



## wwPDB EM Validation Summary Report ⓘ

Feb 13, 2024 – 02:35 PM EST

PDB ID : 3JA1  
EMDB ID : EMD-6316  
Title : Activation of GTP Hydrolysis in mRNA-tRNA Translocation by Elongation Factor G  
Authors : Li, W.; Liu, Z.; Koripella, R.K.; Langlois, R.; Sanyal, S.; Frank, J.  
Deposited on : 2015-03-30  
Resolution : 3.60 Å(reported)  
Based on initial model : 3J0U

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

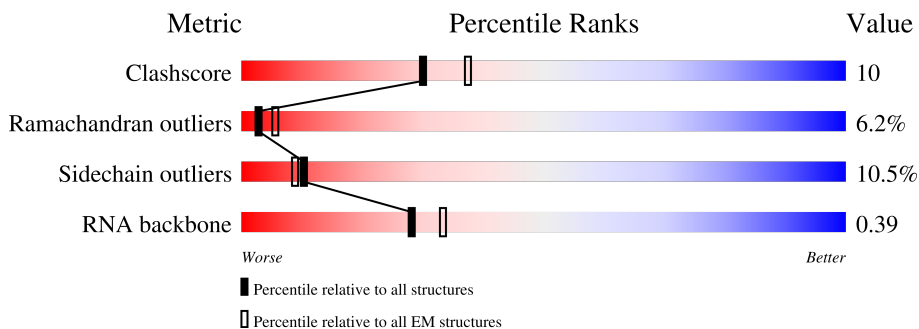
EMDB validation analysis : 0.0.1.dev70  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

# 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 3.60 Å.

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



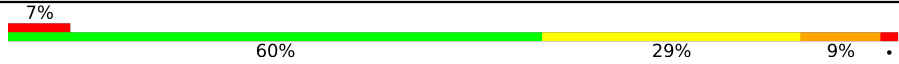

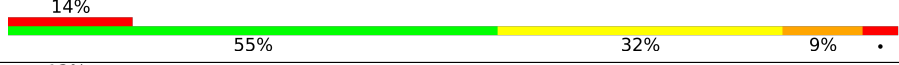

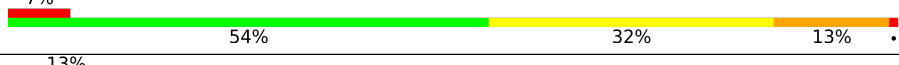
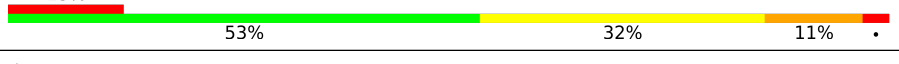
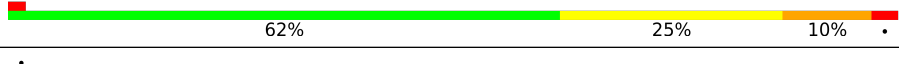

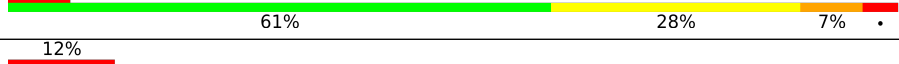



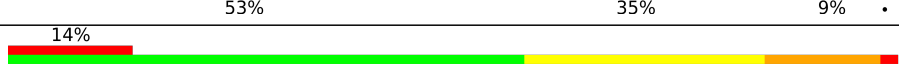


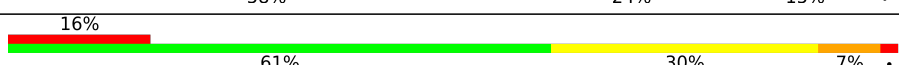


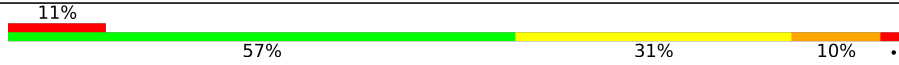


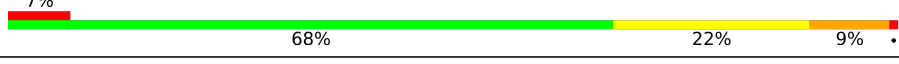
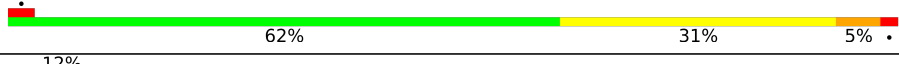


Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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	SS	91	
2	SA	1542	
3	S1	47	
4	S2	77	
5	ST	86	
6	SU	70	
7	SG	178	

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Mol	Chain	Length	Quality of chain
8	SH	129	
9	SI	129	
10	SJ	103	
11	SK	128	
12	SL	123	
13	SM	117	
14	SN	100	
15	SO	88	
16	SP	82	
17	SQ	83	
18	SB	240	
19	SC	232	
20	SD	205	
21	SE	166	
22	SF	135	
23	SR	74	
24	S3	702	
25	LB	120	
26	LA	2904	
27	LD	272	
28	LU	110	
29	LV	100	
30	LW	103	
31	LX	94	
32	LY	84	

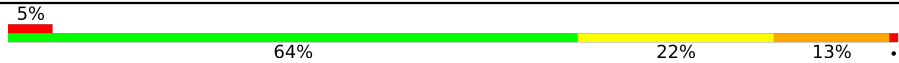
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Mol	Chain	Length	Quality of chain
33	LZ	77	5% 58% 31% 6% .
34	L0	63	19% 52% 41% 5% .
35	L1	58	5% 52% 38% 7% .
36	L2	70	21% 56% 31% 6% 7%
37	LC	234	35% 60% 29% 9% .
38	LE	209	8% 53% 33% 12% .
39	L3	56	5% 57% 25% 16% .
40	L4	54	6% 63% 30% . .
41	L5	46	7% 46% 37% 11% 7%
42	L6	64	6% 73% 20% 6%
43	L7	38	63% 26% 5% 5%
44	LF	201	9% 62% 29% 7% .
45	LG	178	7% 52% 33% 12% .
46	LH	176	6% 59% 30% 7% 5%
47	LJ	164	54% 65% 26% 7% .
48	LN	144	. 62% 28% 6% .
49	LK	141	27% 61% 30% 8% .
50	LL	142	. 60% 32% 8% .
51	LI	149	75% 62% 32% 6% .
52	LO	136	. 61% 29% 8% .
53	LP	127	8% 54% 34% 10% .
54	LM	123	19% 62% 30% 7% .
55	LQ	117	. 59% 28% 9% .
56	LR	114	19% 53% 32% 13% .
57	LS	117	. 54% 29% 14% .

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Mol	Chain	Length	Quality of chain
58	LT	103	 <p>5% 64% 22% 13%</p>

## 2 Entry composition

There are 59 unique types of molecules in this entry. The entry contains 156127 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 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	SS	91	727	464	139	122	2	0	0

- Molecule 2 is a RNA chain called 16S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	SA	1542	33076	14754	6064	10717	1541	0	0

- Molecule 3 is a RNA chain called mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
3	S1	47	993	445	167	335	46	0	0

- Molecule 4 is a RNA chain called P/E-tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
4	S2	77	1639	732	297	534	76	0	0

- Molecule 5 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	ST	86	670	414	138	115	3	0	0

- Molecule 6 is a protein called 30S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	SU	70	590	366	125	98	1	0	0

- Molecule 7 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	SG	178	1400	874	269	253	4	0	0

- Molecule 8 is a protein called 30S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	SH	129	979	616	173	184	6	0	0

- Molecule 9 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	SI	129	1036	642	208	183	3	0	0

- Molecule 10 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	SJ	103	825	514	158	151	2	0	0

- Molecule 11 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	SK	128	965	595	196	171	3	0	0

- Molecule 12 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	SL	123	955	590	196	165	4	0	0

- Molecule 13 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	SM	117	910	564	183	160	3	0	0

- Molecule 14 is a protein called 30S ribosomal protein S14.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	SN	100	Total	C	N	O	S	0	0
			805	499	164	139	3		

- Molecule 15 is a protein called 30S ribosomal protein S15.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	SO	88	Total	C	N	O	S	0	0
			716	440	146	129	1		

- Molecule 16 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	SP	82	Total	C	N	O	S	0	0
			649	406	128	114	1		

- Molecule 17 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	SQ	83	Total	C	N	O	S	0	0
			672	425	124	120	3		

- Molecule 18 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	SB	240	Total	C	N	O	S	0	0
			1872	1180	332	352	8		

- Molecule 19 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	SC	232	Total	C	N	O	S	0	0
			1822	1149	346	323	4		

- Molecule 20 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	SD	205	Total	C	N	O	S	0	0
			1643	1026	315	298	4		

- Molecule 21 is a protein called 30S ribosomal protein S5.



Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	SE	166	1225	761	232	226	6	0	0

- Molecule 22 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
22	SF	135	1101	677	198	219	7	0	0

- Molecule 23 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
23	SR	74	626	395	123	107	1	0	0

- Molecule 24 is a protein called Elongation factor G.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
24	S3	702	5431	3420	938	1048	25	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
S3	91	ALA	HIS	engineered mutation	UNP P0A6M8

- Molecule 25 is a RNA chain called 5S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
25	LB	120	2566	1144	468	835	119	0	0

- Molecule 26 is a RNA chain called 23S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
26	LA	2904	62330	27807	11462	20158	2903	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
LA	1618	C	A	conflict	GB 33357927

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Chain	Residue	Modelled	Actual	Comment	Reference
LA	1915	C	U	conflict	GB 33357927
LA	2030	U	A	conflict	GB 33357927
LA	2251	U	G	conflict	GB 33357927

- Molecule 27 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
27	LD	272	Total	C	N	O	S	0	0
			2092	1294	425	366	7		

- Molecule 28 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
28	LU	110	Total	C	N	O	S	0	0
			857	532	166	156	3		

- Molecule 29 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
29	LV	100	Total	C	N	O	S	0	0
			787	496	146	143	2		

- Molecule 30 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
30	LW	103	Total	C	N	O	0	0
			789	498	148	143		

- Molecule 31 is a protein called 50S ribosomal protein L25.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
31	LX	94	Total	C	N	O	S	0	0
			753	479	137	134	3		

- Molecule 32 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
32	LY	84	Total	C	N	O	S	0	0
			634	391	129	113	1		

- Molecule 33 is a protein called 50S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	LZ	77	Total	C	N	O	S	0	0
			625	388	129	106	2		

- Molecule 34 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	L0	63	Total	C	N	O	S	0	0
			509	313	99	95	2		

- Molecule 35 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	L1	58	Total	C	N	O	S	0	0
			449	281	87	79	2		

- Molecule 36 is a protein called 50S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	L2	70	Total	C	N	O	S	0	0
			549	339	104	100	6		

- Molecule 37 is a protein called 50S ribosomal protein L1.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	LC	234	Total	C	N	O	S	0	0
			1733	1081	315	330	7		

- Molecule 38 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	LE	209	Total	C	N	O	S	0	0
			1565	979	288	294	4		

- Molecule 39 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	L3	56	Total	C	N	O	S	0	0
			444	269	94	80	1		

- Molecule 40 is a protein called 50S ribosomal protein L33.

Mol	Chain	Residues	Atoms				AltConf	Trace
40	L4	54	Total	C	N	O	0	0
			441	284	81	76		

- Molecule 41 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	L5	46	Total	C	N	O	S	0	0
			377	228	90	57	2		

- Molecule 42 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	L6	64	Total	C	N	O	S	0	0
			504	323	105	74	2		

- Molecule 43 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	L7	38	Total	C	N	O	S	0	0
			302	185	65	48	4		

- Molecule 44 is a protein called 50S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	LF	201	Total	C	N	O	S	0	0
			1552	974	283	290	5		

- Molecule 45 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	LG	178	Total	C	N	O	S	0	0
			1420	905	251	258	6		

- Molecule 46 is a protein called 50S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	LH	176	Total	C	N	O	S	0	0
			1323	832	243	246	2		

- Molecule 47 is a protein called 50S ribosomal protein L10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
47	LJ	164	1233	776	220	231	6	0	0

- Molecule 48 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
48	LN	144	1053	654	207	190	2	0	0

- Molecule 49 is a protein called 50S ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
49	LK	141	1032	651	179	196	6	0	0

- Molecule 50 is a protein called 50S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
50	LL	142	1129	714	212	199	4	0	0

- Molecule 51 is a protein called 50S ribosomal protein L9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
51	LI	149	1111	699	197	214	1	0	0

- Molecule 52 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
52	LO	136	1074	686	205	177	6	0	0

- Molecule 53 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
53	LP	127	1008	621	204	178	5	0	0

- Molecule 54 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
54	LM	123	Total	C	N	O	S	0	0
			947	593	181	167	6		

- Molecule 55 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms					AltConf	Trace
55	LQ	117	Total	C	N	O	S	0	0
			900	557	179	163	1		

- Molecule 56 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
56	LR	114	Total	C	N	O	S	0	0
			917	574	179	163	1		

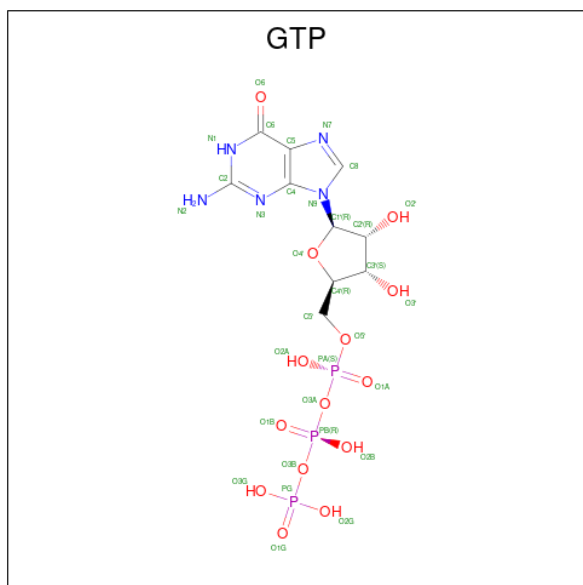
- Molecule 57 is a protein called 50S ribosomal protein L20.

Mol	Chain	Residues	Atoms				AltConf	Trace
57	LS	117	Total	C	N	O	0	0
			947	604	192	151		

- Molecule 58 is a protein called 50S ribosomal protein L21.

Mol	Chain	Residues	Atoms					AltConf	Trace
58	LT	103	Total	C	N	O	S	0	0
			816	516	153	145	2		

- Molecule 59 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula:  $C_{10}H_{16}N_5O_{14}P_3$ ).

