wwPDB EM Validation Summary Report ⓘ

Jul 15, 2025 – 03:20 PM EDT

PDB ID	:	8VOO / pdb_00008voo
EMDB ID	:	EMD-43387
Title	:	Escherichia coli transcription-translation loosely coupled complex (TTC-LC) containing mRNA with a 39 nt long spacer, ops signal, RfaH, NusA, and fMet-tRNAs in E-site and P-site
Authors	:	Molodtsov, V.; Wang, C.; Ebright, R.H.
Deposited on	:	2024-01-15
Resolution	:	3.40 Å(reported)

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

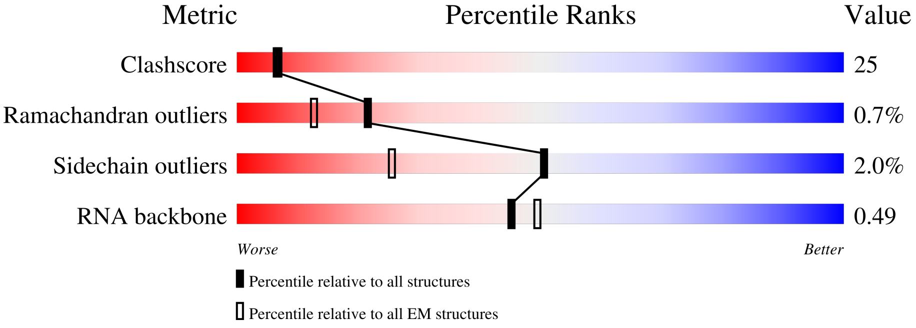
EMDB validation analysis	:	0.0.1.dev118
MolProbity	:	4-5-2 with Phenix2.0rc1
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.44

1 Overall quality at a glance ⓘ

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

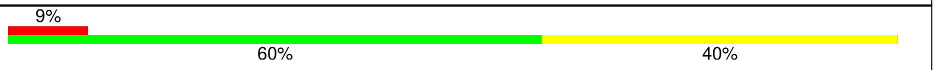
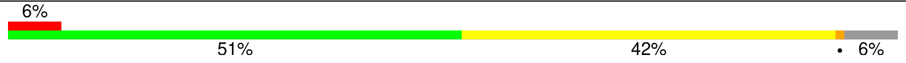
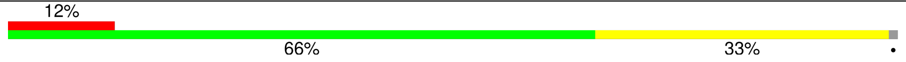
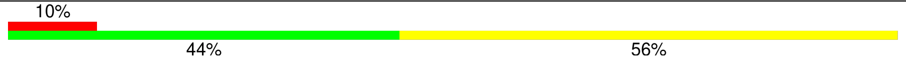
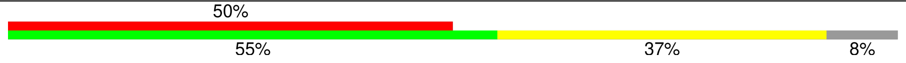
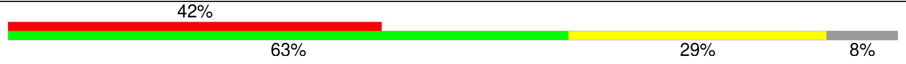
The reported resolution of this entry is 3.40 Å.

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% The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	0	103	
2	1	110	
3	2	100	
4	3	104	
5	4	94	
6	5	38	
7	6	38	

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Mol	Chain	Length	Quality of chain
8	7	56	11% • 18% 21% • 55%
9	9	165	21% 20% 66% • • 10%
10	A	76	• 16% 47% 37%
10	B	76	9% 17% 45% 38%
11	AA	1342	80% 81% 17% •
12	AB	162	41% 24% 54% 15% 6% •
13	AC	329	66% 60% 7% 33%
13	AD	329	90% 74% 16% • 9%
14	AE	1407	73% 78% 16% • 5%
15	AF	91	84% 77% 13% 10%
16	AG	495	66% 32% 42% 21% •
17	C	75	5% 35% 52% • 12%
18	D	1542	• 49% 43% 7% •
19	E	87	11% 49% 49% •
20	F	71	11% 41% 58% •
21	G	241	16% 51% 40% • 7%
22	H	557	29% 24% 21% • 54%
23	I	233	16% 46% 42% • 11%
24	J	206	13% 67% 32%
25	K	167	• 44% 47% • • 7%
26	L	135	5% 27% 48% • 23%
27	M	179	12% 42% 41% • 16%
28	N	130	5% 52% 48% •
29	O	130	16% 49% 45% • •
30	P	103	12% 51% 45% •

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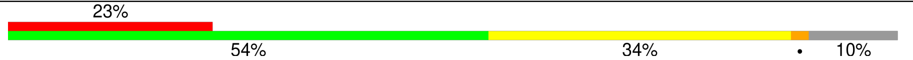
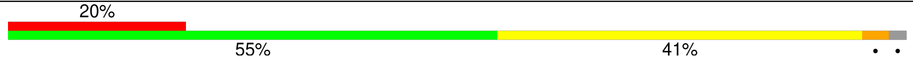
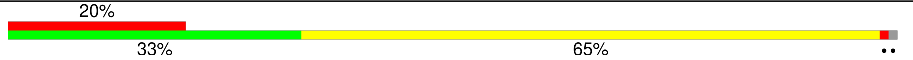
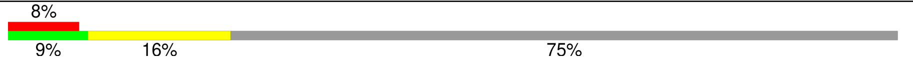
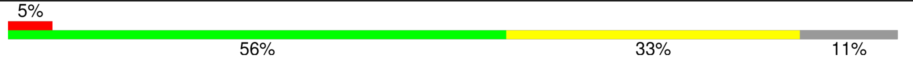
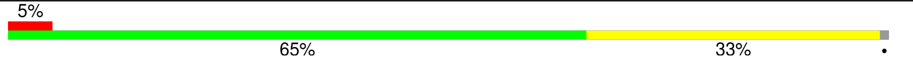
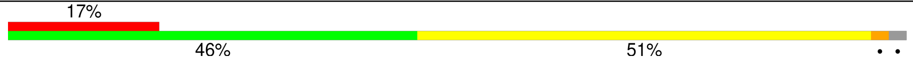
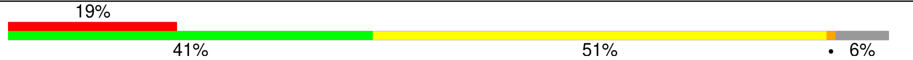
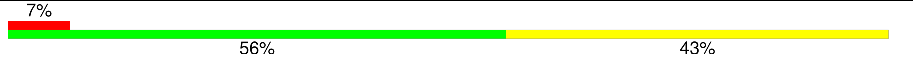
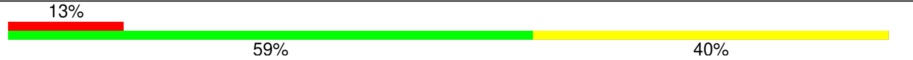
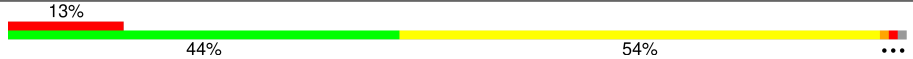
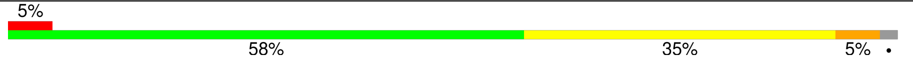
Mol	Chain	Length	Quality of chain
31	Q	129	
32	R	124	
33	S	101	
34	T	89	
35	U	82	
36	V	84	
37	W	92	
38	X	118	
39	Y	142	
40	Z	121	
41	a	2904	
42	b	85	
43	c	78	
44	d	120	
45	e	63	
46	f	59	
47	g	70	
48	h	273	
49	i	57	
50	j	209	
51	k	55	
52	l	201	
53	m	46	
54	n	179	
55	o	65	

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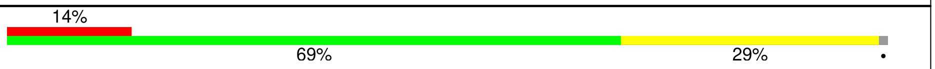
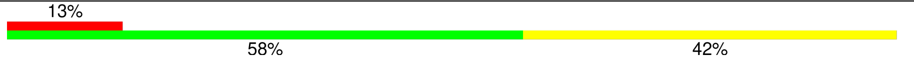
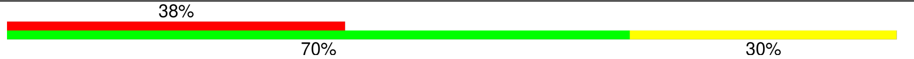
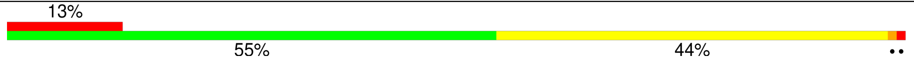
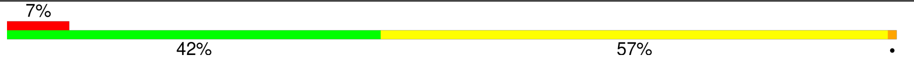
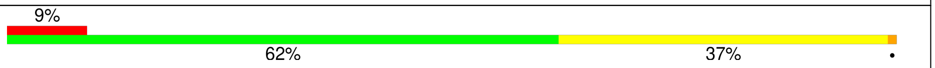
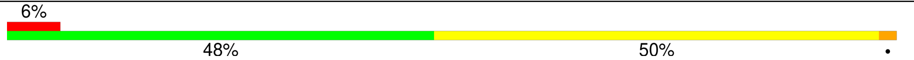
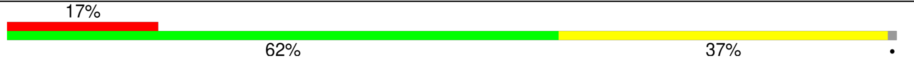
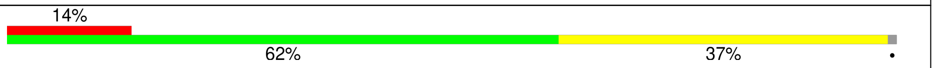
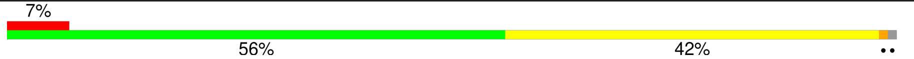
Mol	Chain	Length	Quality of chain
56	p	177	
57	q	38	
58	r	149	
59	s	142	
60	t	123	
61	u	144	
62	v	136	
63	w	127	
64	x	117	
65	y	115	
66	z	118	

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
68	ZN	AE	1502	-	-	X	-

2 Entry composition ⓘ

There are 68 unique types of molecules in this entry. The entry contains 280046 atoms, of which 98638 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called Ribosomal protein L21.

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

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

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

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

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

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

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

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

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

- Molecule 6 is a DNA chain called NT DNA ops.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
6	5	35	726	342	141	208	35	0	0

- Molecule 7 is a DNA chain called T DNA ops.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
7	6	35	703	336	117	215	35	0	0

- Molecule 8 is a RNA chain called mRNA with 39 nt long spacer.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
8	7	25	527	235	80	187	25	0	0

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

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

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

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	AA	1316	10381	6514	1810	2014	43	0	0

- Molecule 12 is a protein called Transcription antitermination protein RfaH.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	AB	161	1286	828	222	232	4	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	AC	221	1698	1060	299	333	6	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
13	AD	299	Total 2078	C 1287	N 378	O 407	S 6	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
14	AE	1337	Total 10404	C 6535	N 1856	O 1963	S 50	0	0

- Molecule 15 is a protein called DNA-directed RNA polymerase subunit omega.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	AF	82	Total 650	C 396	N 122	O 131	S 1	0	0

- Molecule 16 is a protein called Transcription termination/antitermination protein NusA.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	AG	495	Total 3852	C 2396	N 669	O 774	S 13	0	0

- Molecule 17 is a protein called 30S ribosomal protein S18.

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

- Molecule 18 is a RNA chain called 16S rRNA.

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

- Molecule 19 is a protein called 30S ribosomal protein S20.

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

- Molecule 20 is a protein called 30S ribosomal protein S21.

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

- Molecule 21 is a protein called 30S ribosomal protein S2.

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

- Molecule 22 is a protein called 30S ribosomal protein S1.

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

- Molecule 23 is a protein called 30S ribosomal protein S3.

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

- Molecule 24 is a protein called 30S ribosomal protein S4.

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

- Molecule 25 is a protein called 30S ribosomal protein S5.

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

- Molecule 26 is a protein called 30S ribosomal protein S6.

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

- Molecule 27 is a protein called 30S ribosomal protein S7.

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

- Molecule 28 is a protein called 30S ribosomal protein S8.

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

- Molecule 29 is a protein called 30S ribosomal protein S9.

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

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

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

- Molecule 31 is a protein called 30S ribosomal protein S11.

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

- Molecule 32 is a protein called 30S ribosomal protein S12.

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

- Molecule 33 is a protein called 30S ribosomal protein S14.

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

- Molecule 34 is a protein called Small ribosomal subunit protein uS15.

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

- Molecule 35 is a protein called 30S ribosomal protein S16.

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

- Molecule 36 is a protein called 30S ribosomal protein S17.

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

- Molecule 37 is a protein called 30S ribosomal protein S19.

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

- Molecule 38 is a protein called 30S ribosomal protein S13.

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

- Molecule 39 is a protein called 50S ribosomal protein L11.

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

- Molecule 40 is a protein called 50S ribosomal protein L7/L12.

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

- Molecule 41 is a RNA chain called 23S rRNA.

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

There is a discrepancy between the modelled and reference sequences:

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

- Molecule 42 is a protein called 50S ribosomal protein L27.

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

- Molecule 43 is a protein called 50S ribosomal protein L28.

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

- Molecule 44 is a RNA chain called 5S rRNA.

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

- Molecule 45 is a protein called 50S ribosomal protein L29.

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

- Molecule 46 is a protein called 50S ribosomal protein L30.

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

- Molecule 47 is a protein called 50S ribosomal protein L31.

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

- Molecule 48 is a protein called 50S ribosomal protein L2.

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

- Molecule 49 is a protein called 50S ribosomal protein L32.

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

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

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

- Molecule 51 is a protein called 50S ribosomal protein L33.

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

- Molecule 52 is a protein called 50S ribosomal protein L4.

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

- Molecule 53 is a protein called 50S ribosomal protein L34.

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

- Molecule 54 is a protein called 50S ribosomal protein L5.

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

- Molecule 55 is a protein called 50S ribosomal protein L35.

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

- Molecule 56 is a protein called 50S ribosomal protein L6.

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

- Molecule 57 is a protein called 50S ribosomal protein L36.

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

- Molecule 58 is a protein called 50S ribosomal protein L9.

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

- Molecule 59 is a protein called 50S ribosomal protein L13.

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

- Molecule 60 is a protein called 50S ribosomal protein L14.

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

- Molecule 61 is a protein called 50S ribosomal protein L15.

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

- Molecule 62 is a protein called 50S ribosomal protein L16.

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

- Molecule 63 is a protein called 50S ribosomal protein L17.

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

- Molecule 64 is a protein called 50S ribosomal protein L18.

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

- Molecule 65 is a protein called 50S ribosomal protein L19.

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

- Molecule 66 is a protein called 50S ribosomal protein L20.

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

- Molecule 67 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

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

- Molecule 68 is ZINC ION (CCD ID: ZN) (formula: Zn).

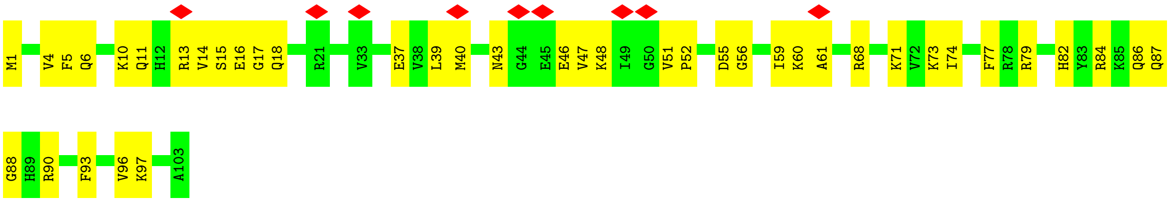
Mol	Chain	Residues	Atoms	AltConf
68	AE	2	Total Zn 2 2	0

3 Residue-property plots ⓘ

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

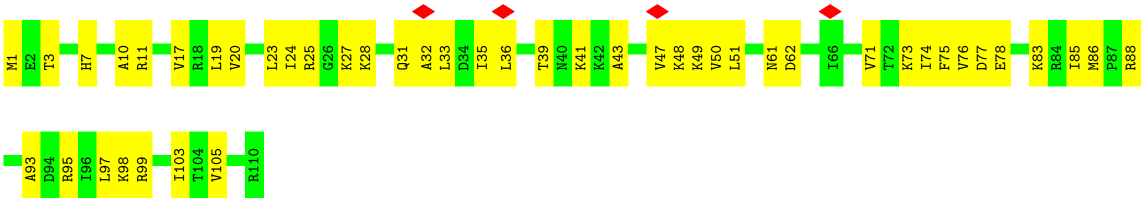
- Molecule 1: Ribosomal protein L21

Chain 0:



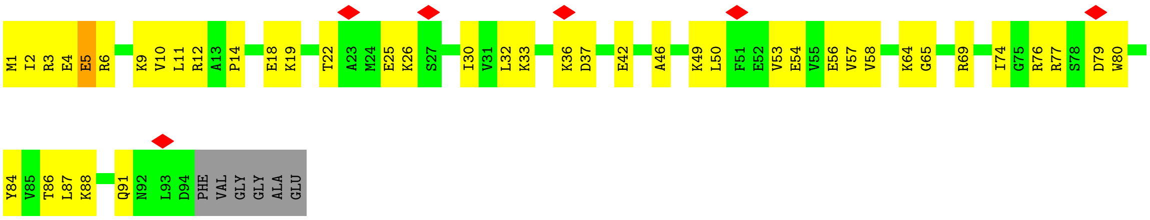
- Molecule 2: 50S ribosomal protein L22

Chain 1:



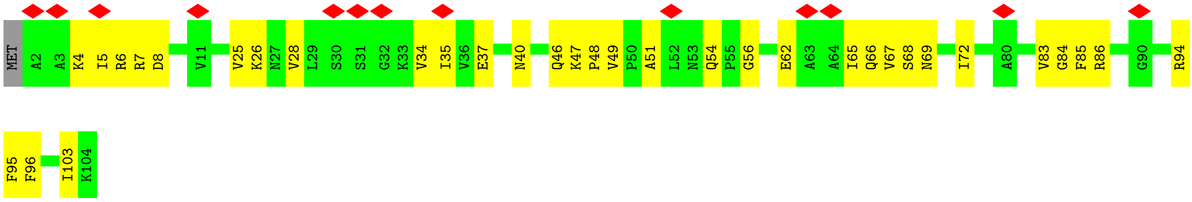
- Molecule 3: 50S ribosomal protein L23

Chain 2:



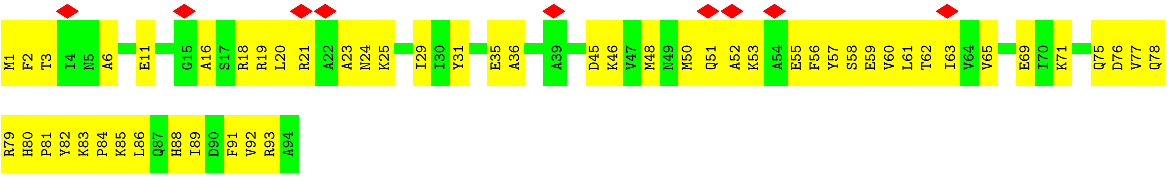
- Molecule 4: 50S ribosomal protein L24

Chain 3:



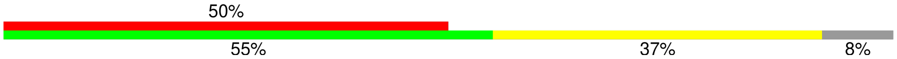
- Molecule 5: 50S ribosomal protein L25

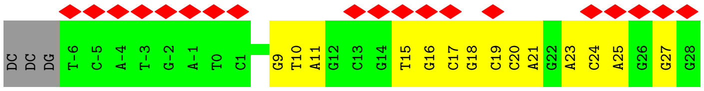
Chain 4:



- Molecule 6: NT DNA ops

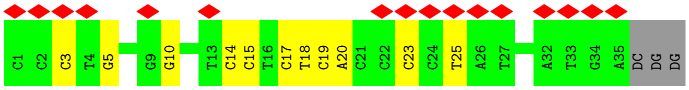
Chain 5:





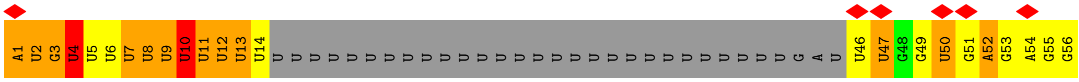
- Molecule 7: T DNA ops

Chain 6:



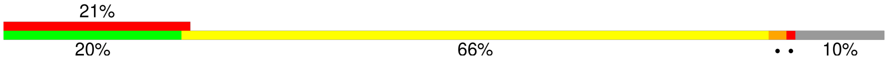
- Molecule 8: mRNA with 39 nt long spacer

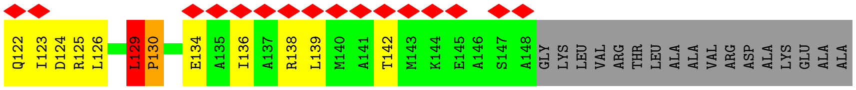
Chain 7:



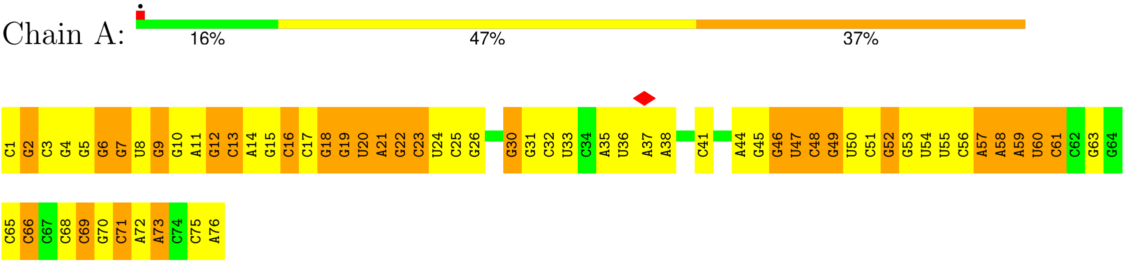
- Molecule 9: 50S ribosomal protein L10

Chain 9:

