



wwPDB EM Validation Summary Report ⓘ

Jun 25, 2025 – 07:19 PM JST

PDB ID : 8YLD / pdb_00008yld
EMDB ID : EMD-38666
Title : State 4a (S4a) of yeast 80S ribosome bound to 2 tRNAs and open eEF3 and eEF2 during translocation
Authors : Cheng, J.; Wu, C.L.; Li, J.X.; Zhang, X.Z.
Deposited on : 2024-03-06
Resolution : 3.90 Å(reported)

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

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

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

EMDB validation analysis : **FAILED**
MolProbity : 4-5-2 with Phenix2.0rc1
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : **FAILED**
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.44

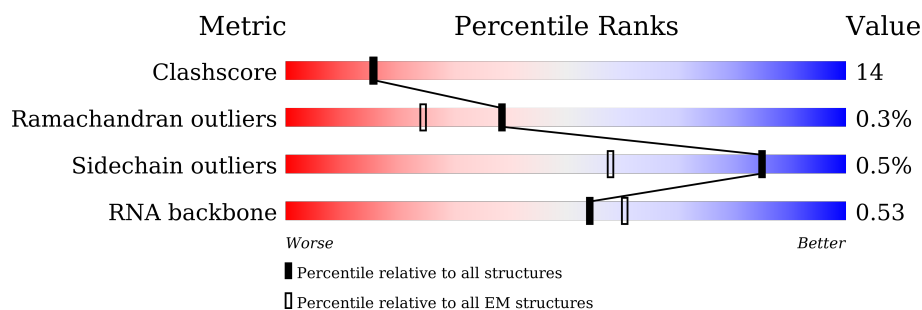
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.90 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415
RNA backbone	6643	2191

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 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 $\leq 5\%$.

Mol	Chain	Length	Quality of chain
1	S	185	71% 29% .
2	2	1799	38% 49% 12% .
3	A	3394	44% 44% 6% 6%
4	B	121	43% 51% 6%
5	C	158	42% 53% 6%
6	D	251	64% 33% .
7	E	386	73% 27%
8	F	361	76% 24%

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Mol	Chain	Length	Quality of chain
9	G	294	
10	H	175	
11	I	223	
12	K	191	
13	L	218	
14	M	169	
15	N	193	
16	O	136	
17	P	203	
18	Q	197	
19	R	183	
20	T	188	
21	U	171	
22	V	159	
23	W	100	
24	X	136	
25	Y	126	
26	Z	121	
27	a	125	
28	b	135	
29	c	148	
30	d	58	
31	e	96	
32	f	109	
33	g	127	

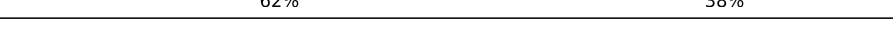
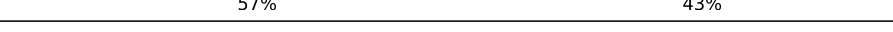
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Mol	Chain	Length	Quality of chain
34	h	106	
35	i	112	
36	j	119	
37	k	99	
38	l	81	
39	m	77	
40	n	50	
41	o	52	
42	p	25	
43	q	103	
44	r	91	
45	s	75	
45	t	75	
46	v	977	
47	x	842	
48	SC	92	
49	SE	117	
50	SA	222	
51	SI	143	
52	SL	63	
53	SM	53	
54	SG	121	
55	SB	206	
56	SF	141	
57	SH	145	

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Mol	Chain	Length	Quality of chain
58	SK	108	
59	SN	73	
60	SD	121	
61	SZ	127	
62	Se	94	
63	SP	206	
64	SQ	232	
65	SR	216	
66	SS	258	
67	ST	228	
68	SU	184	
69	SV	200	
70	SW	184	
71	SX	142	
72	SY	150	
73	Sa	87	
74	Sb	129	
75	Sc	144	
76	Sd	134	
77	Sf	81	
78	Sg	60	
79	SJ	100	
80	J	233	
81	SO	318	

2 Entry composition [i](#)

There are 81 unique types of molecules in this entry. The entry contains 216269 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called Large ribosomal subunit protein eL18A.

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

- Molecule 2 is a RNA chain called 18S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	2	1771	Total	C	N	O	P	0	0
			37739	16872	6683	12413	1771		

- Molecule 3 is a RNA chain called 25S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	A	3193	Total	C	N	O	P	0	0
			68298	30507	12315	22283	3193		

- Molecule 4 is a RNA chain called 5S rRNA.

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

- Molecule 5 is a RNA chain called 5.8S rRNA.

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

- Molecule 6 is a protein called Large ribosomal subunit protein uL2A.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	D	245	Total	C	N	O	S	0	0
			1863	1162	376	324	1		

- Molecule 7 is a protein called Large ribosomal subunit protein uL3.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	E	386	Total	C	N	O	S	0	0
			3075	1950	584	533	8		

- Molecule 8 is a protein called Large ribosomal subunit protein uL4A.

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

- Molecule 9 is a protein called Large ribosomal subunit protein uL18.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	G	288	Total	C	N	O	S	0	0
			2311	1462	402	445	2		

- Molecule 10 is a protein called Large ribosomal subunit protein eL6B.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	H	167	Total	C	N	O	S	0	0
			1307	843	234	230			

- Molecule 11 is a protein called Large ribosomal subunit protein uL30A.

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

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
I	22	ILE	THR	conflict	UNP P05737

- Molecule 12 is a protein called Large ribosomal subunit protein uL6A.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	K	188	Total	C	N	O	S	0	0
			1493	948	271	270	4		

- Molecule 13 is a protein called Large ribosomal subunit protein uL16.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	L	218	Total	C	N	O	S	0	0
			1764	1117	334	306	7		

- Molecule 14 is a protein called Large ribosomal subunit protein uL5B.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	M	169	Total	C	N	O	S	0	0
			1346	843	252	247	4		

- Molecule 15 is a protein called Large ribosomal subunit protein eL13A.

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

- Molecule 16 is a protein called Large ribosomal subunit protein eL14A.

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

- Molecule 17 is a protein called Large ribosomal subunit protein eL15A.

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

- Molecule 18 is a protein called Large ribosomal subunit protein uL13A.

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

- Molecule 19 is a protein called Large ribosomal subunit protein uL22A.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	R	183	Total	C	N	O	S	0	0
			1416	879	284	253			

- Molecule 20 is a protein called Large ribosomal subunit protein eL19A.

Mol	Chain	Residues	Atoms				AltConf	Trace
20	T	184	Total	C	N	O	0	0
			1484	914	318	252		

- Molecule 21 is a protein called Large ribosomal subunit protein eL20A.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	U	171	Total	C	N	O	S	0	0
			1437	925	266	243	3		

- Molecule 22 is a protein called Large ribosomal subunit protein eL21A.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	V	157	Total	C	N	O	S	0	0
			1253	787	243	219	4		

- Molecule 23 is a protein called Large ribosomal subunit protein eL22A.

Mol	Chain	Residues	Atoms				AltConf	Trace
23	W	100	Total	C	N	O	0	0
			796	516	131	149		

- Molecule 24 is a protein called Large ribosomal subunit protein uL14A.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	X	132	Total	C	N	O	S	0	0
			981	617	184	173	7		

- Molecule 25 is a protein called Large ribosomal subunit protein eL24A.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	Y	113	Total	C	N	O	S	0	0
			771	486	152	132	1		

- Molecule 26 is a protein called Large ribosomal subunit protein uL23.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	Z	119	Total	C	N	O	S	0	0
			954	614	167	171	2		

- Molecule 27 is a protein called Large ribosomal subunit protein uL24A.

Mol	Chain	Residues	Atoms				AltConf	Trace
27	a	125	Total	C	N	O	0	0
			984	620	191	173		

- Molecule 28 is a protein called Large ribosomal subunit protein eL27A.

Mol	Chain	Residues	Atoms				AltConf	Trace
28	b	135	Total	C	N	O	0	0
			1080	701	199	180		

- Molecule 29 is a protein called Large ribosomal subunit protein uL15.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	c	148	Total	C	N	O	S	0	0
			1169	747	231	188	3		

- Molecule 30 is a protein called Large ribosomal subunit protein eL29.

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

- Molecule 31 is a protein called Large ribosomal subunit protein eL30.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	e	96	Total	C	N	O	S	0	0
			737	476	123	137	1		

- Molecule 32 is a protein called Large ribosomal subunit protein eL31A.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	f	109	Total	C	N	O	S	0	0
			876	556	167	152	1		

- Molecule 33 is a protein called Large ribosomal subunit protein eL32.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	g	127	Total	C	N	O	S	0	0
			1013	642	205	165	1		

- Molecule 34 is a protein called Large ribosomal subunit protein eL33A.

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

- Molecule 35 is a protein called Large ribosomal subunit protein eL34A.

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

- Molecule 36 is a protein called Large ribosomal subunit protein uL29A.

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

- Molecule 37 is a protein called Large ribosomal subunit protein eL36A.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	k	99	Total	C	N	O	S	0	0
			766	478	154	132	2		

- Molecule 38 is a protein called Large ribosomal subunit protein eL37A.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	l	81	Total	C	N	O	S	0	0
			645	393	141	106	5		

- Molecule 39 is a protein called Large ribosomal subunit protein eL38.

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

- Molecule 40 is a protein called Large ribosomal subunit protein eL39.

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

- Molecule 41 is a protein called Large ribosomal subunit protein eL40A.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	o	52	Total	C	N	O	S	0	0
			410	254	86	65	5		

- Molecule 42 is a protein called Large ribosomal subunit protein eL41A.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	p	25	Total	C	N	O	S	0	0
			229	139	62	27	1		

- Molecule 43 is a protein called Large ribosomal subunit protein eL42A.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	q	103	Total	C	N	O	S	0	0
			824	517	167	135	5		

- Molecule 44 is a protein called Large ribosomal subunit protein eL43A.

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

- Molecule 45 is a RNA chain called tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	s	75	Total	C	N	O	P	0	0
			1605	716	297	517	75		
45	t	75	Total	C	N	O	P	0	0
			1606	716	297	518	75		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
s	10	A	G	conflict	GB 176433
t	10	A	G	conflict	GB 176433

- Molecule 46 is a protein called Elongation factor 3A.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	v	977	Total	C	N	O	S	0	0
			7476	4726	1295	1418	37		

- Molecule 47 is a protein called Elongation factor 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	x	837	Total	C	N	O	S	0	0
			6520	4140	1118	1233	29		

- Molecule 48 is a protein called Small ribosomal subunit protein eS10A.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	SC	92	Total	C	N	O	S	0	0
			752	487	122	141	2		

- Molecule 49 is a protein called Small ribosomal subunit protein uS19.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	SE	114	Total	C	N	O	S	0	0
			894	570	166	151	7		

- Molecule 50 is a protein called Small ribosomal subunit protein uS3.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	SA	217	Total	C	N	O	S	0	0
			1687	1071	306	304	6		

- Molecule 51 is a protein called Small ribosomal subunit protein eS19A.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	SI	143	Total	C	N	O	S	0	0
			1112	694	208	208	2		

- Molecule 52 is a protein called Small ribosomal subunit protein eS28A.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	SL	63	Total	C	N	O	S	0	0
			491	303	96	91	1		

- Molecule 53 is a protein called Small ribosomal subunit protein uS14A.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	SM	47	Total	C	N	O	S	0	0
			387	237	84	62	4		

- Molecule 54 is a protein called Small ribosomal subunit protein eS17A.

Mol	Chain	Residues	Atoms					AltConf	Trace
54	SG	121	Total	C	N	O	S	0	0
			961	599	182	178	2		

- Molecule 55 is a protein called Small ribosomal subunit protein uS7.

Mol	Chain	Residues	Atoms					AltConf	Trace
55	SB	206	Total	C	N	O	S	0	0
			1605	1005	299	298	3		

- Molecule 56 is a protein called Small ribosomal subunit protein uS9A.

Mol	Chain	Residues	Atoms					AltConf	Trace
56	SF	141	Total	C	N	O	S	0	0
			1105	708	203	194			

- Molecule 57 is a protein called Small ribosomal subunit protein uS13A.

Mol	Chain	Residues	Atoms					AltConf	Trace
57	SH	145	Total	C	N	O	S	0	0
			1188	741	237	208	2		

- Molecule 58 is a protein called Small ribosomal subunit protein eS25A.

Mol	Chain	Residues	Atoms					AltConf	Trace
58	SK	77	Total	C	N	O	S	0	0
			608	387	115	106			

- Molecule 59 is a protein called Small ribosomal subunit protein eS31.

Mol	Chain	Residues	Atoms					AltConf	Trace
59	SN	73	Total	C	N	O	S	0	0
			560	355	106	95	4		

- Molecule 60 is a protein called Small ribosomal subunit protein eS12.

Mol	Chain	Residues	Atoms					AltConf	Trace
60	SD	121	Total	C	N	O	S	0	0
			875	551	153	169	2		

- Molecule 61 is a protein called Small ribosomal subunit protein uS11B.

Mol	Chain	Residues	Atoms					AltConf	Trace
61	SZ	127	Total	C	N	O	S	0	0
			891	545	182	163	1		

- Molecule 62 is a protein called Small ribosomal subunit protein eS26A.

