



## wwPDB EM Validation Summary Report ⓘ

Nov 20, 2022 – 12:50 pm GMT

PDB ID : 6Q97  
EMDB ID : EMD-4476  
Title : Structure of tmRNA SmpB bound in A site of E. coli 70S ribosome  
Authors : Rae, C.D.  
Deposited on : 2018-12-17  
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](mailto:validation@mail.wwpdb.org)

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

---

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

EMDB validation analysis : 0.0.1.dev43  
Mogul : 1.8.4, CSD as541be (2020)  
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

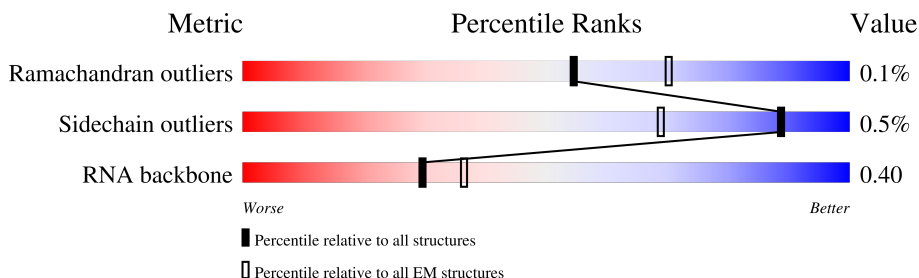
# 1 Overall quality at a glance i

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)
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	1	2903	
2	2	1534	
3	3	120	
4	5	145	
5	6	28	
6	8	77	
7	9	6	
8	B	270	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
9	C	209	94% 100%
10	D	201	86% 100%
11	E	177	95% 98%
12	F	175	100% 99%
13	G	149	81% 99%
14	H	130	100% 98%
15	I	135	100% 99%
16	J	141	96% 100%
17	K	123	93% 99%
18	L	144	69% 99%
19	M	136	93% 100%
20	N	119	89% 99%
21	O	115	79% 100%
22	P	114	85% 99%
23	Q	117	87% 99%
24	R	103	88% 100%
25	S	108	76% 98%
26	T	94	80% 100%
27	U	103	79% 100%
28	V	94	98% 99%
29	W	76	91% 100%
30	X	77	78% 99%
31	Y	58	88% 100%
32	Z	56	88% 100%
33	a	66	97% 100%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
34	b	54	87% 100%
35	c	52	88% 100%
36	d	46	65% 100%
37	e	64	72% 95% 5%
38	f	37	100%
39	g	225	100%
40	h	208	99% 98%
41	i	205	99% 100%
42	j	156	99% 100%
43	k	104	76% 100%
44	l	151	66% 99%
45	m	129	99% 100%
46	n	126	80% 99%
47	o	99	97% 100%
48	p	117	85% 99%
49	q	123	76% 99%
50	r	115	70% 98%
51	s	100	90% 100%
52	t	87	60% 98%
53	u	81	98% 98%
54	v	80	88% 100%
55	w	65	85% 98%
56	x	82	85% 100%
57	y	85	76% 99%
58	z	70	81% 99%

Continued on next page...

*Continued from previous page...*

Mol	Chain	Length	Quality of chain
59	4	363	
60	7	77	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
1	6MZ	1	1618	X	-	-	-
1	PSU	1	1911	X	-	-	-
1	3TD	1	1915	X	-	-	-
1	PSU	1	1917	X	-	-	-
1	5MU	1	1939	X	-	-	-
1	6MZ	1	2030	X	-	-	-
1	G7M	1	2069	X	-	-	-
1	OMG	1	2251	X	-	-	-
1	PSU	1	2457	X	-	-	-
1	OMC	1	2498	X	-	-	-
1	2MA	1	2503	X	-	-	-
1	PSU	1	2504	X	-	-	-
1	OMU	1	2552	X	-	-	-
1	PSU	1	2580	X	-	-	-
1	PSU	1	2605	X	-	-	-
1	1MG	1	745	X	-	-	-
1	PSU	1	746	X	-	-	-
1	5MU	1	747	X	-	-	-
1	PSU	1	955	X	-	-	-
2	4OC	2	1402	X	-	-	-
2	PSU	2	516	X	-	-	-
2	7MG	2	527	X	-	-	-

## 2 Entry composition [i](#)

There are 63 unique types of molecules in this entry. The entry contains 156609 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a RNA chain called 23S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	1	2903	62336	27816	11470	20147	2903	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	2	1534	32929	14693	6041	10661	1534	0	0

- Molecule 3 is a RNA chain called 5S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
3	3	120	2569	1144	468	837	120	0	0

- Molecule 4 is a protein called SsrA-binding protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	5	145	1170	741	216	209	4	0	0

- Molecule 5 is a protein called Nascent peptide.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
5	6	28	140	84	28	28	0	0

- Molecule 6 is a RNA chain called tRNA-Met.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
6	8	77	1638	732	291	538	77	0	0

- Molecule 7 is a RNA chain called mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
7	9	6	128	57	22	43	6	0	0

- Molecule 8 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	B	270	2078	1285	422	364	7	0	0

- Molecule 9 is a protein called 50S ribosomal protein L3.

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

- Molecule 10 is a protein called 50S ribosomal protein L4.

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

- Molecule 11 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	E	177	1411	899	249	257	6	0	0

- Molecule 12 is a protein called 50S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	F	175	1313	826	241	244	2	0	0

- Molecule 13 is a protein called 50S ribosomal protein L9.

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

- Molecule 14 is a protein called 50S ribosomal protein L10.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	H	130	Total	C	N	O	S	0	0
			980	620	174	182	4		

- Molecule 15 is a protein called 50S ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	I	135	Total	C	N	O	S	0	0
			984	622	171	185	6		

- Molecule 16 is a protein called 50S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	J	141	Total	C	N	O	S	0	0
			1121	709	211	198	3		

- Molecule 17 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	K	123	Total	C	N	O	S	0	0
			946	593	181	166	6		

- Molecule 18 is a protein called 50S ribosomal protein L15.

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

- Molecule 19 is a protein called 50S ribosomal protein L16.

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

- Molecule 20 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	N	119	Total	C	N	O	S	0	0
			951	588	195	163	5		

- Molecule 21 is a protein called 50S ribosomal protein L18.



Mol	Chain	Residues	Atoms				AltConf	Trace
21	O	115	Total	C	N	O	0	0
			884	548	177	159		

- Molecule 22 is a protein called 50S ribosomal protein L19.

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

- Molecule 23 is a protein called 50S ribosomal protein L20.

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

- Molecule 24 is a protein called 50S ribosomal protein L21.

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

- Molecule 25 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	S	108	Total	C	N	O	S	0	0
			840	522	164	152	2		

- Molecule 26 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	T	94	Total	C	N	O	S	0	0
			746	470	140	134	2		

- Molecule 27 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms				AltConf	Trace
27	U	103	Total	C	N	O	0	0
			788	498	148	142		

- Molecule 28 is a protein called 50S ribosomal protein L25.

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

- Molecule 29 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	W	76	Total	C	N	O	S	0	0
			582	360	117	104	1		

- Molecule 30 is a protein called 50S ribosomal protein L28.

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

- Molecule 31 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	Y	58	Total	C	N	O	S	0	0
			477	294	93	89	1		

- Molecule 32 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	Z	56	Total	C	N	O	S	0	0
			434	272	84	76	2		

- Molecule 33 is a protein called 50S ribosomal protein L31.

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

- Molecule 34 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	b	54	Total	C	N	O	S	0	0
			429	260	91	77	1		

- Molecule 35 is a protein called 50S ribosomal protein L33.

Mol	Chain	Residues	Atoms				AltConf	Trace
35	c	52	Total	C	N	O	0	0
			426	275	78	73		

- Molecule 36 is a protein called 50S ribosomal protein L34.

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

- Molecule 37 is a protein called 50S ribosomal protein L35.

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

- Molecule 38 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	f	37	Total	C	N	O	S	0	0
			297	183	64	46	4		

- Molecule 39 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	g	225	Total	C	N	O	S	0	0
			1760	1113	316	323	8		

- Molecule 40 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	h	208	Total	C	N	O	S	0	0
			1636	1036	307	290	3		

- Molecule 41 is a protein called 30S ribosomal protein S4.

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

- Molecule 42 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	j	156	Total	C	N	O	S	0	0
			1152	717	217	212	6		

- Molecule 43 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	k	104	Total	C	N	O	S	0	0
			848	536	153	152	7		

- Molecule 44 is a protein called 30S ribosomal protein S7.

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

- Molecule 45 is a protein called 30S ribosomal protein S8.

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

- Molecule 46 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	n	126	Total	C	N	O	S	0	0
			1010	628	202	177	3		

- Molecule 47 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	o	99	Total	C	N	O	S	0	0
			790	495	151	143	1		

- Molecule 48 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	p	117	Total	C	N	O	S	0	0
			877	540	174	160	3		

- Molecule 49 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	q	123	Total	C	N	O	S	0	0
			957	591	196	165	5		

- Molecule 50 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	r	115	Total	C	N	O	S	0	0
			891	552	179	157	3		

- Molecule 51 is a protein called 30S ribosomal protein S14.

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

- Molecule 52 is a protein called 30S ribosomal protein S15.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	t	87	Total	C	N	O	S	0	0
			708	436	143	128	1		

- Molecule 53 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	u	81	Total	C	N	O	S	0	0
			643	403	127	112	1		

- Molecule 54 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
54	v	80	Total	C	N	O	S	0	0
			649	411	121	114	3		

- Molecule 55 is a protein called 30S ribosomal protein S18.

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

- Molecule 56 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
56	x	82	Total	C	N	O	S	0	0
			658	421	125	110	2		

- Molecule 57 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms					AltConf	Trace
57	y	85	Total	C	N	O	S	0	0
			664	411	137	113	3		

- Molecule 58 is a protein called 30S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
58	z	70	Total	C	N	O	S	0	0
			589	366	125	97	1		

- Molecule 59 is a RNA chain called transfer-messenger RNA (tmRNA).

Mol	Chain	Residues	Atoms					AltConf	Trace
59	4	334	Total	C	N	O	P	0	0
			7134	3184	1286	2330	334		

- Molecule 60 is a RNA chain called tRNA-Val.

Mol	Chain	Residues	Atoms					AltConf	Trace
60	7	77	Total	C	N	O	P	0	0
			1644	732	292	543	77		

- Molecule 61 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
61	1	294	Total	Mg	0
			294	294	
61	2	128	Total	Mg	0
			128	128	
61	3	8	Total	Mg	0
			8	8	
61	8	2	Total	Mg	0
			2	2	
61	M	1	Total	Mg	0
			1	1	
61	Q	1	Total	Mg	0
			1	1	

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Residues	Atoms		AltConf
61	X	1	Total 1	Mg 1	0
61	y	1	Total 1	Mg 1	0
61	7	3	Total 3	Mg 3	0

- Molecule 62 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
62	a	1	Total 1	Zn 1	0
62	f	1	Total 1	Zn 1	0

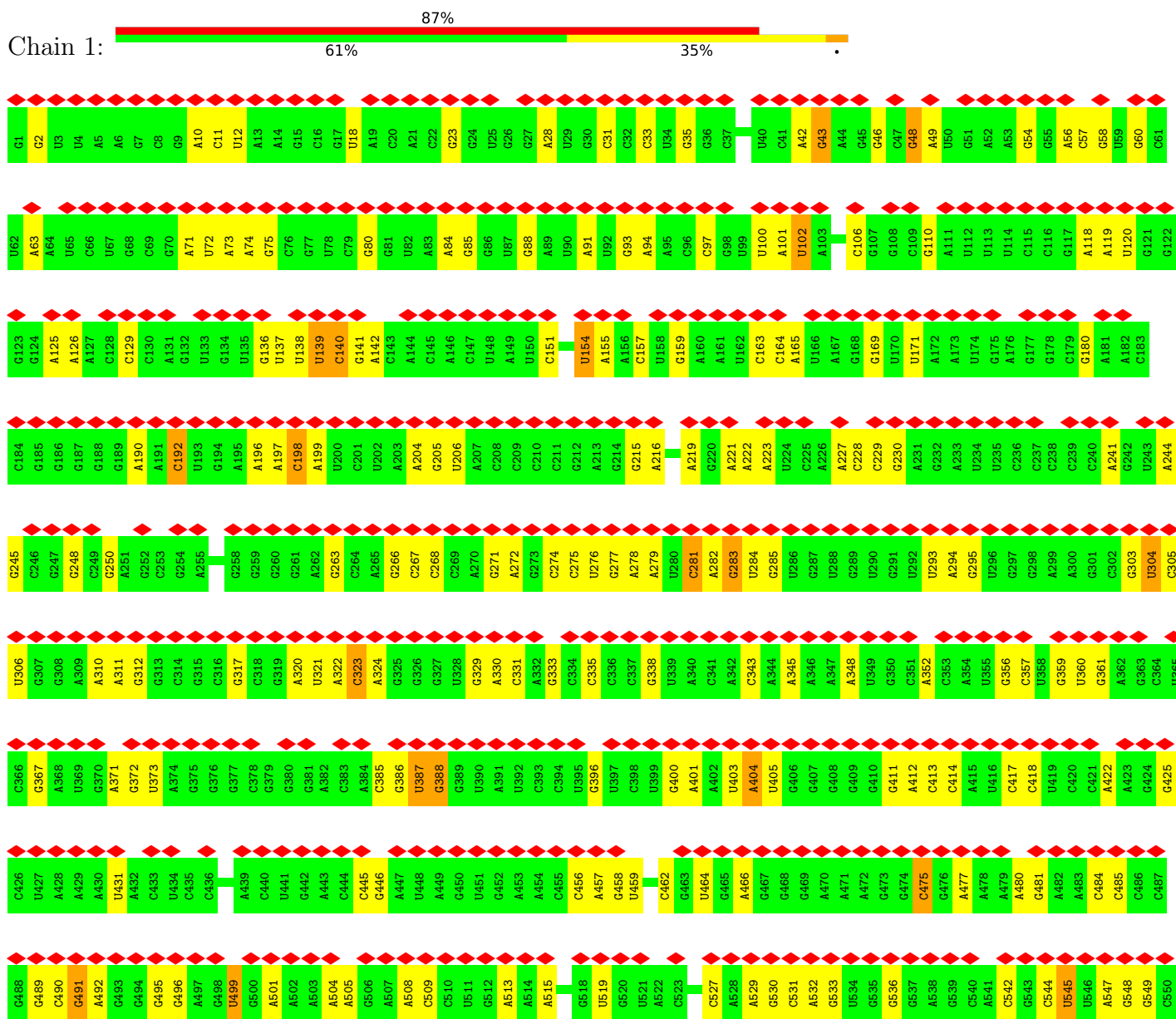
- Molecule 63 is water.

Mol	Chain	Residues	Atoms		AltConf
63	B	2	Total 2	O 2	0

### 3 Residue-property plots

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

- Molecule 1: 23S ribosomal RNA



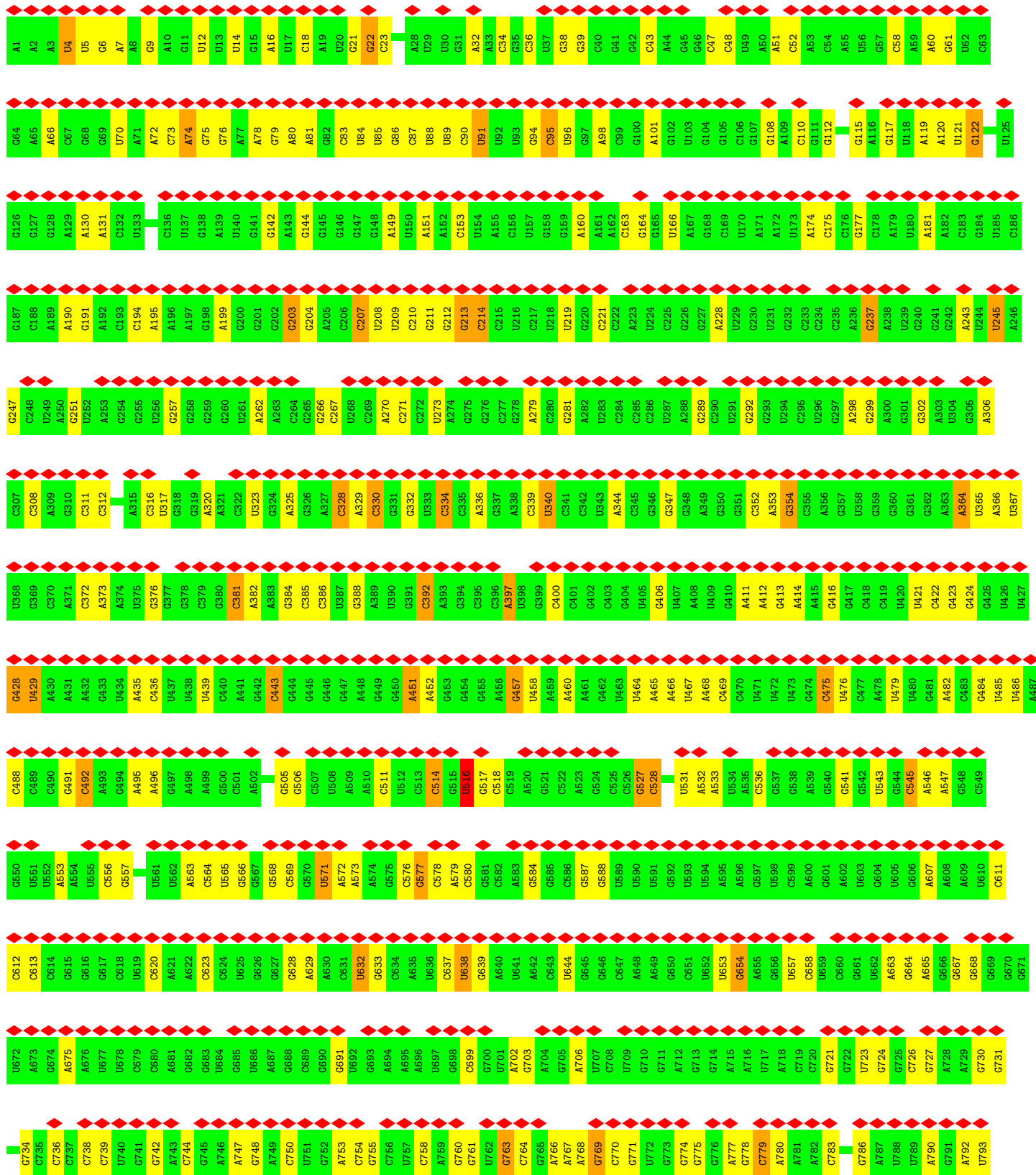
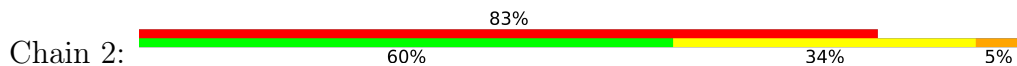


