Full wwPDB EM Validation Report ⓘ

Nov 19, 2022 – 10:23 pm GMT

PDB ID	:	6EXN
EMDB ID	:	EMD-3979
Title	:	Post-catalytic P complex spliceosome with 3' splice site docked
Authors	:	Wilkinson, M.E.; Fica, S.M.; Galej, W.P.; Norman, C.M.; Newman, A.J.; Nagai, K.
Deposited on	:	2017-11-08
Resolution	:	3.70 Å(reported)

This is a Full wwPDB EM Validation 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:

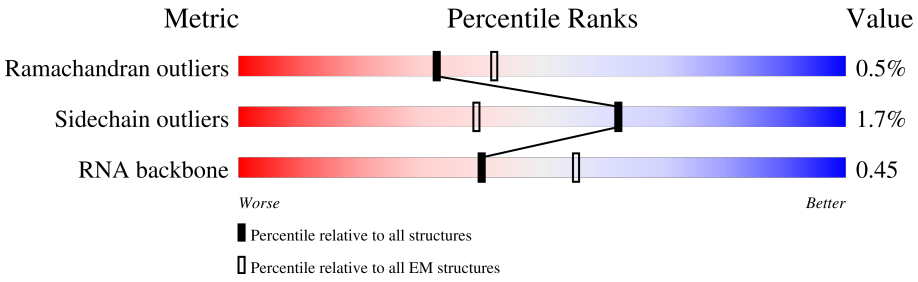
EMDB validation analysis	:	0.0.1.dev43
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.9
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.31.2

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.70 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=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	2	1175	9% 7% · 88%
2	5	179	48% 58% 33% 5% ·
3	6	112	12% 66% 22% · 9%
4	A	2413	9% 80% · 19%
5	C	1008	15% 87% 13%
6	D	278	17% 35% 65%
7	E	39	44% 23% 54% 5% 18%
8	H	577	41% 71% 29%

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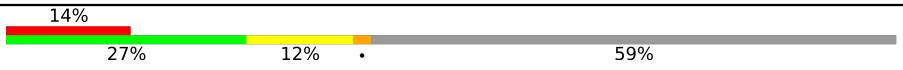
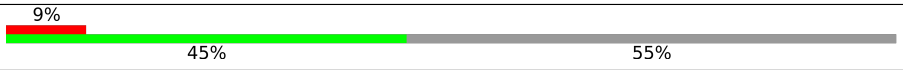
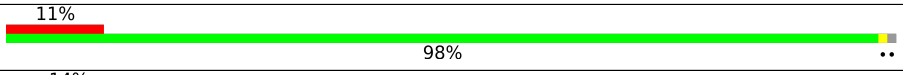
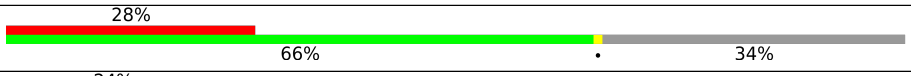
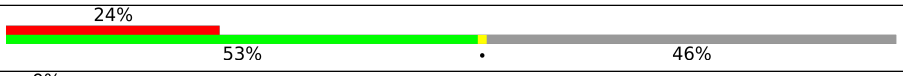
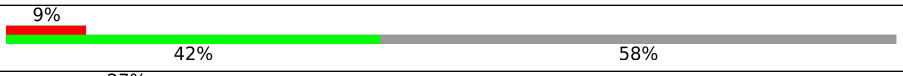
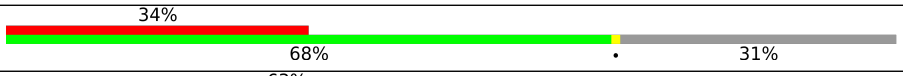
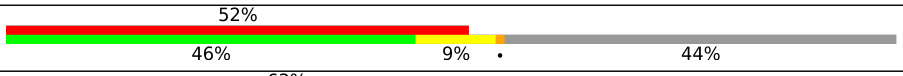
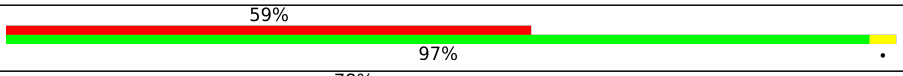
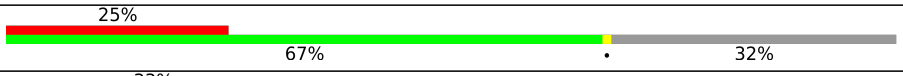
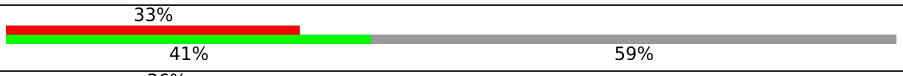
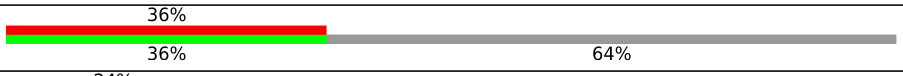
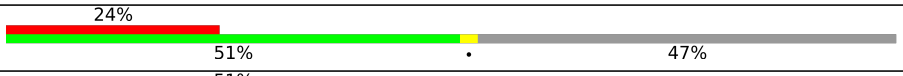
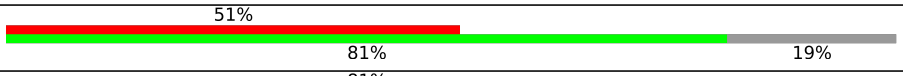
Mol	Chain	Length	Quality of chain
9	I	95	
10	J	451	
11	K	379	
12	L	157	
13	M	339	
14	N	364	
15	O	590	
16	P	175	
17	R	135	
18	S	687	
19	T	859	
20	V	1145	
21	W	238	
22	X	95	
23	Y	111	
24	a	251	
25	b	196	
25	k	196	
26	c	382	
27	d	101	
27	n	101	
28	e	94	
28	p	94	
29	f	86	
29	q	86	

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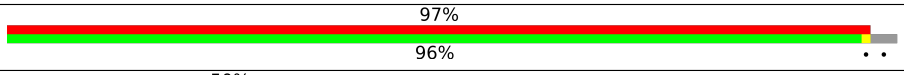
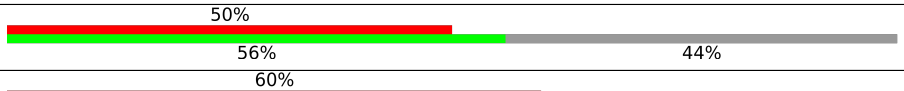
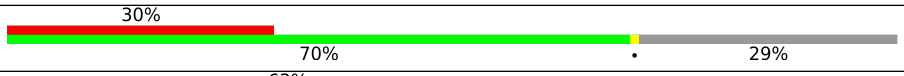
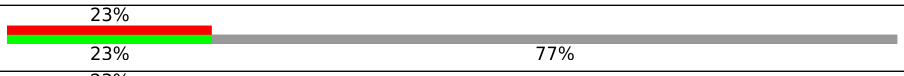
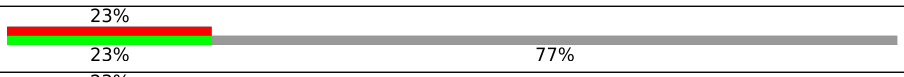
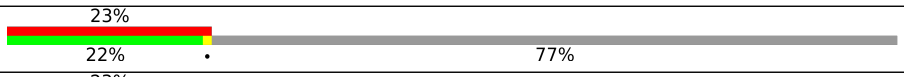
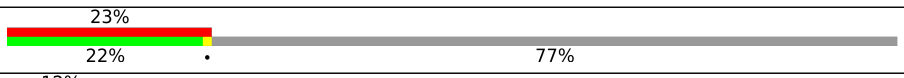
Mol	Chain	Length	Quality of chain
30	g	77	
30	r	77	
31	h	146	
31	l	146	
32	j	110	
32	m	110	
33	o	455	
34	s	175	
35	t	503	
35	u	503	
35	v	503	
35	w	503	
36	y	215	

2 Entry composition

There are 40 unique types of molecules in this entry. The entry contains 80677 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 U2 snRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	2	136	2868	1282	476	974	136	0	0

- Molecule 2 is a RNA chain called U5 snRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	5	171	3626	1623	630	1203	170	0	0

- Molecule 3 is a RNA chain called U6 snRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
3	6	102	2170	972	386	710	102	0	0

- Molecule 4 is a protein called Pre-mRNA-splicing factor Prp8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	A	1945	16046	10308	2764	2915	59	0	0

- Molecule 5 is a protein called Pre-mRNA-splicing factor SNU114.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	C	880	6999	4522	1169	1280	28	0	0

- Molecule 6 is a protein called Pre-mRNA-splicing factor CWC16.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	D	97	579	347	108	123	1	0	0

- Molecule 7 is a RNA chain called Ligated exons: UBC4 mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	E	32	Total	C	N	O	P	0	0
			586	258	86	210	32		

- Molecule 8 is a protein called Pre-mRNA-splicing factor CWC22.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	H	411	Total	C	N	O	S	0	0
			2689	1685	477	521	6		

- Molecule 9 is a RNA chain called Intron lariat: UBC4 RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	I	39	Total	C	N	O	P	0	0
			804	360	136	269	39		

- Molecule 10 is a protein called Pre-mRNA-splicing factor PRP46.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	J	342	Total	C	N	O	S	0	0
			2691	1699	475	507	10		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
J	80	THR	ALA	conflict	UNP Q12417

- Molecule 11 is a protein called Pre-mRNA-processing protein 45.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	K	170	Total	C	N	O	S	0	0
			1355	847	249	254	5		

- Molecule 12 is a protein called Pre-mRNA-splicing factor BUD31.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	L	156	Total	C	N	O	S	0	0
			1283	803	239	231	10		

- Molecule 13 is a protein called Pre-mRNA-splicing factor CWC2.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	M	255	Total	C	N	O	S	0	0
			2048	1297	362	378	11		

- Molecule 14 is a protein called Pre-mRNA-splicing factor SLT11.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	N	242	Total	C	N	O	S	0	0
			1917	1217	335	350	15		

- Molecule 15 is a protein called Pre-mRNA-splicing factor CEF1.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	O	320	Total	C	N	O	S	0	0
			2350	1457	437	449	7		

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
O	125	VAL	ALA	conflict	UNP Q03654
O	285	PRO	SER	conflict	UNP Q03654
O	341	GLU	ASP	conflict	UNP Q03654
O	342	PRO	SER	conflict	UNP Q03654
O	417	SER	PRO	conflict	UNP Q03654
O	425	PRO	ARG	conflict	UNP Q03654

- Molecule 16 is a protein called Pre-mRNA-splicing factor CWC15.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	P	73	Total	C	N	O	S	0	0
			600	378	119	102	1		

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
P	49	LYS	ARG	conflict	UNP Q03772
P	58	ASN	SER	conflict	UNP Q03772
P	66	VAL	ALA	conflict	UNP Q03772
P	68	VAL	MET	conflict	UNP Q03772

- Molecule 17 is a protein called Pre-mRNA-splicing factor CWC21.

Mol	Chain	Residues	Atoms				AltConf	Trace
17	R	73	Total	C	N	O	0	0
			423	252	82	89		

- Molecule 18 is a protein called Pre-mRNA-splicing factor CLF1.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	S	472	Total	C	N	O	S	0	0
			3189	1989	599	593	8		

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
S	561	LYS	GLU	conflict	UNP Q12309
S	615	MET	LEU	conflict	UNP Q12309
S	649	ASP	ASN	conflict	UNP Q12309
S	659	VAL	ILE	conflict	UNP Q12309

- Molecule 19 is a protein called Pre-mRNA-splicing factor SYF1.

Mol	Chain	Residues	Atoms				AltConf	Trace
19	T	594	Total	C	N	O	0	0
			2957	1769	594	594		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
T	695	ILE	THR	conflict	UNP Q04048

- Molecule 20 is a protein called Pre-mRNA-splicing factor ATP-dependent RNA helicase PRP22.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	V	638	Total	C	N	O	S	0	0
			5059	3217	854	959	29		

- Molecule 21 is a protein called U2 small nuclear ribonucleoprotein A'.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	W	149	Total	C	N	O	S	0	0
			1211	756	223	228	4		

- Molecule 22 is a protein called Unassigned structure.

Mol	Chain	Residues	Atoms				AltConf	Trace
22	X	95	Total	C	N	O	0	0
			475	285	95	95		

- Molecule 23 is a protein called U2 small nuclear ribonucleoprotein B".

Mol	Chain	Residues	Atoms					AltConf	Trace
23	Y	87	Total	C	N	O	S	0	0
			704	451	123	127	3		

- Molecule 24 is a protein called Pre-mRNA-splicing factor Prp18.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	a	171	Total	C	N	O	S	0	0
			1372	878	244	246	4		

- Molecule 25 is a protein called Small nuclear ribonucleoprotein-associated protein B.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	b	80	Total	C	N	O	S	0	0
			631	403	114	111	3		
25	k	70	Total	C	N	O	S	0	0
			563	360	98	102	3		

- Molecule 26 is a protein called Pre-mRNA-splicing factor SLU7.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	c	204	Total	C	N	O	S	0	0
			1709	1072	315	314	8		

- Molecule 27 is a protein called Small nuclear ribonucleoprotein Sm D3.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	d	82	Total	C	N	O	S	0	0
			625	399	109	115	2		
27	n	82	Total	C	N	O	S	0	0
			632	402	109	119	2		

- Molecule 28 is a protein called Small nuclear ribonucleoprotein E.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	e	75	Total	C	N	O	S	0	0
			575	379	92	101	3		

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Mol	Chain	Residues	Atoms					AltConf	Trace
28	p	77	Total	C	N	O	S	0	0
			602	396	95	108	3		

- Molecule 29 is a protein called Small nuclear ribonucleoprotein F.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	f	72	Total	C	N	O	S	0	0
			573	368	101	103	1		
29	q	73	Total	C	N	O	S	0	0
			585	376	102	106	1		

- Molecule 30 is a protein called Small nuclear ribonucleoprotein G.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	g	69	Total	C	N	O	S	0	0
			529	337	93	97	2		
30	r	75	Total	C	N	O	S	0	0
			577	363	100	112	2		

- Molecule 31 is a protein called Small nuclear ribonucleoprotein Sm D1.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	h	82	Total	C	N	O	S	0	0
			644	409	110	123	2		
31	l	87	Total	C	N	O	S	0	0
			679	435	118	123	3		

- Molecule 32 is a protein called Small nuclear ribonucleoprotein Sm D2.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	j	94	Total	C	N	O	S	0	0
			741	477	141	119	4		
32	m	92	Total	C	N	O	S	0	0
			752	481	136	131	4		

- Molecule 33 is a protein called Pre-mRNA-processing factor Prp17.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	o	322	Total	C	N	O	S	0	0
			2599	1655	462	474	8		

- Molecule 34 is a protein called Pre-mRNA-splicing factor SNT309.

Mol	Chain	Residues	Atoms				AltConf	Trace
34	s	110	Total 548	C 328	N 110	O 110	0	0

- Molecule 35 is a protein called Pre-mRNA-processing factor Prp19.

Mol	Chain	Residues	Atoms				AltConf	Trace
35	t	117	Total 583	C 349	N 117	O 117	0	0
35	u	116	Total 578	C 346	N 116	O 116	0	0
35	v	118	Total 588	C 352	N 118	O 118	0	0
35	w	114	Total 568	C 340	N 114	O 114	0	0

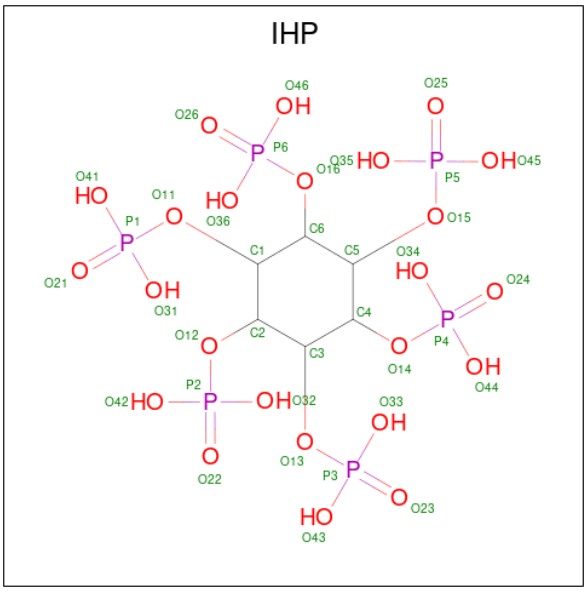
- Molecule 36 is a protein called Pre-mRNA-splicing factor SYF2.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	y	88	Total 719	C 444	N 132	O 142	S 1	0	0

- Molecule 37 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

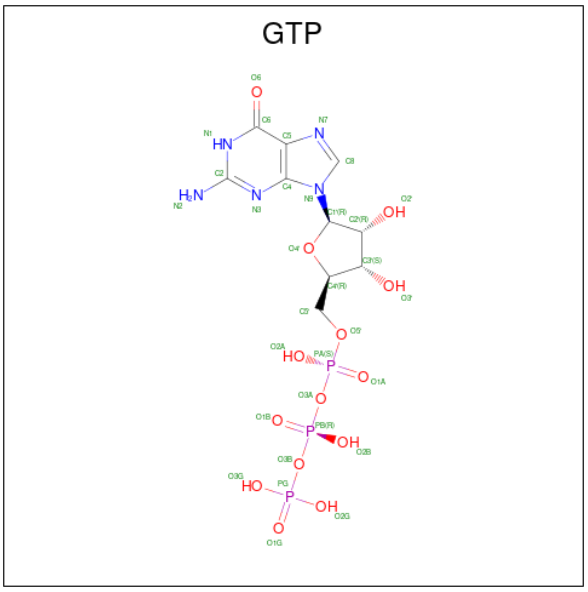
Mol	Chain	Residues	Atoms		AltConf
37	6	1	Total 1	Mg 1	0

- Molecule 38 is INOSITOL HEXAKISPHOSPHATE (three-letter code: IHP) (formula: $C_6H_{18}O_{24}P_6$).



Mol	Chain	Residues	Atoms				AltConf
			Total	C	O	P	
38	A	1	36	6	24	6	0

- Molecule 39 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula: $C_{10}H_{16}N_5O_{14}P_3$).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
39	C	1	32	10	5	14	3	0

- Molecule 40 is ZINC ION (three-letter code: ZN) (formula: Zn).

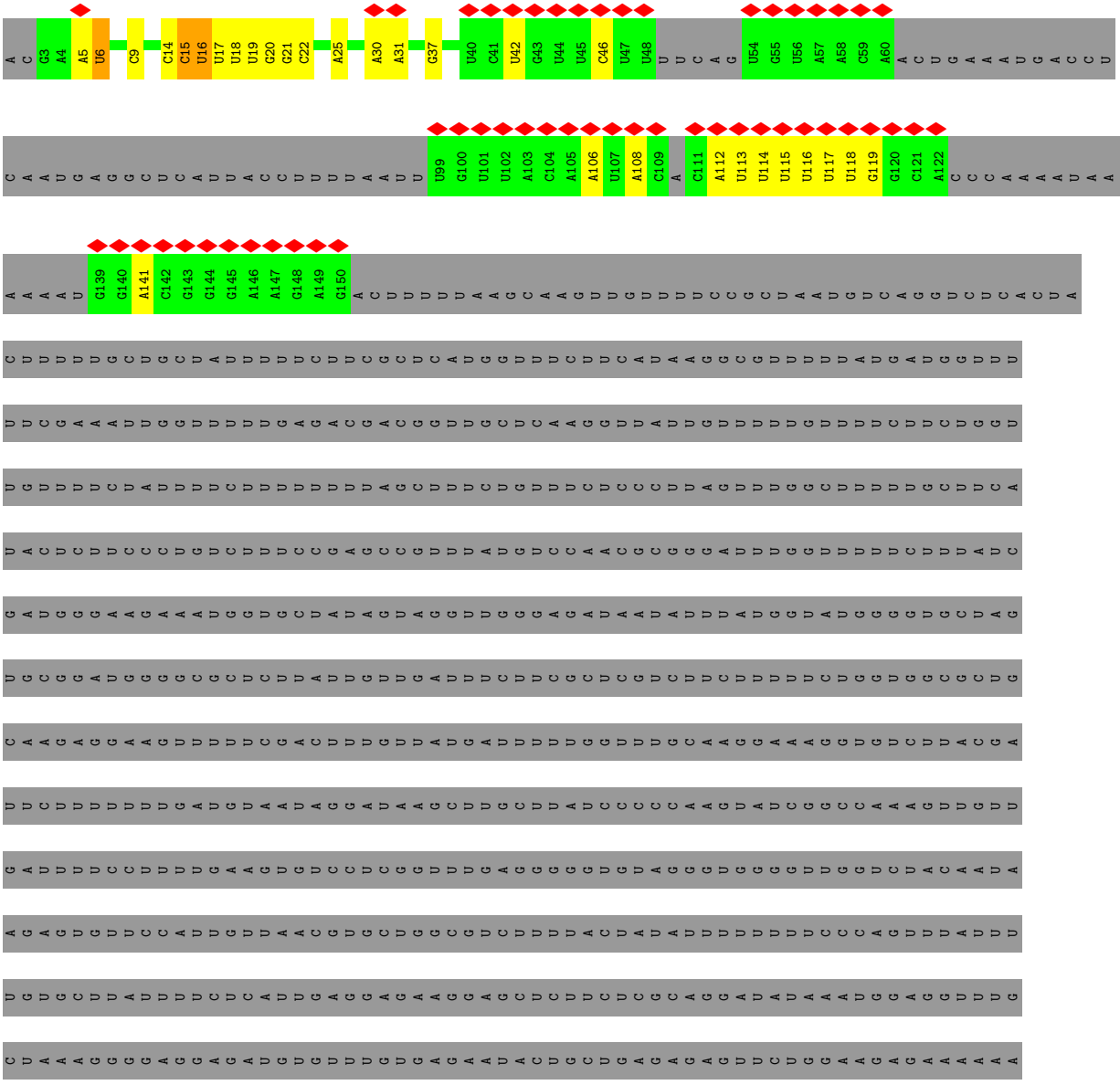
Mol	Chain	Residues	Atoms	AltConf
40	L	3	Total Zn 3 3	0
40	M	1	Total Zn 1 1	0
40	N	2	Total Zn 2 2	0
40	c	1	Total Zn 1 1	0

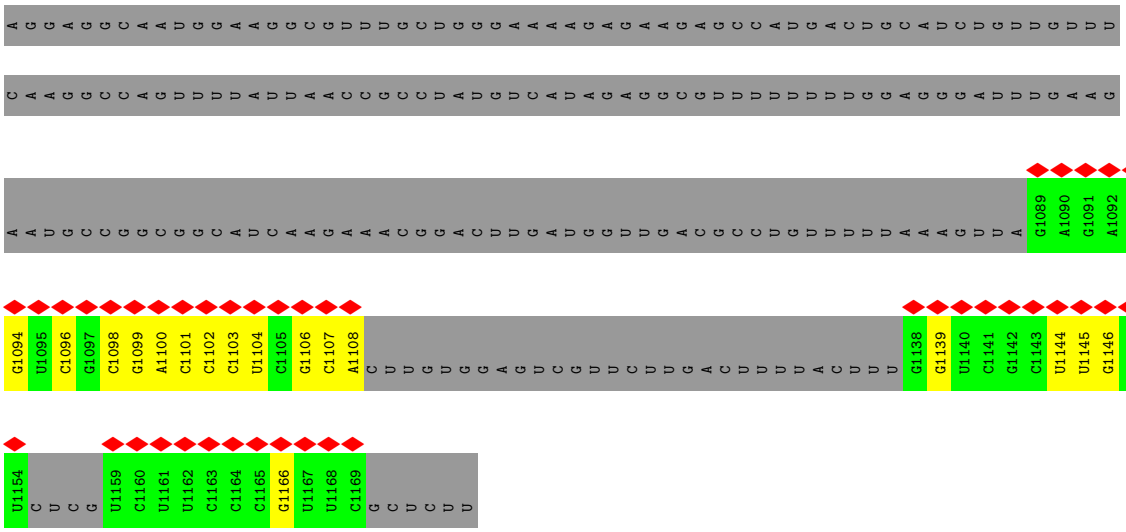
3 Residue-property plots (i)

