



wwPDB EM Validation Summary Report ⓘ

Jun 25, 2025 – 07:53 PM JST

PDB ID : 8YLR / pdb_00008ylr
EMDB ID : EMD-38668
Title : State 6 (S6) of yeast 80S ribosome bound to 2 tRNAs and eEF2 and eEF3 during tranlocation
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

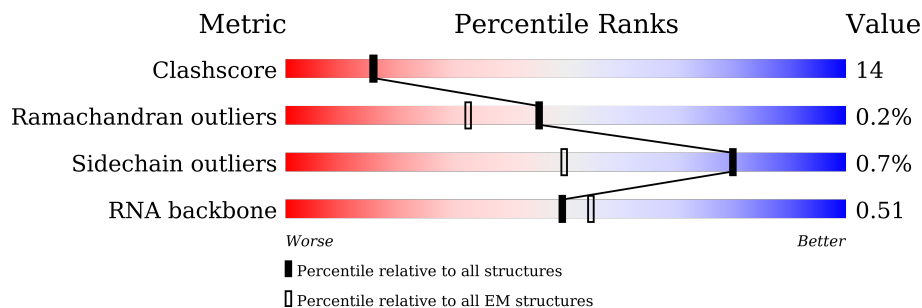
1 Overall quality at a glance

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	2	1799	33% 52% 13% .
2	A	3394	41% 47% 6% 6%
3	B	121	36% 58% 7%
4	C	158	33% 58% 9%
5	D	251	70% 30%
6	F	361	75% 25%
7	G	294	69% 31%
8	H	175	70% 26% 5%

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Mol	Chain	Length	Quality of chain	
9	I	223		
10	J	233		
11	K	191		.
12	L	218		.
13	M	169		
14	N	193		.
15	O	136		
16	P	203		.
17	Q	197		.
18	R	183		
19	S	185		
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		

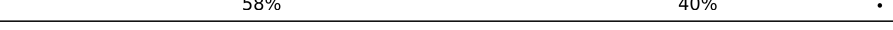
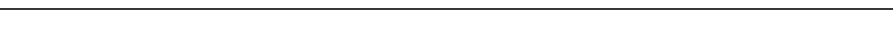
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Mol	Chain	Length	Quality of chain
34	h	106	 60% 40%
35	i	112	 72% 27% .
36	j	119	 69% 29% .
37	k	99	 64% 36%
38	l	81	 59% 37% ..
39	m	77	 68% 32%
40	n	50	 50% 48% .
41	o	52	 65% 33% .
42	p	25	 52% 44% .
43	q	103	 80% 20%
44	r	91	 53% 46% .
45	t	75	 41% 48% 11%
45	u	75	 49% 40% 9% .
46	v	1044	 65% 28% 6%
47	x	842	 65% 35%
48	SA	222	 73% 27%
49	SC	92	 62% 37% .
50	SD	121	 68% 32%
51	SE	117	 75% 25%
52	SF	141	 52% 46% .
53	SH	145	 65% 35%
54	SI	143	 58% 42%
55	SJ	100	 67% 33%
56	SK	108	 38% 20% . 41%
57	SM	53	 62% 38%

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Mol	Chain	Length	Quality of chain
58	SN	73	 58% 37% 5%
59	SO	312	 57% 42% 1%
60	SQ	232	 57% 40% 3%
61	SS	258	 67% 33% 0%
62	ST	228	 76% 23% 1%
63	SR	216	 67% 33% 0%
64	SV	200	 62% 31% 6%
65	SW	184	 67% 29% 4%
66	SX	142	 74% 25% 1%
67	SY	150	 73% 26% 1%
68	SZ	127	 68% 32% 0%
69	Sa	87	 72% 28% 0%
70	Sb	129	 53% 47% 0%
71	Sc	144	 58% 40% 2%
72	Sd	134	 72% 28% 0%
73	Se	94	 64% 36% 0%
74	Sf	81	 85% 15% 0%
75	Sg	60	 75% 25% 0%
76	SG	121	 64% 36% 0%
77	SP	206	 65% 35% 0%
78	SU	184	 65% 34% 1%
79	SL	63	 49% 46% 5%
80	SB	206	 48% 51% 1%
81	E	386	 71% 29% 0%

2 Entry composition [i](#)

There are 81 unique types of molecules in this entry. The entry contains 216620 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 18S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	2	1771	Total	C	N	O	P	0	0
			37739	16872	6683	12413	1771		

- Molecule 2 is a RNA chain called 25S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	A	3192	Total	C	N	O	P	0	0
			68278	30498	12313	22275	3192		

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

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

- Molecule 4 is a RNA chain called 5.8S rRNA.

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

- Molecule 5 is a protein called Large ribosomal subunit protein uL2A.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	D	251	Total	C	N	O	S	0	0
			1899	1182	385	331	1		

- Molecule 6 is a protein called Large ribosomal subunit protein uL4A.

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

- Molecule 7 is a protein called Large ribosomal subunit protein uL18.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	294	Total	C	N	O	S	0	0
			2351	1484	410	455	2		

- Molecule 8 is a protein called Large ribosomal subunit protein eL6B.

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

- Molecule 9 is a protein called Large ribosomal subunit protein uL30A.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	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 10 is a protein called Large ribosomal subunit protein eL8A.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	J	233	Total	C	N	O	S	0	0
			1804	1151	323	327	3		

- Molecule 11 is a protein called Large ribosomal subunit protein uL6A.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	K	191	Total	C	N	O	S	0	0
			1508	957	274	273	4		

- Molecule 12 is a protein called Large ribosomal subunit protein uL16.

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

- Molecule 13 is a protein called Large ribosomal subunit protein uL5B.

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

- Molecule 14 is a protein called Large ribosomal subunit protein eL13A.

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

- Molecule 15 is a protein called Large ribosomal subunit protein eL14A.

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

- Molecule 16 is a protein called Large ribosomal subunit protein eL15A.

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

- Molecule 17 is a protein called Large ribosomal subunit protein uL13A.

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

- Molecule 18 is a protein called Large ribosomal subunit protein uL22A.

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

- Molecule 19 is a protein called Large ribosomal subunit protein eL18A.

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

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

Mol	Chain	Residues	Atoms				AltConf	Trace
20	T	188	Total	C	N	O	0	0
			1515	932	323	260		

- 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	159	Total	C	N	O	S	0	0
			1272	802	245	221	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	136	Total	C	N	O	S	0	0
			1003	628	189	179	7		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
25	Y	126	Total	C	N	O	S	0	0
			836	525	165	145	1		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
26	Z	121	Total	C	N	O	S	0	0
			964	620	169	173	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	t	75	Total	C	N	O	P	0	0
			1605	716	297	517	75		
45	u	74	Total	C	N	O	P	0	0
			1584	706	292	512	74		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
t	10	A	G	conflict	GB 176433
u	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	842	Total	C	N	O	S	0	0
			6559	4166	1124	1238	31		

- Molecule 48 is a protein called Small ribosomal subunit protein uS3.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	SA	222	Total	C	N	O	S	0	0
			1729	1098	312	313	6		

- Molecule 49 is a protein called Small ribosomal subunit protein eS10A.

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

- Molecule 50 is a protein called Small ribosomal subunit protein eS12.

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

- Molecule 51 is a protein called Small ribosomal subunit protein uS19.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	SE	117	Total	C	N	O	S	0	0
			916	583	171	155	7		

- Molecule 52 is a protein called Small ribosomal subunit protein uS9A.

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

- Molecule 53 is a protein called Small ribosomal subunit protein uS13A.

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

- Molecule 54 is a protein called Small ribosomal subunit protein eS19A.

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

- Molecule 55 is a protein called Small ribosomal subunit protein uS10.

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

- Molecule 56 is a protein called Small ribosomal subunit protein eS25A.

Mol	Chain	Residues	Atoms				AltConf	Trace
56	SK	64	Total	C	N	O	0	0
			519	332	95	92		

- Molecule 57 is a protein called Small ribosomal subunit protein uS14A.

Mol	Chain	Residues	Atoms					AltConf	Trace
57	SM	53	Total	C	N	O	S	0	0
			442	274	92	72	4		

- Molecule 58 is a protein called Small ribosomal subunit protein eS31.

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

- Molecule 59 is a protein called Small ribosomal subunit protein RACK1.

Mol	Chain	Residues	Atoms					AltConf	Trace
59	SO	312	Total	C	N	O	S	0	0
			2383	1514	409	452	8		

- Molecule 60 is a protein called Small ribosomal subunit protein eS1A.

Mol	Chain	Residues	Atoms					AltConf	Trace
60	SQ	225	Total	C	N	O	S	0	0
			1794	1137	329	324	4		

- Molecule 61 is a protein called Small ribosomal subunit protein eS4A.

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

- Molecule 62 is a protein called Small ribosomal subunit protein eS6A.

Mol	Chain	Residues	Atoms					AltConf	Trace
62	ST	228	Total	C	N	O	S	0	0
			1815	1138	351	323	3		

- Molecule 63 is a protein called Small ribosomal subunit protein uS5.

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

- Molecule 64 is a protein called Small ribosomal subunit protein eS8A.

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

- Molecule 65 is a protein called Small ribosomal subunit protein uS4A.

Mol	Chain	Residues	Atoms					AltConf	Trace
65	SW	178	Total	C	N	O	S	0	0
			1441	913	278	249	1		

- Molecule 66 is a protein called Small ribosomal subunit protein uS17A.

Mol	Chain	Residues	Atoms					AltConf	Trace
66	SX	142	Total	C	N	O	S	0	0
			1142	733	217	189	3		

- Molecule 67 is a protein called Small ribosomal subunit protein uS15.

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

- Molecule 68 is a protein called Small ribosomal subunit protein uS11B.

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

- Molecule 69 is a protein called Small ribosomal subunit protein eS21A.

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

- Molecule 70 is a protein called Small ribosomal subunit protein uS8A.

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

- Molecule 71 is a protein called Small ribosomal subunit protein uS12A.

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

- Molecule 72 is a protein called Small ribosomal subunit protein eS24A.

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

- Molecule 73 is a protein called Small ribosomal subunit protein eS26A.

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

- Molecule 74 is a protein called Small ribosomal subunit protein eS27A.

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

- Molecule 75 is a protein called Small ribosomal subunit protein eS30A.

Mol	Chain	Residues	Atoms					AltConf	Trace
75	Sg	60	Total	C	N	O	S	0	0
			472	298	97	76	1		

- Molecule 76 is a protein called Small ribosomal subunit protein eS17A.

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

- Molecule 77 is a protein called Small ribosomal subunit protein uS2A.

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

- Molecule 78 is a protein called Small ribosomal subunit protein eS7A.

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

- Molecule 79 is a protein called Small ribosomal subunit protein eS28A.

Mol	Chain	Residues	Atoms					AltConf	Trace
79	SL	63	Total	C	N	O	S	0	0
			497	306	99	91	1		

- Molecule 80 is a protein called Small ribosomal subunit protein uS7.