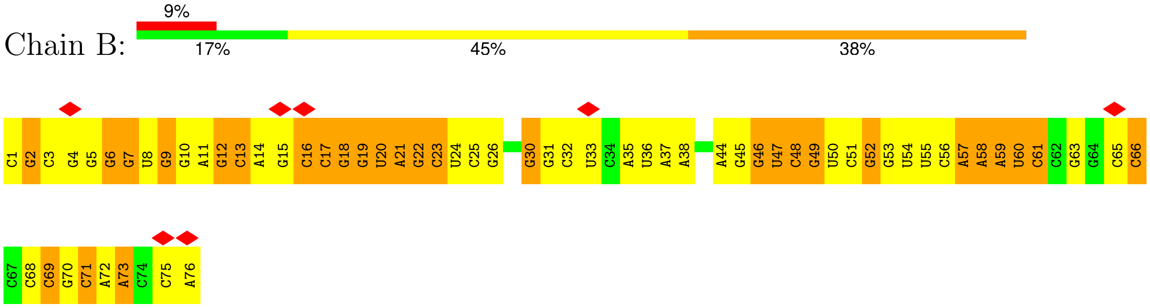




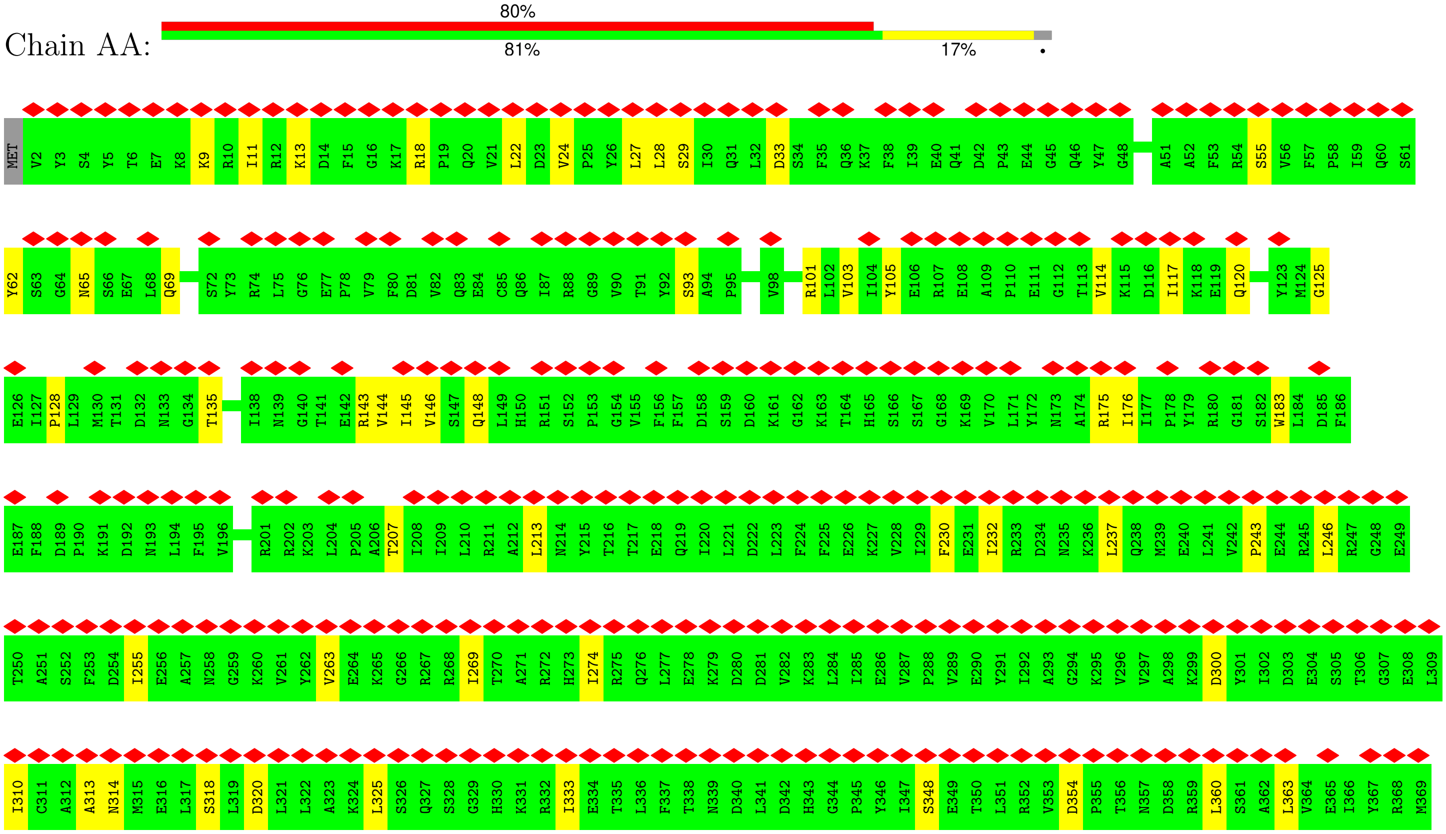
- Molecule 10: E-site and P-site tRNA (fMet)

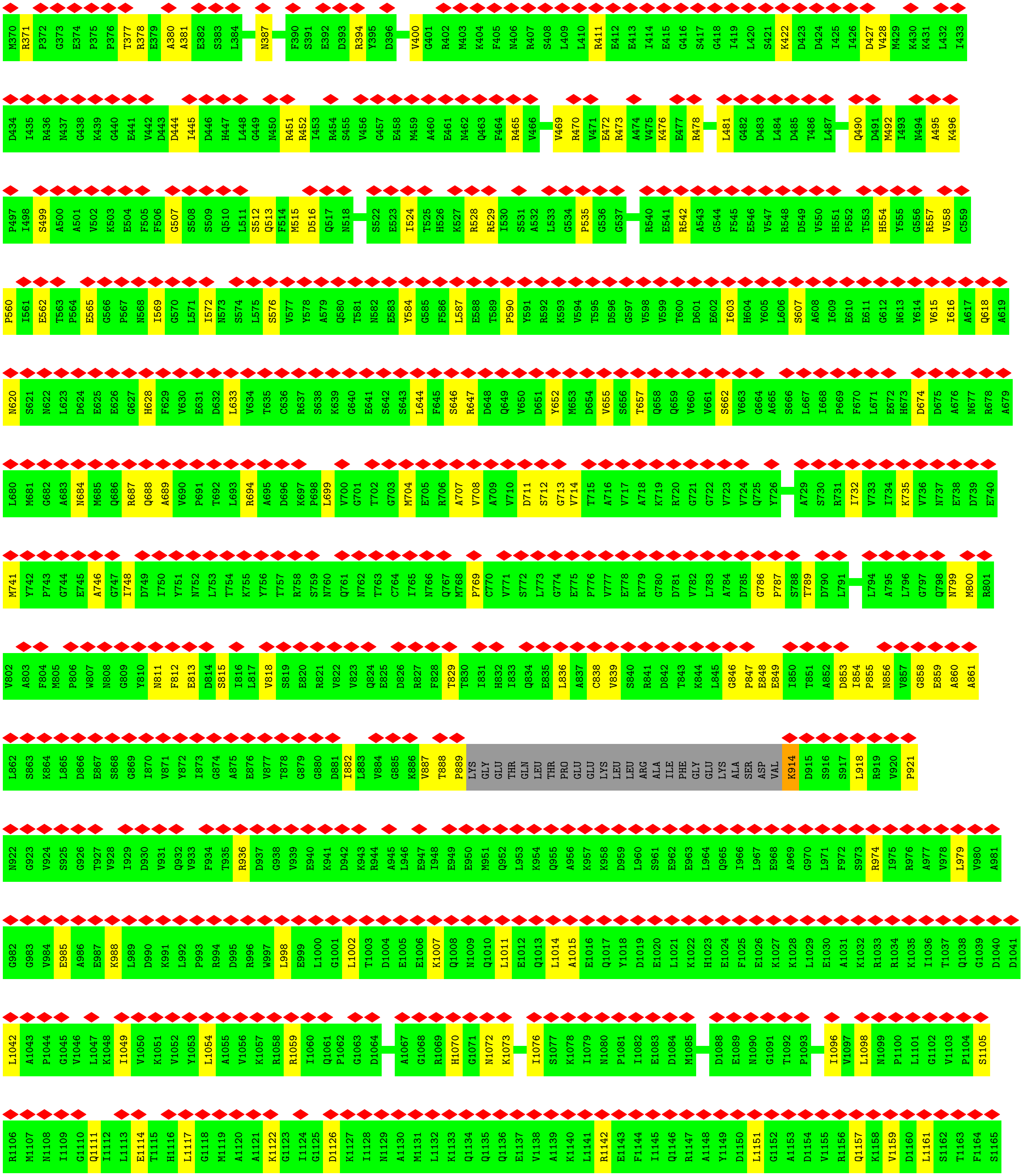


- Molecule 10: E-site and P-site tRNA (fMet)



- Molecule 11: DNA-directed RNA polymerase subunit beta

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D434 I435 R436 N437 G438 K439 G440 E441 V442 D443 D444 I445 D446 H447 L448 G449 N450 R451 R452 I453 R454 S455 V456 G457 E458 M459 A460 E461 N462 Q463 F464 R465 V466 V469 R470 V471 E472 R473 A474 V475 K476 E477 R478 L481 G482 D483 L484 D485 T486 L487 Q490 D491 M492 I493 N494 A495 K496
P497 I498 S499 A500 A501 V502 K503 E504 F505 F506 G507 S508 S509 Q510 L511 S512 Q513 F514 M515 D516 Q517 N518 S522 E523 I524 T525 H526 K527 R528 R529 I530 S531 A532 L533 G534 P535 G536 G537 R540 E541 R542 A543 G544 F545 E546 V547 R548 D549 V550 H551 P552 T553 H554 Y555 G556 R557 V558 C559
P560 I561 E562 T563 P564 E565 G566 P567 N568 I569 G570 L571 I572 N573 S574 L575 S576 V577 Y578 A579 Q580 T581 N582 E583 Y584 G585 F586 L587 E588 T589 P590 Y591 R592 K593 V594 T595 D596 G597 V598 V599 T600 D601 E602 I603 H604 Y605 L606 S607 A608 I609 E610 E611 G612 N613 Y614 V615 I616 A617 Q618 A619
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M741 Y742 P743 G744 E745 A746 G747 I748 D749 I750 Y751 N752 L753 T754 K755 Y756 T757 R758 S759 N760 Q761 N762 T763 C764 I765 N766 Q767 M768 P769 C770 V771 S772 L773 G774 E775 P776 V777 E778 R779 G780 D781 V782 L783 A784 D785 G786 P787 S788 T789 D790 L791 L794 A795 L796 G797 Q798 N799 M800 R801
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L862 S863 K864 L865 D866 E867 S868 G869 I870 V871 Y872 I873 G874 A875 E876 V877 T878 G879 G880 D881 I882 L883 V884 G885 K886 V887 T888 P889 LYS GLY GLU THR GLN LEU THR PRO GLU GLU LYS LEU LEU ARG ALA ILE PHE GLY GLU LYS ALA SER ASP VAL K914 D915 S916 S917 L918 R919 V920 P921
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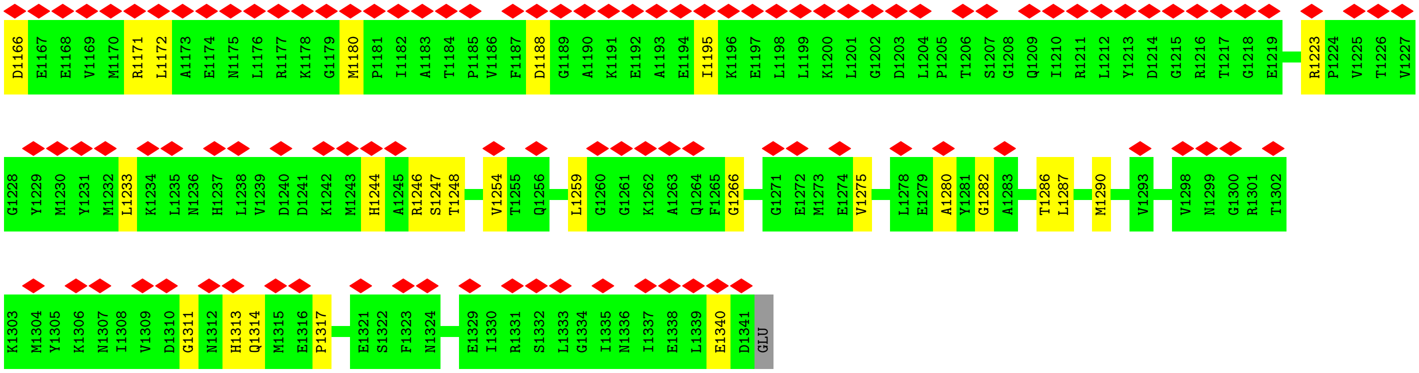
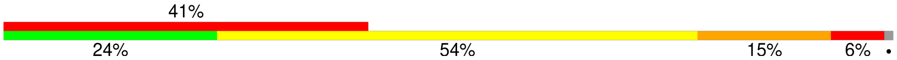
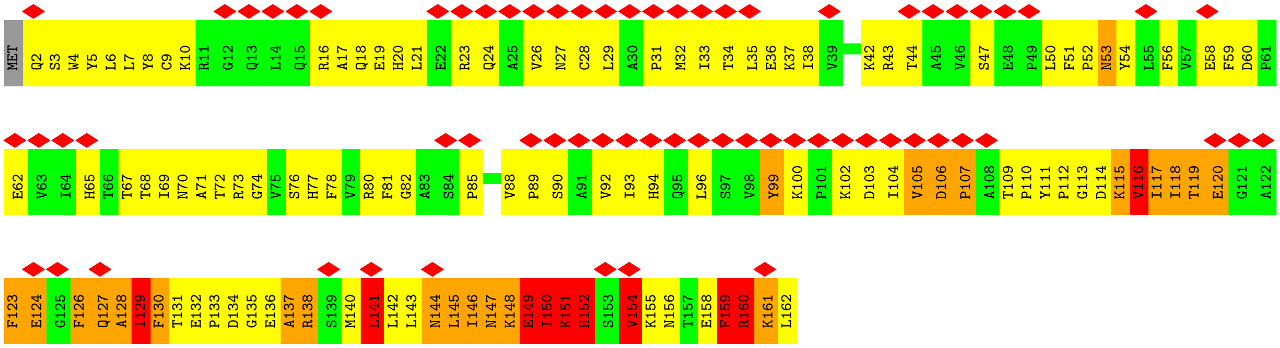
G982 G983 V984 E985 A986 E987 K988 L989 D990 K991 L992 P993 R994 D995 R996 W997 L998 E999 L1000 G1001 L1002 T1003 D1004 E1005 E1006 K1007 Q1008 N1009 Q1010 L1011 E1012 Q1013 L1014 A1015 E1016 Q1017 Y1018 D1019 E1020 L1021 K1022 H1023 E1024 F1025 E1026 K1027 K1028 L1029 E1030 A1031 K1032 R1033 R1034 K1035 I1036 T1037 Q1038 G1039 D1040 D1041
L1042 A1043 P1044 G1045 V1046 L1047 K1048 I1049 V1050 K1051 V1052 Y1053 L1054 A1055 V1056 K1057 R1058 R1059 I1060 Q1061 P1062 G1063 D1064 A1067 G1068 R1069 H1070 G1071 N1072 K1073 I1076 S1077 K1078 I1079 N1080 P1081 I1082 E1083 D1084 M1085 D1088 E1089 N1090 G1091 T1092 P1093 I1096 V1097 L1098 N1099 P1100 L1101 G1102 V1103 P1104 S1105
R1106 M1107 N1108 I1109 G1110 Q1111 I1112 L1113 E1114 T1115 H1116 L1117 G1118 M1119 A1120 A1121 K1122 G1123 I1124 G1125 D1126 K1127 I1128 N1129 A1130 M1131 L1132 K1133 Q1134 Q1135 Q1136 E1137 V1138 A1139 K1140 L1141 R1142 E1143 F1144 I1145 Q1146 R1147 A1148 Y1149 D1150 L1151 G1152 A1153 D1154 V1155 R1156 Q1157 K1158 V1159 D1160 L1161 S1162 T1163 F1164 S1165



- Molecule 12: Transcription antitermination protein RfaH

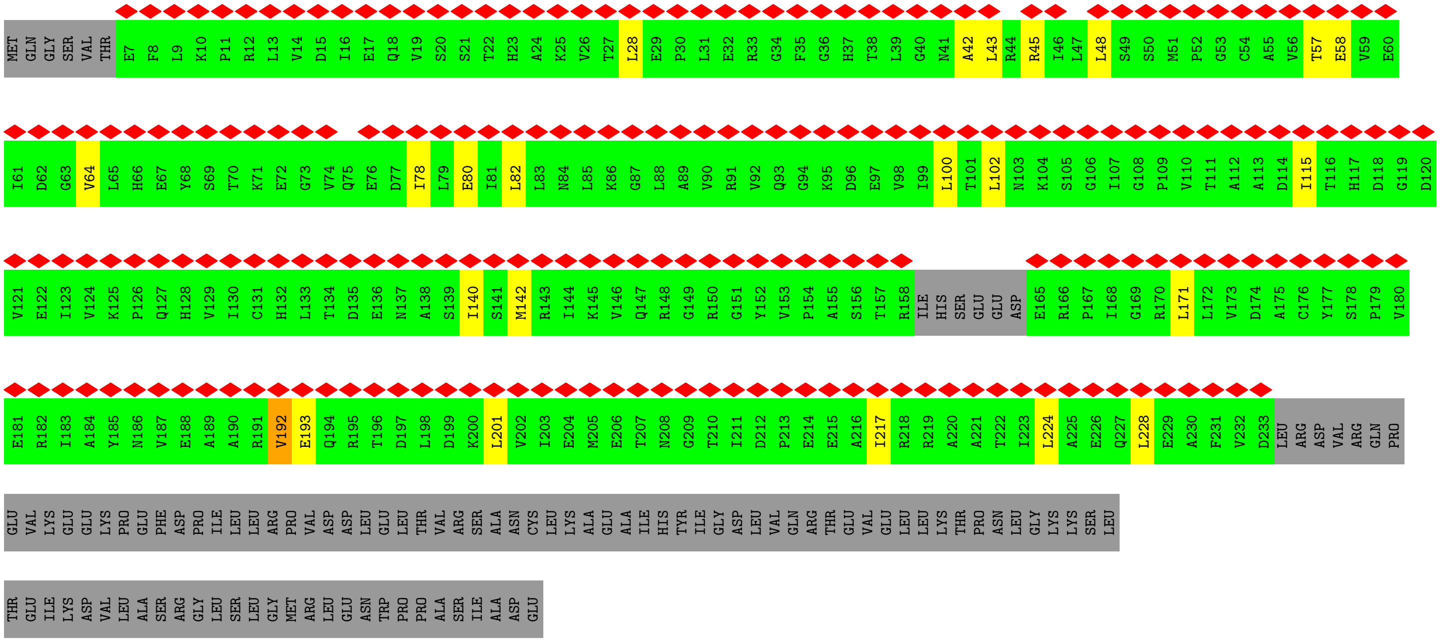
Chain AB:



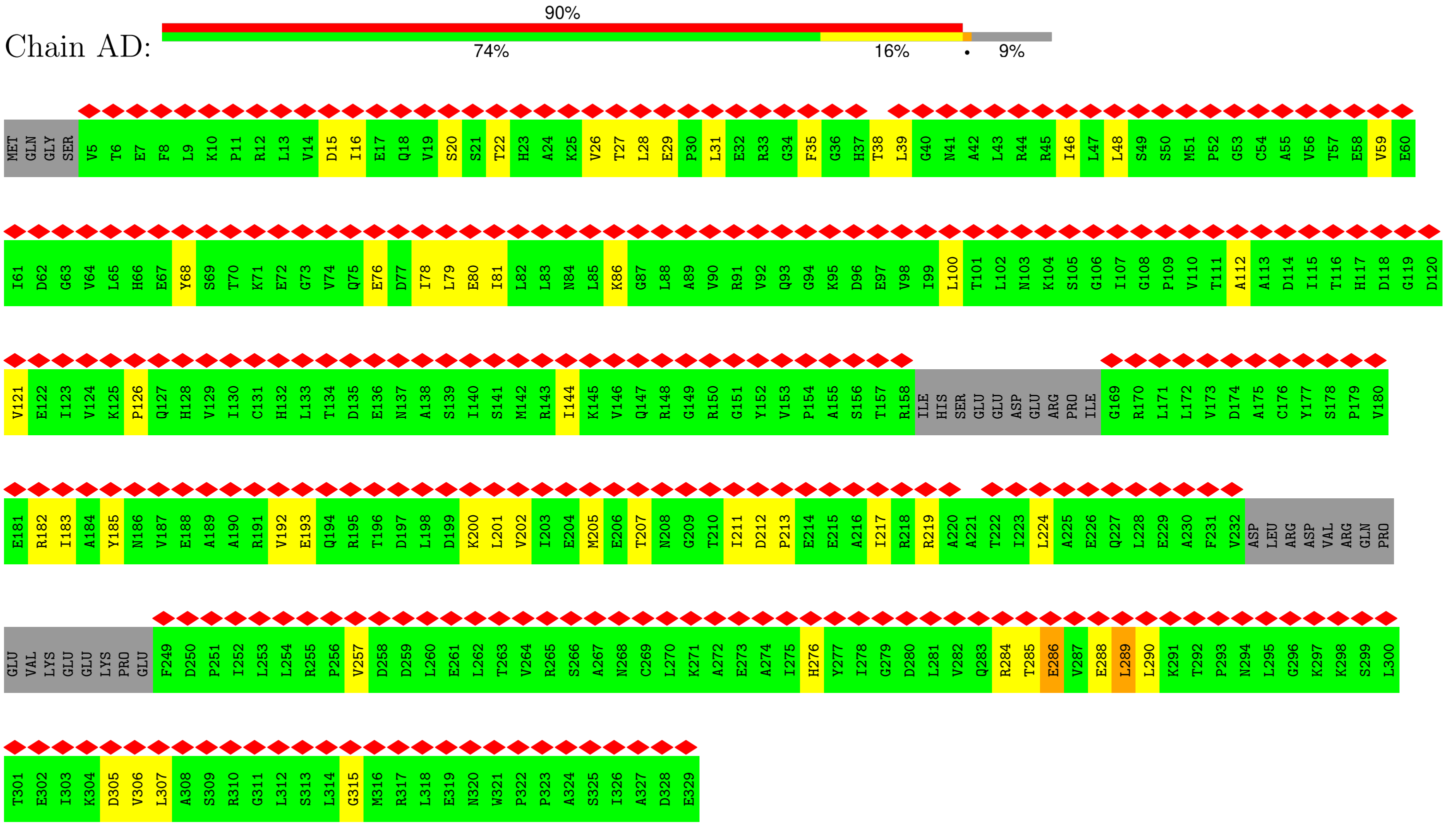


- Molecule 13: DNA-directed RNA polymerase subunit alpha

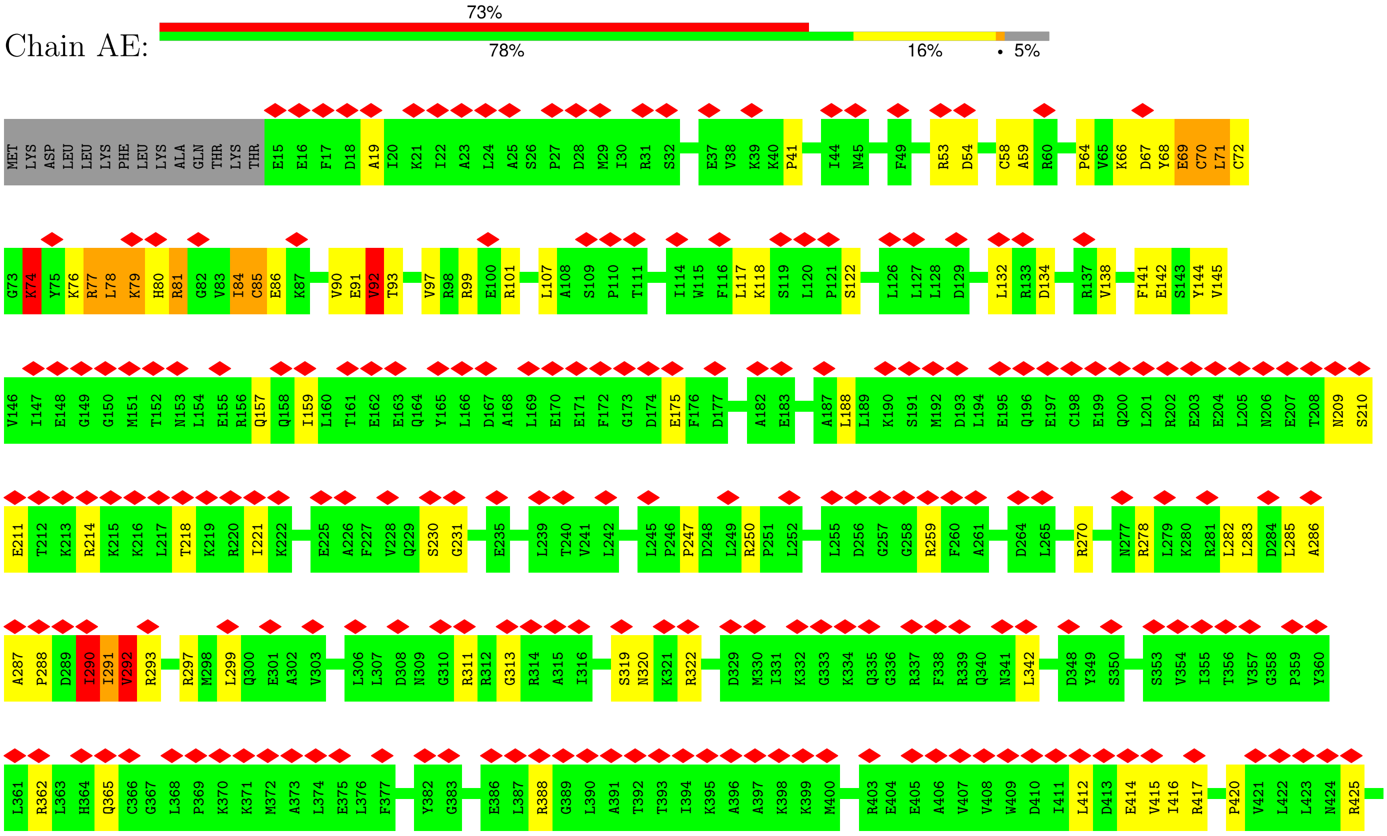
Chain AC:

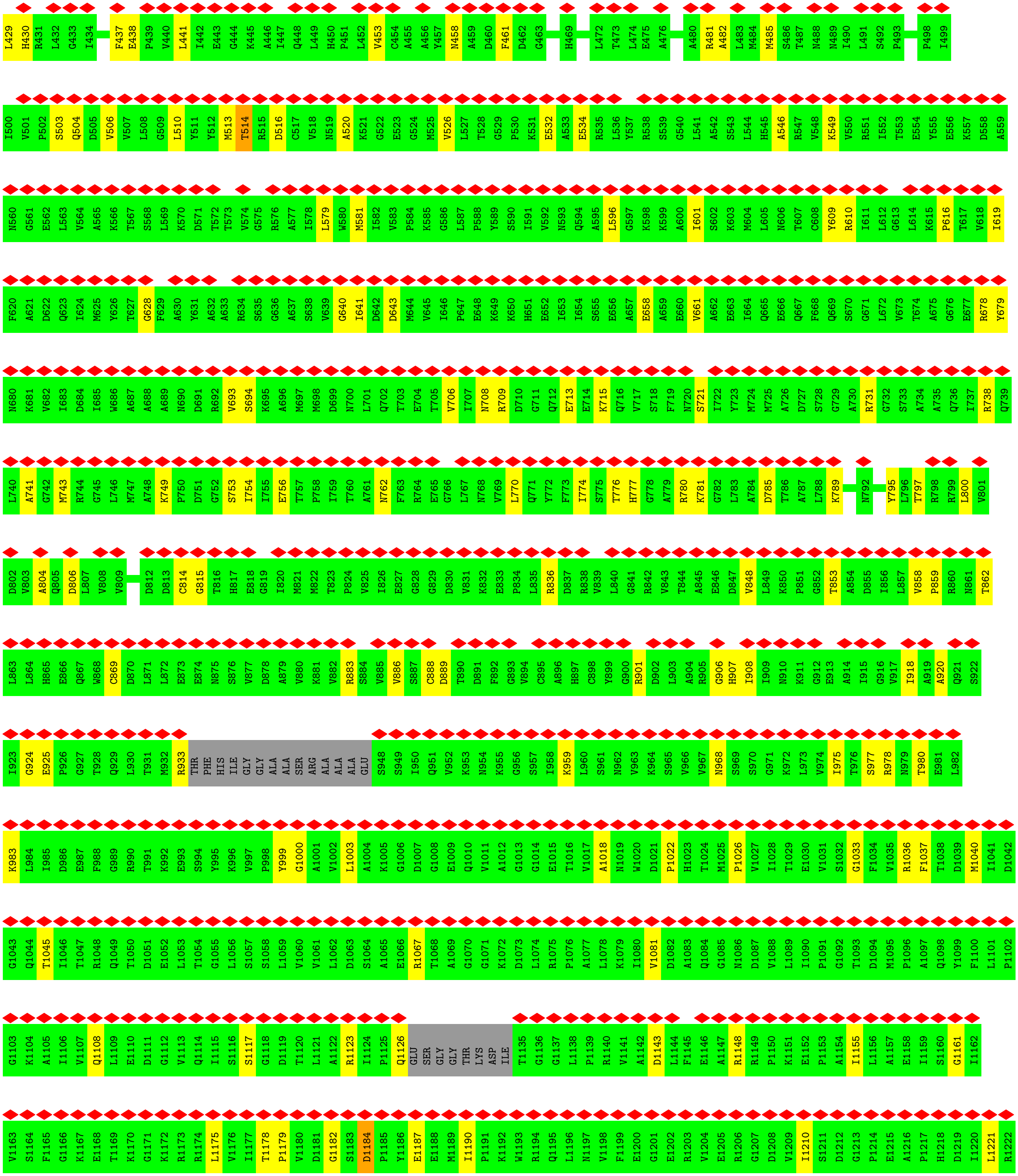


- Molecule 13: DNA-directed RNA polymerase subunit alpha



- Molecule 14: DNA-directed RNA polymerase subunit beta’

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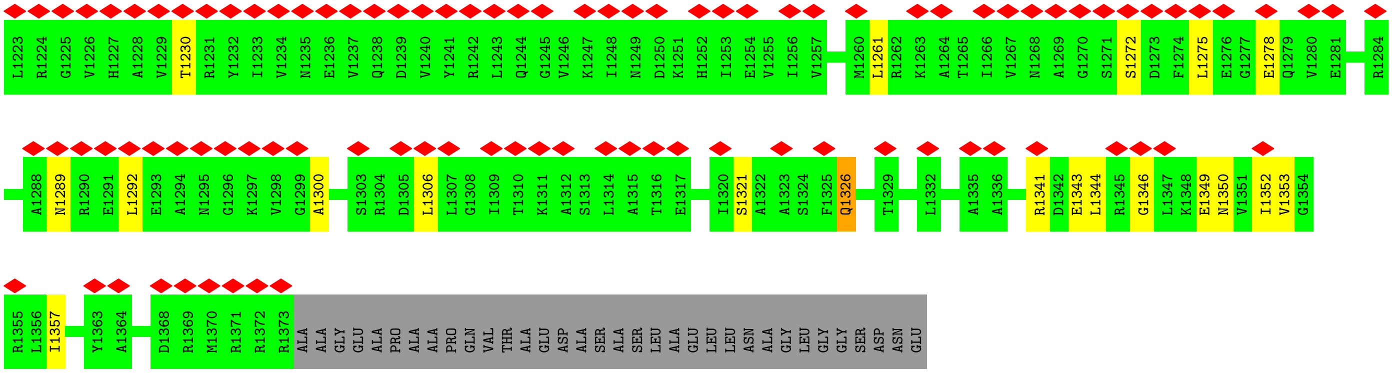
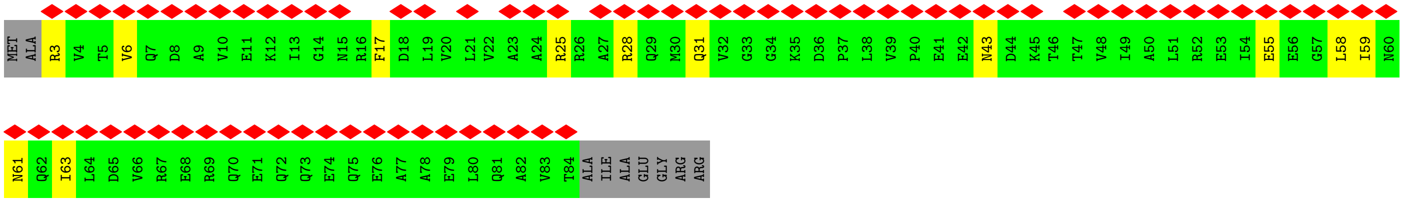


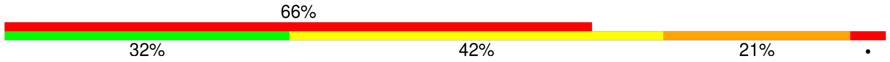
- Molecule 15: DNA-directed RNA polymerase subunit omega

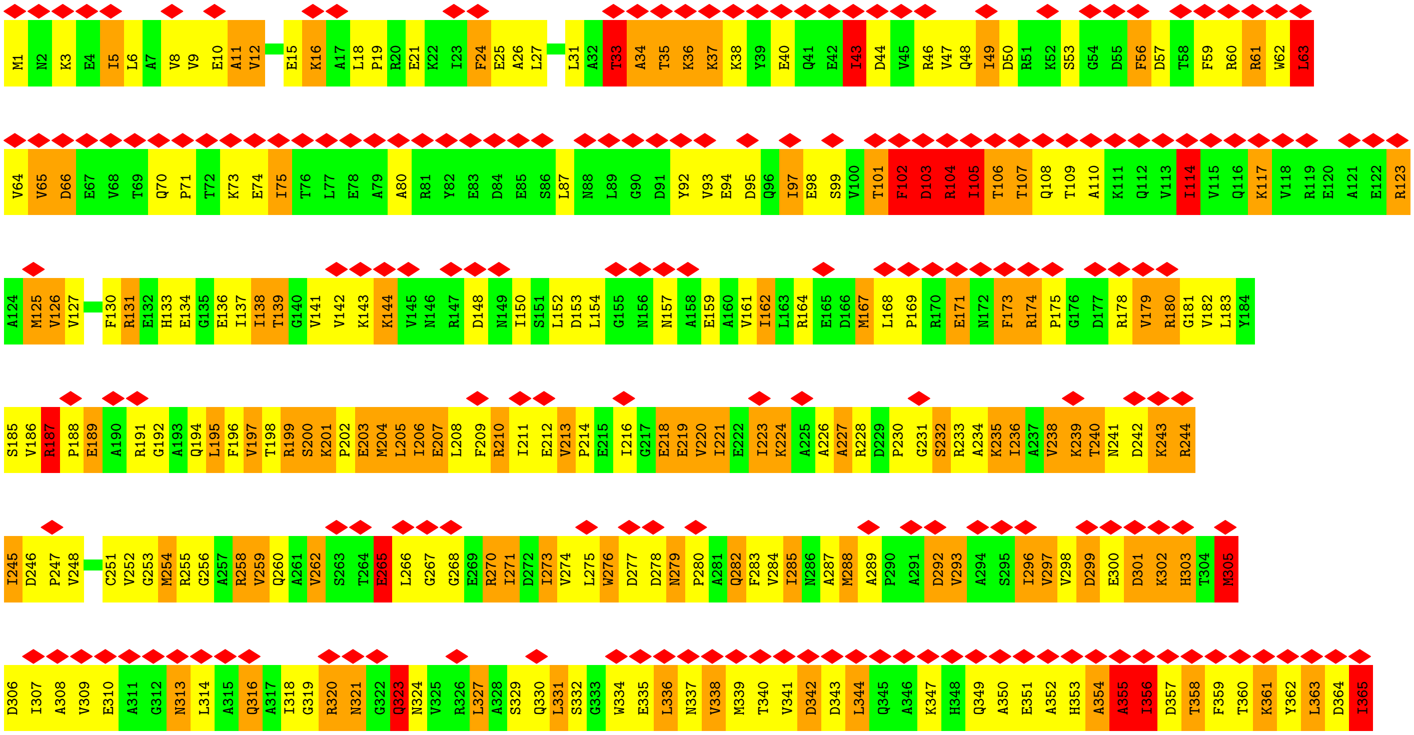
Chain AF:

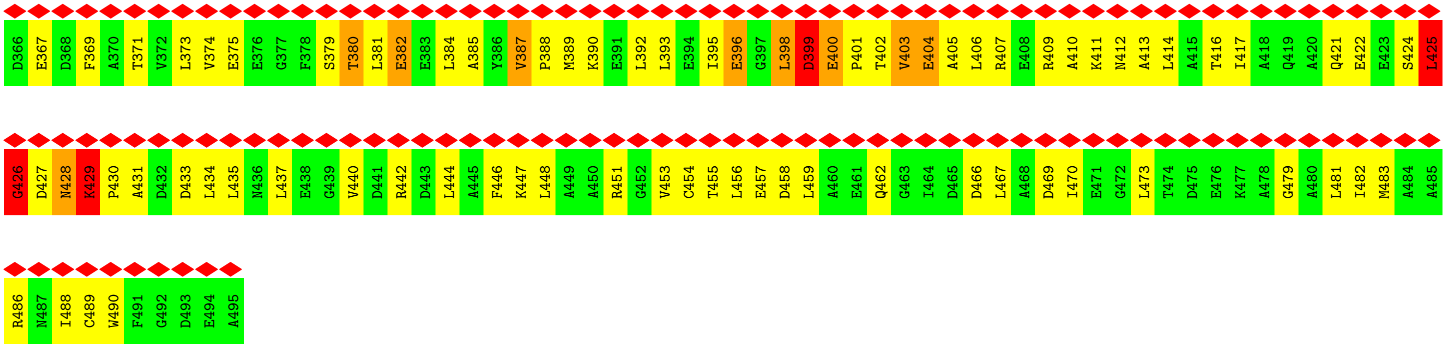


- Molecule 16: Transcription termination/antitermination protein NusA

Chain AG:

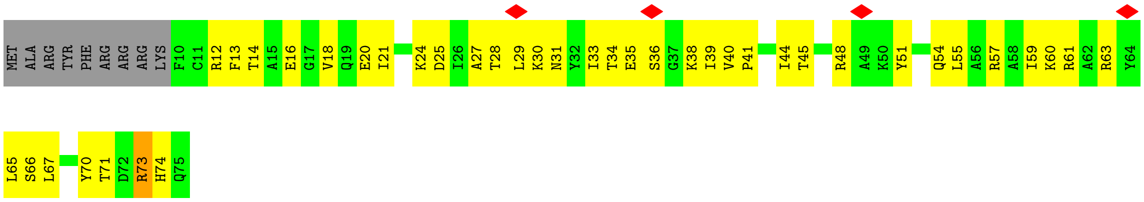






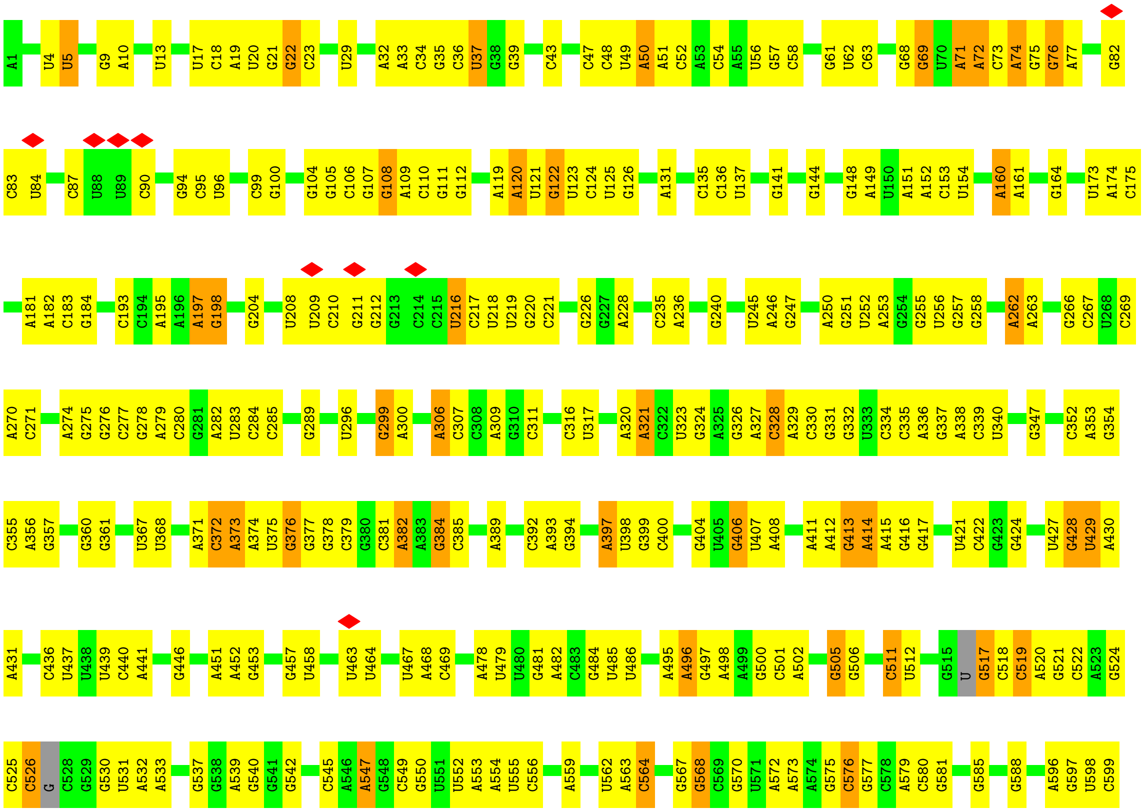
- Molecule 17: 30S ribosomal protein S18

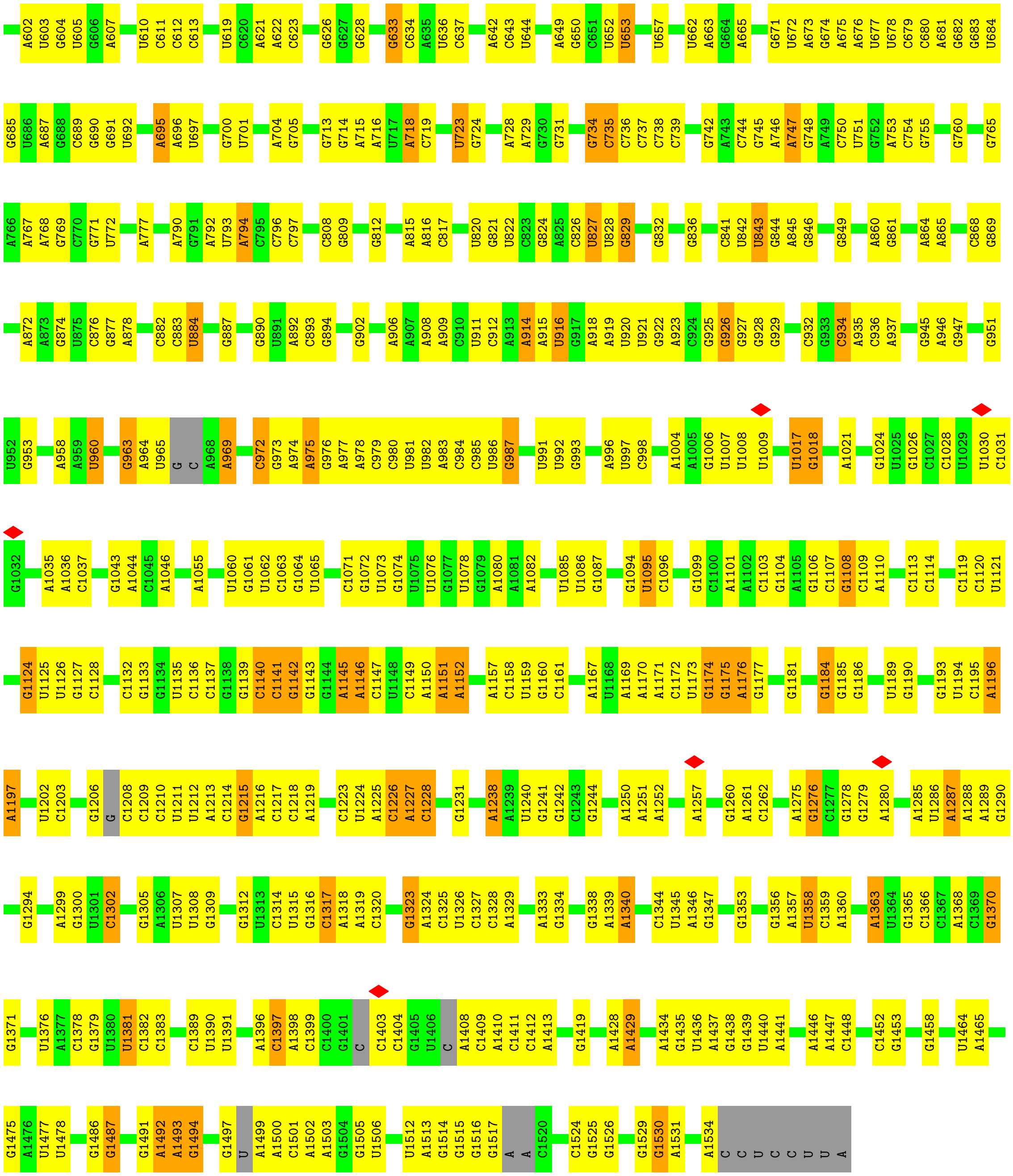
Chain C:



- Molecule 18: 16S rRNA

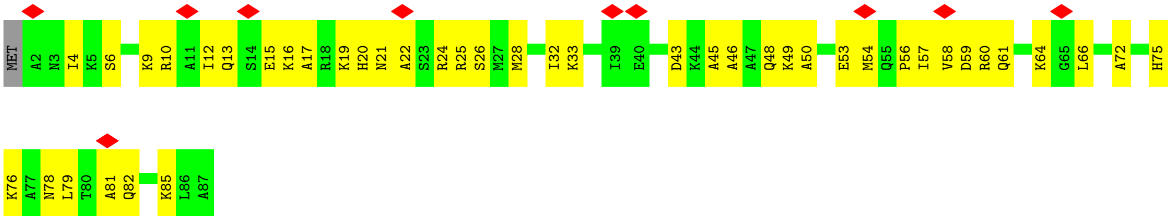
Chain D:



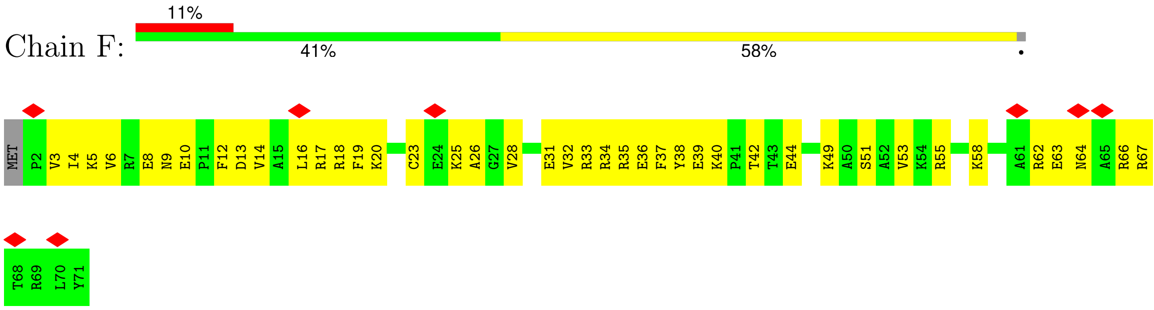


- Molecule 19: 30S ribosomal protein S20

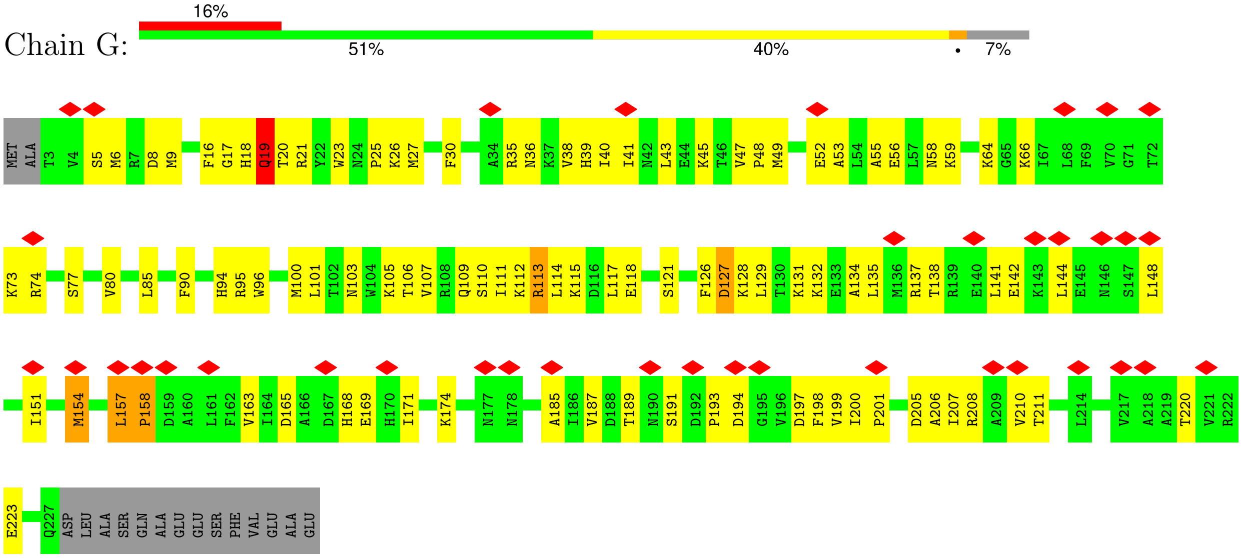
Chain E:

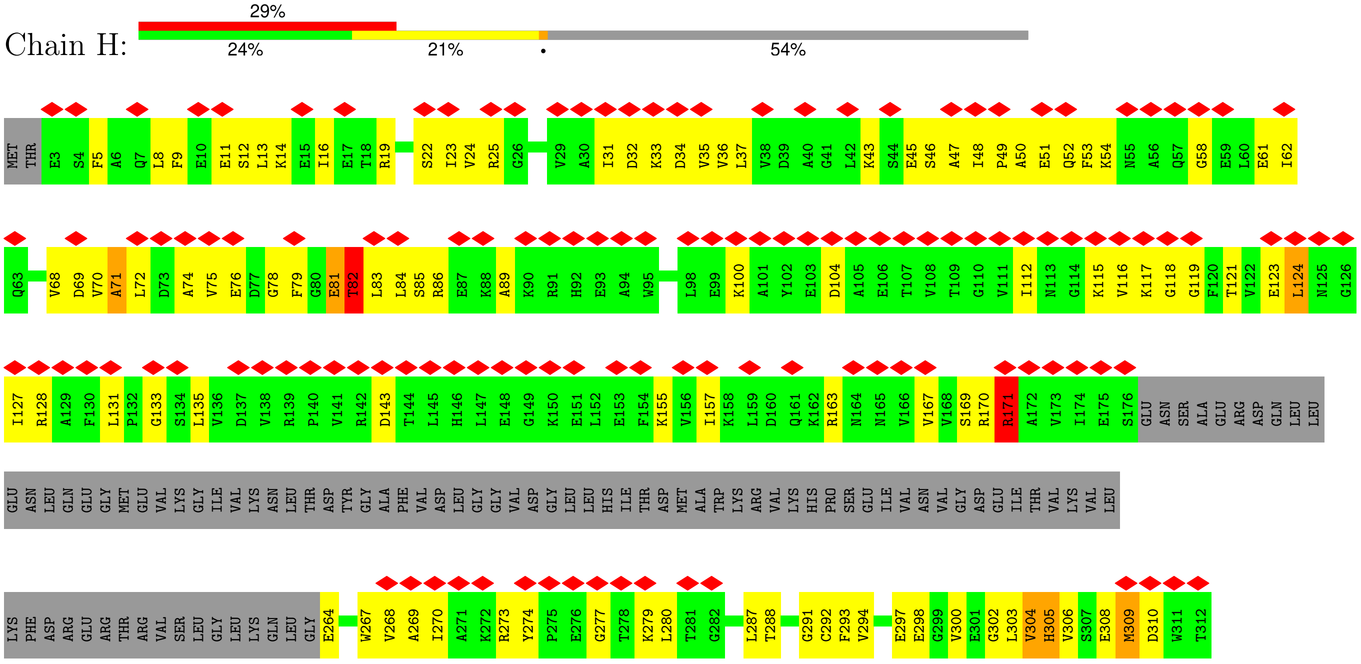
- Molecule 20: 30S ribosomal protein S21

