



## wwPDB EM Validation Summary Report ⓘ

Nov 15, 2022 – 05:26 PM EST

PDB ID : 6XIJ  
EMDB ID : EMD-22193  
Title : Escherichia coli transcription-translation complex A (TTC-A) containing an  
24 nt long mRNA spacer, NusG, and fMet-tRNAs at E-site and P-site  
Authors : Molodtsov, V.; Wang, C.; Su, M.; Ebright, R.H.  
Deposited on : 2020-06-20  
Resolution : 8.00 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](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:

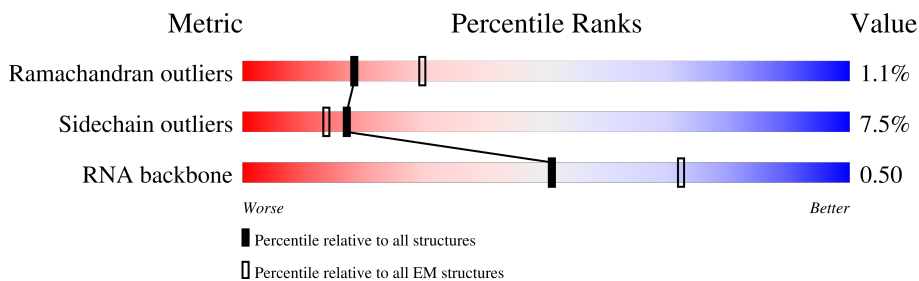
EMDB validation analysis : 0.0.1.dev43  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP)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

# 1 Overall quality at a glance

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

The reported resolution of this entry is 8.00 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	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	0	103	
2	1	110	
3	2	100	
4	3	104	
5	4	94	
6	5	36	
7	6	36	
8	7	33	

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Mol	Chain	Length	Quality of chain
9	9	165	68% 54% 33% 10%
10	A	76	29% 58% 38%
10	B	76	38% 46% 49% 5%
11	AA	1342	91% 89% 8%
12	AB	181	54% 53% 46%
13	AC	329	68% 64% 5% 30%
13	AD	329	68% 68% 31%
14	AE	1407	92% 89% 5% 5%
15	C	75	48% 85% 12%
16	D	1542	78% 20%
17	E	87	46% 93% 6%
18	F	71	65% 94%
19	G	241	43% 90% 7%
20	H	557	46% 41% 54%
21	I	233	57% 86% 11%
22	J	206	53% 96%
23	K	167	42% 89% 5% 7%
24	L	135	36% 72% 23%
25	M	179	48% 80% 16%
26	N	130	44% 97%
27	O	130	52% 93% 5%
28	P	103	50% 87% 9%
29	Q	129	49% 87% 9%
30	R	124	48% 92% 6%
31	S	101	43% 95%

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Mol	Chain	Length	Quality of chain
32	T	89	42% 85% 13%
33	U	82	52% 93% 7%
34	V	84	48% 93% 5%
35	W	92	57% 86% 10%
36	X	118	64% 88% 10%
37	Y	142	83% 68% 27%
38	Z	121	24% 12% 75%
39	a	2904	81% 18%
40	b	85	35% 88% 11%
41	c	78	50% 94% 5%
42	d	120	86% 14%
43	e	63	38% 97%
44	f	59	25% 95%
45	g	70	64% 86% 9% 6%
46	h	273	50% 93% 7%
47	i	57	42% 88% 11%
48	j	209	43% 97%
49	k	55	49% 89% 5% 5%
50	l	201	44% 93% 7%
51	m	46	41% 93% 7%
52	n	179	55% 89% 10%
53	o	65	60% 91% 8%
54	p	177	50% 97%
55	q	38	53% 95% 5%
56	r	149	77% 93% 7%

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Mol	Chain	Length	Quality of chain
57	s	142	
58	t	123	
59	u	144	
60	v	136	
61	w	127	
62	x	117	
63	y	115	
64	z	118	

## 2 Entry composition [i](#)

There are 66 unique types of molecules in this entry. The entry contains 300463 atoms, of which 124723 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 L21.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
1	0	103	1655	516	839	153	145	2	0	0

- Molecule 2 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
2	1	110	1779	532	922	166	156	3	0	0

- Molecule 3 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
3	2	94	1557	470	811	140	134	2	0	0

- Molecule 4 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	H	N	O		
4	3	103	1632	498	844	148	142	0	0

- Molecule 5 is a protein called 50S ribosomal protein L25.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
5	4	94	1533	479	780	137	134	3	0	0

- Molecule 6 is a DNA chain called NT DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			P
6	5	23	732	225	260	87	137	23	0	0

- Molecule 7 is a DNA chain called T DNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
7	6	27	Total	C	H	N	O	P	0	0
			847	259	305	89	167	27		

- Molecule 8 is a RNA chain called mRNA with 24 nt long spacer.

Mol	Chain	Residues	Atoms						AltConf	Trace
8	7	22	Total	C	H	N	O	P	0	0
			564	208	97	74	163	22		

- Molecule 9 is a protein called 50S ribosomal protein L10.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	9	148	Total	C	N	O	S	0	0
			1117	705	196	209	7		

- Molecule 10 is a RNA chain called E-site and P-site tRNA (fMet).

Mol	Chain	Residues	Atoms						AltConf	Trace
10	A	76	Total	C	H	N	O	P	0	0
			2446	723	826	295	527	75		
10	B	76	Total	C	H	N	O	P	0	0
			2433	723	813	295	527	75		

- Molecule 11 is a protein called DNA-directed RNA polymerase subunit beta.

Mol	Chain	Residues	Atoms						AltConf	Trace
11	AA	1322	Total	C	H	N	O	S	0	0
			20851	6539	10426	1817	2026	43		

- Molecule 12 is a protein called Transcription termination/antitermination protein NusG.

Mol	Chain	Residues	Atoms						AltConf	Trace
12	AB	98	Total	C	H	N	O	S	0	0
			1573	505	783	139	140	6		

- Molecule 13 is a protein called DNA-directed RNA polymerase subunit alpha.

Mol	Chain	Residues	Atoms						AltConf	Trace
13	AC	230	Total	C	H	N	O	S	0	0
			3599	1112	1813	317	351	6		

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Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
13	AD	228	3556	1100	1789	312	349	6	0	0

- Molecule 14 is a protein called DNA-directed RNA polymerase subunit beta'.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
14	AE	1335	21000	6526	10612	1854	1958	50	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AE	1384	VAL	MET	conflict	UNP A0A4S1NBU2

- Molecule 15 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
15	C	66	1103	344	559	102	97	1	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			P
16	D	1524	49126	14585	16423	6003	10591	1524	0	0

- Molecule 17 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
17	E	86	1388	414	719	138	114	3	0	0

- Molecule 18 is a protein called 30S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
18	F	70	1218	366	629	125	97	1	0	0

- Molecule 19 is a protein called 30S ribosomal protein S2.



Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
19	G	225	3545	1113	1785	316	323	8	0	0

- Molecule 20 is a protein called 30S ribosomal protein S1.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
20	H	259	3184	1073	1454	305	349	3	0	0

- Molecule 21 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
21	I	208	3346	1036	1710	307	290	3	0	0

- Molecule 22 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
22	J	205	3350	1026	1707	315	298	4	0	0

- Molecule 23 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
23	K	156	2348	717	1196	217	212	6	0	0

- Molecule 24 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
24	L	104	1694	536	846	153	152	7	0	0

- Molecule 25 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
25	M	151	2416	735	1235	227	215	4	0	0

- Molecule 26 is a protein called 30S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
26	N	129	2010	616	1031	173	184	6	0	0

- Molecule 27 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
27	O	127	2092	634	1070	206	179	3	0	0

- Molecule 28 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
28	P	99	1621	495	831	151	143	1	0	0

- Molecule 29 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
29	Q	117	1764	540	887	174	160	3	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
30	R	121	1940	580	1001	194	161	4	0	0

- Molecule 31 is a protein called 30S ribosomal protein S14.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
31	S	100	1649	499	844	164	139	3	0	0

- Molecule 32 is a protein called 30S ribosomal protein S15.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
32	T	88	1448	439	734	144	130	1	0	0

- Molecule 33 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace	
33	U	82	Total	C	H	N	O	S	0	0
			1315	406	666	128	114	1		

- Molecule 34 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace	
34	V	80	Total	C	H	N	O	S	0	0
			1339	411	691	121	113	3		

- Molecule 35 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace	
35	W	83	Total	C	H	N	O	S	0	0
			1351	424	688	126	111	2		

- Molecule 36 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace	
36	X	116	Total	C	H	N	O	S	0	0
			1864	558	964	181	158	3		

- Molecule 37 is a protein called 50S ribosomal protein L11.

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

- Molecule 38 is a protein called 50S ribosomal protein L7/L12.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	Z	30	Total	C	N	O	S	0	0
			227	144	33	47	3		

- Molecule 39 is a RNA chain called 23S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace	
39	a	2880	Total	C	H	N	O	P	0	0
			92918	27587	31077	11398	19976	2880		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
a	887	A	U	conflict	GB 937521852

- Molecule 40 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
40	b	76	1181	360	599	117	104	1	0	0

- Molecule 41 is a protein called 50S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
41	c	77	1277	388	652	129	106	2	0	0

- Molecule 42 is a RNA chain called 5S rRNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	P		
42	d	120	3870	1144	1301	468	837	120	0	0

- Molecule 43 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
43	e	62	1032	308	531	98	94	1	0	0

- Molecule 44 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
44	f	58	936	281	488	87	78	2	0	0

- Molecule 45 is a protein called 50S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
45	g	66	1042	323	520	99	94	6	0	0

- Molecule 46 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
46	h	271	4236	1288	2154	423	364	7	0	0

- Molecule 47 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
47	i	56	903	269	459	94	80	1	0	0

- Molecule 48 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
48	j	209	3182	979	1617	288	294	4	0	0

- Molecule 49 is a protein called 50S ribosomal protein L33.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	H	N	O		
49	k	52	890	275	464	78	73	0	0

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

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
50	l	201	3171	974	1619	283	290	5	0	0

- Molecule 51 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
51	m	46	795	228	418	90	57	2	0	0

- Molecule 52 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
52	n	177	2853	899	1443	249	256	6	0	0

- Molecule 53 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace	
53	o	64	Total	C	H	N	O	S	0	0
			1076	323	572	105	74	2		

- Molecule 54 is a protein called 50S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace	
54	p	175	Total	C	H	N	O	S	0	0
			2671	826	1358	241	244	2		

- Molecule 55 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace	
55	q	38	Total	C	H	N	O	S	0	0
			645	185	343	65	48	4		

- Molecule 56 is a protein called 50S ribosomal protein L9.

Mol	Chain	Residues	Atoms					AltConf	Trace	
56	r	149	Total	C	H	N	O	S	0	0
			2259	699	1148	197	214	1		

- Molecule 57 is a protein called 50S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace	
57	s	142	Total	C	H	N	O	S	0	0
			2291	714	1162	212	199	4		

- Molecule 58 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace	
58	t	123	Total	C	H	N	O	S	0	0
			1969	593	1023	181	166	6		

- Molecule 59 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace	
59	u	144	Total	C	H	N	O	S	0	0
			2182	654	1129	207	190	2		

- Molecule 60 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms					AltConf	Trace	
60	v	136	Total	C	H	N	O	S	0	0
			2231	686	1157	205	177	6		

- Molecule 61 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace	
61	w	119	Total	C	H	N	O	S	0	0
			1945	588	994	195	163	5		

- Molecule 62 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms					AltConf	Trace	
62	x	116	Total	C	H	N	O		0	0
			1815	552	923	178	162			

- Molecule 63 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace	
63	y	114	Total	C	H	N	O	S	0	0
			1879	574	962	179	163	1		

- Molecule 64 is a protein called 50S ribosomal protein L20.

Mol	Chain	Residues	Atoms					AltConf	Trace	
64	z	117	Total	C	H	N	O		0	0
			1967	604	1020	192	151			

- Molecule 65 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
65	AE	1	Total	Mg	0
			1	1	

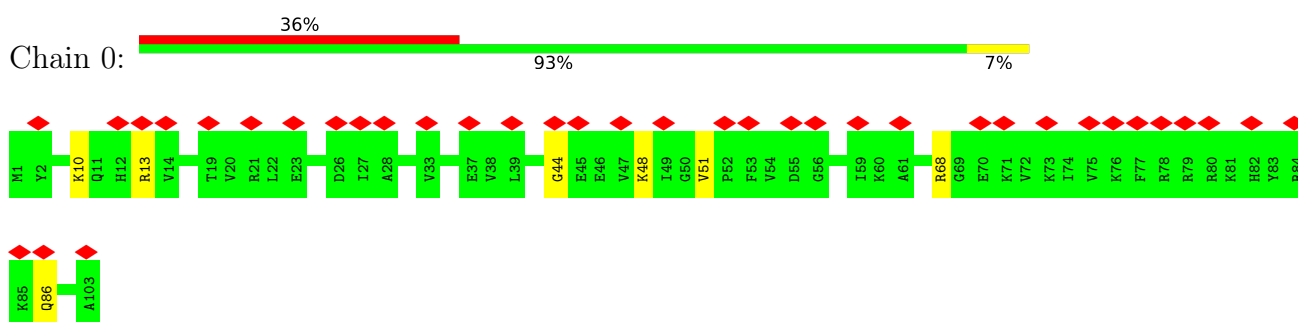
- Molecule 66 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
66	AE	2	Total	Zn	0
			2	2	

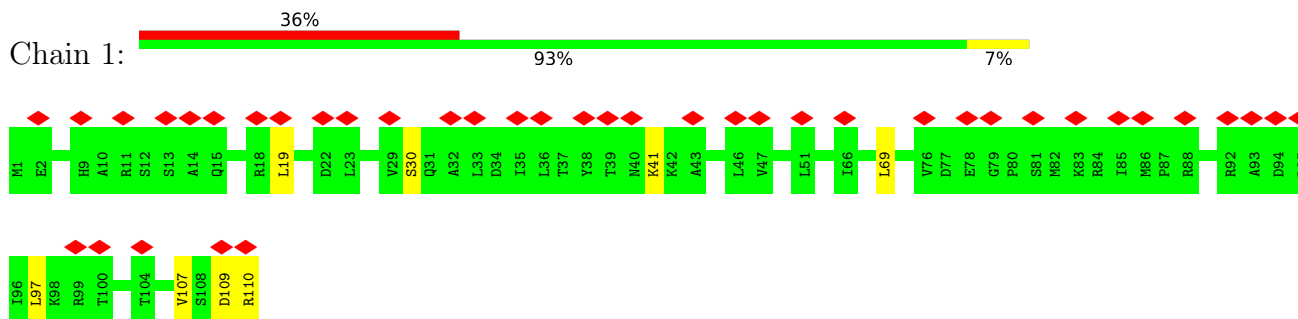
### 3 Residue-property plots [i](#)

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

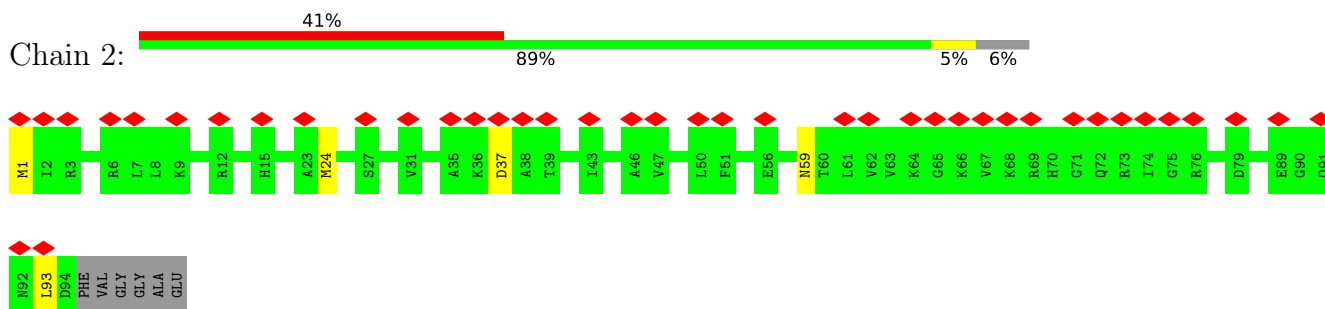
- Molecule 1: 50S ribosomal protein L21



- Molecule 2: 50S ribosomal protein L22



- Molecule 3: 50S ribosomal protein L23



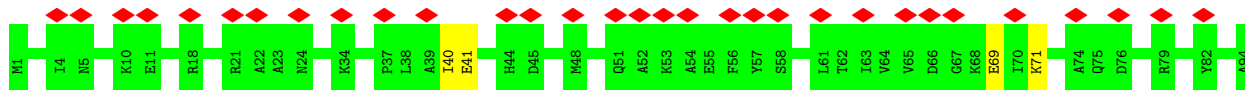
- Molecule 4: 50S ribosomal protein L24



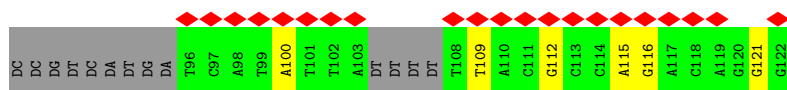




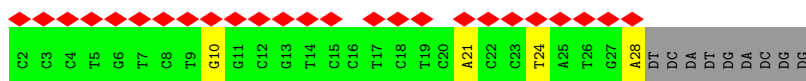
• Molecule 5: 50S ribosomal protein L25



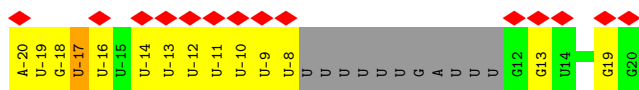
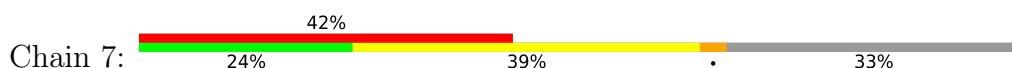
• Molecule 6: NT DNA



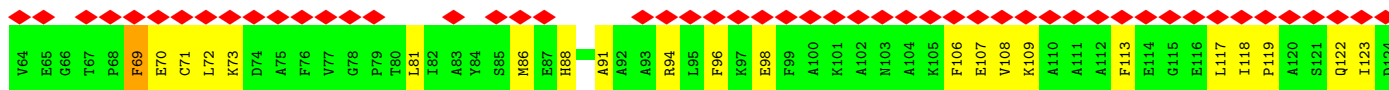
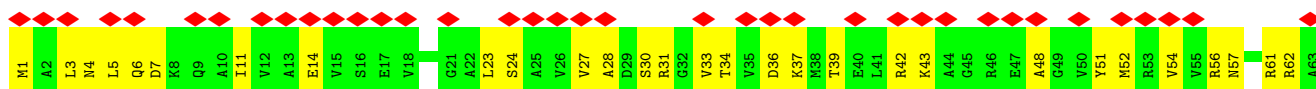
• Molecule 7: T DNA



