wwPDB EM Validation Summary Report

Jun 25, 2025 – 07:16 PM JST

PDB ID	:	8Z71 / pdb_00008z71
EMDB ID	:	EMD-38657
Title	:	State 1a (S1a) of yeast 80S ribosome bound to open eEF3 and 2 tRNAs and eEF1A during mRNA decoding
Authors	:	Cheng, J.; Wu, C.L.; Li, J.X.; Zhang, X.Z.
Deposited on	:	2024-04-19
Resolution	:	3.60 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:

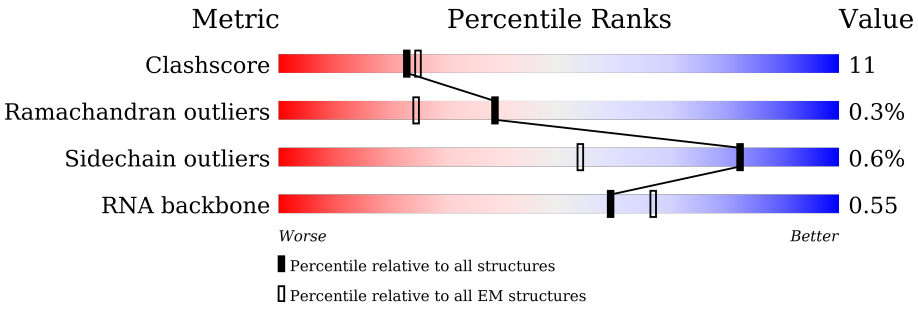
EMDB validation analysis	:	FAILED
MolProbity	:	4-5-2 with Phenix2.0rc1
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)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

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.60 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 <=5%

Mol	Chain	Length	Quality of chain
1	2	1799	56% 35% 8% .
2	SA	222	76% 24%
3	SB	206	67% 31% ..
4	SC	92	61% 38% .
5	SD	121	68% 31% .
6	SE	117	77% 23%
7	SF	141	60% 38% .
8	SG	121	69% 31% .

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Mol	Chain	Length	Quality of chain
9	SH	145	67% 33%
10	SI	143	72% 28%
11	SJ	100	69% 31%
12	SK	108	56% 19% 24%
13	SL	63	73% 27%
14	SM	53	72% 28%
15	SN	73	75% 23%
16	SO	312	55% 43%
17	SP	206	75% 25%
18	SQ	232	73% 24%
19	SR	216	71% 28%
20	SS	258	74% 26%
21	ST	228	78% 22%
22	SU	184	73% 26%
23	SV	200	66% 27% 6%
24	SW	184	74% 25%
25	SX	142	85% 15%
26	SY	150	80% 19%
27	SZ	127	71% 29%
28	Sa	87	71% 29%
29	Sb	129	72% 28%
30	Sc	144	70% 28%
31	Sd	134	79% 21%
32	Se	94	81% 19%
33	Sf	81	88% 12%

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Mol	Chain	Length	Quality of chain
34	Sg	60	85% 15%
35	s	77	21% 53% 25%
36	t	75	65% 28% 7%
37	B	121	67% 29%
38	C	158	66% 29%
39	T	188	84% 16%
40	Y	126	79% 20%
41	A	3394	47% 42% 5% 6%
42	D	251	71% 29%
43	E	386	75% 24%
44	F	361	85% 15%
45	G	294	83% 17%
46	H	175	70% 26% 5%
47	I	223	78% 22%
48	J	233	77% 23%
49	K	191	77% 23%
50	L	218	76% 24%
51	M	169	72% 28%
52	N	193	79% 20%
53	O	136	77% 22%
54	P	203	76% 24%
55	Q	197	81% 19%
56	R	183	81% 19%
57	S	185	79% 21%
58	U	171	77% 23%

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Mol	Chain	Length	Quality of chain
59	V	159	79% 21%
60	W	100	69% 31%
61	X	136	72% 28%
62	Z	121	79% 21%
63	a	125	78% 22%
64	b	135	68% 32%
65	c	148	84% 16%
66	d	58	86% 14%
67	e	96	73% 27%
68	f	109	77% 23%
69	g	127	83% 17%
70	h	106	74% 26%
71	i	112	74% 25%
72	j	119	76% 24%
73	k	99	82% 18%
74	l	81	72% 26%
75	m	77	79% 21%
76	n	50	84% 16%
77	o	52	83% 17%
78	p	25	60% 40%
79	q	103	85% 15%
80	r	91	74% 26%
81	x	462	63% 29% 5%
82	v	1044	49% 43% 6%

2 Entry composition (i)

There are 82 unique types of molecules in this entry. The entry contains 213525 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
			Total	C	N	O	P		
1	2	1771	37739	16872	6683	12413	1771	0	0

- Molecule 2 is a protein called Small ribosomal subunit protein uS3.

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

- Molecule 3 is a protein called Small ribosomal subunit protein uS7.

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

- Molecule 4 is a protein called Small ribosomal subunit protein eS10A.

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

- Molecule 5 is a protein called Small ribosomal subunit protein eS12.

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

- Molecule 6 is a protein called Small ribosomal subunit protein uS19.

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

- Molecule 7 is a protein called Small ribosomal subunit protein uS9A.

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

- Molecule 8 is a protein called Small ribosomal subunit protein eS17A.

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

- Molecule 9 is a protein called Small ribosomal subunit protein uS13A.

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

- Molecule 10 is a protein called Small ribosomal subunit protein eS19A.

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

- Molecule 11 is a protein called Small ribosomal subunit protein uS10.

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

- Molecule 12 is a protein called Small ribosomal subunit protein eS25A.

Mol	Chain	Residues	Atoms				AltConf	Trace
12	SK	82	Total	C	N	O	0	0
			651	416	123	112		

- Molecule 13 is a protein called Small ribosomal subunit protein eS28A.

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

- Molecule 14 is a protein called Small ribosomal subunit protein uS14A.

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

- Molecule 15 is a protein called Small ribosomal subunit protein eS31.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	SN	73	Total	C	N	O	S	0	0
			556	352	105	95	4		

- Molecule 16 is a protein called Small ribosomal subunit protein RACK1.

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

- Molecule 17 is a protein called Small ribosomal subunit protein uS2A.

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

- Molecule 18 is a protein called Small ribosomal subunit protein eS1A.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	SQ	226	Total	C	N	O	S	0	0
			1798	1139	330	325	4		

- Molecule 19 is a protein called Small ribosomal subunit protein uS5.

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

- Molecule 20 is a protein called Small ribosomal subunit protein eS4A.

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

- Molecule 21 is a protein called Small ribosomal subunit protein eS6A.

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

- Molecule 22 is a protein called Small ribosomal subunit protein eS7A.

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

- Molecule 23 is a protein called Small ribosomal subunit protein eS8A.

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

- Molecule 24 is a protein called Small ribosomal subunit protein uS4A.

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

- Molecule 25 is a protein called Small ribosomal subunit protein uS17A.

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

- Molecule 26 is a protein called Small ribosomal subunit protein uS15.

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

- Molecule 27 is a protein called Small ribosomal subunit protein uS11B.

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

- Molecule 28 is a protein called Small ribosomal subunit protein eS21A.

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

- Molecule 29 is a protein called Small ribosomal subunit protein uS8A.

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

- Molecule 30 is a protein called Small ribosomal subunit protein uS12A.

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

- Molecule 31 is a protein called Small ribosomal subunit protein eS24A.

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

- Molecule 32 is a protein called Small ribosomal subunit protein eS26A.

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

- Molecule 33 is a protein called Small ribosomal subunit protein eS27A.

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

- Molecule 34 is a protein called Small ribosomal subunit protein eS30A.

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

- Molecule 35 is a RNA chain called tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	s	76	Total	C	N	O	P	0	0
			1616	723	291	527	75		

- Molecule 36 is a RNA chain called tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	t	75	Total	C	N	O	P	0	0
			1606	716	297	518	75		

- Molecule 37 is a RNA chain called 5S rRNA.

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

- Molecule 38 is a RNA chain called 5.8S rRNA.

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

- Molecule 39 is a protein called Large ribosomal subunit protein eL19A.

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

- Molecule 40 is a protein called Large ribosomal subunit protein eL24A.

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

- Molecule 41 is a RNA chain called 25S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	A	3187	Total	C	N	O	P	0	0
			68170	30449	12289	22245	3187		

- Molecule 42 is a protein called Large ribosomal subunit protein uL2A.

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

- Molecule 43 is a protein called Large ribosomal subunit protein uL3.

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

- Molecule 44 is a protein called Large ribosomal subunit protein uL4A.

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

- Molecule 45 is a protein called Large ribosomal subunit protein uL18.

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

- Molecule 46 is a protein called Large ribosomal subunit protein eL6B.

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

- Molecule 47 is a protein called Large ribosomal subunit protein uL30A.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	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 48 is a protein called Large ribosomal subunit protein eL8A.

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

- Molecule 49 is a protein called Large ribosomal subunit protein uL6A.

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

- Molecule 50 is a protein called Large ribosomal subunit protein uL16.

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

- Molecule 51 is a protein called Large ribosomal subunit protein uL5B.

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

- Molecule 52 is a protein called Large ribosomal subunit protein eL13A.

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

- Molecule 53 is a protein called Large ribosomal subunit protein eL14A.

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

- Molecule 54 is a protein called Large ribosomal subunit protein eL15A.

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

- Molecule 55 is a protein called Large ribosomal subunit protein uL13A.

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

- Molecule 56 is a protein called Large ribosomal subunit protein uL22A.

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

- Molecule 57 is a protein called Large ribosomal subunit protein eL18A.

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

- Molecule 58 is a protein called Large ribosomal subunit protein eL20A.

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

- Molecule 59 is a protein called Large ribosomal subunit protein eL21A.

Mol	Chain	Residues	Atoms					AltConf	Trace
59	V	159	Total	C	N	O	S	0	0
			1272	802	245	221	4		

- Molecule 60 is a protein called Large ribosomal subunit protein eL22A.

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

- Molecule 61 is a protein called Large ribosomal subunit protein uL14A.

Mol	Chain	Residues	Atoms					AltConf	Trace
61	X	136	Total	C	N	O	S	0	0
			1003	628	189	179	7		

- Molecule 62 is a protein called Large ribosomal subunit protein uL23.

Mol	Chain	Residues	Atoms					AltConf	Trace
62	Z	121	Total	C	N	O	S	0	0
			964	620	169	173	2		

- Molecule 63 is a protein called Large ribosomal subunit protein uL24A.

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

- Molecule 64 is a protein called Large ribosomal subunit protein eL27A.

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

- Molecule 65 is a protein called Large ribosomal subunit protein uL15.

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

- Molecule 66 is a protein called Large ribosomal subunit protein eL29.

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

- Molecule 67 is a protein called Large ribosomal subunit protein eL30.

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

- Molecule 68 is a protein called Large ribosomal subunit protein eL31A.

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

- Molecule 69 is a protein called Large ribosomal subunit protein eL32.

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

- Molecule 70 is a protein called Large ribosomal subunit protein eL33A.

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

- Molecule 71 is a protein called Large ribosomal subunit protein eL34A.

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

- Molecule 72 is a protein called Large ribosomal subunit protein uL29A.

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

- Molecule 73 is a protein called Large ribosomal subunit protein eL36A.

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

- Molecule 74 is a protein called Large ribosomal subunit protein eL37A.

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

- Molecule 75 is a protein called Large ribosomal subunit protein eL38.

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

- Molecule 76 is a protein called Large ribosomal subunit protein eL39.

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

- Molecule 77 is a protein called Large ribosomal subunit protein eL40A.

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

- Molecule 78 is a protein called Large ribosomal subunit protein eL41A.

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

- Molecule 79 is a protein called Large ribosomal subunit protein eL42A.

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

- Molecule 80 is a protein called Large ribosomal subunit protein eL43A.

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

- Molecule 81 is a protein called Elongation factor 1-alpha 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
81	x	441	Total	C	N	O	S	0	0
			3379	2148	581	633	17		

- Molecule 82 is a protein called Elongation factor 3A.