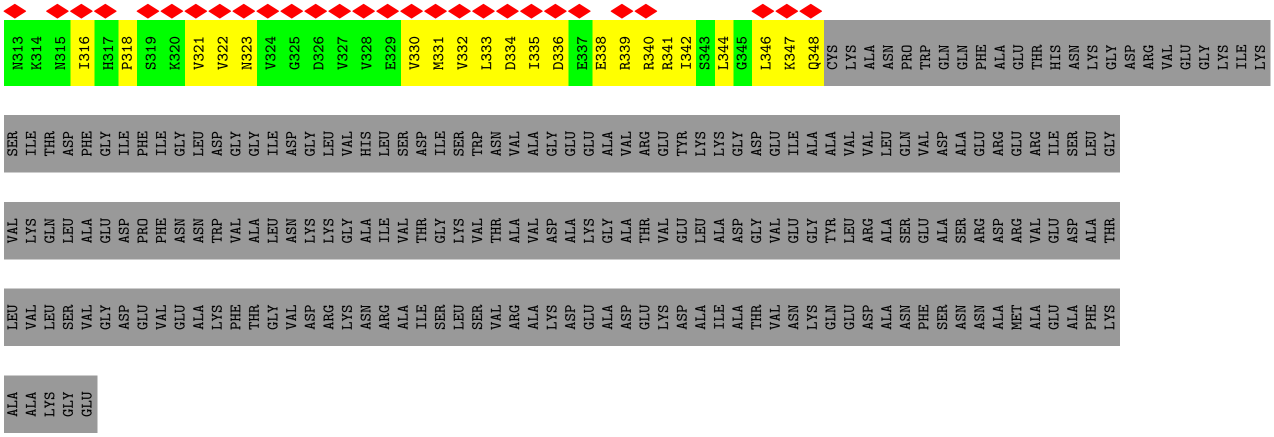


- Molecule 21: 30S ribosomal protein S2



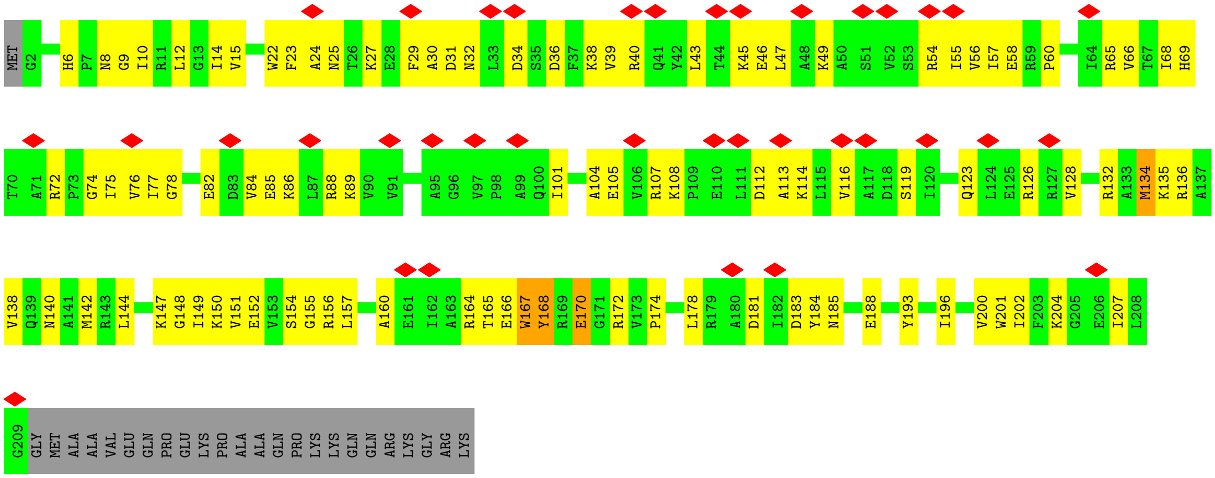
- Molecule 22: 30S ribosomal protein S1





- Molecule 23: 30S ribosomal protein S3

Chain I:



- Molecule 24: 30S ribosomal protein S4

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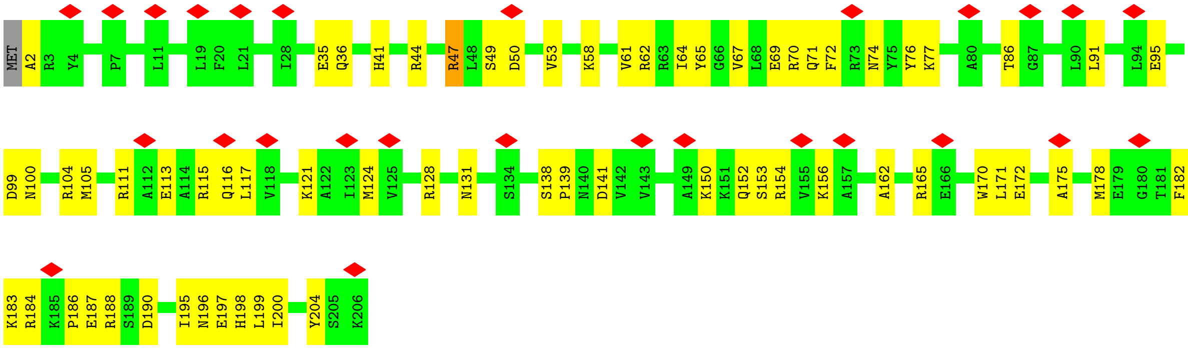

- Molecule 25: 30S ribosomal protein S5

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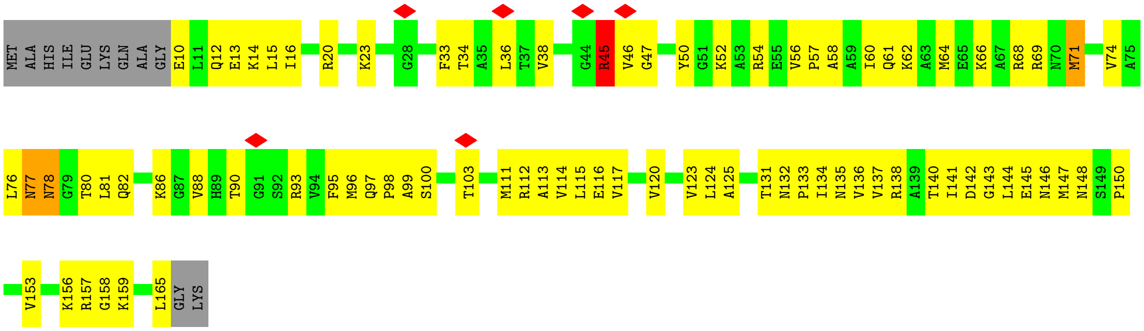

- Molecule 26: 30S ribosomal protein S6

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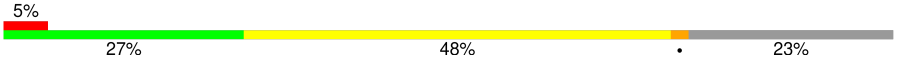
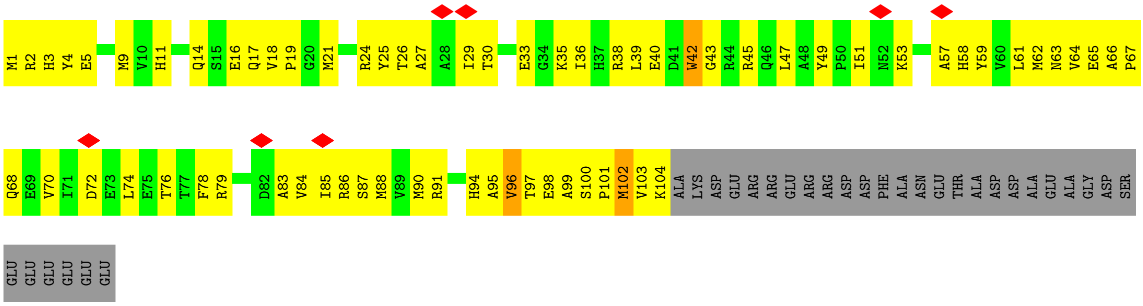
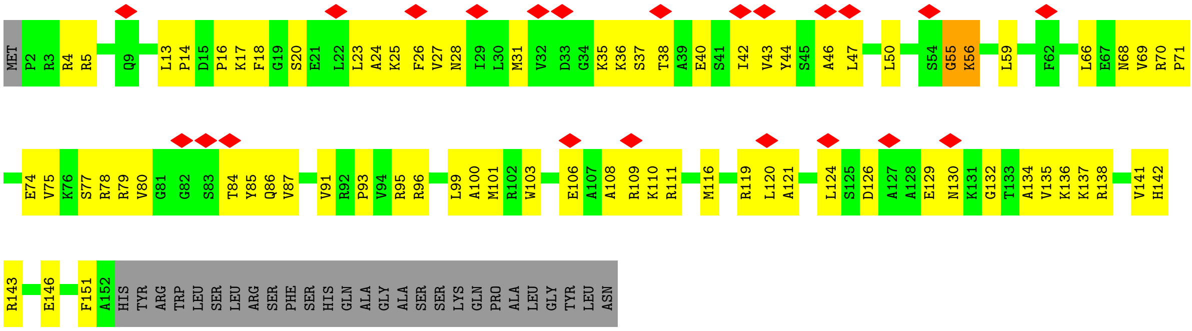




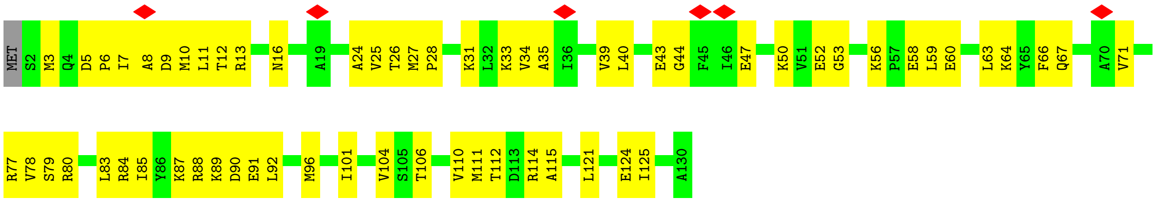
- Molecule 27: 30S ribosomal protein S7

Chain M:

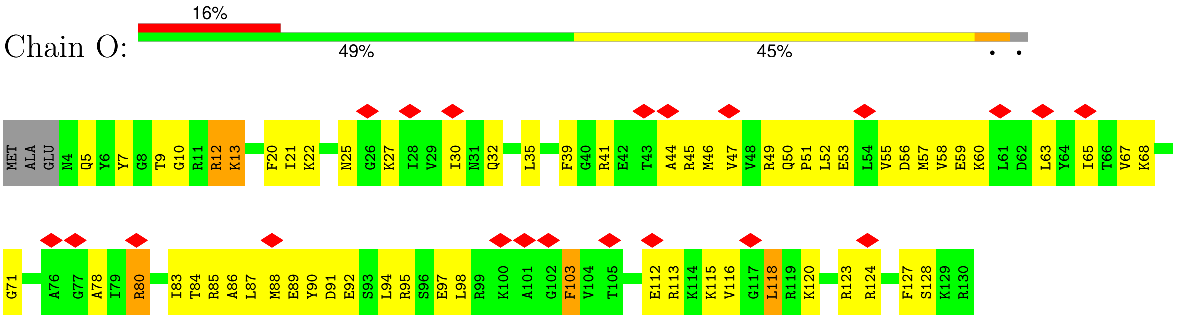


- Molecule 28: 30S ribosomal protein S8

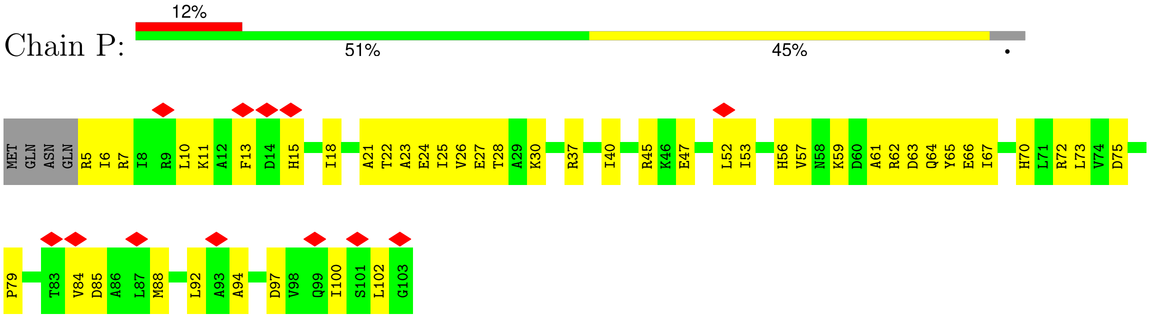
Chain N:



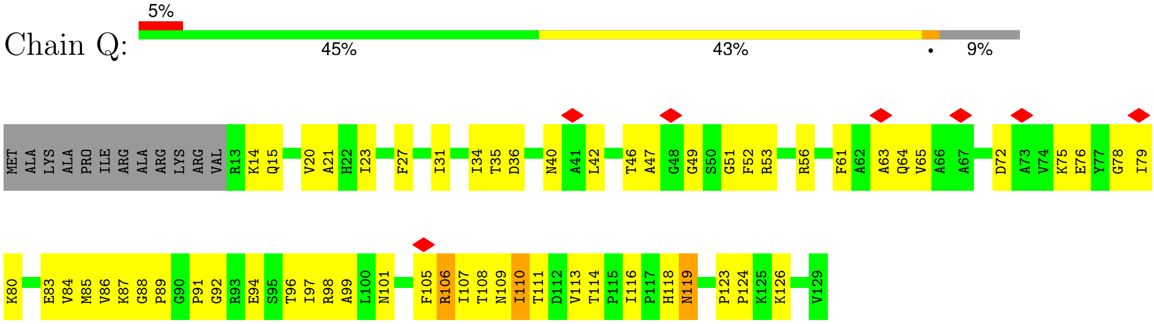
- Molecule 29: 30S ribosomal protein S9



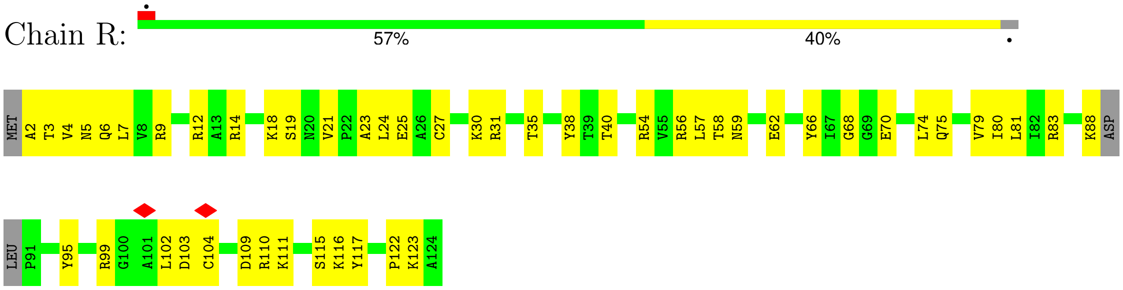
- Molecule 30: 30S ribosomal protein S10



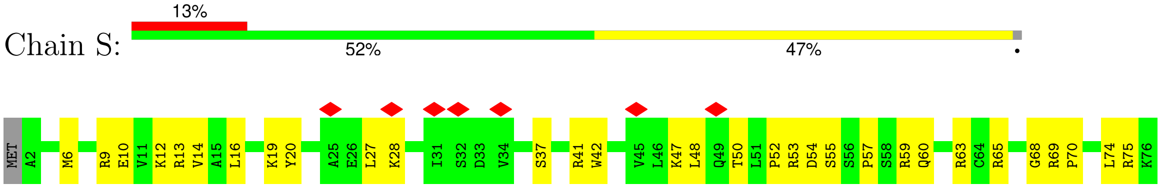
- Molecule 31: 30S ribosomal protein S11

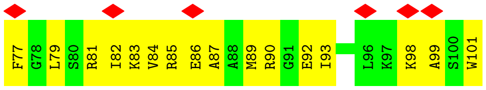


- Molecule 32: 30S ribosomal protein S12

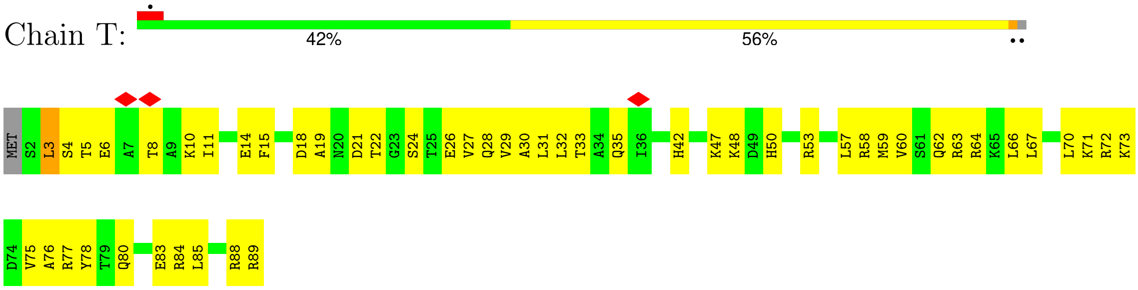


- Molecule 33: 30S ribosomal protein S14

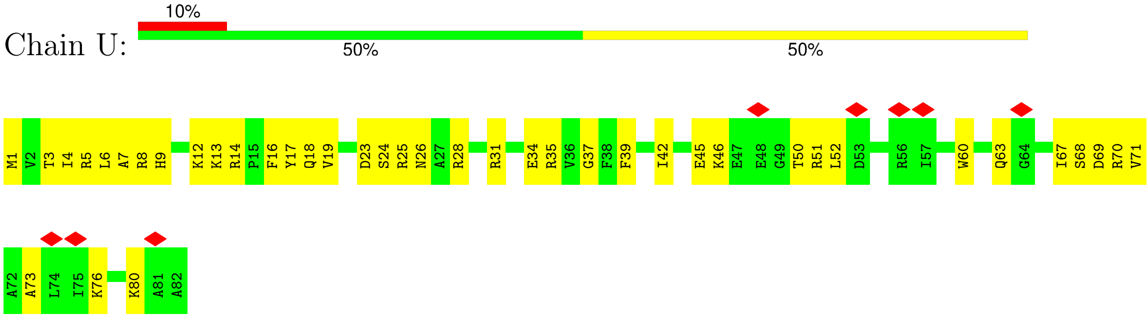




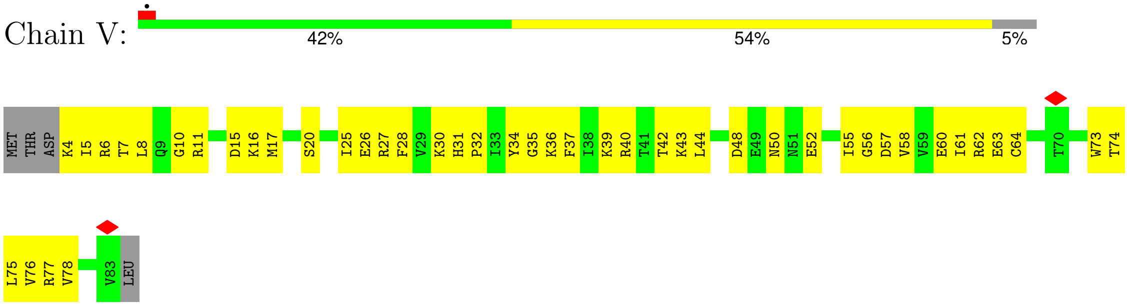
- Molecule 34: Small ribosomal subunit protein uS15



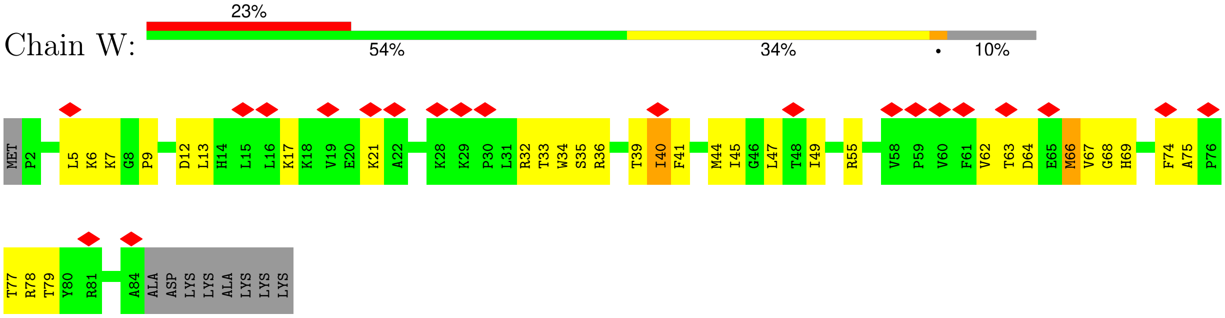
- Molecule 35: 30S ribosomal protein S16



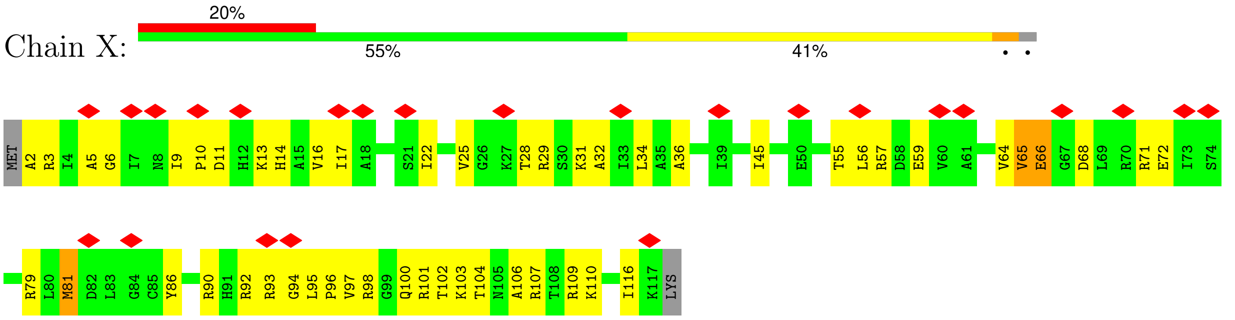
- Molecule 36: 30S ribosomal protein S17



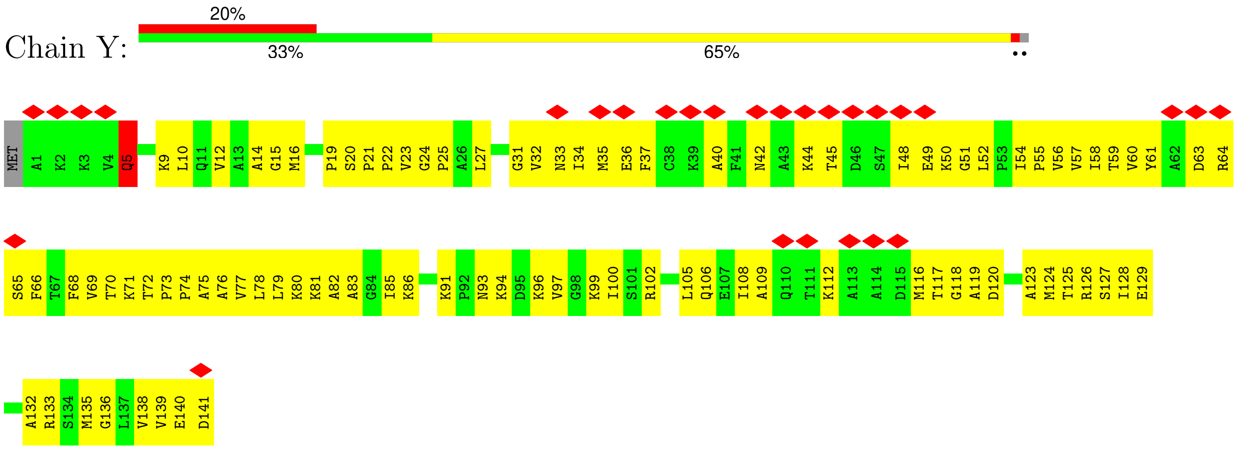
- Molecule 37: 30S ribosomal protein S19