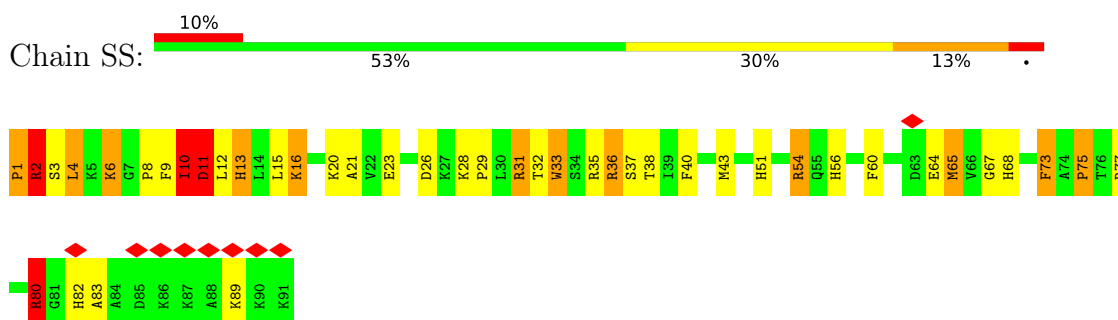


Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
59	S3	1	32	10	5	14	3	0

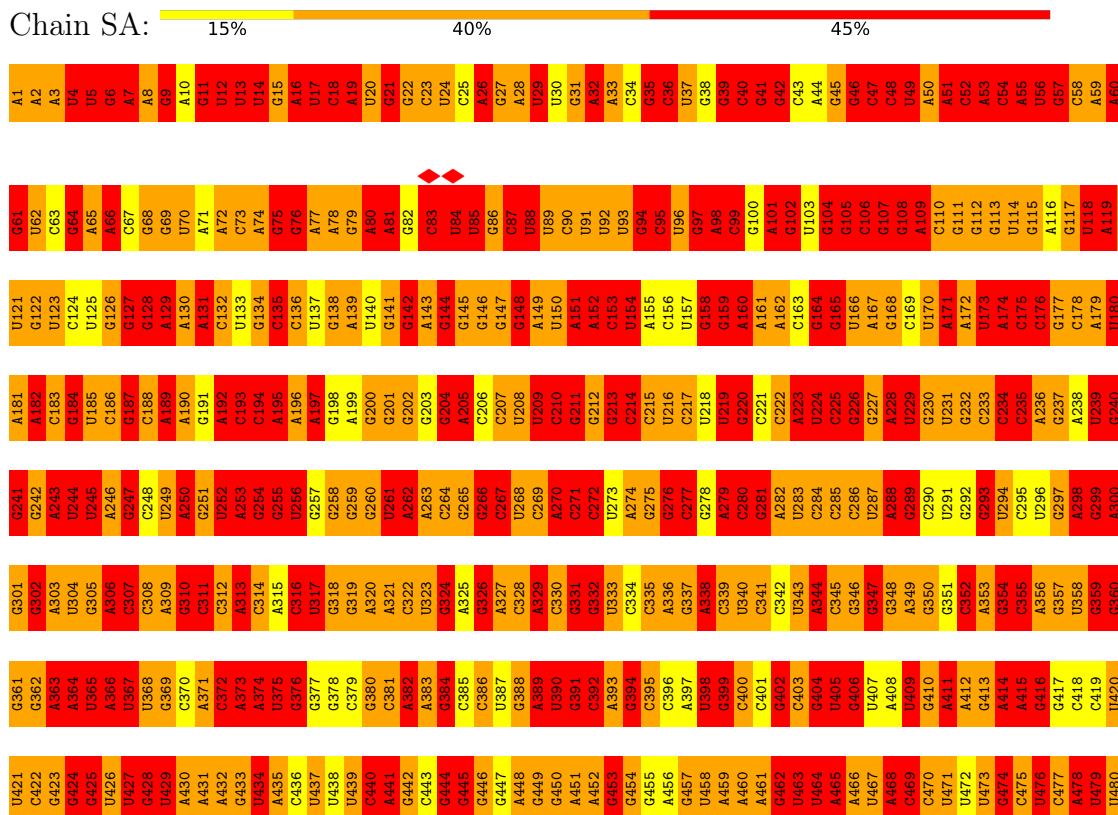
### 3 Residue-property plots

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: 30S ribosomal protein S19



- Molecule 2: 16S ribosomal RNA





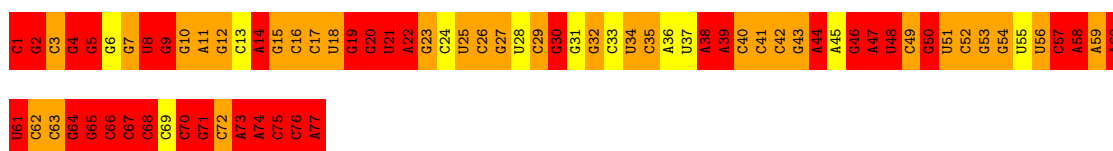
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G1442	A452
C1443	C483
U1444	G484
U1445	U485
A1446	U486
A1447	A487
C1448	C488
C1449	C489
U1450	C490
U1451	G491
C1452	A492
G1453	A493
G1454	G494
G1455	A495
A1456	A496
G1457	G497
G1458	A498
G1459	A499
C1460	G500
C1461	C501
C1462	A502
U1463	C503
U1464	C504
A1465	G505
C1466	G506
C1467	C507
A1468	U508
C1469	A509
U1470	G510
C1471	C511
C1472	U512
G1473	C513
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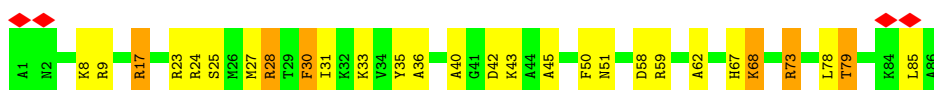
• Molecule 3: mRNA



• Molecule 4: P/E-tRNA



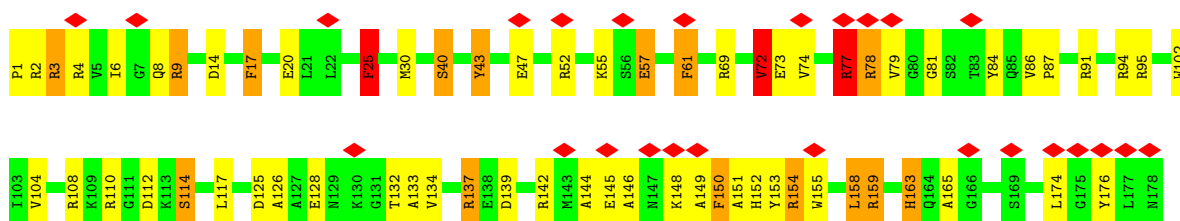
• Molecule 5: 30S ribosomal protein S20



• Molecule 6: 30S ribosomal protein S21

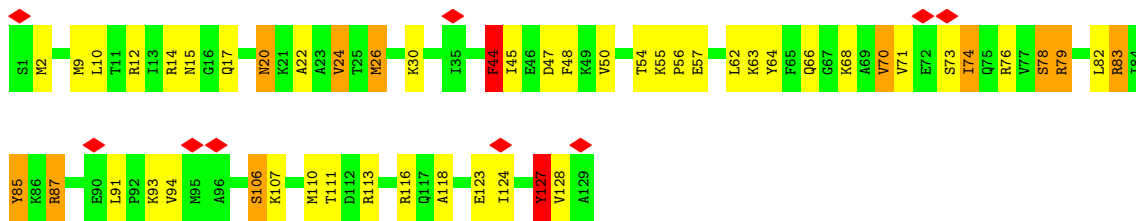


• Molecule 7: 30S ribosomal protein S7

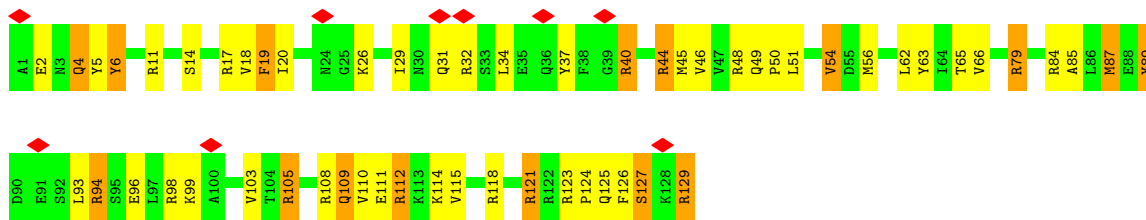


• Molecule 8: 30S ribosomal protein S8

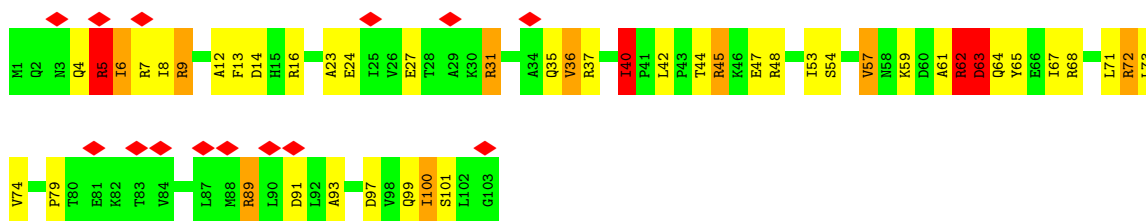




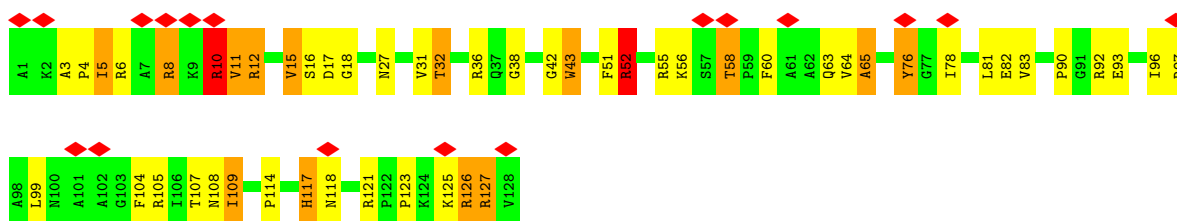
• Molecule 9: 30S ribosomal protein S9



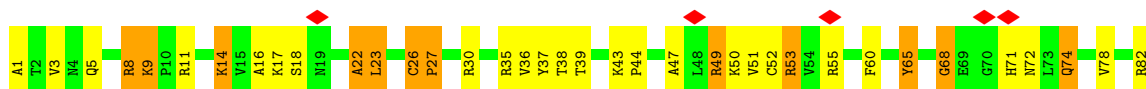
• Molecule 10: 30S ribosomal protein S10

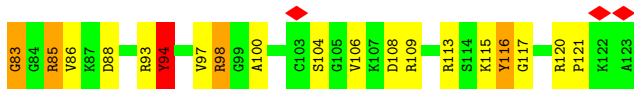


• Molecule 11: 30S ribosomal protein S11

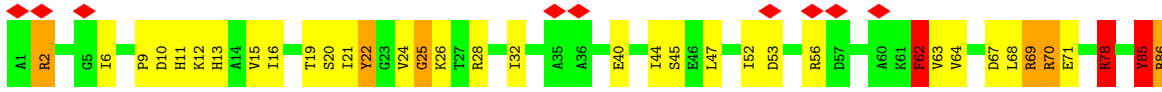


• Molecule 12: 30S ribosomal protein S12

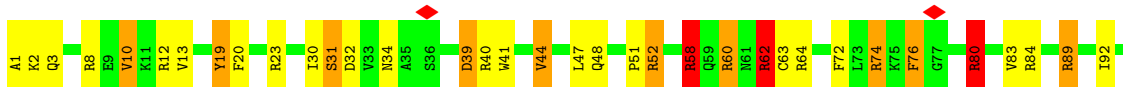




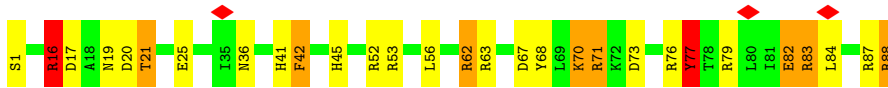
- Molecule 13: 30S ribosomal protein S13



- Molecule 14: 30S ribosomal protein S14



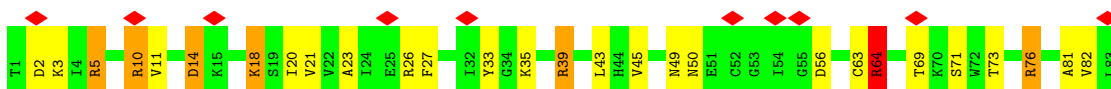
- Molecule 15: 30S ribosomal protein S15



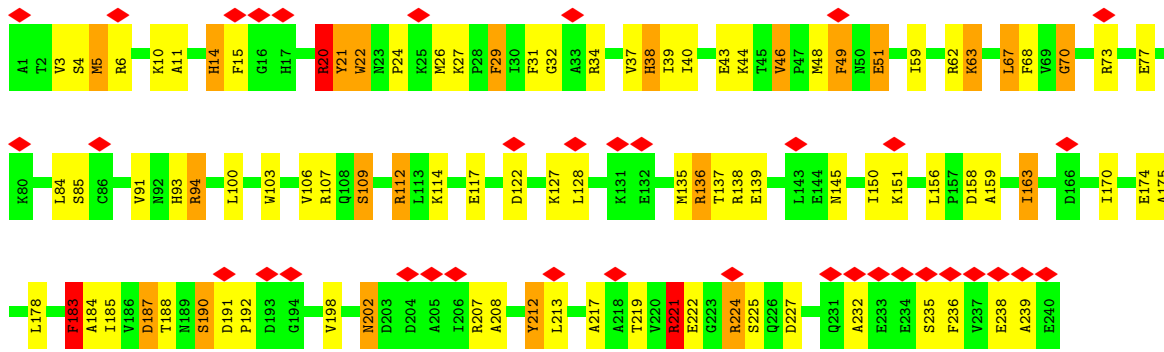
- Molecule 16: 30S ribosomal protein S16



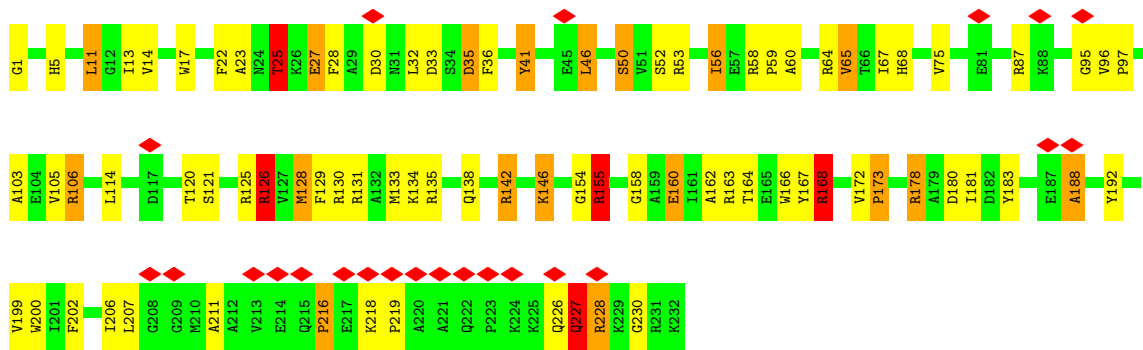
- Molecule 17: 30S ribosomal protein S17



