wwPDB EM Validation Summary Report (i)

Aug 8, 2026 – 12:44 PM JST

PDB ID	:	9XTT / pdb_00009xtt
EMDB ID	:	EMD-67250
Title	:	Human minor spliceosome branching-completed C complex (after step-I)
Authors	:	Bai, R.; Wan, R.
Deposited on	:	2025-11-23
Resolution	:	2.92 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the (i) 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 (i)) were used in the production of this report:

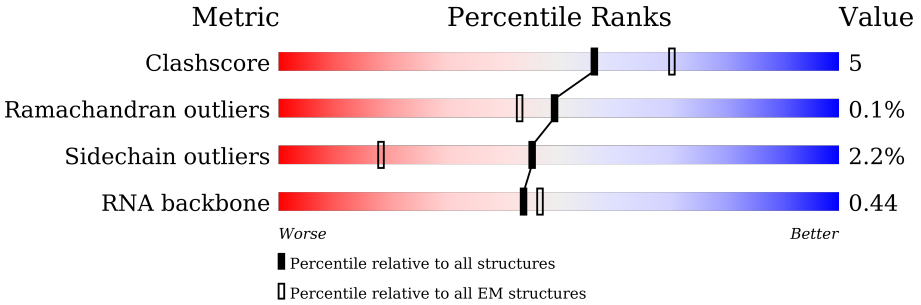
EMDB validation analysis	:	0.0.1.dev133
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.50

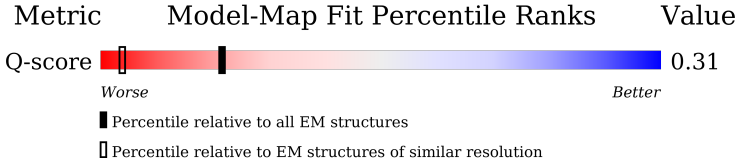
1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.92 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)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
RNA backbone	8273	3508	-
Q-score	-	25397	13007 (2.42 - 3.42)

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	57	25% 16% • 56%
2	1	277	9% • • • 83%
3	2	150	15% 11% • 72%

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Mol	Chain	Length	Quality of chain
4	4	646	43% 52% 11% 37%
5	5	117	12% 52% 38% 7%
6	6	125	33% 15% 51%
7	A	2335	8% 86% 11%
8	B	972	80% 13% 7%
9	C	2136	82% 74% 16% 10%
10	D	357	23% 73% 10% 16%
11	E	802	40% 64% 32%
12	F	855	41% 74% 7% 18%
13	G	848	33% 64% 31%
14	H	166	23% 27% 73%
15	I	285	18% 53% 7% 40%
16	J	536	34% 61%
17	K	514	14% 71% 7% 21%
18	L	367	33% 62%
19	M	198	7% 73% 14% 13%
20	N	229	5% 40% 5% 55%
21	O	166	88% 80% 16%
22	P	301	6% 24% 76%
23	Q	1485	75% 89% 11%
24	R	425	21% 76%
25	S	586	5% 93%
26	T	1227	12% 52% 11% 37%
27	U	2752	5% 95%
28	V	908	44% 7% 49%

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Mol	Chain	Length	Quality of chain
29	X	258	26% 71% 10% 17%
30	X1	20	100% 100%
31	X2	18	83% 100%
32	X3	21	76% 100%
33	Y	345	8% 51% 9% 40%
34	Z	654	44% 8% 48%
35	a	240	6% 21% 9% 70%
35	h	240	27% 29% 70%
36	b	119	14% 49% 19% 31%
36	i	119	63% 66% 32%
37	c	118	40% 58% 25% 17%
37	j	118	78% 83% 17%
38	d	126	6% 49% 17% 33%
38	k	126	56% 63% 36%
39	e	92	52% 61% 23% 16%
39	l	92	72% 84% 16%
40	f	86	51% 55% 30% 15%
40	m	86	76% 85% 15%
41	g	76	29% 71% 24%
41	n	76	86% 97%
42	q	504	26% 27% 73%
42	r	504	26% 26% 73%
42	s	504	27% 27% 73%
42	t	504	27% 27% 73%
43	u	225	100% 100%

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Mol	Chain	Length	Quality of chain
44	v	411	14% 74% 20% • 5%
45	w	146	46% 72% 27% •
46	x	174	29% 39% 12% • 48%
47	z	263	• 27% • 70%

2 Entry composition (i)

There are 54 unique types of molecules in this entry. The entry contains 117342 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 MSE-U12_exon.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	0	25	533	238	98	172	25	0	0

- Molecule 2 is a RNA chain called MSE-U12_Intron.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	1	46	957	430	149	332	46	0	0

- Molecule 3 is a RNA chain called U12 snRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
3	2	42	898	403	163	290	42	0	0

- Molecule 4 is a protein called Peptidylprolyl isomerase domain and WD repeat-containing protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	4	407	3283	2095	559	606	23	0	0

- Molecule 5 is a RNA chain called U5 snRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
5	5	109	2296	1028	383	776	109	0	0

- Molecule 6 is a RNA chain called U6atac snRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
6	6	61	1327	588	247	429	63	0	0

- Molecule 7 is a protein called Pre-mRNA-processing-splicing factor 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	A	2261	18751	12074	3268	3327	82	0	0

- Molecule 8 is a protein called 116 kDa U5 small nuclear ribonucleoprotein component.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	B	900	7122	4556	1185	1347	34	0	0

- Molecule 9 is a protein called U5 small nuclear ribonucleoprotein 200 kDa helicase.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	C	1923	15118	9637	2604	2804	73	0	0

- Molecule 10 is a protein called U5 small nuclear ribonucleoprotein 40 kDa protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	D	299	2337	1469	410	445	13	0	0

- Molecule 11 is a protein called Cell division cycle 5-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	E	545	3485	2136	671	671	7	0	0

- Molecule 12 is a protein called Pre-mRNA-splicing factor SYF1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	F	700	4580	2852	844	870	14	0	0

- Molecule 13 is a protein called Crooked neck-like protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	G	582	3969	2484	739	740	6	0	0

- Molecule 14 is a protein called Coiled-coil domain-containing protein 12.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
14	H	44	219	131	44	44	0	0

- Molecule 15 is a protein called Pre-mRNA-splicing factor ISY1 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	I	170	1226	763	236	225	2	0	0

- Molecule 16 is a protein called SNW domain-containing protein 1.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	N	O	P	S		
16	J	207	1648	1041	289	307	1	10	0	0

- Molecule 17 is a protein called Pleiotropic regulator 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	K	406	3014	1897	550	558	9	0	0

- Molecule 18 is a protein called RNA-binding protein 48.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	L	141	1139	727	197	210	5	0	0

- Molecule 19 is a protein called Armadillo repeat-containing protein 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	M	173	1249	787	214	243	5	0	0

- Molecule 20 is a protein called Spliceosome-associated protein CWC15 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	N	102	866	529	171	164	2	0	0

- Molecule 21 is a protein called Peptidyl-prolyl cis-trans isomerase-like 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	O	159	1236	787	215	227	7	0	0

- Molecule 22 is a protein called Peptidyl-prolyl cis-trans isomerase E.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
22	P	72	288	144	72	72	0	0

- Molecule 23 is a protein called RNA helicase aquarius.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
23	Q	1327	6579	3925	1327	1327	0	0

- Molecule 24 is a protein called Pre-mRNA-splicing factor CWC25 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
24	R	103	852	530	159	160	3	0	0

- Molecule 25 is a protein called Pre-mRNA-splicing factor SLU7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
25	S	41	319	196	63	56	4	0	0

- Molecule 26 is a protein called Pre-mRNA-splicing factor ATP-dependent RNA helicase PRP16.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
26	T	779	6173	3888	1075	1169	41	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
T	561	ALA	LYS	engineered mutation	UNP Q92620

- Molecule 27 is a protein called Serine/arginine repetitive matrix protein 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
27	U	139	909	551	181	176	1	0	0

- Molecule 28 is a protein called Pre-mRNA-splicing factor CWC22 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
28	V	464	3768	2415	642	689	22	0	0

- Molecule 29 is a protein called Protein FRG1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
29	X	213	1660	1041	291	320	8	0	0

- Molecule 30 is a protein called Unknown polymer.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
30	X1	20	100	60	20	20	0	0

- Molecule 31 is a protein called Unknown polymer.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
31	X2	18	90	54	18	18	0	0

- Molecule 32 is a protein called Unknown polymer.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
32	X3	21	105	63	21	21	0	0

- Molecule 33 is a protein called Splicing factor YJU2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	Y	207	1653	1032	301	310	10	0	0

There are 22 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
Y	324	GLN	-	insertion	UNP Q9BW85
Y	325	ARG	-	insertion	UNP Q9BW85
Y	326	GLN	-	insertion	UNP Q9BW85
Y	327	ALA	-	insertion	UNP Q9BW85
Y	328	HIS	-	insertion	UNP Q9BW85
Y	329	ALA	-	insertion	UNP Q9BW85
Y	330	ASP	-	insertion	UNP Q9BW85
Y	331	PHE	-	insertion	UNP Q9BW85
Y	332	GLU	-	insertion	UNP Q9BW85
Y	333	ALA	-	insertion	UNP Q9BW85
Y	334	MET	-	insertion	UNP Q9BW85
Y	335	LEU	-	insertion	UNP Q9BW85
Y	336	ARG	-	insertion	UNP Q9BW85
Y	337	GLN	-	insertion	UNP Q9BW85
Y	338	HIS	-	insertion	UNP Q9BW85
Y	339	ARG	-	insertion	UNP Q9BW85
Y	340	LEU	-	insertion	UNP Q9BW85
Y	341	SER	-	insertion	UNP Q9BW85
Y	342	GLU	-	insertion	UNP Q9BW85
Y	343	GLU	-	insertion	UNP Q9BW85
Y	344	GLU	-	insertion	UNP Q9BW85
Y	345	ARG	-	insertion	UNP Q9BW85

- Molecule 34 is a protein called WD repeat-containing protein 70.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
34	Z	343	2681	1685	467	508	21	0	0

- Molecule 35 is a protein called Small nuclear ribonucleoprotein-associated proteins B and B'.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	a	73	591	376	105	103	7	0	0
			Total	C	N	O			
35	h	73	360	214	73	73		0	0

- Molecule 36 is a protein called Small nuclear ribonucleoprotein Sm D1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
36	b	82	649	413	113	119	4	0	0

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Mol	Chain	Residues	Atoms	AltConf	Trace
36	i	81	Total C N O 401 239 81 81	0	0

- Molecule 37 is a protein called Small nuclear ribonucleoprotein Sm D2.

Mol	Chain	Residues	Atoms	AltConf	Trace
37	c	98	Total C N O S 796 498 144 148 6	0	0
37	j	98	Total C N O 487 291 98 98	0	0

- Molecule 38 is a protein called Small nuclear ribonucleoprotein Sm D3.

Mol	Chain	Residues	Atoms	AltConf	Trace
38	d	85	Total C N O S 663 415 117 125 6	0	0
38	k	81	Total C N O 399 237 81 81	0	0

- Molecule 39 is a protein called Small nuclear ribonucleoprotein E.

Mol	Chain	Residues	Atoms	AltConf	Trace
39	e	77	Total C N O S 638 405 113 115 5	0	0
39	l	77	Total C N O 381 227 77 77	0	0

- Molecule 40 is a protein called Small nuclear ribonucleoprotein F.

Mol	Chain	Residues	Atoms	AltConf	Trace
40	f	73	Total C N O S 567 367 94 101 5	0	0
40	m	73	Total C N O 356 210 73 73	0	0

- Molecule 41 is a protein called Small nuclear ribonucleoprotein G.

Mol	Chain	Residues	Atoms	AltConf	Trace
41	g	74	Total C N O S 584 369 106 103 6	1	0
41	n	74	Total C N O 364 215 74 75	0	0

- Molecule 42 is a protein called Pre-mRNA-processing factor 19.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
42	q	137	684	410	137	137	0	0
42	r	135	674	404	135	135	0	0
42	s	138	689	413	138	138	0	0
42	t	136	679	407	136	136	0	0

- Molecule 43 is a protein called Pre-mRNA-splicing factor SPF27.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
43	u	225	1117	666	225	226	0	0

- Molecule 44 is a protein called Eukaryotic initiation factor 4A-III.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
44	v	390	3130	1976	546	589	19	0	0

- Molecule 45 is a protein called Protein mago nashi homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
45	w	144	1196	772	200	221	3	0	0

- Molecule 46 is a protein called RNA-binding protein 8A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
46	x	91	730	463	122	142	3	0	0

- Molecule 47 is a protein called Multiple myeloma tumor-associated protein 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
47	z	78	611	375	119	115	2	0	0

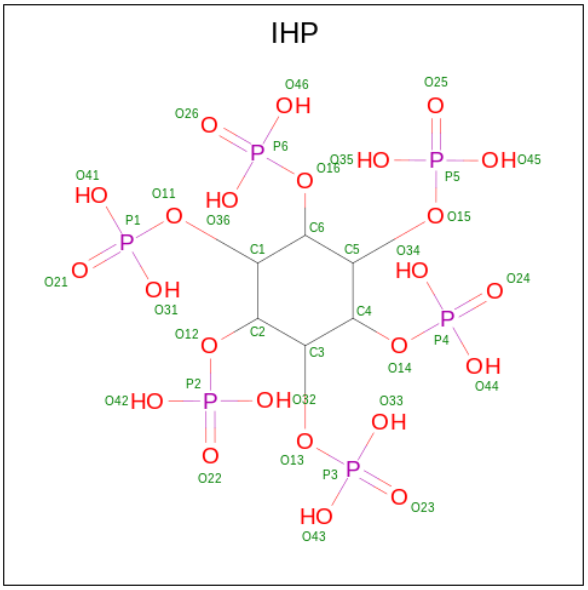
- Molecule 48 is MAGNESIUM ION (CCD ID: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
48	6	6	6	6	0
			Total	Mg	
48	B	1	1	1	0
			Total	Mg	
48	C	1	1	1	0
			Total	Mg	
48	v	1	1	1	0

- Molecule 49 is POTASSIUM ION (CCD ID: K) (formula: K) (labeled as "Ligand of Interest" by depositor).

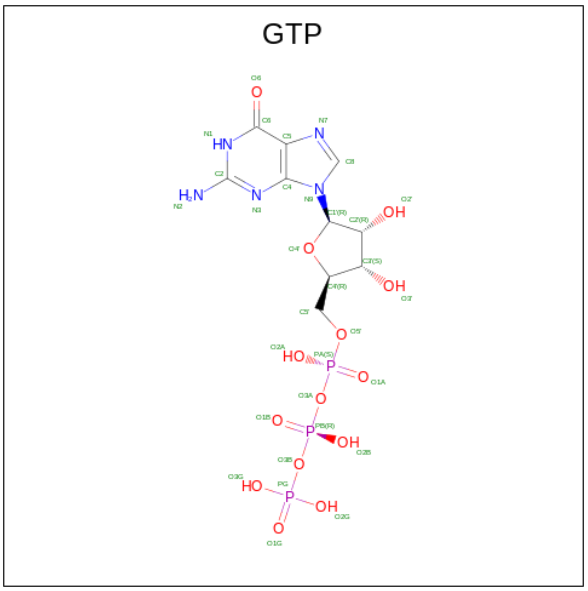
Mol	Chain	Residues	Atoms		AltConf
			Total	K	
49	6	2	2	2	0

- Molecule 50 is INOSITOL HEXAKISPHOSPHATE (CCD ID: IHP) (formula: $C_6H_{18}O_{24}P_6$) (labeled as "Ligand of Interest" by depositor).



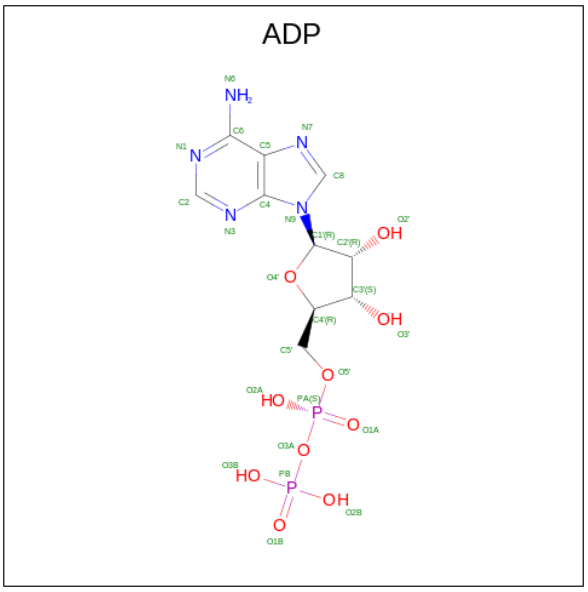
Mol	Chain	Residues	Atoms				AltConf
			Total	C	O	P	
50	A	1	36	6	24	6	0

- Molecule 51 is GUANOSINE-5'-TRIPHOSPHATE (CCD ID: GTP) (formula: $C_{10}H_{16}N_5O_{14}P_3$) (labeled as "Ligand of Interest" by depositor).



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

- Molecule 52 is ADENOSINE-5'-DIPHOSPHATE (CCD ID: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$) (labeled as "Ligand of Interest" by depositor).

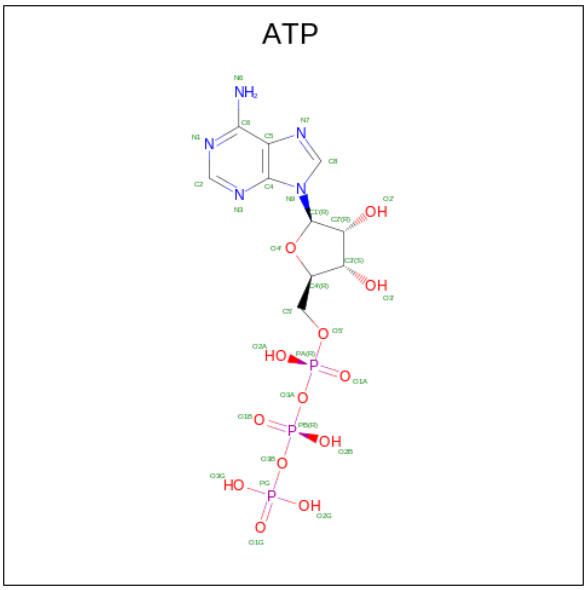


Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
52	C	1	27	10	5	10	2	0
			Total	C	N	O	P	
52	C	1	27	10	5	10	2	0

- Molecule 53 is ZINC ION (CCD ID: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
			Total	Zn	
53	S	1	1	1	0
53	Y	1	1	1	0

- Molecule 54 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
54	v	1	31	10	5	13	3	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: MSE-U12_exon

Chain 0:

• Molecule 2: MSE-U12_Intron

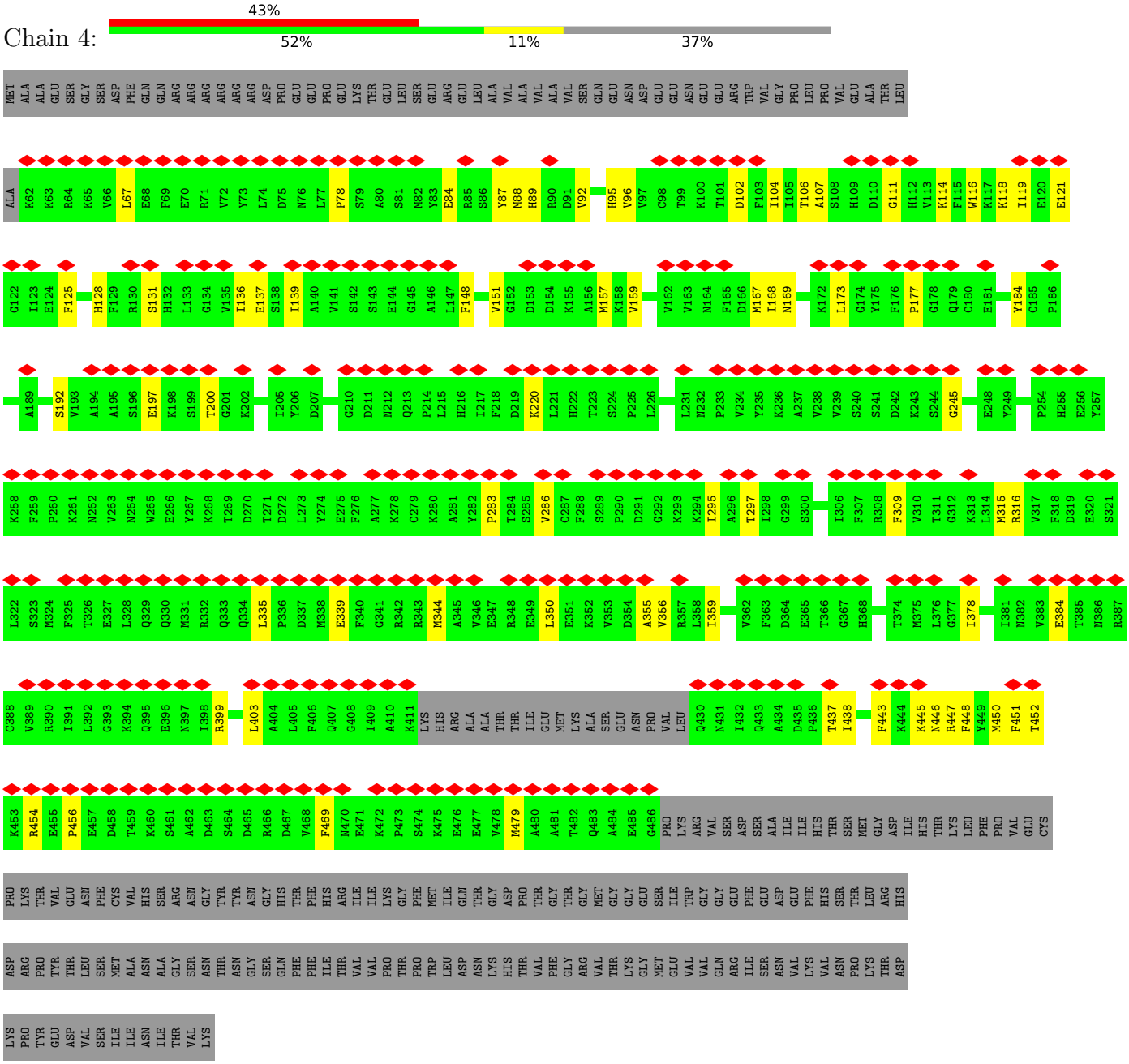
Chain 1:

• Molecule 3: U12 snRNA

Chain 2:

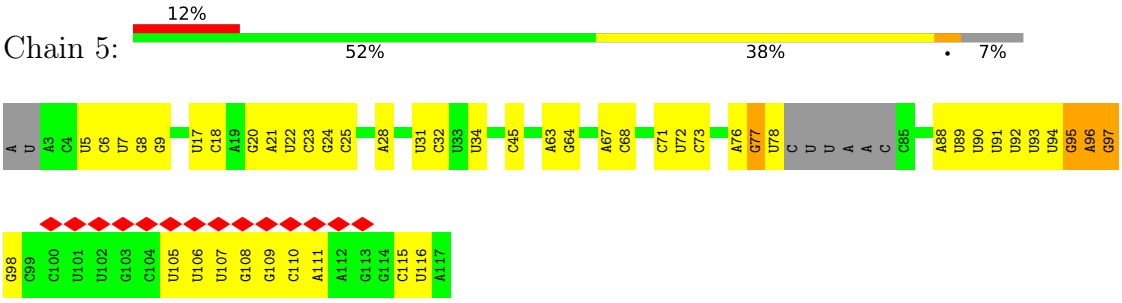
• Molecule 4: Peptidylprolyl isomerase domain and WD repeat-containing protein 1

Chain 4:



- Molecule 5: U5 snRNA

Chain 5:



- Molecule 6: U6atac snRNA

Chain 6: 33% 15% • 51%

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G C A U U G C C A C C U A C U U C G U G G C A U C U A A C C A U C G U U U U U

• Molecule 7: Pre-mRNA-processing-splicing factor 8

Chain A: 8% 86% 11% •

MET ALA GLY VAL PHE PRO TYR ARG GLY PRO GLY ASN PRO VAL PRO GLY PRO LEU ALA PRO LEU PRO ASP TYR M25 S26 E27 E28 K29 L30 K33 K36 L40 R44 E47 K48 F53 V54 Q57 M76 R79 R82 M95 P96 H97 P109 H121

I126 M147 M151 L176 V185 T224 Y225 Q226 V250 I273 V283 R284 ASP ILE ASN LEU GLN ASP GLU D292 P345 R362 H363 S364 V365 K366 S367 L371 P372 E377 F378 E379 L380 P386 K389 N429 R432 K465 K468 K469

D488 V492 G493 L494 M503 N512 V527 V550 T554 V562 V569 Q573 M591 L598 Q601 I602 R603 M604 L608 G619 P620 W630 A631 A632 F640 H664 V668 W750 A754 T766 V767 D768 V771 R778 E787

R790 P799 W816 R820 Y832 D835 R845 V852 Y871 I881 M899 T918 D919 P942 V952 Q963 E982 N994 I1000 V1001 D1002 H1003 T1010 N1018 Q1035 S1038 Q1042 D1070 I1077 Y1091 I1092 N1130 K1131 K1132

K1144 Q1169 L1186 M1189 E1193 C1194 R1195 F1207 T1208 H1209 Q1217 R1224 M1237 L1248 M1249 T1255 V1260 N1261 K1262 L1284 K1294 I1295 Q1296 L1303 M1307 R1310 L1325 G1326 M1327 Q1337 K1344 R1354 M1357 S1382 R1393

R1402 L1403 T1404 L1405 G1415 W1436 R1437 V1438 V1447 L1448 K1449 P1452 H1457 H1460 W1498 L1501 E1510 E1511 S1512 M1513 K1514 L1518 A1521 GLN ARG SER GLY L1526 N1527 Q1528 I1529 P1530 R1533 L1555 M1562 K1565 V1596 V1609 T1613 L1631

L1645 W1661 Q1665 I1676 K1683 I1694 G1700 V1701 L1702 D1706 A1714 A1729 M1734 N1737 L1740 L1763 L1771 N1774 Q1775 I1776 I1777 T1789 I1790 H1791 K1792 T1793 F1794 E1795 T1800 I1803 I1807 Q1816 K1820 K1831 K1838 W1839 K1840

R1850 P1858 K1859 Q1860 F1879 L1891 P1892 F1893 Q1894 A1895 V1899 F1902 L1905 M1914 V1915 L1916 L1924 R1941 H1944 R1949 I1953 L1954 K1955 P1956 D1957 K1958 E1963 H1966 L1971 E1975 E1980 V1981 Q1982 L1983 L1986 I1987 L1988 K1993 V1999

S2005 R2008 I2016 S2017 A2018 P2019 SER GLN GLN ARG GLN GLN ILE ALA GLU ILE GLU LYS GLN THR LYS GLU GLN SER GLN LEU THR ALA THR GLN THR ARG THR VAL ASN LYS HIS GLY ASP GLU ILE ILE THR SER THR T2059 S2060 N2061 Y2062 E2063 T2064 Q2065 S2069 K2070 T2071 E2072

W2073 R2074 S2079 A2080 A2081 N2082 L2083 H2084 T2087 N2088 S2094 D2095 D2096 I2097 K2098 E2099 T2100 G2101 Y2102 T2103 Y2104 P2107 K2108 N2109 V2110 L2111 K2112 K2113 F2114 I2115 C2116 I2117 S2118 R2121 A2125 G2126 Y2127 G2130 V2131 S2132 P2133 P2134 D2135 N2136 P2137 Q2138 V2139 K2140 E2141 I2142 R2143 C2144 I2145

V2148 P2149 Q2150 L2159 P2160 G2161 Q2162 L2163 P2164 Q2165 H2166 E2167 Y2168 L2169 K2170 E2171 M2172 E2173 P2174 I2178 H2179 W2183 E2184 S2185 P2186 Q2187 L2188 S2189 P2190 V2193 W2196 A2197 K2198 I2199 M2200 A2201 D2202 N2203 P2204 S2205 W2206 D2207 G2208 E2209 K2210 T2211 I2212 T2219 P2220 L2225 T2226 A2227

Y2228 K2229 L2230 T2231 P2232 S2233 G2234 Y2235 E2236 W2237 W2237 G2238 R2239 Q2240 N2241 T2242 D2243 K2244 G2245 N2246 N2247 P2248 K2249 G2250 Y2251 L2252 P2253 S2254 H2255 Y2256 E2257 R2258 V2259 Q2260 M2261 S2264 D2265 R2266 F2267 L2268 G2269 F2270 F2271 M2272 V2273 Q2276 S2277 S2278 W2279 N2280 F2283 M2284 G2285 D2289 P2290 N2291 M2292

K2293 Y2294 E2295 L2296 Q2297 L2298 A2299 N2300 P2301 H2309 L2315 N2316 F2317 A2318 L2319 L2320 Q2321 E2322 G2323 E2324 V2325 Y2326 S2327 A2328 D2329 R2330 E2331 D2332 L2333 Y2334 A2335

- Molecule 8: 116 kDa U5 small nuclear ribonucleoprotein component

Chain B: 80% 13% 7%

MET ASP THR ASP LEU TYR ASP GLU PHE GLY ASN TYR ILE GLY PRO GLU LEU ASP SER ASP GLU ASP ASP ASP GLU LEU GLY ARG GLU THR LYS ASP LEU ASP GLU MET ASP ASP ASP ASP ASP ASP ASP ASP VAL GLY ASP HIS ASP ASP ASP HIS PRO GLY MET E56 V57 V58 L59 H60