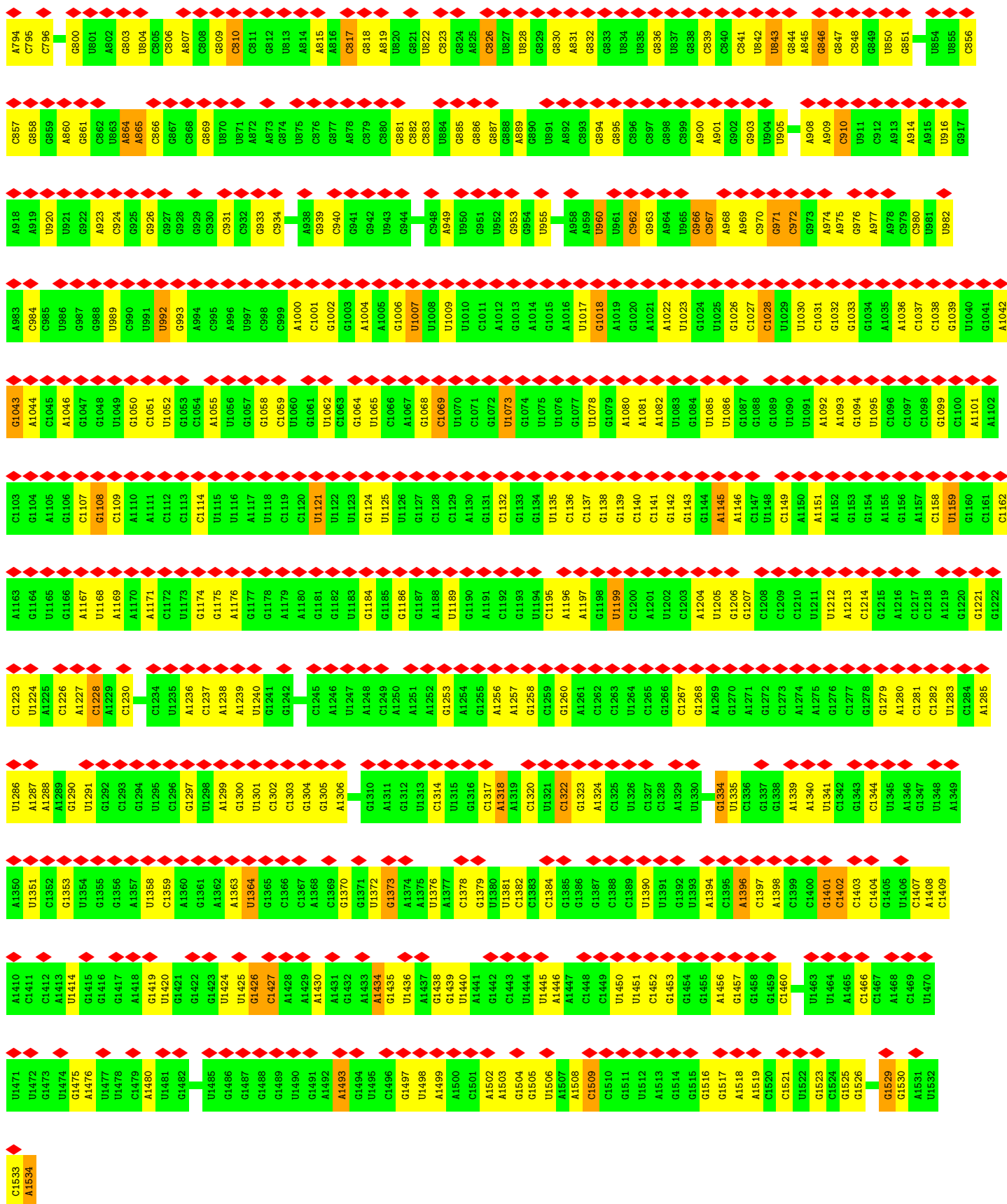
G1286	G1289	G1290	G1291	G1292	G1293	G1294	G1295	G1296	G1297	G1298	G1299	G1300	A1301	A1302	G1303	A1304	C1305	C1306	A1307	A1308	G1309	G1310	G1311	U1312	U1313	C1314	C1315	U1316	G1317	U1318	C1319	C1320	A1321	A1322	C1323	G1324	U1325	U1326	A1327	A1328	U1329	C1330	G1331	G1332	G1333	G1334	C1335	G1336	G1337	G1338	U1339	G1340	U1341	A1342	A1343	A1344	C1345	C1346	G1347
G1223	U1224	G1225	A1226	G1227	G1228	C1229	A1230	U1231	G1236	A1237	G1238	G1239	U1240	A1241	U1242	C1243	A1244	G1245	A1246	A1247	G1248	U1249	G1250	C1251	G1252	A1253	U1254	U1255	G1256	C1257	U1258	G1259	A1260	C1261	A1264	A1265	G1266	U1267	A1268	A1269	C1270	G1271	A1272	U1273	A1276	G1277	C1278	G1279	U1280	G1281	U1282	G1283	U1284	A1285	A1286	A1287			
G1163	C1164	A1165	G1166	C1167	G1168	A1169	C1170	G1171	C1172	U1173	U1174	A1175	U1176	G1177	C1178	G1179	U1180	U1181	G1182	U1183	U1184	G1185	G1186	C1187	U1188	A1189	G1190	G1191	G1192	G1193	A1194	G1195	C1196	G1197	U1198	U1199	C1200	U1201	G1202	U1203	A1204	A1205	G1206	C1207	G1208	U1209	G1210	C1211	G1212	A1213	G1214	G1215	G1216	U1217	G1218	U1219	G1220	C1221	U1222
A1103	C1104	U1105	G1106	G1107	U1108	C1109	G1110	A1111	U1112	U1113	C1114	G1115	G1116	C1117	U1118	G1119	U1120	C1121	G1122	C1123	G1124	G1125	A1126	A1127	G1128	A1129	U1130	G1131	U1132	A1133	A1134	C1135	G1136	G1137	U1138	G1139	C1140	U1141	G1203	A1204	A1205	G1206	C1207	G1208	U1209	G1210	C1211	G1212	A1213	G1214	G1215	G1216	U1217	G1218	U1219	G1220	C1221	U1222	
C1043	C1044	C1045	A1046	G1047	A1048	C1049	A1050	G1051	C1052	C1053	A1054	G1055	G1056	A1057	U1058	G1059	U1060	U1061	G1062	G1063	C1064	U1065	U1066	A1067	G1068	A1069	A1070	G1071	C1072	A1073	G1074	C1075	G1076	A1077	U1078	C1079	A1080	U1081	U1082	U1083	A1084	A1085	A1086	G1087	A1088	A1089	C1090	G1091	C1092	G1093	U1094	A1095	A1096	U1097	A1098	A1099	G1100	U1101	C1102
G923	G924	A925	G926	A927	A928	U929	G930	U931	U932	A933	U934	C935	A936	C937	G938	G939	G940	A941	G942	A943	C944	A945	C946	A947	C948	G949	G950	C951	G952	G953	G954	U955	G956	C957	U958	A959	A960	C961	G962	U963	C964	C965	G966	U967	C968	G969	U970	G971	A972	C973	G974	A975	G976	G977	G978	A979	A980	A981	C982
A863	G864	C865	A866	C867	U868	G869	U870	U871	U872	C873	G874	C875	G876	A877	A878	G879	G880	G881	G882	U884	C885	A886	A887	C888	C889	C890	G891	G892	C893	U894	U895	U896	A896	C897	C898	A899	A900	C901	C902	C903	G904	A905	U906	G907	C908	A909	A910	U911	C912	U913	G914	C915	G916	A917	A918	U919	A920	C921	C922
G801	A802	U803	A804	G805	C806	U807	G808	G809	U810	U811	C812	U813	C814	C817	G818	A819	A820	A821	G822	C823	U824	A825	U826	U827	U828	A829	G830	G831	U832	A833	G834	C835	G836	C837	C840	G841	U842	G843	A844	A845	U846	U847	C848	A849	U850	C851	U852	C853	G854	G855	G856	G857	G858	G859	U860	A861	G862		
A739	C740	U741	A742	A743	U744	G745	U746	U747	A749	A750	A751	A752	A753	U754	U755	A756	G757	C758	G759	G760	C634	A635	U636	A637	G638	U639	C640	U641	U642	A643	A644	C645	U646	U647	G648	G649	C650	G651	U652	U653	A654	U655	G656	U657	C660	A661	G662	G663	G664	U667	A668	G669	A670	C671	C672	C673	G674		
A675	U652	G553	U554	G555	C557	U558	G559	C560	G561	U562	A563	C564	C565	U566	U567	U568	U569	G570	U571	A572	U573	A574	A575	U576	G577	U580	C581	A582	G583	C584	G585	A586	C587	U588	U589	A590	U591	A592	U593	U594	C595	U596	G597	U598	A599	G600	C601	A602	A603	G604	G605	A608	A609	C610	C611	G612			

U1409	A1469	G1529	U1589	G1649	U1712	A1772	C1833	G1894	G1954	A2014	U2074	
G1410	A1470	G1530	A1590	A1650	A1713	A1773	U1834	C1895	U1955	A2015	U2075	
U1411	G1471	C1531	A1591	G1651	U1714	C1774	G1835	G1896	U1956	A2016	U2076	
U1412	C1472	A1532	C1592	A1652	G1715	U1775	C1836	G1897	C1957	U2017	A2077	
C1413	G1473	U1533	A1593	G1653	U1716	U1776	C1837	U1898	C1958	G2018	C2078	
U1414	U1474	C1534	U1594	A1654	A1717	U1777	C1838	A1899	G1959	A2019	U2079	
U1415	G1475	U1535	C1595	A1655	G1718	U1778	G1839	A1900	A1960	A2020	A2080	
G1416	U1476	A1536	A1596	C1656	U1719	U1779	G1840	A1901	C1961	C2021	U2081	
C1417	A1477	G1537	A1597	U1657	U1720	A1780	G1842	U1841	U1962	U2022	A2082	
U1418	G1478	U1538	A1598	G1658	G1721	U1781	C1843	G1843	U1963	C2023	G2083	
U1419	U1479	U1539	U1599	G1659	A1722	U1782	C1844	C1844	G1964	G2024	C2084	
A1420	C1480	G1540	C1600	U1660	G1723	A1783	C1844	C1844	C1965	U2025	U2085	
G1421	U1481	C1541	G1601	U1661	G1724	A1784	A1847	A1847	A1966	U2026	U2086	
G1422	G1482	U1542	U1602	G1662	U1725	A1785	A1848	A1848	C1967	G2027	G2087	
G1423	U1483	G1543	A1603	A1663	C1726	A1786	G1849	A1849	G1968	U2028	A2088	
G1424	U1484	U1544	C1604	A1664	C1727	A1787	G1850	G1850	G1969	G2029	C2089	
G1425	U1485	A1545	C1605	G1665	U1728	C1788	G1851	A1851	A1970	A2030	A2090	
U1426	U1486	G1546	C1606	G1666	U1729	A1789	U1852	U1852	U1971	A2031	C2091	
A1427	U1487	U1547	A1608	U1667	C1730	C1790	U1853	A1853	G1972	A2033	U2092	
C1428	C1488	A1548	A1609	A1668	G1731	G1791	A1854	A1854	C1974	U2034	G2093	
G1429	U1489	U1549	A1610	C1669	C1732	U1792	U1855	U1855	U1975	G2035	C2094	
G1430	A1490	A1550	C1611	U1670	G1733	G1793	U1856	U1856	G1976	C2036	A2095	
U1431	U1491	A1551	C1612	U1671	G1734	G1794	U1857	U1857	U1977	A2037	C2096	
G1432	G1492	A1552	G1613	G1672	A1735	U1795	U1858	U1858	A1977	G2038	U2097	
A1433	C1493	A1553	A1614	G1673	U1736	U1796	U1859	U1859	A1978	U2039	A2098	
U1434	U1494	U1554	C1615	C1674	G1737	G1797	U1860	U1860	U1979	G2040	U2099	
G1435	A1495	G1555	A1616	A1675	U1738	U1798	G1861	G1861	G1980	U2041	G2100	
U1436	U1496	U1556	C1618	A1676	A1739	G1799	G1862	G1862	A1981	A2042	A2101	
U1437	U1497	C1557	A1618	A1677	U1740	C1800	U1863	U1863	U1982	C2043	G2102	
U1438	C1498	U1558	G1619	A1678	C1741	A1801	U1864	U1864	G1983	C2044	C2103	
A1439	C1499	U1559	U1620	U1679	U1742	A1802	U1865	U1865	G1984	U2045	C2104	
U1440	U1500	G1560	G1620	G1680	U1743	A1803	U1866	U1866	C1986	G2046	U2105	
G1441	G1501	U1561	G1622	U1681	G1744	C1804	U1867	U1867	U1927	C2047	U2106	
U1442	A1502	U1562	G1623	G1682	A1745	C1806	G1868	G1868	A1928	G2048	C2107	
G1443	A1503	U1563	U1624	U1683	U1746	G1807	C1869	C1869	G1929	C2049	A2108	
U1444	U1504	C1564	C1625	G1684	U1747	U1808	C1870	C1870	U1930	C2050	U2109	
G1445	A1505	U1565	A1626	G1685	C1748	A1809	A1871	A1871	U1931	A2051	G2110	
U1446	U1506	G1566	G1627	U1686	A1749	G1810	G1872	G1872	G1932	A2052	U2111	
C1447	C1507	U1567	U1628	U1687	G1750	G1811	A1873	A1873	C1933	G2053	G2112	
U1448	A1508	G1568	U1629	U1688	U1751	U1812	G1874	G1874	C1934	A2054	U2113	
U1449	U1509	U1569	A1630	U1689	C1752	G1813	C1875	C1875	G1935	C2055	A2114	
G1450	G1510	A1570	G1631	U1690	G1753	G1814	U1876	U1876	A1936	G2056	G2115	
C1451	U1511	A1571	A1632	U1691	A1754	U1815	A1877	A1877	A1937	C2057	C2116	
A1393	C1512	U1572	G1633	C1694	U1755	G1816	G1878	G1878	U1938	A2058	G2117	
U1394	U1513	G1573	A1634	G1695	G1756	G1817	U1879	U1879	A1939	A2060	U2118	
A1395	A1453	C1574	U1636	G1696	A1757	U1818	A1880	A1880	U1940	G2061	A2119	
U1396	G1454	U1575	U1637	G1697	U1758	U1819	U1881	U1881	C1942	G2062	G2120	
U1397	U1455	C1577	A1638	G1698	A1759	U1820	U1882	U1882	U1943	A2063	U2121	
C1398	G1456	U1577	C1639	G1699	C1760	G1821	U1883	U1883	U1944	G2064	U2122	
A1401	U1457	U1578	U1640	U1700	A1761	G1822	U1884	U1884	U1945	C2065	G2123	
U1402	U1458	A1579	A1641	G1701	A1762	G1823	U1885	U1885	U1946	G2066	G2124	
A1403	G1459	U1580	G1642	G1702	U1763	G1824	U1886	U1886	C1947	C2067	G2125	
A1404	U1460	G1581	G1643	U1703	G1763	G1825	U1887	U1887	U1948	U2068	A2126	
C1404	C1461	U1521	U1644	A1705	U1765	G1826	U1888	U1888	G1949	G2069	C2127	
U1405	U1462	C1522	G1645	C1708	U1766	G1827	U1889	U1889	U1950	A2070	G2128	
U1406	G1463	U1523	U1646	U1709	G1767	G1828	U1890	U1890	U1951	A2071	C2129	
U1407	U1464	U1524	U1647	U1710	U1768	G1829	U1891	U1891	C2072	U2072	U2130	
G1408	U1465	G1525	U1648	U1711	C1771	G1830	C1892	C1892	G2073	C2073	U2131	
	U1466	G1526										U2132
	U1467	G1527										G2133

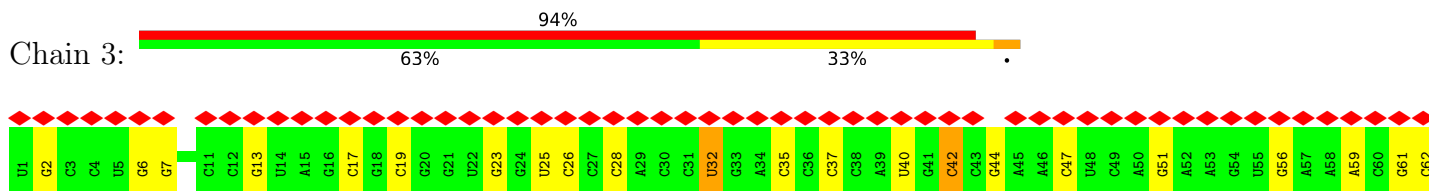
U2194	U2195	C2196	U2197	A2198	U2199	C2200	G2201	G2202	U2203	G2204	A2205	C2206	A2207	C2208	G2209	U2210	A2211	A2212	U2213	C2214	C2215	G2216	G2217	G2218	U2219	U2220	G2221	C2222	G2223	G2224	A2225	C2226	A2227	G2228	U2229	G2230	U2231	C2232	U2233	G2234	G2235	U2236	U2237	G2238	G2239	U2240	A2241	G2242	U2243	U2244	U2245	G2246	A2247	C2248	U2249	G2250	G2251	G2252	G2253	C2254	G2255	G2256	U2257	U2258	U2259	C2260	C2261	U2262	U2263	C2264	U2265	A2266	C2267	A2268	G2269	U2270	A2271	U2272	A2273	A2274	U2275	U2276	A2277	U2278	U2279	G2280	G2281	A2282	G2283	C2284	A2285	C2286	G2287	U2288	G2289	U2290	A2291	U2292	G2293	G2294	C2295	U2296	A2297	U2298	G2299	U2299	C2300	A2301	U2302	U2303	G2304	U2305	C2306	G2307	U2308	U2309	A2310	U2311	U2312	C2313	A2314	G2315	G2316	A2317	U2318	G2319	U2320	U2321	A2322	C2323	U2324	A2325	C2326	A2327	U2328	A2328	G2329	U2330	A2331	C2332	A2333	U2334	A2335	A2336	G2337	C2338	C2339	A2340	G2341	C2342	U2343	U2344	G2345	A2346	C2347	C2350	G2351	A2352	G2353	G2354	G2355	U2356	G2357	A2358	C2359	G2360	U2361	C2362	G2363	U2364	U2365	G2366	G2367	A2368	U2369	U2370	G2371	U2372	G2373	C2374	A2375	A2376	A2377	A2378	U2379	C2380	A2381	G2382	G2383	U2384	C2385	A2386	U2387	A2388	G2389	U2390	G2391	A2392	U2393	C2394	C2395	U2396	G2397	U2398	G2399	G2400	U2401	U2402	C2403	U2404	G2405	A2406	A2407	U2408	G2409	G2410	A2411	A2412	G2413	G2414	G2415	U2416	C2417	A2418	U2419	C2420	G2421	C2422	U2423	C2424	A2425	A2426	C2427	U2428	G2429	A2430	U2431	A2432	A2433	A2434	A2435	G2436	U2437	U2438	C2439	C2440	U2441	C2442	C2443	G2444	G2445	G2446	A2447	A2448	U2449	A2450	A2451	C2452	A2453	G2454	U2455	U2456	A2457	A2458	U2459	U2460	A2461	C2462	C2463	U2464	C2465	C2466	C2467	A2468	A2469	G2470	A2471	G2472	U2473	U2474	C2475	A2476	U2477	A2478	U2479	C2480	G2481	A2482	C2483	G2484	G2485	C2486	G2487	U2491	U2492	U2493	G2494	G2495	C2496	A2497	C2498	C2499	U2500	G2501	G2502	A2503	U2504	G2505	U2506	G2507	G2508	G2509	C2510	U2511	C2512	A2513	C2514	C2515	A2516	U2517	U2518	U2519	C2520	U2521	U2522	G2523	U2524	G2525	U2526	C2527	U2528	G2529	A2530	A2531	G2532	U2533	A2534	G2535	G2536	U2537	C2538	C2539	C2540	U2541	A2542	G2543	G2544	G2545	U2546	U2547	U2548	U2549	G2550	C2551	U2552	G2553	U2554	U2555	C2556	C2619	C2620	C2621	U2622	G2623	G2624	G2625	C2626	G2627	C2628	U2629	G2630	C2631	A2632	G2633	A2634	A2635	C2636	U2637	G2638	A2639	G2640	G2641	G2642	G2643	G2644	C2645	C2646	G2647	G2648	C2649	U2650	C2651	C2652	U2653	A2654	G2655	U2656	A2657	C2658	G2659	A2660	G2661	A2662	G2663	G2664	A2665	C2666	C2667	C2668	G2669	A2670	G2671	U2672	G2673	G2674	A2675	C2676	G2677	C2678	A2679	U2680	U2681	C2682	U2683	U2684	C2685	A2686	U2687	U2688	U2689	A2690	C2691	G2692	G2693	G2694	U2695	U2696	U2697	U2698	U2699	A2700	U2701	G2702	C2703	C2704	A2705	A2706	U2707	G2708	C2709	C2710	A2711	C2712	U2713	G2714	C2715	C2716	U2717	G2718	G2719	U2720	A2721	G2722	C2723	U2724	A2725	A2726	U2727	U2728	U2729	C2730	G2731	G2732	A2733	A2734	G2735	A2736	C2737	A2738	U2739	A2740	A2741	G2742	U2743	G2744	C2745	U2746	G2747	A2748	U2749	A2750	G2751	C2752	A2753	U2754	C2755	U2756	A2757	A2758	G2759	C2760	A2761	C2762	G2763	A2764	A2765	A2766	C2767	U2768	U2769	C2770	C2771	C2772	C2773	C2774	G2775	A2776	G2777	A2778	U2779	U2780	A2781	G2782	U2783	U2784	C2785	U2786	C2787	U2788	C2789	U2790	G2791	A2792	C2793	C2794	C2795	U2796	U2797	U2798	A2799	A2800	G2801	G2802	G2803	U2804	C2805	C2806	U2807	G2808	A2809	A2810	G2811	C2812	A2813	A2814	C2815	C2816	U2817	U2818	G2819	A2820	A2821	C2822	A2823	G2824	G2825	A2826	C2827	C2828	A2829	C2830	G2831	U2832	U2833	C2834	A2835	U2836	A2837	G2838	G2839	C2840	C2841	G2842	G2843	U2844	U2845	G2846	U2847	U2848	U2849	A2850	A2851	C2852	C2853	G2854	C2855	C2856	G2857	A2860
-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

