



## Full wwPDB EM Validation Report ⓘ

Dec 16, 2024 – 06:10 PM EST

PDB ID : 8EVS  
EMDB ID : EMD-28635  
Title : Hypopseudouridylated yeast 80S bound with Taura syndrome virus (TSV) internal ribosome entry site (IRES), eEF2 and GDP, Structure II  
Authors : Zhao, Y.; Rai, J.; Li, H.  
Deposited on : 2022-10-20  
Resolution : 2.62 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>.

---

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

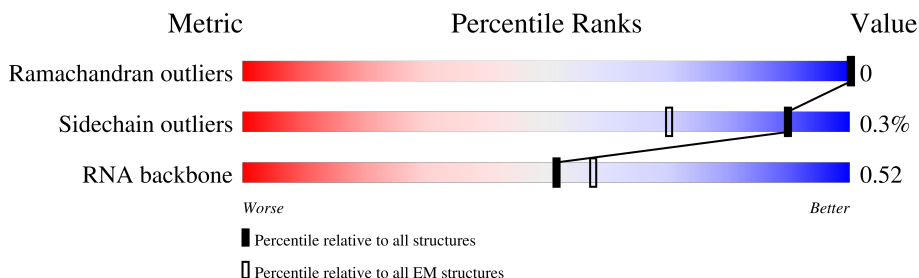
EMDB validation analysis : 0.0.1.dev113  
Mogul : 2022.3.0, CSD as543be (2022)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal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

# 1 Overall quality at a glance

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

The reported resolution of this entry is 2.62 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	BA	252	
2	BB	255	
3	BC	254	
4	BE	261	
5	BG	236	
6	BH	190	
7	BI	200	
8	BJ	197	

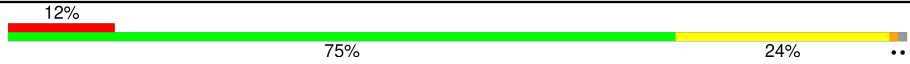
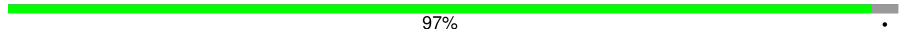
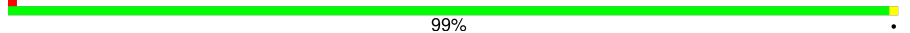












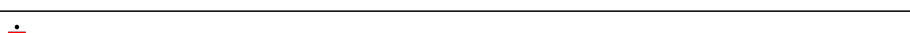
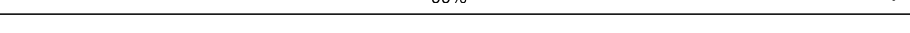
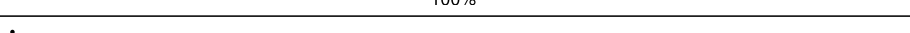
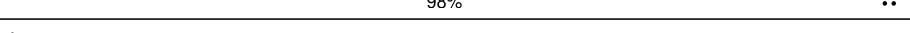
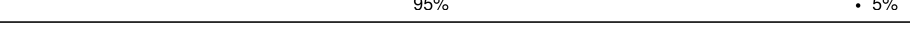
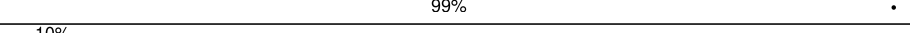
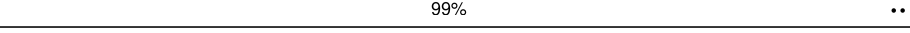
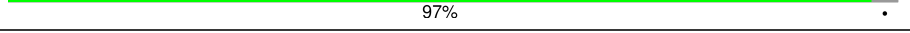
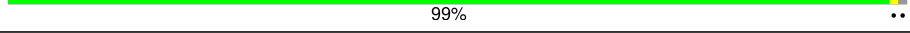

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
9	BL	156	
10	BN	151	
11	BO	137	
12	BV	87	
13	BW	130	
14	BX	145	
15	BY	135	
16	Ba	119	
17	Bb	82	
18	Be	63	
19	BD	240	
20	BF	225	
21	BK	105	
22	BP	142	
23	BQ	143	
24	BR	136	
25	BS	146	
26	BT	144	
27	BU	121	
28	BZ	108	
29	Bc	67	
30	Bd	56	
31	Bg	319	
32	Bf	152	
33	BM	143	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
34	B5	1798	
35	AA	254	
36	AB	387	
37	AC	362	
38	A1	3199	
39	A3	121	
40	A4	158	
41	AD	297	
42	AE	176	
43	AF	244	
44	AG	256	
45	AH	191	
46	AI	221	
47	AJ	174	
48	AL	199	
49	AM	138	
50	AN	204	
51	AO	199	
52	AP	184	
53	AQ	186	
54	AR	189	
55	AS	178	
56	AT	160	
57	AU	121	
58	AV	137	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
59	AW	155	
60	AX	142	
61	AY	127	
62	AZ	136	
63	Aa	149	
64	Ab	59	
65	Ac	105	
66	Ad	113	
67	Ae	130	
68	Af	107	
69	Ag	121	
70	Ah	120	
71	Ai	100	
72	Aj	88	
73	Ak	78	
74	Al	51	
75	Am	128	
76	An	25	
77	Ao	106	
78	Ap	92	
79	E	217	
80	DC	842	
81	V	312	
82	EC	202	

## 2 Entry composition

There are 85 unique types of molecules in this entry. The entry contains 214019 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called 40S ribosomal protein S0-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	BA	206	Total	C	N	O	S	0	0
			1612	1034	285	291	2		

- Molecule 2 is a protein called RPS1A isoform 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	BB	214	Total	C	N	O	S	0	0
			1709	1084	310	311	4		

- Molecule 3 is a protein called RPS2 isoform 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	BC	217	Total	C	N	O	S	0	0
			1635	1047	289	297	2		

- Molecule 4 is a protein called 40S ribosomal protein S4-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	BE	260	Total	C	N	O	S	0	0
			2068	1316	389	360	3		

- Molecule 5 is a protein called 40S ribosomal protein S6-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	BG	226	Total	C	N	O	S	0	0
			1820	1142	350	325	3		

- Molecule 6 is a protein called 40S ribosomal protein S7-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
6	BH	184	Total	C	N	O	0	0
			1481	951	265	265		

- Molecule 7 is a protein called 40S ribosomal protein S8-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	BI	188	Total	C	N	O	S	0	0
			1489	925	298	264	2		

- Molecule 8 is a protein called 40S ribosomal protein S9-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	BJ	185	Total	C	N	O	S	0	0
			1494	943	289	261	1		

- Molecule 9 is a protein called 40S ribosomal protein S11-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	BL	155	Total	C	N	O	S	0	0
			1244	798	235	208	3		

- Molecule 10 is a protein called 40S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	BN	150	Total	C	N	O	S	0	0
			1192	759	224	207	2		

- Molecule 11 is a protein called 40S ribosomal protein S14-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	BO	127	Total	C	N	O	S	0	0
			941	578	186	174	3		

- Molecule 12 is a protein called 40S ribosomal protein S21-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	BV	87	Total	C	N	O	S	0	0
			684	420	125	137	2		

- Molecule 13 is a protein called RPS22A isoform 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	BW	129	Total	C	N	O	S	0	0
			1021	650	188	180	3		

- Molecule 14 is a protein called 40S ribosomal protein S23-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	BX	144	Total	C	N	O	S	0	0
			1121	708	220	191	2		

- Molecule 15 is a protein called 40S ribosomal protein S24-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	BY	134	Total	C	N	O	S	0	0
			1073	676	208	189			

- Molecule 16 is a protein called RPS26B isoform 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	Ba	97	Total	C	N	O	S	0	0
			769	475	160	129	5		

- Molecule 17 is a protein called 40S ribosomal protein S27-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	Bb	81	Total	C	N	O	S	0	0
			610	382	110	113	5		

- Molecule 18 is a protein called 40S ribosomal protein S30-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	Be	60	Total	C	N	O	S	0	0
			475	299	98	77	1		

- Molecule 19 is a protein called RPS3 isoform 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	BD	223	Total	C	N	O	S	0	0
			1734	1101	313	314	6		

- Molecule 20 is a protein called Rps5p.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	BF	206	Total	C	N	O	S	0	0
			1609	1007	300	299	3		

- Molecule 21 is a protein called 40S ribosomal protein S10-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	BK	96	Total	C	N	O	S	0	0
			817	529	133	153	2		

- Molecule 22 is a protein called RPS15 isoform 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	BP	124	Total	C	N	O	S	0	0
			991	631	187	166	7		

- Molecule 23 is a protein called 40S ribosomal protein S16-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
23	BQ	141	Total	C	N	O	0	0
			1105	708	203	194		

- Molecule 24 is a protein called 40S ribosomal protein S17-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	BR	121	Total	C	N	O	S	0	0
			975	611	183	179	2		

- Molecule 25 is a protein called 40S ribosomal protein S18-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	BS	145	Total	C	N	O	S	0	0
			1192	743	237	210	2		

- Molecule 26 is a protein called 40S ribosomal protein S19-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	BT	141	Total	C	N	O	S	0	0
			1095	685	206	202	2		

- Molecule 27 is a protein called RPS20 isoform 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	BU	107	Total	C	N	O	S	0	0
			855	539	156	159	1		

- Molecule 28 is a protein called RPS25A isoform 1.

Mol	Chain	Residues	Atoms				AltConf	Trace
28	BZ	69	Total	C	N	O	0	0
			558	357	103	98		

- Molecule 29 is a protein called RPS28A isoform 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	Bc	63	Total	C	N	O	S	0	0
			497	306	99	91	1		

- Molecule 30 is a protein called RPS29A isoform 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	Bd	53	Total	C	N	O	S	0	0
			442	274	92	72	4		

- Molecule 31 is a protein called Guanine nucleotide-binding protein subunit beta-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	Bg	312	Total	C	N	O	S	0	0
			2401	1522	410	461	8		

- Molecule 32 is a protein called Ubiquitin-40S ribosomal protein S31.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	Bf	75	Total	C	N	O	S	0	0
			605	386	116	99	4		

- Molecule 33 is a protein called 40S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	BM	124	Total	C	N	O	S	0	0
			935	587	165	181	2		

- Molecule 34 is a RNA chain called 18S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	B5	1782	Total	C	N	O	P	1	0
			38004	17005	6718	12499	1782		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B5	1280	4AC	C	conflict	GB 1329886537
B5	1773	4AC	C	conflict	GB 1329886537

- Molecule 35 is a protein called 60S ribosomal protein L2-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	AA	247	Total	C	N	O	S	0	0
			1878	1170	381	326	1		

- Molecule 36 is a protein called 60S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	AB	386	Total	C	N	O	S	0	0
			3080	1955	584	533	8		

- Molecule 37 is a protein called RPL4A isoform 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	AC	361	Total	C	N	O	S	0	0
			2748	1729	522	494	3		

- Molecule 38 is a RNA chain called 25S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	A1	3198	Total	C	N	O	P	0	0
			68445	30596	12331	22320	3198		

- Molecule 39 is a RNA chain called 5s rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	A3	121	Total	C	N	O	P	0	0
			2579	1152	461	845	121		

- Molecule 40 is a RNA chain called 5.8 S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	A4	158	Total	C	N	O	P	0	0
			3353	1500	586	1109	158		

- Molecule 41 is a protein called RPL5 isoform 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	AD	292	Total	C	N	O	S	0	0
			2341	1478	408	453	2		

- Molecule 42 is a protein called 60S ribosomal protein L6-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	AE	156	Total	C	N	O	S	0	0
			1239	800	222	216	1		

- Molecule 43 is a protein called 60S ribosomal protein L7-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	AF	222	Total	C	N	O	S	0	0
			1784	1151	324	308	1		

- Molecule 44 is a protein called 60S ribosomal protein L8-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	AG	230	Total	C	N	O	S	0	0
			1798	1149	323	323	3		

- Molecule 45 is a protein called 60S ribosomal protein L9-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	AH	190	Total	C	N	O	S	0	0
			1510	957	273	276	4		

- Molecule 46 is a protein called RPL10 isoform 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	AI	205	Total	C	N	O	S	0	0
			1672	1063	316	288	5		

- Molecule 47 is a protein called RPL11A isoform 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	AJ	169	Total	C	N	O	S	0	0
			1353	847	253	249	4		

- Molecule 48 is a protein called 60S ribosomal protein L13-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
48	AL	193	Total	C	N	O		
			1543	962	315	266	0	0

- Molecule 49 is a protein called 60S ribosomal protein L14-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	AM	136	Total	C	N	O	S		
			1053	675	199	177	2	0	0

- Molecule 50 is a protein called 60S ribosomal protein L15-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	AN	203	Total	C	N	O	S		
			1720	1077	361	281	1	0	0

- Molecule 51 is a protein called 60S ribosomal protein L16-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	AO	197	Total	C	N	O	S		
			1555	1003	289	262	1	197	0

- Molecule 52 is a protein called 60S ribosomal protein L17-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
52	AP	175	Total	C	N	O		
			1388	862	277	249	0	0

- Molecule 53 is a protein called 60S ribosomal protein L18-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	AQ	185	Total	C	N	O	S		
			1441	908	290	241	2	0	0

- Molecule 54 is a protein called 60S ribosomal protein L19-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
54	AR	188	Total	C	N	O		
			1521	935	326	260	0	0

- Molecule 55 is a protein called 60S ribosomal protein L20.

Mol	Chain	Residues	Atoms					AltConf	Trace
55	AS	172	Total	C	N	O	S	0	0
			1445	930	267	244	4		

- Molecule 56 is a protein called 60S ribosomal protein L21-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
56	AT	159	Total	C	N	O	S	0	0
			1276	805	246	221	4		

- Molecule 57 is a protein called 60S ribosomal protein L22-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
57	AU	100	Total	C	N	O	S	0	0
			796	516	131	149			

- Molecule 58 is a protein called 60S ribosomal protein L23-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
58	AV	136	Total	C	N	O	S	0	0
			1003	628	189	179	7		

- Molecule 59 is a protein called RPL24A isoform 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
59	AW	63	Total	C	N	O	S	0	0
			521	336	102	82	1		

- Molecule 60 is a protein called 60S ribosomal protein L25.

Mol	Chain	Residues	Atoms					AltConf	Trace
60	AX	121	Total	C	N	O	S	0	0
			968	623	170	173	2		

- Molecule 61 is a protein called 60S ribosomal protein L26-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
61	AY	126	Total	C	N	O	S	0	0
			993	625	192	176			

- Molecule 62 is a protein called 60S ribosomal protein L27-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
62	AZ	135	Total	C	N	O	0	0
			1092	710	202	180		

- Molecule 63 is a protein called 60S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
63	Aa	148	Total	C	N	O	S	0	0
			1173	749	231	190	3		

- Molecule 64 is a protein called RPL29 isoform 1.

Mol	Chain	Residues	Atoms				AltConf	Trace
64	Ab	58	Total	C	N	O	0	0
			462	289	100	73		

- Molecule 65 is a protein called 60S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace
65	Ac	97	Total	C	N	O	S	0	0
			743	479	124	139	1		

- Molecule 66 is a protein called 60S ribosomal protein L31-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
66	Ad	109	Total	C	N	O	S	0	0
			890	565	168	156	1		

- Molecule 67 is a protein called RPL32 isoform 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
67	Ae	127	Total	C	N	O	S	0	0
			1020	647	205	167	1		

- Molecule 68 is a protein called 60S ribosomal protein L33-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
68	Af	106	Total	C	N	O	S	0	0
			850	540	165	144	1		

- Molecule 69 is a protein called 60S ribosomal protein L34-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
69	Ag	112	Total	C	N	O	S	0	0
			880	545	179	152	4		

- Molecule 70 is a protein called 60S ribosomal protein L35-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
70	Ah	119	Total	C	N	O	S	0	0
			969	615	186	167	1		

- Molecule 71 is a protein called 60S ribosomal protein L36-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
71	Ai	99	Total	C	N	O	S	0	0
			771	481	156	132	2		

- Molecule 72 is a protein called 60S ribosomal protein L37-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
72	Aj	87	Total	C	N	O	S	0	0
			681	414	148	114	5		

- Molecule 73 is a protein called RPL38 isoform 1.

Mol	Chain	Residues	Atoms				AltConf	Trace
73	Ak	77	Total	C	N	O	0	0
			612	391	115	106		

- Molecule 74 is a protein called 60S ribosomal protein L39.

Mol	Chain	Residues	Atoms					AltConf	Trace
74	Al	50	Total	C	N	O	S	0	0
			436	272	97	65	2		

- Molecule 75 is a protein called Ubiquitin-60S ribosomal protein L40.

Mol	Chain	Residues	Atoms					AltConf	Trace
75	Am	52	Total	C	N	O	S	0	0
			417	259	86	67	5		

- Molecule 76 is a protein called 60S ribosomal protein L41-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
76	An	25	Total	C	N	O	S	0	0
			233	142	63	27	1		

- Molecule 77 is a protein called 60S ribosomal protein L42-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
77	Ao	102	Total	C	N	O	S	0	0
			819	514	166	134	5		

- Molecule 78 is a protein called 60S ribosomal protein L43-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
78	Ap	91	Total	C	N	O	S	0	0
			694	429	138	121	6		

- Molecule 79 is a protein called RPL1A isoform 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
79	E	217	Total	C	N	O	S	0	0
			1718	1097	299	312	10		

- Molecule 80 is a protein called Elongation factor 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
80	DC	824	Total	C	N	O	S	0	0
			6419	4085	1096	1208	30		

- Molecule 81 is a protein called 60S acidic ribosomal protein P0.

Mol	Chain	Residues	Atoms					AltConf	Trace
81	V	189	Total	C	N	O	S	0	0
			1473	942	257	270	4		

- Molecule 82 is a RNA chain called TSV IRES.

Mol	Chain	Residues	Atoms					AltConf	Trace
82	EC	195	Total	C	N	O	P	0	0
			4128	1843	731	1359	195		

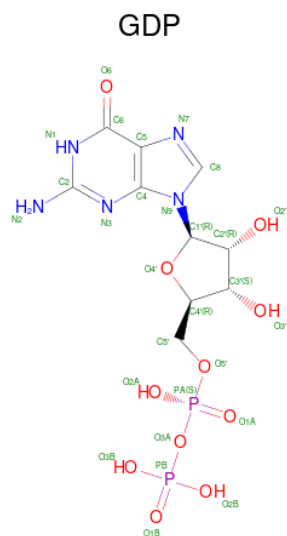
- Molecule 83 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
83	BJ	1	Total 1	Mg 1	0
83	Ba	1	Total 1	Mg 1	0
83	B5	62	Total 62	Mg 62	0
83	A1	174	Total 174	Mg 174	0
83	A3	2	Total 2	Mg 2	0
83	A4	6	Total 6	Mg 6	0
83	AI	1	Total 1	Mg 1	0
83	AL	1	Total 1	Mg 1	0
83	AN	1	Total 1	Mg 1	0
83	AP	1	Total 1	Mg 1	0
83	AR	1	Total 1	Mg 1	0
83	Ae	2	Total 2	Mg 2	0
83	Aj	1	Total 1	Mg 1	0

- Molecule 84 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
84	Ao	1	Total 1	Zn 1	0

- Molecule 85 is GUANOSINE-5'-DIPHOSPHATE (three-letter code: GDP) (formula:  $C_{10}H_{15}N_5O_{11}P_2$ ).




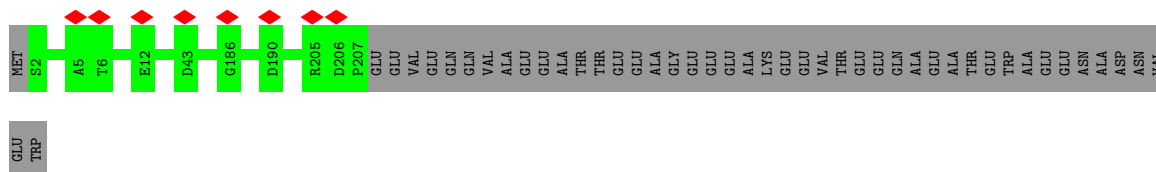
Mol	Chain	Residues	Atoms					AltConf
85	DC	1	Total	C	N	O	P	0
			28	10	5	11	2	

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


These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

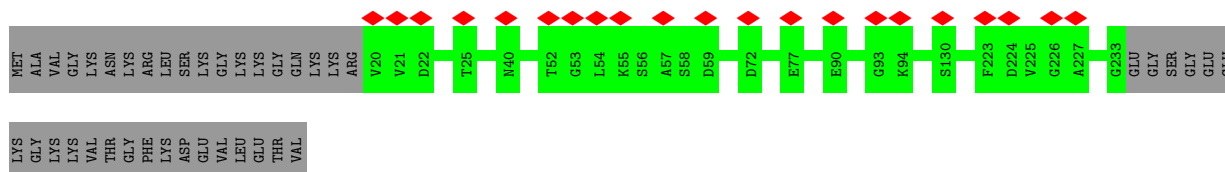
- Molecule 1: 40S ribosomal protein S0-A

Chain BA: 




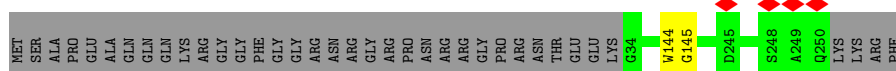
- Molecule 2: RPS1A isoform 1

Chain BB: 



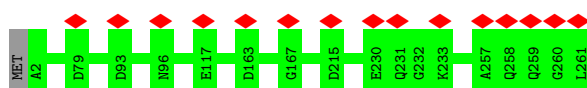
- Molecule 3: RPS2 isoform 1

Chain BC: 

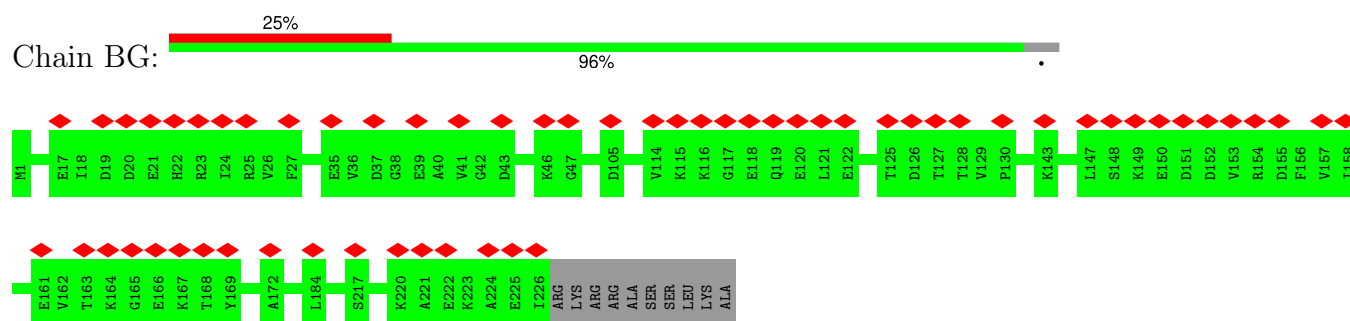


- Molecule 4: 40S ribosomal protein S4-A

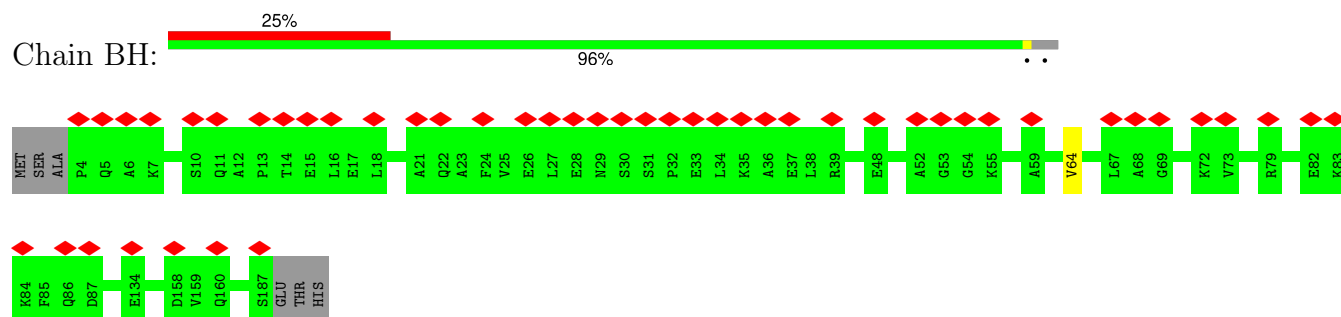
Chain BE: 



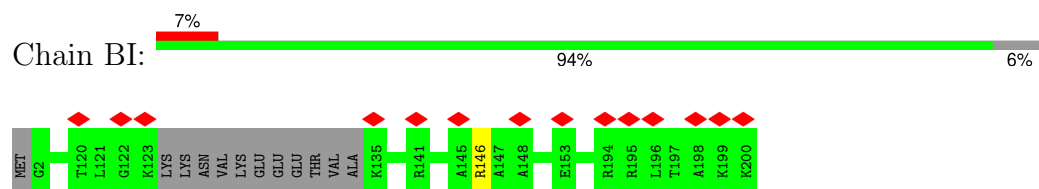
- Molecule 5: 40S ribosomal protein S6-A



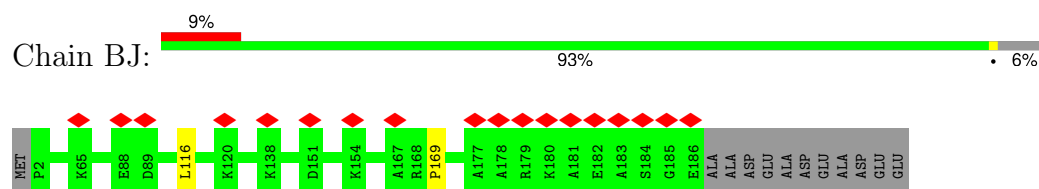
- Molecule 6: 40S ribosomal protein S7-A



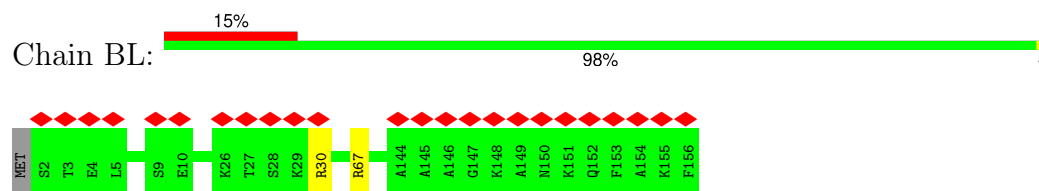
- Molecule 7: 40S ribosomal protein S8-A



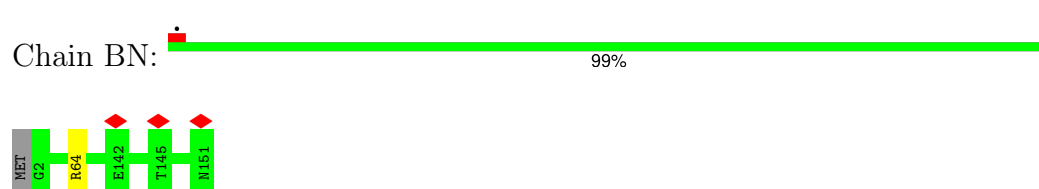
- Molecule 8: 40S ribosomal protein S9-A



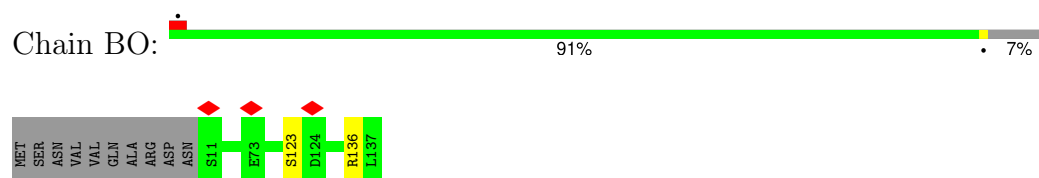
- Molecule 9: 40S ribosomal protein S11-A