T86 Q87 P92 K95 T103 L104 M105 L109 D121 L122 T133 L134 C135 H140 K159 D164 L165 L171 E174 M203 D204 T205 V215 I221 G224 D230 M236 E240 R241 L242 C308 Q313 Y314 L320 A328 I334

R342 L343 W344 I347 F356 T357 L374 I380 L399 R417 E426 F427 T428 I438 K442 L474 K480 T484 F493 G494 T500 I501 V507 Y514 D521 L530 W531 H538 I539 P545 T564 P568 R569 I576 I590

M603 V628 L637 I651 T669 K673 T678 K681 K682 N683 K684 I685 L696 V704 V705 T708 W709 G715 F718 W724 A729 I732 W733 A734 P742 N743 I744 L745 L750 L758 S761 D764 S765 I766 V767 Q768 R775

R785 K788 I791 L792 V796 A797 Q798 E799 P800 L801 H802 R803 I809 P810 T811 T824 P825 R826 E829 V834 E835 V836 P876 D879 F883 S897 L898 S899 V907 V947 K951 D955 PRO MET LEU LEU GLU LEU ALA LYS GLN ASP VAL VAL LEU

ASN TYR PRO MET

- Molecule 9: U5 small nuclear ribonucleoprotein 200 kDa helicase

Chain C: 82% 74% 16% 10%

MET ALA ASP VAL THR ALA ARG SER LEU GLN TYR GLU TYR LYS ALA ASN SER ASN LEU VAL LEU GLN ALA ASP ARG SER LEU ILE ASP ARG THR ARG ARG ASP GLU PRO THR GLY GLU VAL LEU SER LEU VAL GLY LYS LEU GLU GLY THR ARG MET GLY ASP LYS ALA GLN ARG THR LYS

PRO GLN MET GLN GLU GLU ARG ARG ALA LYS ARG ARG LYS ARG ASP GLU ASP ARG HIS ASP ILE ASN LYS MET LYS GLY TYR THR LEU LEU SER GLU GLU GLY ILE ASP GLU MET VAL GLY I100 I101 Y102 K103 P104 K105 T106 K107 E108 T109 R110 E111 T112 Y113 E114 V115 L116 L117 S118 F119 I120

Q121 A122 A123 L124 G125 D126 Q127 P128 R129 D130 I131 L132 C133 G134 A135 A136 D137 E138 V139 L140 A141 V142 L143 K144 N145 E146 K147 L148 R149 D150 K151 E152 R153 R154 K155 E156 I157 D158 L159 L160 L161 G162 Q163 T164 D165 D166 T167 R168 Y169 H170 V171 L172 V173 N174 L175 G176 K177 K178 I179 T180

D181 Y182 G183 G184 ASP LYS GLU ILE GLN ASN MET ASP ASP ASN ILE ASP GLU THR TYR GLY VAL ASN VAL GLN PHE GLU SER ASP GLU GLU GLU GLY ASP GLU ASP VAL TYR GLY GLU VAL ARG GLU GLU ALA SER ASP ASP ASP MET GLU GLY ASP GLU ALA VAL VAL ARG CYS THR LEU

SER ALA ASN LEU VAL ALA SER GLY GLU LEU M251 S252 S253 K254 K255 K256 D257 L258 H259 P260 R261 D262 I263 D264 A265 F266 W267 L268 Q269 R270 Q271 L272 S273 R274 F275 Y276 D277 D278 A279 I280 V281 S282 Q283 K284 K285 A286 D287 E288 V289 L290 E291 I292 L293 K294 T295 A296 S297 D298 D299 R300

E301 C302 E303 N304 Q305 L306 V307 L308 L309 L310 G311 F312 N313 T314 F315 D316 F317 I318 K319 V320 L321 R322 Q323 H324 R325 M326 M327 I328 L329 Y330 C331 T332 L333 L334 A335 S336 A337 Q338 S339 E340 A341 E342 K343 E344 R345 I346 M347 G348 K349 M350 E351 A352 D353 P354 E355 L356 S357 K358 F359 L360

Y361 Q362 L363 H364 E365 T366 GLU LYS GLU ASP LEU ILE ARG GLU GLU ARG SER ARG ARG GLU ARG VAL ARG GLN SER ARG MET ASP THR ASP LEU GLU THR MET ASP LEU ASP GLN GLY GLY GLU GLU ALA LEU A404 P405 R406 Q407 V408 L409 D410 L411 E412 D413 L414 V415 F416 T417 Q418 G419 S420

H421 F422 M423 A424 N425 K426 R427 C428 Q429 L430 P431 D432 G433 S434 F435 R436 R437 Q438 R439 K440 G441 Y442 E443 E444 V445 H446 V447 P448 A449 L450 K451 P452 K453 P454 F455 G456 S457 E458 E459 Q460 L461 L462 P463 V464 E465 K466 L467 P468 K469 Y470 A471 Q472 A473 G474 F475 E476 G477 F478 K479 T480

L481 N482 R483 I484 Q485 S486 K487 L488 Y489 R490 A491 A492 L493 E494 T495 D496 E497 N498 L499 L500 L501 C502 A503 P504 T505 G506 A507 G508 K509 T510 N511 V512 A513 L514 M515 C516 M517 L518 R519 E520 I521 G522 K523 H524 I525 N526 M527 D528 G529 T530 I531 N532 V533 D534 D535 F536 K537 I538 I539 Y540

I541 A542 P543 M544 R545 S546 L547 V548 Q549 E550 M551 V552 G553 S554 F555 G556 K557 R558 L559 A560 T561 Y562 G563 I564 T565 V566 A567 E568 L569 T570 G571 D572 H573 Q574 L575 C576 K577 E578 E579 I580 S581 A582 T583 Q584 I585 I586 V587 C588 T589 P590 E591 K592 I596 T597 R598 K599 G600 G601 E602

R603 T604 Y605 T606 Q607 L608 V609 R610 L611 I612 I613 L614 D615 E616 I617 H618 L619 L620 H621 D622 D623 R624 G625 L628 E629 A630 L631 V632 A633 R634 A635 I636 R637 N638 I639 E640 M641 T642 Q643 E644 D645 V646 R647 L648 I649 G650 L651 S652 A653 E659 A662 T663 F664 L665 R666 V667 D668

P669 A670 K671 G672 L673 F674 Y675 F676 D677 N678 S679 F680 R681 P682 V683 P684 L685 E686 Q687 T688 Y689 V690 G691 I692 T693 E694 K695 K696 A697 I698 K699 R700 F701 Q702 I703 M704 N705 E706 I707 V708 Y709 E710 K711 I712 M713 E714 H715 A716 G717 K718 N719 Q720 V721 L722 V723 F724 V725 H726 S727 R728

K729 E730 T731 G732 K733 T734 A735 R736 A737 I738 R739 D740 M741 C742 L743 E744 R745 D746 T747 L748 G749 L750 F751 L752 R753 E754 G755 S756 A757 S758 T759 E760 V761 L762 R763 T764 E765 A766 E767 Q768 C769 K770 M771 L772 E773 L774 K775 D776 L777 L778 P779 Y780 G781 F782 A783 I784 H785 H786 A787 G788

M789 T790 R791 V792 D793 R794 T795 L796 V797 E798 D799 L800 F801 A802 D803 K804 H805 I806 Q807 V808 L809 V810 S811 T812 A813 T814 L815 A816 W817 G818 V819 N820 L821 P822 A823 H824 T825 V826 I827 I828 K829 G830 T831 Q832 V833 Y834 S835 P836 E837 K838 G839 R840 W841 T842 E843 L844 G845 A846 L847 D848

M852 L853 G854 R855 A856 G857 R858 P859 Q860 Y861 D862 T863 K864 G865 E866 G867 I868 L869 I870 T871 S872 H873 G874 E875 L876 Q877 Y878 Y879 L880 S881 L882 L883 N884 Q885 Q886 I889 E890 S891 Q892 M893 V894 S895 D899 M900 L901 N902 A903 E904 I905 V906 L907 G908 N909 V910 Q911 N912 A913

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E1042 R1043 V1048 K1049 E1050 S1051 I1052 E1053 E1054 A1057 K1058 I1059 N1060 V1061 L1062 L1063 Q1064 A1065 F1066 I1067 S1068 Q1069 L1070 K1071 L1072 E1073 G1074 F1075 A1076 L1077 M1078 A1079 D1080 M1081 V1082 Y1083 V1084 T1085 A1088 G1089 R1090 L1091 M1092 F1096 E1097 I1098 N1101 R1102 G1103 W1104 L1107 K1110

N1113 M1117 I1118 D1119 K1120 R1121 M1122 W1123 Q1124 S1125 M1126 C1127 P1128 L1129 R1130 Q1131 F1132 R1133 K1134 L1135 P1136 E1137 E1138 V1139 V1140 K1141 K1142 I1143 E1144 K1145 K1146 N1147 F1148 P1149 F1150 E1151 R1152 L1153 Y1154 D1155 L1156 N1157 H1158 N1159 E1160 I1161 G1162 E1163 L1164 I1165 R1166 M1167 P1168 K1169 M1170 G1171 K1172 T1173 I1174

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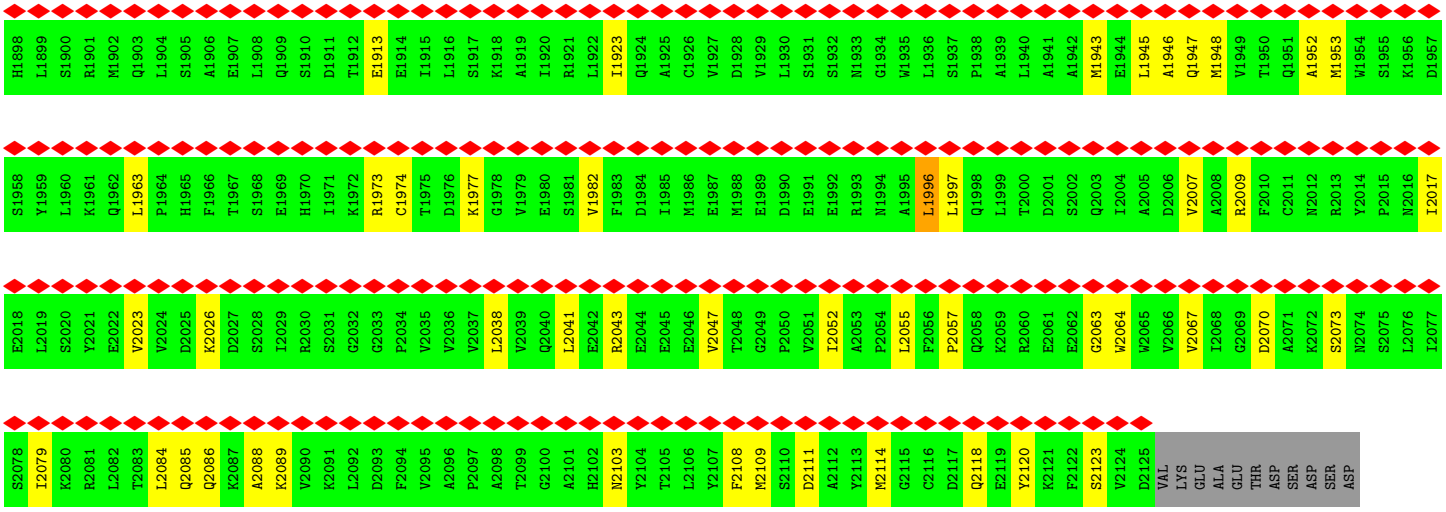
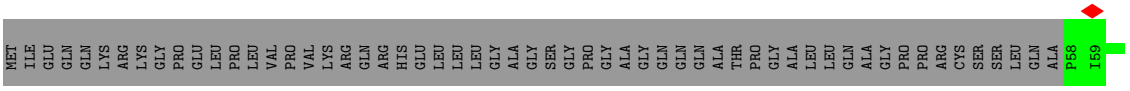
H1778 R1779 H1780 L1781 S1782 D1783 H1784 L1785 S1786 E1787 L1788 V1789 E1790 Q1791 T1792 L1793 S1794 D1795 L1796 E1797 Q1798 S1799 K1800 C1801 I1802 S1803 I1804 E1805 D1806 E1807 M1808 D1809 V1810 A1811 P1812 L1813 M1814 L1815 G1816 M1817 I1818 A1819 A1820 Y1821 Y1822 Y1823 I1824 N1825 Y1826 T1827 T1828 I1829 E1830 L1831 F1832 S1833 M1834 S1835 L1836 N1837

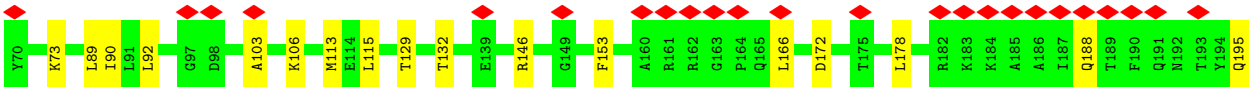
A1838 K1839 T1840 K1841 V1842 R1843 G1844 L1845 I1846 E1847 I1848 I1849 S1850 N1851 A1852 A1853 E1854 Y1855 E1856 N1857 I1858 P1859 I1860 R1861 H1862 H1863 E1864 D1865 N1866 L1867 L1868 R1869 Q1870 L1871 A1872 Q1873 K1874 V1875 P1876 H1877 K1878 L1879 N1880 N1881 P1882 K1883 F1884 N1885 D1886 P1887 H1888 V1889 K1890 T1891 N1892 L1893 L1894 L1895 Q1896 A1897

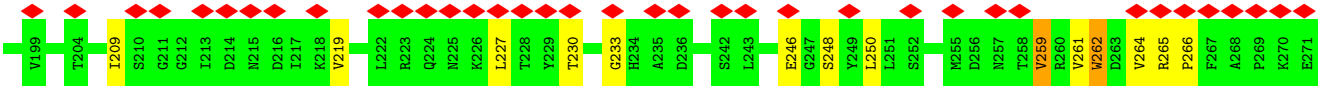


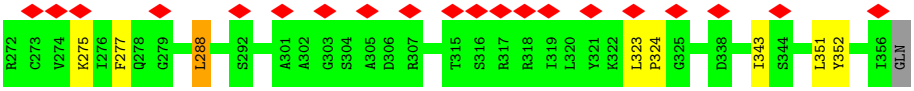
- Molecule 10: U5 small nuclear ribonucleoprotein 40 kDa protein

Chain D:



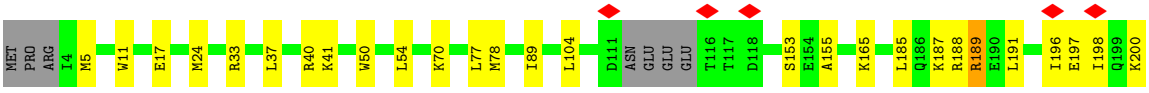


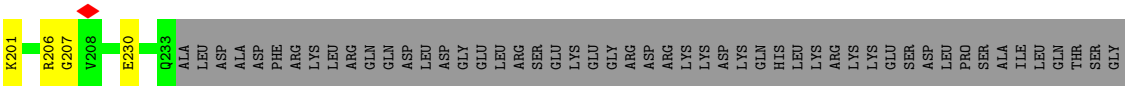


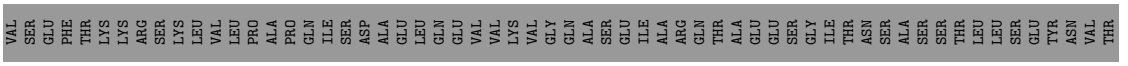


- Molecule 11: Cell division cycle 5-like protein

Chain E:







PRO ASN THR VAL LEU SER THR PRO PHE ARG THR PRO SER ASN GLY ALA GLU GLY LEU THR PRO ARG SER GLY THR THR PRO LYS PRO VAL ILE ASN SER THR PRO GLY ARG THR PRO LEU ARG ASP LYS LEU ASN ILE ASN PRO GLU ASP GLY MET ALA ASP TYR SER D461 P462 S463 Y464

V465 K466 Q467 M468 E469 R470 E471 S472 R473 E474 H475 L476 R477 L478 G479 L480 L481 G482 L483 P484 A485 P486 K487 ASN ASP PHE GLU ILE VAL LEU PRO GLU ASN ALA GLU LYS GLU LEU GLU GLU ARG GLU ILE ASP ASP THR Y511 I512 E513 D514 A515 A516 D519 A520 R521 K522 Q523 A524 I525

R526 D527 A528 E529 R530 V531 K532 E533 M534 K535 R536 M537 H538 K539 A540 V541 Q542 K543 D544 L545 P546 R547 P548 S549 E550 V551 N552 E553 T554 I555 L556 R557 P558 L559 N560 V561 E562 P563 P564 L565 T566 D567 L568 Q569 K570 S571 E572 E573 L574 I575 K576 K577 E578 M579 I580 T581 M582 L583 H584 Y585

D586 L587 L588 H589 H590 P591 Y592 E593 P594 S595 G596 N597 K598 K599 G600 K601 T602 V603 G604 F605 G606 T607 N608 N609 S610 E611 H612 I613 T614 Y615 L616 E617 H618 N619 P620 Y621 E622 K623 F624 S625 K626 E627 E628 L629 K630 K631 A632 Q633 D634 V635 L636 V637 Q638 E639 M640 E641 V642 V643 K644 Q645

G646 M647 S648 H649 G650 E651 L652 S653 S654 E655 A656 Y657 N658 Q659 V660 W661 E662 E663 C664 Y665 S666 Q667 V668 L669 Y670 L671 P672 G673 Q674 S675 R676 Y677 T678 R679 A680 N681 L682 A683 S684 K685 K686 D687 R688 I689 E690 S691 L692 E693 K694 R695 L696 E697 I698 N699 R700 G701 H702 M703 T704 T705

E706 A707 K708 R709 A710 A711 K712 M713 E714 K715 K716 M717 K718 I719 L720 L721 G722 G723 Y724 Q725 S726 R727 A728 M729 G730 L731 M732 K733 Q734 L735 N736 D737 L738 W739 D740 Q741 I742 E743 Q744 A745 H746 L747 E748 L749 R750 T751 F752 E753 E754 L755 K756 K757 H758 E759 D760 S761 A762 I763 P764 R765

R766 L767 E768 C769 L770 K771 E772 D773 V774 Q775 R776 Q777 Q778 E779 R780 E781 K782 E783 L784 Q785 H786 R787 Y788 A789 D790 L791 L792 L793 E794 K795 E796 T797 L798 K799 S800 K801 F802

- Molecule 12: Pre-mRNA-splicing factor SYF1

Chain F:

MET VAL VAL MET ALA ARG LEU SER ARG PRO GLU ARG PRO ASP LEU VAL PHE GLU E19 E20 D21 L22 P23 Y24 E25 E26 E27 I28 M29 R30 N31 Q32 F33 S34 V35 K36 C37 W38 L39 R40 Y41 I42 E43 F44 K45 Q46 G47 A48 P49 K50 P51 R52 L53 N54 Q55 L56 Y57 E58 R59

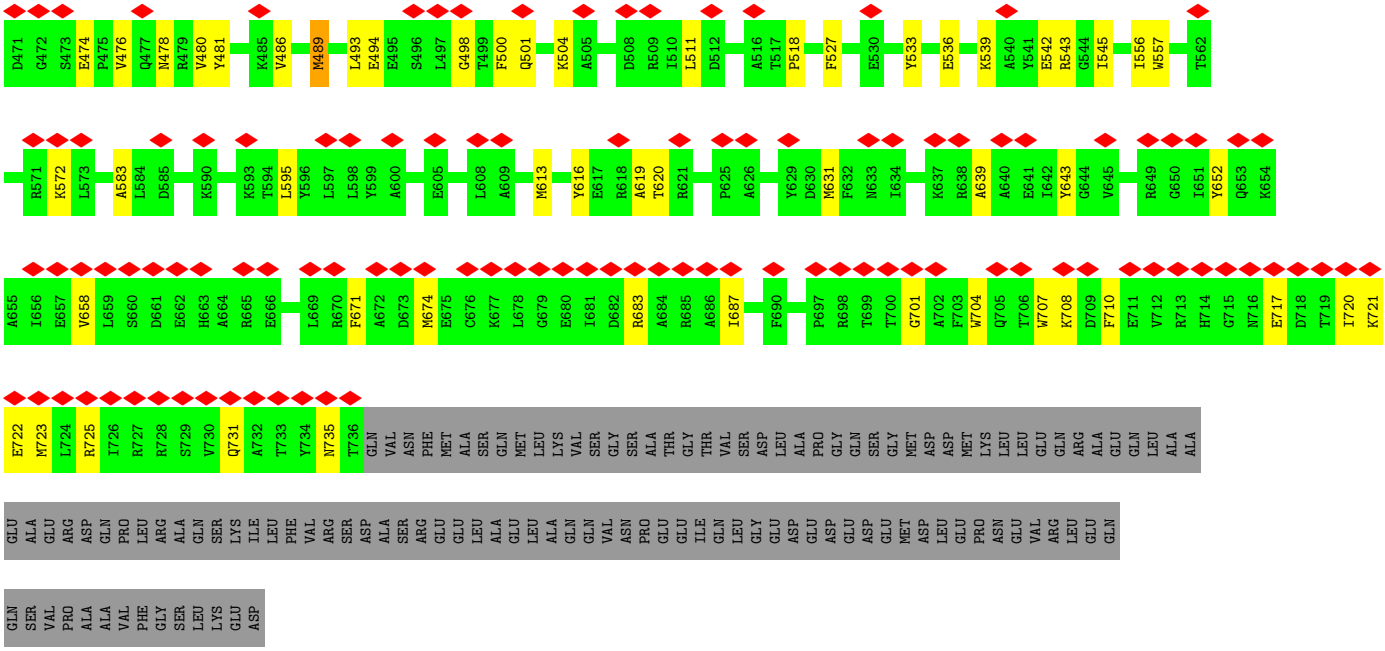
K62 L63 L64 Y68 K69 L70 L75 K76 A77 R78 Q81 V82 K83 H84 V87 T88 D89 P90 A91 Y92 E93 K108 M109 P110 L114 D115 Y116 C117 Q118 F119 L120 Q123 T127 T143 S146 P150 L153 R154 F155 L156 R157 S158 H159 P160 L161 P162 E163

V166 R167 R170 L173 S176 P177 E178 S179 A180 E181 E182 E185 Y186 L187 K188 S189 S190 D191 R192 L193 D194 E195 A196 A197 Q198 R199 L200 A201 T202 V203 V204 N205 D206 E207 R208 F209 V210 S211 K212 A213 G214 K215 S216 N217 Y218 Q219 H222 E223 L224 C225 D226 L227 I228 S229 Q230

N231 P232 D233 K234 V235 Q236 S237 L238 N239 V240 D241 A242 I243 G246 G247 L248 T249 R250 F251 T252 D253 Q254 L255 G256 K257 L258 W259 C260 S261 L262 A263 D264 Y265 Y266 I267 R268 S269 G270 H271 F272 V278 Y279 E280 E281 A282 I283 R284 T285 V286 M287 R290 D291 S298 Y299 A300 Q301

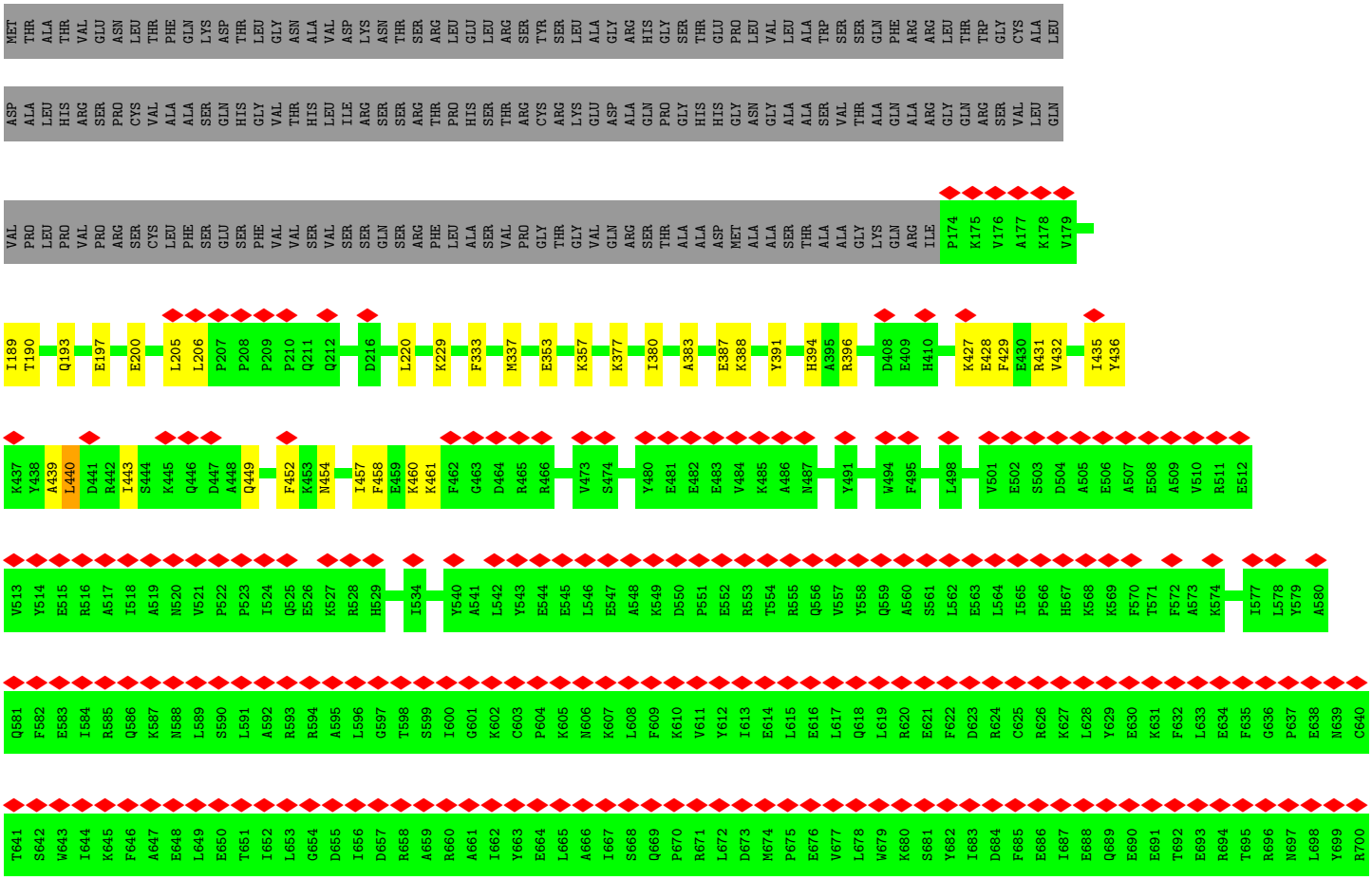
F302 E303 E304 S305 M306 I307 A308 A309 K310 M311 E312 T313 ALA SER GLU LEU GLY ARG GLU GLU E322 D323 D324 R330 L331 A332 E335 Q336 L337 I338 S339 R340 R341 P342 L343 L344 V348 L349 P354 K362 A365 L366 H367 Q368 G369 R370 P371 T384 VAL ASP PRO PHE LYS

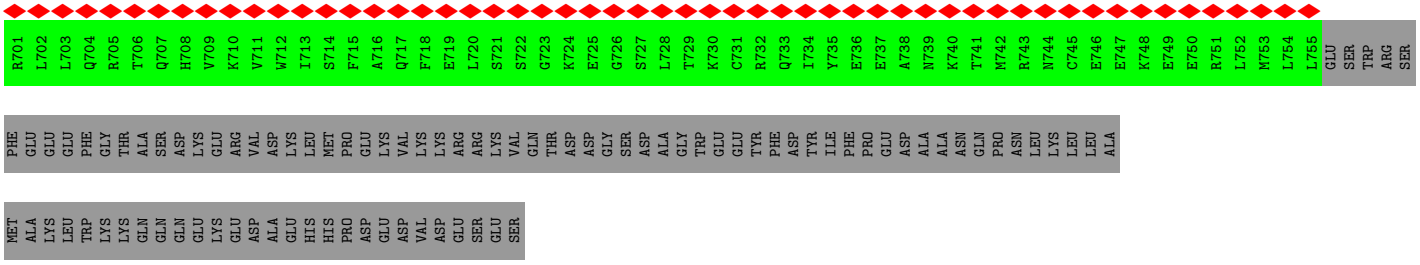
ALA THR GLY LYS PRO H395 V399 K403 D407 N408 G409 Q410 L411 D412 D413 A414 R415 L418 E419 K420 A421 T422 Q428 V429 D430 D431 Q438 E441 L444 R445 H446 E447 N448 Y449 D450 E451 A452 L453 R454 L455 L456 R457 K458 A461 L462 P463 A464 R465 R466 A467