Mol	Chain	Residues	Atoms					AltConf	Trace
62	Se	94	Total	C	N	O	S	0	0
			750	462	157	126	5		

- Molecule 63 is a protein called Small ribosomal subunit protein uS2A.

Mol	Chain	Residues	Atoms					AltConf	Trace
63	SP	206	Total	C	N	O	S	0	0
			1603	1030	284	287	2		

- Molecule 64 is a protein called Small ribosomal subunit protein eS1A.

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

- Molecule 65 is a protein called Small ribosomal subunit protein uS5.

Mol	Chain	Residues	Atoms					AltConf	Trace
65	SR	216	Total	C	N	O	S	0	0
			1626	1042	287	295	2		

- Molecule 66 is a protein called Small ribosomal subunit protein eS4A.

Mol	Chain	Residues	Atoms					AltConf	Trace
66	SS	258	Total	C	N	O	S	0	0
			2056	1308	387	358	3		

- Molecule 67 is a protein called Small ribosomal subunit protein eS6A.

Mol	Chain	Residues	Atoms					AltConf	Trace
67	ST	224	Total	C	N	O	S	0	0
			1789	1123	344	319	3		

- Molecule 68 is a protein called Small ribosomal subunit protein eS7A.

Mol	Chain	Residues	Atoms				AltConf	Trace
68	SU	184	Total	C	N	O		
			1473	946	263	264	0	0

- Molecule 69 is a protein called Small ribosomal subunit protein eS8A.

Mol	Chain	Residues	Atoms					AltConf	Trace
69	SV	187	Total	C	N	O	S		
			1476	916	295	263	2	0	0

- Molecule 70 is a protein called Small ribosomal subunit protein uS4A.

Mol	Chain	Residues	Atoms					AltConf	Trace
70	SW	184	Total	C	N	O	S		
			1479	935	285	258	1	0	0

- Molecule 71 is a protein called Small ribosomal subunit protein uS17A.

Mol	Chain	Residues	Atoms					AltConf	Trace
71	SX	140	Total	C	N	O	S		
			1132	727	215	187	3	0	0

- Molecule 72 is a protein called Small ribosomal subunit protein uS15.

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

- Molecule 73 is a protein called Small ribosomal subunit protein eS21A.

Mol	Chain	Residues	Atoms					AltConf	Trace
73	Sa	87	Total	C	N	O	S		
			673	415	125	131	2	0	0

- Molecule 74 is a protein called Small ribosomal subunit protein uS8A.

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

- Molecule 75 is a protein called Small ribosomal subunit protein uS12A.

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

- Molecule 76 is a protein called Small ribosomal subunit protein eS24A.

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

- Molecule 77 is a protein called Small ribosomal subunit protein eS27A.

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

- Molecule 78 is a protein called Small ribosomal subunit protein eS30A.

Mol	Chain	Residues	Atoms					AltConf	Trace
78	Sg	55	Total	C	N	O	S	0	0
			437	276	89	71	1		

- Molecule 79 is a protein called Small ribosomal subunit protein uS10.

Mol	Chain	Residues	Atoms					AltConf	Trace
79	SJ	100	Total	C	N	O	S	0	0
			797	506	144	146	1		

- Molecule 80 is a protein called Large ribosomal subunit protein eL8A.

Mol	Chain	Residues	Atoms					AltConf	Trace
80	J	231	Total	C	N	O	S	0	0
			1793	1145	321	324	3		

- Molecule 81 is a protein called Small ribosomal subunit protein RACK1.

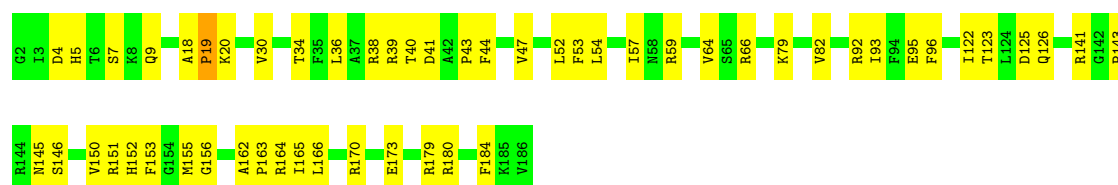
Mol	Chain	Residues	Atoms					AltConf	Trace
81	SO	318	Total	C	N	O	S	0	0
			2436	1541	418	469	8		

3 Residue-property plots

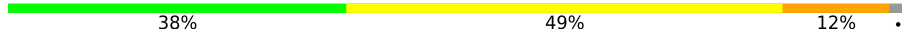
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded 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. 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.

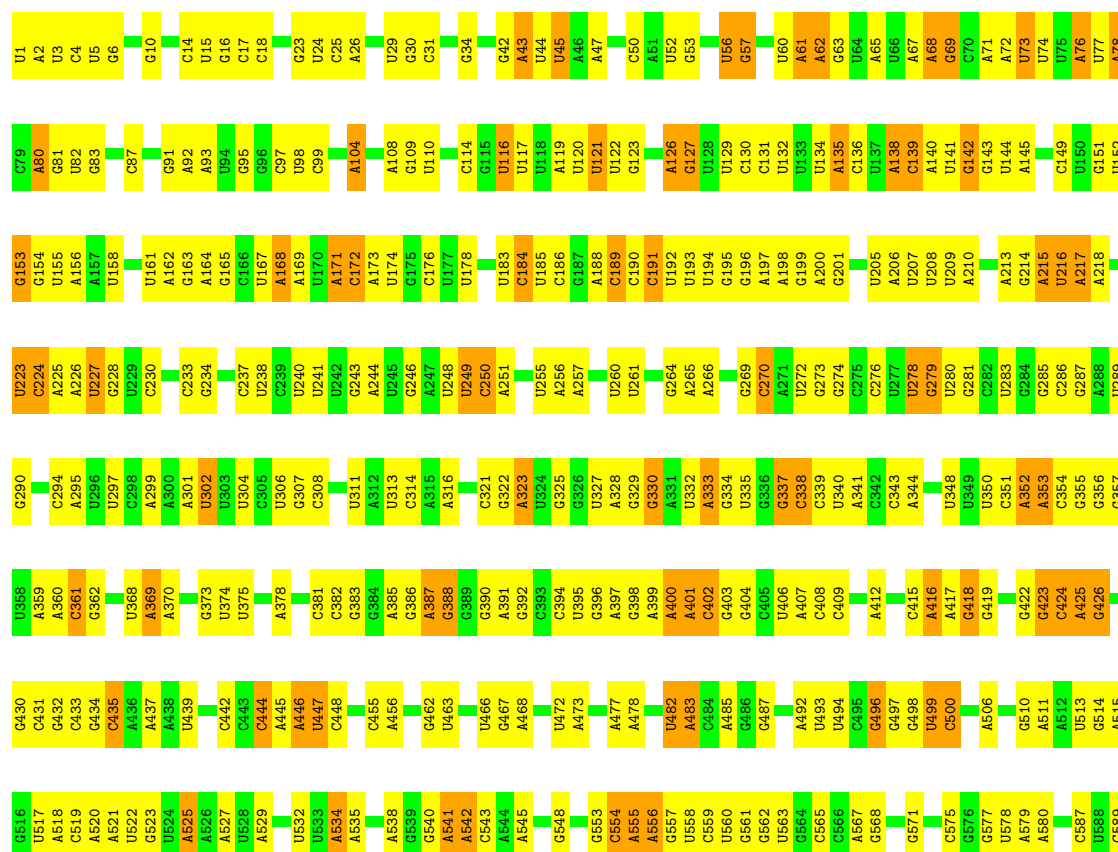
- Molecule 1: Large ribosomal subunit protein eL18A

Chain S: 

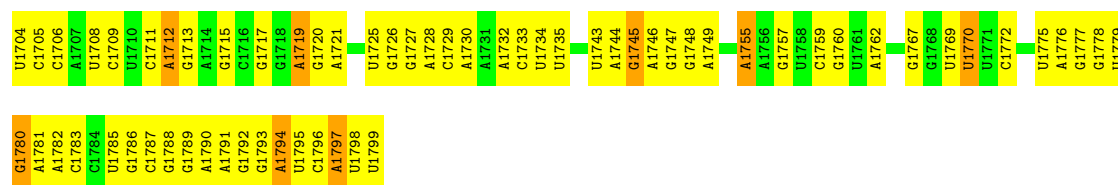


- Molecule 2: 18S rRNA

Chain 2: 