• Molecule 2: 16S ribosomal RNA

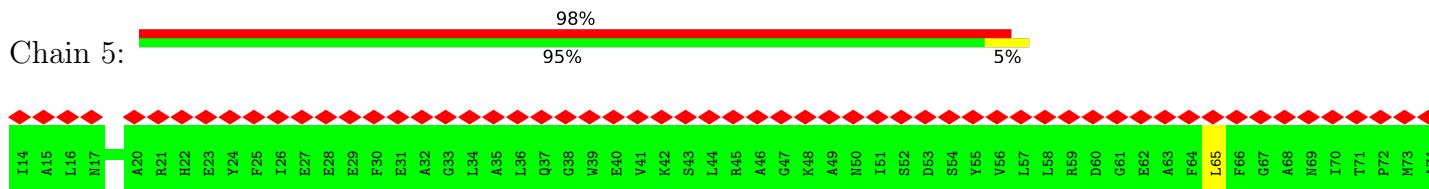




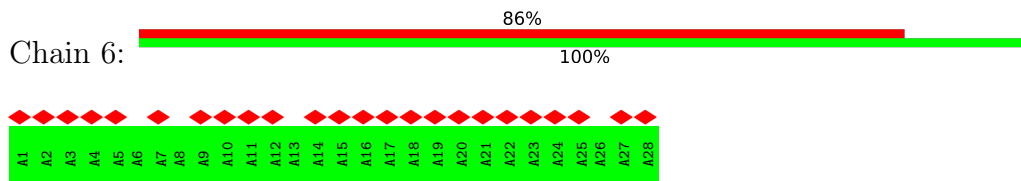
• Molecule 3: 5S ribosomal RNA



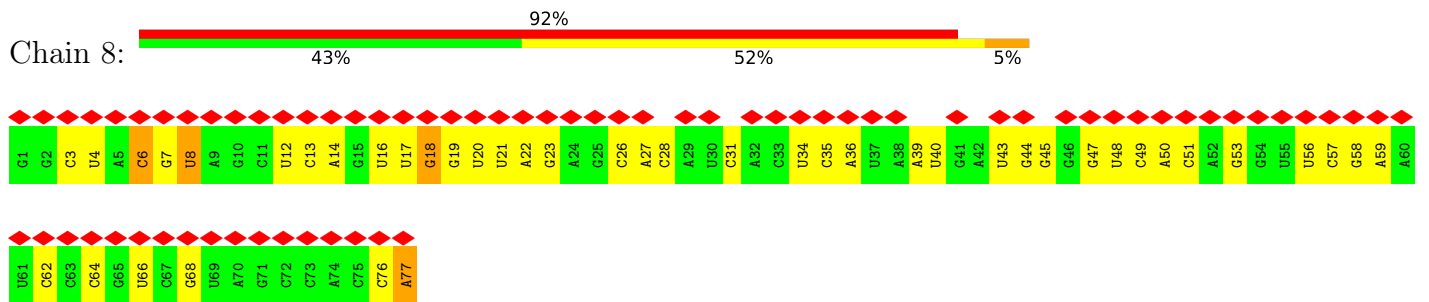
• Molecule 4: SsrA-binding protein



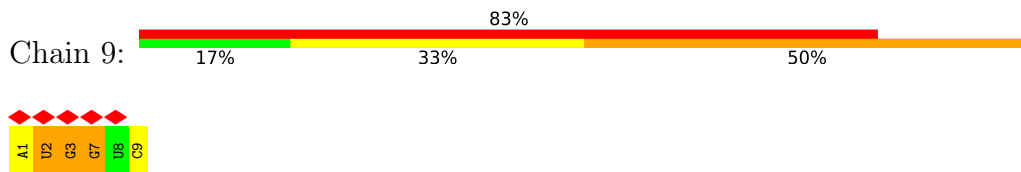
• Molecule 5: Nascent peptide



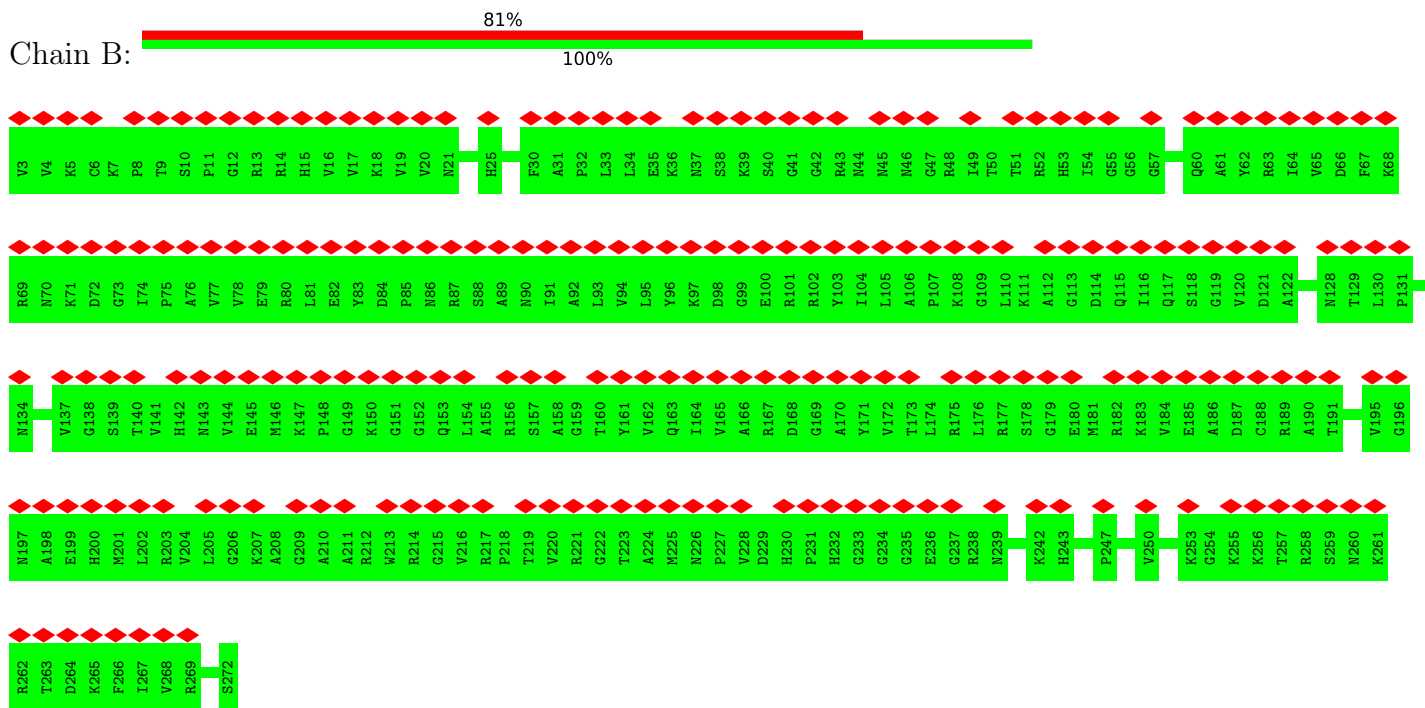
• Molecule 6: tRNA-Met



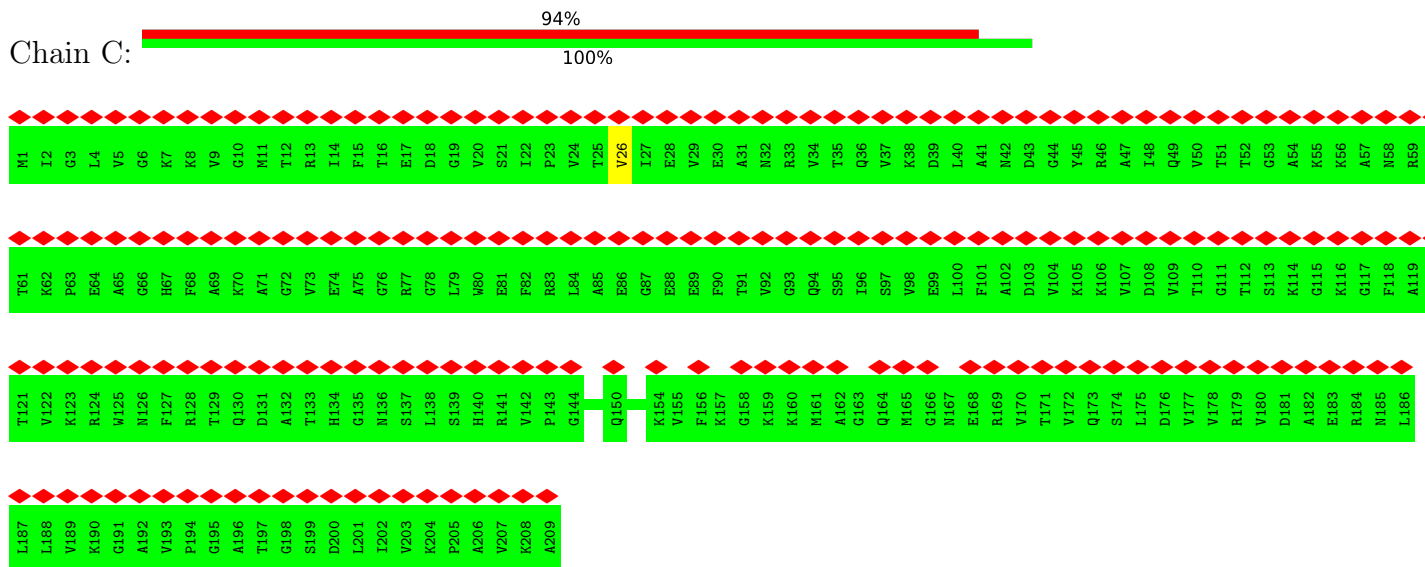
• Molecule 7: mRNA



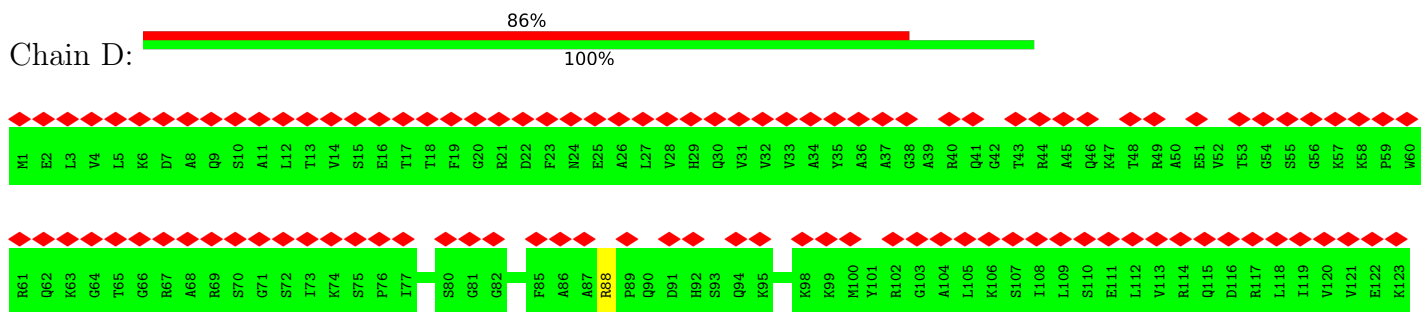
• Molecule 8: 50S ribosomal protein L2

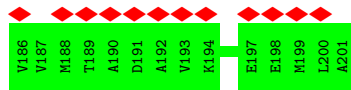
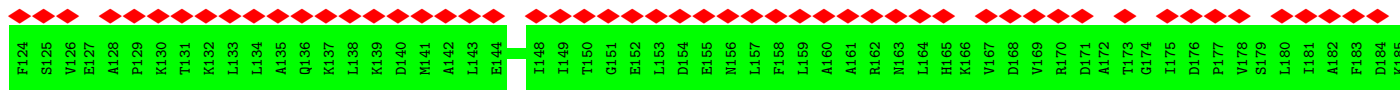


• Molecule 9: 50S ribosomal protein L3

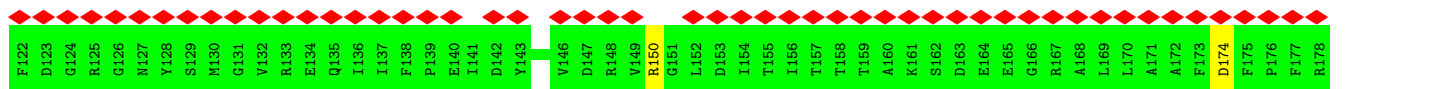
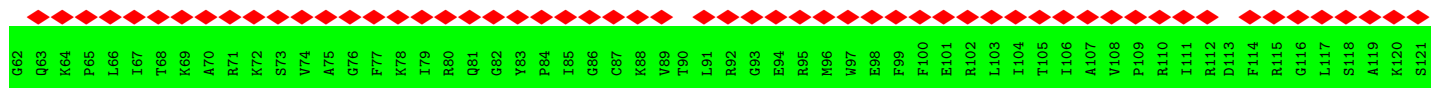
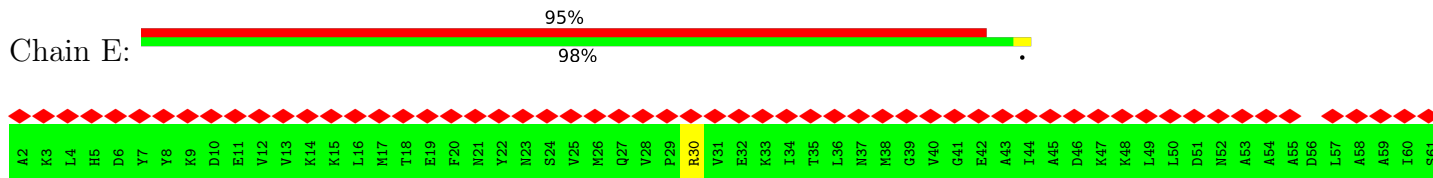


• Molecule 10: 50S ribosomal protein L4

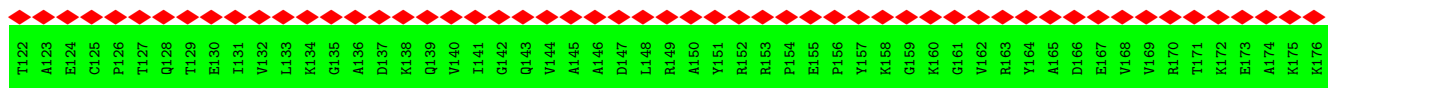
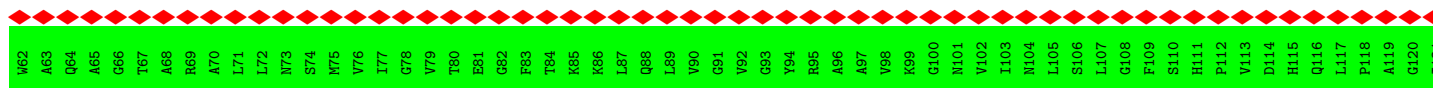
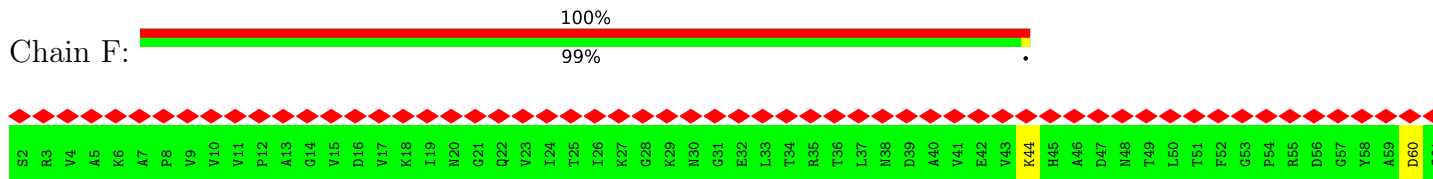




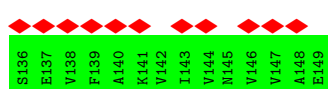
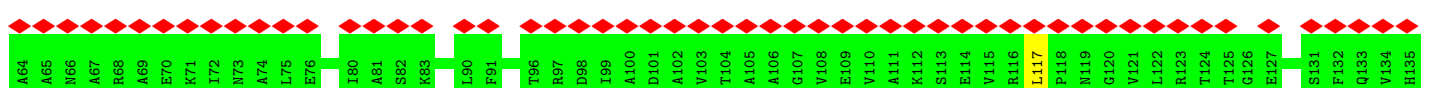
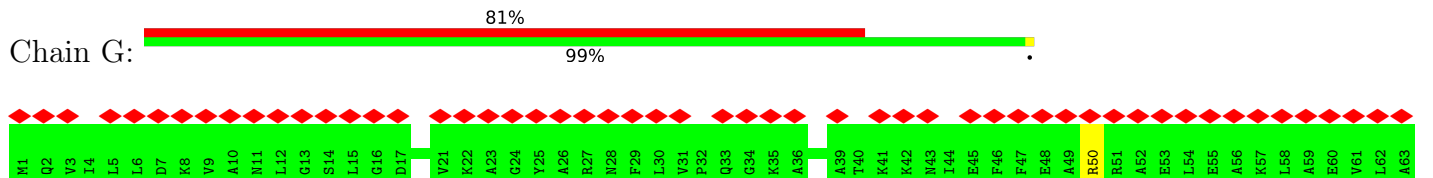
• Molecule 11: 50S ribosomal protein L5



• Molecule 12: 50S ribosomal protein L6

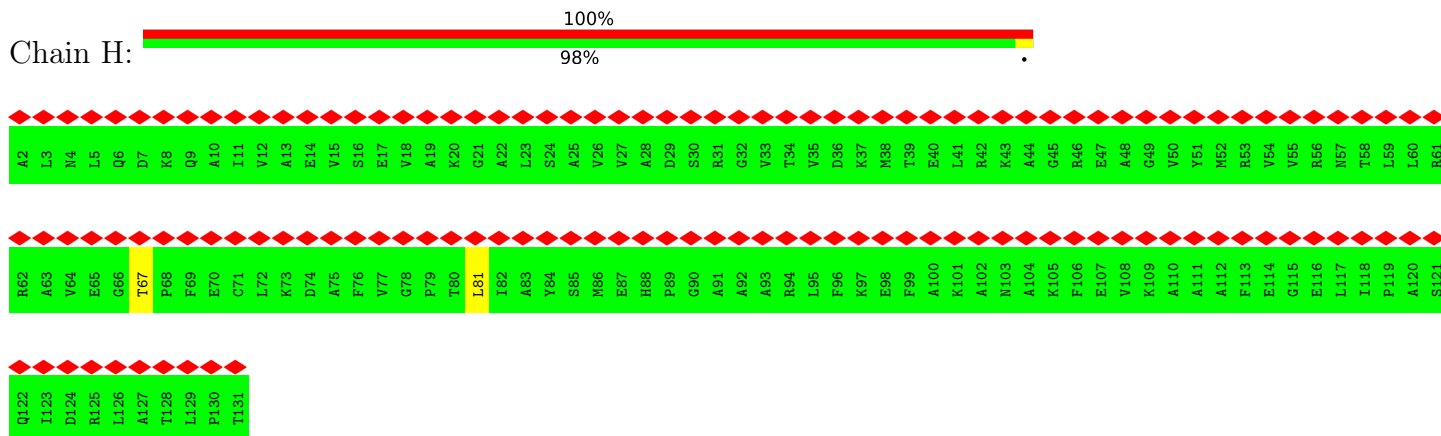


• Molecule 13: 50S ribosomal protein L9

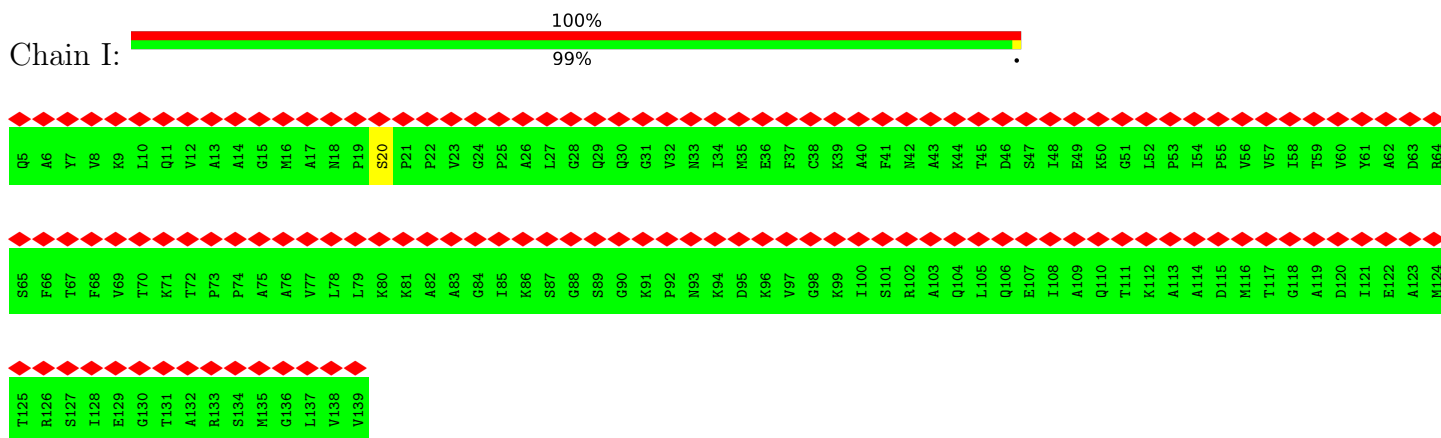




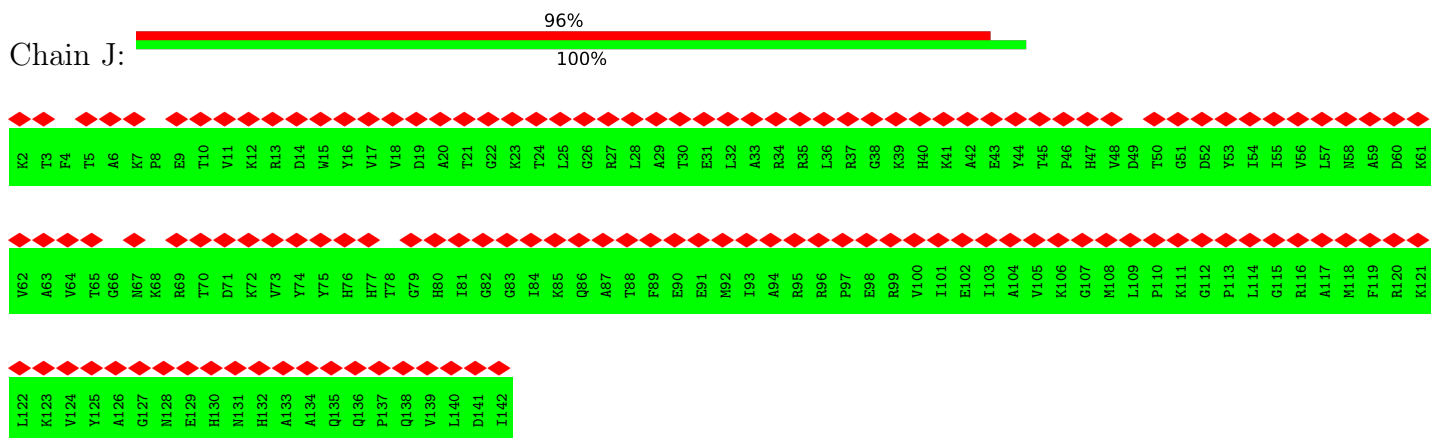
• Molecule 14: 50S ribosomal protein L10