- Molecule 13: Crooked neck-like protein 1

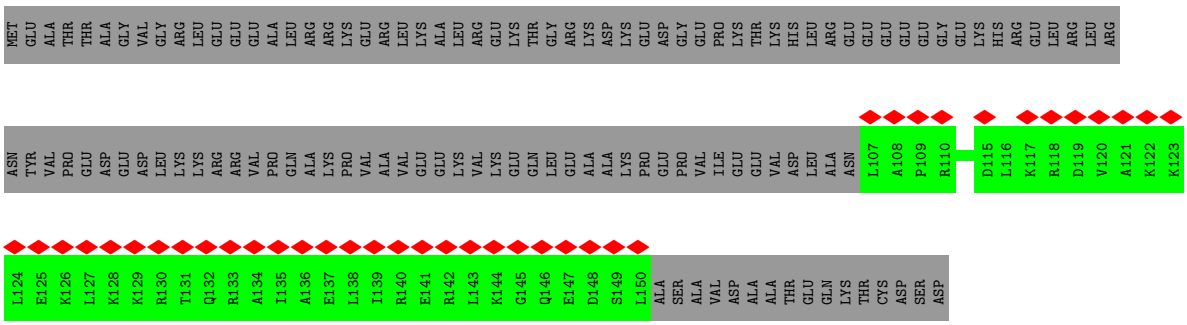
Chain G: 33% 64% • 31%





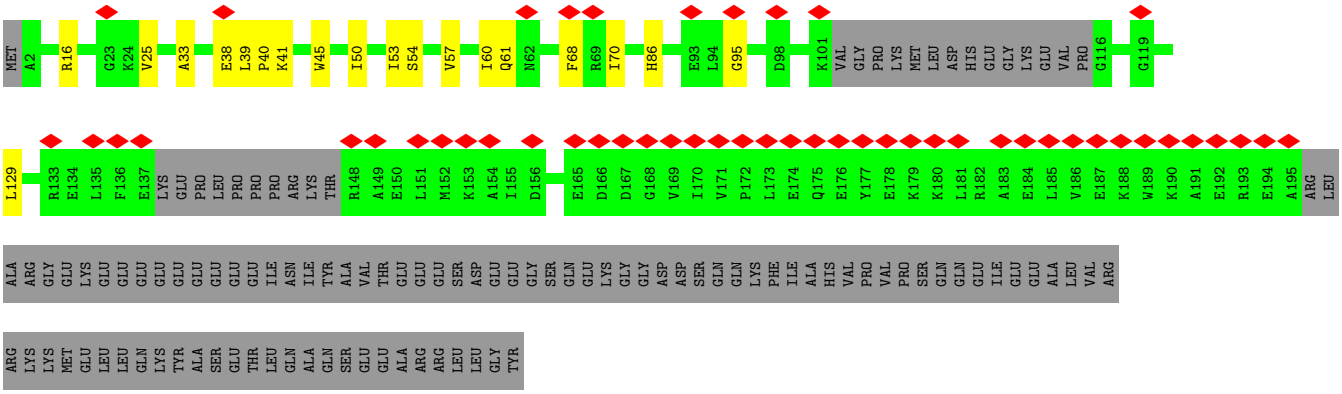
- Molecule 14: Coiled-coil domain-containing protein 12

Chain H:



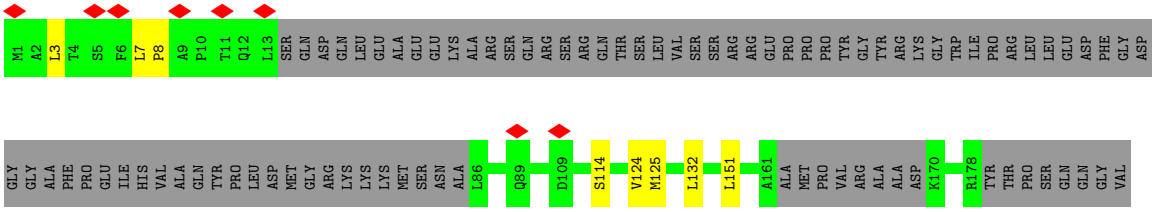
- Molecule 15: Pre-mRNA-splicing factor ISY1 homolog

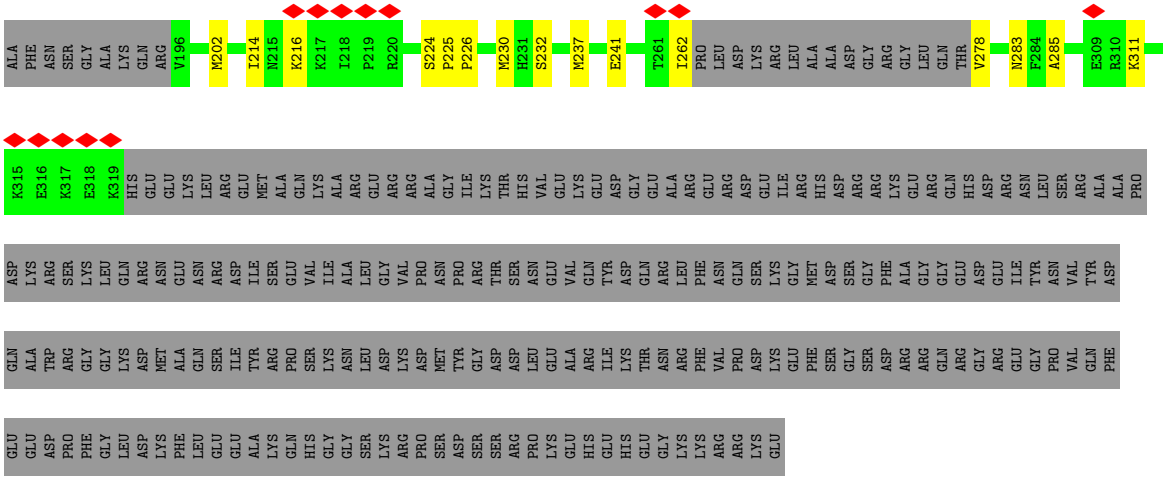
Chain I:



- Molecule 16: SNW domain-containing protein 1

Chain J:



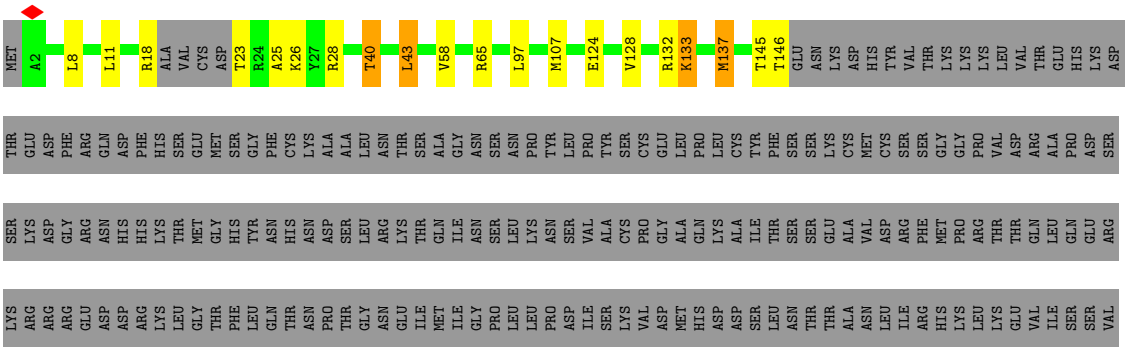


- Molecule 17: Pleiotropic regulator 1

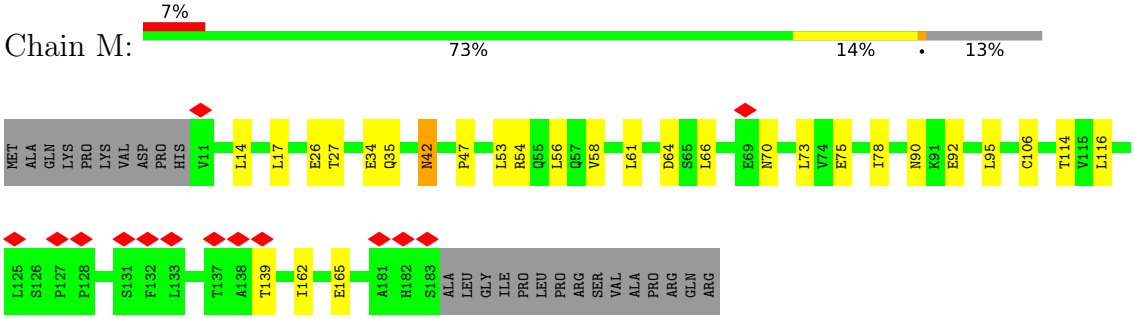
Chain K:

- Molecule 18: RNA-binding protein 48

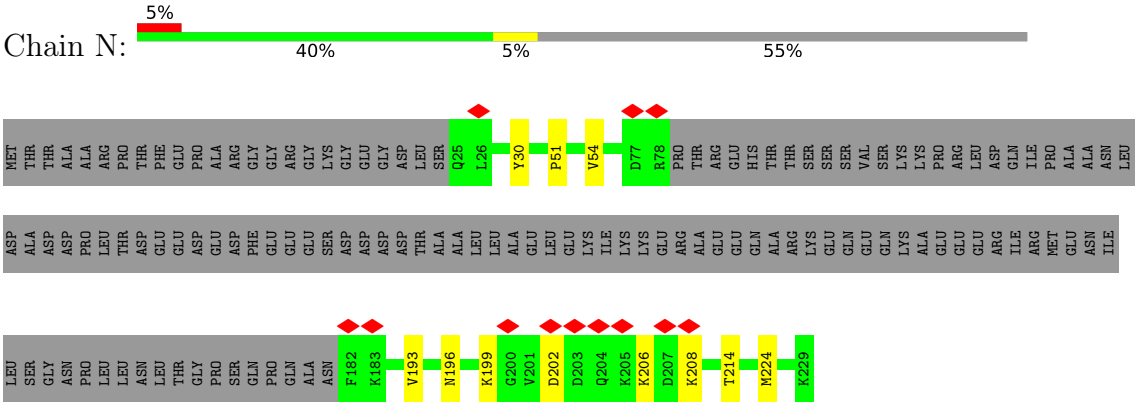
Chain L:



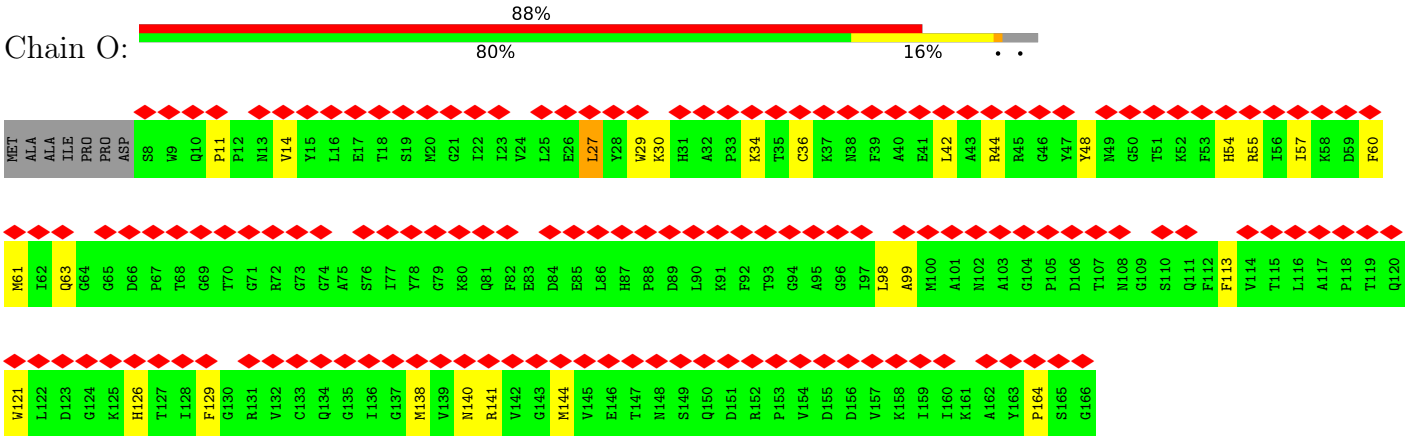
• Molecule 19: Armadillo repeat-containing protein 7



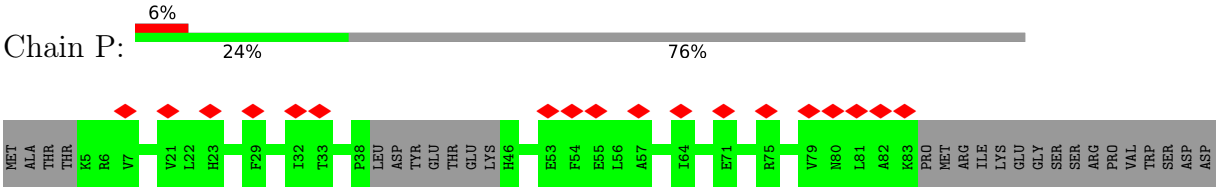
• Molecule 20: Spliceosome-associated protein CWC15 homolog



• Molecule 21: Peptidyl-prolyl cis-trans isomerase-like 1



• Molecule 22: Peptidyl-prolyl cis-trans isomerase E



ASP TRP LEU LYS LYS PHE SER GLY LYS THR LEU GLU GLU ASN LYS GLU GLU GLU GLY SER GLU PRO PRO LYS ALA GLU THR GLN GLU GLY GLU PRO ILE ALA LYS LYS ALA ARG SER ASN PRO GLN VAL TYR MET ASP ILE LYS ILE GLY ASN LYS PRO ALA GLY ARG ILE GLN MET LEU

LEU ARG SER ASP VAL VAL PRO MET THR ALA GLU ASN PHE ARG CYS LEU CYS THR HIS GLU LYS GLY PHE GLY PHE LYS GLY SER SER PHE HIS ARG ILE ILE PRO GLN PHE MET CYS GLN GLY GLY GLY ASP PHE THR ASN HIS ASN GLY THR GLY GLY LYS SER ILE TYR GLY LYS LYS PHE

ASP ASP GLU ASN PHE ILE LEU LYS HIS THR GLY PRO GLY LEU LEU SER MET ALA ASN SER GLY PRO ASN THR ASN GLY SER GLN PHE PHE LEU THR CYS ASP LYS THR ASP TRP LEU ASP GLY LYS HIS VAL VAL PHE GLY GLU VAL THR GLU GLY LEU ASP VAL LEU ARG GLN ILE GLU

ALA GLN GLY SER LYS ASP GLY LYS PRO LYS GLN LYS VAL ILE ILE ALA ASP CYS GLY GLU TYR VAL

- Molecule 23: RNA helicase aquarius

Chain Q:

MET ALA ALA PRO ALA GLN PRO LYS LYS ILE VAL ALA PRO THR VAL SER GLN ILE ASN ALA E21 F22 V23 T24 Q25 L26 A27 C28 K29 Y30 W31 A32 P33 H34 I35 K36 K37 K38 S39 P40 F41 D42 I43 K44 V45 I46 E47 D48 I49 Y50 E51 K52 E53 I54 V55 K56 S57 R58 F59 A60

I61 R62 K63 I64 M65 L66 L67 E68 F69 S70 Q71 Y72 L73 E74 N75 Y76 L77 W78 M79 N80 Y81 S82 P83 E84 V85 S86 S87 K88 A89 Y90 L91 M92 S93 I94 C95 C96 M97 V98 N99 E100 K101 F102 R103 E104 N105 V106 P107 A108 W109 E110 I111 F112 K113 K114 K115 P116 D117 H118 F119 P120

F121 F122 F123 K124 H125 I126 L127 K128 A129 A130 L131 A132 E133 T134 D135 G136 E137 F138 S139 L140 H141 E142 Q143 T144 L147 L148 F149 L150 D151 H152 C153 F154 N155 S156 L157 E158 V159 D160 L161 I162 R163 S164 Q165 V166 Q167 I170 S171 L172 W175 M176 G177 L178 Q179 L180 A181 R182 L183

E184 L185 E186 L187 K188 K189 T190 P191 K192 L193 R194 K195 F196 W197 N198 L199 I200 K201 K202 N203 D204 E205 K206 M207 D208 P209 E210 A211 R212 E213 Q214 A215 Y216 Q217 E218 R219 R220 F221 L222 S223 Q224 L225 I226 Q227 K228 F229 I230 S231 Y232 L233 K234 S235 V236 P237 L238 S239 E240 P241 V242 T243

M244 D245 K246 V247 H248 E251 R252 E255 A262 L263 L264 P265 T266 W269 F270 N271 D276 S277 H278 L279 L280 V281 H282 C283 Y284 L285 S286 N287 L288 V289 R290 R291 E292 E293 D294 G295 H296 L297 F298 S299 Q300 D303 M304 L305 K306 F307 Y308 T309 G310 F311 E312 I313 N314 D315

Q316 T317 G318 N319 A320 L321 T322 E323 N324 E325 M326 T327 D332 R333 I334 T335 S336 R339 A340 A341 F342 A343 H344 F345 P346 E347 L348 Y349 E358 V359 D360 T361 R362 E363 S364 L365 V366 K367 F368 F369 G370 P371 L372 S373 S374 N375 T376 L377 H378 Q379 V380 A381 S382 Y383 L384 C385 L386

L387 P388 T389 L390 P391 K392 N393 E394 D395 T396 T397 F398 D399 K400 E401 F402 L403 L404 E405 L406 L407 V408 H411 E412 R413 R414 I415 S416 Q417 I418 Q419 Q420 L421 N422 Q423 M424 P425 L426 Y427 P428 T429 E430 K431 I432 I433 W434 D435 E436 T441 E442 Y443 Y444 S445 G446 E447 G448 C449 L450

A451 L452 N456 L457 Q458 F459 L460 T461 L462 H463 D464 Y465 L466 N469 F470 N471 R474 L475 T478 Y479 E480 I481 R482 Q483 D484 I485 E486 D487 S488 V489 S490 R491 M492 K493 P494 W495 Q496 S497 GLU TYR GLY GLY V502 V503 F504 G505 G506 W507 A508 A511 Q512 P513 I514 V515 A516

F517 T518 V519 V520 E521 V522 A523 K524 P525 N526 ILE GLY E529 N530 W531 P532 T533 R534 V535 R536 A537 D538 V539 T540 I541 N542 L543 N544 V545 R546 D547 H548 I549 K550 D551 E552 W553 E554 G555 L556 R557 K558 H559 D560 V561 C562 F563 L564 I565 T566 V567 R568 P569 T570 K571 P572 Y573 G574 T575 K576

F577 D578 R579 R580 R581 P582 F583 I584 E585 Q586 V587 G588 L589 V590 Y591 V592 R593 G594 C595 E596 I597 Q598 G599 M600 L601 D602 D603 K604 G605 R606 V607 I608 E609 D610 G611 P612 E613 P614 R615 P616 N617 L618 R619 G620 E621 S622 R623 T624 F625 F628 L629 D630 P631 N632 Q633 Y634 Q635 Q636 D637

M638 T639 N640 T641 I642 Q643 N644 G645 A646 E647 D648 V649 Y650 E651 T652 F653 N654 I655 I656 M657 R658 R659 K660 P661 N664 N665 F666 K667 T672 I673 R674 N675 L676 M677 N678 T679 D680 C681 V682 V683 P684 D685 W686 L687 H688 D689 I690 I691 L692 G693 Y694 G695 D696 P697 S698 S699 A700 H701

Y702 S703 K704 W705 P706 N707 Q708 I709 A710 T711 L712 D713 F714 N715 D716 T717 F718 L719 S720 I721 E722 H723 L724 K725 A726 S727 F728 P729 G730 H731 N732 V733 K734 V735 T736 V737 E738 D739 P740 A741 L742 Q743 I744 P745 P746 F747 R748 I749 T750 F751 P752 VAL ARG SER GLY LYS GLY LYS LYS ARG

LYS ASP ALA ASP VAL GLU ASP GLU ASP THR GLU E773 A774 K775 T776 L777 I778 V779 E780 P781 H782 V783 I784 P785 N786 R787 G788 P789 Y790 P791 Y792 N793 Q794 P795 K796 R797 N798 T799 I800 Q801 F802 T803 H804 T805 Q806 I807 E808 R811 A812 G813 M814 Q815 P816 G817 L818 T819 M820 V821 V822

G823 P824 P825 G826 T827 G828 K829 T830 D831 V832 A833 V834 Q835 I836 I837 S838 N839 I840 Y841 H842 N843 F844 P845 E846 Q847 S855 A858 Q861 L862 F863 E864 K865 I866 M867 A868 L869 D870 I871 D872 E873 R874 H875 R878 L879 G880 H881 G882 E883 E884 E885 L886 E887 T888 E889 K890

R894 Y895 G896 R897 V898 N899 Y900 V901 L902 A903 R904 R905 I906 E907 L908 L909 E910 E911 V912 K913 R914 L915 Q916 K917 S918 L919 G920 V921 P922 G923 D924 A925 S926 Y927 T928 T931 F935 F936 L937 Y938 Q939 V940 M941 S942 R943 W944 E945 E946 Y947 I948 S949 K950 V951 K952 N953 K954 G955 S956

T957 L958 P959 D960 V961 T962 E963 V964 S965 T966 F967 F968 P969 F970 H971 E972 Y973 F974 A975 N976 A977 P978 Q979 P980 I981 F982 K983 G984 R985 S986 Y987 E988 E989 D990 M991 E992 I993 A994 E995 G996 C997 F998 R999 H1000 I1001 K1002 K1003 I1004 F1005 T1006 E1010 E1015 L1016 L1017 R1018 S1019 L1028

V1029 K1030 I1034 M1037 A1042 A1043 L1044 K1045 L1049 V1050 K1051 L1052 G1053 F1054 K1055 Y1056 D1057 N1058 I1059 L1060 M1061 A1064 I1067 F1073 I1074 P1075 L1076 L1077 L1078 Q1079 N1080 P1081 Q1082 D1083 G1084 F1085 S1086 R1087 L1088 K1089 R1090 W1091 I1092 M1093 I1094 G1095 D1096 H1097 H1098 P1102 V1103 I1104

M1107 A1108 F1109 Q1110 K1111 M1115 T1121 R1122 F1123 V1124 R1125 V1126 G1127 V1128 V1131 D1132 L1133 D1134 A1135 Q1136 G1137 R1138 A1139 R1140 A1141 S1142 L1143 C1144 N1145 L1146 Y1147 N1148 W1149 R1150 Y1151 K1152 N1153 L1154 G1155 N1156 L1157 P1158 H1159 V1160 Q1161 L1162 L1163 P1164 E1165 F1166 S1167 T1168 A1169 N1170 A1171 G1172

L1173 L1174 Y1175 D1176 F1177 Q1178 L1179 L1180 N1181 V1182 E1183 D1184 F1185 Q1186 G1187 V1188 G1189 E1190 S1191 E1192 P1193 N1194 P1195 Y1196 F1197 Y1198 Q1199 N1200 L1201 G1202 E1203 A1204 E1205 Y1206 V1207 V1208 A1209 L1210 F1211 M1212 Y1213 M1214 C1215 L1216 L1217 G1218 Y1219 P1220 A1221 D1222 K1223 I1224 S1225 I1226 L1227 T1228 T1229 Y1230 N1231 G1232

Q1233 K1234 H1235 L1236 I1237 R1238 D1239 I1240 I1241 N1242 R1243 R1244 C1245 G1246 N1247 N1248 P1249 L1250 I1251 G1252 R1253 P1254 N1255 K1256 V1257 T1258 T1259 V1260 D1261 R1262 G1265 Q1266 Q1267 N1268 D1269 Y1270 I1271 L1272 L1273 S1274 L1275 V1276 R1277 T1278 R1279 A1280 V1281 G1282 H1283 L1284 R1285 D1286 V1287 R1288 R1289 L1290 V1291 V1292 A1293

M1294 S1295 R1296 A1297 R1298 L1299 G1300 L1301 Y1302 I1303 F1304 A1305 R1306 V1307 S1308 L1309 F1310 Q1311 N1312 C1313 F1314 E1315 L1316 T1317 P1318 A1319 F1320 S1321 Q1322 L1323 T1324 A1325 R1326 P1327 L1328 H1329 L1330 H1331 I1332 I1333 P1334 T1335 E1336 P1337 F1338 P1339 T1340 T1341 R1342 K1343 N1344 G1345 E1346 R1347 P1348 S1349 H1350 E1351 V1352 Q1353

I1354 I1355 K1356 N1357 M1358 P1359 Q1360 M1361 A1362 N1363 F1364 V1365 Y1366 N1367 M1368 Y1369 M1370 H1371 L1372 I1373 GLN THR THR HIS HIS TYR HIS GLN THR LEU LEU GLN LEU PRO PRO ALA MET VAL GLU GLU GLY GLU GLU VAL GLN ASN GLN GLU THR GLU LEU GLU THR GLU GLU GLU ALA MET THR VAL

GLN ALA ASP ILE ILE PRO SER PRO THR ASP THR SER CYS ARG GLN GLU THR PRO ALA PHE GLN THR ASP THR THR PRO SER GLU THR GLY ALA THR SER THR PRO GLU ALA ILE PRO ALA LEU SER GLU THR THR PRO THR VAL VAL GLY ALA VAL SER ALA PRO ALA GLU ALA ASN THR

PRO GLN ASP ALA THR SER ALA PRO GLU GLU THR LYS

- Molecule 24: Pre-mRNA-splicing factor CWC25 homolog

Chain R: 21% 76%

MET G2 K29 E33 L44 R55 Y56 V60 V63 K64 K65 K66 E67 E68 K69 L70 D71 W72 M73 P77 GLY GLY MET VAL ASN ARG ASP GLU TYR LEU LEU GLY ARG PRO ILE ASP LYS TYR VAL PHE GLU LYS MET GLU GLU LYS GLU ALA GLY CYS SER SER GLU

THR GLY LEU LEU PRO GLY SER ILE PHE ALA PRO S122 G123 L139 I142 R143 K144 K145 E146 E147 E148 LYS LYS ARG GLU VAL LEU ASN ASN PRO VAL LYS MET LYS LYS ILE LYS GLU LEU LEU GLN MET SER LEU GLU LYS LYS GLU LYS LYS LYS LYS GLU LYS LYS LYS LYS

HIS LYS LYS HIS LYS HIS ARG SER SER SER SER ASP ARG SER SER SER GLU ASP GLU HIS SER ALA GLY ARG SER GLN LYS LYS MET ALA ASN SER SER PRO VAL LEU SER LYS VAL PRO GLY TYR GLY LEU GLN VAL ARG ASN SER ASP ARG ASN GLN GLY LEU GLN GLY PRO LEU THR

ALA GLU GLN LYS ARG GLY HIS GLY MET LYS ASN HIS SER ARG SER ARG SER SER SER HIS SER PRO PRO ARG HIS ALA SER LYS LYS SER THR ARG GLU ALA GLY SER ARG ASP ARG ARG ARG SER ARG SER LEU GLY ARG ARG SER ARG SER PRO ARG PRO SER LYS LEU HIS ASN SER LYS

VAL ASN ARG ARG GLU THR GLY GLN THR ARG SER PRO SER PRO LYS LYS GLU VAL TYR GLN ARG ARG HIS ALA PRO GLY TYR THR ARG LYS LEU SER ALA GLU GLU LEU GLU ARG ASP ARG LYS ARG GLN GLU MET MET GLU ASN ALA LYS TRP ARG GLU GLU GLU ARG LEU ASN ILE LEU LYS ARG

HIS ALA LYS ASP GLU GLU GLN ARG GLU GLU LYS LEU ASP SER ARG ASP GLY LYS PHE ILE HIS ARG MET LYS LEU GLU SER ALA SER THR SER SER LEU GLU LYS ASP ARG VAL LYS ARG ASN ILE TYR SER LEU GLN ARG THR SER VAL ALA LEU GLU LYS ASN PHE MET LYS ARG

- Molecule 25: Pre-mRNA-splicing factor SLU7

Chain S: 5% 93%

MET SER ALA THR VAL VAL ASP ALA VAL ASN ALA ALA PRO LEU SER GLY SER LYS GLU MET SER LEU GLU GLU GLU PRO LYS LYS MET THR ARG GLU ASP TRP ARG LYS LYS LYS GLU GLU LEU GLU GLU GLN ARG LYS LEU GLY ASN ALA PRO ALA GLU VAL ASP GLU GLU GLY LYS ASP ILE ASN

PRO HIS ILE PRO GLN TYR ILE SER SER VAL PRO TRP TYR ILE ASP PRO SER LYS ARG PRO THR LEU LYS HIS GLN ARG PRO GLN PRO GLU LYS GLN LYS GLN PHE SER SER SER GLY GLU TRP TYR LYS ARG GLY VAL LYS GLU ASN SER ILE I112 T113 R116 C120 C123 G124

H128 K129 V140 G141 A142 K143 F144 T145 G146 T147 N148 I149 A150 P151 D152 GLU HIS VAL GLN PRO GLN LEU MET PHE ASP TYR ASP GLY LYS ARG ASP ARG TRP ASN GLY TYR ASN PRO GLU GLU HIS MET LYS ILE VAL GLU GLU TYR ALA LYS VAL ASP LEU ALA LYS ARG THR LEU

LYS ALA GLN LYS LEU GLN GLU GLU LEU ALA SER GLY LYS LEU VAL GLU GLN ALA ASN SER PRO LYS HIS GLN TRP GLY GLU GLU PRO ASN SER GLN MET GLU LYS ASP HIS ASN SER GLU ASP GLU ASP GLU ASP LYS TYR ALA ASP ASP ILE ASP MET PRO GLY GLN ASN PHE ASP

