Full wwPDB EM Validation Report

Sep 2, 2024 – 08:06 pm BST

PDB ID	:	6QDV
EMDB ID	:	EMD-4525
Title	:	Human post-catalytic P complex spliceosome
Authors	:	Fica, S.M.; Oubridge, C.; Wilkinson, M.E.; Newman, A.J.; Nagai, K.
Deposited on	:	2019-01-03
Resolution	:	3.30 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

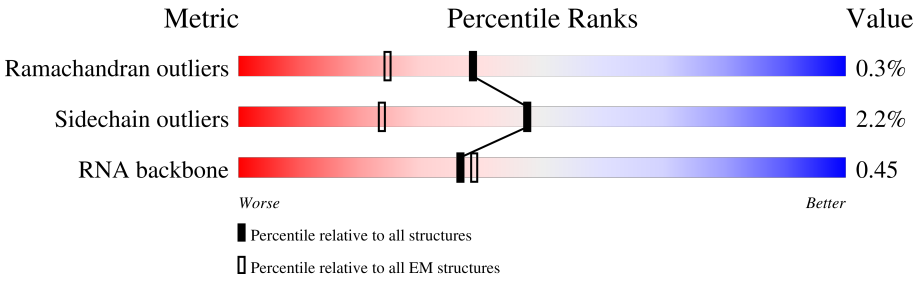
EMDB validation analysis	:	0.0.1.dev112
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.38.2

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.30 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415
RNA backbone	6643	2191

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	2	189	38% 44% 18% · 37%
2	5	116	9% 39% 22% · 35%
3	6	106	12% 55% 34% · 8%
4	7	390	100% 98% ·
5	8	91	100% 97% · ·
6	9	144	100% 99% ·
7	A	2335	15% 94% · ·
8	B	1722	100% 89% 10%

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Mol	Chain	Length	Quality of chain
9	C	899	12% 99%
10	D	123	54% 99%
11	E	14	7% 57% 29% 14%
12	F	122	18% 100%
13	G	60	17% 97%
14	H	908	30% 50% 49%
15	I	113	9% 19% 15% 63%
16	J	320	100%
17	K	295	26% 99%
18	L	144	6% 96%
19	M	289	39% 99%
20	N	306	15% 99%
21	O	802	27% 55% 45%
22	P	229	8% 46% 54%
23	R	26	92% 8%
24	S	848	37% 66% 33%
25	T	855	73% 73% 25%
26	U	1485	89% 86% 11%
27	V	1220	55% 55% 42%
28	W	162	99% 99%
29	Y	92	100% 100%
30	Z	30	7% 100%
31	b	82	59% 83% 17%
31	k	82	90% 100%
32	c	586	7% 46% 54%

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Mol	Chain	Length	Quality of chain
33	d	84	39% 100%
33	n	84	49% 99%
34	e	81	96% 98%
34	p	81	88% 100%
35	f	72	99% 99%
35	q	72	97% 100%
36	g	73	81% 100%
36	r	73	59% 99%
37	h	80	94% 100%
37	l	80	96% 100%
38	i	164	22% 100%
39	j	118	81% 81% 19%
39	m	118	81% 81% 19%
40	o	513	12% 99%
41	s	225	73% 74% 25%
42	t	504	25% 25% 75%
42	u	504	23% 23% 77%
42	v	504	25% 25% 75%
42	w	504	23% 23% 77%
43	y	144	20% 99%
44	z	34	100% 100%

2 Entry composition

There are 50 unique types of molecules in this entry. The entry contains 121152 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a RNA chain called U2 snRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	2	120	2535	1135	428	852	120	0	0

- Molecule 2 is a RNA chain called U5 snRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	5	75	1579	708	264	532	75	0	0

- Molecule 3 is a RNA chain called U6 snRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
3	6	97	2075	928	381	669	97	0	0

- Molecule 4 is a protein called Eukaryotic initiation factor 4A-III, N-terminally processed.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	7	390	3130	1976	546	589	19	0	0

- Molecule 5 is a protein called RNA-binding protein 8A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	8	91	730	463	122	142	3	0	0

- Molecule 6 is a protein called Protein mago nashi homolog 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	9	144	1196	772	200	221	3	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
7	A	2250	Total	C	N	O	S	0	0
			18655	12009	3256	3309	81		

- Molecule 8 is a protein called U5 small nuclear ribonucleoprotein 200 kDa helicase.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	B	1722	Total	C	N	O	S	0	0
			13846	8848	2369	2557	72		

- Molecule 9 is a protein called 116 kDa U5 small nuclear ribonucleoprotein component.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	C	899	Total	C	N	O	S	0	0
			7116	4553	1184	1345	34		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	?	-	SER	deletion	UNP Q15029

- Molecule 10 is a protein called PRKR-interacting protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	D	123	Total	C	N	O	S	0	0
			1013	635	193	180	5		

- Molecule 11 is a RNA chain called Ligated exons: MINX mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	E	14	Total	C	N	O	P	0	0
			296	132	52	98	14		

- Molecule 12 is a protein called Cactin.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	F	122	Total	C	N	O	S	0	0
			1084	712	197	173	2		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
F	654	ALA	GLU	conflict	UNP Q8WUQ7

- Molecule 13 is a protein called Protein FAM32A.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	G	60	Total	C	N	O	S	0	0
			504	314	96	92	2		

- Molecule 14 is a protein called Pre-mRNA-splicing factor CWC22 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	H	459	Total	C	N	O	S	0	0
			3713	2380	634	678	21		

- Molecule 15 is a RNA chain called Intron lariat: MINX RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	I	42	Total	C	N	O	P	0	0
			872	390	148	292	42		

- Molecule 16 is a protein called Pleiotropic regulator 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	J	320	Total	C	N	O	S	0	0
			2523	1594	457	464	8		

- Molecule 17 is a protein called SNW domain-containing protein 1.

Mol	Chain	Residues	Atoms						AltConf	Trace
17	K	295	Total	C	N	O	P	S	0	0
			2360	1479	431	435	2	13		

- Molecule 18 is a protein called Protein BUD31 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	L	144	Total	C	N	O	S	0	0
			1188	748	218	210	12		

- Molecule 19 is a protein called Pre-mRNA-splicing factor RBM22.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	M	289	Total	C	N	O	S	0	0
			2318	1455	416	428	19		

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
M	143	ALA	THR	conflict	UNP Q9NW64
M	144	ALA	SER	conflict	UNP Q9NW64
M	145	ALA	ASP	conflict	UNP Q9NW64
M	146	ALA	MET	conflict	UNP Q9NW64

- Molecule 20 is a protein called U5 small nuclear ribonucleoprotein 40 kDa protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	N	306	Total	C	N	O	S	0	0
			2394	1501	422	457	14		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
N	?	-	ALA	deletion	UNP Q96DI7

- Molecule 21 is a protein called Cell division cycle 5-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	O	441	Total	C	N	O	S	0	0
			3416	2116	648	639	13		

- Molecule 22 is a protein called Spliceosome-associated protein CWC15 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	P	106	Total	C	N	O	S	0	0
			888	544	174	168	2		

- Molecule 23 is a protein called Serine/arginine repetitive matrix protein 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	R	26	Total	C	N	O	S	0	0
			193	120	36	36	1		

- Molecule 24 is a protein called Crooked neck-like protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	S	570	Total	C	N	O	S	0	0
			3965	2482	740	737	6		

- Molecule 25 is a protein called Pre-mRNA-splicing factor SYF1.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	T	639	Total	C	N	O	S	0	0
			4003	2479	748	763	13		

- Molecule 26 is a protein called Intron-binding protein aquarius.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	U	1322	Total	C	N	O	S	4	0
			10885	6989	1879	1963	54		

- Molecule 27 is a protein called ATP-dependent RNA helicase DHX8.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	V	713	Total	C	N	O	S	0	0
			2995	1538	722	734	1		

- Molecule 28 is a protein called U2 small nuclear ribonucleoprotein A'.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	W	162	Total	C	N	O	S	0	0
			1282	820	219	240	3		

- Molecule 29 is a protein called U2 small nuclear ribonucleoprotein B".

Mol	Chain	Residues	Atoms					AltConf	Trace
29	Y	92	Total	C	N	O	S	0	0
			745	480	130	130	5		

- Molecule 30 is a protein called NF-kappa-B-activating protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	Z	30	Total	C	N	O	S	0	0
			230	140	43	45	2		

- Molecule 31 is a protein called Small nuclear ribonucleoprotein-associated proteins B and B'.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	b	68	Total	C	N	O	S	0	0
			545	347	95	96	7		
31	k	82	Total	C	N	O	S	0	0
			664	419	121	117	7		

- Molecule 32 is a protein called Pre-mRNA-splicing factor SLU7.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	c	269	Total	C	N	O	S	0	0
			2215	1392	397	418	8		

- Molecule 33 is a protein called Small nuclear ribonucleoprotein Sm D3.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	d	84	Total	C	N	O	S	0	0
			658	412	116	124	6		
33	n	83	Total	C	N	O	S	0	0
			652	409	115	122	6		

- Molecule 34 is a protein called Small nuclear ribonucleoprotein E.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	e	79	Total	C	N	O	S	0	0
			651	413	115	118	5		
34	p	81	Total	C	N	O	S	0	0
			669	424	119	121	5		

- Molecule 35 is a protein called Small nuclear ribonucleoprotein F.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	f	72	Total	C	N	O	S	0	0
			562	364	93	100	5		
35	q	72	Total	C	N	O	S	0	0
			562	364	93	100	5		

- Molecule 36 is a protein called Small nuclear ribonucleoprotein G.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	g	73	Total	C	N	O	S	0	0
			568	358	102	102	6		
36	r	73	Total	C	N	O	S	0	0
			568	358	102	102	6		

- Molecule 37 is a protein called Small nuclear ribonucleoprotein Sm D1.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	h	80	Total	C	N	O	S	0	0
			634	404	111	115	4		
37	l	80	Total	C	N	O	S	0	0
			634	404	111	115	4		

- Molecule 38 is a protein called Peptidyl-prolyl cis-trans isomerase-like 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	i	164	Total	C	N	O	S	0	0
			1270	810	220	233	7		

- Molecule 39 is a protein called Small nuclear ribonucleoprotein Sm D2.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	j	95	Total	C	N	O	S	0	0
			774	486	141	142	5		
39	m	95	Total	C	N	O	S	0	0
			774	486	141	142	5		

- Molecule 40 is a protein called Pre-mRNA-processing factor 17.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	o	513	Total	C	N	O	S	0	0
			4157	2643	719	771	24		

- Molecule 41 is a protein called Pre-mRNA-splicing factor SPF27.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	s	169	Total	C	N	O	S	0	0
			1402	872	257	264	9		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
42	t	125	Total	C	N	O	S	0	0
			988	618	176	190	4		
42	u	118	Total	C	N	O	S	0	0
			938	586	167	181	4		
42	v	125	Total	C	N	O	S	0	0
			988	618	176	190	4		

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Mol	Chain	Residues	Atoms					AltConf	Trace
42	w	118	Total	C	N	O	S	0	0
			938	586	167	181	4		

- Molecule 43 is a protein called Pre-mRNA-splicing factor SYF2.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	y	144	Total	C	N	O	S	0	0
			1218	758	225	233	2		

- Molecule 44 is a protein called Replication stress response regulator SDE2.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	z	34	Total	C	N	O	S	0	0
			280	166	59	53	2		

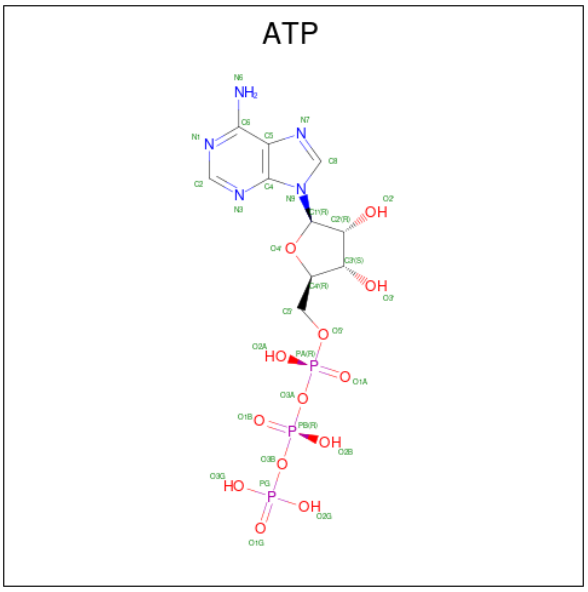
- Molecule 45 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
45	6	5	Total	Mg	0
			5	5	
45	7	1	Total	Mg	0
			1	1	
45	C	1	Total	Mg	0
			1	1	

- Molecule 46 is POTASSIUM ION (three-letter code: K) (formula: K).

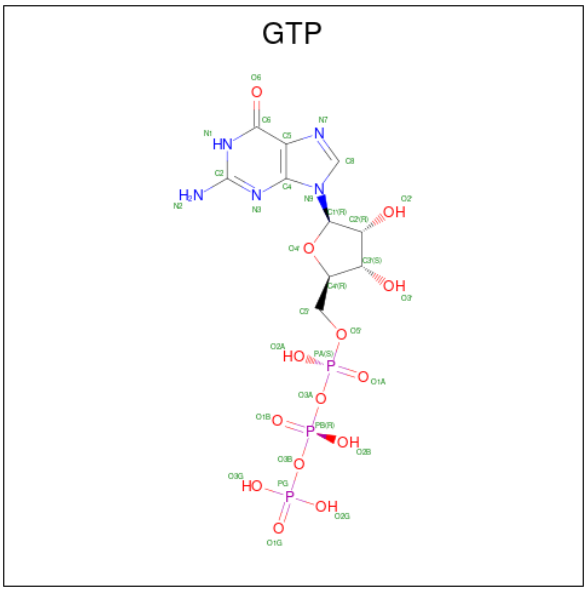
Mol	Chain	Residues	Atoms		AltConf
46	6	1	Total	K	0
			1	1	

- Molecule 47 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).



Mol	Chain	Residues	Atoms					AltConf
47	7	1	Total	C	N	O	P	0
			31	10	5	13	3	

- Molecule 48 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula: $C_{10}H_{16}N_5O_{14}P_3$).

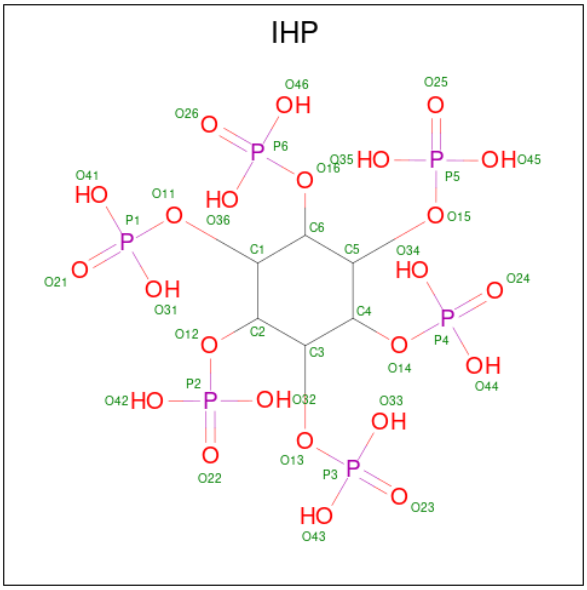


Mol	Chain	Residues	Atoms					AltConf
48	C	1	Total	C	N	O	P	0
			32	10	5	14	3	

- Molecule 49 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	AltConf
49	L	3	Total Zn 3 3	0
49	M	3	Total Zn 3 3	0
49	c	1	Total Zn 1 1	0

- Molecule 50 is INOSITOL HEXAKISPHOSPHATE (three-letter code: IHP) (formula: $C_6H_{18}O_{24}P_6$).



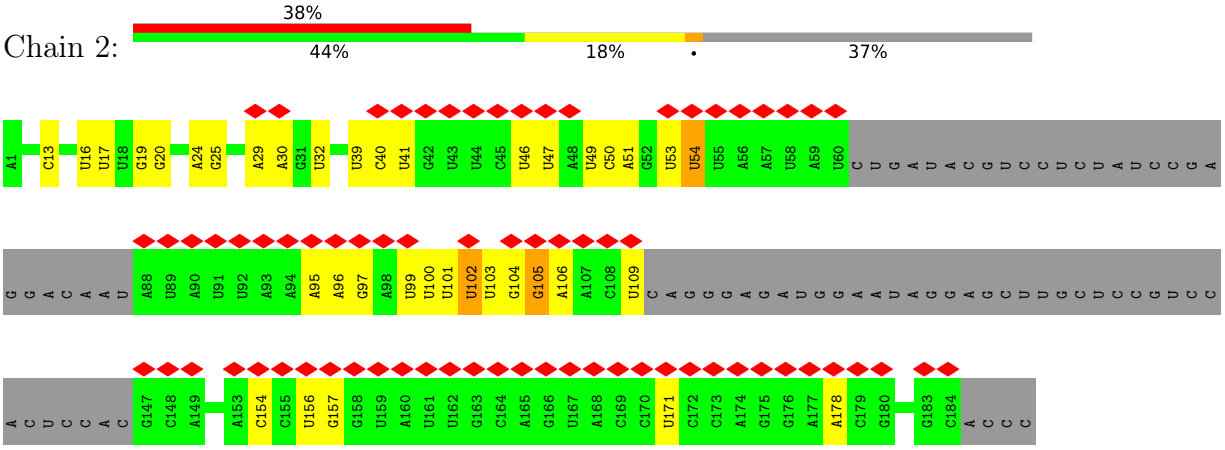
Mol	Chain	Residues	Atoms	AltConf
50	c	1	Total C O P 36 6 24 6	0

3 Residue-property plots (i)

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

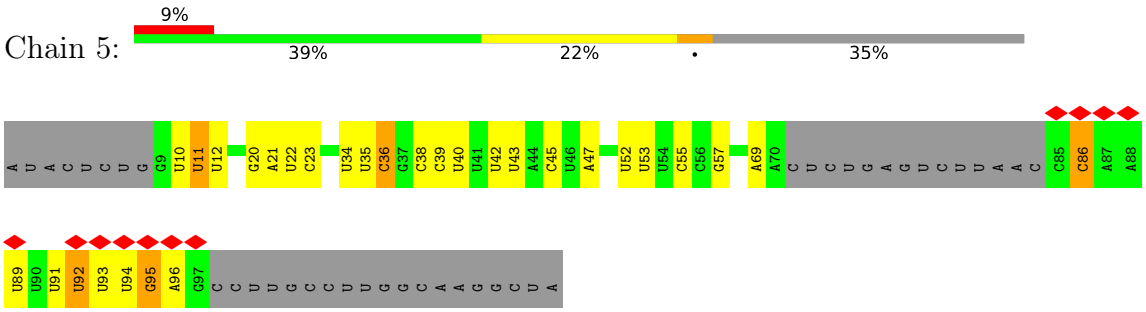
• Molecule 1: U2 snRNA

Chain 2:



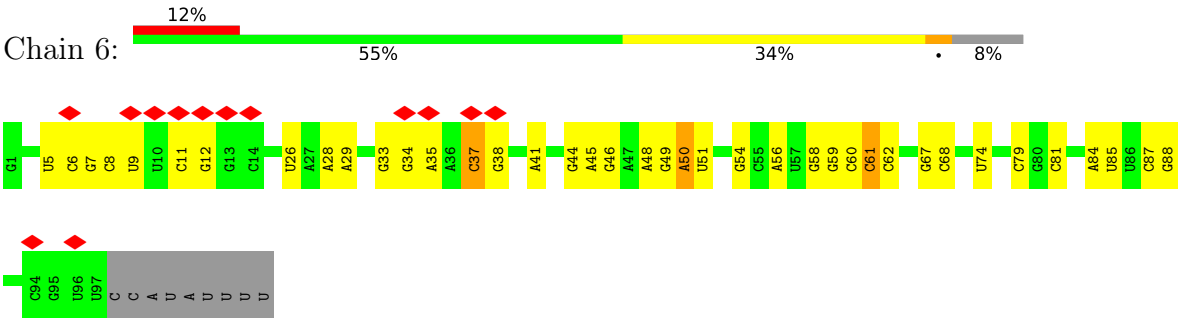
• Molecule 2: U5 snRNA

Chain 5:



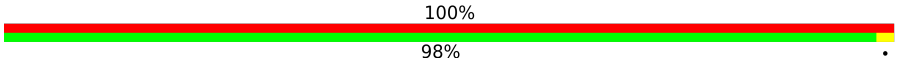
• Molecule 3: U6 snRNA

Chain 6:



• Molecule 4: Eukaryotic initiation factor 4A-III, N-terminally processed

Chain 7:



D22 M23 T24 K25 V26 E27 F28 E29 T30 S31 E32 E33 V34 D35 V36 T37 P38 T39 F40 D41 T42 M43 G44 L45 R46 E47 D48 L49 L50 R51 G52 I53 Y54 A55 Y56 G57 F58 E59 K60 P61 S62 A63 I64 Q65 Q66 R67 A68 I69 K70 Q71 I72 I73 K74 G75 R76 D77 V78 I79 A80 Q81

S82 Q83 S84 G85 T86 G87 K88 T89 A90 T91 F92 S93 I94 S95 V96 L97 Q98 C99 L100 D101 I102 Q103 V104 R105 E106 T107 Q108 A109 L110 I111 L112 A113 P114 T115 R116 E117 L118 A119 V120 Q121 I122 Q123 K124 G125 L126 L127 A128 L129 G130 D131 Y132 M133 N134 V135 Q136 C137 H138 A139 C140 I141

G142 G143 T144 N145 V146 G147 E148 D149 I150 R151 K152 L153 D154 Y155 G156 Q157 H158 V159 V160 A161 G162 T163 P164 G165 R166 V167 F168 D169 M170 I171 R172 R173 R174 S175 L176 R177 T178 R179 A180 I181 K182 M183 L184 V185 L186 D187 E188 A189 D190 E191 M192 L193 N194 K195 G196 F197 K198 E199 Q200 I201

Y202 D203 V204 Y205 R206 Y207 L208 P209 P210 A211 T212 Q213 V214 V215 L216 I217 S218 A219 T220 L221 P222 H223 E224 I225 L226 E227 M228 T229 N230 K231 F232 M233 T234 D235 P236 I237 R238 I239 L240 V241 K242 R243 D244 E245 L246 T247 L248 E249 G250 I251 K252 Q253 F254 P255 V256 A257 V258 E259 R260 E261

E262 W263 K264 F265 D266 T267 L268 C269 D270 L271 Y272 D273 T274 L275 T276 I277 T278 Q279 A280 V281 I282 F283 C284 N285 T286 K287 R288 K289 V290 D291 W292 L293 T294 E295 K296 M297 R298 E299 A300 N301 F302 T303 V304 S305 S306 M307 H308 G309 D310 M311 P312 Q313 K314 E315 R316 E317 S318 I319 M320 K321

E322 F323 R324 S325 G326 A327 S328 R329 V330 L331 I332 S333 T334 D335 V336 W337 A338 R339 G340 L341 D342 V343 P344 Q345 V346 S347 L348 I349 I350 N351 Y352 D353 L354 P355 N356 N357 R358 E359 L360 Y361 I362 H363 R364 I365 G366 R367 S368 G369 R370 Y371 G372 R373 K374 G375 V376 A377 I378 N379 F380 V381

K382 N383 D384 D385 I386 R387 I388 L389 R390 D391 I392 E393 Q394 Y395 Y396 S397 T398 Q399 I400 D401 E402 M403 P404 M405 N406 V407 A408 D409 L410 I411

• Molecule 5: RNA-binding protein 8A

Chain 8:

P64 G65 P66 Q67 R68 S69 V70 E71 G72 W73 I74 L75 F76 V77 T78 G79 V80 H81 E82 E83 A84 T85 E86 E87 D88 I89 H90 D91 K92 F93 A94 E95 Y96 G97 E98 I99 K100 N101 I102 H103 L104 N105 L106 D107 R108 R109 T110 G111 Y112 L113 K114 G115 Y116 T117 L118 V119 E120 Y121 E122 T123

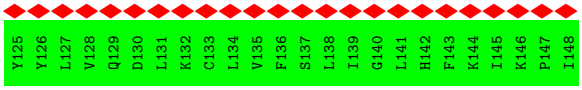
Y124 K125 E126 A127 Q128 A129 A130 M131 E132 G133 L134 N135 G136 Q137 D138 L139 M140 G141 Q142 P143 I144 S145 V146 D147 W148 C149 F150 V151 R152 G153 P154

• Molecule 6: Protein mago nashi homolog 2

Chain 9:

S5 D6 F7 Y8 L9 R10 Y11 Y12 V13 G14 H15 K16 G17 K18 F19 G20 H21 E22 F23 L24 E25 F26 E27 F28 R29 P30 D31 G32 K33 L34 R35 Y36 A37 N38 N39 S40 N41 Y42 K43 N44 D45 V46 M47 I48 R49 K50 E51 A52 Y53 V54 H55 K56 S57 V58 M59 E60 E61 L62 K63 R64

I65 I66 D67 D68 S69 E70 I71 T72 K73 E74 D75 D76 A77 L78 W79 P80 P81 P82 D83 R84 V85 G86 R87 Q88 E89 L90 E91 I92 V93 I94 G95 D96 E97 H98 I99 S100 F101 T102 T103 S104 K105 I106 G107 S108 L109 I110 D111 V112 N113 Q114 S115 K116 D117 P118 E119 G120 L121 R122 V123 F124



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

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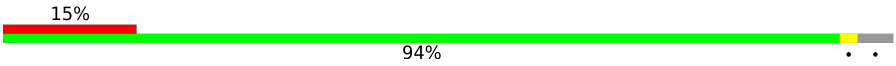
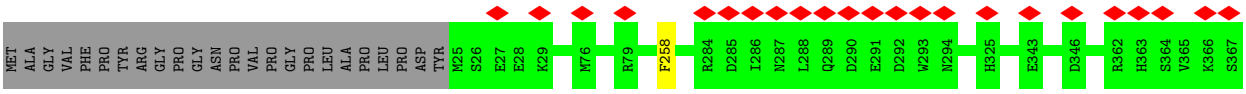
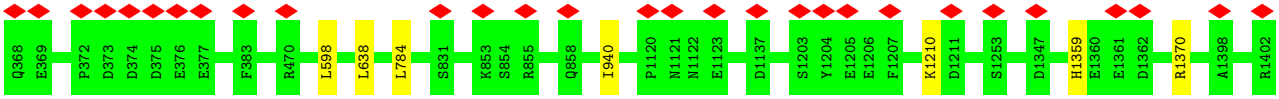
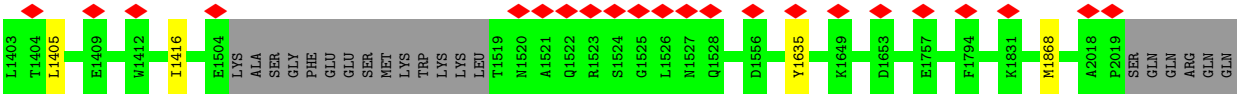
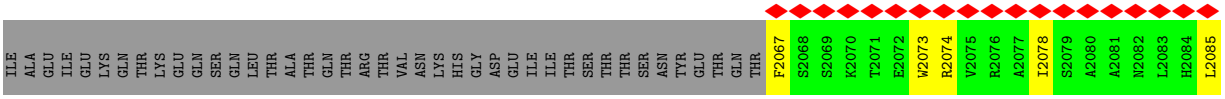
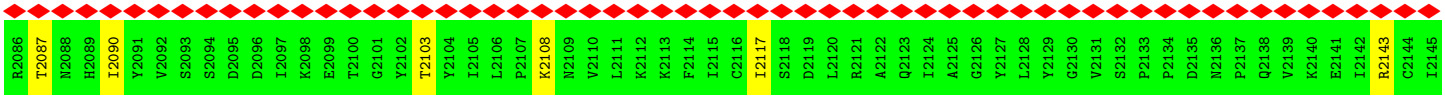


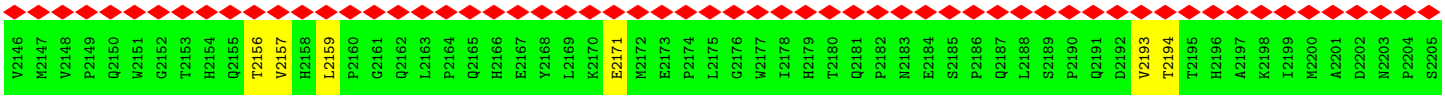


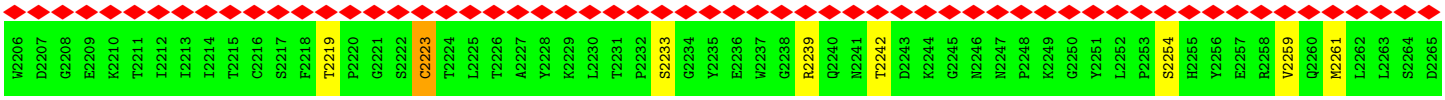


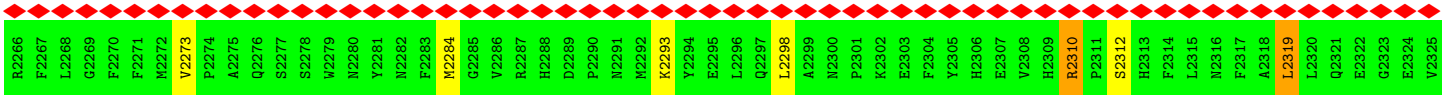


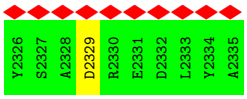






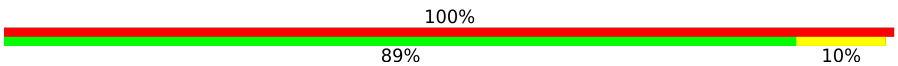


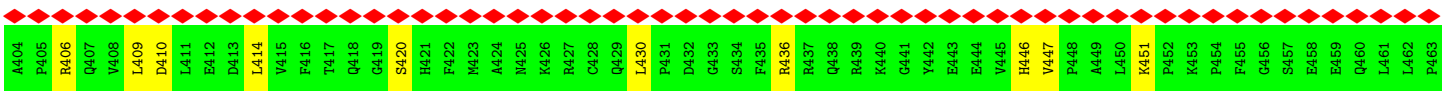


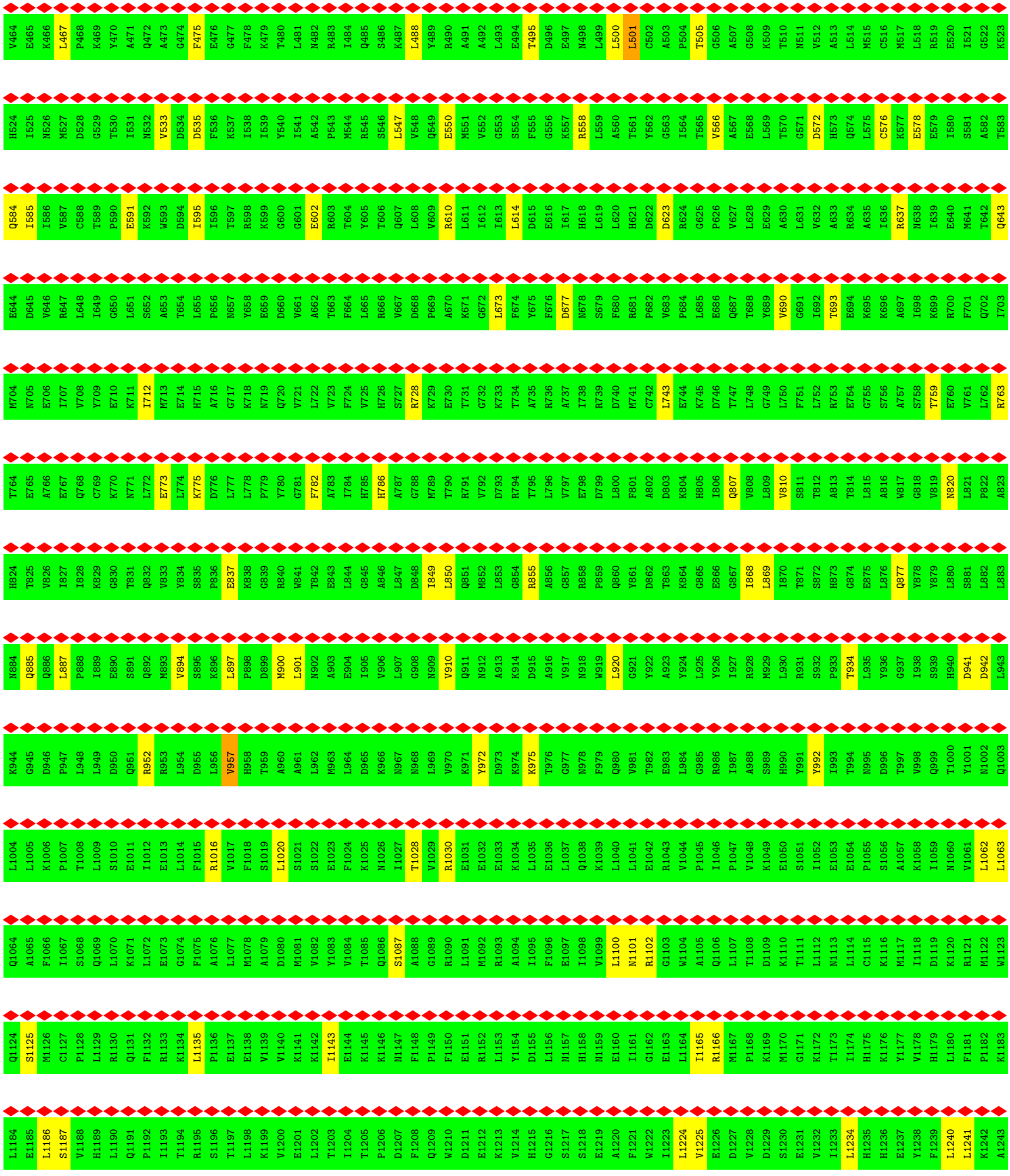


• Molecule 8: U5 small nuclear ribonucleoprotein 200 kDa helicase

Chain B:



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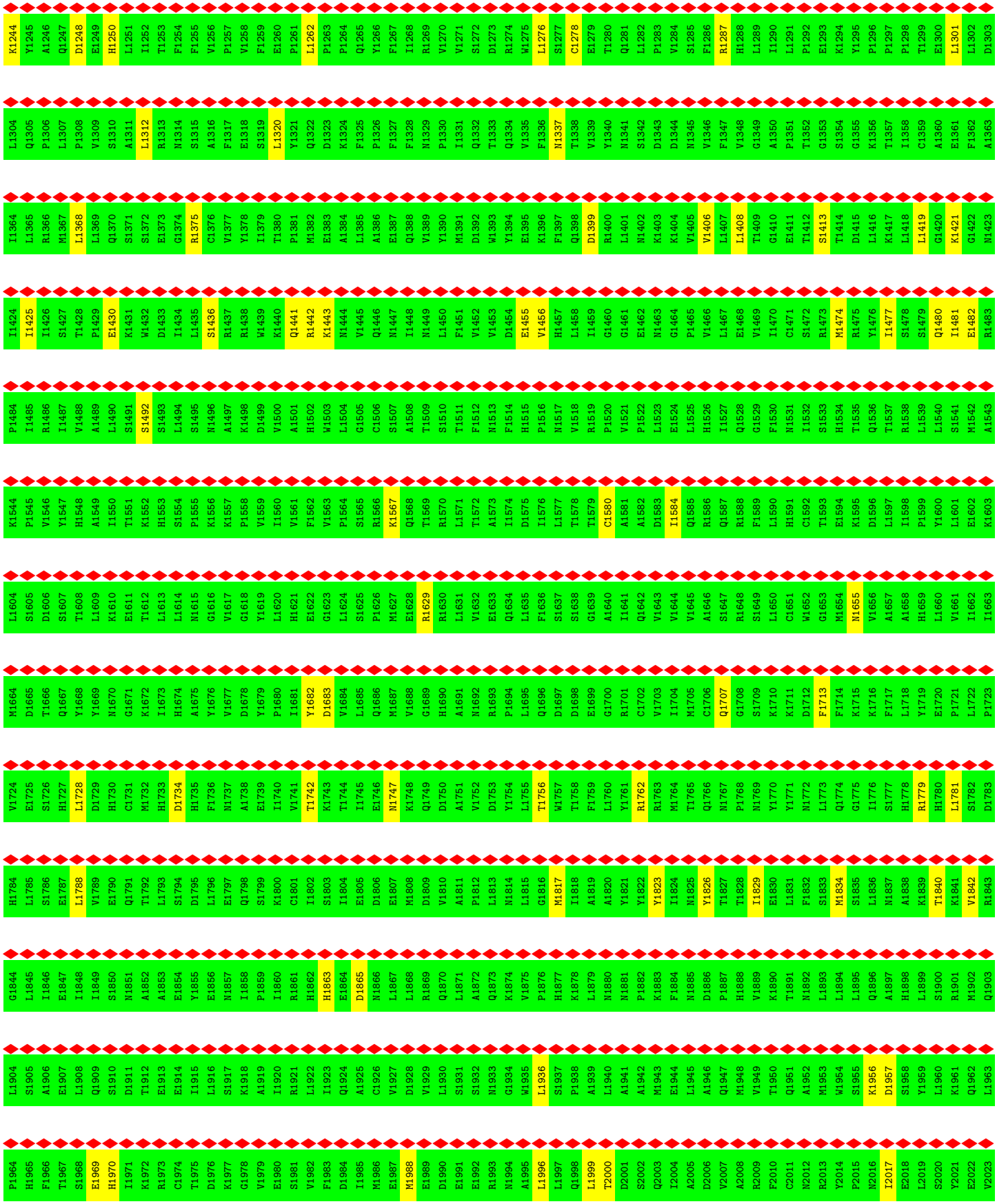
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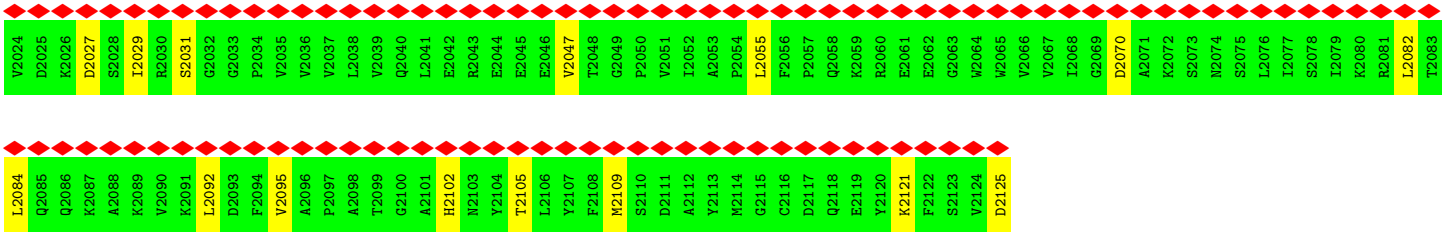
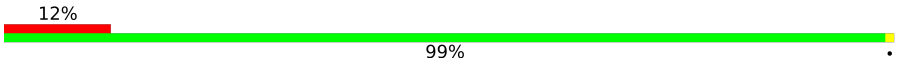
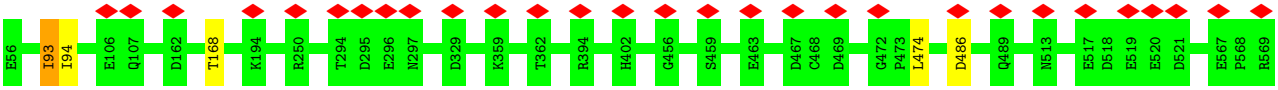
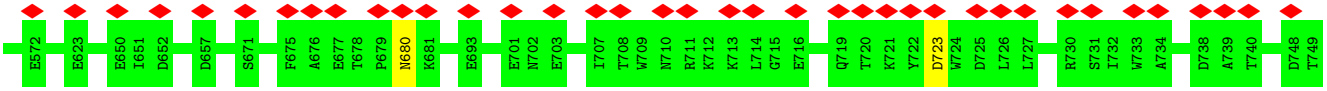