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 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: U2 snRNA

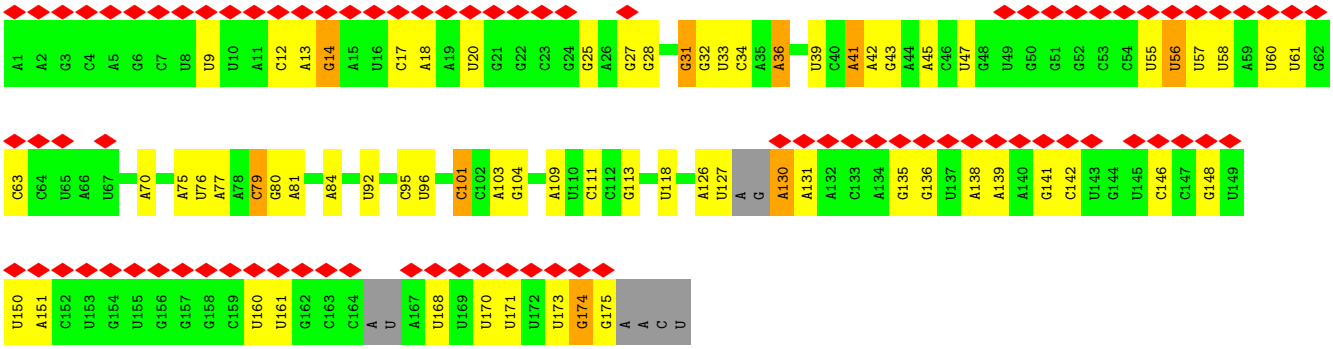
Chain 2: 





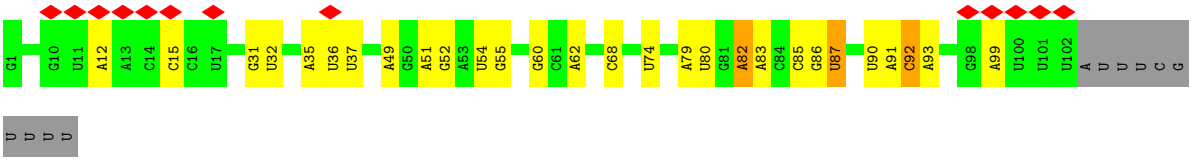
• Molecule 2: U5 snRNA

Chain 5:



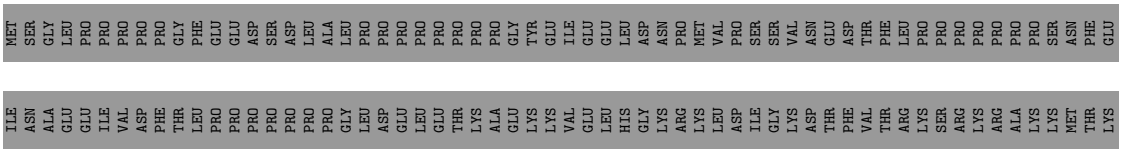
• Molecule 3: U6 snRNA

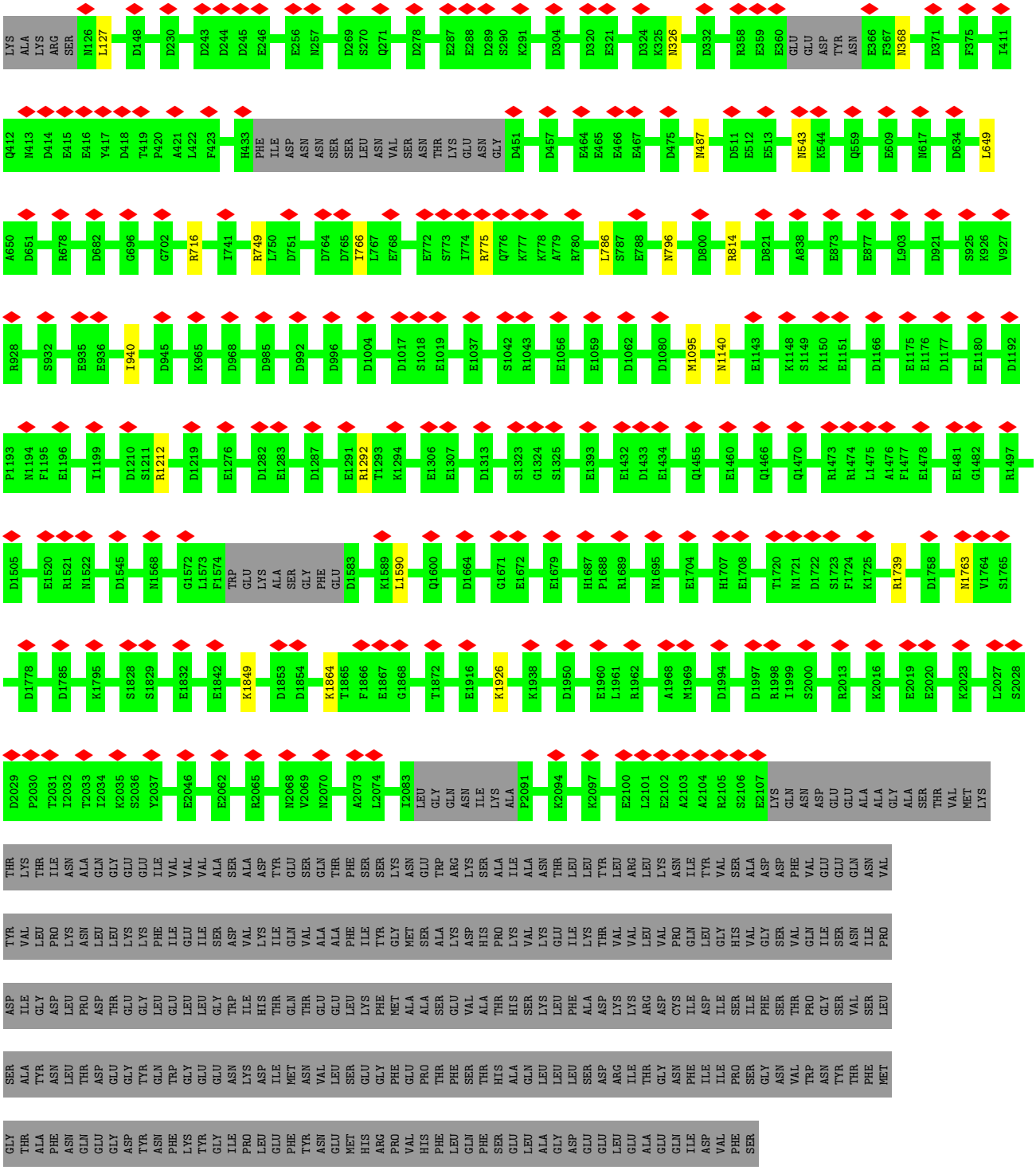
Chain 6:



• Molecule 4: Pre-mRNA-splicing factor Prp8

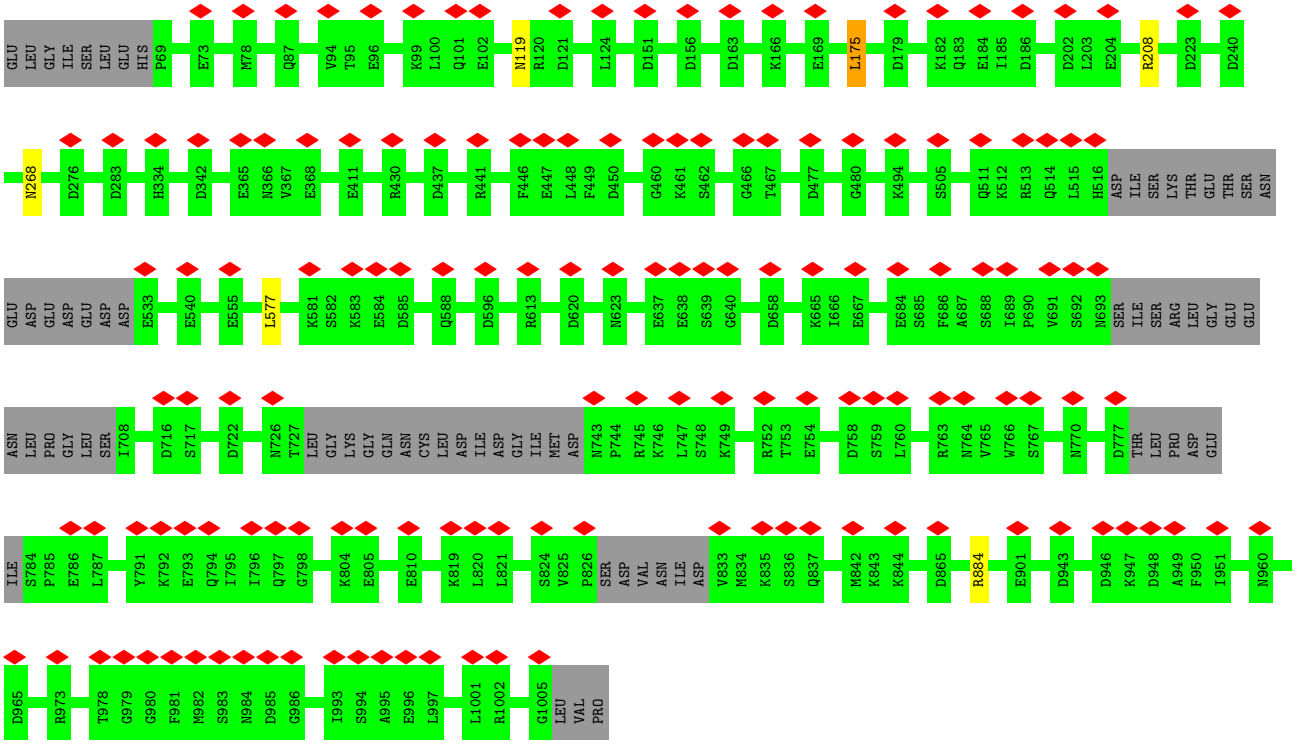
Chain A:



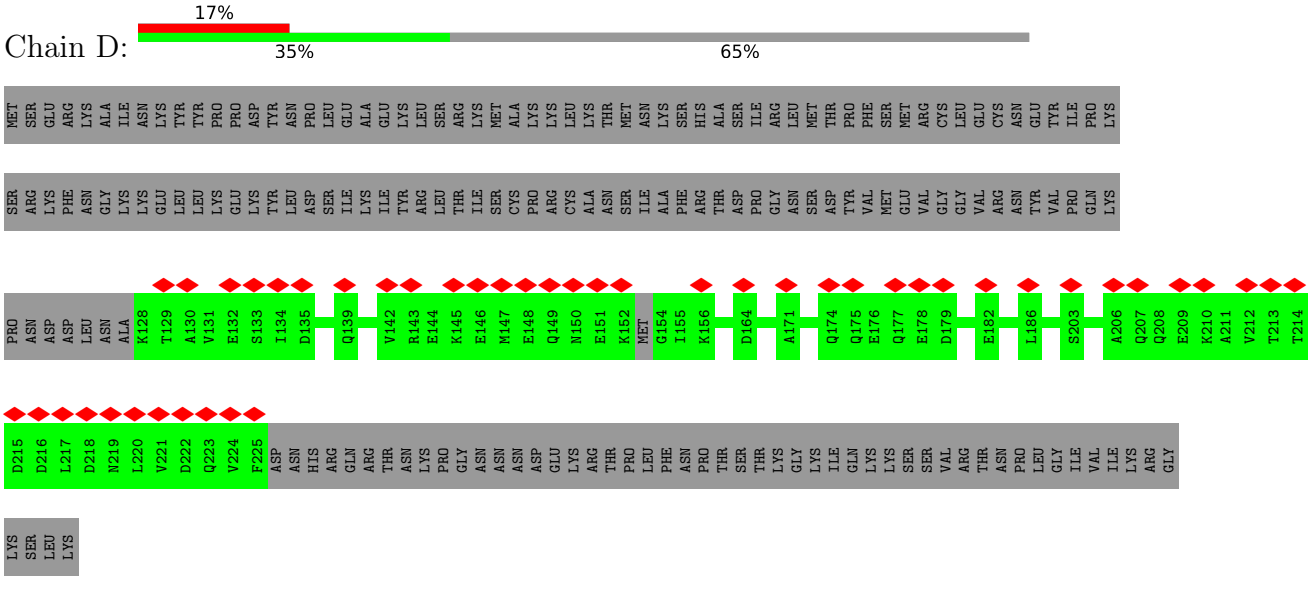


• Molecule 5: Pre-mRNA-splicing factor SNU114

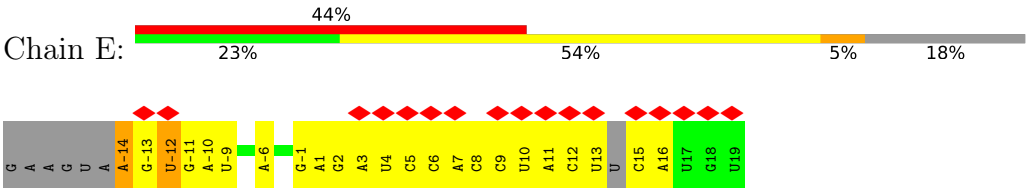
Chain C:



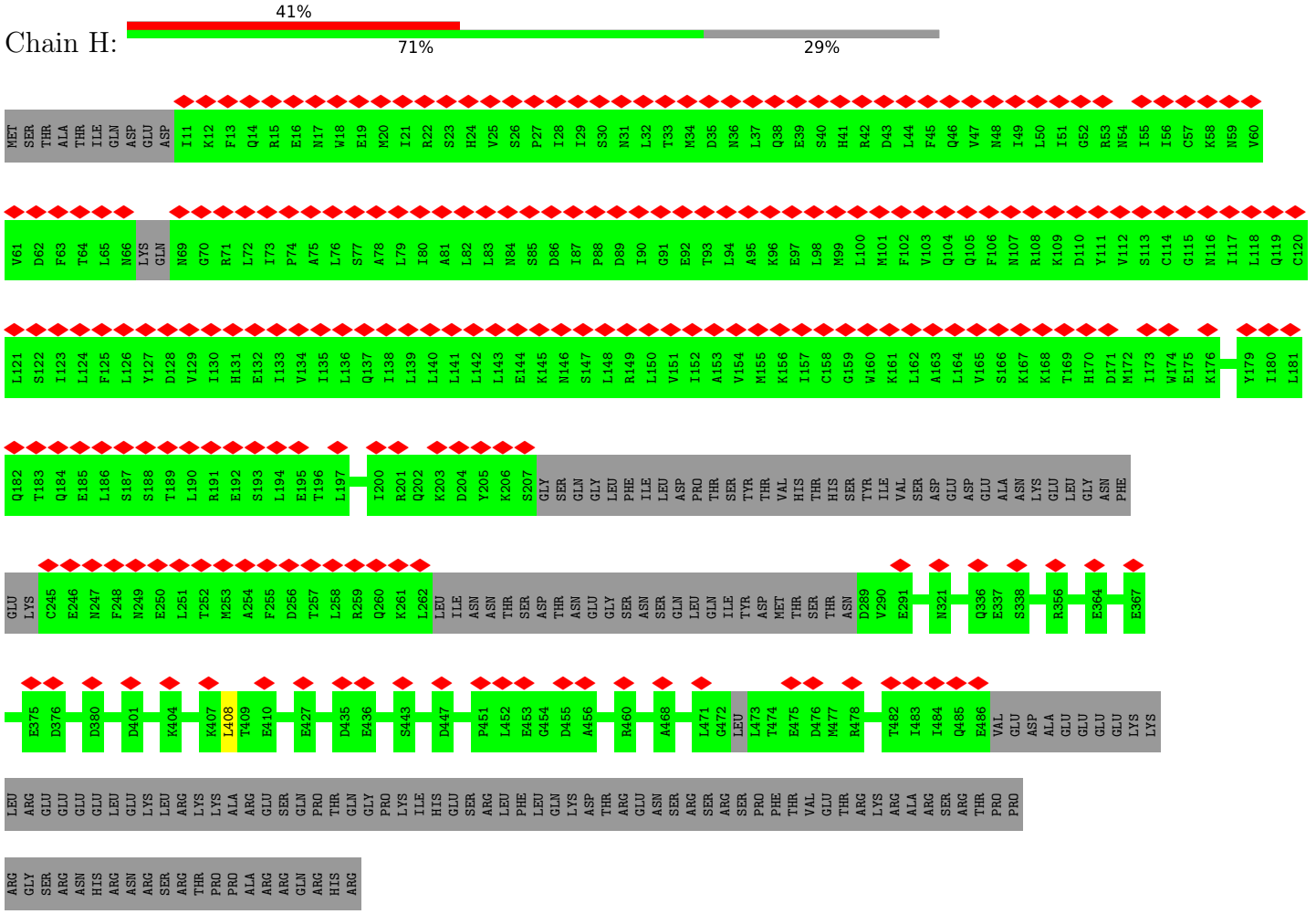
• Molecule 6: Pre-mRNA-splicing factor CWC16



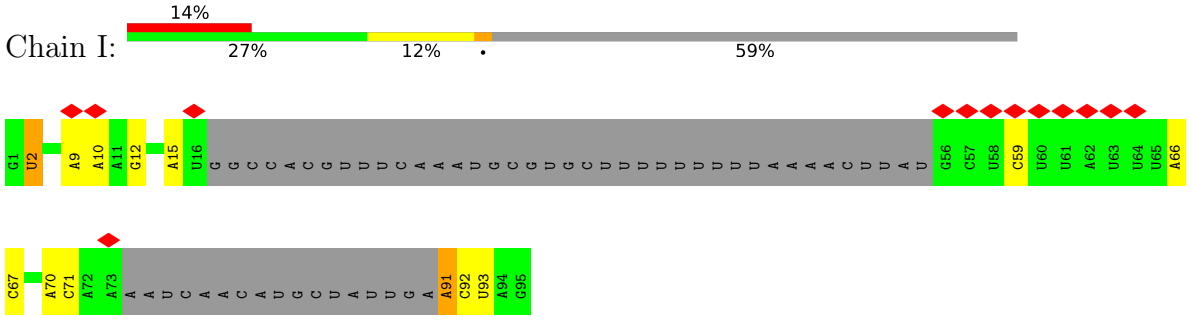
• Molecule 7: Ligated exons: UBC4 mRNA



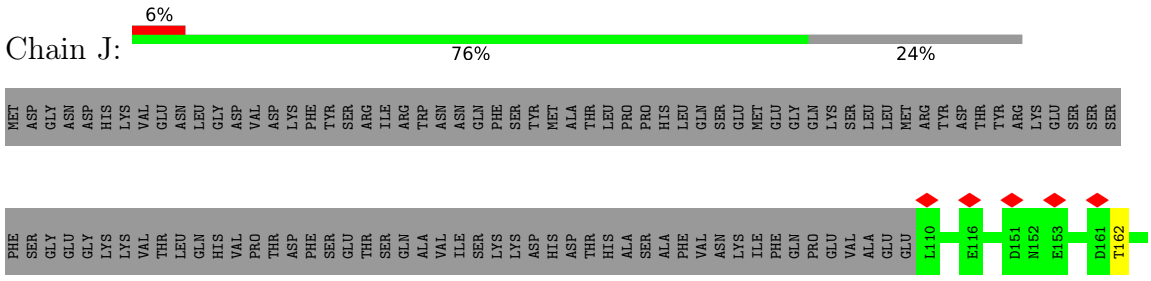
• Molecule 8: Pre-mRNA-splicing factor CWC22

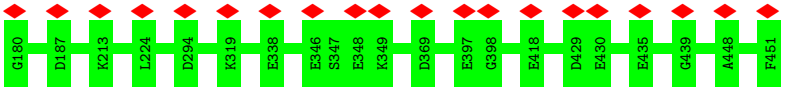


• Molecule 9: Intron lariat: UBC4 RNA

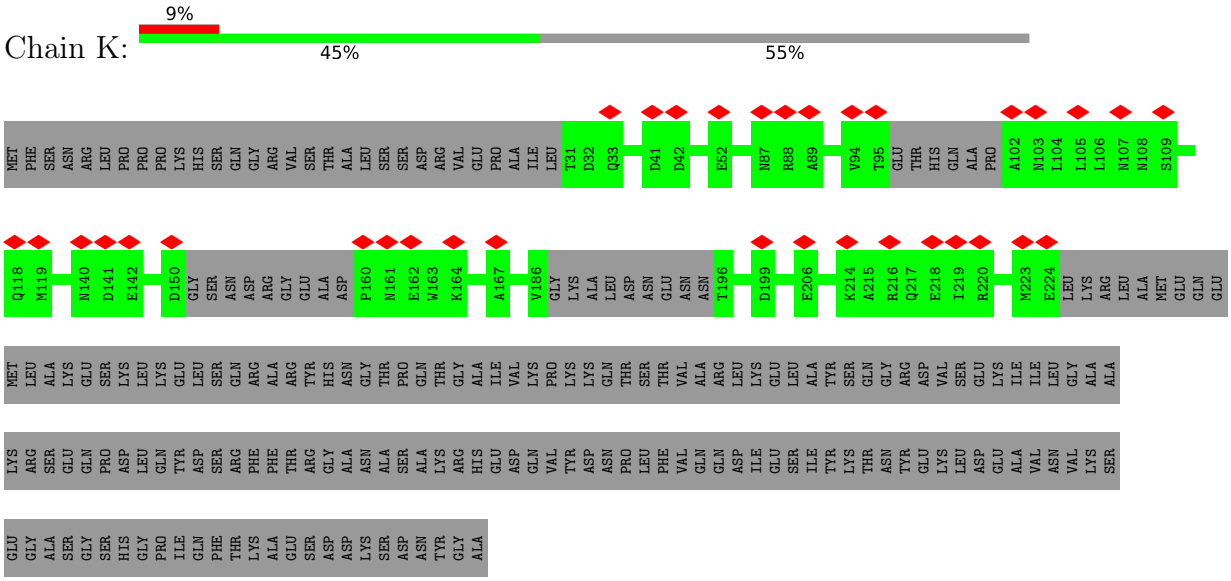


• Molecule 10: Pre-mRNA-splicing factor PRP46

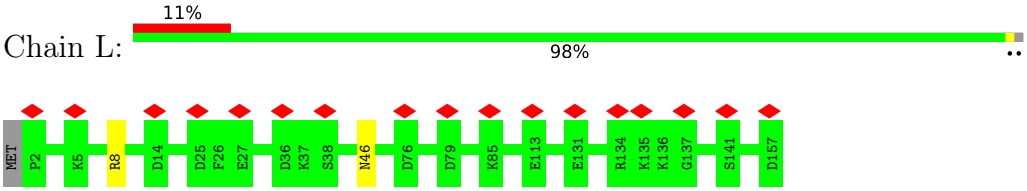




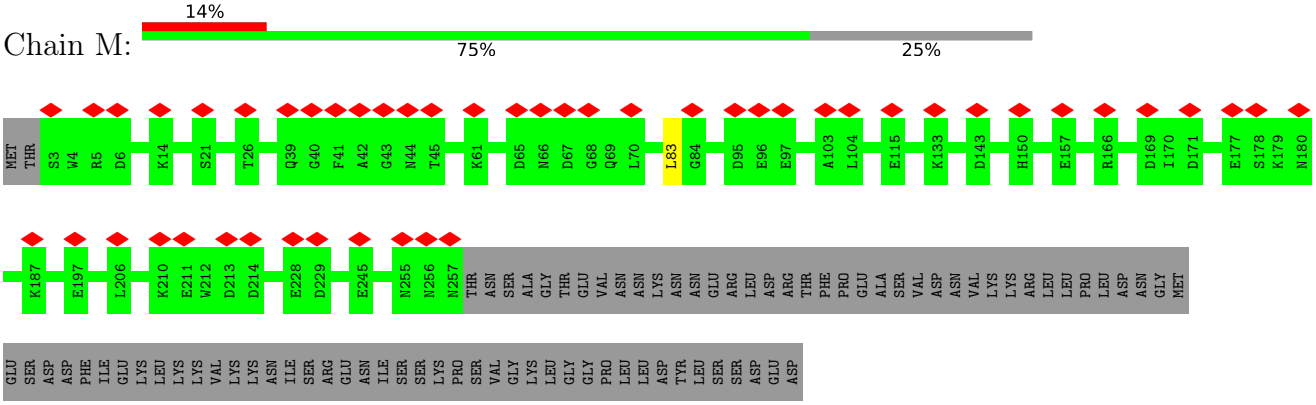
• Molecule 11: Pre-mRNA-processing protein 45