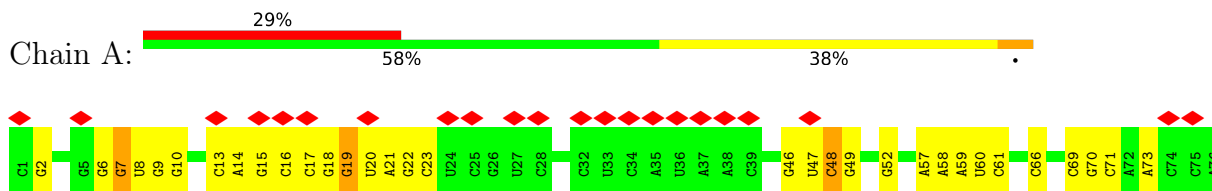
• Molecule 8: mRNA with 24 nt long spacer



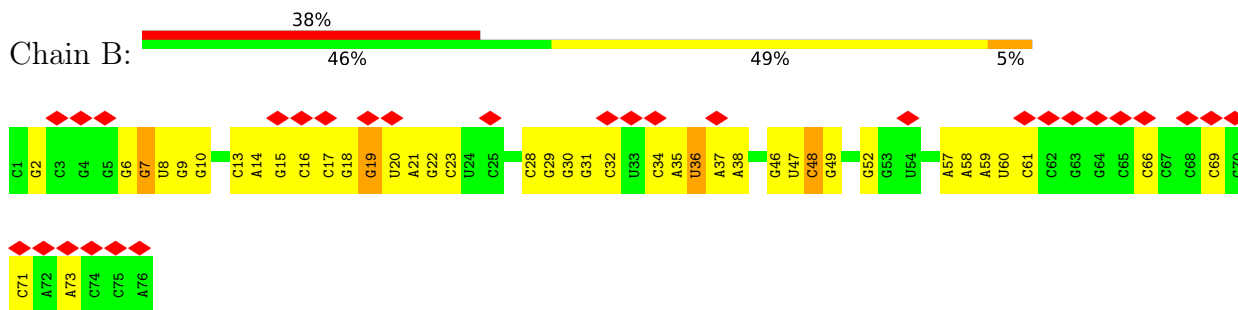
• Molecule 9: 50S ribosomal protein L10



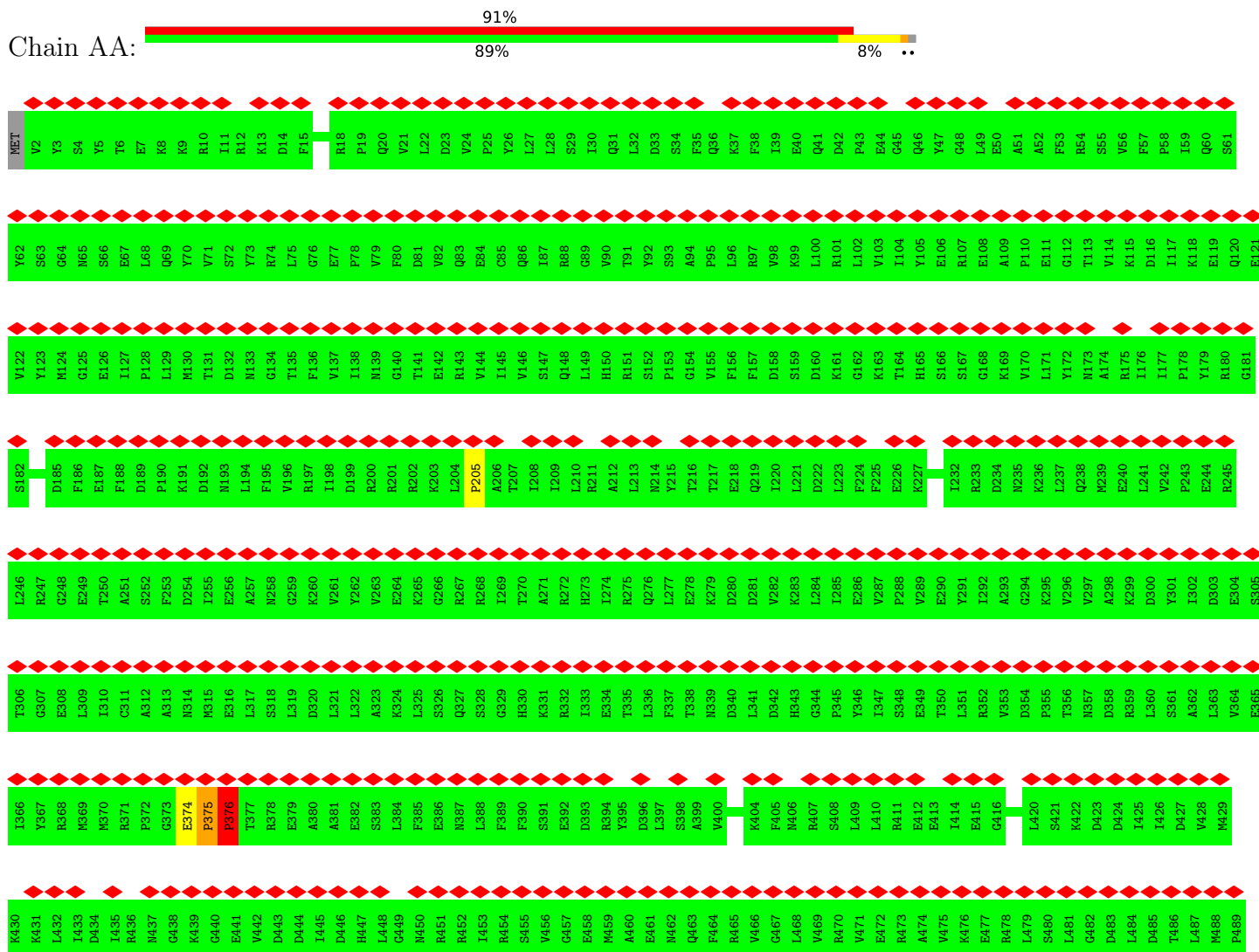
• Molecule 10: E-site and P-site tRNA (fMet)



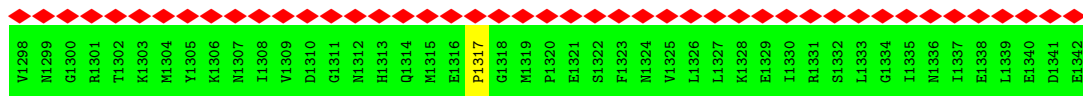
• Molecule 10: E-site and P-site tRNA (fMet)



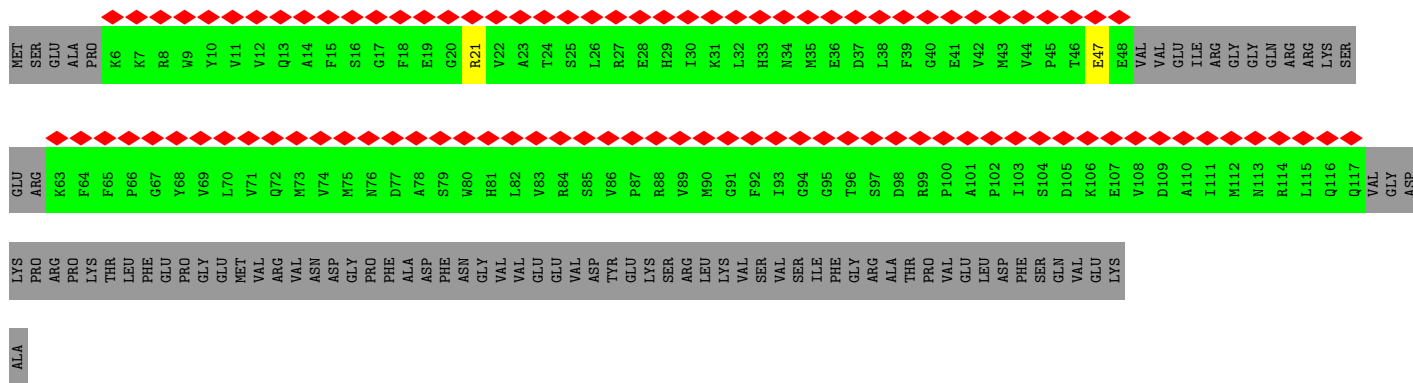
• Molecule 11: DNA-directed RNA polymerase subunit beta



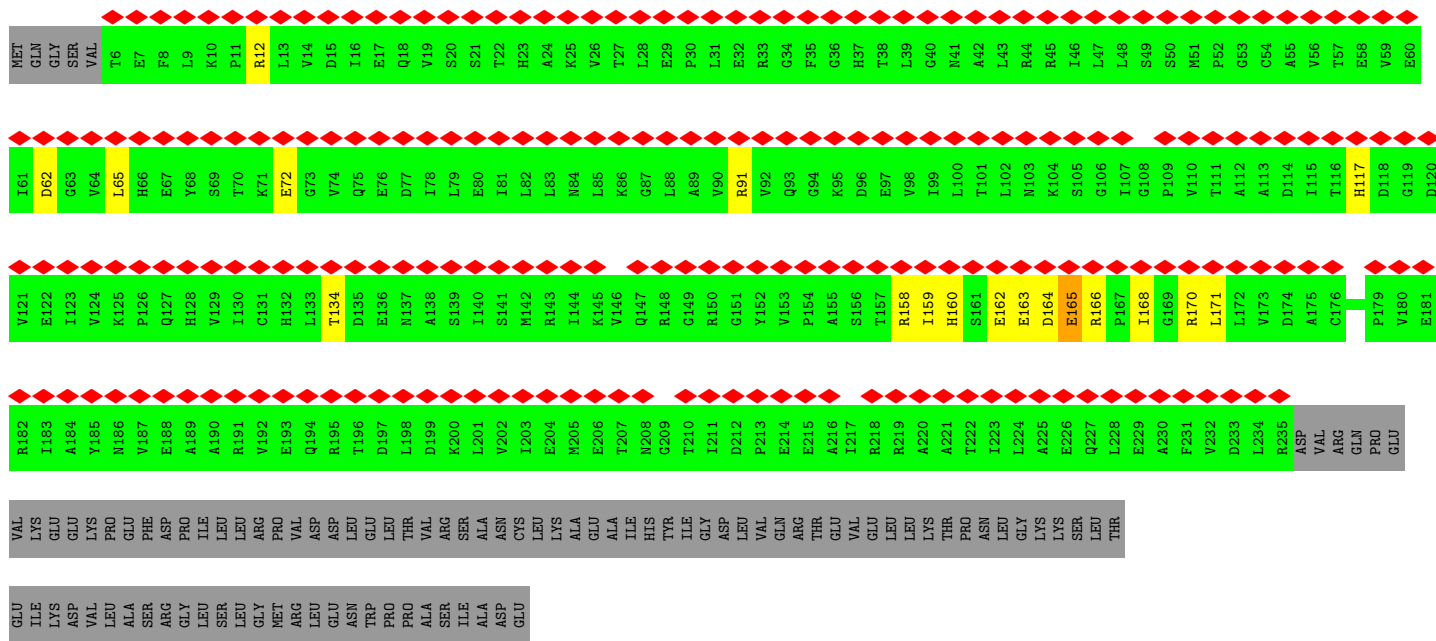
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L817	V818	S819	E820	R821	V822	V823	Q824	E825	D826	R827	F828	T829	T830	L831	H832	L833	Q834	E835	L836	A837	C838	V839	S840	R841	D842	T843	K844	L845	G846	P847	E848	E849	L850	T851	A852	D853	L854	P855	N856	V857	G858	E859	A860	A861	L862	S863	K864	L865	D866	E867	S868	G869	L870	V871	V872	L873	G874	A875	E876
V677	T678	G679	G680	D681	L682	L683	V684	G685	K686	V687	T688	P689	K690	G691	GLU	THR	GLN	LEU	THR	PRO	GLU	LYS	LEU	LEU	ARG	ALA	ILE	PHE	GLY	GLU	L785	S911	D912	V913	K914	D915	S916	S917	L918	R919	V920	P921	N922	G923	V924	S925	G926	T927	V928	I929	D930	V931	Q932	V933	F934	T935	L936	R937	R938
D696	K697	P698	L699	V700	G701	T702	G703	M704	E705	R706	A707	V708	A709	S712	G713	V714	F715	A716	V717	A718	R719	R720	G721	G722	V723	V724	Q725	Y726	D727	D728	A729	S730	L731	R732	V733	I734	V735	N736	N737	E738	D739	E740	M741	V742	F743	G744	E745	A746	G747	L748	D749	I750	Y751	N752	L753	T754	K755	V756	
H628	F629	V630	D631	E632	L633	V634	T635	C636	R637	S638	K639	G640	E641	S642	S643	L644	F645	S646	I647	L648	Q649	D654	V655	S656	T657	Q658	S662	V663	G664	A665	G666	L667	I668	H673	D674	D675	A676	M677	R678	A679	L680	M681	G682	A683	M684	M685	Q686	R687	Q688	A689	V690	P691	T692	L693	R694	A695			
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V550	H551	P552	T553	H554	Y555	G556	R557	V558	I561	E562	T563	P564	E565	G566	P567	M568	I569	G570	L571	I572	N573	S574	L575	S576	T577	Y578	A579	Q580	T581	Y584	G585	F586	L587	V594	T595	D596	D601	E602	I603	H604	Y605	A608	E609	I610	A619	M620	S621	N622	L623	D624	E625	E626	G627						



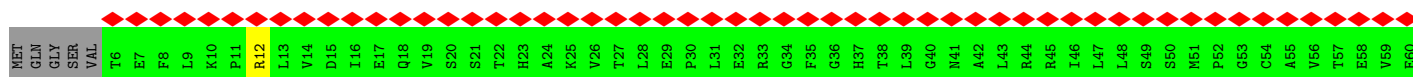
• Molecule 12: Transcription termination/antitermination protein NusG



• Molecule 13: DNA-directed RNA polymerase subunit alpha

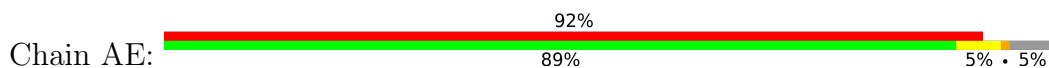


• Molecule 13: DNA-directed RNA polymerase subunit alpha



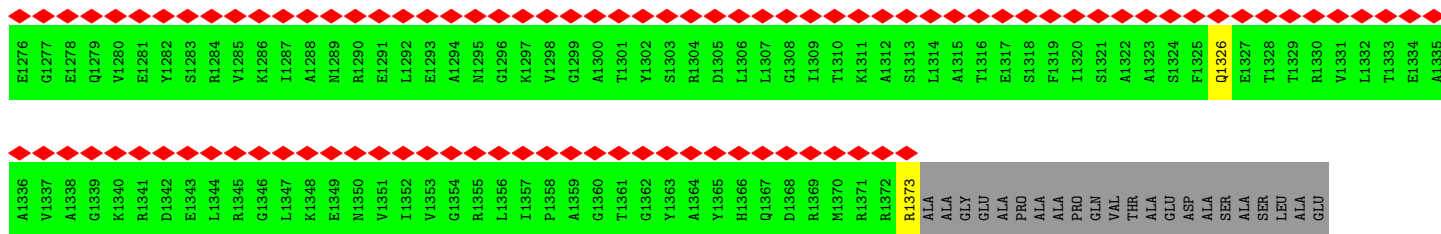
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E181	R182	I183	A184	Y185	N186	V187	E188	A189	A190	R191	V192	E193	Q194	R195	T196	L197	L198	D199	K200	L201	V202	I203	E204	M205	E206	T207	N208	G209	T210	I211	D212	P213	E214	E215	A216	I217	R218	R219	A220	A221	T222	I223	L224	A225	E226	Q227	L228	E229	A230	F231	V232	D233	LEU	ARG	ASP	VAL	ARG	GLN	PRO
GLU	VAL	LYS	GLU	LYS	PRO	PHE	ASP	PRO	ILE	LEU	ARG	VAL	ASP	ASP	LEU	TRP	GLU	THR	VAL	ARG	SER	ALA	CYS	LEU	ALA	ALA	ILE	HIS	TVR	ILE	GLY	ASP	VAL	GLN	ARG	THR	VAL	LEU	LEU	LYS	THR	PRO	ASN	LEU	GLY	LYS	SER	LEU											
THR	GLU	ILE	LYS	ASP	VAL	LEU	ALA	SER	LEU	THR	MET	ARG	LEU	GLU	ASN	TRP	PRO	ALA	SER	ILE	ALA	ASP	LEU	GLU																																			

• Molecule 14: DNA-directed RNA polymerase subunit beta'



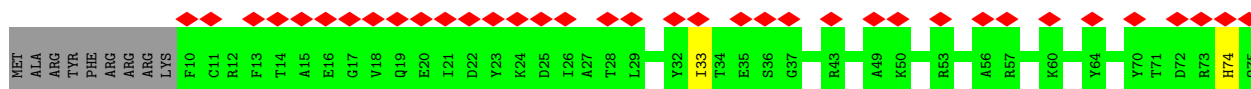
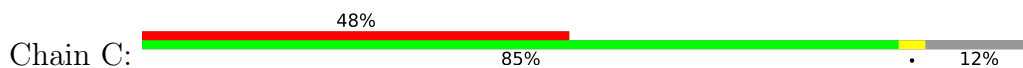
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L361	R362	L363	H364	Q365	C366	G367	L368	P369	K370	K371	N372	A373	L374	E375	L376	F377	K378	P379	F380	L381	Y382	G383	K384	L385	E386	L387	R388	G389	L390	A391	T392	T393	L394	K395	A396	A397	K398	K399	M400	V401	E402	R403	E404	E405	A406	V407	V408	M409	D410	L411	L412	D413	E414	V415	I416	R417	E418	H419	P420		
V421	L422	L423	H424	R425	A426	P427	T428	L429	H430	R431	L432	G433	L434	Q435	A436	F437	E438	P439	V440	L441	L442	E443	Q444	K445	A446	L447	Q448	L449	H450	P451	L452	C453	C454	A455	A456	Y457	N458	A459	D460	F461	G463	D464	Q465	M466	A467	V468	H469	V470	P471	L472	T473	L474	E475	A476	Q477	L478	E479	A480			