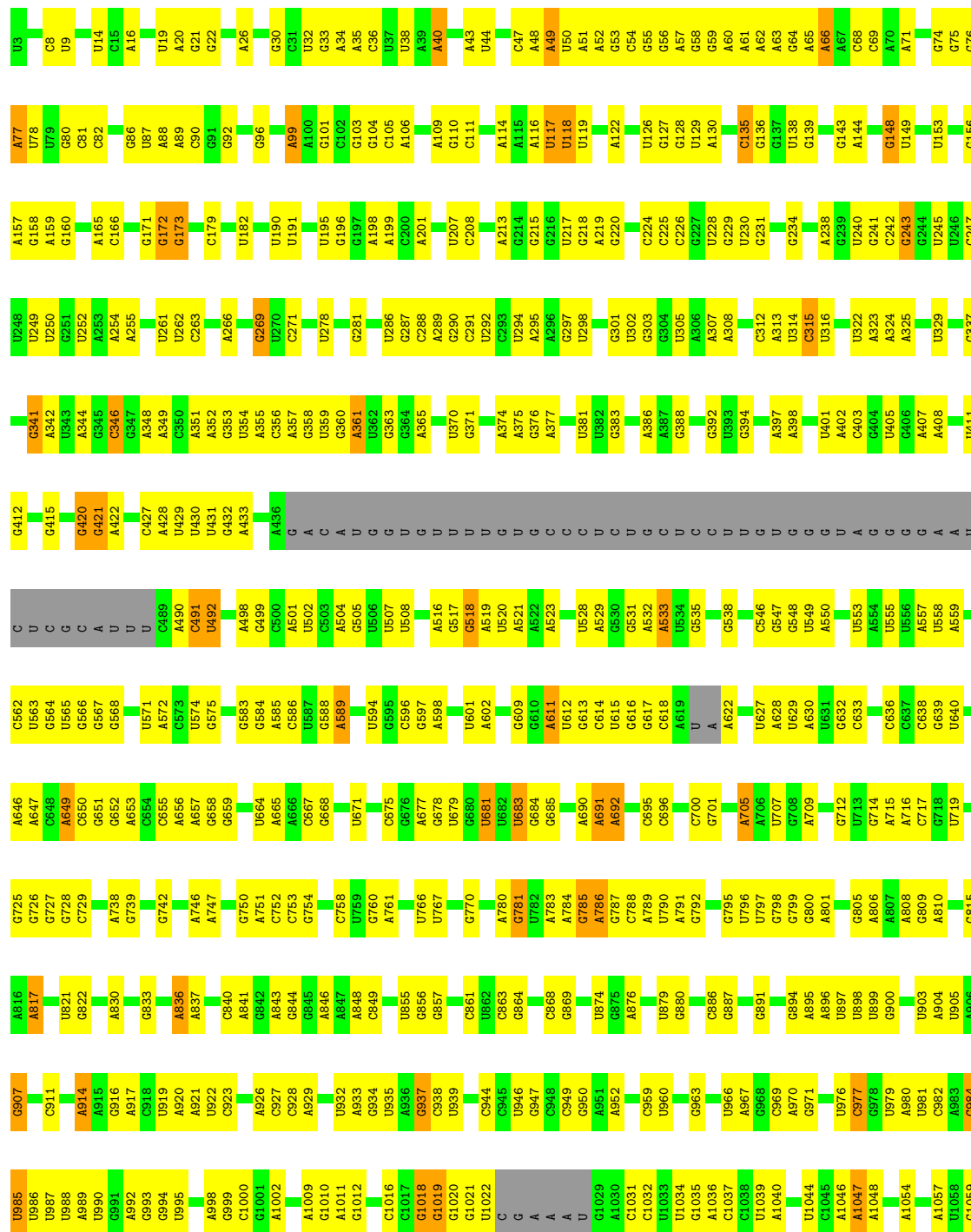


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G1629	G1486	U1414	A1348	U1262	U1186	U1104	G953	G878	A799	G	C	A591
U1630	G1487	U1415	G1349	G1263	U1187		G954	G879	G802	C	G	A592
C1632	G1488	U1416	U1352	G1265	G1188	G1108	A955	C880	A803	C	A	U593
A1633	U1489	A1417	U1353		A1189	G1109	C956	U882	A804	U	U	A594
C1634	C1490		G1190	G1270	G1190	A1113	U958	C883		C726	U	G595
A1635	A1425		U1191		U1191	A1113	U959	A884	A809	U727	U	U600
C1636	C1426		C1192	G1273	C1192	G1114	U960	A885	G810	U728	U	A601
C1637	A1427		U1193	C1274	A1193	U1115	U961	G886	G811	G729	U	U602
	G1428		U1194	A1275	A1194	A1116	C962	U887	A812	U730	U	U603
C1641	G1429		G1195	U1276	C1195	U1117	A963		U813	C731	U	U604
G1642	U1430		A1196		A1196		U964	A891	A814	G732	C	A605
U1643	C1431		G1365	U1285		C1123	U965	A892		A733	U	A606
G1644	U1432		U1199	U1286	G1199	A1123	U966	A893	G815		G	A607
G1645	G1433		G1366	G1288	G1200	A1124	A967	U894	A816	C736	G	U608
C1646	U1434		G1367		G1201	A1126		U895	A817	A737	U	U609
U1647	G1435		G1368	G1291	A1202	G1127	U968	U896	G818	G738	A	G610
A1648	A1436		U1369				C969	U897	G819		C	
U1649			U1370	A1296	A1208	A1131	A970	C898	U820	C741	U	
U1650	U1443		A1371	G1297		A1132	A971	A898	U821	U742	G	G613
A1651	A1444		U1372		A1211	A1133	G972	G899	U822	U743	G	C614
C1652	G1445		C1373	A1300	G1212	A1134	U973	A900	G823	U744	G	A615
C1653	A1446		C1374	U1301	G1213		C975	G901		U745	G	G616
G1654			A1375	U1302		U1135	A977	G902	U833	U748	U	U617
A1655	U1450		G1376	U1303	C1216	U1136	A978		U834	U749	U	U618
U1656	C1451		U1377	G1304	A1217	A1137	A979	A907	U835	U750	C	A619
C1657	U1452		U1378	U1305	G1218	U1138	U982	U912	U836	U751	C	A620
U1658	G1453		C1379	C1306	A1219	A1139	U983	G913	G837	A752	A	A621
A1659	G1454		U1380	U1307	C1220	G1141	A983		U840	A753	G	A622
A1593	G1455		U1381		A1221	A1142	U984	U918	U841	A754	U	G624
U1594	C1456		A1382	U1310	C1222	A1143	U985	A919	C842	A755	C	C625
C1662	C1457		G1383	U1311	A1223	U1144	C990		U843	A756	U	U626
A1596	G1458		U1384		A1224		A992	G922	A844		U	C627
A1597	C1459		G1385	U1314	U1225	A1147	U993	A923	U845	A762	U	G628
	A1460		U1386	G1315	A1226	C1148	G997	A924	G846	G763	G	U629
G1601	C1461		G1387	G1316	A1227	G1149	U998	G925		U764	G	A630
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U1603	C1463		C1389	G1318	G1229		U999	C927	C852	U766	U	U632
U1604	G1464		U1390	A1319		C1158	C1000	U928	G853	U767	G	U633
C1605	C1465		A1391	U1320	A1234	C1159	A1001	A929		C768	U	G634
G1606	G1466		U1392	A1321	C1235	A1160	G1002	A930	A856	A769	G	
U1607	C1467		C1393	A1322	A1236		A1003	C931	U857		G	C637
G1608	U1468		G1394	C1323		A1163	U1004	U932	G858	C773	U	U638
U1609	A1469		G1395	G1324	G1241	G1164		A933	A859	A774	U	U639
U1610	C1470		U1396	A1325	A1242	G1165	C1010	A934	U860	G775	C	U640
A1611	A1471		U1397		G1243	A1166	G1011	U935	U861	G776	U	G641
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U1613	U1473		C1399	U1334	G1245	U1168	U1018	C937	A863	G778	G	G643
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C1615	A1475		A1401	A1336	U1247	G1170		A941	A865	U781	U	C645
U1616	C1476		G1402	U1337	C1248	A1171	C1022	G942	G866	U782	U	U646
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A1547	C1478		G1404	C1339	C1252	C1173	A1024	A944			G	
	A1479		G1405	U1340		G1174	U945	U946	G871	C786	U	U650
U1552	U1480		A1406	A1341	C1256	U1175	A1025	U947	A872	C787	C	G651
			U1407		U1257	G1176	A1026	G948	U873	A788	U	G652
A1555	C1481		U1408	A1344	U1258	G1177	A1027		C874	A789	U	C653
C1625	G1482		G1409	A1345	U1259	C1178	U1028		G875		G	G654
U1626	A1483		A1410	A1346	U1260	G1179	U1029	A951	G876	G797	G	G655
U1627	G1484											



• Molecule 3: 25S rRNA

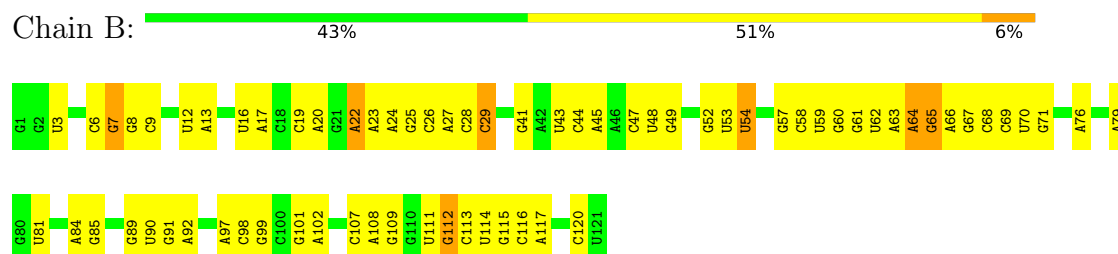
Chain A: 44% 44% 6% 6%



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U2190	U2103	U	C	C1802	C1725	U1554		G1370	C1292	A1212	G1142	A1062
U2191	A2104	U	C	C1803	C1726	U1555		G1371	U1293	G1222	A1143	G1063
C2192	A2107	U	U	A1804	G1727	C1556	C1459	G1372	A1294	G1223	U1144	A1064
U2183		A	C	C1805	A1729	A1557	A1460	A1372	C1298	C1224	G1145	A1065
C2194	G2110	G	C	A1806	U1630	G1560	A1461	A1373	U1299	C1225	C1146	
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C2196	U2112	C	U	G1808	G1734	C1562	U1463		A1301	C1227	U1148	
C2197		G	U	A1809		C1563	A1467	G1380	A1302	C1228	U1151	U1077
A2198	C2118	C	U	G1812	U1737	U1564		A1381	G1306	G1229	G1152	U1078
	G2122	C	G	C1738	U1738	C1565	U1472	G1382	G1307	G1230	A1153	U1081
		C	G	U1740	U1740	A1566	G1473	G1383	A1308	G1231		
		U	A	A1815	A1741	U1567	A1474	U1384	A1309	C1232	G1157	A1084
U2129	U2129	U	C	A1816	U1742	U1568	G1483	G1385	U1308		A1158	A1085
C2204	G2130	G	U	U1820	G1743	U1569	G1487	G1386	G1310	U1235	A1159	C1086
U2205	A2131	G	G	U1821	G1744	U1570	G1488	U1387	G1311	U1236	G1160	G1087
	C2132	U	C	C1745	C1745	U1571	G1489	G1389	C1312	C1237	U1161	U1088
	U2133	A	U			U1572	A1488			C1238	U1162	G1089
G2216		G	U	U1824		G1573	A1489	G1392	A1317	C1239	A1163	A1093
U2217	U2137	U	G	G1748		U1574		G1395	A1318	G1242	G1164	
G2218		G	G	A1749		G1576	G1492	G1396	G1321	G1243	U1167	U1096
A2219	U2141	U	G	A1750		G1577	G1493	C1396	U1322	G1244	U1168	G1097
A2220	A2142	C	U	G1751		G1578	U1494	C1397	G1323	A1245	A1169	A1098
G2221		U	G			C1579	U1495	U1398	U1324	G1246		
A2222		C	G	C1756		U1580	C1496	G1400		U1247	C1175	U1100
A2223	A2147	U	C	A1757		A1581	C1497	G1401	G1328	G1248	C1176	G1101
U2225		U	C	G1758		C1582	A1498		U1329	U1249	G1177	A1102
		U	U	U1759		A1583	C1499	C1403	A1330	G1250	G1178	A1103
A2228	U2154	A	U	A1760		G1586	A1503	G1404	U1331	A1251	A1179	G1104
A2229	U2155	G	C	C1761			A1504	A1407	A1332	A1252	A1180	A1105
	C2156	G	C	U1837		A1589	G1507	C1411	C1333	U1253	G1181	G1106
	A2157	C	U	G1762		U1590	U1507	G1412	U1334	C1254	A1182	C1107
	A2158	C	C	U1763		G1591	C1508	G1413	C1335	C1255	U1108	U1109
U2240	U2159	G	U	U1765		A1593	A1509	G1414	U1336	G1256		
U2241	G2160	U	G	G1766		U1594	G1517	U1415	A1337	C1257	G1186	U1110
A2242	C2161	C	U	C1767		U1595	U1518	C1416	C1338	U1258	C1187	U1111
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A2244	C2163	C	A	G1769		C1597	G1525	A1418	U1341	G1261	G1189	G1113
C2245	A2164	U	G	C1773		G1598	U1526			G1262	A1190	U1114
	C2165	U	G	C1774			C1527	G1422	U1347	A1263	C1192	G1117
	A2166	G	C	G1775		U1601	G1528		U1348	G1264	A1193	G1118
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G2250	C2169	A	U	U1778		G1604	U1534	U1427	U1351	U1267	C1196	
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G2253	C2171	A	G	G1780		U1606	A1535		U1353	U1269	C1198	U1128
U2254	A2172	A	A	C1785		C1609	G1538	G1431	G1354	A1270	C1199	A1129
A2255	U2173	C	U	U1786		G1610	U1541	C1432	A1355	A1271	A1200	A1130
	C2174	U	U	G1787		G1611	G1542	A1433	U1356	C1272	C1201	G1131
		A2092	U	C1791		A1612	G1543	U1435	G1357	A1273	A1202	C1132
	A2178	A2093	U	G1792				U1436		C1274	A1203	A1133
U2258	C2179	C2094	C	C1793				C1437	U1361	C1275	A1204	
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U2260	C2181	A2096	U	C1795				U1439	A1363	C1280	G1206	U1137
G2261	A2182	U2097	G	U1796				U1440	G1364		C1364	G1139
A2262	C2183	C2098	C	U1797					G1365			
C2263	U2184	A2099	C	U1798								
U2264	C2185	A2100	U	G1799								
C2265			C									

U3368	G3286	G3191	C3115	A3048	A2969	U2883	G2796	C2711	A2547	A2480	G2414	U2344	U2266
G3369	U3287	U3192	G3116	A3049	C2970	C2894	A2799	U2712	C2548	G2481	C2415	U2344	C2267
A3370	G3288	C3193	U3121	A3050	A2971	A2887	G2800	U2713	G2549	G2482	U2416	A2345	U2268
G3371	G3289	C3194	U3122	U3051	A2972	U2888	A2801	U2716	U2550	G2483	U2417	U2349	U2269
A3372	G3290	U3198	A3122	G3052	G2973	C2889	A2804	U2717	U2551	A2484	A2419	A2270	A2270
U3373	A3292	G3053	A3123	G3053	U2974	U2890	G2805	U2718	C2552	A2485	A2419	A2350	G2272
U3374	A3293	U3054	C3126	U3054	U2975	A2890	A2804	U2719	U2553	A2486	C2420	U2351	G2272
A3375	G3202	U3055	A3127	U3055	A2976	U2891	G2805	U2719	G2554	U2487	U2421	A2352	U2274
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C3377	U3207	U3057	A3131	U3057	U2980	C2895	G2809	U2725	U2556	A2489	U2423	G2354	U2274
C3378	U3207	U3058	U3131	U3058	U2981	G2896	C2810	U2726	C2557	C2490	A2424	G2355	G2276
C3379	U3207	U3059	A3132	G3059	U2982	A2897	A2811	A2727	A2557	A2491	A2425	A2356	C2277
U3380	U3211	C3212	C3133	C3060	C2883	G2898	C2812	G2728	C2558	C2492	U2426	A2357	C2278
U3381	A3213	A3213	A3134	G3061	C2883	G2899	A2813	G2729	C2559	U2493	U2427	A2358	U2278
U3382	C3217	C3217	C3137	U3064	G2990	C2899	A2814	G2730	A2561	A2494	U2428	A2359	U2278
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U3391	A3226	A3226	C3146	A3073	A3003	U2917	G2826	C2742	G2576	U2505	U2437	G2370	U2293
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U3407	A3242	A3242	C3162	A3089	A3019	U2933	U2859	U2767	U2592	U2521	U2456	G2389	U2300
U3408	A3243	A3243	C3163	A3090	U3020	U2934	U2860	U2768	U2593	U2522	U2457	G2390	U2300
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U3411	A3246	A3246	C3166	A3093	A3023	U2937	U2863	U2771	U2596	U2525	U2460	G2393	U2300
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U3413	A3248	A3248	C3168	A3095	A3025	U2939	U2865	U2773	U2598	U2527	U2462	G2395	U2300
U3414	A3249	A3249	C3169	A3096	A3026	U2940	U2866	U2774	U2599	U2528	U2463	G2396	U2300
U3415	A3250	A3250	C3170	A3097	A3027	U2941	U2867	U2775	U2600	U2529	U2464	G2397	U2300
U3416	A3251	A3251	C3171	A3098	A3028	U2942	U2868	U2776	U2601	U2530	U2465	G2398	U2300
U3417	A3252	A3252	C3172	A3099	A3029	U2943	U2869	U2777	U2602	U2531	U2466	G2399	U2300
U3418	A3253	A3253	C3173	A3100	A3030	U2944	U2870	U2778	U2603	U2532	U2467	G2400	U2300
U3419	A3254	A3254	C3174	A3101	A3031	U2945	U2871	U2779	U2604	U2533	U2468	G2401	U2300
U3420	A3255	A3255	C3175	A3102	A3032	U2946	U2872	U2780	U2605	U2534	U2469	G2402	U2300
U3421	A3256	A3256	C3176	A3103	A3033	U2947	U2873	U2781	U2606	U2535	U2470	G2403	U2300
U3422	A3257	A3257	C3177	A3104	A3034	U2948	U2874	U2782	U2607	U2536	U2471	G2404	U2300
U3423	A3258	A3258	C3178	A3105	A3035	U2949	U2875	U2783	U2608	U2537	U2472	G2405	U2300
U3424	A3259	A3259	C3179	A3106	A3036	U2950	U2876	U2784	U2609	U2538	U2473	G2406	U2300
U3425	A3260	A3260	C3180	A3107	A3037	U2951	U2877	U2785	U2610	U2539	U2474	G2407	U2300
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U3442	A3277	A3277	C3197	A3124	A3053	U2968	U2894	U2802	U2627	U2556	U2491	G2424	U2300
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U3450	A3285	A3285	C3205	A3132	A3061	U2976	U2902	U2810	U2635	U2564	U2499	G2432	U2300
U3451	A3286	A3286	C3206	A3133	A3062	U2977	U2903	U2811	U2636	U2565	U2500	G2433	U2300
U3452	A3287	A3287	C3207	A3134	A3063	U2978	U2904	U2812	U2637	U2566	U2501	G2434	U2300
U3453	A3288	A3288	C3208	A3135	A3064	U2979	U2905	U2813	U2638	U2567	U2502	G2435	U2300
U3454	A3289	A3289	C3209	A3136	A3065	U2980	U2906	U2814	U2639	U2568	U2503	G2436	U2300
U3455	A3290	A3290	C3210	A3137	A3066	U2981	U2907	U2815	U2640	U2569	U2504	G2437	U2300
U3456	A3291	A3291	C3211	A3138	A3067	U2982	U2908	U2816	U2641	U2570	U2505	G2438	U2300
U3457	A3292	A3292	C3212	A3139	A3068	U2983	U						