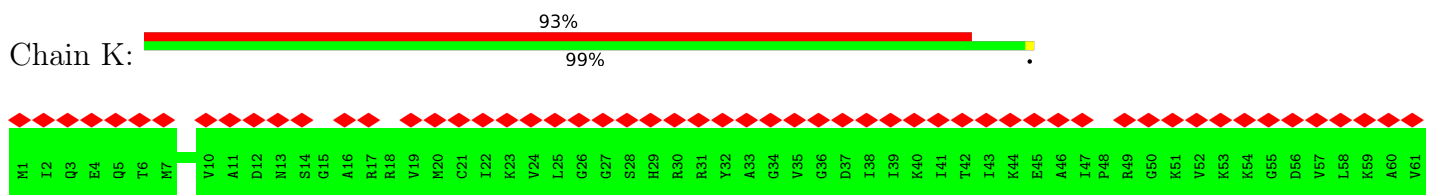
• Molecule 15: 50S ribosomal protein L11

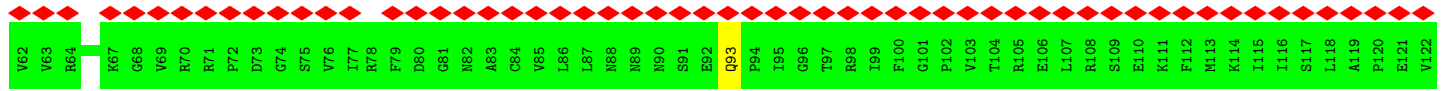


• Molecule 16: 50S ribosomal protein L13



• Molecule 17: 50S ribosomal protein L14

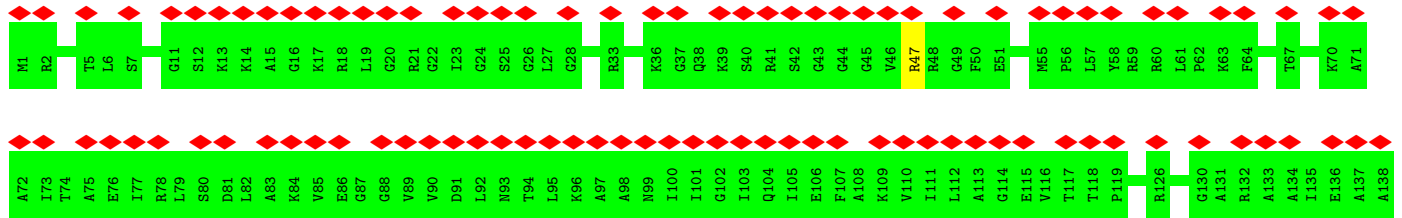




Li23

• Molecule 18: 50S ribosomal protein L15

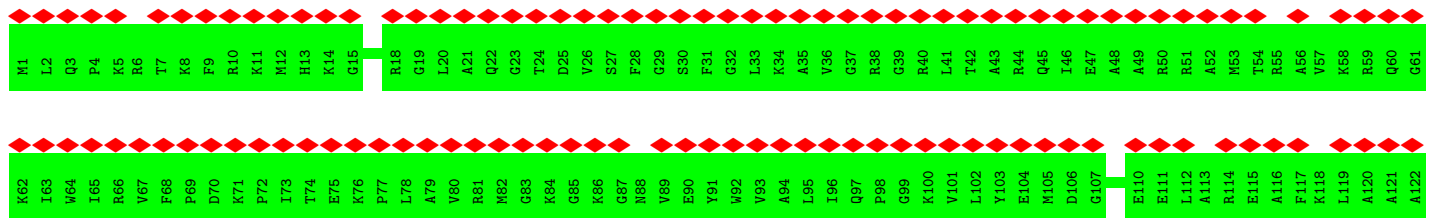
Chain L:



G139  
G140  
K141  
I142  
E143  
E144

• Molecule 19: 50S ribosomal protein L16

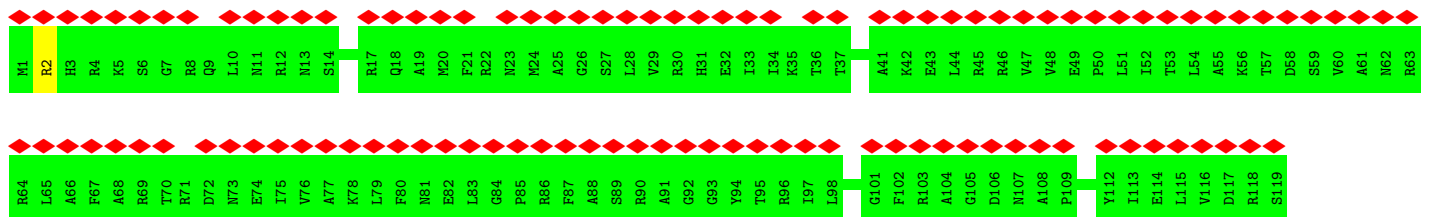
Chain M:



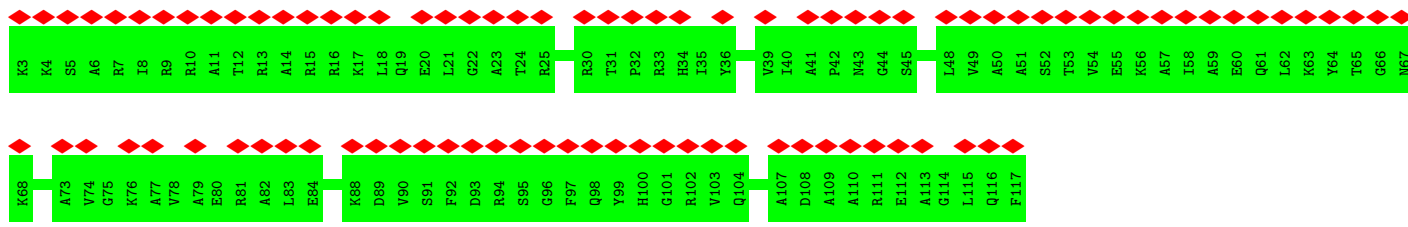
K123  
L124  
P125  
I126  
K127  
T128  
T129  
F130  
V131  
T132  
K133  
T134  
V135  
M136

• Molecule 20: 50S ribosomal protein L17

Chain N:



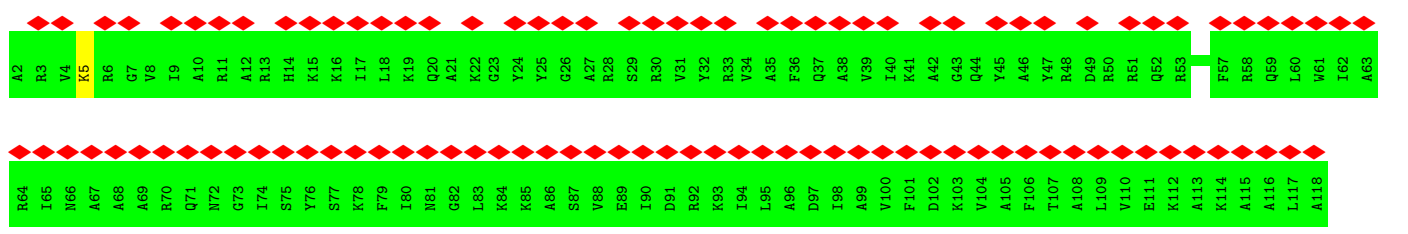
• Molecule 21: 50S ribosomal protein L18



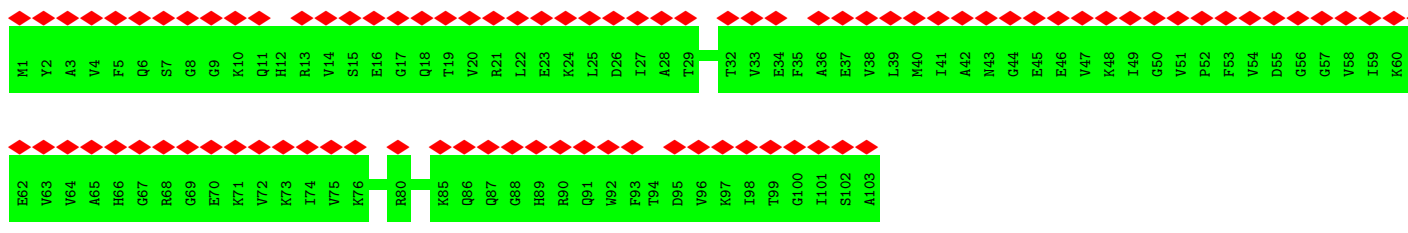
• Molecule 22: 50S ribosomal protein L19



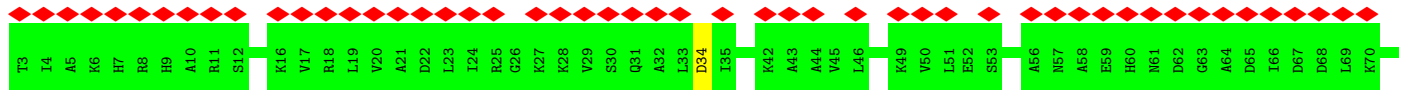
• Molecule 23: 50S ribosomal protein L20

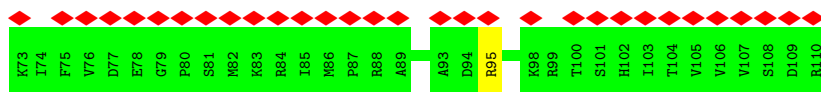


• Molecule 24: 50S ribosomal protein L21

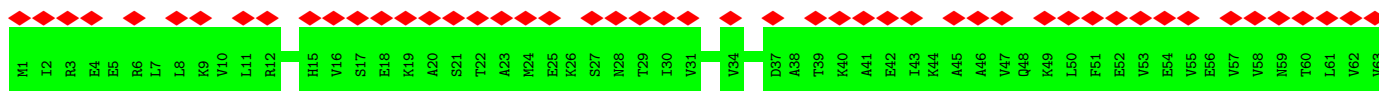
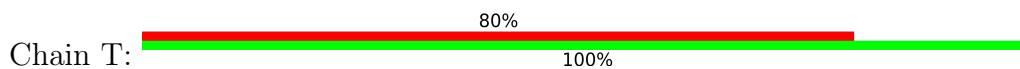


• Molecule 25: 50S ribosomal protein L22

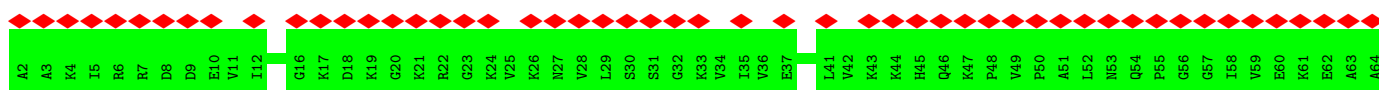
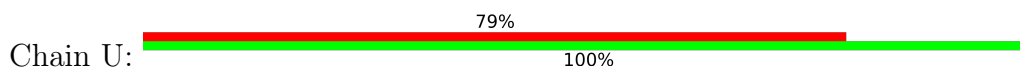




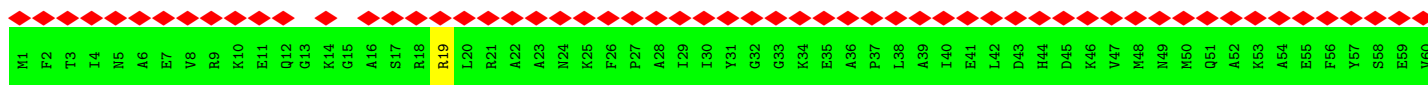
- Molecule 26: 50S ribosomal protein L23



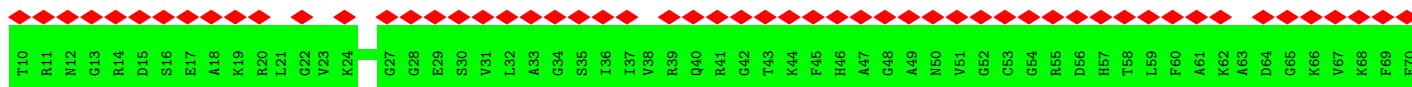
- Molecule 27: 50S ribosomal protein L24



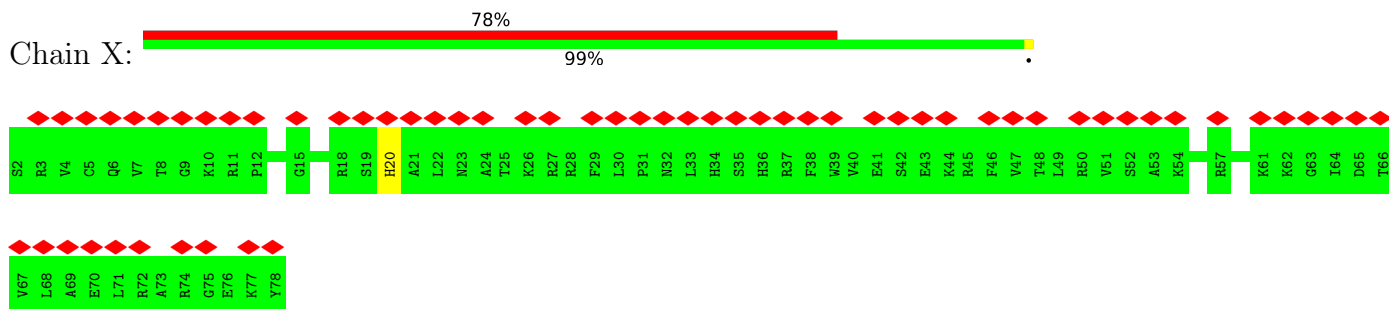
- Molecule 28: 50S ribosomal protein L25



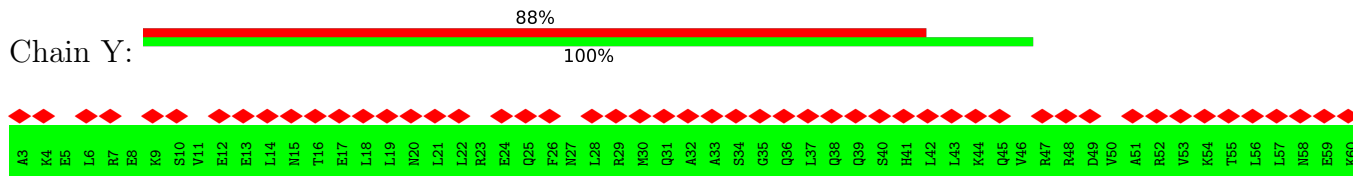
- Molecule 29: 50S ribosomal protein L27



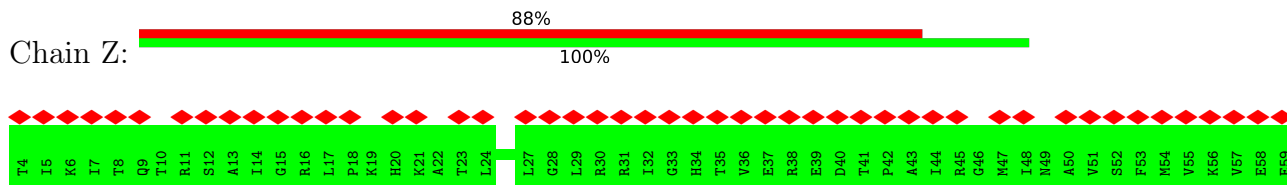
- Molecule 30: 50S ribosomal protein L28



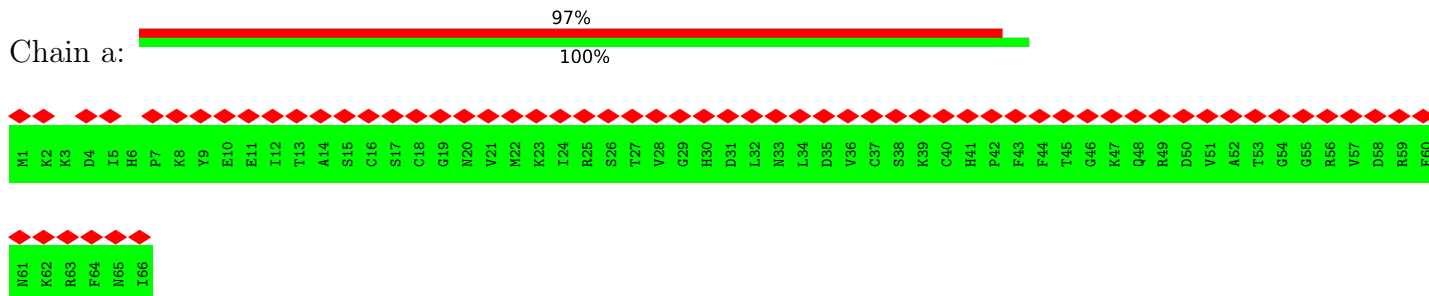
• Molecule 31: 50S ribosomal protein L29



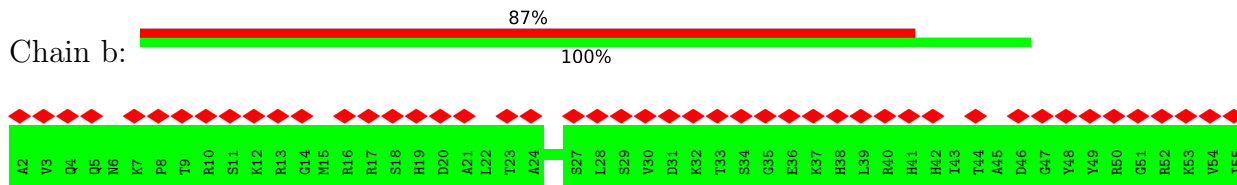
• Molecule 32: 50S ribosomal protein L30



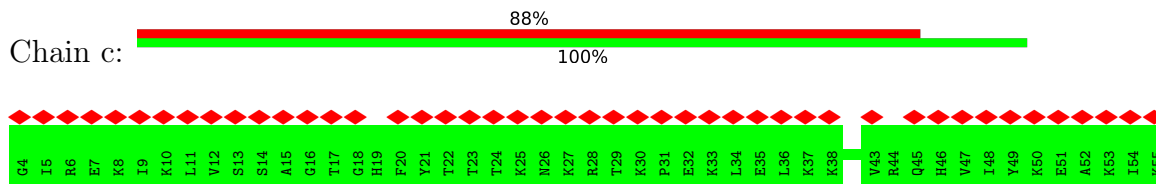
• Molecule 33: 50S ribosomal protein L31



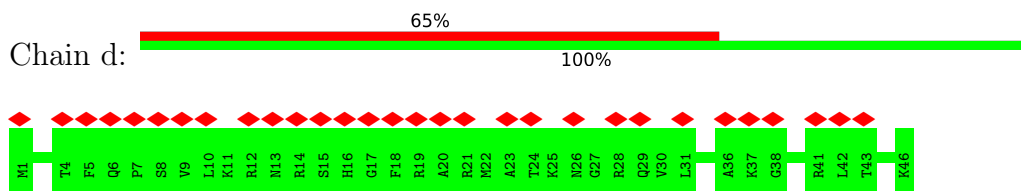
• Molecule 34: 50S ribosomal protein L32



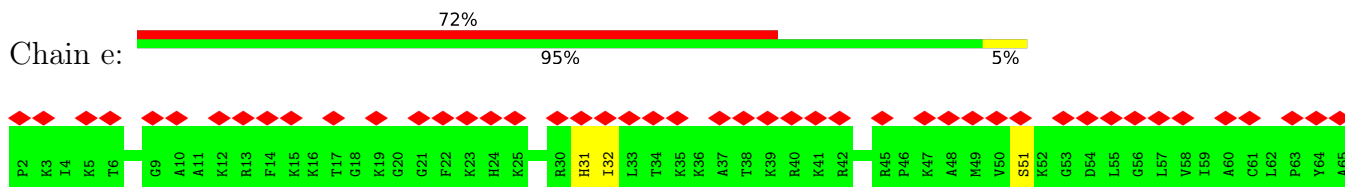
• Molecule 35: 50S ribosomal protein L33



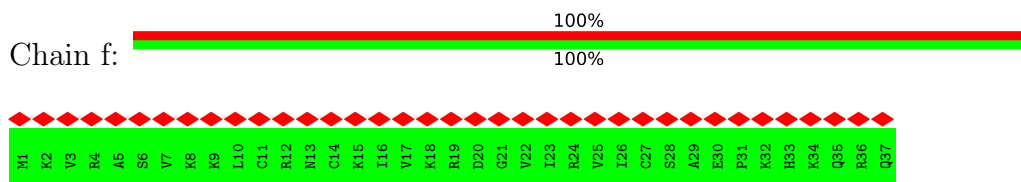
• Molecule 36: 50S ribosomal protein L34



