



wwPDB EM Validation Summary Report ⓘ

Dec 12, 2022 – 10:40 AM EST

PDB ID : 5KPX
EMDB ID : EMD-8282
Title : Structure of RelA bound to ribosome in presence of A/R tRNA (Structure IV)
Authors : Loveland, A.B.; Bah, E.; Madireddy, R.; Zhang, Y.; Brilot, A.F.; Grigorieff, N.; Korostelev, A.A.
Deposited on : 2016-07-05
Resolution : 3.90 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

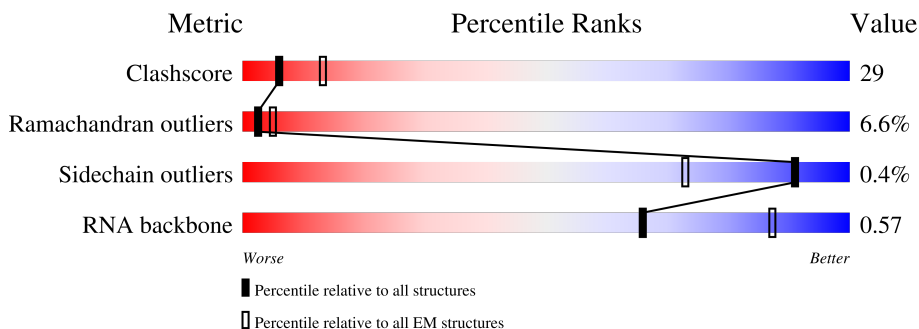
EMDB validation analysis : 0.0.1.dev43
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.31.2

1 Overall quality at a glance i

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

The reported resolution of this entry is 3.90 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 ≥ 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	A	273	44% (green), 51% (yellow), 5% (orange), 0% (red), 0% (grey)
2	B	209	44% (green), 56% (yellow), 0% (orange), 0% (red), 0% (grey)
3	C	201	5% (red), 36% (green), 58% (yellow), 6% (orange), 0% (grey)
4	D	179	39% (green), 57% (yellow), 0% (orange), 0% (red), 0% (grey)
5	E	177	45% (green), 53% (yellow), 0% (orange), 0% (red), 0% (grey)
6	F	149	38% (green), 55% (yellow), 7% (orange), 0% (red), 0% (grey)
7	G	165	24% (green), 50% (yellow), 21% (grey), 0% (orange), 0% (red)


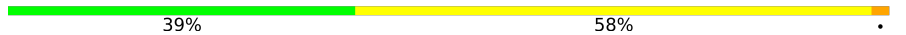
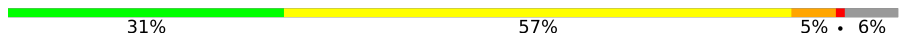
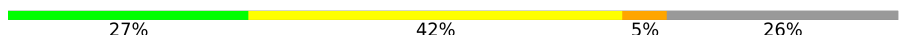


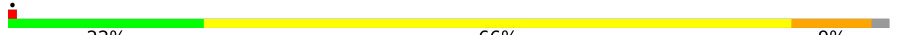
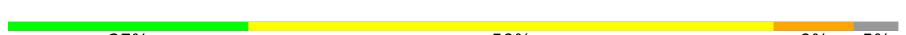



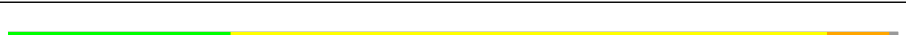

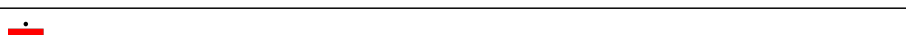
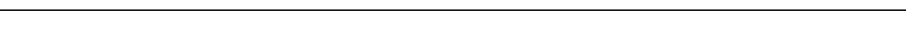
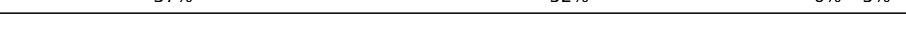
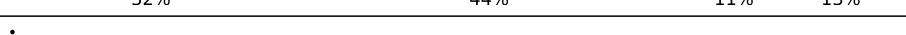
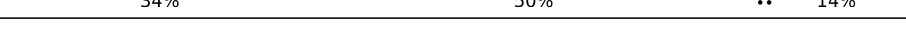

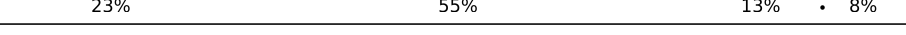




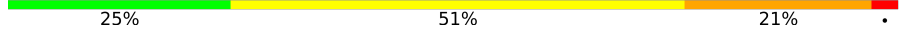
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Mol	Chain	Length	Quality of chain
8	H	142	
9	I	142	
10	J	123	
11	K	144	
12	L	136	
13	M	127	
14	N	117	
15	O	115	
16	P	118	
17	Q	103	
18	R	110	
19	S	100	
20	T	104	
21	U	94	
22	V	85	
23	W	78	
24	X	63	
25	Y	59	
26	Z	70	
27	1	57	
28	2	55	
29	3	46	
30	4	65	
31	5	38	
32	6	241	

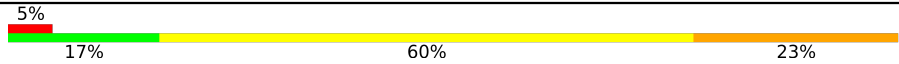

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Mol	Chain	Length	Quality of chain
33	7	233	
34	8	206	
35	9	167	
36	10	135	
37	11	179	
38	12	130	
39	13	130	
40	14	103	
41	15	129	
42	16	124	
43	17	118	
44	18	101	
45	19	89	
46	20	82	
47	21	84	
48	22	75	
49	23	92	
50	24	87	
51	25	71	
52	26	1539	
53	27	2903	
54	28	120	
55	29	20	
56	30	76	
57	31	77	

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Mol	Chain	Length	Quality of chain
58	32	77	
59	33	750	

2 Entry composition [i](#)

There are 59 unique types of molecules in this entry. The entry contains 154603 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 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	271	2082	1288	423	364	7	0	0

- Molecule 2 is a protein called 50S ribosomal protein L3.

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

- Molecule 3 is a protein called 50S ribosomal protein L4.

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

- Molecule 4 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	177	1410	899	249	256	6	0	0

- Molecule 5 is a protein called 50S ribosomal protein L6.

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

- Molecule 6 is a protein called 50S ribosomal protein L9.

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

- Molecule 7 is a protein called 50S ribosomal protein L10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	G	131	988	625	175	183	5	0	0

- Molecule 8 is a protein called 50S ribosomal protein L11.

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

- Molecule 9 is a protein called 50S ribosomal protein L13.

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

- Molecule 10 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	J	122	938	587	180	165	6	0	0

- Molecule 11 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	K	143	1045	649	206	189	1	0	0

- Molecule 12 is a protein called 50S ribosomal protein L16.

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

- Molecule 13 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	M	120	960	593	196	166	5	0	0

- Molecule 14 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
14	N	116	892	552	178	162	0	0

- Molecule 15 is a protein called 50S ribosomal protein L19.

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

- Molecule 16 is a protein called 50S ribosomal protein L20.

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

- Molecule 17 is a protein called 50S ribosomal protein L21.

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

- Molecule 18 is a protein called 50S ribosomal protein L22.

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

- Molecule 19 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	S	93	738	466	139	131	2	0	0

- Molecule 20 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
20	T	102	779	492	146	141	0	0

- Molecule 21 is a protein called 50S ribosomal protein L25.

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

- Molecule 22 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	V	75	Total	C	N	O	S	0	0
			575	356	116	102	1		

- Molecule 23 is a protein called 50S ribosomal protein L28.

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

- Molecule 24 is a protein called 50S ribosomal protein L29.

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

- Molecule 25 is a protein called 50S ribosomal protein L30.

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

- Molecule 26 is a protein called 50S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	Z	66	Total	C	N	O	S	0	0
			522	323	99	94	6		

- Molecule 27 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	1	56	Total	C	N	O	S	0	0
			444	269	94	80	1		

- Molecule 28 is a protein called 50S ribosomal protein L33.

Mol	Chain	Residues	Atoms				AltConf	Trace
28	2	50	Total	C	N	O	0	0
			409	263	75	71		

- Molecule 29 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	3	46	Total	C	N	O	S	0	0
			377	228	90	57	2		

- Molecule 30 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	4	64	Total	C	N	O	S	0	0
			504	323	105	74	2		

- Molecule 31 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	5	38	Total	C	N	O	S	0	0
			302	185	65	48	4		

- Molecule 32 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	6	218	Total	C	N	O	S	0	0
			1704	1081	305	311	7		

- Molecule 33 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	7	206	Total	C	N	O	S	0	0
			1624	1028	305	288	3		

- Molecule 34 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	8	205	Total	C	N	O	S	0	0
			1643	1026	315	298	4		

- Molecule 35 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	9	157	1156	719	218	213	6	0	0

- Molecule 36 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
36	10	100	817	515	148	148	6	0	0

- Molecule 37 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
37	11	151	1181	735	227	215	4	0	0

- Molecule 38 is a protein called 30S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
38	12	129	979	616	173	184	6	0	0

- Molecule 39 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
39	13	127	1022	634	206	179	3	0	0

- Molecule 40 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
40	14	98	786	493	150	142	1	0	0

- Molecule 41 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
41	15	116	869	535	173	158	3	0	0

- Molecule 42 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
42	16	123	955	590	196	165	4	0	0

- Molecule 43 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
43	17	114	883	546	178	156	3	0	0

- Molecule 44 is a protein called 30S ribosomal protein S14.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
44	18	100	805	499	164	139	3	0	0

- Molecule 45 is a protein called 30S ribosomal protein S15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
45	19	88	714	439	144	130	1	0	0

- Molecule 46 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
46	20	82	649	406	128	114	1	0	0

- Molecule 47 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
47	21	80	648	411	121	113	3	0	0

- Molecule 48 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
48	22	65	535	339	100	95	1	0	0

- Molecule 49 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	23	79	Total	C	N	O	S	0	0
			637	408	120	107	2		

- Molecule 50 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	24	85	Total	C	N	O	S	0	0
			665	411	137	114	3		

- Molecule 51 is a protein called 30S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	25	65	Total	C	N	O	S	0	0
			544	335	117	91	1		

- Molecule 52 is a RNA chain called 16S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	26	1539	Total	C	N	O	P	0	0
			33016	14725	6052	10700	1539		

- Molecule 53 is a RNA chain called 23S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	27	2903	Total	C	N	O	P	0	0
			62322	27801	11468	20150	2903		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
27	747	C	U	conflict	GB 802133627
27	1847	G	A	conflict	GB 802133627

- Molecule 54 is a RNA chain called 5S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
54	28	120	Total	C	N	O	P	0	0
			2572	1145	471	836	120		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
28	120	A	-	conflict	GB 1028475309

- Molecule 55 is a RNA chain called mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
55	29	20	432	195	86	132	19	0	0

- Molecule 56 is a RNA chain called A-site tRNAPhe.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
56	30	76	1623	723	290	534	76	0	0

- Molecule 57 is a RNA chain called P-site tRNAfMet.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
57	31	77	1644	732	297	538	77	0	0

- Molecule 58 is a RNA chain called E-site tRNAfMet.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
58	32	77	1643	732	297	537	77	0	0

- Molecule 59 is a protein called GTP pyrophosphokinase.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
59	33	675	4911	3070	904	915	22	0	0

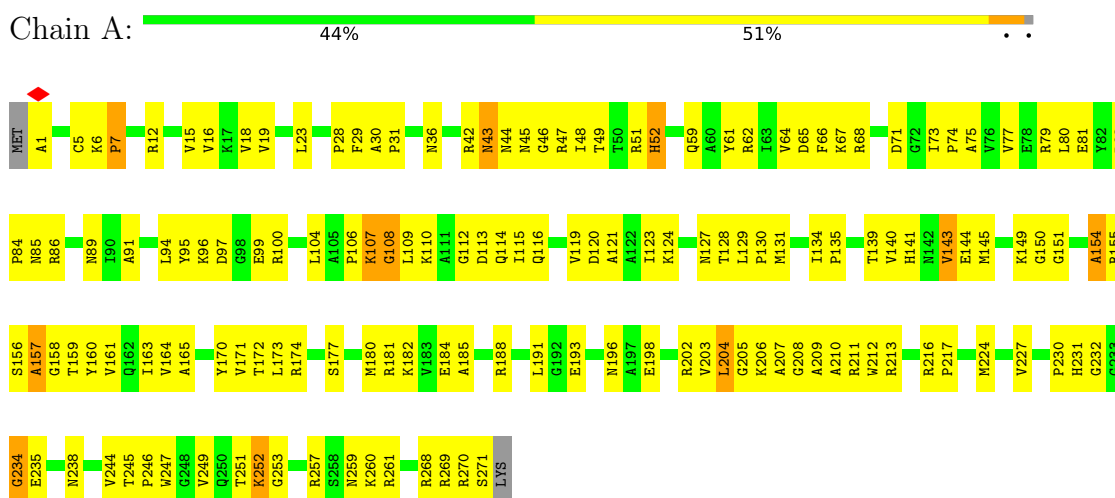
There are 7 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
33	-5	MET	-	expression tag	UNP P0AG20
33	-4	HIS	-	expression tag	UNP P0AG20
33	-3	HIS	-	expression tag	UNP P0AG20
33	-2	HIS	-	expression tag	UNP P0AG20
33	-1	HIS	-	expression tag	UNP P0AG20
33	0	HIS	-	expression tag	UNP P0AG20
33	1	HIS	-	expression tag	UNP P0AG20

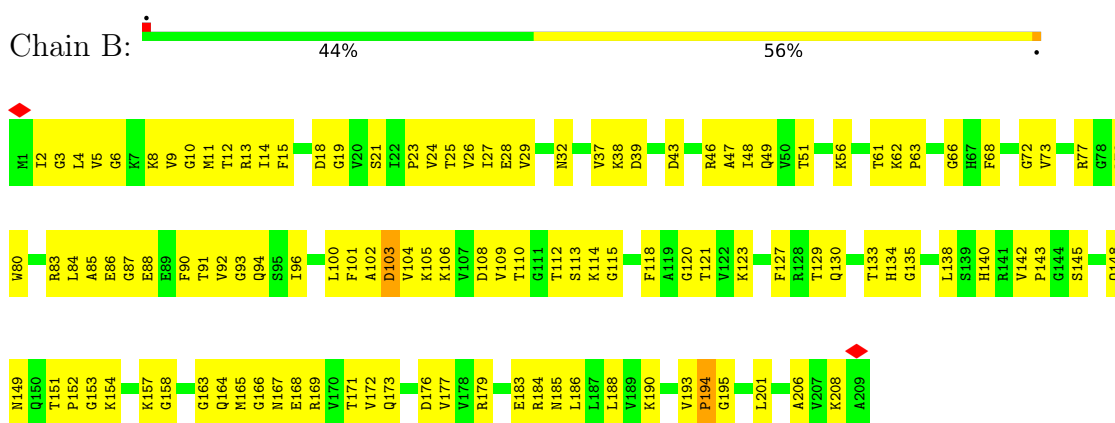
3 Residue-property plots

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.