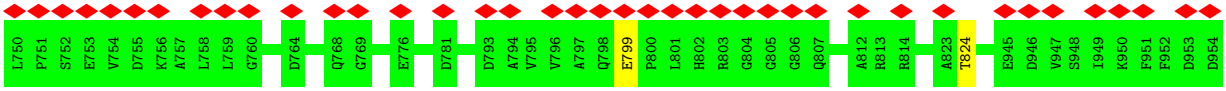
• Molecule 9: 116 kDa U5 small nuclear ribonucleoprotein component

Chain C:



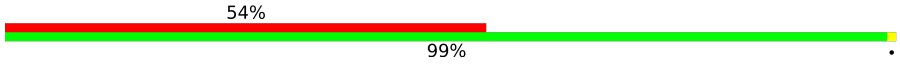


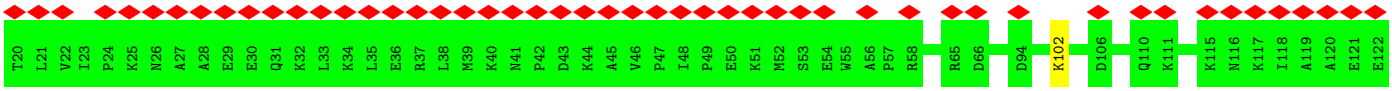


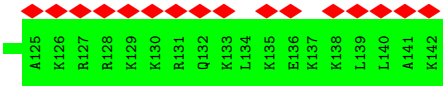


• Molecule 10: PRKR-interacting protein 1

Chain D:

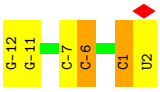






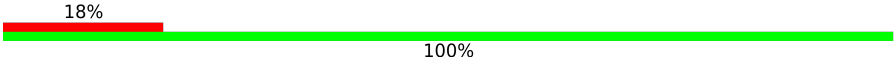
• Molecule 11: Ligated exons: MINX mRNA

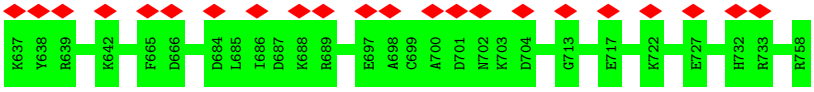
Chain E:



• Molecule 12: Cactin

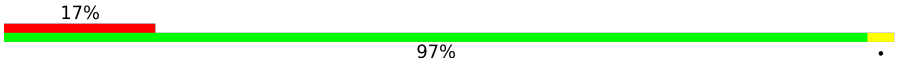
Chain F:

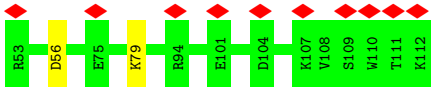




• Molecule 13: Protein FAM32A

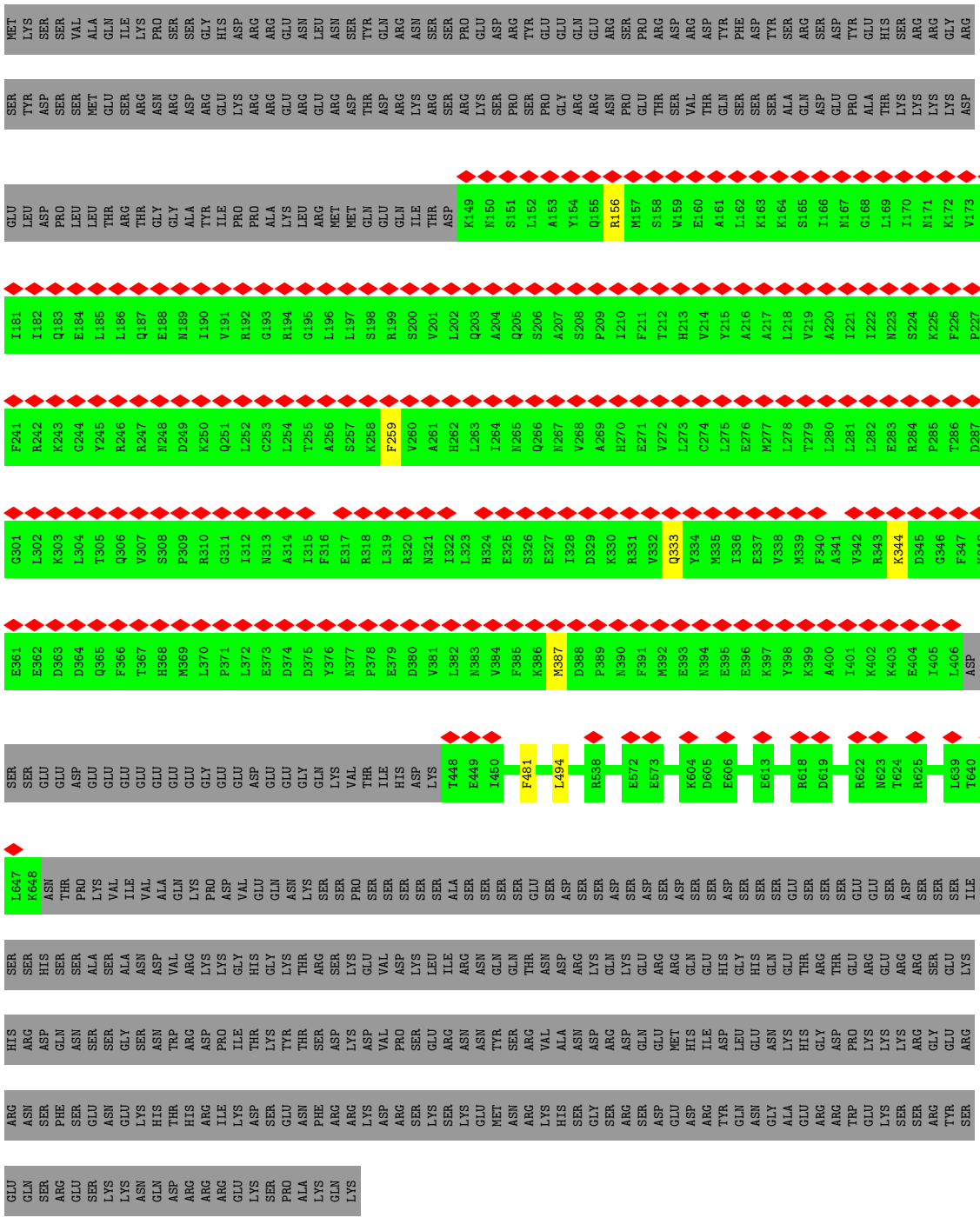
Chain G:





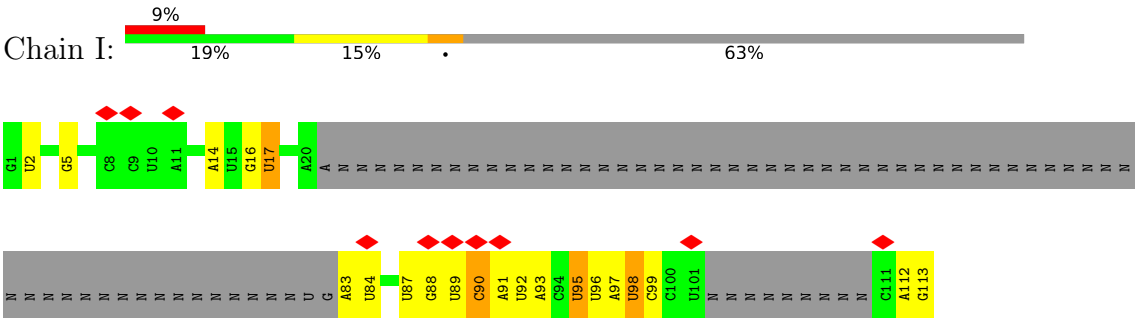
• Molecule 14: Pre-mRNA-splicing factor CWC22 homolog

Chain H:



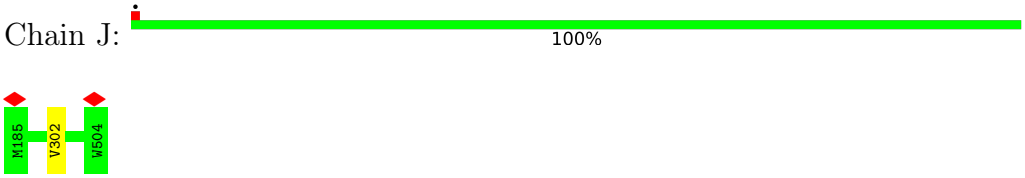
• Molecule 15: Intron lariat: MINX RNA

Chain I:



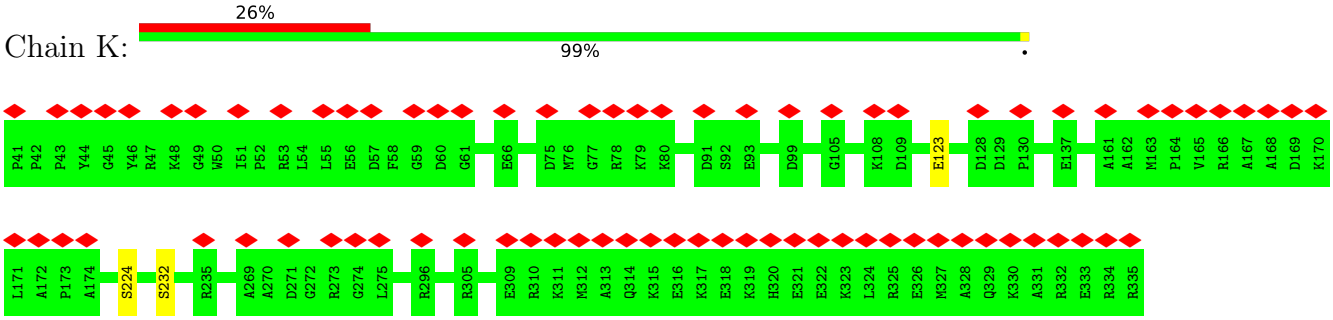
• Molecule 16: Pleiotropic regulator 1

Chain J:



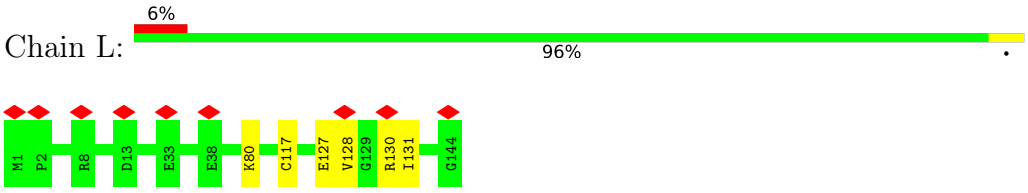
• Molecule 17: SNW domain-containing protein 1

Chain K:



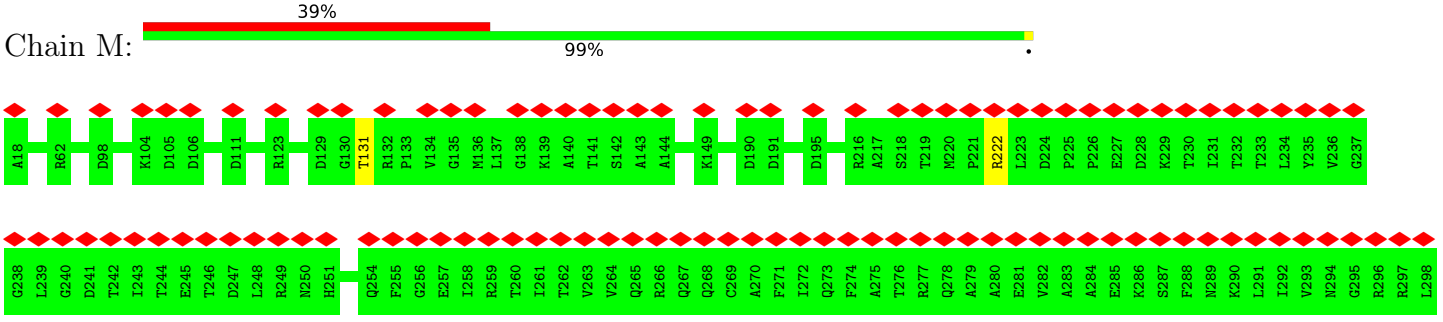
• Molecule 18: Protein BUD31 homolog

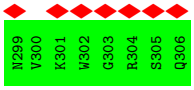
Chain L:



• Molecule 19: Pre-mRNA-splicing factor RBM22

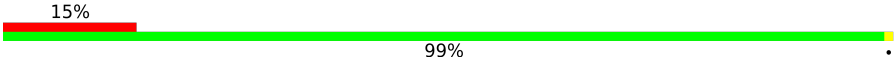
Chain M:

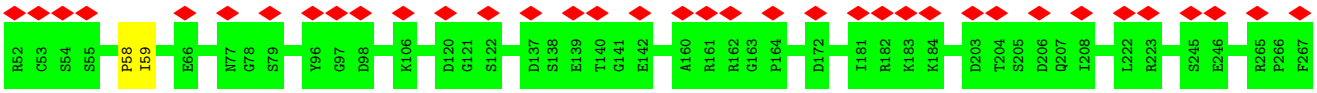


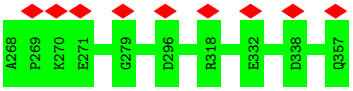


• Molecule 20: U5 small nuclear ribonucleoprotein 40 kDa protein

Chain N:

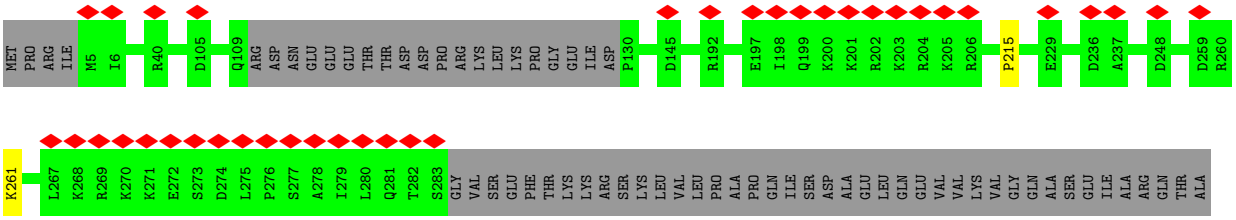


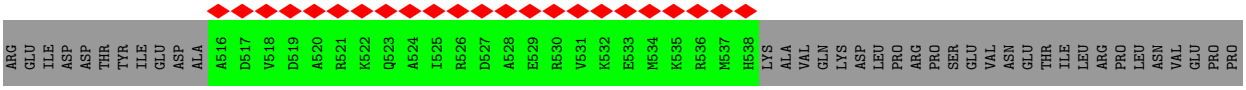


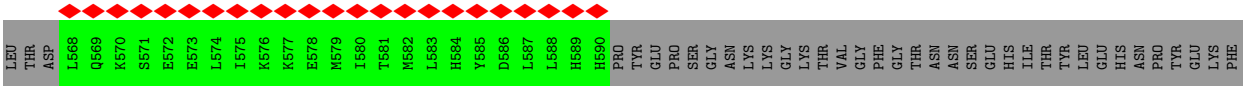


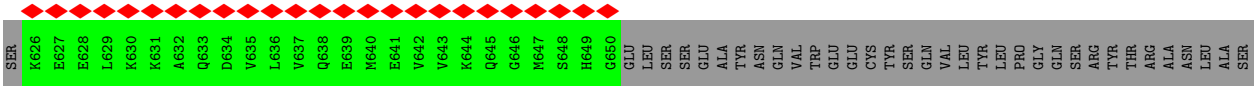
• Molecule 21: Cell division cycle 5-like protein

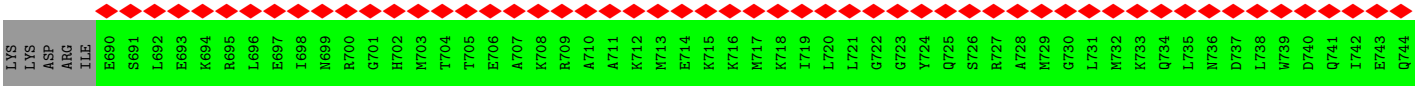
Chain O:

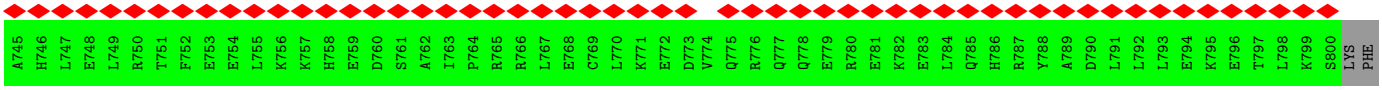






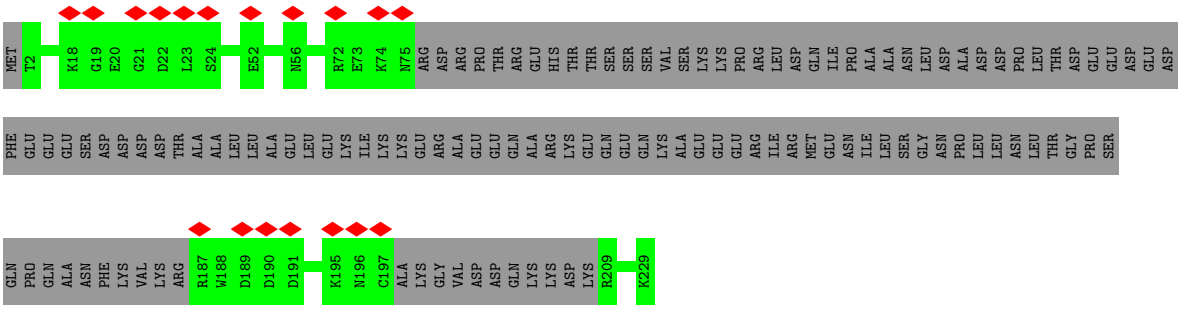






• Molecule 22: Spliceosome-associated protein CWC15 homolog

Chain P:

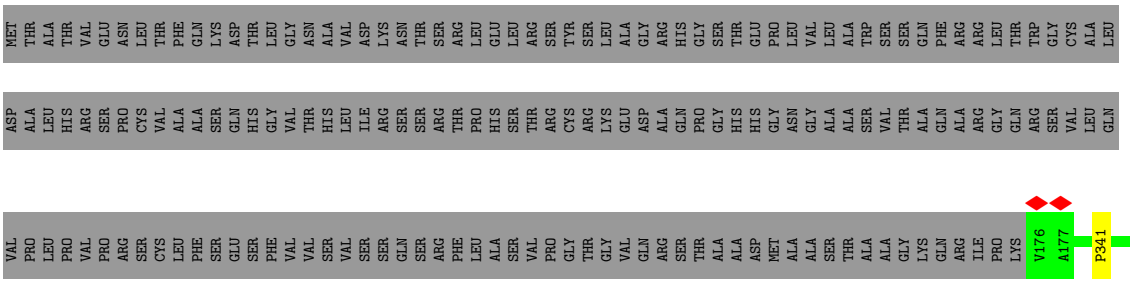


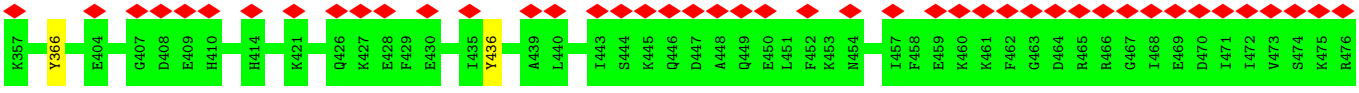
• Molecule 23: Serine/arginine repetitive matrix protein 2