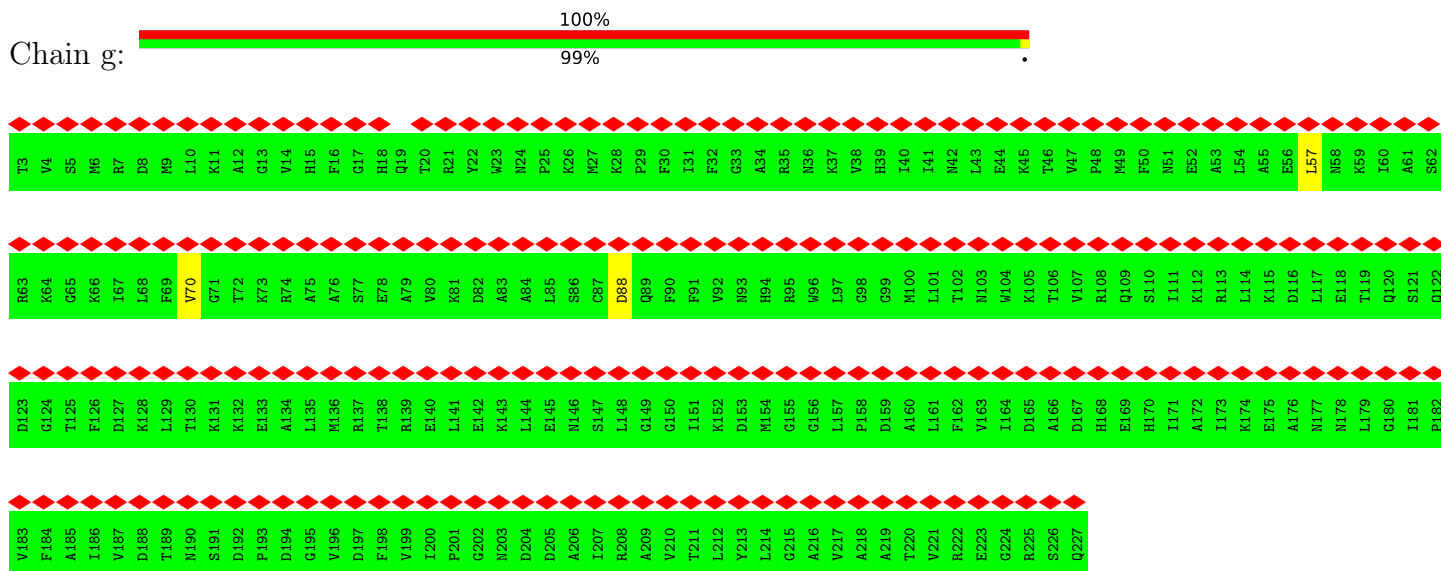
• Molecule 37: 50S ribosomal protein L35



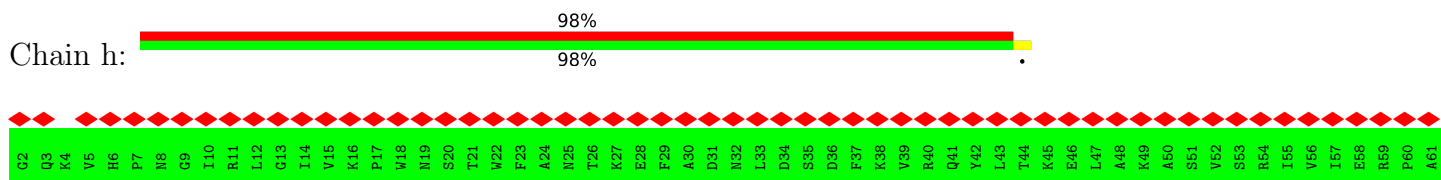
• Molecule 38: 50S ribosomal protein L36

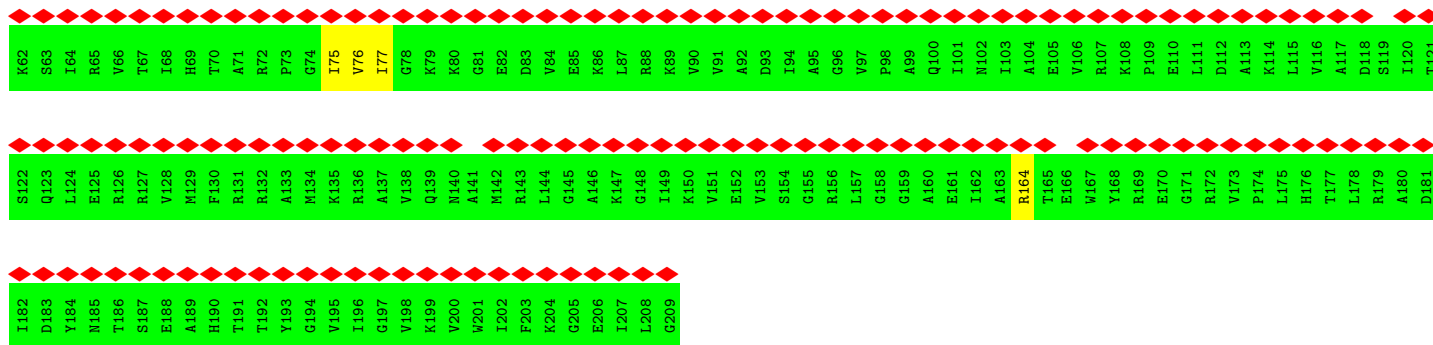


• Molecule 39: 30S ribosomal protein S2

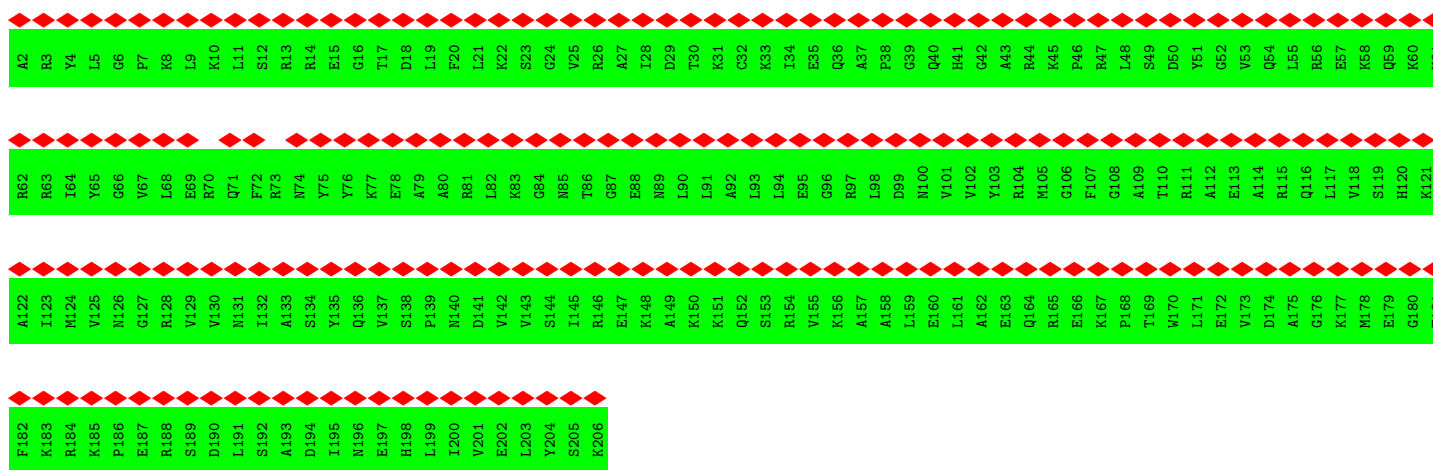


• Molecule 40: 30S ribosomal protein S3

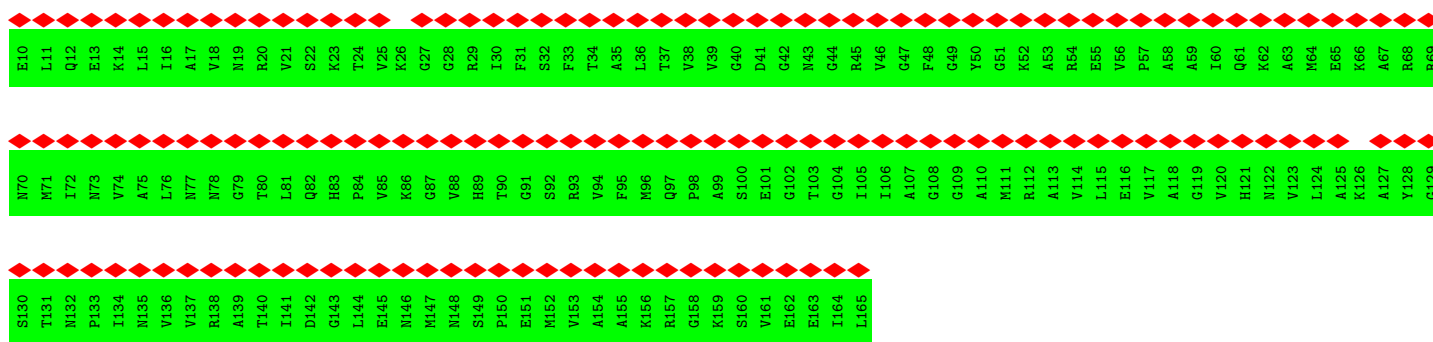




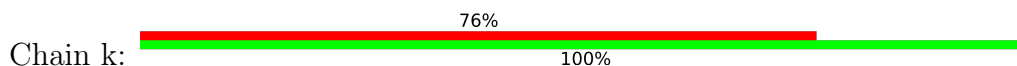
• Molecule 41: 30S ribosomal protein S4



• Molecule 42: 30S ribosomal protein S5



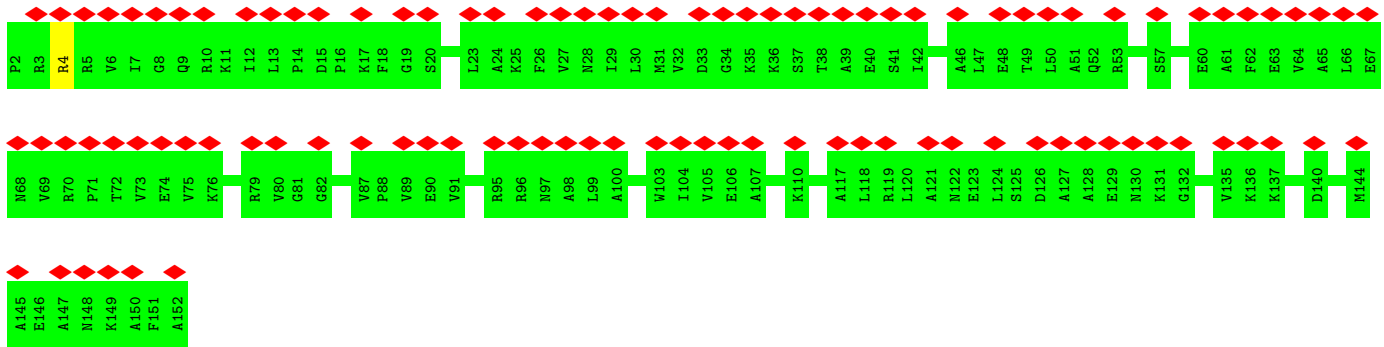
• Molecule 43: 30S ribosomal protein S6





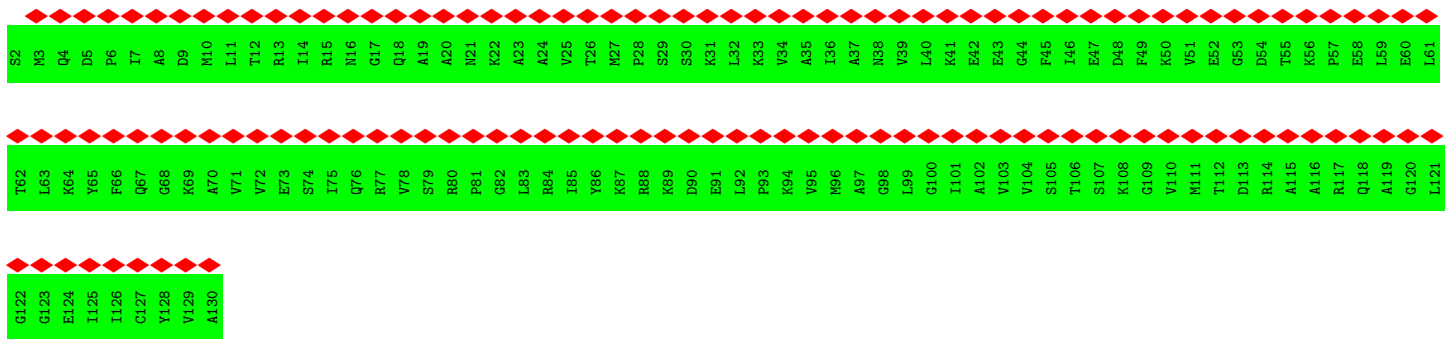
- Molecule 44: 30S ribosomal protein S7

Chain l: 66% 99%



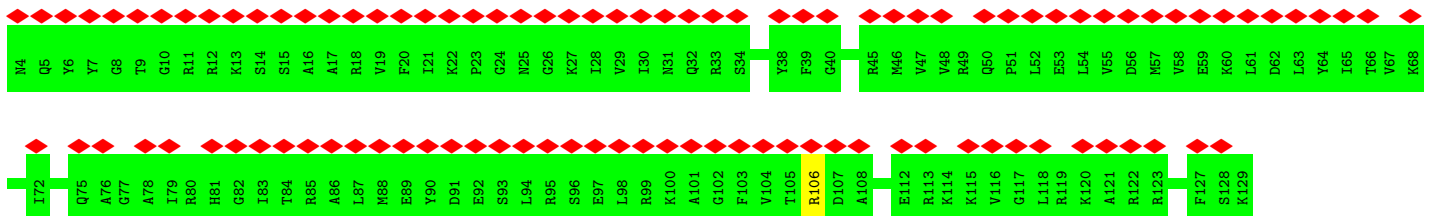
- Molecule 45: 30S ribosomal protein S8

Chain m: 99% 100%



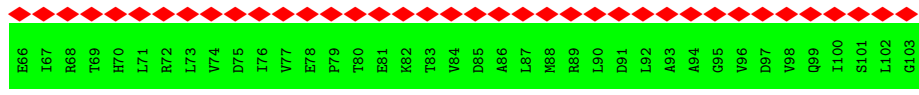
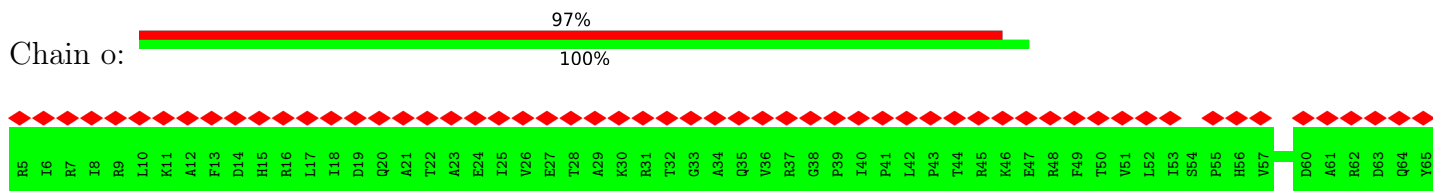
- Molecule 46: 30S ribosomal protein S9

Chain n: 80% 99%

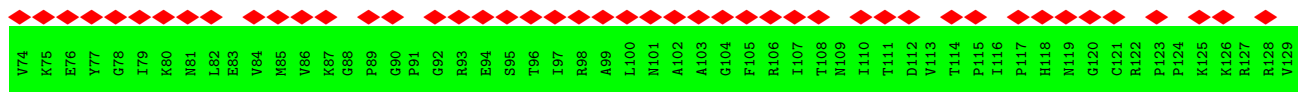
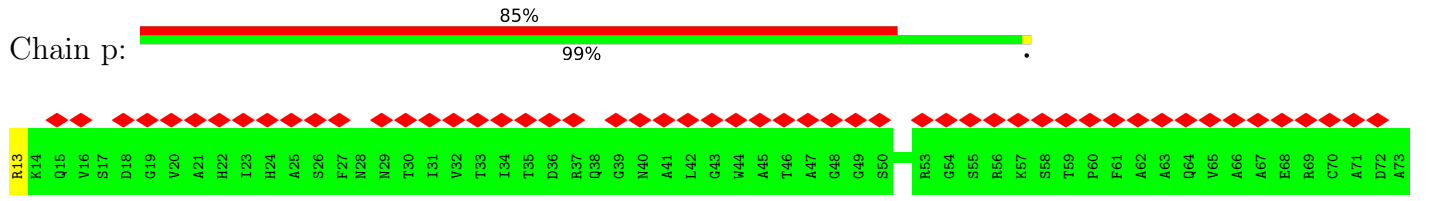


- Molecule 47: 30S ribosomal protein S10

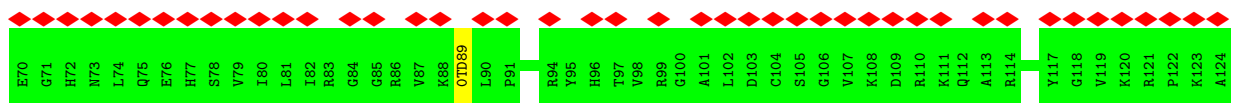
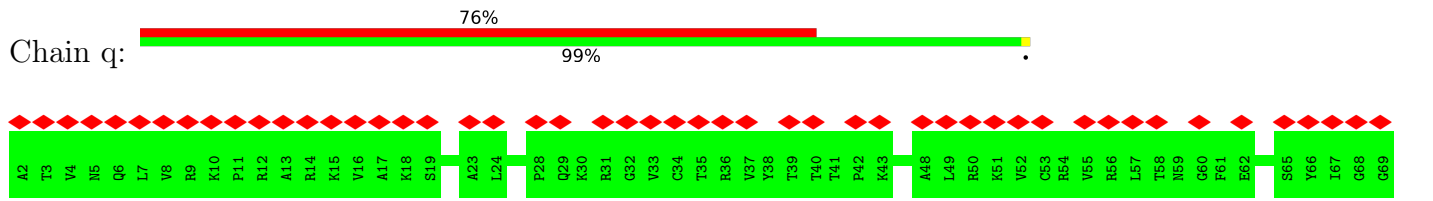




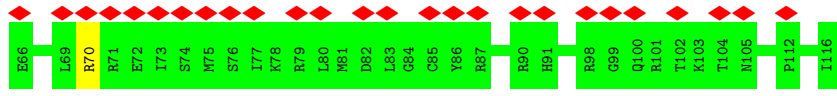
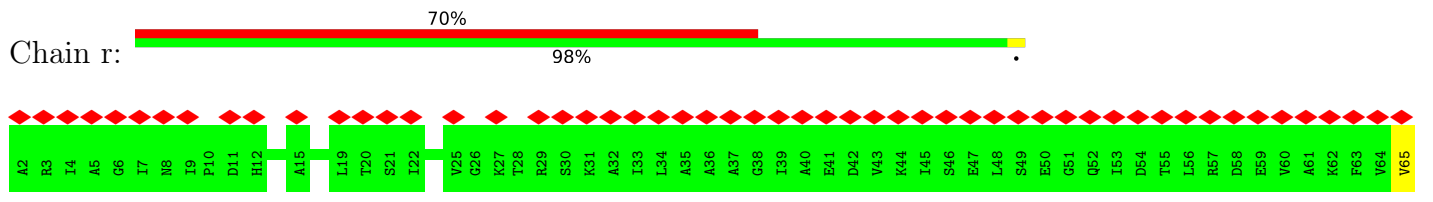
• Molecule 48: 30S ribosomal protein S11



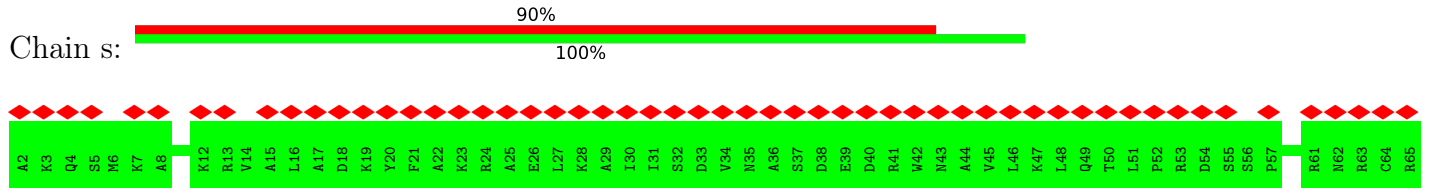
• Molecule 49: 30S ribosomal protein S12