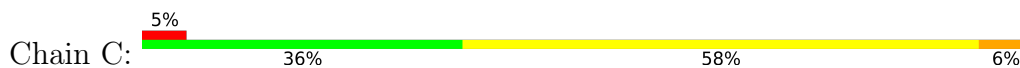
- Molecule 1: 50S ribosomal protein L2

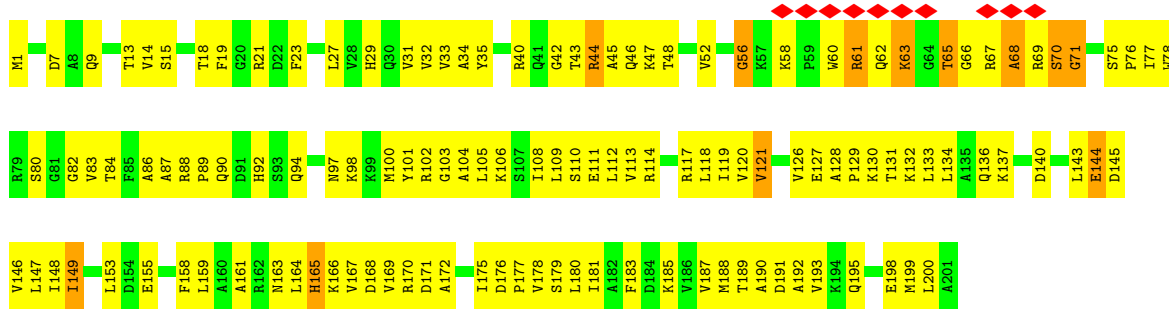


- Molecule 2: 50S ribosomal protein L3

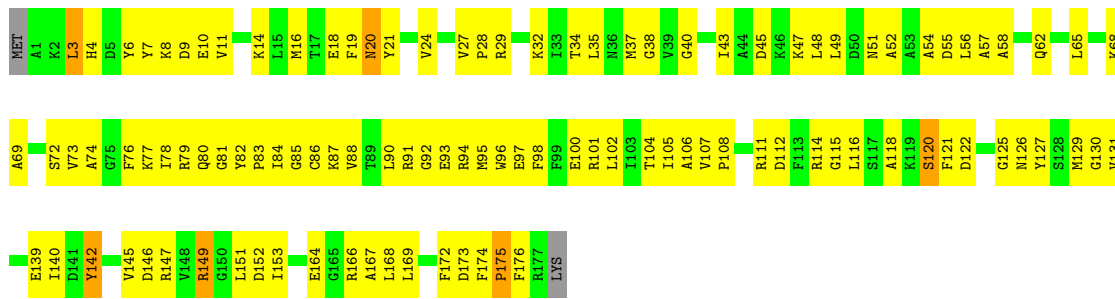
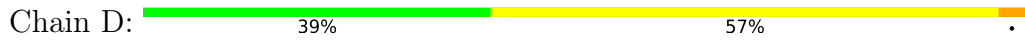


- Molecule 3: 50S ribosomal protein L4

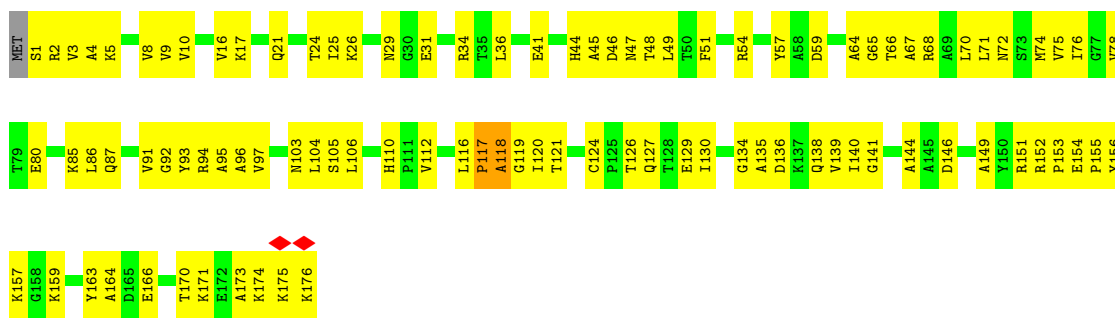




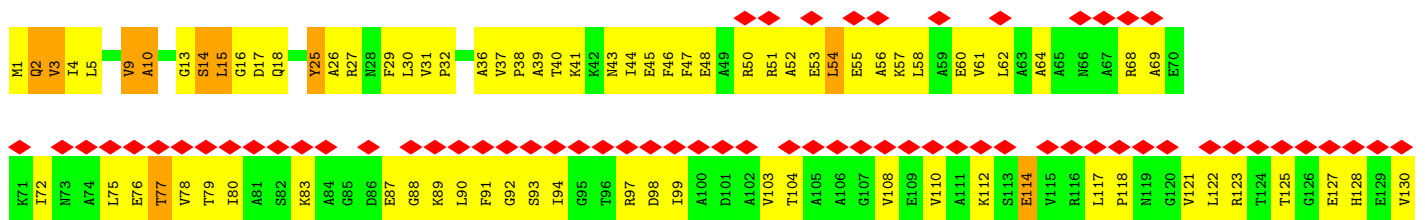
• Molecule 4: 50S ribosomal protein L5

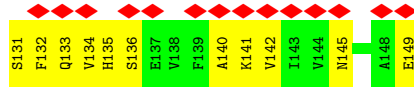


• Molecule 5: 50S ribosomal protein L6

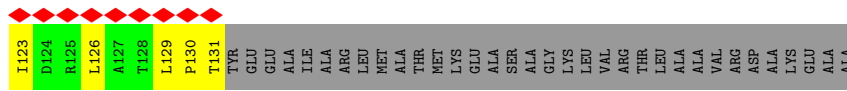
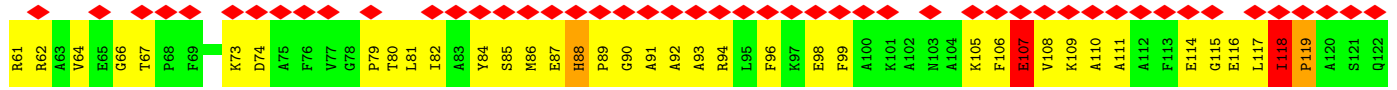
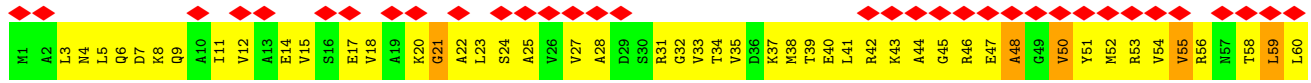


• Molecule 6: 50S ribosomal protein L9

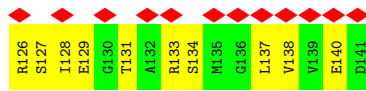
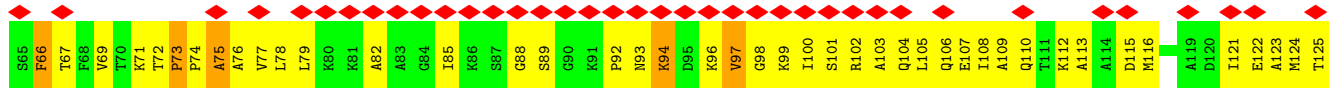
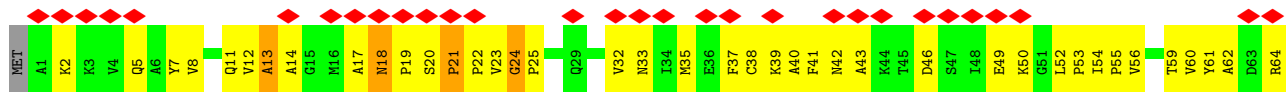




• Molecule 7: 50S ribosomal protein L10



• Molecule 8: 50S ribosomal protein L11

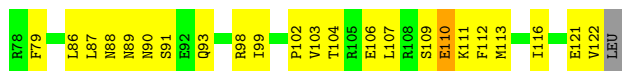


• Molecule 9: 50S ribosomal protein L13



• Molecule 10: 50S ribosomal protein L14

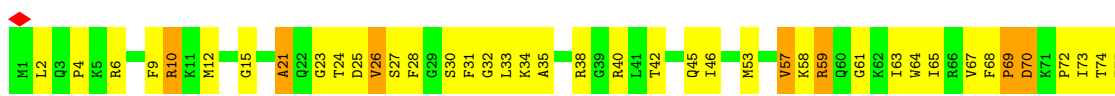




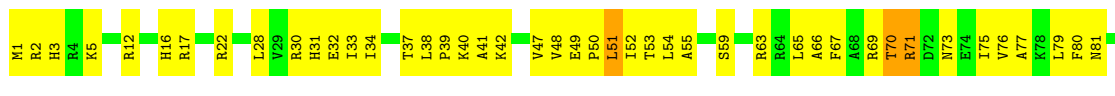
• Molecule 11: 50S ribosomal protein L15



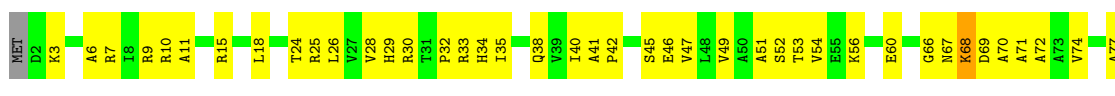
• Molecule 12: 50S ribosomal protein L16



• Molecule 13: 50S ribosomal protein L17

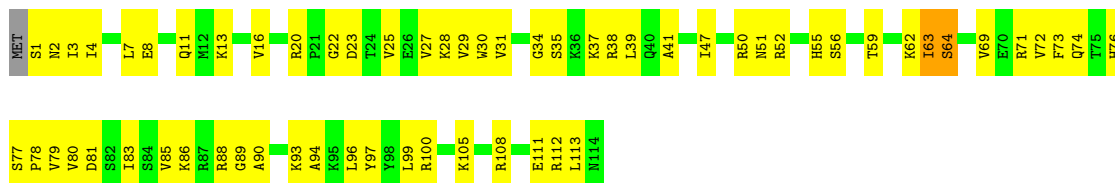


• Molecule 14: 50S ribosomal protein L18

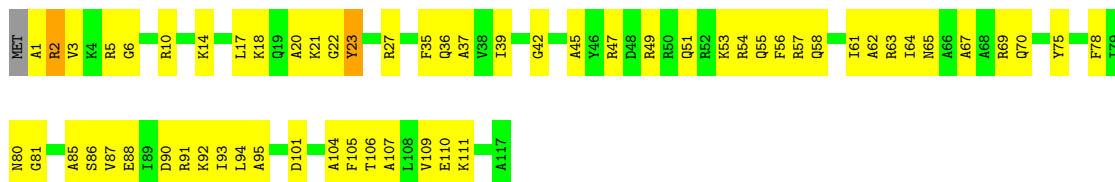


• Molecule 15: 50S ribosomal protein L19

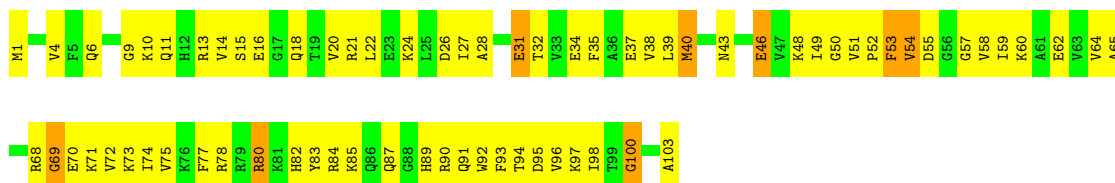
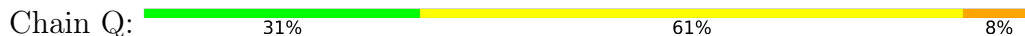




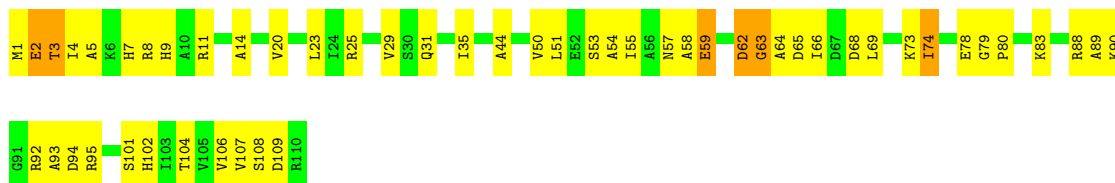
• Molecule 16: 50S ribosomal protein L20



• Molecule 17: 50S ribosomal protein L21



• Molecule 18: 50S ribosomal protein L22

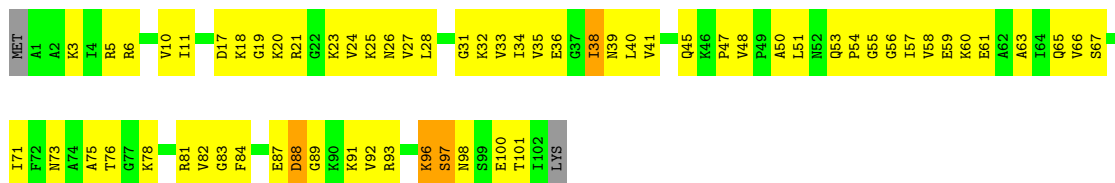


• Molecule 19: 50S ribosomal protein L23

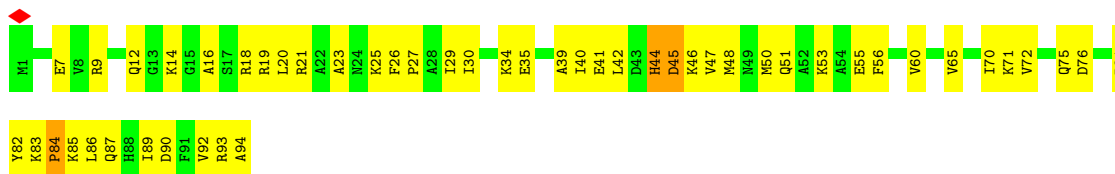


• Molecule 20: 50S ribosomal protein L24

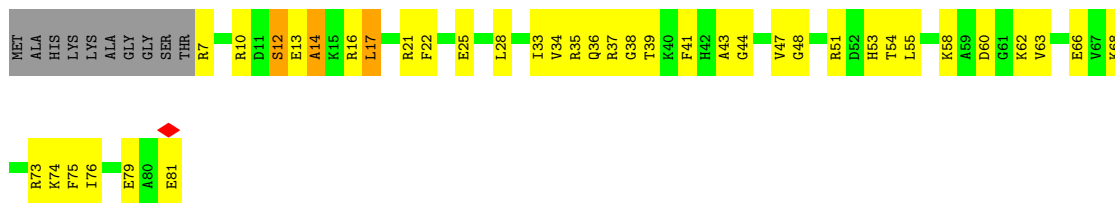




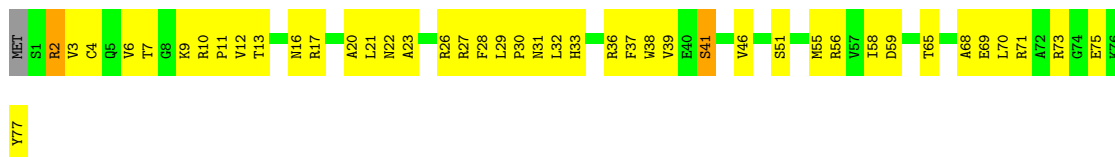
- Molecule 21: 50S ribosomal protein L25



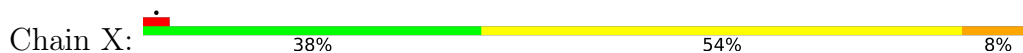
- Molecule 22: 50S ribosomal protein L27



