7-C8-C9-N10
69	1	3116	SPM	C6-C7-C8-C9
69	1	3139	SPM	C6-C7-C8-C9

There are no ring outliers.

No monomer is involved in short contacts.

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues

There are no chain breaks in this entry.

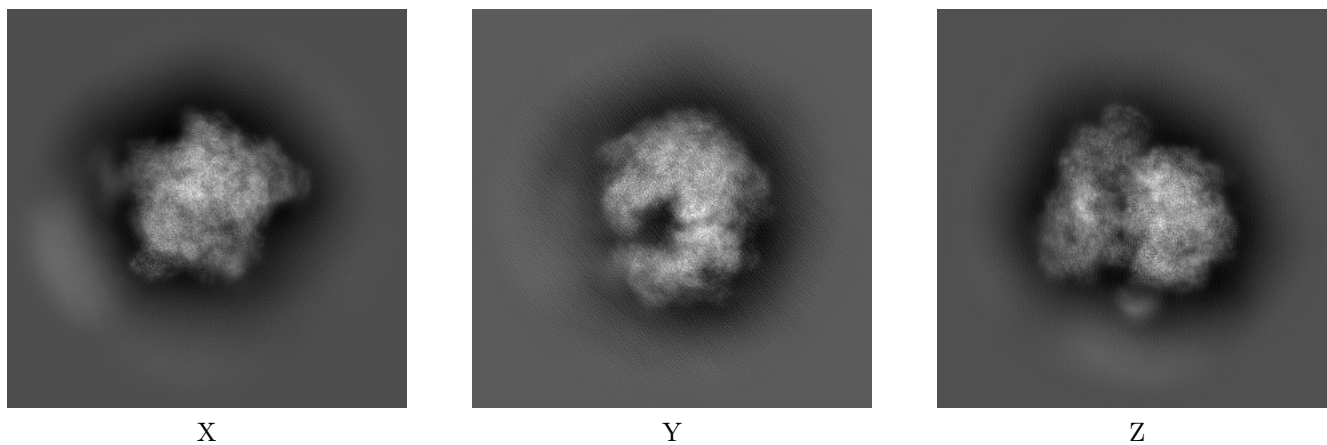
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-47628. 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](#)