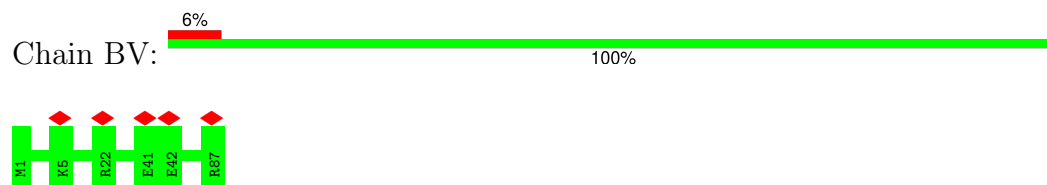
- Molecule 10: 40S ribosomal protein S13



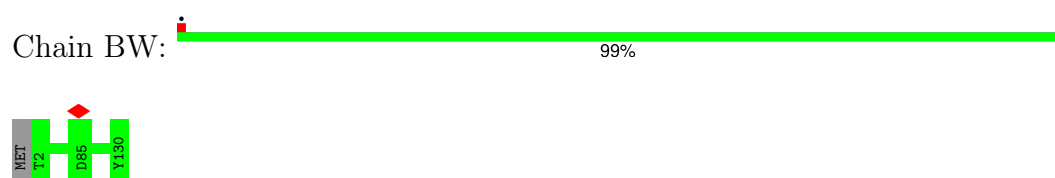
- Molecule 11: 40S ribosomal protein S14-A



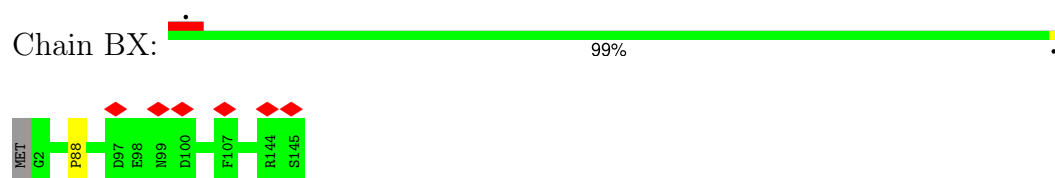
- Molecule 12: 40S ribosomal protein S21-A



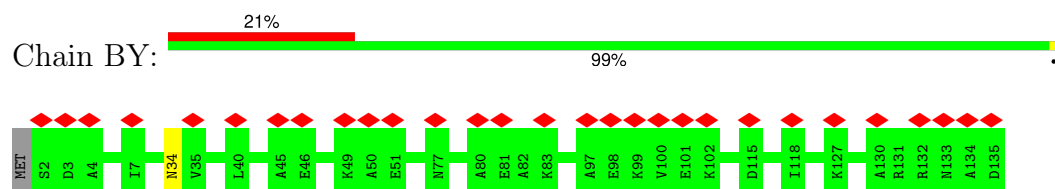
- Molecule 13: RPS22A isoform 1



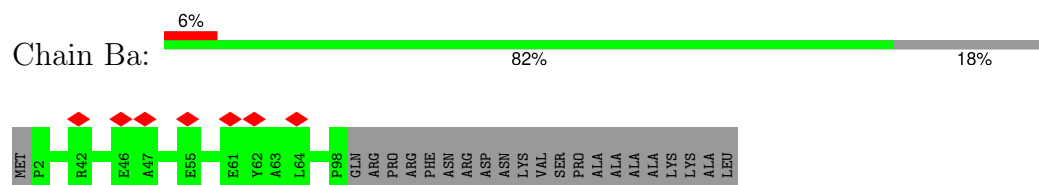
- Molecule 14: 40S ribosomal protein S23-A



- Molecule 15: 40S ribosomal protein S24-A

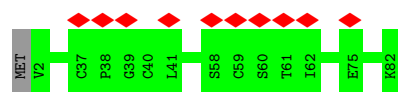


- Molecule 16: RPS26B isoform 1

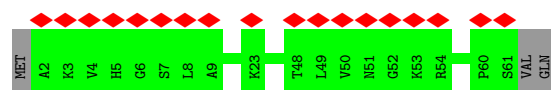


- Molecule 17: 40S ribosomal protein S27-A

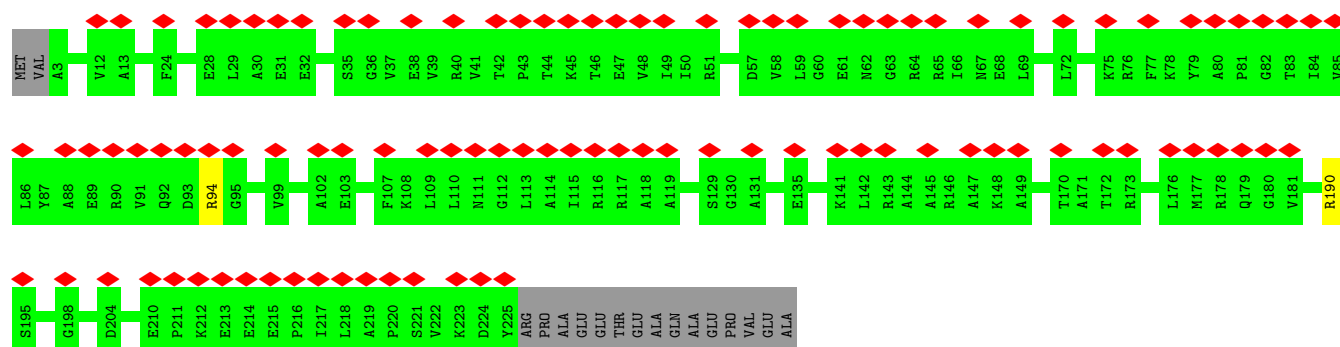
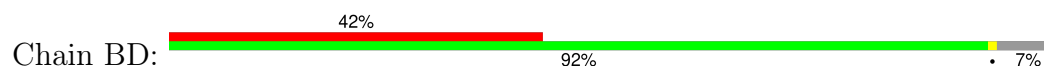




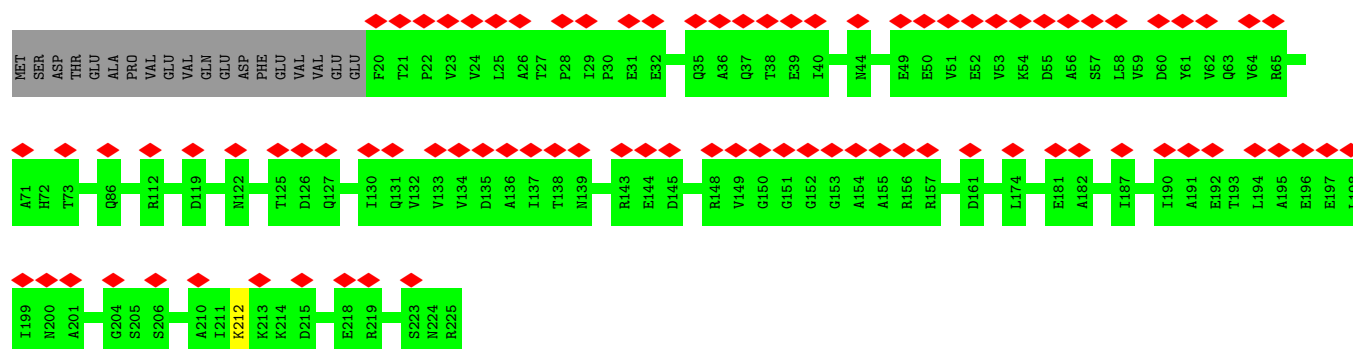
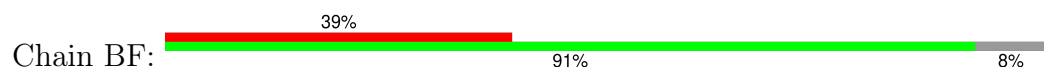
- Molecule 18: 40S ribosomal protein S30-A



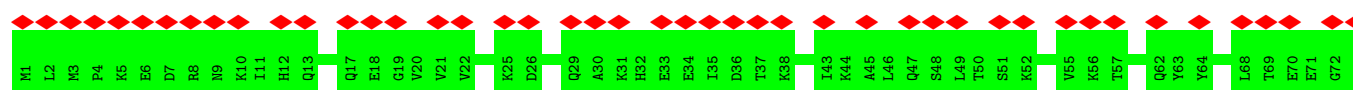
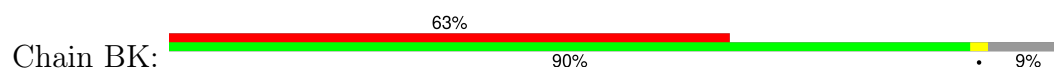
- Molecule 19: RPS3 isoform 1

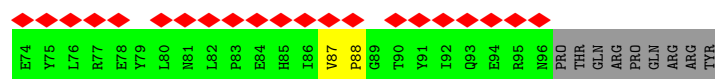


- Molecule 20: Rps5p

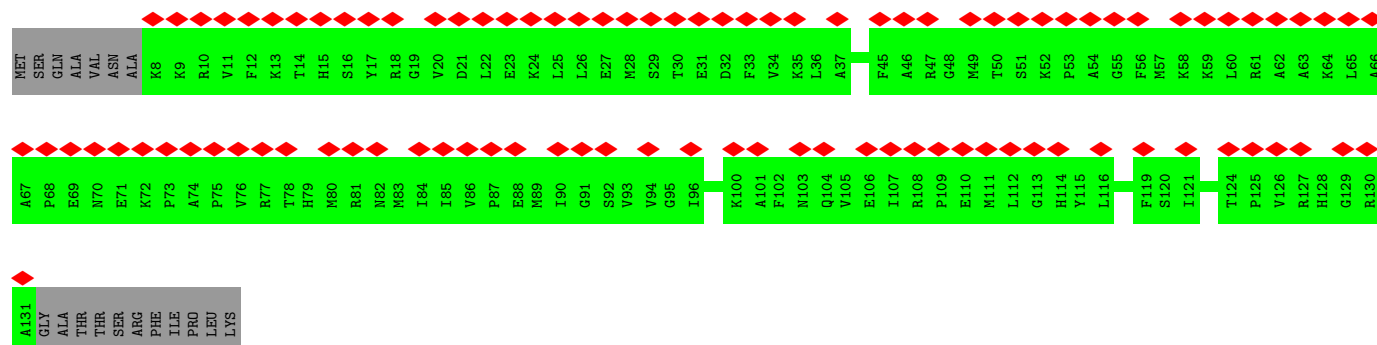
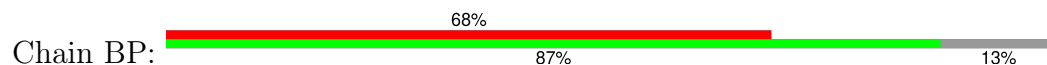


- Molecule 21: 40S ribosomal protein S10-A

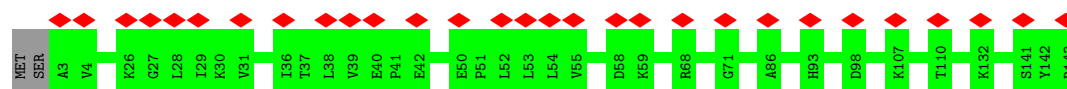




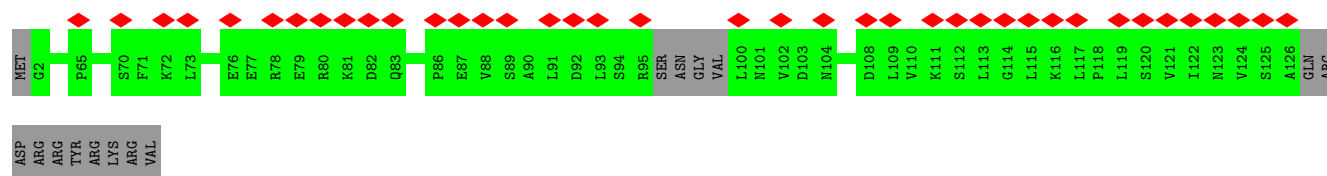
• Molecule 22: RPS15 isoform 1



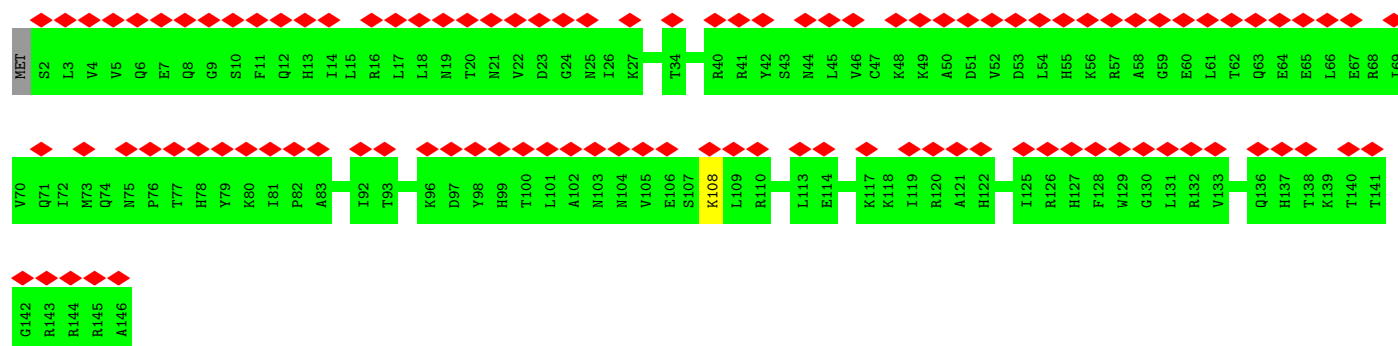
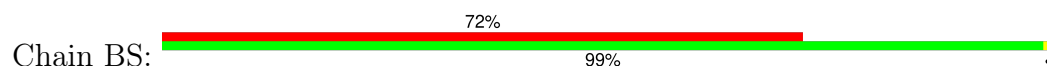
• Molecule 23: 40S ribosomal protein S16-A



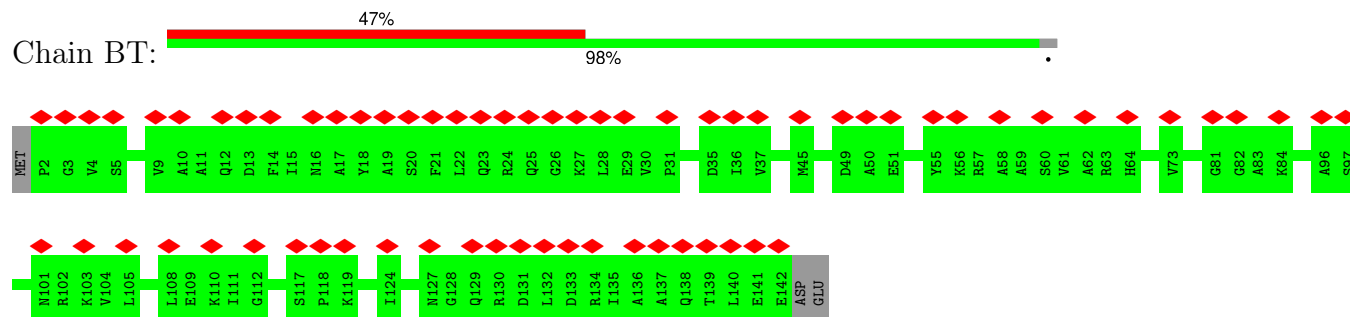
• Molecule 24: 40S ribosomal protein S17-A



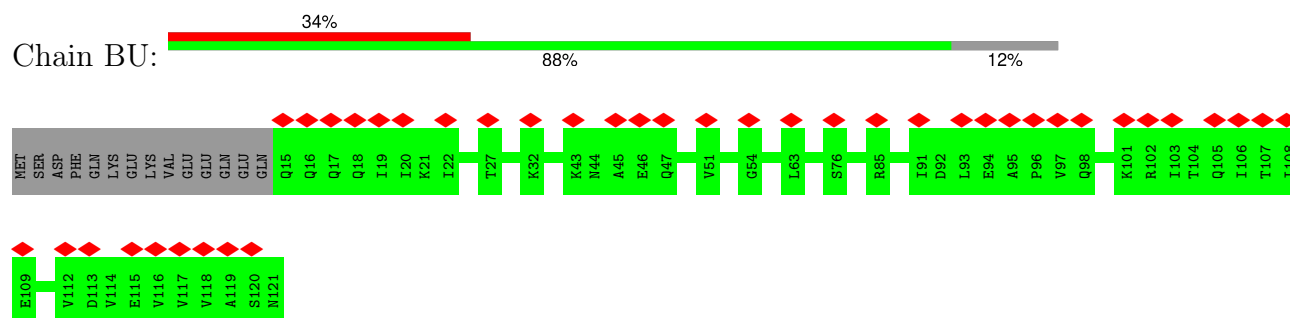
• Molecule 25: 40S ribosomal protein S18-A



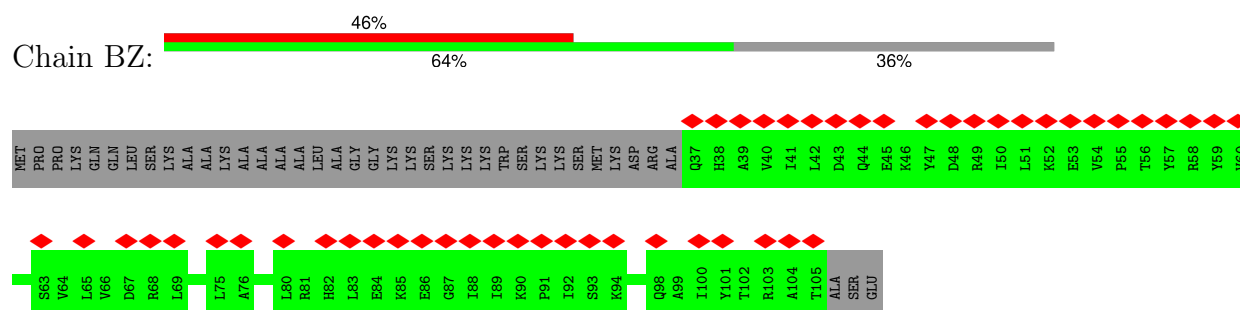
- Molecule 26: 40S ribosomal protein S19-A



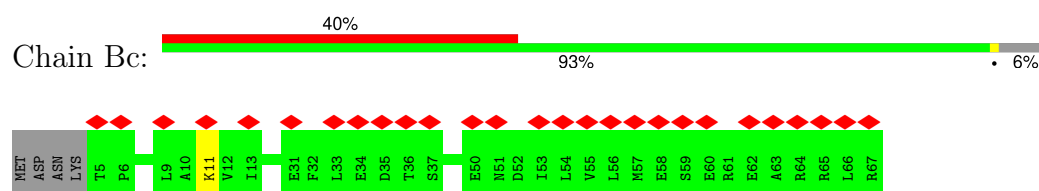
- Molecule 27: RPS20 isoform 1



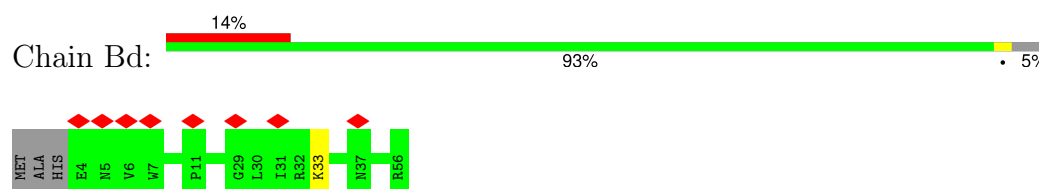
- Molecule 28: RPS25A isoform 1



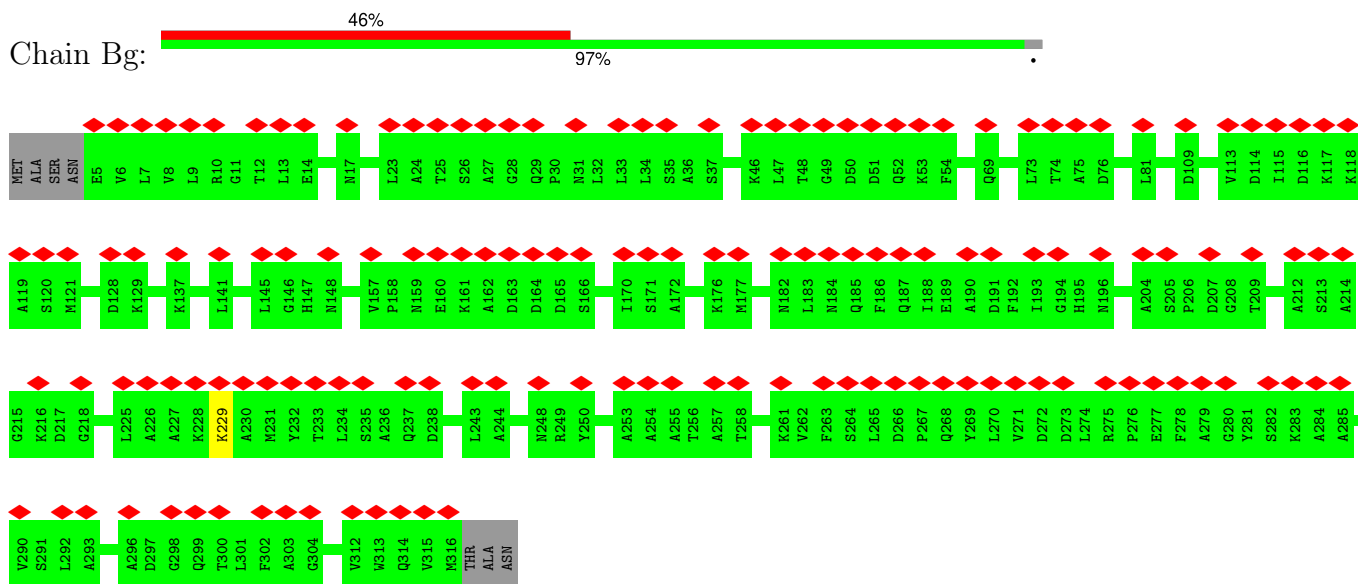
- Molecule 29: RPS28A isoform 1



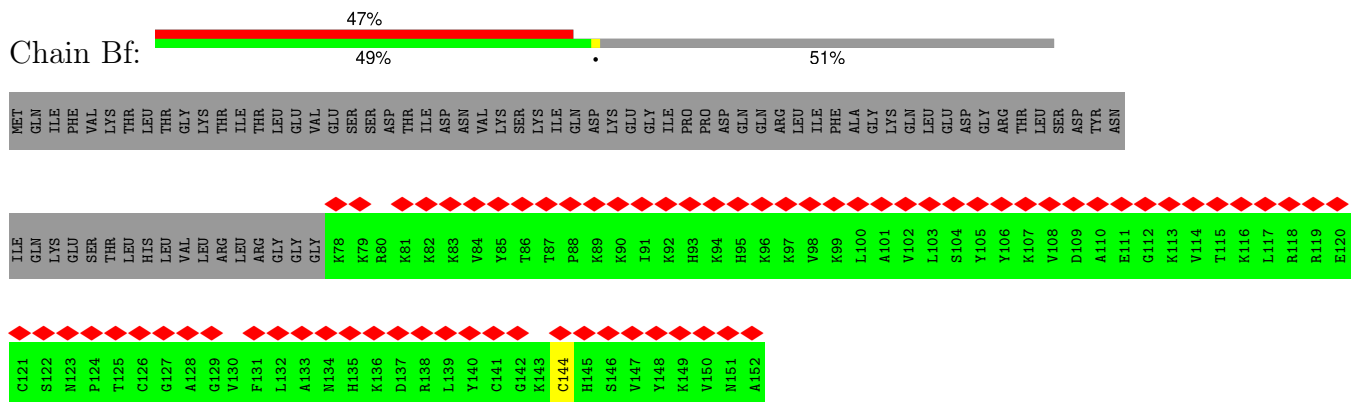
- Molecule 30: RPS29A isoform 1



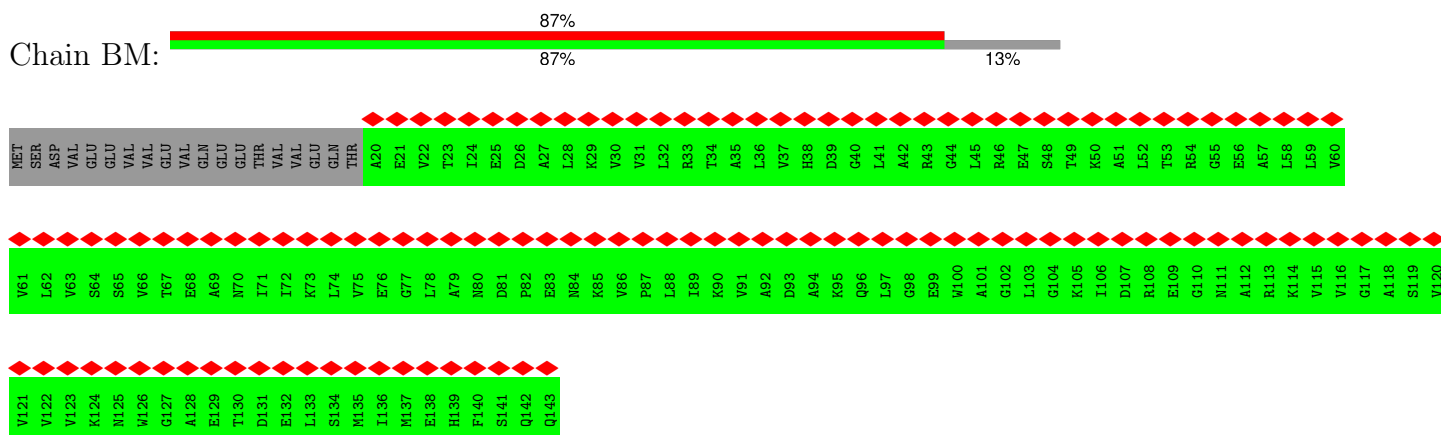
- Molecule 31: Guanine nucleotide-binding protein subunit beta-like protein



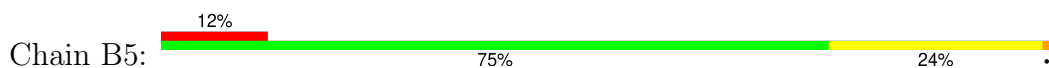
- Molecule 32: Ubiquitin-40S ribosomal protein S31