- Molecule 23: 50S ribosomal protein L28

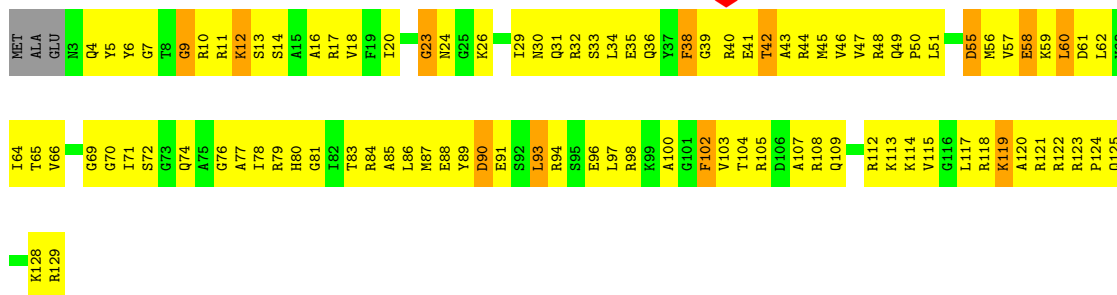
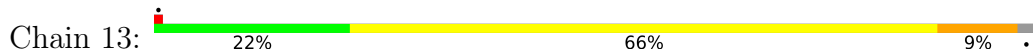


- Molecule 24: 50S ribosomal protein L29

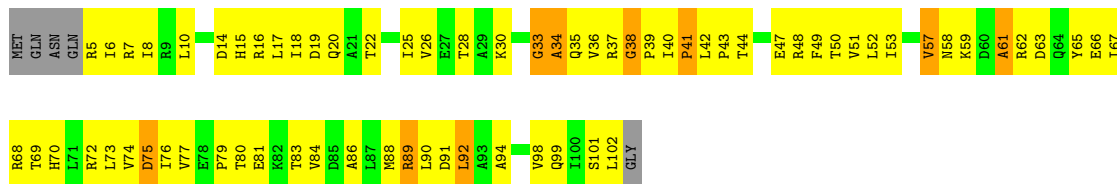


- Molecule 25: 50S ribosomal protein L30

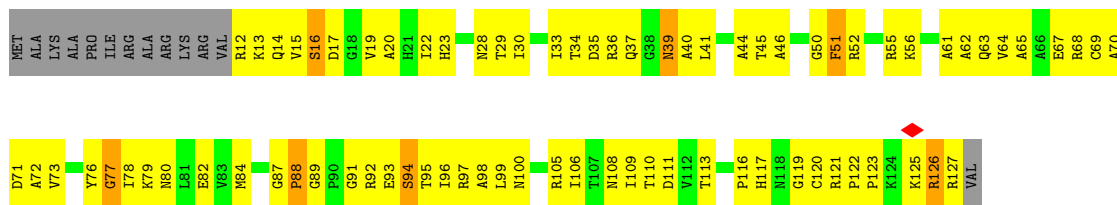




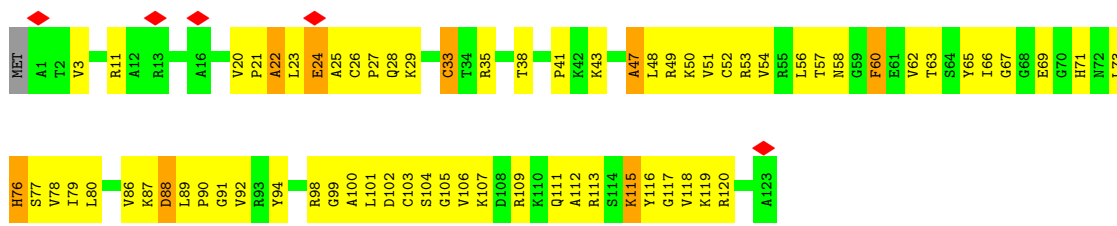
• Molecule 40: 30S ribosomal protein S10



• Molecule 41: 30S ribosomal protein S11



• Molecule 42: 30S ribosomal protein S12

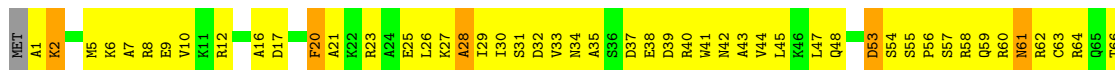


• Molecule 43: 30S ribosomal protein S13





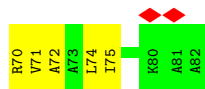
• Molecule 44: 30S ribosomal protein S14



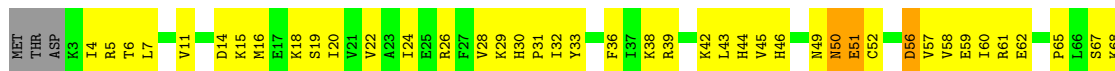
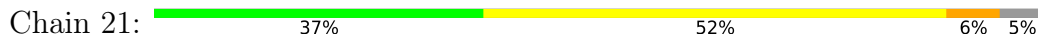
• Molecule 45: 30S ribosomal protein S15



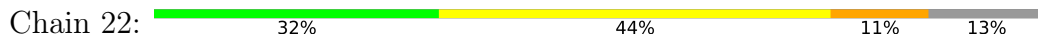
• Molecule 46: 30S ribosomal protein S16

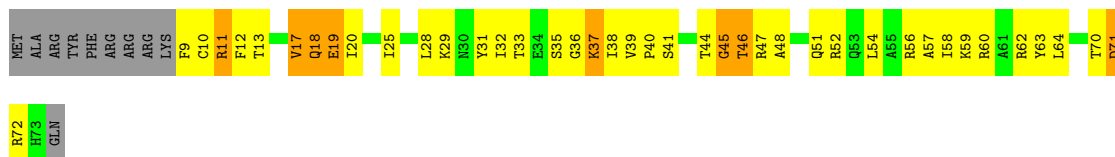


• Molecule 47: 30S ribosomal protein S17

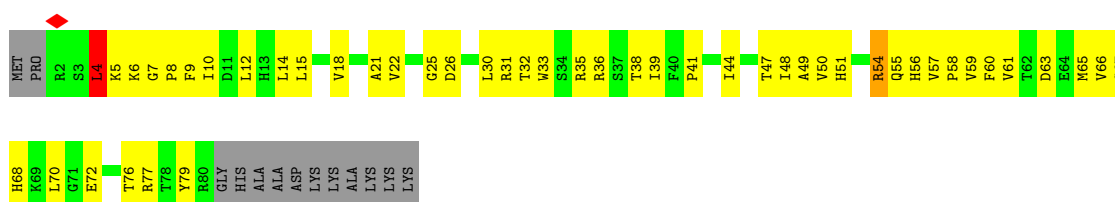


• Molecule 48: 30S ribosomal protein S18





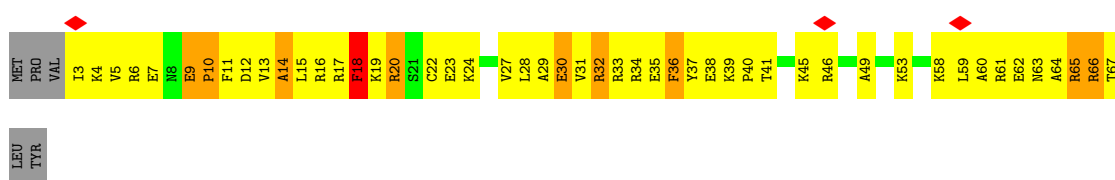
• Molecule 49: 30S ribosomal protein S19



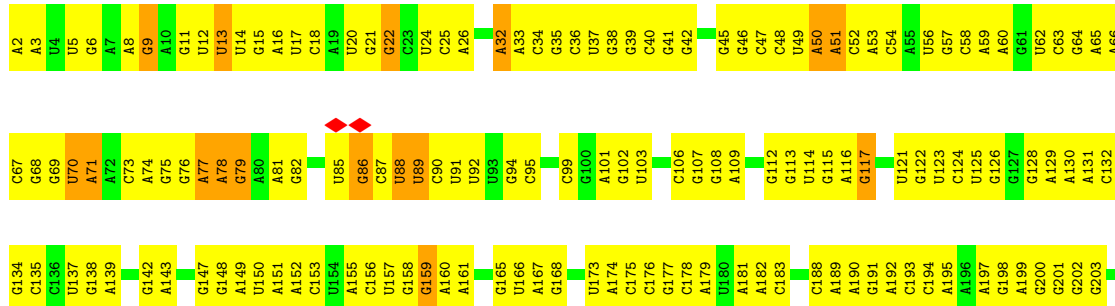
• Molecule 50: 30S ribosomal protein S20



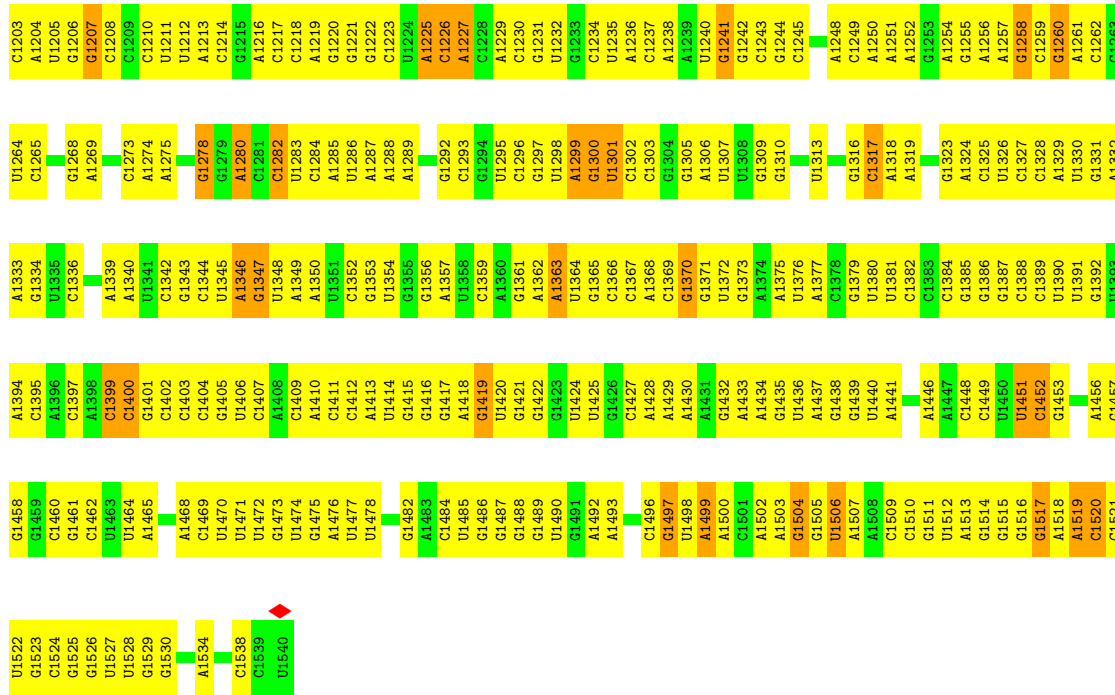
• Molecule 51: 30S ribosomal protein S21



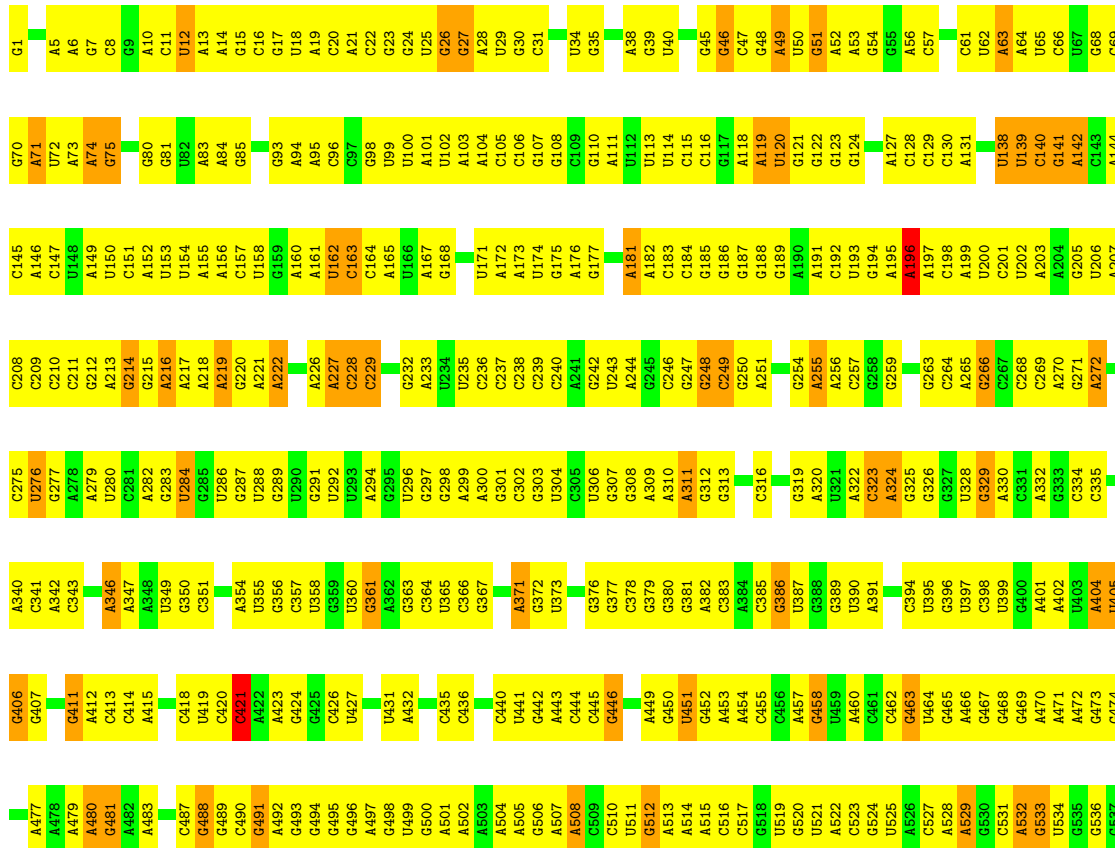
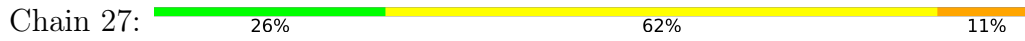
• Molecule 52: 16S ribosomal RNA