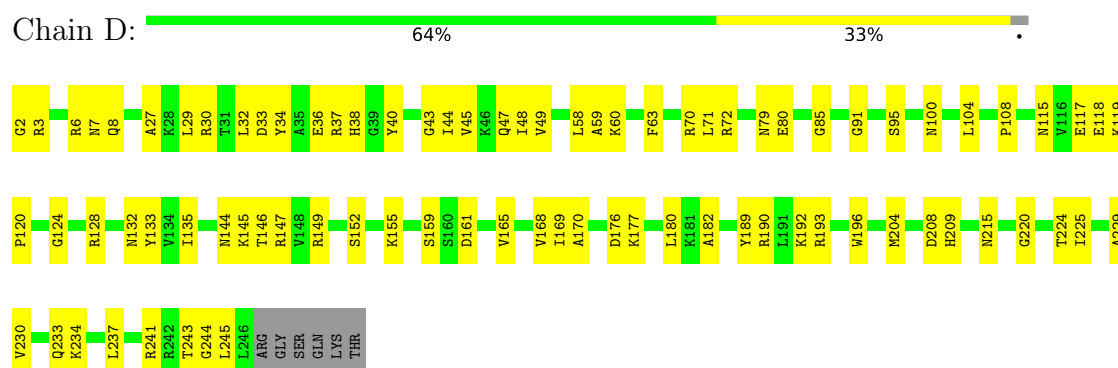
- Molecule 4: 5S rRNA



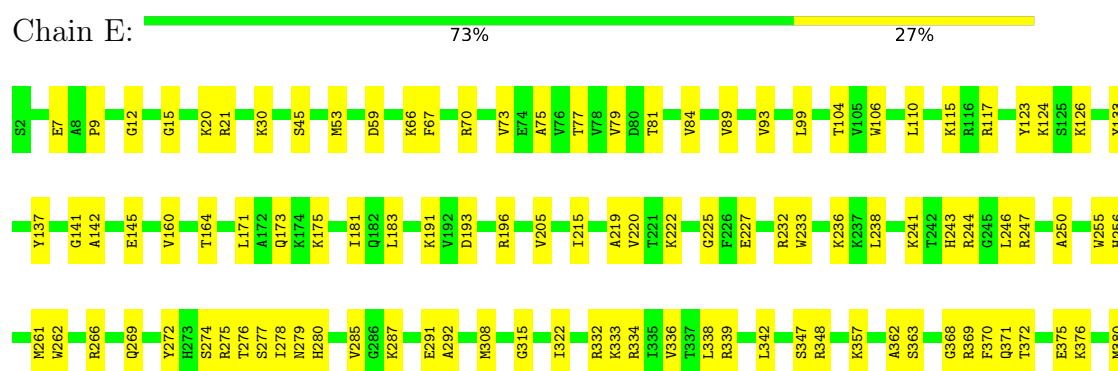
- Molecule 5: 5.8S rRNA



- Molecule 6: Large ribosomal subunit protein uL2A



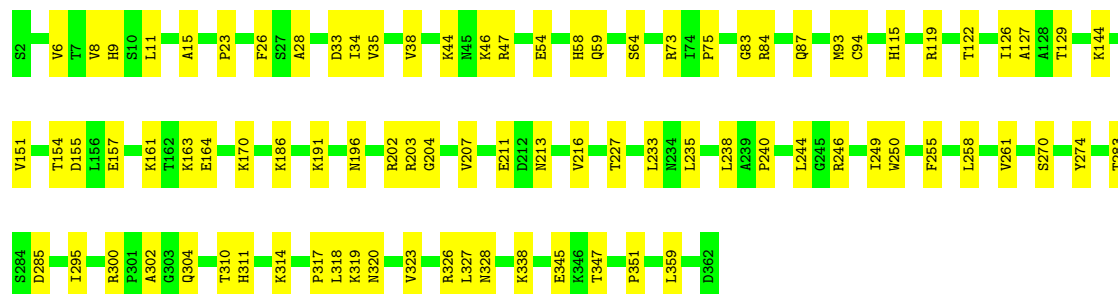
- Molecule 7: Large ribosomal subunit protein uL3





- Molecule 8: Large ribosomal subunit protein uL4A

Chain F: 76% 24%



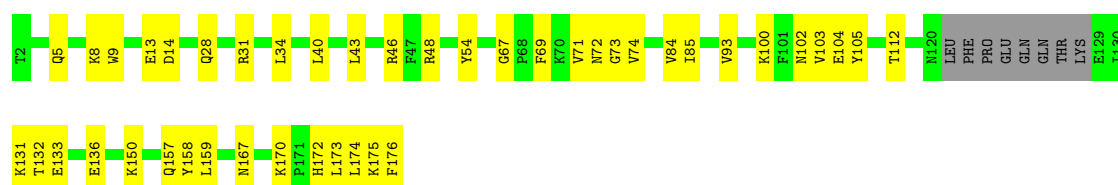
- Molecule 9: Large ribosomal subunit protein uL18

Chain G: 66% 32% .



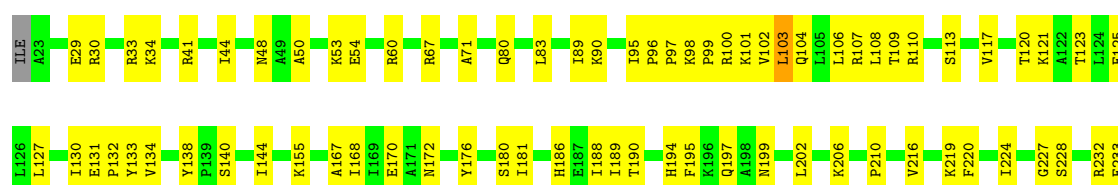
- Molecule 10: Large ribosomal subunit protein eL6B

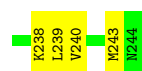
Chain H: 71% 25% 5%



- Molecule 11: Large ribosomal subunit protein uL30A

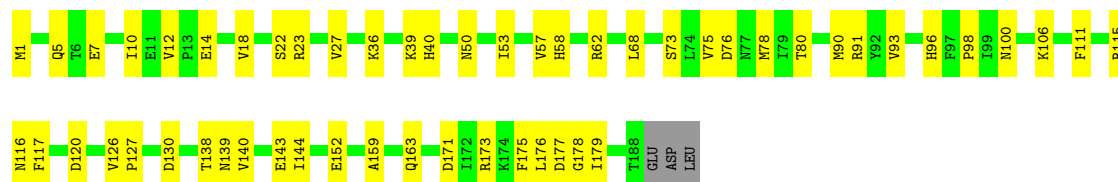
Chain I: 65% 35%





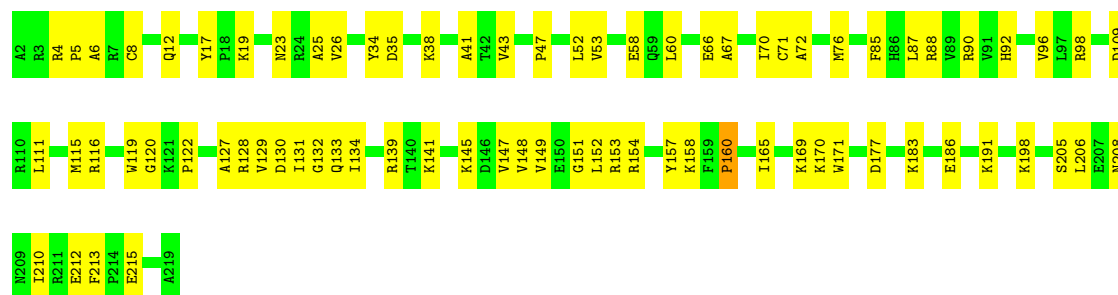
- Molecule 12: Large ribosomal subunit protein uL6A

Chain K: 70% 28%



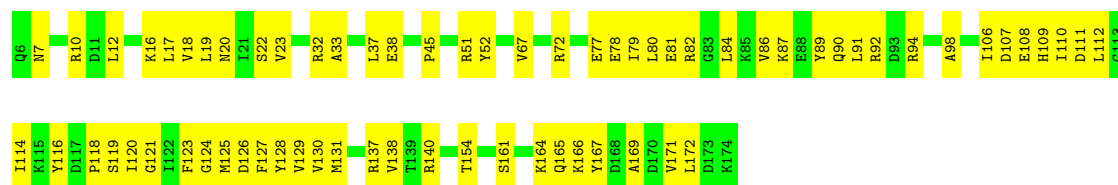
- Molecule 13: Large ribosomal subunit protein uL16

Chain L: 65% 35%



- Molecule 14: Large ribosomal subunit protein uL5B

Chain M: 60% 40%



- Molecule 15: Large ribosomal subunit protein eL13A

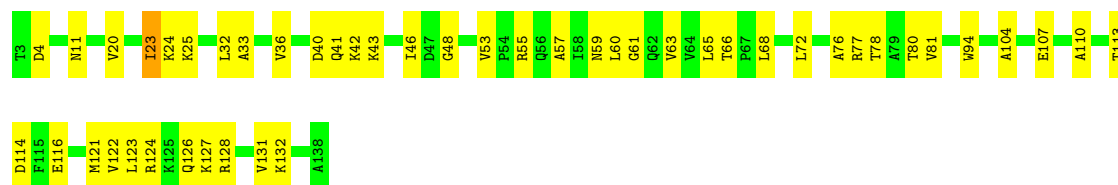
Chain N: 72% 27%



- Molecule 16: Large ribosomal subunit protein eL14A

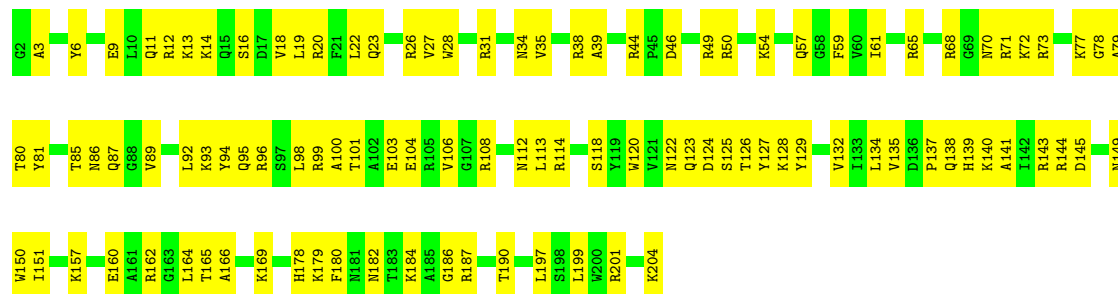
Chain O: 65% 34%





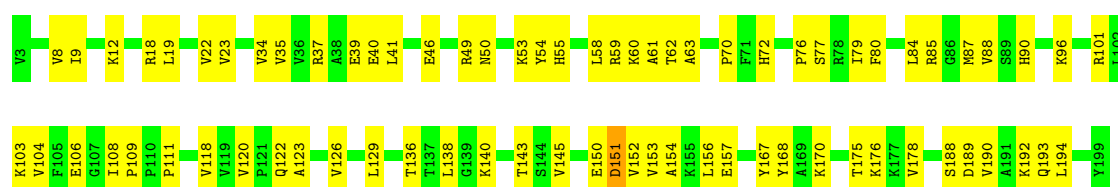
• Molecule 17: Large ribosomal subunit protein eL15A