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I601	S602	K603	M604	L605	N606	T607	C608	G609	R610	I611	L612	A613	L614	K615	P616	T617	V618	I619	F620	A621	Q622	L623	I624	A625	K626	T627	G628	F629	A630	Y631	A632	A633	R634	S635	G636	A637	S638	V639	G640	I641	D642	D643	M644	V645	I646	P647	E648	K649	G650	H651	E652	I653	I654	A657	E658	A659	E660	V661	
I664	Q665	E666	Q667	F668	Q669	S670	G671	L672	V673	T674	A675	G676	E677	R678	Y679	M680	K681	V682	I683	D684	I685	M686	A687	A688	A689	M690	D691	R692	V693	S694	K695	M698	L701	Q702	V706	I707	M708	R709	D710	G711	Q712	E713	E714	K715	E716	E717	K718	H651	E652	I653	I654	A657	E658	A659	E660	V661			
S728	G729	A730	R731	G732	S733	A734	A735	Q736	I737	R738	Q739	L740	A741	R744	G745	L746	M747	A748	K749	F750	D751	G752	A753	A754	I755	E756	P758	I759	F763	R764	L767	M768	V769	L770	Q771	Y772	F773	I774	S775	T776	H777	G778	A779	R780	K781	G782	L783	A784	D785	D786	I787	L788	K789	T790	A791				
M792	S793	G794	Y795	L796	T797	R798	R799	L800	V801	D802	V803	A804	Q805	D806	L807	V808	V809	T810	E811	D812	D813	C814	G815	T816	E818	G819	I820	M821	M822	T823	P824	V825	I826	E827	G828	G829	D830	V831	K832	E833	P834	L835	R836	R838	V839	L840	G841	R842	V843	E846	D847	L848	L849	K850	P851	G852			
T853	A854	D855	L856	L857	V858	P859	R860	M861	L862	L863	L864	H865	E866	Q867	V868	C869	D870	L871	L872	E873	D874	M875	S876	H877	D878	A879	V880	K881	R882	S883	S884	V885	H886	D889	T890	D891	F892	G893	V894	C895	A896	V899	G900	R901	D902	L903	A904	R905	G906	H907	I908	I909	N910	K911	G912	E913	A914		
I915	G916	V917	I918	A919	A920	Q921	S922	I923	G924	E925	P926	G927	T928	Q929	L930	T931	R932	L933	THR	PHE	HIS	ILE	GLY	ALA	SER	ARG	ALA	ALA	S948	S949	I950	Q951	V952	K953	N954	K955	G956	S957	I958	C959	A896	S961	N962	V963	K964	S965	V966	V967	N968	S969	S970	G971	K972	L973	I974	E913	A914		
I975	T976	S977	R978	N979	T980	E981	L982	K983	L984	I985	E987	F988	G989	R990	T991	K992	E993	Y995	K996	V997	P998	S999	G1000	A1001	L1002	L1003	A1004	K1005	G1006	D1007	G1008	E1009	Q1010	N954	K955	G956	S957	I958	C959	A896	S961	N962	V963	K964	S965	V966	V967	N968	S969	S970	G971	K972	L973	I974	E913	A914			
R1036	F1037	T1038	D1039	M1040	I1041	D1042	G1043	Q1044	T1045	I1046	T1047	R1048	Q1049	T1050	D1051	E1052	L1053	T1054	G1055	L1056	S1057	S1058	L1059	V1060	V1061	L1062	D1063	S1064	E1066	R1067	T1068	A1069	G1070	G1071	K1072	A1073	L1074	R1075	P1076	A1077	L1078	K1079	I1080	V1081	D1082	A1083	Q1084	G1085	M1086	D1087	V1088	L1089	I1090	P1091	G1092	D1094	M1095		
P1096	A1097	Q1098	Y1099	F1100	L1101	P1102	G1103	K1104	A1105	I1106	V1107	Q1108	L1109	E1110	D1111	G1112	V1113	Q1114	I1115	S1116	S1117	G1118	D1119	T1120	L1121	A1122	R1123	I1124	P1125	Q1126	GLU	SER	GLY	THR	LYS	ASP	I1192	G1136	L1137	L1138	P1139	R1140	V1141	A1142	D1143	L1144	F1145	E1146	A1147	R1148	R1149	P1150	K1151	E1152	P1153	A1154	I1155		
L1156	A1157	E1158	I1159	S1160	G1161	I1162	V1163	S1164	G1166	K1167	E1168	T1169	K1170	G1171	K1172	R1173	L1174	L1175	V1176	I1177	T1178	P1179	V1180	D1181	G1182	S1183	D1184	P1185	Y1186	E1187	E1188	M1189	I1190	P1191	K1192	M1193	R1194	Q1195	L1196	M1197	V1198	F1199	E1200	G1201	E1202	R1203	V1204	E1205	R1206	G1207	D1208	V1209	I1210	S1211	D1212	G1213	F1214	E1215	

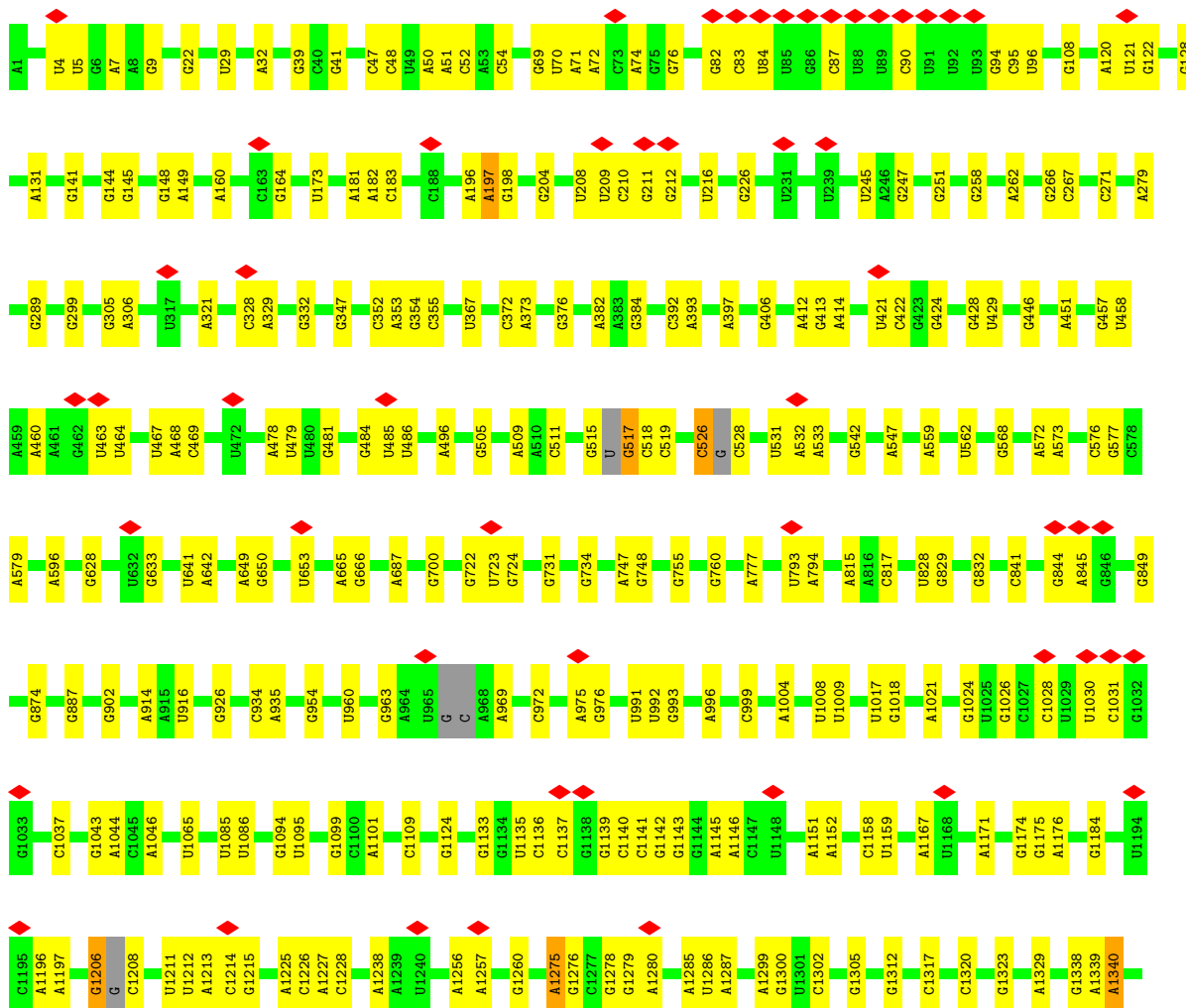
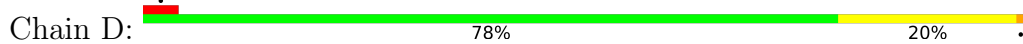


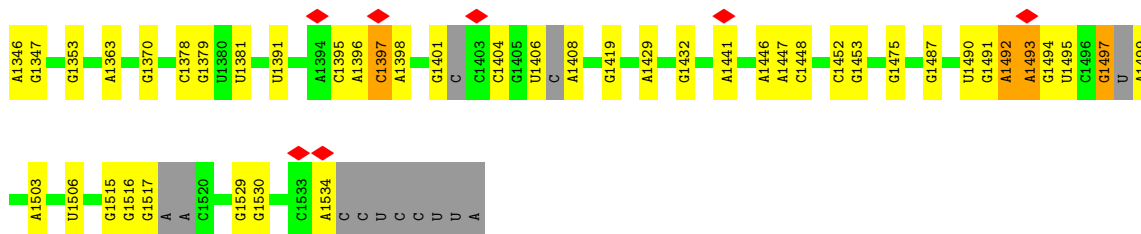
LEU  
LEU  
ASN  
ALA  
GLY  
LEU  
GLY  
SER  
ASP  
ASN  
GLU

• Molecule 15: 30S ribosomal protein S18

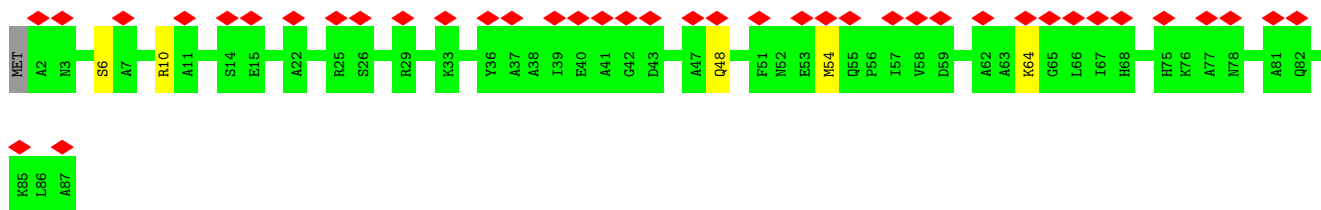
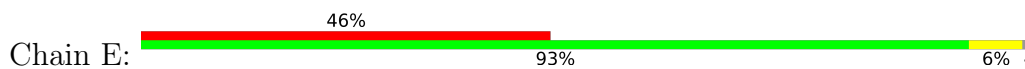


• Molecule 16: 16S rRNA

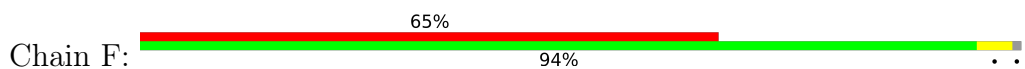




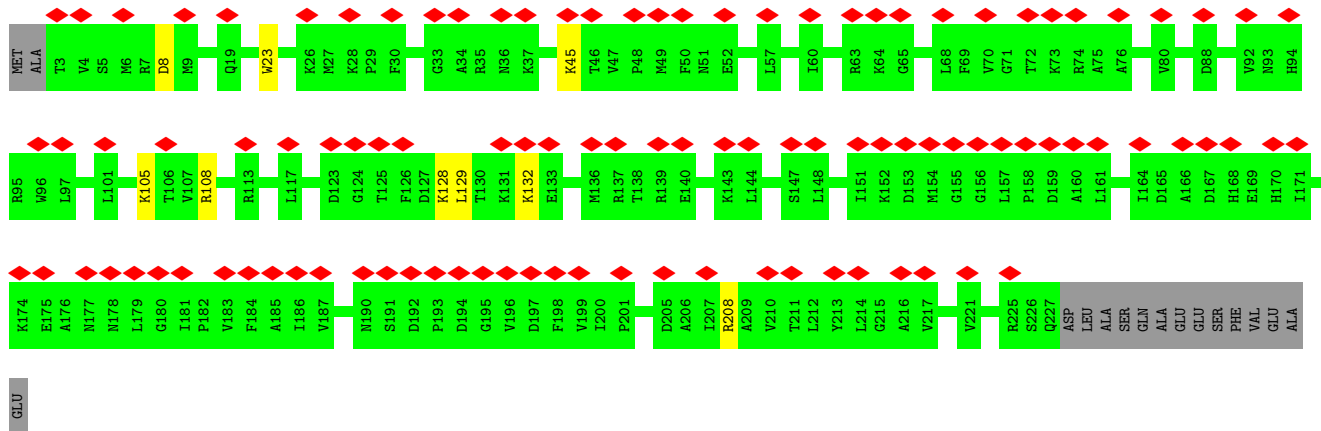
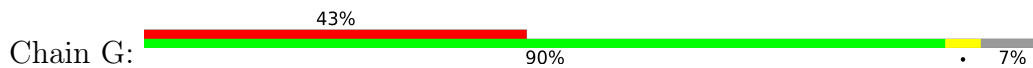
• Molecule 17: 30S ribosomal protein S20



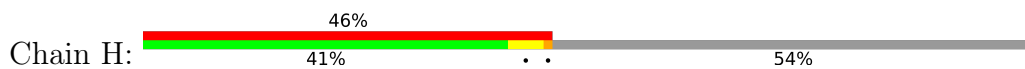
• Molecule 18: 30S ribosomal protein S21



• Molecule 19: 30S ribosomal protein S2



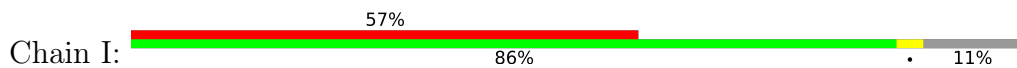
• Molecule 20: 30S ribosomal protein S1





E61	I62	Q63	V64	G65	D66	E67	D68	V70	A71	L72	D73	A74	V75	E76	D77	G78	F79	G80	E81	T82	L83	L84	S85	R86	E87	K88	A89	R91	H92	L92	E93	A94	W95	I96	T97	L98	E99	K100	A101	Y102	E103	D104	A105	E106	T107	V108	T109	G110	V111	I112	N113	G114	K115	V116	K117	G118	G119	F120				
T121	V122	E123	L124	N125	G126	I127	R128	A129	D69	L131	P132	G133	S134	L135	V136	D137	V138	R139	P140	V141	R142	D143	T144	L145	H146	L147	E148	G149	K150	E151	L152	E153	F154	K155	V156	I157	K158	L159	D160	Q161	R163	N164	N165	V166	V167	V168	S169	R170	R171	A172	V173	I174	E175	S176	GLU	ASN	SER	ALA				
GLU	ARG	ASP	GLN	LEU	LEU	GLU	ASN	GLN	GLN	GLY	VAL	VAL	ILE	VAL	LYS	ASN	THR	ASP	GLY	PHE	ALA	VAL	LEU	GLY	VAL	VAL	GLY	LEU	ILE	THR	ASP	MET	ALA	TRP	LYS	ARG	VAL	LYS	HIS	PRO	SER	GLU	ILE	VAL	ASN	VAL	GLY	V166	V167	V168	S169	R170	R171	A172	V173	I174	E175	S176	GLU	ASN	SER	ALA
ILE	THR	VAL	LYS	VAL	LEU	LYS	PHE	ASP	ARG	GLU	THR	ARG	VAL	VAL	GLN	GLY	E264	D265	P266	W267	V268	A269	I270	A271	K272	R273	Y274	P275	P276	E276	G277	T278	K279	L280	T281	G282	R283	V284	T285	N286	N286	L287	T288	D289	Y290	G291	C292	F293	V294	E295	I296	E297	E298	G299	V300							
E301	G302	L303	V304	R305	V306	S307	E308	R309	D310	W311	T312	R313	K314	R315	I316	R317	P318	S319	K320	V321	V322	R323	V324	G325	D326	V327	V328	E329	V330	R331	V332	L333	D334	I335	D336	E337	E338	R339	R340	R341	I342	S343	L344	G345	L346	R347	Q348	CYS	LYS	ALA	ASN	PRO	TRP	GLN	PHE	GLU	ALA	THR				
HIS	ASN	GLY	ASP	ARG	VAL	GLU	GLY	ILE	LYS	THR	THR	PHE	GLY	ILE	ILE	GLY	ASP	GLY	ILE	ASP	GLY	LEU	VAL	HIS	LEU	SER	ILE	SER	TRP	ASN	VAL	ALA	GLY	GLU	VAL	ARG	THR	TYR	LYS	LYS	ALA	ASP	GLY	ASP	GLU	VAL	ILE	ALA	VAL	LEU												
GLN	VAL	ALA	GLU	ARG	GLU	ARG	ILE	SER	LYS	GLN	LEU	ALA	GLU	ASP	PRO	PHE	GLU	ASN	TRP	VAL	ALA	LYS	GLY	ALA	VAL	ILE	THR	GLY	LYS	VAL	THR	ALA	VAL	ASP	ALA	LYS	ALA	GLY	ALA	ASP	THR	VAL	VAL	ASN	GLY	TYR	GLN	VAL	ARG	ALA												
SER	GLU	ALA	SER	ASP	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL									
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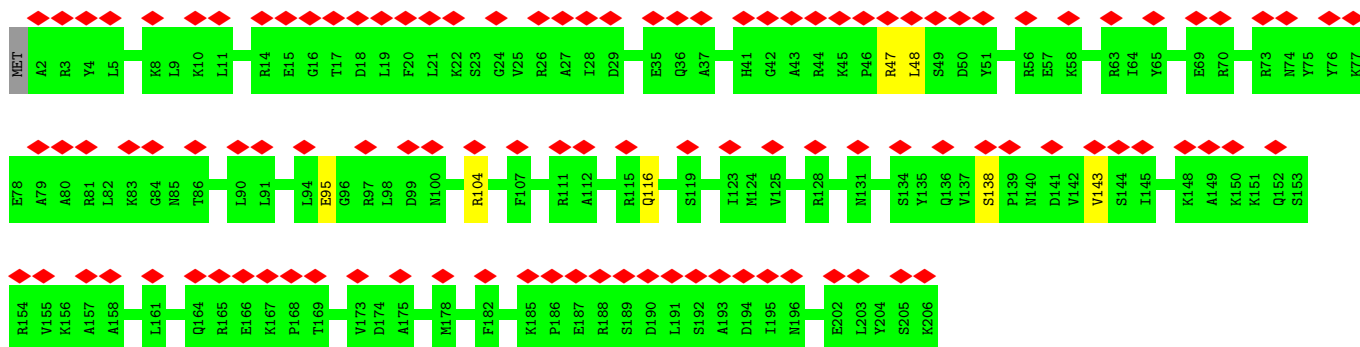
• Molecule 21: 30S ribosomal protein S3



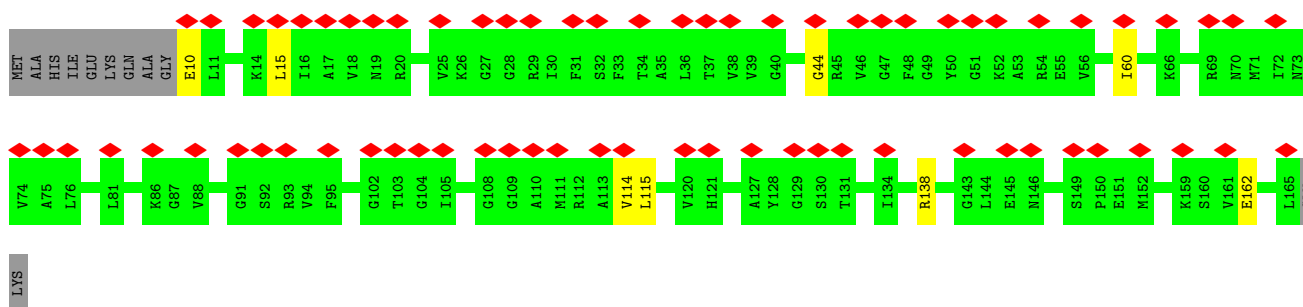
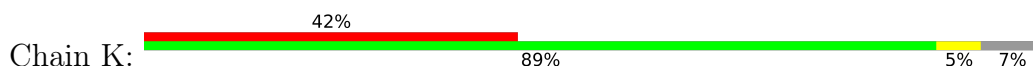
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I75	V76	I77	G78	K79	K80	G81	E82	D83	V84	L87	R88	K89	V90	V91	A92	D93	I94	A95	G96	V97	P98	A99	Q100	I101	N102	I103	A104	E105	V106	R107	K108	P109	E110	L111	D112	A113	K114	L115	V116	A117	I120	T121	L124	E125	R126	R127	F130	R131	M134	K135	R136	A137	V138							
Q139	N140	A141	M142	R143	L144	G145	A146	K147	G148	E152	V153	L157	G158	G159	A160	E161	I162	A163	R164	T165	E166	W167	Y168	R169	E170	L175	A180	D181	I182	D183	Y184	M185	T186	S187	E188	A189	H190	T191	T192	Y193	G194	V195	I196	G197	V198	K199	V200	E206	I207	L208	G209	GLY	MET	ALA						
ALA	VAL	GLU	GLN	PRO	GLU	LYS	PRO	ALA	ALA	GLN	LYS	LYS	GLN	ARG	ARG	GLY	ARG	LYS																																										