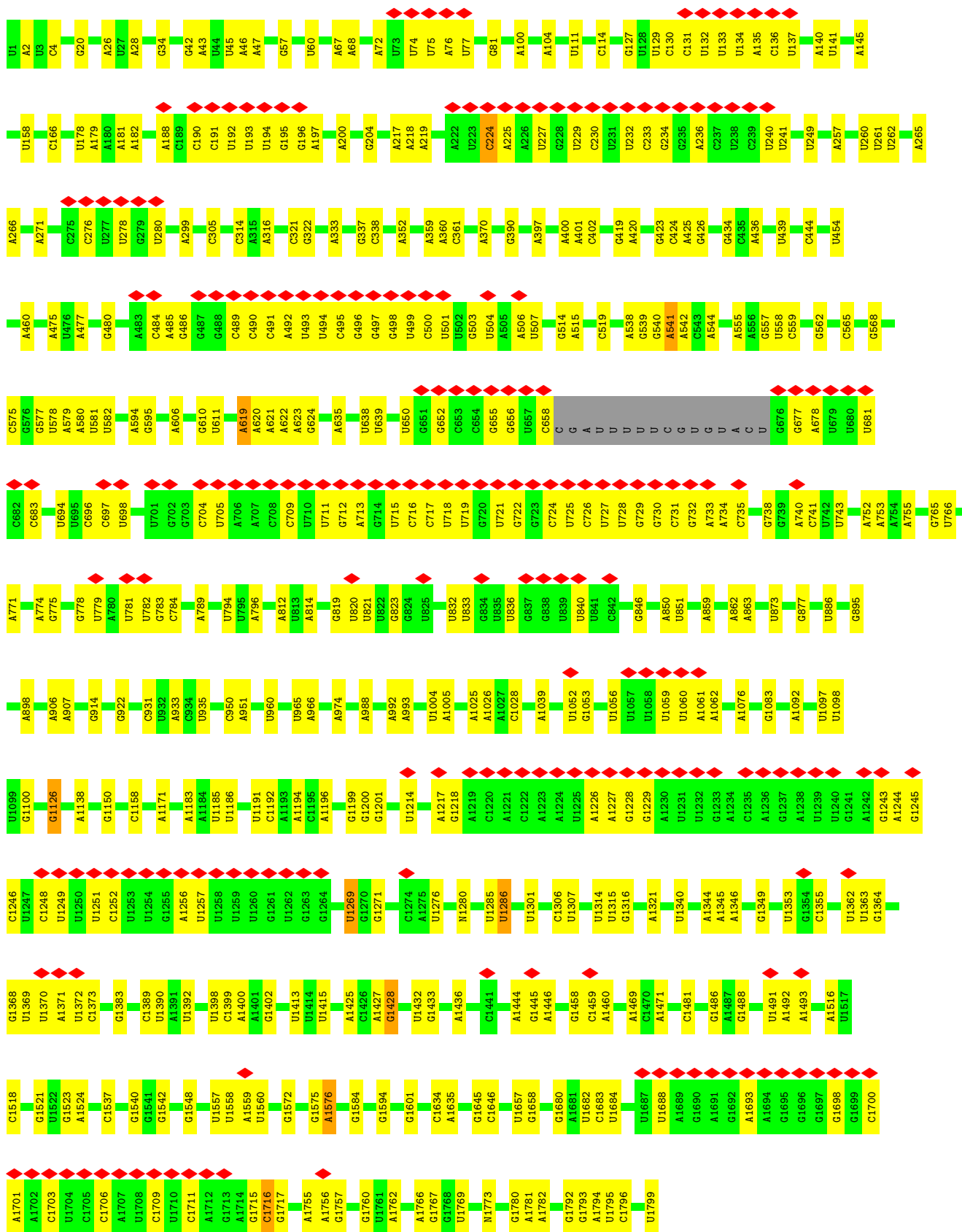


- Molecule 33: 40S ribosomal protein S12

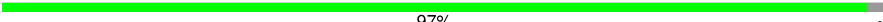


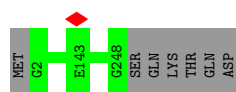
- Molecule 34: 18S rRNA





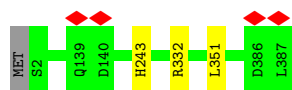
- Molecule 35: 60S ribosomal protein L2-A

Chain AA:  97%



- Molecule 36: 60S ribosomal protein L3

Chain AB:  99%





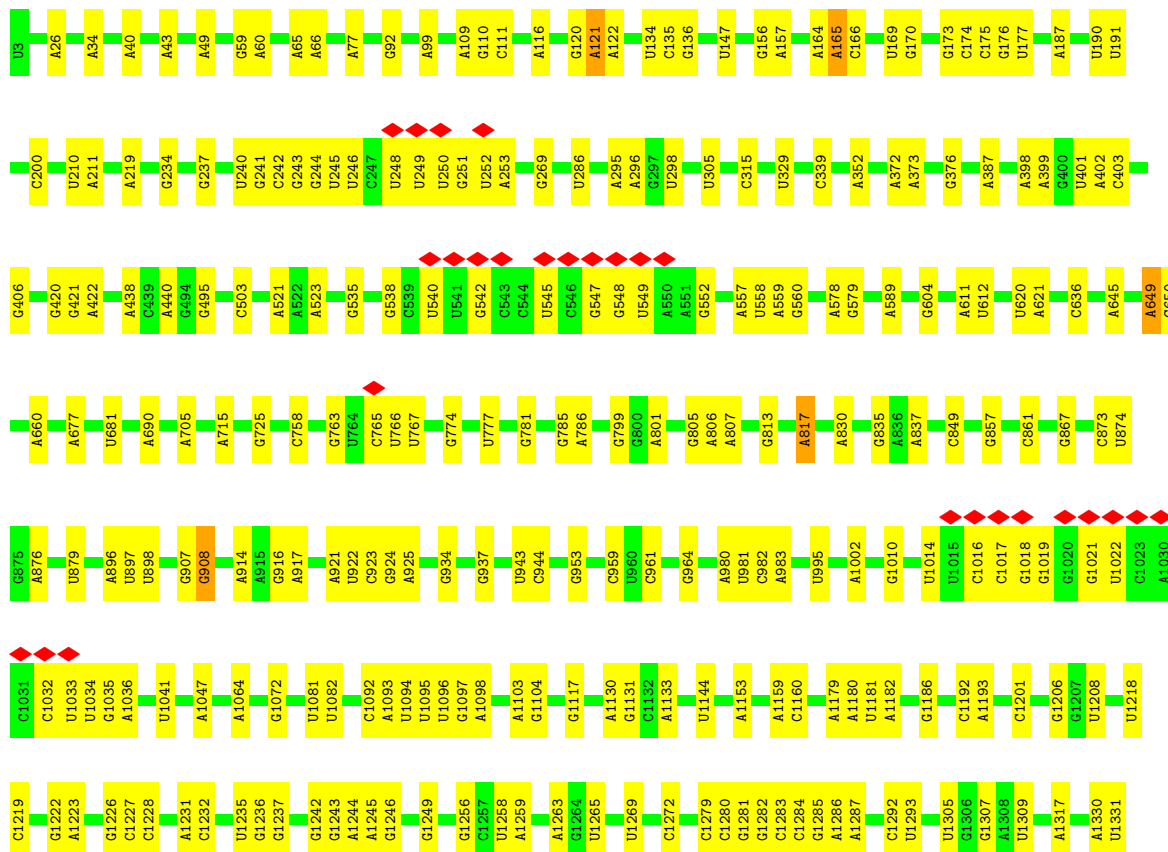
- Molecule 37: RPL4A isoform 1

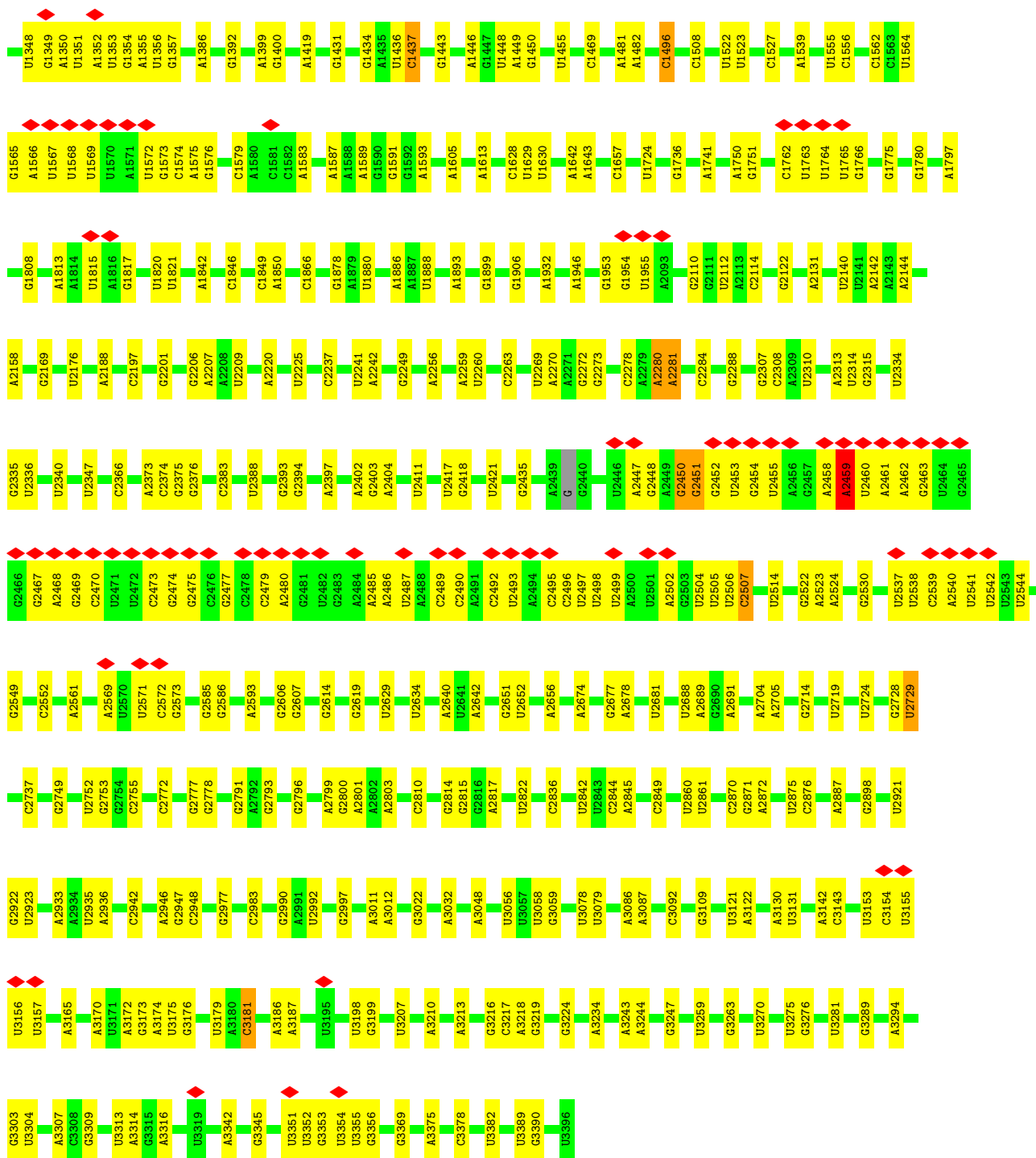
Chain AC:  99%



- Molecule 38: 25S rRNA

Chain A1:  80%  20%





• Molecule 39: 5s rRNA

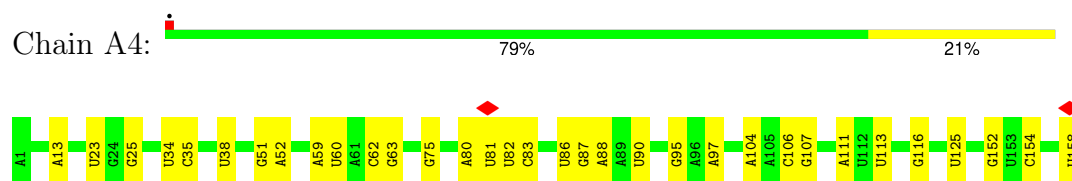
Chain A3:

91%

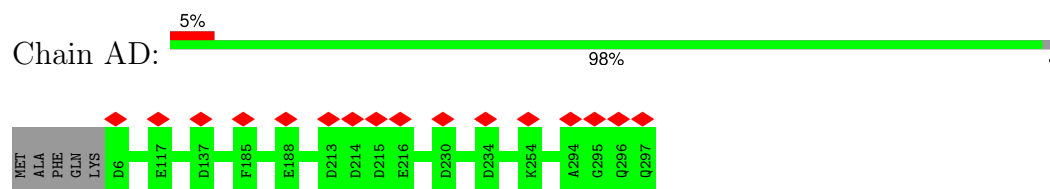
9%



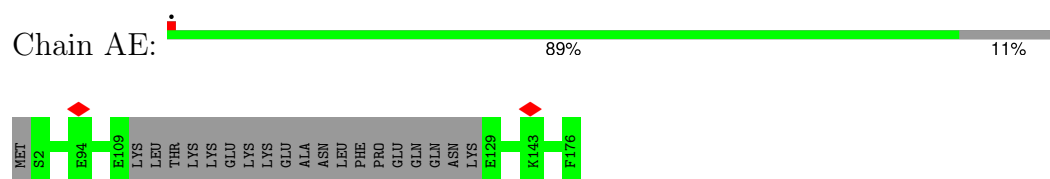
• Molecule 40: 5.8 S rRNA



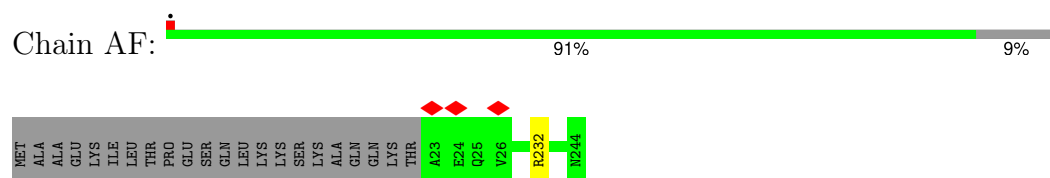
- Molecule 41: RPL5 isoform 1



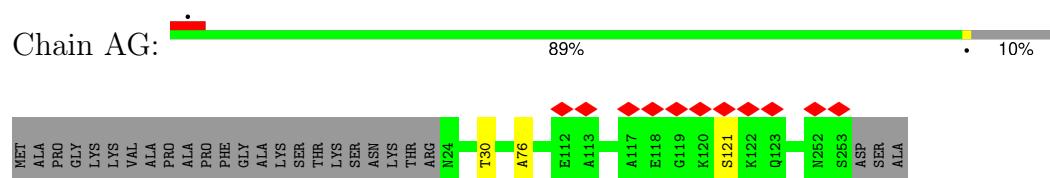
- Molecule 42: 60S ribosomal protein L6-A



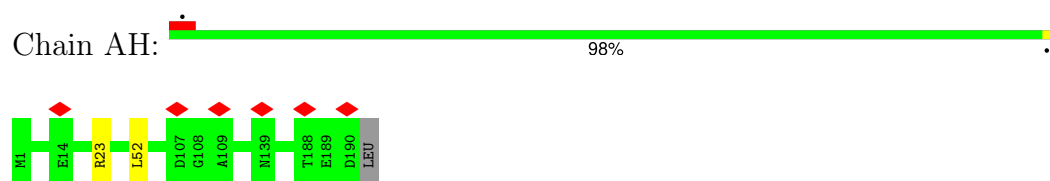
- Molecule 43: 60S ribosomal protein L7-A



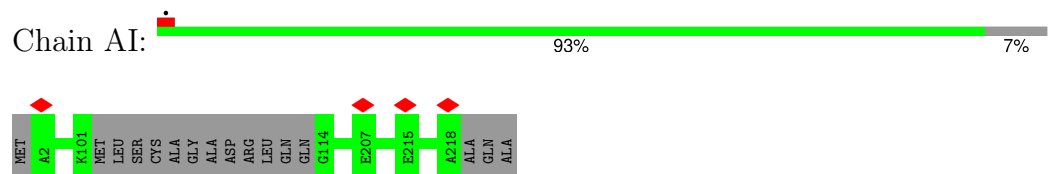
- Molecule 44: 60S ribosomal protein L8-A



- Molecule 45: 60S ribosomal protein L9-A

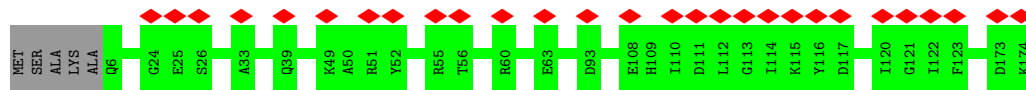


- Molecule 46: RPL10 isoform 1



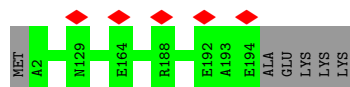
## • Molecule 47: RPL11A isoform 1

Chain AJ:  16% 97%



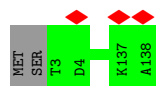
## • Molecule 48: 60S ribosomal protein L13-A

Chain AL:  97%



## • Molecule 49: 60S ribosomal protein L14-A

Chain AM:  99%



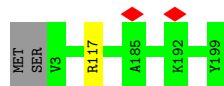
## • Molecule 50: 60S ribosomal protein L15-A

Chain AN:  100%



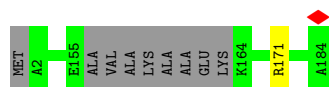
## • Molecule 51: 60S ribosomal protein L16-A

Chain AO:  98%



## • Molecule 52: 60S ribosomal protein L17-A

Chain AP:  95% 5%




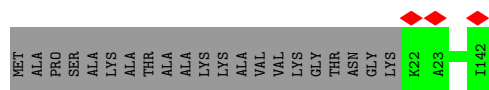
## • Molecule 53: 60S ribosomal protein L18-A

Chain AQ:  99%



- Molecule 60: 60S ribosomal protein L25

Chain AX:  85% 15%



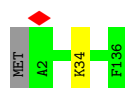
- Molecule 61: 60S ribosomal protein L26-A

Chain AY:  99%



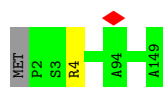
- Molecule 62: 60S ribosomal protein L27-A

Chain AZ:  99%



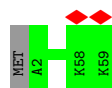
- Molecule 63: 60S ribosomal protein L28

Chain Aa:  99%



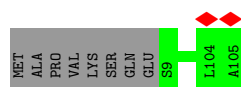
- Molecule 64: RPL29 isoform 1

Chain Ab:  98%



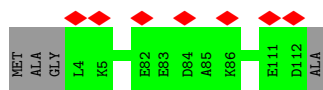
- Molecule 65: 60S ribosomal protein L30

Chain Ac:  92% 8%

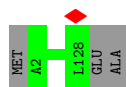


- Molecule 66: 60S ribosomal protein L31-A

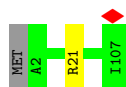
Chain Ad:  6% 96%



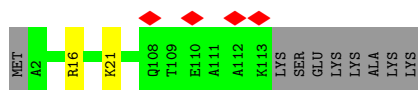
- Molecule 67: RPL32 isoform 1



- Molecule 68: 60S ribosomal protein L33-A



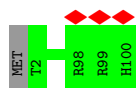
- Molecule 69: 60S ribosomal protein L34-A



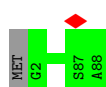
- Molecule 70: 60S ribosomal protein L35-A



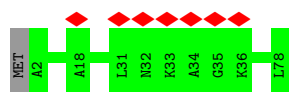
- Molecule 71: 60S ribosomal protein L36-A



- Molecule 72: 60S ribosomal protein L37-A



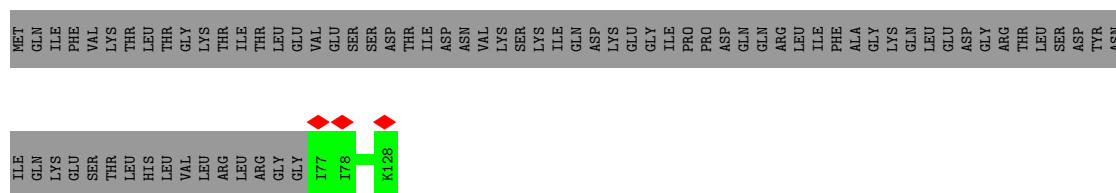
- Molecule 73: RPL38 isoform 1



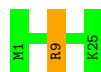
- Molecule 74: 60S ribosomal protein L39



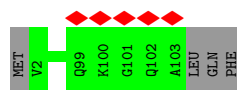
- Molecule 75: Ubiquitin-60S ribosomal protein L40



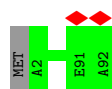
- Molecule 76: 60S ribosomal protein L41-A



- Molecule 77: 60S ribosomal protein L42-A

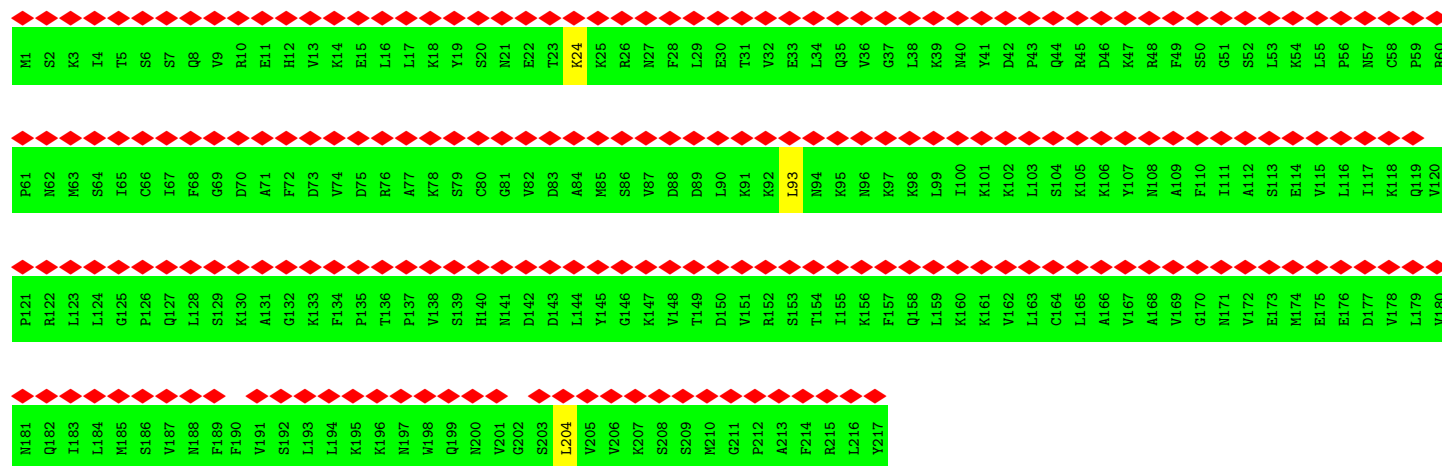


- Molecule 78: 60S ribosomal protein L43-A

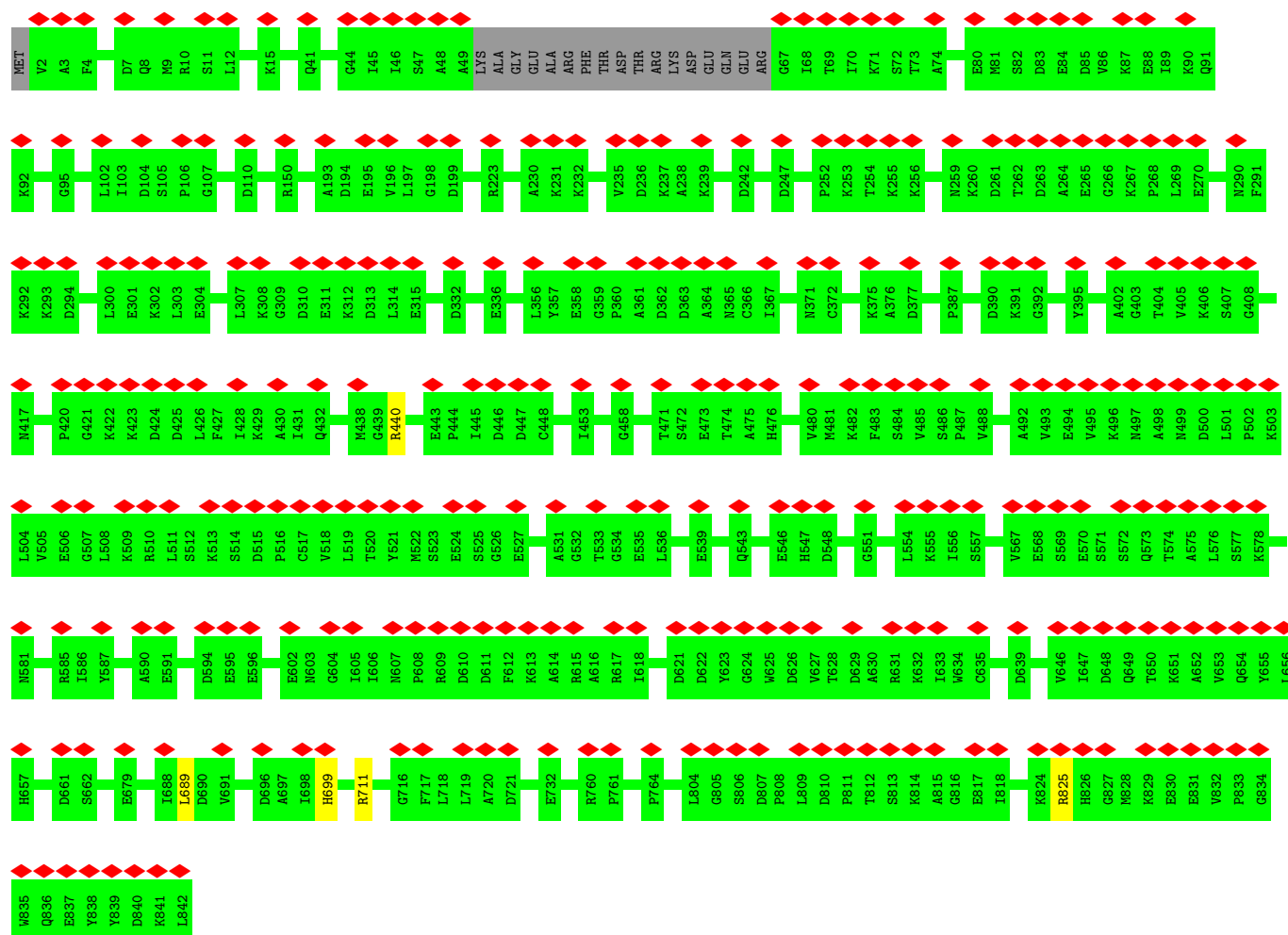


- Molecule 79: RPL1A isoform 1



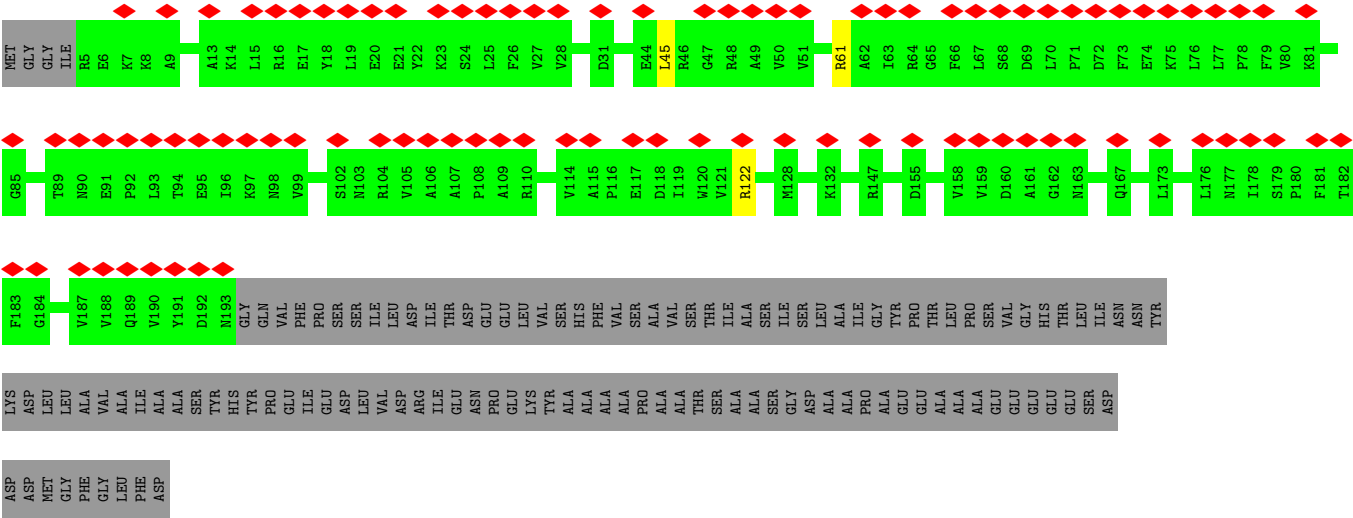


• Molecule 80: Elongation factor 2

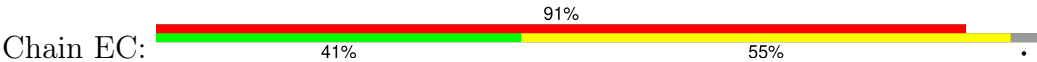


• Molecule 81: 60S acidic ribosomal protein P0





• Molecule 82: TSV IRES



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	65607	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	60	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	4.770	Depositor
Minimum map value	-1.793	Depositor
Average map value	0.035	Depositor
Map value standard deviation	0.202	Depositor
Recommended contour level	0.6	Depositor
Map size (Å)	423.99997, 423.99997, 423.99997	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.06, 1.06, 1.06	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, ZN, OMG, 1MA, MG, 5MC, HIC, DDE, 4AC, A2M, UR3, XSX, OMU, OMC, 7MG, GDP