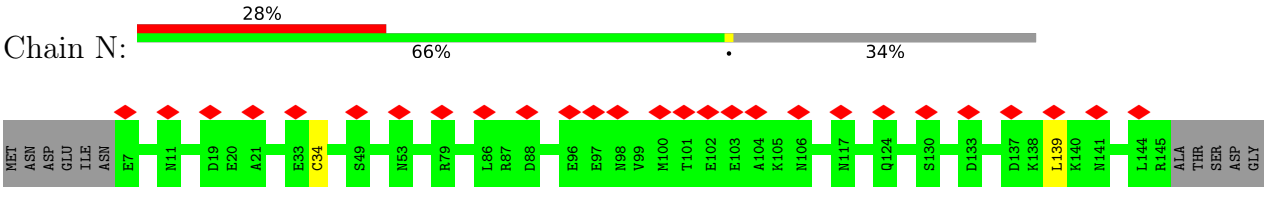
• Molecule 12: Pre-mRNA-splicing factor BUD31

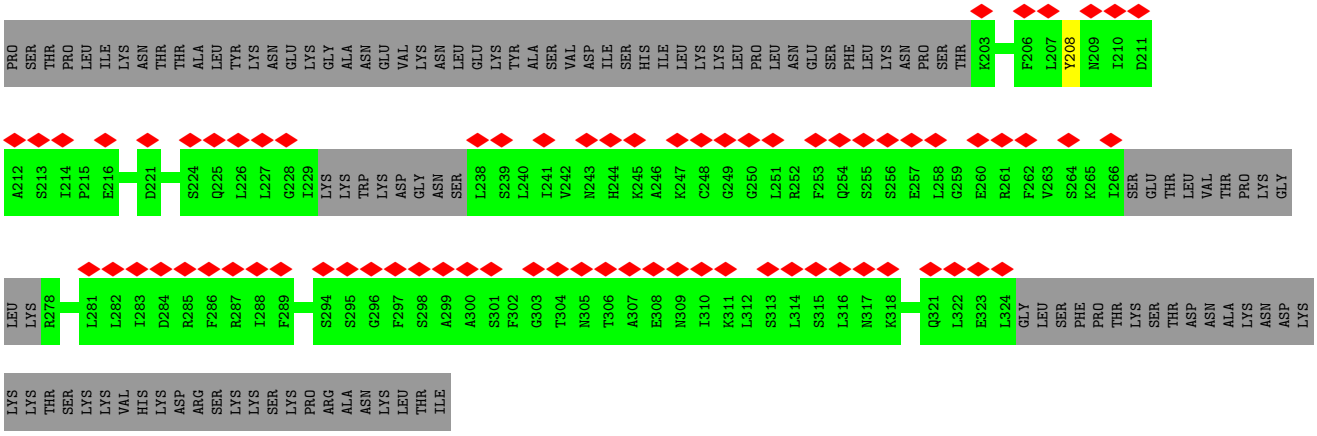


• Molecule 13: Pre-mRNA-splicing factor CWC2



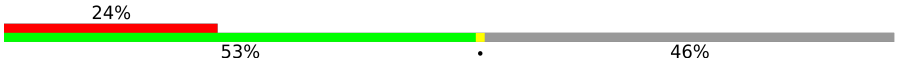
• Molecule 14: Pre-mRNA-splicing factor SLT11

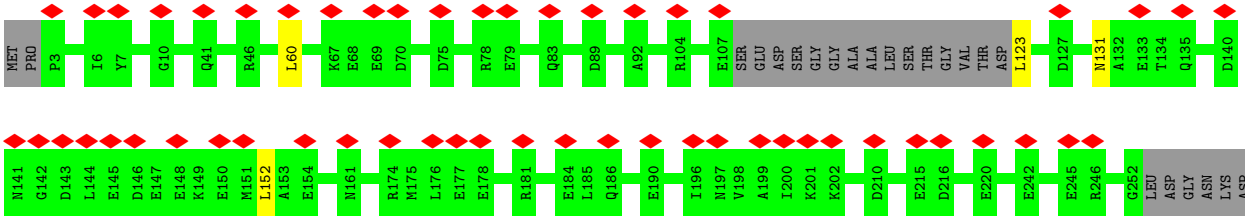


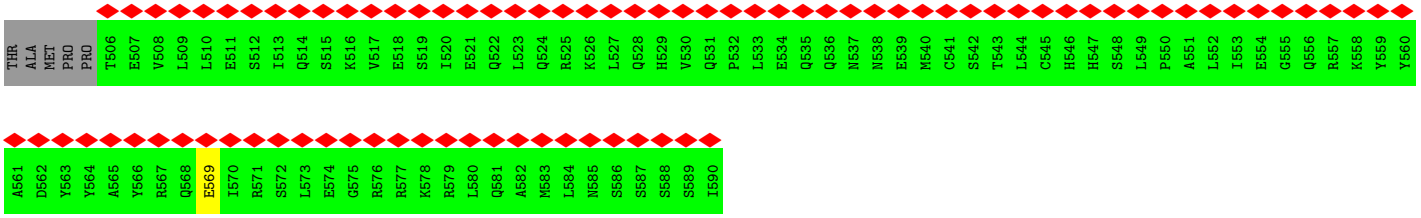


• Molecule 15: Pre-mRNA-splicing factor CEF1

Chain O:

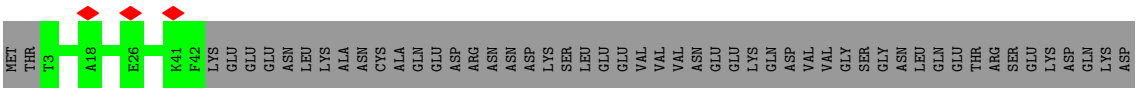


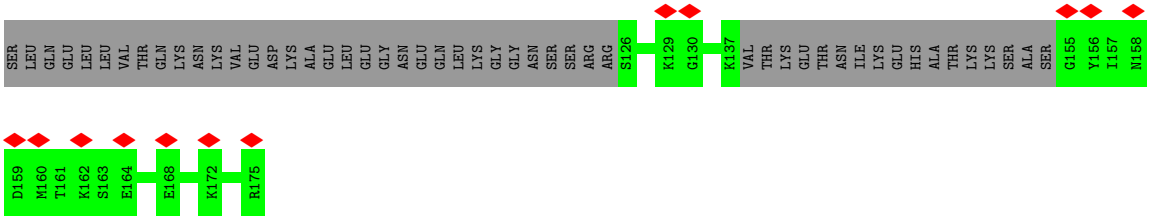




• Molecule 16: Pre-mRNA-splicing factor CWC15

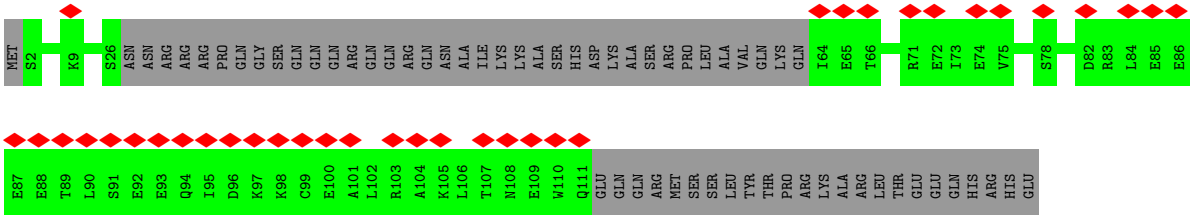
Chain P:





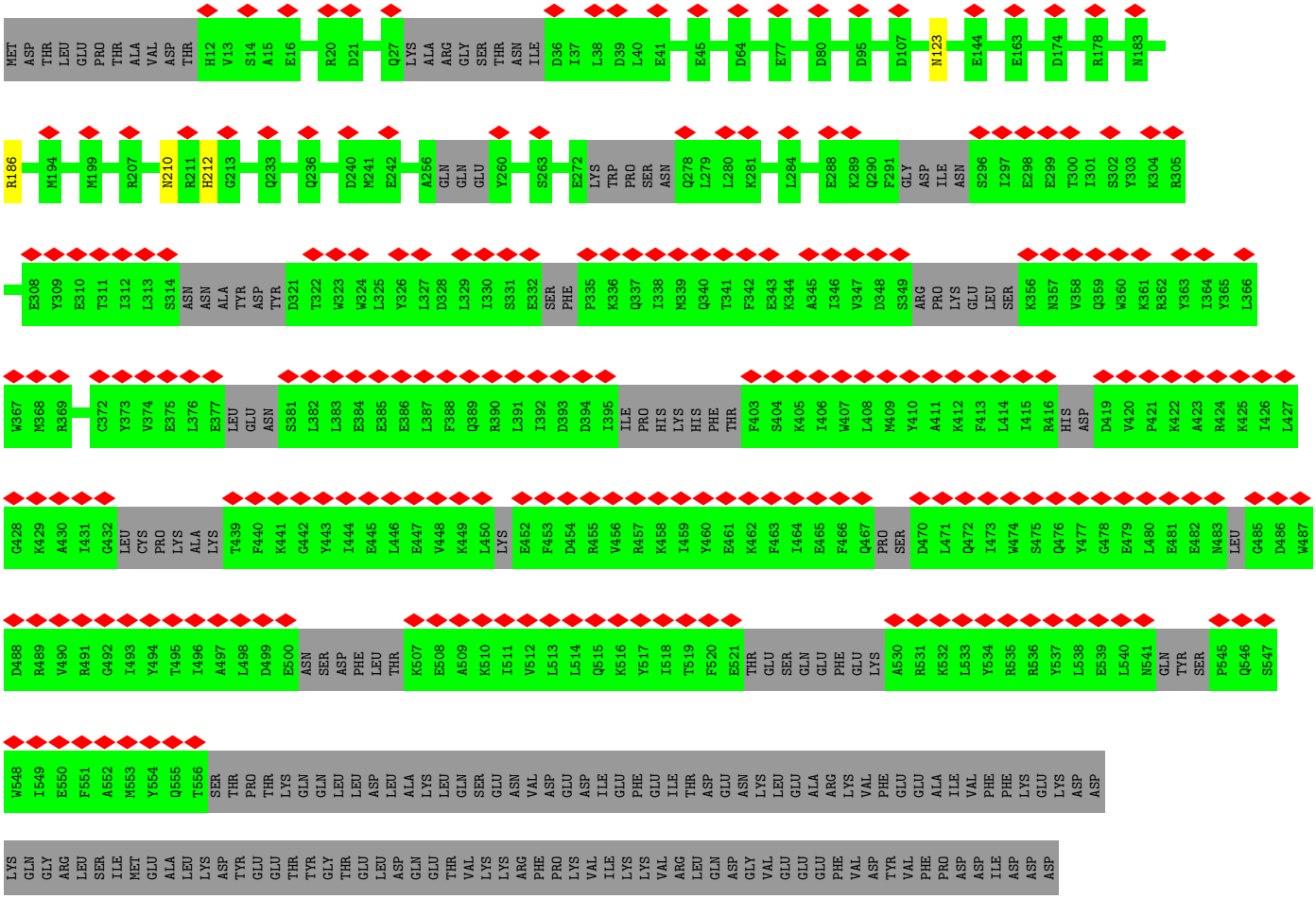
• Molecule 17: Pre-mRNA-splicing factor CWC21

Chain R:



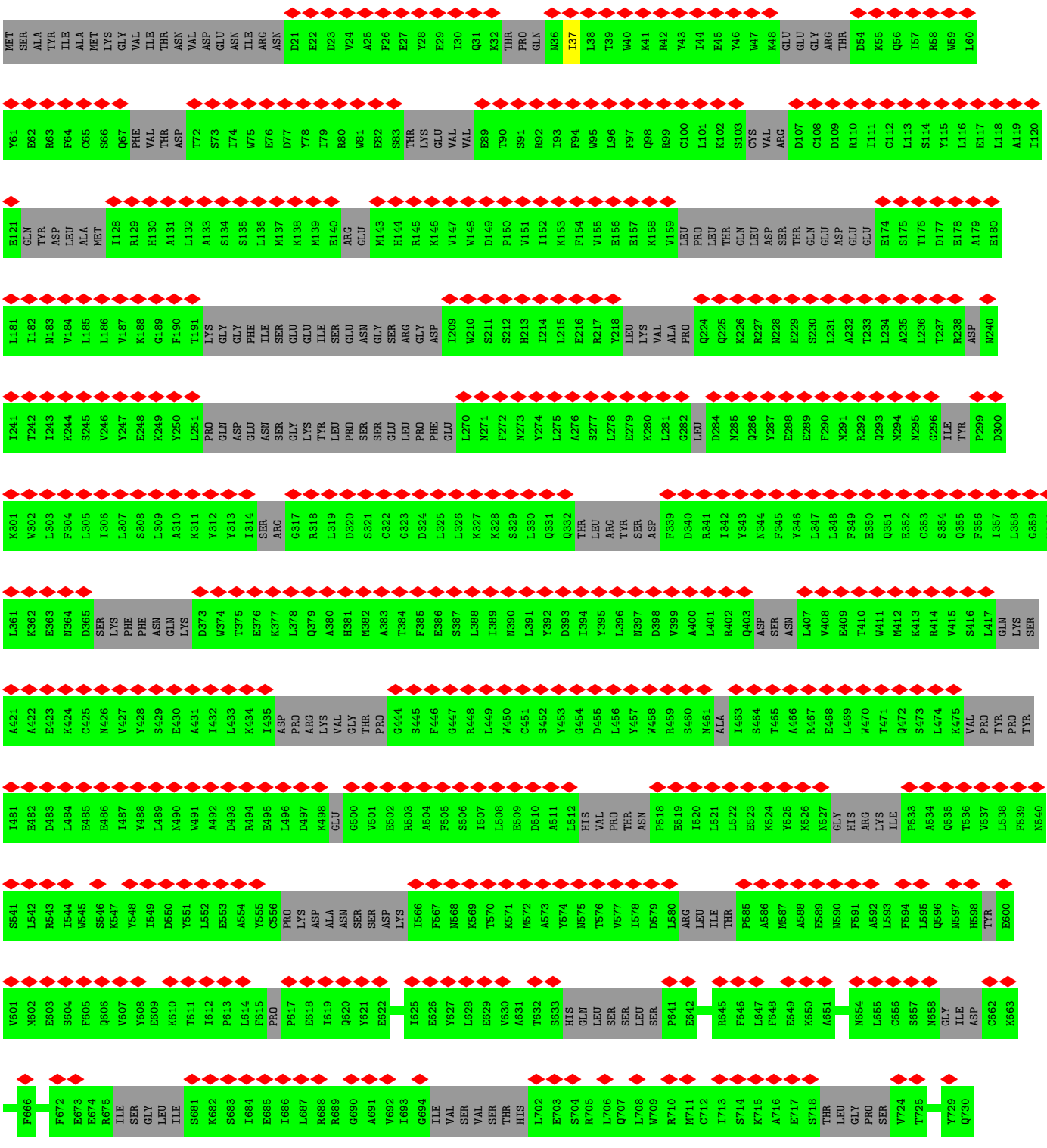
• Molecule 18: Pre-mRNA-splicing factor CLF1

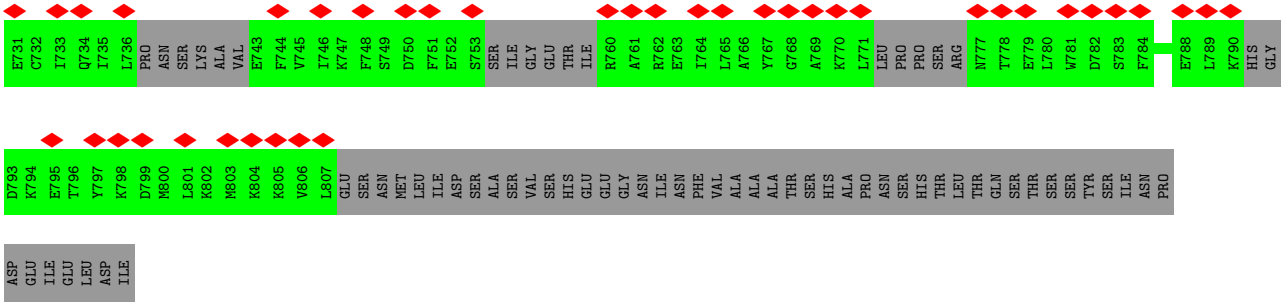
Chain S:



• Molecule 19: Pre-mRNA-splicing factor SYF1

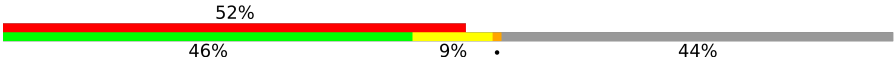
Chain T:

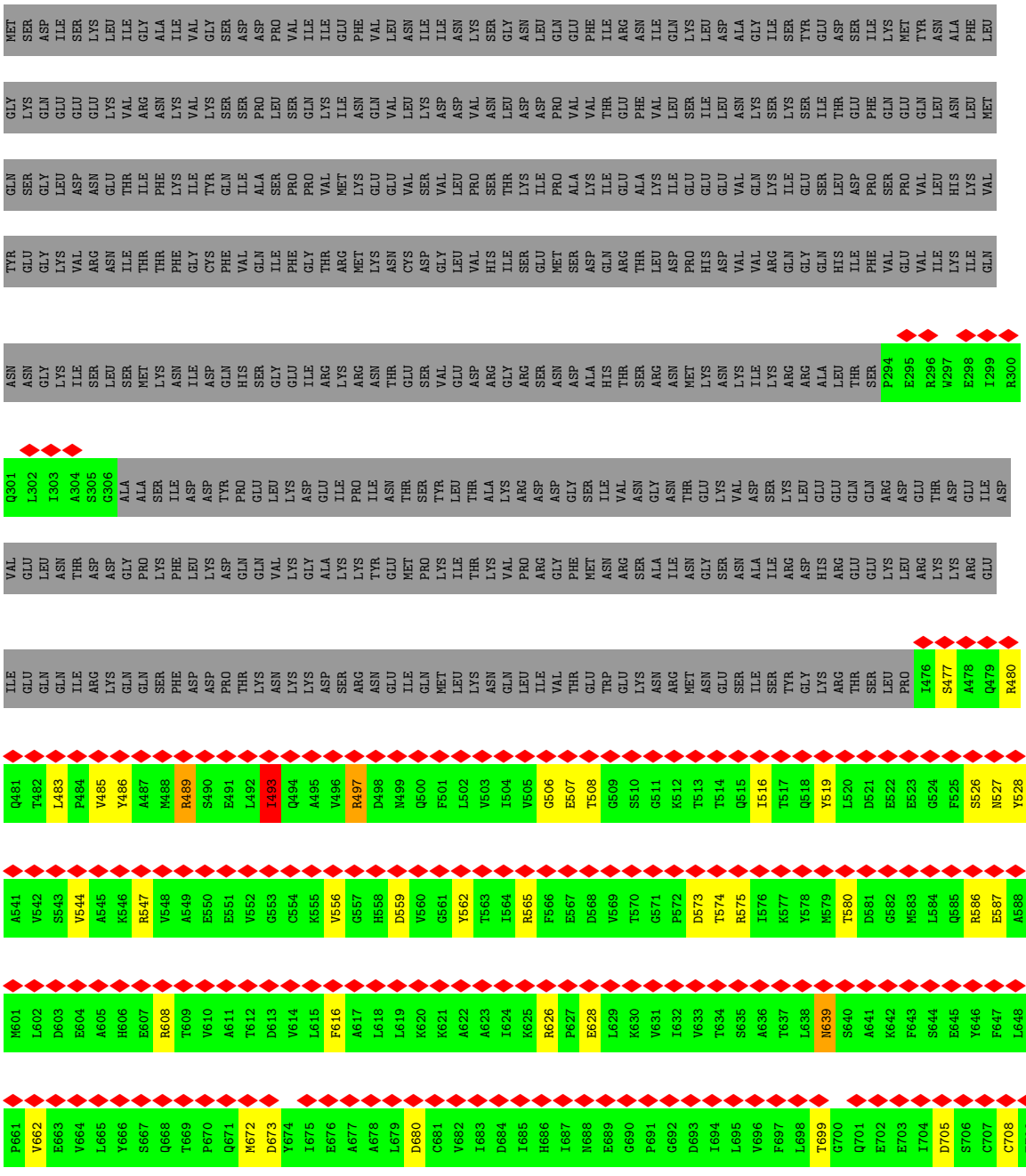


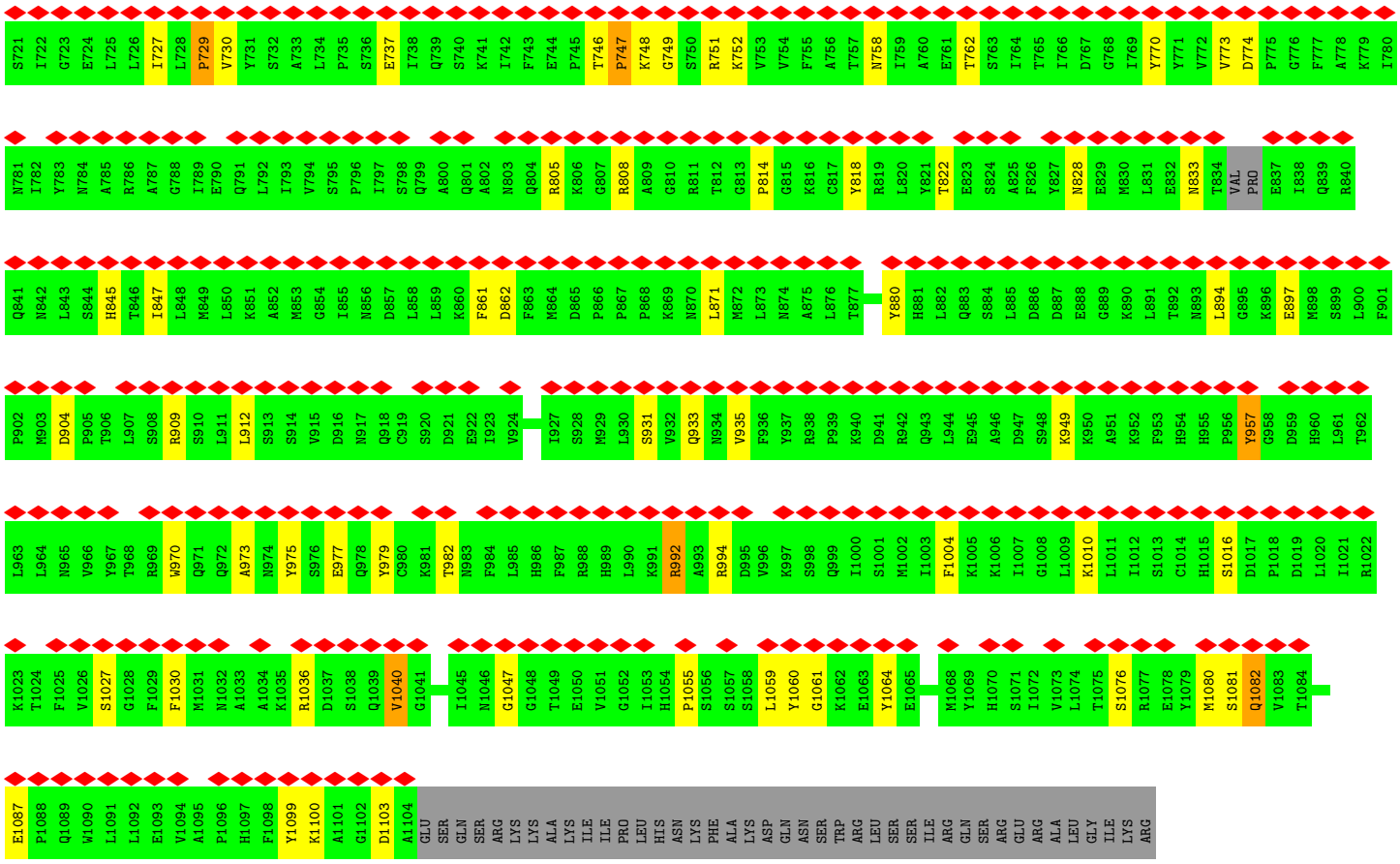


• Molecule 20: Pre-mRNA-splicing factor ATP-dependent RNA helicase PRP22

Chain V:

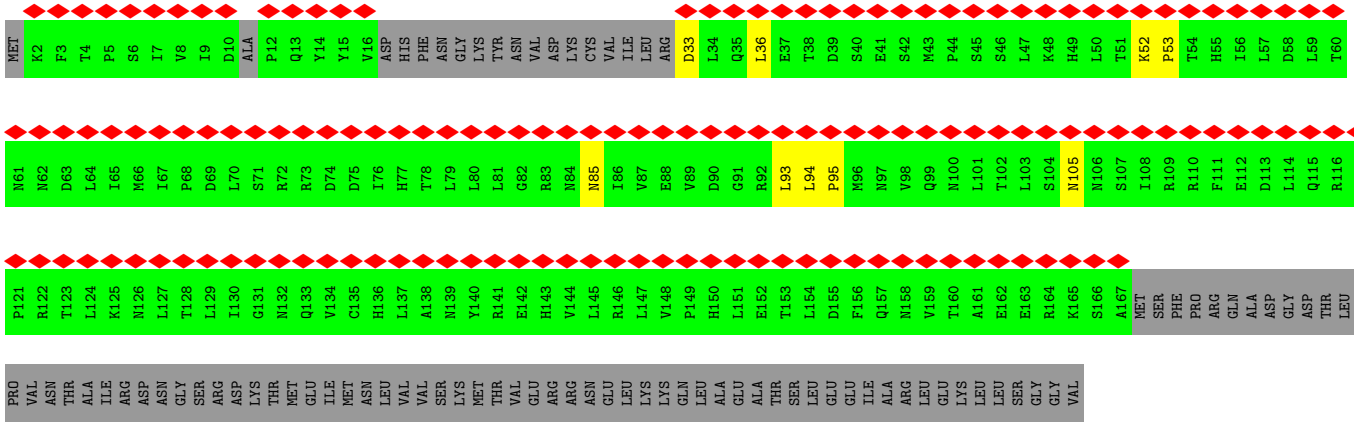






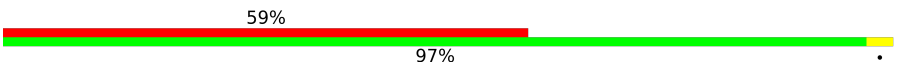
• Molecule 21: U2 small nuclear ribonucleoprotein A'

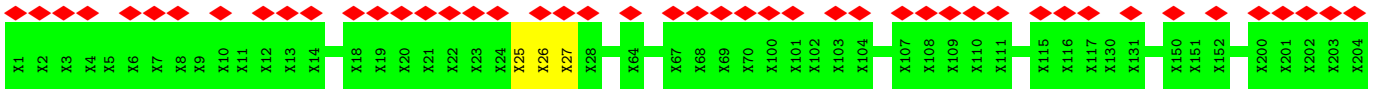
Chain W:

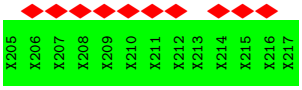


• Molecule 22: Unassigned structure

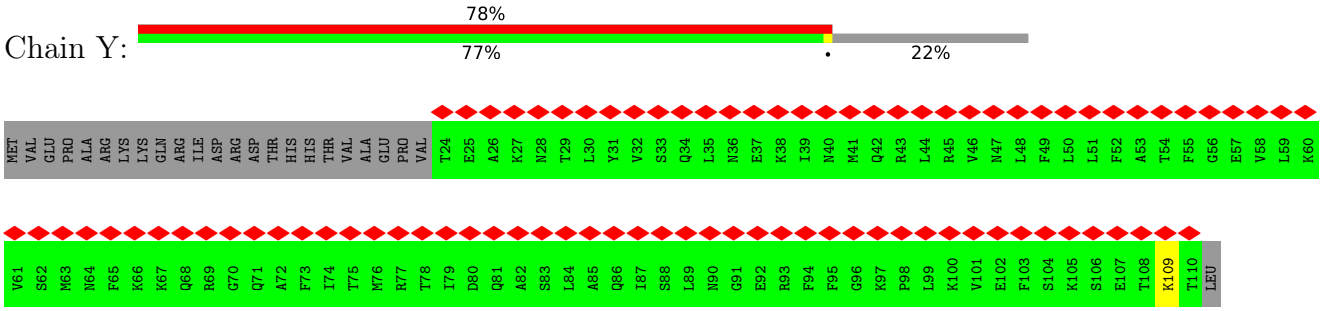
Chain X:



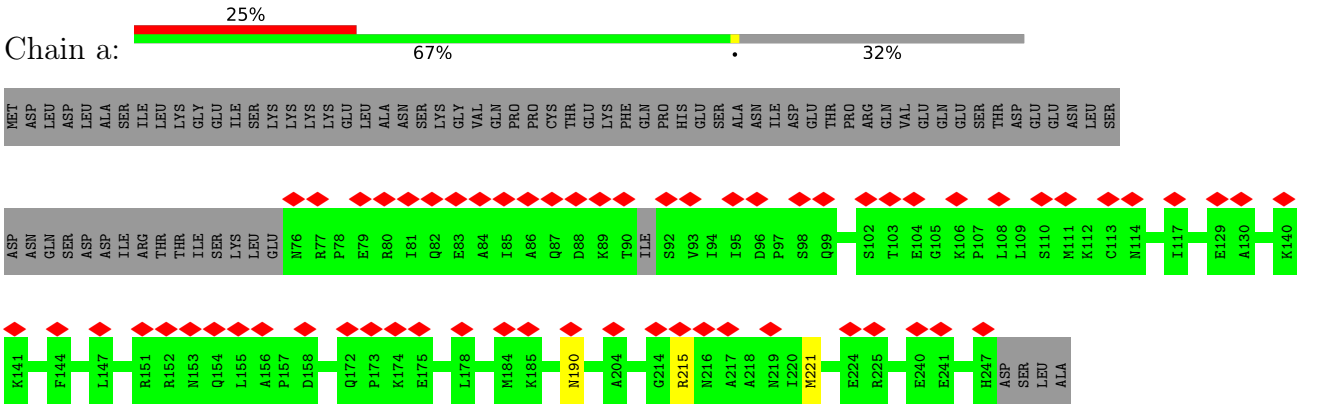




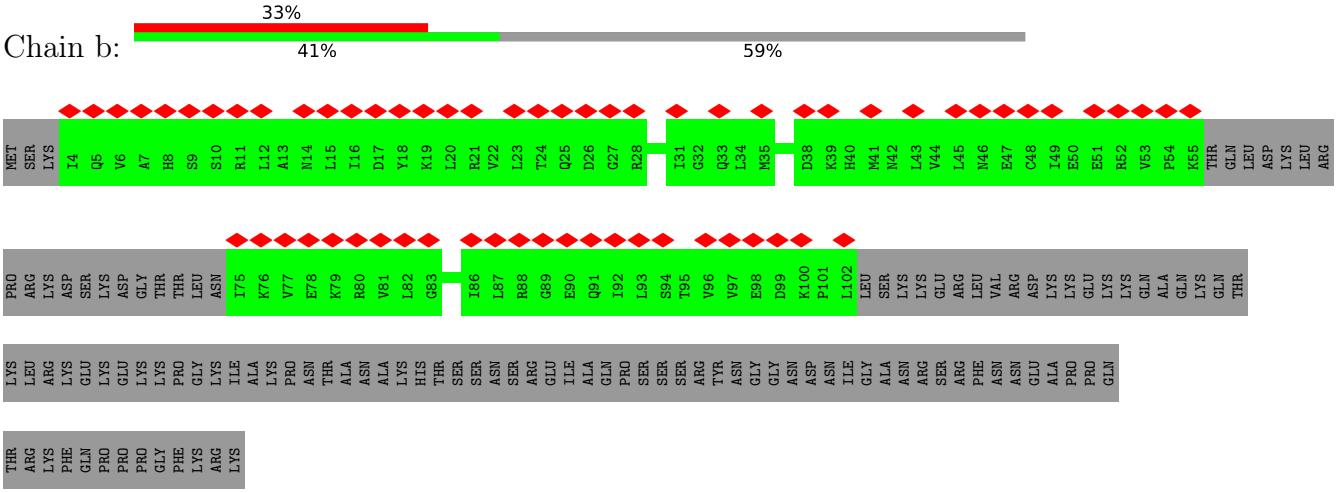
• Molecule 23: U2 small nuclear ribonucleoprotein B"



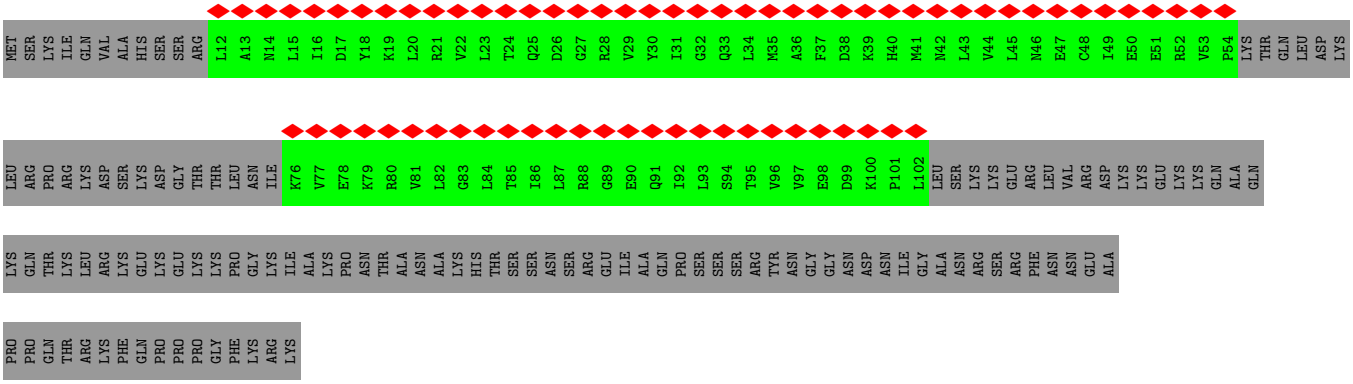
• Molecule 24: Pre-mRNA-splicing factor Prp18



• Molecule 25: Small nuclear ribonucleoprotein-associated protein B

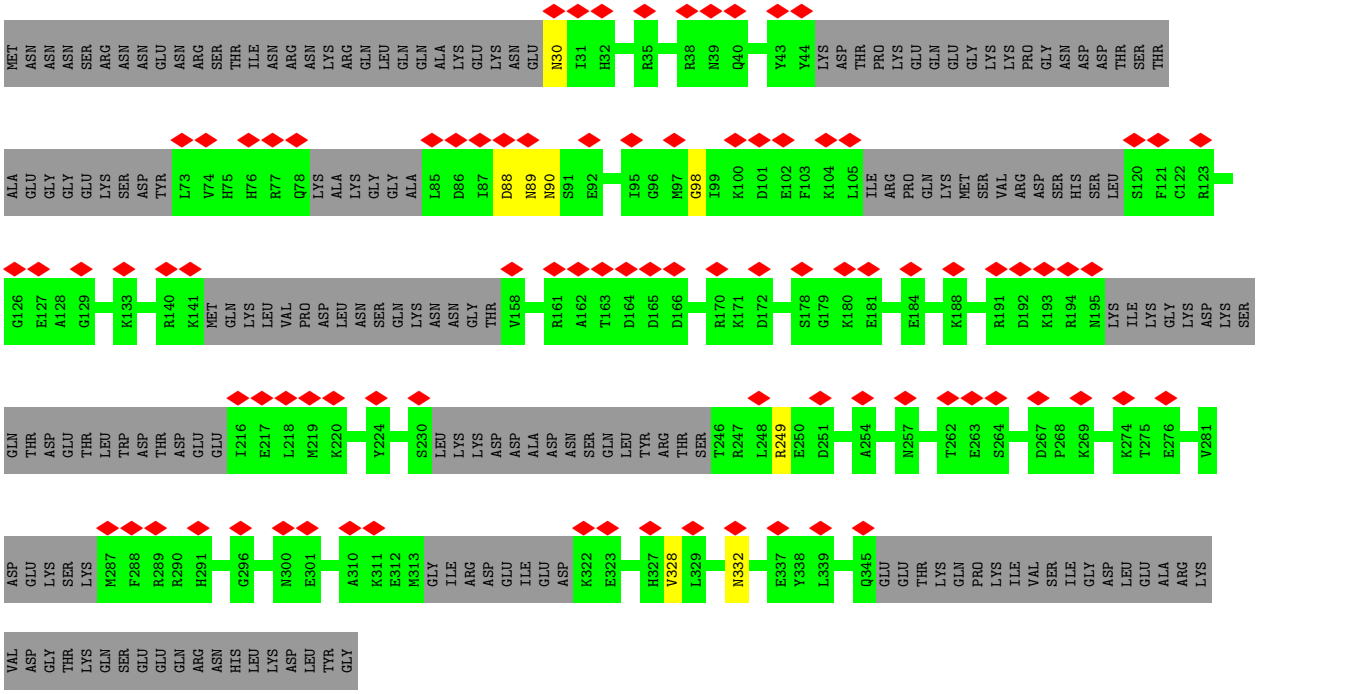


• Molecule 25: Small nuclear ribonucleoprotein-associated protein B



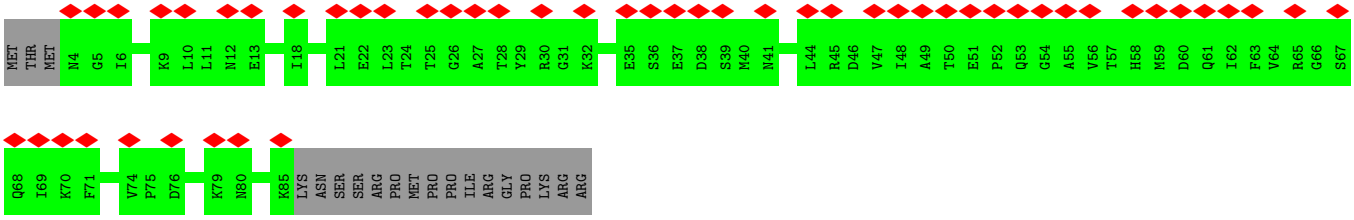
• Molecule 26: Pre-mRNA-splicing factor SLU7

Chain c:



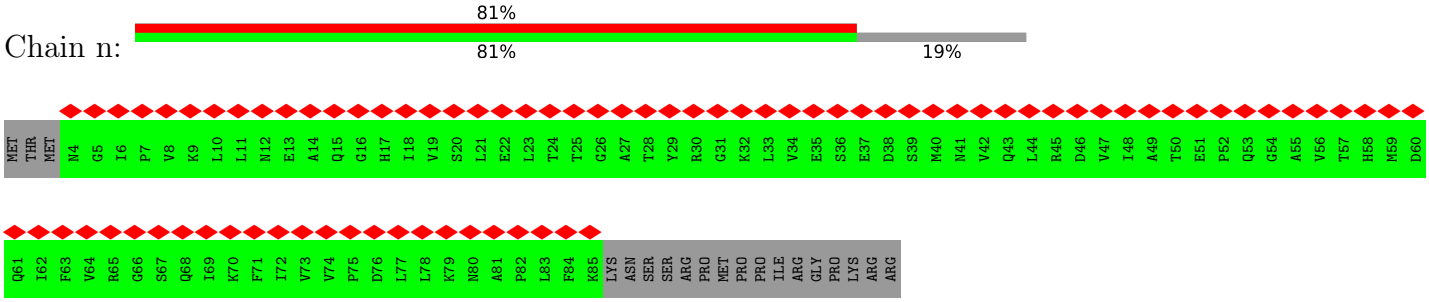
• Molecule 27: Small nuclear ribonucleoprotein Sm D3

Chain d:



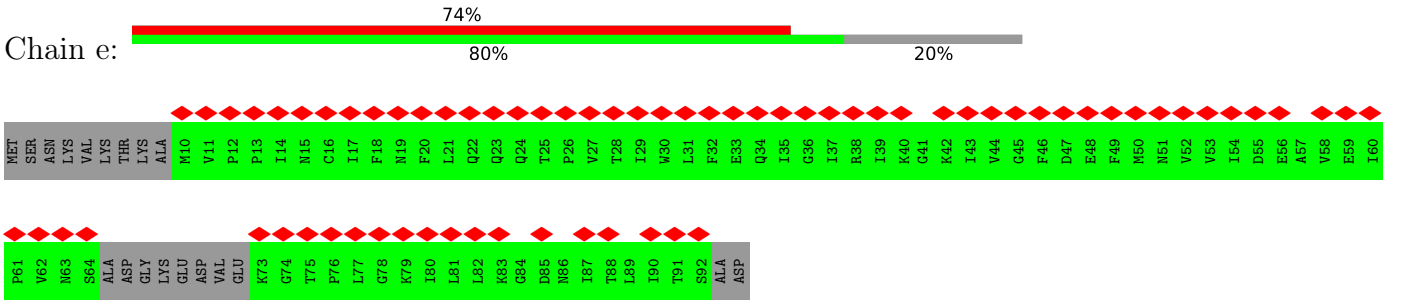
• Molecule 27: Small nuclear ribonucleoprotein Sm D3

Chain n:



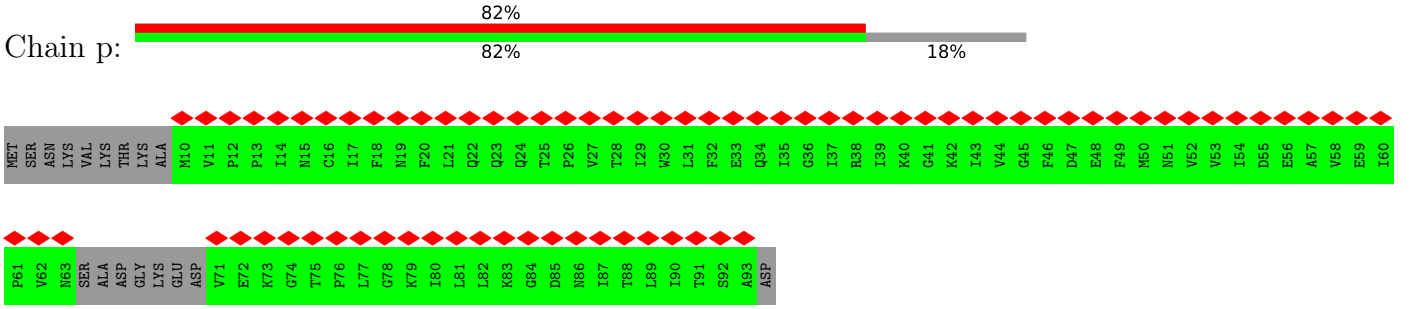
• Molecule 28: Small nuclear ribonucleoprotein E

Chain e:



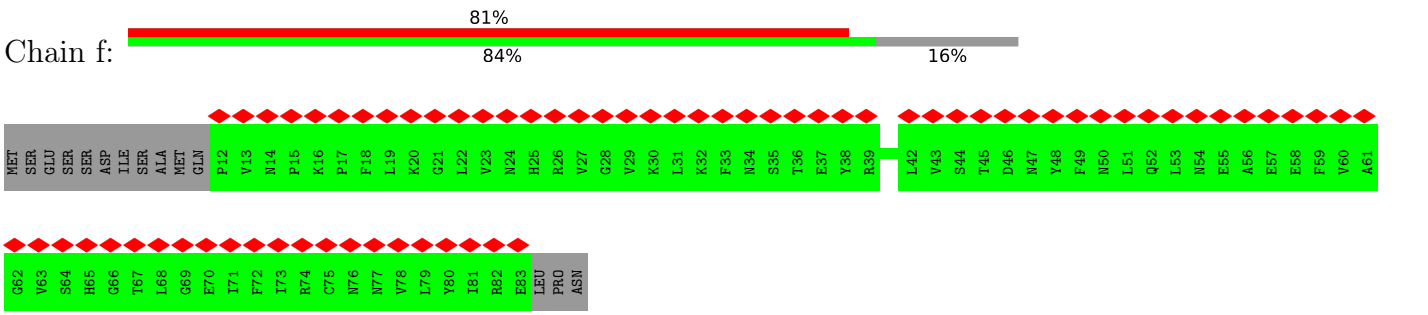
• Molecule 28: Small nuclear ribonucleoprotein E

Chain p:



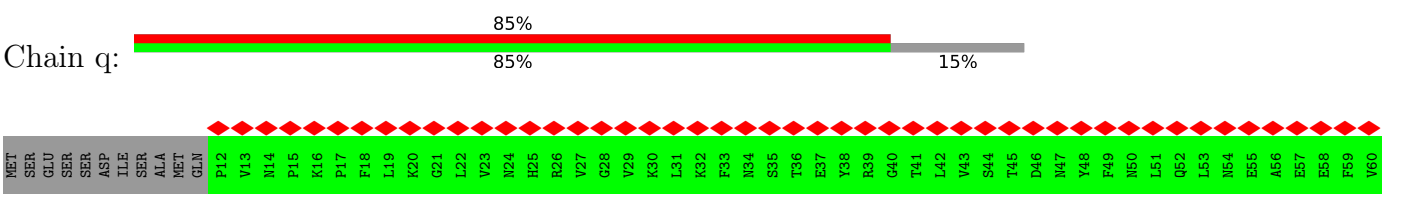
• Molecule 29: Small nuclear ribonucleoprotein F

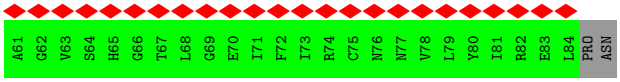
Chain f:



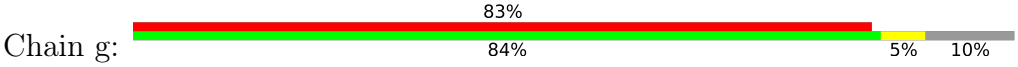
• Molecule 29: Small nuclear ribonucleoprotein F

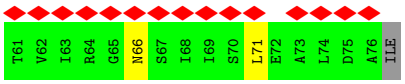
Chain q:



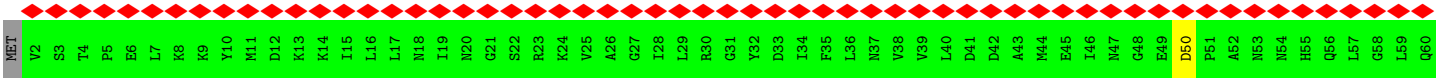


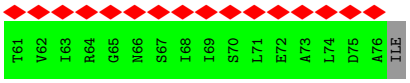
• Molecule 30: Small nuclear ribonucleoprotein G



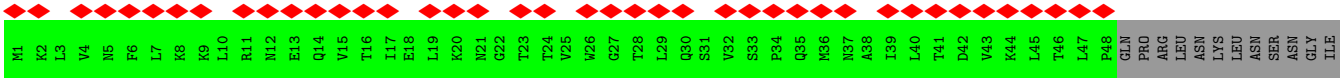


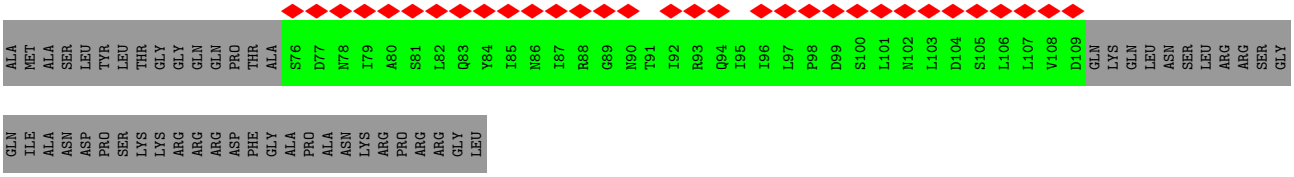
• Molecule 30: Small nuclear ribonucleoprotein G