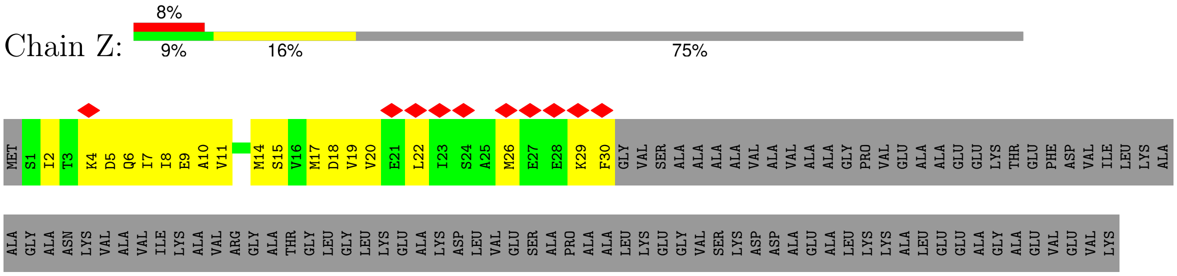
- Molecule 38: 30S ribosomal protein S13



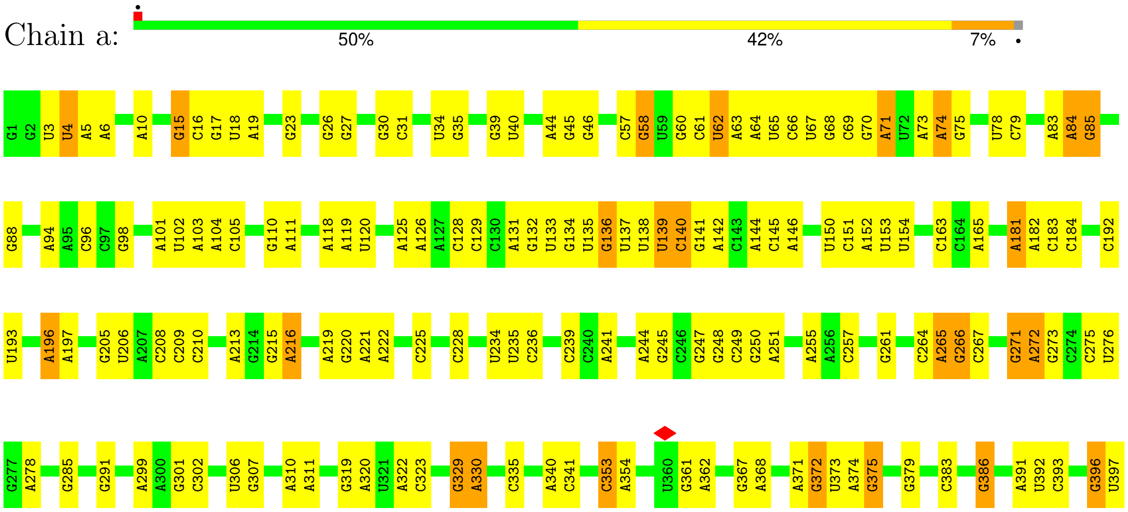
- Molecule 39: 50S ribosomal protein L11

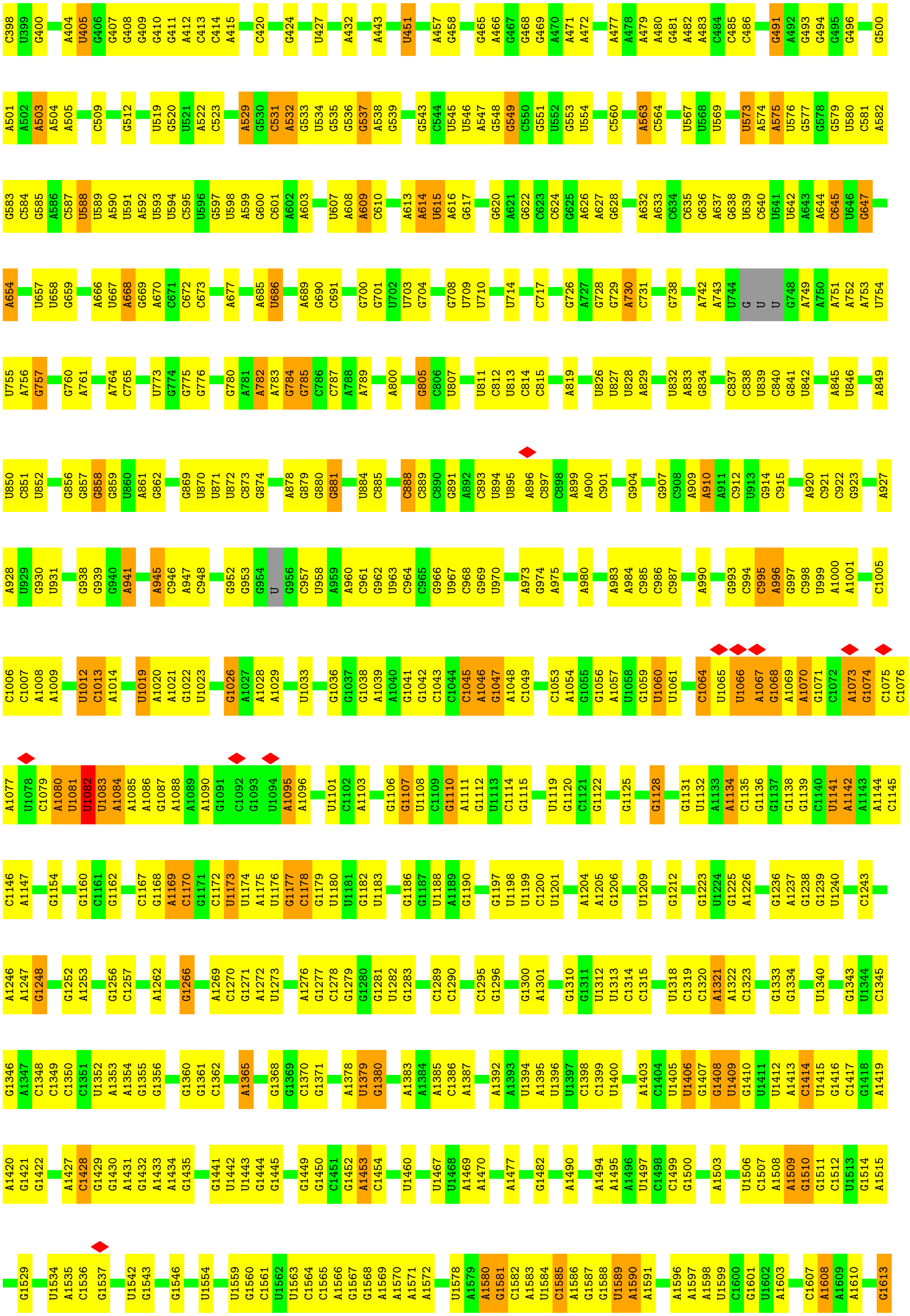


- Molecule 40: 50S ribosomal protein L7/L12



- Molecule 41: 23S rRNA

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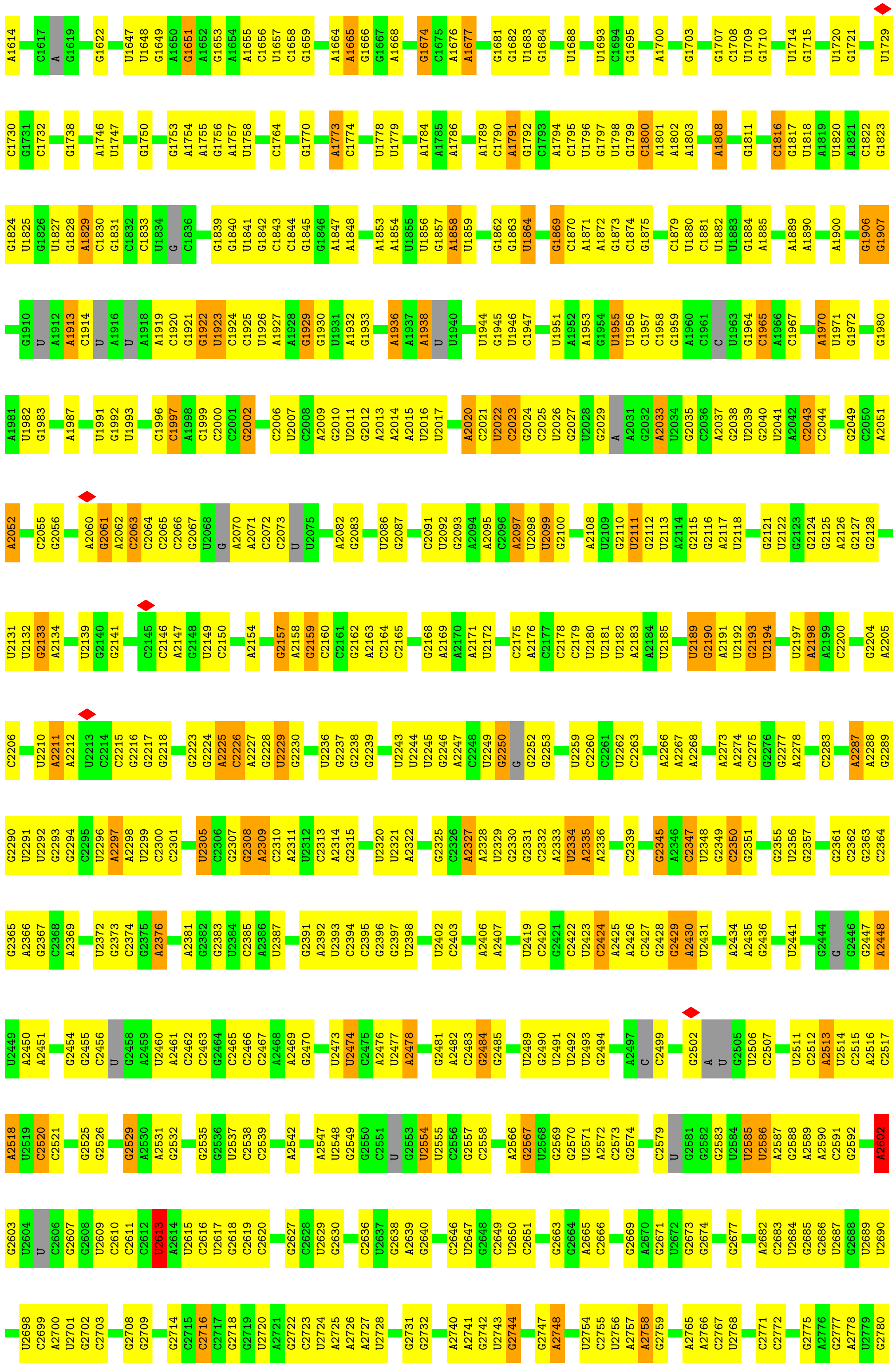
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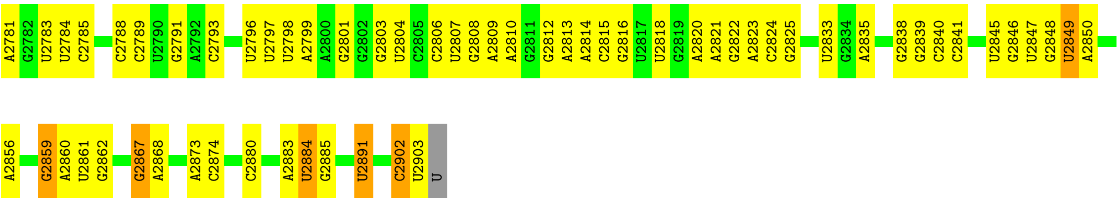
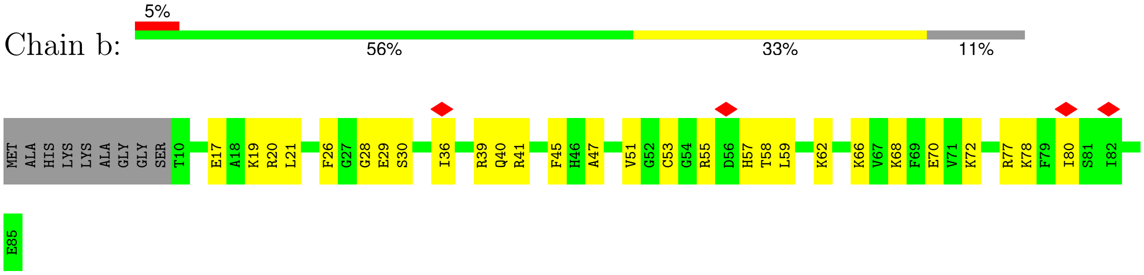
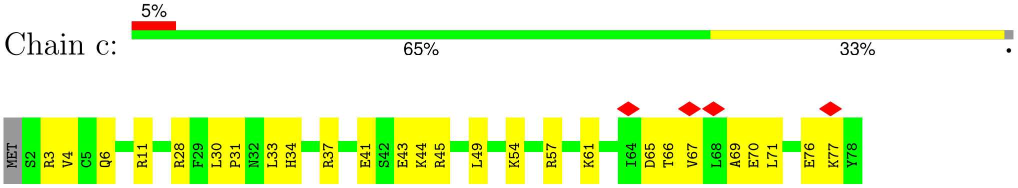
G2603 U2604 U C2606 G2607 G2608 U2609 C2610 C2611 C2612 U2613 A2614 U2615 C2616 U2617 G2618 C2619 C2620 G2627 C2628 U2629 G2630 C2636 U2637 G2638 A2639 G2640 C2646 U2647 G2648 C2649 U2650 C2651 G2663 G2664 A2665 C2666 G2669 A2670 G2671 U2672 G2673 G2674 G2677 A2682 C2683 U2684 G2685 G2686 U2687 G2688 U2689 U2690
U2698 C2699 A2700 U2701 G2702 C2703 G2708 G2709 G2714 C2715 C2716 C2717 G2718 G2719 U2720 A2721 C2722 C2723 U2724 A2725 A2726 A2727 U2728 G2731 G2732 A2740 A2741 G2742 U2743 G2744 G2747 A2748 U2754 C2755 U2756 A2757 A2758 G2759 A2765 A2766 C2767 U2768 C2771 C2772 G2775 A2776 G2777 A2778 U2779 G2780



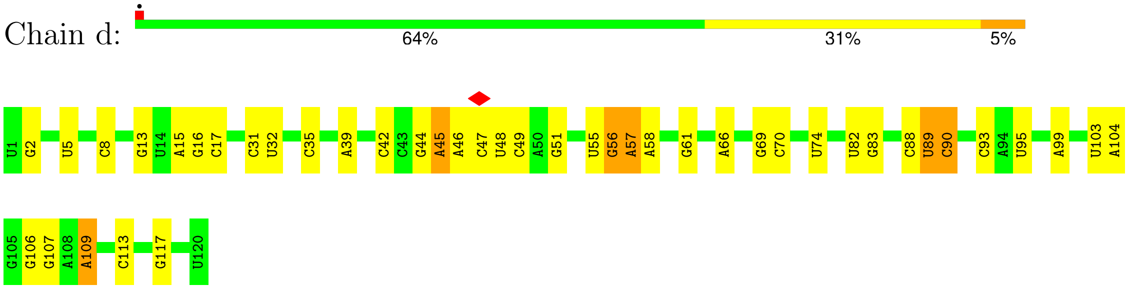
- Molecule 42: 50S ribosomal protein L27



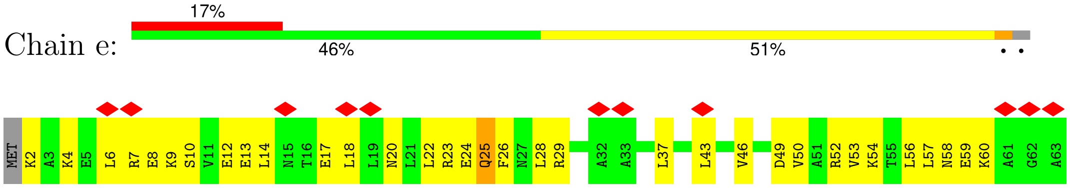
- Molecule 43: 50S ribosomal protein L28



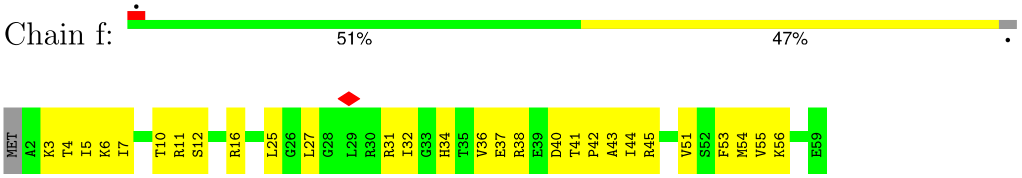
- Molecule 44: 5S rRNA



- Molecule 45: 50S ribosomal protein L29

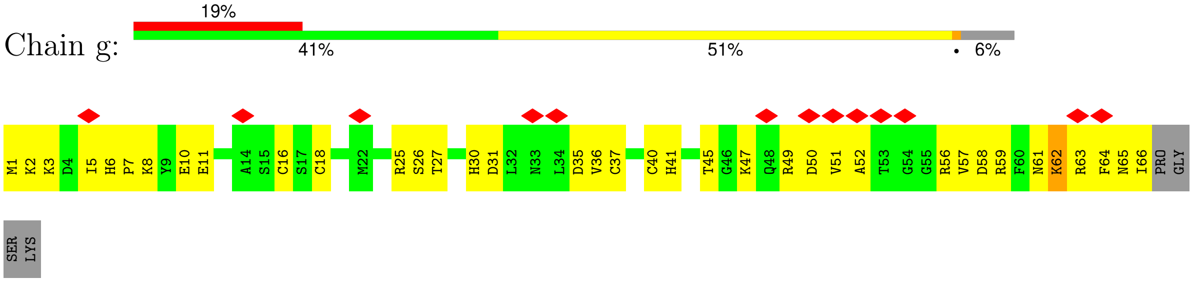


- Molecule 46: 50S ribosomal protein L30



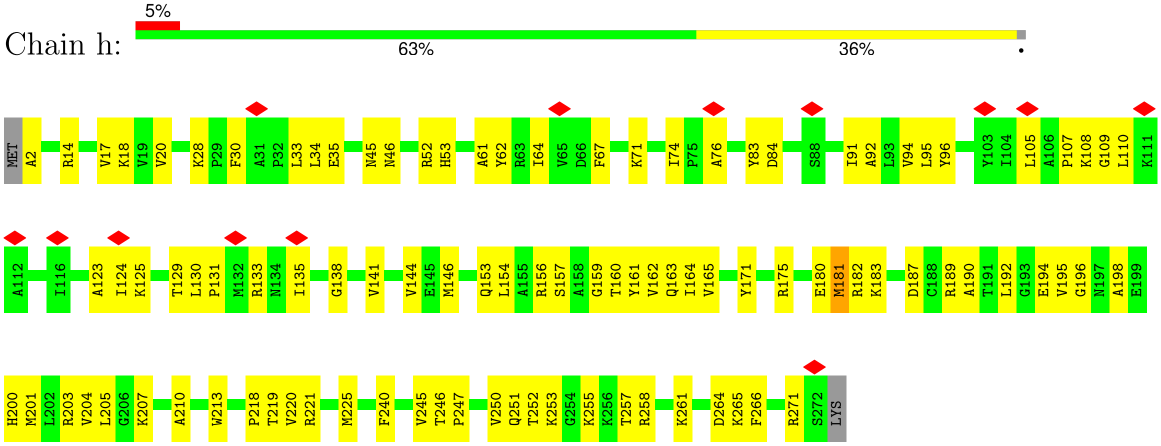
- Molecule 47: 50S ribosomal protein L31

Chain g:



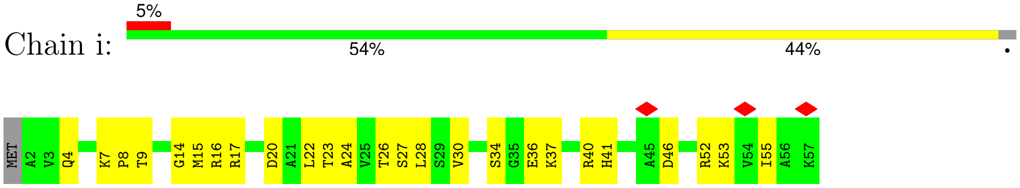
- Molecule 48: 50S ribosomal protein L2

Chain h:



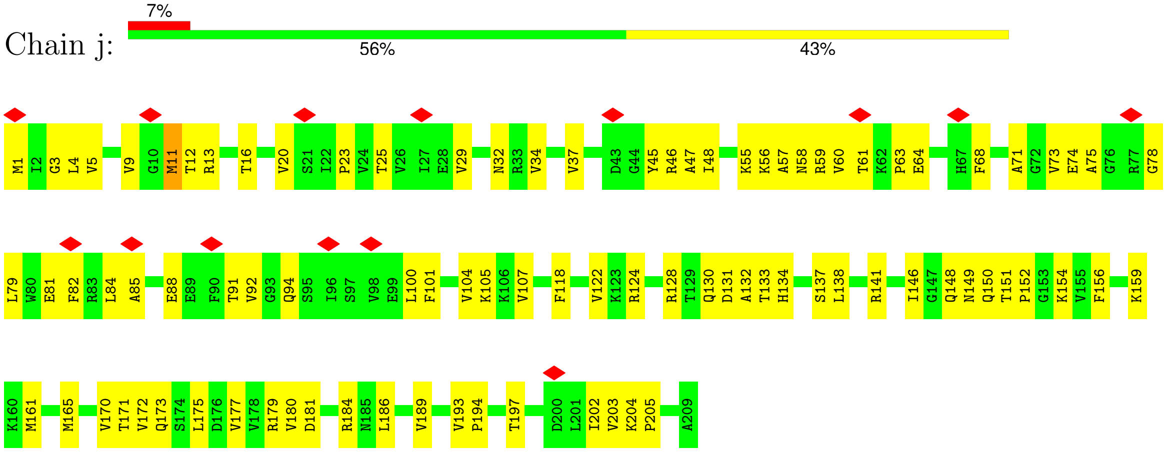
- Molecule 49: 50S ribosomal protein L32

Chain i:

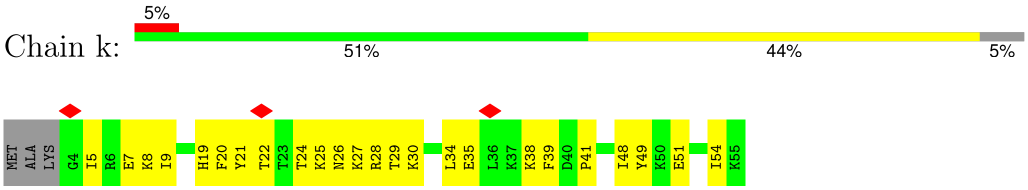


- Molecule 50: 50S ribosomal protein L3

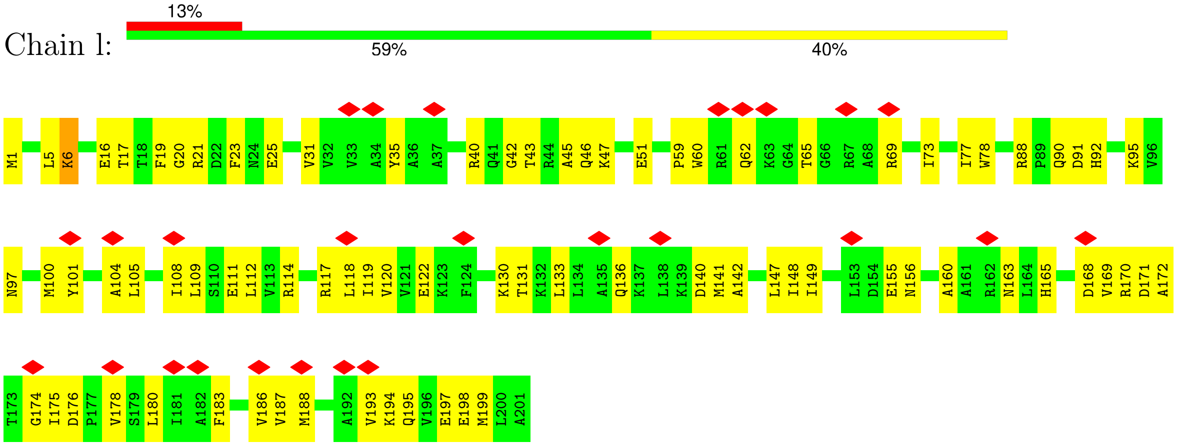
Chain j:



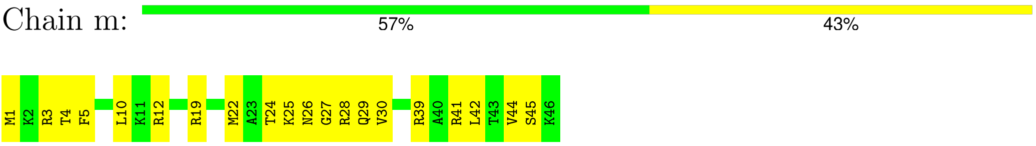
- Molecule 51: 50S ribosomal protein L33