• Molecule 22: 30S ribosomal protein S4

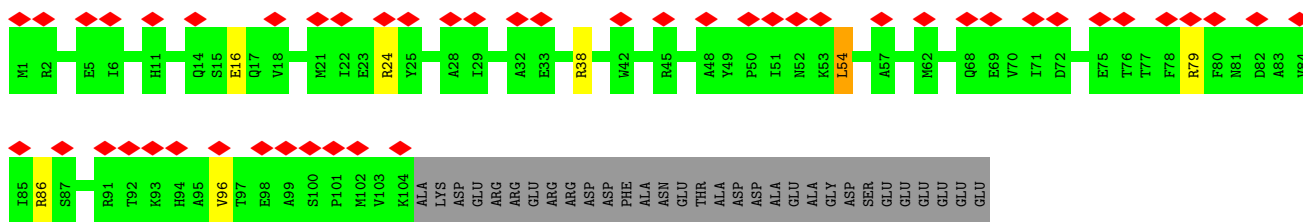




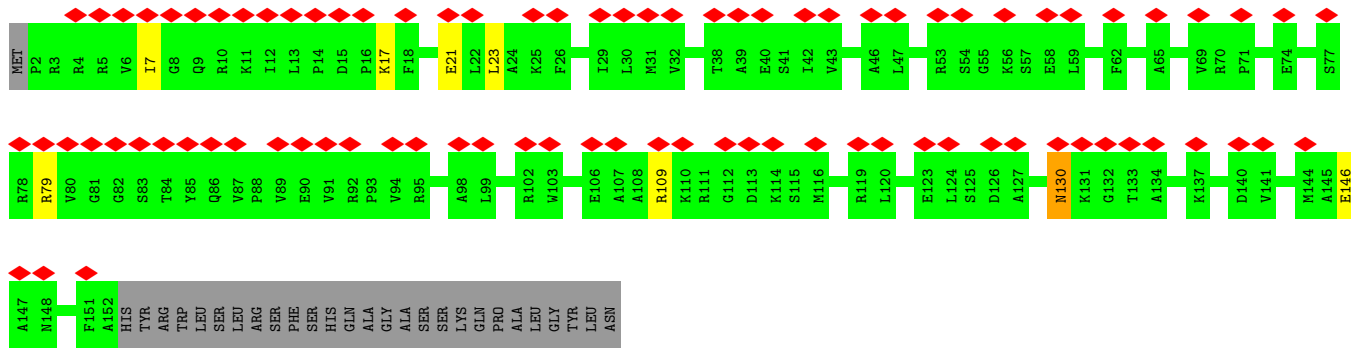
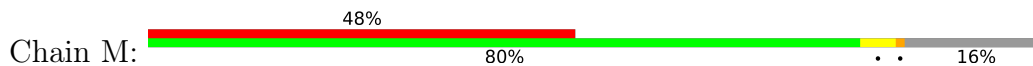
• Molecule 23: 30S ribosomal protein S5



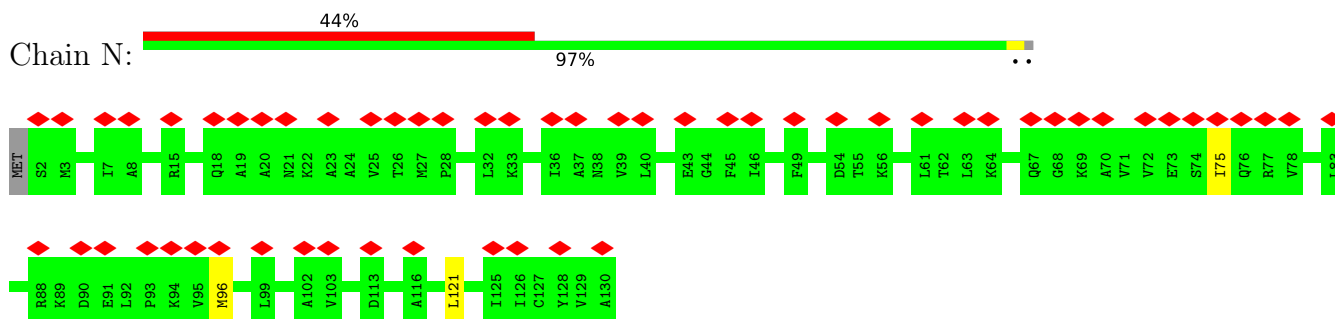
• Molecule 24: 30S ribosomal protein S6



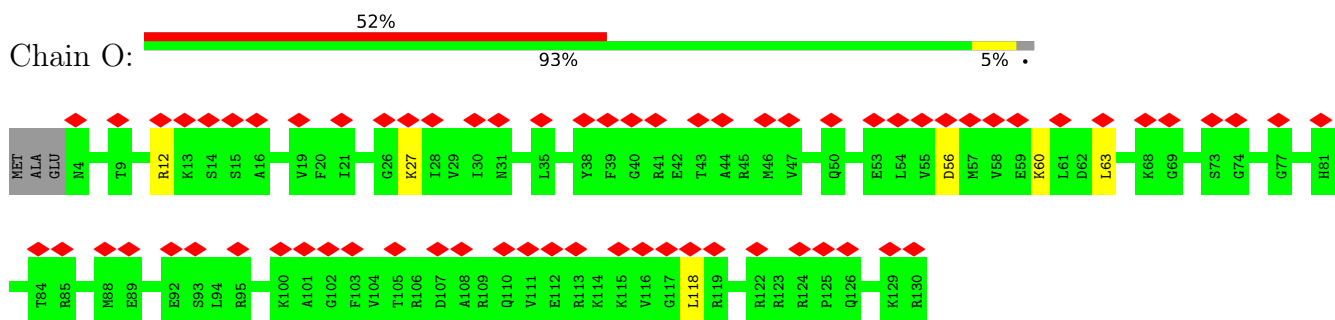
• Molecule 25: 30S ribosomal protein S7



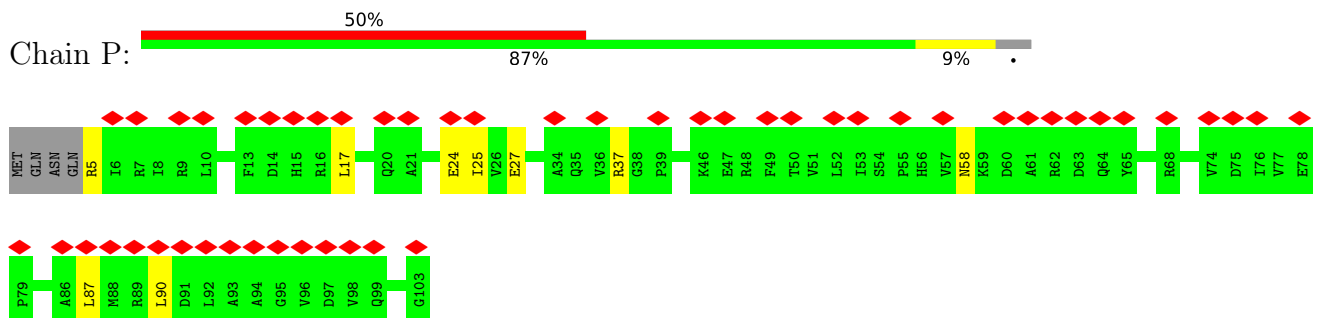
- Molecule 26: 30S ribosomal protein S8



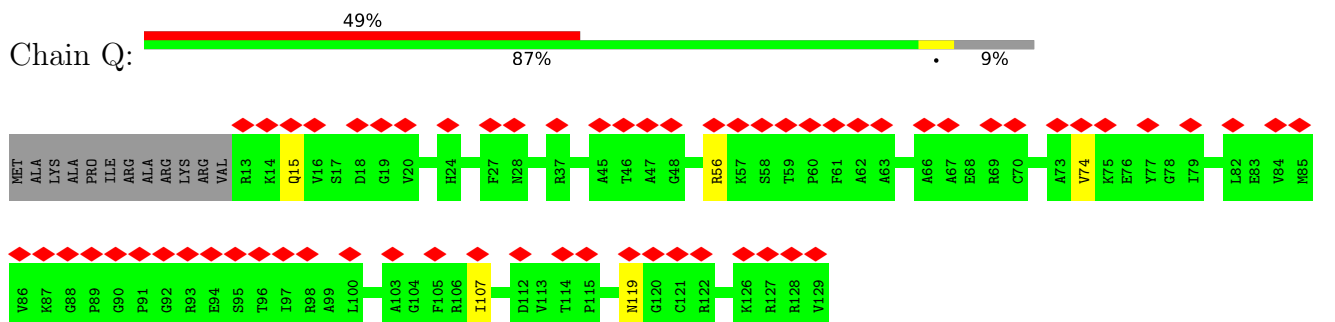
- Molecule 27: 30S ribosomal protein S9



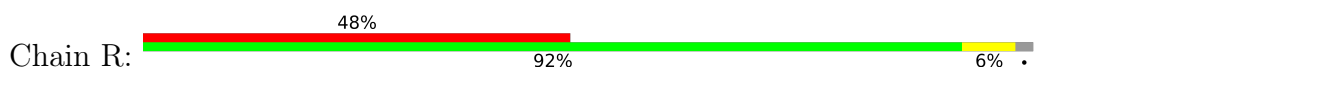
- Molecule 28: 30S ribosomal protein S10

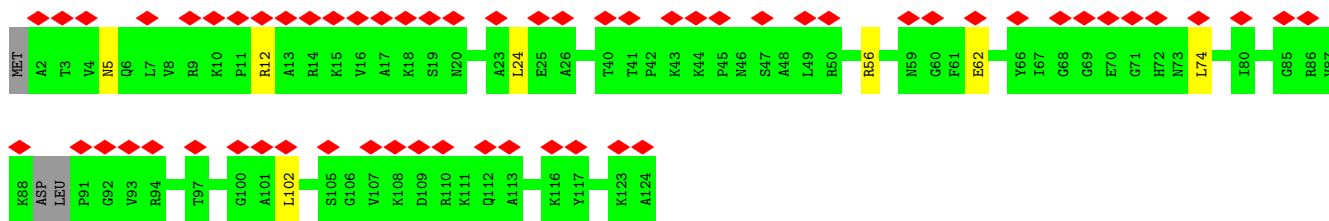


- Molecule 29: 30S ribosomal protein S11



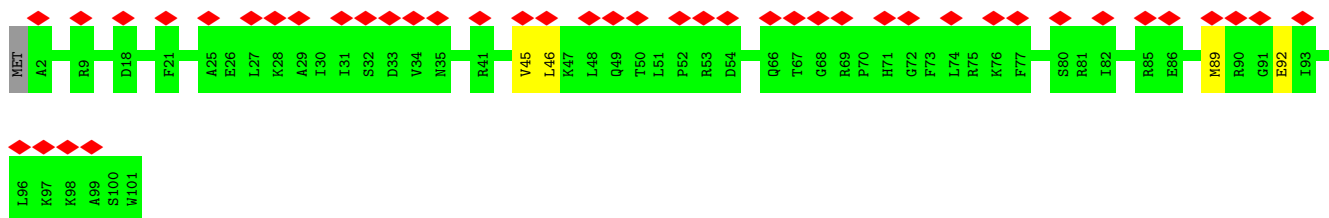
- Molecule 30: 30S ribosomal protein S12





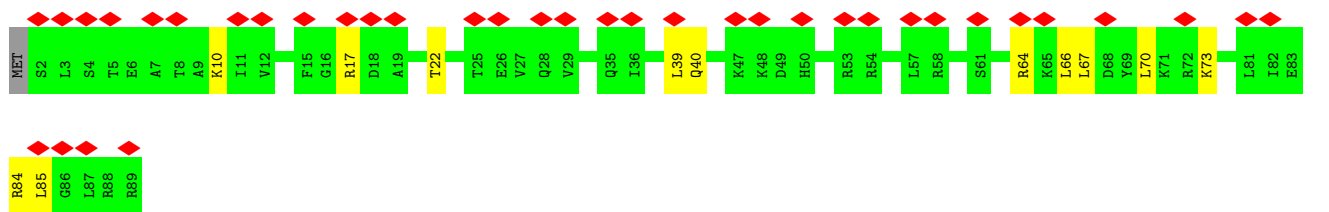
- Molecule 31: 30S ribosomal protein S14

Chain S: 43% 95%



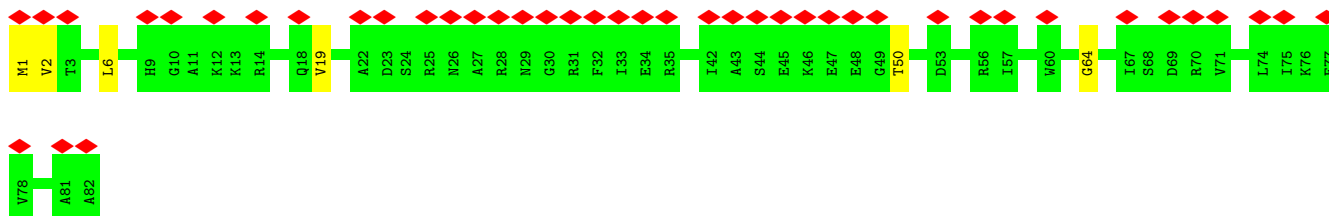
- Molecule 32: 30S ribosomal protein S15

Chain T: 42% 85% 13%



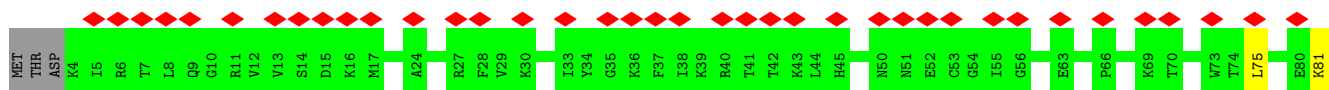
- Molecule 33: 30S ribosomal protein S16

Chain U: 52% 93% 7%



- Molecule 34: 30S ribosomal protein S17

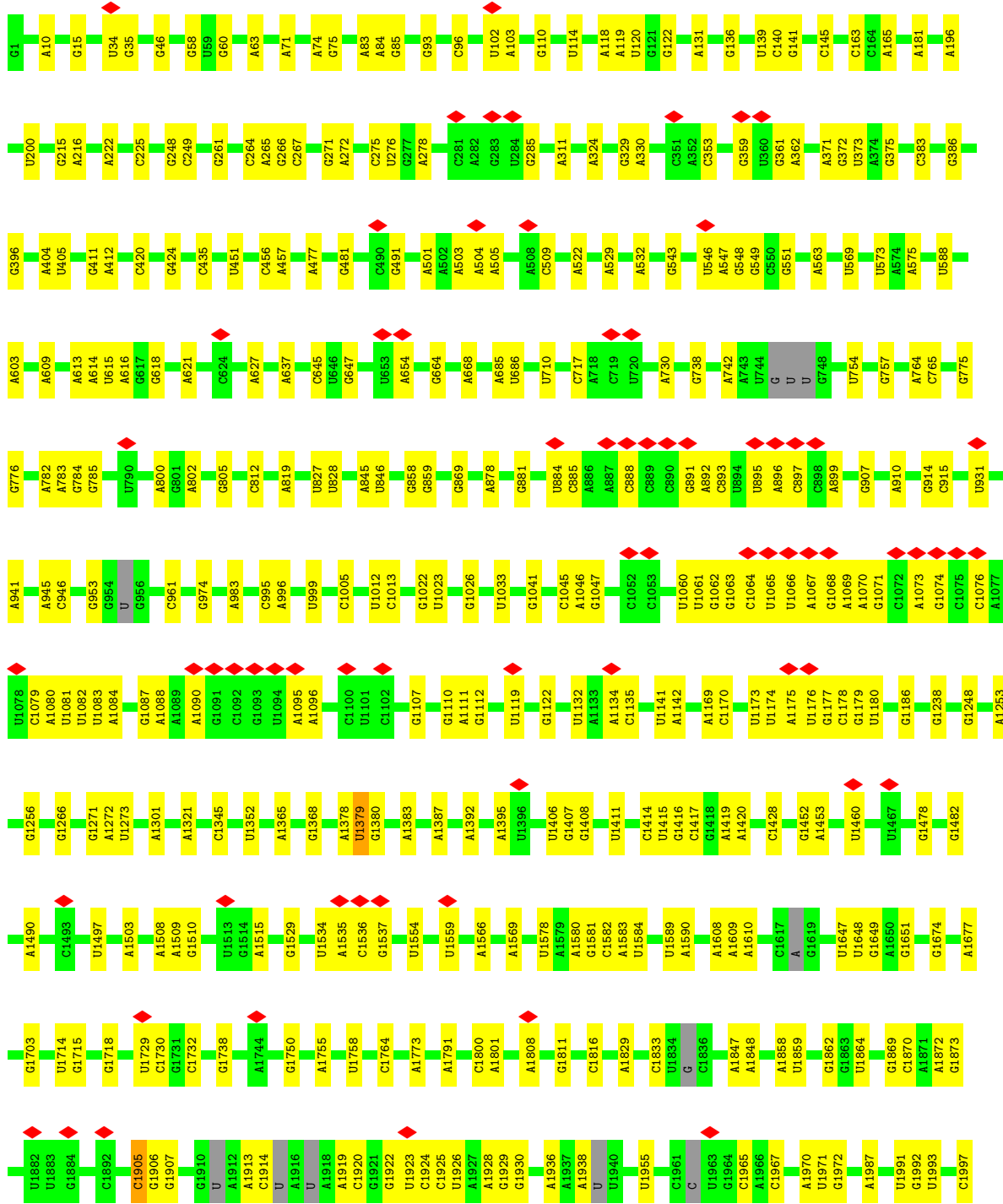
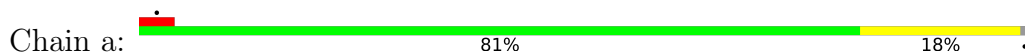
Chain V: 48% 93% 5%