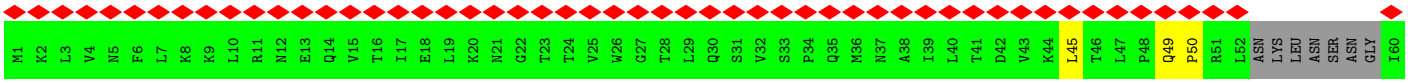


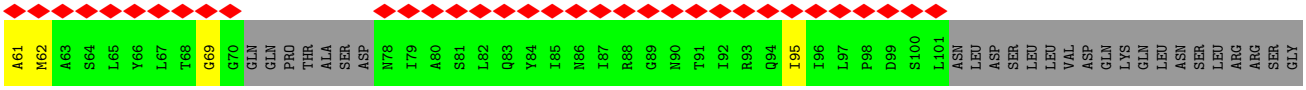
• Molecule 31: Small nuclear ribonucleoprotein Sm D1





• Molecule 31: Small nuclear ribonucleoprotein Sm D1





• Molecule 32: Small nuclear ribonucleoprotein Sm D2

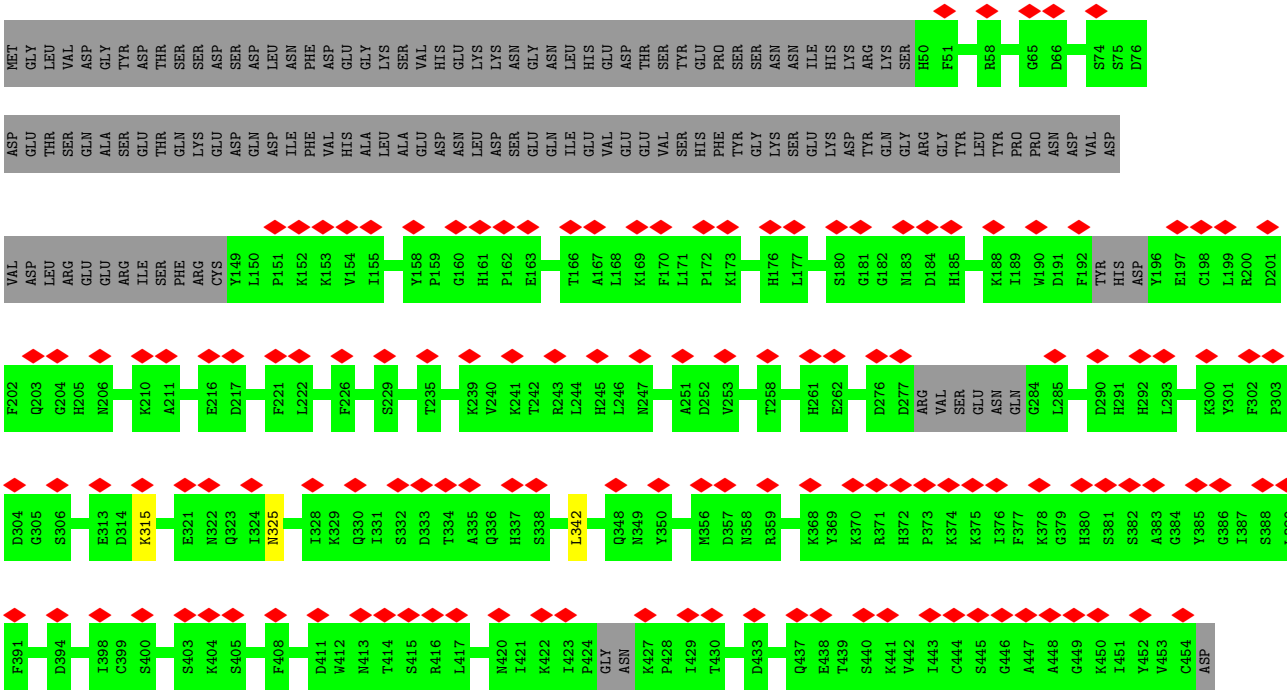
Chain j:

• Molecule 32: Small nuclear ribonucleoprotein Sm D2

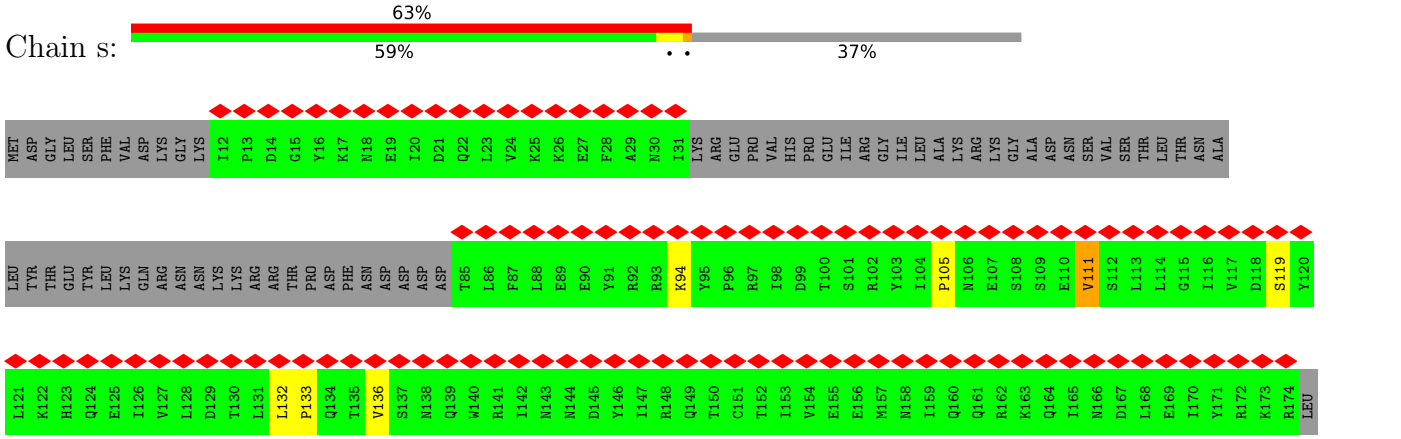
Chain m:

• Molecule 33: Pre-mRNA-processing factor Prp17

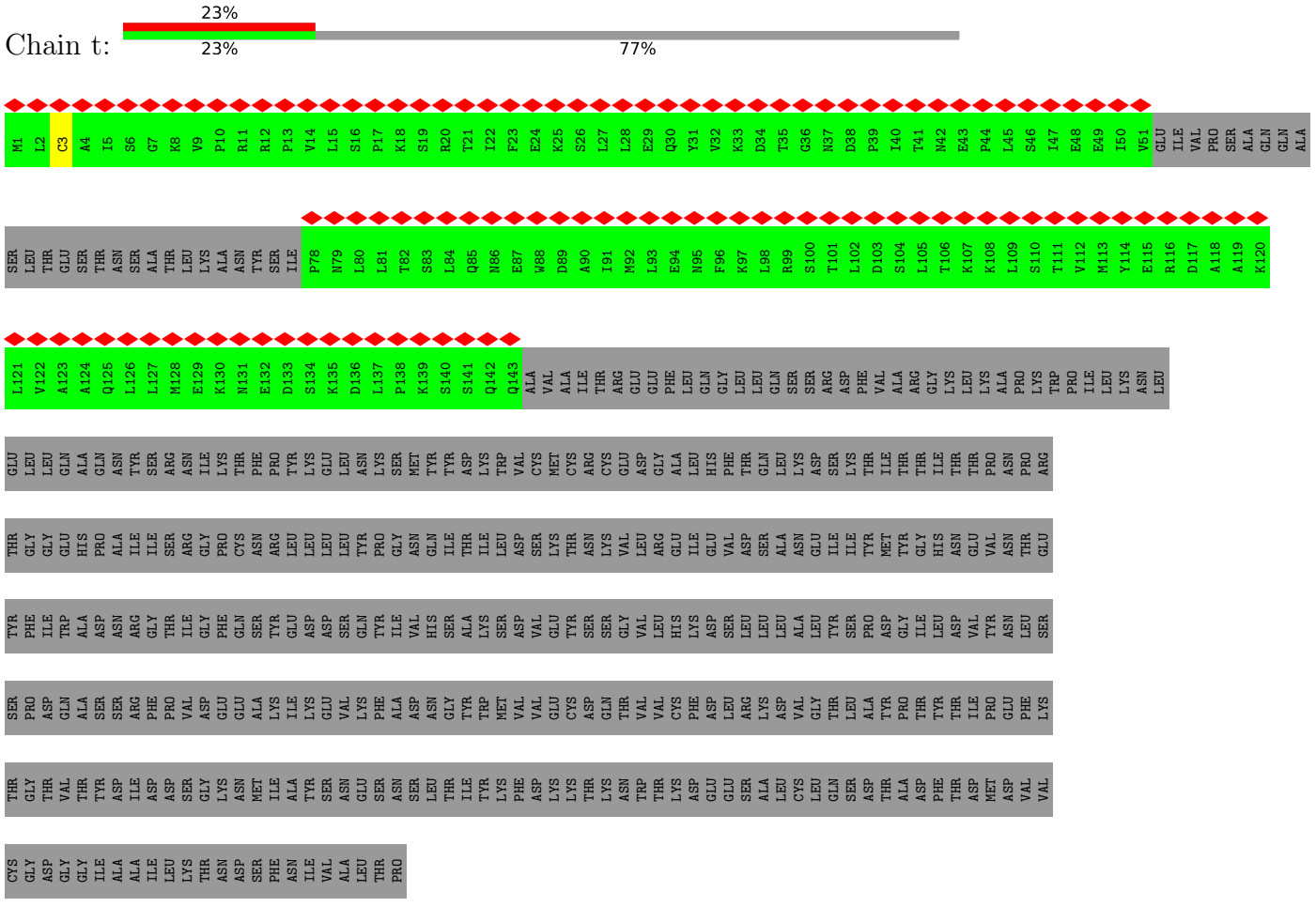
Chain o:



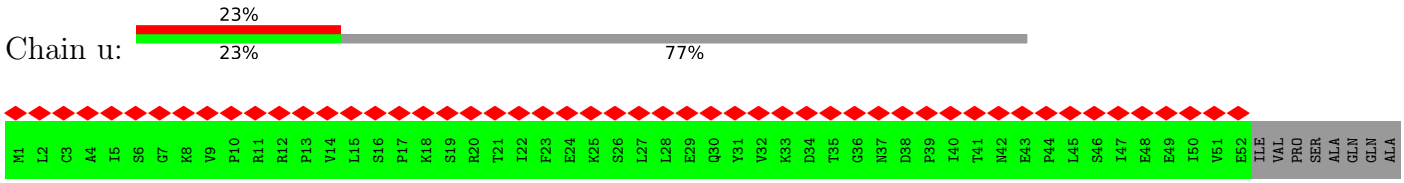
• Molecule 34: Pre-mRNA-splicing factor SNT309

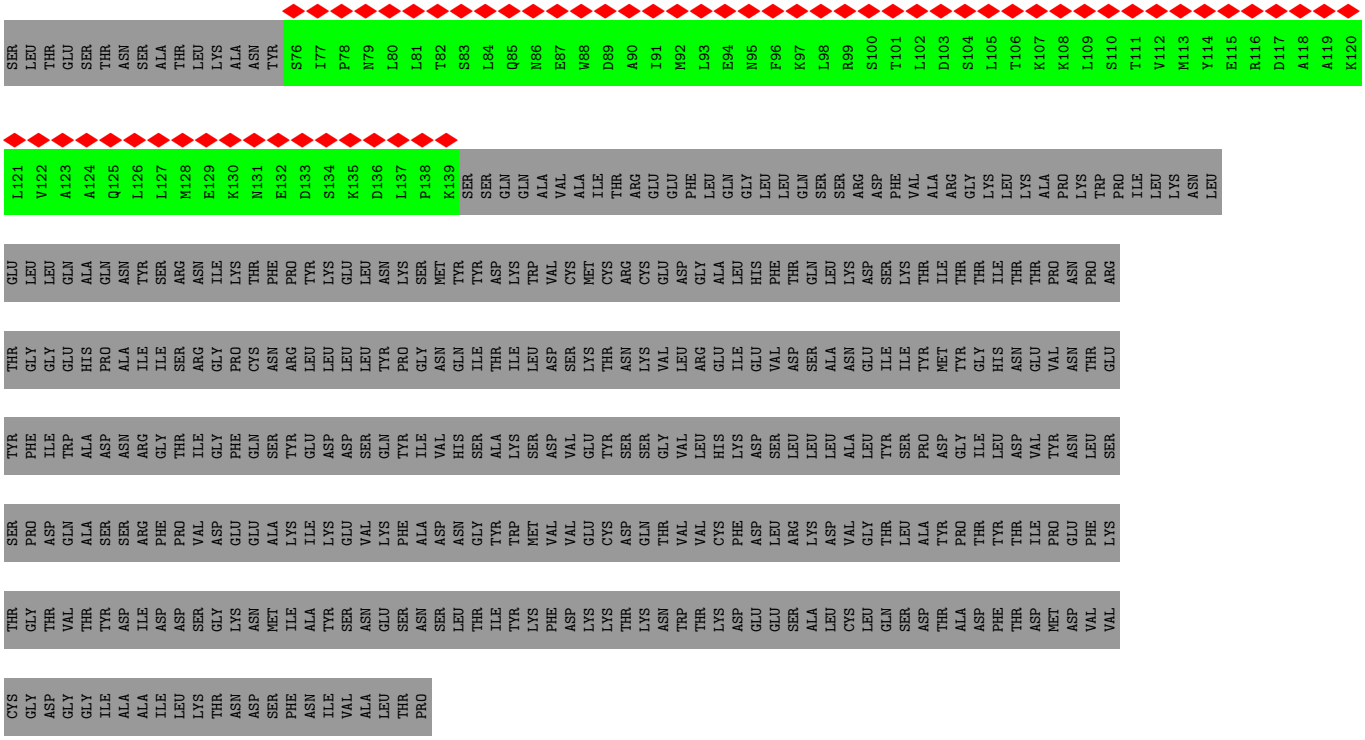


• Molecule 35: Pre-mRNA-processing factor Prp19



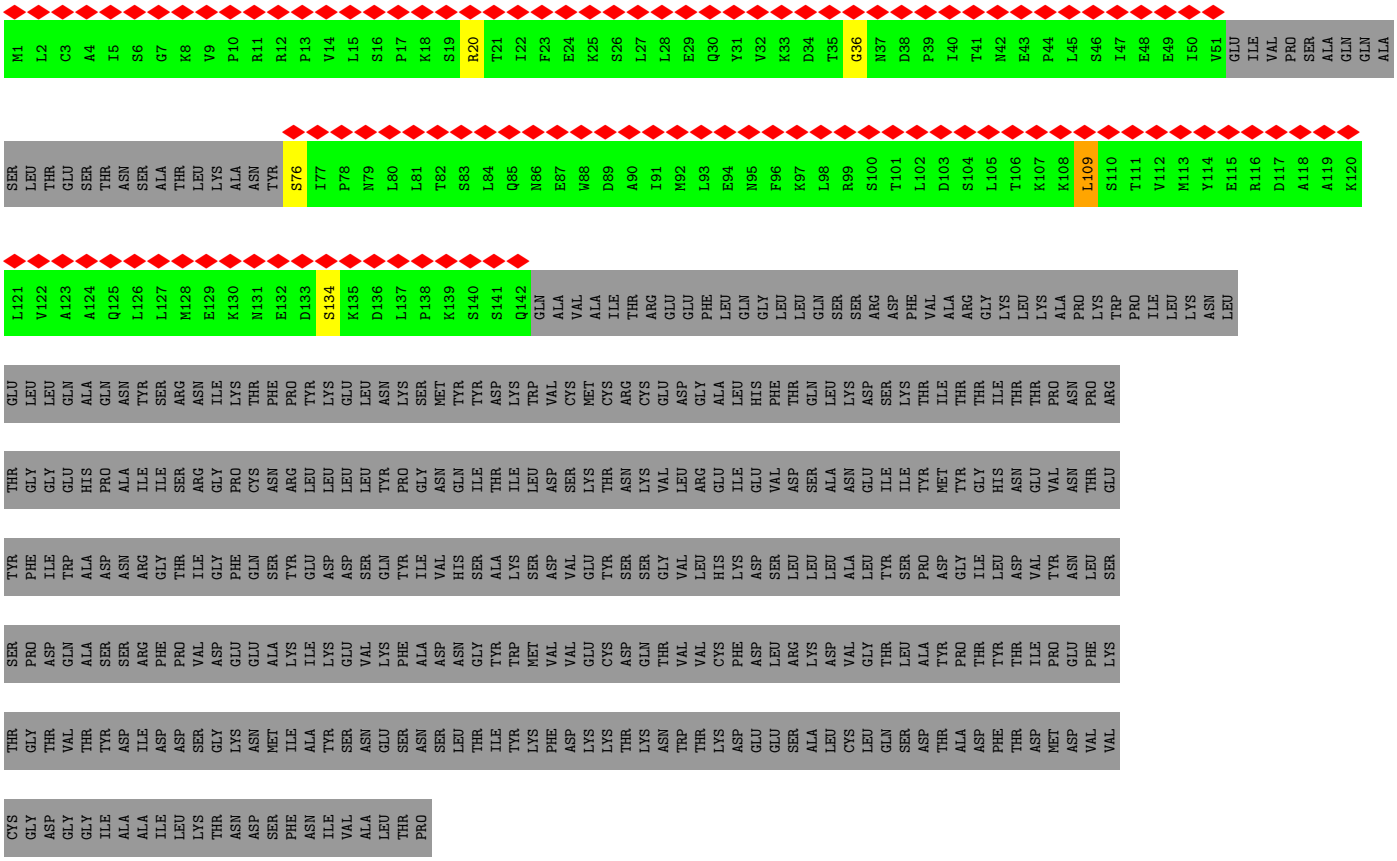
• Molecule 35: Pre-mRNA-processing factor Prp19





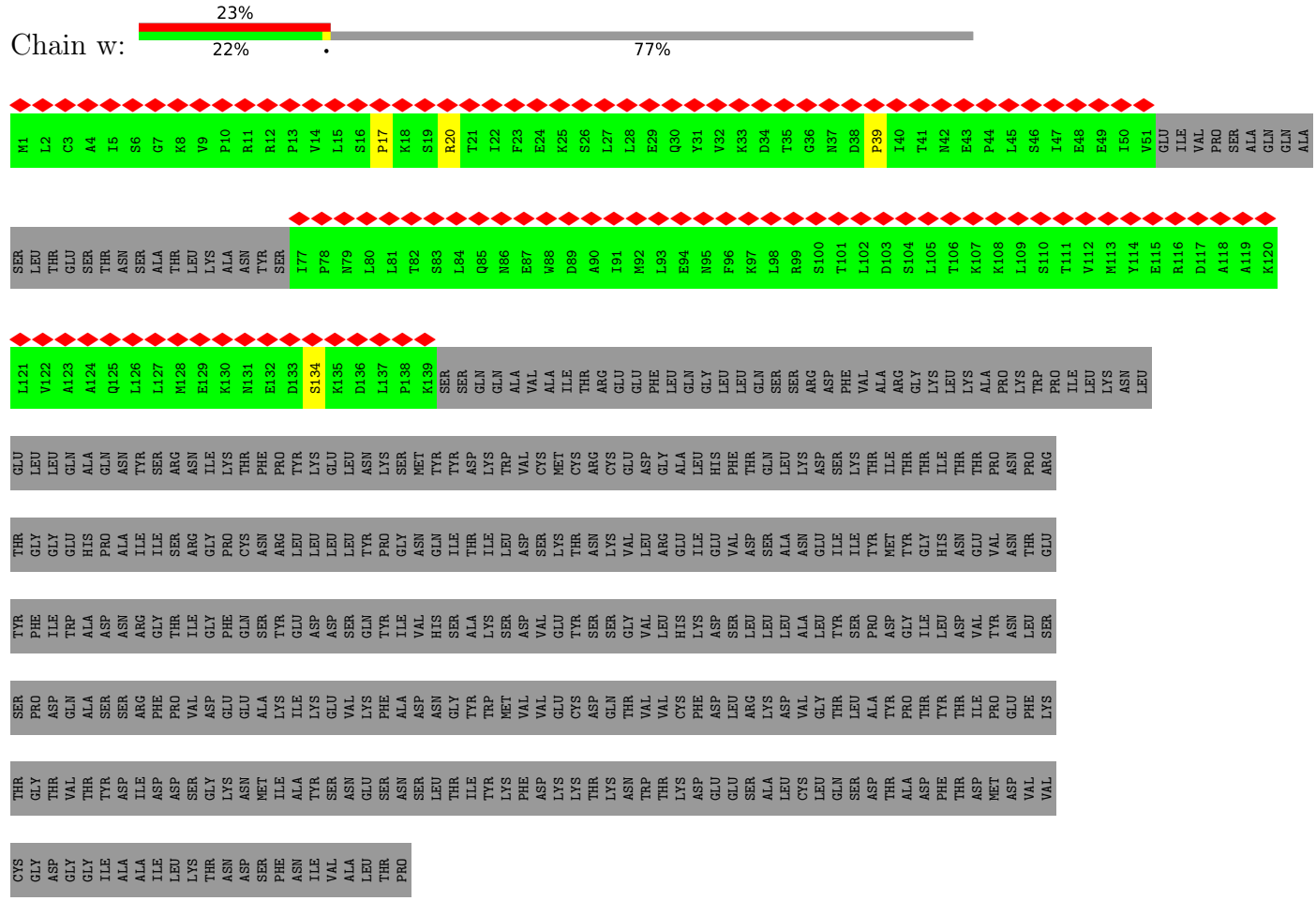
- Molecule 35: Pre-mRNA-processing factor Prp19

Chain v:



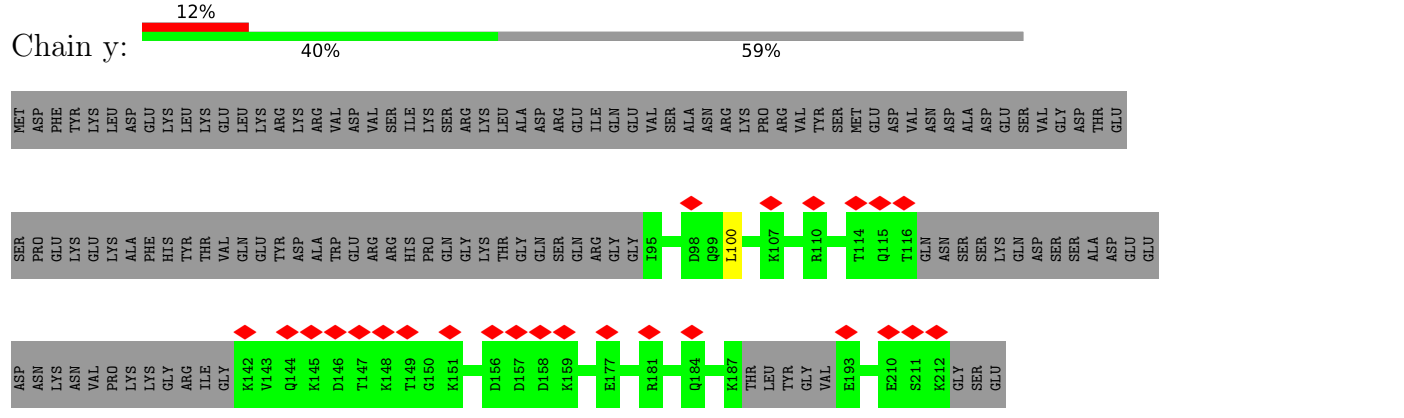
• Molecule 35: Pre-mRNA-processing factor Prp19

Chain w:



• Molecule 36: Pre-mRNA-splicing factor SYF2

Chain y:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	48617	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 ($e^-/Å^2$)	47	Depositor
Minimum defocus (nm)	200	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	105000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.174	Depositor
Minimum map value	-0.094	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.007	Depositor
Recommended contour level	0.04	Depositor
Map size (Å)	537.6, 537.6, 537.6	wwPDB
Map dimensions	480, 480, 480	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.12, 1.12, 1.12	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

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

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	0.38	0/3190	0.93	8/4946 (0.2%)
2	5	0.49	0/4049	1.24	40/6300 (0.6%)
3	6	0.53	0/2427	1.09	10/3778 (0.3%)
4	A	0.38	0/16452	0.57	2/22294 (0.0%)
5	C	0.38	0/7147	0.60	2/9673 (0.0%)
6	D	0.25	0/577	0.37	0/787
7	E	0.47	0/651	1.04	4/1008 (0.4%)
8	H	0.36	0/2716	0.65	1/3702 (0.0%)
9	I	0.45	0/895	1.09	4/1384 (0.3%)
10	J	0.41	0/2750	0.61	0/3735
11	K	0.31	0/1375	0.52	0/1854
12	L	0.37	0/1307	0.53	0/1748
13	M	0.36	0/2094	0.57	1/2815 (0.0%)
14	N	0.30	0/1945	0.59	1/2617 (0.0%)
15	O	0.37	0/2378	0.65	3/3212 (0.1%)
16	P	0.30	0/616	0.51	0/822
17	R	0.38	0/423	0.68	0/577
18	S	0.36	0/3221	0.64	0/4379
19	T	0.36	0/2918	0.67	0/4015
20	V	0.72	0/5157	1.25	29/6973 (0.4%)
21	W	0.34	0/1228	0.68	1/1663 (0.1%)
23	Y	0.34	0/713	0.59	0/952
24	a	0.30	0/1400	0.55	0/1897
25	b	0.27	0/636	0.61	0/856
25	k	0.38	0/567	0.62	0/762
26	c	0.31	0/1737	0.59	0/2315
27	d	0.28	0/634	0.57	0/859
27	n	0.33	0/641	0.63	0/868
28	e	0.30	0/585	0.61	0/795
28	p	0.32	0/612	0.56	0/830
29	f	0.30	0/585	0.63	0/791
29	q	0.36	0/597	0.63	0/807

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
30	g	0.27	0/532	0.64	1/715 (0.1%)
30	r	0.30	0/582	0.63	0/785
31	h	0.27	0/649	0.57	0/880
31	l	0.30	0/685	0.63	0/926
32	j	0.28	0/753	0.61	1/1013 (0.1%)
32	m	0.31	0/764	0.56	0/1026
33	o	0.35	0/2671	0.59	1/3605 (0.0%)
34	s	0.57	0/546	0.80	0/760
35	t	0.45	0/581	0.72	0/809
35	u	0.57	0/576	0.78	0/802
35	v	0.59	0/586	0.89	3/816 (0.4%)
35	w	0.47	0/566	0.74	1/788 (0.1%)
36	y	0.30	0/721	0.50	1/954 (0.1%)
All	All	0.41	0/82435	0.76	114/113893 (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
14	N	0	1
18	S	0	1
20	V	0	23
21	W	0	3
22	X	0	3
26	c	0	2
30	r	0	1
34	s	0	2
35	t	0	1
35	v	0	1
35	w	0	1
All	All	0	39

There are no bond length outliers.