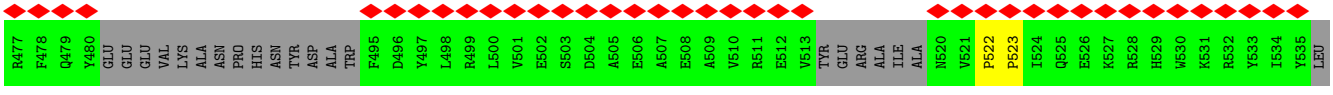
Chain R:

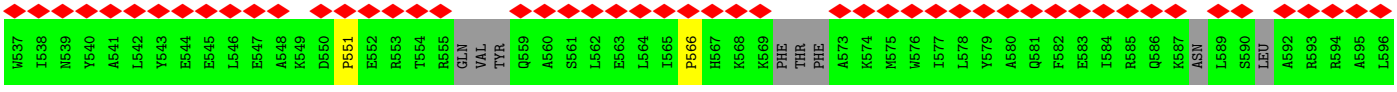
• Molecule 24: Crooked neck-like protein 1

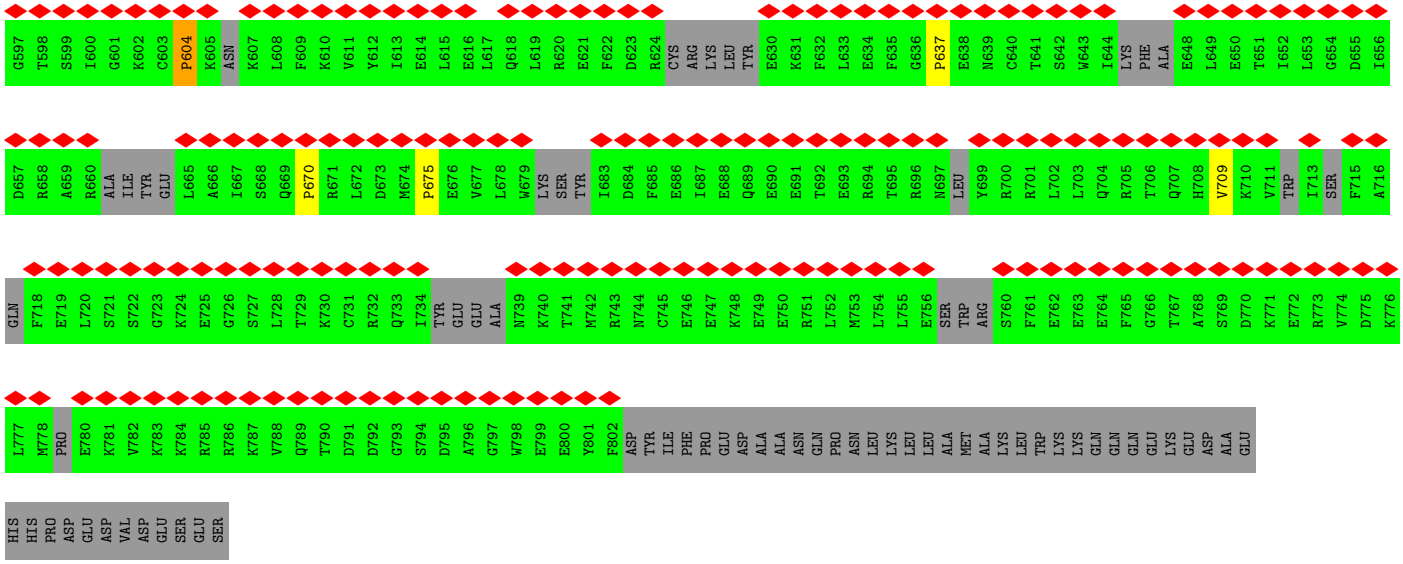
Chain S:





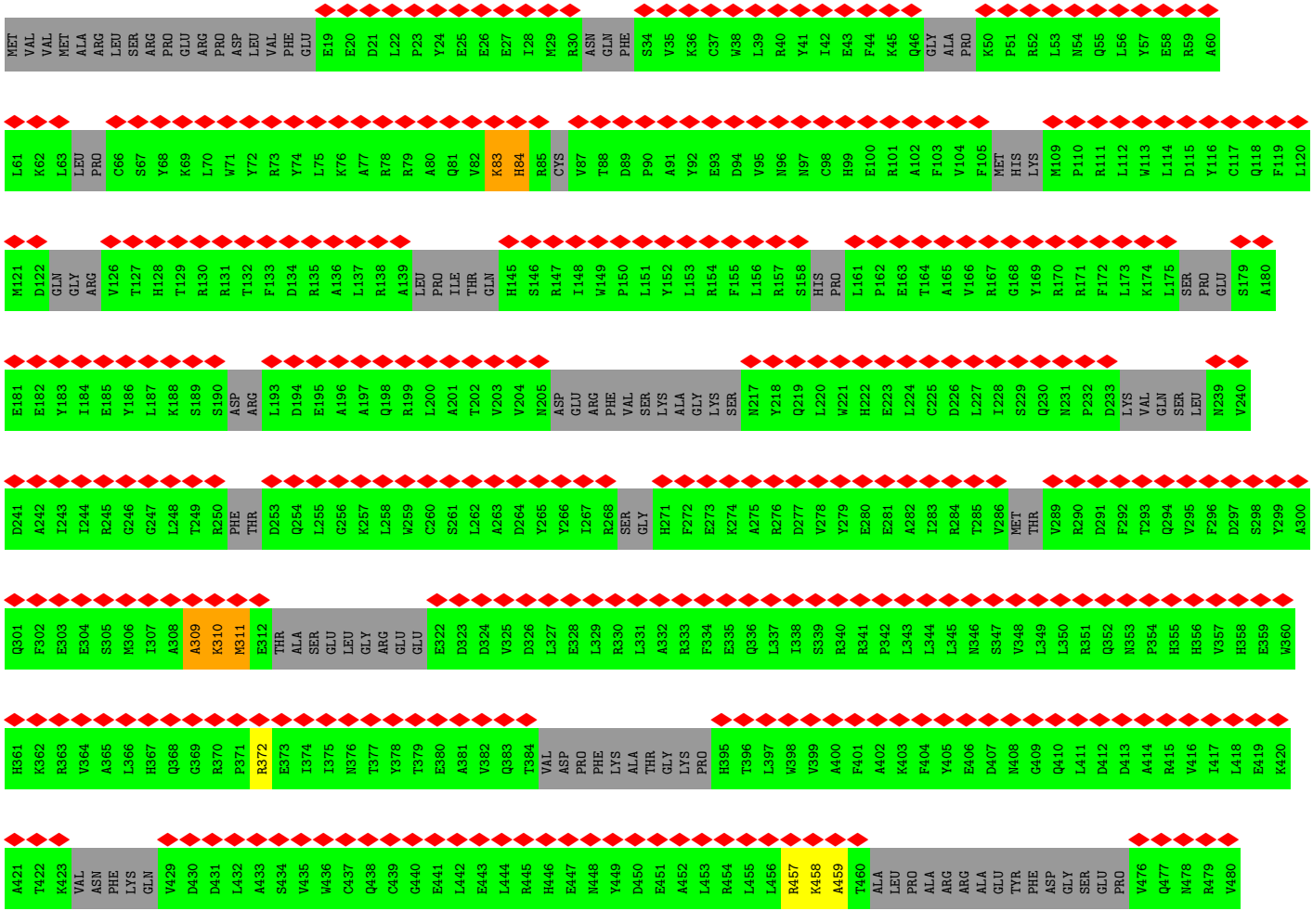


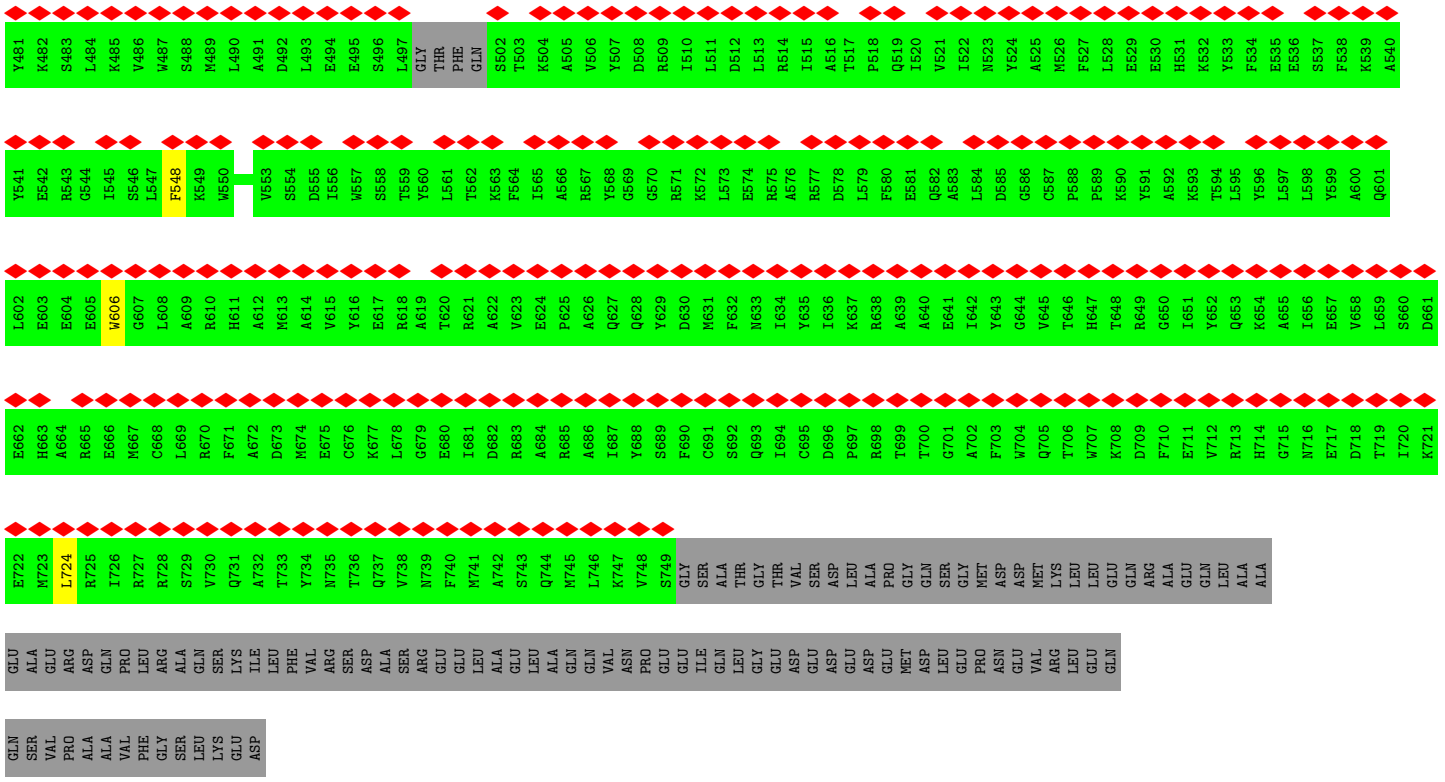




• Molecule 25: Pre-mRNA-splicing factor SYF1

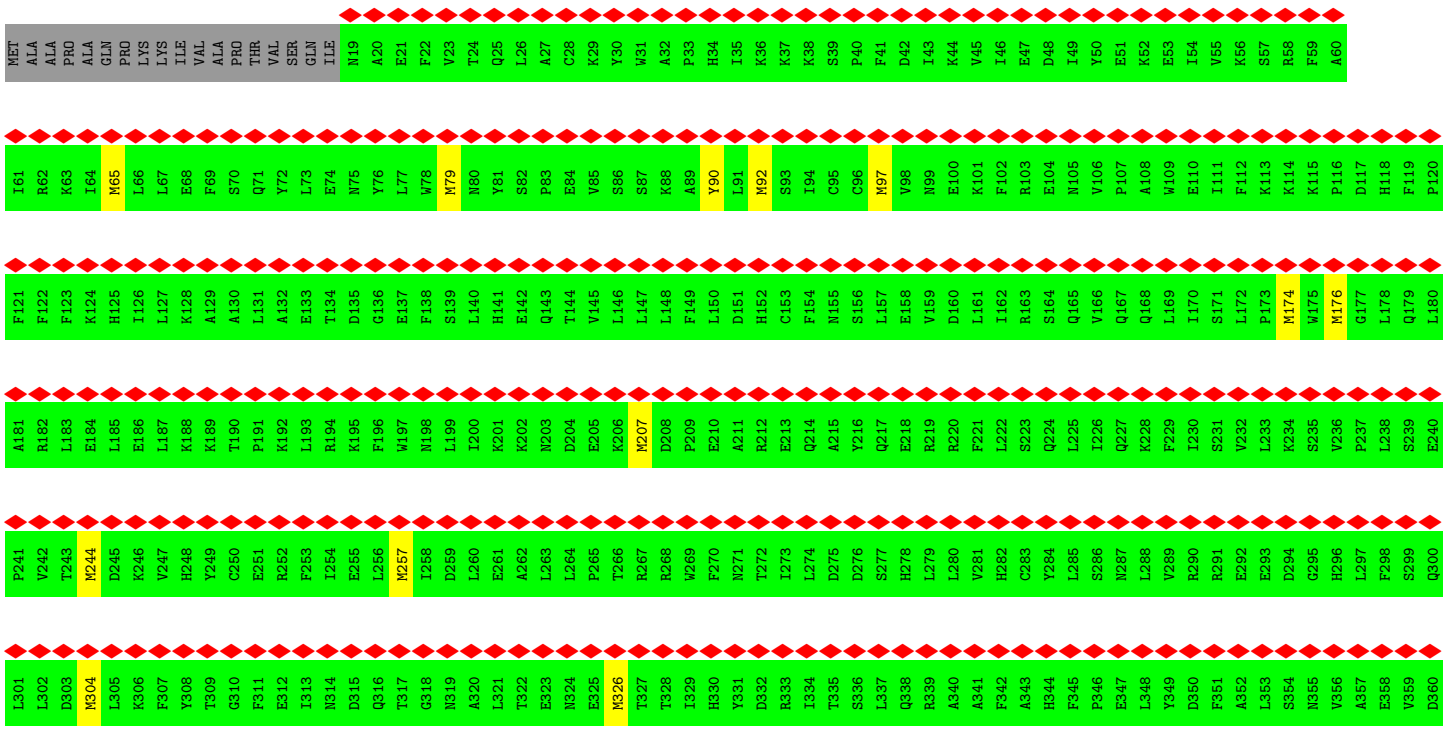
Chain T:

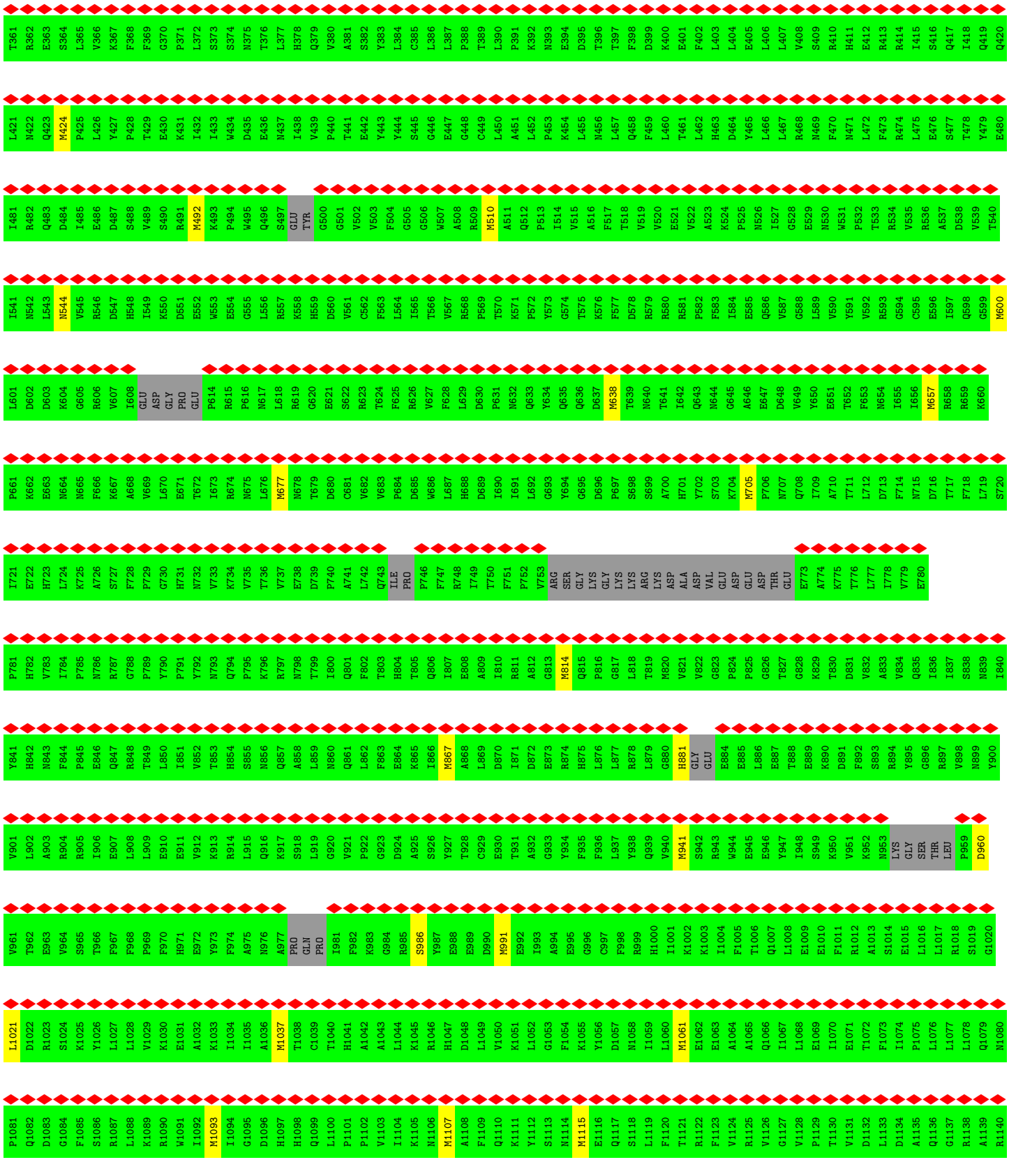




- Molecule 26: Intron-binding protein aquarius

Chain U:

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L421 N422 Q423 M424 P425 L426 Y427 P428 T429 E430 K431 I432 I433 W434 D435 E436 N437 I438 V439 P440 T441 E442 Y443 Y444 S445 G446 E447 G448 C449 L450 A451 L452 P453 K454 L455 N456 L457 Q458 F459 L460 T461 L462 H463 D464 Y465 L466 L467 R468 N469 F470 N471 L472 F473 R474 L475 E476 S477 T478 Y479 E480
I481 R482 Q483 D484 I485 E486 D487 S488 V489 S490 R491 M492 K493 P494 W495 Q496 S497 GLU TYR G500 G501 V502 V503 F504 G505 G506 W507 A508 R509 M510 A511 Q512 P513 I514 V515 A516 F517 T518 V519 V520 E521 V522 A523 K524 P525 N526 I527 G528 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
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I721 E722 H723 L724 K725 A726 S727 F728 P729 G730 H731 N732 V733 K734 V735 T736 V737 E738 D739 P740 A741 L742 Q743 ILE PRO P746 F747 R748 I749 T750 F751 P752 V753 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
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Y841 H842 N843 F844 P845 E846 Q847 R848 T849 L850 I851 V852 T853 H854 S855 N856 Q857 A858 L859 N860 Q861 L862 F863 E864 K865 I866 M867 A868 L869 D870 I871 D872 E873 R874 H875 L876 L877 R878 L879 G880 H881 GLY GLU E884 E885 L886 E887 T888 E889 K890 D891 F892 S893 R894 Y895 G896 R897 V898 N899 Y900
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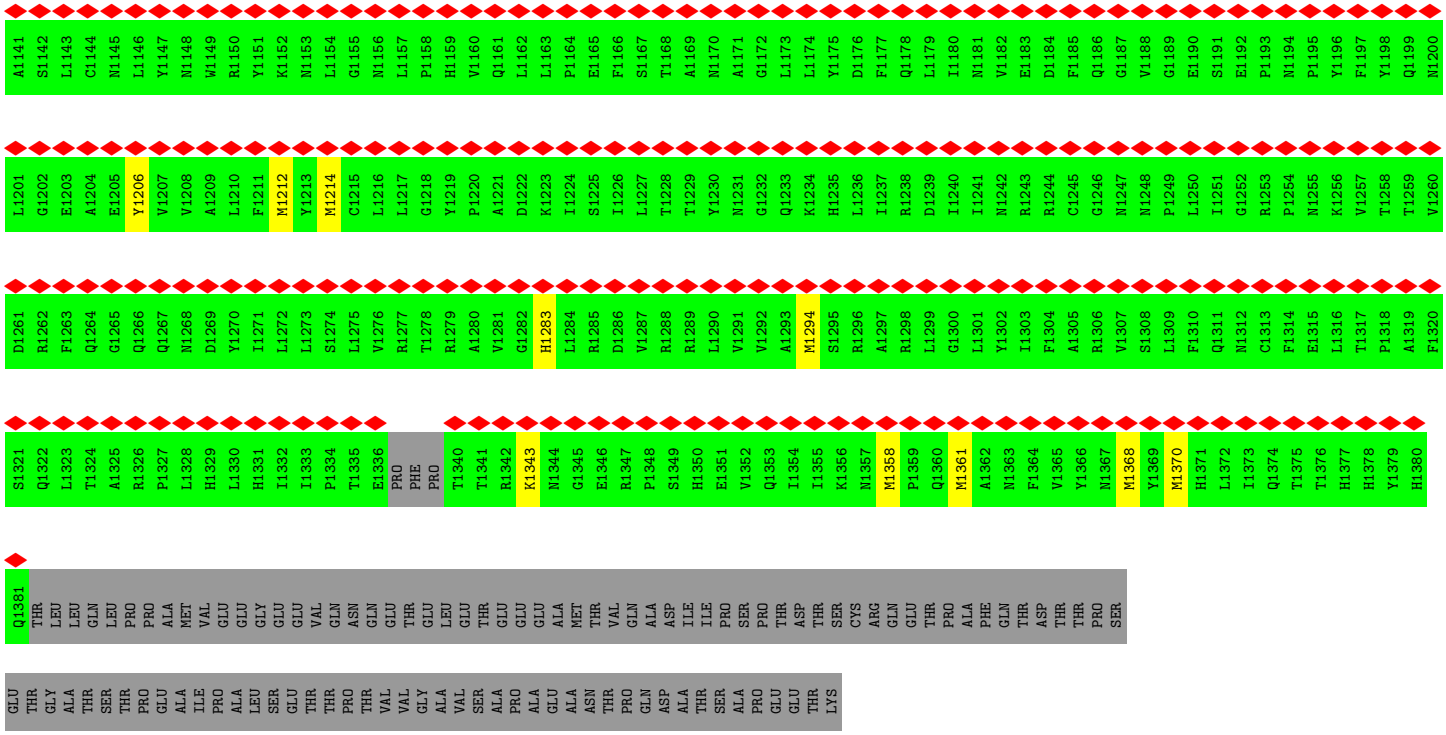
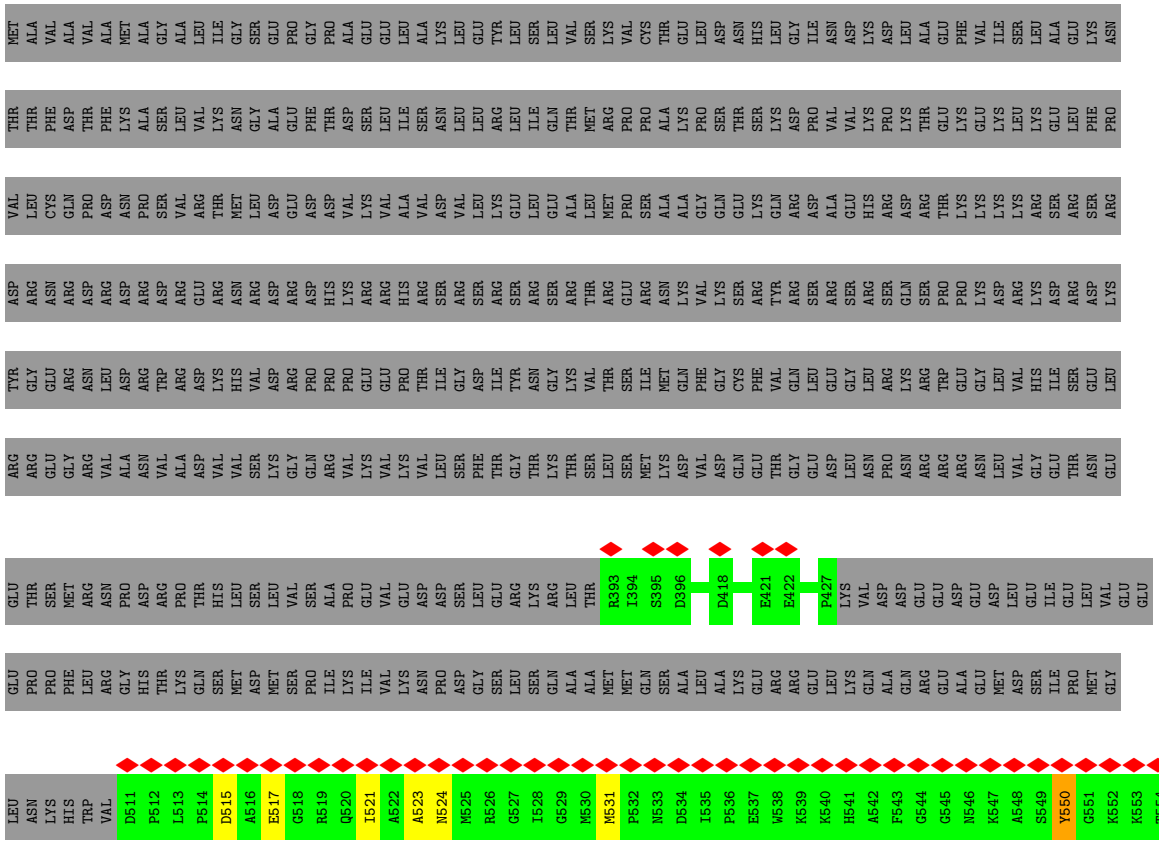
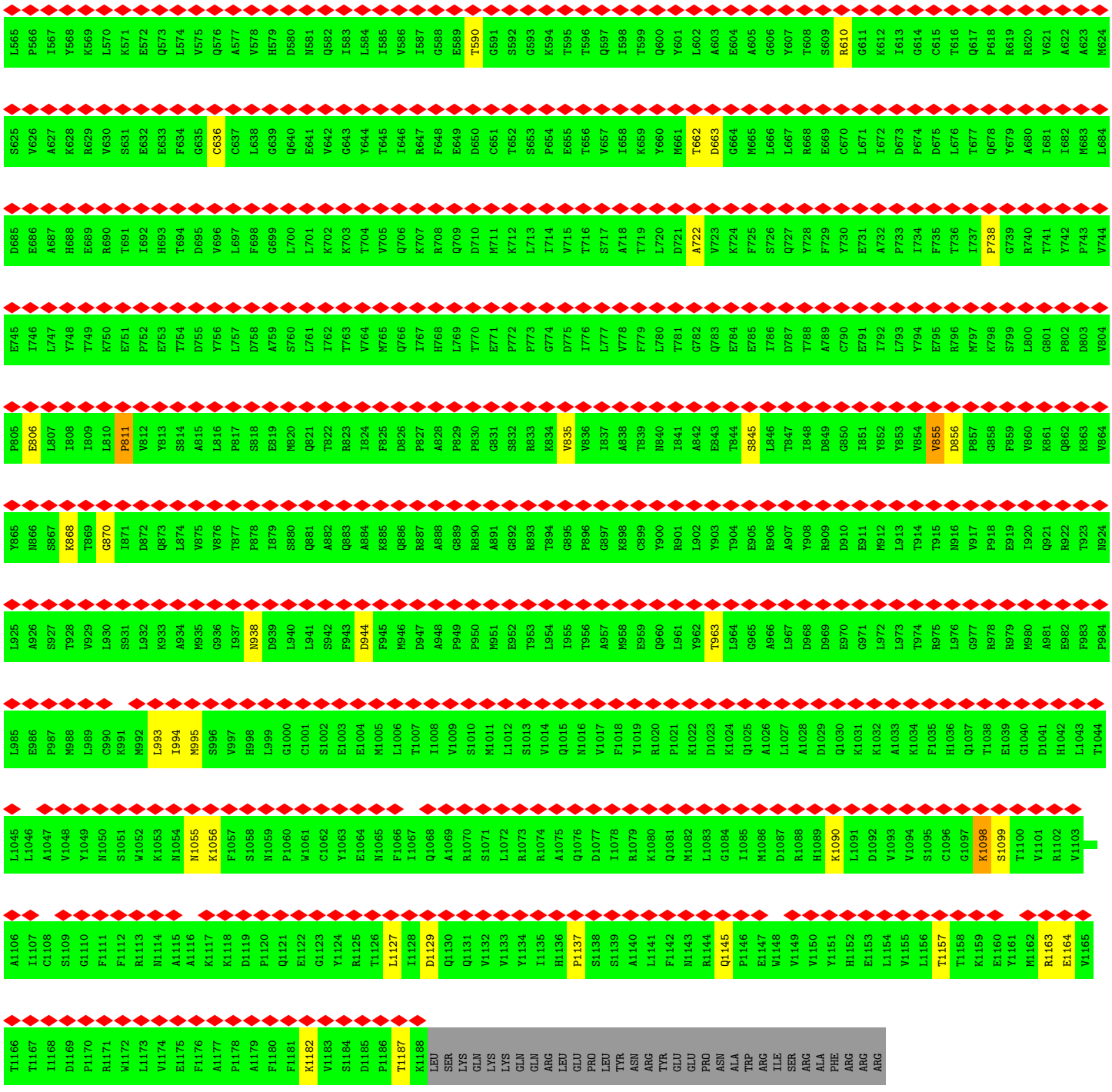
V961 T962 E963 V964 S965 T966 F967 F968 P969 F970 H971 E972 Y973 F974 A975 N976 A977 PRO GLN PRO I981 P982 K983 G984 R985 S986 Y987 E988 E989 D990 M991 E992 I993 A994 E995 G996 C997 F998 R999 H1000 I1001 K1002 K1003 I1004 F1005 T1006 Q1007 L1008 E1009 E1010 F1011 R1012 A1013 S1014 E1015 L1016 L1017 R1018 S1019 G1020
L1021 D1022 R1023 S1024 K1025 Y1026 L1027 L1028 V1029 K1030 E1031 A1032 K1033 I1034 I1035 A1036 M1037 T1038 C1039 T1040 H1041 A1042 A1043 L1044 K1045 R1046 H1047 D1048 L1049 V1050 K1051 L1052 G1053 F1054 K1055 Y1056 D1057 N1058 I1059 L1060 M1061 E1062 E1063 A1064 A1065 Q1066 I1067 L1068 E1069 I1070 E1071 T1072 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 Q1099 L1100 P1101 P1102 V1103 I1104 K1105 N1106 M1107 A1108 F1109 Q1110 K1111 Y1112 S1113 N1114 M1115 E1116 Q1117 S1118 L1119 F1120 T1121 R1122 F1123 V1124 R1125 V1126 G1127 V1128 P1129 T1130 V1131 D1132 L1133 D1134 A1135 Q1136 G1137 R1138 A1139 R1140



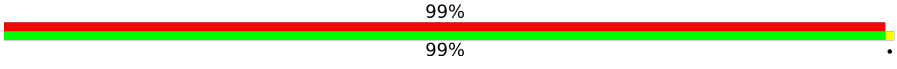
• Molecule 27: ATP-dependent RNA helicase DHX8

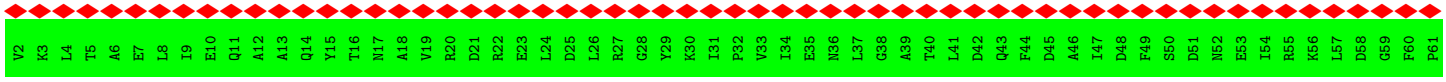


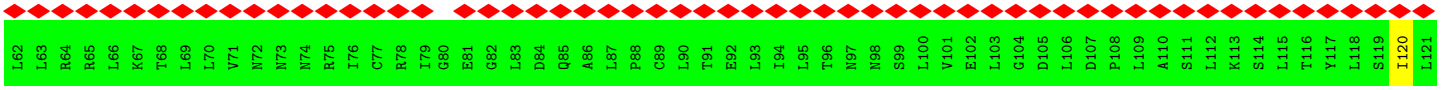


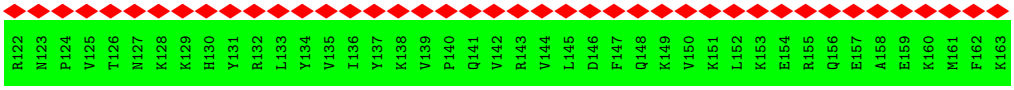
• Molecule 28: U2 small nuclear ribonucleoprotein A'

Chain W:



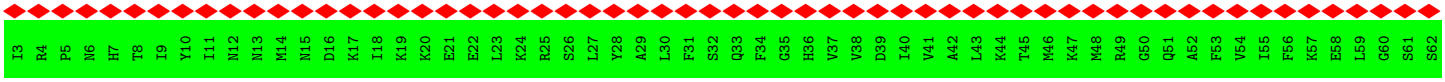


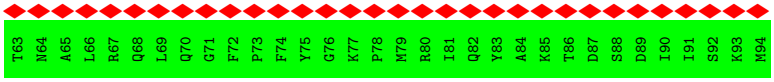




• Molecule 29: U2 small nuclear ribonucleoprotein B"

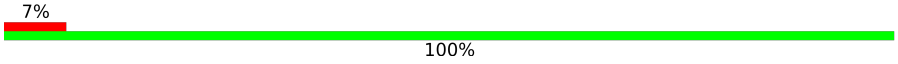
Chain Y:





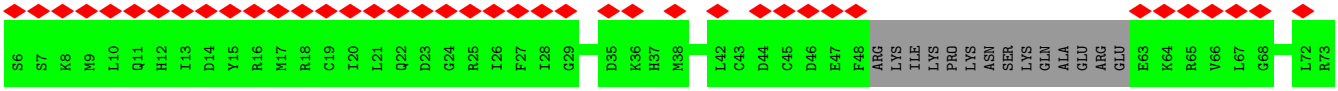
• Molecule 30: NF-kappa-B-activating protein

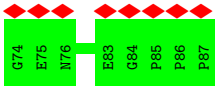
Chain Z:



• Molecule 31: Small nuclear ribonucleoprotein-associated proteins B and B'

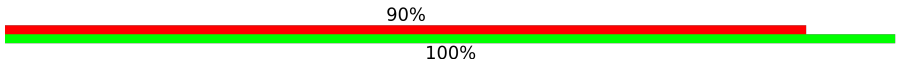
Chain b:

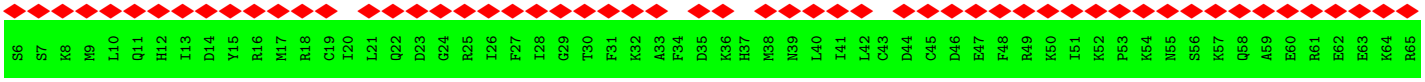


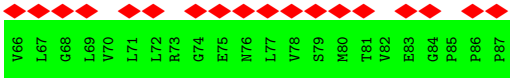


• Molecule 31: Small nuclear ribonucleoprotein-associated proteins B and B'

Chain k:

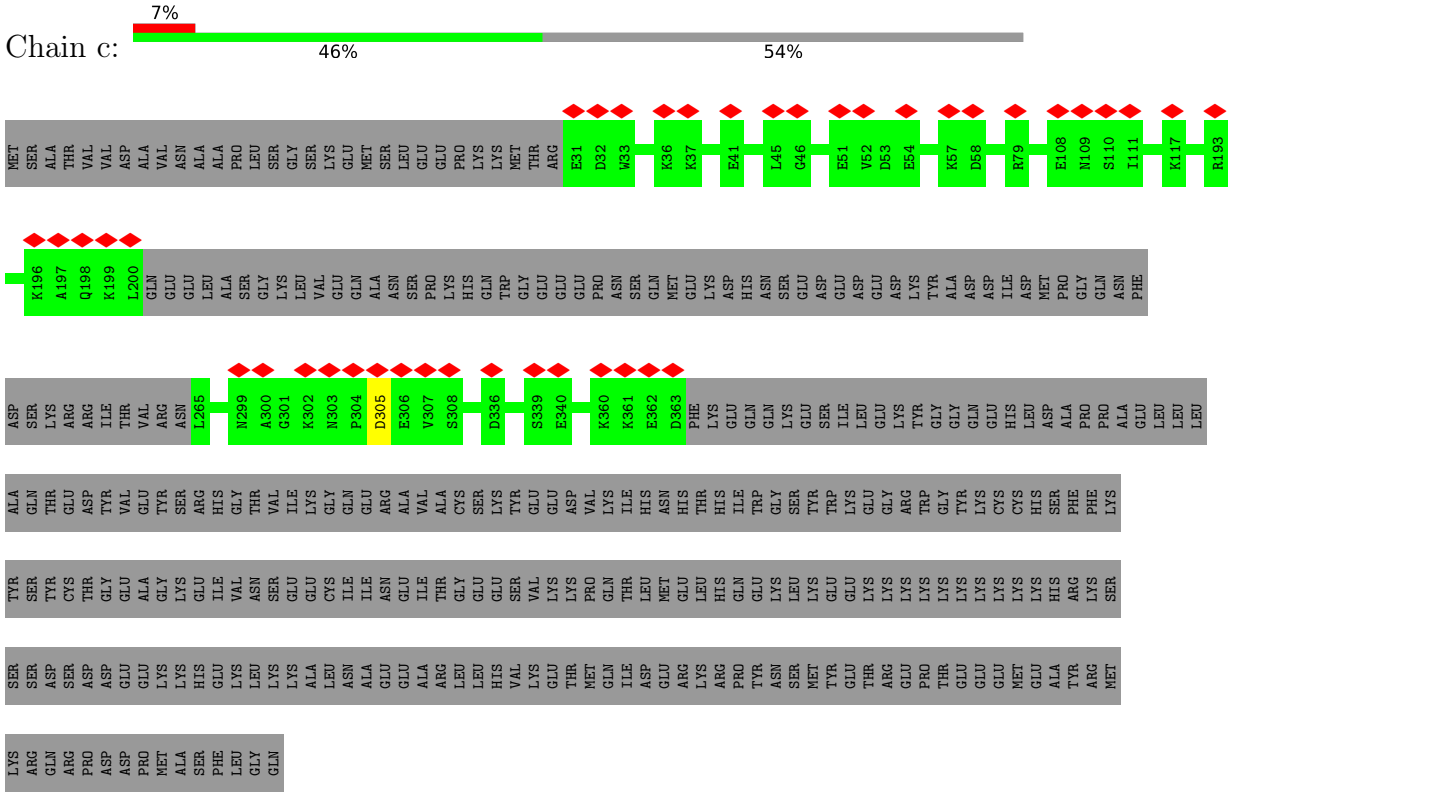






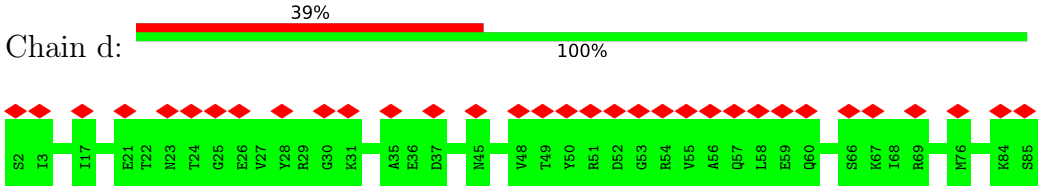
• Molecule 32: Pre-mRNA-splicing factor SLU7