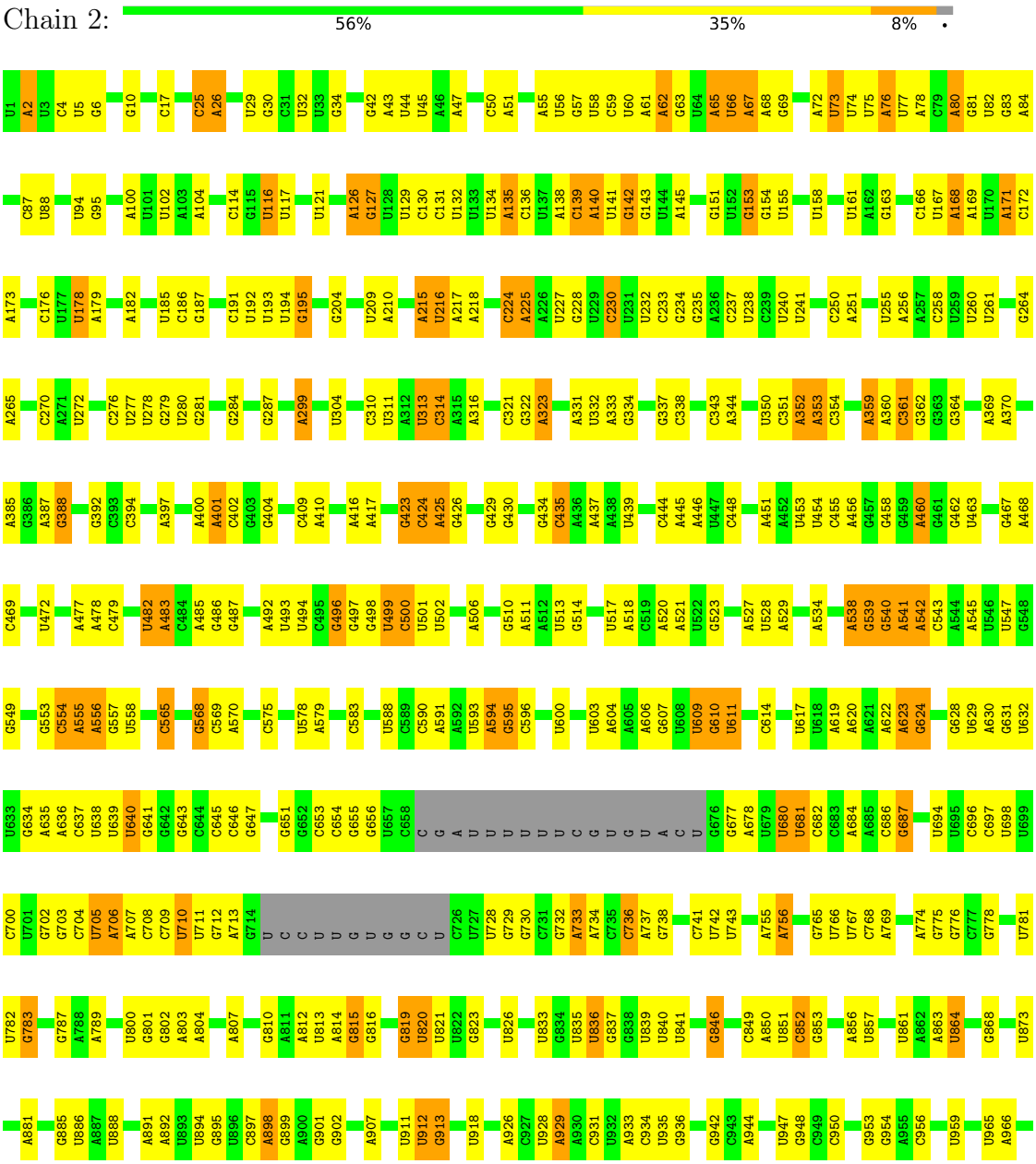
Mol	Chain	Residues	Atoms					AltConf	Trace
82	v	977	Total	C	N	O	S	0	0
			7476	4726	1295	1418	37		

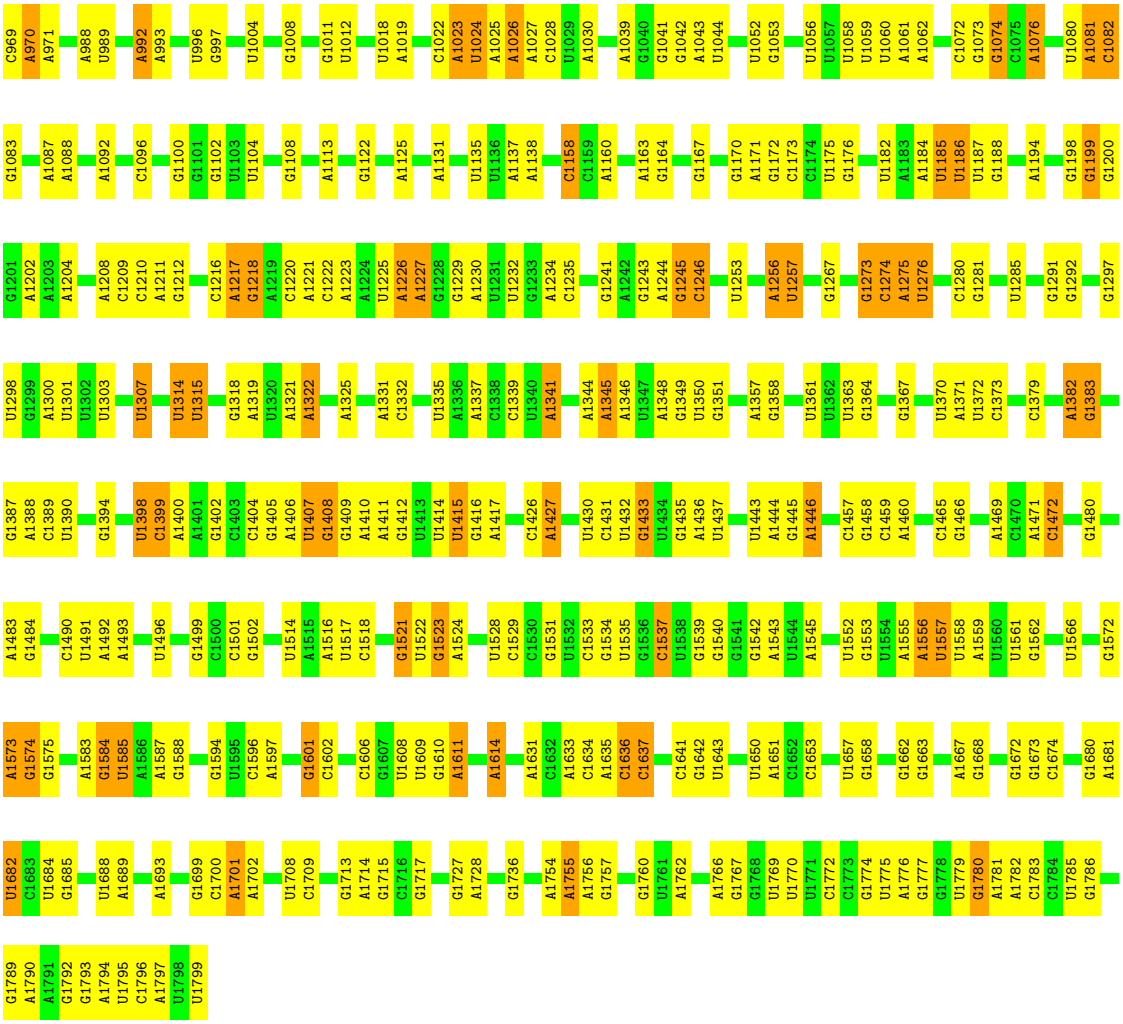
3 Residue-property plots (i)

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

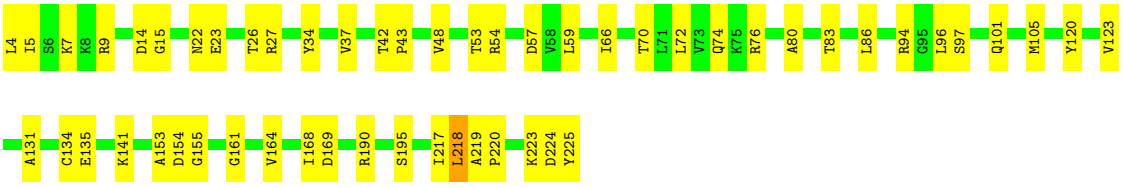
Chain 2:





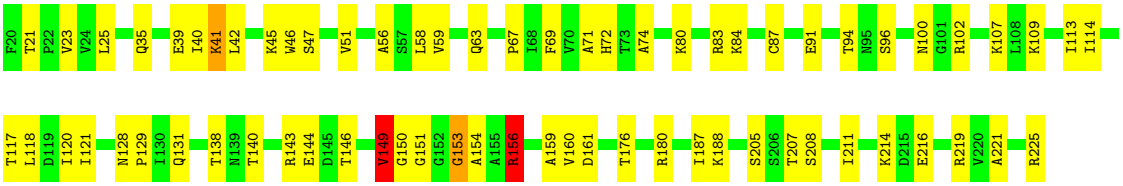
• Molecule 2: Small ribosomal subunit protein uS3

Chain SA:



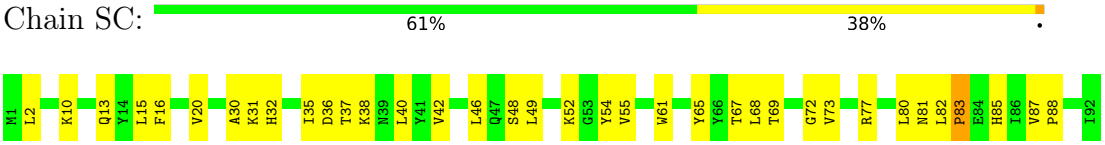
• Molecule 3: Small ribosomal subunit protein uS7

Chain SB:



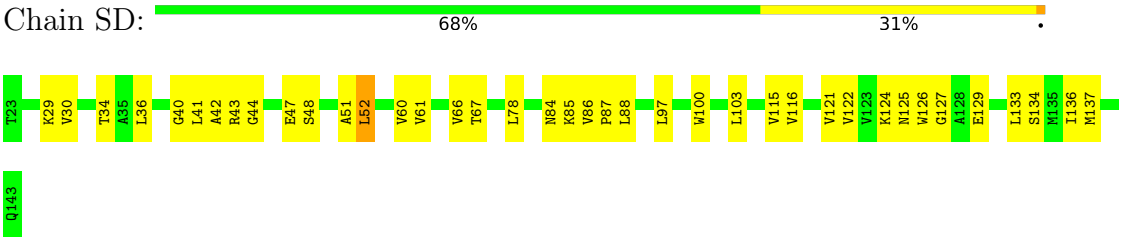
• Molecule 4: Small ribosomal subunit protein eS10A

Chain SC:



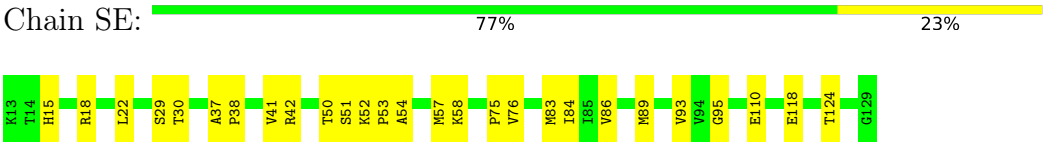
• Molecule 5: Small ribosomal subunit protein eS12

Chain SD:



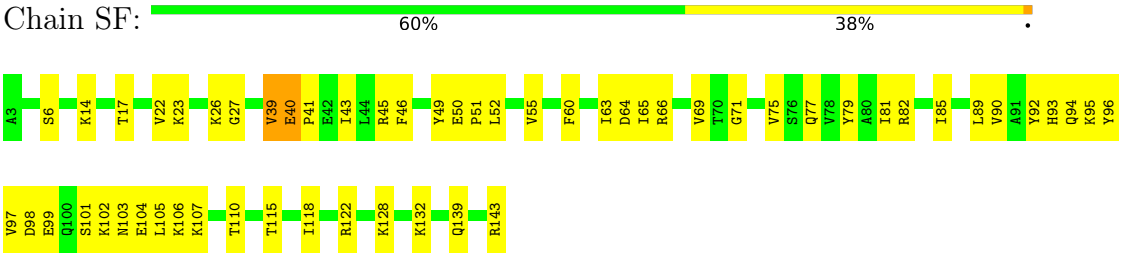
• Molecule 6: Small ribosomal subunit protein uS19

Chain SE:



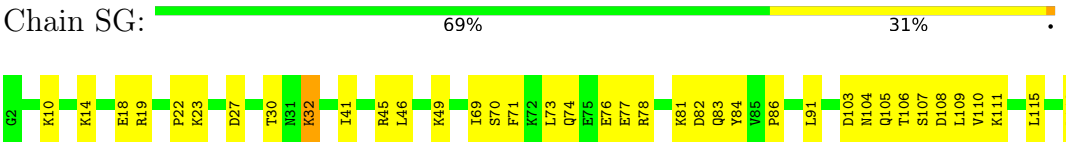
• Molecule 7: Small ribosomal subunit protein uS9A

Chain SF:



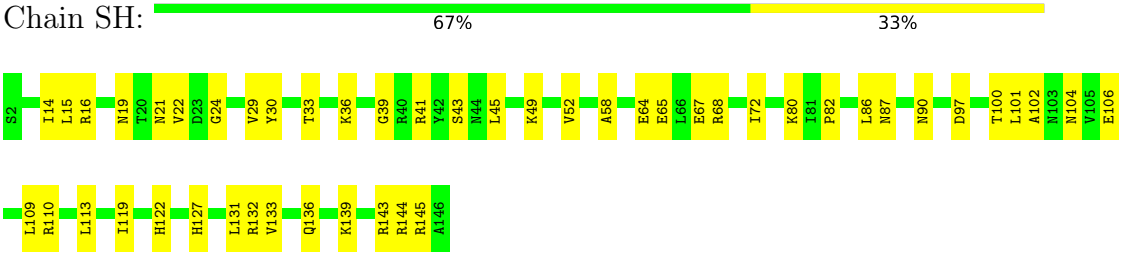
• Molecule 8: Small ribosomal subunit protein eS17A

Chain SG:



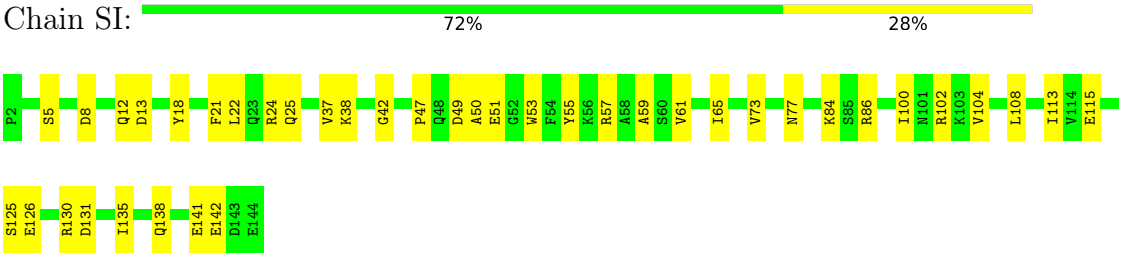
• Molecule 9: Small ribosomal subunit protein uS13A