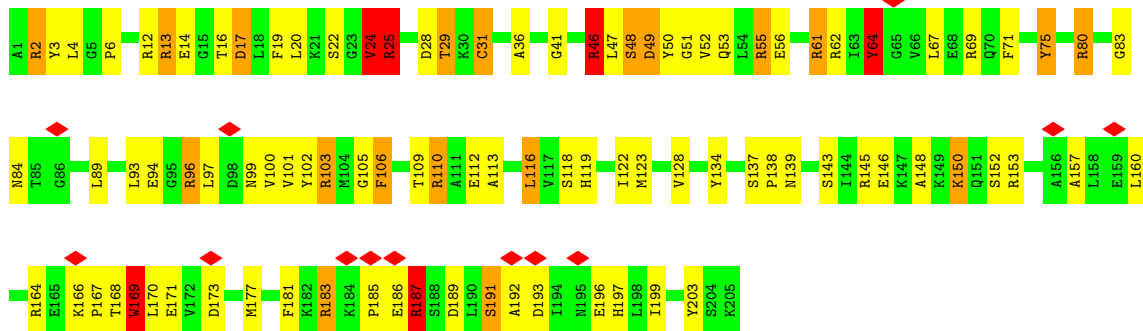
- Molecule 18: 30S ribosomal protein S2



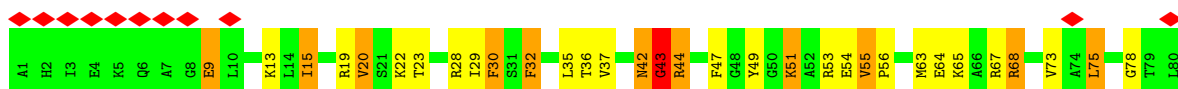
• Molecule 19: 30S ribosomal protein S3

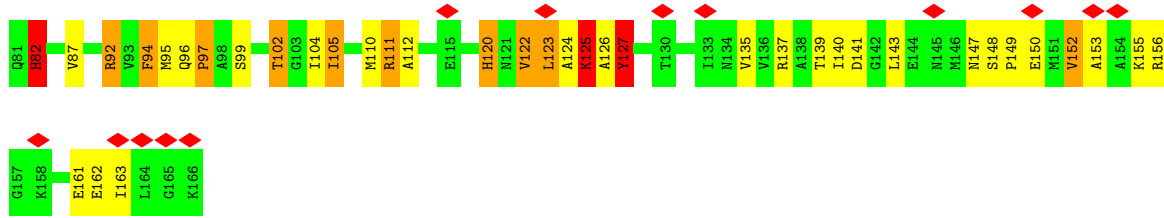


• Molecule 20: 30S ribosomal protein S4

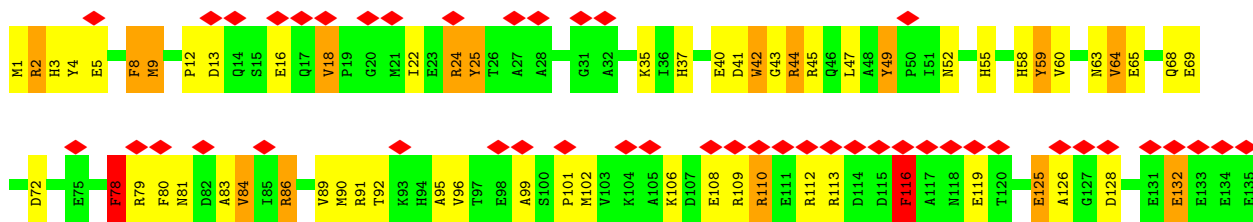


• Molecule 21: 30S ribosomal protein S5

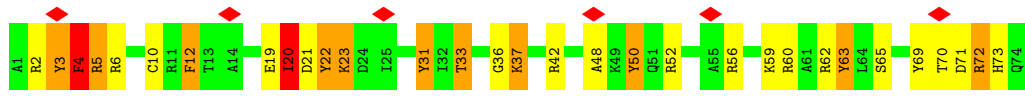




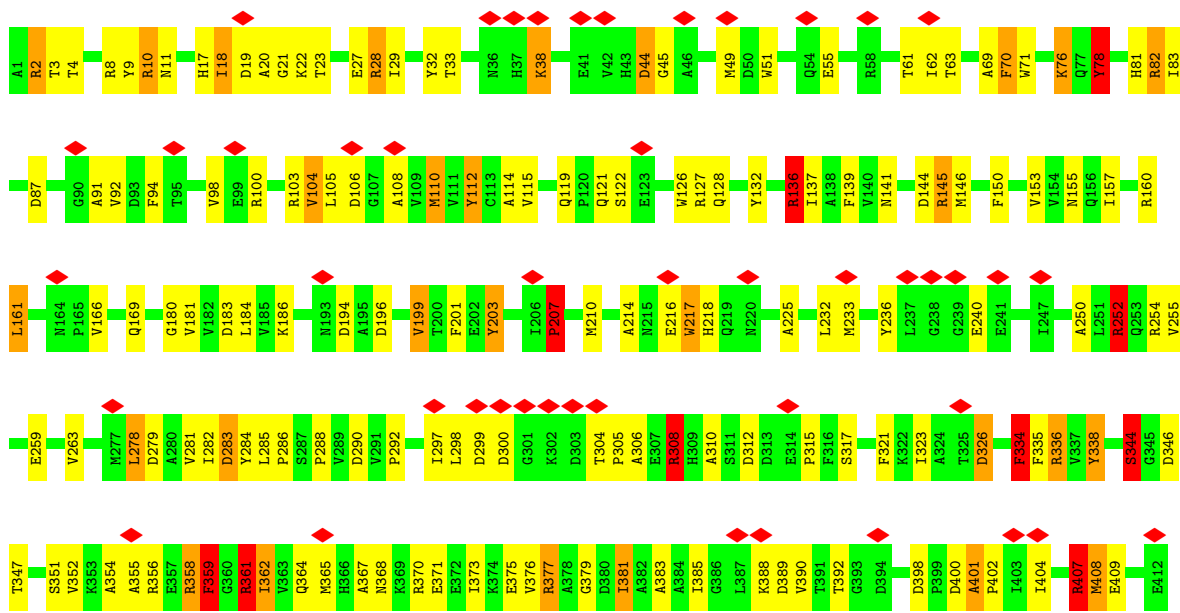
• Molecule 22: 30S ribosomal protein S6

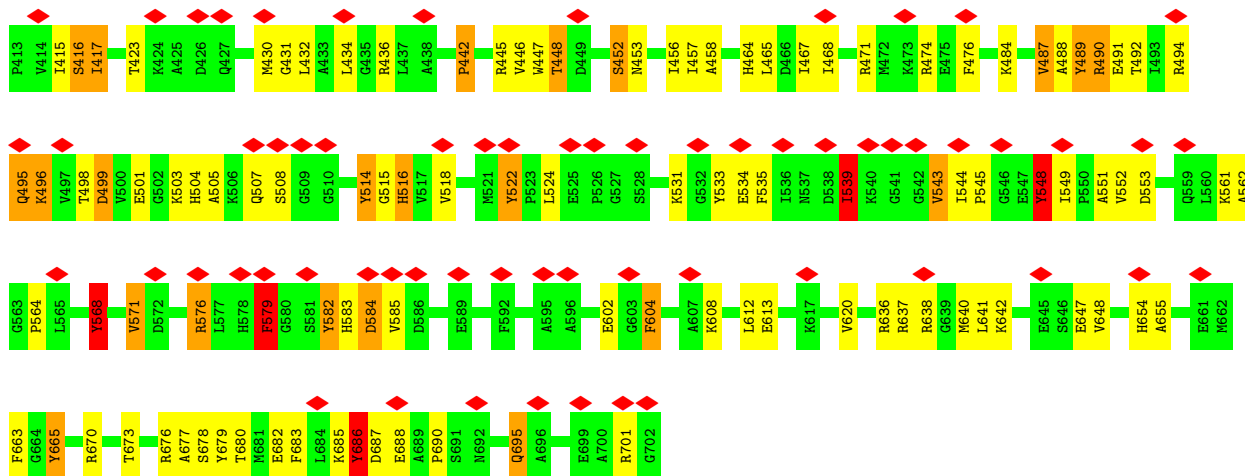


• Molecule 23: 30S ribosomal protein S18

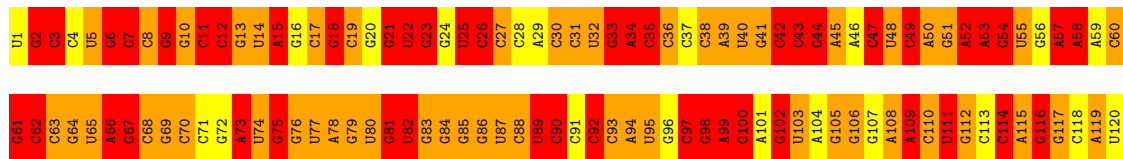
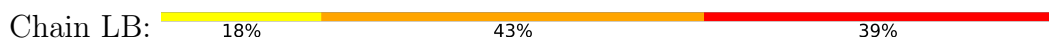


• Molecule 24: Elongation factor G

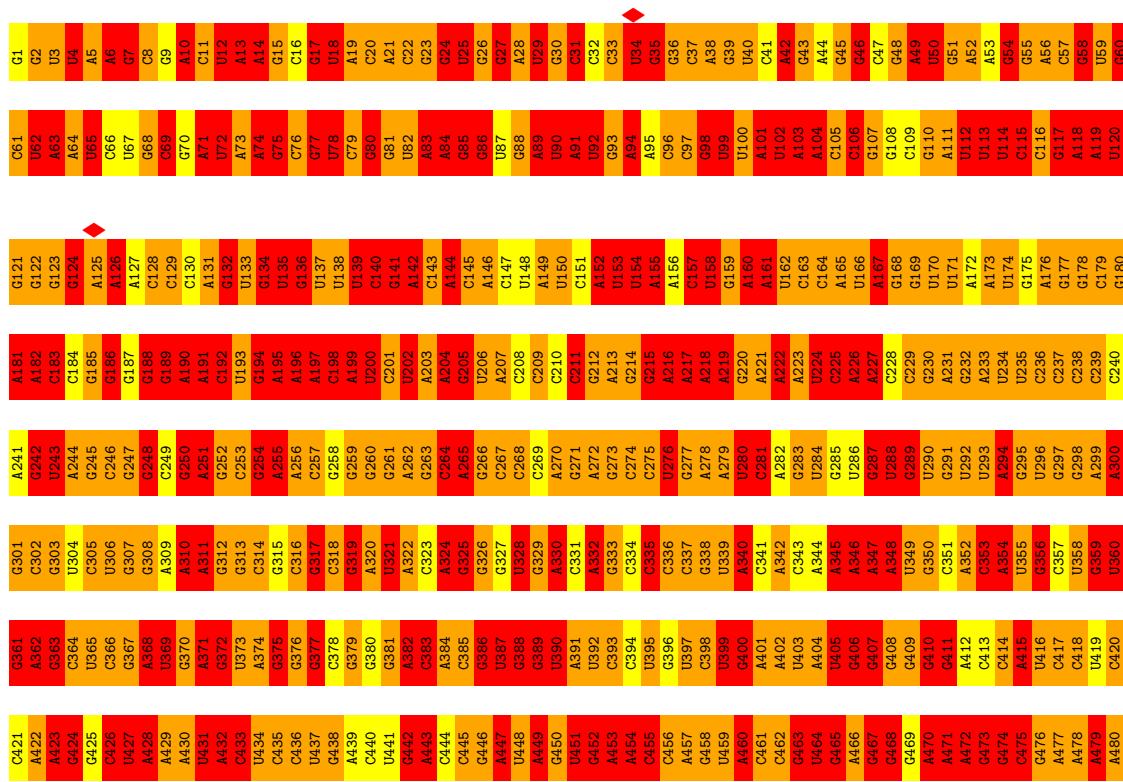




• Molecule 25: 5S ribosomal RNA



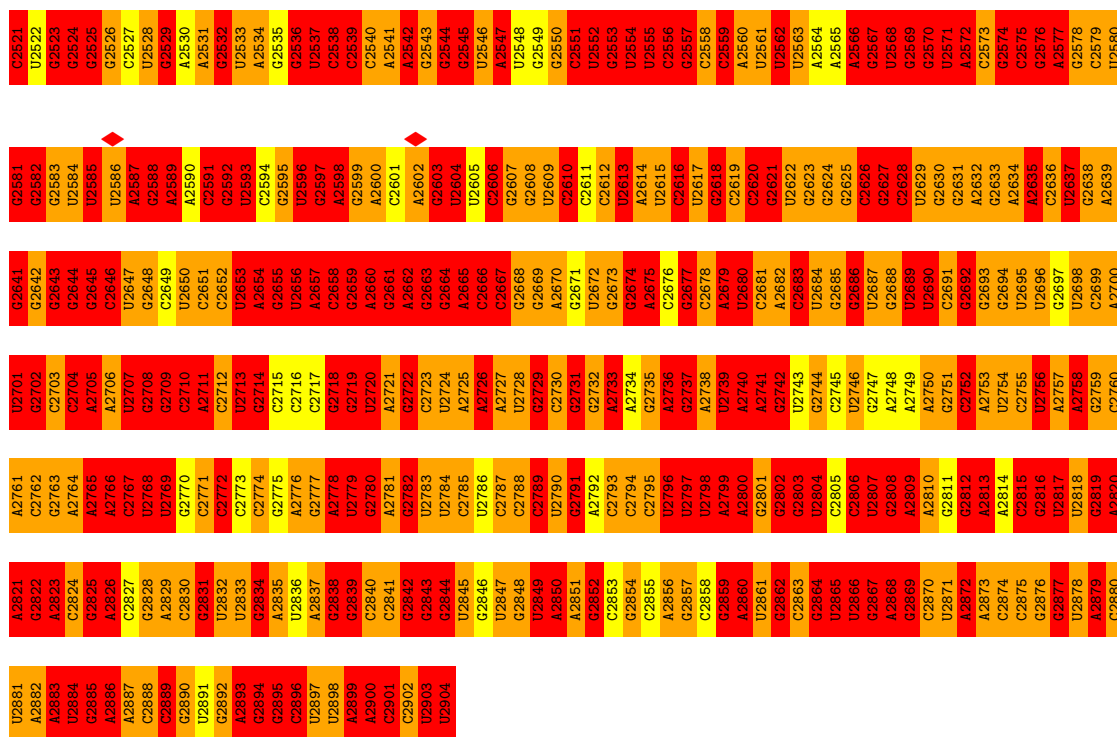
• Molecule 26: 23S ribosomal RNA



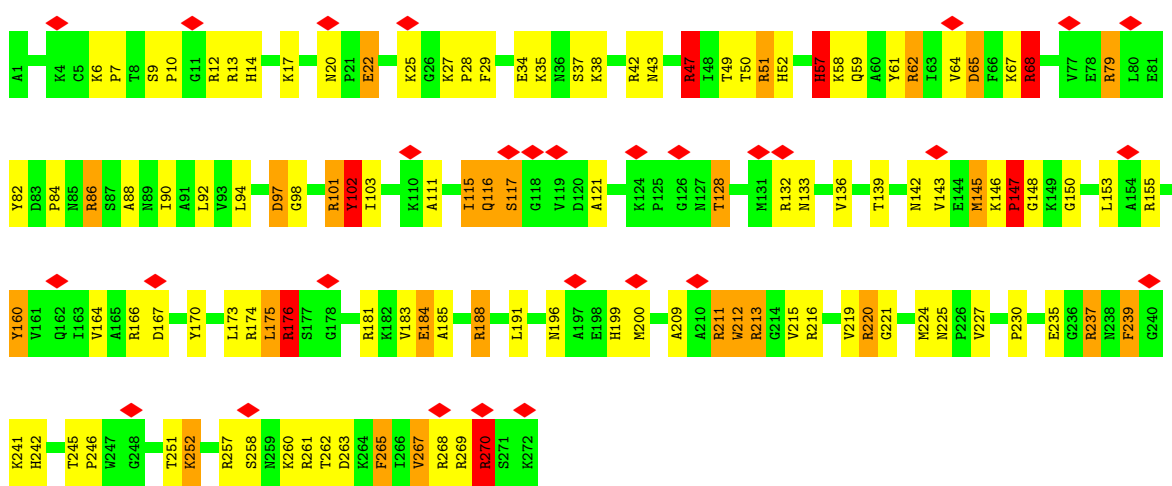




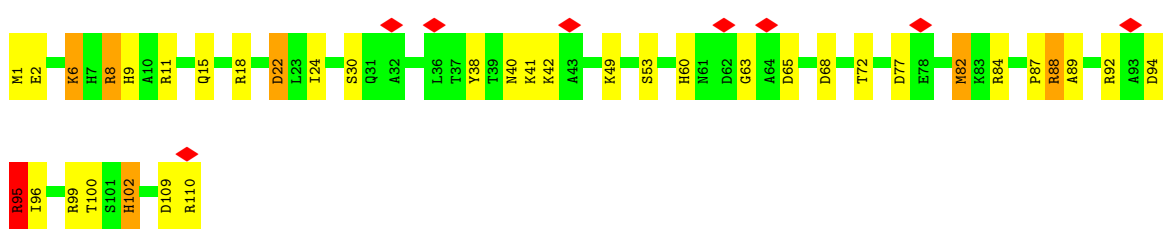
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G2341	G2342	G2343	G2344	G2345	G2346	G2347	G2348	G2349	G2350	G2351	G2352	G2353	G2354	G2355	G2356	G2357	G2358	G2359	G2360	G2361	G2362	G2363	G2364	G2365	G2366	G2367	G2368	G2369	G2370	G2371	G2372	G2373	G2374	G2375	G2376	G2377	G2378	G2379	G2380	G2381	G2382	G2383	G2384	G2385	G2386	G2387	G2388	G2389	G2390	G2391	G2392	G2393	G2394	G2395	G2396	G2397	G2398	G2399	G2400																																																																																
U2401	U2402	C2403	U2404	G2405	G2406	U2407	U2408	U2409	G2410	U2411	G2412	G2413	G2414	G2415	U2416	U2417	U2418	U2419	G2420	G2481	G2482	G2483	G2484	G2485	G2486	G2487	G2488	U2489	G2490	U2491	U2492	U2493	U2494	U2495	U2496	U2497	U2498	U2499	U2500	G2501	G2502	G2503	G2504	G2505	G2506	G2507	G2508	G2509	G2510	G2511	G2512	G2513	G2514	G2515	G2516	G2517	G2518	G2519	G2520																																																																																



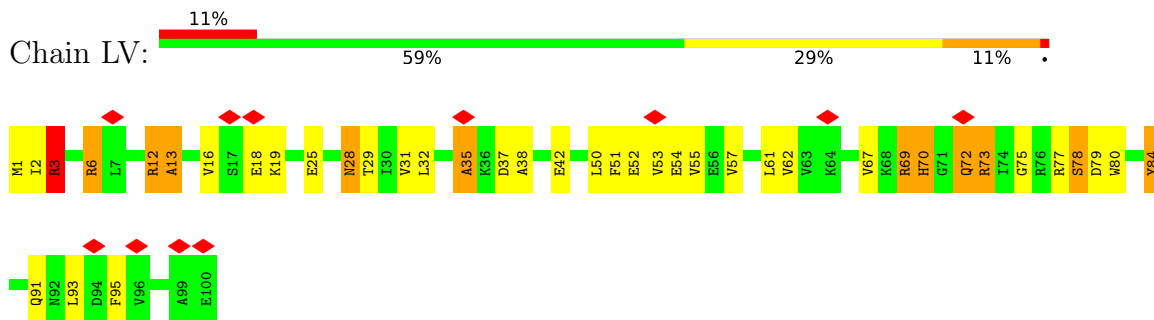
• Molecule 27: 50S ribosomal protein L2



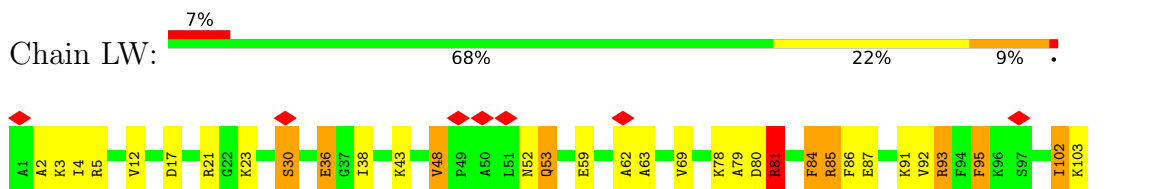
• Molecule 28: 50S ribosomal protein L22