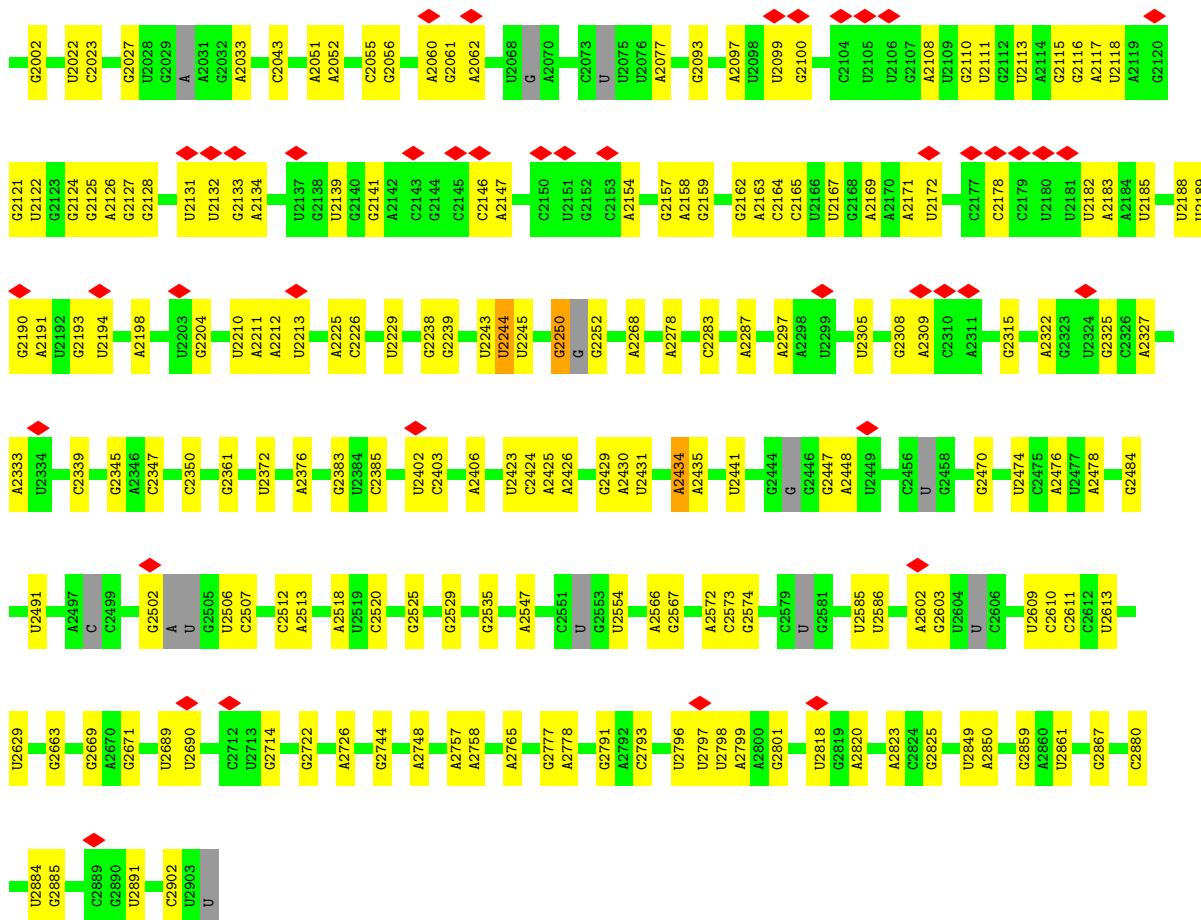




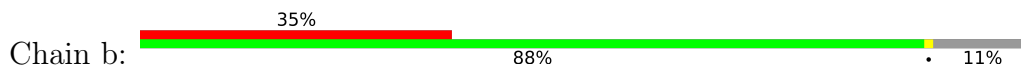
LYS

• Molecule 39: 23S rRNA

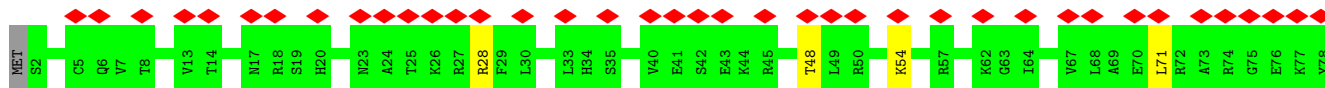
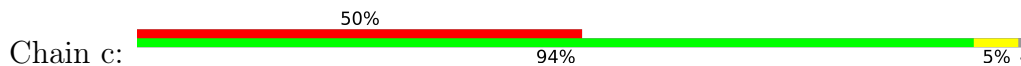




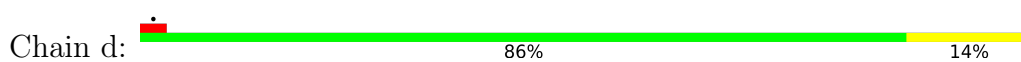
• Molecule 40: 50S ribosomal protein L27



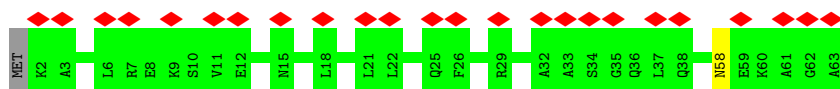
• Molecule 41: 50S ribosomal protein L28



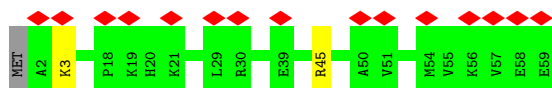
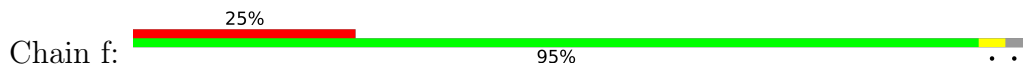
• Molecule 42: 5S rRNA



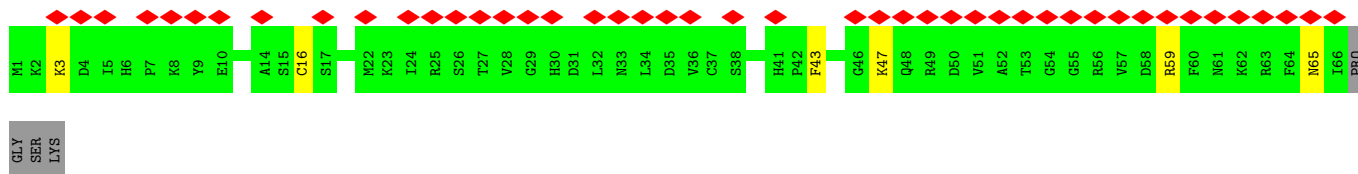
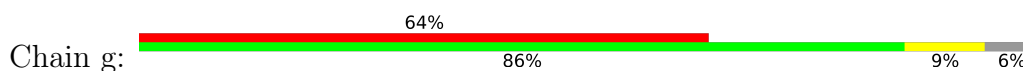
• Molecule 43: 50S ribosomal protein L29



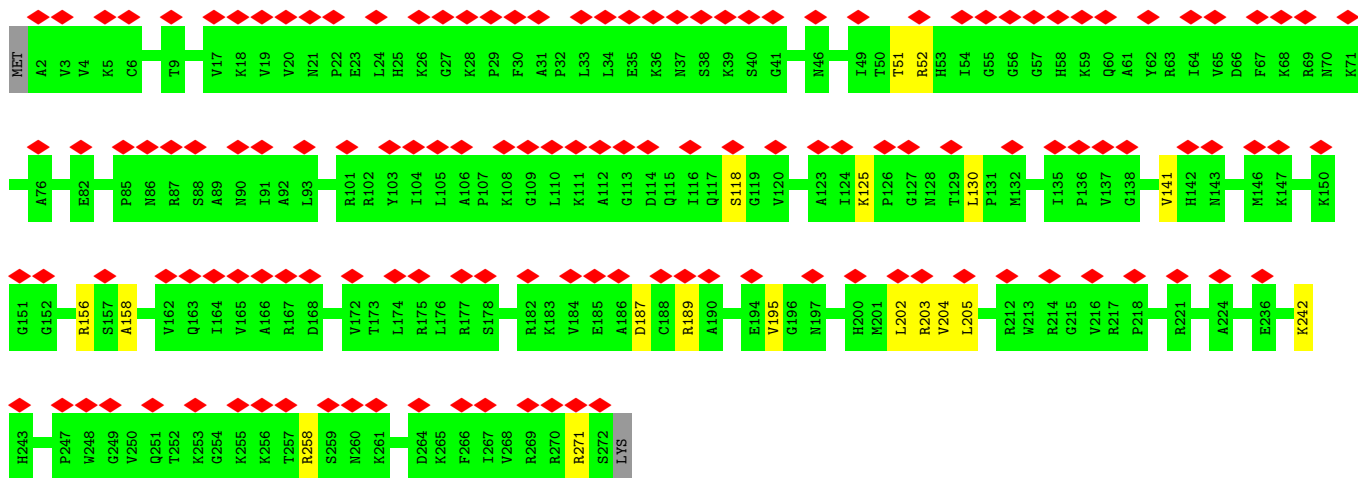
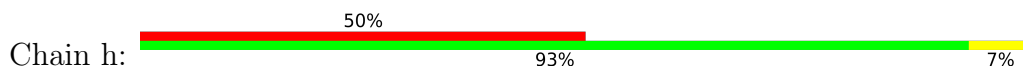
- Molecule 44: 50S ribosomal protein L30



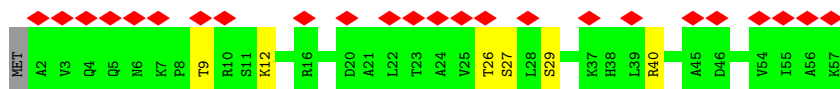
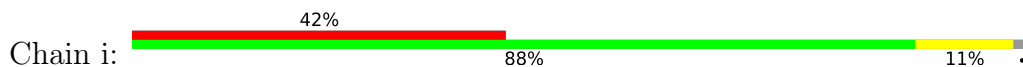
- Molecule 45: 50S ribosomal protein L31



- Molecule 46: 50S ribosomal protein L2

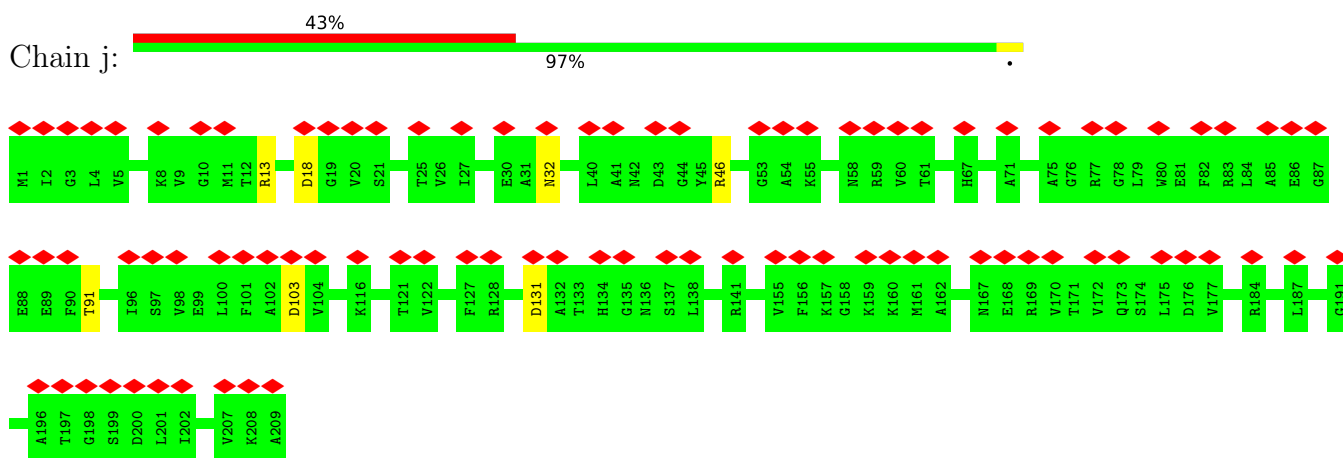


- Molecule 47: 50S ribosomal protein L32

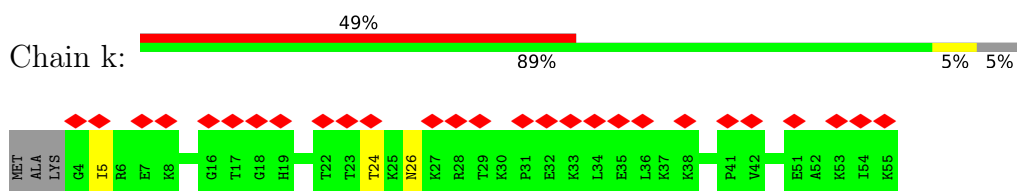


- Molecule 48: 50S ribosomal protein L3

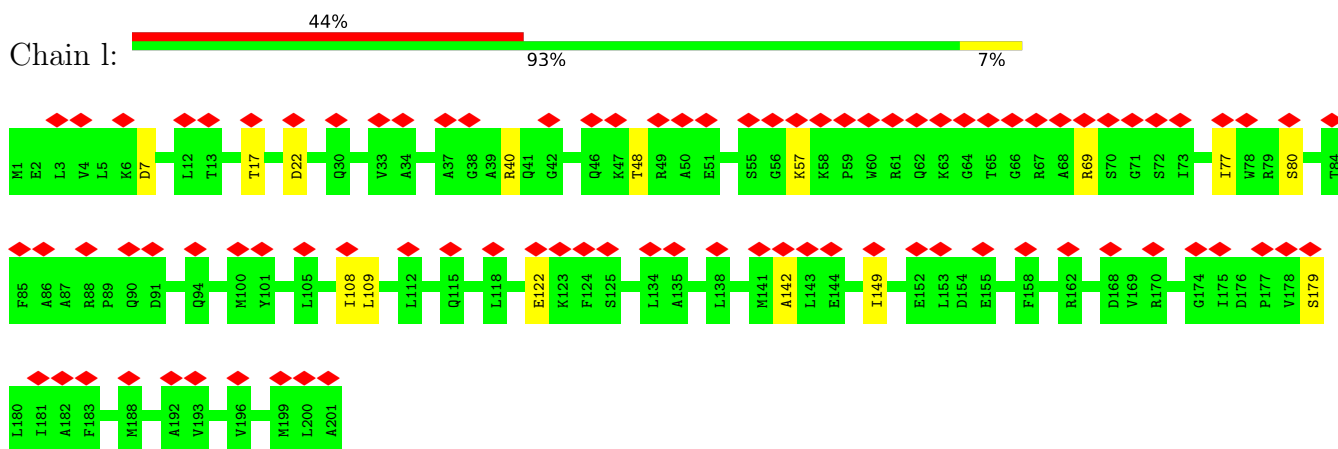




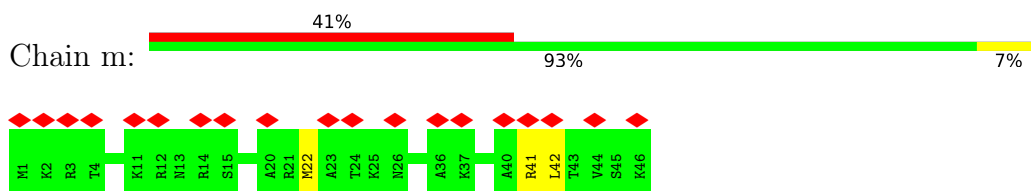
- Molecule 49: 50S ribosomal protein L33



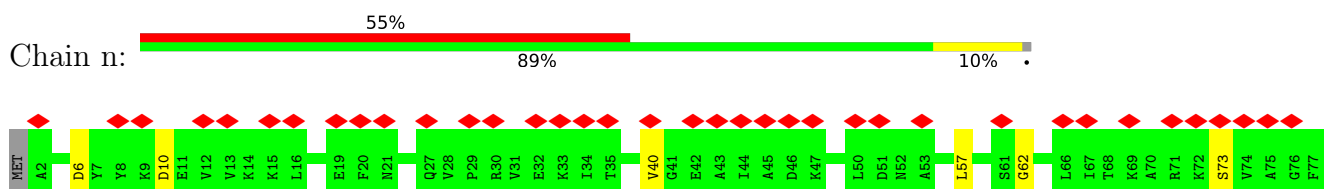
- Molecule 50: 50S ribosomal protein L4

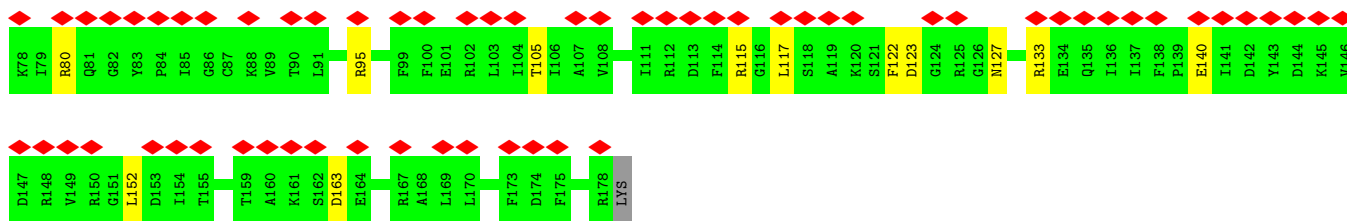


- Molecule 51: 50S ribosomal protein L34

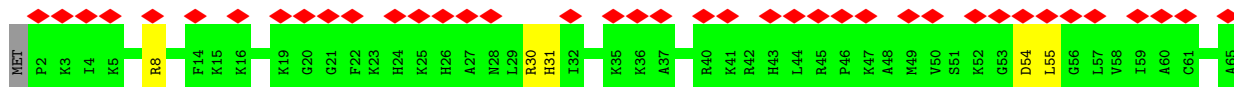
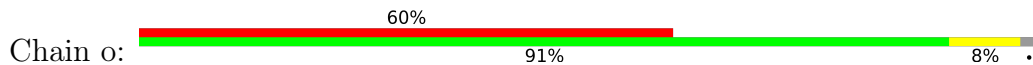


- Molecule 52: 50S ribosomal protein L5

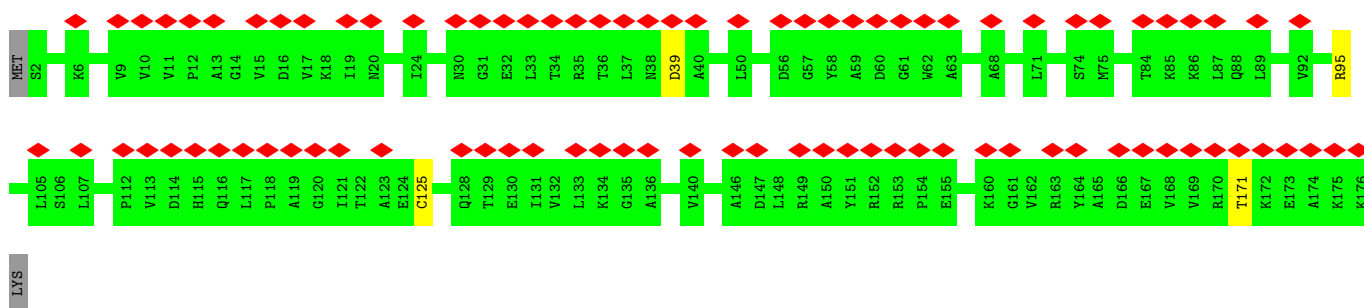




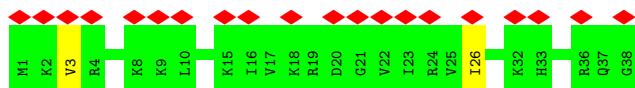
• Molecule 53: 50S ribosomal protein L35