Mol	Chain	Residues	Atoms					AltConf	Trace
80	SB	206	Total	C	N	O	S	0	0
			1609	1007	300	299	3		

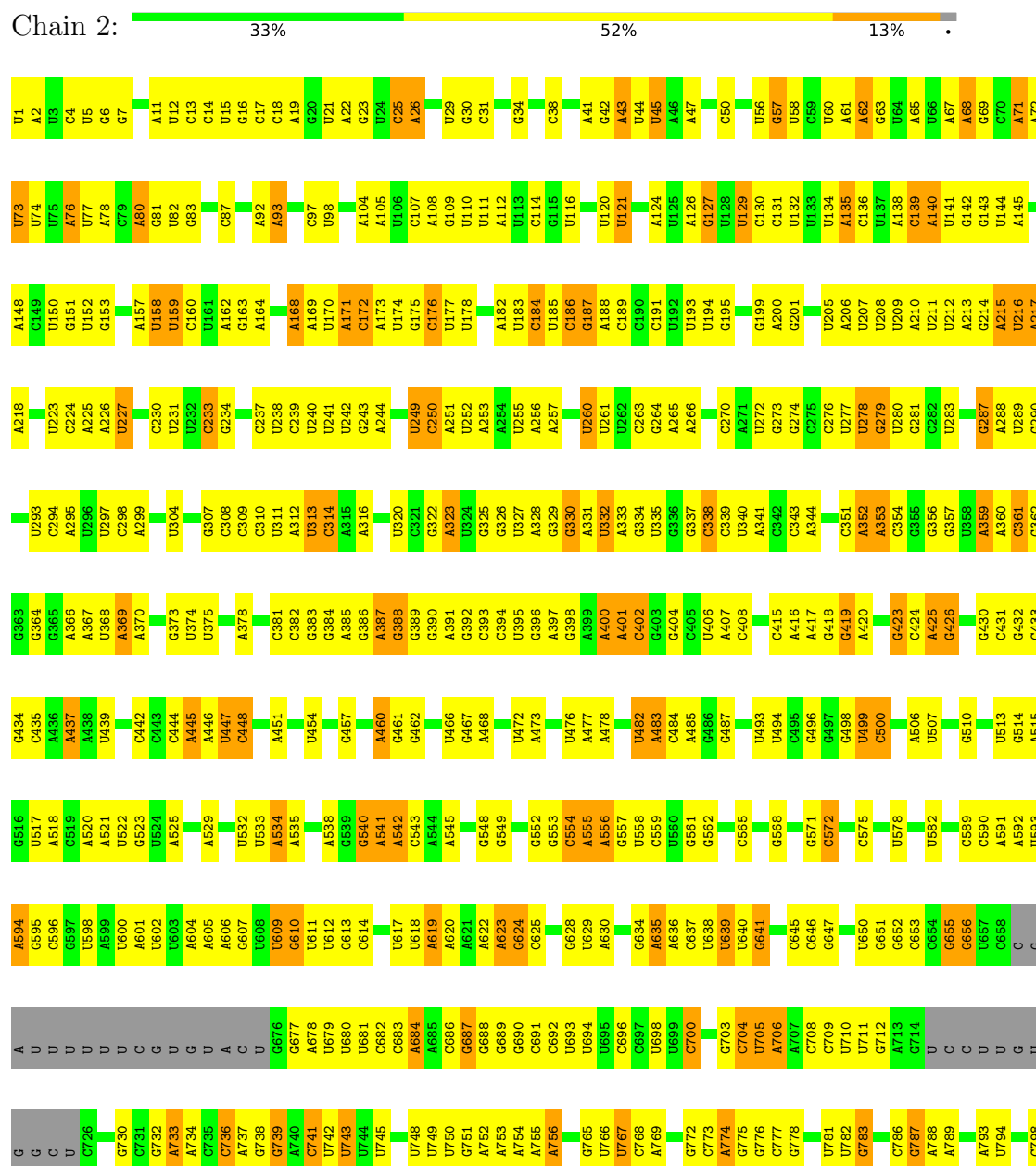
- Molecule 81 is a protein called Large ribosomal subunit protein uL3.

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

3 Residue-property plots

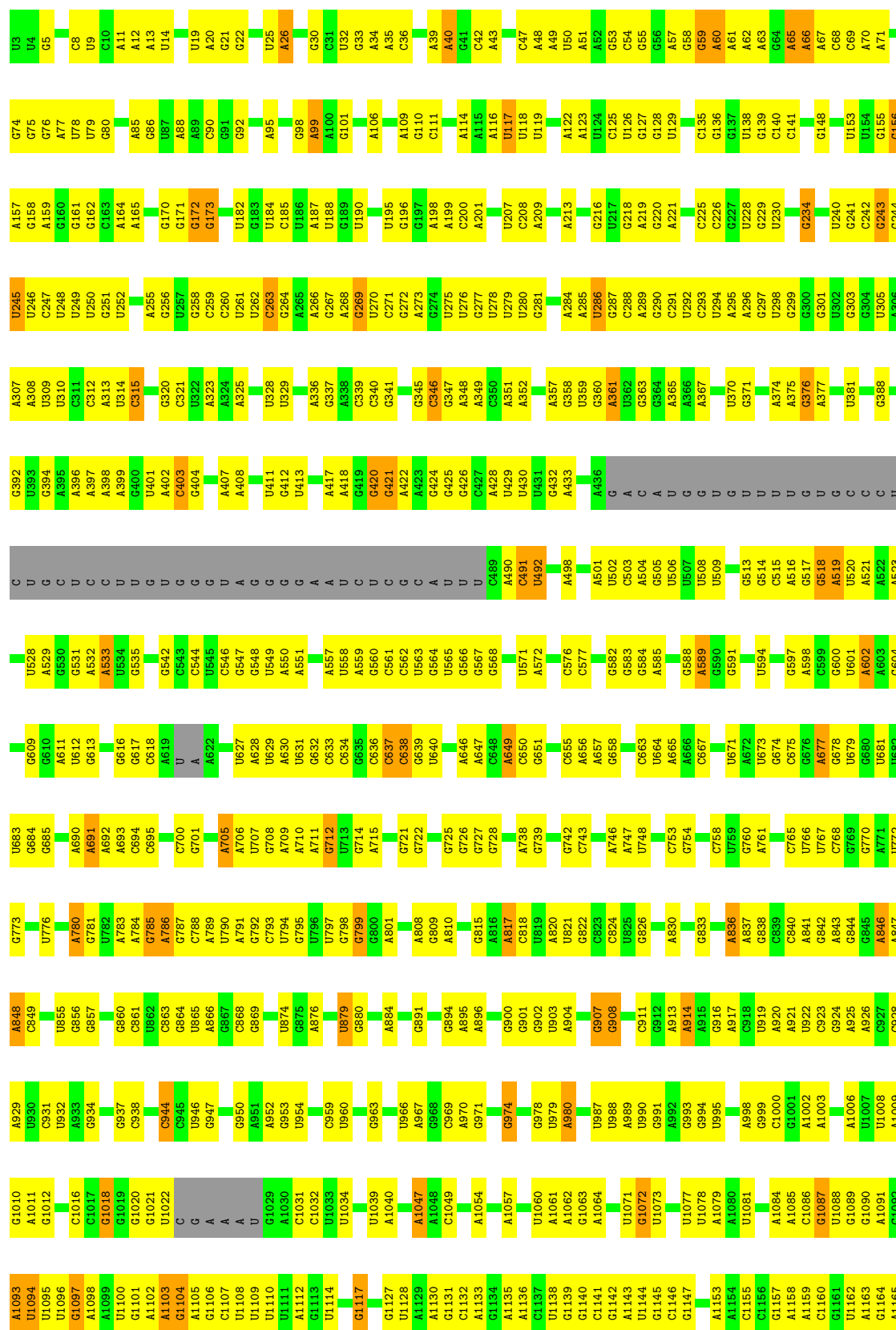
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded 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: 18S rRNA



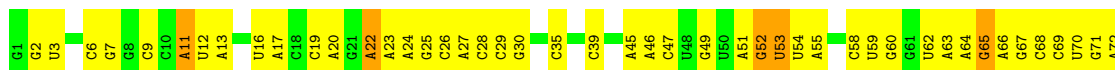
A1782	C1706	C1634	A1570	U1508	C1439	C1373	U1301	A1234	U1168	A1087	A1023	U946	G879	A799
C1783	A1707	A1635	G1571	C1509	C1440	C1374	U1302	C1235	G1169	A1088	U1024	U947	G882	A803
C1784	C1708	C1637	G1572	G1512	C1441	A1375	U1303	A1236	G1170	A1092	A1025	C948	C883	A804
C1786	C1710	C1641	G1574	U1514	U1443	U1378	U1305	A1238	G1171	C1096	A1027	A951	C884	A809
C1787	C1711	G1642	G1575	U1515	A1444	U1381	C1306	U1239	G1172	C1097	C1028	A952	C885	G810
C1788	A1712	U1643	A1576	A1516	G1445	A1382	U1307	U1240	C1174	U1098	U1029	C954	C886	G811
C1789	G1713	C1644	A1577	U1517	A1446	A1383	U1308	G1241	U1175	U1099	U1030	G955	C887	A812
A1790	G1717	C1645	A1578	C1580	U1450	G1382	C1309	A1242	G1176	C1099	U1031	A955	C888	U813
G1792	C1718	G1646	U1579	U1519	C1451	A1384	U1310	A1243	G1177	G1101	C1032	C957	C889	U814
G1793	A1719	U1647	C1581	U1520	U1452	G1386	C1311	A1244	G1178	G1102	C1033	U958	C890	G815
A1794	G1720	G1648	U1582	G1521	G1453	G1387	U1314	G1245	G1179	U1103	C1034	U959	A891	G816
U1795	A1721	G1649	A1583	U1522	G1456	A1388	U1315	U1247	A1183	G1108	A1036	U960	A892	A817
C1796	G1727	U1650	G1584	G1523	C1456	C1389	U1316	C1248	A1184	G1109	U1038	U961	U894	C818
U1797	A1728	A1651	U1585	A1524	C1457	U1390	C1317	U1251	A1185	U1085	U1039	C962	C895	C819
U1798	C1729	C1652	A1586	A1525	G1458	A1391	G1318	U1252	U1186	A1113	G1040	U963	C896	U820
U1799	C1730	C1653	A1587	A1526	C1459	U1392	A1319	G1255	U1187	G1114	G1041	U965	C897	U821
	A1731	A1655	C1588	C1527	A1460	C1393	U1320	G1256	G1188	U1115	C1042	A967	C898	U822
	A1732	U1656	G1589	U1528	C1461	C1394	A1321	G1257	A1189	U1116	A1043	A967	C899	G823
	C1733	U1657	G1590	C1529	G1462	G1395	A1322	U1258	C1192	G1117	U1044	U968	G901	U826
	U1734	G1658	A1591	G1530	G1466	U1396	G1323	U1259	A1193	G1118	C1045	C969	G902	C827
	U1735	A1659	A1592	U1532	C1467	U1398	G1324	U1260	A1194	U1122	G1046	A970	G903	U833
	G1736	A1660	C1594	C1533	U1468	C1399	A1325	U1261	A1195	A1137	U1054	A971	U907	G834
		U1661	U1595	G1534	A1469	A1400	A1326	G1262	A1196	A1138	U1055	G972	U908	U835
	C1739	G1662	G1600	U1535	C1470	A1401	G1330	U1263	C1197	A1125	U1049	A973	U909	U836
	A1740	G1663	G1536	G1536	A1471	G1402	A1331	G1264	G1198	G1126	G1050	A974	C910	U840
	U1741	U1669	C1601	C1537	C1472	C1403	C1332	G1265	G1199	G1127	U1051	G976	U911	U841
	U1742	U1670	C1602	U1538	U1473	G1404	C1333	G1266	G1200	G1137	U1052	A977	U912	C842
	U1743	G1671	U1604	G1539	G1474	A1405	C1334	U1267	G1201	A1139	U1053	A978	C913	U843
	A1744	A1671	U1605	G1540	A1475	A1406	U1335	G1267	A1202	A1143	U1056	U979	U916	A844
	G1745	G1672	G1605	G1541	U1476	U1407	A1336	U1268	A1203	A1144	U1057	U982	U917	G845
	A1746	C1673	C1606	G1542	A1478	G1408	A1337	U1269	C1204	G1141	U1058	A983	U918	G846
		C1675	A1543	U1544	A1479	G1409	U1206	U1276	A1205	A1142	H1059	G984	U921	C852
	A1755	G1676	U1544	A1545	C1482	A1410	A1341	G1277	C1207	U1144	U1060	A988	G922	
	G1757	U1680	A1546	G1546	A1483	G1412	A1344	G1278	G1210	U1145	A1061	U989	A923	A856
	U1758	A1681	U1547	U1547	G1484	U1413	A1345	G1279	A1211	G1146	A1062	C990	A924	U857
	C1759	U1682	A1611	G1548	G1485	U1414	A1346	C1280	G1212	A1147	U1063	G991	G925	U860
	G1760	C1683	U1613	A1550	G1486	U1415	U1347	G1281	G1213	C1148	G1064	A992	A926	U861
	U1761	U1684	A1614	U1551	A1487	G1416	A1348	U1282	A1217	G1149	A1065	A993	U928	A862
	A1762	G1685	C1615	U1552	U1488	G1417	G1349	U1283	G1218	G1150	C1066	C927	C927	A863
	A1763		G1616	G1553	U1489	A1421	U1350	C1284	A1151	C1158	C1074	U1004	U929	
		U1688	U1617	U1554	C1490	A1424	G1351	U1285	A1219	U1152	U1071	U996	A930	G866
	G1767	A1689	C1618	A1555	U1491	A1425	A1357	U1286	C1220	G1153	C1072	C997	A929	G867
	U1769	C1690	C1619	U1557	A1492	C1426	G1358	G1288	A1221	G1154	G1073	G1002	A931	G868
	U1770			U1558	C1493	A1427	C1359	U1289	C1222	G1157	G1074	A1003	A933	G869
	U1771	A1693	G1622	U1559	C1494	G1428	A1360	U1290	A1223	C1158	C1075	U1004	C934	C870
	C1772	G1695	C1623	U1560	U1496	G1429	U1361	G1291	A1224	C1159	A1076	A1005	G936	G871
	C1773	U1696	C1624	U1561	U1497	U1430	U1362	G1292	U1225	A1160	U1080	U1012	G937	G872
	G1774	G1697	U1626	G1562	G1498	C1431	U1363	U1293	A1226	C1161	C1081	U1017	G938	U873
	U1775	G1698	U1627	C1563	G1499	G1432	G1364	G1294	A1227	C1162	A1082	U1018	A941	C874
	A1776	G1699	U1628	U1564	C1500	U1433	G1367	A1295	A1228	C1163	G1083	U1019	G942	G875
	G1777	C1700	G1629	C1565	C1501	U1434	U1370	G1296	A1230	G1164	A1084	U1018	A941	G876
	G1778	A1701	U1630	U1566	G1502	G1435	A1367	G1297	A1231	G1165	G1085	A1019	G942	G877
	U1779	U1702	C1631	U1567	G1503	A1436	U1371	G1298	U1232	A1166	G1085	C1022	U945	G878
	G1780		C1632	C1568	A1506	A1437	A1372	G1299	G1233	G1167	A1086			