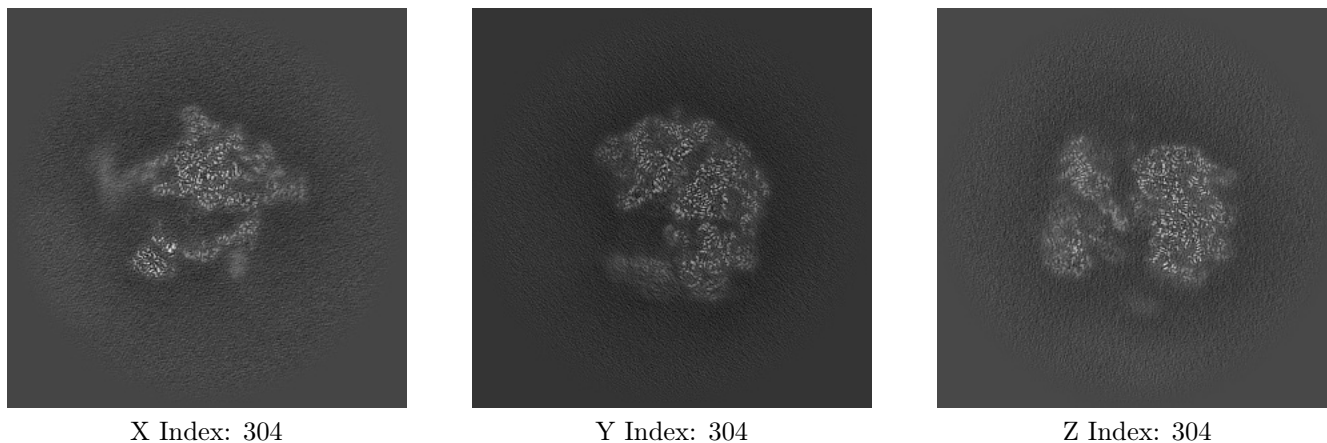
#### 6.1.1 Primary map



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

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

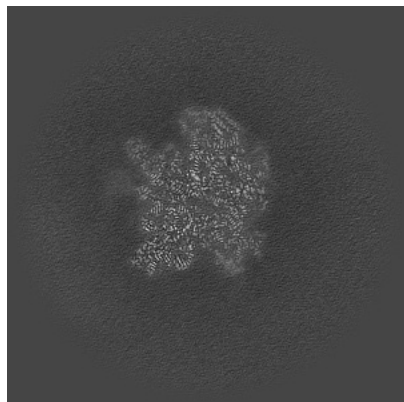
#### 6.2.1 Primary map



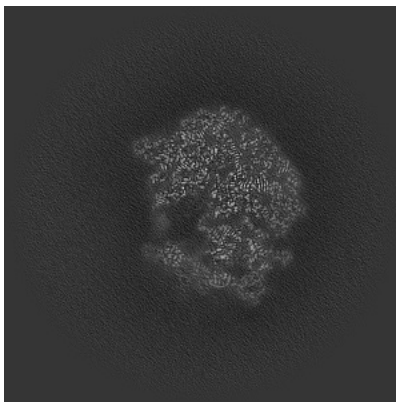
The images above show central slices of the map in three orthogonal directions.

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

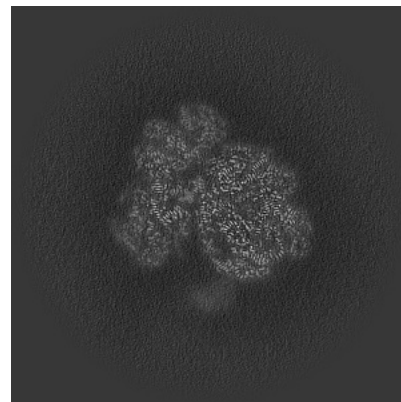
### 6.3.1 Primary map



X Index: 334



Y Index: 288

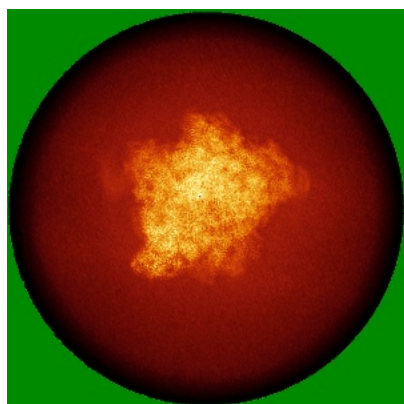


Z Index: 326

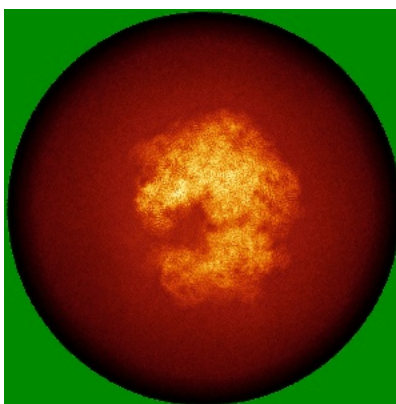
The images above show the largest variance slices of the map in three orthogonal directions.