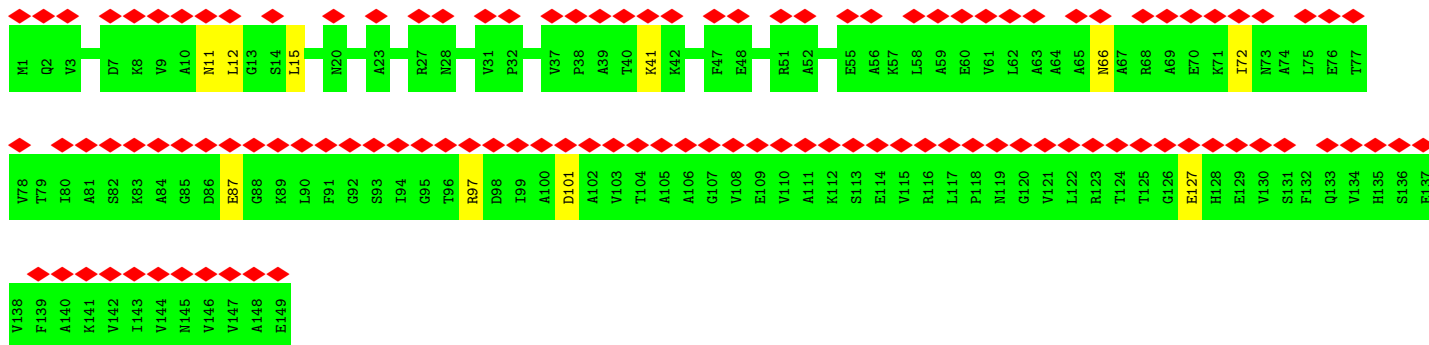
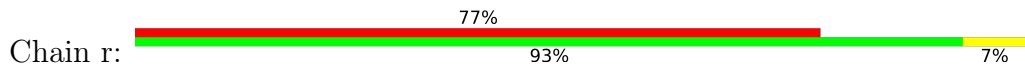
• Molecule 54: 50S ribosomal protein L6



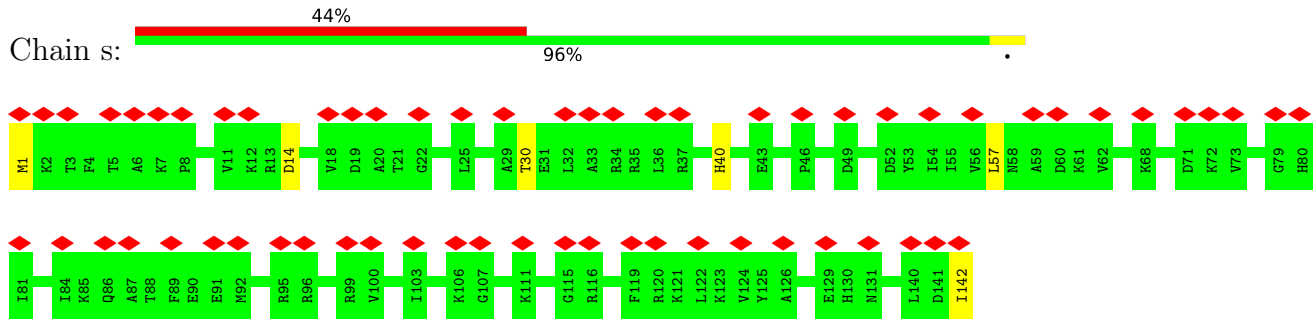
• Molecule 55: 50S ribosomal protein L36



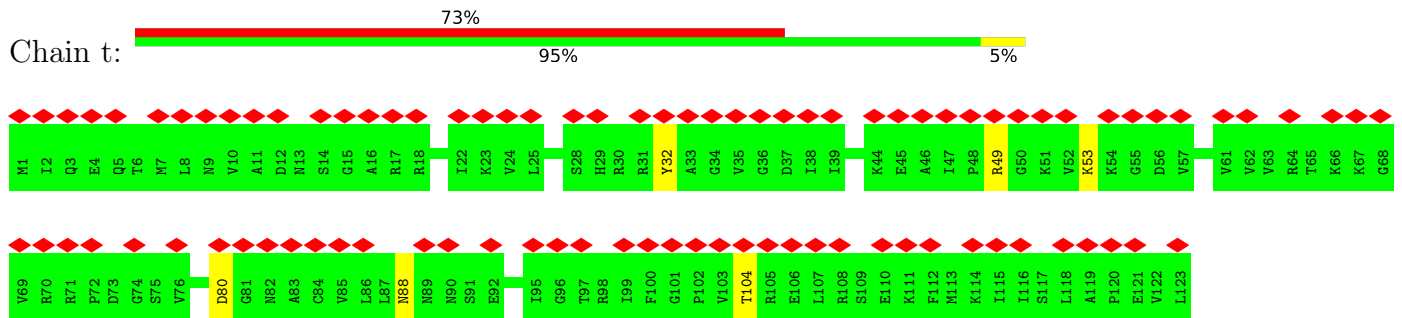
• Molecule 56: 50S ribosomal protein L9



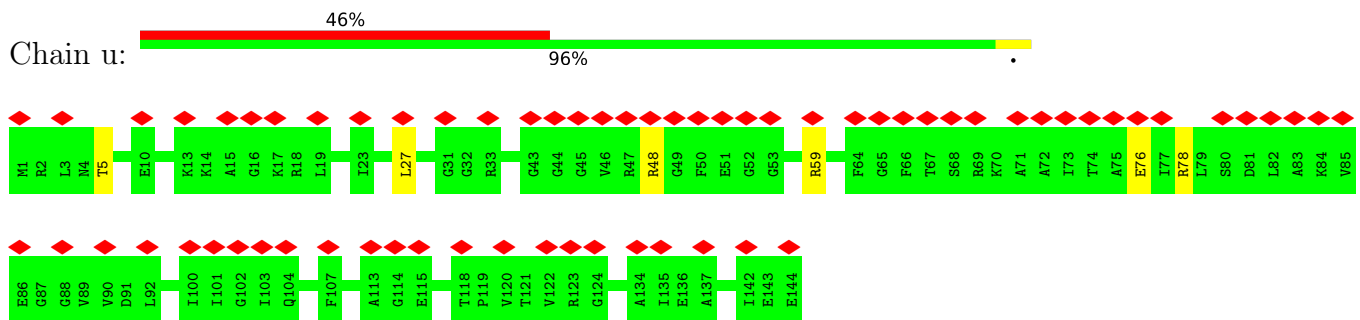
- Molecule 57: 50S ribosomal protein L13



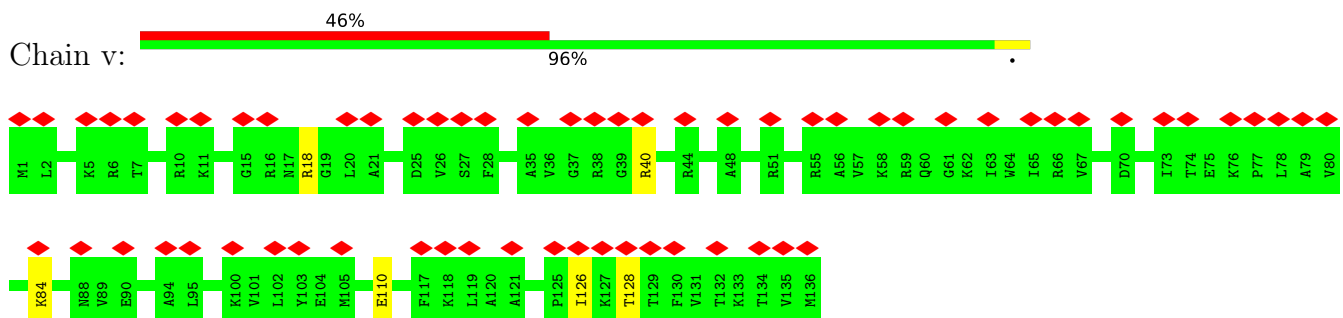
- Molecule 58: 50S ribosomal protein L14



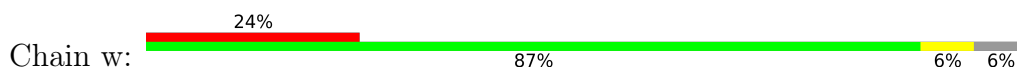
- Molecule 59: 50S ribosomal protein L15

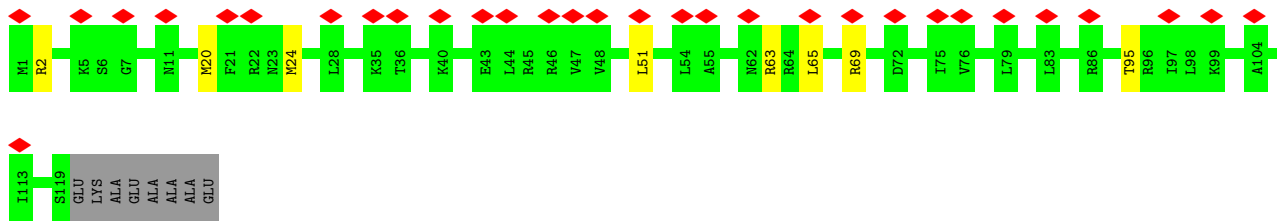


- Molecule 60: 50S ribosomal protein L16

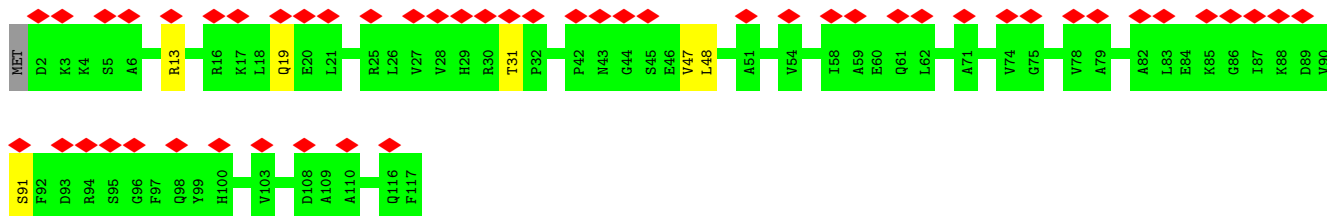
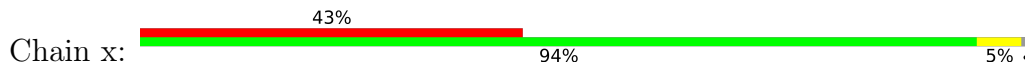


- Molecule 61: 50S ribosomal protein L17

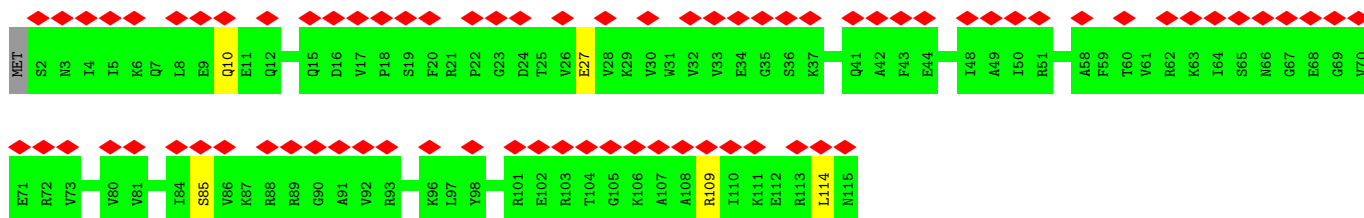




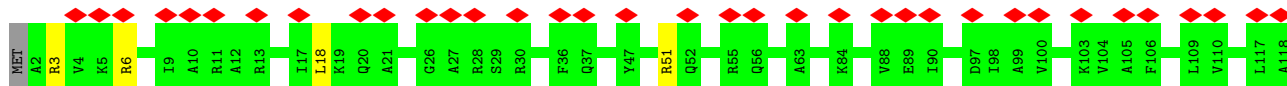
• Molecule 62: 50S ribosomal protein L18



• Molecule 63: 50S ribosomal protein L19



• Molecule 64: 50S ribosomal protein L20



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	4000	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TALOS ARCTICA	Depositor
Voltage (kV)	200	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	45	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.029	Depositor
Minimum map value	-0.014	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.009	Depositor
Map size (Å)	532.48, 532.48, 532.48	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.04, 1.04, 1.04	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: MG, ZN

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	0	0.38	0/829	0.67	0/1107
2	1	0.49	0/864	0.82	0/1156
3	2	0.42	0/752	0.71	0/1005
4	3	0.35	0/796	0.67	2/1062 (0.2%)
5	4	0.40	0/766	0.68	0/1025
6	5	1.13	6/528 (1.1%)	0.97	1/810 (0.1%)
7	6	1.12	4/603 (0.7%)	0.97	0/926
8	7	0.67	2/519 (0.4%)	0.99	3/804 (0.4%)
9	9	0.79	2/1131 (0.2%)	0.64	1/1524 (0.1%)
10	A	0.39	0/1810	0.75	1/2821 (0.0%)
10	B	0.46	1/1810 (0.1%)	0.86	7/2821 (0.2%)
11	AA	0.59	2/10591 (0.0%)	0.75	15/14289 (0.1%)
12	AB	0.43	0/808	0.60	0/1088
13	AC	0.48	0/1808	0.62	1/2450 (0.0%)
13	AD	0.39	0/1789	0.56	0/2425
14	AE	0.52	3/10545 (0.0%)	0.66	5/14236 (0.0%)
15	C	0.48	0/553	0.83	0/743
16	D	0.34	10/36610 (0.0%)	0.74	30/57091 (0.1%)
17	E	0.57	0/675	0.86	0/895
18	F	0.56	0/597	0.87	0/792
19	G	0.49	0/1791	0.71	0/2413
20	H	0.54	1/1746 (0.1%)	1.03	12/2382 (0.5%)
21	I	0.44	0/1663	0.71	0/2241
22	J	0.47	0/1665	0.73	0/2227
23	K	0.45	0/1165	0.75	0/1568
24	L	0.43	0/867	0.75	1/1171 (0.1%)
25	M	0.50	0/1195	0.81	0/1602
26	N	0.41	0/989	0.69	0/1326
27	O	0.43	0/1034	0.75	0/1375
28	P	0.43	0/800	0.75	0/1082
29	Q	0.40	0/893	0.70	0/1205
30	R	0.36	0/952	0.74	0/1274

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
31	S	0.49	0/817	0.78	0/1088
32	T	0.53	0/722	0.86	0/964
33	U	0.44	0/659	0.78	0/884
34	V	0.34	0/657	0.61	0/881
35	W	0.38	0/680	0.62	0/915
36	X	0.49	0/909	0.87	0/1215
37	Y	0.67	0/1046	0.58	0/1410
38	Z	0.69	0/227	0.57	0/304
39	a	0.38	3/69247 (0.0%)	0.72	18/107985 (0.0%)
40	b	0.39	0/589	0.70	0/779
41	c	0.48	0/635	0.81	1/848 (0.1%)
42	d	0.29	0/2872	0.69	0/4478
43	e	0.54	0/502	0.83	0/667
44	f	0.45	0/452	0.78	0/605
45	g	0.43	0/531	0.68	0/709
46	h	0.39	0/2121	0.78	0/2852
47	i	0.40	0/450	0.79	0/599
48	j	0.44	0/1586	0.69	0/2134
49	k	0.35	0/433	0.65	0/576
50	l	0.46	0/1571	0.77	0/2113
51	m	0.53	0/380	0.99	0/498
52	n	0.49	0/1434	0.88	3/1926 (0.2%)
53	o	0.46	0/513	0.83	0/676
54	p	0.39	0/1333	0.67	0/1805
55	q	0.37	0/303	0.77	0/397
56	r	0.43	0/1122	0.69	0/1515
57	s	0.50	0/1152	0.75	0/1551
58	t	0.41	0/955	0.78	0/1279
59	u	0.40	0/1062	0.76	0/1413
60	v	0.47	0/1093	0.82	0/1460
61	w	0.52	0/964	0.87	0/1289
62	x	0.46	0/902	0.81	0/1209
63	y	0.41	0/929	0.73	1/1242 (0.1%)
64	z	0.60	0/960	0.91	1/1278 (0.1%)
All	All	0.43	34/188952 (0.0%)	0.74	103/278480 (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
10	A	0	2

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Mol	Chain	#Chirality outliers	#Planarity outliers
10	B	0	2
11	AA	0	10
14	AE	0	5
20	H	0	3
36	X	0	1
All	All	0	23

The worst 5 of 34 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	9	130	PRO	N-CA	13.73	1.70	1.47
16	D	1516	G	O3'-P	-13.37	1.45	1.61
16	D	1339	A	O3'-P	10.52	1.73	1.61
11	AA	374	GLU	C-N	10.46	1.54	1.34
14	AE	88	CYS	CB-SG	-10.17	1.65	1.82

The worst 5 of 103 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
16	D	1516	G	P-O3'-C3'	-19.03	96.86	119.70
16	D	1516	G	O3'-P-O5'	13.79	130.21	104.00
11	AA	1250	SER	C-N-CA	11.14	149.55	121.70
39	a	2252	G	N9-C1'-C2'	-10.95	99.76	114.00
16	D	1401	G	N9-C1'-C2'	-10.70	100.09	114.00

There are no chirality outliers.