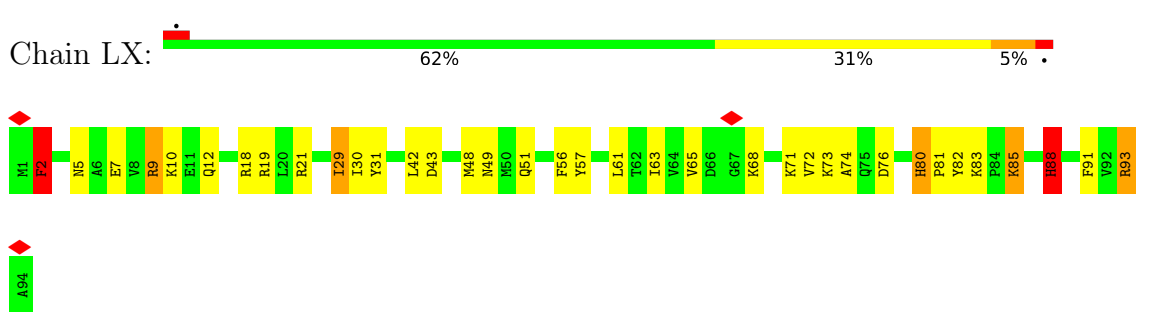
• Molecule 29: 50S ribosomal protein L23



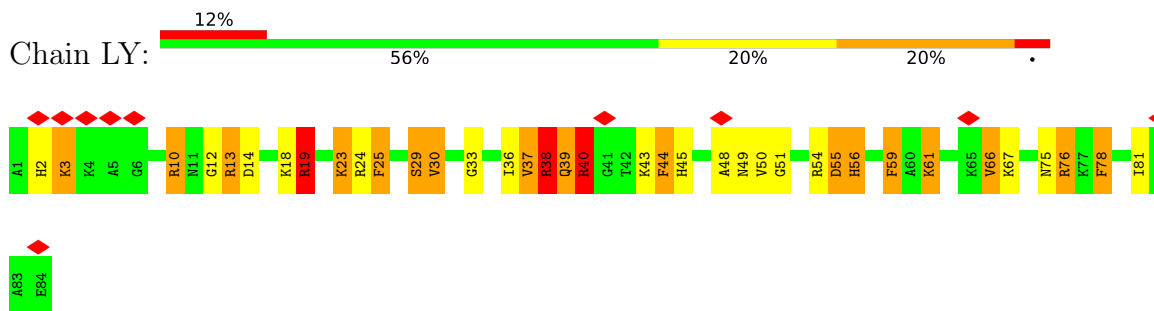
• Molecule 30: 50S ribosomal protein L24



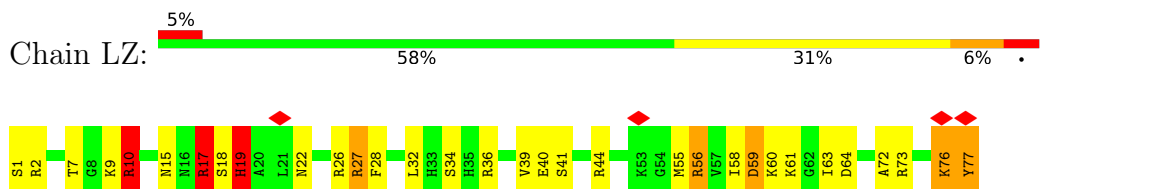
• Molecule 31: 50S ribosomal protein L25



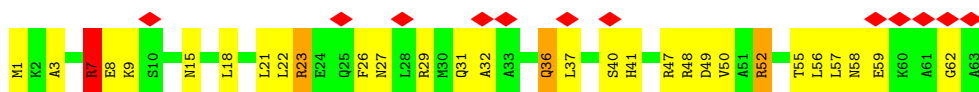
• Molecule 32: 50S ribosomal protein L27



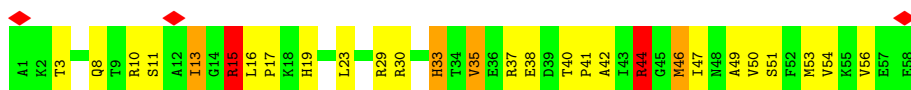
• Molecule 33: 50S ribosomal protein L28



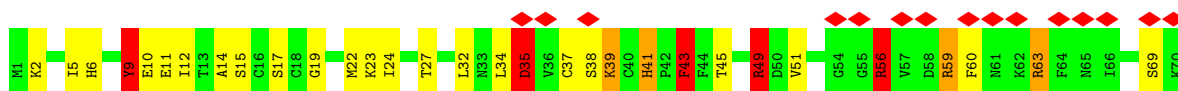
• Molecule 34: 50S ribosomal protein L29



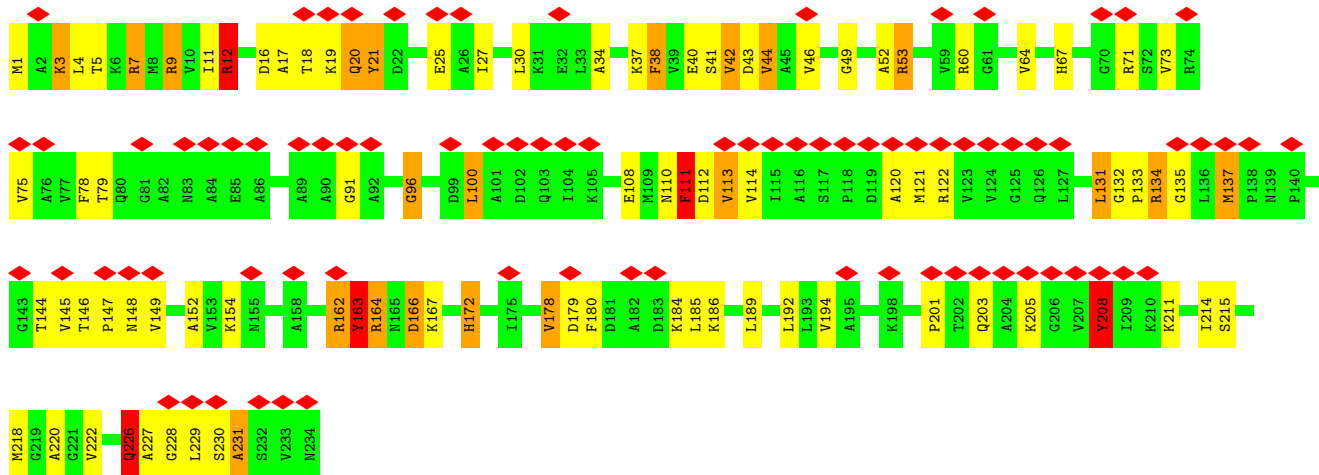
- Molecule 35: 50S ribosomal protein L30



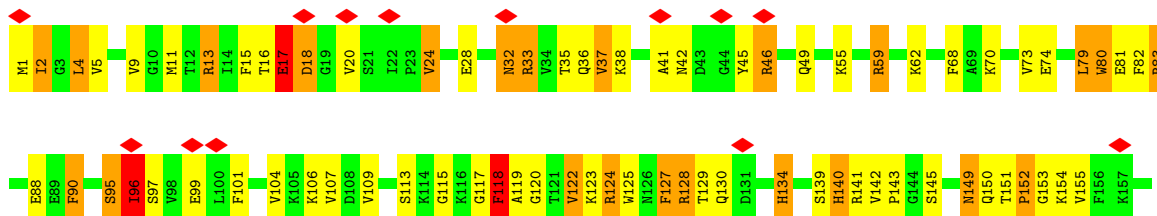
- Molecule 36: 50S ribosomal protein L31

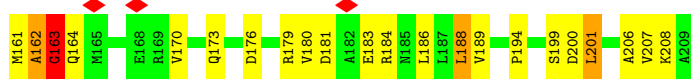


- Molecule 37: 50S ribosomal protein L1

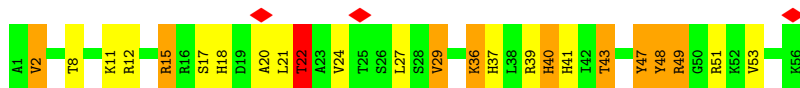


- Molecule 38: 50S ribosomal protein L3





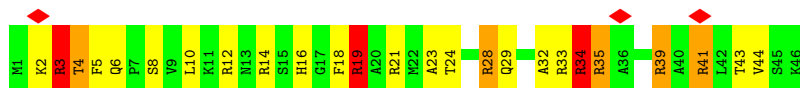
- Molecule 39: 50S ribosomal protein L32



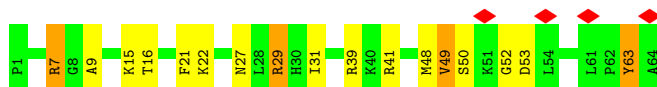
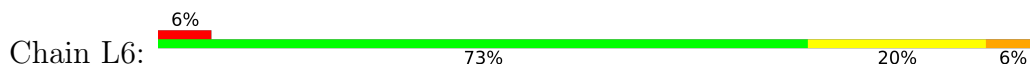
- Molecule 40: 50S ribosomal protein L33



- Molecule 41: 50S ribosomal protein L34



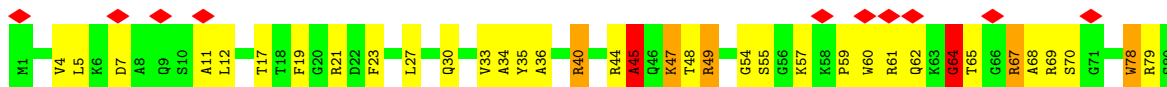
- Molecule 42: 50S ribosomal protein L35

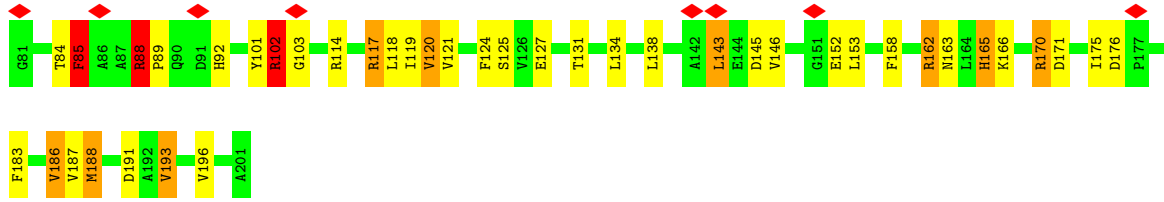


- Molecule 43: 50S ribosomal protein L36

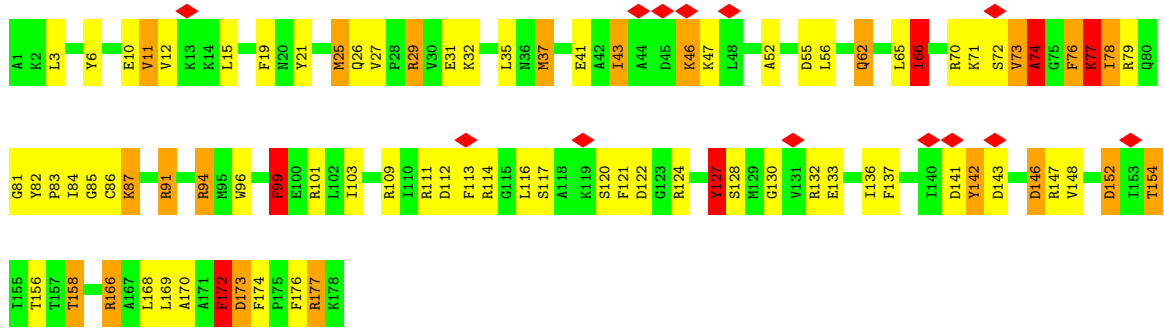


- Molecule 44: 50S ribosomal protein L4

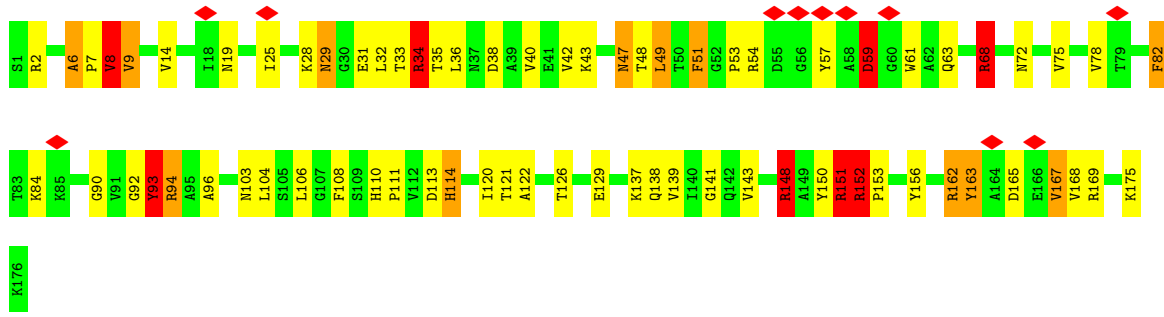




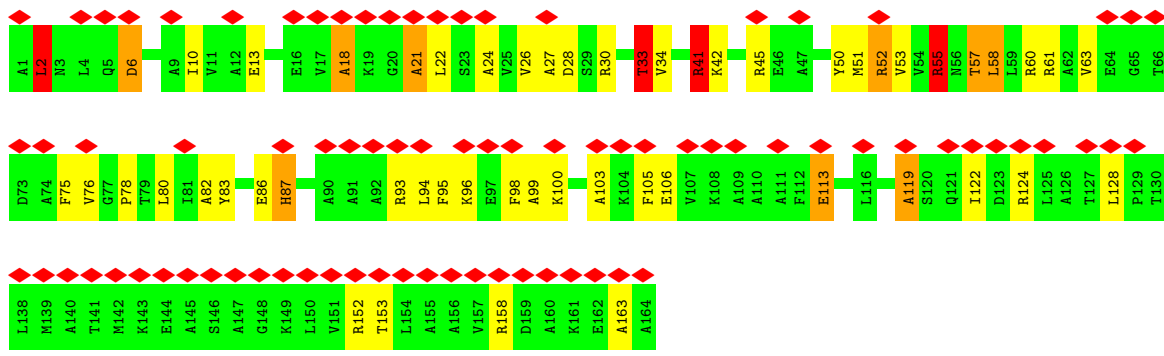
• Molecule 45: 50S ribosomal protein L5



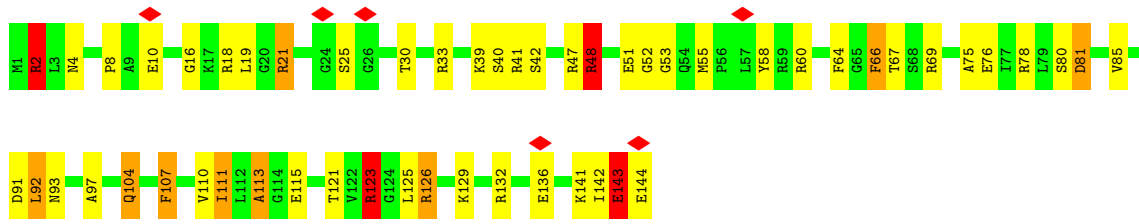
• Molecule 46: 50S ribosomal protein L6



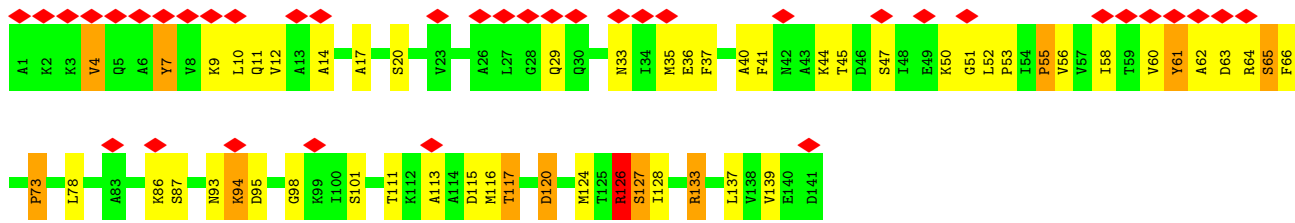
• Molecule 47: 50S ribosomal protein L10