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

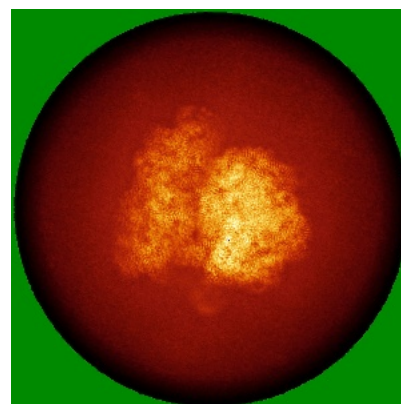
### 6.4.1 Primary map



X



Y

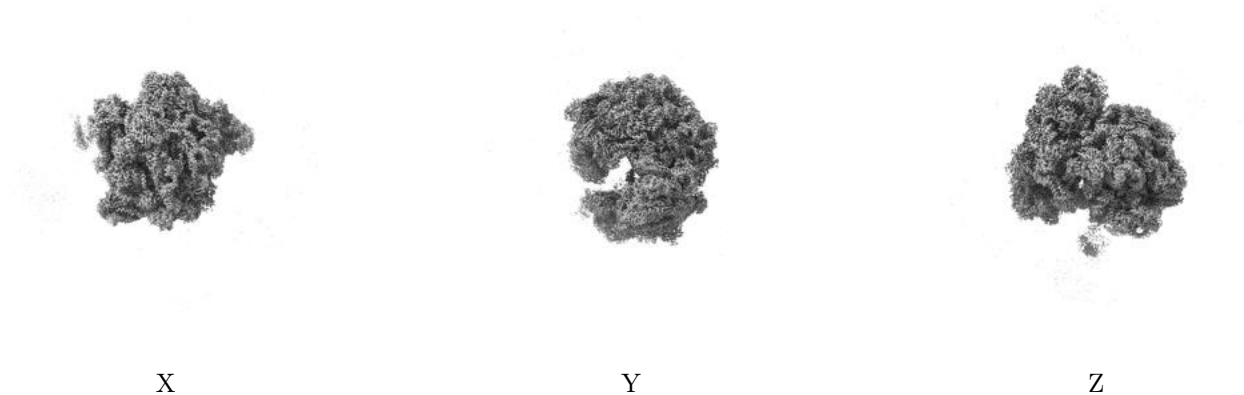


Z

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

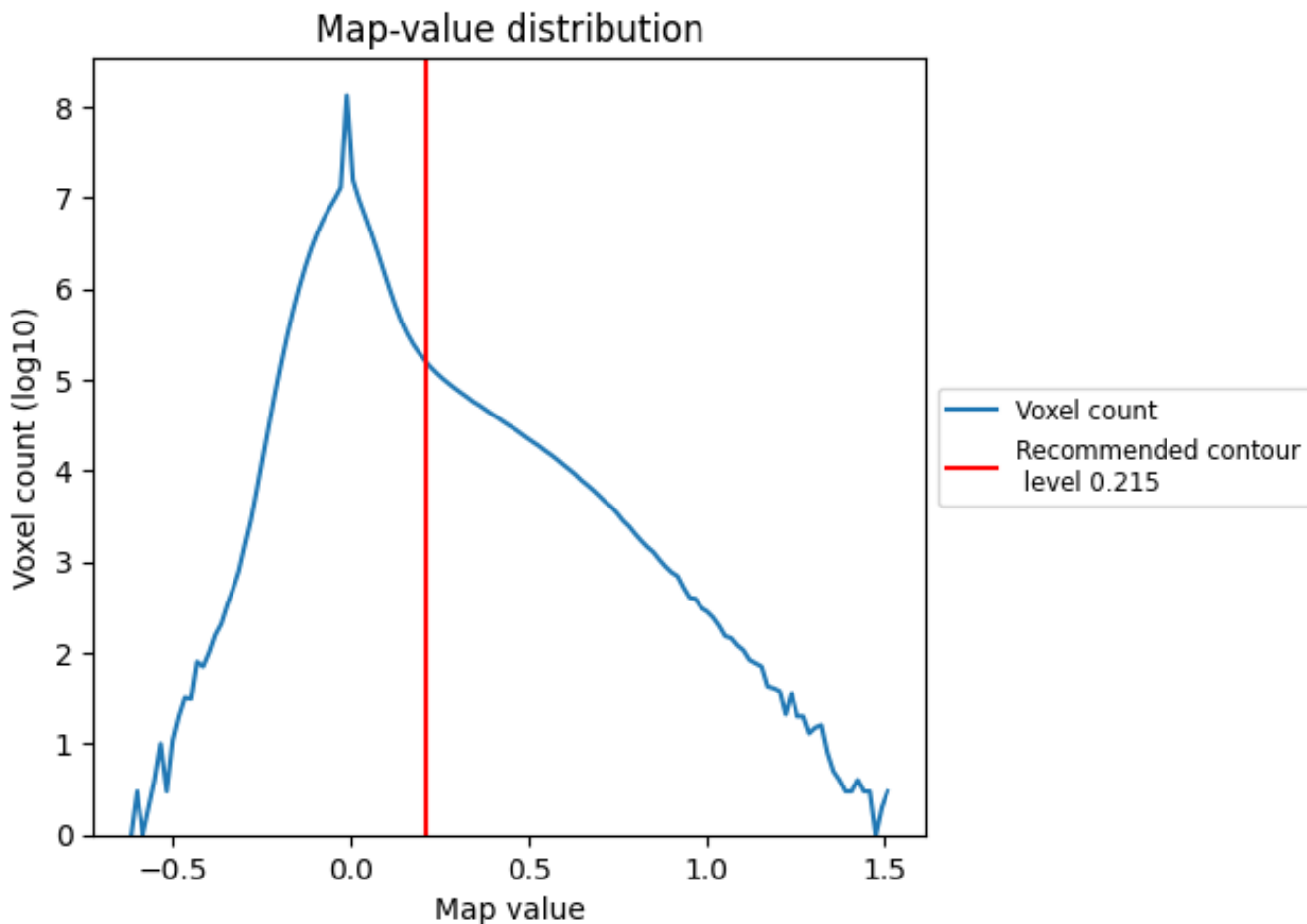
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