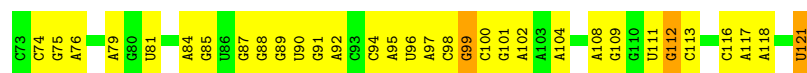
• Molecule 2: 25S rRNA





- Molecule 3: 5S rRNA

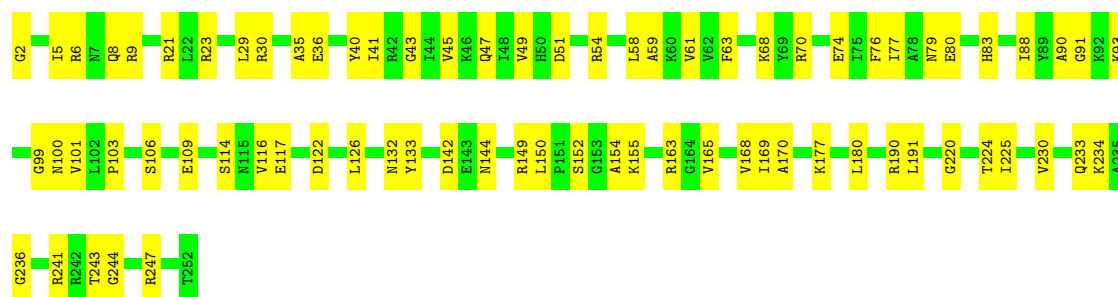




• Molecule 4: 5.8S rRNA



• Molecule 5: Large ribosomal subunit protein uL2A

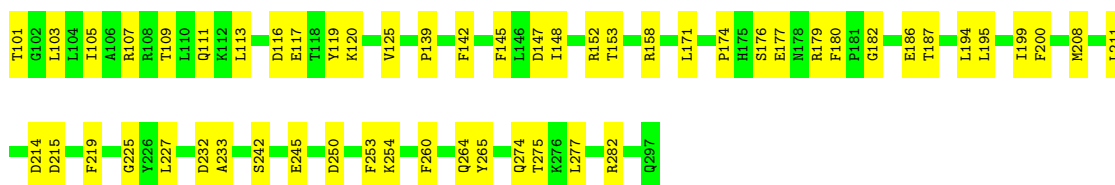


• Molecule 6: Large ribosomal subunit protein uL4A



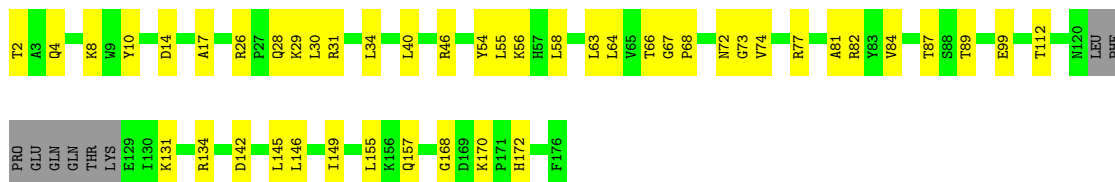
• Molecule 7: Large ribosomal subunit protein uL18





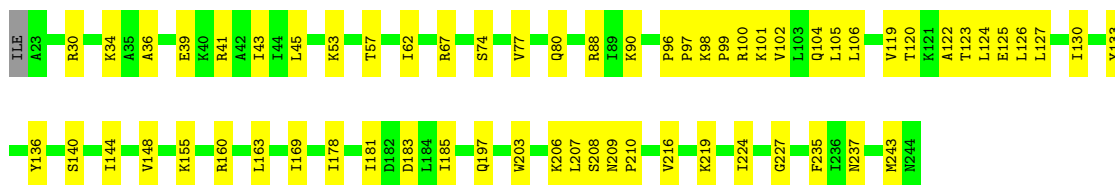
• Molecule 8: Large ribosomal subunit protein eL6B

Chain H: 70% 26% 5%



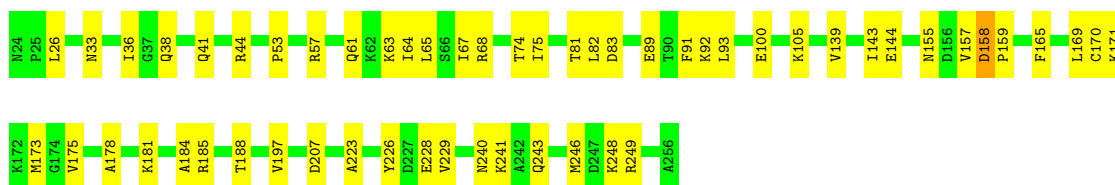
• Molecule 9: Large ribosomal subunit protein uL30A

Chain I: 72% 28%



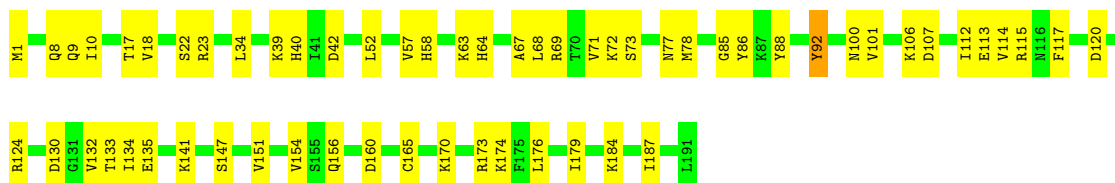
• Molecule 10: Large ribosomal subunit protein eL8A

Chain J: 76% 23%



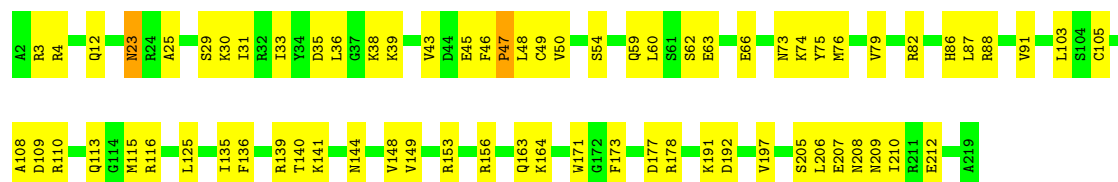
• Molecule 11: Large ribosomal subunit protein uL6A

Chain K: 69% 30%



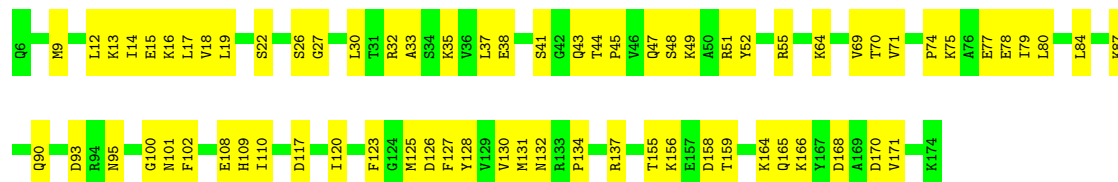
• Molecule 12: Large ribosomal subunit protein uL16

Chain L: 67% 32%



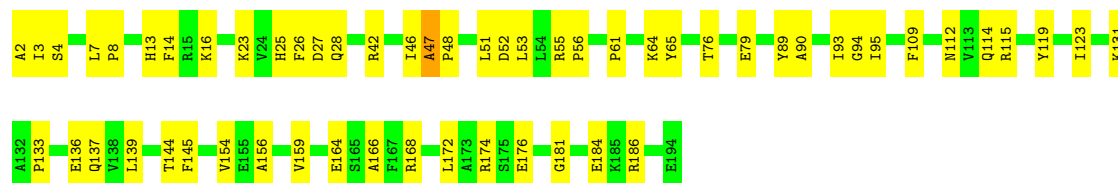
- Molecule 13: Large ribosomal subunit protein uL5B

Chain M: 58% 42%



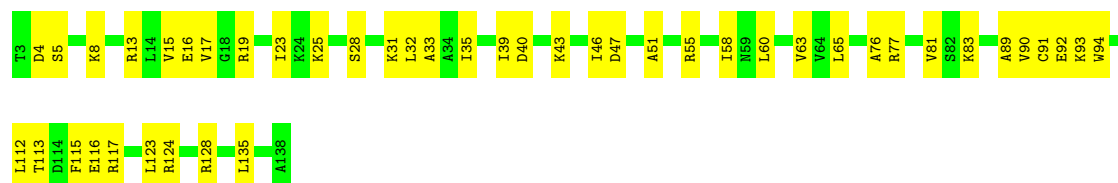
- Molecule 14: Large ribosomal subunit protein eL13A