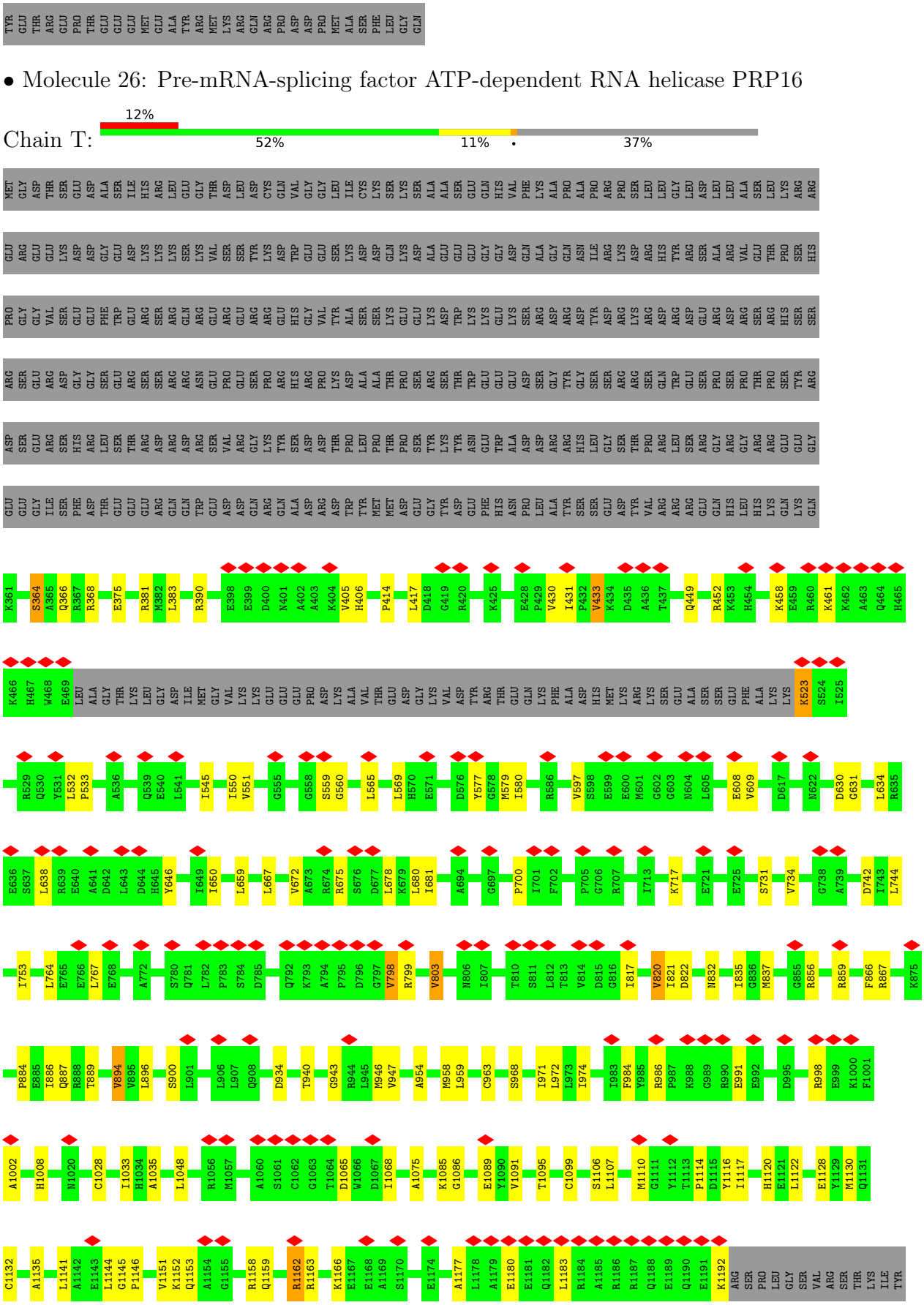
SER LYS ARG ARG ILE THR VAL ARG ASN LEU ARG ILE ARG GLU ASP ILE ALA LYS TYR LEU ARG ASN LEU ASP PRO ASN SER ALA TYR TYR ASP PRO LYS THR ARG ALA MET ARG GLU ASN PRO TYR ALA ASN ALA GLY LYS ASN PRO ASP GLU VAL SER TYR ALA GLY ASP ASN PHE VAL

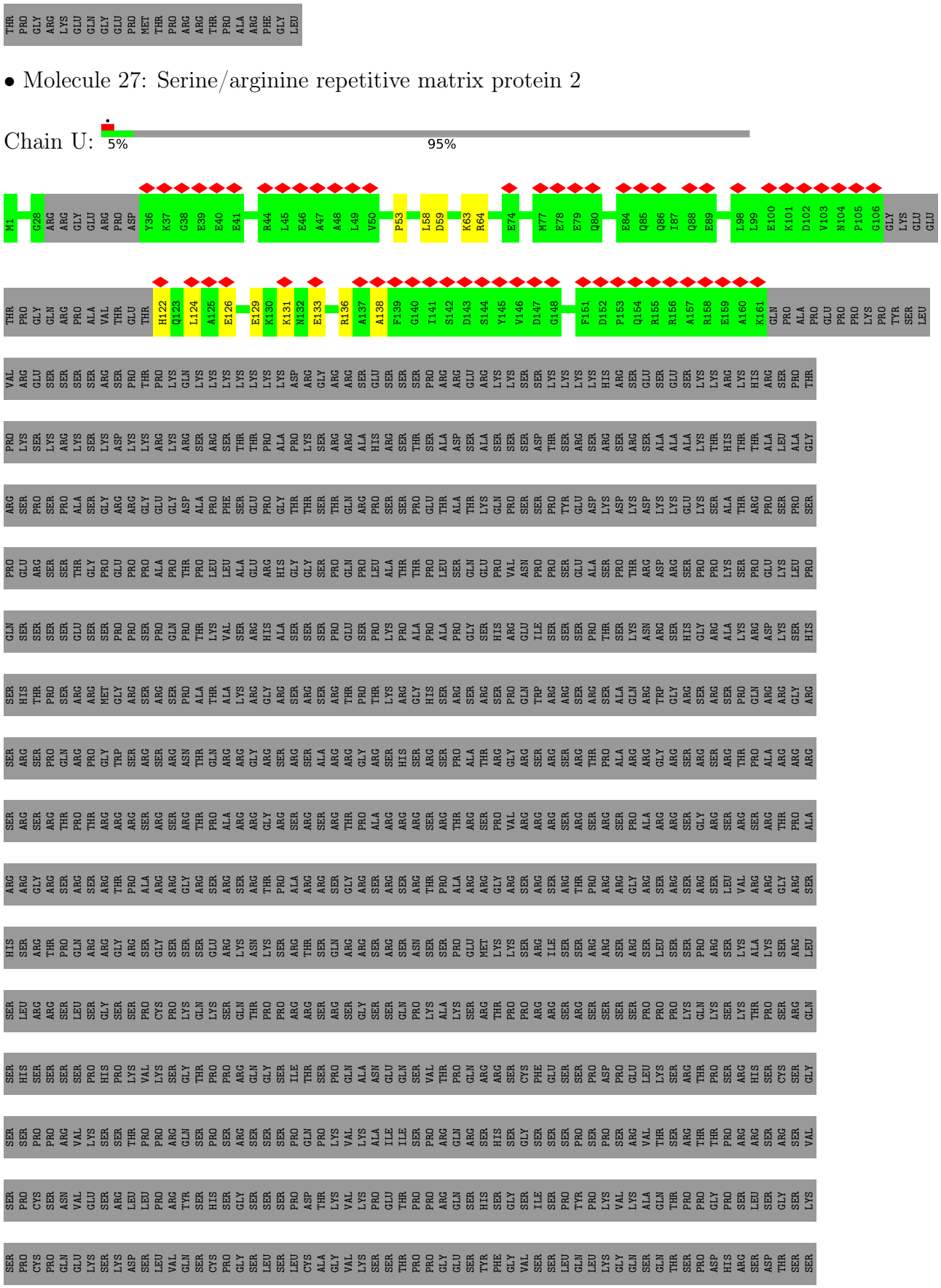
ARG TYR THR GLY ASP THR ILE SER MET ALA GLN THR GLN LEU PHE ALA TRP GLU ALA TYR ASP LYS GLY SER GLU VAL HIS LEU GLN ALA ASP PRO THR LYS LEU GLU LEU LEU TYR LYS SER PHE LYS VAL LYS LYS GLU ASP PHE PHE LYS GLU GLN LYS GLU SER ILE LEU GLU LYS

TYR GLY GLY GLN GLU HIS LEU ASP ALA PRO PRO ALA GLU LEU LEU ALA GLN THR GLU ASP TYR VAL GLU TYR SER ARG HIS GLY THR VAL ILE LYS GLY GLN GLU ARG ALA VAL ALA CYS SER LYS TYR GLU GLU ASP VAL LYS ILE HIS ASN HIS THR HIS ILE TRP GLY SER TYR

TRP LYS GLU GLY ARG TRP GLY TYR LYS CYS CYS HIS SER PHE PHE LYS TYR SER TYR CYS THR GLY GLU ALA GLY LYS GLU ILE VAL ASN SER GLU GLU CYS ILE ILE ASN GLU ILE THR GLY GLU GLU GLU SER VAL LYS LYS PRO GLN THR LEU MET GLU GLU LEU HIS GLN GLU LYS LYS

GLU GLU LYS LYS LYS LYS LYS LYS LYS LYS HIS ARG LYS SER SER SER ASP SER ASP ASP GLU GLU LYS LYS HIS GLU LYS LEU LYS LYS ALA LEU ASN ALA GLU GLU ALA ARG LEU LEU HIS VAL LYS GLU THR MET GLN ILE ASP GLU ARG LYS ARG PRO TYR ASN SER MET


TYR GLU THR ARG GLU PRO THR GLU GLU GLU MET GLU ALA TYR ARG MET LYS ARG GLN ARG PRO ASP ASP PRO MET ALA SER PHE LEU GLY GLN
• Molecule 26: Pre-mRNA-splicing factor ATP-dependent RNA helicase PRP16
Chain T:
12%
52%
11%
•
37%
MET GLY ASP THR SER GLU ASP ALA SER ILE HIS ARG LEU GLU GLY THR ASP LEU ASP CYS GLN VAL GLY GLY LEU ILE CYS LYS SER LYS SER ALA ALA SER GLU GLU GLN HIS VAL PHE LYS ALA PRO ALA PRO ARG PRO SER LEU LEU GLY LEU ASP LEU LEU ALA SER LEU LYS ARG ARG
GLU ARG GLU GLU LYS ASP ASP GLY GLU ASP LYS LYS LYS SER LYS VAL SER SER TYR LYS ASP TRP GLU GLU SER LYS ASP ASP GLN LYS ASP ALA GLU GLU GLU GLY GLY ASP GLN ALA GLY GLN ASN ILE ARG LYS ASP ARG HIS TYR ARG SER ALA ARG VAL GLU THR PRO SER HIS
PRO GLY GLY VAL SER GLU GLU PHE TRP GLU ARG SER ARG GLN ARG GLU ARG ARG GLU ARG GLU HIS GLU VAL TYR ALA SER SER LYS GLU GLU LYS ASP TRP LYS LYS GLU LYS SER ARG ASP ASP ARG ASP TYR ASP ARG LYS ARG ASP ARG ASP GLU ARG ASP ARG SER ARG HIS SER SER
ARG SER GLU ARG ASP GLY GLY SER GLU ARG SER SER ARG ARG ARG ASN GLU PRO GLU SER PRO ARG HIS ARG GLY PRO LYS ASP ALA ALA THR PRO SER ARG SER THR TRP GLU GLU GLU ASP SER GLY TYR GLY SER SER ARG ARG SER GLN TRP GLU SER PRO SER PRO THR PRO SER TYR ARG
ASP SER GLU ARG SER HIS ARG LEU SER THR ARG ASP ARG ARG ASP SER VAL ARG GLY LYS TYR SER ASP ASP ASP THR PRO LEU PRO THR PRO SER TYR LYS TYR ASN GLU TRP ALA ASP ASP ARG ARG HIS LEU GLY SER THR PRO ARG LEU SER ARG GLY ARG ARG ARG GLU GLU GLY
GLU GLU GLY ILE SER PHE ASP THR GLU GLU GLU ARG GLN GLN TRP GLU ASP ASP GLN ARG GLN ALA ASP ARG ASP TRP TYR MET MET ASP GLU GLY TYR ASP GLU PHE HIS ASN PRO LEU ALA TYR SER SER GLU ASP TYR VAL ARG ARG ARG GLU GLN HIS LEU HIS LYS GLN LYS GLN
K361 S364 A365 Q366 R367 R368 E375 R381 M382 L383 R390 E398 E399 D400 N401 A402 A403 K404 V405 H406 P414 L417 D418 G419 R420 K425 E428 P429 V430 I431 P432 V433 K434 D435 A436 T437 Q449 R452 K453 H454 K458 E459 R460 K461 K462 A463 Q464 H465
K466 H467 W468 E469 LEU ALA GLY THR LYS LEU GLY ASP ILE MET GLY VAL LYS LYS GLU GLU PRO ASP LYS ALA VAL THR GLU ASP GLY LYS VAL ASP TYR ARG THR GLU GLN LYS PHE ALA ASP HIS MET LYS ARG LYS SER GLU ALA SER SER GLU PHE ALA LYS LYS K523 S524 I525
R529 Q530 Y531 L532 P533 A536 Q539 E540 L541 I545 I550 V551 G555 G558 S559 G560 L565 L569 H570 E571 D576 Y577 G578 M579 I580 R586 V597 S598 E599 E600 M601 G602 G603 N604 L605 E608 V609 D617 N622 D630 G631 L634 R635
E636 S637 L638 R639 E640 A641 D642 L643 D644 H645 Y646 I649 I650 L659 L667 V672 A673 R674 R675 S676 D677 L678 K679 L680 I681 A694 G697 P700 I701 F702 P705 G706 R707 I713 K717 E721 E725 S731 V734 G738 A739 D742 I743 L744
I753 L764 E765 L767 E768 A772 S780 Q781 L782 P783 S784 D785 Q792 K793 A794 P795 D796 G797 V798 R799 V803 N806 I807 T810 S811 L812 T813 V814 D815 G816 I817 V820 I821 D822 N832 I835 G836 M837 G855 R856 R859 F866 R867 K875
P884 E885 I886 Q887 R888 T889 V894 V895 L896 S900 L901 L906 L907 Q908 D934 T940 G943 R944 L945 M946 V947 A954 M958 L959 C963 S968 I971 L972 L973 I974 I983 F984 Y985 R986 P987 K988 G989 R990 E991 E992 D995 R998 E999 K1000 F1001
A1002 H1008 N1020 C1028 I1033 H1034 A1035 L1048 R1056 M1057 A1060 S1061 C1062 G1063 T1064 D1065 W1066 D1067 I1068 A1075 K1085 G1086 E1089 Y1090 V1091 T1095 C1099 S1106 L1107 M1110 G1111 Y1112 T1113 P1114 D1115 Y1116 I1117 H1120 E1121 L1122 E1128 Y1129 M1130 Q1131
C1132 A1135 L1141 A1142 E1143 L1144 G1145 P1146 V1151 K1152 Q1153 A1154 G1155 R1158 Q1159 R1162 R1163 K1166 E1167 E1168 A1169 S1170 E1174 A1177 L1178 A1179 E1180 E1181 Q1182 L1183 R1184 A1185 R1186 R1187 Q1188 E1189 Q1190 E1191 K1192 ARG SER PRO LEU GLY SER VAL ARG SER THR LYS ILE TYR


THR PRO GLY ARG LYS GLU GLN GLY GLU PRO MET THR PRO ARG ARG THR PRO ALA ARG PHE GLY LEU
• Molecule 27: Serine/arginine repetitive matrix protein 2
Chain U:
5%
95%
M1 G28 ARG ARG GLY GLU ARG PRO ASP Y36 K37 G38 E39 E40 E41 R44 L45 E46 A47 A48 L49 V50 P53 L58 D59 K63 R64 E74 M77 E78 E79 Q80 E84 Q85 Q86 I87 Q88 E89 L98 L99 E100 K101 D102 V103 N104 P105 G106 GLY LYS GLU GLU
THR PRO GLY GLN ARG PRO ALA VAL THR GLU THR H122 Q123 L124 A125 E126 E129 K130 K131 N132 E133 R136 A137 A138 F139 G140 I141 S142 D143 S144 Y145 V146 D147 G148 F151 D152 P153 Q154 R155 R156 A157 R158 E159 A160 K161 GLN PRO ALA PRO GLU PRO PRO LYS PRO TYR SER LEU

PRO GLU VAL ARG GLN SER HIS SER GLU SER PRO SER LEU GLN SER LYS SER GLN THR SER PRO LYS GLY GLY ARG SER ARG SER SER SER PRO VAL THR GLU LEU ALA SER ARG SER PRO ILE ARG GLN ASP ARG GLY GLU PHE SER ALA SER PRO MET LEU LYS SER GLY MET SER PRO

GLU GLN SER ARG PHE GLN SER ASP SER SER SER TYR PRO THR VAL ASP SER ASN SER LEU LEU GLY GLN SER ARG LEU GLU THR ALA GLU SER LYS GLU LYS MET ALA LEU PRO PRO GLN GLU ASP ALA THR ALA SER PRO PRO ARG GLN LYS ASP LYS PHE SER PRO PHE PRO VAL GLN

ASP ARG PRO GLU SER SER LEU VAL PHE LYS ASP THR LEU ARG THR PRO PRO ARG GLU ARG SER GLY ALA GLY SER SER PRO GLU THR LYS GLU GLN ASN SER ALA LEU PRO THR SER SER GLN ASP GLU GLU LEU MET GLU VAL VAL GLU LYS SER GLU GLU PRO ALA GLY GLN ILE LEU

SER HIS LEU SER SER GLU LEU LYS GLU MET SER THR SER ASN PHE GLU SER SER PRO GLU VAL GLU GLU ARG PRO ALA VAL SER LEU THR LEU ASP GLN SER GLN SER GLN ALA SER LEU GLU ALA VAL GLU VAL PRO SER MET ALA SER SER TRP GLY GLY PRO HIS PHE SER PRO GLU

HIS LYS GLU LEU SER ASN SER PRO LEU ARG GLU ASN SER PHE GLY SER PRO LEU GLU PHE ARG ASN SER GLY PRO LEU GLY THR GLU MET ASN THR GLY PHE SER SER GLU VAL LYS GLU ASP LEU ASN GLY PRO PHE LEU ASN GLN LEU GLU THR ASP PRO SER LEU ASP MET LYS GLU

GLN SER THR ARG SER SER GLY HIS SER SER SER GLU LEU SER PRO ASP ALA VAL GLU LYS ALA GLY MET SER SER ASN GLN SER ILE SER SER PRO VAL LEU ASP ALA VAL PRO ARG THR PRO SER ARG GLU ARG SER SER SER ALA SER SER PRO GLU MET LYS ASP GLY LEU PRO ARG

THR PRO SER ARG ARG SER ARG SER GLY SER SER PRO GLY LEU ARG ASP GLY SER GLY THR PRO SER ARG HIS SER LEU SER GLY SER SER PRO GLY MET LYS ASP ILE PRO ARG THR PRO SER ARG GLY ARG SER GLU CYS ASP SER SER PRO GLU PRO LYS ALA LEU PRO GLN THR PRO

ARG PRO ARG SER ARG SER PRO SER SER PRO GLU LEU ASN ASN LYS CYS LEU THR PRO GLN ARG GLU ARG SER GLY SER GLU SER SER VAL ASP GLN LYS THR VAL ALA ARG THR PRO LEU GLY GLN ARG SER ARG SER GLY SER SER GLN GLU LEU ASP VAL LYS PRO SER ALA SER PRO

GLN GLU ARG SER GLU SER ASP SER SER PRO ASP SER LYS ALA LYS THR ARG THR PRO LEU ARG GLN ARG SER ARG SER GLY SER SER PRO GLU VAL ASP SER LYS SER ARG LEU SER PRO ARG ARG SER ARG SER GLY SER SER PRO GLU VAL LYS ASP LYS PRO ARG ALA ALA PRO ARG

ALA GLN SER GLY SER ASP SER SER PRO GLU PRO LYS ALA PRO ALA PRO ARG ALA LEU PRO ARG ARG SER ARG SER GLY SER SER SER LYS GLY ARG GLY PRO SER PRO GLU GLY SER SER SER THR GLU SER SER PRO GLU HIS PRO PRO LYS SER ARG THR ALA ARG ARG GLY SER ARG

SER SER PRO GLU PRO LYS THR LYS SER ARG THR PRO PRO ARG ARG ARG SER SER ARG SER SER PRO GLU LEU THR ARG LYS ALA ARG LEU SER ARG ARG SER ARG SER ALA SER SER SER PRO GLU THR ARG SER ARG THR PRO PRO ARG HIS ARG ARG SER PRO SER VAL SER SER PRO

GLU PRO ALA GLU LYS SER ARG SER SER ARG ARG ARG ARG SER ALA SER SER PRO ARG THR LYS THR THR SER ARG ARG GLY ARG SER PRO SER PRO LYS PRO ARG GLY LEU GLN ARG SER ARG SER ARG SER ARG ARG GLU LYS THR ARG THR THR ARG ARG ARG ASP ARG SER GLY SER

SER GLN SER THR SER ARG ARG ARG GLN ARG SER ARG SER ARG SER ARG VAL THR ARG ARG ARG ARG GLY GLY SER GLY TYR HIS SER ARG SER PRO ALA ARG GLN GLU SER SER ARG THR SER SER ARG ARG ARG ARG GLY ARG SER ARG THR PRO PRO THR SER ARG LYS ARG SER ARG

SER ARG THR SER PRO ALA PRO TRP LYS ARG SER ARG SER ARG ALA SER PRO ALA THR HIS ARG ARG SER ARG SER ARG THR PRO LEU ILE SER ARG ARG ARG SER ARG SER ARG THR SER PRO VAL SER ARG ARG ARG SER ARG SER ARG THR SER VAL THR ARG ARG ARG SER ARG SER

ARG ALA SER PRO VAL SER ARG ARG ARG SER ARG SER ARG THR PRO PRO VAL THR ARG ARG ARG SER ARG SER ARG THR PRO THR THR ARG ARG ARG SER ARG SER ARG THR PRO PRO VAL THR ARG ARG ARG SER ARG SER ARG THR PRO PRO VAL THR ARG ARG ARG SER ARG SER ARG

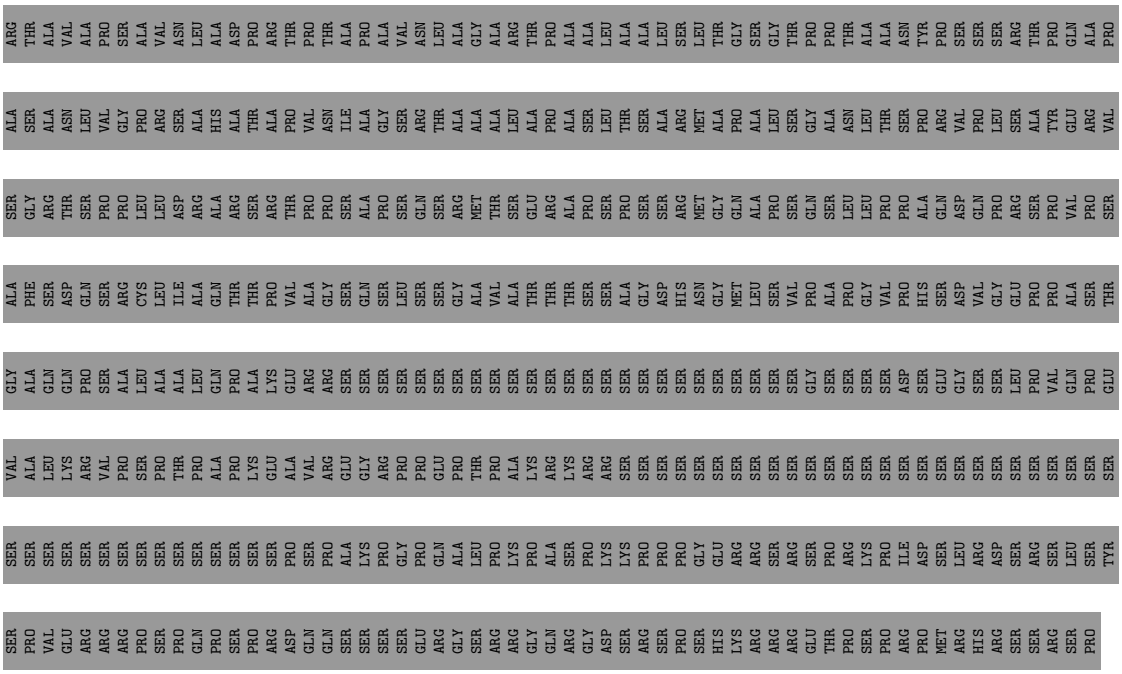
THR SER PRO ILE THR ARG ARG ARG SER ARG SER ARG THR SER PRO VAL THR ARG ARG ARG SER ARG SER ARG THR SER PRO VAL THR ARG ARG ARG SER ARG SER ARG THR SER PRO VAL THR ARG ARG ARG SER ARG SER ARG THR PRO PRO ALA ILE ARG ARG ARG SER ARG SER ARG

THR PRO LEU LEU PRO ARG LYS ARG SER ARG SER ARG SER PRO LEU ALA ILE ARG ARG ARG SER ARG SER ARG THR PRO ARG THR ALA ARG GLY LYS ARG SER LEU THR ARG SER PRO PRO ALA ILE ARG ARG ARG SER ALA SER GLY SER SER SER ASP ARG SER ARG SER ALA THR PRO

PRO ALA THR ARG ASN HIS SER GLY SER ARG THR PRO PRO VAL ALA LEU ASN SER SER ARG MET SER CYS PHE SER ARG PRO SER MET SER PRO THR PRO LEU ASP ARG CYS ARG SER PRO GLY MET LEU GLU PRO LEU GLY SER SER ARG THR PRO MET SER VAL LEU GLN GLN ALA GLY

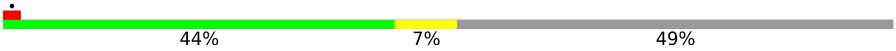
GLY SER MET MET ASP GLY PRO GLY PRO ARG ILE PRO ASP HIS GLN ARG THR SER VAL PRO GLU ASN HIS ALA GLN SER ARG ILE ALA LEU ALA LEU THR ALA ILE SER LEU GLY THR ALA ARG PRO PRO PRO SER MET SER ALA ALA GLY LEU ALA ALA ARG MET SER GLN VAL PRO ALA

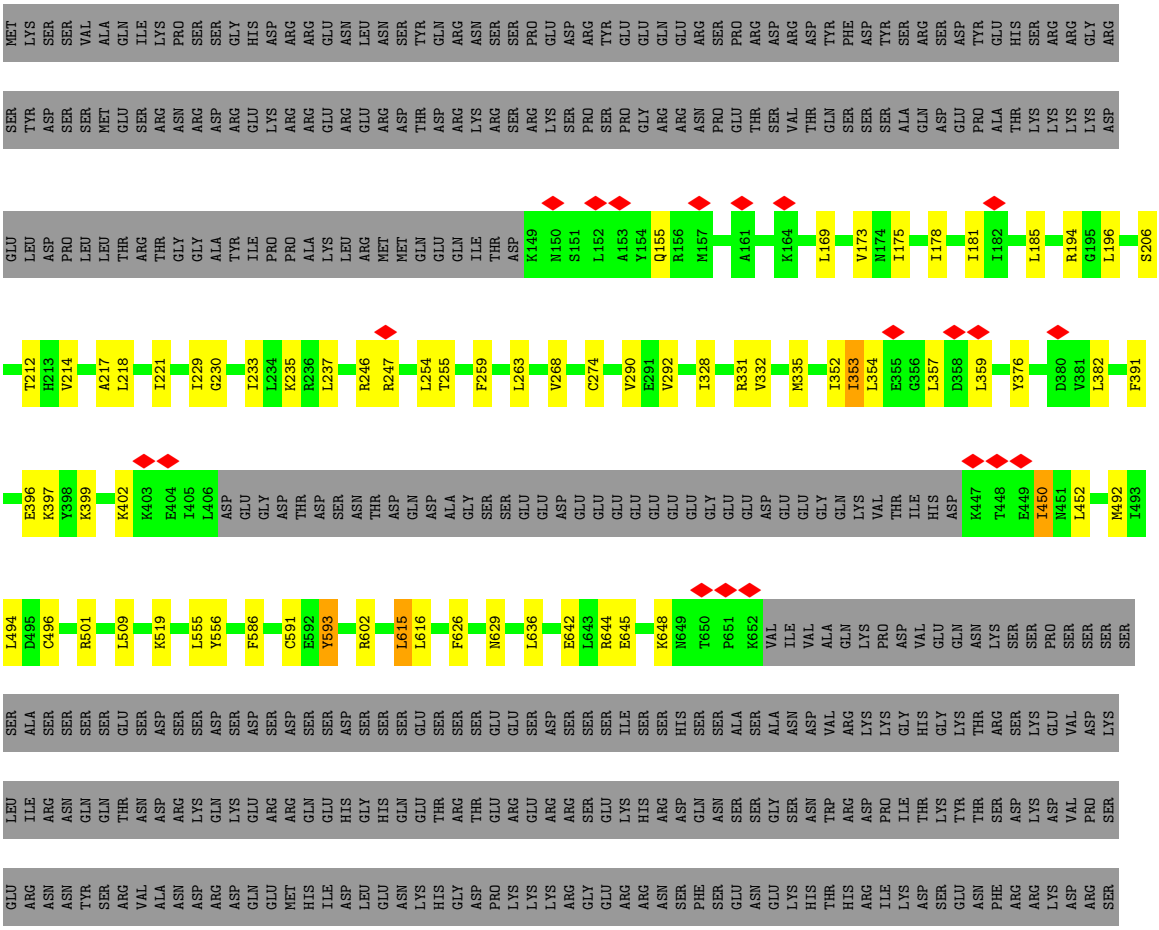
PRO VAL PRO LEU MET SER LEU ARG THR ALA PRO ALA ALA ASN LEU ALA SER ARG ILE PRO ALA ALA SER ALA ALA ALA MET ASN LEU ALA SER ALA ARG THR PRO ALA ILE PRO THR ALA VAL ASN LEU ALA ASP SER ARG THR PRO ALA ALA ALA ALA ALA MET ASN LEU ALA SER PRO