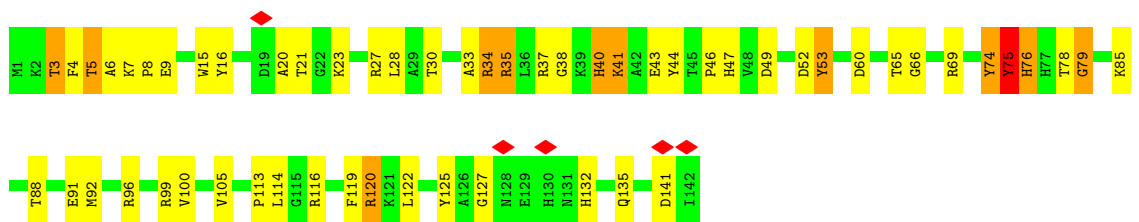
• Molecule 48: 50S ribosomal protein L15



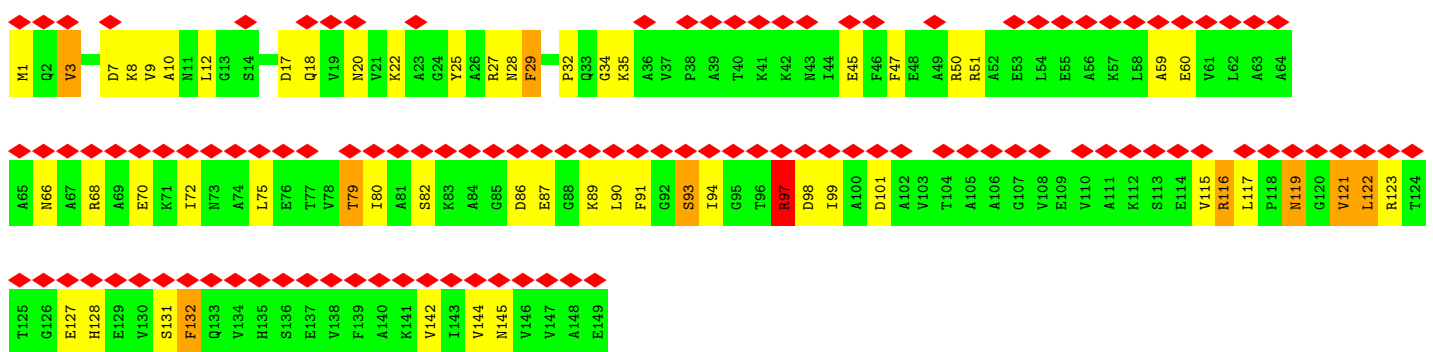
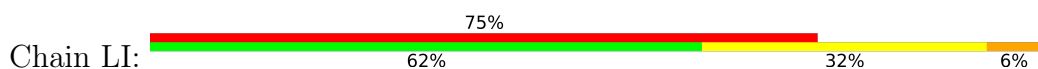
• Molecule 49: 50S ribosomal protein L11



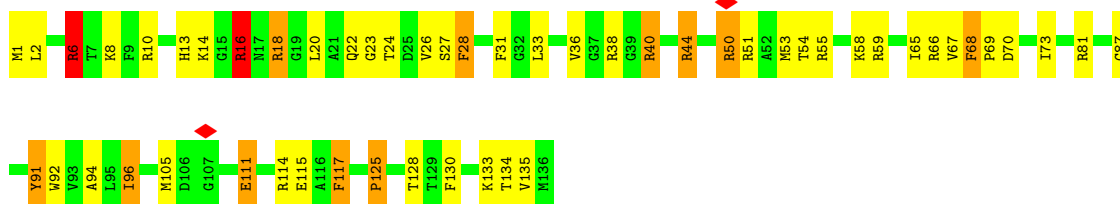
• Molecule 50: 50S ribosomal protein L13



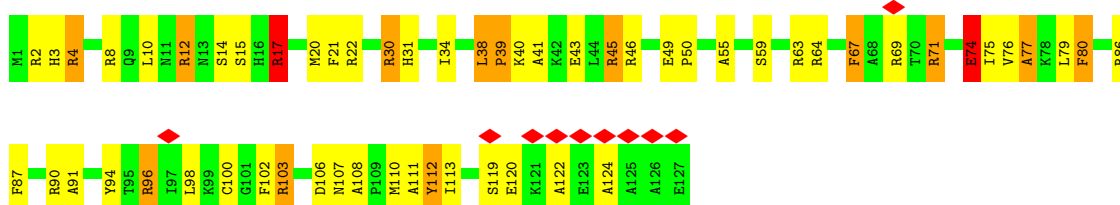
• Molecule 51: 50S ribosomal protein L9



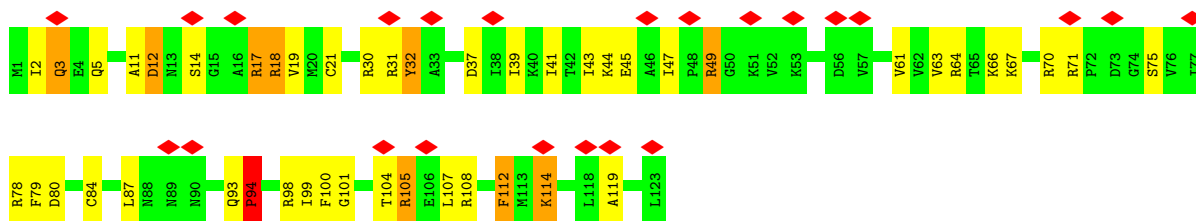
• Molecule 52: 50S ribosomal protein L16



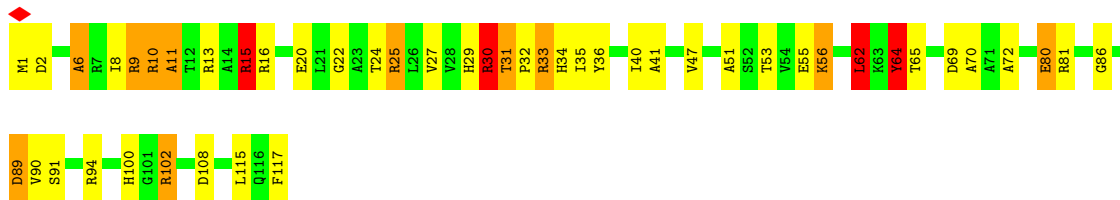
• Molecule 53: 50S ribosomal protein L17



• Molecule 54: 50S ribosomal protein L14



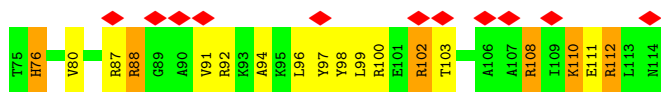
• Molecule 55: 50S ribosomal protein L18



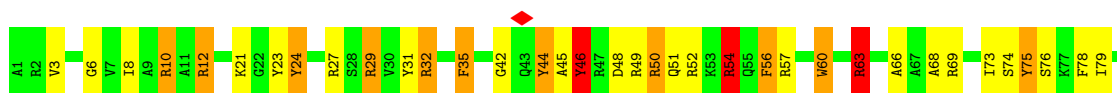
• Molecule 56: 50S ribosomal protein L19



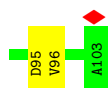
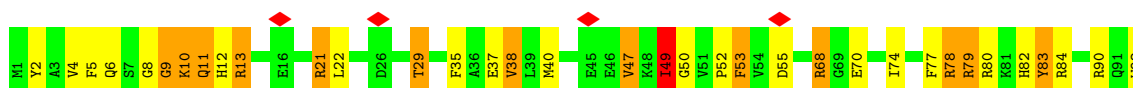




- Molecule 57: 50S ribosomal protein L20



- Molecule 58: 50S ribosomal protein L21



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	50000	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	CTFFIND3 and CTFIT	Depositor
Microscope	FEI TITAN	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	Not provided	
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	5000	Depositor
Magnification	58000	Depositor
Image detector	DIRECT ELECTRON DE-12 (4k x 3k)	Depositor
Maximum map value	0.207	Depositor
Minimum map value	-0.084	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.015	Depositor
Recommended contour level	0.03	Depositor
Map size ( $\text{\AA}$ )	377.99997, 377.99997, 377.99997	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.05, 1.05, 1.05	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: GTP

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	SS	1.56	2/744 (0.3%)	2.24	33/995 (3.3%)
2	SA	3.39	5085/37035 (13.7%)	3.51	8259/57774 (14.3%)
3	S1	3.38	150/1108 (13.5%)	3.59	243/1724 (14.1%)
4	S2	3.42	257/1831 (14.0%)	3.58	423/2853 (14.8%)
5	ST	1.63	4/676 (0.6%)	2.23	33/895 (3.7%)
6	SU	1.70	5/598 (0.8%)	2.73	30/792 (3.8%)
7	SG	1.68	10/1422 (0.7%)	2.09	48/1908 (2.5%)
8	SH	1.58	5/989 (0.5%)	2.10	33/1326 (2.5%)
9	SI	1.67	6/1048 (0.6%)	2.18	43/1394 (3.1%)
10	SJ	1.65	8/835 (1.0%)	2.13	34/1127 (3.0%)
11	SK	1.67	8/982 (0.8%)	2.23	33/1323 (2.5%)
12	SL	1.66	6/969 (0.6%)	2.28	46/1300 (3.5%)
13	SM	1.61	3/919 (0.3%)	2.36	43/1226 (3.5%)
14	SN	1.59	6/817 (0.7%)	2.23	36/1088 (3.3%)
15	SO	1.56	5/724 (0.7%)	2.20	29/966 (3.0%)
16	SP	1.56	4/659 (0.6%)	2.17	25/884 (2.8%)
17	SQ	1.66	3/681 (0.4%)	2.07	20/913 (2.2%)
18	SB	1.61	10/1904 (0.5%)	2.05	63/2565 (2.5%)
19	SC	1.60	8/1852 (0.4%)	2.10	50/2490 (2.0%)
20	SD	1.65	17/1665 (1.0%)	2.20	62/2227 (2.8%)
21	SE	1.60	8/1239 (0.6%)	2.11	38/1664 (2.3%)
22	SF	1.65	8/1121 (0.7%)	2.34	42/1509 (2.8%)
23	SR	1.71	9/637 (1.4%)	2.26	25/851 (2.9%)
24	S3	1.63	40/5532 (0.7%)	2.11	178/7485 (2.4%)
25	LB	3.37	384/2869 (13.4%)	3.42	601/4474 (13.4%)
26	LA	3.49	10162/69808 (14.6%)	3.51	15513/108905 (14.2%)
27	LD	1.64	14/2131 (0.7%)	2.20	72/2863 (2.5%)
28	LU	1.50	3/864 (0.3%)	2.05	25/1156 (2.2%)
29	LV	1.62	6/794 (0.8%)	2.08	29/1060 (2.7%)
30	LW	1.58	4/797 (0.5%)	2.12	17/1062 (1.6%)
31	LX	1.61	4/766 (0.5%)	2.09	29/1025 (2.8%)
32	LY	1.71	4/642 (0.6%)	2.27	25/848 (2.9%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
33	LZ	1.74	6/635 (0.9%)	2.24	24/848 (2.8%)
34	L0	1.56	2/510 (0.4%)	2.31	24/677 (3.5%)
35	L1	1.56	2/453 (0.4%)	2.22	19/605 (3.1%)
36	L2	1.57	1/559 (0.2%)	2.11	15/745 (2.0%)
37	LC	1.62	11/1748 (0.6%)	2.15	59/2355 (2.5%)
38	LE	1.66	10/1586 (0.6%)	2.14	61/2134 (2.9%)
39	L3	1.63	2/450 (0.4%)	1.98	9/599 (1.5%)
40	L4	1.67	4/448 (0.9%)	2.12	11/594 (1.9%)
41	L5	1.66	1/380 (0.3%)	2.65	31/498 (6.2%)
42	L6	1.53	1/513 (0.2%)	2.02	14/676 (2.1%)
43	L7	1.53	0/303	2.12	9/397 (2.3%)
44	LF	1.66	10/1571 (0.6%)	2.07	53/2113 (2.5%)
45	LG	1.60	5/1444 (0.3%)	2.28	64/1937 (3.3%)
46	LH	1.62	8/1343 (0.6%)	2.17	53/1816 (2.9%)
47	LJ	1.60	4/1247 (0.3%)	2.08	46/1679 (2.7%)
48	LN	1.56	5/1062 (0.5%)	2.24	42/1413 (3.0%)
49	LK	1.58	6/1046 (0.6%)	2.07	33/1410 (2.3%)
50	LL	1.71	10/1152 (0.9%)	2.19	45/1551 (2.9%)
51	LI	1.58	4/1122 (0.4%)	2.10	30/1515 (2.0%)
52	LO	1.63	9/1093 (0.8%)	2.27	29/1460 (2.0%)
53	LP	1.69	11/1021 (1.1%)	2.21	45/1364 (3.3%)
54	LM	1.59	2/956 (0.2%)	2.32	35/1279 (2.7%)
55	LQ	1.67	6/910 (0.7%)	2.00	28/1219 (2.3%)
56	LR	1.72	8/929 (0.9%)	2.27	32/1242 (2.6%)
57	LS	1.62	6/960 (0.6%)	2.27	39/1278 (3.1%)
58	LT	1.62	2/829 (0.2%)	2.18	32/1107 (2.9%)
All	All	2.97	16384/168928 (9.7%)	3.17	27062/251183 (10.8%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	SS	0	11
2	SA	0	979
3	S1	0	36
4	S2	0	48
5	ST	0	5
6	SU	0	11
7	SG	0	19
8	SH	0	10

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Mol	Chain	#Chirality outliers	#Planarity outliers
9	SI	0	7
10	SJ	0	9
11	SK	0	7
12	SL	0	10
13	SM	0	8
14	SN	0	11
15	SO	0	7
16	SP	0	9
17	SQ	0	6
18	SB	0	13
19	SC	0	11
20	SD	0	18
21	SE	0	11
22	SF	0	12
23	SR	0	9
24	S3	0	38
25	LB	0	68
26	LA	5	1948
27	LD	0	24
28	LU	0	8
29	LV	0	5
30	LW	0	8
31	LX	0	5
32	LY	0	8
33	LZ	0	7
34	L0	0	2
35	L1	0	3
36	L2	0	9
37	LC	0	17
38	LE	0	15
39	L3	0	5
40	L4	0	4
41	L5	0	7
42	L6	0	2
43	L7	0	4
44	LF	0	10
45	LG	0	15
46	LH	0	13
47	LJ	0	10
48	LN	0	12
49	LK	0	10
50	LL	0	5

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Mol	Chain	#Chirality outliers	#Planarity outliers
51	LI	0	7
52	LO	0	8
53	LP	0	10
54	LM	0	9
55	LQ	0	14
56	LR	0	11
57	LS	0	12
58	LT	0	8
All	All	5	3608

The worst 5 of 16384 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	SA	199	A	N7-C5	-23.19	1.25	1.39
26	LA	727	A	N7-C5	-22.32	1.25	1.39
26	LA	1791	A	N9-C4	-20.53	1.25	1.37
2	SA	298	A	N7-C5	-20.39	1.27	1.39
26	LA	743	A	N7-C5	-19.99	1.27	1.39

The worst 5 of 27062 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
22	SF	44	ARG	NE-CZ-NH1	30.21	135.41	120.30
26	LA	826	U	P-O3'-C3'	28.10	153.42	119.70
26	LA	2451	A	O4'-C1'-N9	27.95	130.56	108.20
26	LA	1005	C	C6-N1-C2	-25.59	110.06	120.30
26	LA	2899	A	N1-C6-N6	23.91	132.94	118.60

All (5) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
26	LA	2451	A	C1'
26	LA	2503	A	C2'
26	LA	2504	U	C3',C2'
26	LA	2575	C	C4'

5 of 3608 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	SS	1	PRO	Peptide
1	SS	10	ILE	Peptide
1	SS	2	ARG	Sidechain

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Mol	Chain	Res	Type	Group
1	SS	3	SER	Peptide
1	SS	8	PRO	Peptide

## 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	SS	727	0	769	10	0
2	SA	33076	0	16190	637	0
3	S1	993	0	496	16	0
4	S2	1639	0	816	32	0
5	ST	670	0	722	2	0
6	SU	590	0	631	6	0
7	SG	1400	0	1449	13	0
8	SH	979	0	1034	5	0
9	SI	1036	0	1084	9	0
10	SJ	825	0	865	9	0
11	SK	965	0	997	13	0
12	SL	955	0	1019	10	0
13	SM	910	0	981	9	0
14	SN	805	0	847	5	0
15	SO	716	0	742	4	0
16	SP	649	0	666	3	0
17	SQ	672	0	716	2	0
18	SB	1872	0	1885	15	0
19	SC	1822	0	1913	13	0
20	SD	1643	0	1710	21	0
21	SE	1225	0	1273	18	0
22	SF	1101	0	1050	11	0
23	SR	626	0	651	6	0
24	S3	5431	0	5403	46	0
25	LB	2566	0	1269	48	0
26	LA	62330	0	30424	1516	0
27	LD	2092	0	2170	21	0
28	LU	857	0	922	5	0
29	LV	787	0	846	5	0
30	LW	789	0	847	9	0
31	LX	753	0	780	4	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
32	LY	634	0	655	16	0
33	LZ	625	0	655	2	0
34	L0	509	0	543	5	0
35	L1	449	0	491	3	0
36	L2	549	0	552	5	0
37	LC	1733	0	1824	19	0
38	LE	1565	0	1616	21	0
39	L3	444	0	461	8	0
40	L4	441	0	485	4	0
41	L5	377	0	418	7	0
42	L6	504	0	574	3	0
43	L7	302	0	343	3	0
44	LF	1552	0	1619	18	0
45	LG	1420	0	1460	16	0
46	LH	1323	0	1374	6	0
47	LJ	1233	0	1283	6	0
48	LN	1053	0	1129	7	0
49	LK	1032	0	1088	3	0
50	LL	1129	0	1162	9	0
51	LI	1111	0	1148	6	0
52	LO	1074	0	1157	17	0
53	LP	1008	0	1045	10	0
54	LM	947	0	1023	6	0
55	LQ	900	0	935	9	0
56	LR	917	0	965	5	0
57	LS	947	0	1022	15	0
58	LT	816	0	839	7	0
59	S3	32	0	12	0	0
All	All	156127	0	107045	2623	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 10.