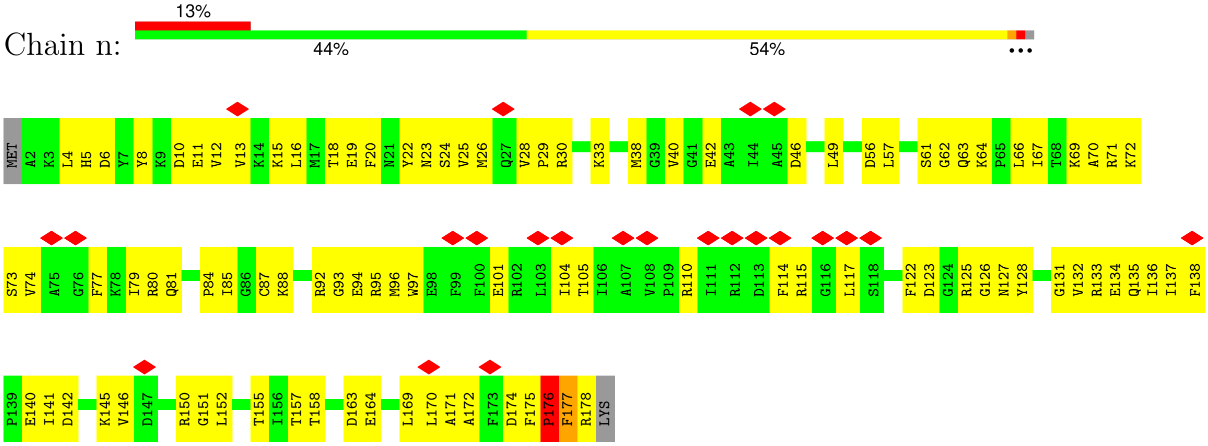
- Molecule 52: 50S ribosomal protein L4



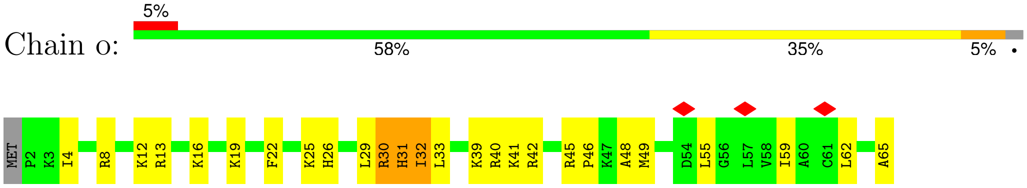
- Molecule 53: 50S ribosomal protein L34



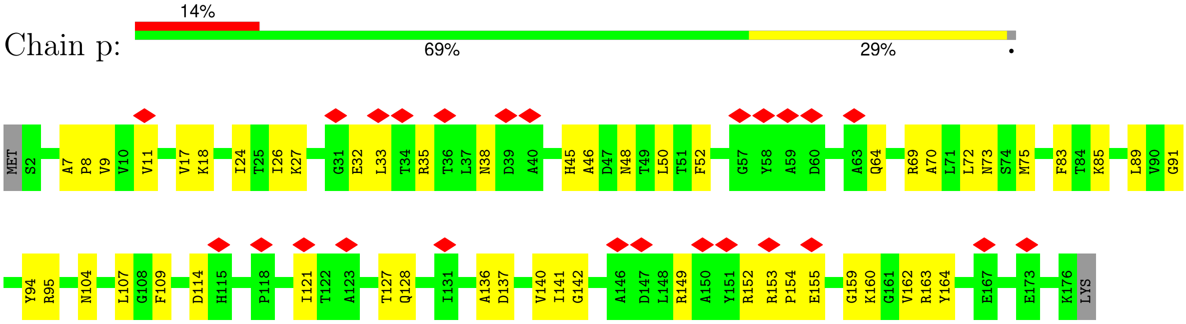
- Molecule 54: 50S ribosomal protein L5



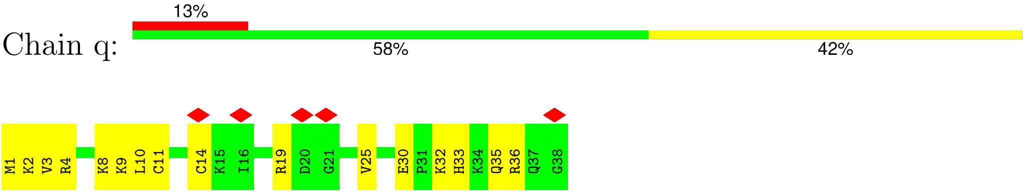
- Molecule 55: 50S ribosomal protein L35



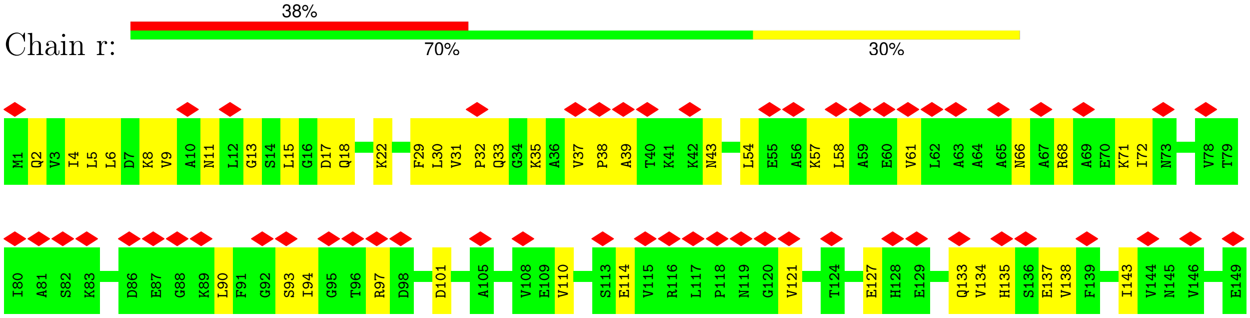
- Molecule 56: 50S ribosomal protein L6



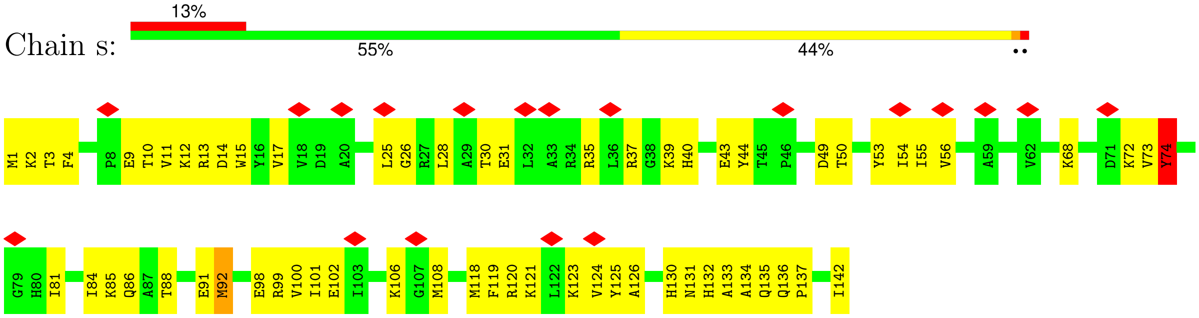
- Molecule 57: 50S ribosomal protein L36



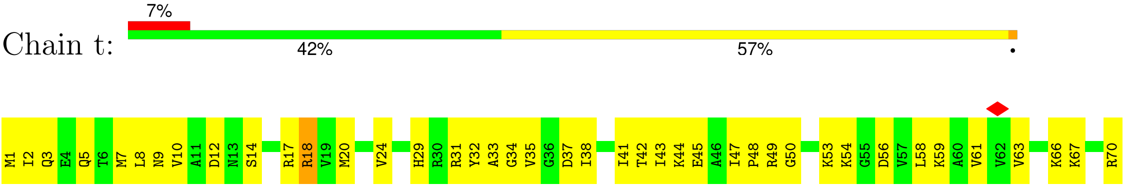
- Molecule 58: 50S ribosomal protein L9

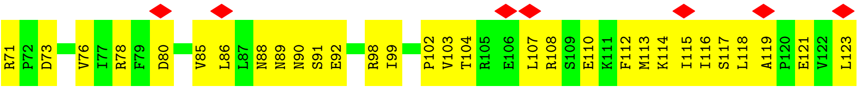


- Molecule 59: 50S ribosomal protein L13

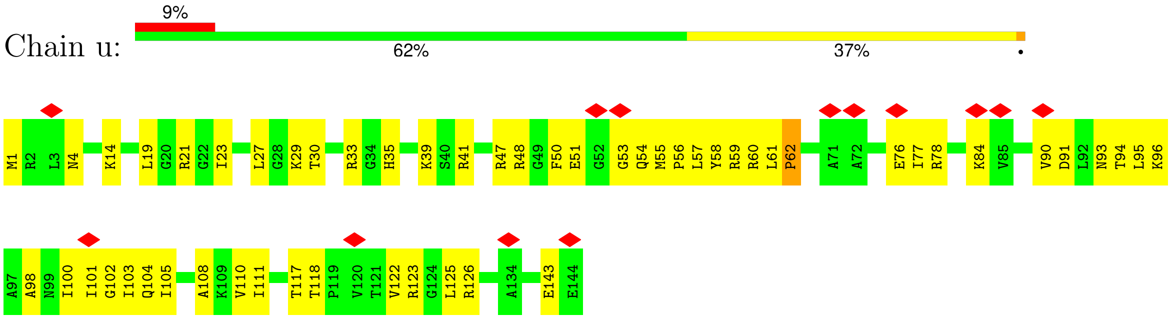


- Molecule 60: 50S ribosomal protein L14

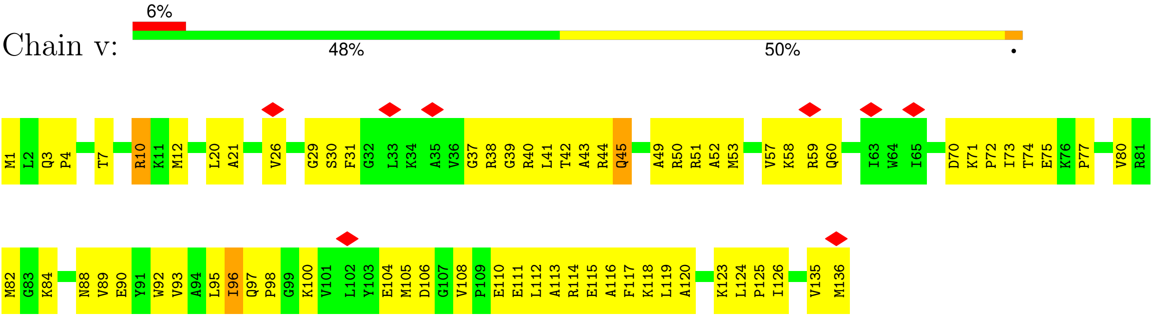




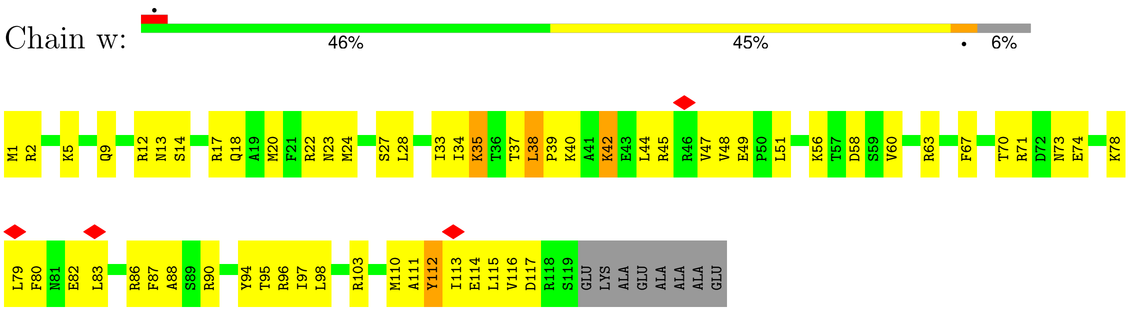
- Molecule 61: 50S ribosomal protein L15



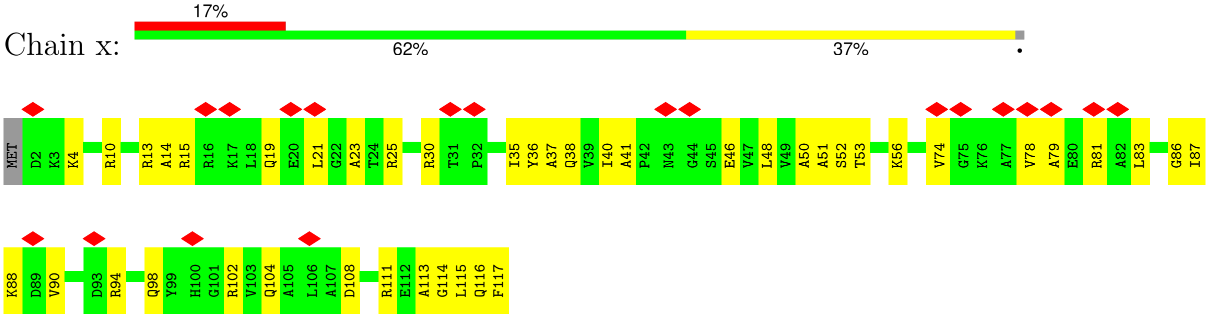
- Molecule 62: 50S ribosomal protein L16



- Molecule 63: 50S ribosomal protein L17

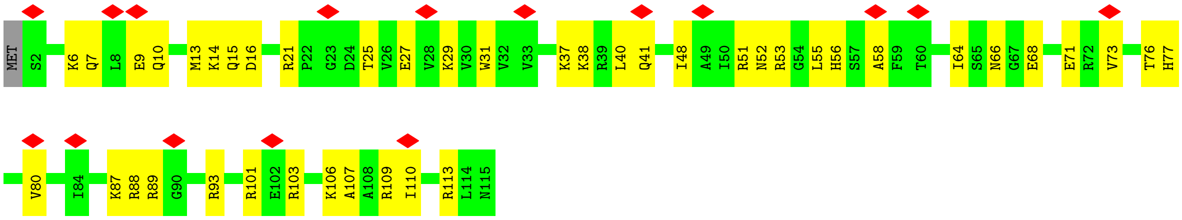


- Molecule 64: 50S ribosomal protein L18



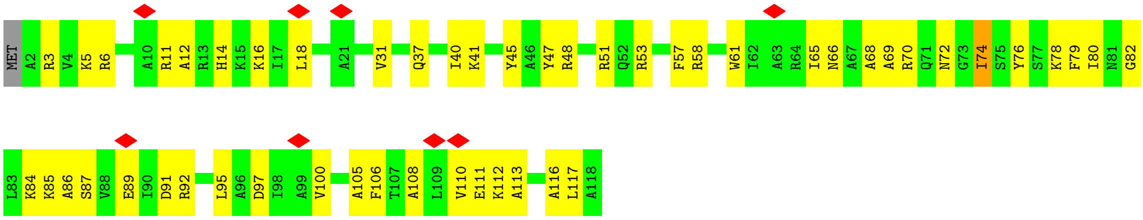
- Molecule 65: 50S ribosomal protein L19

Chain y:



- Molecule 66: 50S ribosomal protein L20

Chain z:



4 Experimental information ⓘ

Property	**Value**	**Source**
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	15810	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{Å}^2$)	50	Depositor
Minimum defocus (nm)	1250	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.019	Depositor
Minimum map value	-0.087	Depositor
Average map value	-0.006	Depositor
Map value standard deviation	0.004	Depositor
Recommended contour level	0.000001	Depositor
Map size (Å)	533.2, 533.2, 533.2	wwPDB
Map dimensions	620, 620, 620	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.86, 0.86, 0.86	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: MG, ZN

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\#\|Z\|>5$	RMSZ	$\#\|Z\|>5$
1	0	0.43	0/829	0.51	0/1107
2	1	0.60	0/864	0.63	0/1156
3	2	0.55	1/752 (0.1%)	0.67	0/1005
4	3	0.36	0/796	0.49	0/1062
5	4	0.57	0/766	0.63	0/1025
6	5	0.57	0/816	0.78	0/1259
7	6	0.57	0/783	0.78	0/1203
8	7	0.61	2/585 (0.3%)	0.91	3/906 (0.3%)
9	9	0.37	0/1131	0.73	2/1524 (0.1%)
10	A	0.27	0/1810	0.58	0/2821
10	B	0.27	0/1810	0.58	0/2821
11	AA	0.38	0/10547	0.62	0/14232
12	AB	0.53	0/1317	1.20	17/1786 (1.0%)
13	AC	0.38	0/1718	0.62	0/2328
13	AD	0.37	0/2096	0.69	3/2854 (0.1%)
14	AE	0.39	0/10561	0.64	5/14258 (0.0%)
15	AF	0.30	0/652	0.61	0/879
16	AG	0.97	6/3897 (0.2%)	1.40	49/5273 (0.9%)
17	C	0.67	0/553	0.81	1/743 (0.1%)
18	D	0.29	0/36610	0.41	9/57091 (0.0%)
19	E	0.61	0/675	0.72	0/895
20	F	0.53	0/597	0.61	0/792
21	G	0.68	5/1791 (0.3%)	0.79	8/2413 (0.3%)
22	H	0.38	0/1746	0.81	0/2382
23	I	0.57	1/1663 (0.1%)	0.68	4/2241 (0.2%)
24	J	0.46	0/1665	0.58	0/2227
25	K	0.72	2/1165 (0.2%)	0.86	6/1568 (0.4%)
26	L	0.68	1/867 (0.1%)	0.79	1/1171 (0.1%)
27	M	0.56	0/1195	0.69	2/1602 (0.1%)
28	N	0.50	0/989	0.58	0/1326
29	O	0.66	3/1034 (0.3%)	0.79	3/1375 (0.2%)
30	P	0.51	0/800	0.73	0/1082

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
31	Q	0.72	2/893 (0.2%)	0.76	2/1205 (0.2%)
32	R	0.49	0/952	0.59	0/1274
33	S	0.53	0/817	0.61	0/1088
34	T	0.57	1/722 (0.1%)	0.68	0/964
35	U	0.42	0/659	0.53	0/884
36	V	0.49	0/657	0.62	0/881
37	W	0.56	1/680 (0.1%)	0.62	1/915 (0.1%)
38	X	0.45	0/909	0.72	1/1215 (0.1%)
39	Y	0.38	2/1046 (0.2%)	0.66	2/1410 (0.1%)
40	Z	0.13	0/227	0.41	0/304
41	a	0.30	0/69247	0.43	10/107985 (0.0%)
42	b	0.42	0/589	0.55	0/779
43	c	0.51	0/635	0.61	0/848
44	d	0.25	0/2872	0.37	0/4478
45	e	0.69	2/502 (0.4%)	0.65	1/667 (0.1%)
46	f	0.52	0/452	0.57	0/605
47	g	0.45	1/531 (0.2%)	0.64	0/709
48	h	0.50	1/2121 (0.0%)	0.59	1/2852 (0.0%)
49	i	0.41	0/450	0.55	0/599
50	j	0.51	0/1586	0.57	1/2134 (0.0%)
51	k	0.46	0/433	0.63	0/576
52	l	0.51	1/1571 (0.1%)	0.62	0/2113
53	m	0.45	0/380	0.56	0/498
54	n	0.46	0/1434	0.66	1/1926 (0.1%)
55	o	0.51	0/513	0.71	1/676 (0.1%)
56	p	0.42	0/1333	0.62	2/1805 (0.1%)
57	q	0.45	0/303	0.64	0/397
58	r	0.28	0/1122	0.48	0/1515
59	s	0.70	2/1152 (0.2%)	0.74	2/1551 (0.1%)
60	t	0.53	0/955	0.75	3/1279 (0.2%)
61	u	0.43	0/1062	0.59	0/1413
62	v	0.60	1/1093 (0.1%)	0.77	3/1460 (0.2%)
63	w	0.83	2/964 (0.2%)	0.80	3/1289 (0.2%)
64	x	0.34	0/902	0.50	0/1209
65	y	0.41	0/929	0.54	0/1242
66	z	0.62	2/960 (0.2%)	0.62	0/1278
All	All	0.41	39/194733 (0.0%)	0.56	147/286430 (0.1%)

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
9	9	0	3
12	AB	0	1
13	AC	0	1
13	AD	0	2
14	AE	0	4
16	AG	0	6
21	G	0	1
22	H	0	5
23	I	0	1
25	K	0	2
29	O	0	1
38	X	0	1
39	Y	0	1
54	n	0	1
55	o	0	1
59	s	0	1
61	u	0	2
All	All	0	34

The worst 5 of 39 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
16	AG	429	LYS	C-N	13.93	1.51	1.33
63	w	35	LYS	CE-NZ	-12.76	1.11	1.49
29	O	80	ARG	CD-NE	-10.52	1.31	1.46
63	w	42	LYS	CD-CE	-9.42	1.24	1.52
25	K	45	ARG	CG-CD	7.72	1.75	1.52

The worst 5 of 147 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
16	AG	104	ARG	CA-C-N	17.97	154.32	121.97
16	AG	104	ARG	C-N-CA	17.97	154.32	121.97
16	AG	246	ASP	CA-C-N	14.49	137.95	119.84
16	AG	246	ASP	C-N-CA	14.49	137.95	119.84
16	AG	354	ALA	O-C-N	-13.69	107.30	122.09

There are no chirality outliers.

5 of 34 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
9	9	107	GLU	Peptide

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Mol	Chain	Res	Type	Group
9	9	79	PRO	Peptide
9	9	92	ALA	Peptide
12	AB	149	GLU	Mainchain
13	AC	192	VAL	Peptide

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	0	816	839	839	53	0
2	1	857	922	922	73	0
3	2	746	811	811	60	0
4	3	788	844	844	44	0
5	4	753	780	780	87	0
6	5	726	0	392	112	0
7	6	703	0	396	35	0
8	7	527	0	262	82	0
9	9	1117	0	1155	254	0
10	A	1620	826	827	109	0
10	B	1620	813	827	111	0
11	AA	10381	0	10388	382	0
12	AB	1286	0	1302	375	0
13	AC	1698	0	1718	13	0
13	AD	2078	0	1891	37	0
14	AE	10404	0	10625	273	0
15	AF	650	0	658	10	0
16	AG	3852	0	3828	899	0
17	C	544	559	560	110	0
18	D	32703	16423	16451	744	0
19	E	669	719	719	79	0
20	F	589	629	629	60	0
21	G	1760	1785	1787	152	0
22	H	1730	1454	1455	164	0
23	I	1636	1710	1710	129	0
24	J	1643	1707	1707	88	0
25	K	1152	1196	1196	119	0
26	L	848	846	846	105	0
27	M	1181	1235	1238	123	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
28	N	979	1031	1031	91	0
29	O	1022	1070	1070	92	0
30	P	790	831	831	94	0
31	Q	877	887	887	96	0
32	R	939	1001	1001	94	0
33	S	805	844	844	74	0
34	T	714	734	734	93	0
35	U	649	666	666	62	0
36	V	648	691	691	71	0
37	W	663	688	688	46	0
38	X	900	964	965	111	0
39	Y	1032	0	1088	211	0
40	Z	227	0	237	30	0
41	a	61841	31077	31120	1314	0
42	b	582	599	599	48	0
43	c	625	652	652	32	0
44	d	2569	1301	1301	43	0
45	e	501	531	531	43	0
46	f	448	488	488	37	0
47	g	522	520	520	65	0
48	h	2082	2154	2154	136	0
49	i	444	459	458	47	0
50	j	1565	1617	1616	121	0
51	k	426	464	464	42	0
52	l	1552	1619	1619	126	0
53	m	377	418	418	29	0
54	n	1410	1443	1444	152	0
55	o	504	572	572	53	0
56	p	1313	1358	1358	74	0
57	q	302	343	343	27	0
58	r	1111	1148	1148	51	0
59	s	1129	1162	1162	123	0
60	t	946	1023	1023	107	0
61	u	1053	1129	1129	78	0
62	v	1074	1157	1157	124	0
63	w	951	994	994	98	0
64	x	892	923	923	48	0
65	y	917	962	962	54	0
66	z	947	1020	1019	82	0
67	AE	1	0	0	0	0
68	AE	2	0	0	3	0
All	All	181408	98638	132670	7674	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 25.