All (114) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
20	V	909	ARG	NE-CZ-NH1	11.53	126.06	120.30
20	V	626	ARG	NE-CZ-NH1	10.42	125.51	120.30
3	6	87	U	C2-N1-C1'	9.53	129.14	117.70
3	6	87	U	N3-C2-O2	-9.48	115.56	122.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
20	V	493	ILE	CB-CA-C	-9.47	92.65	111.60
20	V	493	ILE	N-CA-CB	9.10	131.72	110.80
1	2	16	U	N1-C2-O2	8.94	129.06	122.80
3	6	87	U	N1-C2-O2	8.78	128.94	122.80
1	2	16	U	N3-C2-O2	-8.66	116.14	122.20
20	V	565	ARG	NE-CZ-NH1	8.54	124.57	120.30
2	5	79	C	C2-N1-C1'	8.49	128.14	118.80
20	V	477	SER	N-CA-CB	-8.39	97.91	110.50
2	5	111	C	N1-C2-O2	8.26	123.86	118.90
9	I	91	A	P-O3'-C3'	8.25	129.60	119.70
2	5	60	U	C2-N1-C1'	8.21	127.55	117.70
20	V	833	ASN	O-C-N	8.16	135.75	122.70
2	5	60	U	N1-C2-O2	8.00	128.40	122.80
2	5	101	C	N1-C2-O2	7.72	123.53	118.90
20	V	1036	ARG	NE-CZ-NH1	7.64	124.12	120.30
20	V	493	ILE	CA-CB-CG1	7.56	125.37	111.00
2	5	101	C	C2-N1-C1'	7.47	127.02	118.80
20	V	957	TYR	CB-CG-CD2	-7.46	116.52	121.00
2	5	101	C	C6-N1-C2	-7.41	117.34	120.30
2	5	111	C	N3-C2-O2	-7.19	116.87	121.90
20	V	714	ARG	NE-CZ-NH1	7.17	123.89	120.30
2	5	60	U	N3-C2-O2	-7.15	117.20	122.20
20	V	586	ARG	NE-CZ-NH1	7.05	123.82	120.30
2	5	101	C	N3-C2-O2	-7.02	116.99	121.90
20	V	538	ARG	NE-CZ-NH2	6.99	123.79	120.30
2	5	111	C	C6-N1-C2	-6.95	117.52	120.30
20	V	833	ASN	CA-C-N	-6.89	102.03	117.20
1	2	16	U	C2-N1-C1'	6.85	125.92	117.70
14	N	139	LEU	CA-CB-CG	6.81	130.97	115.30
2	5	174	G	P-O3'-C3'	6.80	127.86	119.70
2	5	146	C	C6-N1-C2	-6.76	117.60	120.30
13	M	83	LEU	CA-CB-CG	6.74	130.79	115.30
9	I	91	A	OP2-P-O3'	6.72	119.98	105.20
2	5	111	C	C2-N1-C1'	6.69	126.16	118.80
20	V	808	ARG	NE-CZ-NH1	6.67	123.64	120.30
2	5	56	U	P-O3'-C3'	6.55	127.56	119.70
7	E	-14	A	P-O3'-C3'	6.49	127.49	119.70
20	V	547	ARG	NE-CZ-NH1	6.49	123.54	120.30
3	6	92	C	P-O3'-C3'	6.44	127.42	119.70
1	2	42	U	C5-C6-N1	6.43	125.92	122.70
1	2	15	C	P-O3'-C3'	6.34	127.31	119.70
33	o	342	LEU	CA-CB-CG	6.25	129.67	115.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	5	92	U	N3-C2-O2	-6.25	117.83	122.20
20	V	833	ASN	C-N-CA	-6.24	106.10	121.70
20	V	894	LEU	CB-CA-C	-6.22	98.38	110.20
7	E	-12	U	N3-C2-O2	-6.20	117.86	122.20
2	5	63	C	C2-N1-C1'	6.18	125.60	118.80
3	6	87	U	C6-N1-C2	-6.17	117.30	121.00
9	I	2	U	N1-C2-O2	6.10	127.07	122.80
7	E	-12	U	C2-N1-C1'	6.03	124.94	117.70
35	w	39	PRO	N-CA-CB	6.00	110.50	103.30
2	5	47	U	N1-C2-O2	5.98	126.98	122.80
7	E	-12	U	N1-C2-O2	5.95	126.97	122.80
3	6	82	A	P-O3'-C3'	5.95	126.83	119.70
2	5	79	C	C6-N1-C1'	-5.94	113.68	120.80
2	5	146	C	C2-N1-C1'	5.88	125.27	118.80
2	5	103	A	O4'-C1'-N9	5.88	112.90	108.20
15	O	123	LEU	CA-CB-CG	5.86	128.77	115.30
2	5	31	G	N3-C4-N9	5.77	129.46	126.00
20	V	751	ARG	NE-CZ-NH1	5.76	123.18	120.30
2	5	47	U	N3-C2-O2	-5.70	118.21	122.20
2	5	146	C	N1-C2-O2	5.69	122.31	118.90
2	5	92	U	N1-C2-O2	5.69	126.78	122.80
35	v	134	SER	CA-C-O	-5.68	108.17	120.10
15	O	60	LEU	CA-CB-CG	5.68	128.36	115.30
2	5	41	A	P-O3'-C3'	5.67	126.50	119.70
5	C	175	LEU	CA-CB-CG	5.66	128.31	115.30
4	A	127	LEU	CA-CB-CG	5.64	128.28	115.30
3	6	87	U	C5-C6-N1	5.64	125.52	122.70
20	V	519	TYR	CB-CG-CD2	-5.58	117.65	121.00
20	V	805	ARG	NE-CZ-NH1	5.55	123.07	120.30
3	6	32	U	N3-C2-O2	-5.50	118.35	122.20
3	6	87	U	C6-N1-C1'	-5.50	113.49	121.20
5	C	577	LEU	CA-CB-CG	5.49	127.93	115.30
4	A	786	LEU	CA-CB-CG	5.44	127.82	115.30
36	y	100	LEU	CA-CB-CG	5.42	127.76	115.30
2	5	56	U	OP1-P-O3'	5.39	117.06	105.20
1	2	46	C	N1-C2-O2	5.39	122.14	118.90
20	V	538	ARG	NH1-CZ-NH2	-5.38	113.48	119.40
2	5	146	C	N3-C2-O2	-5.38	118.13	121.90
2	5	14	G	C2-N3-C4	5.37	114.59	111.90
20	V	1030	PHE	CB-CG-CD2	-5.36	117.05	120.80
2	5	14	G	N3-C4-C5	-5.34	125.93	128.60
8	H	408	LEU	CA-CB-CG	5.33	127.55	115.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
20	V	705	ASP	CB-CG-OD1	5.32	123.09	118.30
2	5	111	C	C5-C6-N1	5.32	123.66	121.00
2	5	79	C	C6-N1-C2	-5.31	118.18	120.30
21	W	36	LEU	CA-CB-CG	5.29	127.48	115.30
35	v	76	SER	N-CA-CB	5.26	118.39	110.50
2	5	101	C	C5-C6-N1	5.24	123.62	121.00
2	5	60	U	C5-C6-N1	5.23	125.32	122.70
2	5	47	U	C2-N1-C1'	5.22	123.96	117.70
20	V	992	ARG	NE-CZ-NH1	5.20	122.90	120.30
2	5	60	U	C6-N1-C1'	-5.20	113.92	121.20
15	O	152	LEU	CA-CB-CG	5.20	127.25	115.30
2	5	36	A	N7-C8-N9	5.18	116.39	113.80
35	v	134	SER	O-C-N	5.16	130.96	122.70
1	2	6	U	C2-N1-C1'	5.15	123.88	117.70
20	V	608	ARG	NE-CZ-NH1	5.12	122.86	120.30
2	5	136	G	N3-C4-N9	-5.11	122.93	126.00
9	I	59	C	N1-C2-O2	5.10	121.96	118.90
1	2	9	C	C2-N1-C1'	5.08	124.39	118.80
3	6	32	U	N1-C2-O2	5.07	126.35	122.80
2	5	130	A	P-O3'-C3'	5.06	125.77	119.70
32	j	105	LEU	CA-CB-CG	5.05	126.91	115.30
2	5	118	U	C5-C6-N1	5.04	125.22	122.70
20	V	805	ARG	NE-CZ-NH2	-5.04	117.78	120.30
20	V	994	ARG	NE-CZ-NH1	5.03	122.81	120.30
20	V	480	ARG	CD-NE-CZ	5.03	130.64	123.60
30	g	71	LEU	CA-CB-CG	5.00	126.81	115.30

There are no chirality outliers.

All (39) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
14	N	208	TYR	Peptide
18	S	212	HIS	Peptide
20	V	1027	SER	Peptide
20	V	1064	TYR	Peptide
20	V	1080	MET	Peptide
20	V	1100	LYS	Peptide
20	V	489	ARG	Sidechain
20	V	493	ILE	Peptide
20	V	497	ARG	Sidechain
20	V	506	GLY	Peptide
20	V	526	SER	Peptide

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Mol	Chain	Res	Type	Group
20	V	537	ARG	Sidechain
20	V	562	TYR	Peptide
20	V	575	ARG	Sidechain
20	V	672	MET	Peptide
20	V	729	PRO	Peptide
20	V	746	THR	Peptide
20	V	749	GLY	Peptide
20	V	770	TYR	Sidechain
20	V	818	TYR	Sidechain
20	V	861	PHE	Peptide
20	V	880	TYR	Sidechain
20	V	933	GLN	Peptide
20	V	957	TYR	Sidechain
20	V	975	TYR	Sidechain
21	W	93	LEU	Peptide
21	W	94	LEU	Peptide
21	W	95	PRO	Peptide
22	X	25	UNK	Mainchain
22	X	26	UNK	Mainchain
22	X	27	UNK	Mainchain
26	c	88	ASP	Peptide
26	c	98	GLY	Peptide
30	r	50	ASP	Peptide
34	s	111	VAL	Peptide
34	s	132	LEU	Peptide
35	t	3	CYS	Mainchain
35	v	109	LEU	Mainchain
35	w	134	SER	Mainchain

5.2 Too-close contacts

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

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	
4	A	1935/2413 (80%)	1824 (94%)	111 (6%)	0	100	100
5	C	868/1008 (86%)	812 (94%)	56 (6%)	0	100	100
6	D	93/278 (34%)	91 (98%)	2 (2%)	0	100	100
8	H	403/577 (70%)	380 (94%)	23 (6%)	0	100	100
10	J	340/451 (75%)	318 (94%)	22 (6%)	0	100	100
11	K	162/379 (43%)	155 (96%)	7 (4%)	0	100	100
12	L	154/157 (98%)	150 (97%)	4 (3%)	0	100	100
13	M	253/339 (75%)	238 (94%)	15 (6%)	0	100	100
14	N	234/364 (64%)	223 (95%)	11 (5%)	0	100	100
15	O	314/590 (53%)	293 (93%)	20 (6%)	1 (0%)	41	74
16	P	67/175 (38%)	64 (96%)	3 (4%)	0	100	100
17	R	69/135 (51%)	66 (96%)	3 (4%)	0	100	100
18	S	436/687 (64%)	427 (98%)	9 (2%)	0	100	100
19	T	516/859 (60%)	509 (99%)	6 (1%)	1 (0%)	47	78
20	V	630/1145 (55%)	549 (87%)	59 (9%)	22 (4%)	3	30
21	W	143/238 (60%)	122 (85%)	18 (13%)	3 (2%)	7	38
23	Y	85/111 (77%)	79 (93%)	6 (7%)	0	100	100
24	a	167/251 (66%)	148 (89%)	19 (11%)	0	100	100
25	b	76/196 (39%)	68 (90%)	8 (10%)	0	100	100
25	k	66/196 (34%)	59 (89%)	7 (11%)	0	100	100
26	c	186/382 (49%)	157 (84%)	29 (16%)	0	100	100
27	d	80/101 (79%)	74 (92%)	6 (8%)	0	100	100
27	n	80/101 (79%)	76 (95%)	4 (5%)	0	100	100
28	e	71/94 (76%)	66 (93%)	5 (7%)	0	100	100
28	p	73/94 (78%)	70 (96%)	3 (4%)	0	100	100
29	f	70/86 (81%)	57 (81%)	13 (19%)	0	100	100
29	q	71/86 (83%)	68 (96%)	3 (4%)	0	100	100
30	g	65/77 (84%)	61 (94%)	4 (6%)	0	100	100
30	r	73/77 (95%)	62 (85%)	11 (15%)	0	100	100
31	h	78/146 (53%)	70 (90%)	8 (10%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
31	l	81/146 (56%)	74 (91%)	2 (2%)	5 (6%)	1 18
32	j	92/110 (84%)	86 (94%)	6 (6%)	0	100 100
32	m	90/110 (82%)	86 (96%)	4 (4%)	0	100 100
33	o	312/455 (69%)	274 (88%)	38 (12%)	0	100 100
34	s	106/175 (61%)	92 (87%)	8 (8%)	6 (6%)	1 19
35	t	113/503 (22%)	108 (96%)	5 (4%)	0	100 100
35	u	112/503 (22%)	104 (93%)	8 (7%)	0	100 100
35	v	114/503 (23%)	108 (95%)	3 (3%)	3 (3%)	5 34
35	w	110/503 (22%)	105 (96%)	3 (3%)	2 (2%)	8 41
36	y	82/215 (38%)	82 (100%)	0	0	100 100
All	All	9070/15016 (60%)	8455 (93%)	572 (6%)	43 (0%)	32 66

All (43) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
20	V	507	GLU
20	V	729	PRO
20	V	747	PRO
20	V	773	VAL
20	V	774	ASP
20	V	862	ASP
20	V	1060	TYR
21	W	52	LYS
21	W	85	ASN
31	l	49	GLN
31	l	50	PRO
31	l	61	ALA
34	s	94	LYS
34	s	111	VAL
34	s	133	PRO
20	V	528	TYR
20	V	1061	GLY
20	V	1076	SER
20	V	1082	GLN
34	s	105	PRO
34	s	136	VAL
35	v	109	LEU
20	V	639	ASN

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Mol	Chain	Res	Type
20	V	1016	SER
31	l	69	GLY
35	v	20	ARG
20	V	673	ASP
20	V	758	ASN
20	V	973	ALA
34	s	119	SER
35	w	20	ARG
15	O	569	GLU
20	V	1040	VAL
35	w	17	PRO
20	V	1055	PRO
31	l	62	MET
20	V	651	PRO
21	W	53	PRO
20	V	592	PRO
19	T	37	ILE
35	v	36	GLY
20	V	814	PRO
20	V	1047	GLY

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
4	A	1768/2182 (81%)	1746 (99%)	22 (1%)	71 84
5	C	783/910 (86%)	778 (99%)	5 (1%)	86 93
6	D	26/256 (10%)	26 (100%)	0	100 100
8	H	183/538 (34%)	183 (100%)	0	100 100
10	J	299/398 (75%)	298 (100%)	1 (0%)	92 96
11	K	152/328 (46%)	152 (100%)	0	100 100
12	L	140/141 (99%)	138 (99%)	2 (1%)	67 82
13	M	219/296 (74%)	219 (100%)	0	100 100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
14	N	221/332 (67%)	220 (100%)	1 (0%)	88 94
15	O	205/526 (39%)	204 (100%)	1 (0%)	88 94
16	P	60/152 (40%)	60 (100%)	0	100 100
17	R	22/121 (18%)	22 (100%)	0	100 100
18	S	216/633 (34%)	213 (99%)	3 (1%)	67 82
20	V	562/1029 (55%)	501 (89%)	61 (11%)	6 29
21	W	142/219 (65%)	140 (99%)	2 (1%)	67 82
23	Y	78/100 (78%)	77 (99%)	1 (1%)	69 83
24	a	151/225 (67%)	148 (98%)	3 (2%)	55 74
25	b	70/176 (40%)	70 (100%)	0	100 100
25	k	64/176 (36%)	64 (100%)	0	100 100
26	c	184/346 (53%)	178 (97%)	6 (3%)	38 64
27	d	69/89 (78%)	69 (100%)	0	100 100
27	n	71/89 (80%)	71 (100%)	0	100 100
28	e	65/83 (78%)	65 (100%)	0	100 100
28	p	69/83 (83%)	69 (100%)	0	100 100
29	f	63/77 (82%)	63 (100%)	0	100 100
29	q	65/77 (84%)	65 (100%)	0	100 100
30	g	58/66 (88%)	55 (95%)	3 (5%)	23 55
30	r	64/66 (97%)	64 (100%)	0	100 100
31	h	77/129 (60%)	77 (100%)	0	100 100
31	l	78/129 (60%)	76 (97%)	2 (3%)	46 69
32	j	79/103 (77%)	78 (99%)	1 (1%)	69 83
32	m	85/103 (82%)	85 (100%)	0	100 100
33	o	291/413 (70%)	289 (99%)	2 (1%)	84 91
36	y	81/193 (42%)	81 (100%)	0	100 100
All	All	6760/10784 (63%)	6644 (98%)	116 (2%)	62 79

All (116) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	A	326	ASN
4	A	368	ASN

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Mol	Chain	Res	Type
4	A	487	ASN
4	A	543	ASN
4	A	649	LEU
4	A	716	ARG
4	A	749	ARG
4	A	766	ILE
4	A	775	ARG
4	A	796	ASN
4	A	814	ARG
4	A	940	ILE
4	A	1095	MET
4	A	1140	ASN
4	A	1212	ARG
4	A	1292	ARG
4	A	1590	LEU
4	A	1739	ARG
4	A	1763	ASN
4	A	1849	LYS
4	A	1864	LYS
4	A	1926	LYS
5	C	119	ASN
5	C	175	LEU
5	C	208	ARG
5	C	268	ASN
5	C	884	ARG
10	J	162	THR
12	L	8	ARG
12	L	46	ASN
14	N	34	CYS
15	O	131	ASN
18	S	123	ASN
18	S	186	ARG
18	S	210	ASN
20	V	483	LEU
20	V	485	VAL
20	V	486	TYR
20	V	489	ARG
20	V	493	ILE
20	V	497	ARG
20	V	508	THR
20	V	516	ILE
20	V	527	ASN

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Mol	Chain	Res	Type
20	V	538	ARG
20	V	544	VAL
20	V	556	VAL
20	V	559	ASP
20	V	573	ASP
20	V	574	THR
20	V	580	THR
20	V	587	GLU
20	V	599	VAL
20	V	616	PHE
20	V	628	GLU
20	V	639	ASN
20	V	649	ASN
20	V	654	ASN
20	V	662	VAL
20	V	680	ASP
20	V	699	THR
20	V	708	CYS
20	V	711	LEU
20	V	713	ASP
20	V	727	ILE
20	V	730	VAL
20	V	737	GLU
20	V	747	PRO
20	V	748	LYS
20	V	752	LYS
20	V	762	THR
20	V	822	THR
20	V	828	ASN
20	V	845	HIS
20	V	847	ILE
20	V	871	LEU
20	V	897	GLU
20	V	904	ASP
20	V	912	LEU
20	V	931	SER
20	V	935	VAL
20	V	949	LYS
20	V	970	TRP
20	V	977	GLU
20	V	979	TYR
20	V	982	THR

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Mol	Chain	Res	Type
20	V	992	ARG
20	V	1004	PHE
20	V	1010	LYS
20	V	1040	VAL
20	V	1059	LEU
20	V	1081	SER
20	V	1082	GLN
20	V	1087	GLU
20	V	1099	TYR
20	V	1103	ASP
21	W	33	ASP
21	W	105	ASN
23	Y	109	LYS
24	a	190	ASN
24	a	215	ARG
24	a	221	MET
26	c	30	ASN
26	c	89	ASN
26	c	90	ASN
26	c	249	ARG
26	c	328	VAL
26	c	332	ASN
30	g	18	ASN
30	g	20	ASN
30	g	66	ASN
32	j	49	ARG
31	l	45	LEU
31	l	95	ILE
33	o	315	LYS
33	o	325	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (118) such sidechains are listed below:

Mol	Chain	Res	Type
4	A	178	ASN
4	A	203	ASN
4	A	254	HIS
4	A	326	ASN
4	A	343	ASN
4	A	368	ASN
4	A	487	ASN
4	A	497	GLN

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Mol	Chain	Res	Type
4	A	509	HIS
4	A	542	HIS
4	A	543	ASN
4	A	553	ASN
4	A	558	GLN
4	A	559	GLN
4	A	598	ASN
4	A	617	ASN
4	A	654	HIS
4	A	659	HIS
4	A	776	GLN
4	A	796	ASN
4	A	848	ASN
4	A	976	GLN
4	A	1030	GLN
4	A	1140	ASN
4	A	1281	ASN
4	A	1376	ASN
4	A	1417	GLN
4	A	1548	GLN
4	A	1592	HIS
4	A	1635	HIS
4	A	1652	HIS
4	A	1687	HIS
4	A	1763	ASN
4	A	1863	HIS
4	A	1883	ASN
4	A	1895	HIS
4	A	1902	GLN
5	C	119	ASN
5	C	158	HIS
5	C	268	ASN
5	C	290	HIS
5	C	869	HIS
8	H	320	ASN
8	H	355	HIS
8	H	363	ASN
8	H	458	HIS
10	J	121	GLN
10	J	152	ASN
10	J	214	ASN
10	J	273	GLN