- Molecule 28: Pre-mRNA-splicing factor CWC22 homolog

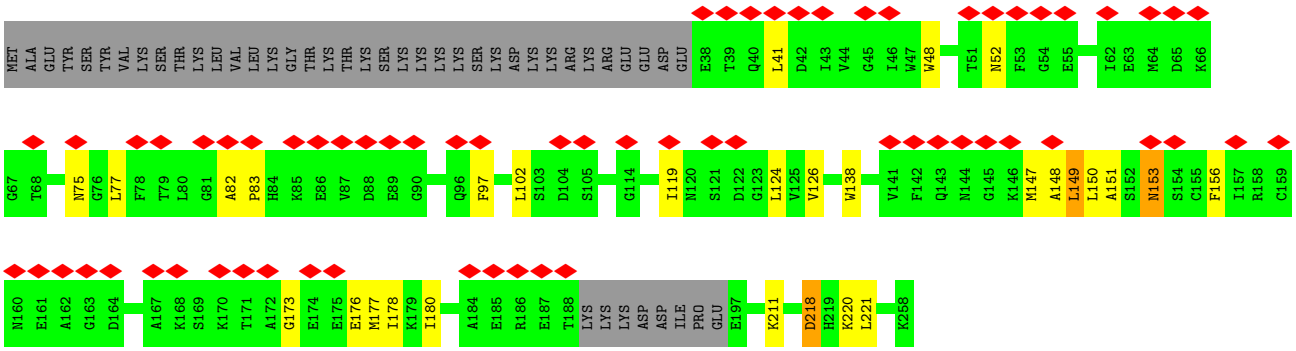
Chain V:





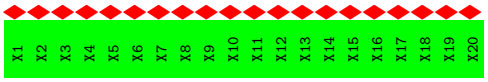
- Molecule 29: Protein FRG1

Chain X:



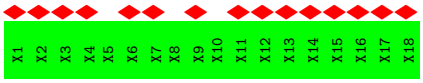
- Molecule 30: Unknown polymer

Chain X1:



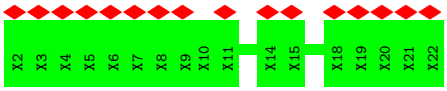
- Molecule 31: Unknown polymer

Chain X2:



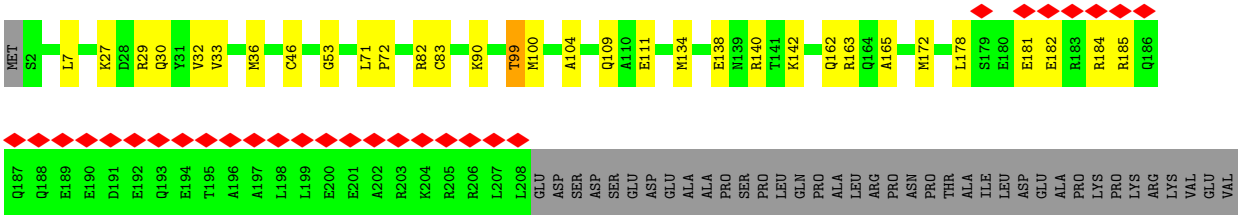
- Molecule 32: Unknown polymer

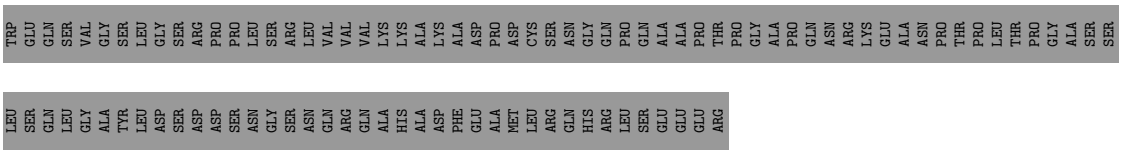
Chain X3:



- Molecule 33: Splicing factor YJU2

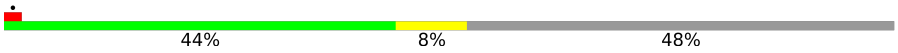
Chain Y:

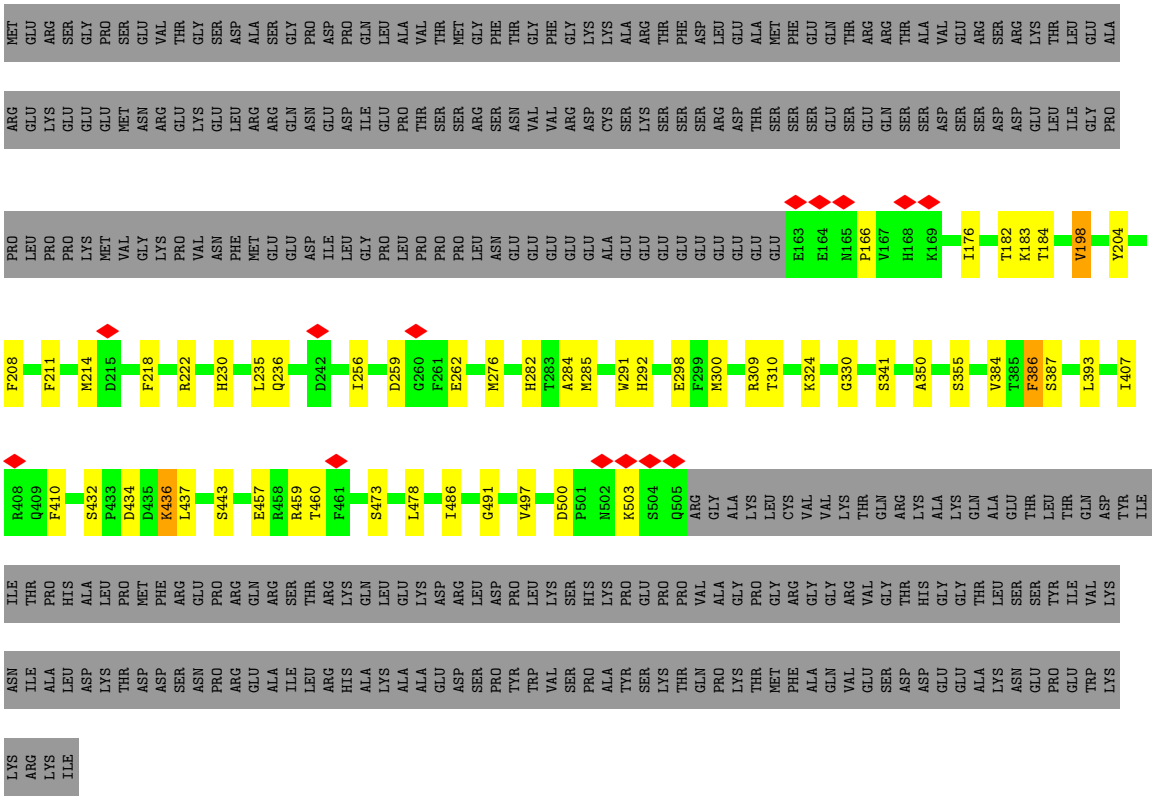




• Molecule 34: WD repeat-containing protein 70

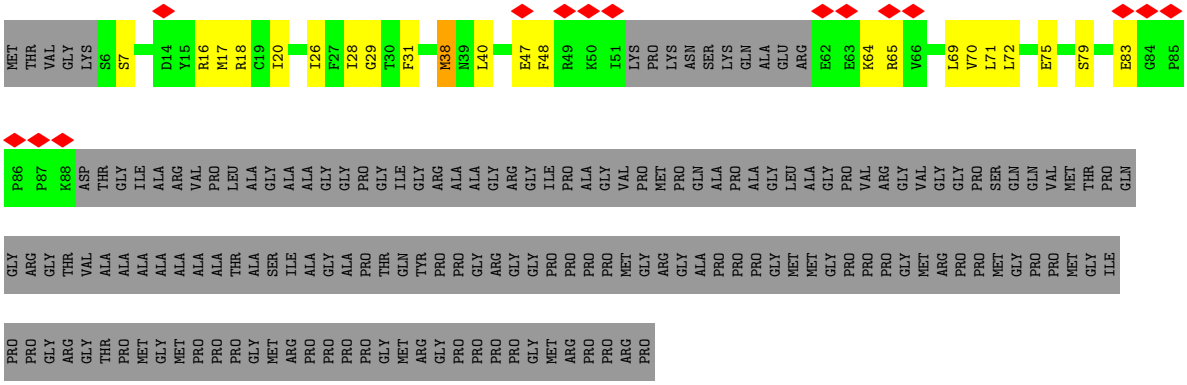
Chain Z:





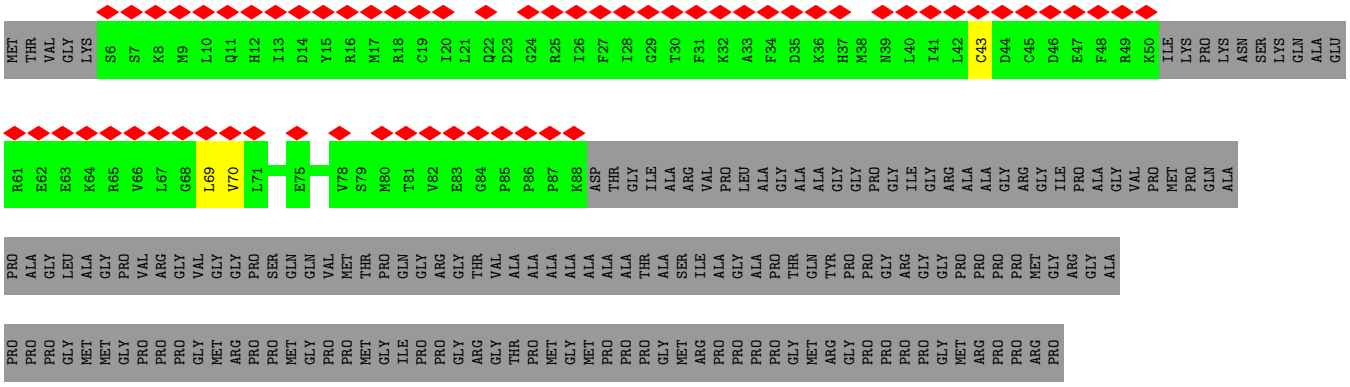
• Molecule 35: Small nuclear ribonucleoprotein-associated proteins B and B'

Chain a:



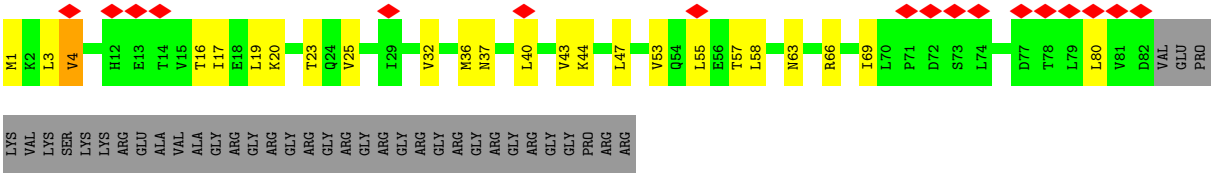
• Molecule 35: Small nuclear ribonucleoprotein-associated proteins B and B'

Chain h:



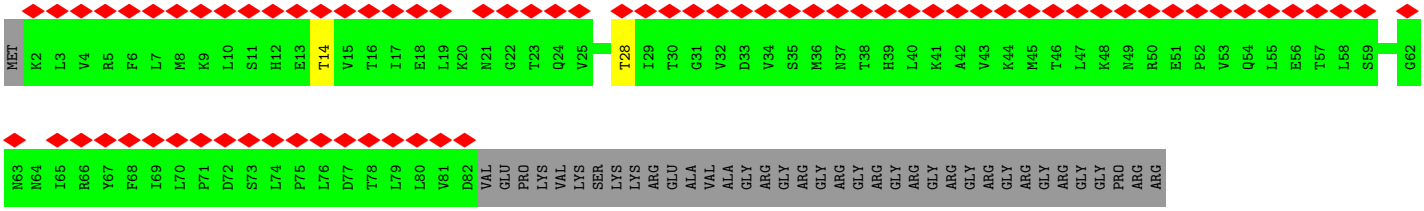
• Molecule 36: Small nuclear ribonucleoprotein Sm D1

Chain b:



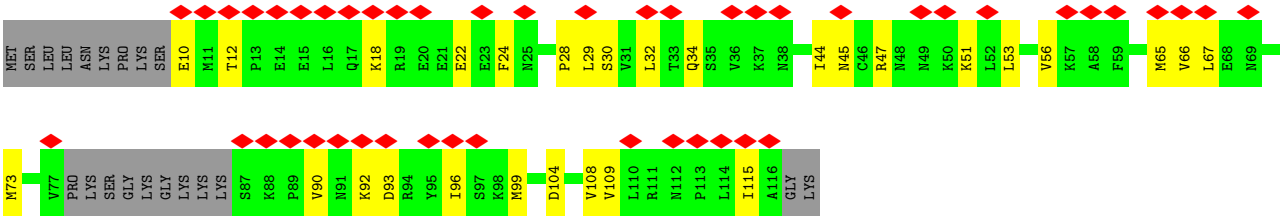
• Molecule 36: Small nuclear ribonucleoprotein Sm D1

Chain i:



• Molecule 37: Small nuclear ribonucleoprotein Sm D2

Chain c:

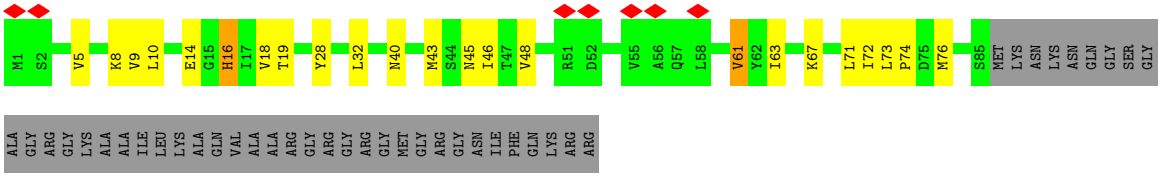


• Molecule 37: Small nuclear ribonucleoprotein Sm D2

Chain j:

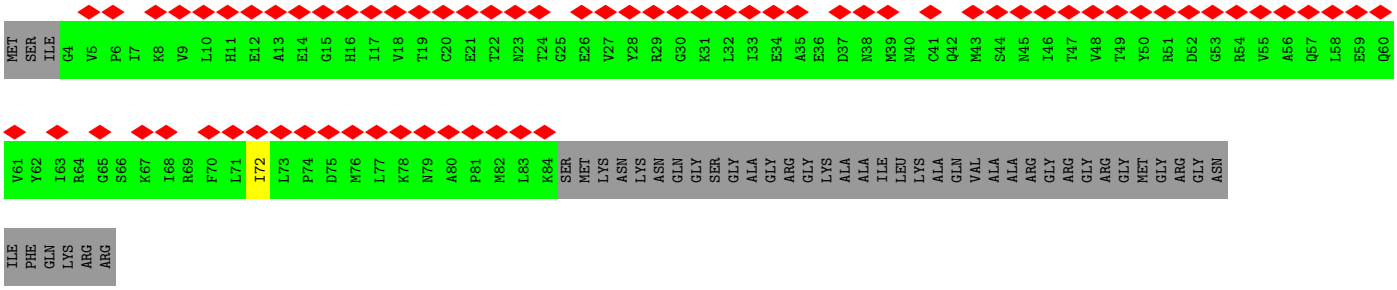
• Molecule 38: Small nuclear ribonucleoprotein Sm D3

Chain d:



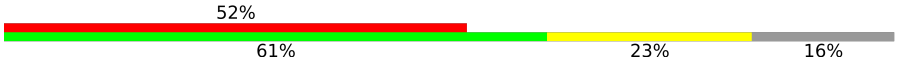
• Molecule 38: Small nuclear ribonucleoprotein Sm D3

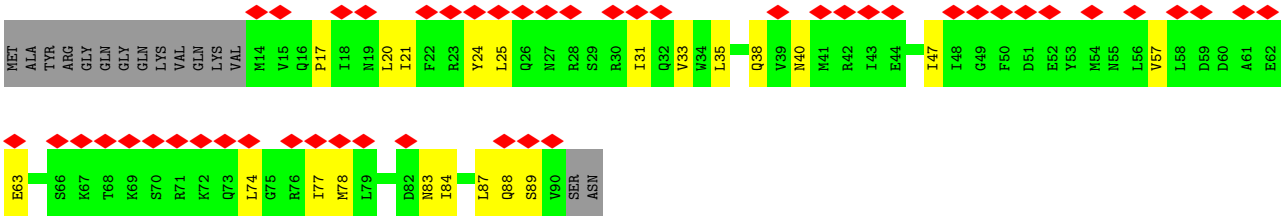
Chain k:



• Molecule 39: Small nuclear ribonucleoprotein E

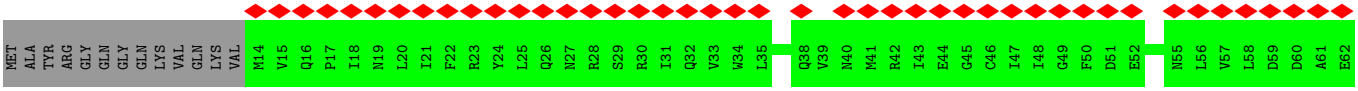
Chain e:

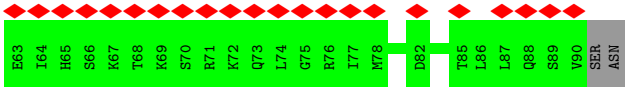




• Molecule 39: Small nuclear ribonucleoprotein E

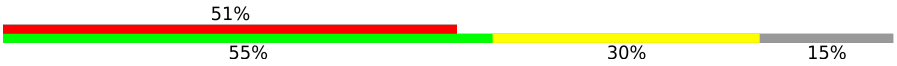
Chain l:

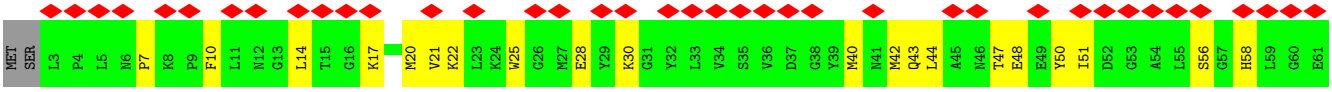


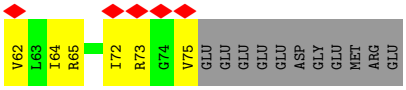


• Molecule 40: Small nuclear ribonucleoprotein F

Chain f:

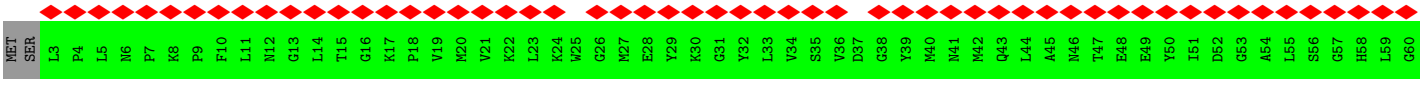


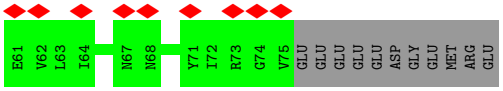




• Molecule 40: Small nuclear ribonucleoprotein F

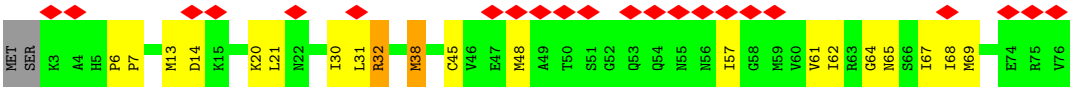
Chain m:





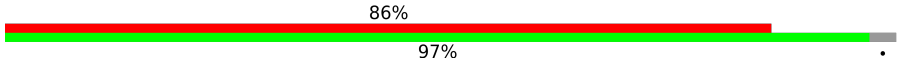
• Molecule 41: Small nuclear ribonucleoprotein G

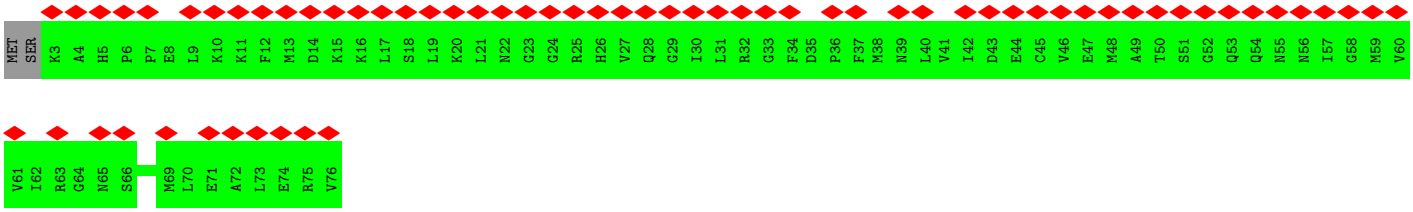
Chain g:



• Molecule 41: Small nuclear ribonucleoprotein G

Chain n:





• Molecule 42: Pre-mRNA-processing factor 19

Chain q:

M1 S2 L3 I4 C5 S6 I7 S8 N9 E10 V11 P12 E13 H14 P15 C16 V17 S18 P19 V20 S21 N22 H23 V24 Y25 E26 R27 R28 L29 I30 E31 K32 Y33 I34 A35 E36 N37 G38 T39 D40 P41 I42 N43 N44 Q45 P46 L47 S48 E49 E50 Q51 L52 I53 D54 I55 K56 V57 A58 H59 P60

I61 R62 P63 K64 P65 P66 S67 A68 T69 S70 I71 P72 A73 I74 L75 K76 A77 L78 Q79 D80 E81 W82 D83 A84 V85 M86 L87 H88 S89 L92 R93 Q94 Q95 L96 Q97 T98 T99 R100 Q101 E102 L103 S104 H105 A106 L107 Y108 Q109 H110 D111 A112 A113 C114 R115 V116 I117 A118 R119 L120 T121

K122 E123 V124 T125 A126 A127 R128 E129 A130 L131 A132 T133 L134 K135 P136 Q137 ALA GLY LEU ILE VAL PRO GLN ALA VAL PRO SER SER GLN PRO SER VAL VAL GLY ALA GLY GLU PRO MET ASP LEU GLY GLU LEU VAL GLY MET THR PRO GLU ILE ILE GLN LYS LEU GLN ASP LYS ALA THR

VAL LEU THR THR GLU ARG LYS LYS ARG GLY LYS THR VAL PRO GLU GLU LEU VAL LYS PRO GLU GLU LEU SER LYS TYR ARG GLN VAL ALA SER HIS VAL GLY LEU HIS SER ALA SER ILE PRO GLY ILE LEU ALA LEU ASP LEU CYS PRO SER ASP THR ASN LYS ILE LEU THR GLY GLY

ALA ASP LYS ASN VAL VAL VAL PHE ASP LYS SER SER GLU GLN ILE LEU ALA THR LEU LYS GLY HIS THR LYS LYS VAL THR SER VAL VAL PHE HIS PRO SER GLN ASP LEU VAL PHE SER ALA SER PRO ASP ALA THR ILE ARG ILE TRP SER VAL PRO ASN ALA SER CYS VAL GLN VAL

VAL ARG ALA HIS GLU SER ALA VAL THR GLY LEU SER LEU HIS ALA THR GLY ASP TYR LEU LEU SER SER SER ASP ASP GLN TYR TRP ALA PHE SER ASP ILE GLN THR GLY ARG VAL LEU THR LYS VAL THR ASP GLU THR SER GLY CYS SER LEU THR CYS ALA GLN PHE HIS PRO ASP

GLY LEU ILE PHE GLY THR GLY THR MET ASP SER GLN ILE LYS ILE TRP ASP LEU LYS GLU ARG THR ASN VAL ALA ASN PHE PRO GLY HIS SER GLY PRO ILE THR SER ILE ALA PHE SER GLU ASN GLY TYR TYR LEU ALA THR ALA ALA ASP ASP SER SER VAL LYS LEU TRP ASP LEU

ARG LYS LEU LYS ASN PHE LYS THR LEU GLN GLN LEU ASP ASN ASN PHE GLU VAL LYS SER LEU ILE PHE ASP GLN SER GLY THR TYR LEU ALA LEU GLY GLY THR ASP VAL GLN ILE TYR ILE CYS LYS GLN TRP THR GLU ILE LEU HIS PHE THR GLU HIS SER GLY LEU THR THR GLY VAL

ALA PHE GLY HIS HIS ALA LYS PHE ILE ALA SER THR GLY MET ASP ARG SER LEU LYS PHE TYR SER LEU

- Molecule 42: Pre-mRNA-processing factor 19

Chain r: 26% 26% 73%

M1 S2 L3 I4 C5 S6 I7 S8 N9 E10 V11 P12 E13 H14 P15 C16 V17 S18 P19 V20 S21 N22 H23 V24 Y25 E26 R27 R28 L29 I30 E31 K32 Y33 I34 A35 E36 N37 G38 T39 D40 P41 I42 N43 N44 Q45 P46 L47 S48 E49 E50 Q51 L52 I53 D54 I55 K56 V57 A58 H59 P60

I61 R62 P63 K64 P65 P66 S67 A68 T69 S70 I71 P72 A73 I74 L75 K76 A77 L78 Q79 D80 E81 W82 D83 A84 V85 M86 L87 H88 S89 F90 T91 L92 R93 Q94 Q95 L96 Q97 T98 T99 R100 Q101 E102 L103 S104 H105 A106 L107 Y108 Q109 H110 D111 A112 A113 C114 R115 V116 I117 A118 R119 L120

T121 K122 E123 V124 T125 A126 A127 R128 E129 A130 L131 A132 T133 L134 K135 PRO GLN ALA GLY LEU ILE VAL PRO GLN ALA VAL PRO SER SER GLN PRO SER VAL VAL GLY ALA GLY GLU PRO MET ASP LEU GLY GLU LEU VAL GLY MET THR PRO GLU ILE ILE GLN LYS LEU GLN ASP LYS ALA

THR VAL LEU THR THR GLU ARG LYS LYS ARG GLY LYS THR VAL PRO GLU GLU LEU VAL LYS PRO GLU GLU LEU SER LYS TYR ARG GLN VAL ALA SER HIS VAL GLY LEU HIS SER ALA SER ILE PRO GLY ILE LEU ALA LEU ASP LEU CYS PRO SER ASP THR ASN LYS ILE LEU THR GLY

GLY ALA ASP LYS ASN VAL VAL VAL PHE ASP LYS SER SER GLU GLN ILE LEU ALA THR LEU LYS GLY HIS THR LYS LYS VAL THR SER VAL VAL PHE HIS PRO SER GLN ASP LEU VAL PHE SER ALA SER PRO ASP ALA THR ILE ARG ILE TRP SER VAL PRO ASN ALA SER CYS VAL GLN

VAL VAL ARG ALA HIS GLU SER ALA VAL THR GLY LEU SER LEU HIS ALA THR GLY ASP TYR LEU LEU SER SER SER ASP ASP GLN TYR TRP ALA PHE SER ASP ILE GLN THR GLY ARG VAL LEU THR LYS VAL THR ASP GLU THR SER GLY CYS SER LEU THR CYS ALA GLN PHE HIS PRO

ASP GLY LEU ILE PHE GLY THR GLY THR MET ASP SER GLN ILE LYS ILE TRP ASP LEU LYS GLU ARG THR ASN VAL ALA ASN PHE PRO GLY HIS SER GLY PRO ILE THR SER ILE ALA PHE SER GLU ASN GLY TYR TYR LEU ALA THR ALA ALA ASP ASP SER SER VAL LYS LEU TRP ASP

LEU ARG LYS LEU LYS ASN PHE LYS THR LEU GLN LEU ASP ASN ASN PHE GLU VAL LYS SER LEU ILE PHE ASP GLN SER GLY THR TYR LEU ALA LEU GLY GLY THR ASP VAL GLN ILE TYR ILE CYS LYS GLN TRP THR GLU ILE LEU HIS PHE THR GLU HIS SER GLY LEU THR THR GLY

VAL ALA PHE GLY HIS HIS ALA LYS PHE ILE ALA SER THR GLY MET ASP ARG SER LEU LYS PHE TYR SER LEU

- Molecule 42: Pre-mRNA-processing factor 19

Chain s: 27% 27% 73%

M1 S2 L3 I4 C5 S6 I7 S8 N9 E10 V11 P12 E13 H14 P15 C16 V17 S18 P19 V20 S21 N22 H23 V24 Y25 E26 R27 R28 L29 I30 E31 K32 Y33 I34 A35 E36 N37 G38 T39 D40 P41 I42 N43 N44 Q45 P46 L47 S48 E49 E50 Q51 L52 I53 D54 I55 K56 V57 A58 H59 P60