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	BA	0.26	0/1653	0.53	0/2261
2	BB	0.26	0/1735	0.55	0/2335
3	BC	0.27	0/1665	0.51	0/2263
4	BE	0.26	0/2109	0.55	0/2839
5	BG	0.26	0/1844	0.54	0/2464
6	BH	0.26	0/1506	0.55	0/2028
7	BI	0.26	0/1514	0.57	0/2021
8	BJ	0.32	1/1519 (0.1%)	0.63	3/2035 (0.1%)
9	BL	0.28	0/1272	0.54	0/1712
10	BN	0.26	0/1215	0.53	0/1638
11	BO	0.27	0/952	0.60	0/1279
12	BV	0.27	0/693	0.56	0/935
13	BW	0.27	0/1038	0.51	0/1395
14	BX	0.26	0/1139	0.53	0/1518
15	BY	0.27	0/1087	0.56	0/1449
16	Ba	0.26	0/782	0.61	0/1047
17	Bb	0.25	0/620	0.54	0/838
18	Be	0.24	0/483	0.57	0/643
19	BD	0.27	0/1759	0.56	0/2368
20	BF	0.24	0/1629	0.53	0/2202
21	BK	0.77	2/837 (0.2%)	1.16	5/1131 (0.4%)
22	BP	0.26	0/1012	0.55	0/1356
23	BQ	0.26	0/1125	0.53	0/1510
24	BR	0.24	0/984	0.56	0/1318
25	BS	0.25	0/1211	0.60	0/1628
26	BT	0.26	0/1113	0.54	0/1494
27	BU	0.25	0/865	0.51	0/1169
28	BZ	0.23	0/566	0.53	0/761
29	Bc	0.25	0/499	0.65	0/670
30	Bd	0.31	0/452	0.64	1/600 (0.2%)
31	Bg	0.25	0/2454	0.51	0/3340
32	Bf	0.26	0/616	0.64	1/817 (0.1%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
33	BM	0.26	0/943	0.61	0/1274
34	B5	0.27	0/41880	0.80	21/65248 (0.0%)
35	AA	0.30	0/1912	0.57	0/2569
36	AB	0.28	0/3138	0.55	1/4217 (0.0%)
37	AC	0.27	0/2800	0.54	1/3790 (0.0%)
38	A1	0.38	0/75561	0.80	27/117806 (0.0%)
39	A3	0.33	0/2883	0.78	0/4491
40	A4	0.40	0/3746	0.77	0/5832
41	AD	0.27	0/2390	0.50	0/3225
42	AE	0.28	0/1260	0.50	0/1694
43	AF	0.28	0/1821	0.50	0/2451
44	AG	0.27	0/1830	0.48	0/2469
45	AH	0.28	0/1531	0.53	1/2062 (0.0%)
46	AI	0.28	0/1708	0.53	0/2290
47	AJ	0.26	0/1374	0.58	0/1842
48	AL	0.27	0/1568	0.57	0/2106
49	AM	0.27	0/1068	0.52	0/1438
50	AN	0.30	0/1757	0.58	0/2354
51	AO	0.28	0/1585	0.51	0/2128
52	AP	0.28	0/1410	0.53	0/1893
53	AQ	0.28	0/1465	0.57	0/1965
54	AR	0.26	0/1538	0.57	0/2050
55	AS	0.29	0/1481	0.56	0/1990
56	AT	0.28	0/1300	0.53	0/1743
57	AU	0.31	0/812	0.57	1/1099 (0.1%)
58	AV	0.29	0/1018	0.55	0/1369
59	AW	0.30	0/533	0.55	0/707
60	AX	0.29	0/983	0.50	0/1325
61	AY	0.28	0/1004	0.57	0/1341
62	AZ	0.29	0/1118	0.51	0/1497
63	Aa	0.29	0/1204	0.54	0/1612
64	Ab	0.25	0/473	0.48	0/629
65	Ac	0.28	0/751	0.48	0/1008
66	Ad	0.27	0/904	0.52	0/1213
67	Ae	0.28	0/1041	0.53	0/1394
68	Af	0.30	0/868	0.54	0/1168
69	Ag	0.28	0/890	0.56	0/1189
70	Ah	0.28	0/978	0.50	0/1301
71	Ai	0.28	0/778	0.57	0/1034
72	Aj	0.29	0/696	0.59	0/923
73	Ak	0.28	0/618	0.56	0/826
74	Al	0.26	0/443	0.59	0/588
75	Am	0.27	0/423	0.54	0/562

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
76	An	0.30	0/234	1.00	1/300 (0.3%)
77	Ao	0.28	0/831	0.54	0/1097
78	Ap	0.28	0/701	0.61	0/934
79	E	0.27	0/1745	0.57	2/2342 (0.1%)
80	DC	0.26	0/6521	0.54	1/8830 (0.0%)
81	V	0.29	0/1498	0.61	1/2025 (0.0%)
82	EC	0.28	1/4613 (0.0%)	0.83	2/7182 (0.0%)
All	All	0.32	4/227575 (0.0%)	0.71	69/333486 (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
3	BC	0	2
6	BH	0	1
11	BO	0	1
14	BX	0	1
15	BY	0	1
38	A1	0	1
43	AF	0	1
44	AG	0	3
76	An	0	1
All	All	0	12

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
21	BK	88	PRO	CB-CG	16.05	2.30	1.50
21	BK	88	PRO	CG-CD	-12.56	1.09	1.50
82	EC	6758	A	OP3-P	-10.53	1.48	1.61
8	BJ	169	PRO	CG-CD	-6.03	1.30	1.50

All (69) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
21	BK	88	PRO	CA-N-CD	-20.65	82.59	111.50
21	BK	88	PRO	CB-CG-CD	-20.04	28.33	106.50
21	BK	88	PRO	N-CD-CG	13.19	122.98	103.20
21	BK	87	VAL	C-N-CD	12.45	154.54	128.40
38	A1	121	A	O5'-P-OP1	-9.46	97.19	105.70

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	BJ	169	PRO	N-CD-CG	-8.82	89.97	103.20
38	A1	406	G	O4'-C1'-N9	7.91	114.53	108.20
38	A1	2459	A	O4'-C1'-N9	7.86	114.49	108.20
34	B5	1576	A	O5'-P-OP1	-7.59	98.87	105.70
34	B5	1389	C	C2-N1-C1'	7.30	126.83	118.80
38	A1	2237	C	N3-C2-O2	-7.29	116.80	121.90
21	BK	88	PRO	N-CA-CB	-6.83	95.08	102.60
38	A1	2459	A	C8-N9-C4	-6.79	103.08	105.80
38	A1	2496	C	N3-C2-O2	-6.74	117.18	121.90
38	A1	922	U	C2-N1-C1'	6.56	125.57	117.70
8	BJ	169	PRO	CA-CB-CG	-6.55	91.56	104.00
38	A1	2450	G	C4-N9-C1'	6.50	134.95	126.50
38	A1	2237	C	N1-C2-O2	6.31	122.69	118.90
34	B5	1576	A	OP1-P-OP2	-6.29	110.16	119.60
82	EC	6859	U	O4'-C1'-N1	-6.18	103.26	108.20
38	A1	2450	G	C8-N9-C1'	-6.17	118.98	127.00
34	B5	1594	G	C8-N9-C1'	-6.17	118.98	127.00
79	E	93	LEU	CA-CB-CG	6.16	129.46	115.30
37	AC	182	LEU	CA-CB-CG	5.93	128.94	115.30
34	B5	1594	G	C4-N9-C1'	5.90	134.16	126.50
81	V	45	LEU	CA-CB-CG	5.84	128.74	115.30
30	Bd	33	LYS	CB-CG-CD	-5.83	96.44	111.60
8	BJ	116	LEU	CA-CB-CG	5.72	128.46	115.30
34	B5	1575	7MG	O3'-P-O5'	5.71	114.85	104.00
34	B5	1575	7MG	P-O3'-C3'	-5.66	112.91	119.70
34	B5	965	U	C2-N1-C1'	5.65	124.47	117.70
57	AU	90	ARG	C-N-CA	5.58	135.66	121.70
38	A1	2451	G	N3-C4-N9	-5.58	122.65	126.00
38	A1	1496	C	C2-N1-C1'	5.58	124.94	118.80
34	B5	1576	A	O5'-P-OP2	5.55	117.37	110.70
38	A1	922	U	N1-C2-O2	5.55	126.69	122.80
34	B5	1389	C	C6-N1-C2	-5.54	118.08	120.30
79	E	204	LEU	CA-CB-CG	5.52	127.99	115.30
38	A1	835	G	O4'-C1'-N9	5.52	112.61	108.20
38	A1	982	C	C2-N1-C1'	5.48	124.83	118.80
38	A1	2451	G	C4-N9-C1'	-5.48	119.38	126.50
38	A1	3048	A	O4'-C1'-N9	5.45	112.56	108.20
38	A1	2507	C	C2-N1-C1'	5.42	124.77	118.80
34	B5	1594	G	N9-C4-C5	-5.42	103.23	105.40
38	A1	2836	C	C2-N1-C1'	5.40	124.74	118.80
32	Bf	144	CYS	CA-CB-SG	-5.38	104.31	114.00
34	B5	1706	C	N3-C2-O2	-5.34	118.16	121.90

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
34	B5	1594	G	C6-C5-N7	-5.33	127.20	130.40
34	B5	224	C	N1-C2-O2	5.25	122.05	118.90
36	AB	351	LEU	CA-CB-CG	5.25	127.38	115.30
38	A1	2366	C	C2-N1-C1'	5.24	124.56	118.80
38	A1	2451	G	C8-N9-C1'	5.21	133.77	127.00
38	A1	2450	G	O4'-C1'-N9	5.18	112.34	108.20
34	B5	1716	C	N1-C2-O2	5.17	122.00	118.90
45	AH	52	LEU	CA-CB-CG	5.15	127.15	115.30
34	B5	1389	C	C5-C6-N1	5.14	123.57	121.00
38	A1	2450	G	N3-C4-N9	5.13	129.08	126.00
76	An	9	ARG	CA-CB-CG	5.13	124.68	113.40
38	A1	165	A	P-O3'-C3'	5.12	125.84	119.70
34	B5	1706	C	N1-C2-O2	5.10	121.96	118.90
38	A1	2225	U	N3-C2-O2	-5.10	118.63	122.20
38	A1	3058	U	C2-N1-C1'	5.09	123.81	117.70
80	DC	689	LEU	CA-CB-CG	5.09	127.00	115.30
34	B5	1560	U	C2-N1-C1'	5.08	123.80	117.70
34	B5	1594	G	C4-C5-N7	5.06	112.83	110.80
38	A1	3181	C	C2-N1-C1'	5.06	124.37	118.80
82	EC	6796	C	C2-N1-C1'	5.04	124.34	118.80
34	B5	1389	C	N1-C2-O2	5.03	121.92	118.90
34	B5	1286	U	N1-C2-O2	5.02	126.31	122.80

There are no chirality outliers.

All (12) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
38	A1	2459	A	Sidechain
43	AF	232	ARG	Peptide
44	AG	121	SER	Peptide
44	AG	30	THR	Peptide
44	AG	76	ALA	Peptide
76	An	9	ARG	Sidechain
3	BC	144	TRP	Peptide
3	BC	145	GLY	Peptide
6	BH	64	VAL	Peptide
11	BO	123	SER	Peptide
14	BX	88	PRO	Peptide
15	BY	34	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	
1	BA	204/252 (81%)	187 (92%)	17 (8%)	0	100	100
2	BB	212/255 (83%)	187 (88%)	25 (12%)	0	100	100
3	BC	215/254 (85%)	206 (96%)	9 (4%)	0	100	100
4	BE	258/261 (99%)	246 (95%)	12 (5%)	0	100	100
5	BG	224/236 (95%)	214 (96%)	10 (4%)	0	100	100
6	BH	182/190 (96%)	168 (92%)	14 (8%)	0	100	100
7	BI	184/200 (92%)	167 (91%)	17 (9%)	0	100	100
8	BJ	183/197 (93%)	170 (93%)	13 (7%)	0	100	100
9	BL	153/156 (98%)	141 (92%)	12 (8%)	0	100	100
10	BN	148/151 (98%)	140 (95%)	8 (5%)	0	100	100
11	BO	125/137 (91%)	111 (89%)	14 (11%)	0	100	100
12	BV	85/87 (98%)	74 (87%)	11 (13%)	0	100	100
13	BW	127/130 (98%)	120 (94%)	7 (6%)	0	100	100
14	BX	142/145 (98%)	131 (92%)	11 (8%)	0	100	100
15	BY	132/135 (98%)	125 (95%)	7 (5%)	0	100	100
16	Ba	95/119 (80%)	82 (86%)	13 (14%)	0	100	100
17	Bb	79/82 (96%)	68 (86%)	11 (14%)	0	100	100
18	Be	58/63 (92%)	49 (84%)	9 (16%)	0	100	100
19	BD	221/240 (92%)	210 (95%)	11 (5%)	0	100	100
20	BF	204/225 (91%)	183 (90%)	21 (10%)	0	100	100
21	BK	94/105 (90%)	82 (87%)	12 (13%)	0	100	100

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
22	BP	122/142 (86%)	113 (93%)	9 (7%)	0	100	100
23	BQ	139/143 (97%)	136 (98%)	3 (2%)	0	100	100
24	BR	117/136 (86%)	112 (96%)	5 (4%)	0	100	100
25	BS	143/146 (98%)	131 (92%)	12 (8%)	0	100	100
26	BT	139/144 (96%)	130 (94%)	9 (6%)	0	100	100
27	BU	105/121 (87%)	97 (92%)	8 (8%)	0	100	100
28	BZ	67/108 (62%)	63 (94%)	4 (6%)	0	100	100
29	Bc	61/67 (91%)	54 (88%)	7 (12%)	0	100	100
30	Bd	51/56 (91%)	50 (98%)	1 (2%)	0	100	100
31	Bg	310/319 (97%)	276 (89%)	34 (11%)	0	100	100
32	Bf	73/152 (48%)	64 (88%)	9 (12%)	0	100	100
33	BM	122/143 (85%)	111 (91%)	11 (9%)	0	100	100
35	AA	245/254 (96%)	232 (95%)	13 (5%)	0	100	100
36	AB	383/387 (99%)	365 (95%)	18 (5%)	0	100	100
37	AC	359/362 (99%)	334 (93%)	25 (7%)	0	100	100
41	AD	290/297 (98%)	276 (95%)	14 (5%)	0	100	100
42	AE	152/176 (86%)	141 (93%)	11 (7%)	0	100	100
43	AF	220/244 (90%)	212 (96%)	8 (4%)	0	100	100
44	AG	228/256 (89%)	211 (92%)	17 (8%)	0	100	100
45	AH	188/191 (98%)	174 (93%)	14 (7%)	0	100	100
46	AI	201/221 (91%)	193 (96%)	8 (4%)	0	100	100
47	AJ	167/174 (96%)	147 (88%)	20 (12%)	0	100	100
48	AL	191/199 (96%)	179 (94%)	12 (6%)	0	100	100
49	AM	134/138 (97%)	128 (96%)	6 (4%)	0	100	100
50	AN	201/204 (98%)	193 (96%)	8 (4%)	0	100	100
51	AO	195/199 (98%)	193 (99%)	2 (1%)	0	100	100
52	AP	171/184 (93%)	167 (98%)	4 (2%)	0	100	100
53	AQ	183/186 (98%)	180 (98%)	3 (2%)	0	100	100
54	AR	186/189 (98%)	179 (96%)	7 (4%)	0	100	100
55	AS	170/178 (96%)	163 (96%)	7 (4%)	0	100	100
56	AT	157/160 (98%)	149 (95%)	8 (5%)	0	100	100

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
57	AU	98/121 (81%)	94 (96%)	4 (4%)	0	100	100
58	AV	134/137 (98%)	130 (97%)	4 (3%)	0	100	100
59	AW	61/155 (39%)	61 (100%)	0	0	100	100
60	AX	119/142 (84%)	113 (95%)	6 (5%)	0	100	100
61	AY	124/127 (98%)	119 (96%)	5 (4%)	0	100	100
62	AZ	133/136 (98%)	128 (96%)	5 (4%)	0	100	100
63	Aa	146/149 (98%)	137 (94%)	9 (6%)	0	100	100
64	Ab	56/59 (95%)	49 (88%)	7 (12%)	0	100	100
65	Ac	95/105 (90%)	93 (98%)	2 (2%)	0	100	100
66	Ad	107/113 (95%)	103 (96%)	4 (4%)	0	100	100
67	Ae	125/130 (96%)	123 (98%)	2 (2%)	0	100	100
68	Af	104/107 (97%)	99 (95%)	5 (5%)	0	100	100
69	Ag	110/121 (91%)	106 (96%)	4 (4%)	0	100	100
70	Ah	117/120 (98%)	111 (95%)	6 (5%)	0	100	100
71	Ai	97/100 (97%)	93 (96%)	4 (4%)	0	100	100
72	Aj	85/88 (97%)	83 (98%)	2 (2%)	0	100	100
73	Ak	75/78 (96%)	73 (97%)	2 (3%)	0	100	100
74	Al	48/51 (94%)	47 (98%)	1 (2%)	0	100	100
75	Am	50/128 (39%)	48 (96%)	2 (4%)	0	100	100
76	An	23/25 (92%)	23 (100%)	0	0	100	100
77	Ao	100/106 (94%)	93 (93%)	7 (7%)	0	100	100
78	Ap	89/92 (97%)	86 (97%)	3 (3%)	0	100	100
79	E	215/217 (99%)	204 (95%)	11 (5%)	0	100	100
80	DC	819/842 (97%)	768 (94%)	51 (6%)	0	100	100
81	V	187/312 (60%)	176 (94%)	11 (6%)	0	100	100
All	All	12112/13257 (91%)	11374 (94%)	738 (6%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains ⓘ

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

entries.

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	BA	173/210 (82%)	173 (100%)	0	100	100
2	BB	191/224 (85%)	191 (100%)	0	100	100
3	BC	176/205 (86%)	176 (100%)	0	100	100
4	BE	221/222 (100%)	221 (100%)	0	100	100
5	BG	193/201 (96%)	193 (100%)	0	100	100
6	BH	165/170 (97%)	165 (100%)	0	100	100
7	BI	150/161 (93%)	149 (99%)	1 (1%)	81	92
8	BJ	158/166 (95%)	158 (100%)	0	100	100
9	BL	136/137 (99%)	134 (98%)	2 (2%)	60	80
10	BN	127/128 (99%)	126 (99%)	1 (1%)	79	91
11	BO	96/105 (91%)	95 (99%)	1 (1%)	73	87
12	BV	74/74 (100%)	74 (100%)	0	100	100
13	BW	110/111 (99%)	110 (100%)	0	100	100
14	BX	119/120 (99%)	119 (100%)	0	100	100
15	BY	112/113 (99%)	112 (100%)	0	100	100
16	Ba	83/100 (83%)	83 (100%)	0	100	100
17	Bb	70/71 (99%)	70 (100%)	0	100	100
18	Be	51/54 (94%)	51 (100%)	0	100	100
19	BD	182/195 (93%)	180 (99%)	2 (1%)	70	86
20	BF	173/191 (91%)	172 (99%)	1 (1%)	84	94
21	BK	89/98 (91%)	89 (100%)	0	100	100
22	BP	104/118 (88%)	104 (100%)	0	100	100
23	BQ	117/119 (98%)	117 (100%)	0	100	100
24	BR	110/124 (89%)	110 (100%)	0	100	100
25	BS	128/129 (99%)	127 (99%)	1 (1%)	79	91
26	BT	113/116 (97%)	113 (100%)	0	100	100
27	BU	100/114 (88%)	100 (100%)	0	100	100
28	BZ	61/89 (68%)	61 (100%)	0	100	100
29	Bc	56/60 (93%)	55 (98%)	1 (2%)	54	76

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
30	Bd	47/49 (96%)	47 (100%)	0	100	100
31	Bg	256/262 (98%)	255 (100%)	1 (0%)	89	96
32	Bf	66/135 (49%)	66 (100%)	0	100	100
33	BM	100/119 (84%)	100 (100%)	0	100	100
35	AA	189/196 (96%)	189 (100%)	0	100	100
36	AB	321/322 (100%)	320 (100%)	1 (0%)	91	97
37	AC	288/289 (100%)	286 (99%)	2 (1%)	81	92
41	AD	241/245 (98%)	241 (100%)	0	100	100
42	AE	134/153 (88%)	134 (100%)	0	100	100
43	AF	186/205 (91%)	186 (100%)	0	100	100
44	AG	189/208 (91%)	189 (100%)	0	100	100
45	AH	170/171 (99%)	169 (99%)	1 (1%)	84	94
46	AI	176/187 (94%)	176 (100%)	0	100	100
47	AJ	147/150 (98%)	147 (100%)	0	100	100
48	AL	154/159 (97%)	154 (100%)	0	100	100
49	AM	107/109 (98%)	107 (100%)	0	100	100
50	AN	175/176 (99%)	175 (100%)	0	100	100
51	AO	160/162 (99%)	159 (99%)	1 (1%)	84	94
52	AP	141/146 (97%)	140 (99%)	1 (1%)	81	92
53	AQ	150/151 (99%)	150 (100%)	0	100	100
54	AR	153/154 (99%)	152 (99%)	1 (1%)	81	92
55	AS	156/162 (96%)	156 (100%)	0	100	100
56	AT	136/137 (99%)	135 (99%)	1 (1%)	81	92
57	AU	87/107 (81%)	87 (100%)	0	100	100
58	AV	104/105 (99%)	104 (100%)	0	100	100
59	AW	55/129 (43%)	55 (100%)	0	100	100
60	AX	105/118 (89%)	105 (100%)	0	100	100
61	AY	109/110 (99%)	109 (100%)	0	100	100
62	AZ	115/116 (99%)	114 (99%)	1 (1%)	75	89
63	Aa	118/119 (99%)	117 (99%)	1 (1%)	79	91
64	Ab	46/47 (98%)	46 (100%)	0	100	100

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
65	Ac	81/88 (92%)	81 (100%)	0	100	100
66	Ad	96/97 (99%)	96 (100%)	0	100	100
67	Ae	109/111 (98%)	109 (100%)	0	100	100
68	Af	90/91 (99%)	89 (99%)	1 (1%)	70	86
69	Ag	95/103 (92%)	93 (98%)	2 (2%)	48	72
70	Ah	104/105 (99%)	104 (100%)	0	100	100
71	Ai	81/82 (99%)	81 (100%)	0	100	100
72	Aj	70/71 (99%)	70 (100%)	0	100	100
73	Ak	68/69 (99%)	68 (100%)	0	100	100
74	Al	45/46 (98%)	45 (100%)	0	100	100
75	Am	47/116 (40%)	47 (100%)	0	100	100
76	An	23/23 (100%)	23 (100%)	0	100	100
77	Ao	87/91 (96%)	87 (100%)	0	100	100
78	Ap	71/72 (99%)	71 (100%)	0	100	100
79	E	198/198 (100%)	197 (100%)	1 (0%)	86	95
80	DC	699/714 (98%)	696 (100%)	3 (0%)	89	96
81	V	160/254 (63%)	158 (99%)	2 (1%)	65	83
All	All	10343/11154 (93%)	10313 (100%)	30 (0%)	90	97

All (30) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
7	BI	146	ARG
9	BL	30	ARG
9	BL	67	ARG
10	BN	64	ARG
11	BO	136	ARG
19	BD	94	ARG
19	BD	190	ARG
20	BF	212	LYS
25	BS	108	LYS
29	Bc	11	LYS
31	Bg	229	LYS
36	AB	332	ARG
37	AC	98	ARG
37	AC	138	ARG

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
45	AH	23	ARG
51	AO	117[A]	ARG
52	AP	171	ARG
54	AR	170	ARG
56	AT	83	ARG
62	AZ	34	LYS
63	Aa	4	ARG
68	Af	21	ARG
69	Ag	16	ARG
69	Ag	21	LYS
79	E	24	LYS
80	DC	440	ARG
80	DC	711	ARG
80	DC	825	ARG
81	V	61	ARG
81	V	122	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (67) such sidechains are listed below:

Mol	Chain	Res	Type
1	BA	30	GLN
1	BA	140	ASN
2	BB	42	ASN
2	BB	208	GLN
4	BE	157	ASN
5	BG	65	GLN
8	BJ	38	ASN
8	BJ	176	ASN
10	BN	21	ASN
15	BY	22	GLN
18	Be	17	GLN
19	BD	174	HIS
20	BF	35	GLN
21	BK	28	ASN
22	BP	79	HIS
22	BP	104	GLN
23	BQ	100	GLN
23	BQ	139	GLN
24	BR	83	GLN
25	BS	13	HIS
26	BT	77	ASN
27	BU	36	ASN

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
27	BU	98	GLN
31	Bg	69	GLN
33	BM	38	HIS
33	BM	96	GLN
37	AC	291	ASN
37	AC	361	HIS
41	AD	151	GLN
41	AD	178	ASN
41	AD	206	GLN
43	AF	146	GLN
44	AG	59	GLN
44	AG	61	GLN
44	AG	145	ASN
45	AH	9	GLN
45	AH	125	ASN
47	AJ	95	ASN
53	AQ	135	GLN
54	AR	3	ASN
54	AR	166	ASN
55	AS	46	GLN
55	AS	157	GLN
56	AT	149	GLN
58	AV	7	GLN
58	AV	28	ASN
58	AV	98	ASN
60	AX	137	ASN
65	Ac	36	GLN
66	Ad	57	GLN
66	Ad	80	ASN
66	Ad	87	ASN
68	Af	87	ASN
69	Ag	3	GLN
71	Ai	63	ASN
72	Aj	20	ASN
73	Ak	10	GLN
73	Ak	40	GLN
73	Ak	67	GLN
79	E	57	ASN
79	E	94	ASN
79	E	182	GLN
80	DC	355	GLN
80	DC	477	ASN

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
80	DC	583	HIS
80	DC	649	GLN
80	DC	694	HIS

### 5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
34	B5	1775/1798 (98%)	407 (22%)	10 (0%)
38	A1	3194/3199 (99%)	591 (18%)	25 (0%)
39	A3	120/121 (99%)	10 (8%)	1 (0%)
40	A4	157/158 (99%)	33 (21%)	0
82	EC	192/202 (95%)	108 (56%)	7 (3%)
All	All	5438/5478 (99%)	1149 (21%)	43 (0%)

All (1149) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
34	B5	2	A
34	B5	4	C
34	B5	20	G
34	B5	26	A
34	B5	34	G
34	B5	42	G
34	B5	43	A
34	B5	45	U
34	B5	46	A
34	B5	47	A
34	B5	57	G
34	B5	60	U
34	B5	67	A
34	B5	68	A
34	B5	72	A
34	B5	74	U
34	B5	75	U
34	B5	76	A
34	B5	77	U
34	B5	81	G
34	B5	104	A
34	B5	111	U
34	B5	114	C
34	B5	127	G