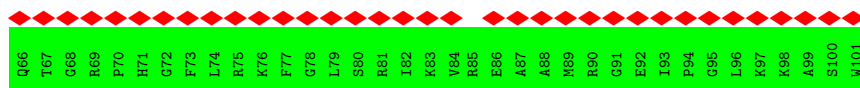


• Molecule 50: 30S ribosomal protein S13

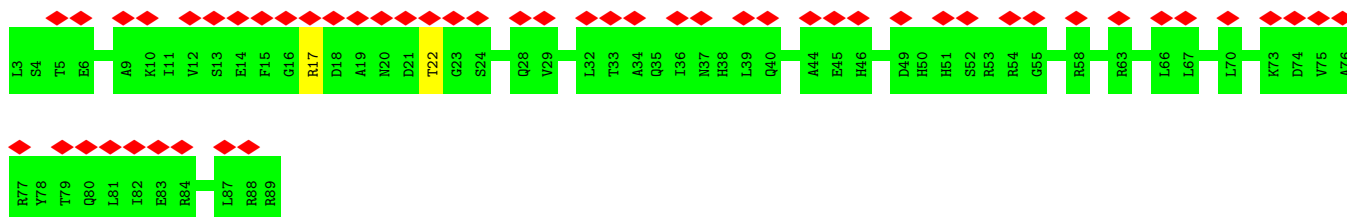


• Molecule 51: 30S ribosomal protein S14

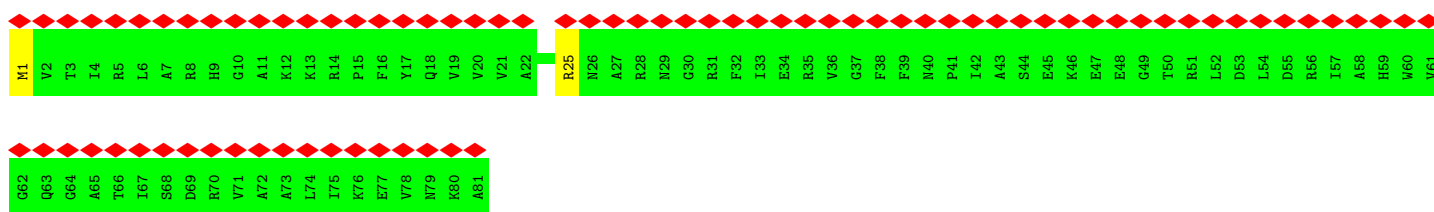




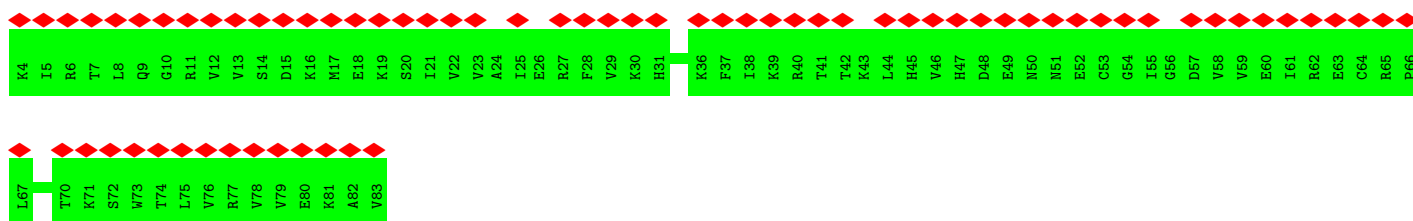
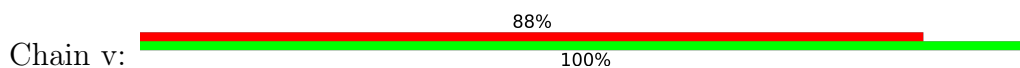
- Molecule 52: 30S ribosomal protein S15



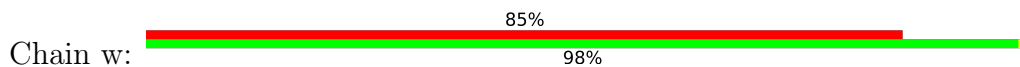
- Molecule 53: 30S ribosomal protein S16



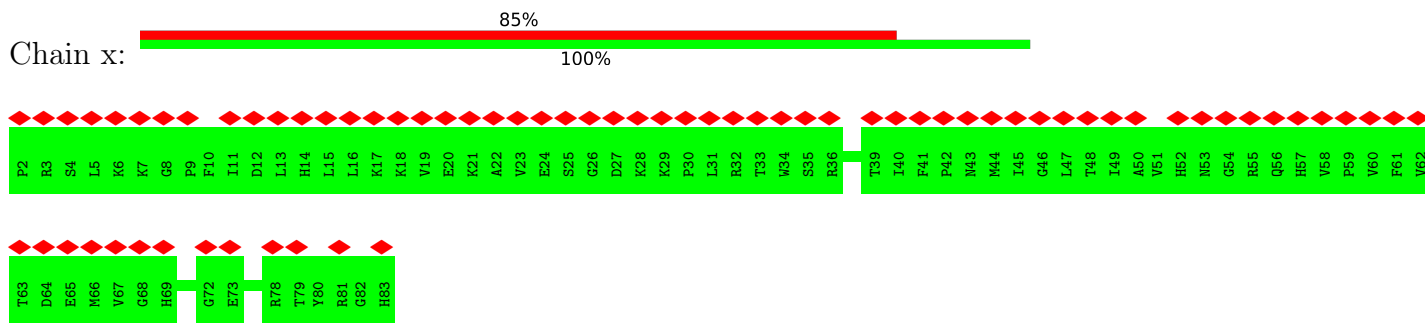
- Molecule 54: 30S ribosomal protein S17



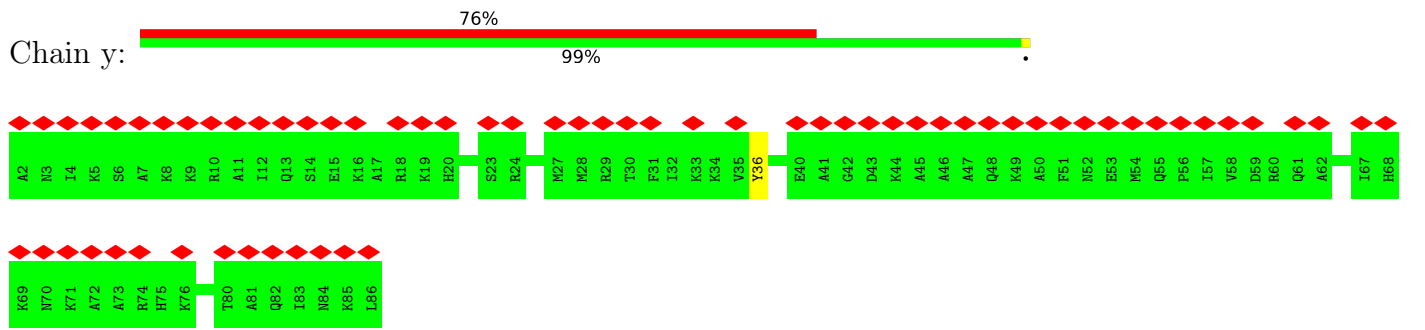
- Molecule 55: 30S ribosomal protein S18



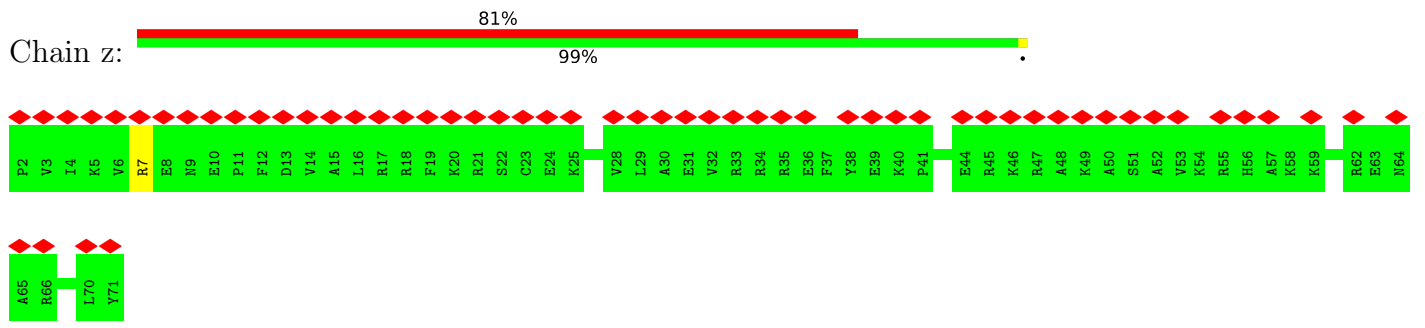
- Molecule 56: 30S ribosomal protein S19



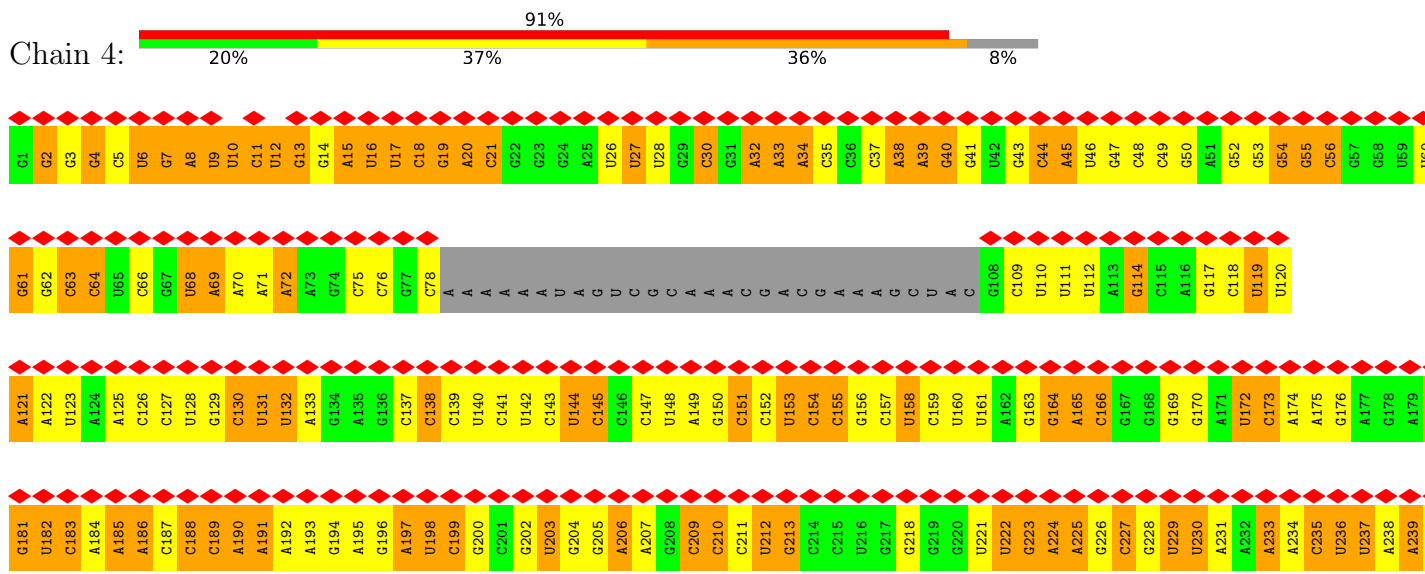
• Molecule 57: 30S ribosomal protein S20

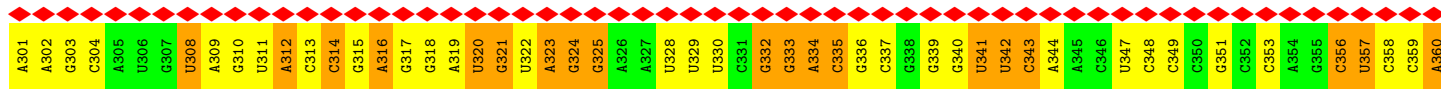
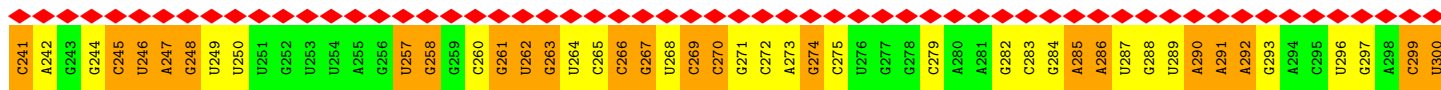


• Molecule 58: 30S ribosomal protein S21

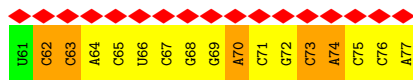
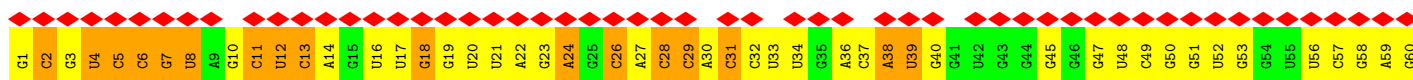
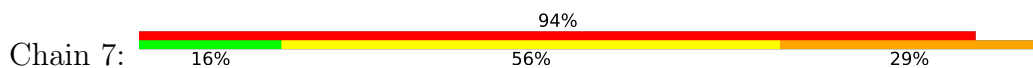


• Molecule 59: transfer-messenger RNA (tmRNA)





• Molecule 60: tRNA-Val



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	47776	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 ( $e^-/\text{\AA}^2$ )	44	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	FEI FALCON II (4k x 4k)	Depositor
Maximum map value	0.508	Depositor
Minimum map value	-0.282	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.013	Depositor
Recommended contour level	0.05	Depositor
Map size (Å)	406.6, 406.6, 406.6	wwPDB
Map dimensions	380, 380, 380	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.07, 1.07, 1.07	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: 4OC, PSU, 7MG, 5MU, MG, 5MC, 3TD, OMG, 6MZ, UR3, 0TD, 1MG, OMC, ZN, 2MG, G7M, 2MA, MA6, OMU

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	1	1.04	5/69285 (0.0%)	1.22	519/108083 (0.5%)
2	2	1.31	47/36588 (0.1%)	1.40	436/57066 (0.8%)
3	3	0.50	0/2872	1.17	18/4478 (0.4%)
4	5	0.41	0/1191	0.71	1/1601 (0.1%)
5	6	0.33	0/139	0.91	0/193
6	8	5.08	5/1830 (0.3%)	1.48	17/2849 (0.6%)
7	9	0.93	1/142 (0.7%)	2.01	7/219 (3.2%)
8	B	0.46	0/2117	0.64	0/2845
9	C	0.34	0/1586	0.60	0/2134
10	D	0.31	0/1571	0.59	0/2113
11	E	0.35	0/1435	0.65	1/1926 (0.1%)
12	F	0.30	0/1333	0.57	0/1805
13	G	0.31	0/1122	0.64	1/1515 (0.1%)
14	H	0.32	0/993	0.69	1/1340 (0.1%)
15	I	0.31	0/998	0.66	0/1348
16	J	0.30	0/1144	0.56	0/1541
17	K	0.42	0/955	0.62	0/1279
18	L	0.30	0/1062	0.57	0/1413
19	M	0.33	0/1093	0.59	0/1460
20	N	0.33	0/964	0.64	0/1289
21	O	0.30	0/894	0.54	0/1198
22	P	0.40	0/929	0.59	1/1242 (0.1%)
23	Q	0.33	0/960	0.50	0/1278
24	R	0.31	0/829	0.56	0/1107
25	S	0.31	0/847	0.61	1/1134 (0.1%)
26	T	0.32	0/752	0.59	0/1005
27	U	0.30	0/796	0.53	0/1062
28	V	0.29	0/766	0.55	0/1025
29	W	0.35	0/589	0.55	0/779
30	X	0.37	0/635	0.62	0/848
31	Y	0.28	0/478	0.57	0/637

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
32	Z	0.27	0/438	0.60	0/587
33	a	0.34	0/531	0.55	0/709
34	b	0.31	0/435	0.58	0/581
35	c	0.33	0/433	0.55	0/576
36	d	0.33	0/380	0.53	0/498
37	e	0.34	0/513	0.66	0/676
38	f	0.29	0/298	0.56	0/392
39	g	0.46	0/1791	0.70	1/2413 (0.0%)
40	h	0.51	0/1663	0.65	0/2241
41	i	0.58	0/1665	0.64	0/2227
42	j	0.61	0/1165	0.70	0/1568
43	k	0.58	0/867	0.66	0/1171
44	l	0.47	0/1195	0.60	0/1602
45	m	0.60	0/989	0.67	0/1326
46	n	0.49	0/1022	0.65	0/1361
47	o	0.51	0/800	0.63	0/1082
48	p	0.51	0/893	0.60	0/1205
49	q	0.61	0/960	0.67	0/1286
50	r	0.40	0/900	0.68	1/1204 (0.1%)
51	s	0.50	0/817	0.58	0/1088
52	t	0.58	0/716	0.65	0/956
53	u	0.63	0/653	0.71	0/877
54	v	0.58	0/658	0.68	0/881
55	w	0.63	0/544	0.66	0/731
56	x	0.48	0/675	0.63	0/908
57	y	0.48	0/670	0.61	0/888
58	z	0.44	0/597	0.55	0/792
59	4	0.74	1/7978 (0.0%)	2.10	509/12434 (4.1%)
60	7	0.74	1/1836 (0.1%)	2.21	114/2861 (4.0%)
All	All	1.09	60/168977 (0.0%)	1.22	1628/252933 (0.6%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	1	34	0
2	2	5	0
14	H	0	1
15	I	0	1
17	K	0	1

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	#Chirality outliers	#Planarity outliers
23	Q	0	1
30	X	0	1
37	e	0	2
39	g	0	1
40	h	0	2
53	u	0	1
All	All	39	11

The worst 5 of 60 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	1	388	G	P-O5'	205.16	3.65	1.59
6	8	77	A	N9-C4	114.08	2.06	1.37
6	8	77	A	N7-C5	106.12	2.02	1.39
6	8	77	A	C8-N7	92.91	1.96	1.31
6	8	77	A	N9-C8	85.15	2.05	1.37

The worst 5 of 1628 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	8	77	A	N7-C8-N9	-24.47	101.56	113.80
1	1	388	G	P-O5'-C5'	22.44	156.80	120.90
6	8	77	A	C5-N7-C8	20.39	114.09	103.90
60	7	72	G	OP1-P-O3'	-19.57	62.15	105.20
60	7	73	C	OP1-P-OP2	19.16	148.35	119.60

5 of 39 chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
1	1	745	1MG	C2',C1'
1	1	746	PSU	C4',C3'
1	1	747	5MU	C4',C2'
1	1	955	PSU	C4',C3'
1	1	1618	6MZ	C2',C3'

5 of 11 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
14	H	67	THR	Peptide
15	I	20	SER	Peptide
17	K	93	GLN	Peptide
23	Q	5	LYS	Peptide

*Continued on next page...*



*Continued from previous page...*

Mol	Chain	Res	Type	Group
30	X	20	HIS	Peptide

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

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

## 5.3 Torsion angles [i](#)

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

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	5	143/145 (99%)	112 (78%)	27 (19%)	4 (3%)	5	34
5	6	26/28 (93%)	17 (65%)	9 (35%)	0	100	100
8	B	268/270 (99%)	243 (91%)	25 (9%)	0	100	100
9	C	207/209 (99%)	194 (94%)	13 (6%)	0	100	100
10	D	199/201 (99%)	176 (88%)	23 (12%)	0	100	100
11	E	175/177 (99%)	157 (90%)	18 (10%)	0	100	100
12	F	173/175 (99%)	151 (87%)	22 (13%)	0	100	100
13	G	147/149 (99%)	133 (90%)	14 (10%)	0	100	100
14	H	128/130 (98%)	103 (80%)	25 (20%)	0	100	100
15	I	133/135 (98%)	108 (81%)	25 (19%)	0	100	100
16	J	139/141 (99%)	129 (93%)	10 (7%)	0	100	100
17	K	121/123 (98%)	105 (87%)	16 (13%)	0	100	100
18	L	142/144 (99%)	124 (87%)	18 (13%)	0	100	100
19	M	134/136 (98%)	128 (96%)	6 (4%)	0	100	100
20	N	117/119 (98%)	102 (87%)	15 (13%)	0	100	100
21	O	113/115 (98%)	103 (91%)	10 (9%)	0	100	100
22	P	112/114 (98%)	102 (91%)	10 (9%)	0	100	100

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
23	Q	115/117 (98%)	109 (95%)	6 (5%)	0	100	100
24	R	101/103 (98%)	90 (89%)	11 (11%)	0	100	100
25	S	106/108 (98%)	97 (92%)	9 (8%)	0	100	100
26	T	92/94 (98%)	85 (92%)	7 (8%)	0	100	100
27	U	101/103 (98%)	91 (90%)	10 (10%)	0	100	100
28	V	92/94 (98%)	86 (94%)	6 (6%)	0	100	100
29	W	74/76 (97%)	65 (88%)	9 (12%)	0	100	100
30	X	75/77 (97%)	66 (88%)	9 (12%)	0	100	100
31	Y	56/58 (97%)	55 (98%)	1 (2%)	0	100	100
32	Z	54/56 (96%)	51 (94%)	3 (6%)	0	100	100
33	a	64/66 (97%)	57 (89%)	7 (11%)	0	100	100
34	b	52/54 (96%)	44 (85%)	8 (15%)	0	100	100
35	c	50/52 (96%)	45 (90%)	5 (10%)	0	100	100
36	d	44/46 (96%)	40 (91%)	4 (9%)	0	100	100
37	e	62/64 (97%)	53 (86%)	8 (13%)	1 (2%)	9	44
38	f	35/37 (95%)	35 (100%)	0	0	100	100
39	g	223/225 (99%)	198 (89%)	25 (11%)	0	100	100
40	h	206/208 (99%)	188 (91%)	17 (8%)	1 (0%)	29	67
41	i	203/205 (99%)	190 (94%)	13 (6%)	0	100	100
42	j	154/156 (99%)	135 (88%)	19 (12%)	0	100	100
43	k	102/104 (98%)	96 (94%)	6 (6%)	0	100	100
44	l	149/151 (99%)	140 (94%)	9 (6%)	0	100	100
45	m	127/129 (98%)	113 (89%)	14 (11%)	0	100	100
46	n	124/126 (98%)	113 (91%)	11 (9%)	0	100	100
47	o	97/99 (98%)	87 (90%)	10 (10%)	0	100	100
48	p	115/117 (98%)	103 (90%)	12 (10%)	0	100	100
49	q	120/123 (98%)	105 (88%)	15 (12%)	0	100	100
50	r	113/115 (98%)	100 (88%)	13 (12%)	0	100	100
51	s	98/100 (98%)	86 (88%)	12 (12%)	0	100	100
52	t	85/87 (98%)	79 (93%)	5 (6%)	1 (1%)	13	49
53	u	79/81 (98%)	71 (90%)	8 (10%)	0	100	100

*Continued on next page...*

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
54	v	78/80 (98%)	69 (88%)	9 (12%)	0	100	100
55	w	63/65 (97%)	57 (90%)	6 (10%)	0	100	100
56	x	80/82 (98%)	75 (94%)	5 (6%)	0	100	100
57	y	83/85 (98%)	76 (92%)	7 (8%)	0	100	100
58	z	68/70 (97%)	66 (97%)	2 (3%)	0	100	100
All	All	6017/6124 (98%)	5403 (90%)	607 (10%)	7 (0%)	54	84

5 of 7 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	5	137	ASP
52	t	22	THR
4	5	135	GLN
4	5	132	GLY
4	5	120	ASN

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

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
4	5	121/121 (100%)	119 (98%)	2 (2%)	60	78
8	B	216/216 (100%)	216 (100%)	0	100	100
9	C	164/164 (100%)	163 (99%)	1 (1%)	86	91
10	D	165/165 (100%)	164 (99%)	1 (1%)	86	91
11	E	148/148 (100%)	146 (99%)	2 (1%)	67	81
12	F	136/136 (100%)	134 (98%)	2 (2%)	65	80
13	G	114/114 (100%)	113 (99%)	1 (1%)	78	87
14	H	99/99 (100%)	99 (100%)	0	100	100
15	I	104/104 (100%)	104 (100%)	0	100	100
16	J	115/115 (100%)	115 (100%)	0	100	100
17	K	104/104 (100%)	104 (100%)	0	100	100

Continued on next page...