I61 R62 P63 K64 P65 P66 S67 A68 T69 S70 I71 P72 A73 I74 L75 K76 A77 L78 Q79 D80 E81 W82 D83 A84 V85 M86 L87 H88 S89 F90 T91 L92 R93 Q94 Q95 L96 Q97 T98 T99 R100 Q101 E102 L103 S104 H105 A106 L107 Y108 Q109 H110 D111 A112 A113 C114 R115 V116 I117 A118 R119 L120

T121 K122 E123 V124 T125 A126 A127 R128 E129 A130 L131 A132 T133 L134 K135 P136 Q137 A138 GLY LEU ILE VAL PRO GLN ALA VAL PRO SER SER GLN PRO SER VAL VAL GLY ALA GLY GLU PRO MET ASP LEU GLY GLU LEU VAL GLY MET THR PRO GLU ILE ILE GLN LYS LEU GLN ASP LYS ALA

THR VAL LEU THR THR GLU ARG LYS LYS ARG GLY LYS THR VAL PRO GLU GLU LEU VAL LYS PRO GLU GLU LEU SER LYS TYR ARG GLN VAL ALA SER HIS VAL GLY LEU HIS SER ALA SER ILE PRO GLY ILE LEU ALA LEU ASP LEU CYS PRO SER ASP THR ASN LYS ILE LEU THR GLY

GLY ALA ASP LYS ASN VAL VAL VAL PHE ASP LYS SER SER GLU GLN ILE LEU ALA THR LEU LYS GLY HIS THR LYS LYS VAL THR SER VAL VAL PHE HIS PRO SER GLN ASP LEU VAL PHE SER ALA SER PRO ASP ALA THR ILE ARG ILE TRP SER VAL PRO ASN ALA SER CYS VAL GLN

VAL VAL ARG ALA HIS GLU SER ALA VAL THR GLY LEU SER LEU HIS ALA THR GLY ASP TYR LEU LEU SER SER SER ASP ASP GLN TYR TRP ALA PHE SER ASP ILE GLN THR GLY ARG VAL LEU THR LYS VAL THR ASP GLU THR SER GLY CYS SER LEU THR CYS ALA GLN PHE HIS PRO

ASP GLY LEU ILE PHE GLY THR GLY THR MET ASP SER GLN ILE LYS ILE TRP ASP LEU LYS SER GLU ARG THR ASN VAL ALA ASN PHE PRO GLY HIS SER GLY PRO ILE THR SER ILE ALA PHE SER GLU ASN GLY TYR TYR LEU ALA THR ALA ALA ASP ASP SER SER VAL LYS LEU TRP ASP

LEU ARG LYS LEU LYS ASN PHE LYS THR LEU GLN LEU ASP ASN ASN PHE GLU VAL LYS SER LEU ILE PHE ASP GLN SER GLY THR TYR LEU ALA LEU GLY GLY THR ASP VAL GLN ILE TYR ILE CYS LYS GLN TRP THR GLU ILE LEU HIS PHE THR GLU HIS SER GLY LEU THR THR GLY

VAL ALA PHE GLY HIS HIS ALA LYS PHE ILE ALA SER THR GLY MET ASP ARG SER LEU LYS PHE TYR SER LEU

- Molecule 42: Pre-mRNA-processing factor 19

Chain t: 27% 27% 73%

M1 S2 L3 I4 C5 S6 I7 S8 N9 E10 V11 P12 E13 H14 P15 C16 V17 S18 P19 V20 S21 N22 H23 V24 Y25 E26 R27 R28 L29 I30 E31 K32 Y33 I34 A35 E36 N37 G38 T39 D40 P41 I42 N43 N44 Q45 P46 L47 S48 E49 E50 Q51 L52 I53 D54 I55 K56 V57 A58 H59 P60

I61 R62 P63 K64 P65 P66 S67 A68 T69 S70 I71 P72 A73 I74 L75 K76 A77 L78 Q79 D80 E81 W82 D83 A84 V85 M86 L87 H88 S89 F90 T91 L92 R93 Q94 Q95 L96 Q97 T98 T99 R100 Q101 E102 L103 S104 H105 A106 L107 Y108 Q109 H110 D111 A112 A113 C114 R115 V116 I117 A118 R119 L120

T121 K122 E123 V124 T125 A126 A127 R128 E129 A130 L131 A132 T133 L134 K135 P136 GLN ALA GLY LEU ILE VAL PRO GLN ALA VAL PRO SER SER GLN PRO SER VAL VAL GLY ALA GLY GLU PRO MET ASP LEU GLY GLU LEU VAL GLY MET THR PRO GLU ILE ILE GLN LYS LEU GLN ASP LYS ALA

THR VAL LEU THR THR GLU ARG LYS LYS ARG GLY LYS THR VAL PRO GLU GLU LEU VAL LYS PRO GLU GLU LEU SER LYS TYR ARG GLN VAL ALA SER HIS VAL GLY LEU HIS SER ALA SER ILE PRO GLY ILE LEU ALA LEU ASP LEU CYS PRO SER ASP THR ASN LYS ILE LEU THR GLY

GLY ALA ASP LYS ASN VAL VAL VAL PHE ASP LYS SER SER GLU GLN ILE LEU ALA THR LEU LYS GLY HIS THR LYS LYS VAL THR SER VAL VAL PHE HIS PRO SER GLN ASP LEU VAL PHE SER ALA SER PRO ASP ALA THR ILE ARG ILE TRP SER VAL PRO ASN ALA SER CYS VAL GLN

VAL VAL ARG ALA HIS GLU SER ALA VAL THR GLY LEU SER LEU HIS ALA THR GLY ASP TYR LEU LEU SER SER SER SER ASP ASP GLN TYR TRP ALA PHE SER ASP ILE GLN THR GLY ARG VAL LEU THR LYS VAL THR ASP GLU GLN THR SER GLY CYS SER LEU THR CYS ALA GLN PHE HIS PRO

ASP GLY LEU ILE PHE GLY THR GLY THR MET ASP SER GLN ILE LYS ILE TRP ASP LEU LYS GLU ARG THR ASN VAL ALA ASN PHE PRO GLY HIS SER GLY PRO ILE THR SER ILE ALA PHE SER GLU ASN GLY TYR TYR GLU LEU ALA THR ALA ALA ASP ASP SER SER VAL LYS LEU TRP ASP

LEU ARG LYS LEU LYS ASN PHE LYS THR LEU GLN LEU ASP ASN ASN PHE GLU VAL LYS SER LEU ILE PHE ASP GLN SER GLY THR TYR LEU ALA LEU GLY GLY THR ASP VAL GLN ILE TYR ILE CYS LYS GLN TRP THR GLU ILE LEU HIS PHE THR GLU HIS SER GLY LEU THR THR GLY

VAL ALA PHE GLY HIS HIS ALA LYS PHE ILE ALA SER THR GLY MET ASP ARG SER LEU LYS PHE TYR SER LEU

- Molecule 43: Pre-mRNA-splicing factor SPF27

Chain u: 100% / 100%

M1 A2 G3 T4 G5 L6 V7 A8 G9 E10 V11 V12 V13 D14 A15 L16 P17 Y18 F19 D20 Q21 G22 Y23 E24 A25 P26 G27 Y28 R29 E30 A31 A32 A33 A34 L35 V36 E37 E38 E39 T40 R41 R42 Y43 R44 P45 T46 K47 N48 Y49 L50 S51 Y52 L53 T54 A55 P56 D57 Y58 S59 A60

F61 E62 T63 D64 I65 M66 R67 N68 E69 F70 E71 R72 L73 A74 A75 R76 Q77 P78 I79 E80 L81 L82 S83 M84 K85 R86 Y87 E88 L89 P90 A91 P92 S93 S94 G95 Q96 K97 N98 D99 I100 T101 A102 W103 Q104 E105 C106 V107 N108 N109 S110 M111 A112 Q113 L114 E115 H116 Q117 A118 V119 R120

I121 E122 N123 L124 E125 L126 M127 S128 Q129 H130 G131 C132 N133 A134 W135 K136 V137 Y138 N139 E140 N141 L142 V143 H144 M145 I146 E147 H148 A149 Q150 K151 E152 L153 Q154 K155 L156 R157 K158 H159 I160 Q161 D162 L163 N164 W165 Q166 R167 K168 N169 M170 Q171 L172 T173 A174 G175 S176 K177 L178 R179 E180

M181 E182 S183 N184 W185 V186 S187 L188 V189 S190 K191 N192 Y193 E194 I195 E196 R197 T198 I199 V200 Q201 L202 E203 N204 E205 I206 Y207 Q208 I209 K210 Q211 Q212 H213 G214 E215 A216 N217 K218 E219 N220 I221 R222 Q223 D224 F225

- Molecule 44: Eukaryotic initiation factor 4A-III

Chain v: 14% / 74% / 20% / • 5%

MET ALA THR THR ALA THR MET ALA THR SER GLY SER ALA ARG LYS ARG LEU LEU LYS GLU GLU D22 M23 T24 K25 V26 E27 F28 E29 T30 S31 E32 E33 V34 D35 V36 T37 F40 D41 T42 M43 L50 I53 I64 Q71 V78 I79 T89 F92 S93 I94

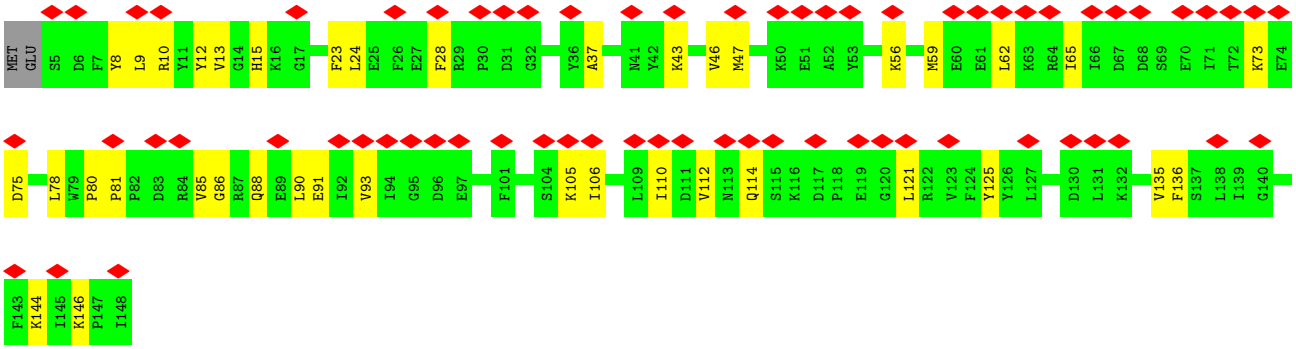
L100 D101 I102 A109 L112 A113 P114 T115 R116 E117 L118 M133 N134 V135 I141 N145 V159 V167 I171 R172 R173 R174 L184 V185 L186 A189 D190 E191 N192 L193 N194 K195 Y207 L208 V214 V215 L216 A219 T220 L221 P222 I225 L226 E227 M228 T229

N230 K231 F232 M233 T234 D235 P236 I237 R238 K242 R243 D244 E245 L246 T247 L248 E249 Q253 V256 A257 V258 E259 R260 E261 E262 D270 L271 Y272 D273 T274 L275 T276 I277 T278 I282 F283 C284 N285 T286 V290 L293 T294 R298 E299 A300 N301 F302 T303 S306 D310

M311 P312 Q313 E317 S318 I319 M320 K321 I332 R339 S347 L348 I349 L354 R358 I362 H363 R364 I365 S368 A377 V381 K382 N383 D384 R387 I388 L389 R390 D391 I392 E393 Q394 T398 M403 N406 V407 A408 D409 L410 I411

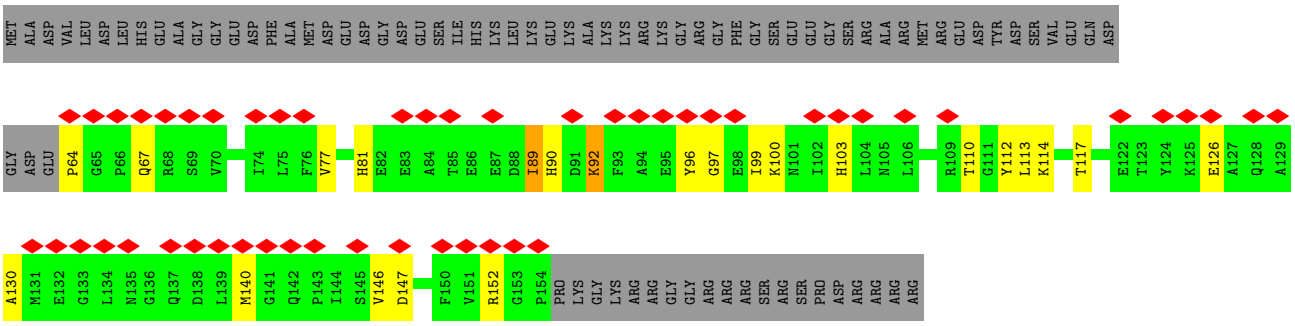
- Molecule 45: Protein mago nashi homolog

Chain w: 46% 72% 27%



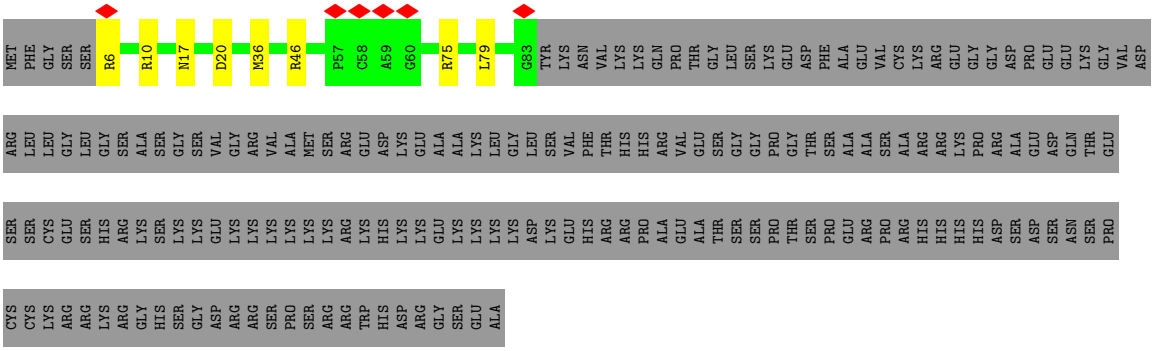
- Molecule 46: RNA-binding protein 8A

Chain x: 29% 39% 12% 48%



- Molecule 47: Multiple myeloma tumor-associated protein 2

Chain z: 27% 70%



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	86306	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	1300	Depositor
Maximum defocus (nm)	1900	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	3.543	Depositor
Minimum map value	-1.168	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.066	Depositor
Recommended contour level	0.4	Depositor
Map size (Å)	689.472, 689.472, 689.472	wwPDB
Map dimensions	640, 640, 640	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.0773, 1.0773, 1.0773	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: SEP, ADP, GTP, MG, ATP, K, IHP, ZN, G5J

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	0.13	0/595	0.37	0/925
2	1	0.29	0/1063	0.66	4/1646 (0.2%)
3	2	0.13	0/1005	0.27	0/1561
4	4	0.13	0/3354	0.34	0/4515
5	5	0.15	0/2559	0.31	0/3977
6	6	0.14	0/1449	0.32	0/2257
7	A	0.15	0/19271	0.35	0/26142
8	B	0.16	0/7283	0.38	0/9895
9	C	0.15	0/15420	0.40	0/20908
10	D	0.14	0/2391	0.39	0/3241
11	E	0.15	0/3518	0.37	0/4795
12	F	0.16	0/4650	0.39	0/6373
13	G	0.16	0/4034	0.37	0/5508
14	H	0.13	0/218	0.40	0/303
15	I	0.17	0/1240	0.37	0/1664
16	J	0.16	0/1665	0.37	0/2237
17	K	0.15	0/3089	0.39	0/4223
18	L	0.11	0/1160	0.30	0/1559
19	M	0.19	0/1269	0.49	0/1736
20	N	0.15	0/878	0.36	0/1166
21	O	0.14	0/1268	0.38	0/1714
22	P	0.11	0/286	0.25	0/354
23	Q	0.10	0/6575	0.26	0/9165
24	R	0.20	0/864	0.50	0/1149
25	S	0.29	0/324	0.58	0/430
26	T	0.17	0/6289	0.45	0/8507
27	U	0.15	0/918	0.37	0/1247
28	V	0.14	0/3835	0.36	0/5164
29	X	0.14	0/1687	0.35	0/2262
33	Y	0.19	0/1680	0.47	0/2260
34	Z	0.13	0/2744	0.39	0/3710
35	a	0.17	0/599	0.44	0/798

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
35	h	0.11	0/358	0.32	0/495
36	b	0.14	0/657	0.44	0/888
36	i	0.12	0/400	0.31	0/556
37	c	0.22	0/805	0.49	0/1081
37	j	0.11	0/485	0.33	0/674
38	d	0.20	0/671	0.51	0/904
38	k	0.10	0/398	0.26	0/552
39	e	0.21	0/646	0.52	0/867
39	l	0.11	0/380	0.36	0/528
40	f	0.31	0/579	0.69	0/783
40	m	0.11	0/355	0.31	0/490
41	g	0.25	0/595	0.66	0/794
41	n	0.11	0/363	0.35	0/501
42	q	0.12	0/683	0.24	0/954
42	r	0.14	0/673	0.26	0/940
42	s	0.20	0/688	0.28	0/961
42	t	0.12	0/678	0.25	0/947
43	u	0.13	0/1116	0.24	0/1554
44	v	0.15	0/3179	0.38	0/4291
45	w	0.17	0/1225	0.45	0/1648
46	x	0.17	0/748	0.50	0/1012
47	z	0.18	0/622	0.46	0/836
All	All	0.15	0/119484	0.38	4/163647 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	1	211	U	P-O3'-C3'	-8.89	106.86	120.20
2	1	207	A	P-O3'-C3'	-7.64	108.73	120.20
2	1	212	U	P-O3'-C3'	-5.57	111.85	120.20
2	1	206	C	P-O3'-C3'	-5.03	112.66	120.20

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	0	533	0	273	3	0
2	1	957	0	486	19	0
3	2	898	0	451	6	0
4	4	3283	0	3269	40	0
5	5	2296	0	1163	21	0
6	6	1327	0	650	12	0
7	A	18751	0	18636	152	0
8	B	7122	0	7132	68	0
9	C	15118	0	14962	205	0
10	D	2337	0	2270	20	0
11	E	3485	0	2656	29	0
12	F	4580	0	3543	41	0
13	G	3969	0	3108	25	0
14	H	219	0	98	0	0
15	I	1226	0	1114	12	0
16	J	1648	0	1698	17	0
17	K	3014	0	2792	22	0
18	L	1139	0	1136	16	0
19	M	1249	0	1152	17	0
20	N	866	0	837	3	0
21	O	1236	0	1210	19	0
22	P	288	0	78	0	0
23	Q	6579	0	2831	3	0
24	R	852	0	853	10	0
25	S	319	0	321	9	0
26	T	6173	0	6146	83	0
27	U	909	0	722	8	0
28	V	3768	0	3833	39	0
29	X	1660	0	1646	17	0
30	X1	100	0	22	0	0
31	X2	90	0	20	0	0
32	X3	105	0	23	0	0
33	Y	1653	0	1575	18	0
34	Z	2681	0	2619	27	0
35	a	591	0	613	17	0
35	h	360	0	149	2	0
36	b	649	0	693	16	0
36	i	401	0	165	1	0
37	c	796	0	821	18	0
37	j	487	0	199	0	0
38	d	663	0	680	15	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
38	k	399	0	176	1	0
39	e	638	0	657	17	0
39	l	381	0	159	0	0
40	f	567	0	575	20	0
40	m	356	0	156	0	0
41	g	584	0	610	14	0
41	n	364	0	160	0	0
42	q	684	0	308	0	0
42	r	674	0	305	1	0
42	s	689	0	313	0	0
42	t	679	0	306	0	0
43	u	1117	0	514	0	0
44	v	3130	0	3173	47	0
45	w	1196	0	1182	22	0
46	x	730	0	690	11	0
47	z	611	0	591	5	0
48	6	6	0	0	0	0
48	B	1	0	0	0	0
48	C	1	0	0	0	0
48	v	1	0	0	0	0
49	6	2	0	0	0	0
50	A	36	0	6	0	0
51	B	32	0	12	1	0
52	C	54	0	24	1	0
53	S	1	0	0	0	0
53	Y	1	0	0	0	0
54	v	31	0	12	0	0
All	All	117342	0	102574	1083	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 5.

The worst 5 of 1083 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)
33:Y:46:CYS:SG	33:Y:83:CYS:HB3	2.07	0.92
44:v:229:THR:O	44:v:233:MET:HB3	1.69	0.92
46:x:89:ILE:HA	46:x:92:LYS:HD2	1.60	0.82
9:C:1367:MET:HE1	9:C:1376:CYS:HB3	1.63	0.79
13:G:439:ALA:O	13:G:443:ILE:HB	1.83	0.78

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	4	403/646 (62%)	397 (98%)	6 (2%)	0	100	100
7	A	2253/2335 (96%)	2195 (97%)	56 (2%)	2 (0%)	48	76
8	B	898/972 (92%)	862 (96%)	34 (4%)	2 (0%)	43	71
9	C	1917/2136 (90%)	1830 (96%)	83 (4%)	4 (0%)	43	71
10	D	297/357 (83%)	283 (95%)	14 (5%)	0	100	100
11	E	537/802 (67%)	522 (97%)	15 (3%)	0	100	100
12	F	694/855 (81%)	664 (96%)	27 (4%)	3 (0%)	30	58
13	G	580/848 (68%)	556 (96%)	24 (4%)	0	100	100
14	H	42/166 (25%)	41 (98%)	1 (2%)	0	100	100
15	I	164/285 (58%)	163 (99%)	1 (1%)	0	100	100
16	J	196/536 (37%)	186 (95%)	9 (5%)	1 (0%)	24	53
17	K	400/514 (78%)	388 (97%)	12 (3%)	0	100	100
18	L	137/367 (37%)	135 (98%)	2 (2%)	0	100	100
19	M	171/198 (86%)	165 (96%)	6 (4%)	0	100	100
20	N	98/229 (43%)	94 (96%)	4 (4%)	0	100	100
21	O	157/166 (95%)	149 (95%)	8 (5%)	0	100	100
22	P	68/301 (23%)	68 (100%)	0	0	100	100
23	Q	1319/1485 (89%)	1296 (98%)	23 (2%)	0	100	100
24	R	99/425 (23%)	91 (92%)	7 (7%)	1 (1%)	12	37
25	S	39/586 (7%)	38 (97%)	1 (3%)	0	100	100
26	T	775/1227 (63%)	725 (94%)	48 (6%)	2 (0%)	36	64
27	U	133/2752 (5%)	132 (99%)	1 (1%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
28	V	460/908 (51%)	444 (96%)	15 (3%)	1 (0%)	43	71
29	X	209/258 (81%)	200 (96%)	9 (4%)	0	100	100
33	Y	205/345 (59%)	196 (96%)	9 (4%)	0	100	100
34	Z	341/654 (52%)	310 (91%)	31 (9%)	0	100	100
35	a	69/240 (29%)	68 (99%)	1 (1%)	0	100	100
35	h	69/240 (29%)	68 (99%)	1 (1%)	0	100	100
36	b	80/119 (67%)	77 (96%)	3 (4%)	0	100	100
36	i	79/119 (66%)	78 (99%)	1 (1%)	0	100	100
37	c	94/118 (80%)	89 (95%)	5 (5%)	0	100	100
37	j	94/118 (80%)	91 (97%)	3 (3%)	0	100	100
38	d	83/126 (66%)	78 (94%)	5 (6%)	0	100	100
38	k	79/126 (63%)	77 (98%)	2 (2%)	0	100	100
39	e	75/92 (82%)	72 (96%)	3 (4%)	0	100	100
39	l	75/92 (82%)	75 (100%)	0	0	100	100
40	f	71/86 (83%)	68 (96%)	3 (4%)	0	100	100
40	m	71/86 (83%)	71 (100%)	0	0	100	100
41	g	73/76 (96%)	72 (99%)	1 (1%)	0	100	100
41	n	72/76 (95%)	68 (94%)	4 (6%)	0	100	100
42	q	135/504 (27%)	135 (100%)	0	0	100	100
42	r	133/504 (26%)	130 (98%)	3 (2%)	0	100	100
42	s	136/504 (27%)	132 (97%)	4 (3%)	0	100	100
42	t	134/504 (27%)	131 (98%)	3 (2%)	0	100	100
43	u	223/225 (99%)	222 (100%)	1 (0%)	0	100	100
44	v	388/411 (94%)	375 (97%)	12 (3%)	1 (0%)	36	64
45	w	142/146 (97%)	135 (95%)	7 (5%)	0	100	100
46	x	89/174 (51%)	83 (93%)	6 (7%)	0	100	100
47	z	76/263 (29%)	75 (99%)	1 (1%)	0	100	100
All	All	15132/25302 (60%)	14600 (96%)	515 (3%)	17 (0%)	49	76

5 of 17 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
9	C	1439	TRP

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Mol	Chain	Res	Type
9	C	1996	LEU
12	F	354	PRO
16	J	214	ILE
26	T	798	VAL

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	4	363/572 (64%)	362 (100%)	1 (0%)	86	95
7	A	2043/2108 (97%)	2012 (98%)	31 (2%)	57	82
8	B	800/866 (92%)	783 (98%)	17 (2%)	47	76
9	C	1617/1908 (85%)	1602 (99%)	15 (1%)	70	88
10	D	255/300 (85%)	249 (98%)	6 (2%)	43	73
11	E	204/709 (29%)	202 (99%)	2 (1%)	68	87
12	F	293/749 (39%)	288 (98%)	5 (2%)	53	80
13	G	260/751 (35%)	258 (99%)	2 (1%)	73	89
15	I	98/240 (41%)	96 (98%)	2 (2%)	48	77
16	J	178/458 (39%)	175 (98%)	3 (2%)	53	80
17	K	297/441 (67%)	293 (99%)	4 (1%)	61	84
18	L	119/326 (36%)	111 (93%)	8 (7%)	15	41
19	M	121/171 (71%)	116 (96%)	5 (4%)	27	60
20	N	91/203 (45%)	85 (93%)	6 (7%)	15	41
21	O	129/134 (96%)	127 (98%)	2 (2%)	55	81
24	R	88/381 (23%)	86 (98%)	2 (2%)	44	74
25	S	33/520 (6%)	32 (97%)	1 (3%)	36	68
26	T	675/1073 (63%)	661 (98%)	14 (2%)	47	76
27	U	63/2432 (3%)	62 (98%)	1 (2%)	55	81
28	V	420/838 (50%)	409 (97%)	11 (3%)	40	72

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
29	X	176/223 (79%)	169 (96%)	7 (4%)	28	61
33	Y	168/308 (54%)	160 (95%)	8 (5%)	23	54
34	Z	298/572 (52%)	287 (96%)	11 (4%)	30	63
35	a	67/177 (38%)	65 (97%)	2 (3%)	36	68
36	b	77/101 (76%)	74 (96%)	3 (4%)	28	61
37	c	93/110 (84%)	88 (95%)	5 (5%)	20	49
38	d	74/101 (73%)	68 (92%)	6 (8%)	11	31
39	e	72/84 (86%)	72 (100%)	0	100	100
40	f	61/74 (82%)	60 (98%)	1 (2%)	55	81
41	g	65/66 (98%)	61 (94%)	4 (6%)	16	44
44	v	345/361 (96%)	328 (95%)	17 (5%)	22	52
45	w	132/134 (98%)	126 (96%)	6 (4%)	24	56
46	x	76/143 (53%)	70 (92%)	6 (8%)	11	33
47	z	58/215 (27%)	58 (100%)	0	100	100
All	All	9909/17849 (56%)	9695 (98%)	214 (2%)	45	75

5 of 214 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
26	T	381	ARG
29	X	153	ASN
44	v	261	GLU
26	T	764	LEU
28	V	328	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 100 such sidechains are listed below:

Mol	Chain	Res	Type
13	G	234	ASN
21	O	108	ASN
47	z	17	ASN
13	G	291	GLN
17	K	408	ASN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	0	24/57 (42%)	9 (37%)	0
2	1	44/277 (15%)	15 (34%)	6 (13%)
3	2	40/150 (26%)	15 (37%)	0
5	5	107/117 (91%)	27 (25%)	2 (1%)
6	6	58/125 (46%)	9 (15%)	0
All	All	273/726 (37%)	75 (27%)	8 (2%)

5 of 75 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	0	-21	G
1	0	-19	A
1	0	-17	A
1	0	-15	C
1	0	-14	C

5 of 8 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
5	5	105	U
5	5	96	A
2	1	211	U
2	1	209	C
2	1	212	U

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

1 non-standard protein/DNA/RNA residue is modelled in this entry.