Chain SH:



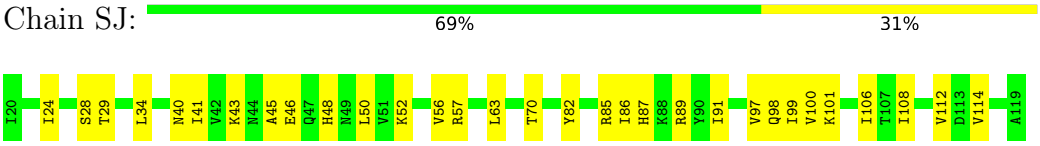
• Molecule 10: Small ribosomal subunit protein eS19A

Chain SI:



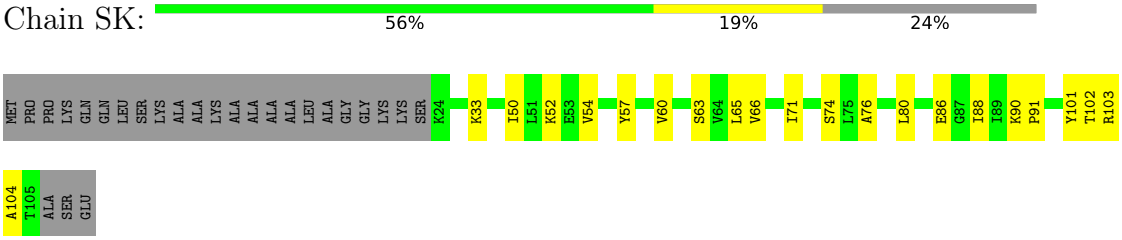
• Molecule 11: Small ribosomal subunit protein uS10

Chain SJ:



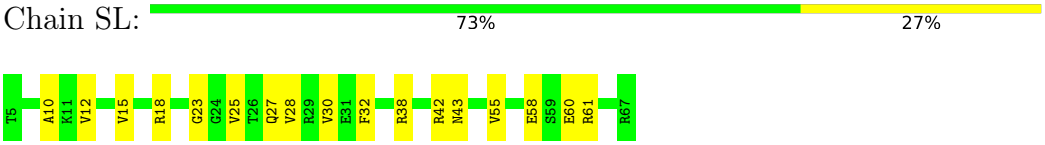
• Molecule 12: Small ribosomal subunit protein eS25A

Chain SK:



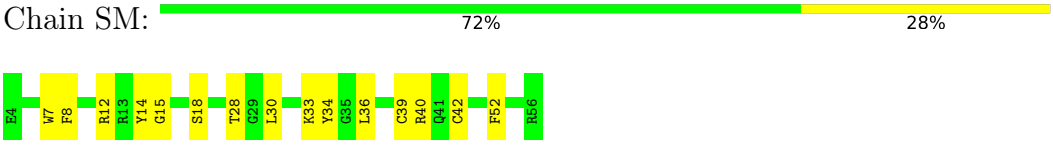
• Molecule 13: Small ribosomal subunit protein eS28A

Chain SL:



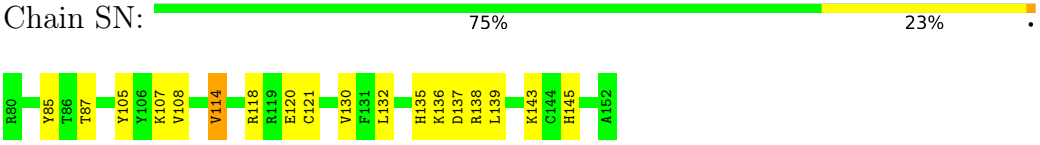
• Molecule 14: Small ribosomal subunit protein uS14A

Chain SM:



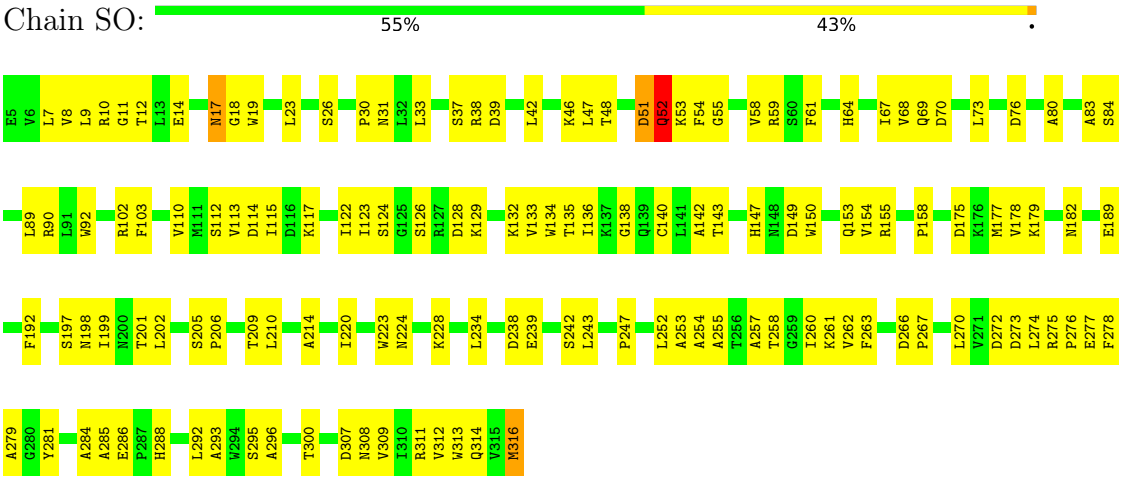
• Molecule 15: Small ribosomal subunit protein eS31

Chain SN:



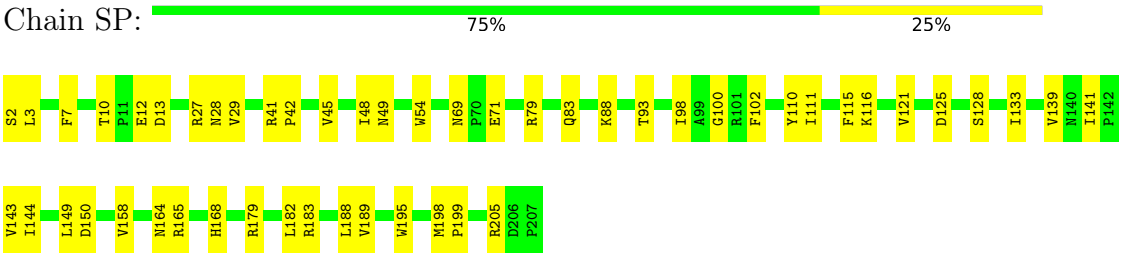
• Molecule 16: Small ribosomal subunit protein RACK1

Chain SO:



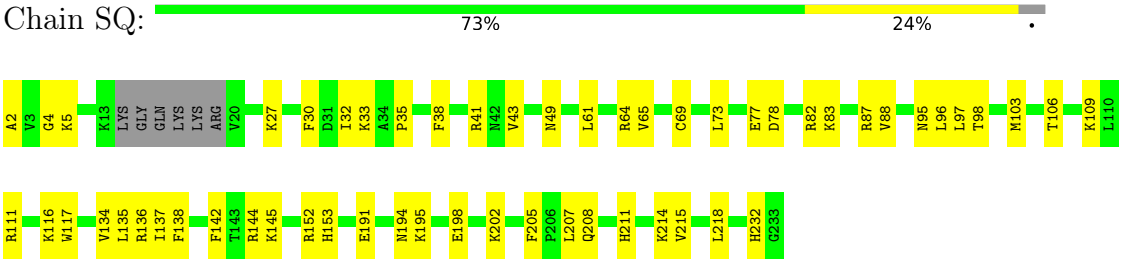
• Molecule 17: Small ribosomal subunit protein uS2A

Chain SP:



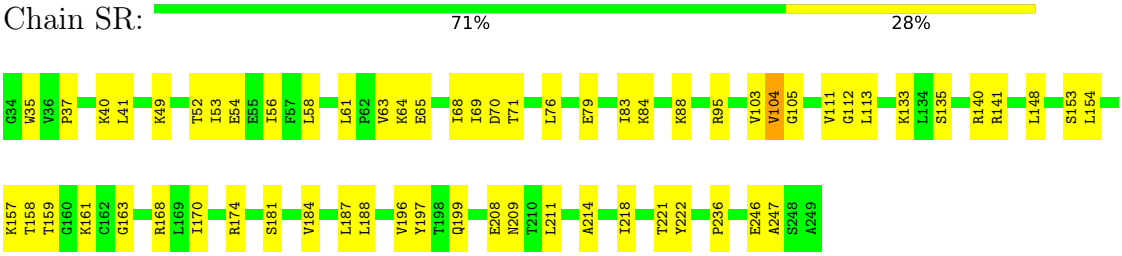
• Molecule 18: Small ribosomal subunit protein eS1A

Chain SQ:



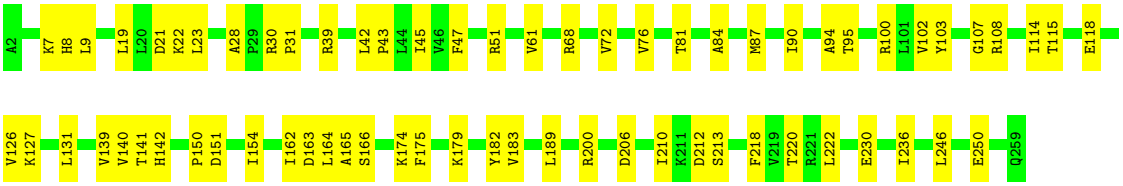
• Molecule 19: Small ribosomal subunit protein uS5

Chain SR:



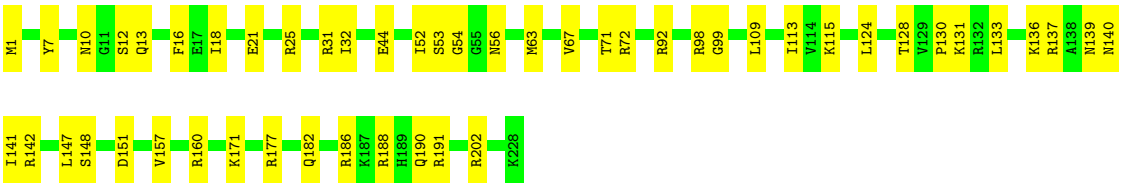
• Molecule 20: Small ribosomal subunit protein eS4A

Chain SS:



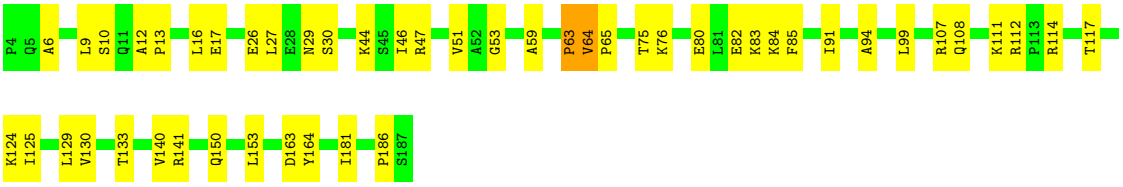
• Molecule 21: Small ribosomal subunit protein eS6A

Chain ST:



• Molecule 22: Small ribosomal subunit protein eS7A

Chain SU:

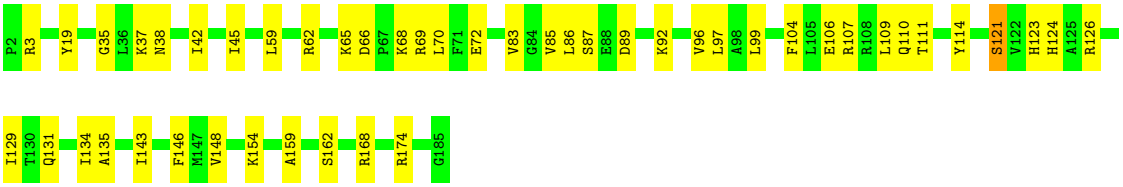


• Molecule 23: Small ribosomal subunit protein eS8A

Chain SV:

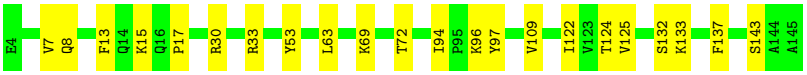
• Molecule 24: Small ribosomal subunit protein uS4A

Chain SW:



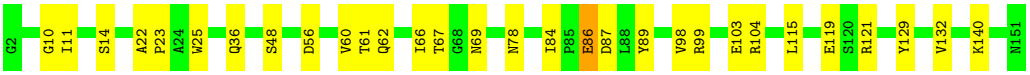
• Molecule 25: Small ribosomal subunit protein uS17A

Chain SX:



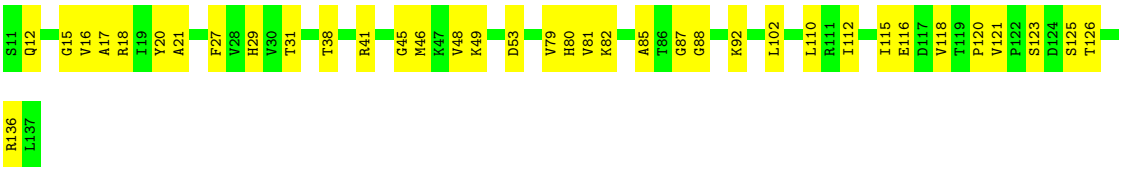
• Molecule 26: Small ribosomal subunit protein uS15

Chain SY:



• Molecule 27: Small ribosomal subunit protein uS11B

Chain SZ:

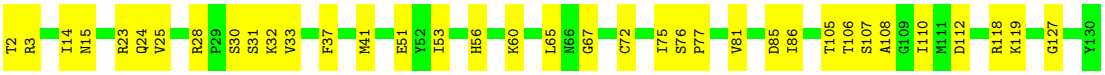


• Molecule 28: Small ribosomal subunit protein eS21A

Chain Sa:

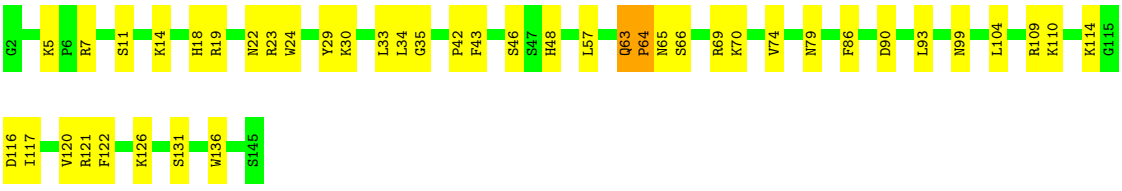
• Molecule 29: Small ribosomal subunit protein uS8A

Chain Sb:



• Molecule 30: Small ribosomal subunit protein uS12A

Chain Sc:

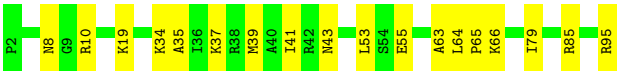


• Molecule 31: Small ribosomal subunit protein eS24A

Chain Sd:

• Molecule 32: Small ribosomal subunit protein eS26A

Chain Se:



• Molecule 33: Small ribosomal subunit protein eS27A

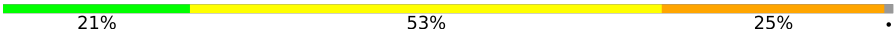
Chain Sf:

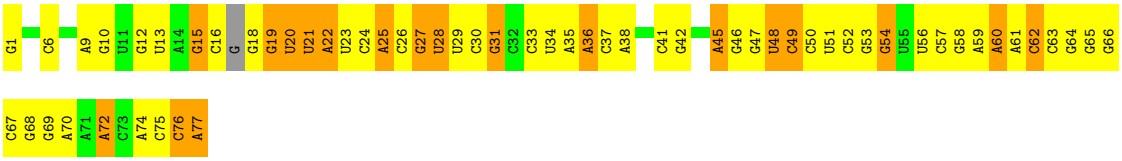
• Molecule 34: Small ribosomal subunit protein eS30A

Chain Sg:

• Molecule 35: tRNA

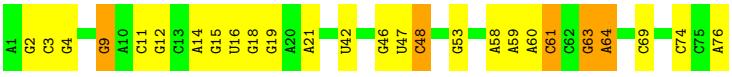
Chain s:





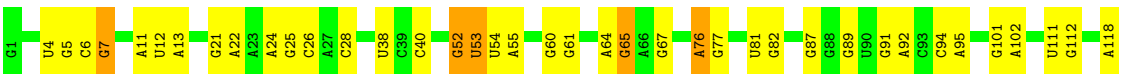
• Molecule 36: tRNA

Chain t:



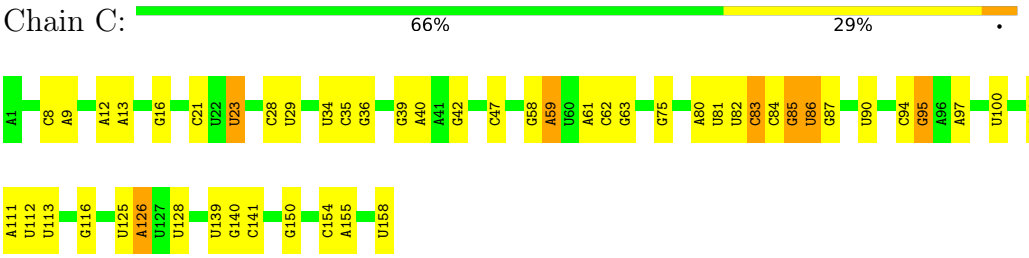
• Molecule 37: 5S rRNA

Chain B:



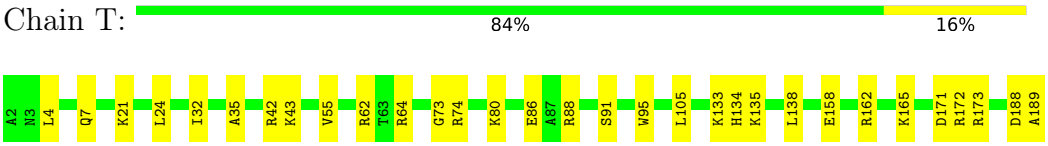
• Molecule 38: 5.8S rRNA

Chain C:



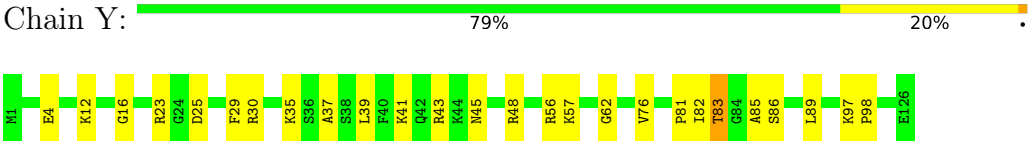
• Molecule 39: Large ribosomal subunit protein eL19A

Chain T:



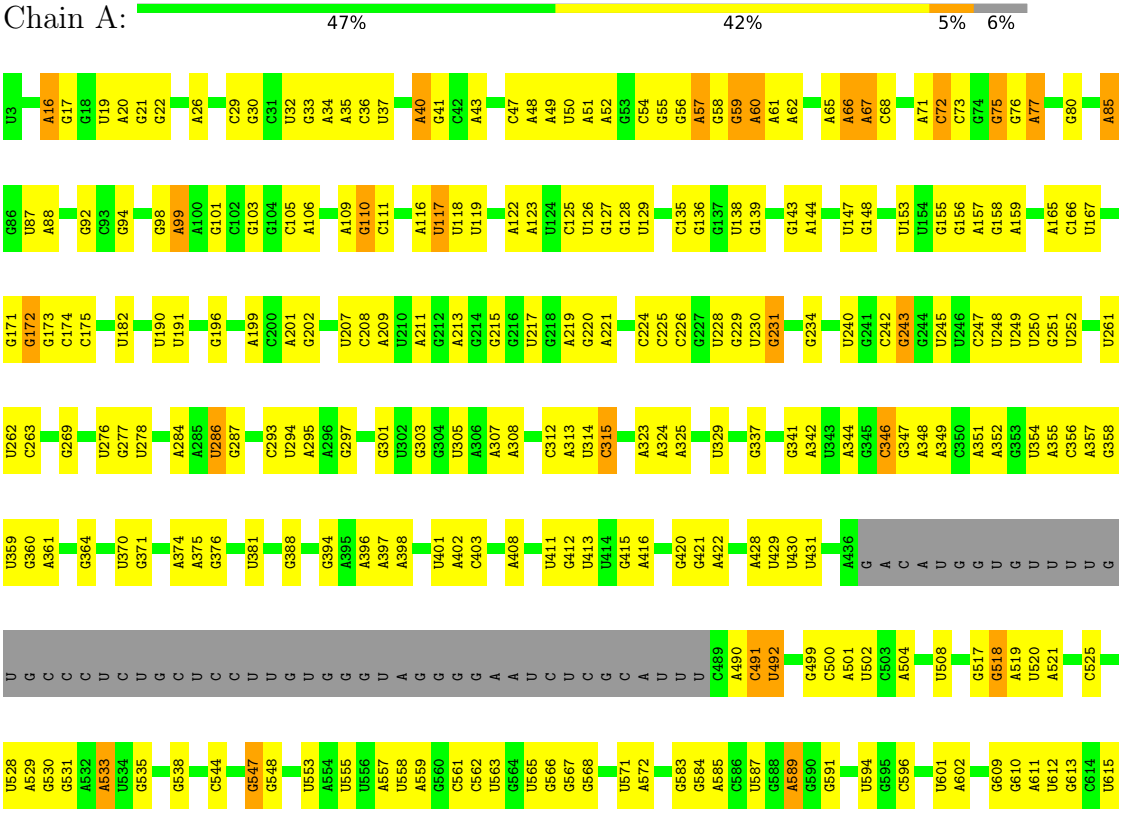
• Molecule 40: Large ribosomal subunit protein eL24A

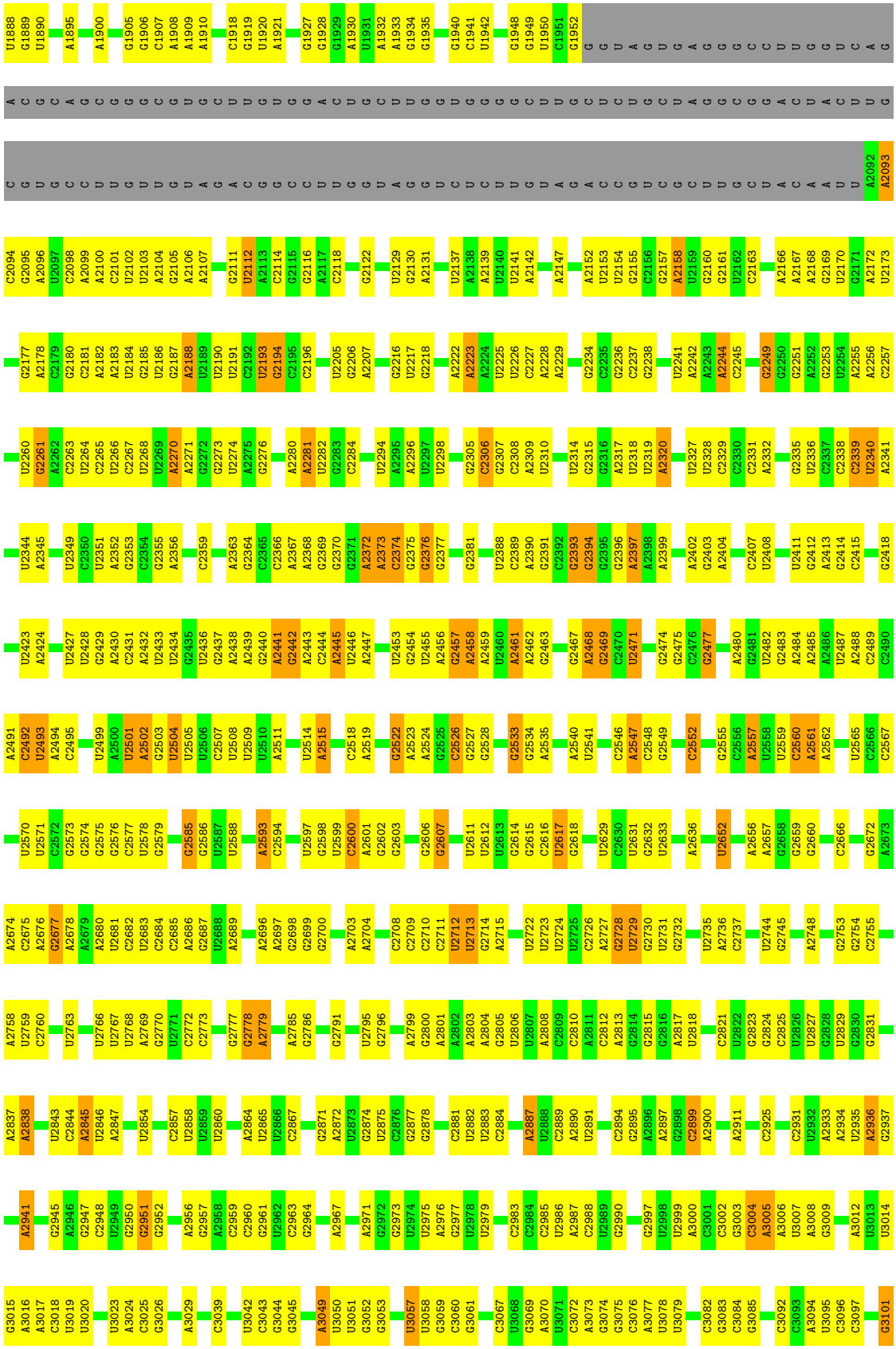
Chain Y:

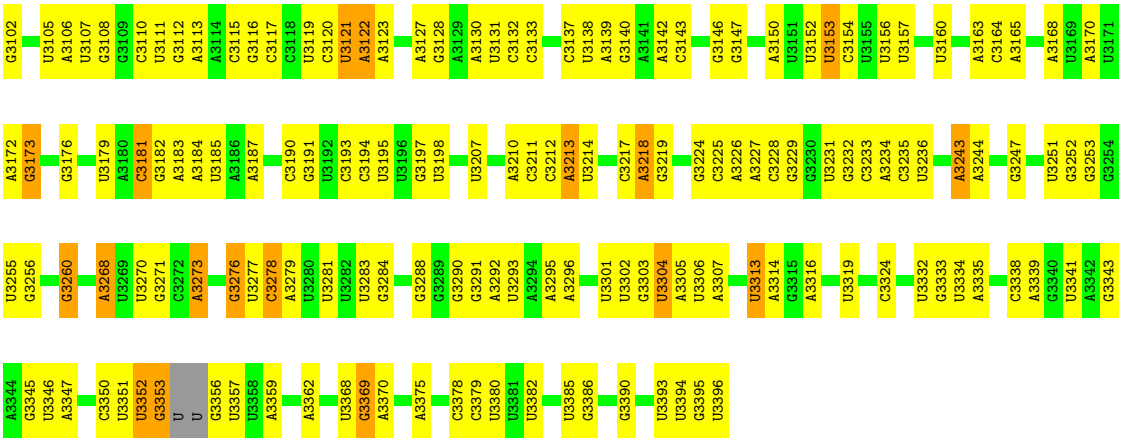


• Molecule 41: 25S rRNA

Chain A:

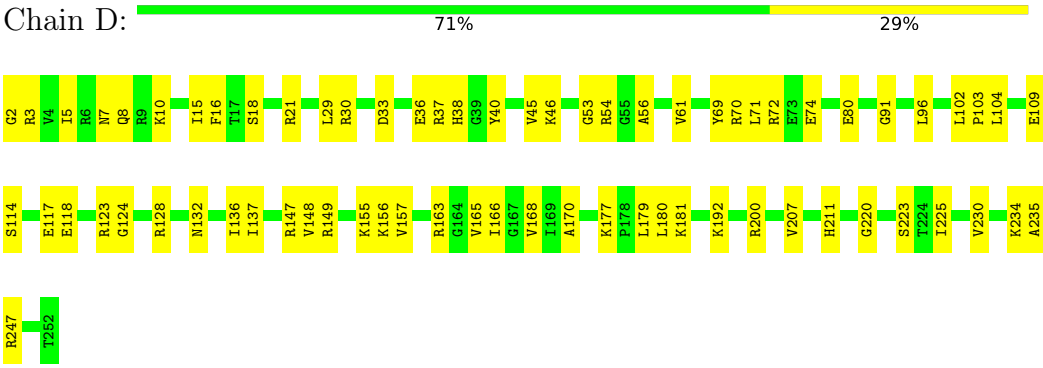






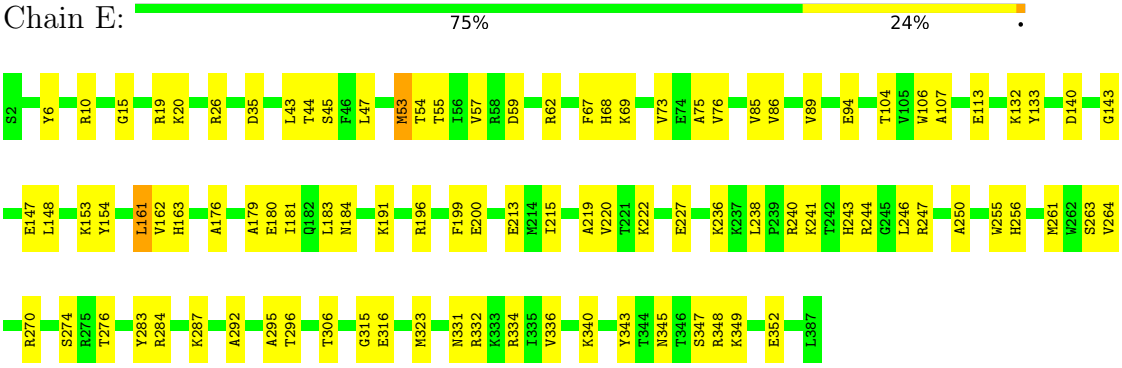
• Molecule 42: Large ribosomal subunit protein uL2A

Chain D:



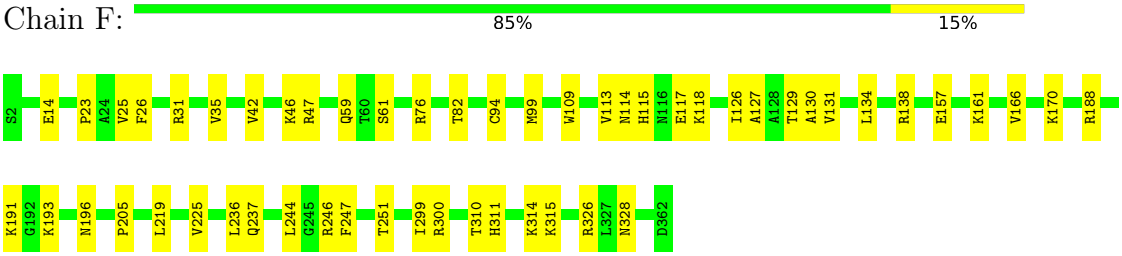
• Molecule 43: Large ribosomal subunit protein uL3

Chain E:



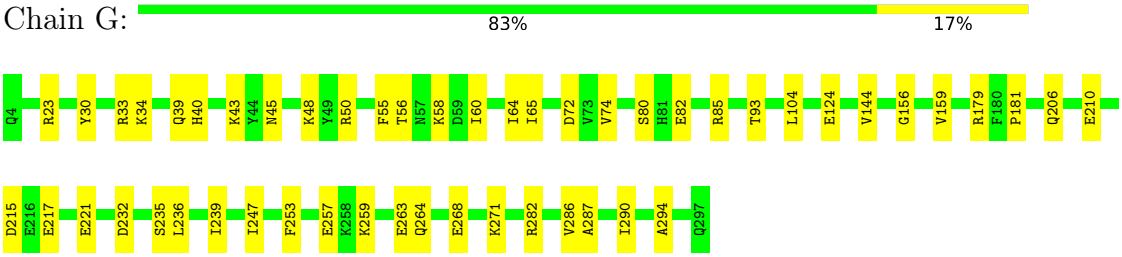
• Molecule 44: Large ribosomal subunit protein uL4A

Chain F:



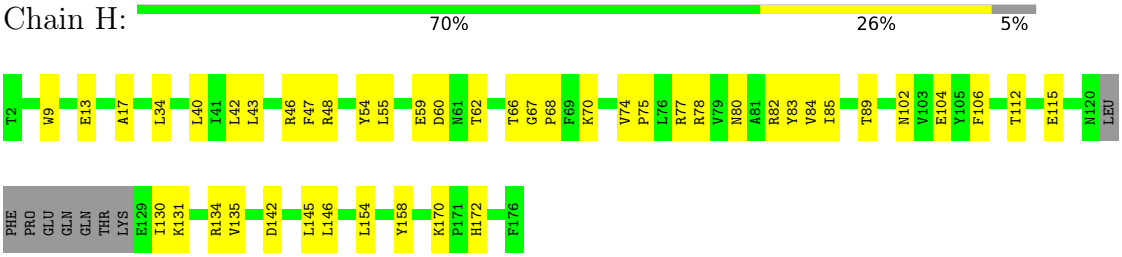
• Molecule 45: Large ribosomal subunit protein uL18

Chain G:



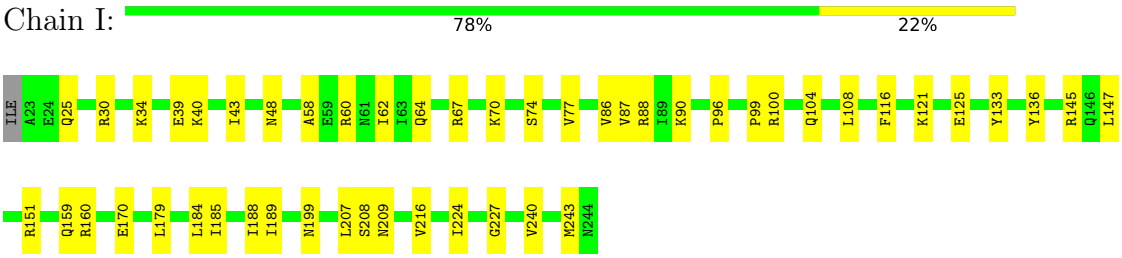
• Molecule 46: Large ribosomal subunit protein eL6B

Chain H:



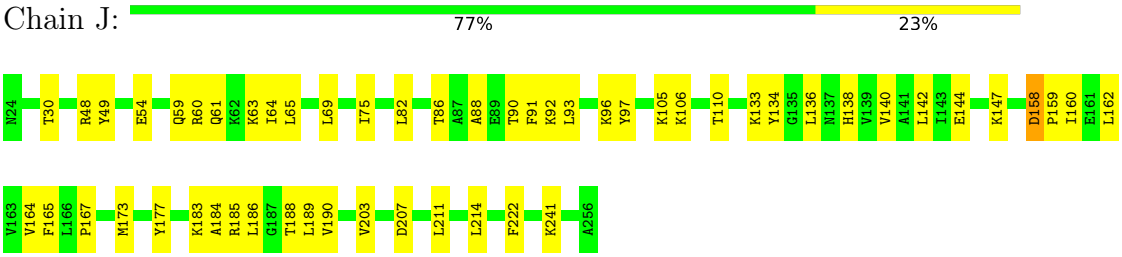
• Molecule 47: Large ribosomal subunit protein uL30A

Chain I:



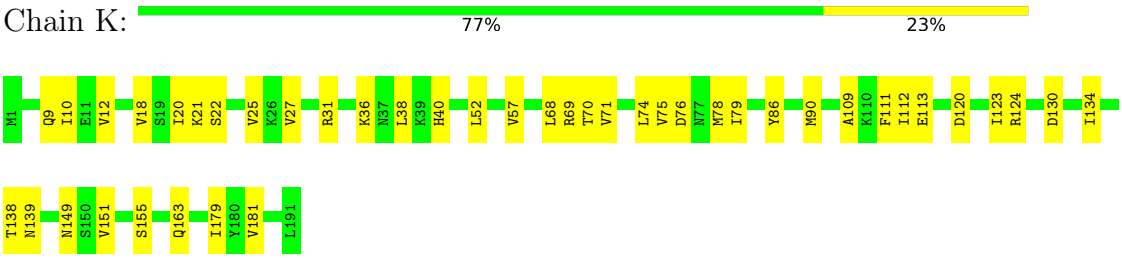
• Molecule 48: Large ribosomal subunit protein eL8A

Chain J:



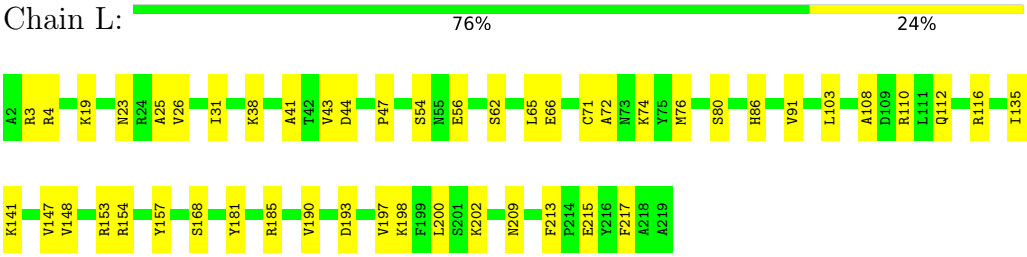
• Molecule 49: Large ribosomal subunit protein uL6A

Chain K:



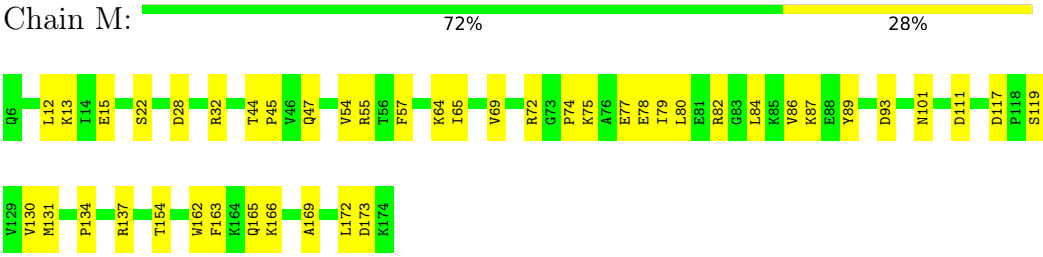
• Molecule 50: Large ribosomal subunit protein uL16

Chain L:



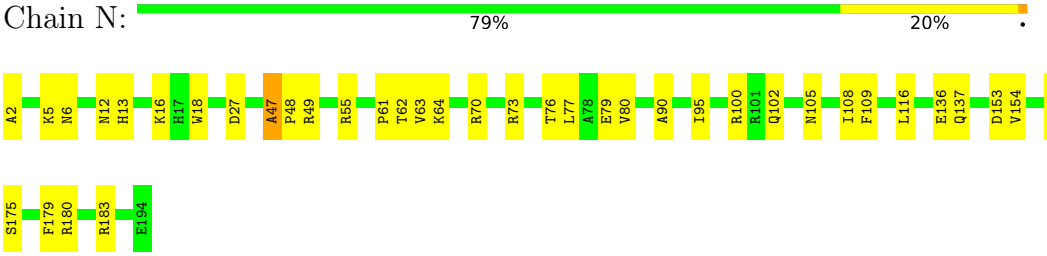
• Molecule 51: Large ribosomal subunit protein uL5B

Chain M:



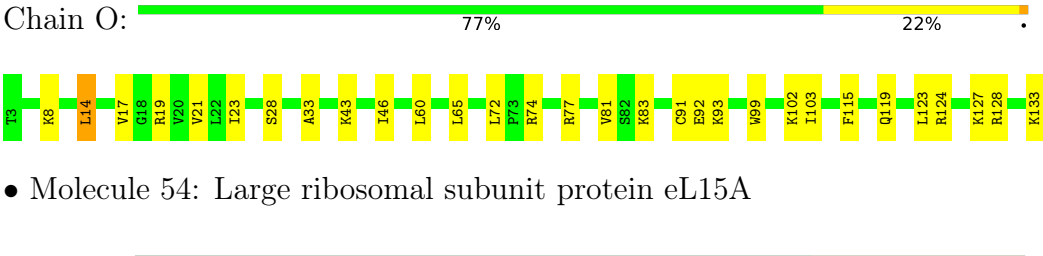
• Molecule 52: Large ribosomal subunit protein eL13A

Chain N:



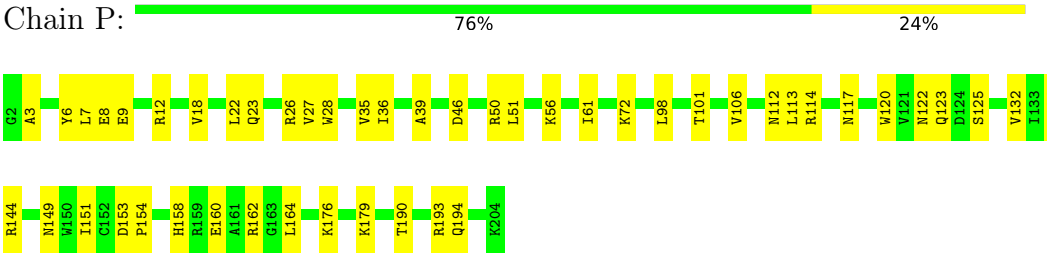
• Molecule 53: Large ribosomal subunit protein eL14A

Chain O:



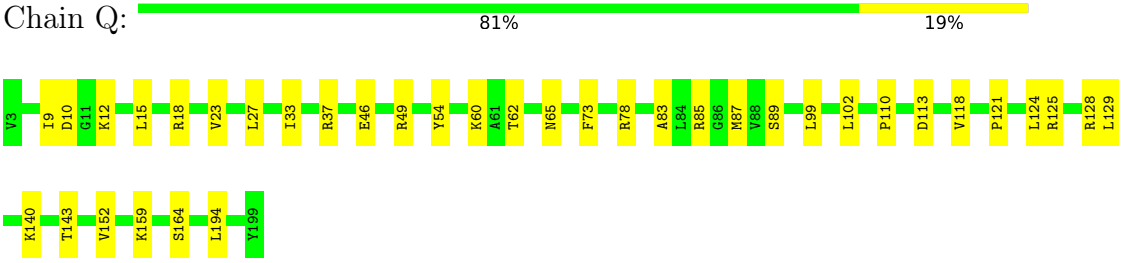
• Molecule 54: Large ribosomal subunit protein eL15A

Chain P:



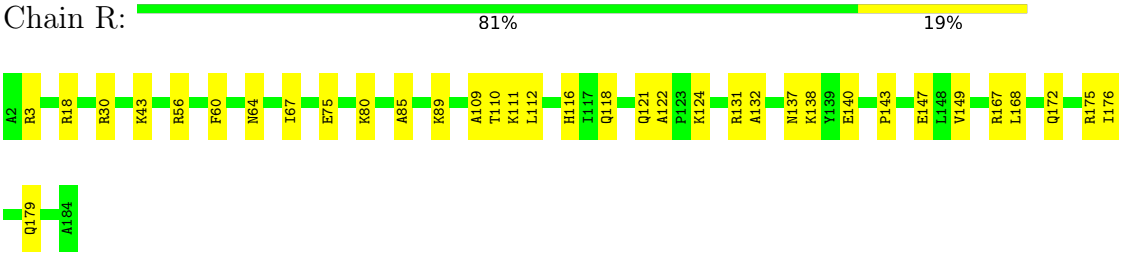
• Molecule 55: Large ribosomal subunit protein uL13A

Chain Q:



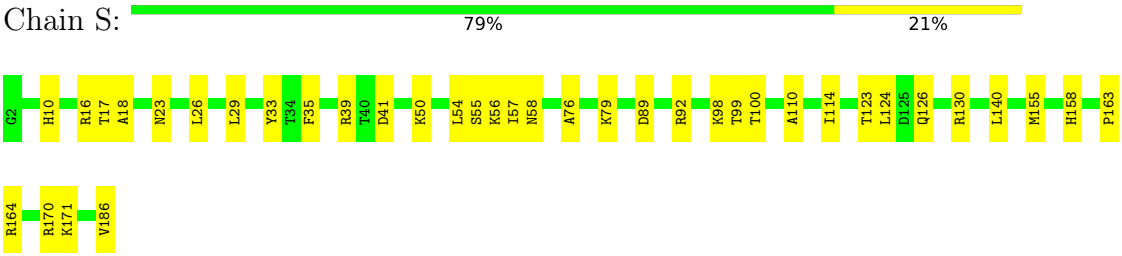
• Molecule 56: Large ribosomal subunit protein uL22A

Chain R:



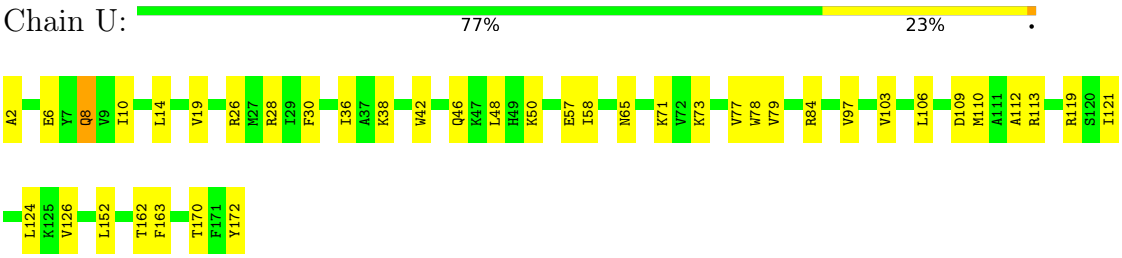
• Molecule 57: Large ribosomal subunit protein eL18A

Chain S:



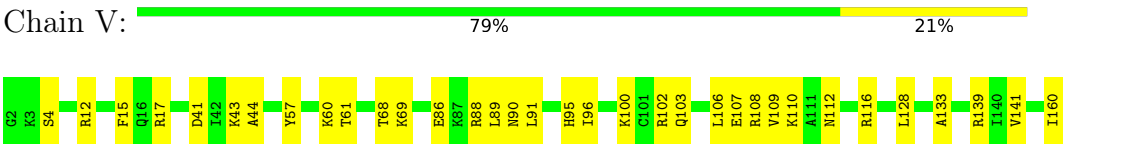
• Molecule 58: Large ribosomal subunit protein eL20A

Chain U:



• Molecule 59: Large ribosomal subunit protein eL21A

Chain V:



• Molecule 60: Large ribosomal subunit protein eL22A

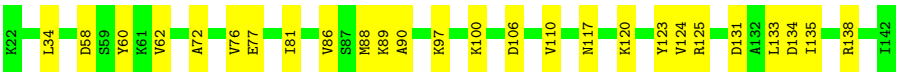
Chain W:

• Molecule 61: Large ribosomal subunit protein uL14A

Chain X:

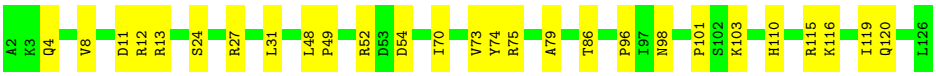
• Molecule 62: Large ribosomal subunit protein uL23

Chain Z:



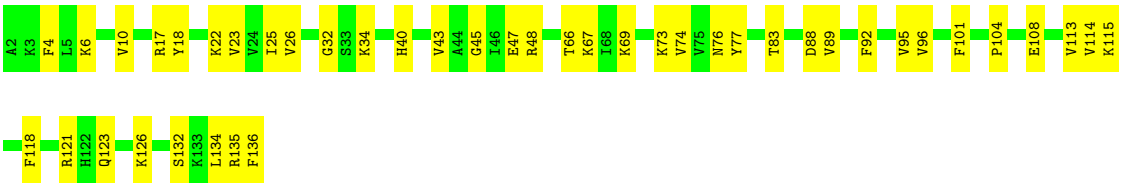
• Molecule 63: Large ribosomal subunit protein uL24A

Chain a:



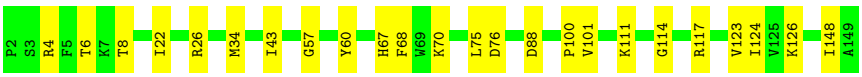
• Molecule 64: Large ribosomal subunit protein eL27A

Chain b:



• Molecule 65: Large ribosomal subunit protein uL15

Chain c:



• Molecule 66: Large ribosomal subunit protein eL29

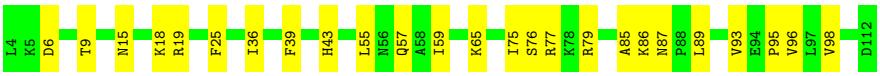
Chain d:

• Molecule 67: Large ribosomal subunit protein eL30

Chain e:

• Molecule 68: Large ribosomal subunit protein eL31A

Chain f:

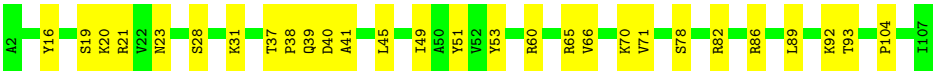


• Molecule 69: Large ribosomal subunit protein eL32

Chain g:

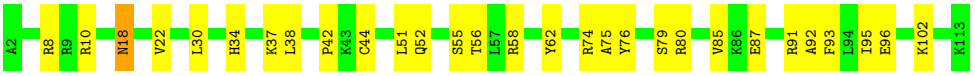
• Molecule 70: Large ribosomal subunit protein eL33A

Chain h:



• Molecule 71: Large ribosomal subunit protein eL34A

Chain i:

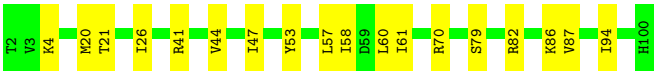


• Molecule 72: Large ribosomal subunit protein uL29A

Chain j:

• Molecule 73: Large ribosomal subunit protein eL36A

Chain k:

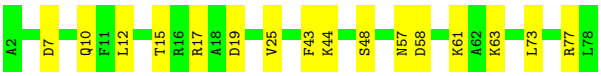


• Molecule 74: Large ribosomal subunit protein eL37A

Chain l:

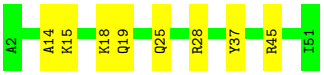
• Molecule 75: Large ribosomal subunit protein eL38

Chain m:



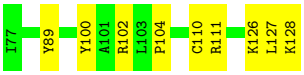
• Molecule 76: Large ribosomal subunit protein eL39

Chain n:



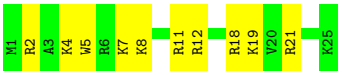
• Molecule 77: Large ribosomal subunit protein eL40A

Chain o:



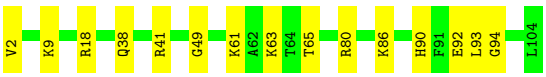
• Molecule 78: Large ribosomal subunit protein eL41A

Chain p:



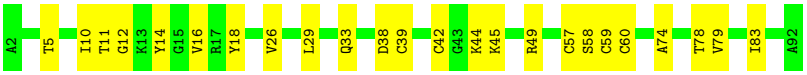
• Molecule 79: Large ribosomal subunit protein eL42A

Chain q:



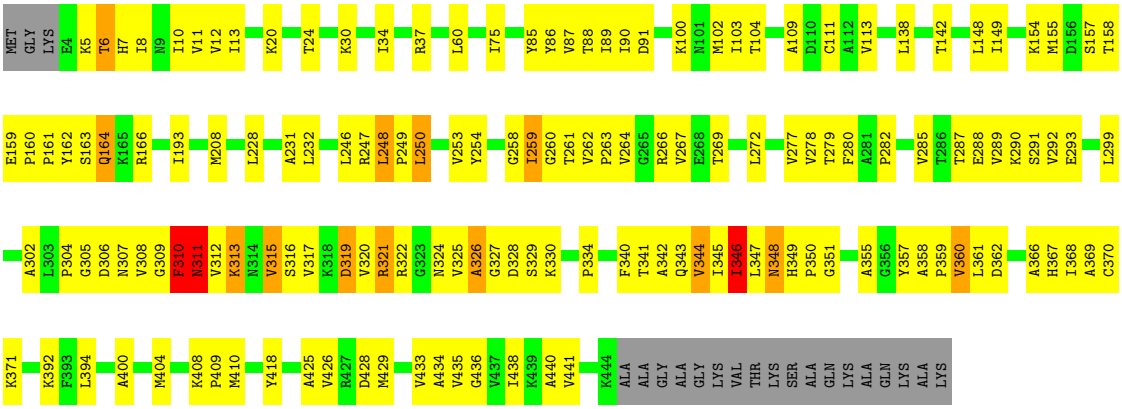
• Molecule 80: Large ribosomal subunit protein eL43A

Chain r:



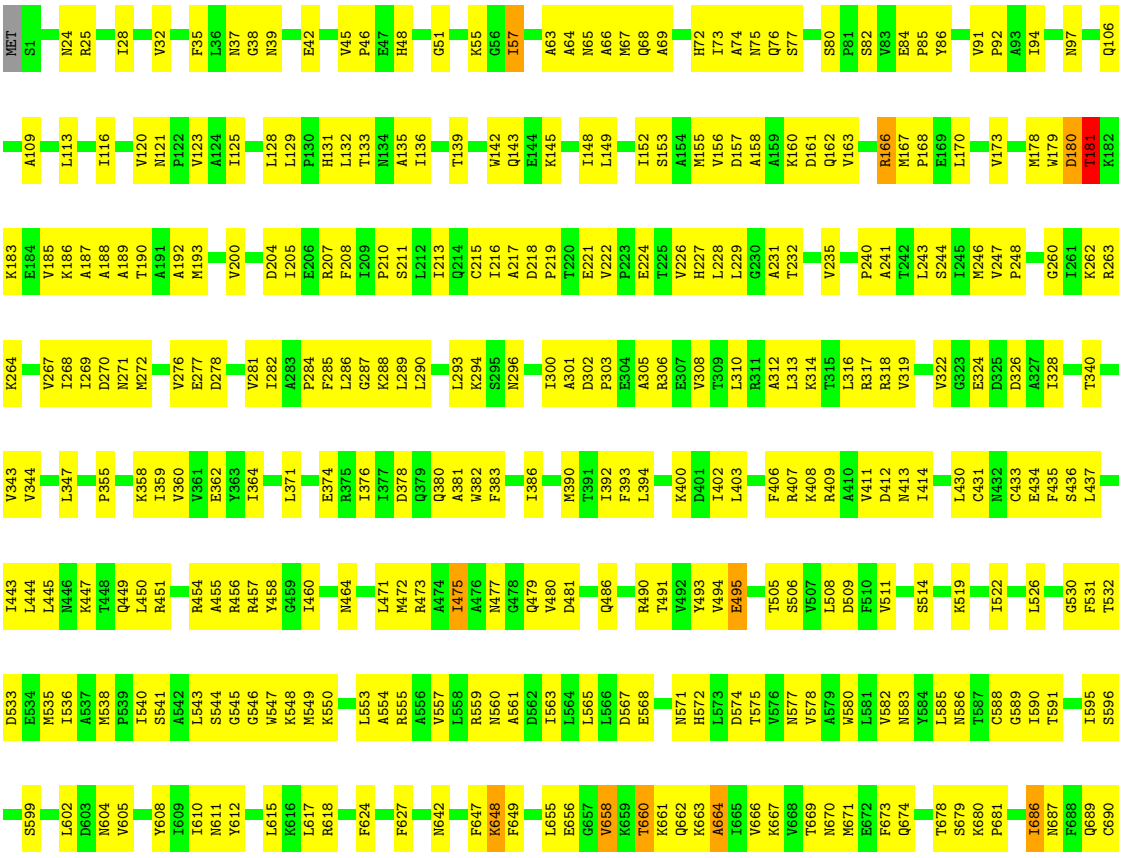
• Molecule 81: Elongation factor 1-alpha 1

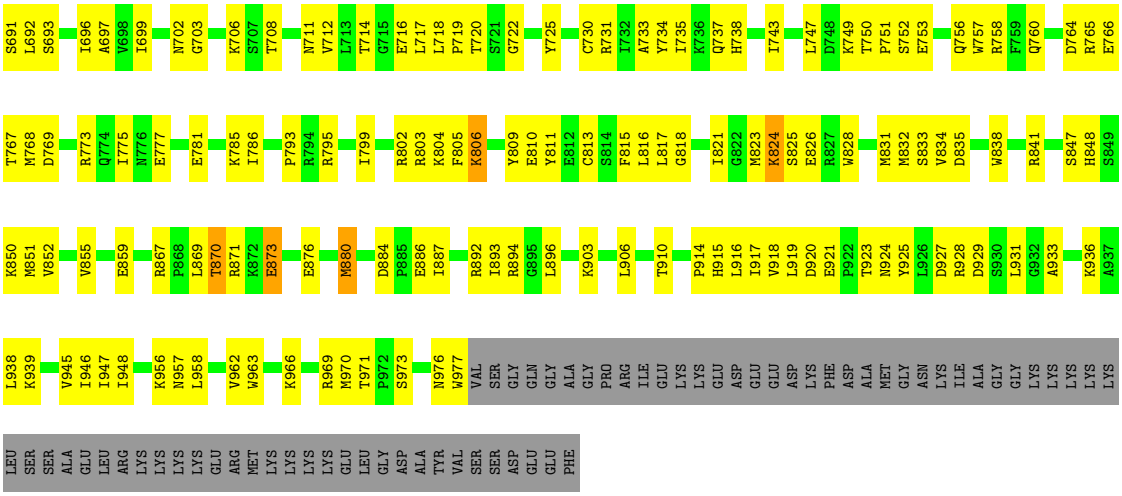
Chain x:



• Molecule 82: Elongation factor 3A

Chain v:




S691 L692 S693 I696 A697 V698 I699 N702 G703 K706 S707 T708 N711 V712 L713 T714 G715 E716 L717 L718 P719 T720 S721 G722 Y725 C730 R731 I732 A733 Y734 I735 K736 Q737 H738 I743 L747 D748 K749 T750 P751 S752 E753 Q756 W757 R758 F759 Q760 D764 R765 E766
T767 M768 D769 R773 Q774 I775 N776 E777 E781 K785 I786 P793 R794 R795 I799 R802 R803 K804 F805 K806 Y809 E810 Y811 E812 C813 S814 F815 L816 L817 G818 I821 G822 M823 K824 S825 E826 R827 W828 M831 M832 S833 V834 D835 W838 R841 S847 H848 S849
K850 M851 V852 V855 E859 R867 P868 L869 T870 R871 K872 E873 E876 M880 D884 P885 E886 I887 R892 I893 R894 G895 L896 K903 L906 T910 P914 H915 L916 I917 V918 L919 D920 E921 P922 T923 N924 Y925 L926 D927 R928 D929 S930 L931 G932 A933 K936 A937
L938 K939 V945 I946 I947 I948 K956 N957 L958 V962 W963 K966 R969 M970 T971 P972 S973 N976 W977 VAL SER GLY GLN GLY ALA GLY PRO ARG ILE GLU LYS LYS GLU ASP GLU GLU ASP LYS PHE ASP ALA MET GLY ASN LYS ILE ALA GLY GLY LYS LYS LYS LYS
LEU SER SER ALA GLU LEU ARG LYS LYS LYS LYS GLU ARG MET LYS LYS LYS LYS GLU LEU GLY ASP ALA TYR VAL SER SER ASP GLU GLU PHE

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	27708	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	500	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	0.07	0/42211	0.17	0/65773
2	SA	0.16	0/1754	0.39	0/2361
3	SB	0.20	0/1625	0.42	0/2197
4	SC	0.12	0/769	0.35	0/1039
5	SD	0.15	0/883	0.49	0/1199
6	SE	0.13	0/936	0.36	0/1259
7	SF	0.18	0/1125	0.45	0/1510
8	SG	0.14	0/971	0.45	0/1303
9	SH	0.16	0/1207	0.39	1/1623 (0.1%)
10	SI	0.12	0/1130	0.34	0/1517
11	SJ	0.14	0/807	0.55	1/1091 (0.1%)
12	SK	0.17	0/661	0.54	0/888
13	SL	0.10	0/493	0.28	0/663
14	SM	0.12	0/452	0.36	0/600
15	SN	0.18	0/567	0.49	0/764
16	SO	0.18	0/2436	0.50	2/3318 (0.1%)
17	SP	0.11	0/1644	0.31	0/2249
18	SQ	0.14	0/1823	0.37	0/2447
19	SR	0.12	0/1656	0.35	0/2251
20	SS	0.11	0/2097	0.33	0/2823
21	ST	0.11	0/1839	0.32	0/2460
22	SU	0.17	0/1498	0.41	1/2019 (0.0%)
23	SV	0.13	0/1501	0.32	0/2006
24	SW	0.10	0/1504	0.30	0/2016
25	SX	0.10	0/1168	0.30	0/1575
26	SY	0.10	0/1215	0.27	0/1638
27	SZ	0.13	0/901	0.35	0/1217
28	Sa	0.13	0/682	0.42	0/921
29	Sb	0.10	0/1038	0.29	0/1395
30	Sc	0.16	0/1139	0.34	0/1518
31	Sd	0.12	0/1087	0.33	0/1449
32	Se	0.12	0/761	0.39	0/1016
33	Sf	0.09	0/620	0.28	0/838
34	Sg	0.10	0/480	0.28	0/639

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\#\|Z\| > 5$	RMSZ	$\#\|Z\| > 5$
35	s	0.11	0/1805	0.27	2/2809 (0.1%)
36	t	0.07	0/1796	0.16	0/2799
37	B	0.05	0/2883	0.11	0/4491
38	C	0.05	0/3746	0.12	0/5832
39	T	0.09	0/1532	0.29	0/2043
40	Y	0.10	0/850	0.30	0/1152
41	A	0.08	0/76303	0.19	0/118956
42	D	0.09	0/1933	0.26	0/2598
43	E	0.09	0/3146	0.26	0/4228
44	F	0.09	0/2800	0.26	0/3790
45	G	0.11	0/2400	0.30	0/3239
46	H	0.14	0/1329	0.35	0/1794
47	I	0.11	0/1821	0.27	0/2451
48	J	0.13	0/1836	0.34	0/2481
49	K	0.13	0/1529	0.34	0/2060
50	L	0.11	0/1801	0.29	0/2416
51	M	0.13	0/1367	0.38	0/1834
52	N	0.12	0/1568	0.29	0/2106
53	O	0.09	0/1068	0.22	0/1438
54	P	0.08	0/1757	0.22	0/2354
55	Q	0.13	0/1585	0.28	0/2128
56	R	0.14	0/1439	0.29	0/1938
57	S	0.10	0/1465	0.25	0/1965
58	U	0.09	0/1473	0.27	0/1980
59	V	0.11	0/1296	0.30	0/1739
60	W	0.13	0/812	0.42	0/1099
61	X	0.14	0/1018	0.33	0/1369
62	Z	0.10	0/979	0.32	0/1321
63	a	0.10	0/995	0.26	0/1329
64	b	0.12	0/1106	0.31	0/1485
65	c	0.09	0/1200	0.27	0/1607
66	d	0.09	0/473	0.24	0/629
67	e	0.12	0/745	0.33	0/1001
68	f	0.09	0/890	0.25	0/1196
69	g	0.07	0/1034	0.21	0/1385
70	h	0.10	0/868	0.26	0/1168
71	i	0.11	0/890	0.29	0/1189
72	j	0.15	0/978	0.36	1/1301 (0.1%)
73	k	0.10	0/772	0.28	0/1026
74	l	0.36	1/660 (0.2%)	0.47	0/875
75	m	0.14	0/618	0.34	0/826
76	n	0.09	0/443	0.24	0/588
77	o	0.12	0/416	0.34	0/553

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
78	p	0.13	0/230	0.36	0/296
79	q	0.09	0/836	0.26	0/1104
80	r	0.17	0/701	0.40	0/934
81	x	0.54	0/3449	0.82	5/4667 (0.1%)
82	v	0.26	1/7611 (0.0%)	0.63	6/10322 (0.1%)
All	All	0.13	2/228932 (0.0%)	0.28	19/335473 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
81	x	0	1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
82	v	648	LYS	C-N	-5.99	1.24	1.33
74	l	33	THR	C-N	5.71	1.41	1.33

The worst 5 of 19 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
81	x	311	ASN	CA-C-N	-7.95	107.66	121.97
81	x	311	ASN	C-N-CA	-7.95	107.66	121.97
11	SJ	101	LYS	N-CA-C	-7.19	103.71	114.64
82	v	180	ASP	N-CA-C	-7.18	103.15	110.97
35	s	76	C	C4'-C3'-O3'	6.83	119.65	109.40

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
81	x	159	GLU	Peptide

5.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen

atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	2	37739	0	18988	437	0
2	SA	1729	0	1812	39	0
3	SB	1605	0	1669	52	0
4	SC	752	0	719	29	0
5	SD	875	0	878	27	0
6	SE	916	0	941	19	0
7	SF	1105	0	1166	64	0
8	SG	961	0	999	39	0
9	SH	1188	0	1218	44	0
10	SI	1112	0	1124	34	0
11	SJ	797	0	863	27	0
12	SK	651	0	682	15	0
13	SL	491	0	524	13	0
14	SM	442	0	432	12	0
15	SN	556	0	549	15	0
16	SO	2383	0	2332	115	0
17	SP	1603	0	1610	35	0
18	SQ	1798	0	1890	40	0
19	SR	1626	0	1715	41	0
20	SS	2056	0	2140	47	0
21	ST	1815	0	1894	44	0
22	SU	1473	0	1555	35	0
23	SV	1476	0	1501	47	0
24	SW	1479	0	1556	37	0
25	SX	1142	0	1209	13	0
26	SY	1192	0	1255	21	0
27	SZ	891	0	883	29	0
28	Sa	673	0	662	21	0
29	Sb	1021	0	1060	30	0
30	Sc	1121	0	1196	37	0
31	Sd	1073	0	1132	23	0
32	Se	750	0	799	18	0
33	Sf	610	0	633	8	0
34	Sg	472	0	521	9	0
35	s	1616	0	824	82	0
36	t	1606	0	816	9	0
37	B	2579	0	1304	30	0
38	C	3353	0	1695	33	0
39	T	1515	0	1606	29	0
40	Y	836	0	706	16	0
41	A	68170	0	34260	1138	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
42	D	1899	0	1957	57	0
43	E	3075	0	3142	70	0
44	F	2748	0	2859	40	0
45	G	2351	0	2294	38	0
46	H	1307	0	1377	39	0
47	I	1784	0	1862	33	0
48	J	1804	0	1877	40	0
49	K	1508	0	1572	27	0
50	L	1764	0	1804	42	0
51	M	1346	0	1370	37	0
52	N	1543	0	1608	30	0
53	O	1053	0	1149	26	0
54	P	1720	0	1779	41	0
55	Q	1555	0	1659	29	0
56	R	1416	0	1433	27	0
57	S	1441	0	1543	30	0
58	U	1437	0	1475	32	0
59	V	1272	0	1312	29	0
60	W	796	0	812	22	0
61	X	1003	0	1048	22	0
62	Z	964	0	1025	20	0
63	a	984	0	1075	20	0
64	b	1080	0	1122	31	0
65	c	1169	0	1211	19	0
66	d	462	0	491	7	0
67	e	737	0	792	18	0
68	f	876	0	912	14	0
69	g	1013	0	1077	19	0
70	h	850	0	880	21	0
71	i	880	0	945	23	0
72	j	969	0	1078	20	0
73	k	766	0	844	11	0
74	l	645	0	649	29	0
75	m	612	0	682	12	0
76	n	436	0	475	7	0
77	o	410	0	446	8	0
78	p	229	0	273	10	0
79	q	824	0	892	12	0
80	r	694	0	738	20	0
81	x	3379	0	3433	296	0
82	v	7476	0	7414	439	0
All	All	213525	0	159704	3968	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 11.