Chain N: 70% 29%



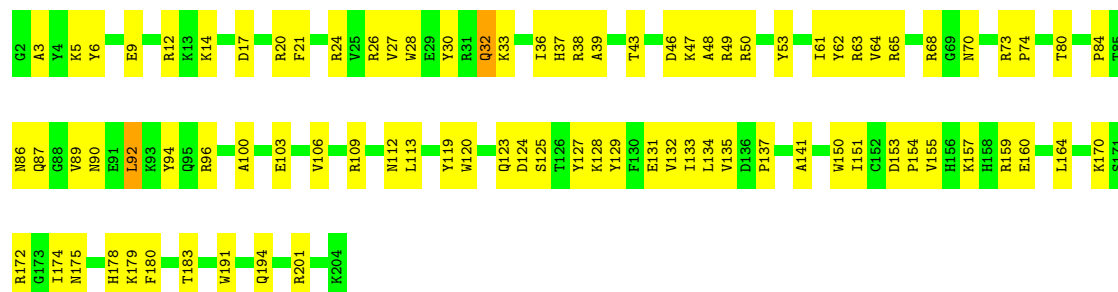
- Molecule 15: Large ribosomal subunit protein eL14A

Chain O: 67% 33%

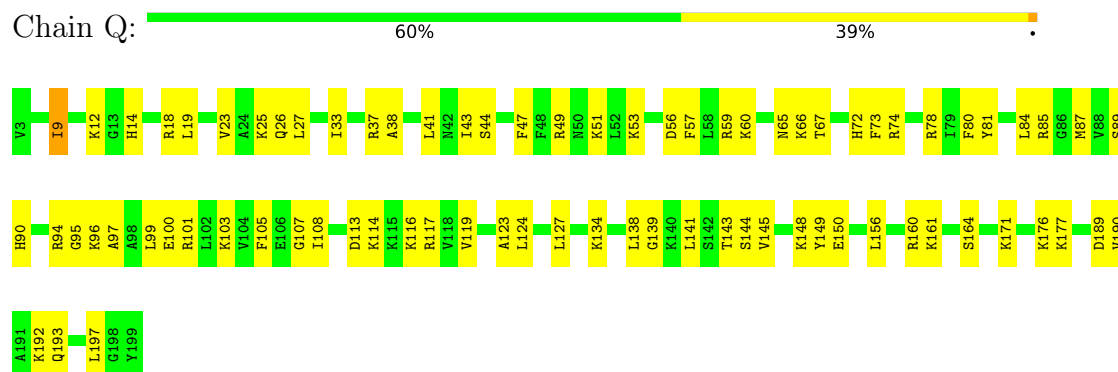


- Molecule 16: Large ribosomal subunit protein eL15A

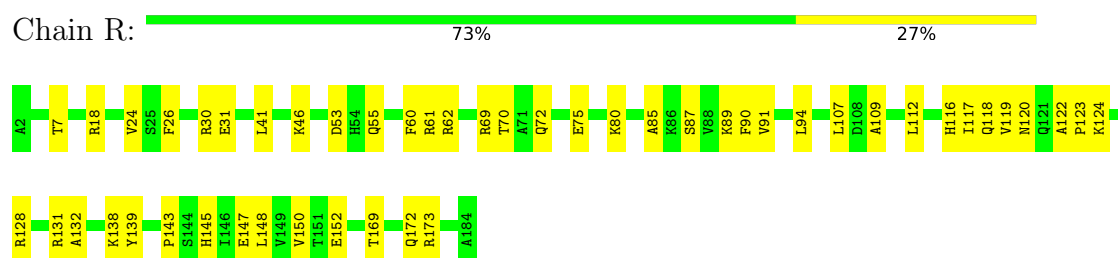
Chain P: 58% 41%



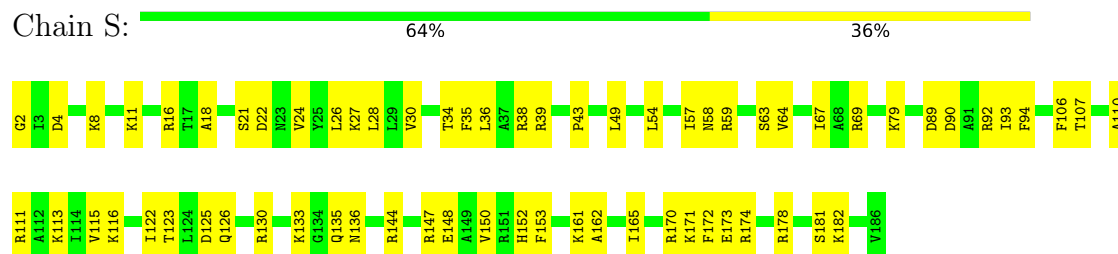
- Molecule 17: Large ribosomal subunit protein uL13A



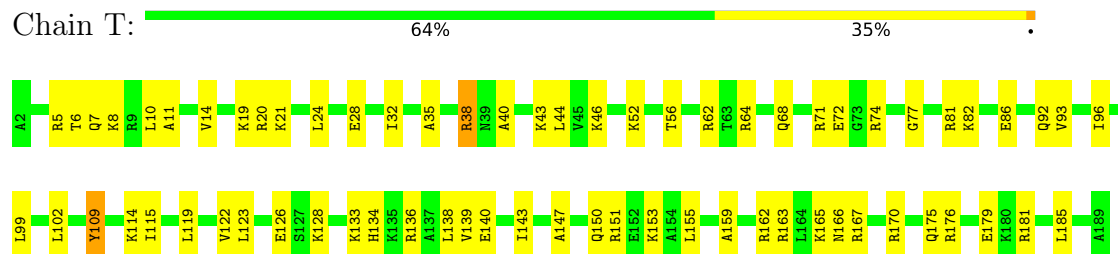
- Molecule 18: Large ribosomal subunit protein uL22A



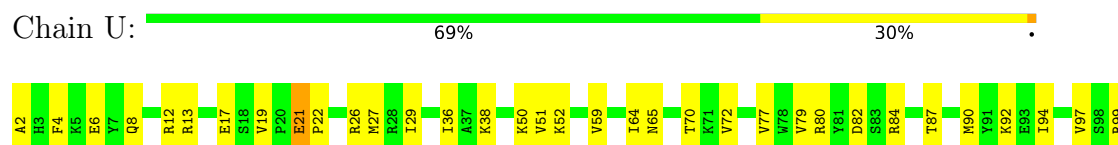
- Molecule 19: Large ribosomal subunit protein eL18A

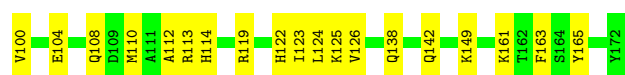


- Molecule 20: Large ribosomal subunit protein eL19A

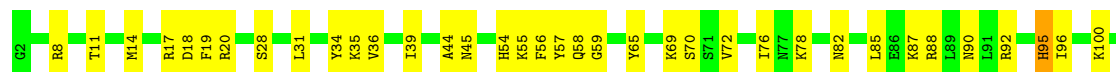


- Molecule 21: Large ribosomal subunit protein eL20A





- Molecule 22: Large ribosomal subunit protein eL21A



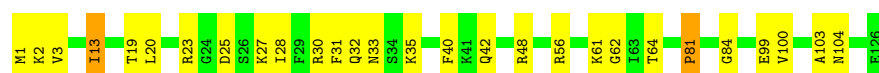
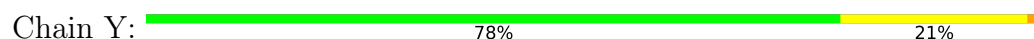
- Molecule 23: Large ribosomal subunit protein eL22A



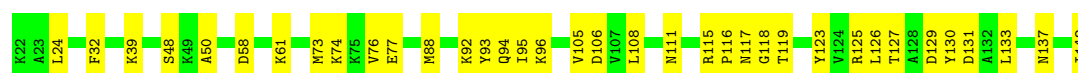
- Molecule 24: Large ribosomal subunit protein uL14A



- Molecule 25: Large ribosomal subunit protein eL24A

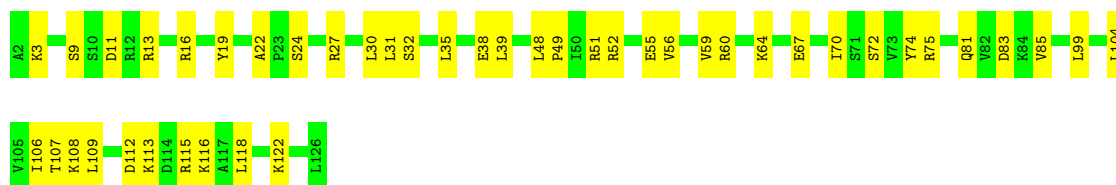


- Molecule 26: Large ribosomal subunit protein uL23



- Molecule 27: Large ribosomal subunit protein uL24A





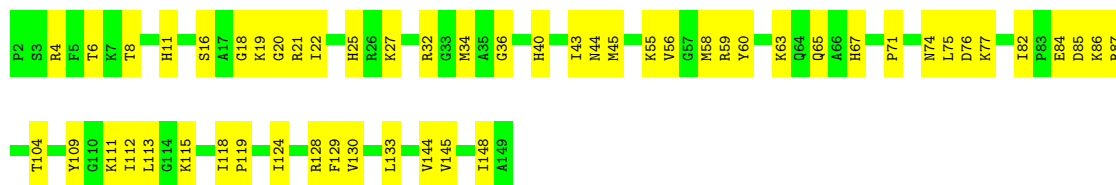
- Molecule 28: Large ribosomal subunit protein eL27A

Chain b: 70% 30%



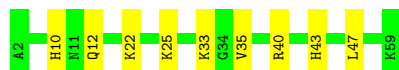
- Molecule 29: Large ribosomal subunit protein uL15

Chain c: 64% 36%



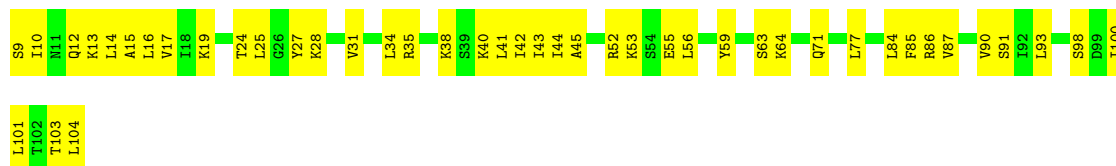
- Molecule 30: Large ribosomal subunit protein eL29

Chain d: 84% 16%



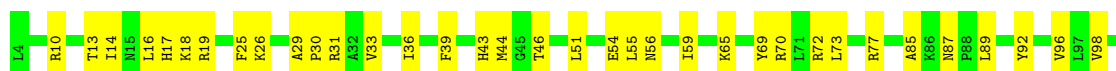
- Molecule 31: Large ribosomal subunit protein eL30

Chain e: 54% 46%



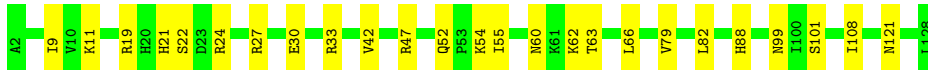
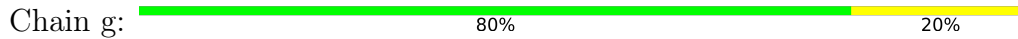
- Molecule 32: Large ribosomal subunit protein eL31A

Chain f: 67% 33%





- Molecule 33: Large ribosomal subunit protein eL32



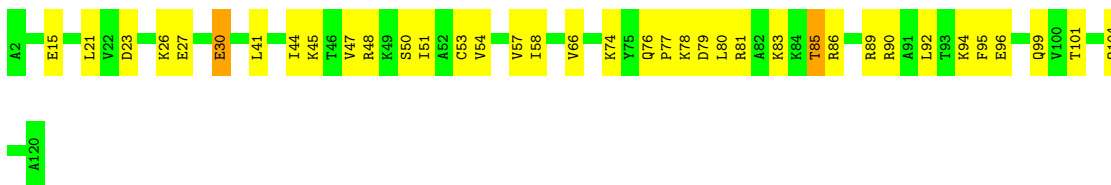
- Molecule 34: Large ribosomal subunit protein eL33A