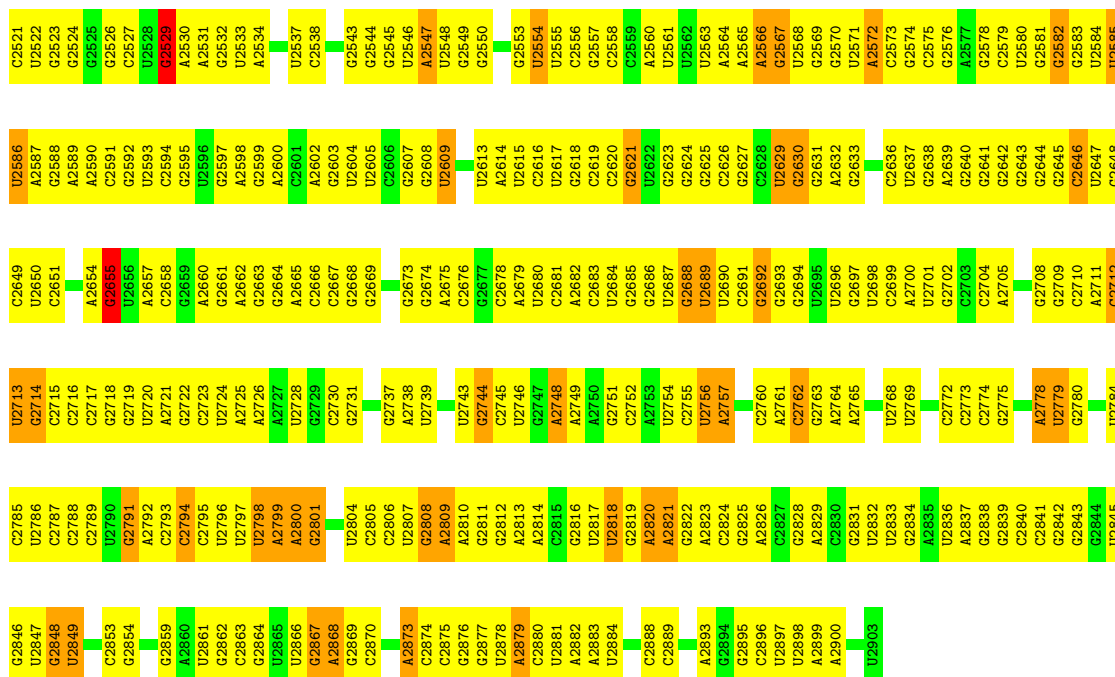
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C271	C277	G278	C279	A280	G281	C284	C285	C286	U287	A288	G289	C290	U291	G292	C295	U296	G297	A298	G299	A300	G301	G305	U306	C307	A308	C309	G310	C311	C312	A313	C314	A315	C316	U317	G318	G319	A320	A321	C322	U323	G324	A325	G326	G327	C328	A329	C330	G331	C332	U333	G334	C335	A336	G337	A338																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
C339	U340	C341	C342	U343	A344	C345	G346	A349	G350	C351	G352	A353	G354	C355	U356	U357	A358	C359	G360	A361	G362	A363	A364	U367	U368	U369	U370	U371	U372	U373	U374	U375	U376	U377	U378	C379	G380	A381	A382	A383	G384	C385	A389	U390	G391	C392	A393	G394	C395	G396	U397	U398	C399	U400	U401	U402																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
C403	G404	U405	G406	U407	A408	U409	G410	A411	A412	U413	A414	C418	C419	U420	U421	U422	U423	U424	U425	U426	U427	U428	U429	A430	A431	U432	U433	U434	U435	U436	U437	U438	U439	U440	U441	U442	C443	G444	U448	U449	U450	A451	A452	G453	U458	A459	A460	A461	U462	U463	U464	A465	A466	U467	A468																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
C469	C470	U471	U472	U473	U474	C475	U476	U477	A478	U479	U480	U481	A482	U483	U484	U485	U486	U487	U488	U489	C490	U491	U492	U493	U494	U495	U496	U497	U498	U499	U500	U501	U502	U503	U504	U505	A510	C511	U512	C513	C514	U515	U516	U517	C518	C519	A520	G521	G522	A523	U524	U525	U526	U527	U528	U529	U530	U531																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
A532	A533	U534	C535	C536	G537	U538	A539	G540	G541	G542	U543	U544	C545	A546	A547	U548	U549	U550	U551	U552	A553	A554	U555	U556	U557	U558	A559	U560	U561	U562	A563	U564	U565	U566	U567	U568	U569	A570	A571	A572	A573	A574	U575	U576	U577	U578	U579	C580	U581	G584	U585	U586	U587	U588	U589	U590	U591	U592	U593	U594	U595	U596	U597	U598	U599	U600	U601	U602	U603	U604	U605	U606	U607	U608	U609	U610	U611	U612	U613	U614	U615	U616	U617	U618	U619	U620	U621	U622	U623	U624	U625	U626	U627	U628	U629	U630	U631	U632	U633	U634	U635	U636	U637	U638	U639	U640	U641	U642	U643	U644	U645	U646	U647	U648	U649	U650	U651	U652	U653	U654	U655	U656	U657	U658	U659	U660	U661	U662	U663	U664	U665	U666	U667	U668	U669	U670	U671	U672	U673	U674	U675	U676	U677	U678	U679	U680	U681	U682	U683	U684	U685	U686	U687	U688	U689	U690	U691	U692	U693	U694	U695	U696	U697	U698	U699	U700	U701	U702	U703	U704	U705	U706	U707	U708	U709	U710	U711	U712	U713	U714	U715	U716	U717	U718	U719	U720	U721	U722	U723	U724	U725	U726	U727	U728	U729	U730	U731	U732	U733	U734	U735	U736	U737	U738	U739	U740	U741	U742	U743	U744	U745	U746	U747	U748	U749	U750	U751	U752	U753	U754	U755	U756	U757	U758	U759	U760	U761	U762	U763	U764	U765	U766	U767	U768	U769	U770	U771	U772	U773	U774	U775	U776	U777	U778	U779	U780	U781	U782	U783	U784	U785	U786	U787	U788	U789	U790	U791	U792	U793	U794	U795	U796	U797	U798	U799	U800	U801	U802	U803	U804	U805	U806	U807	U808	U809	U810	U811	U812	U813	U814	U815	U816	U817	U818	U819	U820	U821	U822	U823	U824	U825	U826	U827	U828	U829	U830	U831	U832	U833	U834	U835	U836	U837	U838	U839	U840	U841	U842	U843	U844	U845	U846	U847	U848	U849	U850	U851	U852	U853	U854	U855	U856	U857	U858	U859	U860	U861	U862	U863	U864	U865	U866	U867	U868	U869	U870	U871	U872	U873	U874	U875	U876	U877	U878	U879	U880	U881	U882	U883	U884	U885	U886	U887	U888	U889	U890	U891	U892	U893	U894	U895	U896	U897	U898	U899	U900	U901	U902	U903	U904	U905	U906	U907	U908	U909	U910	U911	U912	U913	U914	U915	U916	U917	U918	U919	U920	U921	U922	U923	U924	U925	U926	U927	U928	U929	U930	U931	U932	U933	U934	U935	U936	U937	U938	U939	U940	U941	U942	U943	U944	U945	U946	U947	U948	U949	U950	U951	U952	U953	U954	U955	U956	U957	U958	U959	U960	U961	U962	U963	U964	U965	U966	U967	U968	U969	U970	U971	U972	U973	U974	U975	U976	U977	U978	U979	U980	U981	U982	U983	U984	U985	U986	U987	U988	U989	U990	U991	U992	U993	U994	U995	U996	U997	U998	U999	U1000	U1001	U1002	U1003	U1004	U1005	U1006	U1007	U1008	U1009	U1010	U1011	U1012	U1013	U1014	U1015	U1016	U1017	U1018	U1019	U1020	U1021	U1022	U1023	U1024	U1025	U1026	U1027	U1028	U1029	U1030	U1031	U1032	U1033	U1034	U1035	U1036	U1037	U1038	U1039	U1040	U1041	U1042	U1043	U1044	U1045	U1046	U1047	U1048	U1049	U1050	U1051	U1052	U1053	U1054	U1055	U1056	U1057	U1058	U1059	U1060	U1061	U1062	U1063	U1064	U1065	U1066	U1067	U1068	U1069	U1070	U1071	U1072	U1073
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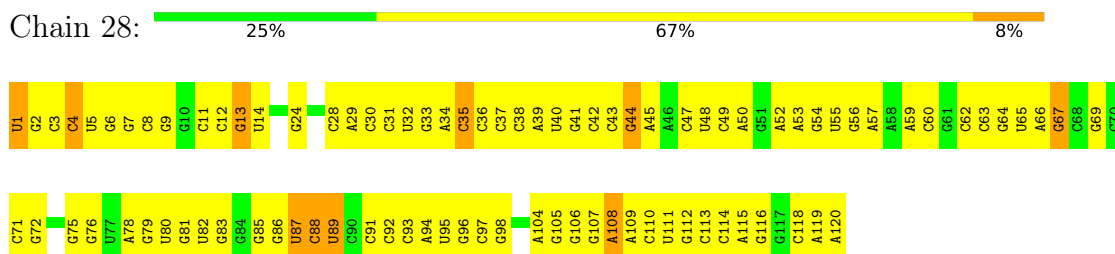
• Molecule 53: 23S ribosomal RNA



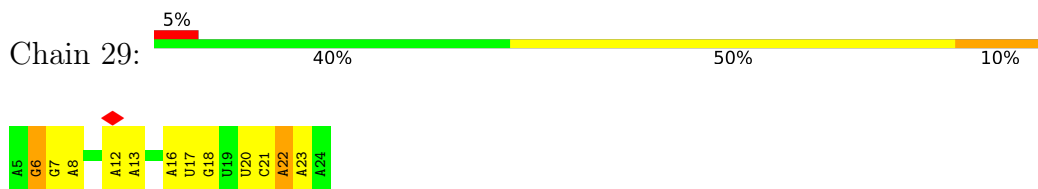
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C2456	U2390	A2247	U2182	G2116	C1908	C1838	U1775	G1699	G1633
U2460	G2391	C2248	U2185	A2117	C1909	G1839	G1776	A1706	U1636
A2461	A2392	U2249	U2188	U2118	G1910	G1840	U1777	C1705	U1563
C2462	G2393	G2250	C2186	A2119	A2051	G1841	U1778	G1707	C1564
C2463	A2394	G2251	U2187	G2120	A1912	C1842	U1779	C1708	C1565
C2466	G2395	G2252	U2188	G2121	A1913	C1843	A1780	U1709	A1566
C2467	U2329	U2256	U2189	G2122	C1914	C1844	U1781	G1710	G1567
A2468	G2330	G2257	G2190	U2123	U1915	G1845	U1782	U1708	A1640
A2469	G2331	C2258	A2191	G2124	A1916	G1846	A1783	U1714	A1641
G2470	G2332	C2258	G2125	U2125	U1917	G1847	A1784	U1713	U1647
G2471	A2333	C2261	A2126	U2126	U1923	G1848	A1785	G1715	U1648
G2472	U2334	U2262	G2127	A2127	G1924	G1849	U1786	U1716	G1661
G2475	A2335	U2263	G2128	U2128	C1925	A1850	U1787	U1720	A1652
A2476	G2336	C2264	U2129	C2063	U1926	A1851	C1788	G1721	G1653
U2477	G2337	U2265	G2130	C2064	G1929	G1852	A1789	U1725	C1575
C2480	C2338	A2267	U2131	U2130	G1930	G1853	U1790	C1726	U1576
G2481	C2339	G2268	U2132	U2131	U1931	A1854	C1791	U1727	C1577
A2482	A2340	G2269	G2133	C2065	A1932	G1855	G1792	C1728	U1578
C2483	G2341	A2270	A2134	U2068	G1933	G1856	C1793	U1729	U1584
C2484	U2408	G2271	U2135	G2069	C1934	U1857	A1801	U1730	C1585
G2485	G2409	U2272	G2136	G2070	G1935	U1858	A1802	G1731	A1586
G2486	G2410	A2273	U2137	A2071	A1936	G1859	A1803	U1732	G1587
G2487	C2411	C2274	G2138	C2072	A1937	G1860	C1804	C1733	A1591
G2488	C2412	G2275	U2139	C2073	A1938	C1861	A1804	G1734	C1592
G2489	U2413	U2276	A2142	U2074	G1939	G1862	A1805	U1735	A1599
G2490	G2414	C2277	C2143	U2075	C1940	U1863	A1806	A1736	U1599
G2491	U2415	A2278	G2144	U2076	U1941	C1864	A1807	U1737	C1600
G2494	C2416	C2279	C2145	U2077	C1942	U1865	A1808	G1738	A1603
G2495	U2417	G2280	U2146	A2080	U1943	G1866	A1809	U1748	C1604
G2496	A2418	U2281	A2147	U2081	U1944	C1867	A1810	A1749	C1605
G2497	U2419	C2282	G2148	A2082	G1945	U1868	A1811	U1750	C1606
G2498	C2420	G2283	U2149	C2083	U1946	C1869	A1812	G1751	C1607
G2499	G2421	A2284	C2150	U2084	G1947	U1870	A1813	U1752	C1608
G2500	U2422	C2285	U2151	C2085	U1948	C1871	A1814	A1753	A1608
G2501	C2423	G2286	C2152	U2086	G1949	U1872	A1815	U1754	A1609
G2502	U2424	A2287	U2153	U2087	U1950	C1873	A1816	A1755	A1610
A2503	C2425	C2288	U2154	U2088	A1951	U1874	A1817	G1756	G1681
U2504	U2426	U2289	G2155	G2087	A1952	C1874	A1818	U1757	G1682
G2505	A2427	A2290	C2156	A2088	A1953	C1875	A1819	U1758	U1683
U2506	G2428	G2291	U2157	C2089	G1954	U1876	A1820	A1759	C1612
C2507	U2429	U2292	G2158	C2090	U1955	A1877	A1821	C1760	A1613
G2508	A2430	C2293	A2159	U2091	U1956	U1878	A1822	C1761	C1685
G2509	G2431	G2294	C2160	C2092	C1957	C1879	G1823	A1762	C1686
C2510	U2432	U2295	C2161	U2093	C1958	U1880	A1815	U1763	A1616
U2511	A2433	C2296	G2162	G2094	G1959	C1881	A1816	C1764	U1688
C2512	G2434	A2297	U2163	A2094	U1960	U1882	A1817	U1765	A1618
A2513	U2435	U2298	C2164	U2095	A1961	C1883	A1818	C1766	A1689
U2514	G2436	C2300	U2165	C2096	C1962	U1884	A1819	U1767	A1690
C2515	C2437	U2305	U2166	U2097	U1963	U1885	A1820	G1768	C1691
A2516	G2438	A2309	G2167	U2098	G1964	C1886	A1821	C1769	U1692
U2517	U2439	U2310	A2168	C2104	U1965	C1887	G1822	U1770	U1693
A2451	G2440	C2311	A2169	U2105	C1966	U1888	G1823	G1771	G1694
C2452	U2441	U2312	A2170	U2106	C1967	C1889	A1824	U1772	G1695
U2518	G2442	C2313	U2171	G2107	U1968	G1890	A1825	C1773	G1696
C2519	U2443	U2314	U2172	A2108	A1969	U1891	G1826	U1774	
U2520	C2444	C2315	A2173	U2109	A1970	G1892	A1827	U1775	
	G2445	U2316	C2174	U2110	U1971	C1893	A1828	U1776	
	U2446	G2317	U2175	U2111	G1972	C1894	A1829	C1777	
	G2447	U2318	A2176	U2112	G1973	U1895	A1830	U1778	
	U2448	C2319	C2177	C2104	C1974	G1896	G1831	A1772	
	G2449	U2320		U2105	C1975	C1897			
	U2450	C2321		U2106	C1976	G1898			
	A2451	U2322		G2107	U1969	C1899			
	C2452	C2323		A2108	A1970	U1890			
	U2453	U2324		U2109	U1971	G1891			
		G2325		U2110	G1972	C1892			
		U2326		U2111	G1973	U1893			
		C2327		U2112	U1974	C1894			
		U2328		U2113	C1975	G1895			
		G2329		U2114	C1976	C1896			
		U2330		U2115	C1977	G1897			
		C2331		U2116	C1978	C1898			
		U2332		U2117	C1979	G1899			
		G2333		U2118	C1980	C1899			
		U2334		U2119	C1981	G1900			
		C2335		U2120	C1982	U1901			
		U2336		U2121	C1983	G1902			
		G2337		U2122	C1984	G1903			
		U2338		U2123	C1985	U1904			
		C2339		U2124	C1986	G1905			
		U2340		U2125	C1987	C1906			
		G2341		U2126	C1988	C1907			
		U2342		U2127	C1989	C1908			
		C2343		U2128	C1990	C1909			
		U2344		U2129	C1991	C1910			
		G2345		U2130	C1992	C1911			
		A2346		U2131	C1993	C1912			
		C2347		U2132	C1994	C1913			
		U2348		U2133	C1995	C1914			
		G2349		U2134	C1996	C1915			
		C2350		U2135	C1997	C1916			
		U2351		U2136	C1998	C1917			
		A2352		U2137	C1999	C1918			
		G2353		U2138	C2000	C1919			
		U2356		U2139	C2001	C1920			
		G2357		U2140	C2002	C1921			
		A2358		U2141	C2003	C1922			
		C2359		U2142	C2004	C1923			
		G2360		U2143	C2005	C1924			
		U2361		U2144	C2006	C1925			
		C2362		U2145	C2007	C1926			
		G2363		U2146	C2008	C1927			
		U2364		U2147	C2009	C1928			
		C2365		U2148	C2010	C1929			
		A2366		U2149	C2011	C1930			
		U2369		U2150	C2012	C1931			
		G2370		U2151	C2013	C1932			
		U2371		U2152	C2014	C1933			
		C2372		U2153	C2015	C1934			
		G2373		U2154	C2016	C1935			
		C2374		U2155	C2017	C1936			
		A2381		U2156	C2018	C1937			
		G2382		U2157	C2019	C1938			
		U2383		U2158	C2020	C1939			
		C2384		U2159	C2021	C1940			
		A2385		U2160	C2022	C1941			
		C2386		U2161	C2023	C1942			
		U2387		U2162	C2024	C1943			
		A2453		U2163	C2025	C1944			
		U2441		U2164	C2026	C1945			
		C2442		U2165	C2027	C1946			
		U2443		U2166	C2028	C1947			
		G2444		U2167	C2029	C1948			
		U2445		U2168	C2030	C1949			
		G2446		U2169	C2031	C1950			
		U2447		U2170	C2032	C1951			
		A2448		U2171	C2033	C1952			
		C2449		U2172	C2034	C1953			
		U2450		U2173	C2035	C1954			
		A2451		U2174	C2036	C1955			
		C2452		U2175	C2037	C1956			
		U2519		U2176	C2038	C1957			
		C2520		U2177	C2039	C1958			