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	$\#\|Z\| > 2$
16	SEP	J	224	16	8,9,10	1.54	1 (12%)	8,12,14	1.60	2 (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
16	SEP	J	224	16	-	3/5/8/10	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
16	J	224	SEP	P-O1P	3.35	1.61	1.50

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
16	J	224	SEP	P-OG-CB	-3.05	109.88	118.30
16	J	224	SEP	OG-CB-CA	2.76	110.83	108.14

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
16	J	224	SEP	CB-OG-P-O2P
16	J	224	SEP	CB-OG-P-O3P
16	J	224	SEP	CB-OG-P-O1P

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 18 ligands modelled in this entry, 13 are monoatomic - leaving 5 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	$\#\|Z\| > 2$
52	ADP	C	2202	48	27,29,29	1.37	4 (14%)	42,45,45	1.96	10 (23%)
52	ADP	C	2201	-	27,29,29	1.37	4 (14%)	42,45,45	1.97	11 (26%)
51	GTP	B	1501	48	30,34,34	0.85	1 (3%)	46,54,54	1.77	11 (23%)
50	IHP	A	3000	-	36,36,36	1.88	6 (16%)	54,60,60	0.91	0
54	ATP	v	702	48	29,33,33	0.31	0	44,52,52	0.52	1 (2%)

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
52	ADP	C	2202	48	-	4/16/32/32	0/3/3/3
52	ADP	C	2201	-	-	3/16/32/32	0/3/3/3
51	GTP	B	1501	48	-	4/22/38/38	0/3/3/3
50	IHP	A	3000	-	-	7/30/54/54	0/1/1/1
54	ATP	v	702	48	-	3/22/38/38	0/3/3/3

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
52	C	2201	ADP	C5-C4	4.61	1.47	1.39
52	C	2202	ADP	C5-C4	4.59	1.47	1.39
50	A	3000	IHP	P2-O12	4.58	1.68	1.59
50	A	3000	IHP	P5-O15	4.47	1.67	1.59
50	A	3000	IHP	P6-O16	4.29	1.67	1.59

The worst 5 of 33 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
52	C	2201	ADP	C5-C4-N3	-6.22	118.64	126.75
52	C	2202	ADP	C5-C4-N3	-6.17	118.70	126.75
52	C	2201	ADP	N3-C4-N9	4.87	135.11	127.08
51	B	1501	GTP	C5-C4-N3	-4.85	120.59	128.46
52	C	2202	ADP	N3-C4-N9	4.79	134.98	127.08

There are no chirality outliers.

5 of 21 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
50	A	3000	IHP	C2-O12-P2-O42
50	A	3000	IHP	C3-O13-P3-O23
50	A	3000	IHP	C6-O16-P6-O46
51	B	1501	GTP	PB-O3B-PG-O3G
52	C	2201	ADP	C5'-O5'-PA-O3A

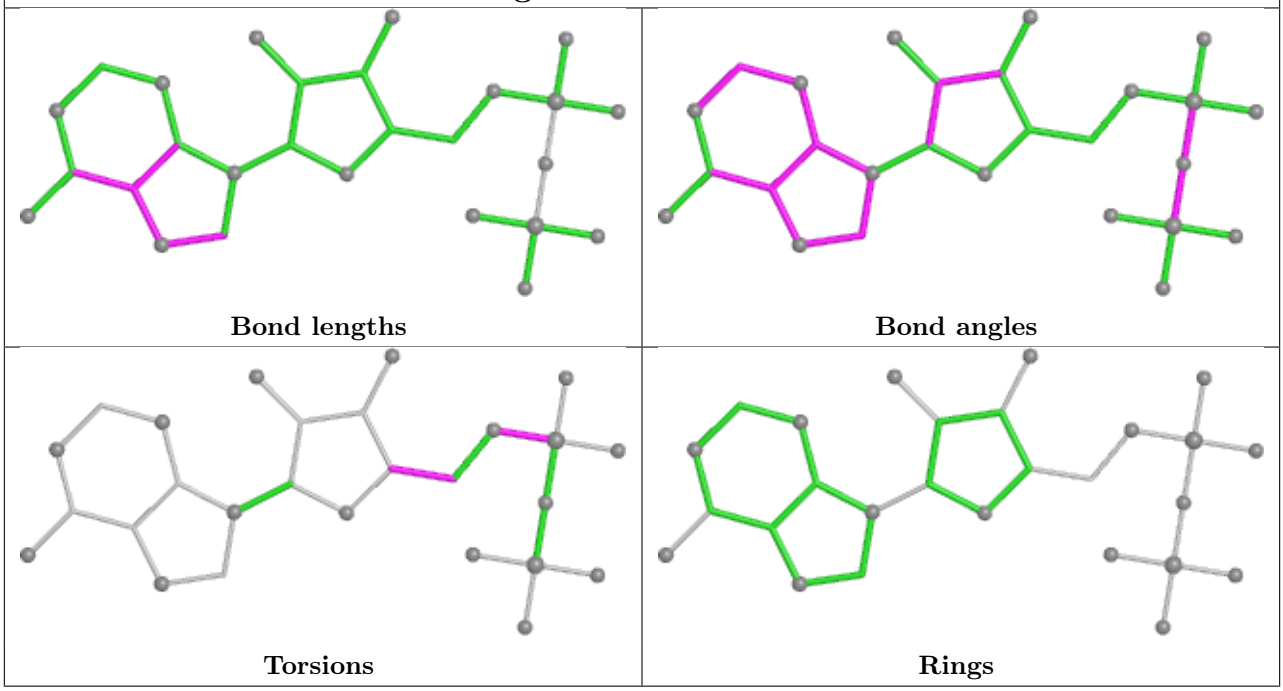
There are no ring outliers.

2 monomers are involved in 2 short contacts:

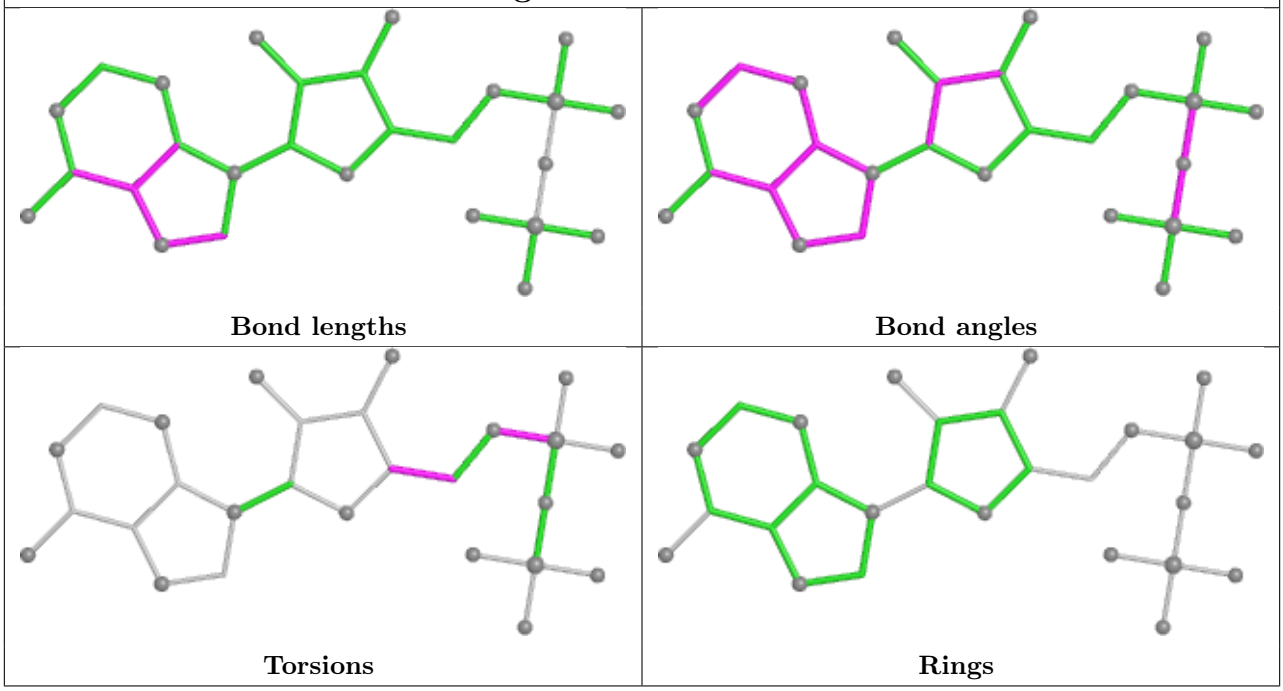
Mol	Chain	Res	Type	Clashes	Symm-Clashes
52	C	2201	ADP	1	0
51	B	1501	GTP	1	0

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.

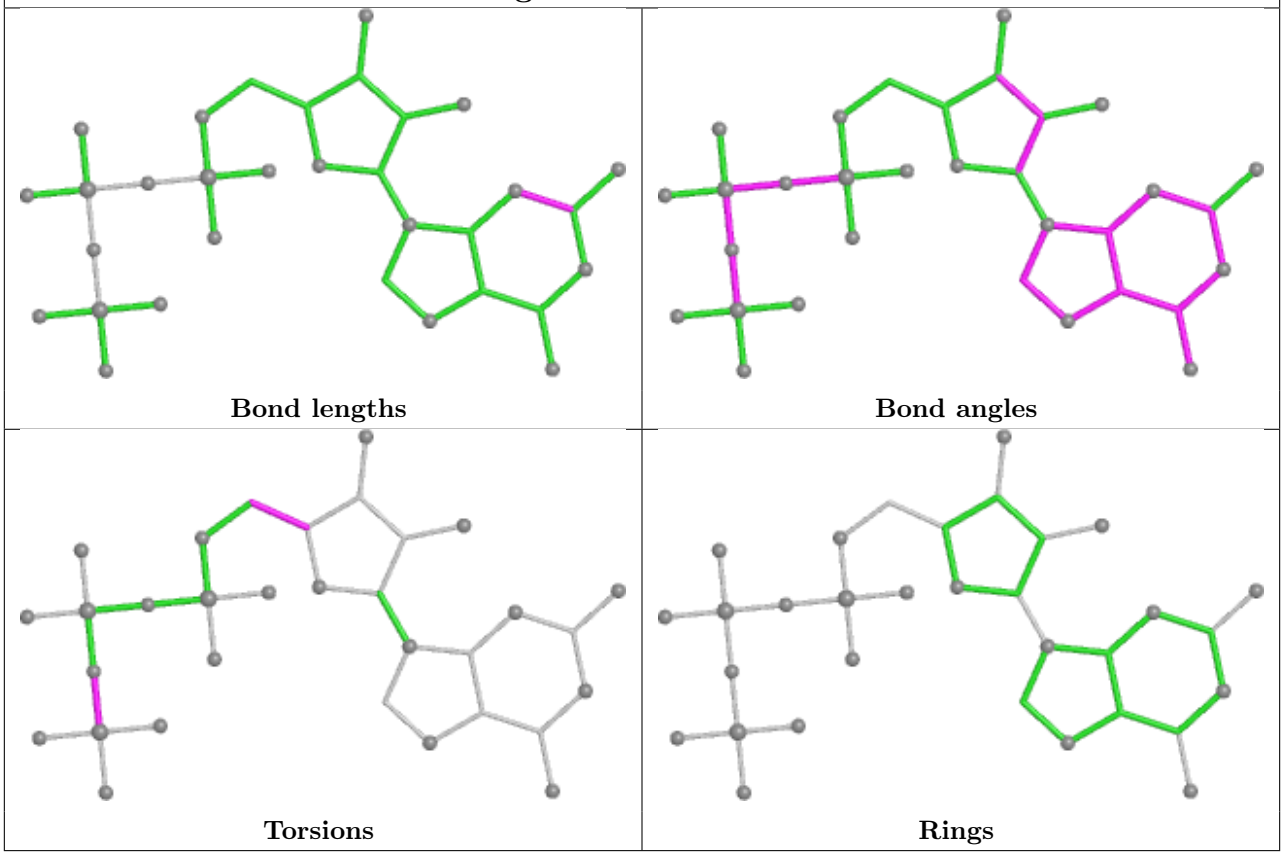
Ligand ADP C 2202



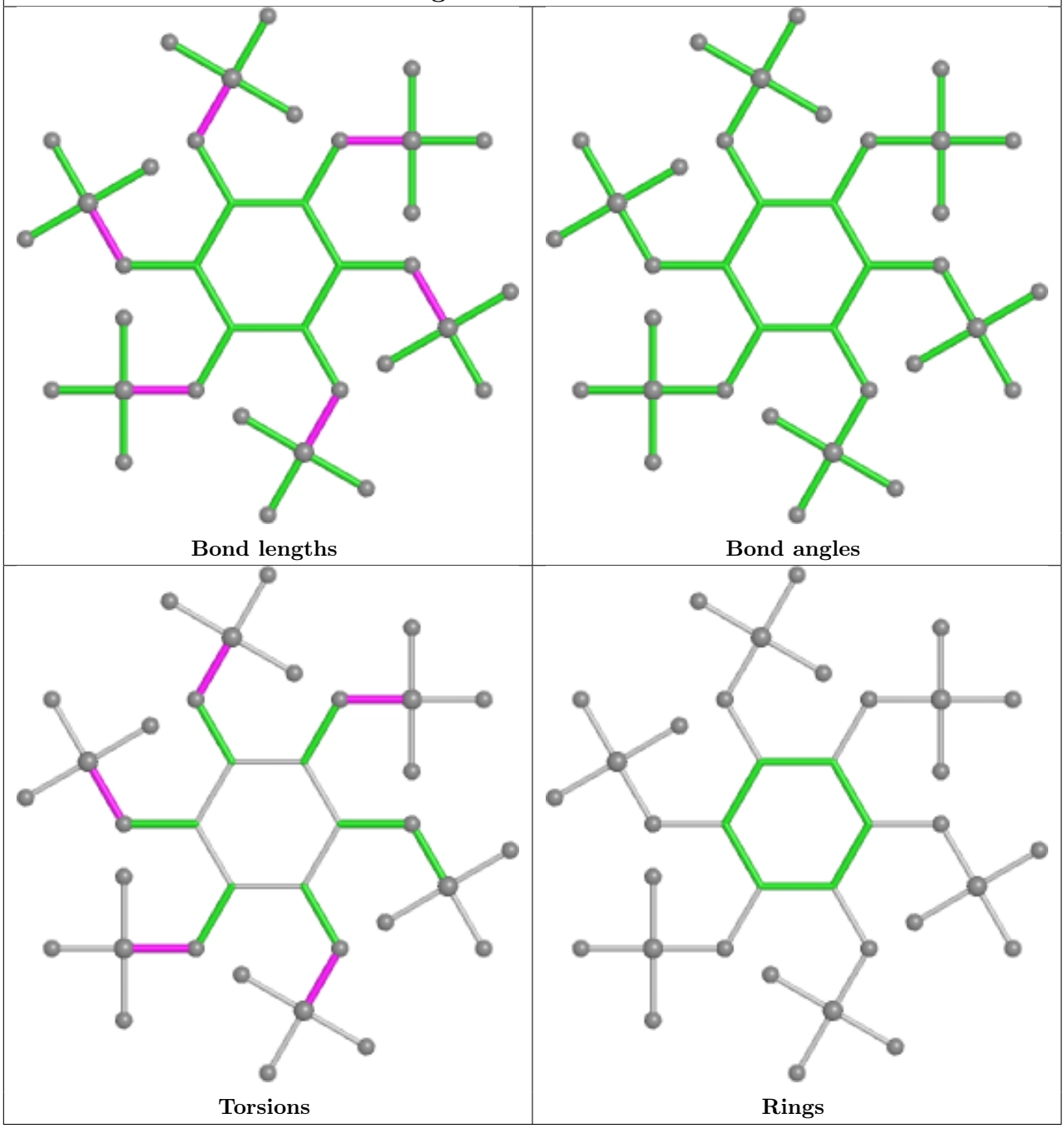
Ligand ADP C 2201

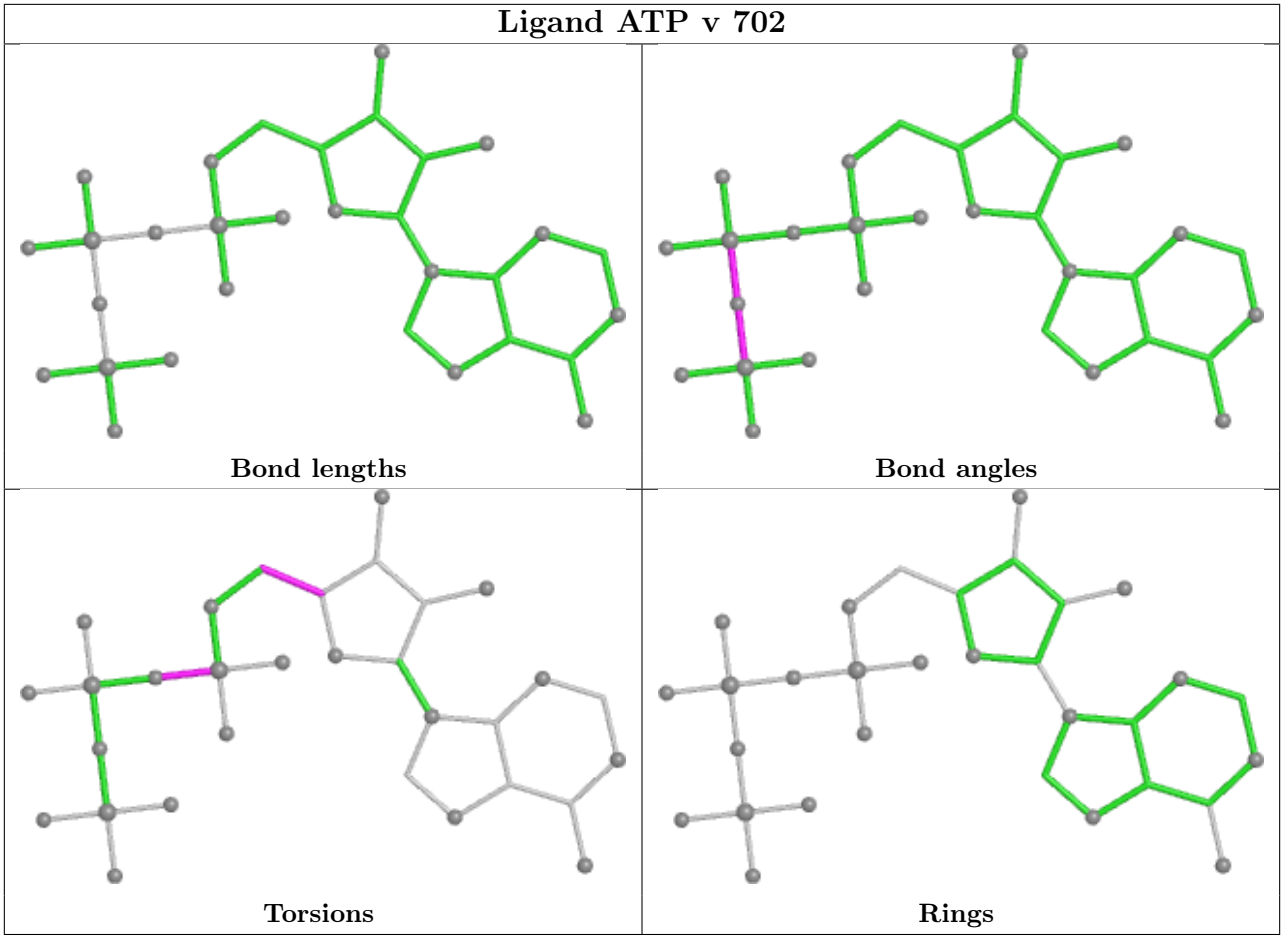


Ligand GTP B 1501



Ligand IHP A 3000





5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

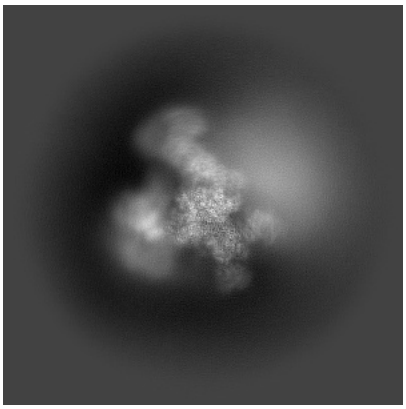
6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-67250. These allow visual inspection of the internal detail of the map and identification of artifacts.

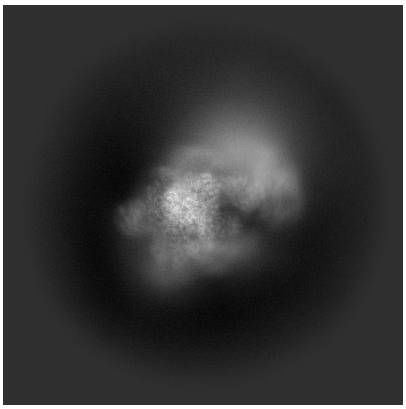
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections (i)

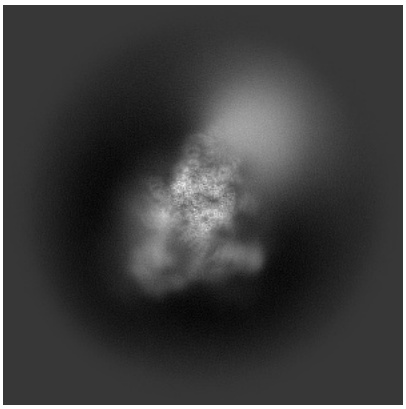
6.1.1 Primary map



X

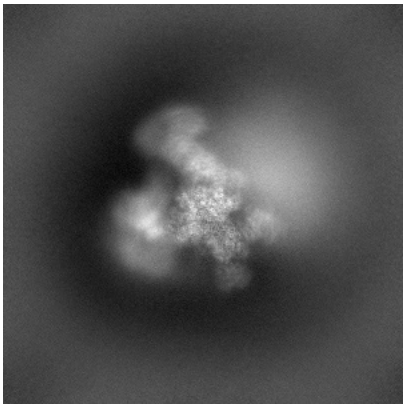


Y

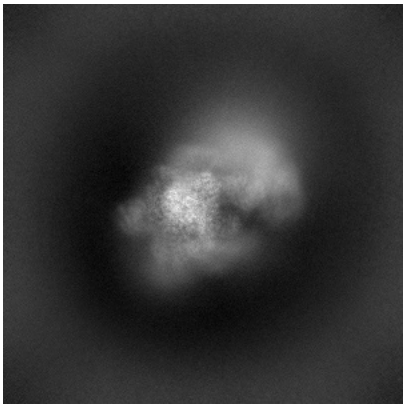


Z

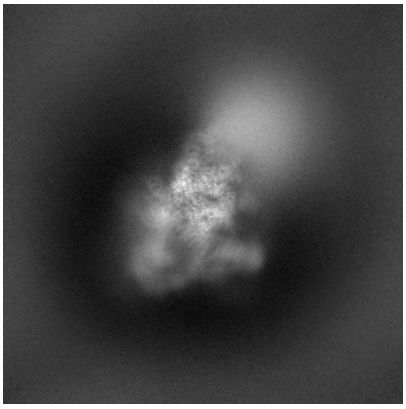
6.1.2 Raw map



X



Y

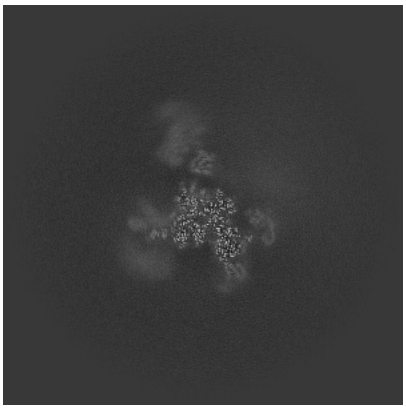


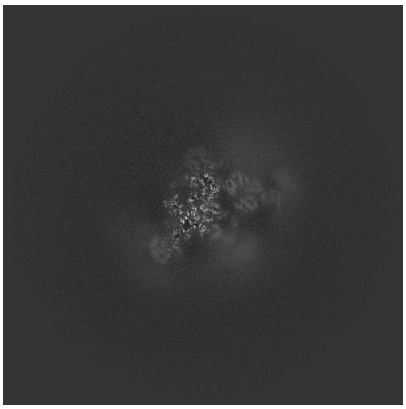
Z

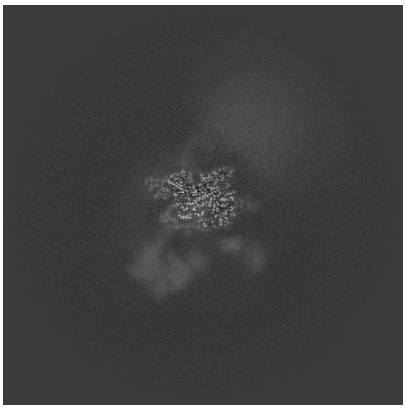
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

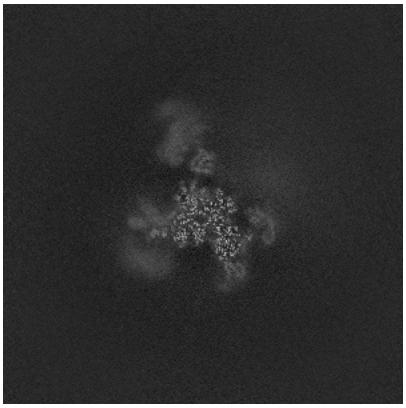
6.2.1 Primary map

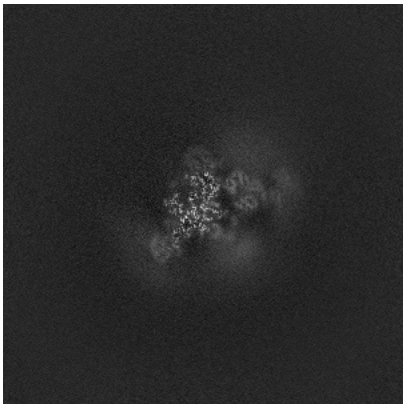

X Index: 320

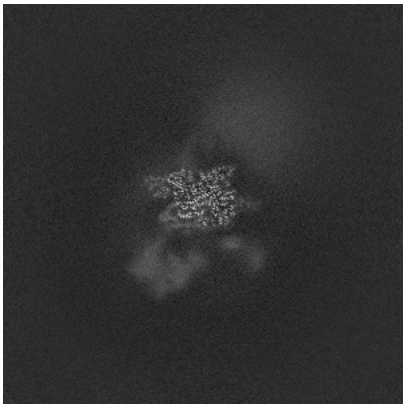

Y Index: 320


Z Index: 320

6.2.2 Raw map


X Index: 320


Y Index: 320

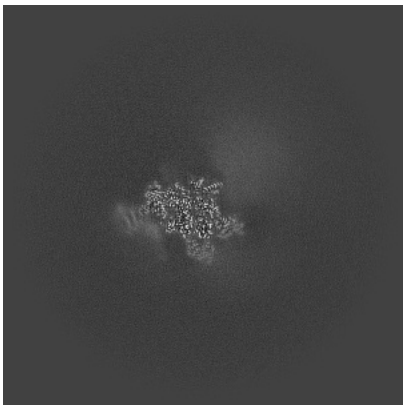

Z Index: 320

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

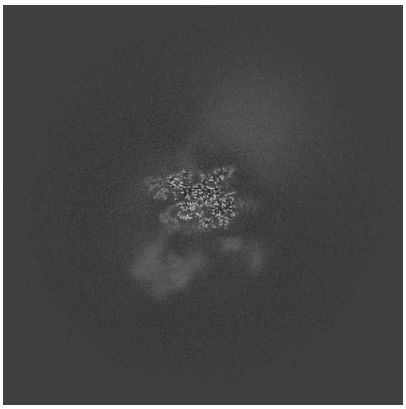
6.3 Largest variance slices (i)

6.3.1 Primary map

X Index: 308

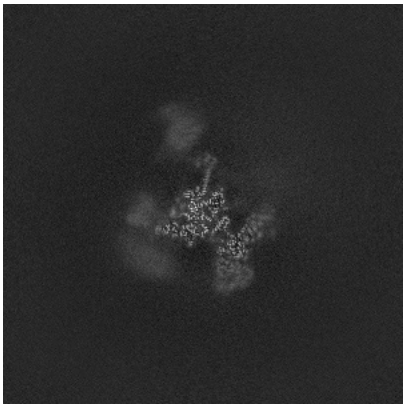


Y Index: 350

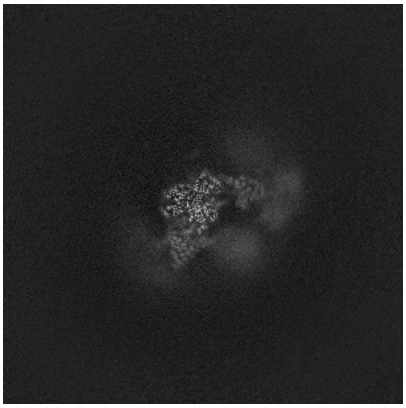


Z Index: 321

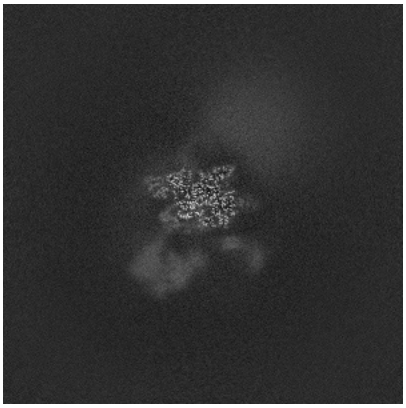
6.3.2 Raw map



X Index: 308



Y Index: 302

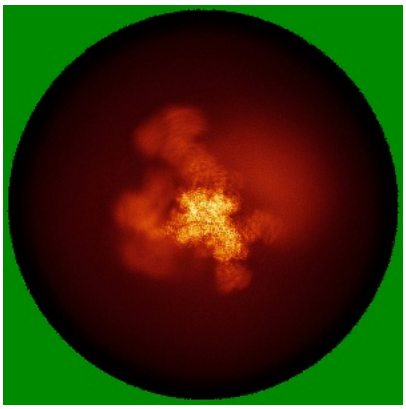


Z Index: 321

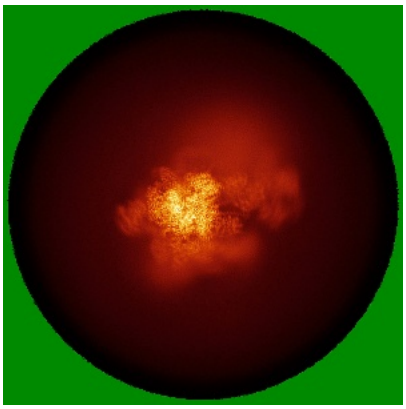
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

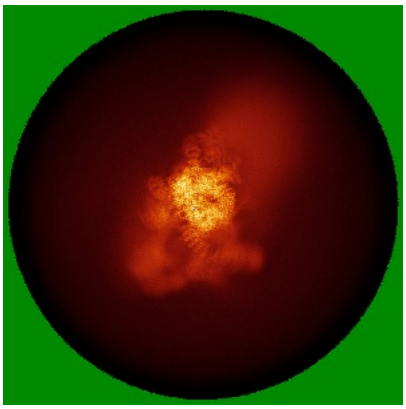
6.4.1 Primary map



X

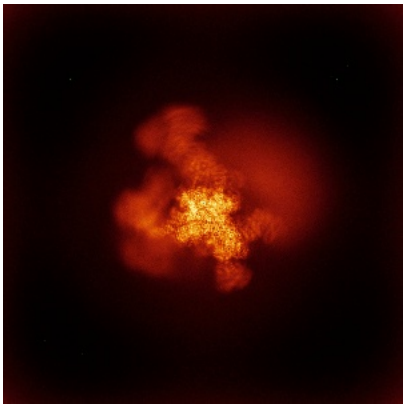


Y

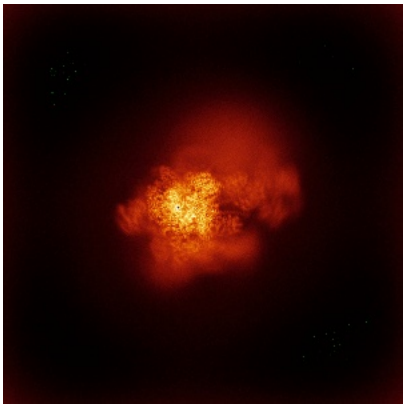


Z

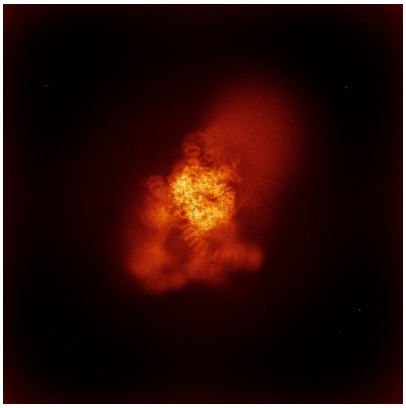
6.4.2 Raw map



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 (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.4. 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.