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
34	B5	129	U
34	B5	130	C
34	B5	131	C
34	B5	132	U
34	B5	133	U
34	B5	134	U
34	B5	135	A
34	B5	136	C
34	B5	137	U
34	B5	140	A
34	B5	141	U
34	B5	145	A
34	B5	158	U
34	B5	166	C
34	B5	178	U
34	B5	179	A
34	B5	181	A
34	B5	182	A
34	B5	188	A
34	B5	190	C
34	B5	191	C
34	B5	192	U
34	B5	193	U
34	B5	194	U
34	B5	195	G
34	B5	196	G
34	B5	197	A
34	B5	200	A
34	B5	204	G
34	B5	217	A
34	B5	218	A
34	B5	219	A
34	B5	224	C
34	B5	225	A
34	B5	227	U
34	B5	229	U
34	B5	230	C
34	B5	232	U
34	B5	233	C
34	B5	234	G
34	B5	236	A
34	B5	240	U

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
34	B5	241	U
34	B5	249	U
34	B5	257	A
34	B5	260	U
34	B5	261	U
34	B5	262	U
34	B5	265	A
34	B5	266	A
34	B5	271	A
34	B5	276	C
34	B5	278	U
34	B5	280	U
34	B5	299	A
34	B5	305	C
34	B5	314	C
34	B5	316	A
34	B5	321	C
34	B5	322	G
34	B5	333	A
34	B5	337	G
34	B5	338	C
34	B5	352	A
34	B5	359	A
34	B5	360	A
34	B5	361	C
34	B5	370	A
34	B5	390	G
34	B5	397	A
34	B5	400	A
34	B5	401	A
34	B5	402	C
34	B5	419	G
34	B5	423	G
34	B5	424	C
34	B5	425	A
34	B5	426	G
34	B5	434	G
34	B5	439	U
34	B5	444	C
34	B5	454	U
34	B5	460	A
34	B5	475	A

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
34	B5	477	A
34	B5	480	G
34	B5	484	C
34	B5	485	A
34	B5	486	G
34	B5	489	C
34	B5	490	C
34	B5	491	C
34	B5	492	A
34	B5	493	U
34	B5	494	U
34	B5	495	C
34	B5	496	G
34	B5	497	G
34	B5	498	G
34	B5	499	U
34	B5	500	C
34	B5	501	U
34	B5	503	G
34	B5	504	U
34	B5	506	A
34	B5	507	U
34	B5	514	G
34	B5	515	A
34	B5	519	C
34	B5	538	A
34	B5	539	G
34	B5	540	G
34	B5	541	A2M
34	B5	542	A
34	B5	544	A
34	B5	555	A
34	B5	557	G
34	B5	558	U
34	B5	559	C
34	B5	565	C
34	B5	568	G
34	B5	575	C
34	B5	577	G
34	B5	579	A
34	B5	580	A
34	B5	581	U

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
34	B5	582	U
34	B5	594	A
34	B5	595	G
34	B5	606	A
34	B5	610	G
34	B5	611	U
34	B5	619	A2M
34	B5	620	A
34	B5	621	A
34	B5	622	A
34	B5	623	A
34	B5	624	G
34	B5	635	A
34	B5	638	U
34	B5	639	U
34	B5	650	U
34	B5	652	G
34	B5	655	G
34	B5	656	G
34	B5	658	C
34	B5	677	G
34	B5	678	A
34	B5	681	U
34	B5	683	C
34	B5	694	U
34	B5	696	C
34	B5	697	C
34	B5	698	U
34	B5	704	C
34	B5	705	U
34	B5	709	C
34	B5	711	U
34	B5	712	G
34	B5	713	A
34	B5	715	U
34	B5	716	C
34	B5	717	C
34	B5	718	U
34	B5	719	U
34	B5	721	U
34	B5	722	G
34	B5	724	C

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
34	B5	725	U
34	B5	726	C
34	B5	727	U
34	B5	728	U
34	B5	729	G
34	B5	730	G
34	B5	731	C
34	B5	732	G
34	B5	733	A
34	B5	734	A
34	B5	735	C
34	B5	738	G
34	B5	740	A
34	B5	741	C
34	B5	743	U
34	B5	753	A
34	B5	755	A
34	B5	765	G
34	B5	766	U
34	B5	771	A
34	B5	774	A
34	B5	775	G
34	B5	778	G
34	B5	779	U
34	B5	781	U
34	B5	782	U
34	B5	783	G
34	B5	784	C
34	B5	789	A
34	B5	794	U
34	B5	812	A
34	B5	814	A
34	B5	820	U
34	B5	821	U
34	B5	823	G
34	B5	832	U
34	B5	833	U
34	B5	836	U
34	B5	840	U
34	B5	846	G
34	B5	850	A
34	B5	851	U

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
34	B5	859	A
34	B5	863	A
34	B5	873	U
34	B5	877	G
34	B5	886	U
34	B5	895	G
34	B5	898	A
34	B5	906	A
34	B5	907	A
34	B5	914	G
34	B5	922	G
34	B5	931	C
34	B5	933	A
34	B5	935	U
34	B5	951	A
34	B5	960	U
34	B5	966	A
34	B5	988	A
34	B5	992	A
34	B5	993	A
34	B5	1004	U
34	B5	1005	A
34	B5	1025	A
34	B5	1026	A
34	B5	1028	C
34	B5	1039	A
34	B5	1052	U
34	B5	1053	G
34	B5	1056	U
34	B5	1059	U
34	B5	1060	U
34	B5	1061	A
34	B5	1062	A
34	B5	1076	A
34	B5	1083	G
34	B5	1092	A
34	B5	1097	U
34	B5	1098	U
34	B5	1100	G
34	B5	1126	OMG
34	B5	1138	A
34	B5	1150	G

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
34	B5	1158	C
34	B5	1171	A
34	B5	1183	A
34	B5	1185	U
34	B5	1186	U
34	B5	1192	C
34	B5	1194	A
34	B5	1196	A
34	B5	1199	G
34	B5	1200	G
34	B5	1201	G
34	B5	1214	U
34	B5	1217	A
34	B5	1218	G
34	B5	1226	A
34	B5	1227	A
34	B5	1228	G
34	B5	1229	G
34	B5	1243	G
34	B5	1244	A
34	B5	1245	G
34	B5	1246	C
34	B5	1248	C
34	B5	1249	U
34	B5	1251	U
34	B5	1252	C
34	B5	1256	A
34	B5	1257	U
34	B5	1269	OMU
34	B5	1276	U
34	B5	1286	U
34	B5	1301	U
34	B5	1306	C
34	B5	1307	U
34	B5	1314	U
34	B5	1315	U
34	B5	1316	G
34	B5	1321	A
34	B5	1340	U
34	B5	1344	A
34	B5	1345	A
34	B5	1346	A

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
34	B5	1349	G
34	B5	1353	U
34	B5	1355	C
34	B5	1362	U
34	B5	1363	U
34	B5	1364	G
34	B5	1368	G
34	B5	1370	U
34	B5	1371	A
34	B5	1372	U
34	B5	1373	C
34	B5	1383	G
34	B5	1390	U
34	B5	1392	U
34	B5	1398	U
34	B5	1399	C
34	B5	1400	A
34	B5	1402	G
34	B5	1413	U
34	B5	1415	U
34	B5	1425	A
34	B5	1427	A
34	B5	1428	OMG
34	B5	1432	U
34	B5	1433	G
34	B5	1436	A
34	B5	1444	A
34	B5	1445	G
34	B5	1446	A
34	B5	1459	C
34	B5	1460	A
34	B5	1469	A
34	B5	1471	A
34	B5	1481	C
34	B5	1486	G
34	B5	1488	G
34	B5	1491	U
34	B5	1492	A
34	B5	1493	A
34	B5	1516	A
34	B5	1518	C
34	B5	1521	G

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
34	B5	1523	G
34	B5	1524	A
34	B5	1537	C
34	B5	1540	G
34	B5	1542	G
34	B5	1548	G
34	B5	1557	U
34	B5	1558	U
34	B5	1559	A
34	B5	1576	A
34	B5	1584	G
34	B5	1601	G
34	B5	1634	C
34	B5	1635	A
34	B5	1646	C
34	B5	1657	U
34	B5	1658	G
34	B5	1680	G
34	B5	1682	U
34	B5	1683	C
34	B5	1684	U
34	B5	1688	U
34	B5	1693	A
34	B5	1698	G
34	B5	1700	C
34	B5	1701	A
34	B5	1703	C
34	B5	1709	C
34	B5	1711	C
34	B5	1715	G
34	B5	1716	C
34	B5	1717	G
34	B5	1755	A
34	B5	1756[A]	A
34	B5	1757	G
34	B5	1760	G
34	B5	1762	A
34	B5	1766	A
34	B5	1767	G
34	B5	1769	U
34	B5	1780	G
34	B5	1792	G

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
34	B5	1793	G
34	B5	1794	A
34	B5	1795	U
34	B5	1796	C
34	B5	1799	U
38	A1	26	A
38	A1	34	A
38	A1	40	A
38	A1	43	A
38	A1	49	A
38	A1	59	G
38	A1	60	A
38	A1	65	A
38	A1	66	A
38	A1	77	A
38	A1	92	G
38	A1	99	A
38	A1	109	A
38	A1	110	G
38	A1	111	C
38	A1	116	A
38	A1	120	G
38	A1	121	A
38	A1	122	A
38	A1	134	U
38	A1	135	C
38	A1	136	G
38	A1	147	U
38	A1	156	G
38	A1	157	A
38	A1	164	A
38	A1	165	A
38	A1	166	C
38	A1	169	U
38	A1	170	G
38	A1	173	G
38	A1	174	C
38	A1	175	C
38	A1	176	G
38	A1	177	U
38	A1	187	A
38	A1	190	U

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
38	A1	191	U
38	A1	200	C
38	A1	210	U
38	A1	211	A
38	A1	219	A
38	A1	234	G
38	A1	237	G
38	A1	240	U
38	A1	241	G
38	A1	242	C
38	A1	243	G
38	A1	244	G
38	A1	245	U
38	A1	246	U
38	A1	248	U
38	A1	249	U
38	A1	250	U
38	A1	251	G
38	A1	252	U
38	A1	253	A
38	A1	269	G
38	A1	286	U
38	A1	295	A
38	A1	296	A
38	A1	298	U
38	A1	305	U
38	A1	315	C
38	A1	329	U
38	A1	339	C
38	A1	352	A
38	A1	372	A
38	A1	373	A
38	A1	376	G
38	A1	387	A
38	A1	398	A
38	A1	399	A
38	A1	401	U
38	A1	402	A
38	A1	403	C
38	A1	420	G
38	A1	421	G
38	A1	422	A

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
38	A1	438	A
38	A1	440	A
38	A1	495	G
38	A1	503	C
38	A1	521	A
38	A1	523	A
38	A1	535	G
38	A1	538	G
38	A1	540	U
38	A1	542	G
38	A1	545	U
38	A1	547	G
38	A1	548	G
38	A1	549	U
38	A1	552	G
38	A1	557	A
38	A1	558	U
38	A1	559	A
38	A1	560	G
38	A1	578	A
38	A1	579	G
38	A1	589	A
38	A1	604	G
38	A1	611	A
38	A1	612	U
38	A1	620	U
38	A1	621	A
38	A1	636	C
38	A1	649	A2M
38	A1	660	A
38	A1	677	A
38	A1	681	U
38	A1	690	A
38	A1	705	A
38	A1	715	A
38	A1	725	G
38	A1	758	C
38	A1	763	G
38	A1	765	C
38	A1	766	U
38	A1	767	U
38	A1	774	G

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
38	A1	777	U
38	A1	781	G
38	A1	785	G
38	A1	786	A
38	A1	799	G
38	A1	801	A
38	A1	806	A
38	A1	813	G
38	A1	817	A2M
38	A1	830	A
38	A1	837	A
38	A1	849	C
38	A1	857	G
38	A1	861	C
38	A1	874	U
38	A1	879	U
38	A1	896	A
38	A1	897	U
38	A1	907	G
38	A1	908	OMG
38	A1	914	A
38	A1	916	G
38	A1	917	A
38	A1	921	A
38	A1	923	C
38	A1	924	G
38	A1	925	A
38	A1	934	G
38	A1	937	G
38	A1	943	U
38	A1	944	C
38	A1	953	G
38	A1	959	C
38	A1	961	C
38	A1	964	G
38	A1	980	A
38	A1	981	U
38	A1	983	A
38	A1	995	U
38	A1	1002	A
38	A1	1010	G
38	A1	1014	U

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
38	A1	1016	C
38	A1	1017	C
38	A1	1018	G
38	A1	1019	G
38	A1	1021	G
38	A1	1022	U
38	A1	1032	C
38	A1	1033	U
38	A1	1034	U
38	A1	1035	G
38	A1	1036	A
38	A1	1041	U
38	A1	1047	A
38	A1	1064	A
38	A1	1072	G
38	A1	1081	U
38	A1	1082	U
38	A1	1093	A
38	A1	1094	U
38	A1	1095	U
38	A1	1096	U
38	A1	1097	G
38	A1	1098	A
38	A1	1103	A
38	A1	1104	G
38	A1	1117	G
38	A1	1130	A
38	A1	1131	G
38	A1	1144	U
38	A1	1153	A
38	A1	1159	A
38	A1	1160	C
38	A1	1179	A
38	A1	1180	A
38	A1	1181	U
38	A1	1182	A
38	A1	1186	G
38	A1	1192	C
38	A1	1193	A
38	A1	1201	C
38	A1	1206	G
38	A1	1208	U

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
38	A1	1219	C
38	A1	1222	G
38	A1	1223	A
38	A1	1226	G
38	A1	1228	C
38	A1	1231	A
38	A1	1232	C
38	A1	1235	U
38	A1	1236	G
38	A1	1237	G
38	A1	1242	G
38	A1	1243	G
38	A1	1244	A
38	A1	1245	A
38	A1	1246	G
38	A1	1249	G
38	A1	1256	G
38	A1	1258	U
38	A1	1259	A
38	A1	1263	A
38	A1	1265	U
38	A1	1269	U
38	A1	1272	C
38	A1	1279	C
38	A1	1281	G
38	A1	1282	G
38	A1	1283	C
38	A1	1284	C
38	A1	1285	G
38	A1	1286	A
38	A1	1287	A
38	A1	1292	C
38	A1	1293	U
38	A1	1305	U
38	A1	1307	G
38	A1	1309	U
38	A1	1317	A
38	A1	1330	A
38	A1	1331	U
38	A1	1348	U
38	A1	1349	G
38	A1	1350	A

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
38	A1	1351	U
38	A1	1352	A
38	A1	1353	U
38	A1	1354	G
38	A1	1355	A
38	A1	1356	U
38	A1	1357	G
38	A1	1386	A
38	A1	1392	G
38	A1	1399	A
38	A1	1400	G
38	A1	1419	A
38	A1	1431	G
38	A1	1434	G
38	A1	1436	U
38	A1	1437	OMC
38	A1	1443	G
38	A1	1446	A
38	A1	1448	U
38	A1	1455	U
38	A1	1469	C
38	A1	1481	A
38	A1	1482	A
38	A1	1496	C
38	A1	1508	C
38	A1	1522	U
38	A1	1523	U
38	A1	1527	C
38	A1	1539	A
38	A1	1555	U
38	A1	1556	C
38	A1	1562	C
38	A1	1564	U
38	A1	1565	G
38	A1	1566	A
38	A1	1567	U
38	A1	1568	U
38	A1	1569	U
38	A1	1572	U
38	A1	1573	G
38	A1	1574	C
38	A1	1575	A

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
38	A1	1576	G
38	A1	1579	C
38	A1	1583	A
38	A1	1587	A
38	A1	1589	A
38	A1	1591	G
38	A1	1593	A
38	A1	1605	A
38	A1	1613	A
38	A1	1628	C
38	A1	1629	U
38	A1	1630	U
38	A1	1642	A
38	A1	1643	A
38	A1	1657	C
38	A1	1724	U
38	A1	1736	G
38	A1	1741	A
38	A1	1750	A
38	A1	1751	G
38	A1	1762	C
38	A1	1763	U
38	A1	1764	U
38	A1	1765	U
38	A1	1766	G
38	A1	1775	G
38	A1	1780	G
38	A1	1797	A
38	A1	1808	G
38	A1	1813	A
38	A1	1815	U
38	A1	1817	G
38	A1	1820	U
38	A1	1821	U
38	A1	1842	A
38	A1	1846	C
38	A1	1849	C
38	A1	1850	A
38	A1	1866	C
38	A1	1878	G
38	A1	1880	U
38	A1	1886	A

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
38	A1	1893	A
38	A1	1899	G
38	A1	1906	G
38	A1	1932	A
38	A1	1946	A
38	A1	1953	G
38	A1	1954	G
38	A1	1955	U
38	A1	2110	G
38	A1	2112	U
38	A1	2114	C
38	A1	2122	G
38	A1	2131	A
38	A1	2140	U
38	A1	2144	A
38	A1	2158	A
38	A1	2169	G
38	A1	2176	U
38	A1	2188	A
38	A1	2197	OMC
38	A1	2201	G
38	A1	2206	G
38	A1	2207	A
38	A1	2209	U
38	A1	2242	A
38	A1	2249	G
38	A1	2259	A
38	A1	2260	U
38	A1	2263	C
38	A1	2269	U
38	A1	2270	A
38	A1	2272	G
38	A1	2273	G
38	A1	2280	A2M
38	A1	2281	A2M
38	A1	2284	C
38	A1	2307	G
38	A1	2308	C
38	A1	2310	U
38	A1	2313	A
38	A1	2314	U
38	A1	2315	G

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
38	A1	2334	U
38	A1	2335	G
38	A1	2336	U
38	A1	2340	U
38	A1	2373	A
38	A1	2374	C
38	A1	2375	G
38	A1	2376	G
38	A1	2383	C
38	A1	2388	U
38	A1	2393	G
38	A1	2394	G
38	A1	2397	A
38	A1	2402	A
38	A1	2403	G
38	A1	2404	A
38	A1	2411	U
38	A1	2418	G
38	A1	2435	G
38	A1	2447	A
38	A1	2448	G
38	A1	2450	G
38	A1	2451	G
38	A1	2452	G
38	A1	2453	U
38	A1	2454	G
38	A1	2455	U
38	A1	2458	A
38	A1	2459	A
38	A1	2460	U
38	A1	2461	A
38	A1	2462	A
38	A1	2463	G
38	A1	2467	G
38	A1	2468	A
38	A1	2469	G
38	A1	2470	C
38	A1	2473	C
38	A1	2474	G
38	A1	2475	G
38	A1	2477	G
38	A1	2479	C

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
38	A1	2480	A
38	A1	2485	A
38	A1	2486	A
38	A1	2487	U
38	A1	2489	C
38	A1	2490	C
38	A1	2492	C
38	A1	2493	U
38	A1	2495	C
38	A1	2497	U
38	A1	2498	U
38	A1	2499	U
38	A1	2502	A
38	A1	2504	U
38	A1	2505	U
38	A1	2506	U
38	A1	2507	C
38	A1	2514	U
38	A1	2522	G
38	A1	2523	A
38	A1	2524	A
38	A1	2530	G
38	A1	2537	U
38	A1	2538	U
38	A1	2539	C
38	A1	2540	A
38	A1	2541	U
38	A1	2542	U
38	A1	2544	U
38	A1	2549	G
38	A1	2552	C
38	A1	2561	A
38	A1	2569	A
38	A1	2571	U
38	A1	2572	C
38	A1	2573	G
38	A1	2585	G
38	A1	2586	G
38	A1	2593	A
38	A1	2606	G
38	A1	2607	G
38	A1	2614	G

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
38	A1	2629	U
38	A1	2642	A
38	A1	2651	G
38	A1	2652	U
38	A1	2656	A
38	A1	2674	A
38	A1	2677	G
38	A1	2678	A
38	A1	2681	U
38	A1	2688	U
38	A1	2689	A
38	A1	2691	A
38	A1	2704	A
38	A1	2705	A
38	A1	2714	G
38	A1	2719	U
38	A1	2728	G
38	A1	2729	OMU
38	A1	2737	C
38	A1	2749	G
38	A1	2752	U
38	A1	2753	G
38	A1	2755	C
38	A1	2772	C
38	A1	2777	G
38	A1	2778	G
38	A1	2796	G
38	A1	2799	A
38	A1	2800	G
38	A1	2801	A
38	A1	2803	A
38	A1	2810	C
38	A1	2814	G
38	A1	2817	A
38	A1	2822	U
38	A1	2842	U
38	A1	2844	C
38	A1	2845	A
38	A1	2849	C
38	A1	2860	U
38	A1	2861	U
38	A1	2871	G

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
38	A1	2872	A
38	A1	2875	U
38	A1	2876	C
38	A1	2887	A
38	A1	2898	G
38	A1	2923	U
38	A1	2933	A
38	A1	2935	U
38	A1	2936	A
38	A1	2942	C
38	A1	2947	G
38	A1	2977	G
38	A1	2983	C
38	A1	2990	G
38	A1	2992	U
38	A1	2997	G
38	A1	3011	A
38	A1	3012	A
38	A1	3022	G
38	A1	3032	A
38	A1	3056	U
38	A1	3059	G
38	A1	3078	U
38	A1	3079	U
38	A1	3086	A
38	A1	3087	A
38	A1	3092	C
38	A1	3109	G
38	A1	3122	A
38	A1	3130	A
38	A1	3131	U
38	A1	3142	A
38	A1	3143	C
38	A1	3153	U
38	A1	3154	C
38	A1	3155	U
38	A1	3156	U
38	A1	3157	U
38	A1	3165	A
38	A1	3170	A
38	A1	3172	A
38	A1	3173	G

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
38	A1	3174	A
38	A1	3175	U
38	A1	3176	G
38	A1	3179	U
38	A1	3181	C
38	A1	3186	A
38	A1	3187	A
38	A1	3198	U
38	A1	3199	G
38	A1	3207	U
38	A1	3210	A
38	A1	3213	A
38	A1	3216	G
38	A1	3217	C
38	A1	3218	A
38	A1	3219	G
38	A1	3224	G
38	A1	3234	A
38	A1	3243	A
38	A1	3244	A
38	A1	3247	G
38	A1	3259	U
38	A1	3263	G
38	A1	3270	U
38	A1	3275	U
38	A1	3276	G
38	A1	3281	U
38	A1	3289	G
38	A1	3294	A
38	A1	3303	G
38	A1	3304	U
38	A1	3307	A
38	A1	3309	G
38	A1	3313	U
38	A1	3314	A
38	A1	3316	A
38	A1	3342	A
38	A1	3345	G
38	A1	3351	U
38	A1	3352	U
38	A1	3353	G
38	A1	3354	U

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
38	A1	3355	U
38	A1	3356	G
38	A1	3369	G
38	A1	3375	A
38	A1	3378	C
38	A1	3382	U
38	A1	3389	U
38	A1	3390	G
39	A3	35	C
39	A3	53	U
39	A3	54	U
39	A3	65	G
39	A3	74	C
39	A3	78	U
39	A3	91	G
39	A3	102	A
39	A3	112	G
39	A3	121	U
40	A4	13	A
40	A4	23	U
40	A4	25	G
40	A4	34	U
40	A4	35	C
40	A4	38	U
40	A4	51	G
40	A4	52	A
40	A4	59	A
40	A4	60	U
40	A4	62	C
40	A4	63	G
40	A4	75	G
40	A4	80	A
40	A4	81	U
40	A4	82	U
40	A4	83	C
40	A4	86	U
40	A4	87	G
40	A4	88	A
40	A4	90	U
40	A4	95	G
40	A4	97	A
40	A4	104	A

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
40	A4	106	C
40	A4	107	G
40	A4	111	A
40	A4	113	U
40	A4	116	G
40	A4	125	U
40	A4	152	G
40	A4	154	C
40	A4	158	U
82	EC	6762	U
82	EC	6768	U
82	EC	6769	A
82	EC	6770	U
82	EC	6771	U
82	EC	6772	G
82	EC	6773	G
82	EC	6774	U
82	EC	6775	U
82	EC	6776	A
82	EC	6777	C
82	EC	6778	C
82	EC	6779	C
82	EC	6780	A
82	EC	6781	U
82	EC	6782	C
82	EC	6789	G
82	EC	6790	A
82	EC	6791	A
82	EC	6792	A
82	EC	6793	A
82	EC	6794	C
82	EC	6795	U
82	EC	6800	G
82	EC	6801	A
82	EC	6802	A
82	EC	6803	C
82	EC	6804	A
82	EC	6809	G
82	EC	6812	C
82	EC	6816	A
82	EC	6817	A
82	EC	6818	G

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
82	EC	6819	G
82	EC	6820	C
82	EC	6821	U
82	EC	6822	U
82	EC	6823	U
82	EC	6824	C
82	EC	6825	A
82	EC	6831	U
82	EC	6832	G
82	EC	6835	U
82	EC	6837	G
82	EC	6840	A
82	EC	6841	U
82	EC	6842	U
82	EC	6843	U
82	EC	6844	A
82	EC	6845	G
82	EC	6847	G
82	EC	6848	U
82	EC	6849	A
82	EC	6850	C
82	EC	6852	U
82	EC	6856	C
82	EC	6857	C
82	EC	6858	A
82	EC	6859	U
82	EC	6860	A
82	EC	6864	A
82	EC	6865	G
82	EC	6866	C
82	EC	6867	C
82	EC	6870	A
82	EC	6871	A
82	EC	6872	A
82	EC	6873	A
82	EC	6874	A
82	EC	6875	C
82	EC	6877	C
82	EC	6880	G
82	EC	6881	U
82	EC	6882	G
82	EC	6883	A

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
82	EC	6884	G
82	EC	6887	G
82	EC	6888	A
82	EC	6890	A
82	EC	6891	G
82	EC	6895	C
82	EC	6896	A
82	EC	6897	G
82	EC	6902	U
82	EC	6903	U
82	EC	6908	C
82	EC	6911	A
82	EC	6915	G
82	EC	6916	A
82	EC	6918	A
82	EC	6922	G
82	EC	6925	C
82	EC	6928	G
82	EC	6929	C
82	EC	6935	G
82	EC	6936	G
82	EC	6938	A
82	EC	6939	C
82	EC	6940	U
82	EC	6941	U
82	EC	6942	A
82	EC	6943	A
82	EC	6944	U
82	EC	6945	U
82	EC	6946	A
82	EC	6947	A
82	EC	6948	U
82	EC	6949	G

All (43) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
34	B5	752	A
34	B5	819	G
34	B5	850	A
34	B5	862	A
34	B5	950	C

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
34	B5	1285	U
34	B5	1344	A
34	B5	1369	U
34	B5	1458	G
34	B5	1645	G
38	A1	120	G
38	A1	121	A
38	A1	122	A
38	A1	165	A
38	A1	176	G
38	A1	241	G
38	A1	245	U
38	A1	873	C
38	A1	916	G
38	A1	1092	C
38	A1	1218	U
38	A1	1227	C
38	A1	1242	G
38	A1	1280	C
38	A1	1282	G
38	A1	1292	C
38	A1	1354	G
38	A1	1572	U
38	A1	1629	U
38	A1	2241	U
38	A1	2469	G
38	A1	2506	U
38	A1	2801	A
38	A1	2875	U
38	A1	3121	U
39	A3	52	G
82	EC	6789	G
82	EC	6831	U
82	EC	6851	G
82	EC	6876	A
82	EC	6889	A
82	EC	6939	C
82	EC	6943	A