The worst 5 of 7674 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)
6:5:11:DA:C5’	12:AB:67:THR:HG22	1.20	1.62
25:K:45:ARG:CD	25:K:45:ARG:CG	1.75	1.58
66:z:74:ILE:CG1	66:z:74:ILE:CD1	1.81	1.58
16:AG:425:LEU:CD2	16:AG:429:LYS:HE2	1.21	1.57
6:5:10:DT:C7	11:AA:62:TYR:CD2	1.84	1.57

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	0	101/103 (98%)	97 (96%)	4 (4%)	0	100	100
2	1	108/110 (98%)	107 (99%)	1 (1%)	0	100	100
3	2	92/100 (92%)	87 (95%)	5 (5%)	0	100	100
4	3	101/104 (97%)	98 (97%)	3 (3%)	0	100	100
5	4	92/94 (98%)	89 (97%)	3 (3%)	0	100	100
9	9	146/165 (88%)	100 (68%)	43 (30%)	3 (2%)	5	24
11	AA	1312/1342 (98%)	1198 (91%)	113 (9%)	1 (0%)	48	78
12	AB	159/162 (98%)	103 (65%)	44 (28%)	12 (8%)	1	5
13	AC	217/329 (66%)	203 (94%)	12 (6%)	2 (1%)	14	41
13	AD	293/329 (89%)	263 (90%)	27 (9%)	3 (1%)	13	39
14	AE	1331/1407 (95%)	1211 (91%)	114 (9%)	6 (0%)	25	54
15	AF	80/91 (88%)	77 (96%)	3 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
16	AG	493/495 (100%)	375 (76%)	86 (17%)	32 (6%)	1	7
17	C	64/75 (85%)	63 (98%)	1 (2%)	0	100	100
19	E	84/87 (97%)	83 (99%)	1 (1%)	0	100	100
20	F	68/71 (96%)	68 (100%)	0	0	100	100
21	G	223/241 (92%)	212 (95%)	10 (4%)	1 (0%)	30	60
22	H	255/557 (46%)	182 (71%)	66 (26%)	7 (3%)	4	21
23	I	206/233 (88%)	193 (94%)	13 (6%)	0	100	100
24	J	203/206 (98%)	201 (99%)	2 (1%)	0	100	100
25	K	154/167 (92%)	145 (94%)	8 (5%)	1 (1%)	22	50
26	L	102/135 (76%)	97 (95%)	4 (4%)	1 (1%)	13	39
27	M	149/179 (83%)	140 (94%)	8 (5%)	1 (1%)	19	47
28	N	127/130 (98%)	123 (97%)	4 (3%)	0	100	100
29	O	125/130 (96%)	116 (93%)	8 (6%)	1 (1%)	16	44
30	P	97/103 (94%)	89 (92%)	8 (8%)	0	100	100
31	Q	115/129 (89%)	107 (93%)	8 (7%)	0	100	100
32	R	117/124 (94%)	112 (96%)	5 (4%)	0	100	100
33	S	98/101 (97%)	97 (99%)	1 (1%)	0	100	100
34	T	86/89 (97%)	83 (96%)	3 (4%)	0	100	100
35	U	80/82 (98%)	76 (95%)	4 (5%)	0	100	100
36	V	78/84 (93%)	74 (95%)	4 (5%)	0	100	100
37	W	81/92 (88%)	80 (99%)	1 (1%)	0	100	100
38	X	114/118 (97%)	103 (90%)	9 (8%)	2 (2%)	7	27
39	Y	139/142 (98%)	101 (73%)	38 (27%)	0	100	100
40	Z	28/121 (23%)	22 (79%)	6 (21%)	0	100	100
42	b	74/85 (87%)	73 (99%)	1 (1%)	0	100	100
43	c	75/78 (96%)	72 (96%)	3 (4%)	0	100	100
45	e	60/63 (95%)	57 (95%)	3 (5%)	0	100	100
46	f	56/59 (95%)	52 (93%)	4 (7%)	0	100	100
47	g	64/70 (91%)	62 (97%)	2 (3%)	0	100	100
48	h	269/273 (98%)	255 (95%)	14 (5%)	0	100	100
49	i	54/57 (95%)	49 (91%)	5 (9%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
50	j	207/209 (99%)	198 (96%)	9 (4%)	0	100	100
51	k	50/55 (91%)	50 (100%)	0	0	100	100
52	l	199/201 (99%)	188 (94%)	11 (6%)	0	100	100
53	m	44/46 (96%)	43 (98%)	1 (2%)	0	100	100
54	n	175/179 (98%)	160 (91%)	14 (8%)	1 (1%)	22	50
55	o	62/65 (95%)	57 (92%)	4 (6%)	1 (2%)	8	29
56	p	173/177 (98%)	162 (94%)	11 (6%)	0	100	100
57	q	36/38 (95%)	35 (97%)	1 (3%)	0	100	100
58	r	147/149 (99%)	139 (95%)	8 (5%)	0	100	100
59	s	140/142 (99%)	133 (95%)	7 (5%)	0	100	100
60	t	121/123 (98%)	114 (94%)	7 (6%)	0	100	100
61	u	142/144 (99%)	134 (94%)	8 (6%)	0	100	100
62	v	134/136 (98%)	129 (96%)	5 (4%)	0	100	100
63	w	117/127 (92%)	112 (96%)	5 (4%)	0	100	100
64	x	114/117 (97%)	107 (94%)	7 (6%)	0	100	100
65	y	112/115 (97%)	105 (94%)	7 (6%)	0	100	100
66	z	115/118 (98%)	111 (96%)	4 (4%)	0	100	100
All	All	10058/11053 (91%)	9172 (91%)	811 (8%)	75 (1%)	21	47

5 of 75 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
12	AB	107	PRO
12	AB	130	PHE
12	AB	137	ALA
12	AB	144	ASN
12	AB	160	ARG

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	0	84/84 (100%)	84 (100%)	0	100	100
2	1	93/93 (100%)	93 (100%)	0	100	100
3	2	81/84 (96%)	81 (100%)	0	100	100
4	3	84/85 (99%)	84 (100%)	0	100	100
5	4	78/78 (100%)	78 (100%)	0	100	100
9	9	112/123 (91%)	112 (100%)	0	100	100
11	AA	1135/1157 (98%)	1130 (100%)	5 (0%)	89	93
12	AB	141/142 (99%)	117 (83%)	24 (17%)	1	6
13	AC	186/286 (65%)	186 (100%)	0	100	100
13	AD	185/286 (65%)	185 (100%)	0	100	100
14	AE	1122/1168 (96%)	1104 (98%)	18 (2%)	58	75
15	AF	70/75 (93%)	69 (99%)	1 (1%)	62	77
16	AG	409/409 (100%)	288 (70%)	121 (30%)	0	1
17	C	57/65 (88%)	57 (100%)	0	100	100
19	E	65/66 (98%)	65 (100%)	0	100	100
20	F	60/61 (98%)	60 (100%)	0	100	100
21	G	187/199 (94%)	187 (100%)	0	100	100
22	H	137/461 (30%)	137 (100%)	0	100	100
23	I	171/190 (90%)	171 (100%)	0	100	100
24	J	172/173 (99%)	171 (99%)	1 (1%)	84	90
25	K	119/126 (94%)	119 (100%)	0	100	100
26	L	91/116 (78%)	91 (100%)	0	100	100
27	M	124/147 (84%)	124 (100%)	0	100	100
28	N	104/105 (99%)	104 (100%)	0	100	100
29	O	105/107 (98%)	105 (100%)	0	100	100
30	P	86/90 (96%)	86 (100%)	0	100	100
31	Q	90/99 (91%)	90 (100%)	0	100	100
32	R	101/104 (97%)	101 (100%)	0	100	100
33	S	83/84 (99%)	83 (100%)	0	100	100
34	T	76/77 (99%)	76 (100%)	0	100	100
35	U	65/65 (100%)	65 (100%)	0	100	100
36	V	74/78 (95%)	74 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
37	W	72/79 (91%)	72 (100%)	0	100	100
38	X	94/96 (98%)	94 (100%)	0	100	100
39	Y	109/110 (99%)	109 (100%)	0	100	100
40	Z	26/85 (31%)	26 (100%)	0	100	100
42	b	58/63 (92%)	58 (100%)	0	100	100
43	c	67/68 (98%)	67 (100%)	0	100	100
45	e	54/55 (98%)	54 (100%)	0	100	100
46	f	48/49 (98%)	48 (100%)	0	100	100
47	g	59/62 (95%)	59 (100%)	0	100	100
48	h	216/218 (99%)	216 (100%)	0	100	100
49	i	47/48 (98%)	47 (100%)	0	100	100
50	j	164/164 (100%)	164 (100%)	0	100	100
51	k	47/49 (96%)	47 (100%)	0	100	100
52	l	165/165 (100%)	165 (100%)	0	100	100
53	m	38/38 (100%)	38 (100%)	0	100	100
54	n	148/150 (99%)	148 (100%)	0	100	100
55	o	51/52 (98%)	51 (100%)	0	100	100
56	p	136/138 (99%)	136 (100%)	0	100	100
57	q	34/34 (100%)	34 (100%)	0	100	100
58	r	114/114 (100%)	114 (100%)	0	100	100
59	s	116/116 (100%)	116 (100%)	0	100	100
60	t	104/104 (100%)	104 (100%)	0	100	100
61	u	103/103 (100%)	103 (100%)	0	100	100
62	v	109/109 (100%)	109 (100%)	0	100	100
63	w	99/103 (96%)	99 (100%)	0	100	100
64	x	86/87 (99%)	86 (100%)	0	100	100
65	y	99/100 (99%)	99 (100%)	0	100	100
66	z	89/90 (99%)	89 (100%)	0	100	100
All	All	8299/9132 (91%)	8129 (98%)	170 (2%)	50	70

5 of 170 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
16	AG	258	ARG
16	AG	323	GLN
16	AG	265	GLU
16	AG	297	VAL
16	AG	340	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 116 such sidechains are listed below:

Mol	Chain	Res	Type
21	G	36	ASN
64	x	38	GLN
27	M	86	GLN
64	x	29	HIS
55	o	28	ASN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
10	A	75/76 (98%)	29 (38%)	8 (10%)
10	B	75/76 (98%)	29 (38%)	8 (10%)
18	D	1514/1542 (98%)	289 (19%)	20 (1%)
41	a	2859/2904 (98%)	510 (17%)	0
44	d	119/120 (99%)	15 (12%)	0
8	7	23/56 (41%)	14 (60%)	3 (13%)
All	All	4665/4774 (97%)	886 (18%)	39 (0%)

5 of 886 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
8	7	3	G
8	7	4	U
8	7	5	U
8	7	7	U
8	7	8	U

5 of 39 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
18	D	992	U
18	D	1447	A
18	D	1145	A

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Mol	Chain	Res	Type
18	D	1212	U
18	D	1492	A

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

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

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-43387. These allow visual inspection of the internal detail of the map and identification of artifacts.

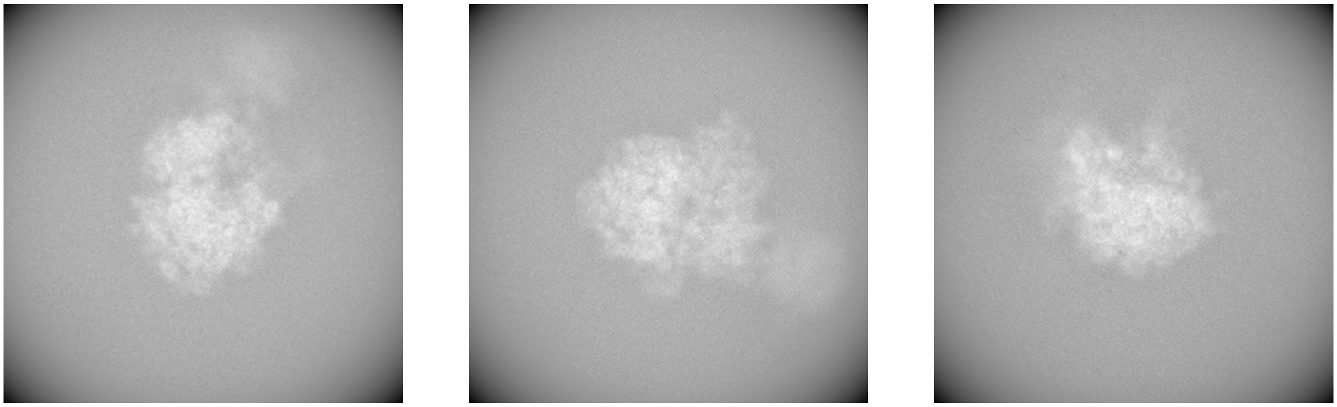
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections ⓘ

6.1.1 Primary map

X Y Z

6.1.2 Raw map

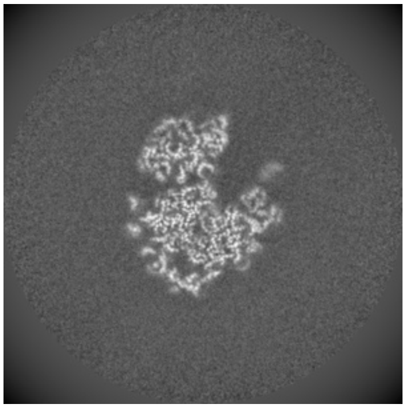


X Y Z

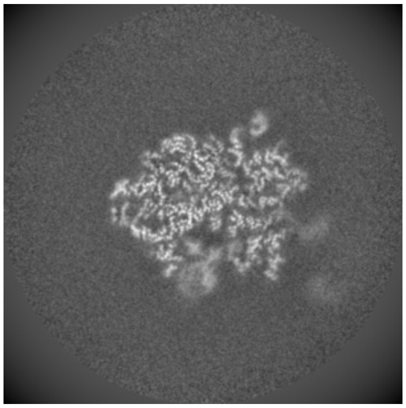
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ

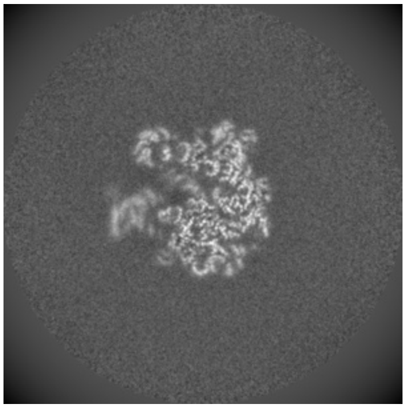
6.2.1 Primary map



X Index: 310

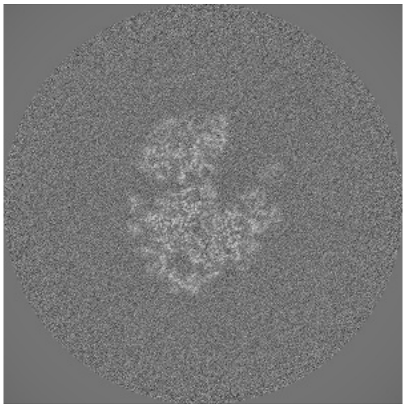


Y Index: 310

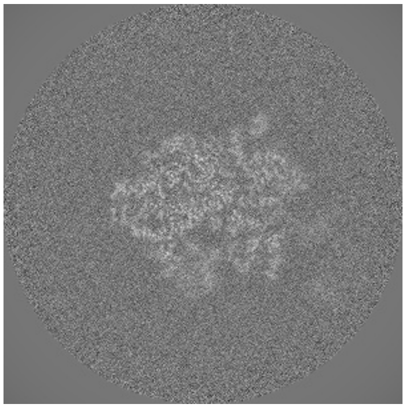


Z Index: 310

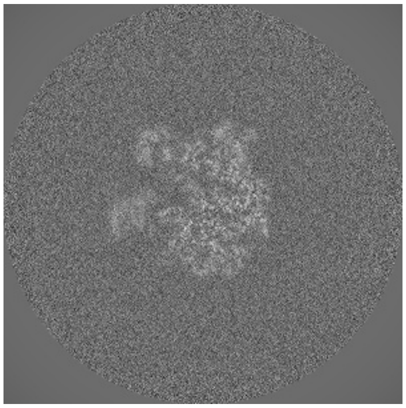
6.2.2 Raw map



X Index: 310



Y Index: 310

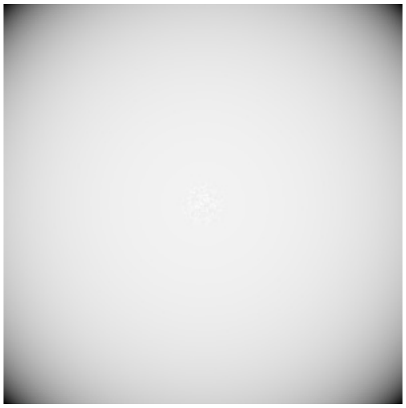


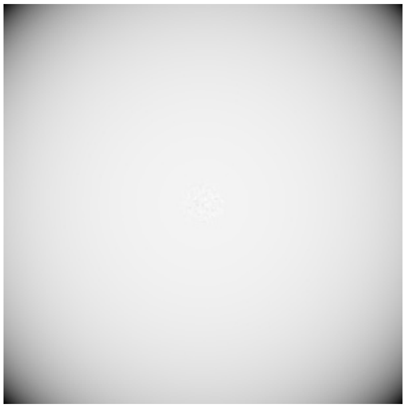
Z Index: 310

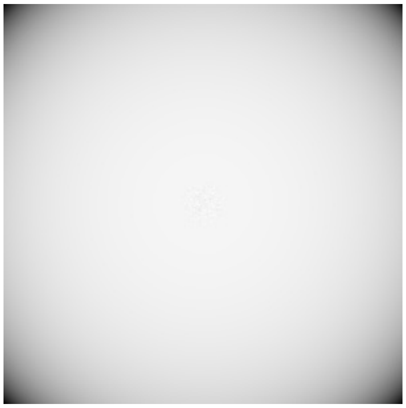
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

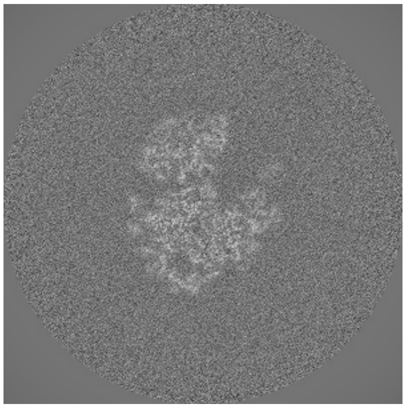
6.3.1 Primary map

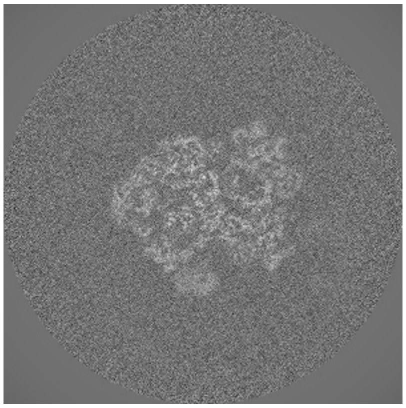

X Index: 0

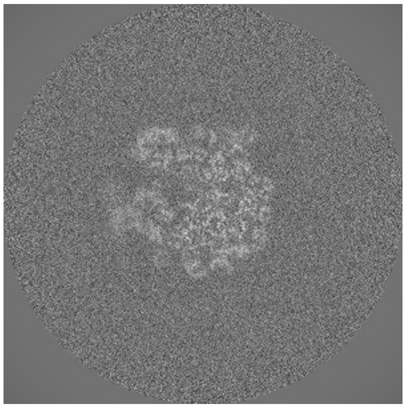

Y Index: 0


Z Index: 0

6.3.2 Raw map


X Index: 310

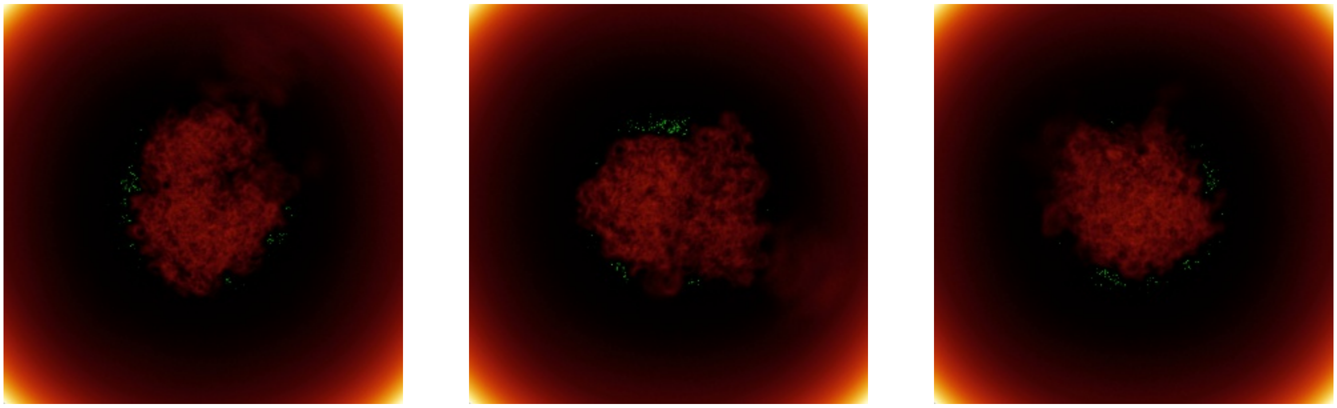

Y Index: 299


Z Index: 302

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

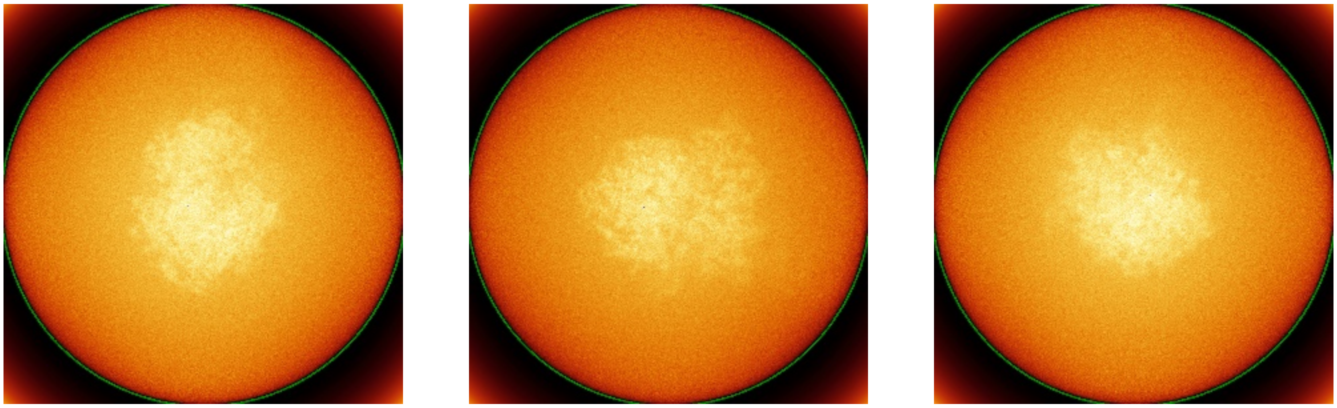
6.4 Orthogonal standard-deviation projections (False-color)

6.4.1 Primary map



X Y Z

6.4.2 Raw map



X Y Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

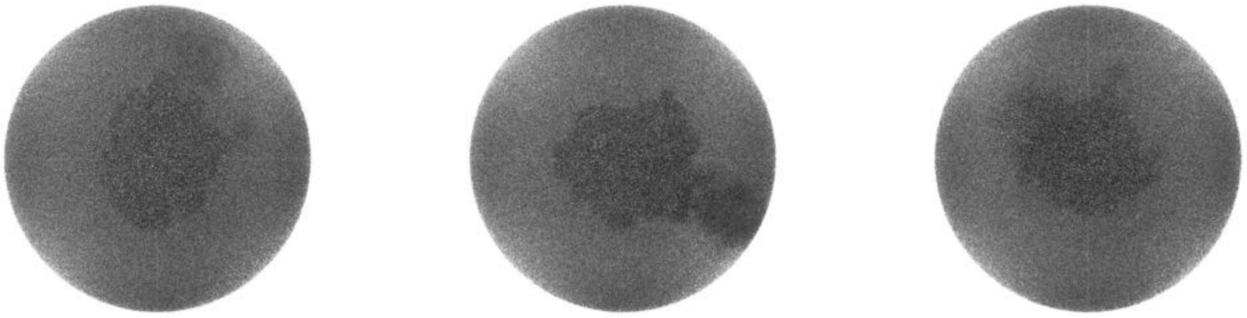
6.5 Orthogonal surface views

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 1e-06. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