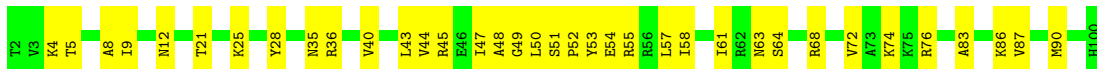
- Molecule 35: Large ribosomal subunit protein eL34A



- Molecule 36: Large ribosomal subunit protein uL29A

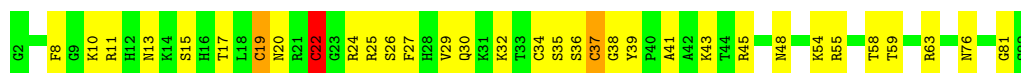


- Molecule 37: Large ribosomal subunit protein eL36A



- Molecule 38: Large ribosomal subunit protein eL37A





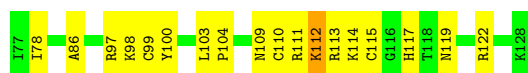
- Molecule 39: Large ribosomal subunit protein eL38



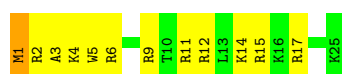
- Molecule 40: Large ribosomal subunit protein eL39



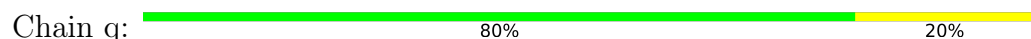
- Molecule 41: Large ribosomal subunit protein eL40A



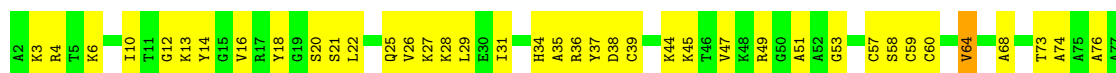
- Molecule 42: Large ribosomal subunit protein eL41A



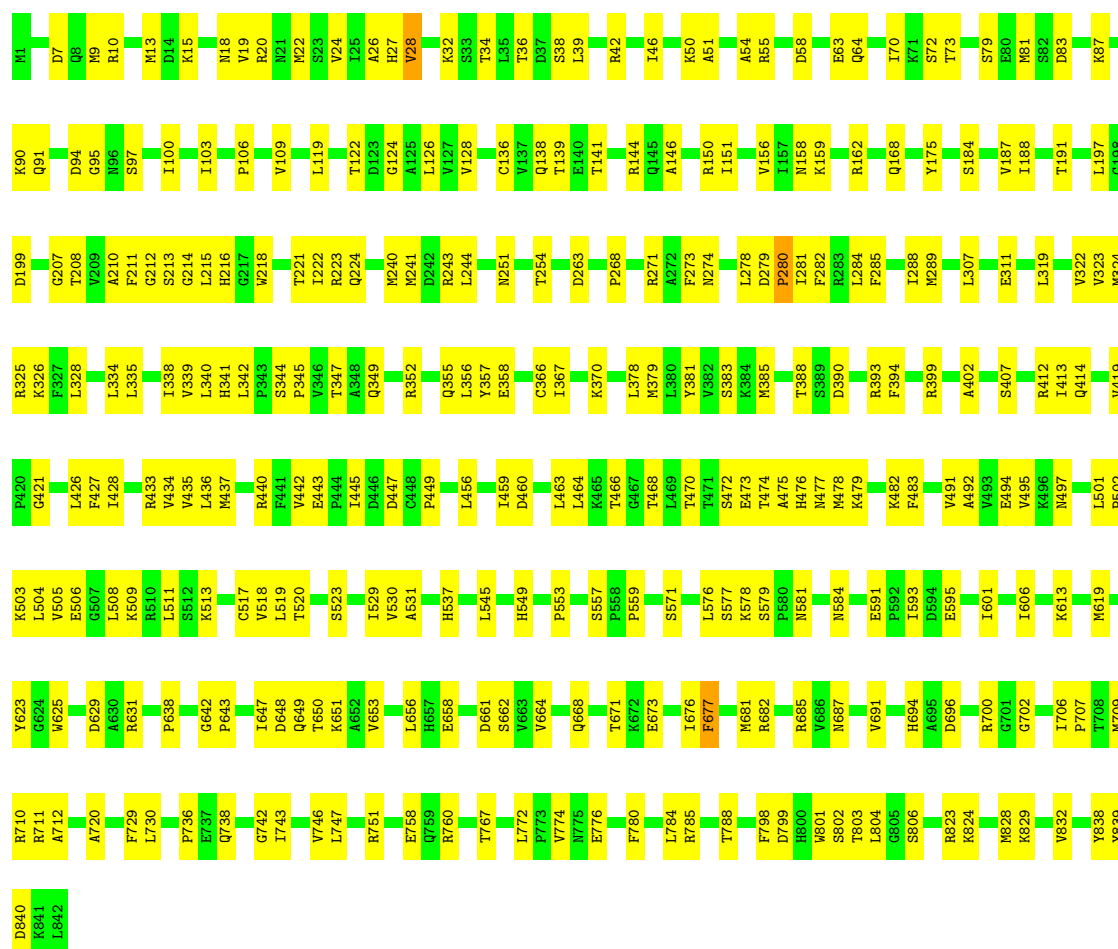
- Molecule 43: Large ribosomal subunit protein eL42A



- Molecule 44: Large ribosomal subunit protein eL43A

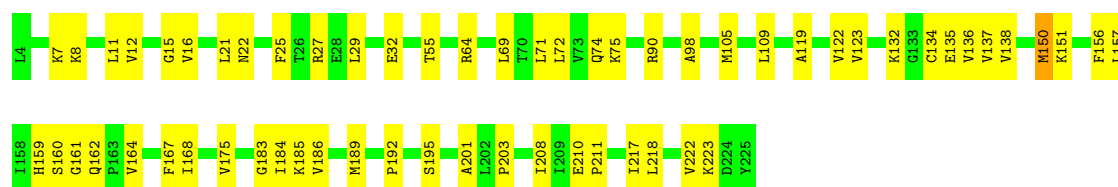


- Molecule 45: tRNA



- Molecule 48: Small ribosomal subunit protein uS3

Chain SA: 73% 27%



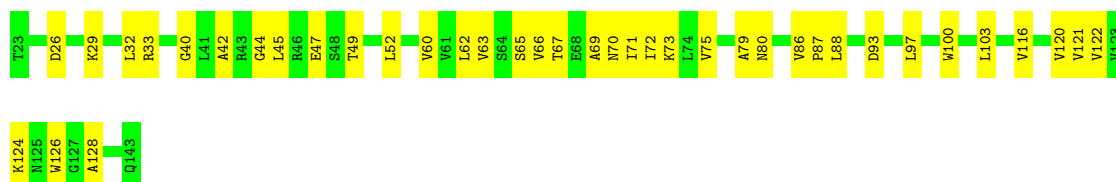
- Molecule 49: Small ribosomal subunit protein eS10A

Chain SC: 62% 37%



- Molecule 50: Small ribosomal subunit protein eS12

Chain SD: 68% 32%



- Molecule 51: Small ribosomal subunit protein uS19

Chain SE: 75% 25%



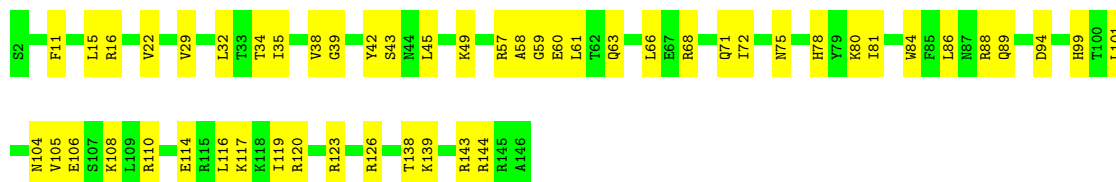
- Molecule 52: Small ribosomal subunit protein uS9A

Chain SF: 52% 46%



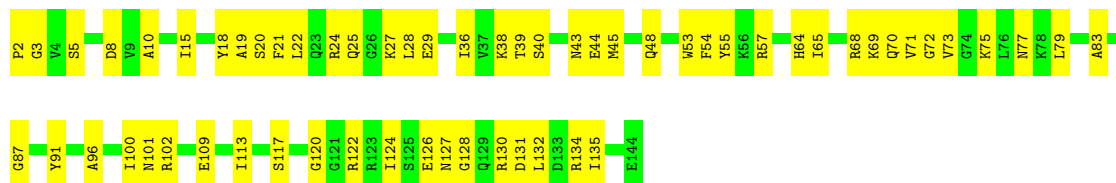
- Molecule 53: Small ribosomal subunit protein uS13A

Chain SH: 65% 35%



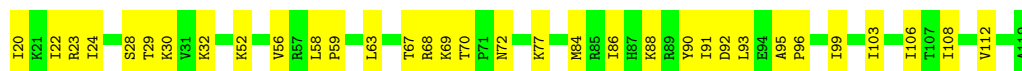
- Molecule 54: Small ribosomal subunit protein eS19A

Chain SI: 58% 42%

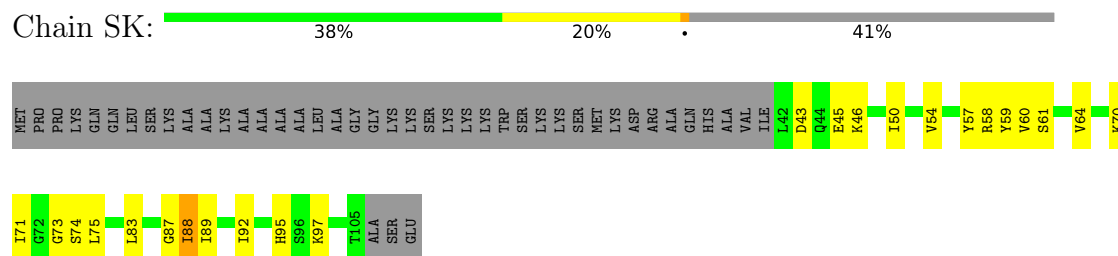


- Molecule 55: Small ribosomal subunit protein uS10

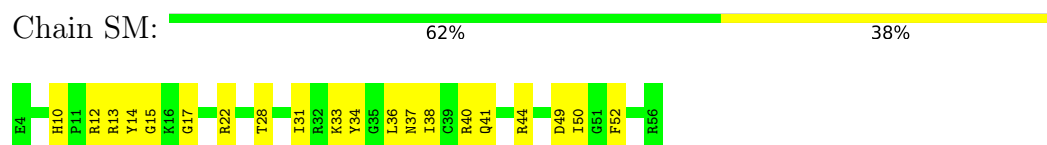
Chain SJ: 67% 33%



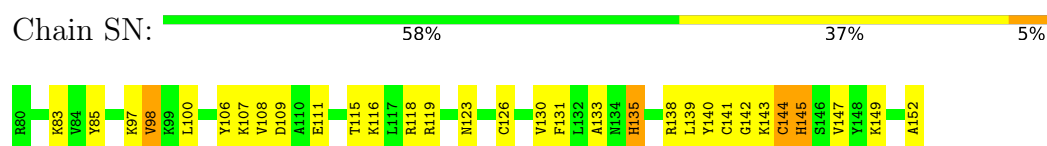
- Molecule 56: Small ribosomal subunit protein eS25A