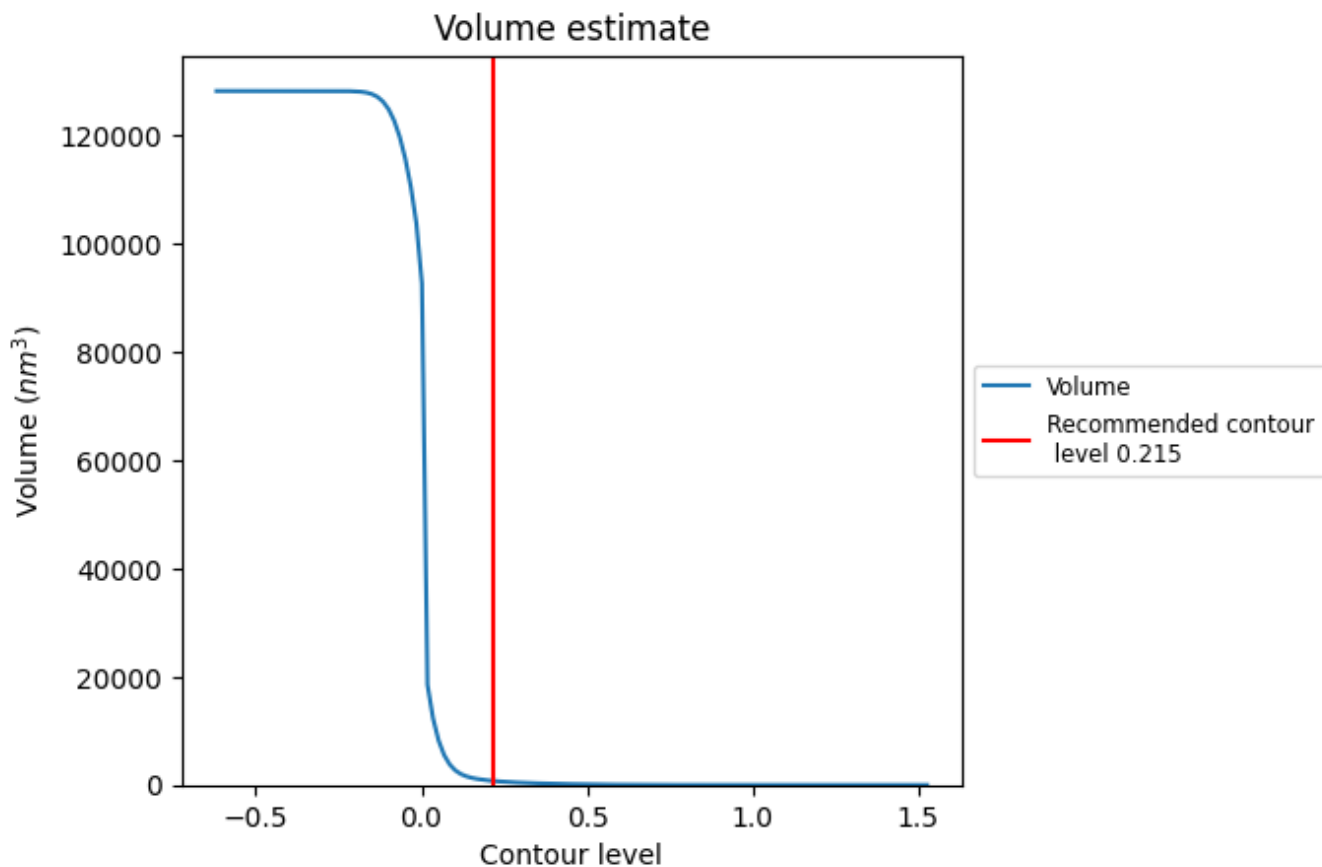
This section contains the results of statistical analysis of the map.