Chain P: 49% 51%



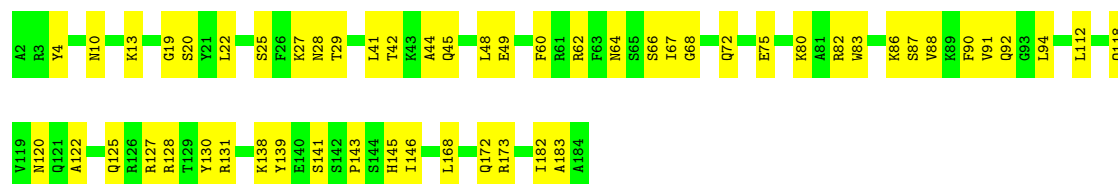
• Molecule 18: Large ribosomal subunit protein uL13A

Chain Q: 62% 37%



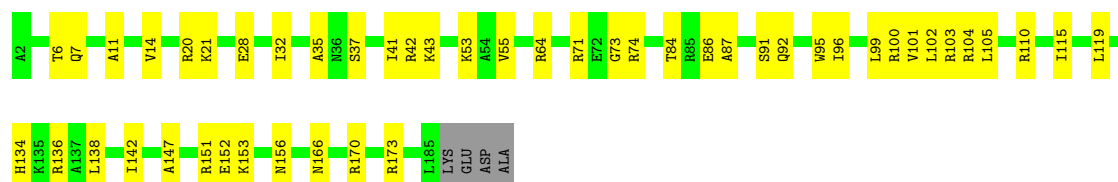
• Molecule 19: Large ribosomal subunit protein uL22A

Chain R: 70% 30%



• Molecule 20: Large ribosomal subunit protein eL19A

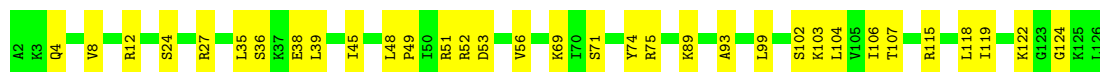
Chain T: 72% 26%



- Chain Z: 71% 27% .



- Molecule 27: Large ribosomal subunit protein uL24A



- Molecule 28: Large ribosomal subunit protein eL27A



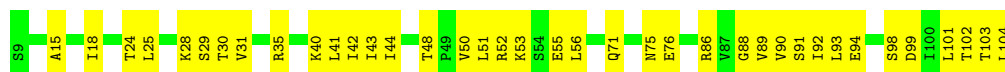
- Molecule 29: Large ribosomal subunit protein uL15



- Molecule 30: Large ribosomal subunit protein eL29

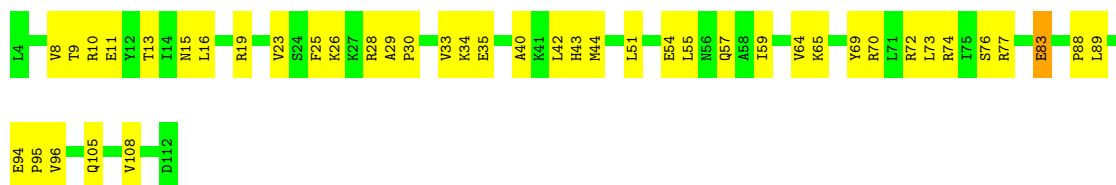


- Molecule 31: Large ribosomal subunit protein eL30



- Molecule 32: Large ribosomal subunit protein eL31A





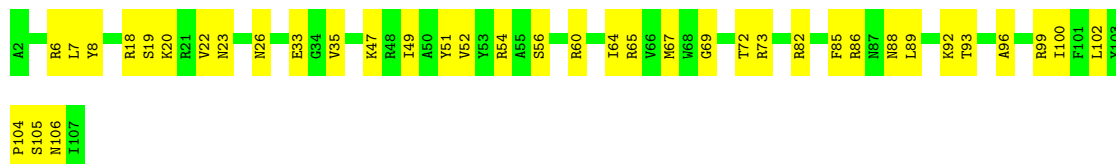
- Molecule 33: Large ribosomal subunit protein eL32

Chain g: 73% 26%



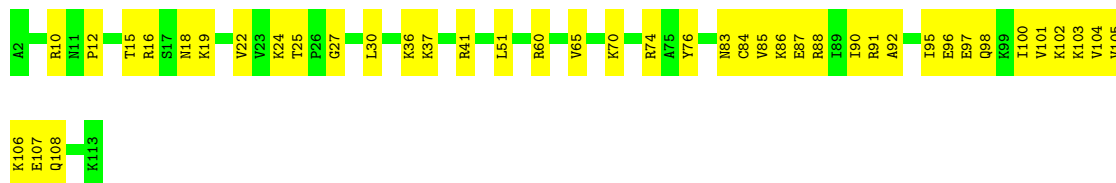
- Molecule 34: Large ribosomal subunit protein eL33A

Chain h: 64% 36%



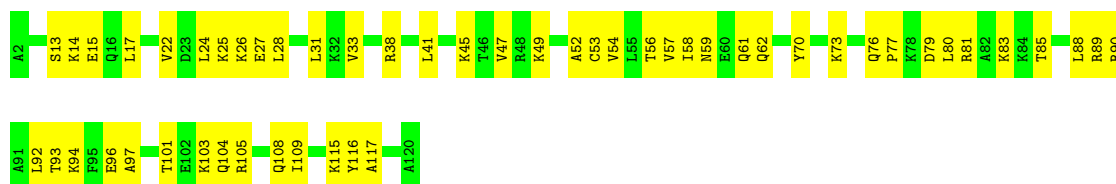
- Molecule 35: Large ribosomal subunit protein eL34A

Chain i: 62% 38%



- Molecule 36: Large ribosomal subunit protein uL29A

Chain j: 56% 44%



- Molecule 37: Large ribosomal subunit protein eL36A

Chain k: 70% 30%



- Molecule 38: Large ribosomal subunit protein eL37A

Chain l:  62% 35%



- Molecule 39: Large ribosomal subunit protein eL38

Chain m:  73% 27%



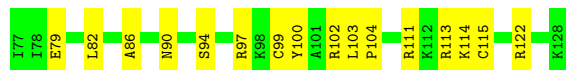
- Molecule 40: Large ribosomal subunit protein eL39

Chain n:  60% 40%



- Molecule 41: Large ribosomal subunit protein eL40A

Chain o:  69% 31%



- Molecule 42: Large ribosomal subunit protein eL41A

Chain p:  52% 48%



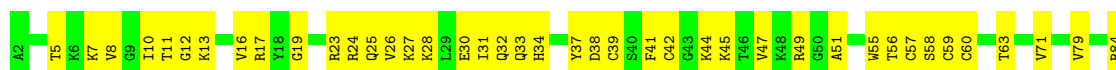
- Molecule 43: Large ribosomal subunit protein eL42A

Chain q:  80% 20%



- Molecule 44: Large ribosomal subunit protein eL43A

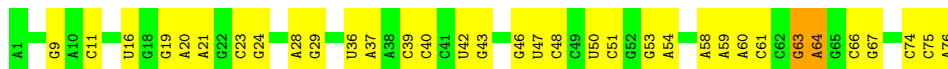
Chain r:  51% 49%





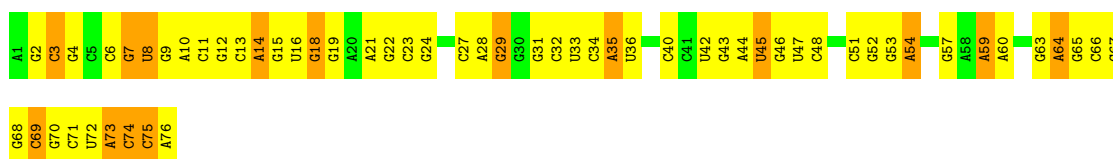
• Molecule 45: tRNA

Chain s: 55% 43%



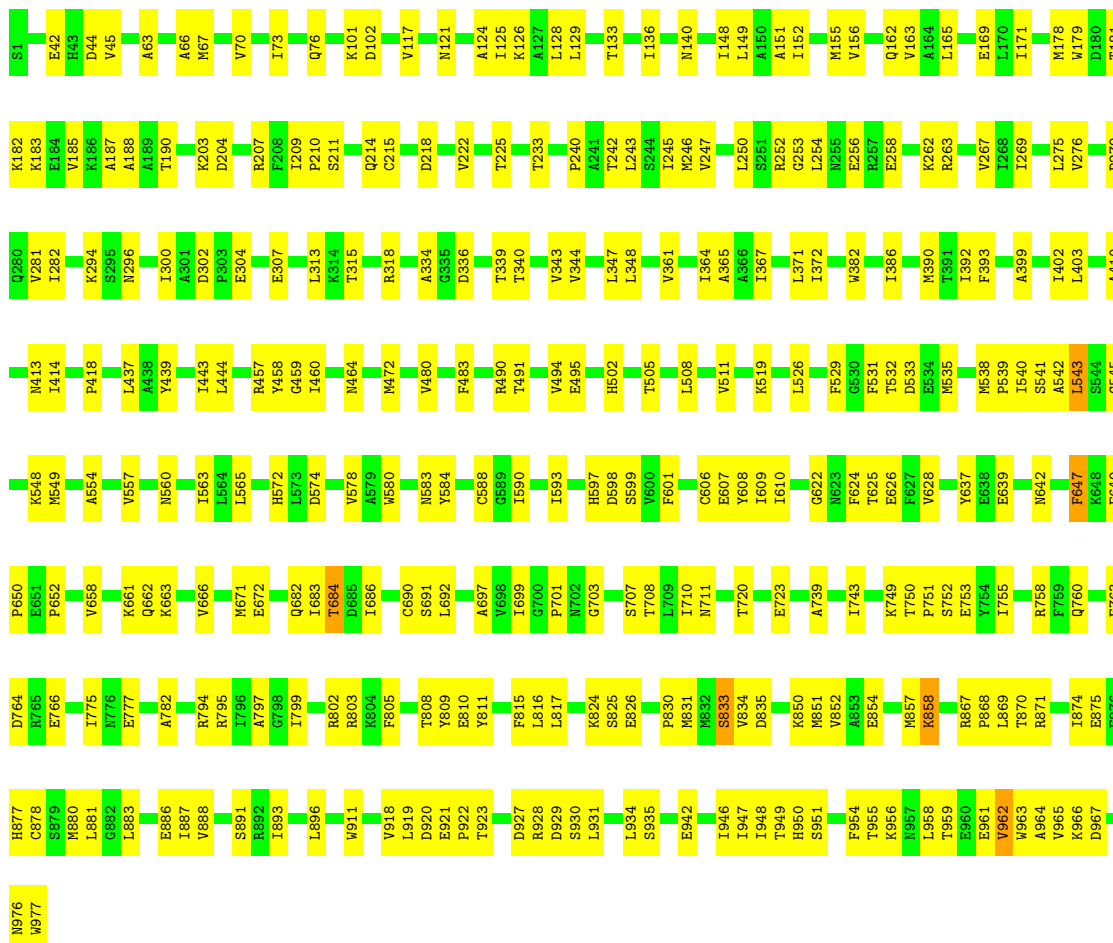
• Molecule 45: tRNA

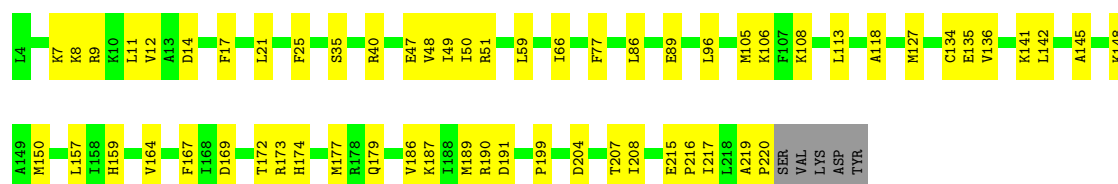
Chain t: 23% 57% 20%



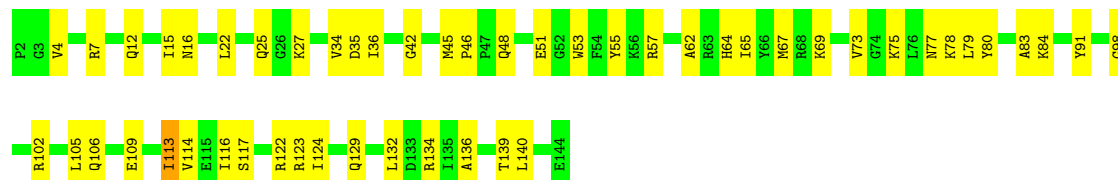
• Molecule 46: Elongation factor 3A

Chain v: 69% 30%





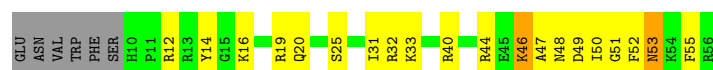
- Molecule 51: Small ribosomal subunit protein eS19A