5 of 23 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
10	A	19	G	Sidechain
10	A	7	G	Sidechain
11	AA	205	PRO	Peptide
11	AA	594	VAL	Peptide
11	AA	595	THR	Peptide

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

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



## 5.3 Torsion angles

### 5.3.1 Protein backbone

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	0	101/103 (98%)	97 (96%)	3 (3%)	1 (1%)	15	55
2	1	108/110 (98%)	104 (96%)	4 (4%)	0	100	100
3	2	92/100 (92%)	90 (98%)	2 (2%)	0	100	100
4	3	101/104 (97%)	96 (95%)	4 (4%)	1 (1%)	15	55
5	4	92/94 (98%)	91 (99%)	1 (1%)	0	100	100
9	9	146/165 (88%)	95 (65%)	37 (25%)	14 (10%)	0	10
11	AA	1318/1342 (98%)	1149 (87%)	137 (10%)	32 (2%)	6	33
12	AB	94/181 (52%)	88 (94%)	6 (6%)	0	100	100
13	AC	228/329 (69%)	215 (94%)	11 (5%)	2 (1%)	17	57
13	AD	226/329 (69%)	213 (94%)	12 (5%)	1 (0%)	34	72
14	AE	1329/1407 (94%)	1200 (90%)	120 (9%)	9 (1%)	22	63
15	C	64/75 (85%)	63 (98%)	1 (2%)	0	100	100
17	E	84/87 (97%)	83 (99%)	1 (1%)	0	100	100
18	F	68/71 (96%)	68 (100%)	0	0	100	100
19	G	223/241 (92%)	210 (94%)	13 (6%)	0	100	100
20	H	255/557 (46%)	188 (74%)	55 (22%)	12 (5%)	2	21
21	I	206/233 (88%)	196 (95%)	9 (4%)	1 (0%)	29	69
22	J	203/206 (98%)	198 (98%)	5 (2%)	0	100	100
23	K	154/167 (92%)	146 (95%)	7 (4%)	1 (1%)	25	66
24	L	102/135 (76%)	97 (95%)	4 (4%)	1 (1%)	15	55
25	M	149/179 (83%)	144 (97%)	4 (3%)	1 (1%)	22	63
26	N	127/130 (98%)	121 (95%)	5 (4%)	1 (1%)	19	60
27	O	125/130 (96%)	115 (92%)	9 (7%)	1 (1%)	19	60
28	P	97/103 (94%)	88 (91%)	8 (8%)	1 (1%)	15	55
29	Q	115/129 (89%)	104 (90%)	9 (8%)	2 (2%)	9	42

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
30	R	117/124 (94%)	116 (99%)	1 (1%)	0	100	100
31	S	98/101 (97%)	97 (99%)	1 (1%)	0	100	100
32	T	86/89 (97%)	82 (95%)	4 (5%)	0	100	100
33	U	80/82 (98%)	75 (94%)	4 (5%)	1 (1%)	12	48
34	V	78/84 (93%)	74 (95%)	4 (5%)	0	100	100
35	W	81/92 (88%)	78 (96%)	3 (4%)	0	100	100
36	X	114/118 (97%)	107 (94%)	5 (4%)	2 (2%)	8	40
37	Y	139/142 (98%)	102 (73%)	25 (18%)	12 (9%)	1	12
38	Z	28/121 (23%)	19 (68%)	7 (25%)	2 (7%)	1	14
40	b	74/85 (87%)	69 (93%)	5 (7%)	0	100	100
41	c	75/78 (96%)	72 (96%)	3 (4%)	0	100	100
43	e	60/63 (95%)	57 (95%)	3 (5%)	0	100	100
44	f	56/59 (95%)	53 (95%)	3 (5%)	0	100	100
45	g	64/70 (91%)	63 (98%)	1 (2%)	0	100	100
46	h	269/273 (98%)	259 (96%)	9 (3%)	1 (0%)	34	72
47	i	54/57 (95%)	51 (94%)	3 (6%)	0	100	100
48	j	207/209 (99%)	198 (96%)	9 (4%)	0	100	100
49	k	50/55 (91%)	50 (100%)	0	0	100	100
50	l	199/201 (99%)	190 (96%)	8 (4%)	1 (0%)	29	69
51	m	44/46 (96%)	43 (98%)	1 (2%)	0	100	100
52	n	175/179 (98%)	162 (93%)	11 (6%)	2 (1%)	14	52
53	o	62/65 (95%)	59 (95%)	3 (5%)	0	100	100
54	p	173/177 (98%)	161 (93%)	12 (7%)	0	100	100
55	q	36/38 (95%)	35 (97%)	1 (3%)	0	100	100
56	r	147/149 (99%)	136 (92%)	11 (8%)	0	100	100
57	s	140/142 (99%)	135 (96%)	5 (4%)	0	100	100
58	t	121/123 (98%)	111 (92%)	10 (8%)	0	100	100
59	u	142/144 (99%)	135 (95%)	7 (5%)	0	100	100
60	v	134/136 (98%)	129 (96%)	5 (4%)	0	100	100
61	w	117/127 (92%)	107 (92%)	10 (8%)	0	100	100
62	x	114/117 (97%)	108 (95%)	6 (5%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
63	y	112/115 (97%)	105 (94%)	7 (6%)	0	100	100
64	z	115/118 (98%)	110 (96%)	4 (4%)	1 (1%)	17	57
All	All	9368/10486 (89%)	8607 (92%)	658 (7%)	103 (1%)	18	52

5 of 103 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
9	9	88	HIS
11	AA	596	ASP
11	AA	853	ASP
11	AA	859	GLU
11	AA	862	LEU

### 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	0	84/84 (100%)	78 (93%)	6 (7%)	14	39
2	1	93/93 (100%)	85 (91%)	8 (9%)	10	32
3	2	81/84 (96%)	76 (94%)	5 (6%)	18	43
4	3	84/85 (99%)	78 (93%)	6 (7%)	14	39
5	4	78/78 (100%)	74 (95%)	4 (5%)	24	48
9	9	112/123 (91%)	65 (58%)	47 (42%)	0	0
11	AA	1140/1157 (98%)	1039 (91%)	101 (9%)	9	30
12	AB	86/158 (54%)	84 (98%)	2 (2%)	50	70
13	AC	198/286 (69%)	182 (92%)	16 (8%)	11	35
13	AD	196/286 (68%)	194 (99%)	2 (1%)	76	86
14	AE	1120/1168 (96%)	1051 (94%)	69 (6%)	18	43
15	C	57/65 (88%)	55 (96%)	2 (4%)	36	59
17	E	65/66 (98%)	60 (92%)	5 (8%)	13	37
18	F	60/61 (98%)	57 (95%)	3 (5%)	24	49

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
19	G	187/199 (94%)	178 (95%)	9 (5%)	25	51
20	H	137/461 (30%)	128 (93%)	9 (7%)	16	41
21	I	171/190 (90%)	165 (96%)	6 (4%)	36	59
22	J	172/173 (99%)	165 (96%)	7 (4%)	30	55
23	K	119/126 (94%)	112 (94%)	7 (6%)	19	45
24	L	91/116 (78%)	85 (93%)	6 (7%)	16	41
25	M	124/147 (84%)	116 (94%)	8 (6%)	17	42
26	N	104/105 (99%)	102 (98%)	2 (2%)	57	75
27	O	105/107 (98%)	100 (95%)	5 (5%)	25	51
28	P	86/90 (96%)	78 (91%)	8 (9%)	9	28
29	Q	90/99 (91%)	87 (97%)	3 (3%)	38	61
30	R	101/104 (97%)	94 (93%)	7 (7%)	15	40
31	S	83/84 (99%)	79 (95%)	4 (5%)	25	51
32	T	76/77 (99%)	64 (84%)	12 (16%)	2	13
33	U	65/65 (100%)	60 (92%)	5 (8%)	13	37
34	V	74/78 (95%)	72 (97%)	2 (3%)	44	65
35	W	72/79 (91%)	68 (94%)	4 (6%)	21	46
36	X	94/96 (98%)	85 (90%)	9 (10%)	8	27
37	Y	109/110 (99%)	72 (66%)	37 (34%)	0	1
38	Z	26/85 (31%)	12 (46%)	14 (54%)	0	0
40	b	58/63 (92%)	57 (98%)	1 (2%)	60	78
41	c	67/68 (98%)	64 (96%)	3 (4%)	27	52
43	e	54/55 (98%)	53 (98%)	1 (2%)	57	75
44	f	48/49 (98%)	46 (96%)	2 (4%)	30	54
45	g	59/62 (95%)	53 (90%)	6 (10%)	7	25
46	h	216/218 (99%)	199 (92%)	17 (8%)	12	35
47	i	47/48 (98%)	41 (87%)	6 (13%)	4	18
48	j	164/164 (100%)	157 (96%)	7 (4%)	29	53
49	k	47/49 (96%)	44 (94%)	3 (6%)	17	42
50	l	165/165 (100%)	151 (92%)	14 (8%)	10	33
51	m	38/38 (100%)	35 (92%)	3 (8%)	12	35

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
52	n	148/150 (99%)	134 (90%)	14 (10%)	8	27
53	o	51/52 (98%)	46 (90%)	5 (10%)	8	26
54	p	136/138 (99%)	132 (97%)	4 (3%)	42	64
55	q	34/34 (100%)	32 (94%)	2 (6%)	19	45
56	r	114/114 (100%)	104 (91%)	10 (9%)	10	31
57	s	116/116 (100%)	110 (95%)	6 (5%)	23	48
58	t	104/104 (100%)	98 (94%)	6 (6%)	20	45
59	u	103/103 (100%)	97 (94%)	6 (6%)	20	45
60	v	109/109 (100%)	103 (94%)	6 (6%)	21	47
61	w	99/103 (96%)	91 (92%)	8 (8%)	11	35
62	x	86/87 (99%)	80 (93%)	6 (7%)	15	40
63	y	99/100 (99%)	95 (96%)	4 (4%)	31	55
64	z	89/90 (99%)	87 (98%)	2 (2%)	52	71
All	All	7791/8664 (90%)	7209 (92%)	582 (8%)	17	38

5 of 582 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
46	h	202	LEU
62	x	47	VAL
48	j	13	ARG
46	h	195	VAL
53	o	54	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 6 such sidechains are listed below:

Mol	Chain	Res	Type
23	K	70	ASN
32	T	40	GLN
36	X	105	ASN
11	AA	1236	ASN
9	9	103	ASN

### 5.3.3 RNA

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
10	A	75/76 (98%)	29 (38%)	6 (8%)
10	B	75/76 (98%)	35 (46%)	6 (8%)
16	D	1515/1542 (98%)	288 (19%)	35 (2%)
39	a	2859/2904 (98%)	533 (18%)	0
42	d	119/120 (99%)	17 (14%)	0
8	7	20/33 (60%)	11 (55%)	3 (15%)
All	All	4663/4751 (98%)	913 (19%)	50 (1%)

5 of 913 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
8	7	-18	G
8	7	-17	U
8	7	-16	U
8	7	-14	U
8	7	-13	U

5 of 50 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
16	D	532	A
16	D	1109	C
16	D	1493	A
16	D	562	U
16	D	793	U

#### 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](#)

Of 3 ligands modelled in this entry, 3 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

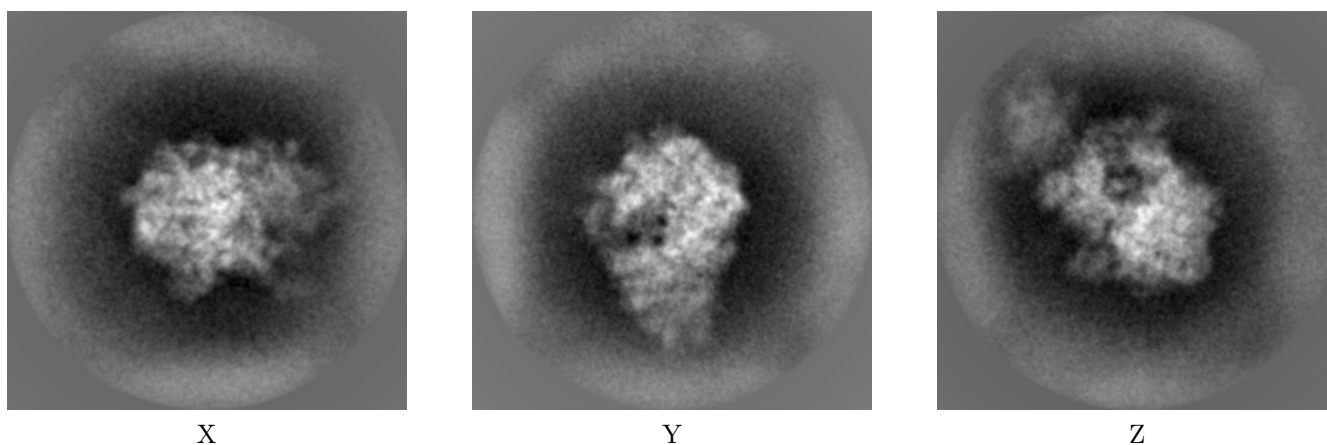
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-22193. These allow visual inspection of the internal detail of the map and identification of artifacts.

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

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

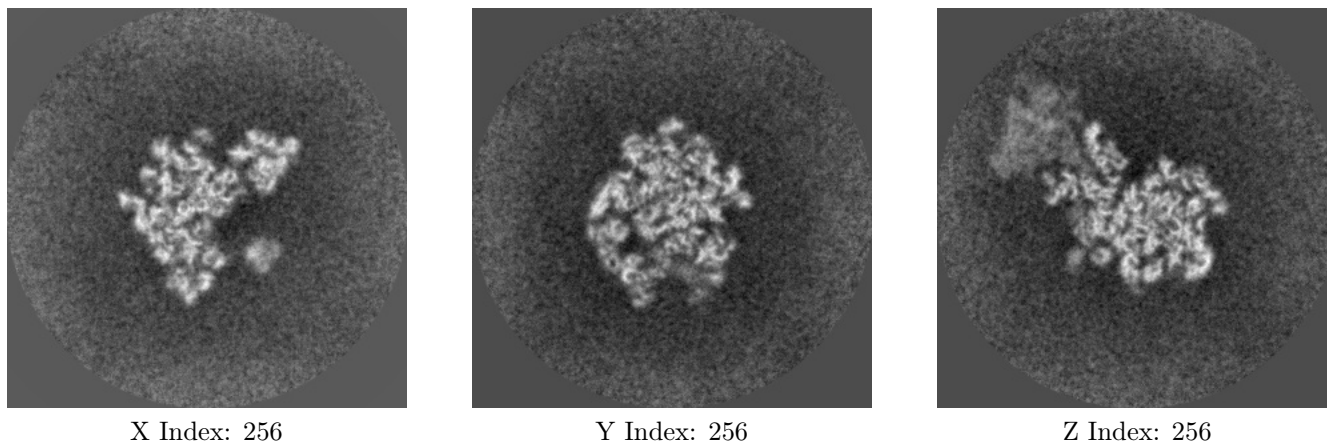
#### 6.1.1 Primary map



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

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

#### 6.2.1 Primary map

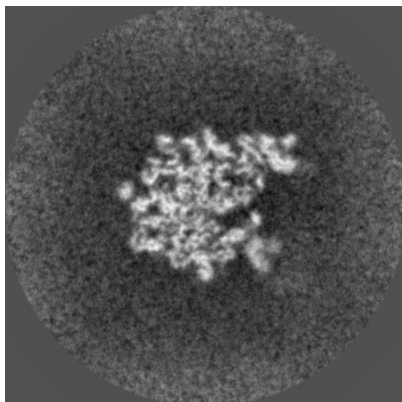




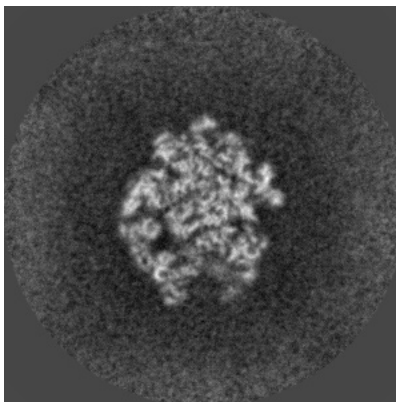
The images above show central slices of the map in three orthogonal directions.

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

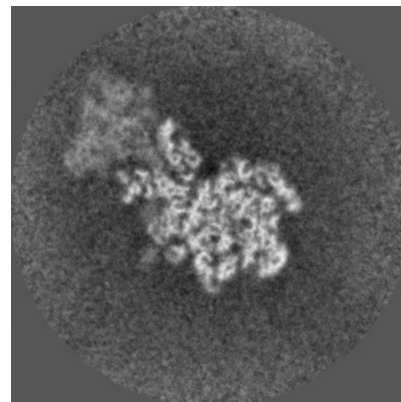
### 6.3.1 Primary map



X Index: 272



Y Index: 257



Z Index: 258

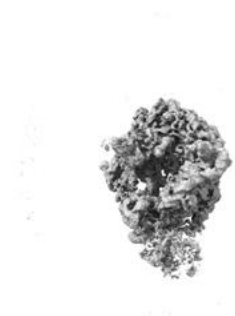
The images above show the largest variance slices of the map in three orthogonal directions.

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

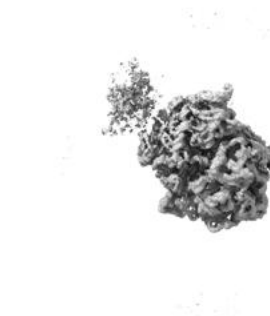
### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.009. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