X Y Z

These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

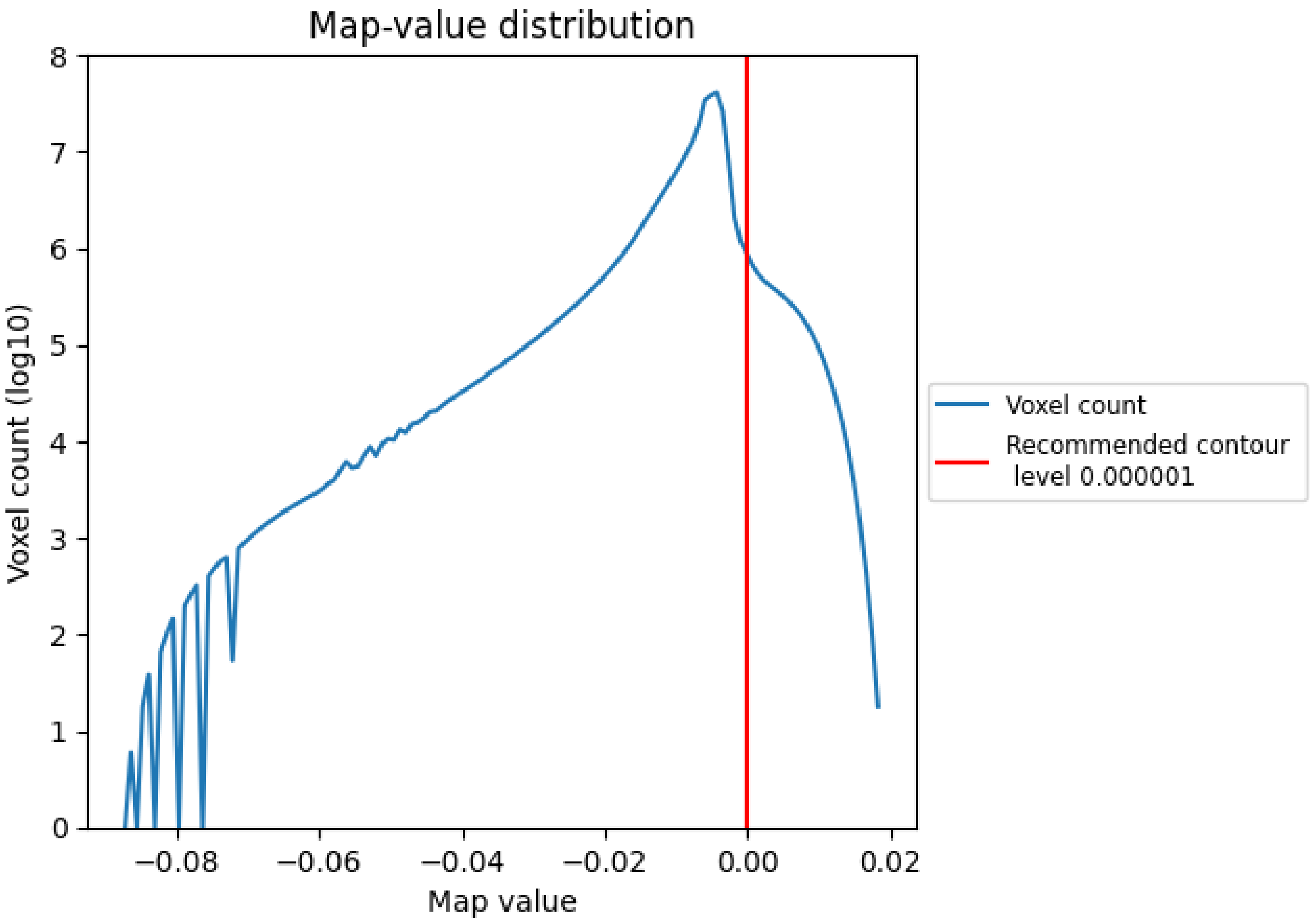
6.6 Mask visualisation

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

7 Map analysis (i)

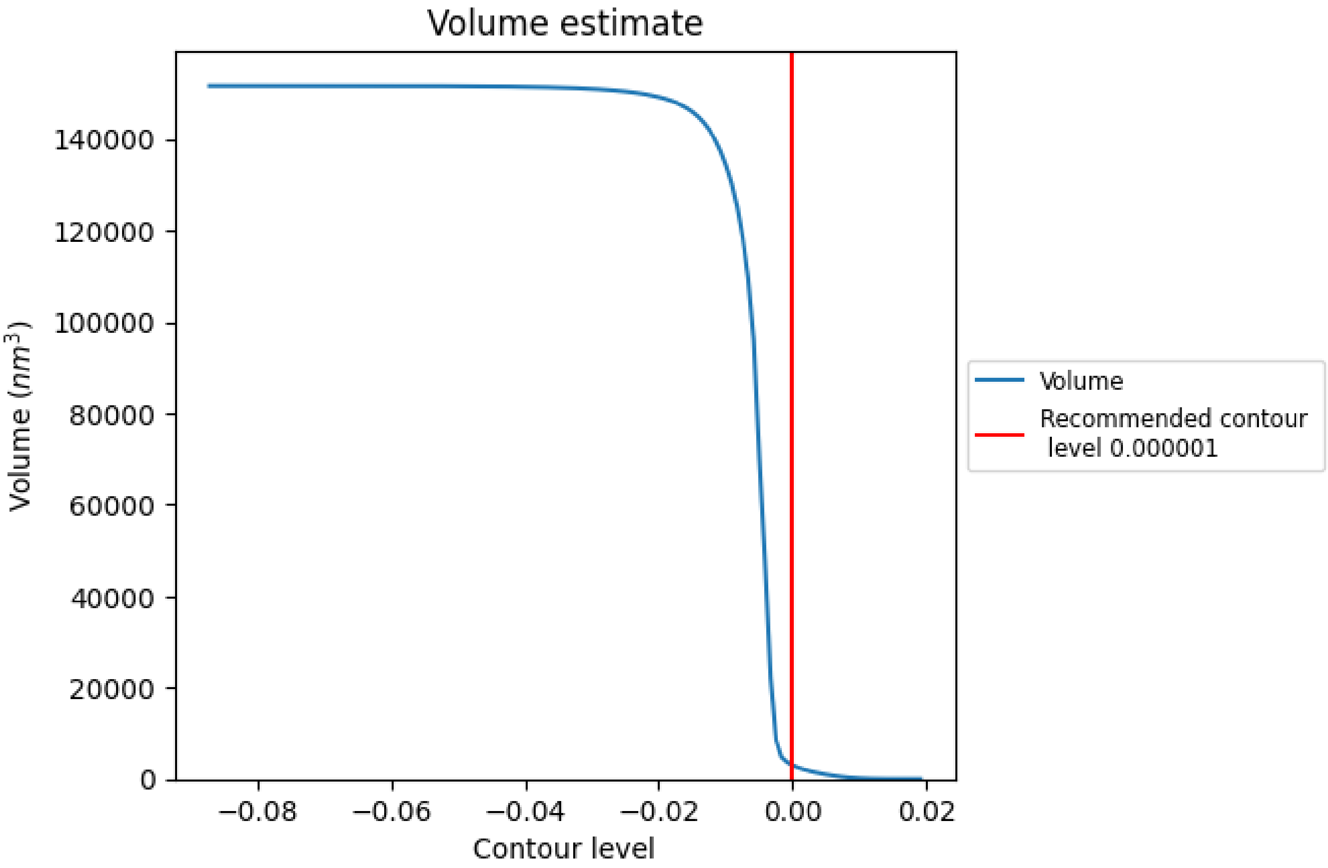
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution (i)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

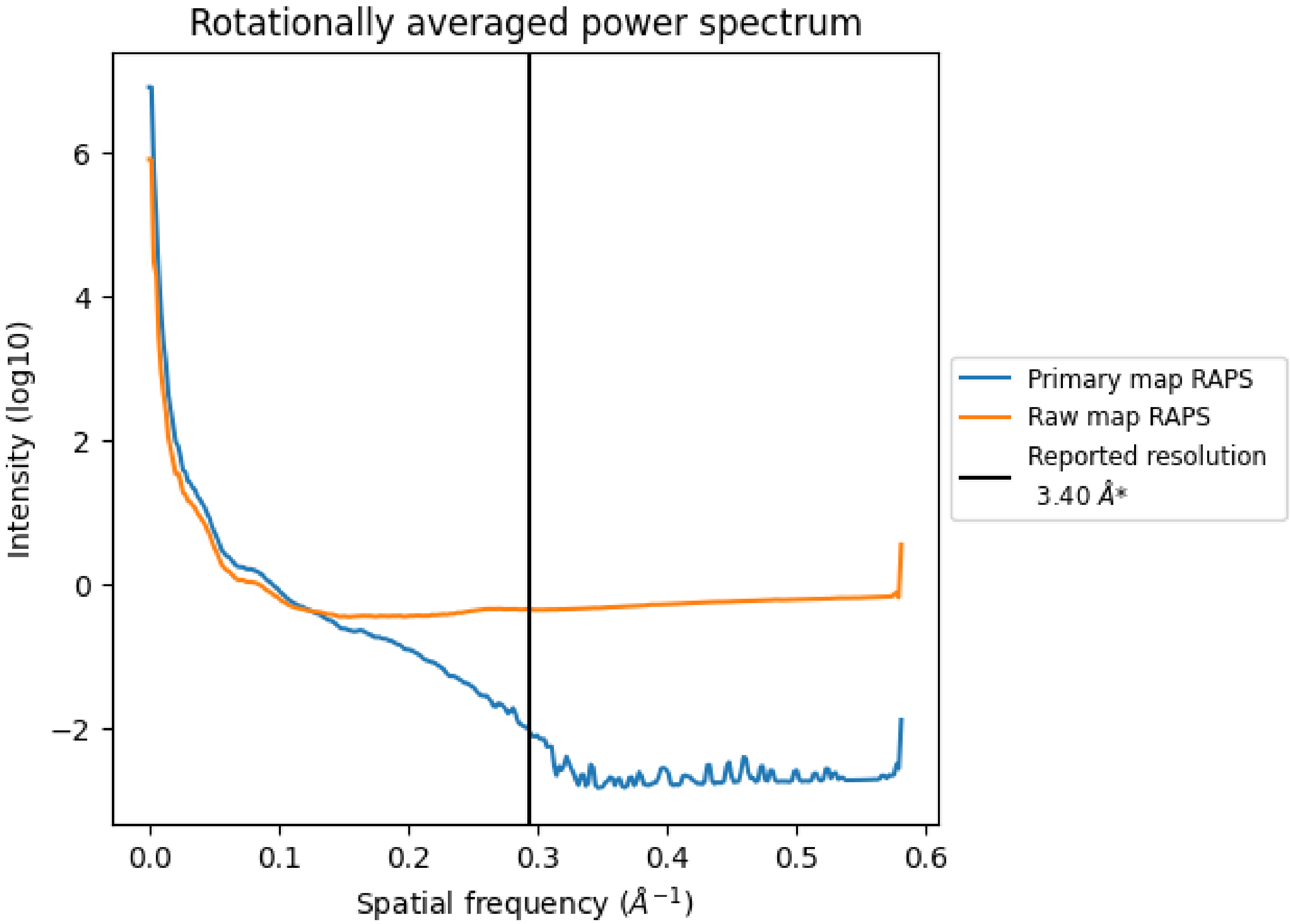
7.2 Volume estimate ⓘ



The volume at the recommended contour level is 3055 nm^3; this corresponds to an approximate mass of 2760 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum ⓘ

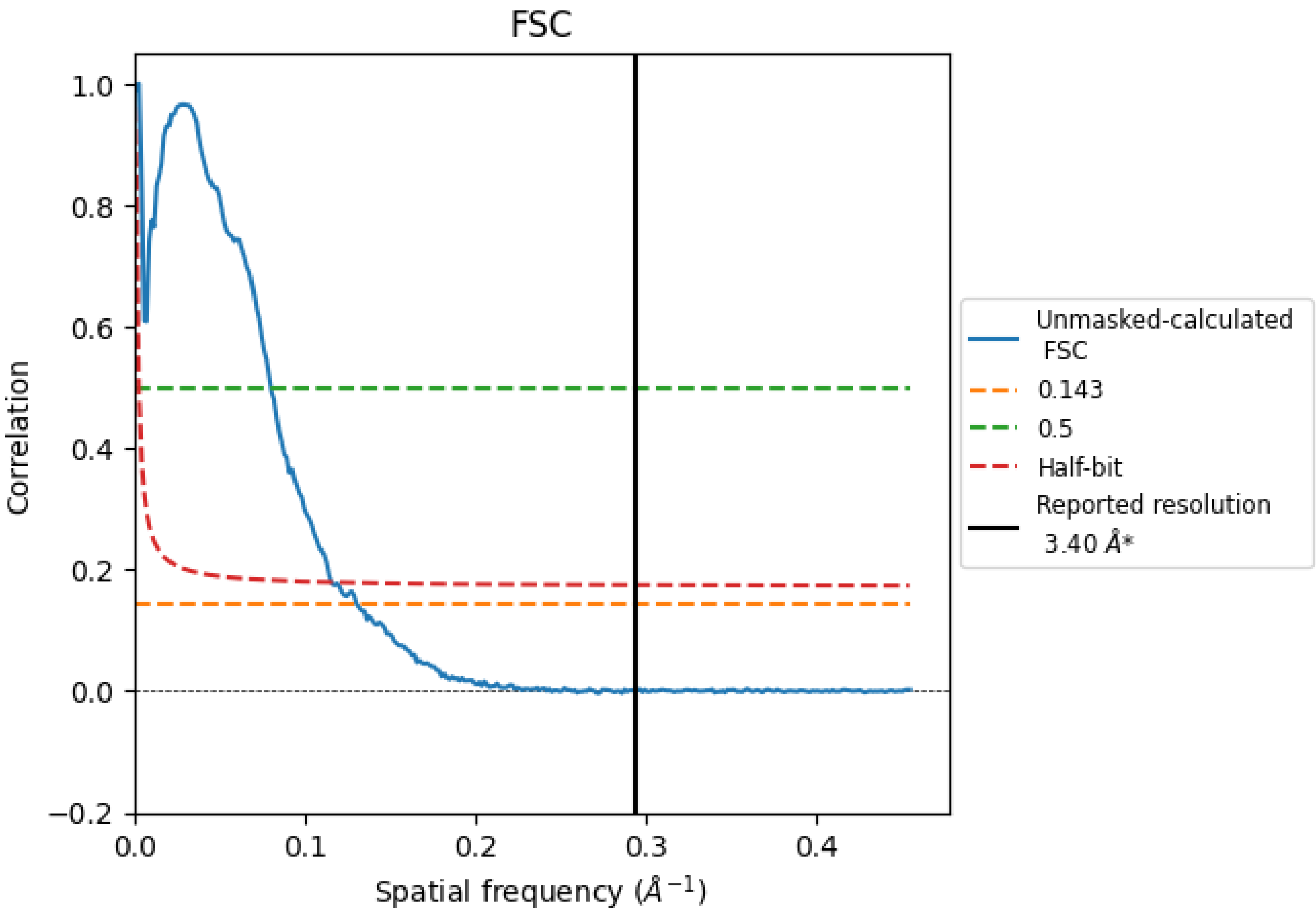


*Reported resolution corresponds to spatial frequency of 0.294 $Å^{-1}$

8 Fourier-Shell correlation ⓘ

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC ⓘ



*Reported resolution corresponds to spatial frequency of 0.294 Å^{-1}

8.2 Resolution estimates ⓘ

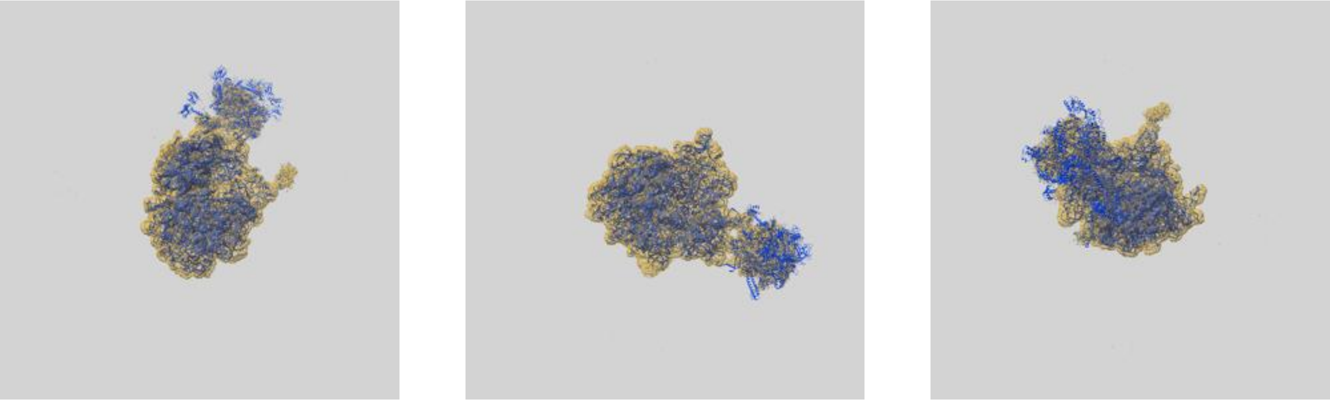
Resolution estimate (Å)	**Estimation criterion (FSC cut-off)**		
	0.143	0.5	Half-bit
Reported by author	3.40	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	7.66	12.47	8.64

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 7.66 differs from the reported value 3.4 by more than 10 %

9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-43387 and PDB model 8VOO. Per-residue inclusion information can be found in section 3 on page 17.

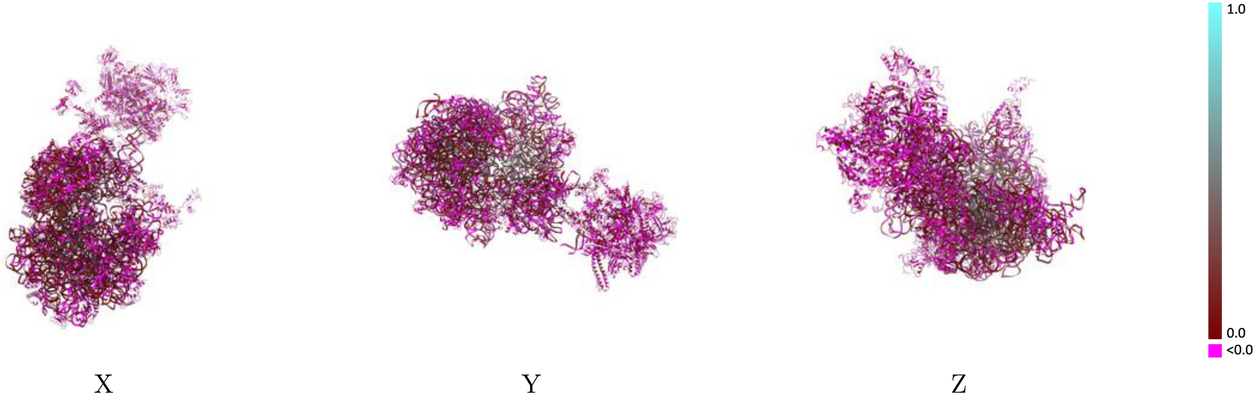
9.1 Map-model overlay



X Y Z

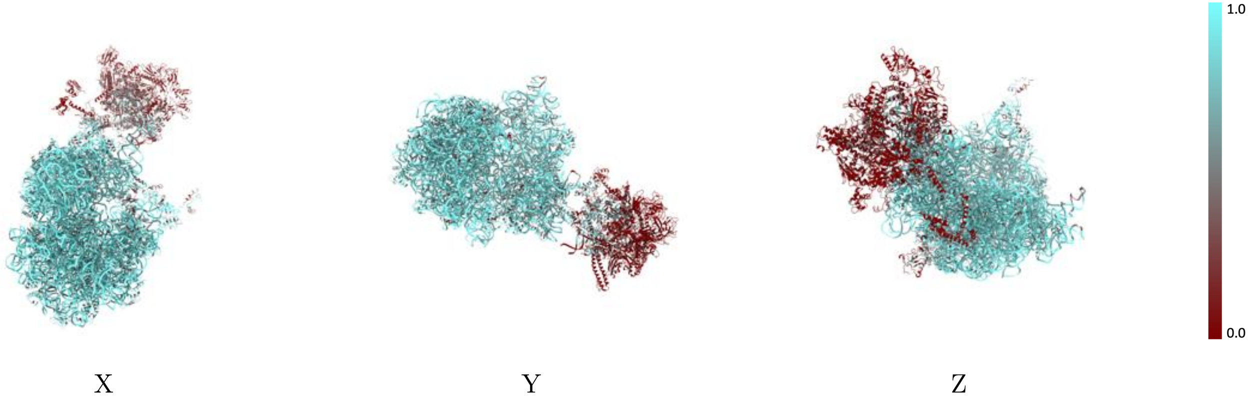
The images above show the 3D surface view of the map at the recommended contour level 1e-06 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model ⓘ



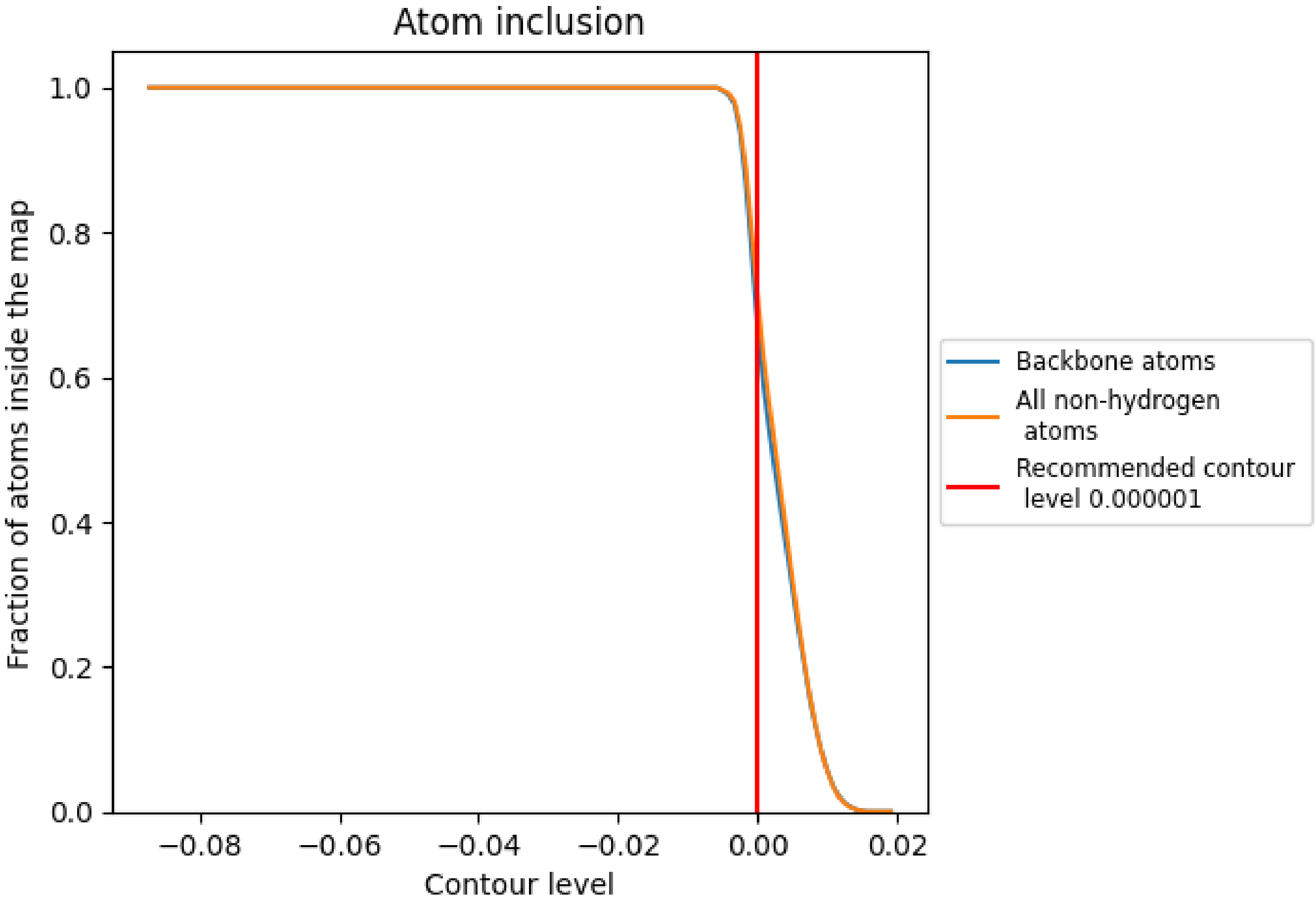
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3 Atom inclusion mapped to coordinate model ⓘ



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.000001).

9.4 Atom inclusion ⓘ



At the recommended contour level, 67% of all backbone atoms, 72% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.000001) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7150	0.0820
0	0.8140	0.0300
1	0.8300	0.1110
2	0.8040	0.0360
3	0.7890	0.0030
4	0.8460	0.0400
5	0.4390	0.0320
6	0.3940	0.0500
7	0.6240	0.0340
9	0.7630	0.0470
A	0.9100	0.1480
AA	0.1830	0.0160
AB	0.5300	0.0830
AC	0.0480	0.0050
AD	0.0110	-0.0050
AE	0.2190	0.0260
AF	0.0820	0.0210
AG	0.2940	0.0160
B	0.7960	0.0470
C	0.8180	0.0220
D	0.9290	0.1250
E	0.8100	0.0310
F	0.8180	0.1220
G	0.7390	0.0360
H	0.3640	0.0350
I	0.7120	0.0100
J	0.7680	0.0140
K	0.8580	0.0970
L	0.8280	0.0290
M	0.7650	0.0540
N	0.8560	0.0890
O	0.7650	0.0250
P	0.7430	0.0550
Q	0.8440	0.0920
R	0.8880	0.1990

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Chain	Atom inclusion	Q-score
S	0.7890	0.0130
T	0.8870	0.1380
U	0.7800	0.0030
V	0.8730	0.1410
W	0.6860	0.0220
X	0.7120	0.0150
Y	0.7340	0.0180
Z	0.5150	0.0100
a	0.9330	0.1160
b	0.8290	0.0400
c	0.8150	0.0890
d	0.8920	0.0560
e	0.8040	0.0220
f	0.8780	0.0990
g	0.7690	0.0300
h	0.8340	0.1030
i	0.8390	0.1070
j	0.8140	0.0290
k	0.8250	0.0300
l	0.7980	0.0560
m	0.9240	0.2220
n	0.7950	0.0350
o	0.8000	0.0480
p	0.7680	-0.0060
q	0.7940	0.0120
r	0.5770	0.0270
s	0.8040	0.0090
t	0.8240	0.1020
u	0.8160	0.0440
v	0.8590	0.0840
w	0.8600	0.0660
x	0.7870	0.0210
y	0.7620	0.0360
z	0.8290	0.0470