### 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](#)

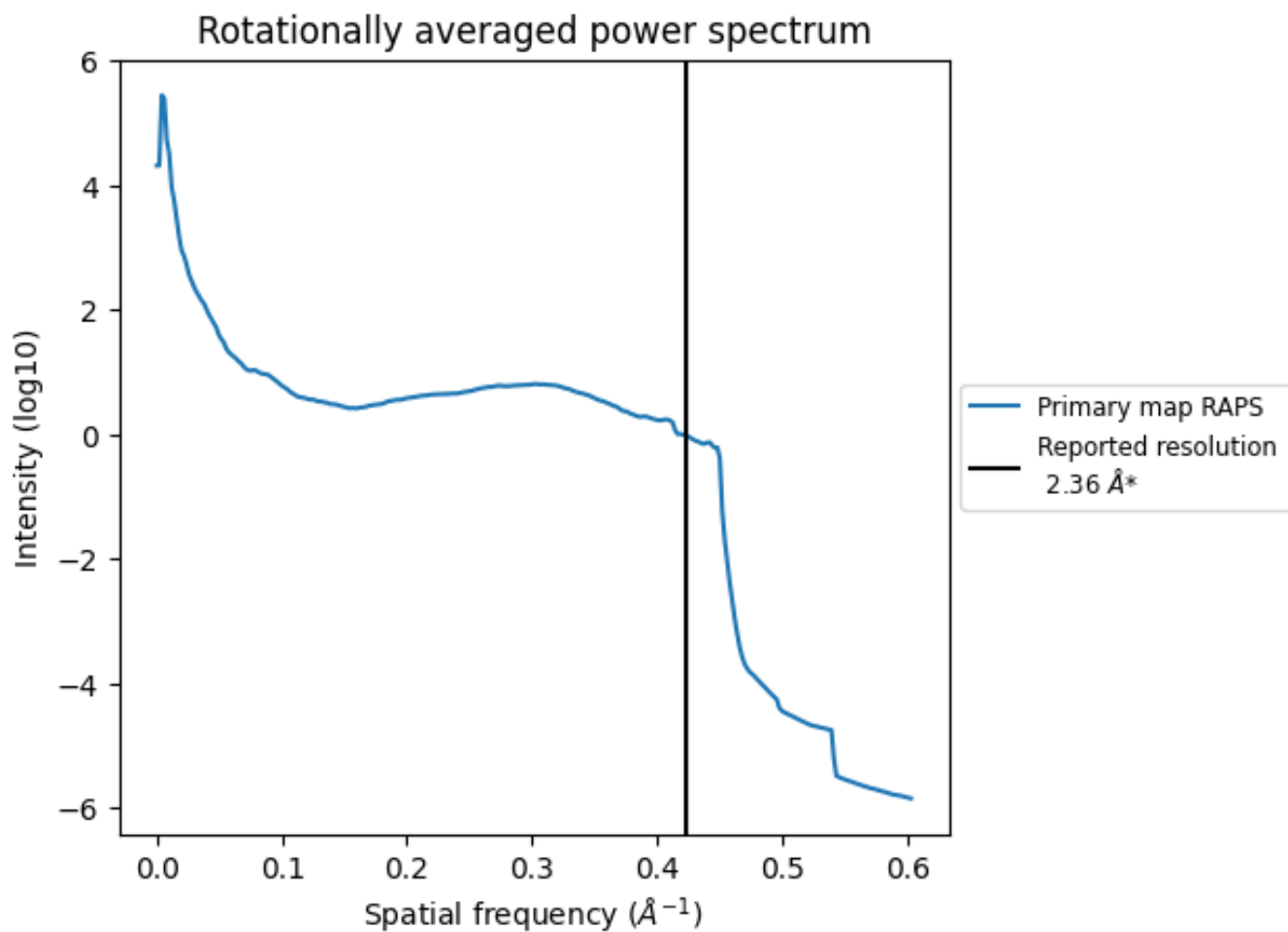


The volume at the recommended contour level is 756  $\text{nm}^3$ ; this corresponds to an approximate mass of 683 kDa.