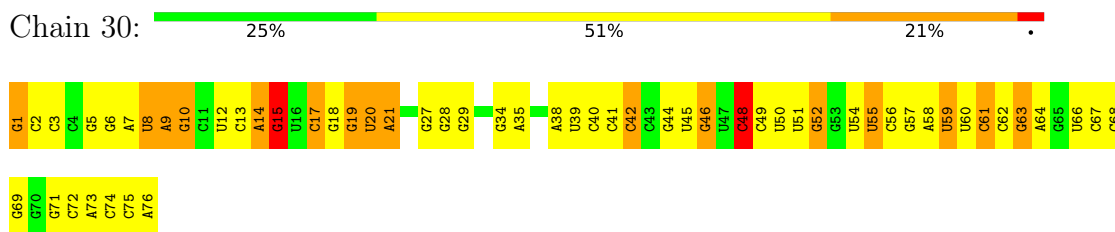
• Molecule 54: 5S ribosomal RNA



• Molecule 55: mRNA



• Molecule 56: A-site tRNA^{Phe}



• Molecule 57: P-site tRNA^{fMet}

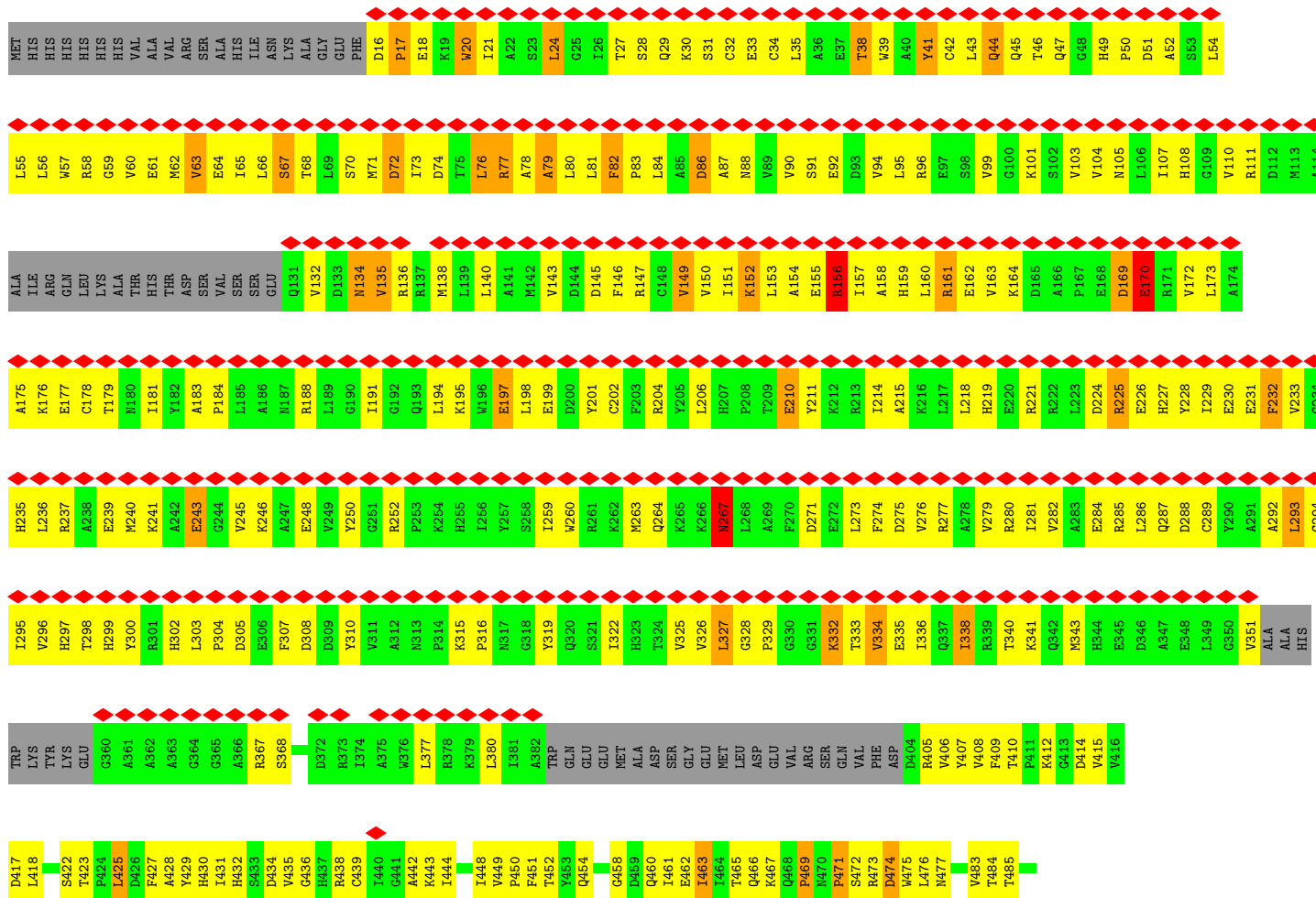




• Molecule 58: E-site tRNAfMet



• Molecule 59: GTP pyrophosphokinase



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	57430	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 ($e^-/\text{\AA}^2$)	1.6	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	30488	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.490	Depositor
Minimum map value	-0.157	Depositor
Average map value	-0.006	Depositor
Map value standard deviation	0.043	Depositor
Recommended contour level	0.1	Depositor
Map size (Å)	393.6, 393.6, 393.6	wwPDB
Map dimensions	480, 480, 480	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.82, 0.82, 0.82	Depositor

5 Model quality i

5.1 Standard geometry i

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.34	0/2121	0.70	0/2852
2	B	0.37	0/1586	0.67	0/2134
3	C	0.39	0/1571	0.71	1/2113 (0.0%)
4	D	0.36	0/1434	0.66	0/1926
5	E	0.35	0/1343	0.69	0/1816
6	F	0.44	0/1122	0.64	0/1515
7	G	0.50	0/1001	0.79	2/1350 (0.1%)
8	H	0.49	0/1046	0.69	1/1410 (0.1%)
9	I	0.33	0/1152	0.63	0/1551
10	J	0.35	0/947	0.68	0/1268
11	K	0.36	0/1054	0.71	1/1403 (0.1%)
12	L	0.35	0/1093	0.64	0/1460
13	M	0.33	0/973	0.64	0/1301
14	N	0.32	0/902	0.63	0/1209
15	O	0.34	0/929	0.73	1/1242 (0.1%)
16	P	0.37	0/960	0.57	0/1278
17	Q	0.39	0/829	0.77	1/1107 (0.1%)
18	R	0.33	0/864	0.68	0/1156
19	S	0.34	0/744	0.66	0/994
20	T	0.35	0/787	0.76	1/1051 (0.1%)
21	U	0.36	0/766	0.63	0/1025
22	V	0.37	0/582	0.62	0/769
23	W	0.37	0/635	0.70	0/848
24	X	0.36	0/510	0.62	0/677
25	Y	0.34	0/453	0.62	0/605
26	Z	0.42	0/531	0.71	1/709 (0.1%)
27	1	0.35	0/450	0.72	0/599
28	2	0.37	0/416	0.60	0/554
29	3	0.41	0/380	0.64	0/498
30	4	0.35	0/513	0.70	0/676
31	5	0.33	0/303	0.68	0/397
32	6	0.42	0/1735	0.68	1/2338 (0.0%)
33	7	0.35	0/1651	0.63	1/2225 (0.0%)
34	8	0.36	0/1665	0.64	0/2227

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
35	9	0.35	0/1169	0.69	0/1573
36	10	0.38	0/835	0.69	0/1128
37	11	0.34	0/1195	0.65	0/1602
38	12	0.34	0/989	0.68	0/1326
39	13	0.36	0/1034	0.72	0/1375
40	14	0.38	0/796	0.72	1/1077 (0.1%)
41	15	0.36	0/885	0.75	0/1195
42	16	0.36	0/969	0.76	3/1300 (0.2%)
43	17	0.32	0/892	0.62	0/1193
44	18	0.33	0/817	0.58	0/1088
45	19	0.33	0/722	0.60	0/964
46	20	0.39	0/659	0.67	0/884
47	21	0.36	0/657	0.71	0/881
48	22	0.38	0/544	0.73	0/731
49	23	0.37	0/652	0.70	1/877 (0.1%)
50	24	0.32	0/671	0.56	0/888
51	25	0.42	0/550	0.73	1/728 (0.1%)
52	26	0.55	1/36967 (0.0%)	0.71	3/57666 (0.0%)
53	27	0.60	1/69801 (0.0%)	0.72	10/108894 (0.0%)
54	28	0.45	1/2876 (0.0%)	0.69	1/4483 (0.0%)
55	29	0.63	0/486	0.67	0/757
56	30	0.67	1/1813 (0.1%)	0.78	1/2823 (0.0%)
57	31	0.49	1/1836 (0.1%)	0.69	1/2859 (0.0%)
58	32	0.87	1/1835 (0.1%)	0.78	0/2857
59	33	0.67	6/4985 (0.1%)	1.09	37/6770 (0.5%)
All	All	0.54	12/167683 (0.0%)	0.72	70/250202 (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
52	26	0	16
53	27	0	37
56	30	0	2
58	32	0	1
59	33	0	2
All	All	0	58

The worst 5 of 12 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
59	33	156	ARG	CZ-NH2	-10.57	1.19	1.33
59	33	152	LYS	CD-CE	-7.77	1.31	1.51
59	33	17	PRO	CA-CB	-7.25	1.39	1.53
57	31	1	C	OP3-P	-6.97	1.52	1.61
56	30	1	G	OP3-P	-6.93	1.52	1.61

The worst 5 of 70 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
59	33	156	ARG	NE-CZ-NH1	19.92	130.26	120.30
59	33	156	ARG	NH1-CZ-NH2	-13.88	104.13	119.40
59	33	17	PRO	N-CA-CB	-11.14	89.93	103.30
59	33	17	PRO	CA-CB-CG	10.28	124.33	104.80
59	33	63	VAL	CG1-CB-CG2	-9.24	96.12	110.90

There are no chirality outliers.

5 of 58 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
52	26	117	G	Sidechain
52	26	159	G	Sidechain
52	26	239	U	Sidechain
52	26	266	G	Sidechain
52	26	438	U	Sidechain

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	A	2082	0	2157	166	0
2	B	1565	0	1616	126	0
3	C	1552	0	1619	123	0
4	D	1410	0	1447	111	0
5	E	1323	0	1374	81	0
6	F	1111	0	1148	85	0
7	G	988	0	1025	114	0
8	H	1032	0	1088	101	0
9	I	1129	0	1162	73	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
10	J	938	0	1012	59	0
11	K	1045	0	1117	85	0
12	L	1074	0	1157	67	0
13	M	960	0	1000	65	0
14	N	892	0	923	68	0
15	O	917	0	965	75	0
16	P	947	0	1022	82	0
17	Q	816	0	839	86	0
18	R	857	0	922	47	0
19	S	738	0	807	48	0
20	T	779	0	834	50	0
21	U	753	0	780	49	0
22	V	575	0	592	35	0
23	W	625	0	655	39	0
24	X	509	0	543	33	0
25	Y	449	0	491	18	0
26	Z	522	0	521	46	0
27	1	444	0	461	39	0
28	2	409	0	440	25	0
29	3	377	0	418	35	0
30	4	504	0	574	41	0
31	5	302	0	343	33	0
32	6	1704	0	1732	105	0
33	7	1624	0	1699	111	0
34	8	1643	0	1710	145	0
35	9	1156	0	1199	122	0
36	10	817	0	808	74	0
37	11	1181	0	1240	74	0
38	12	979	0	1034	70	0
39	13	1022	0	1070	109	0
40	14	786	0	828	82	0
41	15	869	0	878	90	0
42	16	955	0	1019	97	0
43	17	883	0	944	77	0
44	18	805	0	847	104	0
45	19	714	0	737	31	0
46	20	649	0	666	70	0
47	21	648	0	691	64	0
48	22	535	0	552	51	0
49	23	637	0	665	55	0
50	24	665	0	714	60	0
51	25	544	0	579	72	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
52	26	33016	0	16617	1357	0
53	27	62322	0	31345	2394	0
54	28	2572	0	1302	112	0
55	29	432	0	218	15	0
56	30	1623	0	821	58	0
57	31	1644	0	836	33	0
58	32	1643	0	836	78	0
59	33	4911	0	4550	627	0
All	All	154603	0	105189	7602	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 29.