Chain c:



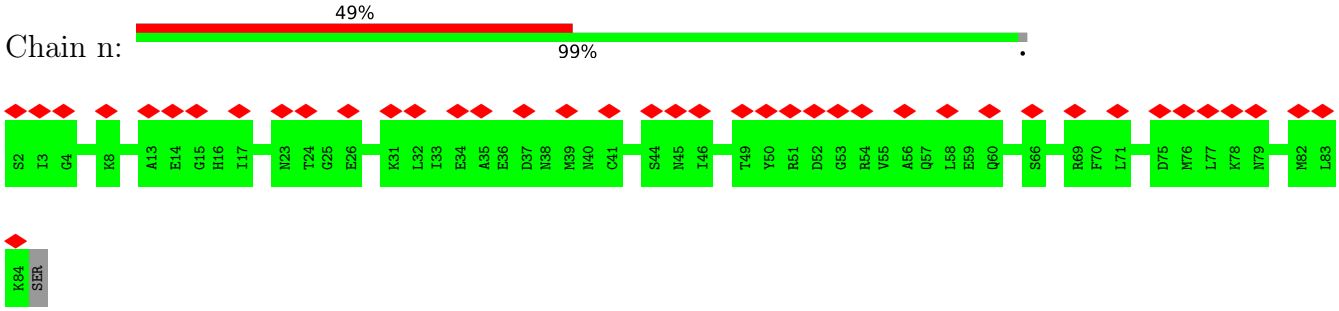
• Molecule 33: Small nuclear ribonucleoprotein Sm D3

Chain d:



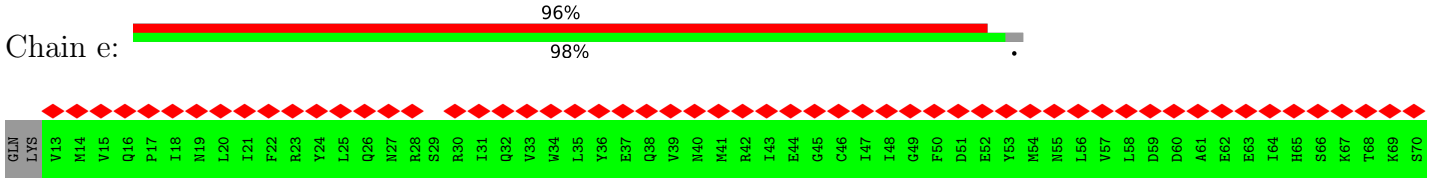
• Molecule 33: Small nuclear ribonucleoprotein Sm D3

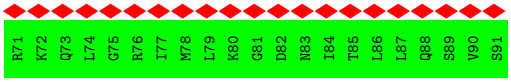
Chain n:



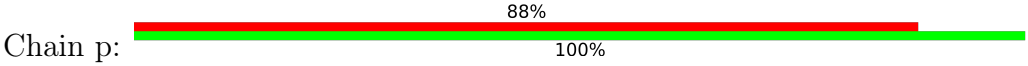
• Molecule 34: Small nuclear ribonucleoprotein E

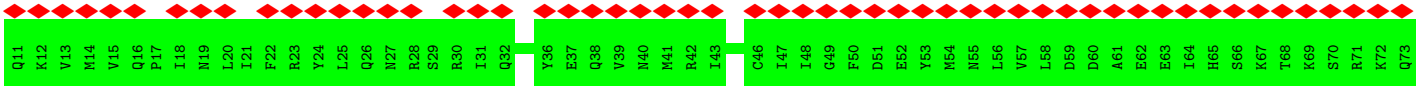
Chain e:

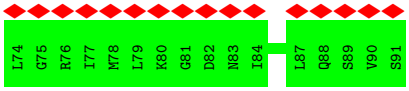




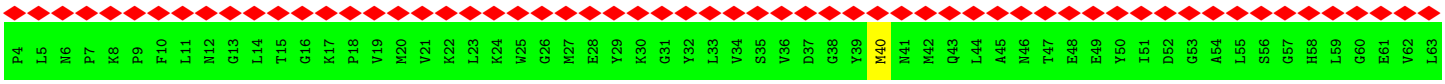
• Molecule 34: Small nuclear ribonucleoprotein E

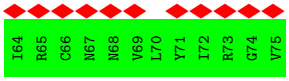




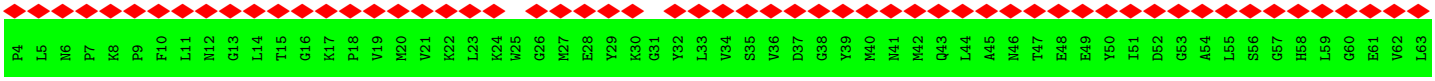


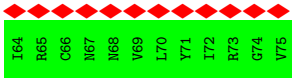
• Molecule 35: Small nuclear ribonucleoprotein F



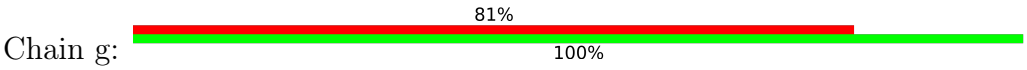


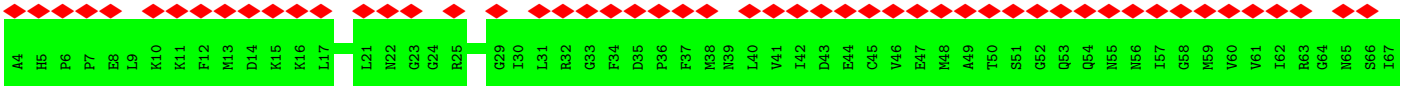
• Molecule 35: Small nuclear ribonucleoprotein F

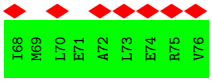




• Molecule 36: Small nuclear ribonucleoprotein G

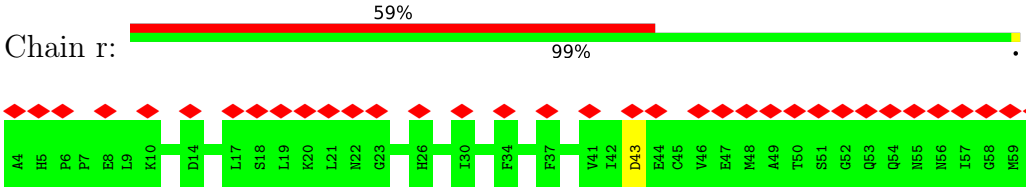






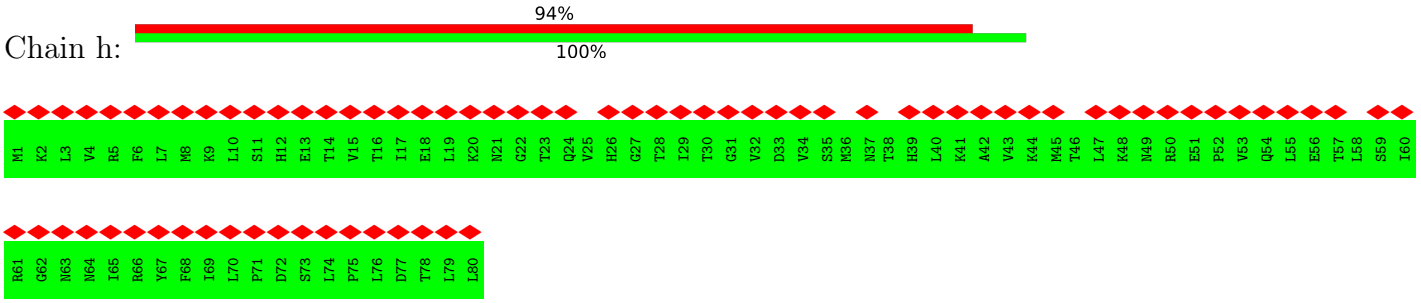
• Molecule 36: Small nuclear ribonucleoprotein G

Chain r:



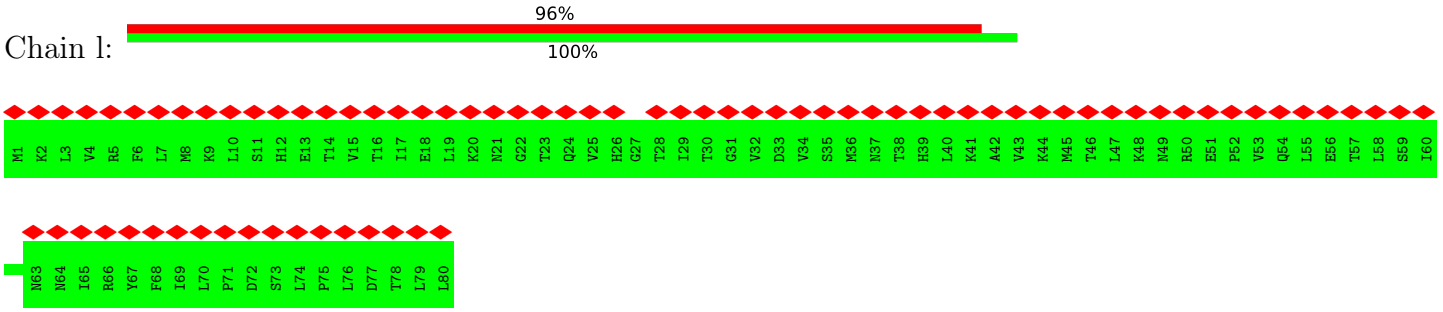
• Molecule 37: Small nuclear ribonucleoprotein Sm D1

Chain h:



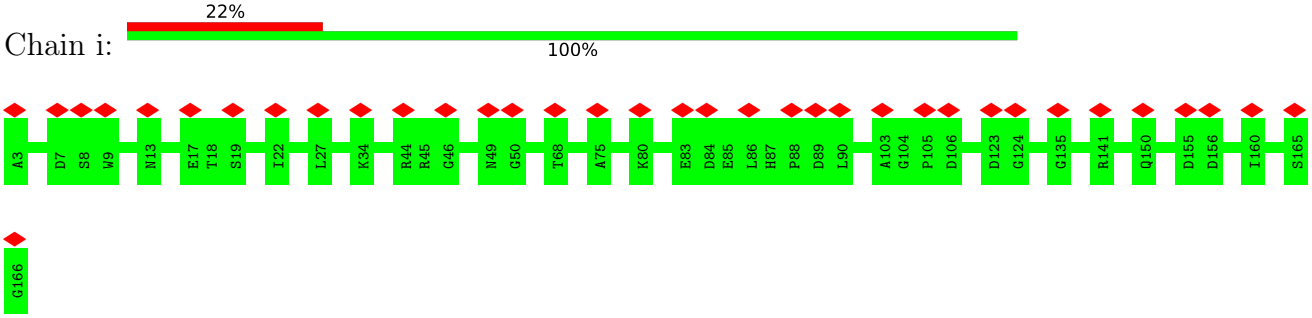
• Molecule 37: Small nuclear ribonucleoprotein Sm D1

Chain l:



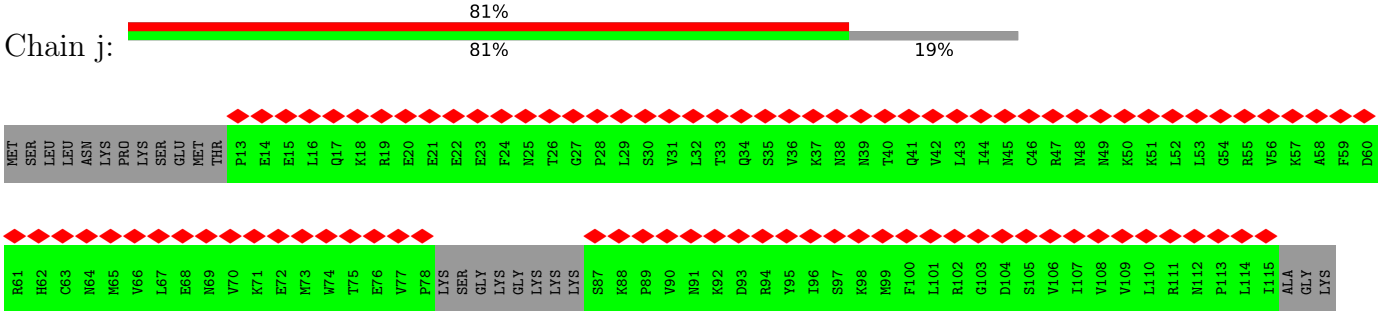
• Molecule 38: Peptidyl-prolyl cis-trans isomerase-like 1

Chain i:



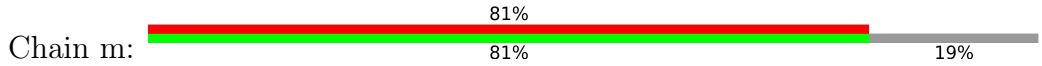
• Molecule 39: Small nuclear ribonucleoprotein Sm D2

Chain j:



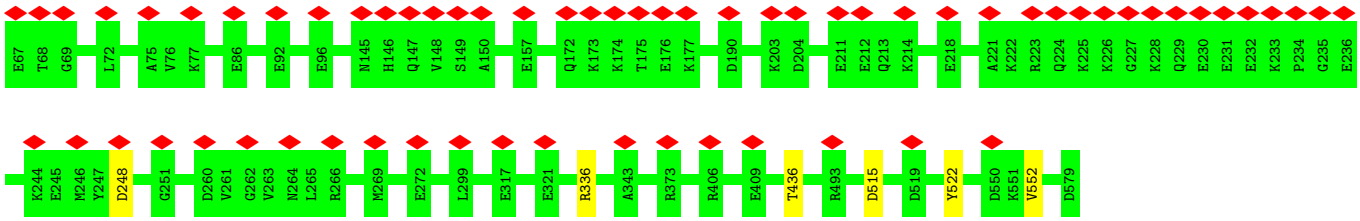
• Molecule 39: Small nuclear ribonucleoprotein Sm D2

Chain m:



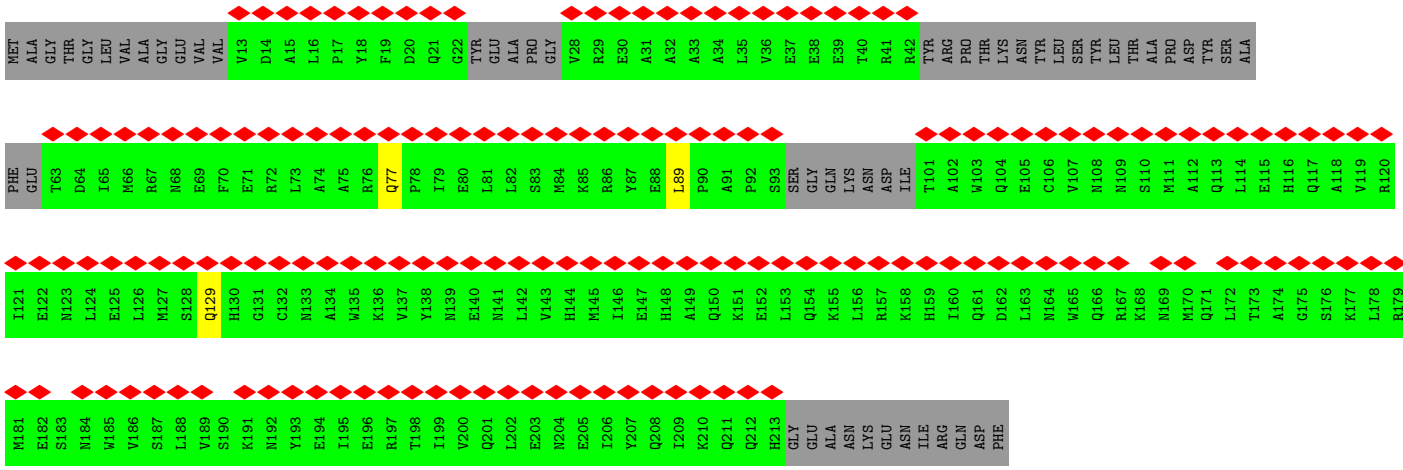
• Molecule 40: Pre-mRNA-processing factor 17

Chain o:



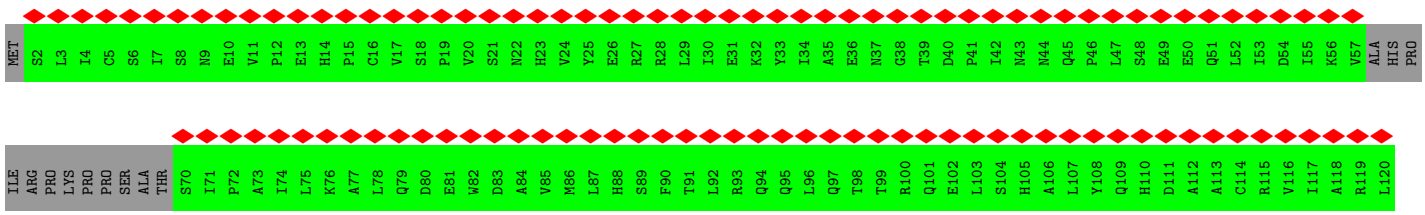
• Molecule 41: Pre-mRNA-splicing factor SPF27

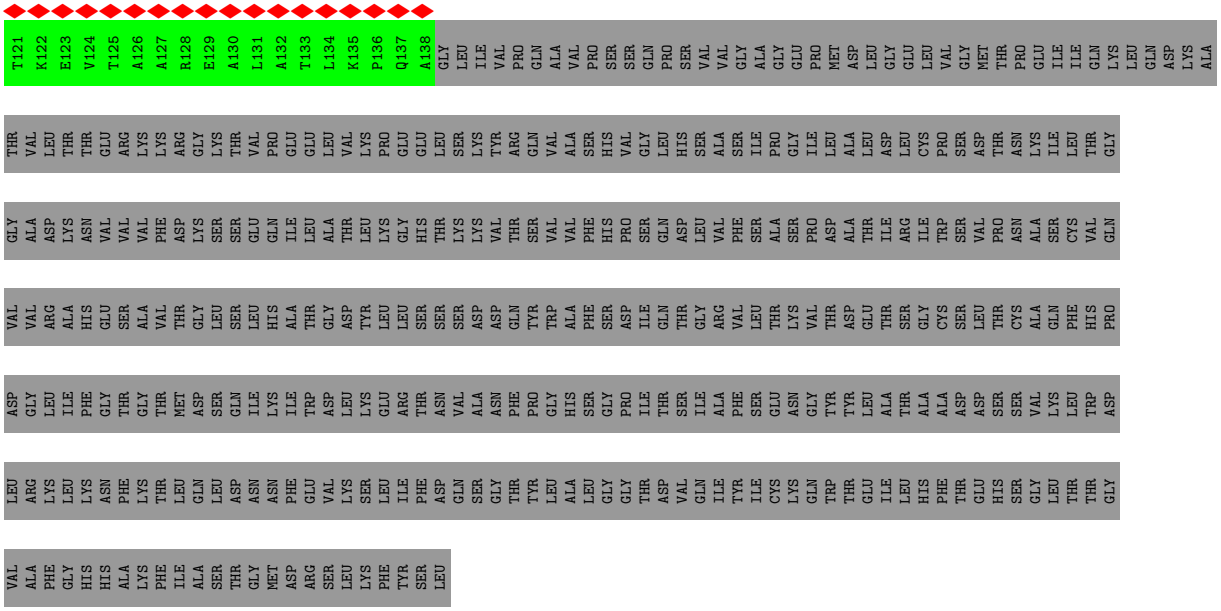
Chain s:



• Molecule 42: Pre-mRNA-processing factor 19

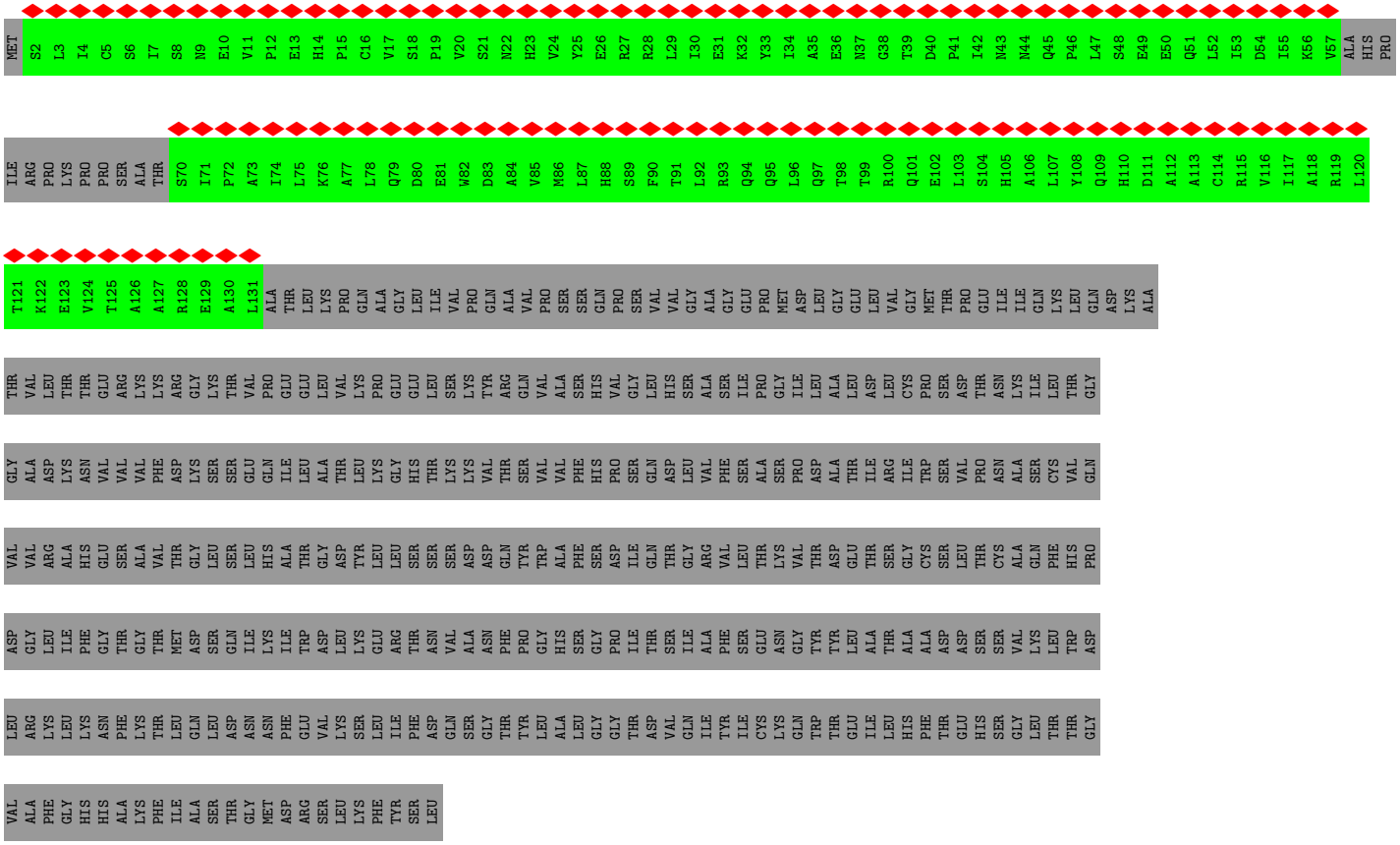
Chain t:





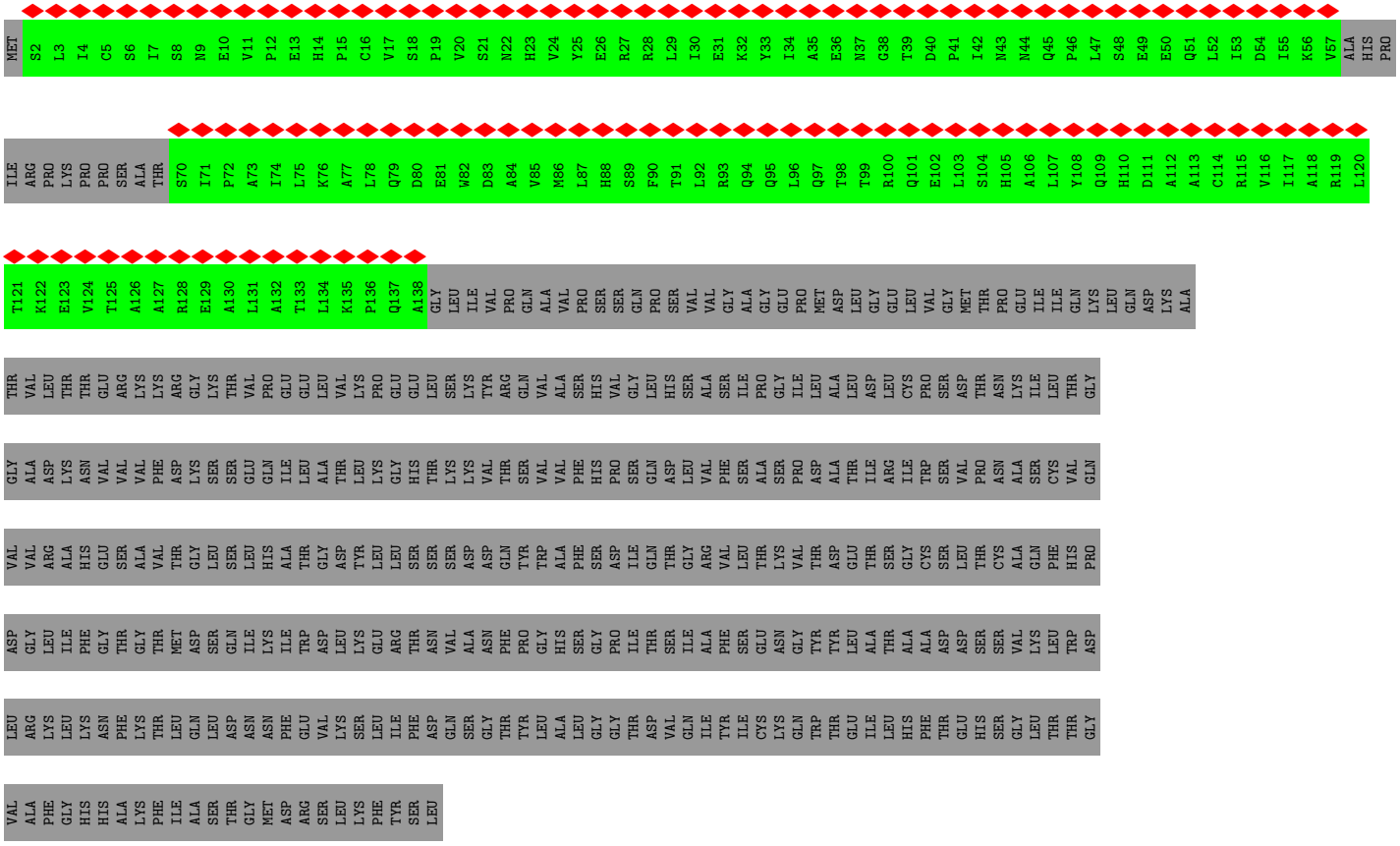
• Molecule 42: Pre-mRNA-processing factor 19

Chain u:



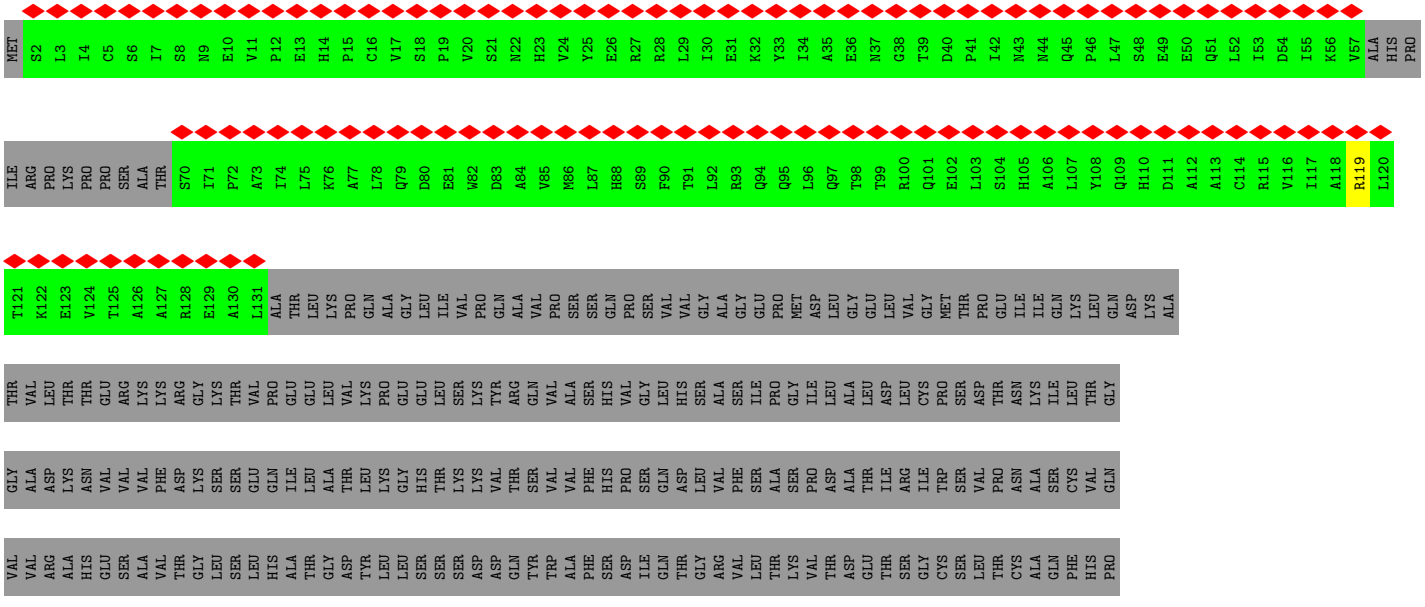
• Molecule 42: Pre-mRNA-processing factor 19

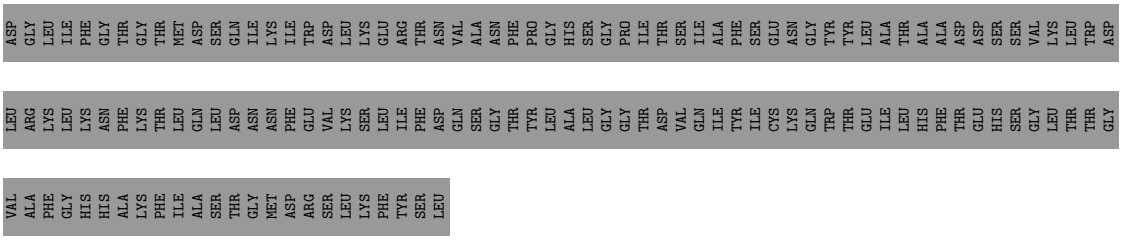
Chain v:



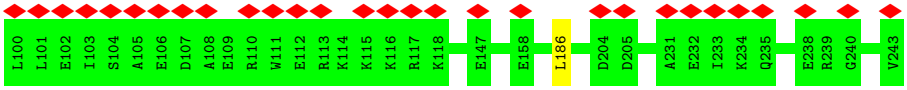
• Molecule 42: Pre-mRNA-processing factor 19

Chain w:

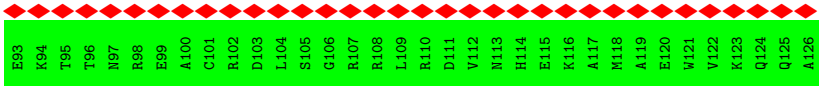




• Molecule 43: Pre-mRNA-splicing factor SYF2



• Molecule 44: Replication stress response regulator SDE2



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	103860	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	53	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	3500	Depositor
Magnification	135000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.177	Depositor
Minimum map value	-0.101	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.005	Depositor
Recommended contour level	0.024	Depositor
Map size (Å)	492.00003, 492.00003, 492.00003	wwPDB
Map dimensions	410, 410, 410	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.2, 1.2, 1.2	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: K, ZN, ATP, MG, SEP, IHP, GTP

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
1	2	0.56	0/2827	1.12	16/4393 (0.4%)
2	5	0.58	0/1760	1.27	25/2733 (0.9%)
3	6	0.53	0/2323	0.98	3/3619 (0.1%)
4	7	0.38	0/3179	0.65	0/4291
5	8	0.36	0/748	0.71	3/1012 (0.3%)
6	9	0.38	0/1225	0.60	0/1648
7	A	0.43	1/19172 (0.0%)	0.58	7/26014 (0.0%)
8	B	0.37	0/14140	0.58	2/19159 (0.0%)
9	C	0.39	0/7277	0.62	4/9887 (0.0%)
10	D	0.34	0/1030	0.59	0/1371
11	E	0.60	0/329	1.18	4/510 (0.8%)
12	F	0.32	0/1129	0.53	0/1525
13	G	0.27	0/513	0.55	1/683 (0.1%)
14	H	0.33	0/3779	0.50	0/5087
15	I	0.41	0/971	1.20	10/1504 (0.7%)
16	J	0.46	0/2592	0.63	0/3535
17	K	0.35	0/2387	0.57	0/3205
18	L	0.45	1/1214 (0.1%)	0.58	0/1627
19	M	0.36	0/2366	0.57	1/3193 (0.0%)
20	N	0.31	0/2448	0.58	0/3316
21	O	0.32	0/3457	0.50	0/4627
22	P	0.34	0/902	0.54	0/1201
23	R	0.58	1/196 (0.5%)	0.53	0/265
24	S	0.38	0/4013	0.55	8/5432 (0.1%)
25	T	0.41	0/4031	0.81	8/5500 (0.1%)
26	U	0.43	35/11155 (0.3%)	0.41	0/15095
27	V	0.47	0/3000	0.93	0/3777
28	W	0.31	0/1299	0.62	0/1761
29	Y	0.38	0/759	0.50	0/1016
30	Z	0.32	0/232	0.48	0/307
31	b	0.33	0/553	0.53	0/739
31	k	0.45	0/674	0.55	0/899

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
32	c	0.36	0/2268	0.53	0/3052
33	d	0.39	0/666	0.55	0/897
33	n	0.47	0/660	0.61	0/889
34	e	0.29	0/659	0.54	0/885
34	p	0.47	0/677	0.60	0/908
35	f	0.30	0/574	0.55	0/775
35	q	0.49	0/574	0.59	0/775
36	g	0.34	0/575	0.59	0/768
36	r	0.47	0/575	0.62	0/768
37	h	0.28	0/642	0.53	0/867
37	l	0.41	0/642	0.55	0/867
38	i	0.31	0/1304	0.57	0/1767
39	j	0.28	0/784	0.51	0/1053
39	m	0.42	0/784	0.56	0/1053
40	o	0.37	0/4265	0.60	0/5761
41	s	0.35	0/1423	0.51	0/1914
42	t	0.32	0/1004	0.50	0/1365
42	u	0.34	0/953	0.49	0/1295
42	v	0.34	0/1004	0.51	0/1365
42	w	0.31	0/953	0.49	0/1295
43	y	0.33	0/1241	0.56	1/1662 (0.1%)
44	z	0.44	0/282	0.50	0/375
All	All	0.40	38/124189 (0.0%)	0.64	93/169287 (0.1%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
7	A	0	4
8	B	0	1
9	C	0	2
17	K	0	1
18	L	0	2
25	T	0	5
27	V	0	15
35	f	0	1
41	s	0	3
All	All	0	34

All (38) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	A	2223	CYS	CB-SG	-6.69	1.70	1.82
18	L	117	CYS	CB-SG	-6.56	1.71	1.82
23	R	24	SER	CA-CB	-5.95	1.44	1.52
26	U	1107	MET	CG-SD	5.78	1.96	1.81
26	U	244	MET	CG-SD	5.75	1.96	1.81
26	U	79	MET	CG-SD	5.74	1.96	1.81
26	U	176	MET	CG-SD	5.74	1.96	1.81
26	U	1294	MET	CG-SD	5.73	1.96	1.81
26	U	991	MET	CG-SD	5.72	1.96	1.81
26	U	1358	MET	CG-SD	5.70	1.96	1.81
26	U	424	MET	CG-SD	5.67	1.96	1.81
26	U	705	MET	CG-SD	5.65	1.95	1.81
26	U	941	MET	CG-SD	5.60	1.95	1.81
26	U	257	MET	CG-SD	5.58	1.95	1.81
26	U	510	MET	CG-SD	5.58	1.95	1.81
26	U	1368	MET	CG-SD	5.55	1.95	1.81
26	U	207	MET	CG-SD	5.54	1.95	1.81
26	U	1212	MET	CG-SD	5.53	1.95	1.81
26	U	638	MET	CG-SD	5.52	1.95	1.81
26	U	1370	MET	CG-SD	5.52	1.95	1.81
26	U	1214	MET	CG-SD	5.52	1.95	1.81
26	U	600	MET	CG-SD	5.48	1.95	1.81
26	U	1361	MET	CG-SD	5.48	1.95	1.81
26	U	174	MET	CG-SD	5.47	1.95	1.81
26	U	677	MET	CG-SD	5.47	1.95	1.81
26	U	657	MET	CG-SD	5.45	1.95	1.81
26	U	92	MET	CG-SD	5.34	1.95	1.81
26	U	97	MET	CG-SD	5.31	1.95	1.81
26	U	1037	MET	CG-SD	5.30	1.95	1.81
26	U	492	MET	CG-SD	5.29	1.95	1.81
26	U	1093	MET	CG-SD	5.23	1.94	1.81
26	U	326	MET	CG-SD	5.23	1.94	1.81
26	U	1061	MET	CG-SD	5.22	1.94	1.81
26	U	65	MET	CG-SD	5.21	1.94	1.81
26	U	304	MET	CG-SD	5.20	1.94	1.81
26	U	1115	MET	CG-SD	5.14	1.94	1.81
26	U	814	MET	CG-SD	5.11	1.94	1.81
26	U	867	MET	CG-SD	5.07	1.94	1.81

All (93) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	5	86	C	N1-C2-O2	14.03	127.32	118.90

Continued on next page...