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  $0.424 \text{\AA}^{-1}$

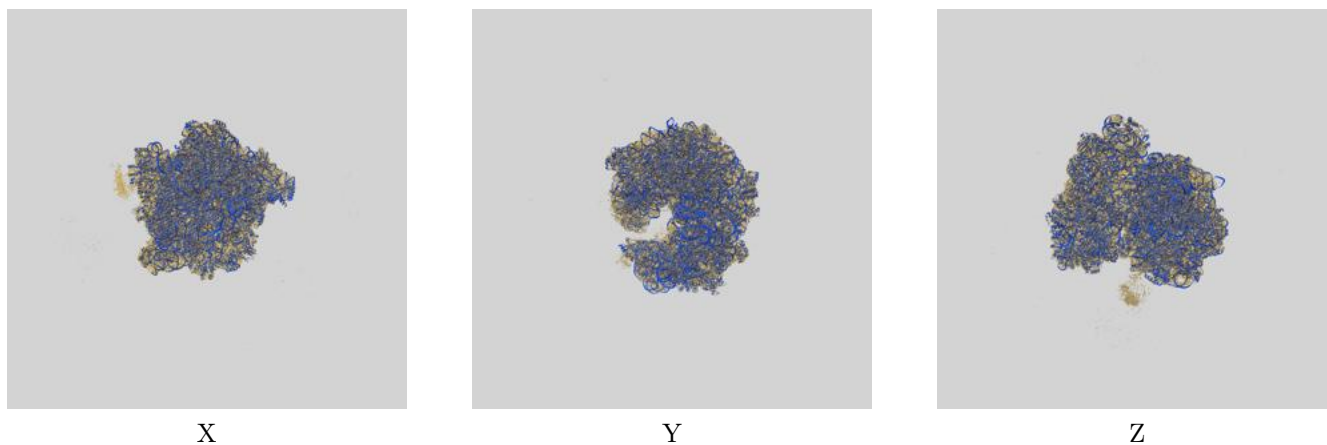
## 8 Fourier-Shell correlation

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

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

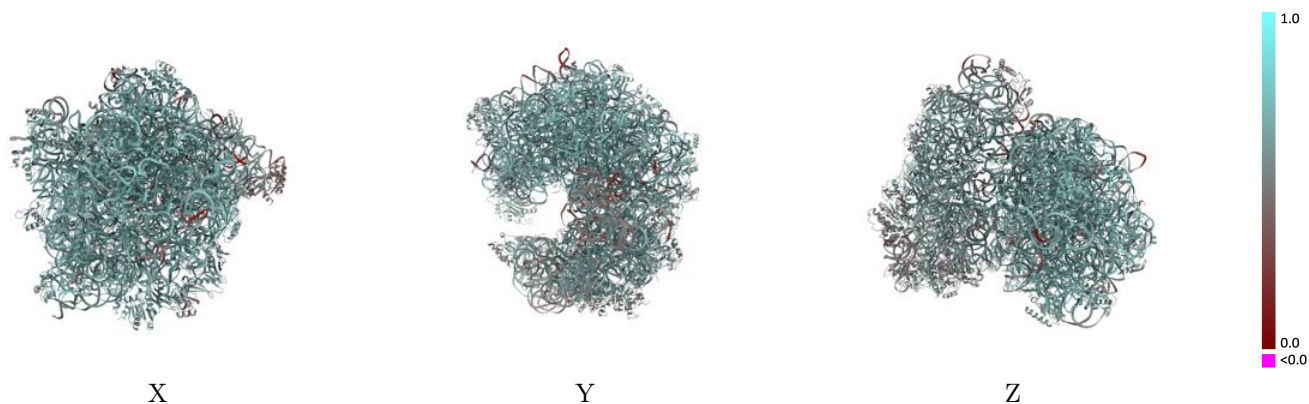
This section contains information regarding the fit between EMDB map EMD-47628 and PDB model 9E71. Per-residue inclusion information can be found in section 3 on page 23.