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Mol	Chain	Res	Type
10	J	280	GLN
11	K	103	ASN
12	L	34	GLN
12	L	46	ASN
12	L	54	GLN
12	L	56	HIS
12	L	110	GLN
12	L	112	ASN
12	L	116	ASN
12	L	147	HIS
13	M	35	ASN
13	M	44	ASN
13	M	58	HIS
13	M	134	ASN
13	M	189	GLN
13	M	201	ASN
14	N	45	HIS
14	N	53	ASN
14	N	72	GLN
14	N	134	ASN
15	O	214	ASN
16	P	34	HIS
16	P	158	ASN
18	S	78	GLN
18	S	117	HIS
18	S	120	ASN
18	S	123	ASN
18	S	170	ASN
18	S	210	ASN
18	S	212	HIS
20	V	841	GLN
20	V	883	GLN
20	V	989	HIS
21	W	35	GLN
21	W	55	HIS
21	W	105	ASN
21	W	157	GLN
24	a	177	ASN
26	c	30	ASN
26	c	89	ASN
26	c	90	ASN
26	c	300	ASN

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Mol	Chain	Res	Type
26	c	326	GLN
26	c	332	ASN
27	d	41	ASN
29	f	54	ASN
30	g	18	ASN
30	g	20	ASN
30	g	55	HIS
30	g	66	ASN
31	h	30	GLN
32	j	64	HIS
31	l	78	ASN
32	m	52	HIS
27	n	4	ASN
27	n	43	GLN
27	n	53	GLN
27	n	68	GLN
33	o	176	HIS
33	o	325	ASN
33	o	337	HIS
33	o	343	ASN
33	o	358	ASN
28	p	86	ASN
29	q	25	HIS
30	r	56	GLN
36	y	200	ASN
36	y	204	ASN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	2	128/1175 (10%)	44 (34%)	3 (2%)
2	5	169/179 (94%)	57 (33%)	6 (3%)
3	6	101/112 (90%)	26 (25%)	3 (2%)
7	E	32/39 (82%)	21 (65%)	4 (12%)
9	I	36/95 (37%)	10 (27%)	2 (5%)
All	All	466/1600 (29%)	158 (33%)	18 (3%)

All (158) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	2	5	A

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Mol	Chain	Res	Type
1	2	6	U
1	2	14	C
1	2	16	U
1	2	17	U
1	2	18	U
1	2	19	U
1	2	20	G
1	2	21	G
1	2	22	C
1	2	25	A
1	2	30	A
1	2	31	A
1	2	37	G
1	2	106	A
1	2	108	A
1	2	112	A
1	2	113	U
1	2	114	U
1	2	115	U
1	2	116	U
1	2	117	U
1	2	118	U
1	2	119	G
1	2	141	A
1	2	1094	G
1	2	1096	C
1	2	1098	C
1	2	1099	G
1	2	1100	A
1	2	1101	C
1	2	1102	C
1	2	1103	C
1	2	1104	U
1	2	1106	G
1	2	1107	C
1	2	1108	A
1	2	1139	G
1	2	1144	U
1	2	1145	U
1	2	1146	G
1	2	1149	G
1	2	1152	U

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Mol	Chain	Res	Type
1	2	1166	G
2	5	9	U
2	5	12	C
2	5	13	A
2	5	14	G
2	5	17	C
2	5	18	A
2	5	20	U
2	5	25	G
2	5	27	G
2	5	28	G
2	5	31	G
2	5	32	G
2	5	33	U
2	5	34	C
2	5	36	A
2	5	39	U
2	5	41	A
2	5	42	A
2	5	43	G
2	5	45	A
2	5	55	U
2	5	56	U
2	5	57	U
2	5	58	U
2	5	61	U
2	5	70	A
2	5	75	A
2	5	76	U
2	5	77	A
2	5	79	C
2	5	80	G
2	5	81	A
2	5	84	A
2	5	95	C
2	5	96	U
2	5	101	C
2	5	104	G
2	5	109	A
2	5	113	G
2	5	126	A
2	5	127	U

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Mol	Chain	Res	Type
2	5	131	A
2	5	135	G
2	5	138	A
2	5	139	A
2	5	141	G
2	5	142	C
2	5	148	G
2	5	151	A
2	5	160	U
2	5	161	U
2	5	168	U
2	5	170	U
2	5	171	U
2	5	173	U
2	5	174	G
2	5	175	G
3	6	12	A
3	6	15	C
3	6	31	G
3	6	35	A
3	6	36	U
3	6	37	U
3	6	49	A
3	6	51	A
3	6	52	G
3	6	54	U
3	6	55	G
3	6	60	G
3	6	62	A
3	6	68	C
3	6	74	U
3	6	79	A
3	6	80	U
3	6	83	A
3	6	85	C
3	6	86	G
3	6	87	U
3	6	90	U
3	6	91	A
3	6	92	C
3	6	93	A
3	6	99	A

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Mol	Chain	Res	Type
7	E	-13	G
7	E	-12	U
7	E	-11	G
7	E	-10	A
7	E	-9	U
7	E	-6	A
7	E	-1	G
7	E	1	A
7	E	2	G
7	E	3	A
7	E	4	U
7	E	5	C
7	E	6	C
7	E	7	A
7	E	8	C
7	E	9	C
7	E	10	U
7	E	11	A
7	E	12	C
7	E	13	U
7	E	16	A
9	I	2	U
9	I	9	A
9	I	10	A
9	I	12	G
9	I	15	A
9	I	67	C
9	I	70	A
9	I	71	C
9	I	92	C
9	I	93	U

All (18) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	2	15	C
1	2	18	U
1	2	1145	U
2	5	17	C
2	5	41	A
2	5	56	U
2	5	130	A

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Mol	Chain	Res	Type
2	5	150	U
2	5	174	G
3	6	36	U
3	6	82	A
3	6	92	C
7	E	-14	A
7	E	1	A
7	E	2	G
7	E	15	C
9	I	66	A
9	I	91	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 monosaccharides in this entry.

5.6 Ligand geometry

Of 10 ligands modelled in this entry, 8 are monoatomic - leaving 2 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
38	IHP	A	2500	-	36,36,36	0.70	0	54,60,60	0.52	0
39	GTP	C	2501	-	26,34,34	1.30	1 (3%)	32,54,54	1.67	8 (25%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
38	IHP	A	2500	-	-	5/30/54/54	0/1/1/1
39	GTP	C	2501	-	-	6/18/38/38	0/3/3/3

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
39	C	2501	GTP	C5-C6	-4.64	1.38	1.47

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
39	C	2501	GTP	PA-O3A-PB	-3.62	120.41	132.83
39	C	2501	GTP	PB-O3B-PG	-3.48	120.90	132.83
39	C	2501	GTP	C5-C6-N1	3.40	119.95	113.95
39	C	2501	GTP	C8-N7-C5	2.90	108.51	102.99
39	C	2501	GTP	C2-N1-C6	-2.87	119.80	125.10
39	C	2501	GTP	C3'-C2'-C1'	2.76	105.13	100.98
39	C	2501	GTP	O3G-PG-O3B	2.54	113.16	104.64
39	C	2501	GTP	O6-C6-C5	-2.47	119.55	124.37

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
38	A	2500	IHP	C2-O12-P2-O22
39	C	2501	GTP	C5'-O5'-PA-O1A
39	C	2501	GTP	C5'-O5'-PA-O2A
38	A	2500	IHP	C1-O11-P1-O31
39	C	2501	GTP	PB-O3A-PA-O1A
39	C	2501	GTP	PB-O3A-PA-O2A
38	A	2500	IHP	C3-O13-P3-O23
38	A	2500	IHP	C1-O11-P1-O41
38	A	2500	IHP	C3-O13-P3-O33
39	C	2501	GTP	C5'-O5'-PA-O3A
39	C	2501	GTP	O4'-C4'-C5'-O5'

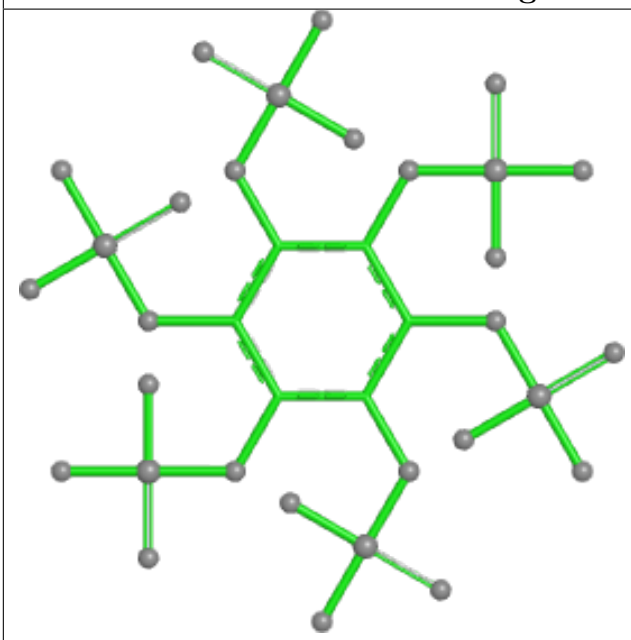
There are no ring outliers.

No monomer is involved in short contacts.

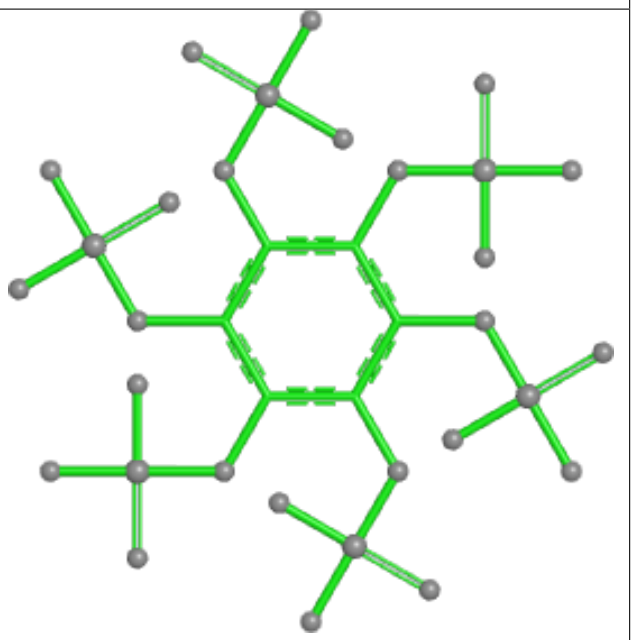
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will

also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

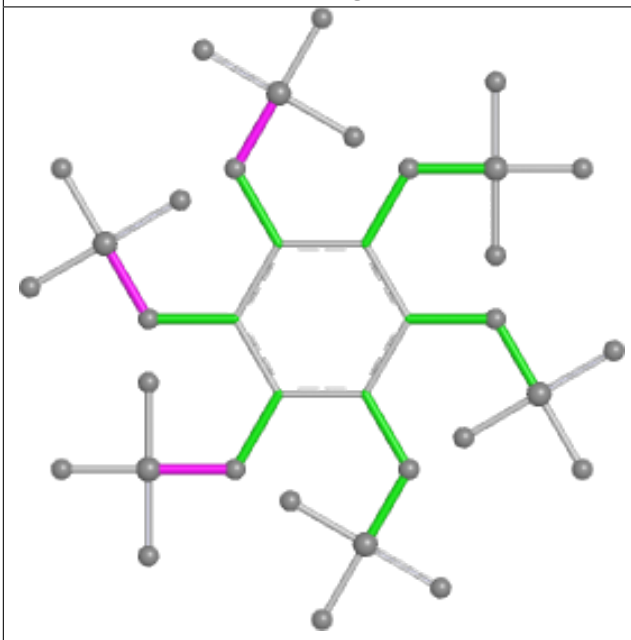
Ligand IHP A 2500



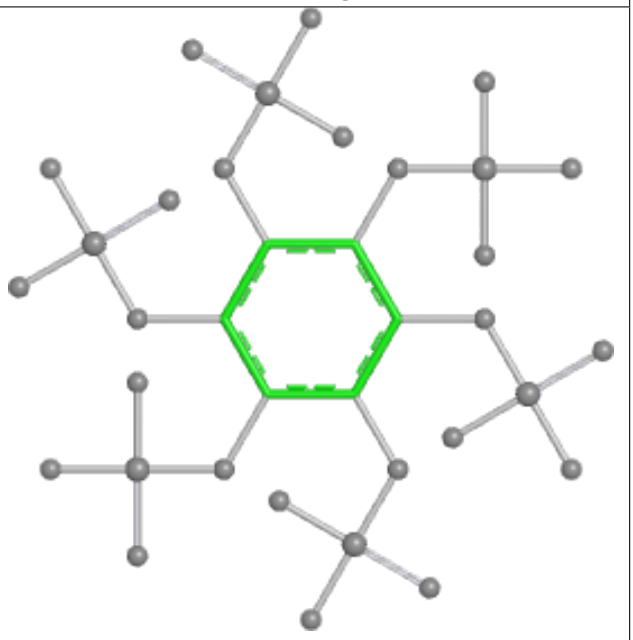
Bond lengths



Bond angles

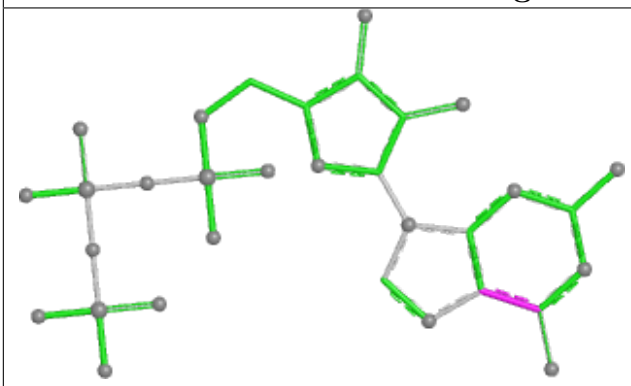


Torsions

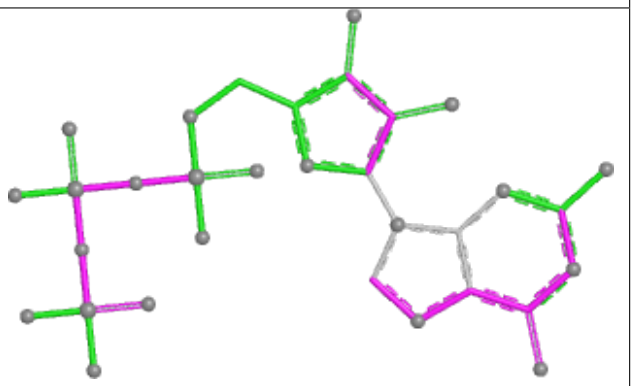


Rings

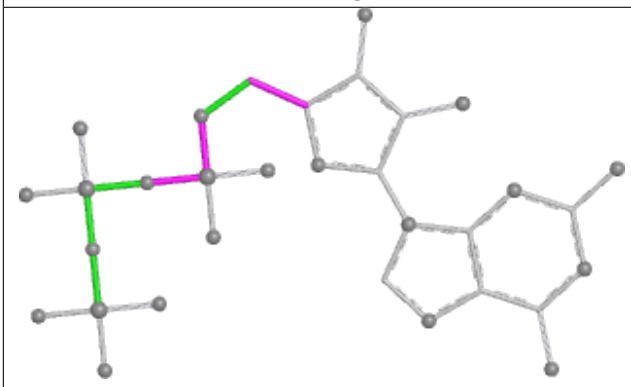
Ligand GTP C 2501



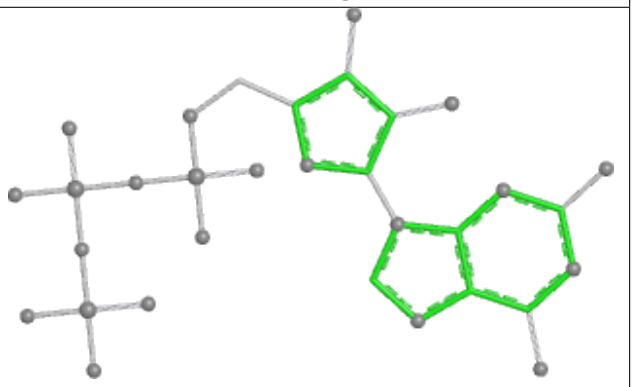
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

The following chains have linkage breaks:

Mol	Chain	Number of breaks
22	X	5

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	X	70:UNK	C	100:UNK	N	122.60
1	X	156:UNK	C	200:UNK	N	74.32
1	X	28:UNK	C	60:UNK	N	43.20
1	X	117:UNK	C	130:UNK	N	9.37
1	X	142:UNK	C	150:UNK	N	9.29

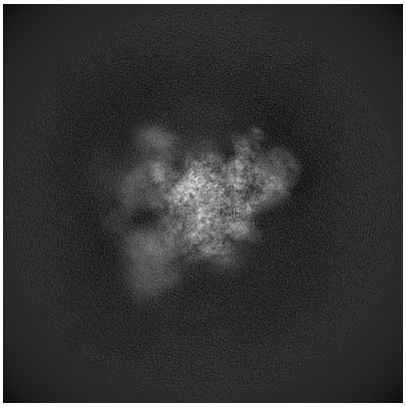
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-3979. These allow visual inspection of the internal detail of the map and identification of artifacts.

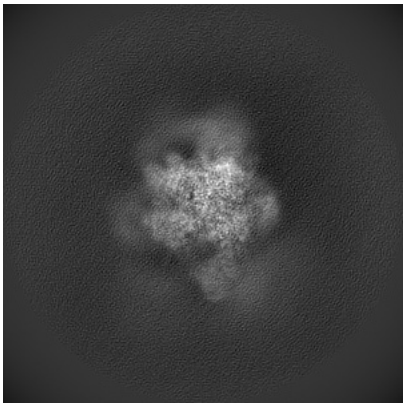
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

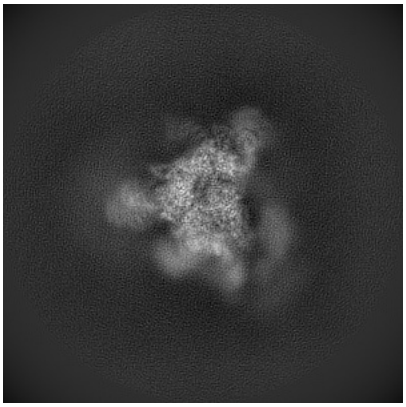
6.1.1 Primary map



X



Y

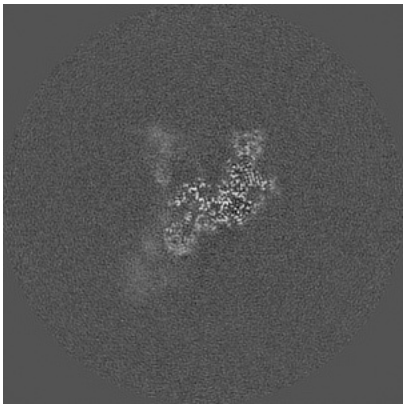


Z

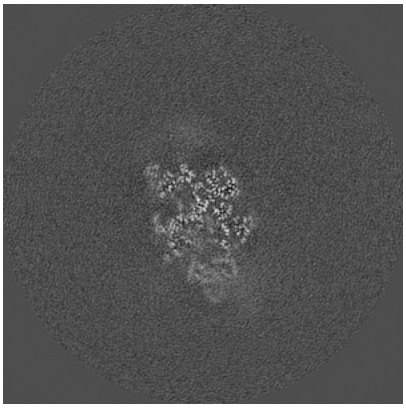
The images above show the map projected in three orthogonal directions.

6.2 Central slices

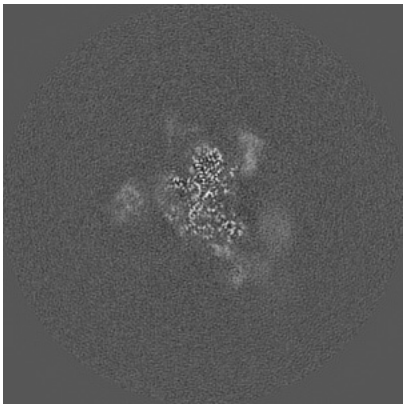
6.2.1 Primary map



X Index: 240



Y Index: 240

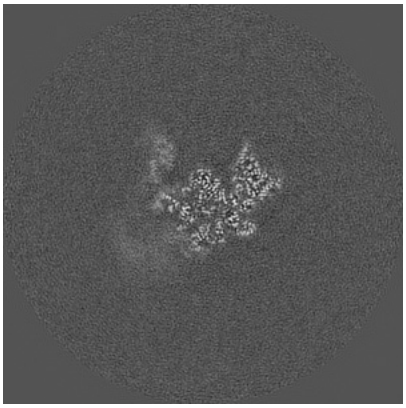


Z Index: 240

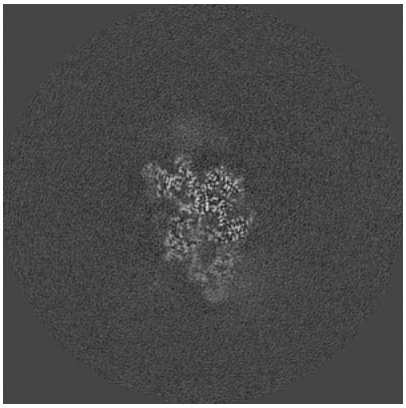
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

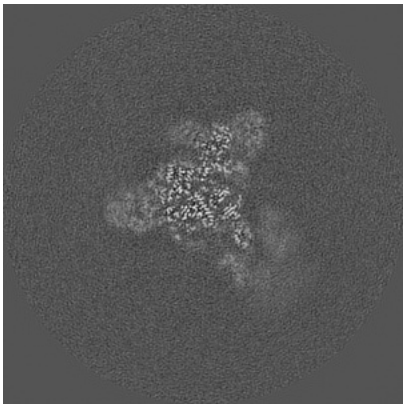
6.3.1 Primary map



X Index: 259



Y Index: 236



Z Index: 261

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

6.4 Orthogonal surface views (i)

6.4.1 Primary map

X

Y

Z

The images above show the 3D surface view of the map at the recommended contour level 0.04. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