The worst 5 of 7602 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)
59:33:188:ARG:NH1	59:33:377:LEU:HA	1.23	1.40
59:33:24:LEU:HD21	59:33:70:SER:HA	1.19	1.16
59:33:17:PRO:HB3	59:33:39:TRP:NE1	1.58	1.15
34:8:84:ASN:HD22	34:8:87:GLU:HG3	0.98	1.15
59:33:188:ARG:NH1	59:33:377:LEU:CA	2.09	1.14

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	A	269/273 (98%)	218 (81%)	34 (13%)	17 (6%)	1	19
2	B	207/209 (99%)	175 (84%)	25 (12%)	7 (3%)	3	31
3	C	199/201 (99%)	157 (79%)	23 (12%)	19 (10%)	0	11

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	D	175/179 (98%)	143 (82%)	23 (13%)	9 (5%)	2	23
5	E	174/177 (98%)	148 (85%)	19 (11%)	7 (4%)	3	27
6	F	147/149 (99%)	116 (79%)	20 (14%)	11 (8%)	1	16
7	G	129/165 (78%)	91 (70%)	27 (21%)	11 (8%)	1	13
8	H	139/142 (98%)	107 (77%)	21 (15%)	11 (8%)	1	15
9	I	140/142 (99%)	120 (86%)	16 (11%)	4 (3%)	4	33
10	J	120/123 (98%)	94 (78%)	19 (16%)	7 (6%)	1	21
11	K	141/144 (98%)	108 (77%)	18 (13%)	15 (11%)	0	8
12	L	134/136 (98%)	104 (78%)	17 (13%)	13 (10%)	0	11
13	M	118/127 (93%)	95 (80%)	18 (15%)	5 (4%)	3	26
14	N	114/117 (97%)	92 (81%)	16 (14%)	6 (5%)	2	22
15	O	112/115 (97%)	96 (86%)	13 (12%)	3 (3%)	5	35
16	P	115/118 (98%)	99 (86%)	13 (11%)	3 (3%)	5	35
17	Q	101/103 (98%)	74 (73%)	19 (19%)	8 (8%)	1	15
18	R	108/110 (98%)	84 (78%)	17 (16%)	7 (6%)	1	19
19	S	91/100 (91%)	76 (84%)	13 (14%)	2 (2%)	6	38
20	T	100/104 (96%)	81 (81%)	11 (11%)	8 (8%)	1	15
21	U	92/94 (98%)	75 (82%)	13 (14%)	4 (4%)	2	26
22	V	73/85 (86%)	64 (88%)	5 (7%)	4 (6%)	2	22
23	W	75/78 (96%)	65 (87%)	7 (9%)	3 (4%)	3	27
24	X	61/63 (97%)	53 (87%)	2 (3%)	6 (10%)	0	10
25	Y	56/59 (95%)	48 (86%)	4 (7%)	4 (7%)	1	17
26	Z	64/70 (91%)	49 (77%)	8 (12%)	7 (11%)	0	8
27	1	54/57 (95%)	39 (72%)	9 (17%)	6 (11%)	0	8
28	2	48/55 (87%)	39 (81%)	8 (17%)	1 (2%)	7	39
29	3	44/46 (96%)	38 (86%)	4 (9%)	2 (4%)	2	25
30	4	62/65 (95%)	49 (79%)	11 (18%)	2 (3%)	4	32
31	5	36/38 (95%)	28 (78%)	5 (14%)	3 (8%)	1	14
32	6	216/241 (90%)	158 (73%)	40 (18%)	18 (8%)	1	14
33	7	204/233 (88%)	174 (85%)	24 (12%)	6 (3%)	4	33
34	8	203/206 (98%)	166 (82%)	27 (13%)	10 (5%)	2	24

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
35	9	155/167 (93%)	119 (77%)	20 (13%)	16 (10%)	0	9
36	10	98/135 (73%)	71 (72%)	18 (18%)	9 (9%)	1	12
37	11	149/179 (83%)	125 (84%)	16 (11%)	8 (5%)	2	22
38	12	127/130 (98%)	109 (86%)	14 (11%)	4 (3%)	4	32
39	13	125/130 (96%)	93 (74%)	16 (13%)	16 (13%)	0	5
40	14	96/103 (93%)	74 (77%)	10 (10%)	12 (12%)	0	5
41	15	114/129 (88%)	89 (78%)	15 (13%)	10 (9%)	1	13
42	16	121/124 (98%)	90 (74%)	21 (17%)	10 (8%)	1	14
43	17	112/118 (95%)	89 (80%)	15 (13%)	8 (7%)	1	17
44	18	98/101 (97%)	74 (76%)	16 (16%)	8 (8%)	1	14
45	19	86/89 (97%)	73 (85%)	10 (12%)	3 (4%)	3	30
46	20	80/82 (98%)	59 (74%)	20 (25%)	1 (1%)	12	48
47	21	78/84 (93%)	57 (73%)	14 (18%)	7 (9%)	1	13
48	22	63/75 (84%)	44 (70%)	11 (18%)	8 (13%)	0	5
49	23	77/92 (84%)	62 (80%)	11 (14%)	4 (5%)	2	23
50	24	83/87 (95%)	71 (86%)	9 (11%)	3 (4%)	3	29
51	25	63/71 (89%)	36 (57%)	14 (22%)	13 (21%)	0	2
59	33	663/750 (88%)	559 (84%)	61 (9%)	43 (6%)	1	19
All	All	6509/6970 (93%)	5217 (80%)	860 (13%)	432 (7%)	2	19

5 of 432 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	97	ASP
1	A	107	LYS
1	A	121	ALA
1	A	143	VAL
1	A	154	ALA

5.3.2 Protein sidechains [i](#)

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

The Analysed column shows the number of residues for which the sidechain conformation was

analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	216/218 (99%)	215 (100%)	1 (0%)	88	93
2	B	164/164 (100%)	164 (100%)	0	100	100
3	C	165/165 (100%)	163 (99%)	2 (1%)	71	83
4	D	148/150 (99%)	147 (99%)	1 (1%)	84	90
5	E	137/138 (99%)	137 (100%)	0	100	100
6	F	114/114 (100%)	114 (100%)	0	100	100
7	G	100/123 (81%)	99 (99%)	1 (1%)	76	86
8	H	109/110 (99%)	109 (100%)	0	100	100
9	I	116/116 (100%)	116 (100%)	0	100	100
10	J	103/104 (99%)	103 (100%)	0	100	100
11	K	102/103 (99%)	101 (99%)	1 (1%)	76	86
12	L	109/109 (100%)	109 (100%)	0	100	100
13	M	100/103 (97%)	99 (99%)	1 (1%)	76	86
14	N	86/87 (99%)	86 (100%)	0	100	100
15	O	99/100 (99%)	99 (100%)	0	100	100
16	P	89/90 (99%)	89 (100%)	0	100	100
17	Q	84/84 (100%)	84 (100%)	0	100	100
18	R	93/93 (100%)	93 (100%)	0	100	100
19	S	80/84 (95%)	80 (100%)	0	100	100
20	T	83/85 (98%)	83 (100%)	0	100	100
21	U	78/78 (100%)	78 (100%)	0	100	100
22	V	57/63 (90%)	57 (100%)	0	100	100
23	W	67/68 (98%)	67 (100%)	0	100	100
24	X	55/55 (100%)	55 (100%)	0	100	100
25	Y	48/49 (98%)	48 (100%)	0	100	100
26	Z	59/62 (95%)	57 (97%)	2 (3%)	37	62
27	1	47/48 (98%)	47 (100%)	0	100	100
28	2	45/49 (92%)	45 (100%)	0	100	100
29	3	38/38 (100%)	38 (100%)	0	100	100
30	4	51/52 (98%)	51 (100%)	0	100	100
31	5	34/34 (100%)	34 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
32	6	180/199 (90%)	179 (99%)	1 (1%)	86	91
33	7	170/190 (90%)	169 (99%)	1 (1%)	86	91
34	8	172/173 (99%)	172 (100%)	0	100	100
35	9	119/126 (94%)	117 (98%)	2 (2%)	60	78
36	10	87/116 (75%)	87 (100%)	0	100	100
37	11	124/147 (84%)	124 (100%)	0	100	100
38	12	104/105 (99%)	104 (100%)	0	100	100
39	13	105/107 (98%)	103 (98%)	2 (2%)	57	75
40	14	86/90 (96%)	86 (100%)	0	100	100
41	15	89/99 (90%)	87 (98%)	2 (2%)	52	71
42	16	103/104 (99%)	103 (100%)	0	100	100
43	17	92/96 (96%)	92 (100%)	0	100	100
44	18	83/84 (99%)	83 (100%)	0	100	100
45	19	76/77 (99%)	76 (100%)	0	100	100
46	20	65/65 (100%)	65 (100%)	0	100	100
47	21	74/78 (95%)	73 (99%)	1 (1%)	67	81
48	22	56/65 (86%)	56 (100%)	0	100	100
49	23	70/79 (89%)	70 (100%)	0	100	100
50	24	65/66 (98%)	65 (100%)	0	100	100
51	25	55/61 (90%)	54 (98%)	1 (2%)	59	77
59	33	452/635 (71%)	448 (99%)	4 (1%)	78	87
All	All	5303/5698 (93%)	5280 (100%)	23 (0%)	91	94

5 of 23 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
39	13	93	LEU
47	21	78	VAL
41	15	117	HIS
51	25	18	PHE
13	M	51	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 94 such sidechains are listed below:

Mol	Chain	Res	Type
34	8	70	GLN
39	13	125	GLN
34	8	99	ASN
37	11	67	ASN
43	17	13	HIS

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
52	26	1538/1539 (99%)	190 (12%)	8 (0%)
53	27	2902/2903 (99%)	410 (14%)	22 (0%)
54	28	119/120 (99%)	9 (7%)	1 (0%)
55	29	19/20 (95%)	4 (21%)	0
56	30	75/76 (98%)	20 (26%)	1 (1%)
57	31	76/77 (98%)	6 (7%)	0
58	32	76/77 (98%)	22 (28%)	1 (1%)
All	All	4805/4812 (99%)	661 (13%)	33 (0%)

5 of 661 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
52	26	9	G
52	26	13	U
52	26	22	G
52	26	32	A
52	26	39	G

5 of 33 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
53	27	2756	U
53	27	2873	A
58	32	16	C
53	27	858	G
53	27	774	G

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](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

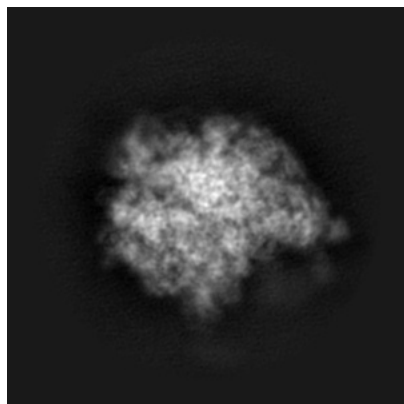
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-8282. These allow visual inspection of the internal detail of the map and identification of artifacts.

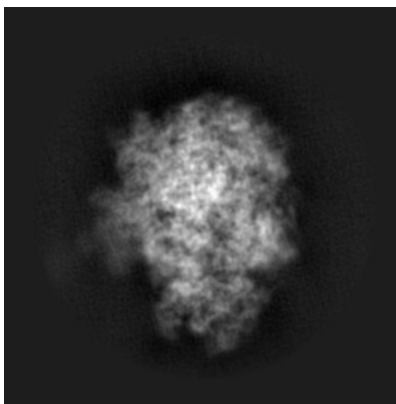
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

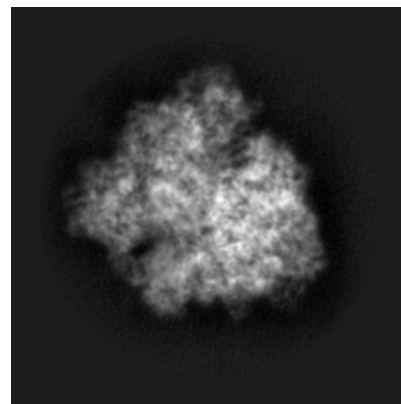
6.1.1 Primary map



X

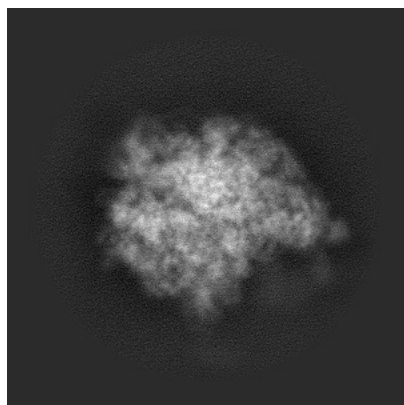


Y

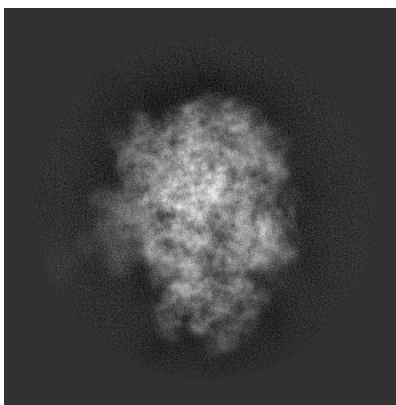


Z

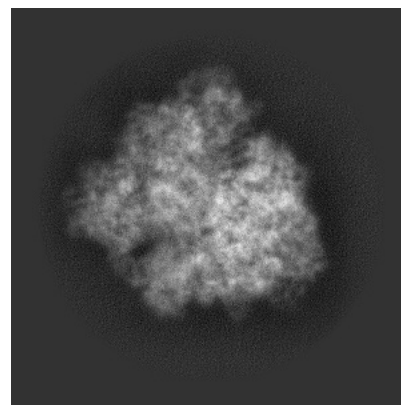
6.1.2 Raw map



X



Y

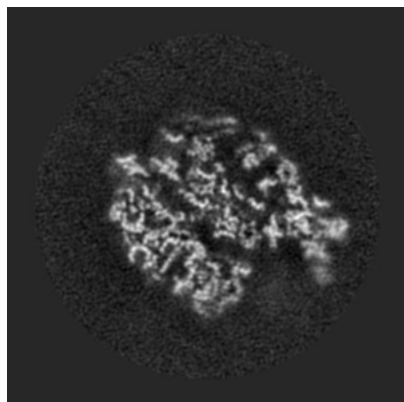


Z

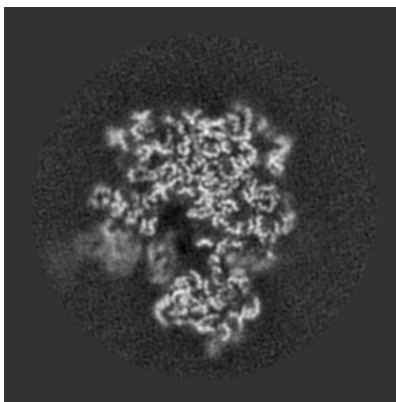
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