*Continued from previous page...*

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
18	L	103/103 (100%)	102 (99%)	1 (1%)	76	86
19	M	109/109 (100%)	109 (100%)	0	100	100
20	N	99/99 (100%)	98 (99%)	1 (1%)	76	86
21	O	85/85 (100%)	85 (100%)	0	100	100
22	P	99/99 (100%)	99 (100%)	0	100	100
23	Q	89/89 (100%)	89 (100%)	0	100	100
24	R	84/84 (100%)	84 (100%)	0	100	100
25	S	91/91 (100%)	90 (99%)	1 (1%)	73	84
26	T	81/81 (100%)	81 (100%)	0	100	100
27	U	84/84 (100%)	84 (100%)	0	100	100
28	V	78/78 (100%)	77 (99%)	1 (1%)	69	82
29	W	58/58 (100%)	58 (100%)	0	100	100
30	X	67/67 (100%)	67 (100%)	0	100	100
31	Y	53/53 (100%)	53 (100%)	0	100	100
32	Z	47/47 (100%)	47 (100%)	0	100	100
33	a	59/59 (100%)	59 (100%)	0	100	100
34	b	46/46 (100%)	46 (100%)	0	100	100
35	c	47/47 (100%)	47 (100%)	0	100	100
36	d	38/38 (100%)	38 (100%)	0	100	100
37	e	51/51 (100%)	51 (100%)	0	100	100
38	f	34/34 (100%)	34 (100%)	0	100	100
39	g	187/187 (100%)	186 (100%)	1 (0%)	88	93
40	h	171/171 (100%)	170 (99%)	1 (1%)	86	91
41	i	172/172 (100%)	172 (100%)	0	100	100
42	j	119/119 (100%)	119 (100%)	0	100	100
43	k	91/91 (100%)	91 (100%)	0	100	100
44	l	124/124 (100%)	123 (99%)	1 (1%)	81	89
45	m	104/104 (100%)	104 (100%)	0	100	100
46	n	104/104 (100%)	103 (99%)	1 (1%)	76	86
47	o	86/86 (100%)	86 (100%)	0	100	100
48	p	90/90 (100%)	89 (99%)	1 (1%)	73	84

*Continued on next page...*

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
49	q	102/102 (100%)	102 (100%)	0	100	100
50	r	93/93 (100%)	92 (99%)	1 (1%)	73	84
51	s	83/83 (100%)	83 (100%)	0	100	100
52	t	75/75 (100%)	74 (99%)	1 (1%)	69	82
53	u	65/65 (100%)	64 (98%)	1 (2%)	65	80
54	v	74/74 (100%)	74 (100%)	0	100	100
55	w	56/56 (100%)	55 (98%)	1 (2%)	59	77
56	x	72/72 (100%)	72 (100%)	0	100	100
57	y	65/65 (100%)	64 (98%)	1 (2%)	65	80
58	z	60/60 (100%)	59 (98%)	1 (2%)	60	78
All	All	4981/4981 (100%)	4957 (100%)	24 (0%)	89	93

5 of 24 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
40	h	164	ARG
48	p	13	ARG
46	n	106	ARG
50	r	65	VAL
12	F	44	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 62 such sidechains are listed below:

Mol	Chain	Res	Type
27	U	99	ASN
50	r	105	ASN
33	a	20	ASN
49	q	46	ASN
57	y	3	ASN

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	1	2897/2903 (99%)	951 (32%)	24 (0%)
2	2	1526/1534 (99%)	428 (28%)	7 (0%)
3	3	119/120 (99%)	38 (31%)	0

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
59	4	332/363 (91%)	198 (59%)	33 (9%)
6	8	76/77 (98%)	43 (56%)	1 (1%)
60	7	76/77 (98%)	49 (64%)	2 (2%)
7	9	5/6 (83%)	4 (80%)	0
All	All	5031/5080 (99%)	1711 (34%)	67 (1%)

5 of 1711 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	1	2	G
1	1	10	A
1	1	11	C
1	1	12	U
1	1	18	U

5 of 67 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
59	4	261	G
59	4	299	C
60	7	13	C
2	2	120	A
1	1	2605	PSU

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

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

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z  > 2$	Counts	RMSZ	# $ Z  > 2$
2	PSU	2	516	2	18,21,22	2.29	6 (33%)	22,30,33	2.50	6 (27%)
1	PSU	1	955	1	18,21,22	1.98	4 (22%)	22,30,33	2.17	5 (22%)
1	5MU	1	747	1	19,22,23	2.10	7 (36%)	28,32,35	4.58	10 (35%)
1	PSU	1	1917	1	18,21,22	2.09	5 (27%)	22,30,33	2.15	5 (22%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
1	PSU	1	1911	1	18,21,22	1.95	4 (22%)	22,30,33	2.22	4 (18%)
2	2MG	2	1207	2	18,26,27	3.02	6 (33%)	16,38,41	1.35	4 (25%)
2	MA6	2	1518	2	19,26,27	1.01	1 (5%)	18,38,41	1.50	2 (11%)
1	6MZ	1	2030	1	18,25,26	1.91	1 (5%)	16,36,39	3.25	5 (31%)
1	PSU	1	746	1	18,21,22	1.85	5 (27%)	22,30,33	2.00	4 (18%)
1	OMU	1	2552	61,1	19,22,23	2.76	7 (36%)	26,31,34	2.07	8 (30%)
1	PSU	1	2580	1	18,21,22	1.94	5 (27%)	22,30,33	2.16	6 (27%)
1	2MA	1	2503	61,1	17,25,26	1.52	3 (17%)	17,37,40	1.30	2 (11%)
2	4OC	2	1402	2	20,23,24	2.57	5 (25%)	26,32,35	2.03	8 (30%)
1	6MZ	1	1618	1	18,25,26	1.90	1 (5%)	16,36,39	2.53	5 (31%)
1	OMC	1	2498	61,1	19,22,23	1.70	4 (21%)	26,31,34	2.22	6 (23%)
49	0TD	q	89	49	7,9,10	1.39	0	6,11,13	1.90	2 (33%)
2	5MC	2	1407	2	18,22,23	2.05	3 (16%)	26,32,35	1.49	4 (15%)
2	2MG	2	966	2	18,26,27	2.95	6 (33%)	16,38,41	1.41	3 (18%)
1	OMG	1	2251	1	18,26,27	2.98	7 (38%)	19,38,41	1.55	4 (21%)
2	5MC	2	967	2	18,22,23	2.11	3 (16%)	26,32,35	1.52	4 (15%)
1	5MC	1	1962	1	18,22,23	2.15	3 (16%)	26,32,35	1.47	5 (19%)
2	UR3	2	1498	2	19,22,23	2.99	7 (36%)	26,32,35	1.55	5 (19%)
1	G7M	1	2069	1	20,26,27	2.82	5 (25%)	17,39,42	0.83	0
2	MA6	2	1519	2	19,26,27	1.13	1 (5%)	18,38,41	1.42	2 (11%)
1	PSU	1	2457	1	18,21,22	1.99	5 (27%)	22,30,33	2.10	7 (31%)
1	2MG	1	2445	1	18,26,27	2.90	5 (27%)	16,38,41	1.32	3 (18%)
1	5MU	1	1939	61,1	19,22,23	2.49	7 (36%)	28,32,35	3.58	10 (35%)
1	2MG	1	1835	1	18,26,27	2.96	6 (33%)	16,38,41	1.78	4 (25%)
2	7MG	2	527	2	22,26,27	6.62	6 (27%)	29,39,42	2.60	9 (31%)
2	2MG	2	1516	2	18,26,27	2.94	6 (33%)	16,38,41	1.43	3 (18%)
1	PSU	1	2504	1	18,21,22	2.02	5 (27%)	22,30,33	2.24	6 (27%)
1	PSU	1	2605	1	18,21,22	2.07	6 (33%)	22,30,33	1.92	4 (18%)
1	1MG	1	745	1	18,26,27	2.97	7 (38%)	19,39,42	2.29	9 (47%)
1	3TD	1	1915	4,61,1	18,22,23	2.77	7 (38%)	22,32,35	1.87	4 (18%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	PSU	2	516	2	2/2/5/5	7/7/25/26	0/2/2/2
1	PSU	1	955	1	2/2/5/5	4/7/25/26	0/2/2/2
1	5MU	1	747	1	2/2/5/5	5/7/25/26	0/2/2/2
1	PSU	1	1917	1	2/2/5/5	2/7/25/26	0/2/2/2
1	PSU	1	1911	1	2/2/5/5	1/7/25/26	0/2/2/2
2	2MG	2	1207	2	-	0/5/27/28	0/3/3/3
2	MA6	2	1518	2	-	4/7/29/30	0/3/3/3
1	6MZ	1	2030	1	2/2/5/6	3/5/27/28	0/3/3/3
1	PSU	1	746	1	2/2/5/5	5/7/25/26	0/2/2/2
1	OMU	1	2552	61,1	2/2/5/5	3/9/27/28	0/2/2/2
1	PSU	1	2580	1	2/2/5/5	4/7/25/26	0/2/2/2
1	2MA	1	2503	61,1	2/2/5/5	2/3/25/26	0/3/3/3
2	4OC	2	1402	2	2/2/5/6	5/9/29/30	0/2/2/2
1	OMC	1	2498	61,1	1/1/5/5	5/9/27/28	0/2/2/2
1	6MZ	1	1618	1	2/2/5/6	3/5/27/28	0/3/3/3
49	0TD	q	89	49	-	2/7/12/14	-
2	5MC	2	1407	2	-	0/7/25/26	0/2/2/2
2	2MG	2	966	2	-	2/5/27/28	0/3/3/3
1	OMG	1	2251	1	1/1/5/5	1/5/27/28	0/3/3/3
2	5MC	2	967	2	-	2/7/25/26	0/2/2/2
1	5MC	1	1962	1	-	4/7/25/26	0/2/2/2
2	UR3	2	1498	2	-	0/7/25/26	0/2/2/2
1	G7M	1	2069	1	1/1/5/5	1/3/25/26	0/3/3/3
2	MA6	2	1519	2	-	6/7/29/30	0/3/3/3
1	PSU	1	2457	1	2/2/5/5	2/7/25/26	0/2/2/2
1	5MU	1	1939	61,1	2/2/5/5	1/7/25/26	0/2/2/2
2	7MG	2	527	2	1/1/7/7	3/7/37/38	0/3/3/3
1	2MG	1	1835	1	-	2/5/27/28	0/3/3/3
1	2MG	1	2445	1	-	4/5/27/28	0/3/3/3
2	2MG	2	1516	2	-	2/5/27/28	0/3/3/3
1	PSU	1	2504	1	2/2/5/5	4/7/25/26	0/2/2/2
1	PSU	1	2605	1	2/2/5/5	3/7/25/26	0/2/2/2
1	1MG	1	745	1	2/2/5/5	1/3/25/26	0/3/3/3
1	3TD	1	1915	4,61,1	1/1/5/5	4/7/25/26	0/2/2/2

The worst 5 of 159 bond length outliers are listed below:



Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	2	527	7MG	C8-N9	-28.63	1.30	1.46
1	1	2069	G7M	O6-C6	10.17	1.44	1.23
1	1	2251	OMG	O6-C6	9.17	1.41	1.23
2	2	1516	2MG	O6-C6	8.90	1.41	1.23
1	1	2445	2MG	O6-C6	8.76	1.41	1.23

The worst 5 of 168 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	1	747	5MU	C1'-N1-C2	10.73	136.99	117.57
1	1	747	5MU	C1'-N1-C6	-10.52	103.61	121.12
1	1	2030	6MZ	C9-N6-C6	-9.43	114.75	122.87
1	1	747	5MU	C5M-C5-C4	9.35	129.06	118.77
1	1	1939	5MU	N3-C2-N1	8.73	126.48	114.89

5 of 39 chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
1	1	745	1MG	C2'
1	1	745	1MG	C1'
1	1	746	PSU	C4'
1	1	746	PSU	C3'
1	1	747	5MU	C4'

5 of 97 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	1	746	PSU	C2'-C1'-C5-C6
1	1	746	PSU	O4'-C1'-C5-C6
1	1	746	PSU	C3'-C4'-C5'-O5'
1	1	746	PSU	O4'-C4'-C5'-O5'
1	1	747	5MU	C3'-C4'-C5'-O5'

There are no ring outliers.

No monomer is involved in short contacts.

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 441 ligands modelled in this entry, 441 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](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
2	2	2
1	1	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	1	2314:A	O3'	2315:G	P	3.20
1	2	1276:G	O3'	1277:C	P	3.19
1	2	1383:C	O3'	1384:C	P	3.17

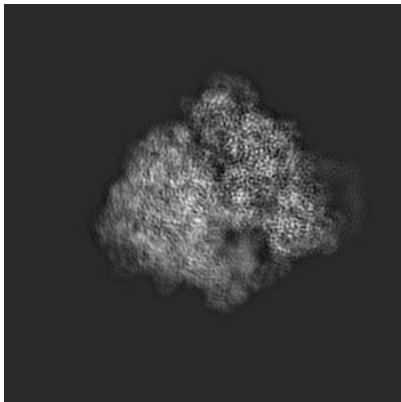
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-4476. These allow visual inspection of the internal detail of the map and identification of artifacts.

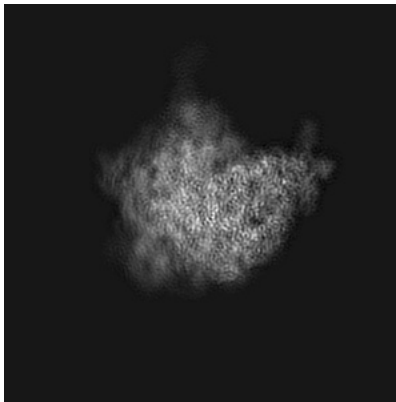
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

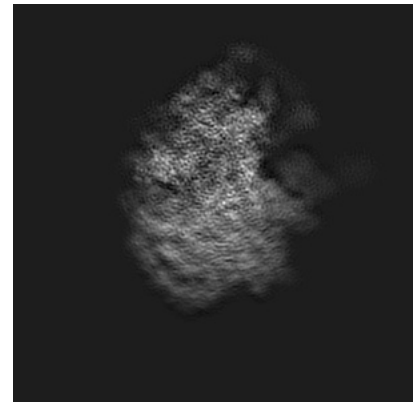
#### 6.1.1 Primary map



X



Y

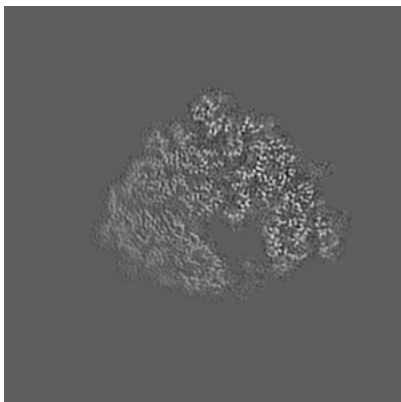


Z

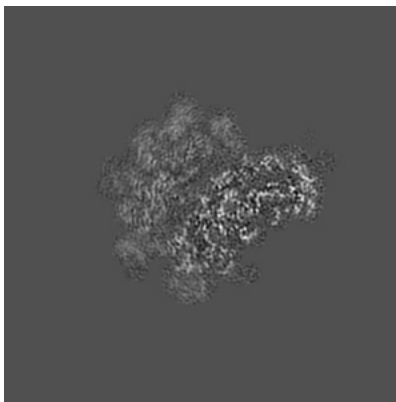
The images above show the map projected in three orthogonal directions.

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

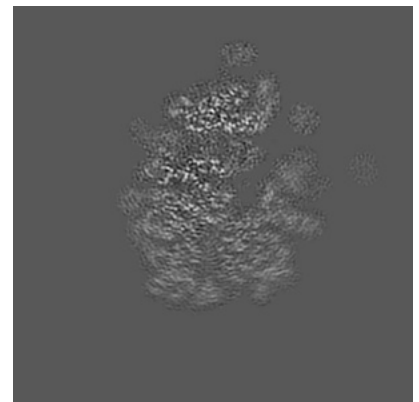
#### 6.2.1 Primary map



X Index: 190



Y Index: 190

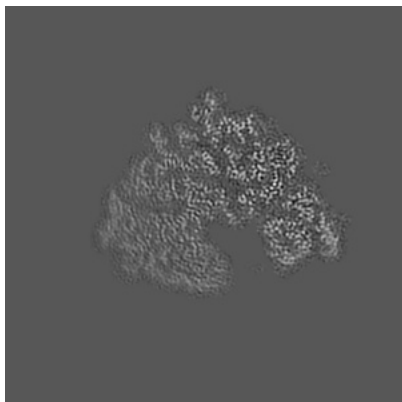


Z Index: 190

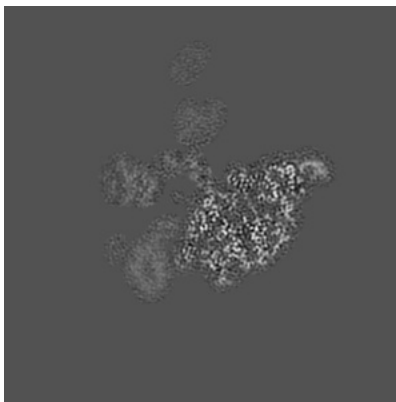
The images above show central slices of the map in three orthogonal directions.