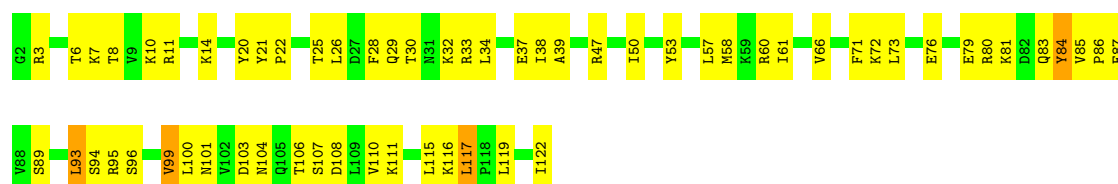
- Molecule 52: Small ribosomal subunit protein eS28A



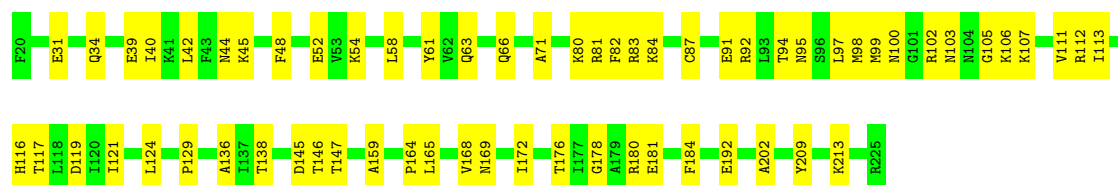
- Molecule 53: Small ribosomal subunit protein uS14A



- Molecule 54: Small ribosomal subunit protein eS17A

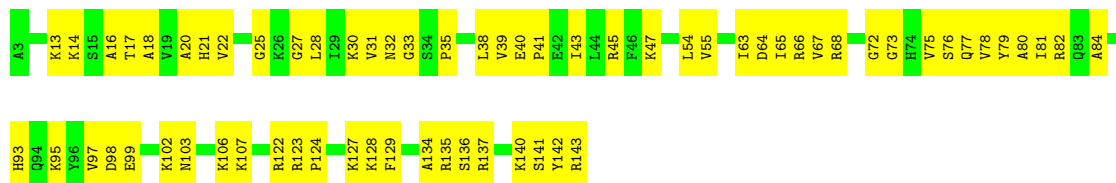


- Molecule 55: Small ribosomal subunit protein uS7



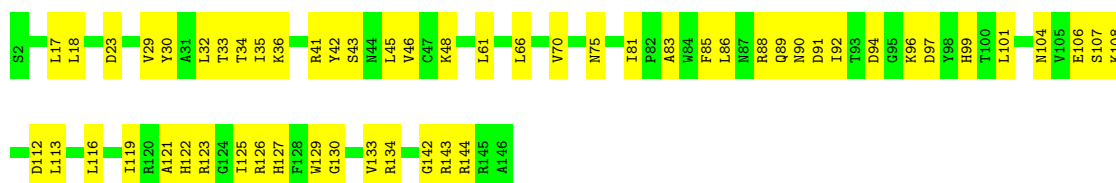
- Molecule 56: Small ribosomal subunit protein uS9A

Chain SF:  54% 46%



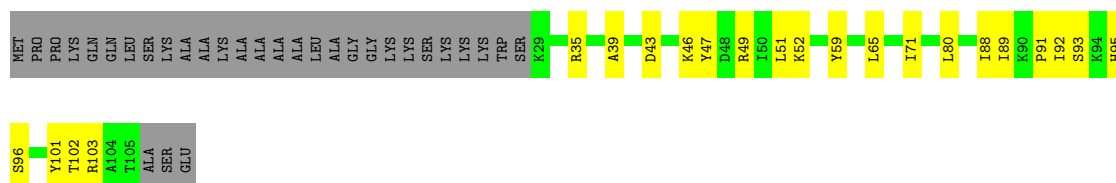
- Molecule 57: Small ribosomal subunit protein uS13A

Chain SH:  62% 38%



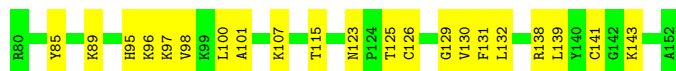
- Molecule 58: Small ribosomal subunit protein eS25A

Chain SK:  51% 20% 29%



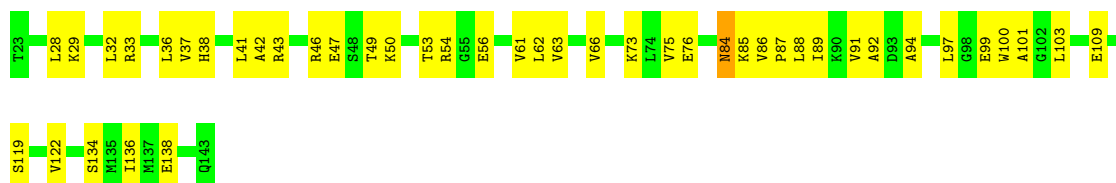
- Molecule 59: Small ribosomal subunit protein eS31

Chain SN:  71% 29%



- Molecule 60: Small ribosomal subunit protein eS12

Chain SD:  64% 36%



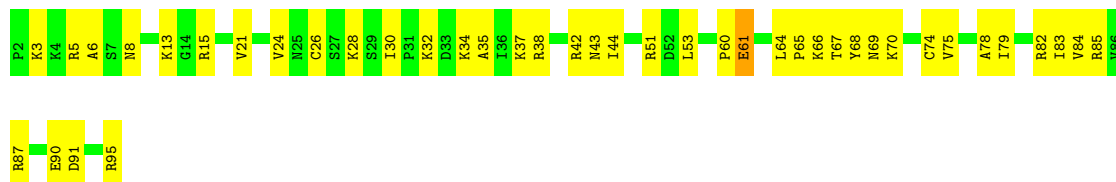
- Molecule 61: Small ribosomal subunit protein uS11B

Chain SZ:  72% 28%



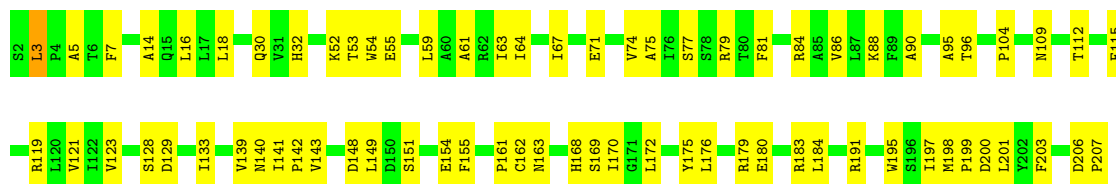
- Molecule 62: Small ribosomal subunit protein eS26A

Chain Se:  55% 44%



- Molecule 63: Small ribosomal subunit protein uS2A

Chain SP:  65% 34%



- Molecule 64: Small ribosomal subunit protein eS1A

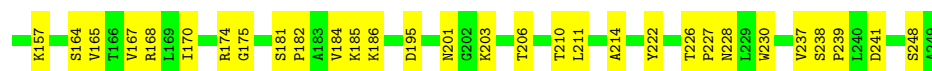
Chain SQ:  55% 38% 8%



- Molecule 65: Small ribosomal subunit protein uS5

Chain SR:  70% 30%

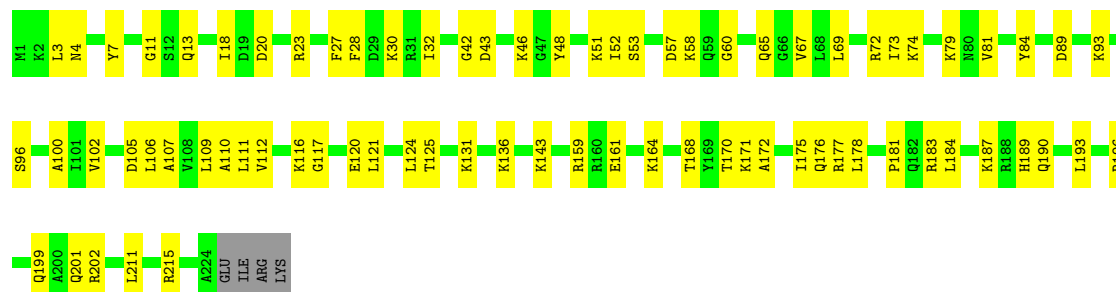




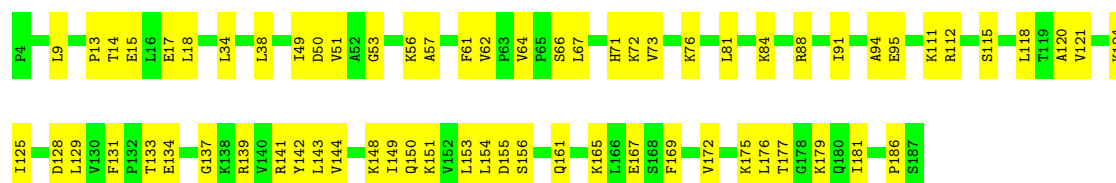
- Molecule 66: Small ribosomal subunit protein eS4A



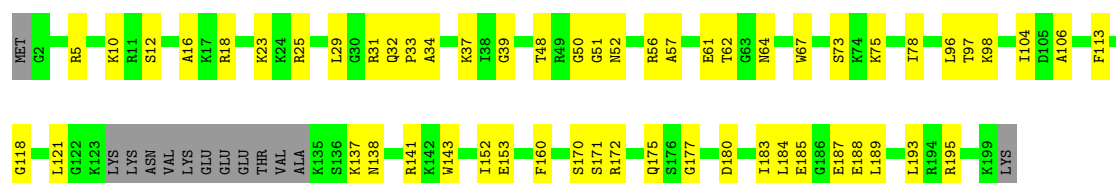
- Molecule 67: Small ribosomal subunit protein eS6A



- Molecule 68: Small ribosomal subunit protein eS7A

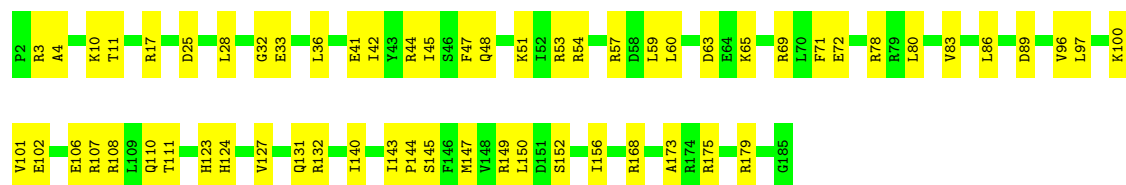


- Molecule 69: Small ribosomal subunit protein eS8A



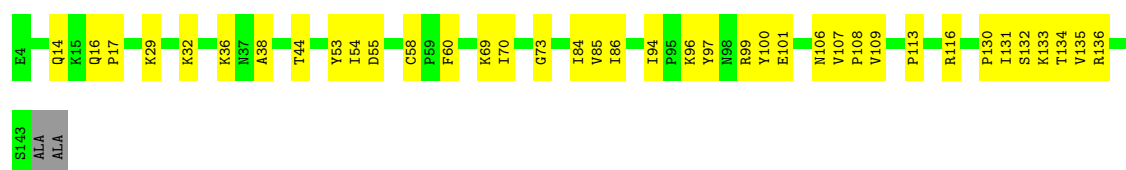
- Molecule 70: Small ribosomal subunit protein uS4A

Chain SW:  67% 33%



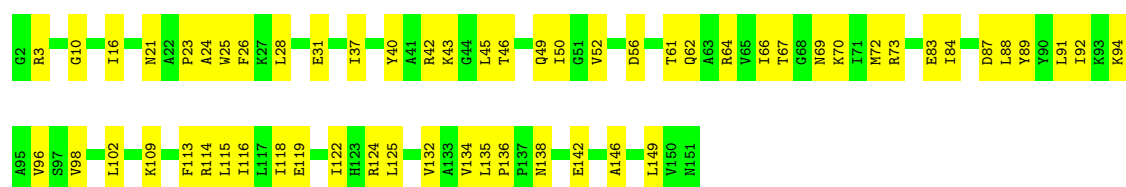
- Molecule 71: Small ribosomal subunit protein uS17A

Chain SX:  72% 27%



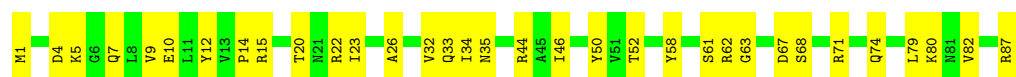
- Molecule 72: Small ribosomal subunit protein uS15

Chain SY:  61% 39%



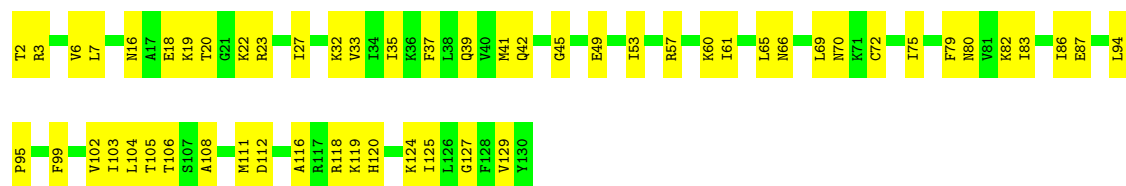
- Molecule 73: Small ribosomal subunit protein eS21A