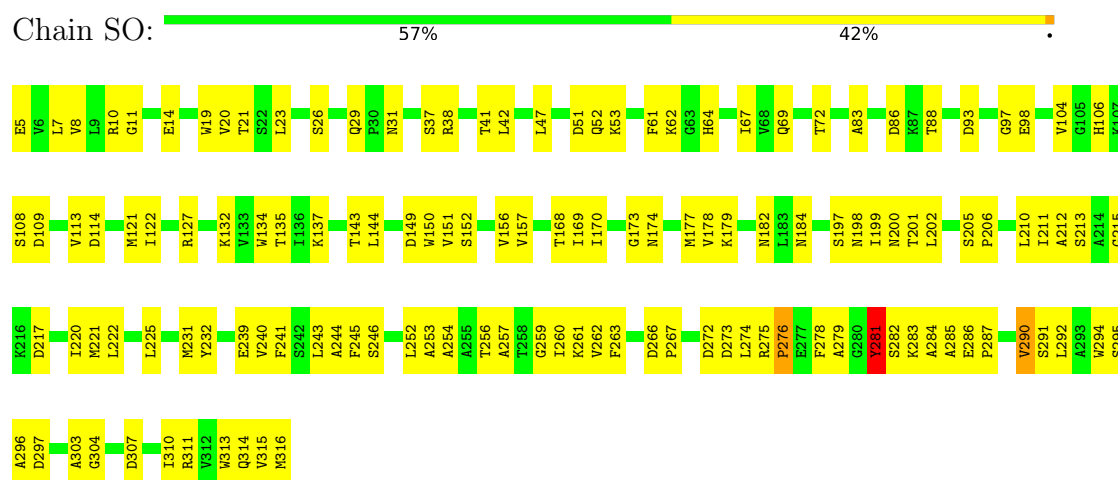
- Molecule 57: Small ribosomal subunit protein uS14A



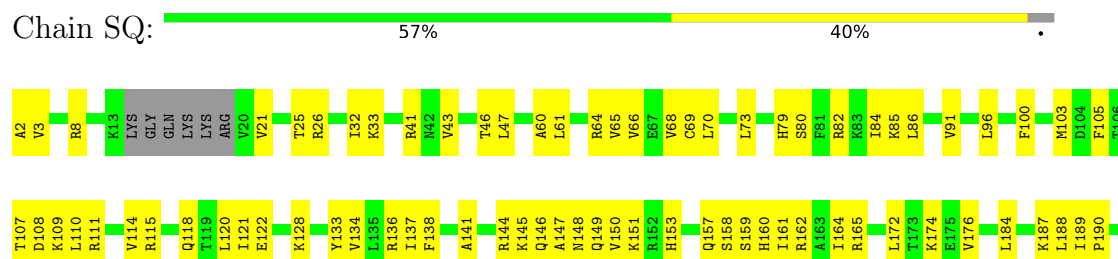
- Molecule 58: Small ribosomal subunit protein eS31



- Molecule 59: Small ribosomal subunit protein RACK1



- Molecule 60: Small ribosomal subunit protein eS1A





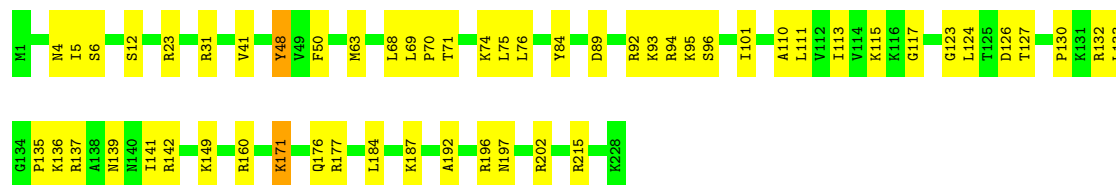
- Molecule 61: Small ribosomal subunit protein eS4A

Chain SS: 67% 33%



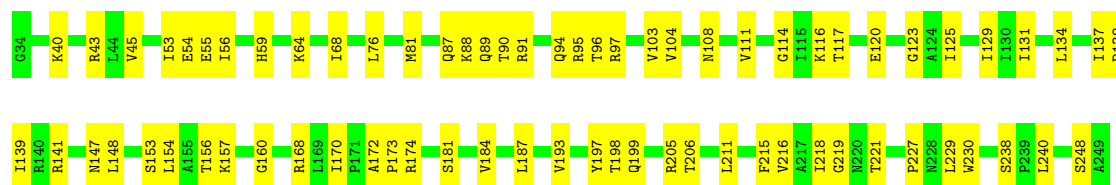
- Molecule 62: Small ribosomal subunit protein eS6A

Chain ST: 76% 23%



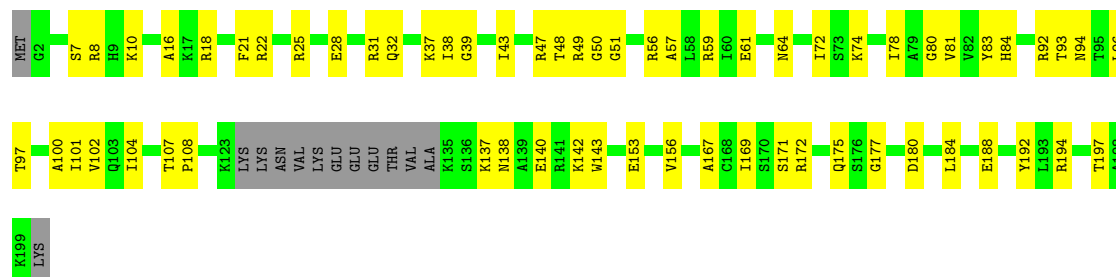
- Molecule 63: Small ribosomal subunit protein uS5

Chain SR: 67% 33%



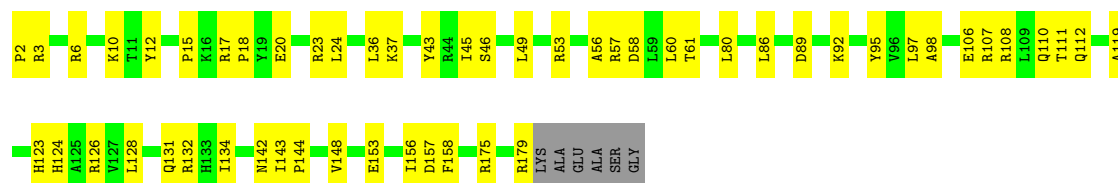
- Molecule 64: Small ribosomal subunit protein eS8A

Chain SV: 62% 31% 6%



- Molecule 65: Small ribosomal subunit protein uS4A

Chain SW:  67% 29%



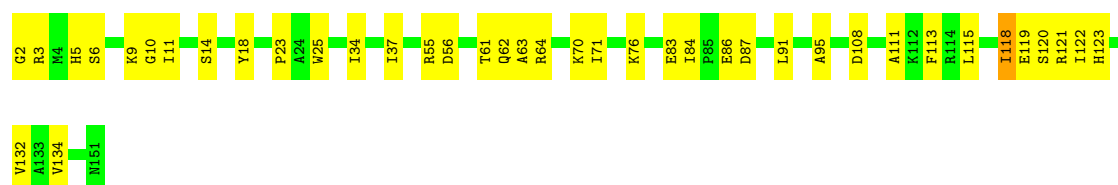
- Molecule 66: Small ribosomal subunit protein uS17A

Chain SX:  74% 25%



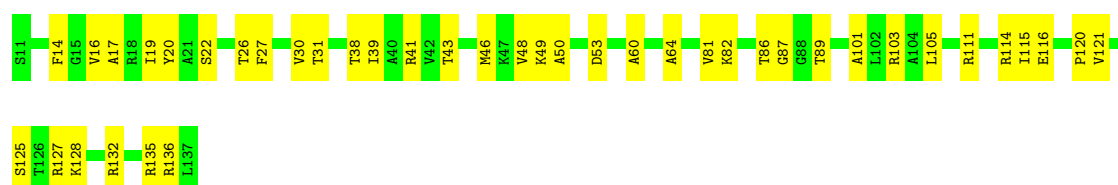
- Molecule 67: Small ribosomal subunit protein uS15

Chain SY:  73% 26%



- Molecule 68: Small ribosomal subunit protein uS11B

Chain SZ:  68% 32%



- Molecule 69: Small ribosomal subunit protein eS21A

Chain Sa:  72% 28%



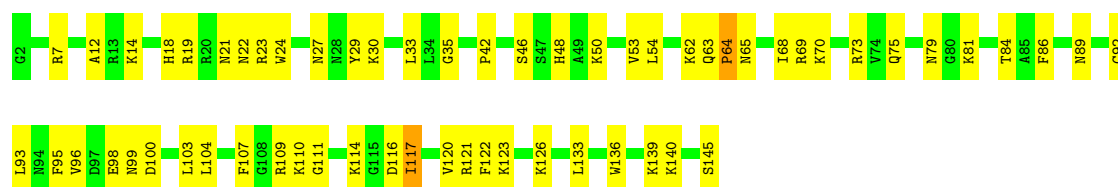
- Molecule 70: Small ribosomal subunit protein uS8A

Chain Sb:  53% 47%



- Molecule 71: Small ribosomal subunit protein uS12A

Chain Sc:  58% 40%



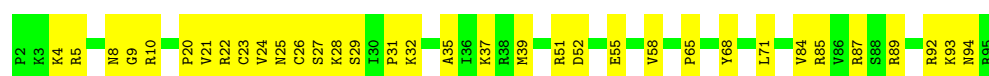
- Molecule 72: Small ribosomal subunit protein eS24A

Chain Sd:  72% 28%



- Molecule 73: Small ribosomal subunit protein eS26A

Chain Se:  64% 36%



- Molecule 74: Small ribosomal subunit protein eS27A

Chain Sf:  85% 15%



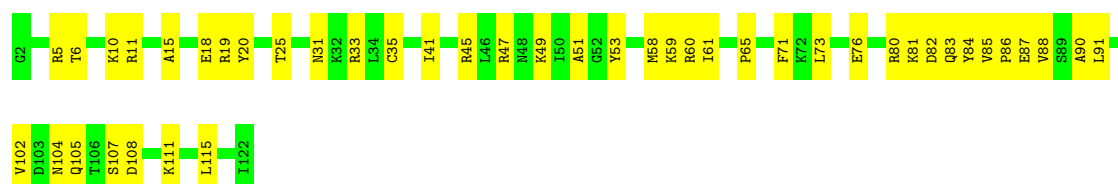
- Molecule 75: Small ribosomal subunit protein eS30A

Chain Sg:  75% 25%



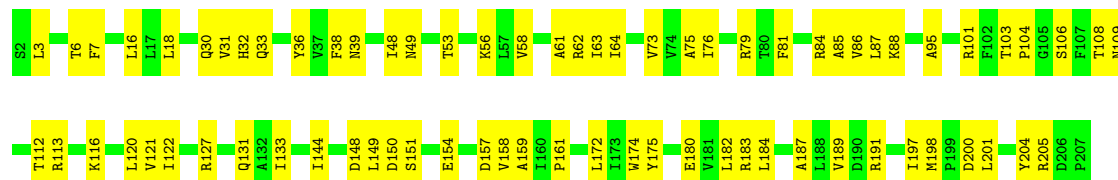
- Molecule 76: Small ribosomal subunit protein eS17A

Chain SG:  64% 36%



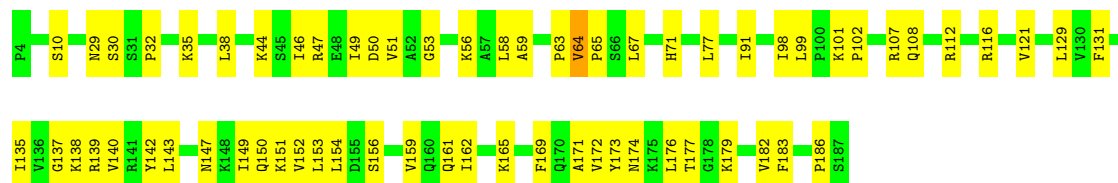
- Molecule 77: Small ribosomal subunit protein uS2A