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

68 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$
34	A2M	B5	541	34	18,25,26	0.91	1 (5%)	20,36,39	1.27	3 (15%)
34	OMU	B5	578	34	19,22,23	1.22	3 (15%)	25,31,34	1.82	5 (20%)
38	A2M	A1	1449	38,83	18,25,26	0.87	1 (5%)	20,36,39	1.15	2 (10%)
38	OMG	A1	1450	38	19,26,27	0.90	1 (5%)	21,38,41	1.01	2 (9%)
38	A2M	A1	649	38,83	18,25,26	0.84	0	20,36,39	1.12	2 (10%)
38	OMU	A1	2729	38	19,22,23	1.28	3 (15%)	25,31,34	1.79	5 (20%)
38	OMG	A1	2815	38	19,26,27	0.90	1 (5%)	21,38,41	1.05	2 (9%)
38	OMC	A1	2948	38	19,22,23	0.77	0	25,31,34	0.88	1 (4%)
34	OMG	B5	1271	34	19,26,27	0.89	1 (5%)	21,38,41	1.04	2 (9%)
38	OMG	A1	2619	38	19,26,27	0.88	1 (5%)	21,38,41	1.05	2 (9%)
38	OMU	A1	1888	38	19,22,23	1.29	3 (15%)	25,31,34	1.82	4 (16%)
34	OMC	B5	1007	34	19,22,23	0.79	0	25,31,34	0.88	0
38	A2M	A1	1133	38	18,25,26	0.86	1 (5%)	20,36,39	1.30	3 (15%)
34	A2M	B5	436	34	18,25,26	0.88	1 (5%)	20,36,39	1.26	2 (10%)
38	OMU	A1	2421	38	19,22,23	1.29	3 (15%)	25,31,34	1.80	4 (16%)
34	A2M	B5	420	34	18,25,26	0.91	1 (5%)	20,36,39	1.16	2 (10%)
38	OMG	A1	908	38	19,26,27	0.94	1 (5%)	21,38,41	1.16	2 (9%)
38	OMU	A1	2417	38	19,22,23	1.23	3 (15%)	25,31,34	1.80	5 (20%)
34	4AC	B5	1280	34	21,24,25	1.07	1 (4%)	28,34,37	1.08	2 (7%)
38	OMC	A1	1437	38	19,22,23	0.77	0	25,31,34	0.96	2 (8%)
38	1MA	A1	2142	38,83	17,25,26	1.52	2 (11%)	17,37,40	1.19	2 (11%)
38	A2M	A1	817	38,83	18,25,26	0.84	0	20,36,39	1.33	2 (10%)
34	OMU	B5	1269	34	19,22,23	1.26	4 (21%)	25,31,34	1.82	5 (20%)
38	OMG	A1	867	38	19,26,27	0.88	1 (5%)	21,38,41	1.05	2 (9%)
38	A2M	A1	2281	38	18,25,26	0.75	0	20,36,39	1.96	4 (20%)
34	4AC	B5	1773	34	21,24,25	1.03	2 (9%)	28,34,37	2.31	6 (21%)
34	A2M	B5	28	34,83	18,25,26	0.91	1 (5%)	20,36,39	1.21	2 (10%)
34	MA6	B5	1781	34	19,26,27	0.97	1 (5%)	18,38,41	2.04	4 (22%)
38	OMC	A1	650	38,83	19,22,23	0.80	1 (5%)	25,31,34	0.91	1 (4%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
34	OMG	B5	562	34	19,26,27	0.90	1 (5%)	21,38,41	1.04	2 (9%)
38	OMU	A1	2347	38	19,22,23	1.27	3 (15%)	25,31,34	1.84	5 (20%)
38	OMG	A1	2791	38	19,26,27	0.90	1 (5%)	21,38,41	1.04	2 (9%)
34	A2M	B5	100	34,83	18,25,26	0.90	1 (5%)	20,36,39	1.22	2 (10%)
36	HIC	AB	243	36	8,11,12	1.63	2 (25%)	5,14,16	1.01	0
34	A2M	B5	619	34,83	18,25,26	0.84	0	20,36,39	1.29	2 (10%)
38	A2M	A1	2280	38	18,25,26	0.82	0	20,36,39	1.27	2 (10%)
34	OMG	B5	1126	34	19,26,27	0.90	1 (5%)	21,38,41	1.09	2 (9%)
38	A2M	A1	807	38	18,25,26	0.84	0	20,36,39	1.34	3 (15%)
34	OMC	B5	414	34	19,22,23	0.79	0	25,31,34	0.81	0
38	OMG	A1	2288	38	19,26,27	0.89	1 (5%)	21,38,41	1.05	2 (9%)
80	DDE	DC	699	80	15,20,21	0.98	1 (6%)	11,28,30	1.02	1 (9%)
38	1MA	A1	645	38,83	17,25,26	1.49	2 (11%)	17,37,40	1.11	2 (11%)
38	OMU	A1	898	38	19,22,23	1.25	3 (15%)	25,31,34	1.82	5 (20%)
38	OMC	A1	2337	38	19,22,23	0.78	0	25,31,34	0.80	0
38	OMC	A1	663	38	19,22,23	0.79	0	25,31,34	0.77	0
34	OMG	B5	1572	34	19,26,27	0.87	1 (5%)	21,38,41	1.07	2 (9%)
38	OMU	A1	2724	38	19,22,23	1.25	3 (15%)	25,31,34	1.80	6 (24%)
34	XSX	B5	1191	34	24,28,29	1.03	1 (4%)	30,40,43	1.43	3 (10%)
38	A2M	A1	2220	38	18,25,26	0.88	1 (5%)	20,36,39	1.30	2 (10%)
38	UR3	A1	2634	38,83	19,22,23	0.95	0	26,32,35	1.77	2 (7%)
38	A2M	A1	2256	38,83	18,25,26	0.86	0	20,36,39	1.33	2 (10%)
38	5MC	A1	2278	38,83	19,22,23	1.58	3 (15%)	26,32,35	1.18	3 (11%)
34	OMC	B5	1639	34	19,22,23	0.78	0	25,31,34	0.76	0
34	7MG	B5	1575	34	23,26,27	1.59	5 (21%)	27,39,42	2.60	9 (33%)
38	OMC	A1	2959	38	19,22,23	0.79	0	25,31,34	0.83	0
34	MA6	B5	1782	34	19,26,27	1.22	2 (10%)	18,38,41	2.10	4 (22%)
38	A2M	A1	876	38	18,25,26	0.86	0	20,36,39	1.14	2 (10%)
38	OMG	A1	2922	38	19,26,27	0.86	1 (5%)	21,38,41	1.06	2 (9%)
38	A2M	A1	2640	38	18,25,26	0.85	1 (5%)	20,36,39	1.16	2 (10%)
34	A2M	B5	974	34	18,25,26	0.87	1 (5%)	20,36,39	1.15	2 (10%)
38	OMG	A1	2793	38	19,26,27	0.89	1 (5%)	21,38,41	1.07	2 (9%)
38	5MC	A1	2870	38	19,22,23	1.54	3 (15%)	26,32,35	1.22	3 (11%)
38	A2M	A1	2946	38,83	18,25,26	0.89	1 (5%)	20,36,39	1.38	3 (15%)
38	OMU	A1	2921	38	19,22,23	1.24	3 (15%)	25,31,34	1.83	5 (20%)
34	A2M	B5	796	34	18,25,26	0.90	1 (5%)	20,36,39	1.41	3 (15%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
38	OMG	A1	805	38	19,26,27	0.88	1 (5%)	21,38,41	1.14	2 (9%)
34	OMG	B5	1428	34	19,26,27	0.89	1 (5%)	21,38,41	1.03	2 (9%)
38	OMC	A1	2197	38	19,22,23	0.78	0	25,31,34	0.79	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
34	A2M	B5	541	34	-	3/5/27/28	0/3/3/3
34	OMU	B5	578	34	-	0/9/27/28	0/2/2/2
38	A2M	A1	1449	38,83	-	0/5/27/28	0/3/3/3
38	OMG	A1	1450	38	-	0/5/27/28	0/3/3/3
38	A2M	A1	649	38,83	-	1/5/27/28	0/3/3/3
38	OMU	A1	2729	38	-	2/9/27/28	0/2/2/2
38	OMG	A1	2815	38	-	0/5/27/28	0/3/3/3
38	OMC	A1	2948	38	-	0/9/27/28	0/2/2/2
34	OMG	B5	1271	34	-	0/5/27/28	0/3/3/3
38	OMG	A1	2619	38	-	1/5/27/28	0/3/3/3
38	OMU	A1	1888	38	-	0/9/27/28	0/2/2/2
34	OMC	B5	1007	34	-	0/9/27/28	0/2/2/2
38	A2M	A1	1133	38	-	0/5/27/28	0/3/3/3
34	A2M	B5	436	34	-	0/5/27/28	0/3/3/3
38	OMU	A1	2421	38	-	0/9/27/28	0/2/2/2
34	A2M	B5	420	34	-	1/5/27/28	0/3/3/3
38	OMG	A1	908	38	-	0/5/27/28	0/3/3/3
38	OMU	A1	2417	38	-	0/9/27/28	0/2/2/2
34	4AC	B5	1280	34	-	2/11/29/30	0/2/2/2
38	OMC	A1	1437	38	-	4/9/27/28	0/2/2/2
38	1MA	A1	2142	38,83	-	1/3/25/26	0/3/3/3
38	A2M	A1	817	38,83	-	1/5/27/28	0/3/3/3
34	OMU	B5	1269	34	-	4/9/27/28	0/2/2/2
38	OMG	A1	867	38	-	1/5/27/28	0/3/3/3
38	A2M	A1	2281	38	-	2/5/27/28	0/3/3/3
34	4AC	B5	1773	34	-	4/11/29/30	0/2/2/2
34	A2M	B5	28	34,83	-	0/5/27/28	0/3/3/3
34	MA6	B5	1781	34	-	2/7/29/30	0/3/3/3
38	OMC	A1	650	38,83	-	0/9/27/28	0/2/2/2
34	OMG	B5	562	34	-	0/5/27/28	0/3/3/3

Continued on next page...

*Continued from previous page...*

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
38	OMU	A1	2347	38	-	2/9/27/28	0/2/2/2
38	OMG	A1	2791	38	-	0/5/27/28	0/3/3/3
34	A2M	B5	100	34,83	-	1/5/27/28	0/3/3/3
36	HIC	AB	243	36	-	2/5/6/8	0/1/1/1
34	A2M	B5	619	34,83	-	2/5/27/28	0/3/3/3
38	A2M	A1	2280	38	-	2/5/27/28	0/3/3/3
34	OMG	B5	1126	34	-	2/5/27/28	0/3/3/3
38	A2M	A1	807	38	-	1/5/27/28	0/3/3/3
34	OMC	B5	414	34	-	0/9/27/28	0/2/2/2
38	OMG	A1	2288	38	-	0/5/27/28	0/3/3/3
80	DDE	DC	699	80	-	5/20/21/23	0/1/1/1
38	1MA	A1	645	38,83	-	0/3/25/26	0/3/3/3
38	OMU	A1	898	38	-	0/9/27/28	0/2/2/2
38	OMC	A1	2337	38	-	0/9/27/28	0/2/2/2
38	OMC	A1	663	38	-	0/9/27/28	0/2/2/2
34	OMG	B5	1572	34	-	0/5/27/28	0/3/3/3
38	OMU	A1	2724	38	-	1/9/27/28	0/2/2/2
34	XSX	B5	1191	34	-	3/16/34/35	0/2/2/2
38	A2M	A1	2220	38	-	0/5/27/28	0/3/3/3
38	UR3	A1	2634	38,83	-	0/7/25/26	0/2/2/2
38	A2M	A1	2256	38,83	-	1/5/27/28	0/3/3/3
38	5MC	A1	2278	38,83	-	0/7/25/26	0/2/2/2
34	OMC	B5	1639	34	-	0/9/27/28	0/2/2/2
34	7MG	B5	1575	34	-	0/7/37/38	0/3/3/3
38	OMC	A1	2959	38	-	0/9/27/28	0/2/2/2
34	MA6	B5	1782	34	-	5/7/29/30	0/3/3/3
38	A2M	A1	876	38	-	0/5/27/28	0/3/3/3
38	OMG	A1	2922	38	-	2/5/27/28	0/3/3/3
38	A2M	A1	2640	38	-	0/5/27/28	0/3/3/3
34	A2M	B5	974	34	-	0/5/27/28	0/3/3/3
38	OMG	A1	2793	38	-	0/5/27/28	0/3/3/3
38	5MC	A1	2870	38	-	4/7/25/26	0/2/2/2
38	A2M	A1	2946	38,83	-	0/5/27/28	0/3/3/3
38	OMU	A1	2921	38	-	0/9/27/28	0/2/2/2
34	A2M	B5	796	34	-	0/5/27/28	0/3/3/3
38	OMG	A1	805	38	-	0/5/27/28	0/3/3/3
34	OMG	B5	1428	34	-	3/5/27/28	0/3/3/3
38	OMC	A1	2197	38	-	6/9/27/28	0/2/2/2

All (84) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
38	A1	2278	5MC	C5-C4	5.65	1.48	1.44
38	A1	2870	5MC	C5-C4	5.23	1.48	1.44
38	A1	2142	1MA	C2-N3	4.94	1.34	1.28
38	A1	645	1MA	C2-N3	4.70	1.34	1.28
36	AB	243	HIC	CD2-CG	3.42	1.41	1.36
34	B5	1782	MA6	C6-C5	3.17	1.49	1.44
34	B5	1575	7MG	C4-N9	-3.14	1.34	1.37
38	A1	645	1MA	C6-N6	3.11	1.35	1.27
34	B5	1280	4AC	C4-N4	-3.07	1.35	1.39
38	A1	2729	OMU	C4-N3	-2.92	1.33	1.38
38	A1	2421	OMU	C4-N3	-2.91	1.33	1.38
38	A1	1888	OMU	C4-N3	-2.91	1.33	1.38
38	A1	2142	1MA	C6-N6	2.90	1.35	1.27
34	B5	1575	7MG	C2'-C3'	-2.87	1.45	1.53
38	A1	2347	OMU	C4-N3	-2.85	1.33	1.38
38	A1	898	OMU	C4-N3	-2.83	1.33	1.38
38	A1	2870	5MC	C6-C5	2.81	1.39	1.34
38	A1	2417	OMU	C4-N3	-2.80	1.33	1.38
34	B5	1575	7MG	C5-C4	2.79	1.46	1.37
38	A1	2724	OMU	C4-N3	-2.72	1.33	1.38
38	A1	2921	OMU	C4-N3	-2.72	1.34	1.38
34	B5	1269	OMU	C4-N3	-2.72	1.34	1.38
38	A1	2815	OMG	C6-N1	-2.68	1.33	1.37
38	A1	2278	5MC	C6-C5	2.68	1.39	1.34
38	A1	1450	OMG	C6-N1	-2.61	1.33	1.37
34	B5	1781	MA6	C6-C5	2.58	1.48	1.44
34	B5	578	OMU	C4-N3	-2.57	1.34	1.38
38	A1	2288	OMG	C6-N1	-2.56	1.33	1.37
34	B5	1575	7MG	C6-N1	-2.54	1.34	1.38
38	A1	867	OMG	C6-N1	-2.52	1.33	1.37
38	A1	908	OMG	C6-N1	-2.52	1.33	1.37
38	A1	2791	OMG	C6-N1	-2.51	1.34	1.37
34	B5	1126	OMG	C6-N1	-2.49	1.34	1.37
38	A1	2793	OMG	C6-N1	-2.49	1.34	1.37
38	A1	2619	OMG	C6-N1	-2.48	1.34	1.37
38	A1	2421	OMU	C2-N3	-2.48	1.33	1.38
38	A1	805	OMG	C6-N1	-2.43	1.34	1.37
38	A1	1888	OMU	C2-N3	-2.40	1.33	1.38
34	B5	1428	OMG	C6-N1	-2.39	1.34	1.37
34	B5	562	OMG	C6-N1	-2.39	1.34	1.37
38	A1	2347	OMU	C2-N3	-2.38	1.33	1.38
38	A1	2922	OMG	C6-N1	-2.38	1.34	1.37
38	A1	2278	5MC	C6-N1	-2.36	1.34	1.38

Continued on next page...

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
34	B5	1773	4AC	C4-N4	-2.36	1.36	1.39
38	A1	2729	OMU	C2-N3	-2.35	1.33	1.38
38	A1	2724	OMU	C2-N3	-2.34	1.33	1.38
38	A1	898	OMU	C2-N3	-2.33	1.33	1.38
38	A1	2921	OMU	C2-N3	-2.31	1.33	1.38
38	A1	2870	5MC	C6-N1	-2.31	1.34	1.38
34	B5	1271	OMG	C6-N1	-2.31	1.34	1.37
38	A1	2724	OMU	C5-C4	-2.31	1.38	1.43
38	A1	2220	A2M	O4'-C1'	2.28	1.43	1.40
34	B5	1269	OMU	C2-N1	2.28	1.42	1.38
34	B5	1572	OMG	C6-N1	-2.28	1.34	1.37
34	B5	1575	7MG	C5-N7	-2.27	1.32	1.35
38	A1	2946	A2M	O4'-C1'	2.26	1.43	1.40
38	A1	2417	OMU	C2-N3	-2.26	1.34	1.38
38	A1	898	OMU	C5-C4	-2.25	1.38	1.43
38	A1	2347	OMU	C5-C4	-2.25	1.38	1.43
38	A1	2729	OMU	C5-C4	-2.24	1.38	1.43
34	B5	420	A2M	O4'-C1'	2.21	1.43	1.40
34	B5	28	A2M	O4'-C1'	2.20	1.43	1.40
38	A1	2921	OMU	C5-C4	-2.20	1.38	1.43
38	A1	1888	OMU	C5-C4	-2.19	1.38	1.43
38	A1	2417	OMU	C5-C4	-2.17	1.39	1.43
34	B5	1782	MA6	C6-N1	2.17	1.35	1.32
38	A1	2421	OMU	C5-C4	-2.17	1.39	1.43
34	B5	1773	4AC	C6-N1	-2.17	1.32	1.38
34	B5	578	OMU	C2-N3	-2.16	1.34	1.38
34	B5	541	A2M	O4'-C1'	2.15	1.43	1.40
36	AB	243	HIC	CZ-NE2	-2.14	1.42	1.48
34	B5	1269	OMU	C2-N3	-2.14	1.34	1.38
34	B5	100	A2M	O4'-C1'	2.13	1.43	1.40
34	B5	796	A2M	O4'-C1'	2.12	1.43	1.40
34	B5	1191	XSX	C2-N1	2.12	1.41	1.38
34	B5	1269	OMU	C5-C4	-2.07	1.39	1.43
80	DC	699	DDE	CD2-NE2	2.07	1.39	1.36
38	A1	1133	A2M	O4'-C1'	2.07	1.43	1.40
34	B5	578	OMU	C5-C4	-2.07	1.39	1.43
34	B5	974	A2M	O4'-C1'	2.03	1.43	1.40
38	A1	2640	A2M	O4'-C1'	2.02	1.43	1.40
34	B5	436	A2M	O4'-C1'	2.01	1.43	1.40
38	A1	650	OMC	C6-N1	-2.01	1.33	1.38
38	A1	1449	A2M	O4'-C1'	2.01	1.43	1.40

All (171) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
34	B5	1773	4AC	N4-C4-N3	8.41	127.53	113.87
38	A1	2634	UR3	C4-N3-C2	-7.21	118.78	124.58
34	B5	1575	7MG	N9-C4-N3	6.67	135.24	125.46
34	B5	1782	MA6	C2-N1-C6	6.47	123.19	116.84
34	B5	1781	MA6	C2-N1-C6	5.69	122.42	116.84
34	B5	1191	XSX	C4-N3-C2	-5.32	118.42	124.66
34	B5	1575	7MG	N9-C8-N7	-5.31	95.86	103.37
34	B5	1773	4AC	C5-C4-N4	-5.23	114.14	122.94
34	B5	1575	7MG	C5-C4-N3	-5.01	118.73	128.13
38	A1	2281	A2M	O4'-C1'-N9	4.95	115.31	108.75
38	A1	2921	OMU	C4-N3-C2	-4.84	120.60	126.61
34	B5	578	OMU	C4-N3-C2	-4.81	120.64	126.61
38	A1	2421	OMU	C4-N3-C2	-4.77	120.69	126.61
38	A1	1888	OMU	C4-N3-C2	-4.77	120.69	126.61
38	A1	898	OMU	C4-N3-C2	-4.74	120.72	126.61
38	A1	2417	OMU	C4-N3-C2	-4.72	120.76	126.61
34	B5	1575	7MG	C2-N3-C4	4.68	120.35	112.30
38	A1	2347	OMU	C4-N3-C2	-4.66	120.83	126.61
38	A1	2729	OMU	C4-N3-C2	-4.62	120.88	126.61
38	A1	2724	OMU	C4-N3-C2	-4.55	120.96	126.61
34	B5	1269	OMU	C4-N3-C2	-4.49	121.03	126.61
38	A1	2417	OMU	N3-C2-N1	4.28	120.46	114.89
38	A1	2421	OMU	N3-C2-N1	4.25	120.42	114.89
38	A1	2921	OMU	N3-C2-N1	4.22	120.38	114.89
34	B5	1269	OMU	N3-C2-N1	4.21	120.37	114.89
38	A1	2347	OMU	N3-C2-N1	4.12	120.26	114.89
38	A1	1888	OMU	N3-C2-N1	4.11	120.24	114.89
38	A1	898	OMU	N3-C2-N1	4.09	120.21	114.89
38	A1	2729	OMU	N3-C2-N1	4.06	120.18	114.89
34	B5	578	OMU	N3-C2-N1	4.05	120.16	114.89
34	B5	1781	MA6	C4-C5-N7	-4.04	105.07	109.34
38	A1	2724	OMU	N3-C2-N1	4.01	120.11	114.89
34	B5	1781	MA6	N3-C2-N1	-3.98	123.28	128.67
38	A1	2921	OMU	C5-C4-N3	3.97	120.36	114.80
34	B5	1782	MA6	N3-C2-N1	-3.96	123.30	128.67
34	B5	1773	4AC	C6-C5-C4	3.95	121.76	117.00
38	A1	898	OMU	C5-C4-N3	3.94	120.32	114.80
38	A1	2724	OMU	C5-C4-N3	3.93	120.30	114.80
34	B5	578	OMU	C5-C4-N3	3.93	120.30	114.80
38	A1	1888	OMU	C5-C4-N3	3.90	120.26	114.80
38	A1	2220	A2M	N3-C2-N1	-3.89	123.39	128.67
38	A1	2870	5MC	C5-C6-N1	-3.87	119.11	123.31
38	A1	2729	OMU	C5-C4-N3	3.85	120.19	114.80

Continued on next page...

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
38	A1	2347	OMU	C5-C4-N3	3.84	120.18	114.80
38	A1	817	A2M	N3-C2-N1	-3.82	123.48	128.67
38	A1	2417	OMU	C5-C4-N3	3.82	120.15	114.80
38	A1	2421	OMU	C5-C4-N3	3.81	120.14	114.80
34	B5	1575	7MG	O2'-C2'-C3'	3.81	124.02	111.82
38	A1	2281	A2M	N3-C2-N1	-3.81	123.51	128.67
38	A1	2281	A2M	C4'-O4'-C1'	-3.80	106.45	109.92
38	A1	2280	A2M	N3-C2-N1	-3.78	123.54	128.67
34	B5	1575	7MG	O3'-C3'-C4'	3.73	121.79	111.08
38	A1	2256	A2M	N3-C2-N1	-3.72	123.62	128.67
34	B5	1269	OMU	C5-C4-N3	3.71	120.00	114.80
38	A1	876	A2M	N3-C2-N1	-3.71	123.63	128.67
34	B5	28	A2M	N3-C2-N1	-3.70	123.65	128.67
38	A1	1449	A2M	N3-C2-N1	-3.69	123.66	128.67
34	B5	796	A2M	N3-C2-N1	-3.68	123.68	128.67
38	A1	1133	A2M	N3-C2-N1	-3.68	123.68	128.67
34	B5	1280	4AC	N4-C4-N3	3.65	119.79	113.87
38	A1	2946	A2M	N3-C2-N1	-3.64	123.73	128.67
38	A1	649	A2M	N3-C2-N1	-3.62	123.75	128.67
34	B5	974	A2M	N3-C2-N1	-3.62	123.76	128.67
38	A1	2640	A2M	N3-C2-N1	-3.61	123.77	128.67
34	B5	420	A2M	N3-C2-N1	-3.57	123.83	128.67
34	B5	100	A2M	N3-C2-N1	-3.57	123.83	128.67
34	B5	436	A2M	N3-C2-N1	-3.54	123.87	128.67
34	B5	619	A2M	N3-C2-N1	-3.54	123.87	128.67
34	B5	541	A2M	N3-C2-N1	-3.49	123.93	128.67
38	A1	2634	UR3	C5-C4-N3	3.44	119.56	115.04
38	A1	807	A2M	N3-C2-N1	-3.38	124.08	128.67
38	A1	2347	OMU	O4-C4-C5	-3.18	119.68	125.16
38	A1	2724	OMU	O4-C4-C5	-3.16	119.70	125.16
38	A1	2278	5MC	C5-C6-N1	-3.15	119.90	123.31
34	B5	578	OMU	O4-C4-C5	-3.13	119.77	125.16
38	A1	898	OMU	O4-C4-C5	-3.12	119.78	125.16
38	A1	2921	OMU	O4-C4-C5	-3.12	119.78	125.16
38	A1	2417	OMU	O4-C4-C5	-3.06	119.88	125.16
38	A1	1888	OMU	O4-C4-C5	-3.03	119.93	125.16
38	A1	2729	OMU	O4-C4-C5	-2.99	120.01	125.16
34	B5	1269	OMU	O4-C4-C5	-2.99	120.01	125.16
34	B5	1575	7MG	C3'-C2'-C1'	2.97	107.08	101.46
38	A1	805	OMG	C8-N7-C5	2.94	107.56	102.55
38	A1	2421	OMU	O4-C4-C5	-2.94	120.09	125.16
38	A1	867	OMG	C8-N7-C5	2.92	107.52	102.55

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
34	B5	1191	XSX	C5-C4-N3	2.92	119.67	115.64
38	A1	2815	OMG	C8-N7-C5	2.88	107.46	102.55
38	A1	2619	OMG	C8-N7-C5	2.87	107.43	102.55
34	B5	1572	OMG	C8-N7-C5	2.86	107.43	102.55
38	A1	2793	OMG	C8-N7-C5	2.86	107.42	102.55
38	A1	2922	OMG	C8-N7-C5	2.86	107.41	102.55
34	B5	1773	4AC	CM7-C7-N4	2.84	119.86	115.27
34	B5	1271	OMG	C8-N7-C5	2.84	107.38	102.55
34	B5	1126	OMG	C8-N7-C5	2.84	107.38	102.55
34	B5	1428	OMG	C8-N7-C5	2.83	107.37	102.55
34	B5	562	OMG	C8-N7-C5	2.83	107.37	102.55
38	A1	2791	OMG	C8-N7-C5	2.83	107.36	102.55
38	A1	645	1MA	C8-N7-C5	2.82	107.36	102.55
38	A1	2870	5MC	C5-C4-N3	-2.82	118.86	121.75
38	A1	2347	OMU	C1'-N1-C2	2.81	122.65	117.59
34	B5	619	A2M	C4-C5-N7	-2.80	106.38	109.34
34	B5	100	A2M	C4-C5-N7	-2.78	106.40	109.34
38	A1	908	OMG	C8-N7-C5	2.76	107.25	102.55
38	A1	1450	OMG	C8-N7-C5	2.76	107.24	102.55
34	B5	1269	OMU	C1'-N1-C2	2.74	122.51	117.59
34	B5	1773	4AC	C5-C4-N3	-2.72	118.34	122.60
34	B5	796	A2M	C4-C5-N7	-2.72	106.46	109.34
38	A1	2278	5MC	C5-C4-N3	-2.72	118.97	121.75
38	A1	2288	OMG	C8-N7-C5	2.68	107.11	102.55
34	B5	420	A2M	C4-C5-N7	-2.67	106.52	109.34
38	A1	1133	A2M	C4-C5-N7	-2.63	106.55	109.34
34	B5	1575	7MG	C5-C6-N1	2.63	115.57	110.94
34	B5	1575	7MG	C6-C5-N7	2.62	136.00	131.93
38	A1	2946	A2M	C4-C5-N7	-2.61	106.58	109.34
34	B5	436	A2M	C4-C5-N7	-2.60	106.59	109.34
34	B5	28	A2M	C4-C5-N7	-2.59	106.60	109.34
38	A1	817	A2M	C4-C5-N7	-2.59	106.60	109.34
38	A1	2256	A2M	C4-C5-N7	-2.59	106.60	109.34
38	A1	2278	5MC	O2-C2-N3	-2.58	118.26	122.33
38	A1	2142	1MA	C8-N7-C5	2.58	106.94	102.55
80	DC	699	DDE	CAU-CBW-CBI	-2.56	106.21	111.22
38	A1	807	A2M	C4-C5-N7	-2.54	106.65	109.34
34	B5	1773	4AC	C1'-N1-C2	2.53	124.02	118.44
34	B5	796	A2M	C2'-C1'-N9	-2.52	106.95	112.56
38	A1	2724	OMU	C1'-N1-C2	2.51	122.11	117.59
38	A1	2280	A2M	C4-C5-N7	-2.50	106.69	109.34
38	A1	2640	A2M	C4-C5-N7	-2.49	106.70	109.34