The worst 5 of 2623 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
21:SE:123:LEU:HD13	21:SE:124:ALA:H	1.44	0.83
2:SA:1381:U:H1'	7:SG:152:HIS:CE1	2.16	0.80
26:LA:1853:A:H61	26:LA:2087:G:H1'	1.47	0.80
26:LA:1965:C:C2	26:LA:1966:A:H2'	2.18	0.78
2:SA:803:G:C5	2:SA:804:U:C4	2.72	0.78



There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	SS	89/91 (98%)	71 (80%)	13 (15%)	5 (6%)	2	19
5	ST	84/86 (98%)	77 (92%)	7 (8%)	0	100	100
6	SU	68/70 (97%)	46 (68%)	14 (21%)	8 (12%)	0	5
7	SG	176/178 (99%)	154 (88%)	14 (8%)	8 (4%)	2	23
8	SH	127/129 (98%)	103 (81%)	16 (13%)	8 (6%)	1	17
9	SI	127/129 (98%)	99 (78%)	22 (17%)	6 (5%)	2	22
10	SJ	101/103 (98%)	83 (82%)	11 (11%)	7 (7%)	1	14
11	SK	126/128 (98%)	102 (81%)	18 (14%)	6 (5%)	2	22
12	SL	121/123 (98%)	95 (78%)	14 (12%)	12 (10%)	0	8
13	SM	115/117 (98%)	97 (84%)	11 (10%)	7 (6%)	1	17
14	SN	98/100 (98%)	81 (83%)	12 (12%)	5 (5%)	2	20
15	SO	86/88 (98%)	76 (88%)	7 (8%)	3 (4%)	3	30
16	SP	80/82 (98%)	72 (90%)	4 (5%)	4 (5%)	2	21
17	SQ	81/83 (98%)	67 (83%)	9 (11%)	5 (6%)	1	17
18	SB	238/240 (99%)	212 (89%)	14 (6%)	12 (5%)	2	21
19	SC	230/232 (99%)	196 (85%)	18 (8%)	16 (7%)	1	14
20	SD	203/205 (99%)	166 (82%)	26 (13%)	11 (5%)	2	19
21	SE	164/166 (99%)	127 (77%)	24 (15%)	13 (8%)	1	11
22	SF	133/135 (98%)	114 (86%)	11 (8%)	8 (6%)	1	17
23	SR	72/74 (97%)	57 (79%)	10 (14%)	5 (7%)	1	14
24	S3	700/702 (100%)	611 (87%)	61 (9%)	28 (4%)	3	26
27	LD	270/272 (99%)	215 (80%)	42 (16%)	13 (5%)	2	22

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
28	LU	108/110 (98%)	95 (88%)	11 (10%)	2 (2%)	8	42
29	LV	98/100 (98%)	75 (76%)	13 (13%)	10 (10%)	0	7
30	LW	101/103 (98%)	84 (83%)	12 (12%)	5 (5%)	2	21
31	LX	92/94 (98%)	83 (90%)	5 (5%)	4 (4%)	2	24
32	LY	82/84 (98%)	57 (70%)	15 (18%)	10 (12%)	0	5
33	LZ	75/77 (97%)	63 (84%)	10 (13%)	2 (3%)	5	35
34	L0	61/63 (97%)	51 (84%)	8 (13%)	2 (3%)	4	31
35	L1	56/58 (97%)	45 (80%)	7 (12%)	4 (7%)	1	14
36	L2	68/70 (97%)	44 (65%)	15 (22%)	9 (13%)	0	4
37	LC	232/234 (99%)	192 (83%)	29 (12%)	11 (5%)	2	22
38	LE	207/209 (99%)	151 (73%)	34 (16%)	22 (11%)	0	7
39	L3	54/56 (96%)	40 (74%)	7 (13%)	7 (13%)	0	5
40	L4	52/54 (96%)	45 (86%)	5 (10%)	2 (4%)	3	27
41	L5	44/46 (96%)	34 (77%)	7 (16%)	3 (7%)	1	15
42	L6	62/64 (97%)	53 (86%)	8 (13%)	1 (2%)	9	46
43	L7	36/38 (95%)	26 (72%)	5 (14%)	5 (14%)	0	4
44	LF	199/201 (99%)	163 (82%)	21 (11%)	15 (8%)	1	12
45	LG	176/178 (99%)	133 (76%)	26 (15%)	17 (10%)	0	8
46	LH	174/176 (99%)	127 (73%)	29 (17%)	18 (10%)	0	7
47	LJ	162/164 (99%)	143 (88%)	11 (7%)	8 (5%)	2	21
48	LN	142/144 (99%)	116 (82%)	22 (16%)	4 (3%)	5	34
49	LK	139/141 (99%)	114 (82%)	17 (12%)	8 (6%)	1	18
50	LL	140/142 (99%)	116 (83%)	14 (10%)	10 (7%)	1	14
51	LI	147/149 (99%)	121 (82%)	16 (11%)	10 (7%)	1	15
52	LO	134/136 (98%)	111 (83%)	14 (10%)	9 (7%)	1	15
53	LP	125/127 (98%)	109 (87%)	10 (8%)	6 (5%)	2	22
54	LM	121/123 (98%)	91 (75%)	18 (15%)	12 (10%)	0	8
55	LQ	115/117 (98%)	108 (94%)	5 (4%)	2 (2%)	9	45
56	LR	112/114 (98%)	79 (70%)	17 (15%)	16 (14%)	0	4
57	LS	115/117 (98%)	104 (90%)	5 (4%)	6 (5%)	2	20
58	LT	101/103 (98%)	87 (86%)	11 (11%)	3 (3%)	4	33

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
All	All	7019/7125 (98%)	5781 (82%)	805 (12%)	433 (6%)	<b>3</b> <b>17</b>

5 of 433 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	SS	11	ASP
1	SS	37	SER
1	SS	75	PRO
6	SU	10	PRO
6	SU	18	PHE

### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	SS	78/78 (100%)	65 (83%)	13 (17%)	<b>2</b> <b>14</b>
5	ST	65/65 (100%)	60 (92%)	5 (8%)	<b>13</b> <b>45</b>
6	SU	60/60 (100%)	54 (90%)	6 (10%)	<b>7</b> <b>35</b>
7	SG	146/146 (100%)	134 (92%)	12 (8%)	<b>11</b> <b>42</b>
8	SH	104/104 (100%)	90 (86%)	14 (14%)	<b>4</b> <b>23</b>
9	SI	106/106 (100%)	91 (86%)	15 (14%)	<b>3</b> <b>21</b>
10	SJ	90/90 (100%)	80 (89%)	10 (11%)	<b>6</b> <b>31</b>
11	SK	98/98 (100%)	90 (92%)	8 (8%)	<b>11</b> <b>42</b>
12	SL	103/103 (100%)	97 (94%)	6 (6%)	<b>20</b> <b>55</b>
13	SM	95/95 (100%)	81 (85%)	14 (15%)	<b>3</b> <b>20</b>
14	SN	83/83 (100%)	78 (94%)	5 (6%)	<b>19</b> <b>54</b>
15	SO	76/76 (100%)	69 (91%)	7 (9%)	<b>9</b> <b>39</b>
16	SP	65/65 (100%)	58 (89%)	7 (11%)	<b>6</b> <b>32</b>
17	SQ	77/77 (100%)	75 (97%)	2 (3%)	<b>46</b> <b>74</b>
18	SB	198/198 (100%)	183 (92%)	15 (8%)	<b>13</b> <b>45</b>
19	SC	189/189 (100%)	170 (90%)	19 (10%)	<b>7</b> <b>34</b>

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
20	SD	172/172 (100%)	152 (88%)	20 (12%)	5	29
21	SE	125/125 (100%)	111 (89%)	14 (11%)	6	30
22	SF	116/116 (100%)	103 (89%)	13 (11%)	6	30
23	SR	64/64 (100%)	58 (91%)	6 (9%)	8	38
24	S3	575/575 (100%)	514 (89%)	61 (11%)	6	32
27	LD	217/217 (100%)	188 (87%)	29 (13%)	4	23
28	LU	93/93 (100%)	82 (88%)	11 (12%)	5	28
29	LV	84/84 (100%)	77 (92%)	7 (8%)	11	42
30	LW	84/84 (100%)	80 (95%)	4 (5%)	25	60
31	LX	78/78 (100%)	70 (90%)	8 (10%)	7	34
32	LY	62/62 (100%)	54 (87%)	8 (13%)	4	24
33	LZ	67/67 (100%)	55 (82%)	12 (18%)	2	11
34	L0	55/55 (100%)	49 (89%)	6 (11%)	6	32
35	L1	48/48 (100%)	39 (81%)	9 (19%)	1	9
36	L2	62/62 (100%)	52 (84%)	10 (16%)	2	16
37	LC	181/181 (100%)	164 (91%)	17 (9%)	8	38
38	LE	164/164 (100%)	143 (87%)	21 (13%)	4	24
39	L3	47/47 (100%)	43 (92%)	4 (8%)	10	41
40	L4	48/48 (100%)	44 (92%)	4 (8%)	11	42
41	L5	38/38 (100%)	35 (92%)	3 (8%)	12	44
42	L6	51/51 (100%)	48 (94%)	3 (6%)	19	55
43	L7	34/34 (100%)	32 (94%)	2 (6%)	19	55
44	LF	165/165 (100%)	153 (93%)	12 (7%)	14	46
45	LG	149/149 (100%)	133 (89%)	16 (11%)	6	32
46	LH	137/137 (100%)	119 (87%)	18 (13%)	4	23
47	LJ	122/122 (100%)	109 (89%)	13 (11%)	6	32
48	LN	103/103 (100%)	87 (84%)	16 (16%)	2	18
49	LK	109/109 (100%)	93 (85%)	16 (15%)	3	20
50	LL	116/116 (100%)	108 (93%)	8 (7%)	15	49
51	LI	114/114 (100%)	99 (87%)	15 (13%)	4	23
52	LO	109/109 (100%)	96 (88%)	13 (12%)	5	27

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
53	LP	103/103 (100%)	95 (92%)	8 (8%)	12	44
54	LM	104/104 (100%)	99 (95%)	5 (5%)	25	60
55	LQ	87/87 (100%)	80 (92%)	7 (8%)	12	43
56	LR	99/99 (100%)	87 (88%)	12 (12%)	5	26
57	LS	89/89 (100%)	78 (88%)	11 (12%)	4	26
58	LT	84/84 (100%)	78 (93%)	6 (7%)	14	48
All	All	5788/5788 (100%)	5182 (90%)	606 (10%)	10	33

5 of 606 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
46	LH	51	PHE
55	LQ	56	LYS
47	LJ	2	LEU
46	LH	49	LEU
49	LK	133	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 41 such sidechains are listed below:

Mol	Chain	Res	Type
44	LF	41	GLN
53	LP	3	HIS
45	LG	20	ASN
50	LL	47	HIS
53	LP	107	ASN

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
2	SA	1541/1542 (99%)	362 (23%)	122 (7%)
25	LB	119/120 (99%)	21 (17%)	9 (7%)
26	LA	2903/2904 (99%)	645 (22%)	221 (7%)
3	S1	46/47 (97%)	36 (78%)	12 (26%)
4	S2	77/77 (100%)	20 (25%)	10 (12%)
All	All	4686/4690 (99%)	1084 (23%)	374 (7%)

5 of 1084 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
2	SA	3	A
2	SA	4	U
2	SA	5	U
2	SA	8	A
2	SA	9	G

5 of 374 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
26	LA	1061	U
26	LA	1818	U
26	LA	1133	A
26	LA	1392	A
26	LA	2042	A

#### 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

#### 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

#### 5.6 Ligand geometry [i](#)

1 ligand is 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
59	GTP	S3	801	-	26,34,34	1.72	6 (23%)	32,54,54	2.46	6 (18%)

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
59	GTP	S3	801	-	-	0/18/38/38	0/3/3/3

The worst 5 of 6 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
59	S3	801	GTP	C8-N7	-5.15	1.26	1.35
59	S3	801	GTP	C5-C4	-2.51	1.36	1.43
59	S3	801	GTP	O4'-C4'	2.33	1.50	1.45
59	S3	801	GTP	C6-N1	2.31	1.41	1.37
59	S3	801	GTP	PG-O2G	-2.17	1.46	1.54

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
59	S3	801	GTP	PA-O3A-PB	-8.72	102.91	132.83
59	S3	801	GTP	PB-O3B-PG	-7.87	105.81	132.83
59	S3	801	GTP	O5'-PA-O1A	-3.25	96.38	109.07
59	S3	801	GTP	O4'-C1'-C2'	-3.21	102.24	106.93
59	S3	801	GTP	O4'-C4'-C3'	-2.78	99.61	105.11

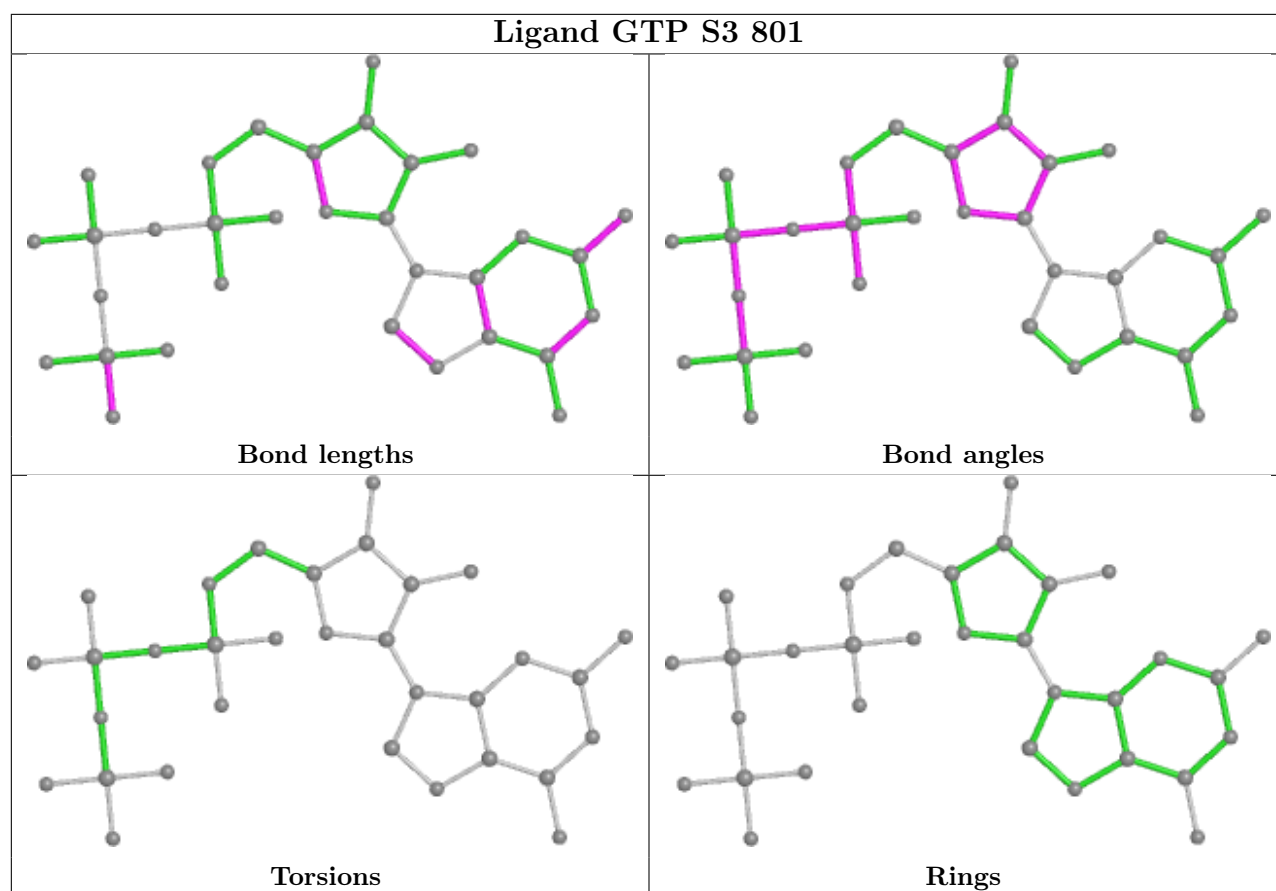
There are no chirality outliers.