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



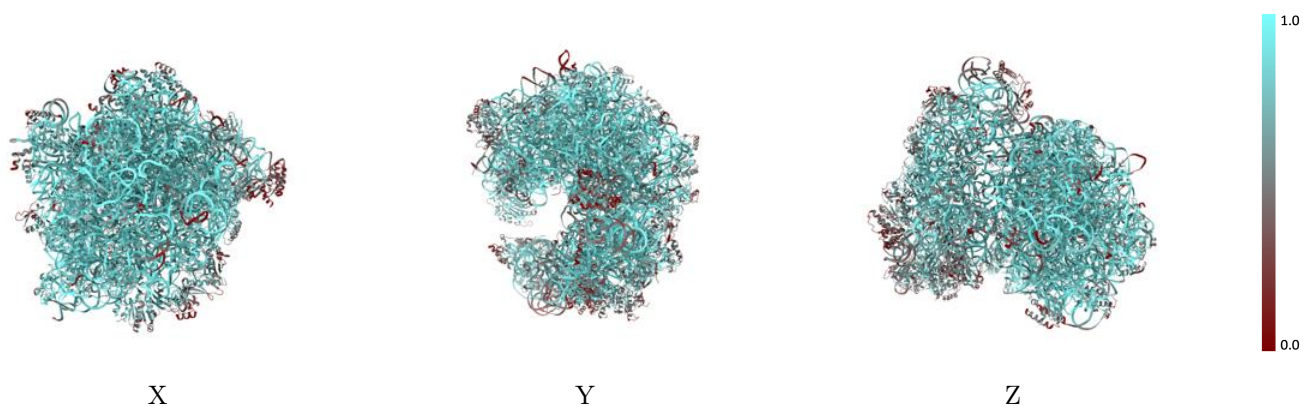
The images above show the 3D surface view of the map at the recommended contour level 0.215 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



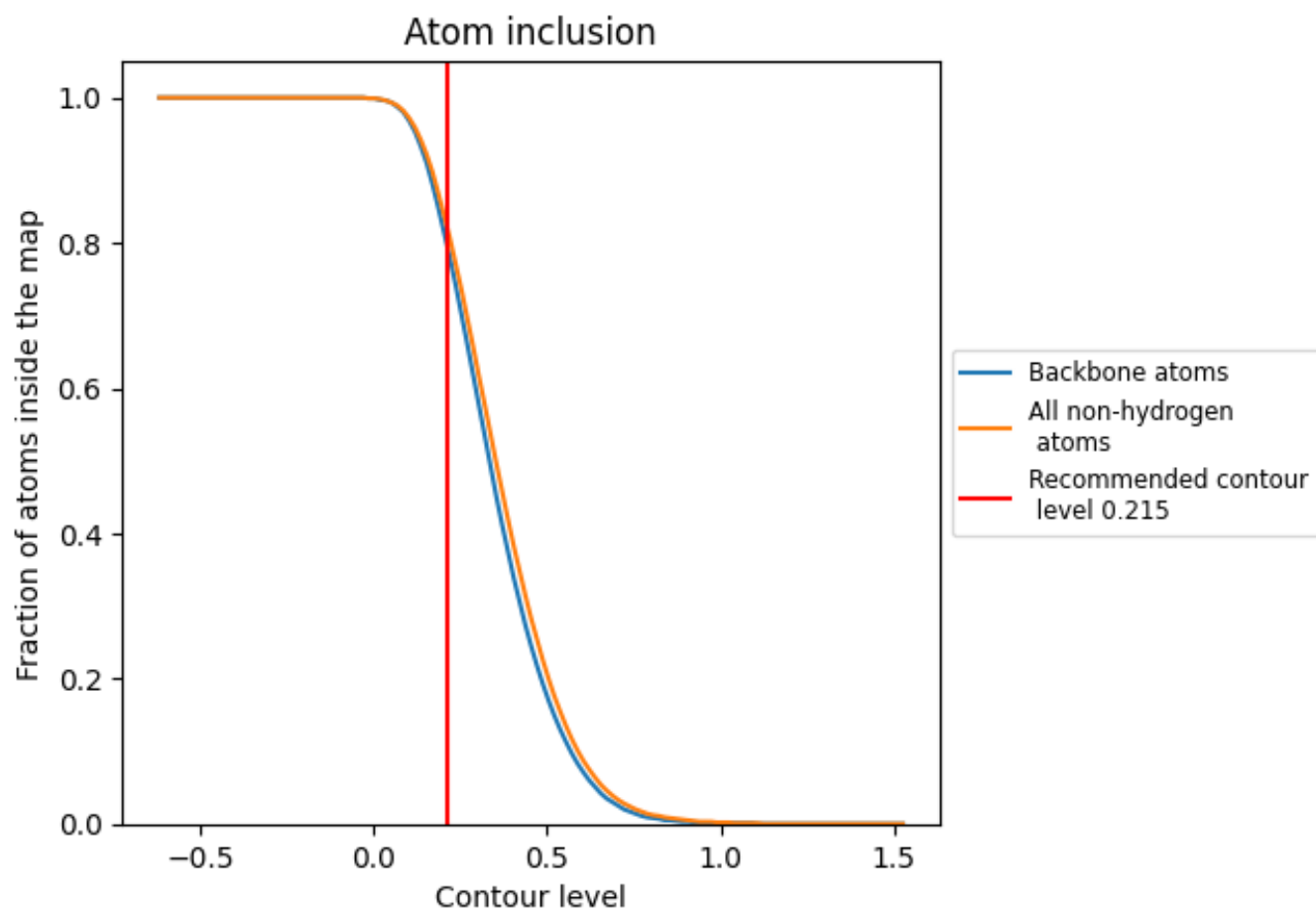
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.215).







