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
38	A1	649	A2M	C4-C5-N7	-2.49	106.71	109.34
34	B5	974	A2M	C4-C5-N7	-2.49	106.71	109.34
38	A1	2142	1MA	C5-C6-N1	2.48	117.52	113.95
34	B5	1782	MA6	C4-C5-N7	-2.48	106.72	109.34
38	A1	807	A2M	O4'-C1'-N9	2.47	112.03	108.75
38	A1	1437	OMC	O2-C2-N3	-2.47	118.44	122.33
38	A1	1449	A2M	C4-C5-N7	-2.46	106.74	109.34
38	A1	2281	A2M	C4-C5-N7	-2.45	106.75	109.34
34	B5	1781	MA6	N1-C6-N6	2.45	119.66	116.83
34	B5	541	A2M	C4-C5-N7	-2.40	106.80	109.34
34	B5	1191	XSX	C1-N3-C4	2.39	121.72	117.10
38	A1	2417	OMU	O2-C2-N1	-2.38	119.69	122.80
38	A1	2220	A2M	C4-C5-N7	-2.37	106.84	109.34
34	B5	1782	MA6	N1-C6-N6	2.35	119.54	116.83
38	A1	1437	OMC	C1'-N1-C2	2.34	123.60	118.44
38	A1	876	A2M	C4-C5-N7	-2.33	106.88	109.34
34	B5	1280	4AC	C6-C5-C4	2.32	119.79	117.00
38	A1	645	1MA	C5-C6-N1	2.25	117.19	113.95
38	A1	2948	OMC	O2-C2-N3	-2.21	118.84	122.33
38	A1	2791	OMG	C5-C6-N1	2.20	118.26	114.07
38	A1	2946	A2M	O4'-C1'-N9	2.19	111.65	108.75
38	A1	2815	OMG	C5-C6-N1	2.19	118.25	114.07
38	A1	2729	OMU	C1'-N1-C2	2.17	121.49	117.59
38	A1	2921	OMU	O2-C2-N1	-2.17	119.98	122.80
38	A1	2288	OMG	C5-C6-N1	2.14	118.15	114.07
34	B5	578	OMU	O2-C2-N1	-2.12	120.04	122.80
38	A1	805	OMG	C5-C6-N1	2.11	118.10	114.07
34	B5	1126	OMG	C5-C6-N1	2.10	118.08	114.07
34	B5	1271	OMG	C5-C6-N1	2.09	118.06	114.07
34	B5	541	A2M	O4'-C1'-N9	2.09	111.52	108.75
38	A1	898	OMU	C1'-N1-C2	2.08	121.33	117.59
38	A1	650	OMC	O2-C2-N3	-2.08	119.06	122.33
38	A1	2793	OMG	C5-C6-N1	2.07	118.03	114.07
38	A1	867	OMG	C5-C6-N1	2.07	118.01	114.07
34	B5	1428	OMG	C5-C6-N1	2.06	118.00	114.07
38	A1	908	OMG	C5-C6-N1	2.06	118.00	114.07
34	B5	562	OMG	C5-C6-N1	2.05	117.99	114.07
38	A1	2922	OMG	C5-C6-N1	2.04	117.96	114.07
34	B5	1572	OMG	C5-C6-N1	2.04	117.96	114.07
38	A1	1450	OMG	C5-C6-N1	2.03	117.94	114.07
38	A1	1133	A2M	C2'-C1'-N9	-2.02	108.07	112.56
38	A1	2724	OMU	O2-C2-N1	-2.02	120.17	122.80

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
38	A1	2870	5MC	O2-C2-N3	-2.02	119.15	122.33
38	A1	2619	OMG	C5-C6-N1	2.01	117.91	114.07

There are no chirality outliers.

All (71) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
34	B5	420	A2M	C1'-C2'-O2'-CM'
34	B5	1782	MA6	O4'-C4'-C5'-O5'
34	B5	1782	MA6	C5-C6-N6-C9
36	AB	243	HIC	CA-CB-CG-ND1
36	AB	243	HIC	CA-CB-CG-CD2
80	DC	699	DDE	CA-CB-CG-ND1
80	DC	699	DDE	CA-CB-CG-CD2
34	B5	1280	4AC	N3-C4-N4-C7
34	B5	1280	4AC	C5-C4-N4-C7
34	B5	1773	4AC	N3-C4-N4-C7
34	B5	1773	4AC	C5-C4-N4-C7
34	B5	1773	4AC	O7-C7-N4-C4
34	B5	1773	4AC	CM7-C7-N4-C4
38	A1	1437	OMC	C1'-C2'-O2'-CM2
38	A1	2197	OMC	C2'-C1'-N1-C2
38	A1	2197	OMC	C2'-C1'-N1-C6
38	A1	2724	OMU	C1'-C2'-O2'-CM2
38	A1	2729	OMU	C3'-C4'-C5'-O5'
34	B5	1782	MA6	C3'-C4'-C5'-O5'
38	A1	2197	OMC	O4'-C4'-C5'-O5'
34	B5	619	A2M	O4'-C4'-C5'-O5'
38	A1	1437	OMC	O4'-C4'-C5'-O5'
38	A1	2197	OMC	C3'-C4'-C5'-O5'
38	A1	2347	OMU	C3'-C4'-C5'-O5'
38	A1	2729	OMU	O4'-C4'-C5'-O5'
34	B5	1191	XSX	N4-C7-C9-O10
34	B5	1782	MA6	N1-C6-N6-C9
34	B5	541	A2M	C3'-C4'-C5'-O5'
34	B5	541	A2M	O4'-C4'-C5'-O5'
34	B5	619	A2M	C3'-C4'-C5'-O5'
38	A1	1437	OMC	C3'-C4'-C5'-O5'
38	A1	2870	5MC	C2'-C1'-N1-C6
34	B5	1428	OMG	O4'-C4'-C5'-O5'
80	DC	699	DDE	N-CA-CB-CG
38	A1	2347	OMU	O4'-C4'-C5'-O5'

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms
34	B5	1191	XSX	N4-C7-C9-O11
80	DC	699	DDE	NAD-CBI-CBW-NCB
34	B5	1269	OMU	O4'-C1'-N1-C6
38	A1	2280	A2M	C3'-C4'-C5'-O5'
38	A1	2870	5MC	O4'-C1'-N1-C6
34	B5	1781	MA6	C5-C6-N6-C10
34	B5	541	A2M	C4'-C5'-O5'-P
38	A1	817	A2M	C4'-C5'-O5'-P
38	A1	2280	A2M	O4'-C4'-C5'-O5'
38	A1	2281	A2M	O4'-C4'-C5'-O5'
38	A1	807	A2M	C3'-C2'-O2'-CM'
34	B5	1269	OMU	O4'-C1'-N1-C2
34	B5	1126	OMG	C3'-C4'-C5'-O5'
80	DC	699	DDE	CAT-CAU-CBW-CBI
38	A1	649	A2M	C4'-C5'-O5'-P
38	A1	2870	5MC	O4'-C1'-N1-C2
38	A1	2197	OMC	O4'-C1'-N1-C6
38	A1	2922	OMG	C3'-C2'-O2'-CM2
34	B5	1126	OMG	C4'-C5'-O5'-P
38	A1	2870	5MC	C2'-C1'-N1-C2
34	B5	1428	OMG	C4'-C5'-O5'-P
34	B5	1782	MA6	C4'-C5'-O5'-P
34	B5	1428	OMG	C1'-C2'-O2'-CM2
38	A1	2619	OMG	C1'-C2'-O2'-CM2
38	A1	2922	OMG	C1'-C2'-O2'-CM2
38	A1	867	OMG	O4'-C4'-C5'-O5'
38	A1	2142	1MA	O4'-C4'-C5'-O5'
34	B5	1191	XSX	C3-C7-C9-O11
38	A1	2256	A2M	C4'-C5'-O5'-P
38	A1	2197	OMC	O4'-C1'-N1-C2
38	A1	2281	A2M	C3'-C4'-C5'-O5'
34	B5	100	A2M	O4'-C4'-C5'-O5'
38	A1	1437	OMC	C2'-C1'-N1-C2
34	B5	1269	OMU	C4'-C5'-O5'-P
34	B5	1781	MA6	N1-C6-N6-C9
34	B5	1269	OMU	C2'-C1'-N1-C2

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 256 ligands modelled in this entry, 255 are monoatomic - leaving 1 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$
85	GDP	DC	901	-	25,30,30	0.97	1 (4%)	30,47,47	1.07	2 (6%)

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
85	GDP	DC	901	-	-	2/12/32/32	0/3/3/3

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
85	DC	901	GDP	C6-N1	-2.39	1.34	1.37

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
85	DC	901	GDP	C8-N7-C5	2.78	107.28	102.55
85	DC	901	GDP	C5-C6-N1	2.12	118.11	114.07

There are no chirality outliers.

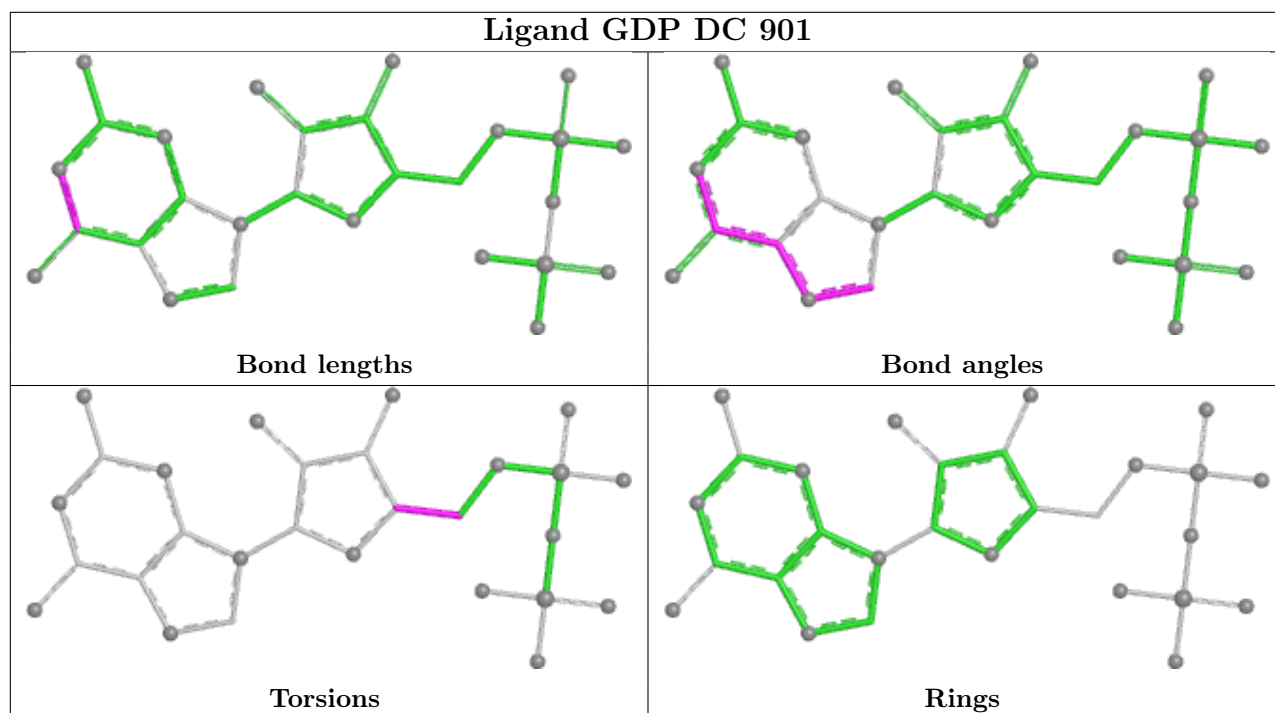
All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
85	DC	901	GDP	C3'-C4'-C5'-O5'
85	DC	901	GDP	O4'-C4'-C5'-O5'

There are no ring outliers.

No monomer is involved in short contacts.

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



## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues

The following chains have linkage breaks:

Mol	Chain	Number of breaks
38	A1	3

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A1	1955:U	O3'	2093:A	P	21.31
1	A1	1023:C	O3'	1030:A	P	14.80
1	A1	440:A	O3'	494:G	P	8.27

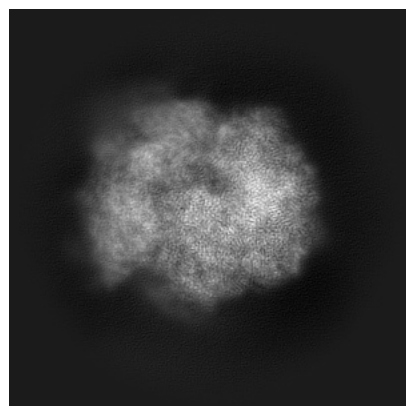
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-28635. These allow visual inspection of the internal detail of the map and identification of artifacts.

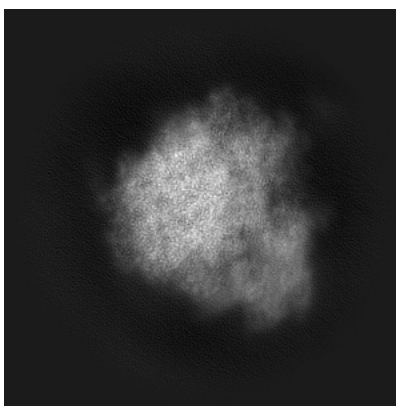
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

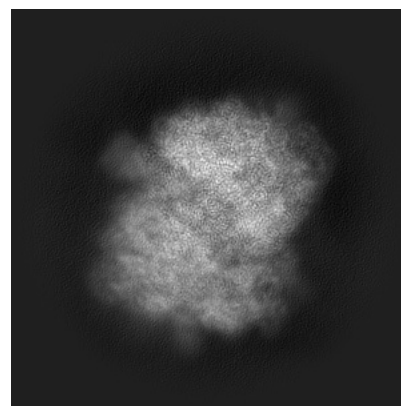
#### 6.1.1 Primary map



X

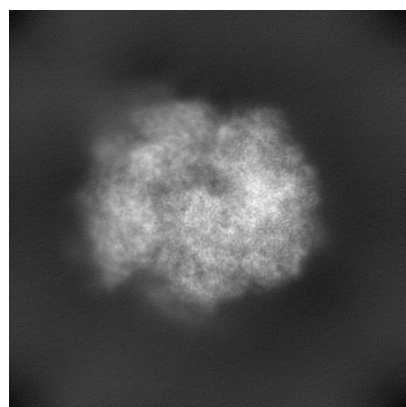


Y

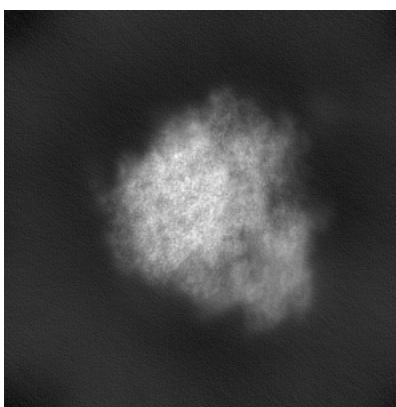


Z

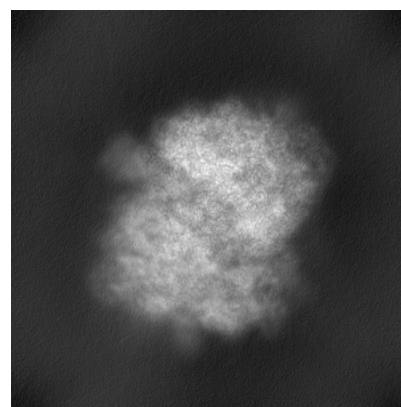
#### 6.1.2 Raw map



X



Y

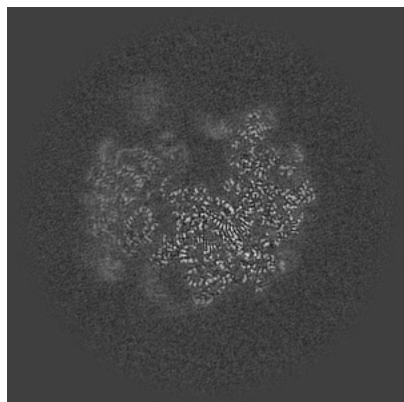


Z

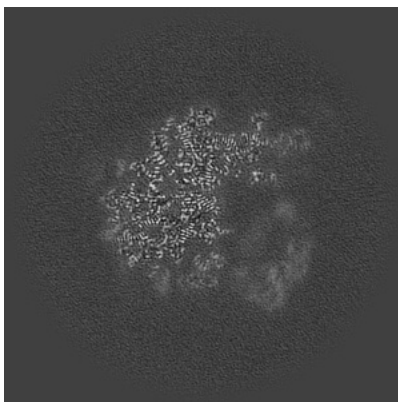
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

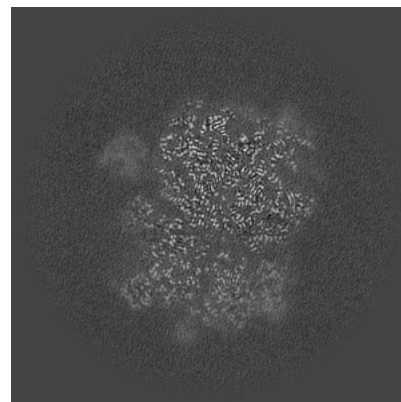
### 6.2.1 Primary map



X Index: 200

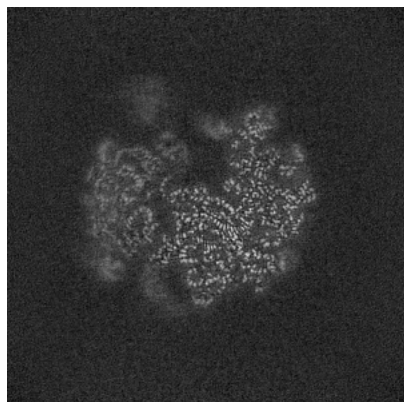


Y Index: 200

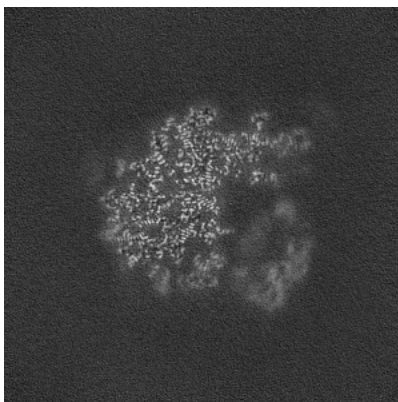


Z Index: 200

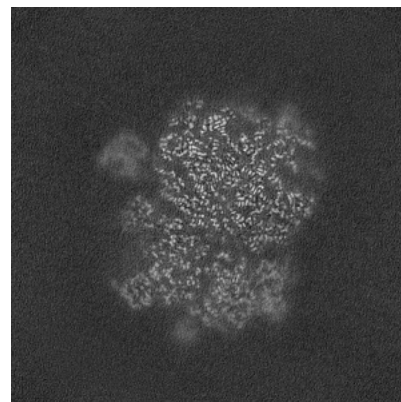
### 6.2.2 Raw map



X Index: 200



Y Index: 200

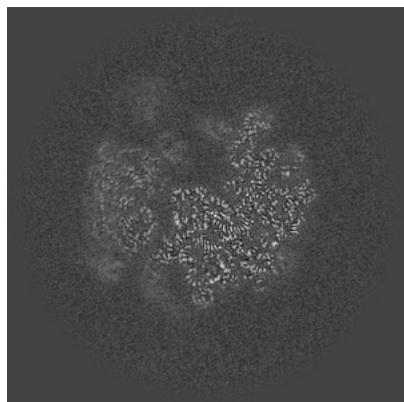


Z Index: 200

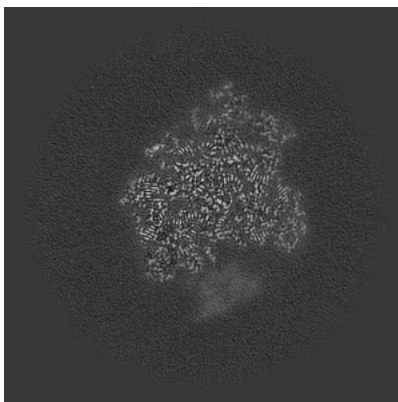
The images above show central slices of the map in three orthogonal directions.

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

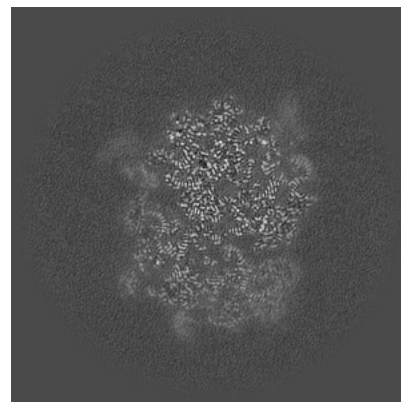
### 6.3.1 Primary map



X Index: 201

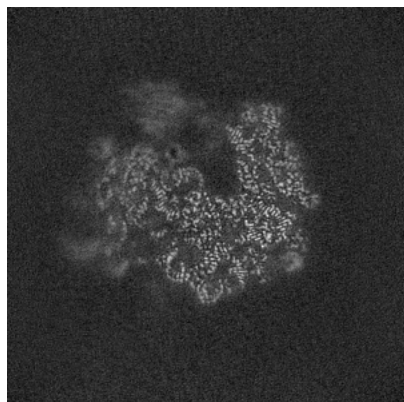


Y Index: 246

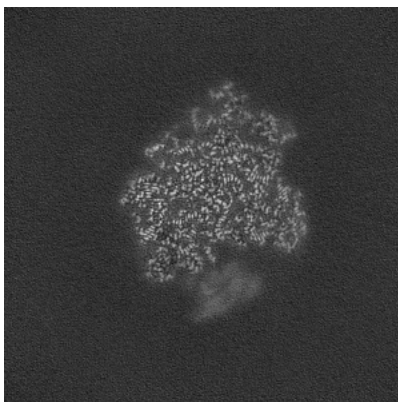


Z Index: 190

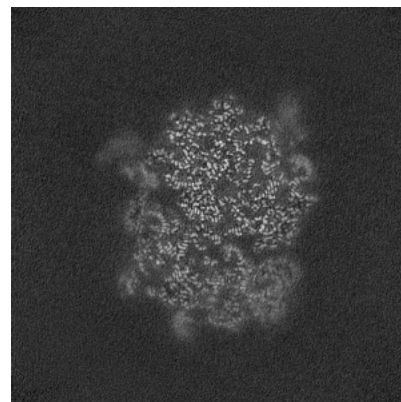
### 6.3.2 Raw map



X Index: 186



Y Index: 246

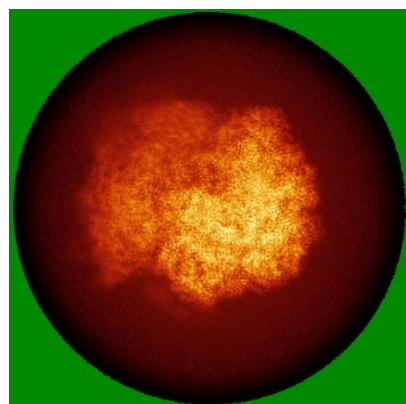


Z Index: 190

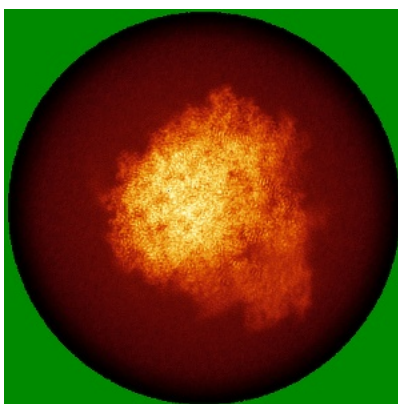
The images above show the largest variance slices of the map in three orthogonal directions.