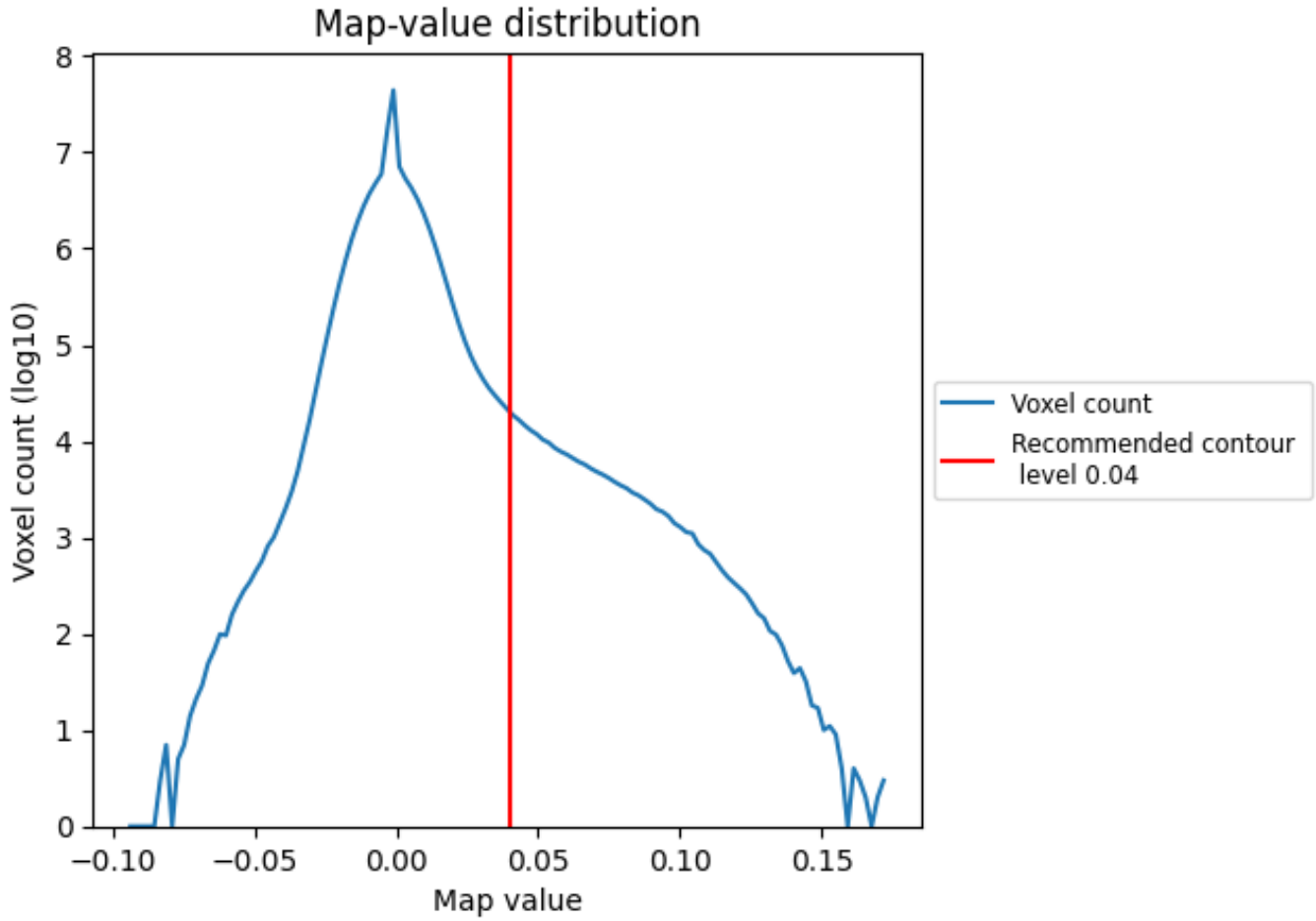
6.5 Mask visualisation (i)

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

7 Map analysis

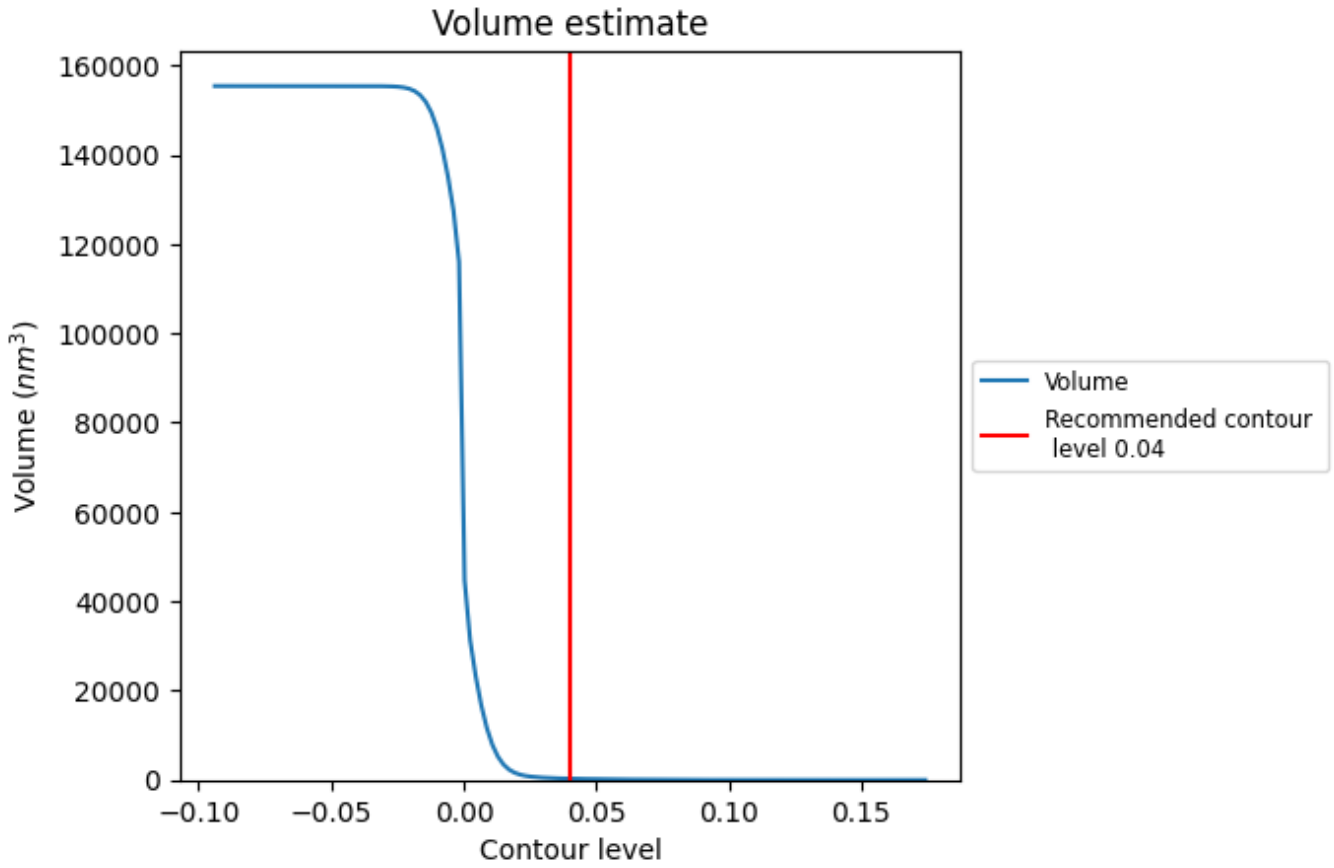
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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.

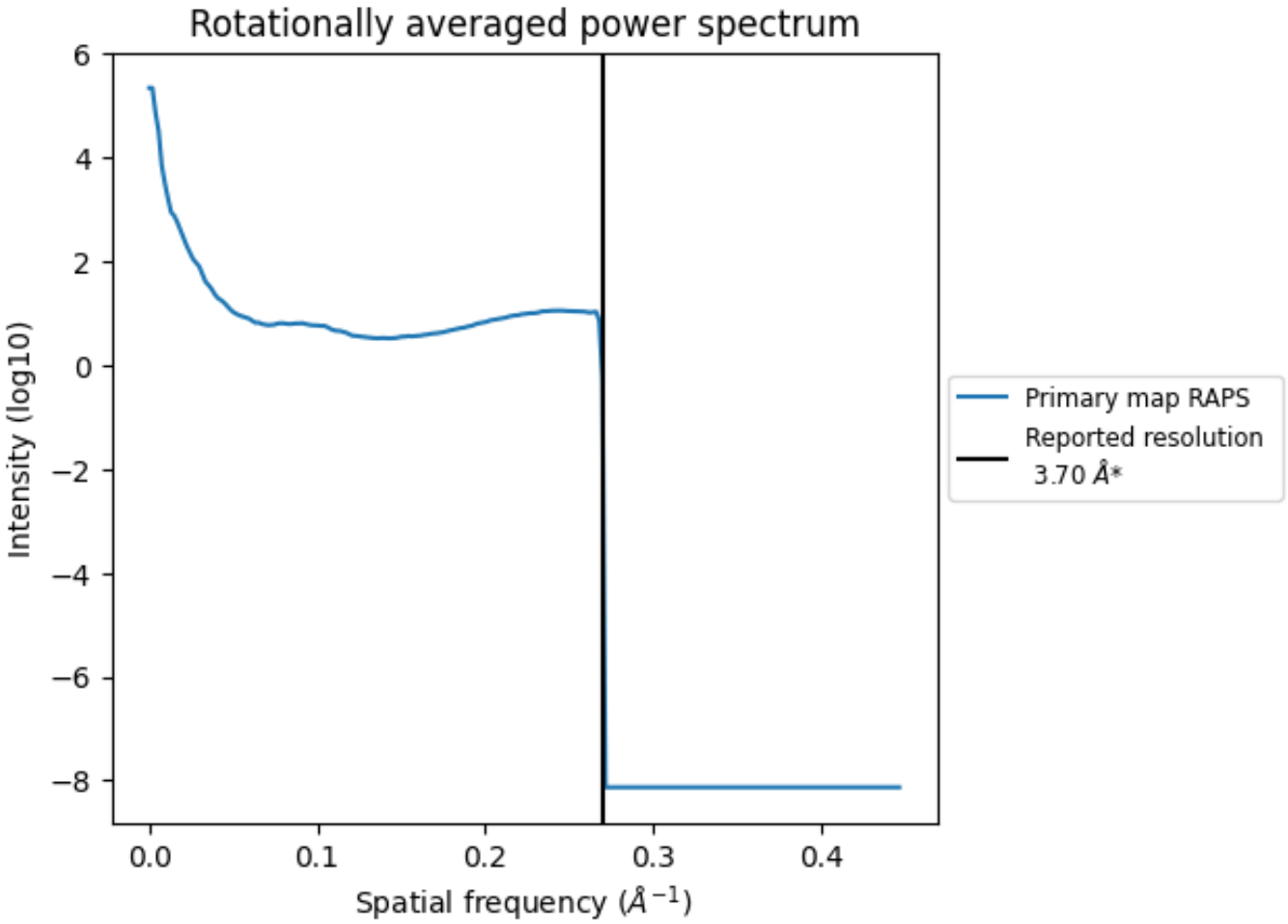
7.2 Volume estimate



The volume at the recommended contour level is 287 nm^3; this corresponds to an approximate mass of 259 kDa.

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

7.3 Rotationally averaged power spectrum (i)

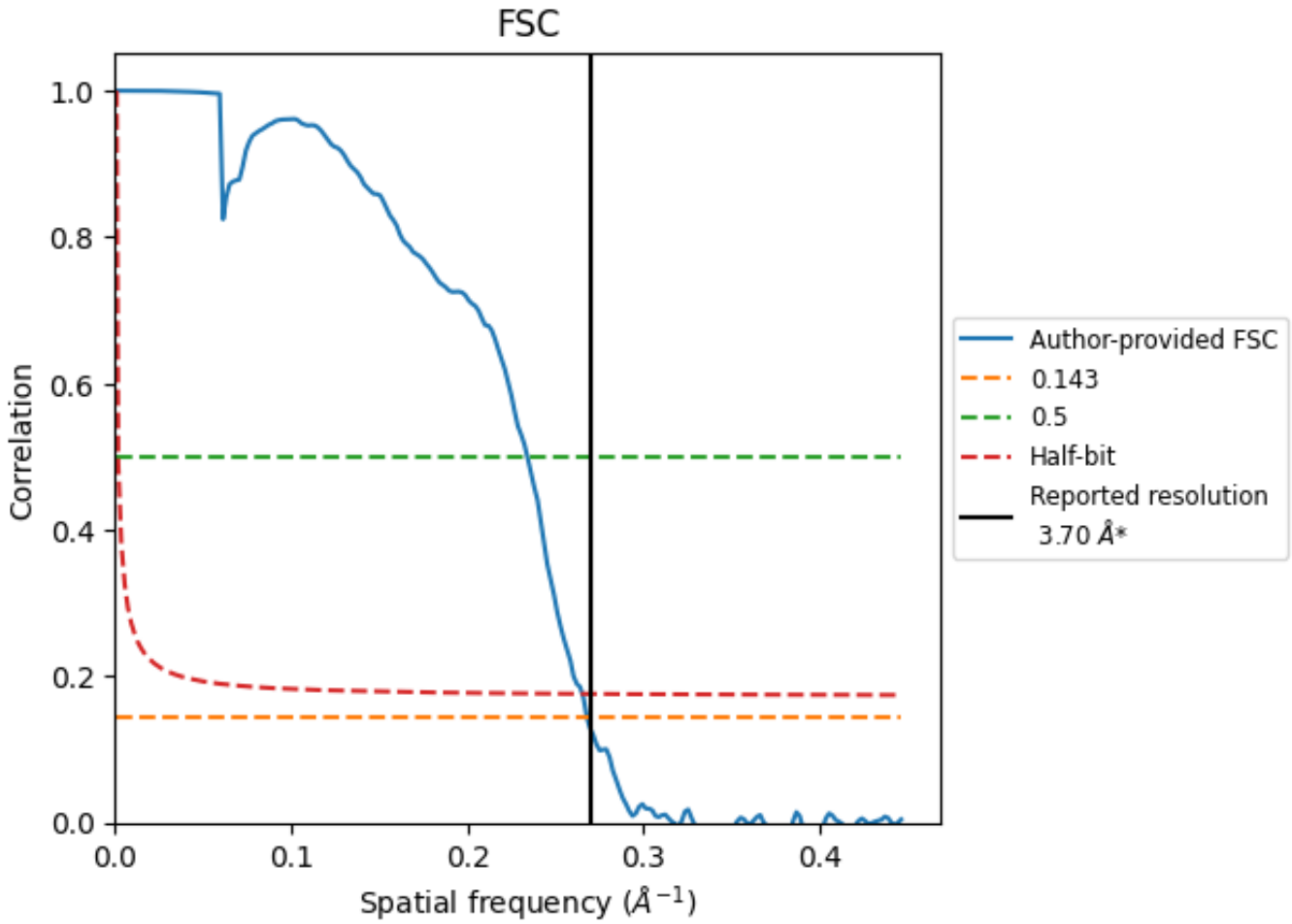


*Reported resolution corresponds to spatial frequency of 0.270 Å^{-1}

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 0.270 Å^{-1}

8.2 Resolution estimates (i)

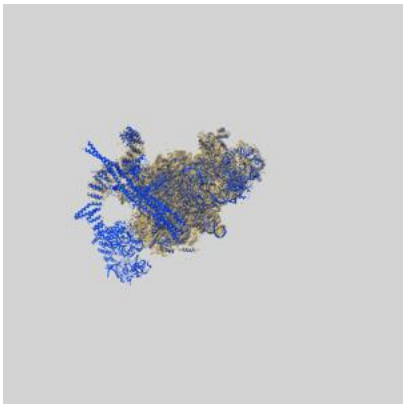
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.70	-	-
Author-provided FSC curve	3.73	4.27	3.77
Unmasked-calculated*	-	-	-

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

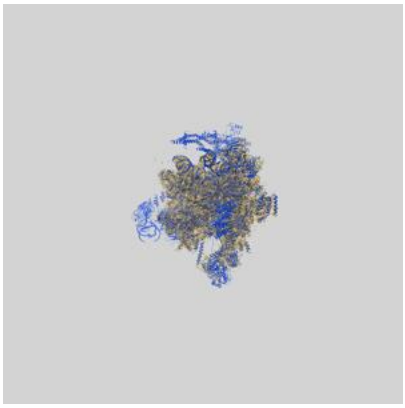
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-3979 and PDB model 6EXN. Per-residue inclusion information can be found in section 3 on page 14.

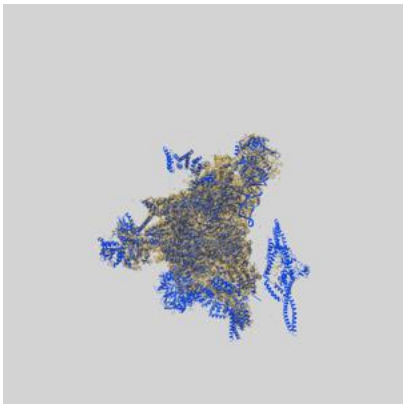
9.1 Map-model overlay



X



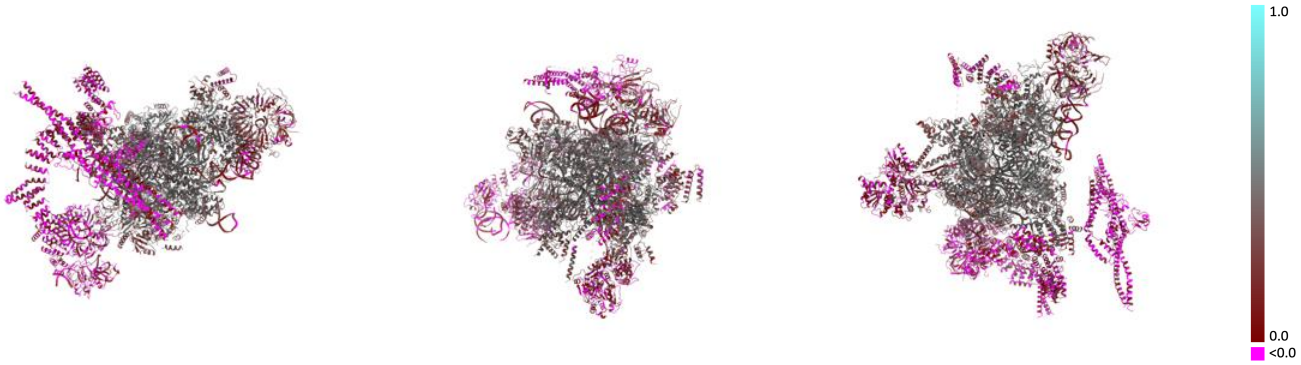
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.04 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

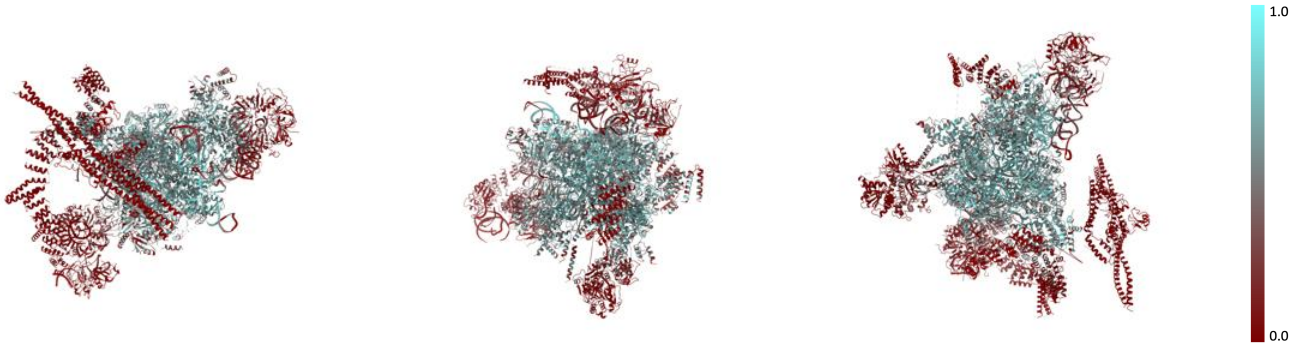
9.2 Q-score mapped to coordinate model (i)



X Y Z

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.

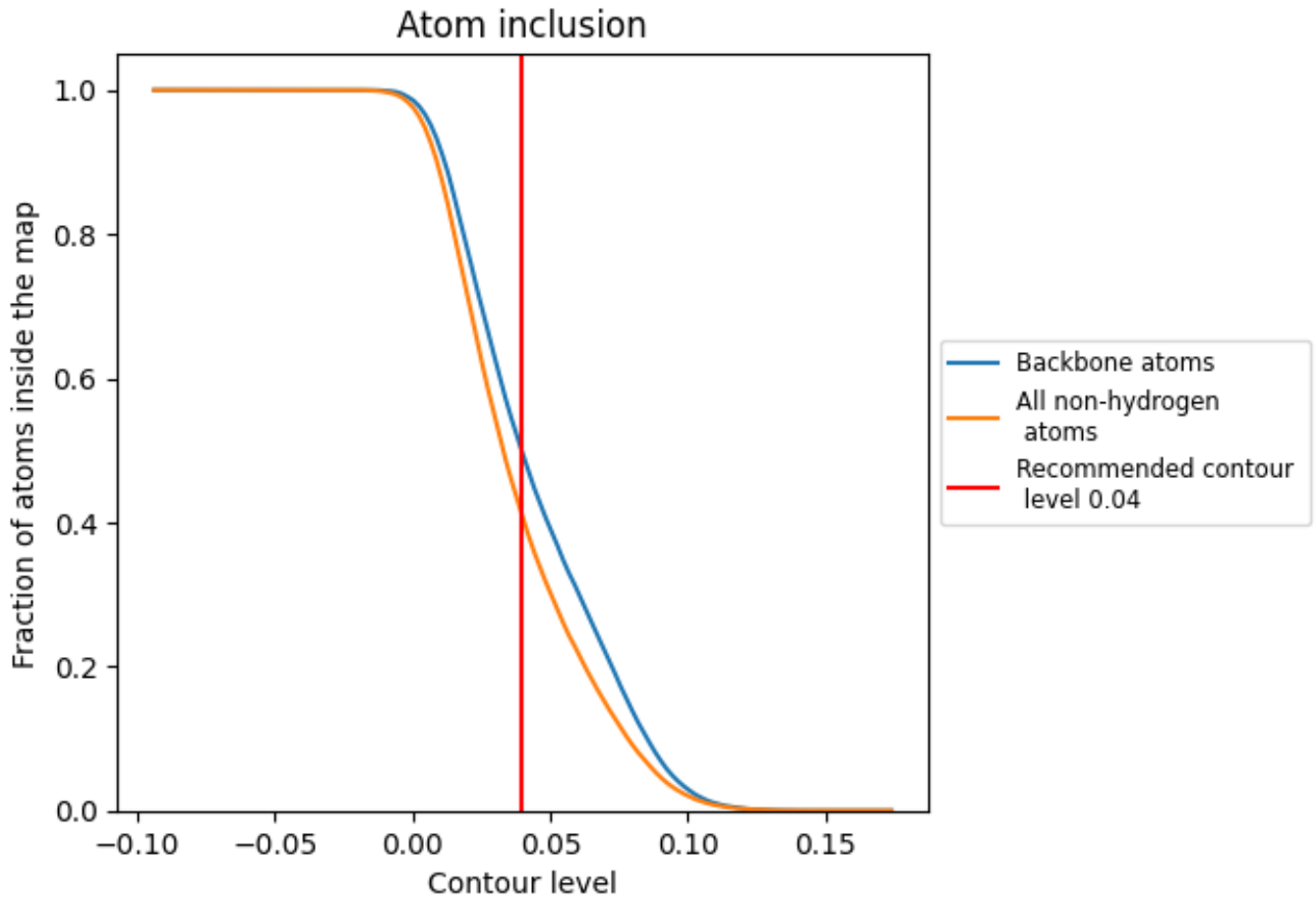
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

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 (0.04).

9.4 Atom inclusion (i)



At the recommended contour level, 50% of all backbone atoms, 41% 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 (0.04) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.4081	0.2960
2	0.1911	0.1300
5	0.4608	0.2840
6	0.6909	0.3820
A	0.6212	0.4310
C	0.5846	0.4150
D	0.4385	0.3080
E	0.4488	0.3090
H	0.3724	0.2960
I	0.5634	0.3590
J	0.6444	0.4540
K	0.5550	0.4100
L	0.6336	0.4270
M	0.5747	0.3970
N	0.4619	0.3610
O	0.4483	0.3180
P	0.5835	0.4480
R	0.4381	0.2970
S	0.4409	0.2850
T	0.1184	0.0880
V	0.1128	0.1090
W	0.0000	0.0040
X	0.3705	0.2460
Y	0.0000	0.0310
a	0.4736	0.3540
b	0.2658	0.3200
c	0.4590	0.3660
d	0.3301	0.3480
e	0.1084	0.2290
f	0.0979	0.2000
g	0.1459	0.2540
h	0.1667	0.2620
j	0.1050	0.1980
k	0.0018	0.0530
l	0.0000	-0.0180

Continued on next page...

Continued from previous page...

Chain	Atom inclusion	Q-score
m	0.0000	0.0040
n	0.0032	0.0520
o	0.4441	0.3500
p	0.0000	-0.0040
q	0.0017	0.0330
r	0.0000	0.0440
s	0.0073	0.0320
t	0.0000	-0.0120
u	0.0000	0.0350
v	0.0000	-0.0400
w	0.0018	0.0170
y	0.5368	0.3950