Chain Sa:  62% 38%



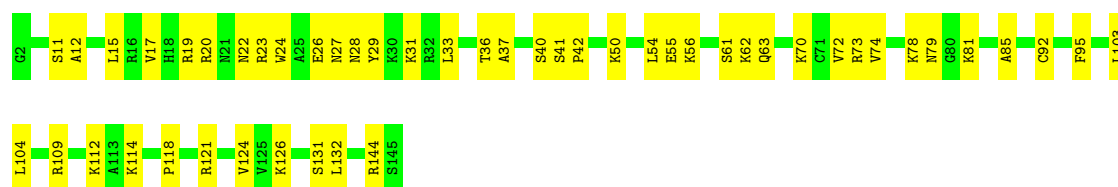
- Molecule 74: Small ribosomal subunit protein uS8A

Chain Sb:  57% 43%



- Molecule 75: Small ribosomal subunit protein uS12A

Chain Sc:  66% 34%



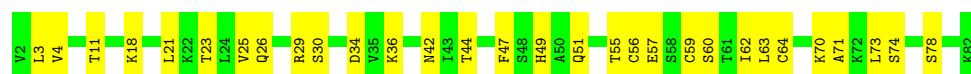
- Molecule 76: Small ribosomal subunit protein eS24A

Chain Sd:



- Molecule 77: Small ribosomal subunit protein eS27A

Chain Sf:



- Molecule 78: Small ribosomal subunit protein eS30A

Chain Sg:



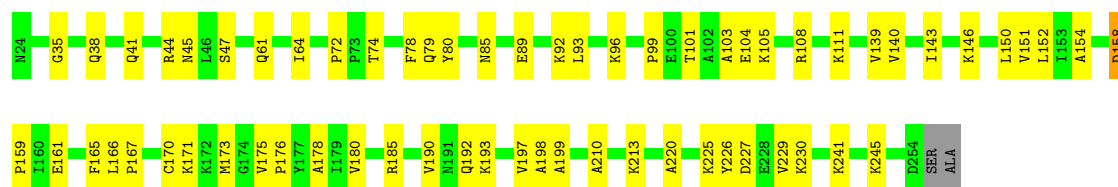
- Molecule 79: Small ribosomal subunit protein uS10

Chain SJ:



- Molecule 80: Large ribosomal subunit protein eL8A

Chain J:



- Molecule 81: Small ribosomal subunit protein RACK1

Chain SO:

26%

69%

..

D266	S197	K129	V68	D69
D267	N198	T130	A3	
Q268	I199	I131	S2	
T269	N200	K132	M4	E5
V271	T201	V133	V6	
D272	L202	W134	L7	
D273	T203	T135	T74	V8
D274	A204	K136	A75	
L275	S205	I137	L9	
R276	G208	K138	D76	L9
P276	T209	Q139	G77	
		C140	A78	
		L141	Y79	G11
		A142	T12	
		T143	L13	
H288	S213	L144	H16	G17
A289	A214	T147	M17	
V290	G215	H147	G18	
A293	D216	N148	W19	V20
W294	Q217	D149	T21	
S295	G218	W150	T22	
A296	E219	Q153	S22	L23
D297	L220	V154	L23	
Q298	M221	R155	A24	
T300	L222	W223	T25	S26
L301	W224	V156	S26	
F302	L225	V157	A27	
A303	K228	P158	G27	
G304	K229	D163		L32
Y305	A230	V167		L33
T306	W231	T168	L34	S35
D307	Y232	I169	A36	
N308	T233	I170	S37	
V309	L234	S171	R102	R38
I310	G312	A172	F103	
R311		G173	A101	
V312		E239	Q101	
W313	V240	M174	L142	R40
K316	F241	D175	T41	
T317	S242	K176	G49	
A318	L243	M177	D109	K46
N319	A244	V178	V110	
	F245	K179	M11	
		A180	S112	
		V113	D50	D51
		W181	D51	
		N182	Q52	
	W251	L183	K53	K53
	L252	F186	F54	
	A253	Q187	G55	
	A254	A255	V56	V56
	A256	T256	A119	
	A257	I188	S120	
	T258	E189	M121	V58
	G259	A190	I122	
	L260	D191	I123	
	K261	F192	S124	G63
	V262	I193	G125	
	F263	G194	S126	
	S264	H195	R127	H64
	L265	N196	H66	
			I67	

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	8681	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	Not provided	
Image detector	GATAN K2 QUANTUM (4k x 4k)	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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	S	0.17	0/1465	0.41	2/1965 (0.1%)
2	2	0.10	0/42211	0.24	0/65773
3	A	0.08	0/76448	0.20	0/119184
4	B	0.07	0/2883	0.18	0/4491
5	C	0.10	0/3746	0.23	0/5832
6	D	0.11	0/1897	0.33	0/2550
7	E	0.10	0/3146	0.28	0/4228
8	F	0.10	0/2800	0.28	0/3790
9	G	0.12	0/2360	0.34	0/3185
10	H	0.13	0/1329	0.33	0/1794
11	I	0.17	0/1821	0.44	1/2451 (0.0%)
12	K	0.13	0/1514	0.38	0/2039
13	L	0.15	0/1801	0.39	1/2416 (0.0%)
14	M	0.16	0/1367	0.50	0/1834
15	N	0.12	0/1568	0.31	0/2106
16	O	0.13	0/1068	0.37	0/1438
17	P	0.12	0/1757	0.31	0/2354
18	Q	0.14	0/1585	0.38	0/2128
19	R	0.11	0/1439	0.31	0/1938
20	T	0.12	0/1501	0.32	0/2002
21	U	0.11	0/1473	0.33	0/1980
22	V	0.13	0/1276	0.35	0/1712
23	W	0.18	0/812	0.49	0/1099
24	X	0.15	0/996	0.45	0/1340
25	Y	0.17	0/784	0.46	0/1058
26	Z	0.16	0/969	0.42	0/1307
27	a	0.10	0/995	0.32	0/1329
28	b	0.14	0/1106	0.39	0/1485
29	c	0.13	0/1200	0.37	0/1607
30	d	0.11	0/473	0.31	0/629
31	e	0.18	0/745	0.39	0/1001
32	f	0.18	0/890	0.45	1/1196 (0.1%)
33	g	0.10	0/1034	0.30	0/1385
34	h	0.13	0/868	0.38	0/1168

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
35	i	0.14	0/890	0.47	0/1189
36	j	0.14	0/978	0.44	0/1301
37	k	0.15	0/772	0.48	0/1026
38	l	0.18	0/660	0.50	1/875 (0.1%)
39	m	0.13	0/618	0.35	0/826
40	n	0.16	0/443	0.41	0/588
41	o	0.14	0/416	0.41	0/553
42	p	0.19	0/230	0.46	0/296
43	q	0.11	0/836	0.30	0/1104
44	r	0.17	0/701	0.47	0/934
45	s	0.07	0/1795	0.18	0/2797
45	t	0.09	0/1796	0.25	0/2799
46	v	0.14	0/7611	0.41	4/10322 (0.0%)
47	x	0.13	0/6645	0.41	0/8996
48	SC	0.13	0/769	0.38	0/1039
49	SE	0.14	0/913	0.40	0/1227
50	SA	0.12	0/1711	0.35	0/2303
51	SI	0.15	0/1130	0.46	0/1517
52	SL	0.11	0/493	0.33	0/663
53	SM	0.18	0/394	0.51	0/520
54	SG	0.18	0/971	0.57	1/1303 (0.1%)
55	SB	0.12	0/1625	0.32	0/2197
56	SF	0.13	0/1125	0.39	0/1510
57	SH	0.13	0/1207	0.34	0/1623
58	SK	0.17	0/616	0.41	1/828 (0.1%)
59	SN	0.13	0/571	0.37	0/768
60	SD	0.15	0/883	0.48	0/1199
61	SZ	0.14	0/901	0.41	0/1217
62	Se	0.20	0/761	0.61	0/1016
63	SP	0.13	0/1644	0.39	0/2249
64	SQ	0.17	0/1735	0.41	0/2335
65	SR	0.13	0/1656	0.36	0/2251
66	SS	0.12	0/2097	0.35	0/2823
67	ST	0.13	0/1813	0.38	0/2425
68	SU	0.12	0/1498	0.34	0/2019
69	SV	0.11	0/1501	0.33	0/2006
70	SW	0.12	0/1504	0.36	0/2016
71	SX	0.12	0/1158	0.36	0/1561
72	SY	0.17	0/1215	0.44	0/1638
73	Sa	0.13	0/682	0.38	0/921
74	Sb	0.19	0/1038	0.48	0/1395
75	Sc	0.15	0/1139	0.40	1/1518 (0.1%)
76	Sd	0.10	0/1087	0.32	0/1449

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
77	Sf	0.14	0/620	0.37	0/838
78	Sg	0.14	0/444	0.39	0/591
79	SJ	0.15	0/807	0.43	0/1091
80	J	0.14	0/1825	0.38	0/2466
81	SO	0.60	0/2489	1.08	5/3389 (0.1%)
All	All	0.13	0/231740	0.31	18/339311 (0.0%)

There are no bond length outliers.

The worst 5 of 18 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
81	SO	127	ARG	N-CA-C	-7.35	104.31	113.28
46	v	511	VAL	N-CA-C	-6.94	106.73	113.53
38	l	22	CYS	N-CA-C	-6.74	102.79	111.02
46	v	962	VAL	CA-C-N	6.72	133.79	121.70
46	v	962	VAL	C-N-CA	6.72	133.79	121.70

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	S	1441	0	1543	44	0
2	2	37739	0	18988	803	0
3	A	68298	0	34325	1353	0
4	B	2579	0	1304	53	0
5	C	3353	0	1695	71	0
6	D	1863	0	1930	71	0
7	E	3075	0	3142	84	0
8	F	2748	0	2859	74	0
9	G	2311	0	2267	74	0
10	H	1307	0	1377	41	0
11	I	1784	0	1862	68	0
12	K	1493	0	1566	47	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
13	L	1764	0	1804	62	0
14	M	1346	0	1370	54	0
15	N	1543	0	1608	57	0
16	O	1053	0	1149	31	0
17	P	1720	0	1779	102	0
18	Q	1555	0	1659	60	0
19	R	1416	0	1433	48	0
20	T	1484	0	1578	42	0
21	U	1437	0	1475	44	0
22	V	1253	0	1292	48	0
23	W	796	0	812	25	0
24	X	981	0	1031	60	0
25	Y	771	0	676	21	0
26	Z	954	0	1018	25	0
27	a	984	0	1075	28	0
28	b	1080	0	1122	30	0
29	c	1169	0	1211	54	0
30	d	462	0	491	15	0
31	e	737	0	792	28	0
32	f	876	0	912	39	0
33	g	1013	0	1077	32	0
34	h	850	0	880	35	0
35	i	880	0	945	30	0
36	j	969	0	1078	39	0
37	k	766	0	844	26	0
38	l	645	0	649	31	0
39	m	612	0	682	15	0
40	n	436	0	475	25	0
41	o	410	0	446	18	0
42	p	229	0	273	10	0
43	q	824	0	892	16	0
44	r	694	0	738	46	0
45	s	1605	0	816	15	0
45	t	1606	0	816	38	0
46	v	7476	0	7414	213	0
47	x	6520	0	6574	244	0
48	SC	752	0	719	22	0
49	SE	894	0	925	26	0
50	SA	1687	0	1772	53	0
51	SI	1112	0	1124	49	0
52	SL	491	0	524	19	0
53	SM	387	0	387	21	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
54	SG	961	0	999	59	0
55	SB	1605	0	1669	50	0
56	SF	1105	0	1166	64	0
57	SH	1188	0	1218	47	0
58	SK	608	0	639	17	0
59	SN	560	0	560	16	0
60	SD	875	0	878	30	0
61	SZ	891	0	883	31	0
62	Se	750	0	799	33	0
63	SP	1603	0	1610	64	0
64	SQ	1709	0	1784	74	0
65	SR	1626	0	1715	60	0
66	SS	2056	0	2140	64	0
67	ST	1789	0	1875	60	0
68	SU	1473	0	1555	47	0
69	SV	1476	0	1501	41	0
70	SW	1479	0	1556	51	0
71	SX	1132	0	1199	34	0
72	SY	1192	0	1255	58	0
73	Sa	673	0	662	31	0
74	Sb	1021	0	1060	58	0
75	Sc	1121	0	1196	41	0
76	Sd	1073	0	1132	29	0
77	Sf	610	0	633	20	0
78	Sg	437	0	484	18	0
79	SJ	797	0	863	33	0
80	J	1793	0	1867	50	0
81	SO	2436	0	2385	339	0
All	All	216269	0	162478	5371	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 14.