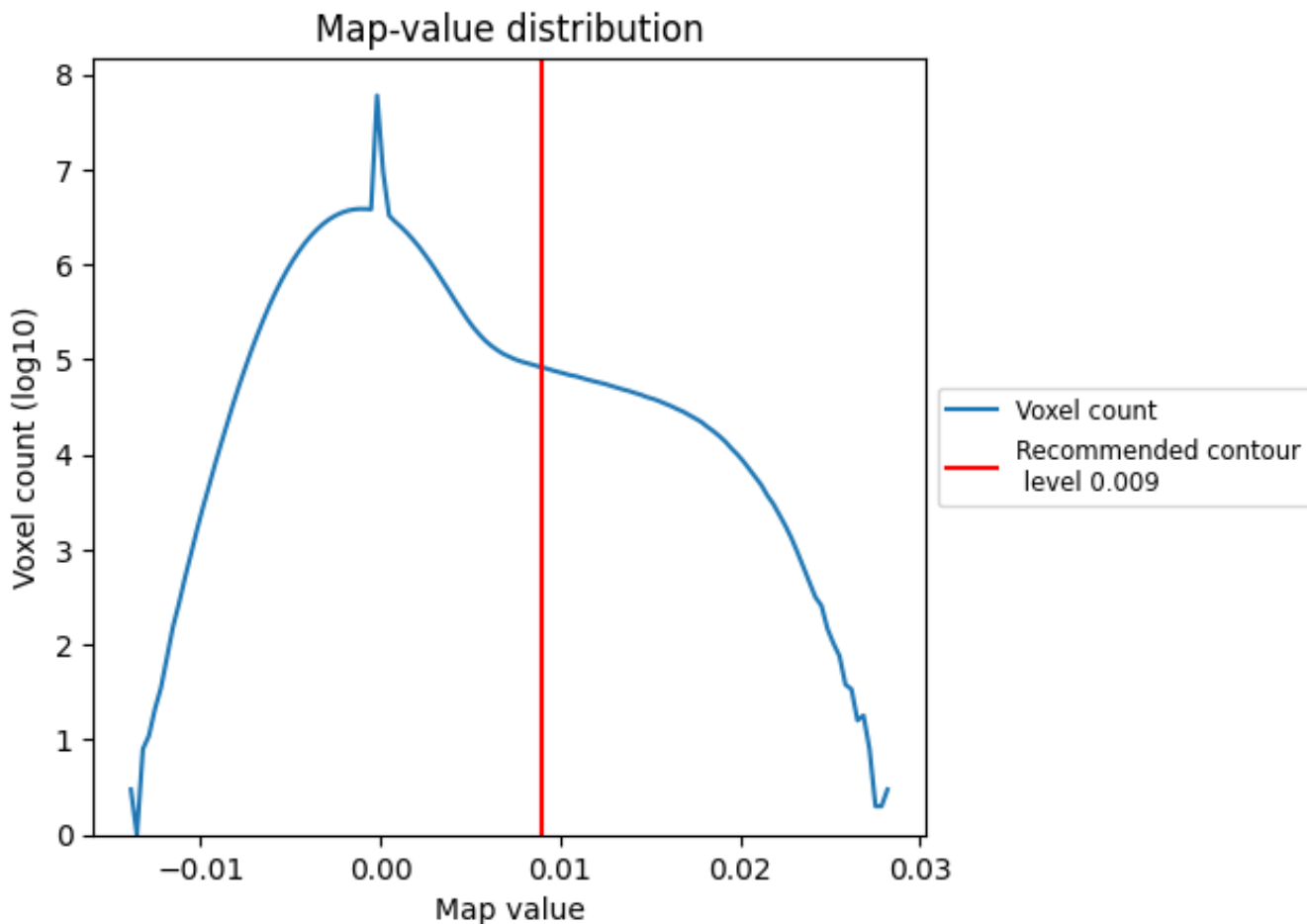
## 6.5 Mask visualisation

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

## 7 Map analysis [i](#)

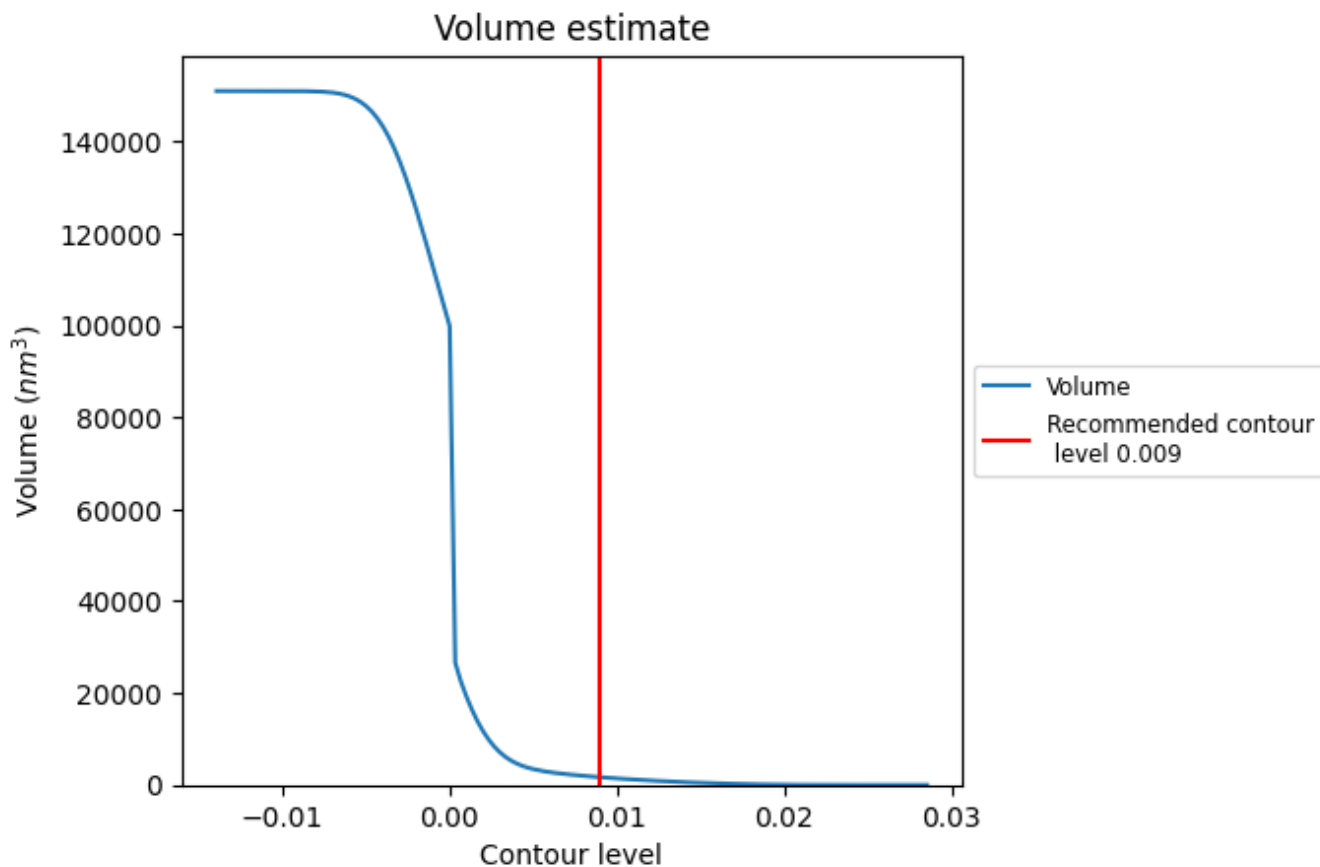
This section contains the results of statistical analysis of the map.

### 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.

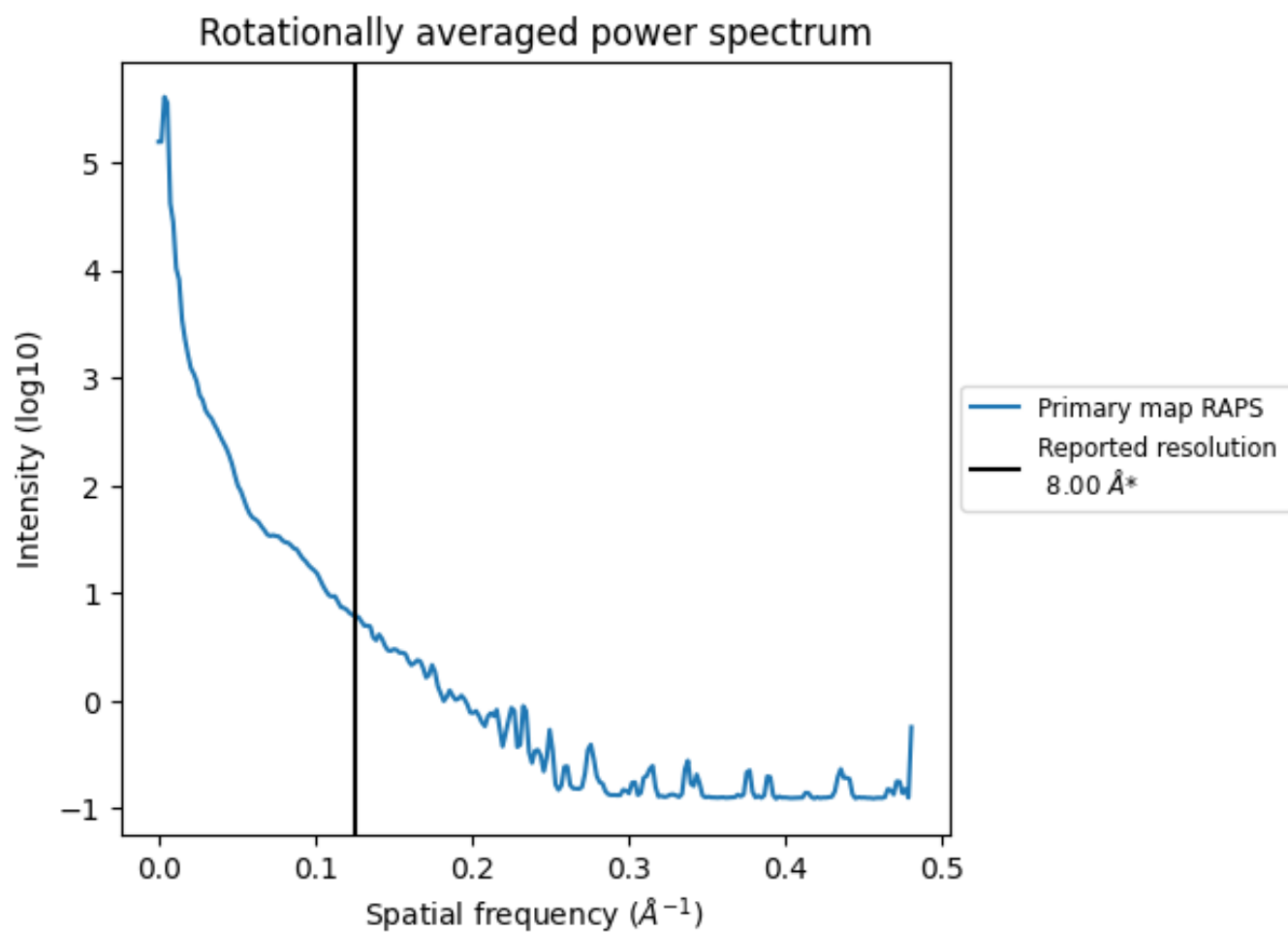
## 7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 1692 nm<sup>3</sup>; this corresponds to an approximate mass of 1529 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 0.125 Å<sup>-1</sup>

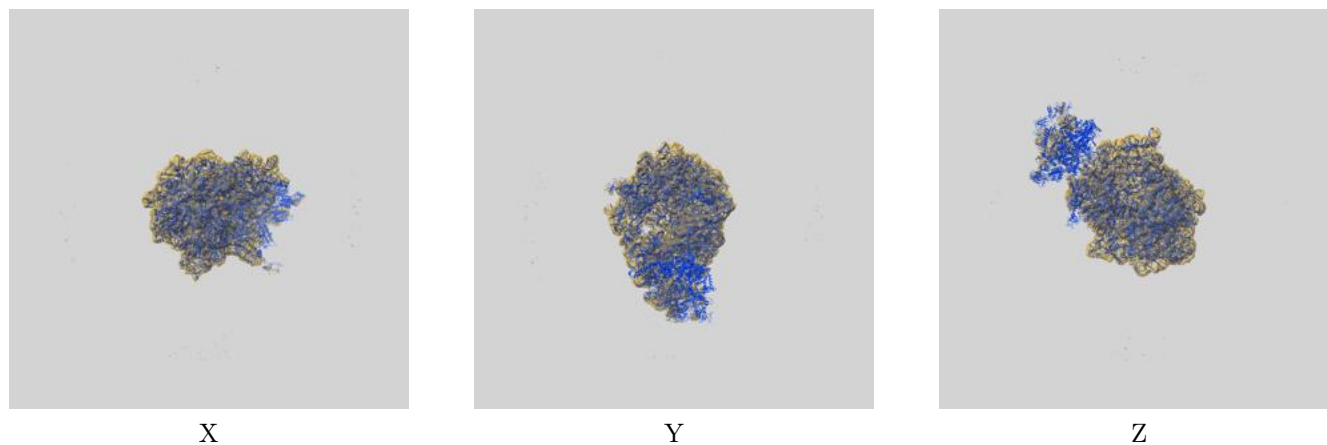
## 8 Fourier-Shell correlation

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

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

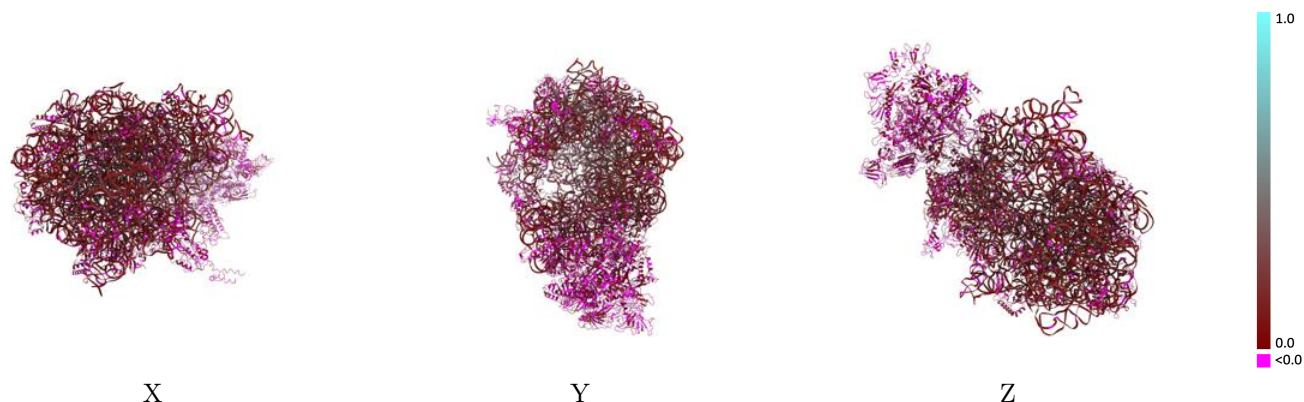
This section contains information regarding the fit between EMDB map EMD-22193 and PDB model 6XIJ. Per-residue inclusion information can be found in section 3 on page 16.

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



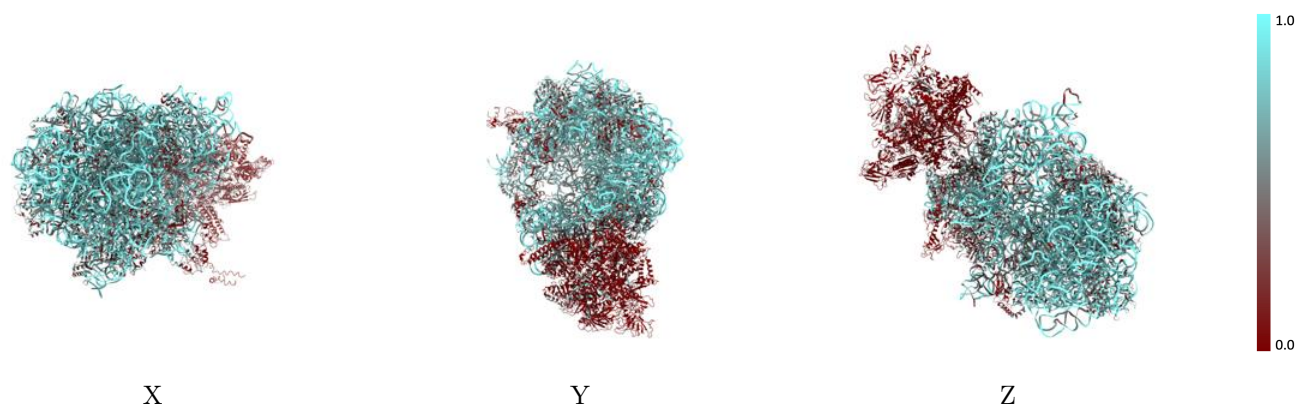
The images above show the 3D surface view of the map at the recommended contour level 0.009 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 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.

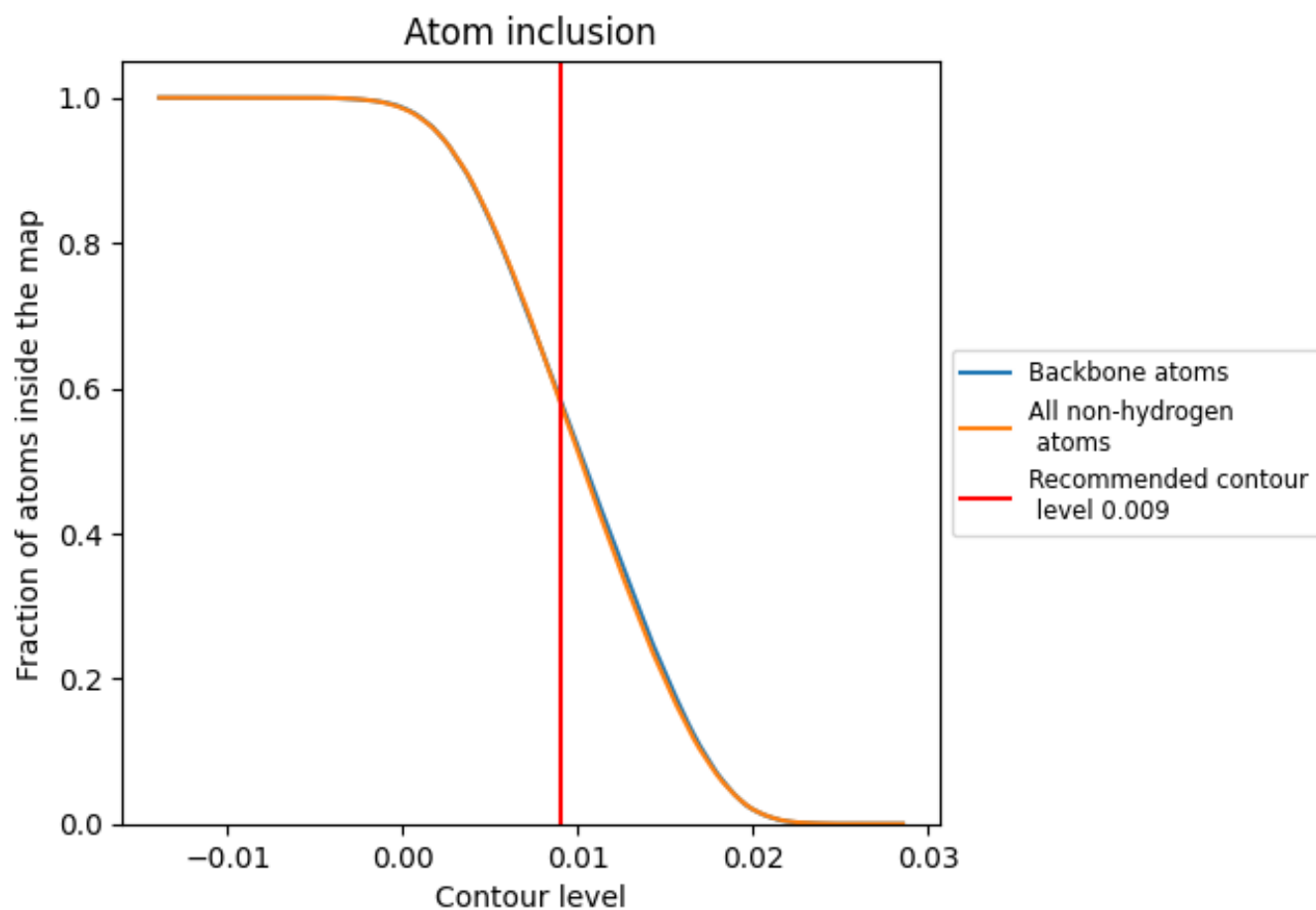
## 9.3 Atom inclusion mapped to coordinate model [i](#)



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 (0.009).









































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 58% of all backbone atoms, 58% 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 (0.009) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.5807	 0.1280
0	 0.5508	 0.1000
1	 0.5060	 0.1330
2	 0.4397	 0.0890
3	 0.5786	 0.0730
4	 0.5799	 0.1160
5	 0.1208	 0.0280
6	 0.1402	 0.1000
7	 0.2591	 0.0880
9	 0.2294	 0.0370
A	 0.5562	 0.1330
AA	 0.0861	 0.0410
AB	 0.0000	 0.0390
AC	 0.0315	 0.0410
AD	 0.0156	 0.0600
AE	 0.0403	 0.0400
B	 0.5321	 0.0790
C	 0.3499	 0.1010
D	 0.8241	 0.1720
E	 0.4847	 0.0870
F	 0.2934	 0.1420
G	 0.4349	 0.1050
H	 0.0093	 0.0250
I	 0.3283	 0.1090
J	 0.3931	 0.1010
K	 0.4504	 0.1640
L	 0.4099	 0.1070
M	 0.3785	 0.1060
N	 0.4760	 0.1400
O	 0.4545	 0.0520
P	 0.3895	 0.0860
Q	 0.3751	 0.1120
R	 0.3967	 0.1660
S	 0.4832	 0.0840
T	 0.4623	 0.1180



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Chain	Atom inclusion	Q-score
U	0.4163	0.0850
V	0.4051	0.1160
W	0.3308	0.0430
X	0.3329	0.0750
Y	0.1477	0.0260
Z	0.0441	-0.0080
a	0.8345	0.1690
b	0.4806	0.0860
c	0.4343	0.1150
d	0.8104	0.1230
e	0.5726	0.0600
f	0.5642	0.1240
g	0.2740	0.0540
h	0.4112	0.1200
i	0.5374	0.1230
j	0.4831	0.0970
k	0.4043	0.0760
l	0.4730	0.1080
m	0.4958	0.1650
n	0.3962	0.0630
o	0.3320	0.0950
p	0.3916	0.0600
q	0.3733	0.0550
r	0.2226	0.0860
s	0.4818	0.1030
t	0.2541	0.1020
u	0.4561	0.1060
v	0.4299	0.1080
w	0.5849	0.0980
x	0.5052	0.0500
y	0.3041	0.0980
z	0.5672	0.1230