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 79% of all backbone atoms, 82% 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 (0.215) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8160	 0.6140
1	 0.9300	 0.6510
2	 0.9230	 0.6430
4	 0.8380	 0.5700
AA	 0.8830	 0.6710
AB	 0.8490	 0.6750
AC	 0.8070	 0.6490
AD	 0.7750	 0.6090
AE	 0.5900	 0.5970
AF	 0.5750	 0.5870
AG	 0.8080	 0.6520
AH	 0.8180	 0.6540
AI	 0.8270	 0.6530
AJ	 0.5520	 0.5570
AK	 0.5190	 0.5690
AL	 0.7420	 0.6260
AM	 0.8600	 0.6640
AN	 0.7920	 0.6340
AO	 0.8770	 0.6530
AP	 0.8330	 0.6490
AQ	 0.8250	 0.6440
AR	 0.6960	 0.6010
AS	 0.9430	 0.6800
AT	 0.8680	 0.6700
AU	 0.8050	 0.6680
AV	 0.7400	 0.6280
AW	 0.8320	 0.6530
AX	 0.6420	 0.6150
AY	 0.8380	 0.6470
AZ	 0.6670	 0.5790
Aa	 0.8080	 0.6560
Ab	 0.8120	 0.6530
Ac	 0.9160	 0.6590
Ad	 0.9830	 0.7140
Ae	 0.7110	 0.6450



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Chain	Atom inclusion	Q-score
Af	 0.9470	 0.6810
Ag	 0.6910	 0.6150
Ah	 0.9020	 0.6710
Ai	 0.7920	 0.6270
Aj	 0.6470	 0.6020
Ak	 0.6880	 0.6160
BA	 0.5200	 0.5220
BB	 0.4950	 0.5050
BC	 0.1640	 0.3990
BD	 0.7110	 0.5830
BE	 0.6780	 0.5840
BF	 0.6980	 0.5740
BG	 0.3720	 0.4690
BH	 0.6510	 0.5460
BI	 0.7930	 0.5960
BJ	 0.7190	 0.5880
BK	 0.6360	 0.5360
BL	 0.1690	 0.4480
BM	 0.6630	 0.5330
BN	 0.7040	 0.5810
BO	 0.5280	 0.5410
BP	 0.1730	 0.4250
BQ	 0.6570	 0.5710
BR	 0.6460	 0.5780
BS	 0.2220	 0.4030
BT	 0.5290	 0.5350
BU	 0.6990	 0.5720
BV	 0.4610	 0.5190
BW	 0.5220	 0.5330
BX	 0.2220	 0.4380
BY	 0.6210	 0.5710
BZ	 0.5230	 0.5050
Ba	 0.5900	 0.5470
Bb	 0.2760	 0.4360
Bc	 0.6180	 0.5340