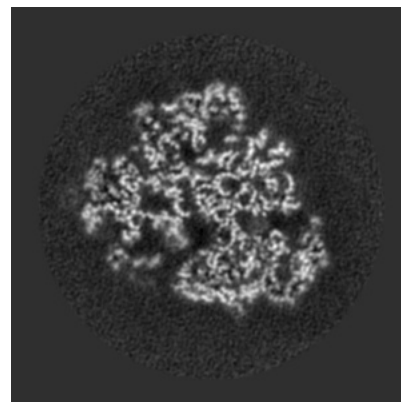
6.2.1 Primary map



X Index: 240

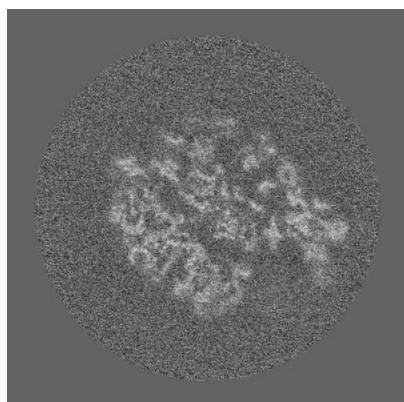


Y Index: 240

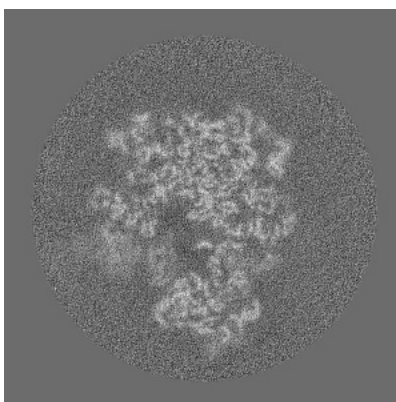


Z Index: 240

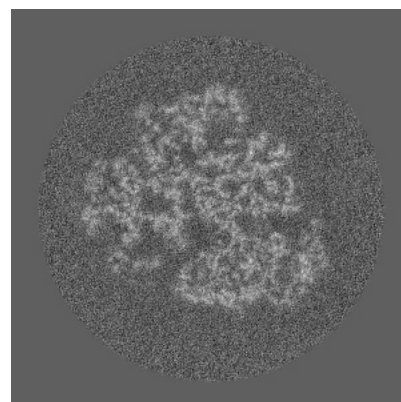
6.2.2 Raw map



X Index: 240



Y Index: 240

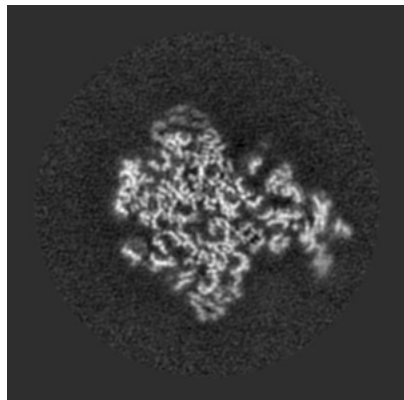


Z Index: 240

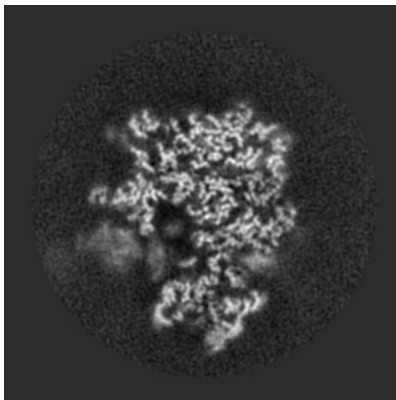
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

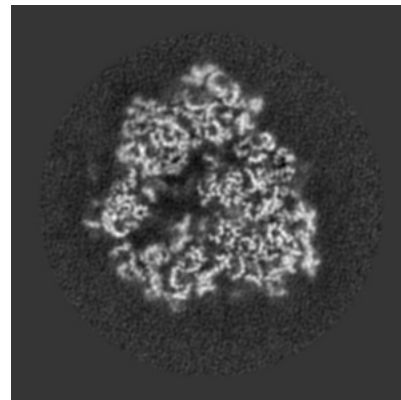
6.3.1 Primary map



X Index: 250

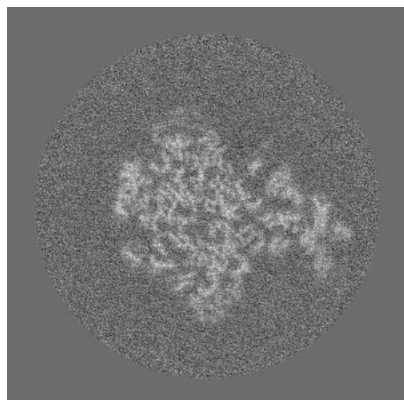


Y Index: 247

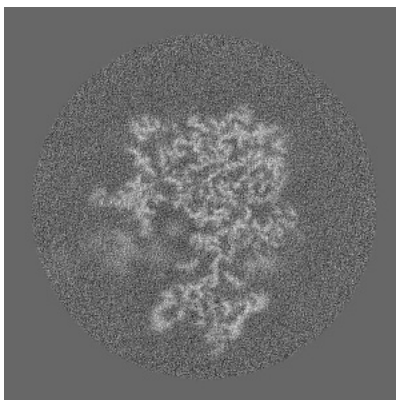


Z Index: 220

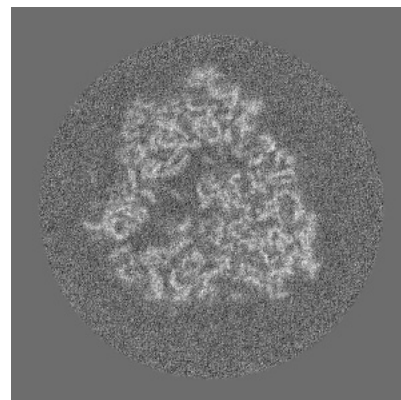
6.3.2 Raw map



X Index: 250



Y Index: 250



Z Index: 222

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

6.4 Orthogonal surface views [i](#)

6.4.1 Primary map



X



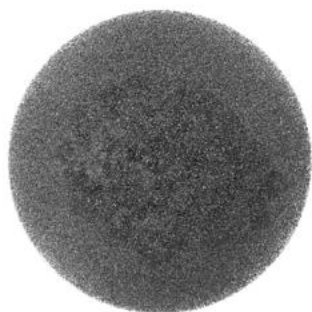
Y



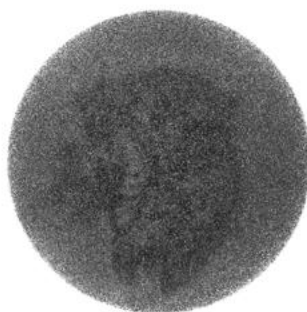
Z

The images above show the 3D surface view of the map at the recommended contour level 0.1. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

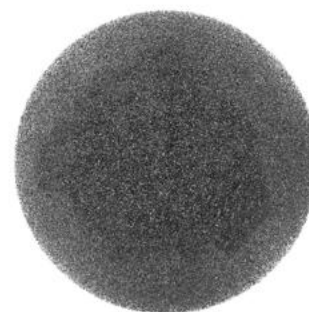
6.4.2 Raw map



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.

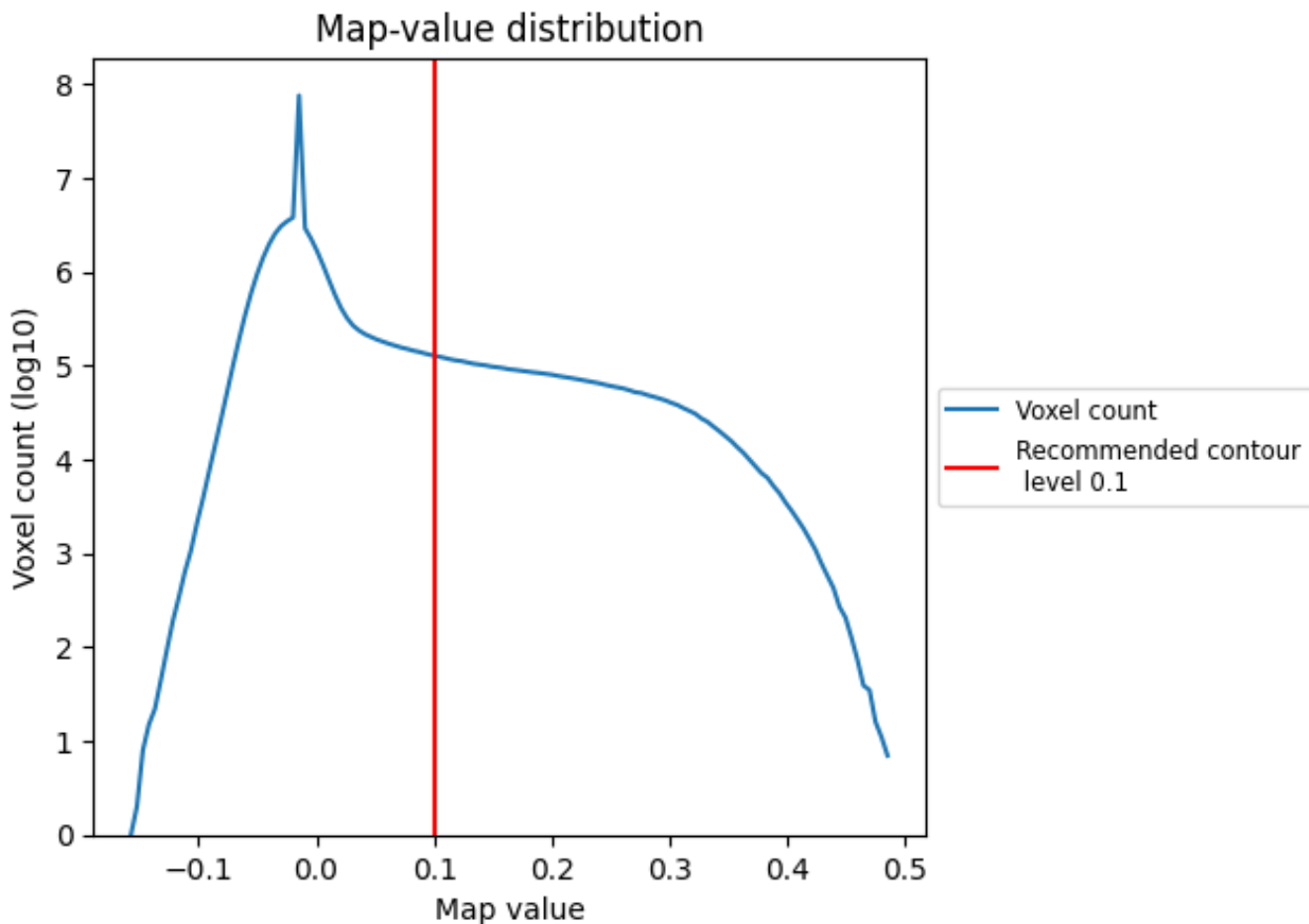
6.5 Mask visualisation [i](#)

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

7 Map analysis [i](#)

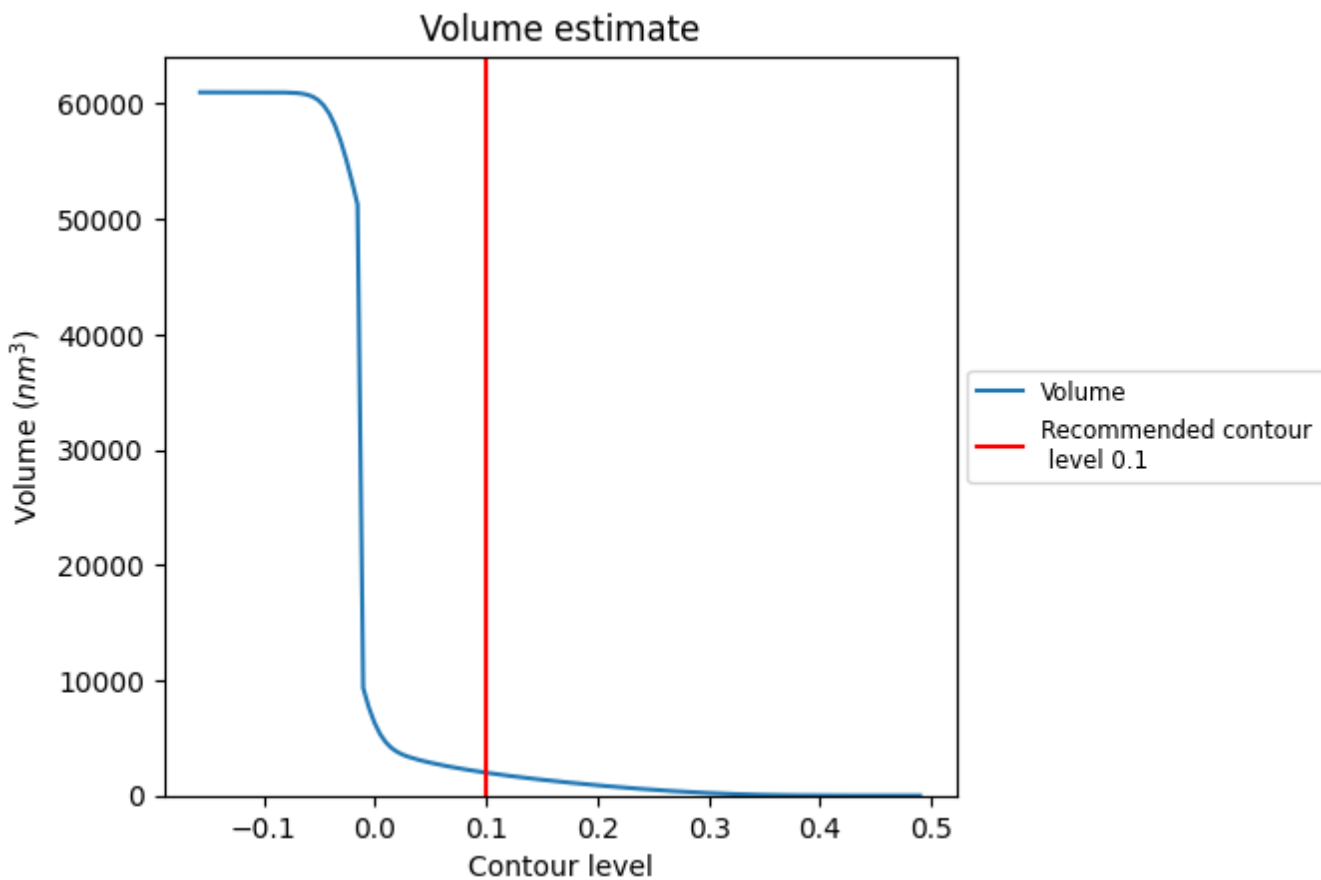
This section contains the results of statistical analysis of the map.

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.