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

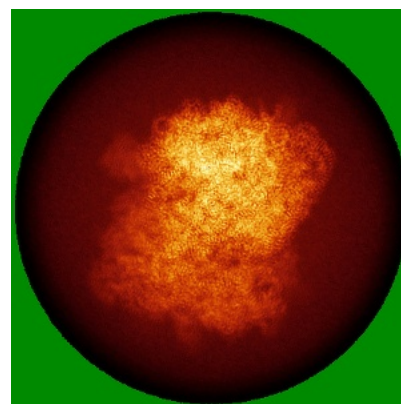
### 6.4.1 Primary map



X

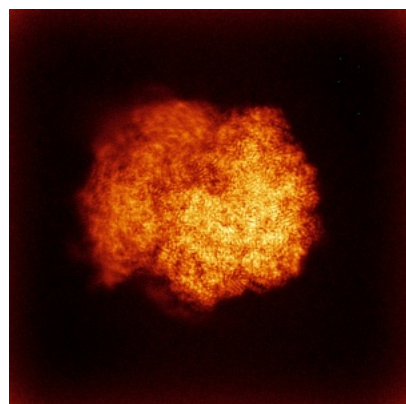


Y

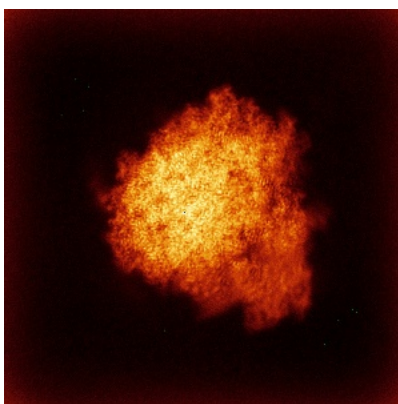


Z

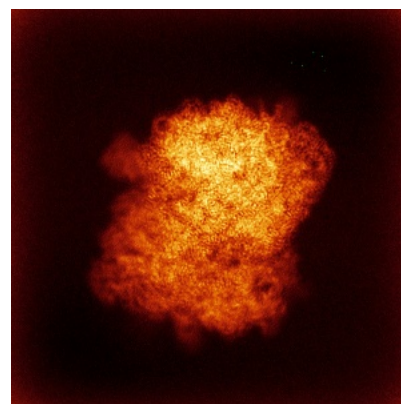
### 6.4.2 Raw map



X



Y



Z

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

## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.6. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2 Raw map



X



Y



Z

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

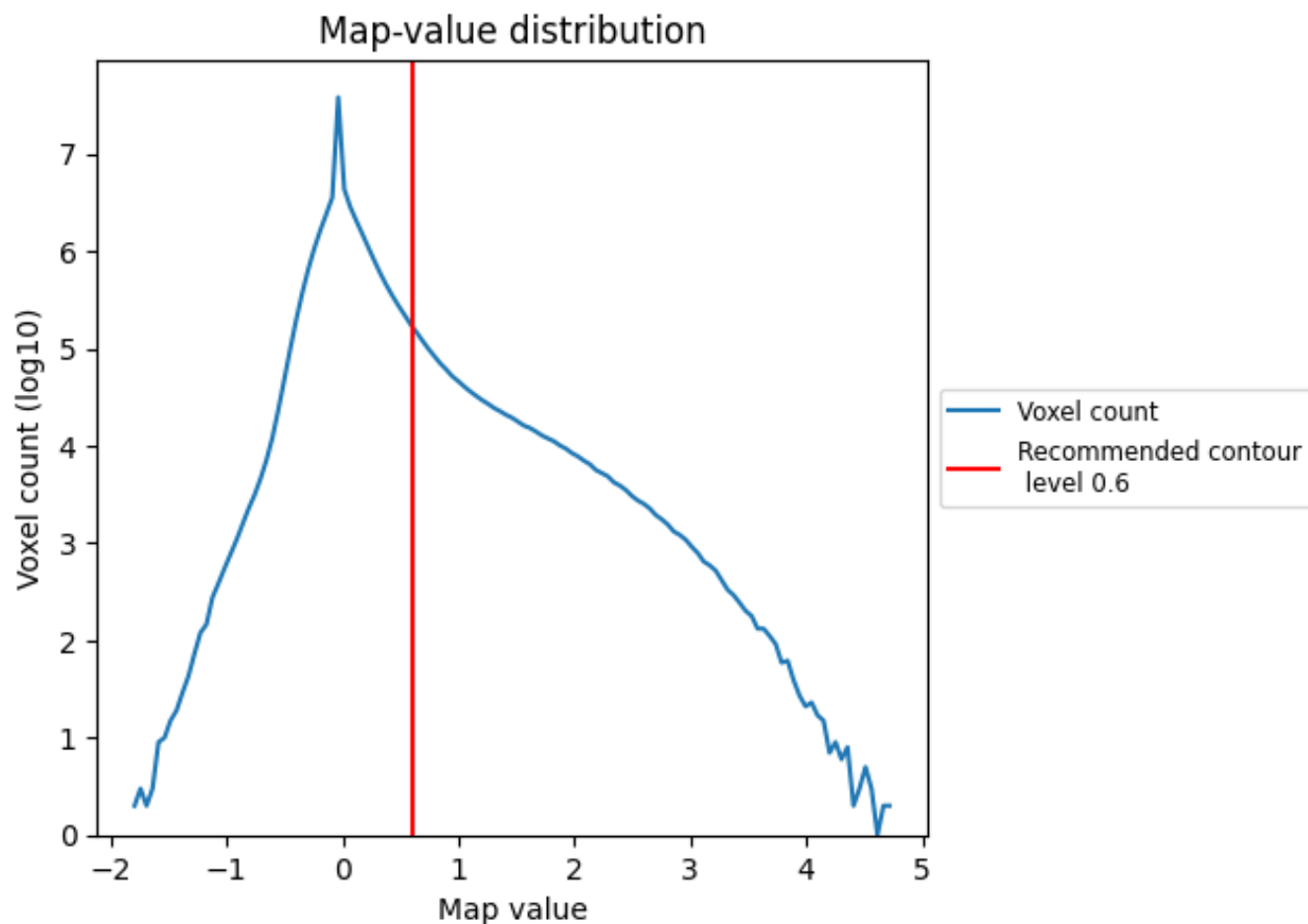
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

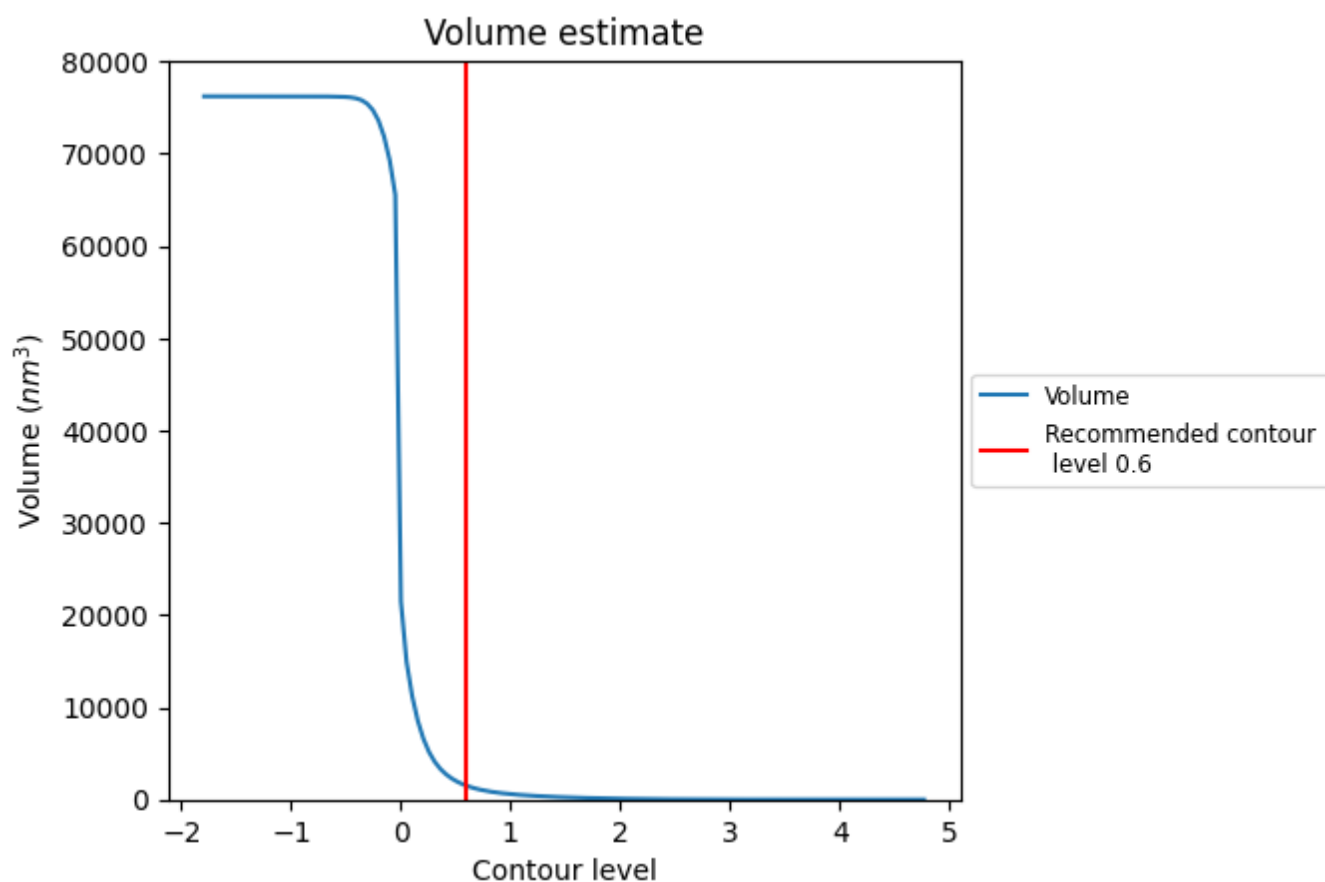
This section contains the results of statistical analysis of the map.

### 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.

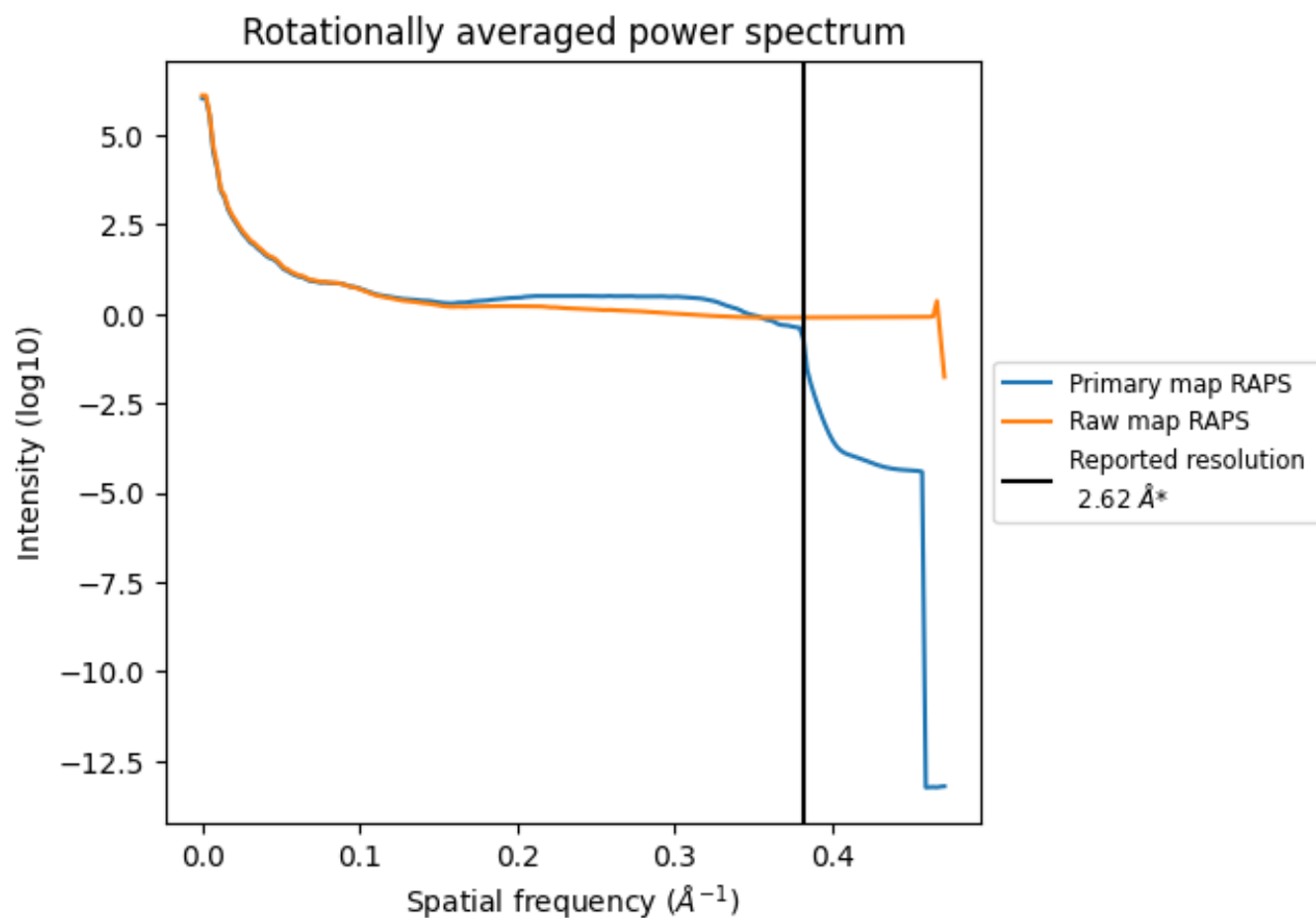
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1503 nm<sup>3</sup>; this corresponds to an approximate mass of 1358 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

### 7.3 Rotationally averaged power spectrum ⓘ

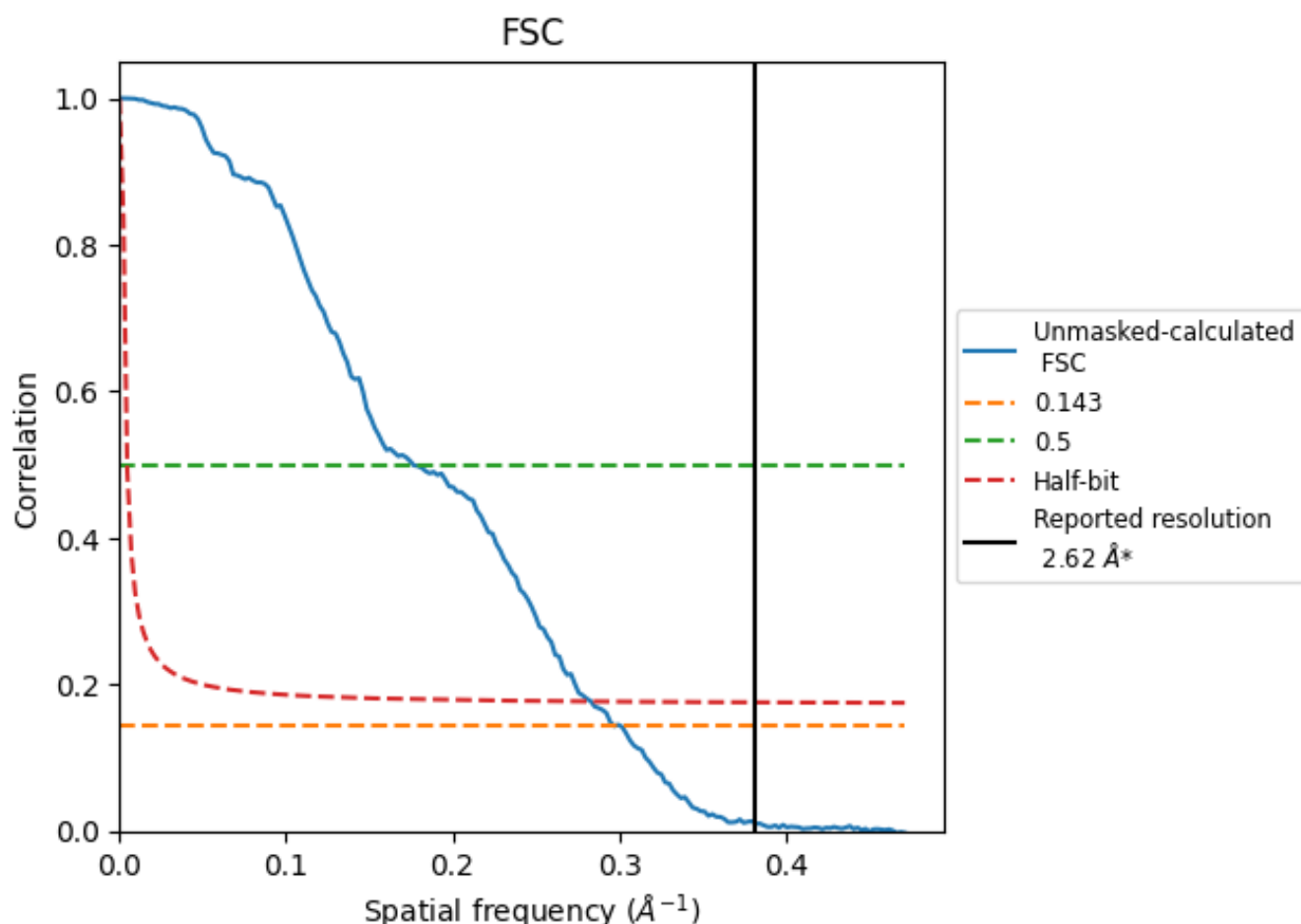


\*Reported resolution corresponds to spatial frequency of 0.382  $\text{\AA}^{-1}$

## 8 Fourier-Shell correlation [i](#)

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

### 8.1 FSC [i](#)



\*Reported resolution corresponds to spatial frequency of 0.382 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

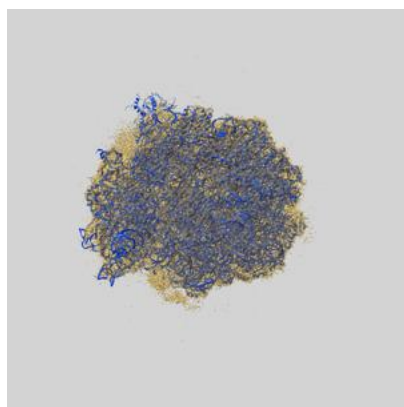
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.62	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.37	5.67	3.53

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.37 differs from the reported value 2.62 by more than 10 %

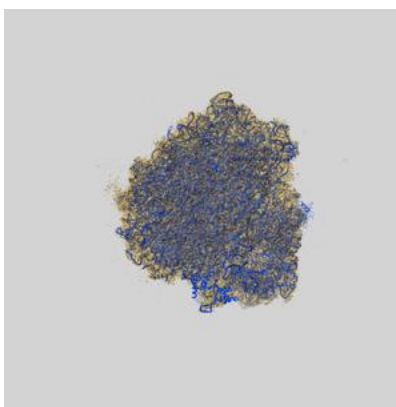
## 9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-28635 and PDB model 8EVS. Per-residue inclusion information can be found in [section 3](#) on [page 20](#).

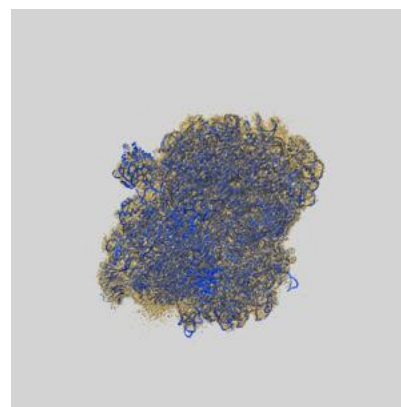
### 9.1 Map-model overlay [i](#)



X



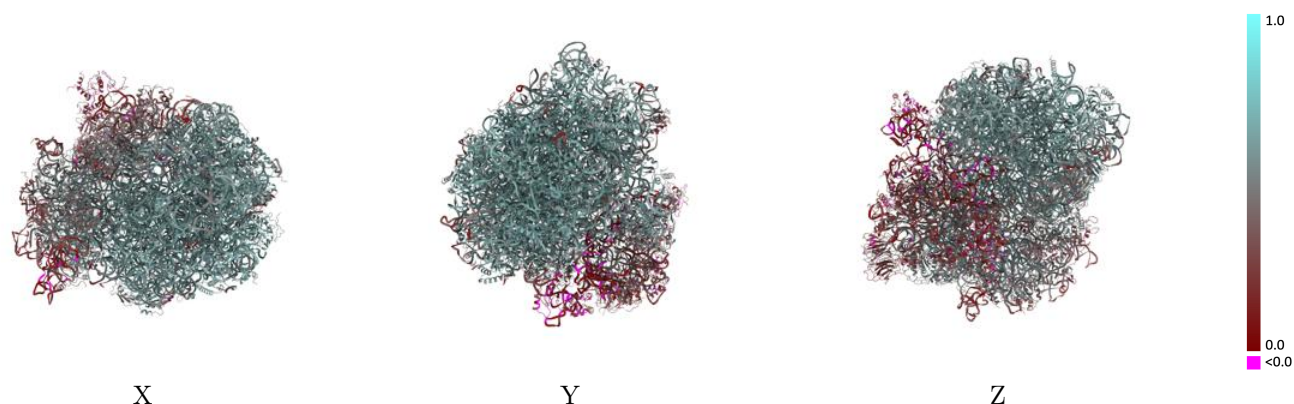
Y



Z

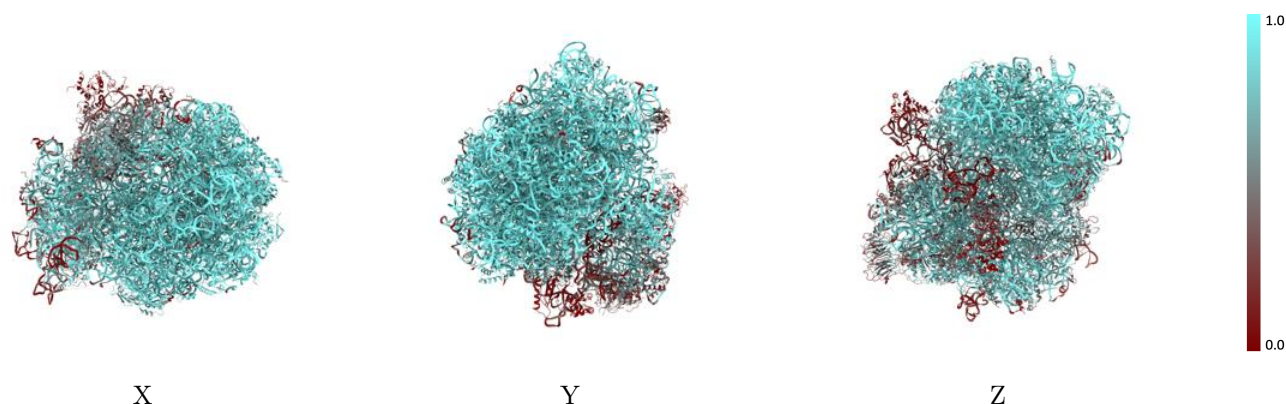
The images above show the 3D surface view of the map at the recommended contour level 0.6 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



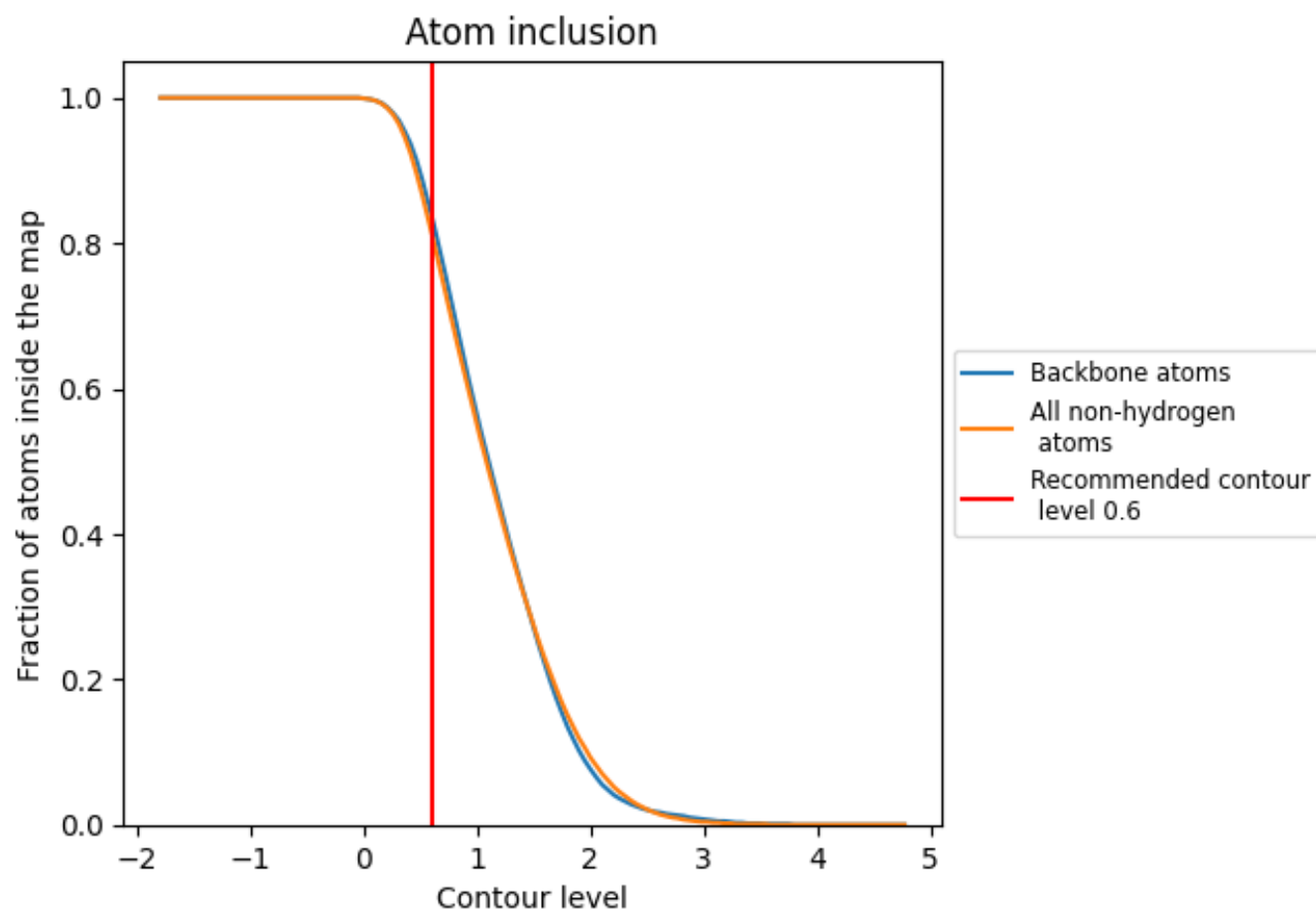
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.6).







































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 84% of all backbone atoms, 81% 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 (0.6) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8130	 0.5130
A1	 0.9460	 0.5920
A3	 0.9710	 0.5900
A4	 0.9760	 0.6190
AA	 0.9700	 0.6370
AB	 0.9230	 0.6040
AC	 0.9420	 0.6150
AD	 0.8400	 0.5450
AE	 0.8730	 0.5700
AF	 0.9390	 0.6140
AG	 0.8730	 0.5680
AH	 0.8550	 0.5650
AI	 0.8890	 0.5890
AJ	 0.6580	 0.4550
AL	 0.9280	 0.6040
AM	 0.8890	 0.5660
AN	 0.9770	 0.6370
AO	 0.9350	 0.6090
AP	 0.9400	 0.6210
AQ	 0.9630	 0.6280
AR	 0.8340	 0.5590
AS	 0.9140	 0.5900
AT	 0.9030	 0.5920
AU	 0.7970	 0.5230
AV	 0.9060	 0.6080
AW	 0.9210	 0.6070
AX	 0.9280	 0.6070
AY	 0.9260	 0.6020
AZ	 0.8940	 0.5790
Aa	 0.9520	 0.6190
Ab	 0.8940	 0.5640
Ac	 0.8910	 0.5940
Ad	 0.8670	 0.5840
Ae	 0.9660	 0.6310
Af	 0.9780	 0.6280















*Continued on next page...*

*Continued from previous page...*

Chain	Atom inclusion	Q-score
Ag	 0.9220	 0.6100
Ah	 0.9260	 0.6040
Ai	 0.8890	 0.5670
Aj	 0.9760	 0.6380
Ak	 0.7810	 0.5290
Al	 0.9590	 0.6240
Am	 0.8780	 0.5830
An	 0.8680	 0.5690
Ao	 0.8930	 0.6040
Ap	 0.9180	 0.6090
B5	 0.8050	 0.4460
BA	 0.7880	 0.5070
BB	 0.7310	 0.5050
BC	 0.8360	 0.5350
BD	 0.4400	 0.2910
BE	 0.7690	 0.4920
BF	 0.4750	 0.3080
BG	 0.5900	 0.3950
BH	 0.6130	 0.4340
BI	 0.8120	 0.5220
BJ	 0.7340	 0.4680
BK	 0.3010	 0.2230
BL	 0.7730	 0.5290
BM	 0.0110	 0.1630
BN	 0.8530	 0.5590
BO	 0.8220	 0.5330
BP	 0.2240	 0.2340
BQ	 0.5920	 0.3400
BR	 0.5680	 0.3590
BS	 0.3000	 0.2430
BT	 0.4390	 0.2700
BU	 0.4810	 0.3050
BV	 0.7790	 0.5190
BW	 0.8960	 0.5730
BX	 0.8200	 0.5410
BY	 0.6040	 0.4150
BZ	 0.3040	 0.2360
Ba	 0.8280	 0.5410
Bb	 0.7550	 0.5140
Bc	 0.5010	 0.3790
Bd	 0.6290	 0.3250
Be	 0.5930	 0.4300

*Continued on next page...*

*Continued from previous page...*

Chain	Atom inclusion	Q-score
Bf	 0.0440	 0.1900
Bg	 0.4350	 0.2770
DC	 0.5070	 0.3800
E	 0.0790	 0.1620
EC	 0.1610	 0.1170
V	 0.4090	 0.3880