Chain SP: 65% 35%



- Molecule 78: Small ribosomal subunit protein eS7A

Chain SU: 65% 34%



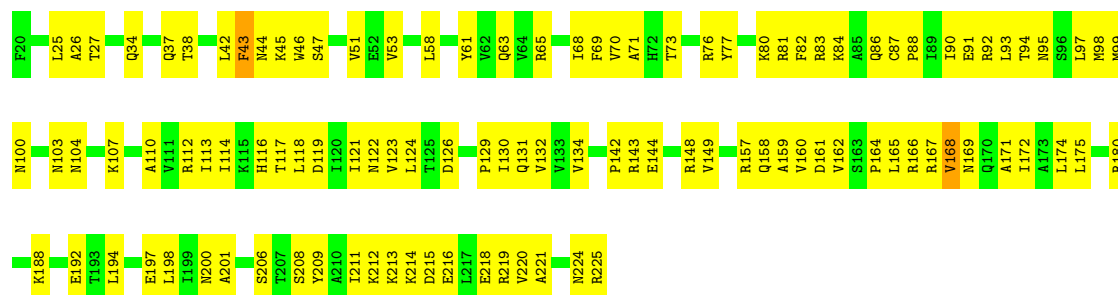
- Molecule 79: Small ribosomal subunit protein eS28A

Chain SL: 49% 46% 5%



- Molecule 80: Small ribosomal subunit protein uS7

Chain SB: 48% 51%



- Molecule 81: Large ribosomal subunit protein uL3

Chain E: 71% 29%



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	11880	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	2	0.11	0/42211	0.26	0/65773
2	A	0.08	0/76425	0.21	0/119146
3	B	0.07	0/2883	0.19	0/4491
4	C	0.10	0/3746	0.25	0/5832
5	D	0.12	0/1933	0.33	0/2598
6	F	0.11	0/2800	0.29	0/3790
7	G	0.10	0/2400	0.33	0/3239
8	H	0.14	0/1329	0.32	0/1794
9	I	0.12	0/1821	0.33	0/2451
10	J	0.14	0/1836	0.40	0/2481
11	K	0.13	0/1529	0.35	0/2060
12	L	0.15	0/1801	0.39	0/2416
13	M	0.16	0/1367	0.45	0/1834
14	N	0.11	0/1568	0.30	0/2106
15	O	0.12	0/1068	0.33	0/1438
16	P	0.16	0/1757	0.39	0/2354
17	Q	0.17	0/1585	0.46	0/2128
18	R	0.13	0/1439	0.37	0/1938
19	S	0.12	0/1465	0.33	0/1965
20	T	0.15	0/1532	0.40	0/2043
21	U	0.14	0/1473	0.34	1/1980 (0.1%)
22	V	0.16	0/1296	0.45	1/1739 (0.1%)
23	W	0.12	0/812	0.37	0/1099
24	X	0.14	0/1018	0.42	0/1369
25	Y	0.16	0/850	0.46	0/1152
26	Z	0.14	0/979	0.40	0/1321
27	a	0.10	0/995	0.35	0/1329
28	b	0.14	0/1106	0.37	0/1485
29	c	0.12	0/1200	0.33	0/1607
30	d	0.11	0/473	0.34	0/629
31	e	0.14	0/745	0.42	0/1001
32	f	0.17	0/890	0.46	0/1196
33	g	0.10	0/1034	0.30	0/1385
34	h	0.13	0/868	0.40	0/1168

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
35	i	0.14	0/890	0.36	0/1189
36	j	0.16	0/978	0.51	1/1301 (0.1%)
37	k	0.12	0/772	0.33	0/1026
38	l	0.19	0/660	0.54	1/875 (0.1%)
39	m	0.20	0/618	0.52	1/826 (0.1%)
40	n	0.25	0/443	0.69	1/588 (0.2%)
41	o	0.14	0/416	0.42	0/553
42	p	0.17	0/230	0.51	0/296
43	q	0.11	0/836	0.34	0/1104
44	r	0.14	0/701	0.45	0/934
45	t	0.08	0/1795	0.20	0/2797
45	u	0.08	0/1771	0.21	0/2760
46	v	0.13	0/7611	0.36	1/10322 (0.0%)
47	x	0.13	0/6685	0.38	1/9050 (0.0%)
48	SA	0.13	0/1754	0.35	0/2361
49	SC	0.18	0/769	0.53	0/1039
50	SD	0.13	0/883	0.42	0/1199
51	SE	0.13	0/936	0.38	0/1259
52	SF	0.16	0/1125	0.44	0/1510
53	SH	0.12	0/1207	0.37	0/1623
54	SI	0.11	0/1130	0.33	0/1517
55	SJ	0.15	0/807	0.45	1/1091 (0.1%)
56	SK	0.19	0/526	0.55	0/706
57	SM	0.14	0/452	0.47	0/600
58	SN	0.21	0/571	0.60	1/768 (0.1%)
59	SO	0.30	2/2436 (0.1%)	0.44	2/3318 (0.1%)
60	SQ	0.14	0/1819	0.38	0/2442
61	SS	0.11	0/2097	0.34	0/2823
62	ST	0.11	0/1839	0.33	0/2460
63	SR	0.16	0/1656	0.47	0/2251
64	SV	0.11	0/1501	0.34	0/2006
65	SW	0.13	0/1466	0.42	0/1966
66	SX	0.12	0/1168	0.35	0/1575
67	SY	0.12	0/1215	0.34	0/1638
68	SZ	0.10	0/901	0.30	0/1217
69	Sa	0.16	0/682	0.42	0/921
70	Sb	0.19	0/1038	0.51	0/1395
71	Sc	0.13	0/1139	0.37	0/1518
72	Sd	0.11	0/1087	0.31	0/1449
73	Se	0.13	0/761	0.38	0/1016
74	Sf	0.13	0/620	0.34	0/838
75	Sg	0.12	0/480	0.34	0/639
76	SG	0.17	0/971	0.45	0/1303

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
77	SP	0.14	0/1644	0.41	0/2249
78	SU	0.13	0/1498	0.38	0/2019
79	SL	0.24	0/499	0.62	0/670
80	SB	0.23	0/1629	0.69	3/2202 (0.1%)
81	E	0.10	0/3146	0.30	0/4228
All	All	0.12	2/232092 (0.0%)	0.31	15/339774 (0.0%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
59	SO	281	TYR	C-N	9.83	1.47	1.34
59	SO	21	THR	C-N	-5.56	1.26	1.33

The worst 5 of 15 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
38	l	22	CYS	N-CA-C	-10.19	100.17	111.07
46	v	205	ILE	N-CA-C	-7.35	106.73	113.71
58	SN	144	CYS	N-CA-C	-6.88	103.28	113.61
22	V	127	GLN	CA-CB-CG	6.20	126.50	114.10
39	m	71	PRO	CA-N-CD	-5.91	103.73	112.00

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	2	37739	0	18988	966	0
2	A	68278	0	34316	1429	0
3	B	2579	0	1304	65	0
4	C	3353	0	1695	87	0
5	D	1899	0	1957	62	0
6	F	2748	0	2859	77	0
7	G	2351	0	2294	66	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
8	H	1307	0	1377	34	0
9	I	1784	0	1862	50	0
10	J	1804	0	1877	43	0
11	K	1508	0	1572	47	0
12	L	1764	0	1804	56	0
13	M	1346	0	1370	61	0
14	N	1543	0	1608	45	0
15	O	1053	0	1149	38	0
16	P	1720	0	1779	80	0
17	Q	1555	0	1659	71	0
18	R	1416	0	1433	37	0
19	S	1441	0	1543	60	0
20	T	1515	0	1606	52	0
21	U	1437	0	1475	47	0
22	V	1272	0	1312	44	0
23	W	796	0	812	23	0
24	X	1003	0	1048	53	0
25	Y	836	0	706	26	0
26	Z	964	0	1025	30	0
27	a	984	0	1075	34	0
28	b	1080	0	1122	33	0
29	c	1169	0	1211	45	0
30	d	462	0	491	7	0
31	e	737	0	792	35	0
32	f	876	0	912	32	0
33	g	1013	0	1077	21	0
34	h	850	0	880	42	0
35	i	880	0	945	29	0
36	j	969	0	1078	31	0
37	k	766	0	844	33	0
38	l	645	0	649	33	0
39	m	612	0	682	21	0
40	n	436	0	475	25	0
41	o	410	0	446	17	0
42	p	229	0	273	16	0
43	q	824	0	892	22	0
44	r	694	0	738	36	0
45	t	1605	0	816	34	0
45	u	1584	0	805	24	0
46	v	7476	0	7414	209	0
47	x	6559	0	6627	215	0
48	SA	1729	0	1812	55	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
49	SC	752	0	719	35	0
50	SD	875	0	878	27	0
51	SE	916	0	941	25	0
52	SF	1105	0	1166	72	0
53	SH	1188	0	1218	42	0
54	SI	1112	0	1124	53	0
55	SJ	797	0	863	28	0
56	SK	519	0	558	24	0
57	SM	442	0	432	27	0
58	SN	560	0	560	33	0
59	SO	2383	0	2332	113	0
60	SQ	1794	0	1887	72	0
61	SS	2056	0	2140	63	0
62	ST	1815	0	1894	49	0
63	SR	1626	0	1715	56	0
64	SV	1476	0	1501	59	0
65	SW	1441	0	1519	46	0
66	SX	1142	0	1209	28	0
67	SY	1192	0	1255	30	0
68	SZ	891	0	883	41	0
69	Sa	673	0	662	21	0
70	Sb	1021	0	1060	63	0
71	Sc	1121	0	1196	56	0
72	Sd	1073	0	1132	32	0
73	Se	750	0	799	28	0
74	Sf	610	0	633	11	0
75	Sg	472	0	521	15	0
76	SG	961	0	999	44	0
77	SP	1603	0	1610	70	0
78	SU	1473	0	1555	49	0
79	SL	497	0	535	37	0
80	SB	1609	0	1675	115	0
81	E	3075	0	3142	97	0
All	All	216620	0	162799	5384	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 5384 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)
1:2:1055:U:H3	1:2:1064:G:H1	1.04	0.98
1:2:1499:G:H1	1:2:1508:U:H3	1.06	0.97
63:SR:227:PRO:HA	63:SR:230:TRP:CD1	1.99	0.97
2:A:3006:A:H62	2:A:3140:G:N2	1.64	0.95
1:2:821:U:H3	1:2:852:C:N4	1.65	0.94