There are no torsion outliers.

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 [\(i\)](#)

There are no chain breaks in this entry.



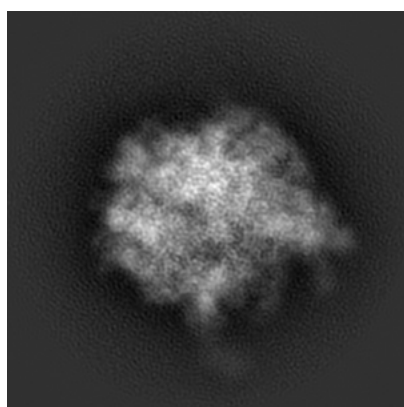
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-6316. These allow visual inspection of the internal detail of the map and identification of artifacts.

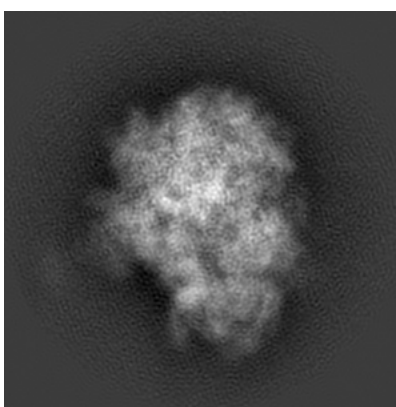
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

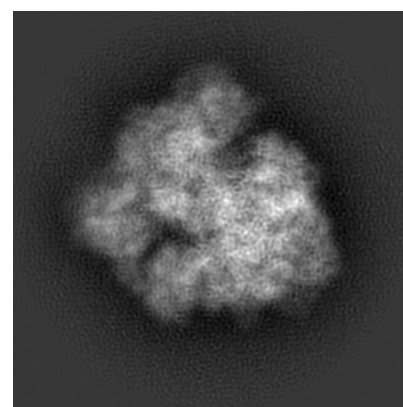
#### 6.1.1 Primary map



X



Y

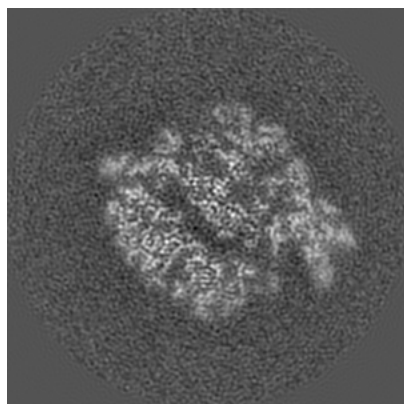


Z

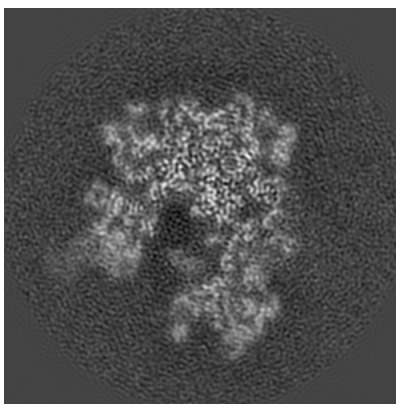
The images above show the map projected in three orthogonal directions.

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

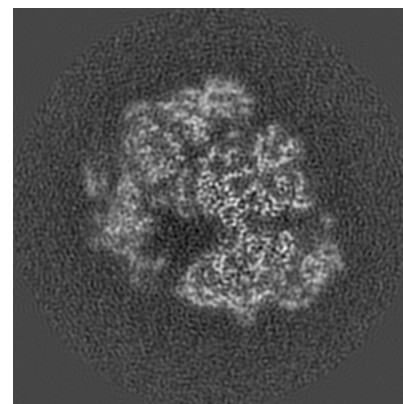
#### 6.2.1 Primary map



X Index: 180



Y Index: 180

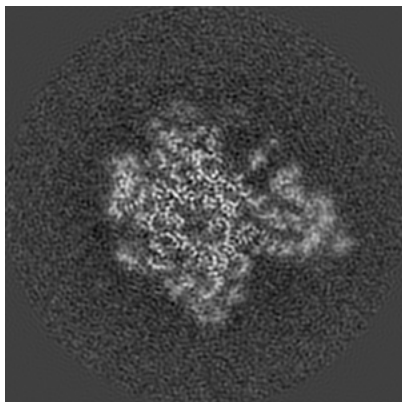


Z Index: 180

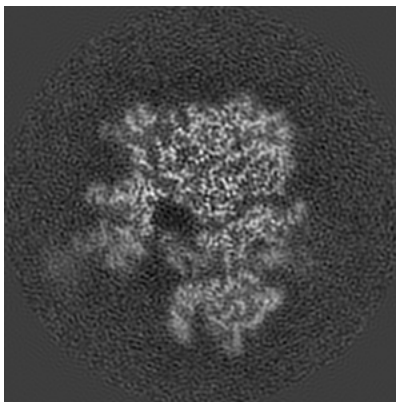
The images above show central slices of the map in three orthogonal directions.

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

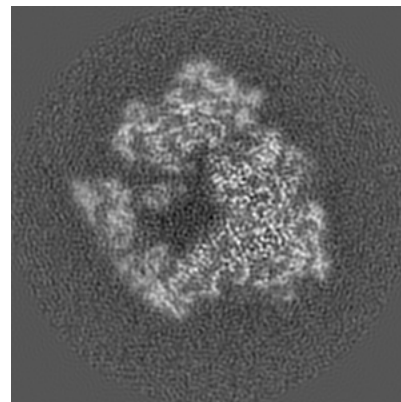
### 6.3.1 Primary map



X Index: 191



Y Index: 188

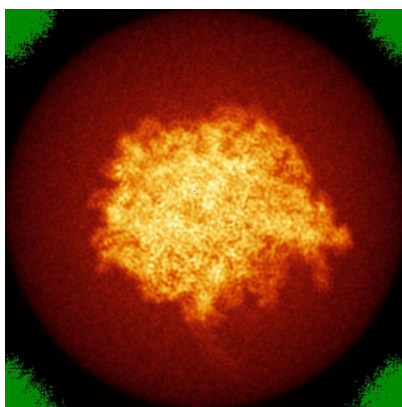


Z Index: 161

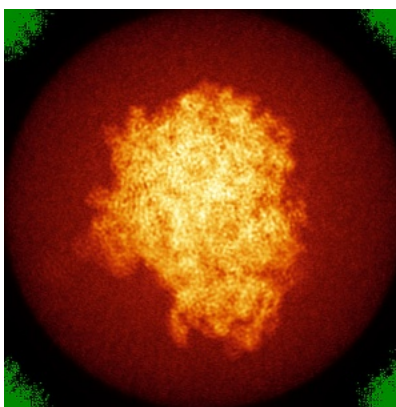
The images above show the largest variance slices of the map in three orthogonal directions.

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

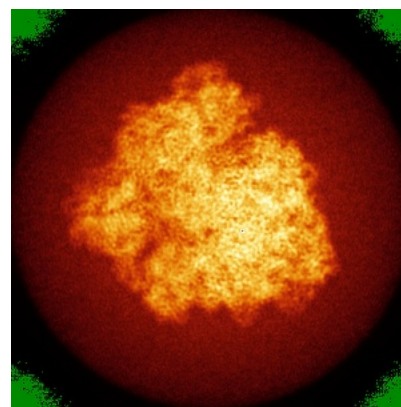
### 6.4.1 Primary map



X



Y

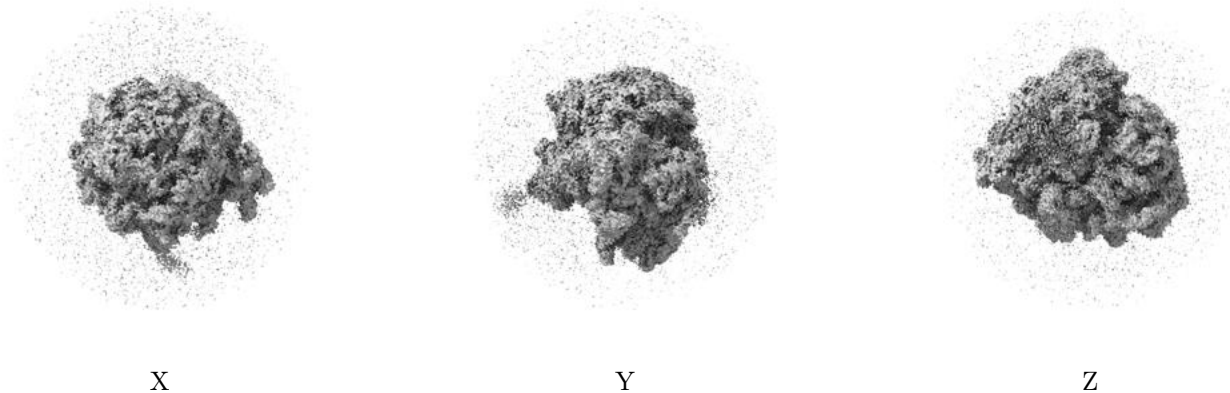


Z

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

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

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.03. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

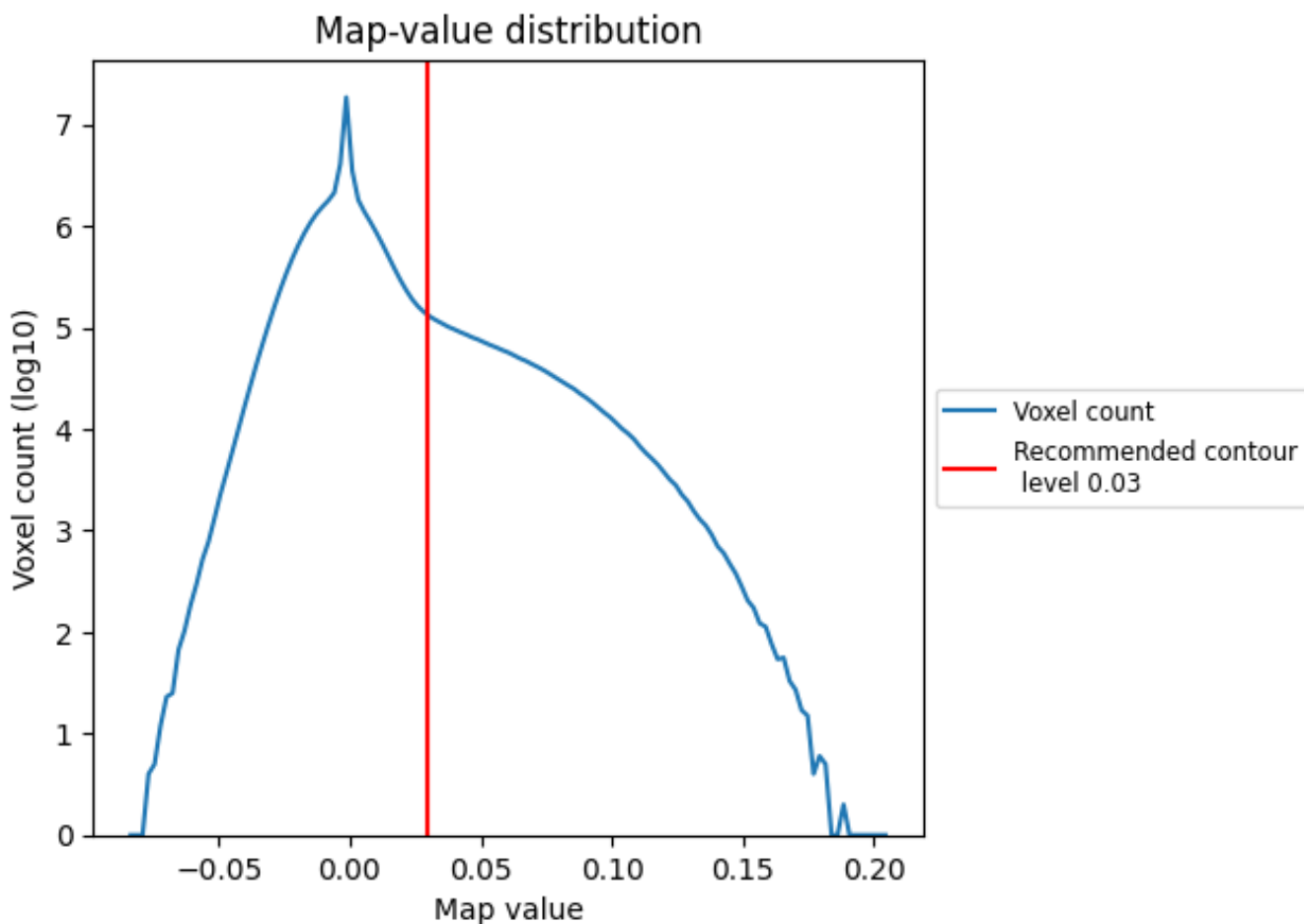
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

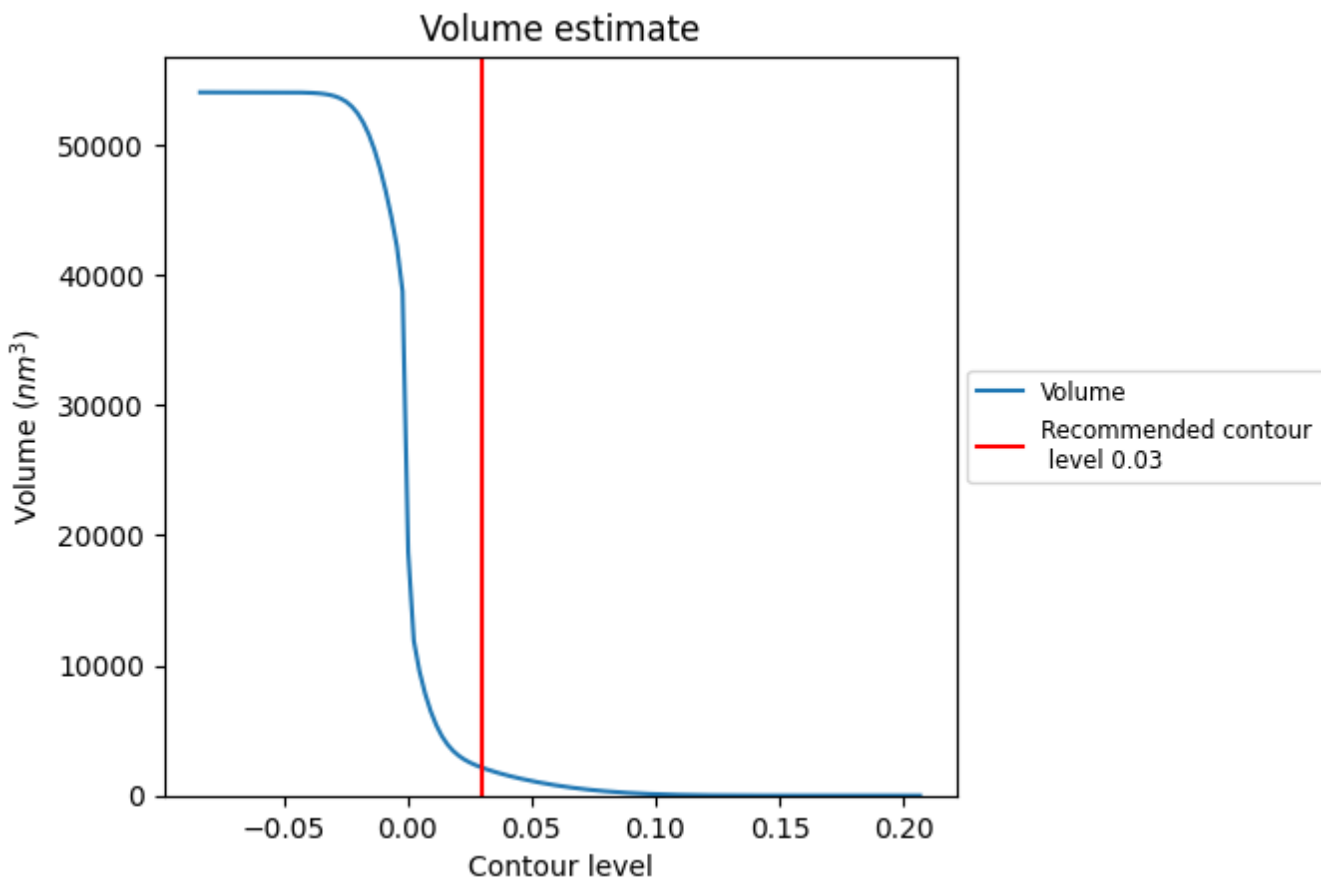
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