The worst 5 of 3968 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:x:280:PHE:HB3	81:x:324:ASN:CG	1.48	1.35
35:s:77:A:C5	81:x:293:GLU:HG3	1.76	1.20
81:x:346:ILE:HA	81:x:434:ALA:CA	1.72	1.18
81:x:280:PHE:CD1	81:x:324:ASN:HB2	1.80	1.16
30:Sc:63:GLN:HB3	30:Sc:64:PRO:HD2	1.23	1.14

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
2	SA	220/222 (99%)	208 (94%)	11 (5%)	1 (0%)	25 59
3	SB	204/206 (99%)	186 (91%)	13 (6%)	5 (2%)	4 29
4	SC	90/92 (98%)	76 (84%)	12 (13%)	2 (2%)	5 32
5	SD	119/121 (98%)	99 (83%)	20 (17%)	0	100 100
6	SE	115/117 (98%)	104 (90%)	11 (10%)	0	100 100
7	SF	139/141 (99%)	130 (94%)	7 (5%)	2 (1%)	9 40
8	SG	119/121 (98%)	108 (91%)	11 (9%)	0	100 100
9	SH	143/145 (99%)	137 (96%)	6 (4%)	0	100 100
10	SI	141/143 (99%)	132 (94%)	8 (6%)	1 (1%)	19 53
11	SJ	98/100 (98%)	87 (89%)	11 (11%)	0	100 100
12	SK	80/108 (74%)	64 (80%)	14 (18%)	2 (2%)	4 29
13	SL	61/63 (97%)	58 (95%)	3 (5%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
14	SM	51/53 (96%)	47 (92%)	4 (8%)	0	100 100
15	SN	71/73 (97%)	49 (69%)	21 (30%)	1 (1%)	9 40
16	SO	310/312 (99%)	285 (92%)	24 (8%)	1 (0%)	37 67
17	SP	204/206 (99%)	191 (94%)	12 (6%)	1 (0%)	25 59
18	SQ	222/232 (96%)	203 (91%)	19 (9%)	0	100 100
19	SR	214/216 (99%)	204 (95%)	10 (5%)	0	100 100
20	SS	256/258 (99%)	240 (94%)	16 (6%)	0	100 100
21	ST	226/228 (99%)	220 (97%)	5 (2%)	1 (0%)	30 63
22	SU	182/184 (99%)	170 (93%)	11 (6%)	1 (0%)	25 59
23	SV	183/200 (92%)	172 (94%)	11 (6%)	0	100 100
24	SW	182/184 (99%)	176 (97%)	6 (3%)	0	100 100
25	SX	140/142 (99%)	132 (94%)	7 (5%)	1 (1%)	19 53
26	SY	148/150 (99%)	142 (96%)	6 (4%)	0	100 100
27	SZ	125/127 (98%)	113 (90%)	12 (10%)	0	100 100
28	Sa	85/87 (98%)	77 (91%)	8 (9%)	0	100 100
29	Sb	127/129 (98%)	119 (94%)	7 (6%)	1 (1%)	16 51
30	Sc	142/144 (99%)	136 (96%)	4 (3%)	2 (1%)	9 40
31	Sd	132/134 (98%)	126 (96%)	6 (4%)	0	100 100
32	Se	92/94 (98%)	79 (86%)	13 (14%)	0	100 100
33	Sf	79/81 (98%)	76 (96%)	3 (4%)	0	100 100
34	Sg	58/60 (97%)	53 (91%)	5 (9%)	0	100 100
39	T	186/188 (99%)	184 (99%)	2 (1%)	0	100 100
40	Y	124/126 (98%)	111 (90%)	11 (9%)	2 (2%)	8 38
42	D	249/251 (99%)	239 (96%)	10 (4%)	0	100 100
43	E	384/386 (100%)	370 (96%)	14 (4%)	0	100 100
44	F	359/361 (99%)	348 (97%)	11 (3%)	0	100 100
45	G	292/294 (99%)	279 (96%)	13 (4%)	0	100 100
46	H	163/175 (93%)	151 (93%)	12 (7%)	0	100 100
47	I	220/223 (99%)	216 (98%)	4 (2%)	0	100 100
48	J	231/233 (99%)	217 (94%)	13 (6%)	1 (0%)	30 63
49	K	189/191 (99%)	181 (96%)	8 (4%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
50	L	216/218 (99%)	207 (96%)	9 (4%)	0	100	100
51	M	167/169 (99%)	157 (94%)	10 (6%)	0	100	100
52	N	191/193 (99%)	178 (93%)	11 (6%)	2 (1%)	13	46
53	O	134/136 (98%)	128 (96%)	6 (4%)	0	100	100
54	P	201/203 (99%)	196 (98%)	5 (2%)	0	100	100
55	Q	195/197 (99%)	189 (97%)	6 (3%)	0	100	100
56	R	181/183 (99%)	172 (95%)	9 (5%)	0	100	100
57	S	183/185 (99%)	175 (96%)	7 (4%)	1 (0%)	25	59
58	U	169/171 (99%)	161 (95%)	8 (5%)	0	100	100
59	V	157/159 (99%)	149 (95%)	8 (5%)	0	100	100
60	W	98/100 (98%)	89 (91%)	9 (9%)	0	100	100
61	X	134/136 (98%)	133 (99%)	1 (1%)	0	100	100
62	Z	119/121 (98%)	113 (95%)	6 (5%)	0	100	100
63	a	123/125 (98%)	120 (98%)	3 (2%)	0	100	100
64	b	133/135 (98%)	127 (96%)	6 (4%)	0	100	100
65	c	146/148 (99%)	138 (94%)	8 (6%)	0	100	100
66	d	56/58 (97%)	54 (96%)	2 (4%)	0	100	100
67	e	94/96 (98%)	92 (98%)	2 (2%)	0	100	100
68	f	107/109 (98%)	102 (95%)	5 (5%)	0	100	100
69	g	125/127 (98%)	124 (99%)	1 (1%)	0	100	100
70	h	104/106 (98%)	97 (93%)	7 (7%)	0	100	100
71	i	110/112 (98%)	104 (94%)	6 (6%)	0	100	100
72	j	117/119 (98%)	114 (97%)	3 (3%)	0	100	100
73	k	97/99 (98%)	93 (96%)	4 (4%)	0	100	100
74	l	79/81 (98%)	74 (94%)	5 (6%)	0	100	100
75	m	75/77 (97%)	69 (92%)	6 (8%)	0	100	100
76	n	48/50 (96%)	47 (98%)	1 (2%)	0	100	100
77	o	50/52 (96%)	48 (96%)	2 (4%)	0	100	100
78	p	23/25 (92%)	23 (100%)	0	0	100	100
79	q	101/103 (98%)	96 (95%)	5 (5%)	0	100	100
80	r	89/91 (98%)	84 (94%)	5 (6%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
81	x	439/462 (95%)	402 (92%)	30 (7%)	7 (2%)	8 38
82	v	975/1044 (93%)	872 (89%)	99 (10%)	4 (0%)	30 63
All	All	12391/12691 (98%)	11622 (94%)	730 (6%)	39 (0%)	38 67

5 of 39 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	SC	83	PRO
4	SC	88	PRO
7	SF	39	VAL
7	SF	40	GLU
12	SK	33	LYS

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
2	SA	182/182 (100%)	182 (100%)	0	100 100
3	SB	172/173 (99%)	170 (99%)	2 (1%)	67 82
4	SC	77/85 (91%)	76 (99%)	1 (1%)	65 81
5	SD	88/98 (90%)	87 (99%)	1 (1%)	70 83
6	SE	95/98 (97%)	95 (100%)	0	100 100
7	SF	117/117 (100%)	117 (100%)	0	100 100
8	SG	105/110 (96%)	104 (99%)	1 (1%)	73 85
9	SH	127/128 (99%)	127 (100%)	0	100 100
10	SI	115/115 (100%)	114 (99%)	1 (1%)	75 87
11	SJ	93/93 (100%)	93 (100%)	0	100 100
12	SK	67/89 (75%)	67 (100%)	0	100 100
13	SL	55/56 (98%)	55 (100%)	0	100 100
14	SM	47/47 (100%)	46 (98%)	1 (2%)	48 71
15	SN	56/64 (88%)	56 (100%)	0	100 100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
16	SO	250/257 (97%)	247 (99%)	3 (1%)	67 82
17	SP	170/173 (98%)	170 (100%)	0	100 100
18	SQ	200/205 (98%)	198 (99%)	2 (1%)	73 85
19	SR	175/175 (100%)	173 (99%)	2 (1%)	70 83
20	SS	220/220 (100%)	220 (100%)	0	100 100
21	ST	189/195 (97%)	189 (100%)	0	100 100
22	SU	163/165 (99%)	163 (100%)	0	100 100
23	SV	148/161 (92%)	148 (100%)	0	100 100
24	SW	156/157 (99%)	155 (99%)	1 (1%)	84 92
25	SX	126/127 (99%)	126 (100%)	0	100 100
26	SY	127/127 (100%)	126 (99%)	1 (1%)	79 88
27	SZ	81/96 (84%)	80 (99%)	1 (1%)	67 82
28	Sa	71/74 (96%)	71 (100%)	0	100 100
29	Sb	110/110 (100%)	110 (100%)	0	100 100
30	Sc	119/119 (100%)	119 (100%)	0	100 100
31	Sd	112/112 (100%)	111 (99%)	1 (1%)	75 87
32	Se	81/81 (100%)	81 (100%)	0	100 100
33	Sf	70/70 (100%)	70 (100%)	0	100 100
34	Sg	50/51 (98%)	50 (100%)	0	100 100
39	T	152/153 (99%)	152 (100%)	0	100 100
40	Y	56/108 (52%)	56 (100%)	0	100 100
42	D	190/193 (98%)	190 (100%)	0	100 100
43	E	319/322 (99%)	316 (99%)	3 (1%)	75 87
44	F	288/288 (100%)	287 (100%)	1 (0%)	91 96
45	G	241/243 (99%)	239 (99%)	2 (1%)	79 88
46	H	139/154 (90%)	139 (100%)	0	100 100
47	I	186/187 (100%)	186 (100%)	0	100 100
48	J	187/191 (98%)	187 (100%)	0	100 100
49	K	168/171 (98%)	168 (100%)	0	100 100
50	L	185/185 (100%)	184 (100%)	1 (0%)	86 93
51	M	145/147 (99%)	144 (99%)	1 (1%)	81 90

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
52	N	154/154 (100%)	153 (99%)	1 (1%)	84 92
53	O	107/107 (100%)	106 (99%)	1 (1%)	75 87
54	P	175/175 (100%)	175 (100%)	0	100 100
55	Q	160/160 (100%)	160 (100%)	0	100 100
56	R	138/145 (95%)	138 (100%)	0	100 100
57	S	150/150 (100%)	149 (99%)	1 (1%)	81 90
58	U	155/155 (100%)	153 (99%)	2 (1%)	65 81
59	V	135/136 (99%)	134 (99%)	1 (1%)	81 90
60	W	87/87 (100%)	87 (100%)	0	100 100
61	X	104/104 (100%)	104 (100%)	0	100 100
62	Z	104/105 (99%)	104 (100%)	0	100 100
63	a	108/108 (100%)	108 (100%)	0	100 100
64	b	112/115 (97%)	111 (99%)	1 (1%)	75 87
65	c	117/118 (99%)	117 (100%)	0	100 100
66	d	46/46 (100%)	46 (100%)	0	100 100
67	e	81/81 (100%)	81 (100%)	0	100 100
68	f	92/96 (96%)	92 (100%)	0	100 100
69	g	107/109 (98%)	107 (100%)	0	100 100
70	h	90/90 (100%)	90 (100%)	0	100 100
71	i	95/95 (100%)	94 (99%)	1 (1%)	70 83
72	j	104/104 (100%)	103 (99%)	1 (1%)	73 85
73	k	80/81 (99%)	79 (99%)	1 (1%)	65 81
74	l	67/67 (100%)	66 (98%)	1 (2%)	60 78
75	m	68/68 (100%)	68 (100%)	0	100 100
76	n	45/45 (100%)	45 (100%)	0	100 100
77	o	45/47 (96%)	45 (100%)	0	100 100
78	p	22/23 (96%)	22 (100%)	0	100 100
79	q	87/88 (99%)	87 (100%)	0	100 100
80	r	71/71 (100%)	71 (100%)	0	100 100
81	x	366/379 (97%)	349 (95%)	17 (5%)	23 52
82	v	789/890 (89%)	777 (98%)	12 (2%)	60 78

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	10331/10671 (97%)	10265 (99%)	66 (1%)	82 92

5 of 66 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
82	v	475	ILE
82	v	660	THR
82	v	880	MET
50	L	140	THR
45	G	221	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 107 such sidechains are listed below:

Mol	Chain	Res	Type
52	N	12	ASN
57	S	23	ASN
82	v	395	HIS
53	O	56	GLN
54	P	117	ASN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	2	1768/1799 (98%)	408 (23%)	40 (2%)
35	s	74/77 (96%)	32 (43%)	0
36	t	74/75 (98%)	18 (24%)	0
37	B	120/121 (99%)	9 (7%)	1 (0%)
38	C	157/158 (99%)	26 (16%)	1 (0%)
41	A	3180/3394 (93%)	506 (15%)	9 (0%)
All	All	5373/5624 (95%)	999 (18%)	51 (0%)

5 of 999 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 51 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	2	1256	A
1	2	1557	U
41	A	3004	C
1	2	1273	G
1	2	1382	A

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.