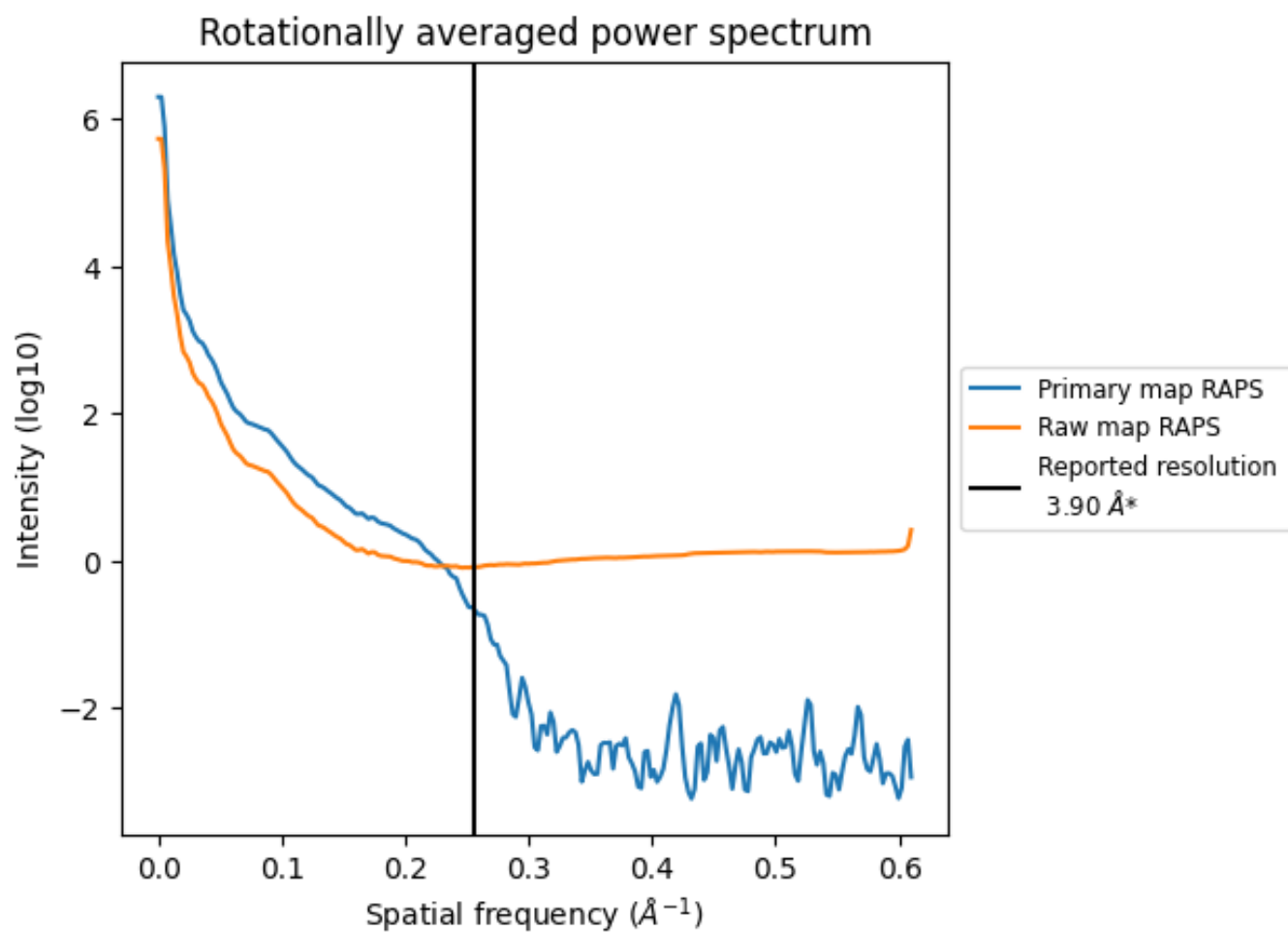
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1983 nm³; this corresponds to an approximate mass of 1791 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](#)

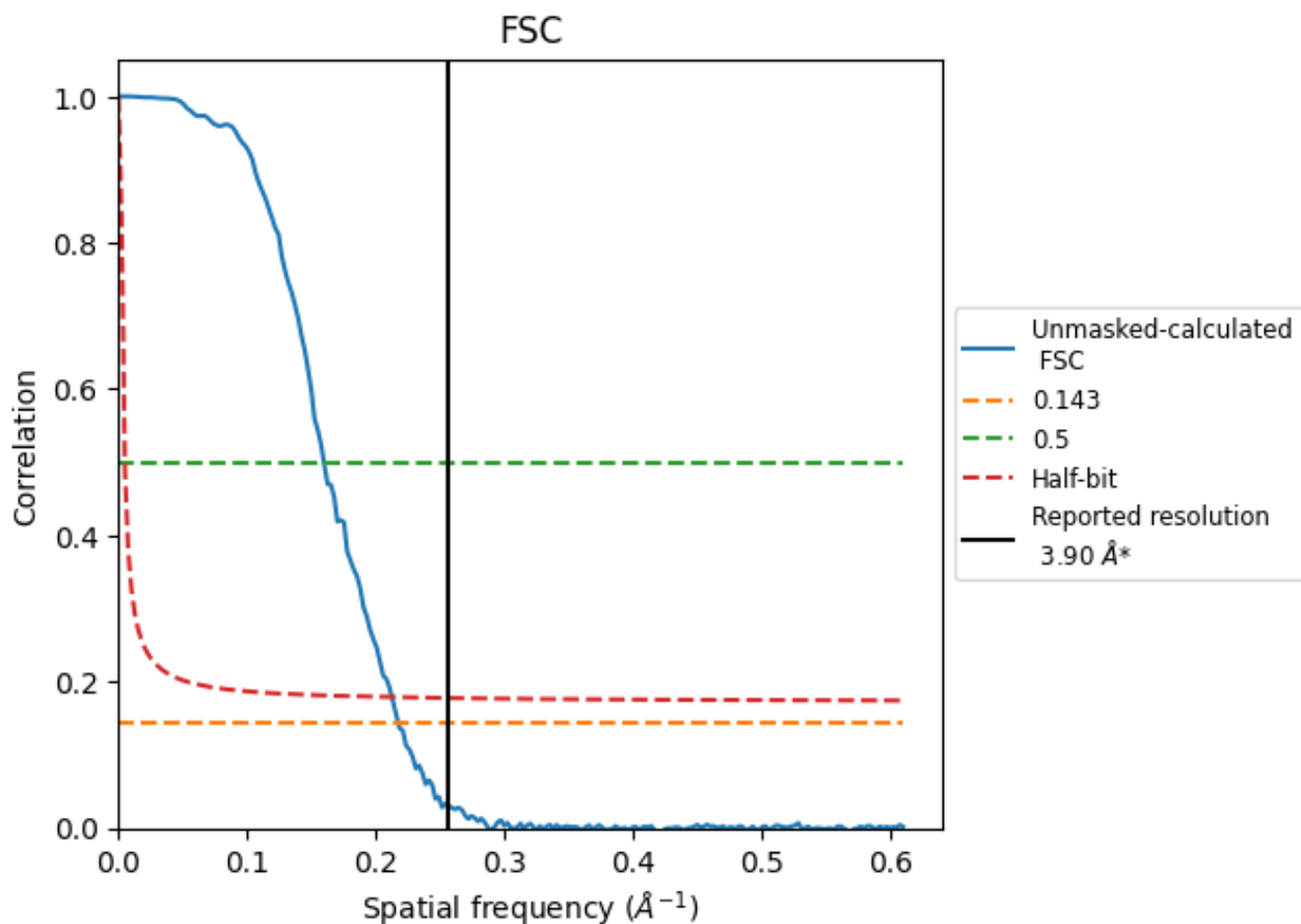


*Reported resolution corresponds to spatial frequency of 0.256 Å⁻¹

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 0.256 Å⁻¹

8.2 Resolution estimates [i](#)

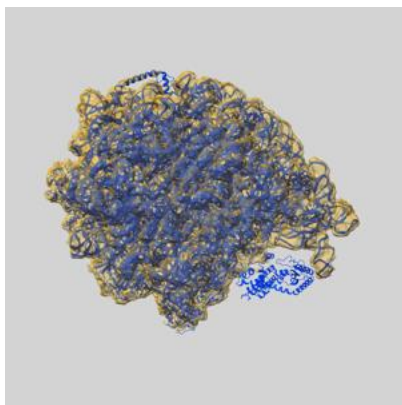
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.90	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.60	6.27	4.70

*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 4.60 differs from the reported value 3.9 by more than 10 %

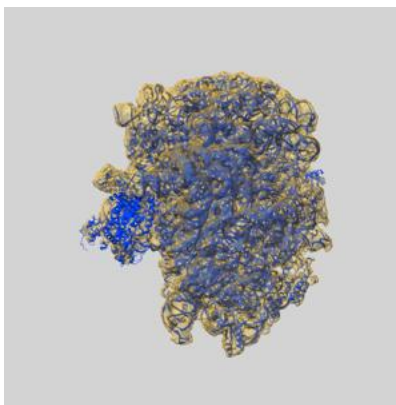
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-8282 and PDB model 5KPX. Per-residue inclusion information can be found in section 3 on page 15.

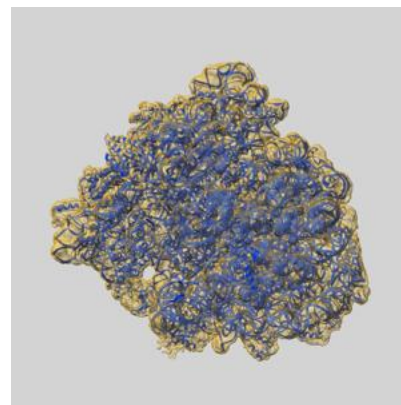
9.1 Map-model overlay [i](#)



X



Y



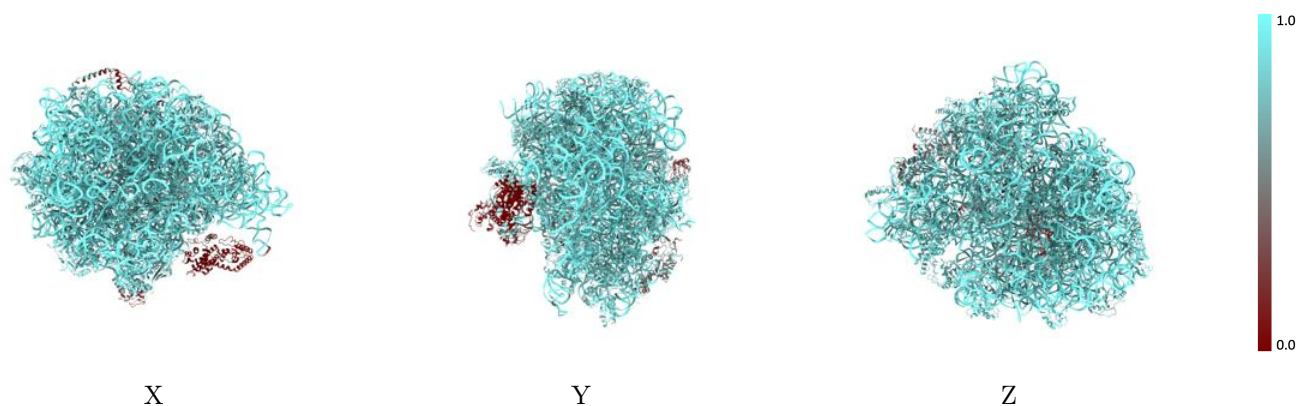
Z

The images above show the 3D surface view of the map at the recommended contour level 0.1 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](#)

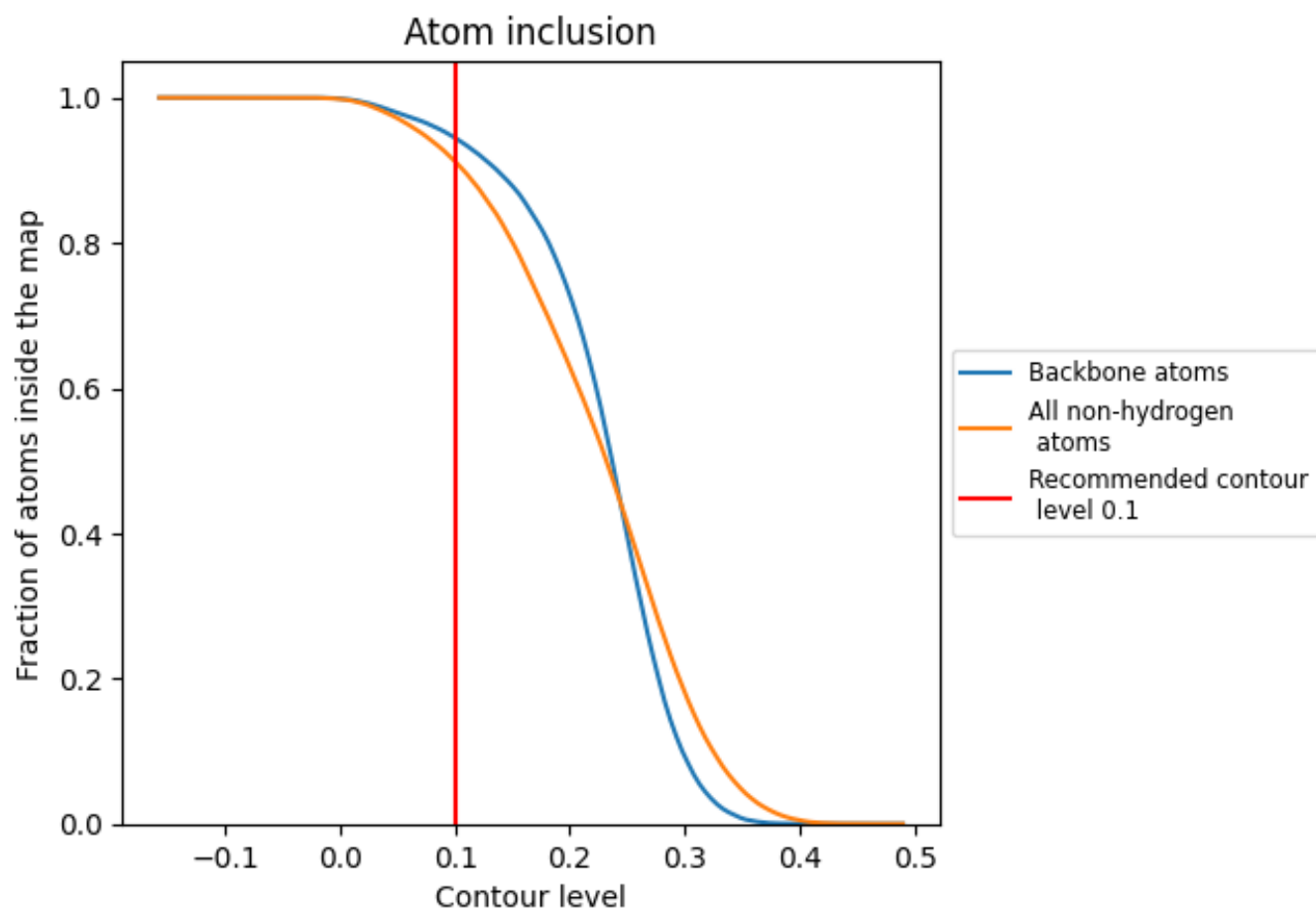
This section was not generated.

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 (0.1).




































9.4 Atom inclusion [i](#)



At the recommended contour level, 94% of all backbone atoms, 91% 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 (0.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion
All	 0.9121
1	 0.8692
10	 0.8794
11	 0.8610
12	 0.8490
13	 0.8744
14	 0.8200
15	 0.8769
16	 0.7894
17	 0.8578
18	 0.8592
19	 0.8667
2	 0.7855
20	 0.8612
21	 0.8592
22	 0.8872
23	 0.8647
24	 0.8615
25	 0.7698
26	 0.9900
27	 0.9879
28	 0.9942
29	 0.9259
3	 0.8732
30	 0.9532
31	 0.9647
32	 0.8089
33	 0.3573
4	 0.8330
5	 0.8596
6	 0.4949
7	 0.8333
8	 0.8289
9	 0.8536
A	 0.8502



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Chain	Atom inclusion
B	 0.8622
C	 0.7901
D	 0.8667
E	 0.8759
F	 0.4124
G	 0.2893
H	 0.3826
I	 0.8736
J	 0.8007
K	 0.8681
L	 0.8244
M	 0.8850
N	 0.8922
O	 0.8581
P	 0.8767
Q	 0.8795
R	 0.8206
S	 0.8643
T	 0.8892
U	 0.8347
V	 0.8640
W	 0.8702
X	 0.8431
Y	 0.8467
Z	 0.8650