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

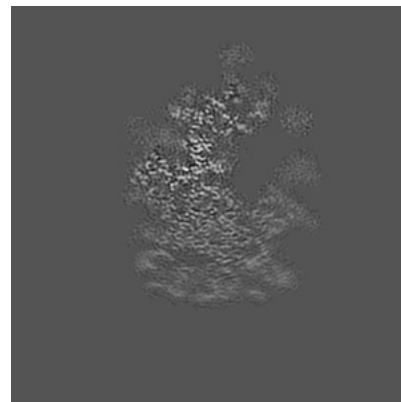
### 6.3.1 Primary map



X Index: 186



Y Index: 231

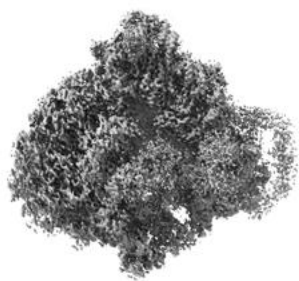


Z Index: 199

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

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

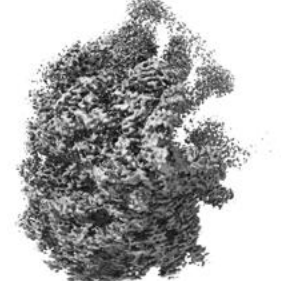
### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.05. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

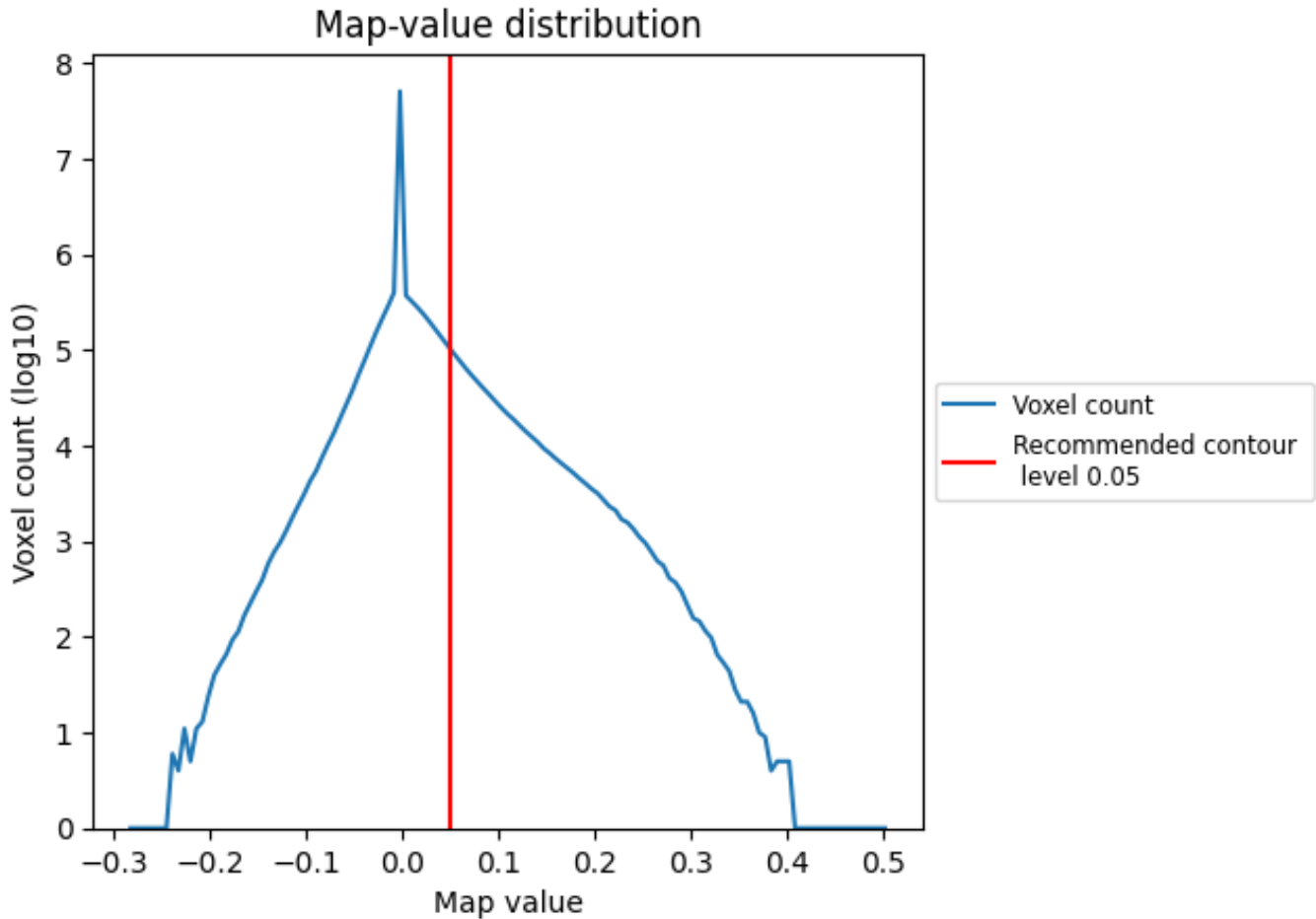
## 6.5 Mask visualisation

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

## 7 Map analysis [i](#)

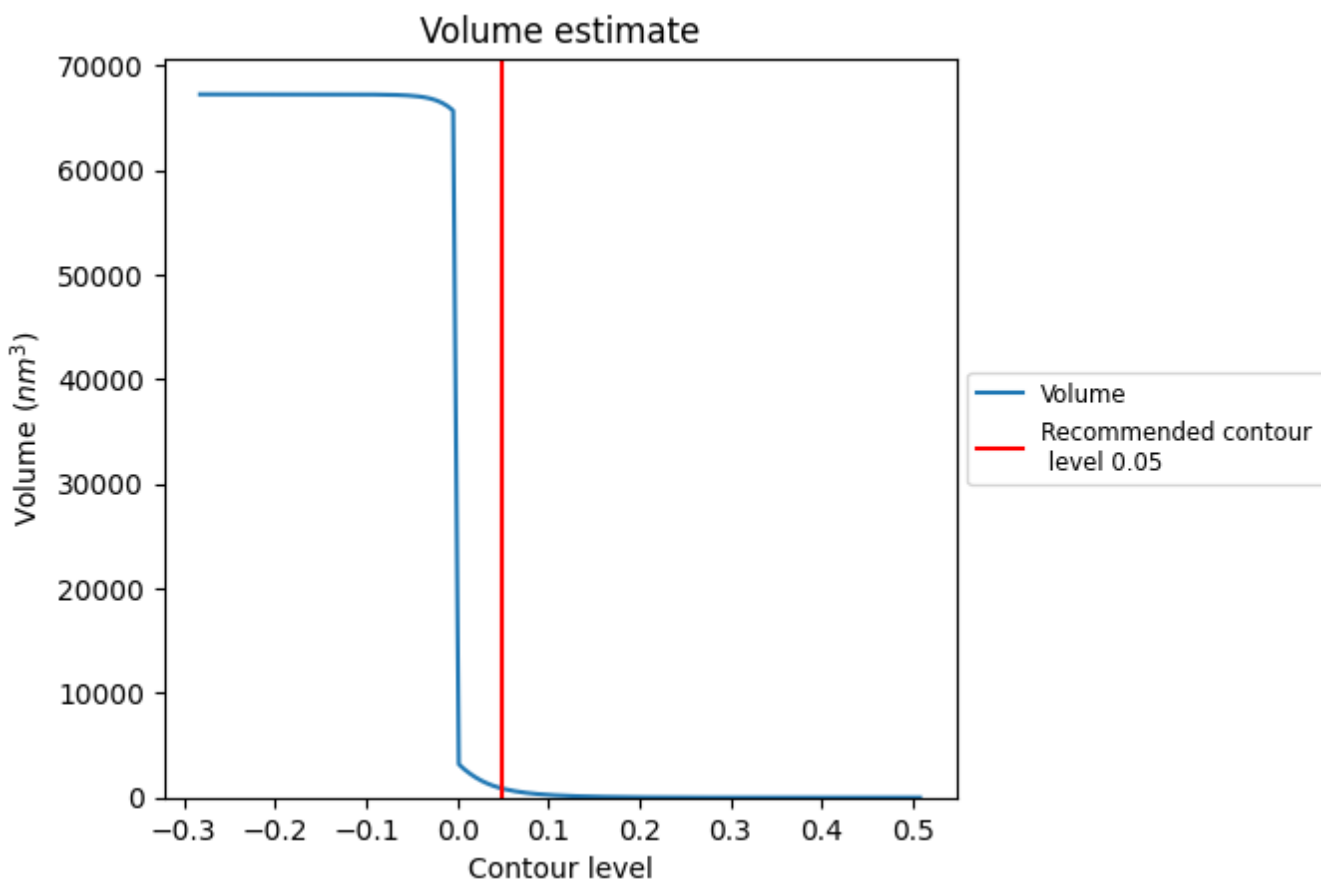
This section contains the results of statistical analysis of the map.

### 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.

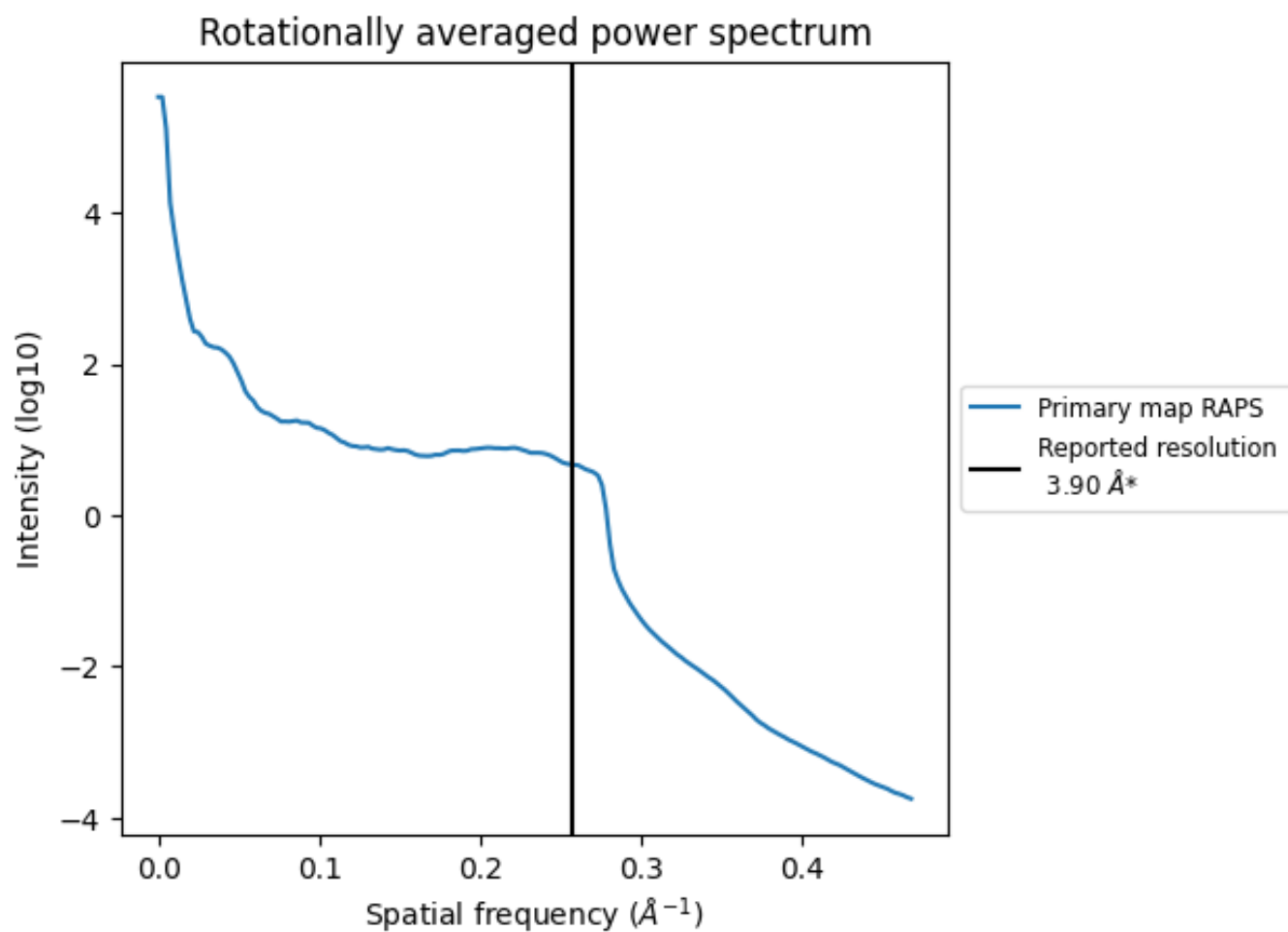
## 7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 855 nm<sup>3</sup>; this corresponds to an approximate mass of 773 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  $0.256 \text{\AA}^{-1}$



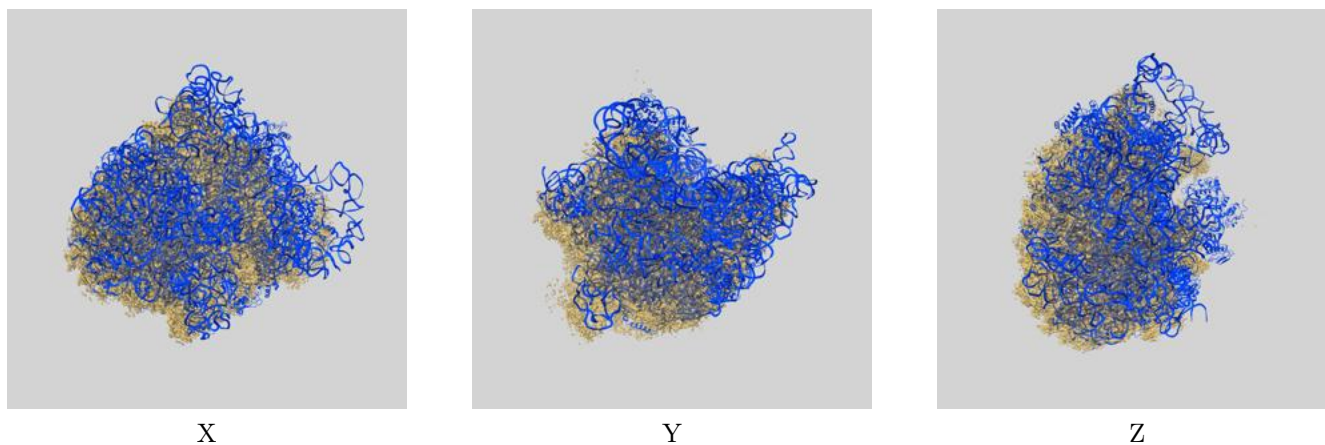
## 8 Fourier-Shell correlation

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

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

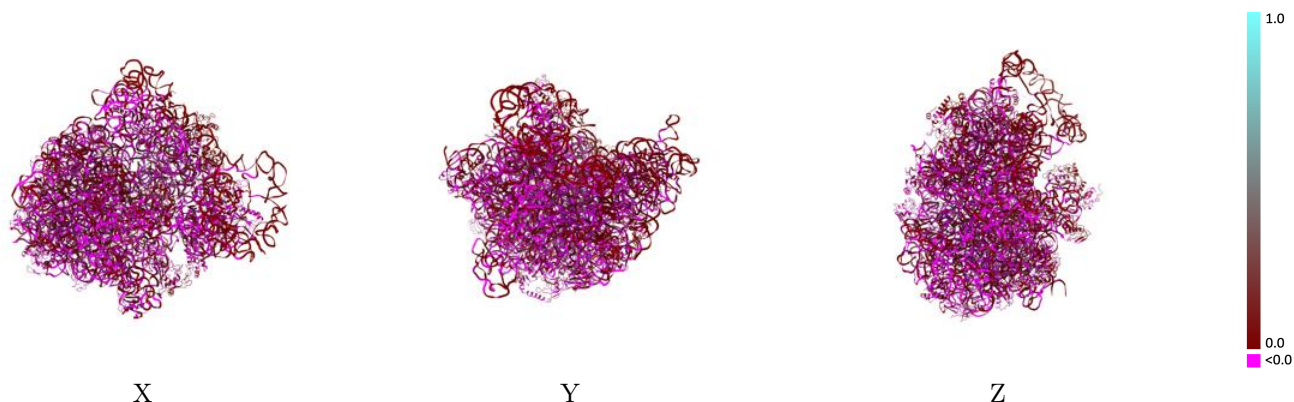
This section contains information regarding the fit between EMDB map EMD-4476 and PDB model 6Q97. Per-residue inclusion information can be found in section 3 on page 16.

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



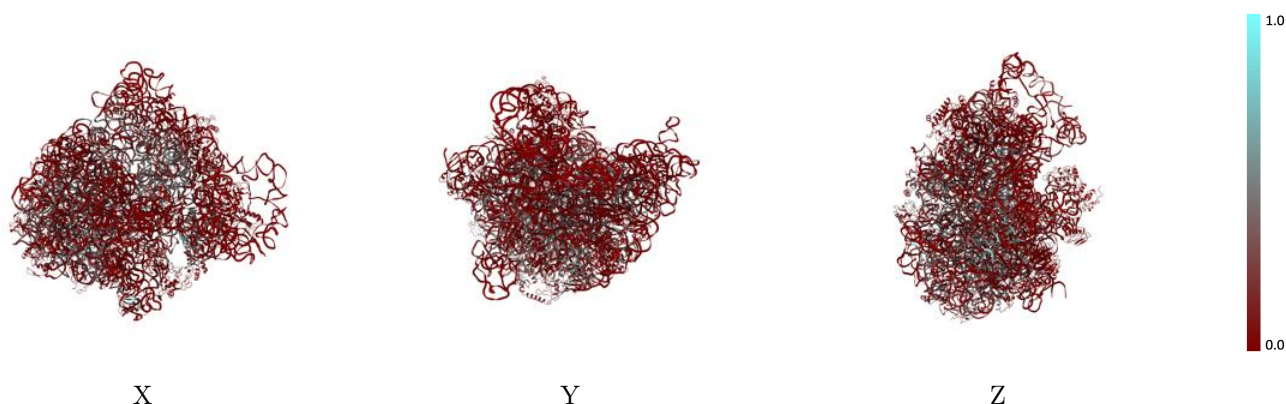
The images above show the 3D surface view of the map at the recommended contour level 0.05 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



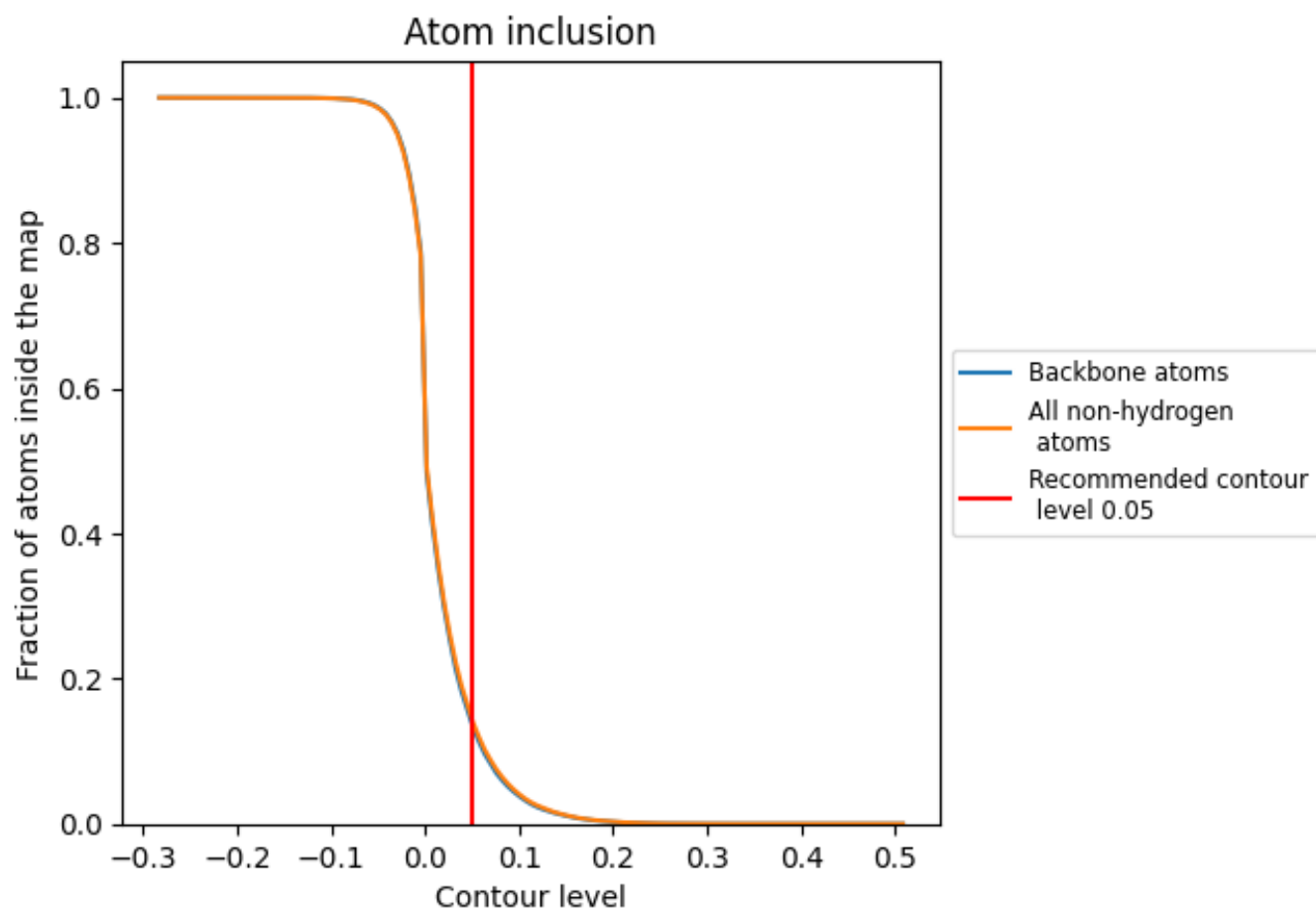
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.05).







































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 14% of all backbone atoms, 14% 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 (0.05) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.1437	 -0.0010
1	 0.1688	 -0.0020
2	 0.1671	 -0.0030
3	 0.0811	 0.0030
4	 0.0137	 -0.0030
5	 0.0264	 0.0150
6	 0.1857	 -0.0290
7	 0.1050	 -0.0190
8	 0.1049	 0.0030
9	 0.2344	 -0.0170
B	 0.1983	 -0.0130
C	 0.0559	 0.0000
D	 0.1421	 -0.0190
E	 0.0459	 0.0070
F	 0.0000	 0.0060
G	 0.1633	 -0.0130
H	 0.0000	 0.0110
I	 0.0000	 0.0110
J	 0.0650	 -0.0030
K	 0.0706	 0.0030
L	 0.2725	 -0.0120
M	 0.1045	 0.0150
N	 0.1369	 0.0140
O	 0.1825	 0.0280
P	 0.1137	 -0.0400
Q	 0.1331	 0.0020
R	 0.1355	 0.0130
S	 0.2234	 -0.0050
T	 0.1904	 0.0030
U	 0.1972	 0.0040
V	 0.0244	 -0.0050
W	 0.1237	 -0.0310
X	 0.2193	 -0.0150
Y	 0.1333	 -0.0100
Z	 0.0900	 0.0510



*Continued on next page...*

Continued from previous page...

Chain	Atom inclusion	Q-score
a	0.0352	0.0220
b	0.1308	0.0080
c	0.0861	0.0350
d	0.2648	-0.0190
e	0.2749	-0.0030
f	0.0208	-0.0030
g	0.0093	0.0020
h	0.0377	0.0150
i	0.0226	0.0100
j	0.0257	0.0040
k	0.2406	-0.0250
l	0.3348	-0.0050
m	0.0073	-0.0010
n	0.1734	-0.0000
o	0.0575	-0.0180
p	0.1477	-0.0090
q	0.2102	0.0100
r	0.2561	0.0240
s	0.1085	0.0230
t	0.3319	-0.0030
u	0.0177	0.0080
v	0.0916	0.0220
w	0.1946	0.0020
x	0.1480	0.0230
y	0.2092	-0.0010
z	0.1431	-0.0070