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	
5	D	249/251 (99%)	227 (91%)	22 (9%)	0	100	100
6	F	359/361 (99%)	345 (96%)	14 (4%)	0	100	100
7	G	292/294 (99%)	279 (96%)	13 (4%)	0	100	100
8	H	163/175 (93%)	153 (94%)	10 (6%)	0	100	100
9	I	220/223 (99%)	209 (95%)	11 (5%)	0	100	100
10	J	231/233 (99%)	221 (96%)	9 (4%)	1 (0%)	30	65
11	K	189/191 (99%)	177 (94%)	12 (6%)	0	100	100
12	L	216/218 (99%)	194 (90%)	21 (10%)	1 (0%)	25	60
13	M	167/169 (99%)	154 (92%)	13 (8%)	0	100	100
14	N	191/193 (99%)	180 (94%)	9 (5%)	2 (1%)	13	46
15	O	134/136 (98%)	124 (92%)	10 (8%)	0	100	100
16	P	201/203 (99%)	195 (97%)	6 (3%)	0	100	100
17	Q	195/197 (99%)	190 (97%)	5 (3%)	0	100	100
18	R	181/183 (99%)	173 (96%)	8 (4%)	0	100	100
19	S	183/185 (99%)	175 (96%)	7 (4%)	1 (0%)	25	60
20	T	186/188 (99%)	185 (100%)	1 (0%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
21	U	169/171 (99%)	162 (96%)	7 (4%)	0	100	100
22	V	157/159 (99%)	147 (94%)	10 (6%)	0	100	100
23	W	98/100 (98%)	96 (98%)	2 (2%)	0	100	100
24	X	134/136 (98%)	131 (98%)	3 (2%)	0	100	100
25	Y	124/126 (98%)	108 (87%)	15 (12%)	1 (1%)	16	51
26	Z	119/121 (98%)	111 (93%)	8 (7%)	0	100	100
27	a	123/125 (98%)	114 (93%)	9 (7%)	0	100	100
28	b	133/135 (98%)	124 (93%)	9 (7%)	0	100	100
29	c	146/148 (99%)	134 (92%)	12 (8%)	0	100	100
30	d	56/58 (97%)	55 (98%)	1 (2%)	0	100	100
31	e	94/96 (98%)	88 (94%)	6 (6%)	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%)	98 (94%)	6 (6%)	0	100	100
35	i	110/112 (98%)	103 (94%)	7 (6%)	0	100	100
36	j	117/119 (98%)	114 (97%)	3 (3%)	0	100	100
37	k	97/99 (98%)	94 (97%)	3 (3%)	0	100	100
38	l	79/81 (98%)	75 (95%)	4 (5%)	0	100	100
39	m	75/77 (97%)	71 (95%)	4 (5%)	0	100	100
40	n	48/50 (96%)	44 (92%)	4 (8%)	0	100	100
41	o	50/52 (96%)	48 (96%)	2 (4%)	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	975/1044 (93%)	897 (92%)	75 (8%)	3 (0%)	37	70
47	x	840/842 (100%)	759 (90%)	79 (9%)	2 (0%)	44	75
48	SA	220/222 (99%)	206 (94%)	14 (6%)	0	100	100
49	SC	90/92 (98%)	78 (87%)	12 (13%)	0	100	100
50	SD	119/121 (98%)	97 (82%)	22 (18%)	0	100	100
51	SE	115/117 (98%)	97 (84%)	18 (16%)	0	100	100
52	SF	139/141 (99%)	132 (95%)	6 (4%)	1 (1%)	19	54

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
53	SH	143/145 (99%)	133 (93%)	10 (7%)	0	100	100
54	SI	141/143 (99%)	131 (93%)	10 (7%)	0	100	100
55	SJ	98/100 (98%)	88 (90%)	10 (10%)	0	100	100
56	SK	62/108 (57%)	57 (92%)	4 (6%)	1 (2%)	8	37
57	SM	51/53 (96%)	43 (84%)	8 (16%)	0	100	100
58	SN	71/73 (97%)	47 (66%)	22 (31%)	2 (3%)	4	28
59	SO	310/312 (99%)	281 (91%)	26 (8%)	3 (1%)	13	46
60	SQ	221/232 (95%)	201 (91%)	20 (9%)	0	100	100
61	SS	256/258 (99%)	239 (93%)	17 (7%)	0	100	100
62	ST	226/228 (99%)	215 (95%)	10 (4%)	1 (0%)	30	65
63	SR	214/216 (99%)	197 (92%)	17 (8%)	0	100	100
64	SV	183/200 (92%)	178 (97%)	5 (3%)	0	100	100
65	SW	176/184 (96%)	166 (94%)	10 (6%)	0	100	100
66	SX	140/142 (99%)	130 (93%)	10 (7%)	0	100	100
67	SY	148/150 (99%)	143 (97%)	5 (3%)	0	100	100
68	SZ	125/127 (98%)	115 (92%)	10 (8%)	0	100	100
69	Sa	85/87 (98%)	76 (89%)	8 (9%)	1 (1%)	11	43
70	Sb	127/129 (98%)	115 (91%)	11 (9%)	1 (1%)	16	51
71	Sc	142/144 (99%)	130 (92%)	11 (8%)	1 (1%)	19	54
72	Sd	132/134 (98%)	122 (92%)	10 (8%)	0	100	100
73	Se	92/94 (98%)	82 (89%)	10 (11%)	0	100	100
74	Sf	79/81 (98%)	76 (96%)	3 (4%)	0	100	100
75	Sg	58/60 (97%)	54 (93%)	4 (7%)	0	100	100
76	SG	119/121 (98%)	107 (90%)	12 (10%)	0	100	100
77	SP	204/206 (99%)	185 (91%)	17 (8%)	2 (1%)	13	46
78	SU	182/184 (99%)	173 (95%)	8 (4%)	1 (0%)	25	60
79	SL	61/63 (97%)	54 (88%)	7 (12%)	0	100	100
80	SB	204/206 (99%)	178 (87%)	26 (13%)	0	100	100
81	E	384/386 (100%)	363 (94%)	21 (6%)	0	100	100
All	All	12767/13071 (98%)	11873 (93%)	869 (7%)	25 (0%)	45	75

5 of 25 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
10	J	158	ASP
25	Y	81	PRO
52	SF	40	GLU
56	SK	88	ILE
70	Sb	76	SER

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	
5	D	190/193 (98%)	188 (99%)	2 (1%)	70	79
6	F	288/288 (100%)	287 (100%)	1 (0%)	91	92
7	G	241/243 (99%)	241 (100%)	0	100	100
8	H	139/154 (90%)	139 (100%)	0	100	100
9	I	186/187 (100%)	185 (100%)	1 (0%)	86	90
10	J	187/191 (98%)	185 (99%)	2 (1%)	70	79
11	K	168/171 (98%)	166 (99%)	2 (1%)	67	78
12	L	185/185 (100%)	184 (100%)	1 (0%)	86	90
13	M	145/147 (99%)	144 (99%)	1 (1%)	81	86
14	N	154/154 (100%)	154 (100%)	0	100	100
15	O	107/107 (100%)	107 (100%)	0	100	100
16	P	175/175 (100%)	171 (98%)	4 (2%)	45	64
17	Q	160/160 (100%)	157 (98%)	3 (2%)	52	70
18	R	138/145 (95%)	136 (99%)	2 (1%)	62	75
19	S	150/150 (100%)	150 (100%)	0	100	100
20	T	152/153 (99%)	149 (98%)	3 (2%)	50	68
21	U	155/155 (100%)	154 (99%)	1 (1%)	84	88
22	V	135/136 (99%)	133 (98%)	2 (2%)	60	74
23	W	87/87 (100%)	87 (100%)	0	100	100
24	X	104/104 (100%)	103 (99%)	1 (1%)	73	81

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
25	Y	56/108 (52%)	54 (96%)	2 (4%)	30	54
26	Z	104/105 (99%)	104 (100%)	0	100	100
27	a	108/108 (100%)	106 (98%)	2 (2%)	52	70
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%)	45 (98%)	1 (2%)	47	65
31	e	81/81 (100%)	81 (100%)	0	100	100
32	f	92/96 (96%)	91 (99%)	1 (1%)	70	79
33	g	107/109 (98%)	107 (100%)	0	100	100
34	h	90/90 (100%)	90 (100%)	0	100	100
35	i	95/95 (100%)	94 (99%)	1 (1%)	70	79
36	j	104/104 (100%)	103 (99%)	1 (1%)	73	81
37	k	80/81 (99%)	80 (100%)	0	100	100
38	l	67/67 (100%)	64 (96%)	3 (4%)	23	48
39	m	68/68 (100%)	68 (100%)	0	100	100
40	n	45/45 (100%)	44 (98%)	1 (2%)	47	65
41	o	45/47 (96%)	44 (98%)	1 (2%)	47	65
42	p	22/23 (96%)	21 (96%)	1 (4%)	23	48
43	q	87/88 (99%)	87 (100%)	0	100	100
44	r	71/71 (100%)	69 (97%)	2 (3%)	38	59
46	v	789/890 (89%)	788 (100%)	1 (0%)	92	95
47	x	715/715 (100%)	714 (100%)	1 (0%)	92	95
48	SA	182/182 (100%)	180 (99%)	2 (1%)	70	79
49	SC	77/85 (91%)	76 (99%)	1 (1%)	65	76
50	SD	88/98 (90%)	88 (100%)	0	100	100
51	SE	95/98 (97%)	95 (100%)	0	100	100
52	SF	117/117 (100%)	115 (98%)	2 (2%)	56	72
53	SH	127/128 (99%)	127 (100%)	0	100	100
54	SI	115/115 (100%)	114 (99%)	1 (1%)	75	83
55	SJ	93/93 (100%)	93 (100%)	0	100	100
56	SK	57/89 (64%)	56 (98%)	1 (2%)	54	71

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
57	SM	47/47 (100%)	46 (98%)	1 (2%)	48	67
58	SN	57/64 (89%)	56 (98%)	1 (2%)	54	71
59	SO	250/257 (97%)	248 (99%)	2 (1%)	79	84
60	SQ	200/205 (98%)	200 (100%)	0	100	100
61	SS	220/220 (100%)	218 (99%)	2 (1%)	75	83
62	ST	189/195 (97%)	188 (100%)	1 (0%)	86	90
63	SR	175/175 (100%)	175 (100%)	0	100	100
64	SV	148/161 (92%)	148 (100%)	0	100	100
65	SW	153/157 (98%)	153 (100%)	0	100	100
66	SX	126/127 (99%)	124 (98%)	2 (2%)	58	73
67	SY	127/127 (100%)	126 (99%)	1 (1%)	79	84
68	SZ	81/96 (84%)	81 (100%)	0	100	100
69	Sa	71/74 (96%)	71 (100%)	0	100	100
70	Sb	110/110 (100%)	109 (99%)	1 (1%)	75	83
71	Sc	119/119 (100%)	118 (99%)	1 (1%)	79	84
72	Sd	112/112 (100%)	111 (99%)	1 (1%)	75	83
73	Se	81/81 (100%)	81 (100%)	0	100	100
74	Sf	70/70 (100%)	70 (100%)	0	100	100
75	Sg	50/51 (98%)	50 (100%)	0	100	100
76	SG	105/110 (96%)	105 (100%)	0	100	100
77	SP	170/173 (98%)	170 (100%)	0	100	100
78	SU	163/165 (99%)	162 (99%)	1 (1%)	84	88
79	SL	56/56 (100%)	52 (93%)	4 (7%)	12	36
80	SB	173/173 (100%)	172 (99%)	1 (1%)	84	88
81	E	320/322 (99%)	318 (99%)	2 (1%)	84	88
All	All	10671/11007 (97%)	10599 (99%)	72 (1%)	80	86

5 of 72 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
62	ST	48	TYR
81	E	14	LEU
66	SX	142	VAL

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Mol	Chain	Res	Type
79	SL	12	VAL
22	V	95	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 126 such sidechains are listed below:

Mol	Chain	Res	Type
40	n	11	GLN
70	Sb	66	ASN
47	x	668	GLN
70	Sb	15	ASN
79	SL	43	ASN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	2	1768/1799 (98%)	471 (26%)	37 (2%)
2	A	3186/3394 (93%)	500 (15%)	6 (0%)
3	B	120/121 (99%)	14 (11%)	1 (0%)
4	C	157/158 (99%)	33 (21%)	1 (0%)
45	t	74/75 (98%)	17 (22%)	0
45	u	73/75 (97%)	17 (23%)	0
All	All	5378/5622 (95%)	1052 (19%)	45 (0%)

5 of 1052 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	2	2	A
1	2	4	C
1	2	25	C
1	2	26	A
1	2	34	G

5 of 45 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	2	1344	A
1	2	1636	C
1	2	1382	A
1	2	1557	U
2	A	1562	C

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

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

5.5 Carbohydrates [i](#)

There are no 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.