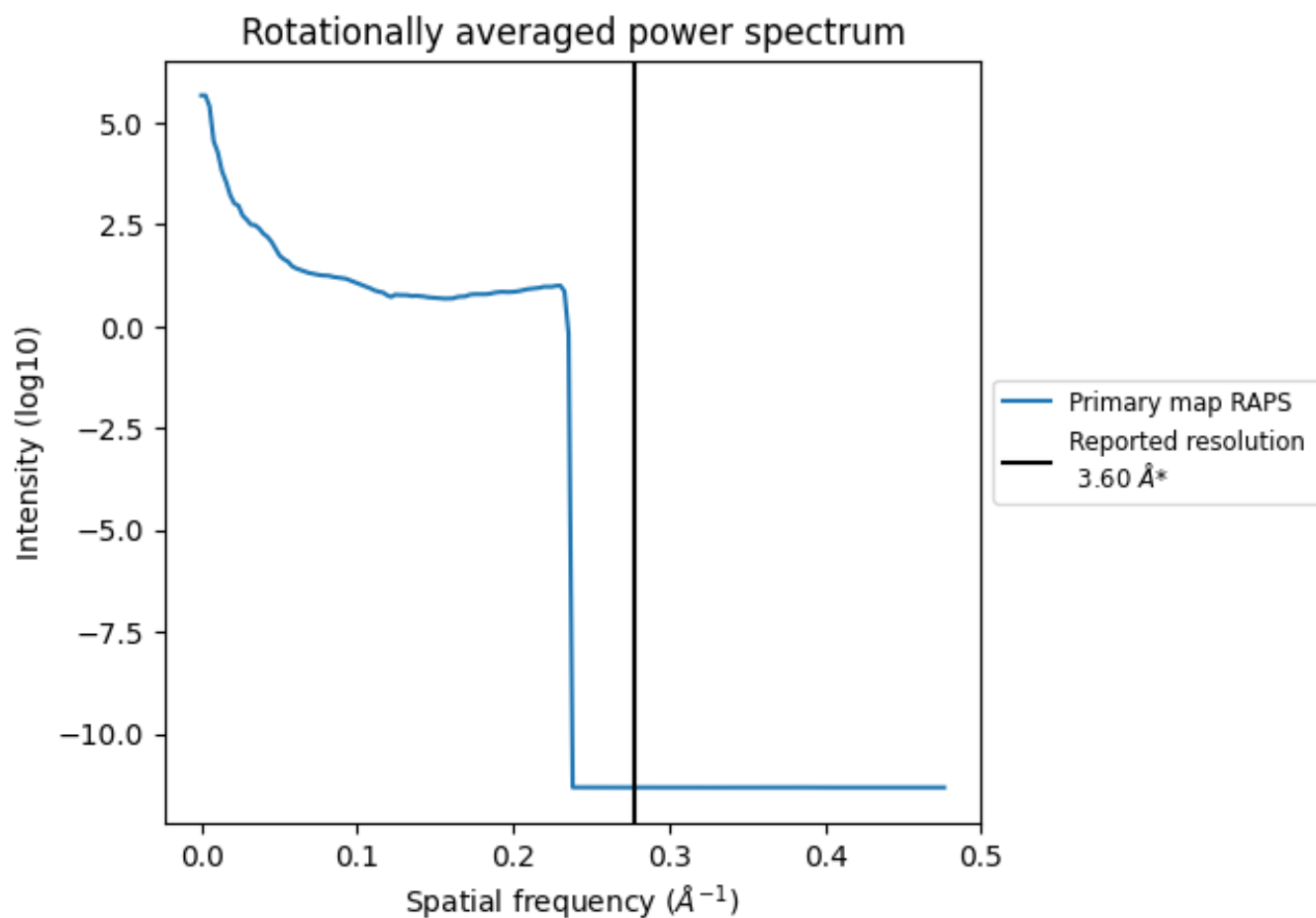
## 7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 2151  $\text{nm}^3$ ; this corresponds to an approximate mass of 1943 kDa.

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

### 7.3 Rotationally averaged power spectrum [i](#)



\*Reported resolution corresponds to spatial frequency of 0.278 Å<sup>-1</sup>

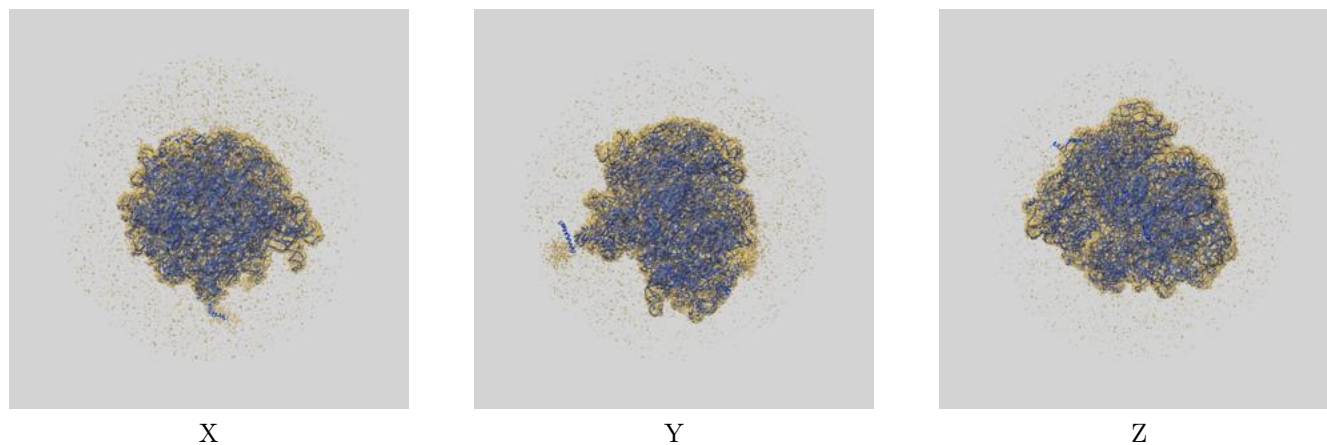
## 8 Fourier-Shell correlation

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

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

This section contains information regarding the fit between EMDB map EMD-6316 and PDB model 3JA1. Per-residue inclusion information can be found in section 3 on page 16.

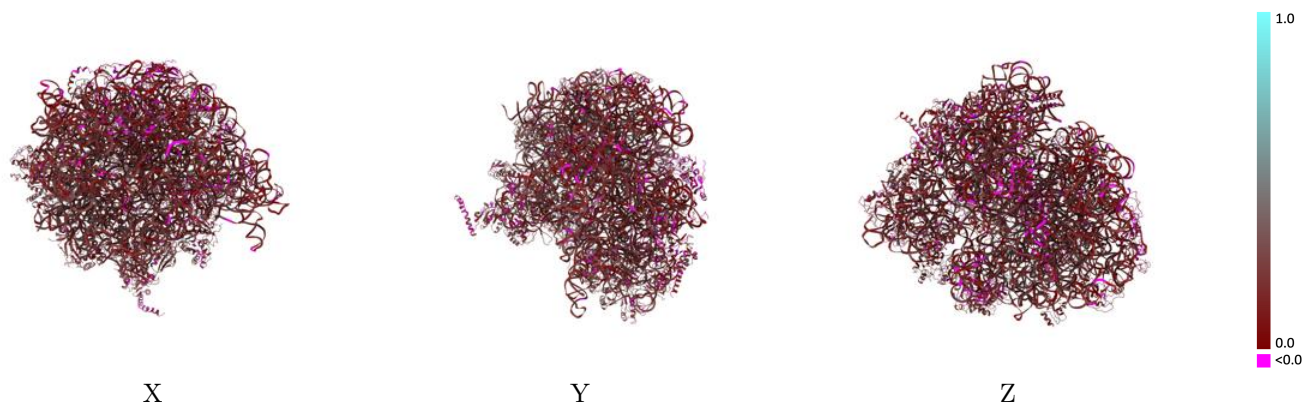
### 9.1 Map-model overlay [i](#)



The images above show the 3D surface view of the map at the recommended contour level 0.03 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.

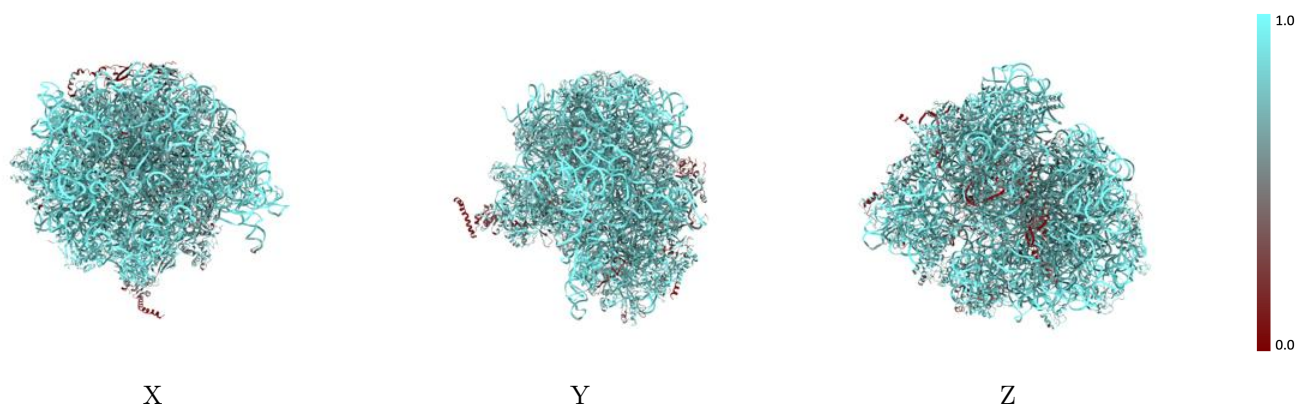


## 9.2 Q-score mapped to coordinate model [i](#)



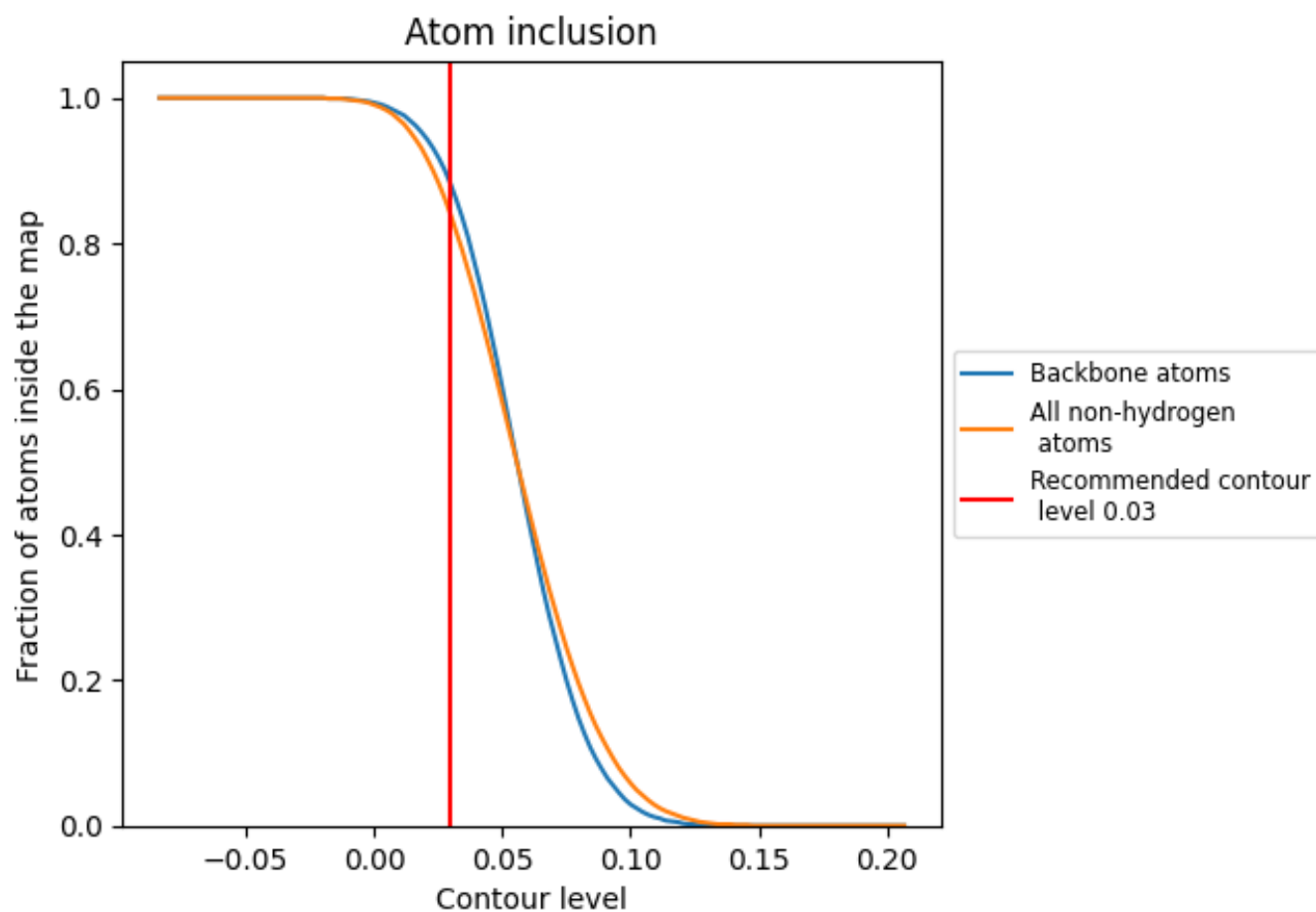
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.03).







































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 88% of all backbone atoms, 84% 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 (0.03) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8380	 0.1980
L0	 0.6980	 0.0780
L1	 0.7940	 0.2550
L2	 0.7100	 0.2320
L3	 0.8130	 0.2120
L4	 0.8010	 0.2200
L5	 0.7130	 0.1580
L6	 0.8310	 0.2520
L7	 0.8390	 0.2520
LA	 0.9060	 0.2080
LB	 0.9630	 0.2520
LC	 0.5670	 0.1420
LD	 0.7030	 0.1620
LE	 0.7480	 0.2040
LF	 0.7470	 0.1930
LG	 0.7990	 0.2160
LH	 0.7970	 0.2420
LI	 0.2460	 0.0930
LJ	 0.3820	 0.1930
LK	 0.6220	 0.1940
LL	 0.8150	 0.2350
LM	 0.6190	 0.1840
LN	 0.8070	 0.2280
LO	 0.8130	 0.2710
LP	 0.7750	 0.1480
LQ	 0.8970	 0.2430
LR	 0.6620	 0.1500
LS	 0.8280	 0.2360
LT	 0.8120	 0.2220
LU	 0.7360	 0.1850
LV	 0.6940	 0.1090
LW	 0.8190	 0.1440
LX	 0.8420	 0.2880
LY	 0.7770	 0.2540
LZ	 0.7590	 0.1900



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Chain	Atom inclusion	Q-score
S1	 0.4400	 0.1220
S2	 0.8660	 0.1970
S3	 0.6700	 0.2040
SA	 0.9160	 0.1960
SB	 0.6690	 0.1540
SC	 0.7290	 0.2070
SD	 0.7940	 0.1780
SE	 0.7070	 0.1600
SF	 0.5420	 0.0470
SG	 0.6780	 0.1610
SH	 0.7280	 0.1580
SI	 0.8110	 0.1870
SJ	 0.7180	 0.1920
SK	 0.6980	 0.1770
SL	 0.7100	 0.2180
SM	 0.7300	 0.2250
SN	 0.8280	 0.2130
SO	 0.7480	 0.1270
SP	 0.8020	 0.1580
SQ	 0.7300	 0.1010
SR	 0.7280	 0.1310
SS	 0.7450	 0.2230
ST	 0.7890	 0.1410
SU	 0.6040	 0.1850