The worst 5 of 5371 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
81:SO:120:SER:OG	81:SO:121:MET:SD	1.92	1.26
54:SG:29:GLN:HG2	81:SO:85:TRP:CH2	1.79	1.16
81:SO:177:MET:HE1	81:SO:193:ILE:C	1.73	1.11
54:SG:29:GLN:HG2	81:SO:85:TRP:CZ3	1.88	1.08
81:SO:123:ILE:HD11	81:SO:154:VAL:HG21	1.28	1.07

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	S	183/185 (99%)	171 (93%)	11 (6%)	1 (0%)	25	60
6	D	243/251 (97%)	230 (95%)	13 (5%)	0	100	100
7	E	384/386 (100%)	366 (95%)	18 (5%)	0	100	100
8	F	359/361 (99%)	350 (98%)	9 (2%)	0	100	100
9	G	286/294 (97%)	265 (93%)	20 (7%)	1 (0%)	37	70
10	H	163/175 (93%)	154 (94%)	9 (6%)	0	100	100
11	I	220/223 (99%)	213 (97%)	7 (3%)	0	100	100
12	K	186/191 (97%)	173 (93%)	13 (7%)	0	100	100
13	L	216/218 (99%)	202 (94%)	14 (6%)	0	100	100
14	M	167/169 (99%)	152 (91%)	14 (8%)	1 (1%)	22	57
15	N	191/193 (99%)	178 (93%)	12 (6%)	1 (0%)	25	60
16	O	134/136 (98%)	127 (95%)	7 (5%)	0	100	100
17	P	201/203 (99%)	192 (96%)	9 (4%)	0	100	100
18	Q	195/197 (99%)	190 (97%)	5 (3%)	0	100	100
19	R	181/183 (99%)	171 (94%)	10 (6%)	0	100	100
20	T	182/188 (97%)	178 (98%)	4 (2%)	0	100	100
21	U	169/171 (99%)	160 (95%)	9 (5%)	0	100	100
22	V	155/159 (98%)	141 (91%)	14 (9%)	0	100	100
23	W	98/100 (98%)	91 (93%)	7 (7%)	0	100	100
24	X	130/136 (96%)	122 (94%)	8 (6%)	0	100	100
25	Y	109/126 (86%)	92 (84%)	14 (13%)	3 (3%)	4	28
26	Z	117/121 (97%)	111 (95%)	6 (5%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
27	a	123/125 (98%)	114 (93%)	9 (7%)	0	100	100
28	b	133/135 (98%)	127 (96%)	6 (4%)	0	100	100
29	c	146/148 (99%)	133 (91%)	13 (9%)	0	100	100
30	d	56/58 (97%)	53 (95%)	3 (5%)	0	100	100
31	e	94/96 (98%)	92 (98%)	2 (2%)	0	100	100
32	f	107/109 (98%)	100 (94%)	7 (6%)	0	100	100
33	g	125/127 (98%)	123 (98%)	2 (2%)	0	100	100
34	h	104/106 (98%)	97 (93%)	7 (7%)	0	100	100
35	i	110/112 (98%)	107 (97%)	3 (3%)	0	100	100
36	j	117/119 (98%)	110 (94%)	7 (6%)	0	100	100
37	k	97/99 (98%)	94 (97%)	3 (3%)	0	100	100
38	l	79/81 (98%)	73 (92%)	6 (8%)	0	100	100
39	m	75/77 (97%)	72 (96%)	3 (4%)	0	100	100
40	n	48/50 (96%)	46 (96%)	2 (4%)	0	100	100
41	o	50/52 (96%)	47 (94%)	3 (6%)	0	100	100
42	p	23/25 (92%)	23 (100%)	0	0	100	100
43	q	101/103 (98%)	98 (97%)	3 (3%)	0	100	100
44	r	89/91 (98%)	86 (97%)	3 (3%)	0	100	100
46	v	975/977 (100%)	877 (90%)	94 (10%)	4 (0%)	30	65
47	x	833/842 (99%)	731 (88%)	96 (12%)	6 (1%)	19	54
48	SC	90/92 (98%)	83 (92%)	7 (8%)	0	100	100
49	SE	112/117 (96%)	103 (92%)	9 (8%)	0	100	100
50	SA	215/222 (97%)	207 (96%)	7 (3%)	1 (0%)	25	60
51	SI	141/143 (99%)	135 (96%)	6 (4%)	0	100	100
52	SL	61/63 (97%)	55 (90%)	6 (10%)	0	100	100
53	SM	45/53 (85%)	33 (73%)	12 (27%)	0	100	100
54	SG	119/121 (98%)	94 (79%)	21 (18%)	4 (3%)	3	25
55	SB	204/206 (99%)	194 (95%)	10 (5%)	0	100	100
56	SF	139/141 (99%)	128 (92%)	11 (8%)	0	100	100
57	SH	143/145 (99%)	138 (96%)	5 (4%)	0	100	100
58	SK	75/108 (69%)	69 (92%)	5 (7%)	1 (1%)	10	41

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
59	SN	71/73 (97%)	59 (83%)	12 (17%)	0	100	100
60	SD	119/121 (98%)	96 (81%)	21 (18%)	2 (2%)	7	36
61	SZ	125/127 (98%)	113 (90%)	12 (10%)	0	100	100
62	Se	92/94 (98%)	65 (71%)	26 (28%)	1 (1%)	12	45
63	SP	204/206 (99%)	179 (88%)	25 (12%)	0	100	100
64	SQ	212/232 (91%)	199 (94%)	13 (6%)	0	100	100
65	SR	214/216 (99%)	202 (94%)	12 (6%)	0	100	100
66	SS	256/258 (99%)	242 (94%)	14 (6%)	0	100	100
67	ST	222/228 (97%)	207 (93%)	15 (7%)	0	100	100
68	SU	182/184 (99%)	169 (93%)	13 (7%)	0	100	100
69	SV	183/200 (92%)	175 (96%)	8 (4%)	0	100	100
70	SW	182/184 (99%)	174 (96%)	8 (4%)	0	100	100
71	SX	138/142 (97%)	131 (95%)	7 (5%)	0	100	100
72	SY	148/150 (99%)	140 (95%)	6 (4%)	2 (1%)	9	39
73	Sa	85/87 (98%)	77 (91%)	8 (9%)	0	100	100
74	Sb	127/129 (98%)	117 (92%)	10 (8%)	0	100	100
75	Sc	142/144 (99%)	133 (94%)	9 (6%)	0	100	100
76	Sd	132/134 (98%)	126 (96%)	6 (4%)	0	100	100
77	Sf	79/81 (98%)	72 (91%)	7 (9%)	0	100	100
78	Sg	53/60 (88%)	47 (89%)	6 (11%)	0	100	100
79	SJ	98/100 (98%)	92 (94%)	6 (6%)	0	100	100
80	J	229/233 (98%)	220 (96%)	8 (4%)	1 (0%)	30	65
81	SO	316/318 (99%)	201 (64%)	106 (34%)	9 (3%)	4	28
All	All	12707/13010 (98%)	11707 (92%)	962 (8%)	38 (0%)	38	70

5 of 38 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
25	Y	22	VAL
25	Y	86	SER
46	v	418	PRO
46	v	833	SER
54	SG	84	TYR

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	S	150/150 (100%)	150 (100%)	0	100	100
6	D	188/193 (97%)	188 (100%)	0	100	100
7	E	320/322 (99%)	316 (99%)	4 (1%)	65	76
8	F	288/288 (100%)	287 (100%)	1 (0%)	91	92
9	G	238/243 (98%)	237 (100%)	1 (0%)	89	91
10	H	139/154 (90%)	139 (100%)	0	100	100
11	I	186/187 (100%)	185 (100%)	1 (0%)	86	90
12	K	168/171 (98%)	167 (99%)	1 (1%)	84	88
13	L	185/185 (100%)	184 (100%)	1 (0%)	86	90
14	M	145/147 (99%)	145 (100%)	0	100	100
15	N	154/154 (100%)	153 (99%)	1 (1%)	84	88
16	O	107/107 (100%)	106 (99%)	1 (1%)	75	83
17	P	175/175 (100%)	175 (100%)	0	100	100
18	Q	160/160 (100%)	159 (99%)	1 (1%)	84	88
19	R	138/145 (95%)	138 (100%)	0	100	100
20	T	149/153 (97%)	149 (100%)	0	100	100
21	U	155/155 (100%)	155 (100%)	0	100	100
22	V	133/136 (98%)	132 (99%)	1 (1%)	79	84
23	W	87/87 (100%)	86 (99%)	1 (1%)	70	79
24	X	102/104 (98%)	100 (98%)	2 (2%)	50	68
25	Y	56/108 (52%)	56 (100%)	0	100	100
26	Z	104/105 (99%)	103 (99%)	1 (1%)	73	81
27	a	108/108 (100%)	107 (99%)	1 (1%)	75	83
28	b	112/115 (97%)	112 (100%)	0	100	100
29	c	117/118 (99%)	117 (100%)	0	100	100
30	d	46/46 (100%)	46 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
31	e	81/81 (100%)	81 (100%)	0	100	100
32	f	92/96 (96%)	92 (100%)	0	100	100
33	g	107/109 (98%)	106 (99%)	1 (1%)	75	83
34	h	90/90 (100%)	90 (100%)	0	100	100
35	i	95/95 (100%)	95 (100%)	0	100	100
36	j	104/104 (100%)	104 (100%)	0	100	100
37	k	80/81 (99%)	80 (100%)	0	100	100
38	l	67/67 (100%)	65 (97%)	2 (3%)	36	58
39	m	68/68 (100%)	68 (100%)	0	100	100
40	n	45/45 (100%)	45 (100%)	0	100	100
41	o	45/47 (96%)	45 (100%)	0	100	100
42	p	22/23 (96%)	22 (100%)	0	100	100
43	q	87/88 (99%)	87 (100%)	0	100	100
44	r	71/71 (100%)	71 (100%)	0	100	100
46	v	789/835 (94%)	784 (99%)	5 (1%)	84	88
47	x	710/715 (99%)	704 (99%)	6 (1%)	79	84
48	SC	77/85 (91%)	76 (99%)	1 (1%)	65	76
49	SE	93/98 (95%)	93 (100%)	0	100	100
50	SA	177/182 (97%)	177 (100%)	0	100	100
51	SI	115/115 (100%)	114 (99%)	1 (1%)	75	83
52	SL	55/56 (98%)	55 (100%)	0	100	100
53	SM	41/47 (87%)	39 (95%)	2 (5%)	21	46
54	SG	105/110 (96%)	105 (100%)	0	100	100
55	SB	172/173 (99%)	171 (99%)	1 (1%)	84	88
56	SF	117/117 (100%)	117 (100%)	0	100	100
57	SH	127/128 (99%)	127 (100%)	0	100	100
58	SK	63/89 (71%)	63 (100%)	0	100	100
59	SN	57/64 (89%)	57 (100%)	0	100	100
60	SD	88/98 (90%)	87 (99%)	1 (1%)	70	79
61	SZ	81/96 (84%)	79 (98%)	2 (2%)	42	62
62	Se	81/81 (100%)	80 (99%)	1 (1%)	67	78

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
63	SP	170/173 (98%)	169 (99%)	1 (1%)	84	88
64	SQ	191/205 (93%)	191 (100%)	0	100	100
65	SR	175/175 (100%)	175 (100%)	0	100	100
66	SS	220/220 (100%)	220 (100%)	0	100	100
67	ST	188/195 (96%)	188 (100%)	0	100	100
68	SU	163/165 (99%)	162 (99%)	1 (1%)	84	88
69	SV	148/161 (92%)	146 (99%)	2 (1%)	62	75
70	SW	156/157 (99%)	156 (100%)	0	100	100
71	SX	126/127 (99%)	126 (100%)	0	100	100
72	SY	127/127 (100%)	127 (100%)	0	100	100
73	Sa	71/74 (96%)	71 (100%)	0	100	100
74	Sb	110/110 (100%)	109 (99%)	1 (1%)	75	83
75	Sc	119/119 (100%)	119 (100%)	0	100	100
76	Sd	112/112 (100%)	111 (99%)	1 (1%)	75	83
77	Sf	70/70 (100%)	69 (99%)	1 (1%)	62	75
78	Sg	47/51 (92%)	47 (100%)	0	100	100
79	SJ	93/93 (100%)	92 (99%)	1 (1%)	70	79
80	J	186/191 (97%)	186 (100%)	0	100	100
81	SO	259/261 (99%)	250 (96%)	9 (4%)	31	54
All	All	10643/10956 (97%)	10585 (100%)	58 (0%)	85	90

5 of 58 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
47	x	341	HIS
81	SO	127	ARG
53	SM	53	ASN
81	SO	94	VAL
81	SO	8	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 118 such sidechains are listed below:

Mol	Chain	Res	Type
40	n	11	GLN

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Mol	Chain	Res	Type
80	J	77	GLN
47	x	27	HIS
76	Sd	63	GLN
67	ST	4	ASN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
2	2	1768/1799 (98%)	444 (25%)	33 (1%)
3	A	3187/3394 (93%)	515 (16%)	10 (0%)
4	B	120/121 (99%)	10 (8%)	1 (0%)
45	s	74/75 (98%)	14 (18%)	0
45	t	74/75 (98%)	31 (41%)	0
5	C	157/158 (99%)	34 (21%)	1 (0%)
All	All	5380/5622 (95%)	1048 (19%)	45 (0%)

5 of 1048 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
2	2	2	A
2	2	4	C
2	2	25	C
2	2	26	A
2	2	34	G

5 of 45 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
2	2	1557	U
3	A	2193	U
2	2	1584	G
2	2	1657	U
3	A	2267	C

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.