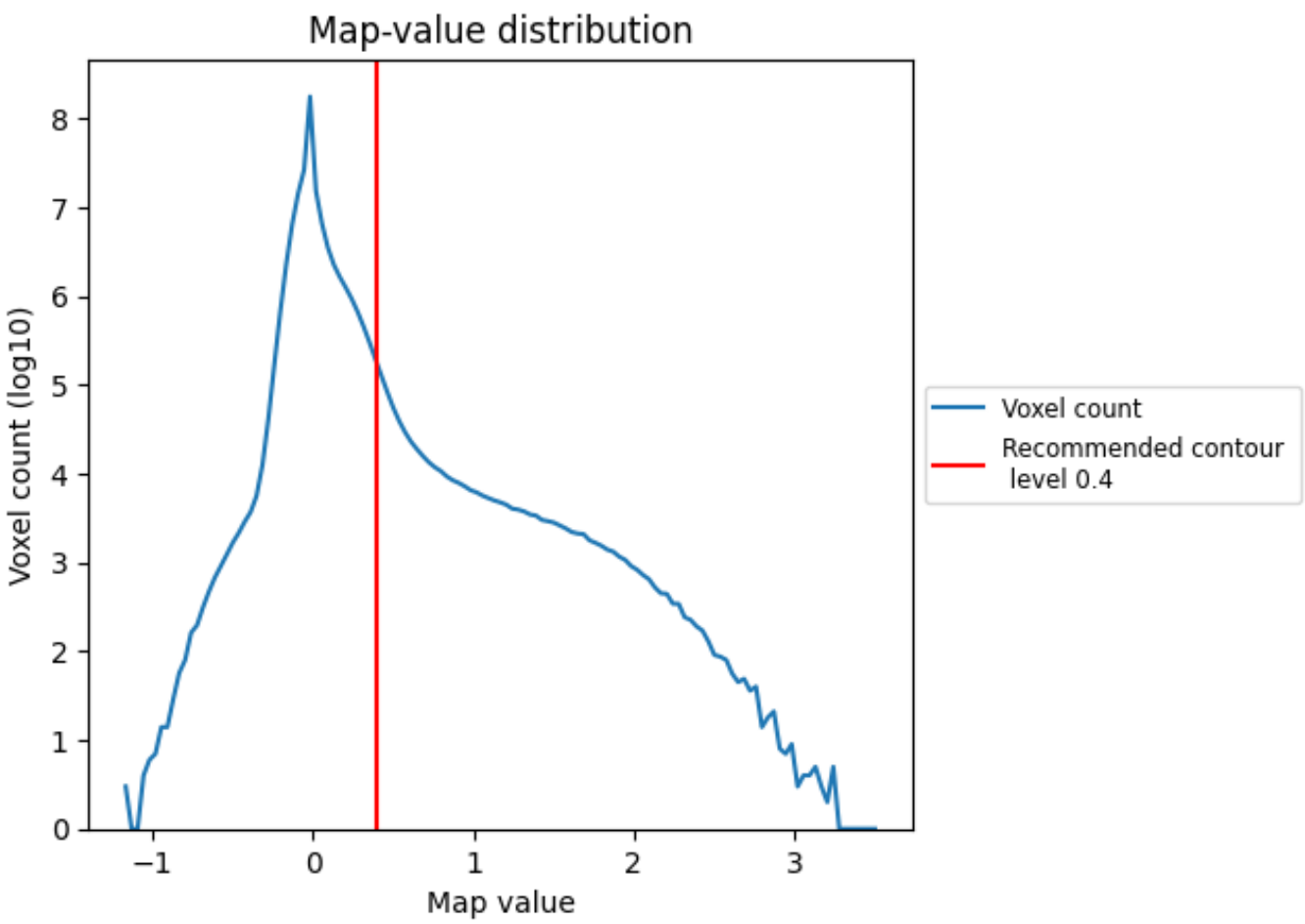
6.6 Mask visualisation (i)

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

7 Map analysis (i)

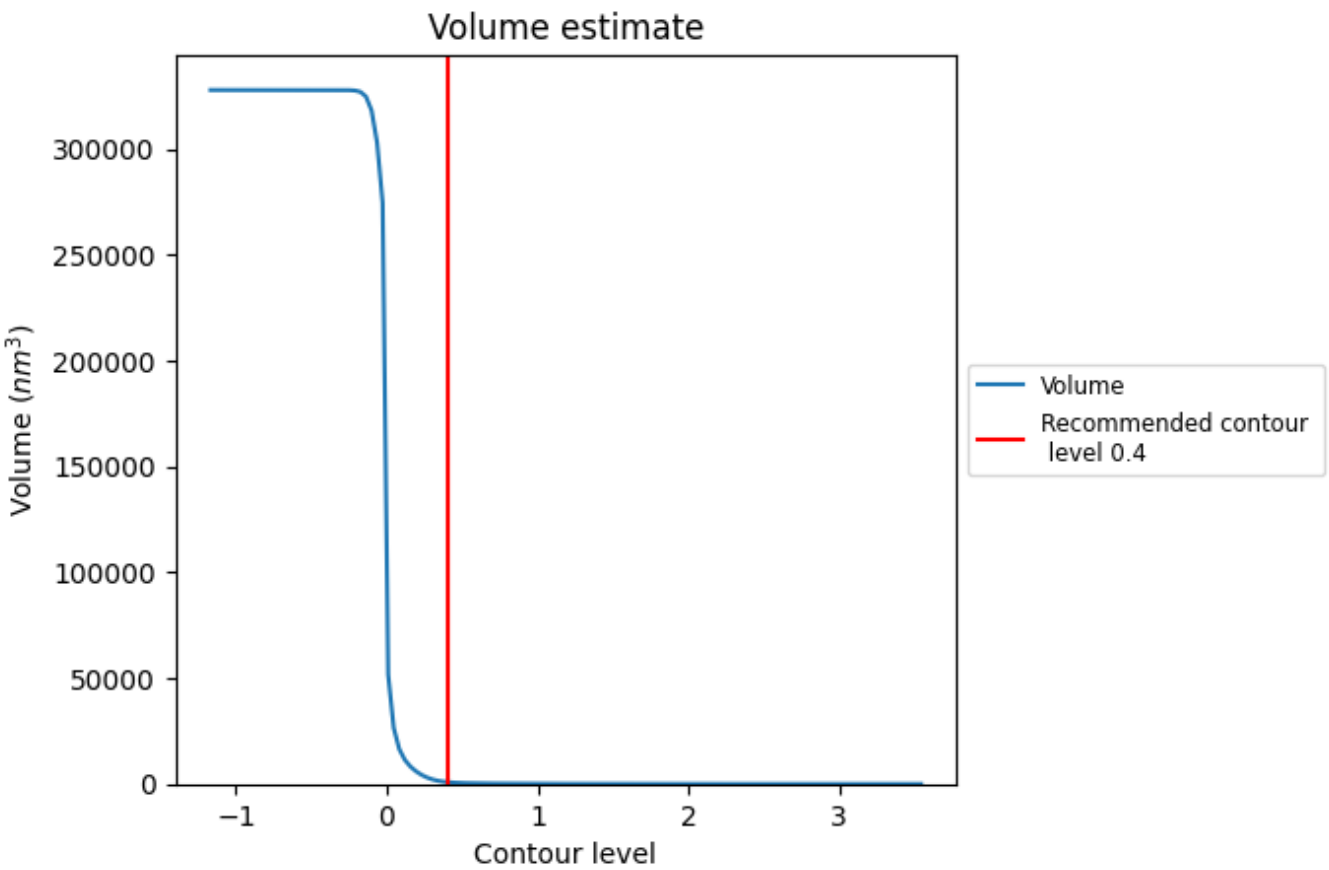
This section contains the results of statistical analysis of the map.

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.

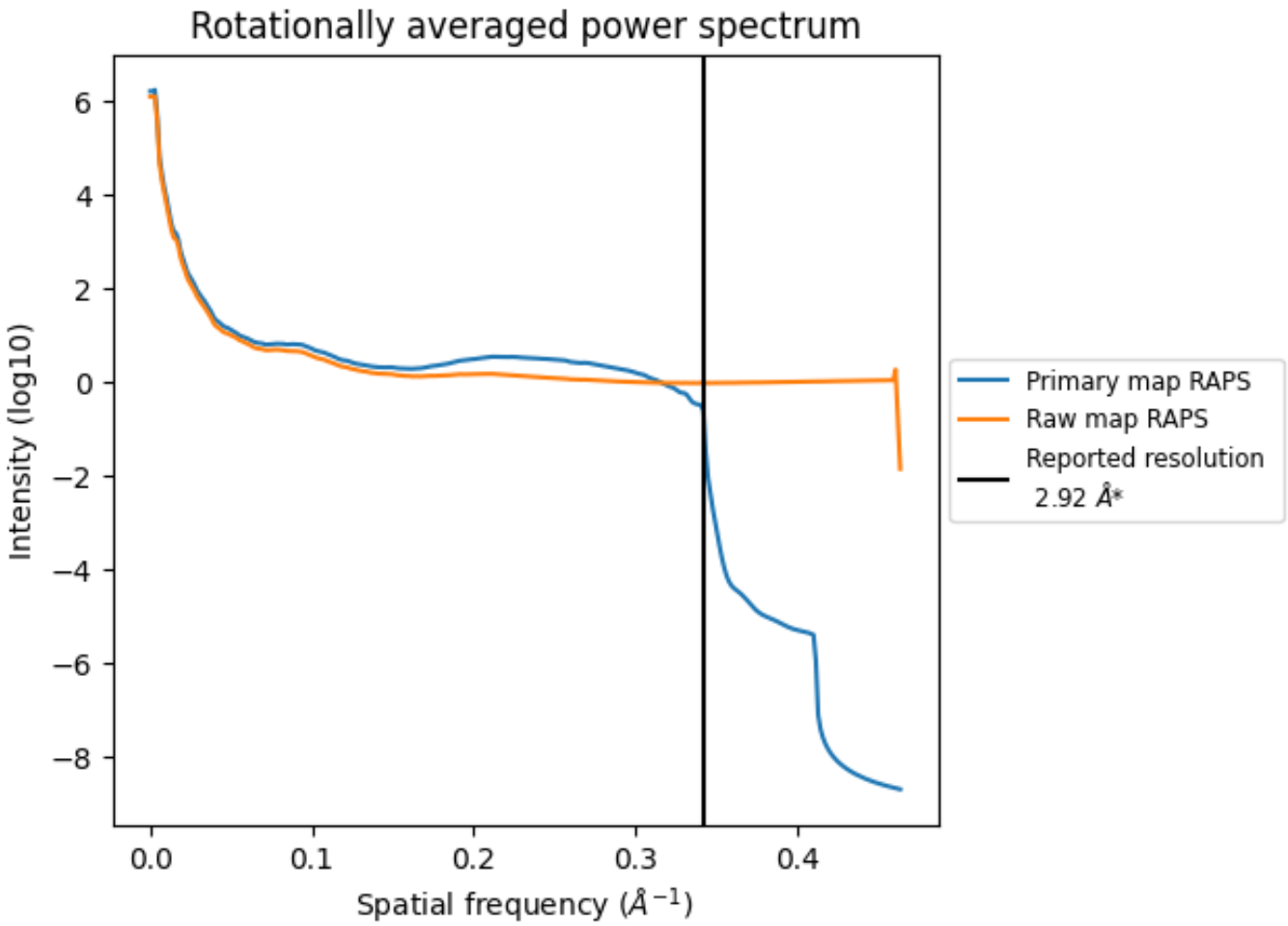
7.2 Volume estimate (i)



The volume at the recommended contour level is 875 nm^3; this corresponds to an approximate mass of 791 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)

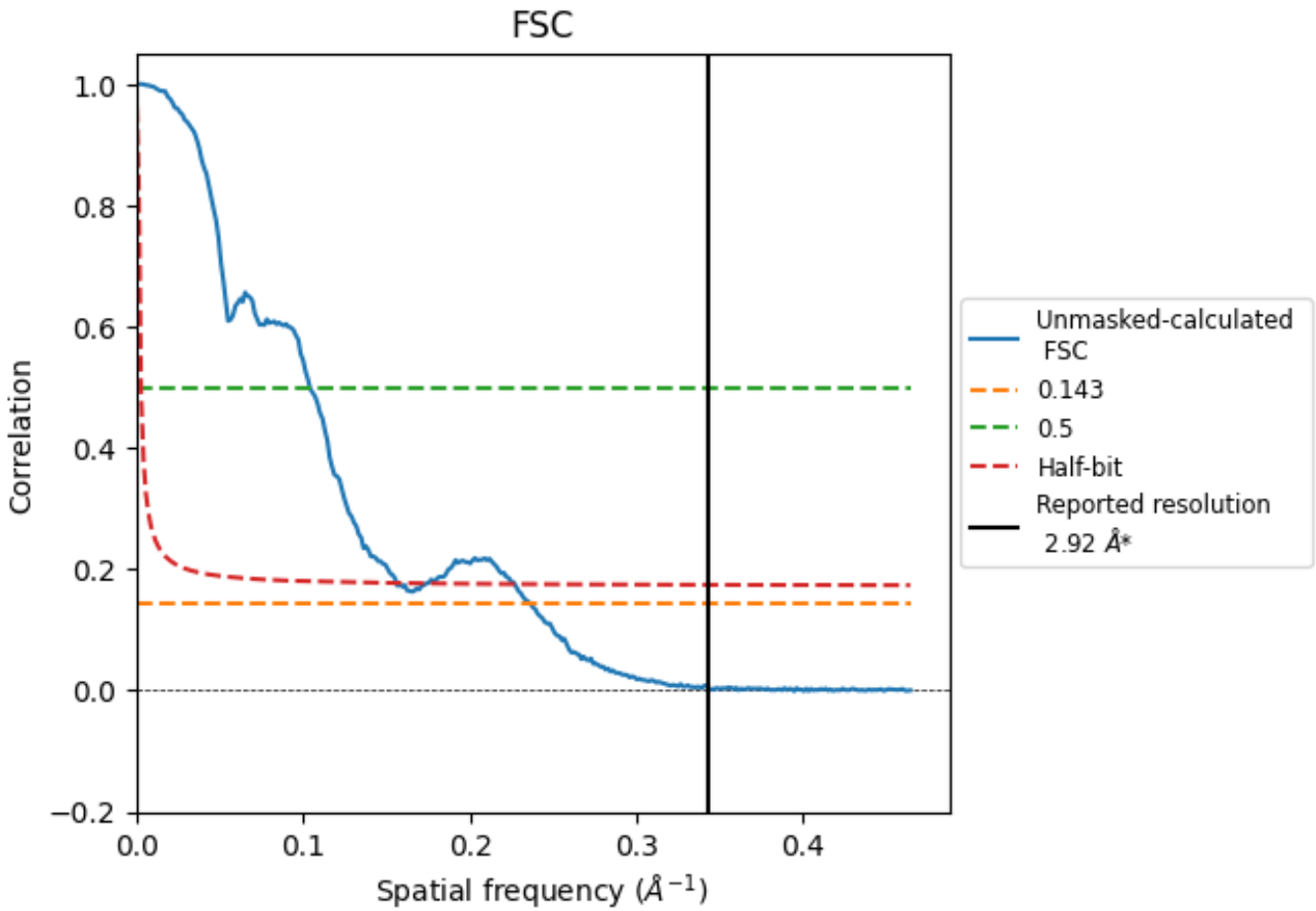


*Reported resolution corresponds to spatial frequency of 0.342 Å^{-1}

8 Fourier-Shell correlation (i)

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 (i)



*Reported resolution corresponds to spatial frequency of 0.342 Å^{-1}

8.2 Resolution estimates (i)

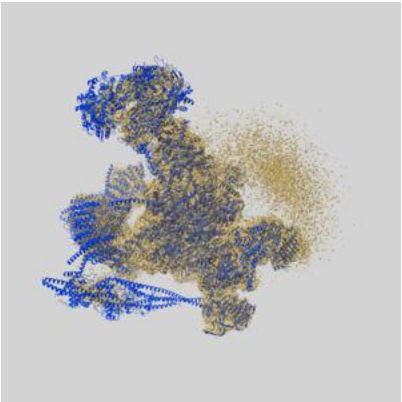
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.92	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.23	9.61	6.41

*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 4.23 differs from the reported value 2.92 by more than 10 %

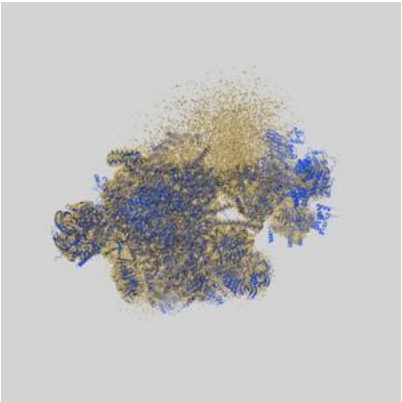
9 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-67250 and PDB model 9XTT. Per-residue inclusion information can be found in section 3 on page 17.

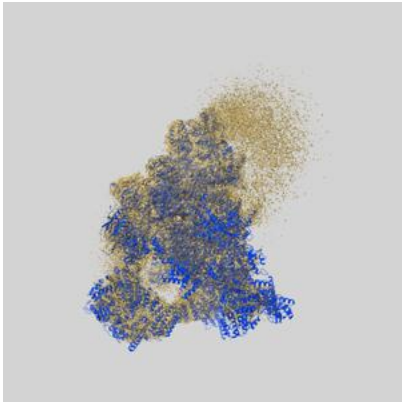
9.1 Map-model overlay (i)



X



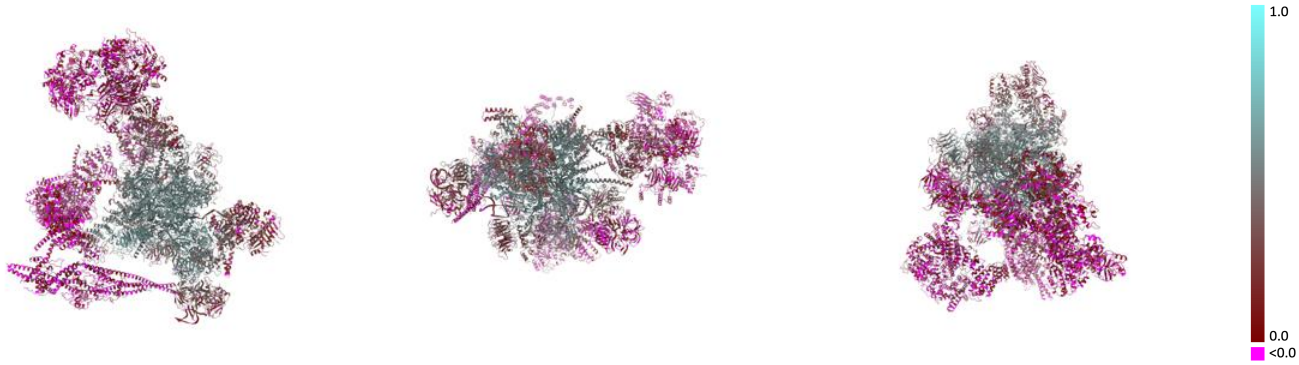
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.4 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.

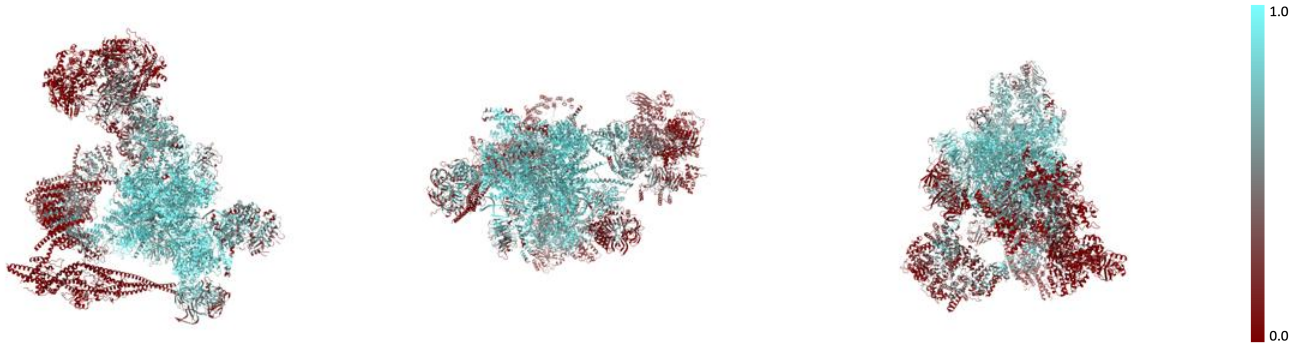
9.2 Q-score mapped to coordinate model (i)



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.

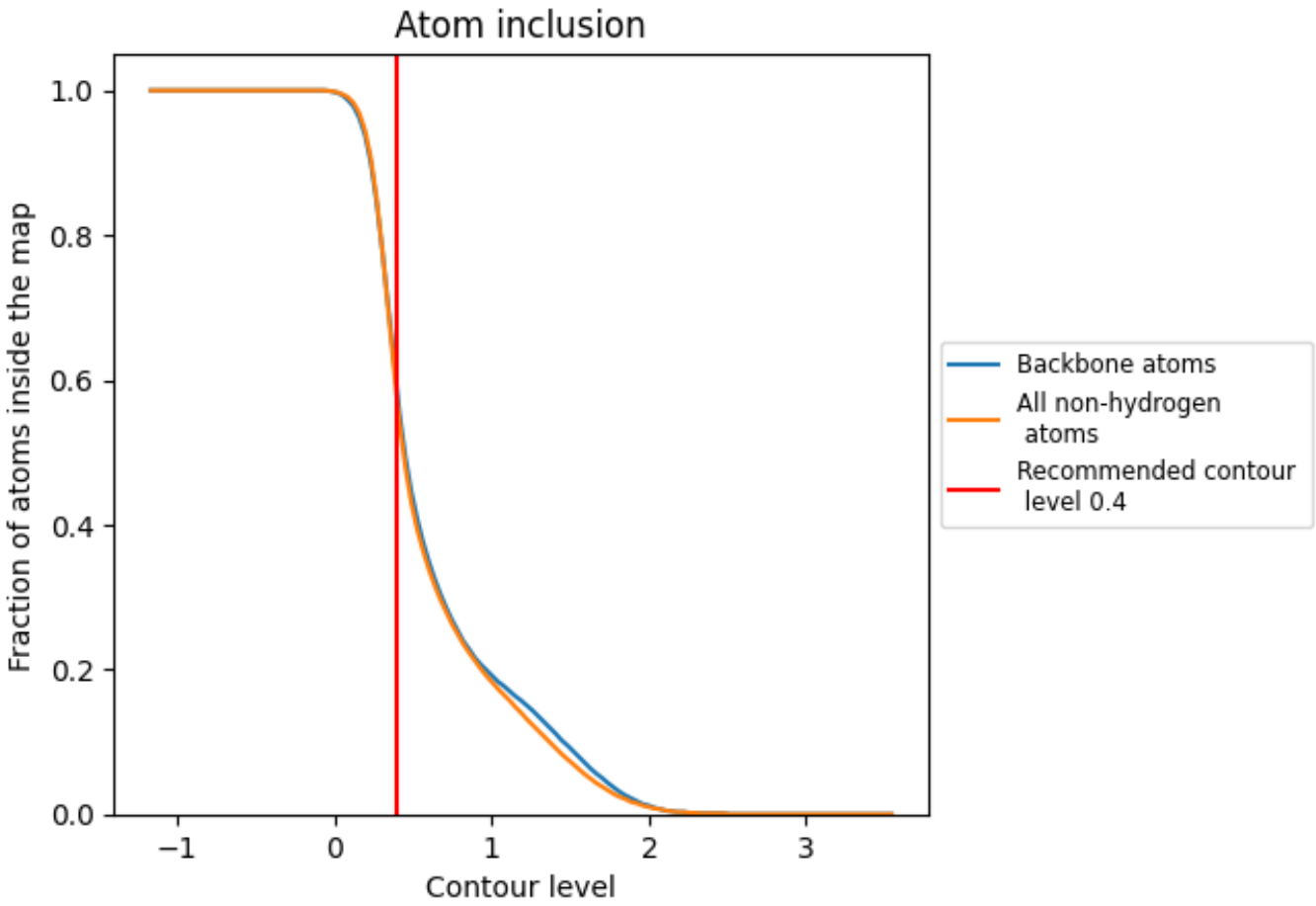
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.4).

9.4 Atom inclusion (i)



At the recommended contour level, 58% of all backbone atoms, 57% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.4) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.5660	0.3100
0	0.7900	0.4030
1	0.9480	0.4900
2	0.8230	0.4110
4	0.2710	0.0800
5	0.8320	0.3970
6	0.9930	0.5380
A	0.8660	0.5110
B	0.9310	0.5470
C	0.1100	0.0790
D	0.5700	0.3140
E	0.4680	0.2950
F	0.4820	0.1080
G	0.5650	0.2900
H	0.1100	0.0020
I	0.6520	0.3340
J	0.7720	0.4710
K	0.8570	0.5320
L	0.9210	0.4650
M	0.7770	0.3190
N	0.7900	0.5250
O	0.1470	0.1000
P	0.5660	0.0740
Q	0.2040	0.0650
R	0.7570	0.4610
S	0.8200	0.5280
T	0.6350	0.3200
U	0.5680	0.3300
V	0.8130	0.4380
X	0.5630	0.3670
X1	0.1400	0.1190
X2	0.2110	0.0290
X3	0.3710	0.1050
Y	0.7950	0.4710
Z	0.8180	0.4840

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Continued from previous page...

Chain	Atom inclusion	Q-score
a	0.6640	0.3220
b	0.6090	0.2260
c	0.4180	0.1710
d	0.7570	0.4380
e	0.3780	0.2700
f	0.3520	0.2090
g	0.5340	0.3730
h	0.2030	0.0840
i	0.1020	0.0320
j	0.1110	0.0620
k	0.1960	0.0700
l	0.1710	0.0530
m	0.1400	0.0950
n	0.1590	0.0440
q	0.0570	0.0630
r	0.0280	0.0450
s	0.0150	0.0580
t	0.0150	0.0660
u	0.0140	0.0630
v	0.6840	0.3180
w	0.4430	0.2120
x	0.3900	0.2310
z	0.8080	0.5120