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	5	86	C	C2-N1-C1'	11.76	131.73	118.80
2	5	86	C	N3-C2-O2	-11.61	113.78	121.90
1	2	50	C	N1-C2-O2	10.30	125.08	118.90
1	2	50	C	C2-N1-C1'	9.37	129.10	118.80
2	5	36	C	N1-C2-O2	8.89	124.24	118.90
1	2	50	C	N3-C2-O2	-8.47	115.97	121.90
2	5	86	C	C6-N1-C2	-8.14	117.04	120.30
25	T	84	HIS	O-C-N	-8.14	109.67	122.70
25	T	83	LYS	O-C-N	-8.11	109.73	122.70
25	T	309	ALA	O-C-N	-8.09	109.76	122.70
25	T	311	MET	O-C-N	-8.09	109.76	122.70
25	T	310	LYS	O-C-N	-8.07	109.78	122.70
2	5	86	C	C6-N1-C1'	-8.00	111.20	120.80
43	y	186	LEU	CB-CG-CD1	-7.85	97.66	111.00
2	5	36	C	C2-N1-C1'	7.69	127.26	118.80
7	A	598	LEU	CB-CG-CD1	-7.19	98.78	111.00
7	A	1405	LEU	CA-CB-CG	7.16	131.76	115.30
2	5	36	C	C6-N1-C2	-7.13	117.45	120.30
11	E	-6	C	N1-C2-O2	7.12	123.17	118.90
2	5	36	C	N3-C2-O2	-7.02	116.99	121.90
9	C	486	ASP	CB-CG-OD1	6.99	124.59	118.30
1	2	102	U	OP2-P-O3'	6.93	120.44	105.20
2	5	23	C	C2-N1-C1'	6.80	126.28	118.80
15	I	2	U	N1-C2-O2	6.71	127.50	122.80
11	E	-6	C	C2-N1-C1'	6.68	126.15	118.80
2	5	95	G	P-O3'-C3'	6.65	127.68	119.70
15	I	2	U	N3-C2-O2	-6.64	117.56	122.20
1	2	102	U	P-O3'-C3'	6.62	127.65	119.70
2	5	23	C	N1-C2-O2	6.55	122.83	118.90
1	2	105	G	P-O3'-C3'	6.52	127.53	119.70
1	2	50	C	C6-N1-C1'	-6.51	112.98	120.80
5	8	114	LYS	N-CA-C	-6.42	93.67	111.00
5	8	118	LEU	CA-CB-CG	6.26	129.70	115.30
1	2	54	U	N3-C2-O2	-6.21	117.85	122.20
15	I	95	U	OP1-P-O3'	6.20	118.84	105.20
8	B	1276	LEU	CA-CB-CG	6.15	129.44	115.30
1	2	54	U	N1-C2-O2	6.09	127.07	122.80
1	2	50	C	C6-N1-C2	-6.00	117.90	120.30
24	S	637	PRO	N-CA-CB	5.94	110.43	103.30
24	S	523	PRO	N-CA-CB	5.92	110.40	103.30
9	C	723	ASP	CB-CG-OD1	5.91	123.62	118.30
24	S	675	PRO	N-CA-CB	5.90	110.39	103.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
24	S	604	PRO	N-CA-CB	5.89	110.37	103.30
9	C	93	ILE	CG1-CB-CG2	-5.88	98.46	111.40
24	S	670	PRO	N-CA-CB	5.87	110.35	103.30
25	T	458	LYS	O-C-N	5.86	132.07	122.70
25	T	459	ALA	O-C-N	5.83	132.03	122.70
2	5	86	C	C5-C6-N1	5.83	123.91	121.00
25	T	457	ARG	O-C-N	5.82	132.02	122.70
9	C	474	LEU	CA-CB-CG	5.80	128.65	115.30
2	5	92	U	P-O3'-C3'	5.77	126.63	119.70
7	A	598	LEU	CA-CB-CG	5.77	128.57	115.30
24	S	551	PRO	N-CA-CB	5.70	110.14	103.30
2	5	36	C	C5-C6-N1	5.69	123.84	121.00
11	E	-6	C	N3-C2-O2	-5.68	117.92	121.90
24	S	566	PRO	N-CA-CB	5.66	110.09	103.30
2	5	23	C	N3-C2-O2	-5.65	117.94	121.90
24	S	522	PRO	N-CA-CB	5.61	110.03	103.30
15	I	98	U	O4'-C1'-N1	5.59	112.67	108.20
1	2	156	U	N1-C2-O2	5.59	126.71	122.80
2	5	95	G	N3-C4-C5	-5.52	125.84	128.60
2	5	11	U	C2-N1-C1'	5.45	124.24	117.70
7	A	2310	ARG	CG-CD-NE	5.40	123.14	111.80
15	I	17	U	C2-N1-C1'	5.39	124.17	117.70
15	I	95	U	P-O3'-C3'	5.38	126.16	119.70
2	5	11	U	C5-C6-N1	5.34	125.37	122.70
2	5	55	C	C6-N1-C2	-5.34	118.16	120.30
15	I	84	U	N1-C2-O2	5.34	126.54	122.80
2	5	12	U	N3-C2-O2	-5.32	118.48	122.20
1	2	13	C	N1-C2-O2	5.31	122.09	118.90
2	5	43	U	N1-C2-O2	5.31	126.52	122.80
11	E	1	C	C6-N1-C2	-5.28	118.19	120.30
8	B	501	LEU	CA-CB-CG	5.27	127.41	115.30
7	A	638	LEU	CB-CG-CD1	-5.25	102.07	111.00
1	2	156	U	N3-C2-O2	-5.23	118.54	122.20
1	2	154	C	N3-C2-O2	-5.22	118.25	121.90
5	8	115	GLY	N-CA-C	5.22	126.16	113.10
13	G	56	ASP	CB-CG-OD2	5.19	122.97	118.30
19	M	131	THR	C-N-CA	5.18	134.66	121.70
15	I	17	U	N1-C2-O2	5.17	126.42	122.80
2	5	40	U	N1-C2-O2	5.16	126.41	122.80
2	5	11	U	N1-C2-O2	5.15	126.40	122.80
3	6	50	A	P-O3'-C3'	5.14	125.86	119.70
3	6	37	C	C6-N1-C2	-5.13	118.25	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	2	156	U	C2-N1-C1'	5.12	123.85	117.70
7	A	784	LEU	CA-CB-CG	-5.07	103.65	115.30
15	I	90	C	P-O3'-C3'	5.07	125.78	119.70
3	6	61	C	C6-N1-C2	-5.05	118.28	120.30
1	2	49	U	N3-C2-O2	-5.04	118.67	122.20
15	I	84	U	N3-C2-O2	-5.04	118.67	122.20
2	5	22	U	C2-N1-C1'	5.03	123.74	117.70
7	A	2319	LEU	CB-CG-CD2	5.03	119.55	111.00

There are no chirality outliers.

All (34) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
7	A	1210	LYS	Peptide
7	A	1416	ILE	Peptide
7	A	1635	TYR	Peptide
7	A	940	ILE	Peptide
8	B	430	LEU	Peptide
9	C	799	GLU	Peptide
9	C	93	ILE	Peptide
17	K	123	GLU	Peptide
18	L	127	GLU	Peptide
18	L	128	VAL	Peptide
25	T	309	ALA	Mainchain
25	T	310	LYS	Mainchain
25	T	311	MET	Mainchain
25	T	83	LYS	Mainchain
25	T	84	HIS	Mainchain
27	V	1098	LYS	Peptide
27	V	1127	LEU	Peptide
27	V	1163	ARG	Peptide
27	V	1187	THR	Peptide
27	V	515	ASP	Peptide
27	V	550	TYR	Peptide
27	V	563	GLU	Peptide
27	V	636	CYS	Peptide
27	V	662	THR	Peptide
27	V	811	PRO	Peptide
27	V	855	VAL	Peptide
27	V	868	LYS	Peptide
27	V	938	ASN	Peptide
27	V	963	THR	Peptide

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Mol	Chain	Res	Type	Group
27	V	993	LEU	Peptide
35	f	40	MET	Peptide
41	s	129	GLN	Peptide
41	s	77	GLN	Peptide
41	s	89	LEU	Peptide

5.2 Too-close contacts (i)

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

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	7	388/390 (100%)	376 (97%)	9 (2%)	3 (1%)	16 46
5	8	89/91 (98%)	87 (98%)	1 (1%)	1 (1%)	12 40
6	9	142/144 (99%)	138 (97%)	4 (3%)	0	100 100
7	A	2244/2335 (96%)	2105 (94%)	139 (6%)	0	100 100
8	B	1720/1722 (100%)	1633 (95%)	84 (5%)	3 (0%)	44 71
9	C	897/899 (100%)	828 (92%)	67 (8%)	2 (0%)	44 71
10	D	121/123 (98%)	116 (96%)	5 (4%)	0	100 100
12	F	120/122 (98%)	107 (89%)	13 (11%)	0	100 100
13	G	58/60 (97%)	56 (97%)	2 (3%)	0	100 100
14	H	455/908 (50%)	440 (97%)	15 (3%)	0	100 100
16	J	318/320 (99%)	303 (95%)	15 (5%)	0	100 100
17	K	291/295 (99%)	271 (93%)	20 (7%)	0	100 100
18	L	142/144 (99%)	134 (94%)	8 (6%)	0	100 100
19	M	287/289 (99%)	271 (94%)	16 (6%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
20	N	304/306 (99%)	283 (93%)	19 (6%)	2 (1%)	19 50
21	O	429/802 (54%)	416 (97%)	12 (3%)	1 (0%)	44 71
22	P	100/229 (44%)	97 (97%)	3 (3%)	0	100 100
23	R	24/26 (92%)	17 (71%)	7 (29%)	0	100 100
24	S	531/848 (63%)	500 (94%)	28 (5%)	3 (1%)	22 53
25	T	597/855 (70%)	584 (98%)	12 (2%)	1 (0%)	44 71
26	U	1308/1485 (88%)	1283 (98%)	25 (2%)	0	100 100
27	V	709/1220 (58%)	617 (87%)	60 (8%)	32 (4%)	2 13
28	W	160/162 (99%)	147 (92%)	13 (8%)	0	100 100
29	Y	90/92 (98%)	88 (98%)	2 (2%)	0	100 100
30	Z	28/30 (93%)	27 (96%)	1 (4%)	0	100 100
31	b	64/82 (78%)	62 (97%)	2 (3%)	0	100 100
31	k	80/82 (98%)	74 (92%)	6 (8%)	0	100 100
32	c	265/586 (45%)	248 (94%)	17 (6%)	0	100 100
33	d	82/84 (98%)	77 (94%)	5 (6%)	0	100 100
33	n	81/84 (96%)	76 (94%)	5 (6%)	0	100 100
34	e	77/81 (95%)	75 (97%)	2 (3%)	0	100 100
34	p	79/81 (98%)	77 (98%)	2 (2%)	0	100 100
35	f	70/72 (97%)	69 (99%)	1 (1%)	0	100 100
35	q	70/72 (97%)	69 (99%)	1 (1%)	0	100 100
36	g	71/73 (97%)	68 (96%)	3 (4%)	0	100 100
36	r	71/73 (97%)	69 (97%)	2 (3%)	0	100 100
37	h	78/80 (98%)	76 (97%)	2 (3%)	0	100 100
37	l	78/80 (98%)	75 (96%)	3 (4%)	0	100 100
38	i	162/164 (99%)	149 (92%)	13 (8%)	0	100 100
39	j	91/118 (77%)	87 (96%)	4 (4%)	0	100 100
39	m	91/118 (77%)	86 (94%)	5 (6%)	0	100 100
40	o	511/513 (100%)	465 (91%)	45 (9%)	1 (0%)	44 71
41	s	161/225 (72%)	148 (92%)	13 (8%)	0	100 100
42	t	121/504 (24%)	118 (98%)	3 (2%)	0	100 100
42	u	114/504 (23%)	113 (99%)	1 (1%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
42	v	121/504 (24%)	119 (98%)	2 (2%)	0	100	100
42	w	114/504 (23%)	113 (99%)	1 (1%)	0	100	100
43	y	142/144 (99%)	138 (97%)	4 (3%)	0	100	100
44	z	32/34 (94%)	30 (94%)	2 (6%)	0	100	100
All	All	14378/18759 (77%)	13605 (95%)	724 (5%)	49 (0%)	38	66

All (49) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	7	383	ASN
8	B	957	VAL
8	B	1584	ILE
20	N	59	ILE
27	V	531	MET
27	V	610	ARG
27	V	855	VAL
27	V	944	ASP
27	V	995	MET
27	V	1090	LYS
27	V	1098	LYS
27	V	1099	SER
27	V	1129	ASP
27	V	1145	GLN
27	V	1164	GLU
4	7	340	GLY
4	7	385	ASP
5	8	115	GLY
9	C	94	ILE
24	S	709	VAL
27	V	517	GLU
27	V	845	SER
27	V	870	GLY
27	V	1182	LYS
27	V	524	ASN
27	V	550	TYR
27	V	806	GLU
27	V	994	ILE
27	V	1056	LYS
20	N	58	PRO
24	S	604	PRO
27	V	590	THR

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Mol	Chain	Res	Type
27	V	663	ASP
27	V	722	ALA
27	V	835	VAL
27	V	1055	ASN
40	o	248	ASP
9	C	680	ASN
24	S	341	PRO
27	V	811	PRO
27	V	1157	THR
25	T	372	ARG
27	V	523	ALA
27	V	856	ASP
21	O	215	PRO
27	V	738	PRO
27	V	521	ILE
27	V	1137	PRO
8	B	585	ILE

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	7	345/345 (100%)	340 (99%)	5 (1%)	62 78
5	8	76/76 (100%)	75 (99%)	1 (1%)	65 79
6	9	132/132 (100%)	131 (99%)	1 (1%)	79 87
7	A	2033/2108 (96%)	1996 (98%)	37 (2%)	54 74
8	B	1541/1541 (100%)	1363 (88%)	178 (12%)	4 18
9	C	799/799 (100%)	797 (100%)	2 (0%)	91 94
10	D	106/106 (100%)	105 (99%)	1 (1%)	75 85
12	F	110/110 (100%)	110 (100%)	0	100 100
13	G	54/55 (98%)	53 (98%)	1 (2%)	52 72
14	H	410/838 (49%)	403 (98%)	7 (2%)	56 74
16	J	276/276 (100%)	275 (100%)	1 (0%)	89 93

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
17	K	246/247 (100%)	246 (100%)	0	100	100
18	L	130/130 (100%)	127 (98%)	3 (2%)	45	68
19	M	254/254 (100%)	253 (100%)	1 (0%)	89	93
20	N	263/263 (100%)	263 (100%)	0	100	100
21	O	322/709 (45%)	321 (100%)	1 (0%)	91	94
22	P	94/203 (46%)	94 (100%)	0	100	100
23	R	21/21 (100%)	20 (95%)	1 (5%)	21	50
24	S	275/751 (37%)	273 (99%)	2 (1%)	81	88
25	T	213/749 (28%)	210 (99%)	3 (1%)	62	78
26	U	1202/1336 (90%)	1193 (99%)	9 (1%)	81	88
27	V	31/1085 (3%)	31 (100%)	0	100	100
28	W	139/147 (95%)	138 (99%)	1 (1%)	81	88
29	Y	81/82 (99%)	81 (100%)	0	100	100
30	Z	25/25 (100%)	25 (100%)	0	100	100
31	b	62/75 (83%)	62 (100%)	0	100	100
31	k	75/75 (100%)	75 (100%)	0	100	100
32	c	236/520 (45%)	235 (100%)	1 (0%)	89	93
33	d	74/74 (100%)	74 (100%)	0	100	100
33	n	73/74 (99%)	73 (100%)	0	100	100
34	e	74/76 (97%)	74 (100%)	0	100	100
34	p	76/76 (100%)	76 (100%)	0	100	100
35	f	61/61 (100%)	61 (100%)	0	100	100
35	q	61/61 (100%)	61 (100%)	0	100	100
36	g	63/63 (100%)	63 (100%)	0	100	100
36	r	63/63 (100%)	62 (98%)	1 (2%)	58	76
37	h	75/75 (100%)	75 (100%)	0	100	100
37	l	75/75 (100%)	75 (100%)	0	100	100
38	i	133/133 (100%)	133 (100%)	0	100	100
39	j	91/110 (83%)	91 (100%)	0	100	100
39	m	91/110 (83%)	91 (100%)	0	100	100
40	o	451/451 (100%)	446 (99%)	5 (1%)	70	82

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
41	s	152/196 (78%)	152 (100%)	0	100 100
42	t	111/435 (26%)	111 (100%)	0	100 100
42	u	106/435 (24%)	106 (100%)	0	100 100
42	v	111/435 (26%)	111 (100%)	0	100 100
42	w	106/435 (24%)	105 (99%)	1 (1%)	75 85
43	y	129/129 (100%)	129 (100%)	0	100 100
44	z	29/29 (100%)	29 (100%)	0	100 100
All	All	11756/16654 (71%)	11493 (98%)	263 (2%)	47 69

All (263) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	7	37	THR
4	7	301	ASN
4	7	316	ARG
4	7	337	TRP
4	7	360	LEU
5	8	118	LEU
6	9	119	GLU
7	A	258	PHE
7	A	1359	HIS
7	A	1370	ARG
7	A	1868	MET
7	A	2067	PHE
7	A	2073	TRP
7	A	2074	ARG
7	A	2078	ILE
7	A	2085	LEU
7	A	2087	THR
7	A	2090	ILE
7	A	2103	THR
7	A	2108	LYS
7	A	2117	ILE
7	A	2143	ARG
7	A	2156	THR
7	A	2157	VAL
7	A	2159	LEU
7	A	2171	GLU
7	A	2193	VAL
7	A	2194	THR

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Mol	Chain	Res	Type
7	A	2219	THR
7	A	2223	CYS
7	A	2233	SER
7	A	2239	ARG
7	A	2242	THR
7	A	2254	SER
7	A	2259	VAL
7	A	2261	MET
7	A	2273	VAL
7	A	2284	MET
7	A	2293	LYS
7	A	2298	LEU
7	A	2310	ARG
7	A	2312	SER
7	A	2319	LEU
7	A	2329	ASP
8	B	406	ARG
8	B	409	LEU
8	B	410	ASP
8	B	414	LEU
8	B	420	SER
8	B	436	ARG
8	B	446	HIS
8	B	447	VAL
8	B	451	LYS
8	B	467	LEU
8	B	475	PHE
8	B	488	LEU
8	B	495	THR
8	B	500	LEU
8	B	501	LEU
8	B	505	THR
8	B	533	VAL
8	B	535	ASP
8	B	547	LEU
8	B	550	GLU
8	B	558	ARG
8	B	566	VAL
8	B	572	ASP
8	B	576	CYS
8	B	578	GLU
8	B	584	GLN

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Mol	Chain	Res	Type
8	B	591	GLU
8	B	595	ILE
8	B	602	GLU
8	B	610	ARG
8	B	614	LEU
8	B	623	ASP
8	B	637	ARG
8	B	643	GLN
8	B	673	LEU
8	B	677	ASP
8	B	690	VAL
8	B	693	THR
8	B	712	ILE
8	B	728	ARG
8	B	743	LEU
8	B	759	THR
8	B	763	ARG
8	B	773	GLU
8	B	775	LYS
8	B	782	PHE
8	B	786	HIS
8	B	807	GLN
8	B	810	VAL
8	B	820	ASN
8	B	837	GLU
8	B	849	ILE
8	B	850	LEU
8	B	855	ARG
8	B	868	ILE
8	B	869	LEU
8	B	877	GLN
8	B	885	GLN
8	B	887	LEU
8	B	894	VAL
8	B	897	LEU
8	B	900	MET
8	B	901	LEU
8	B	910	VAL
8	B	920	LEU
8	B	934	THR
8	B	941	ASP
8	B	942	ASP

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Mol	Chain	Res	Type
8	B	952	ARG
8	B	957	VAL
8	B	972	TYR
8	B	975	LYS
8	B	992	TYR
8	B	1016	ARG
8	B	1020	LEU
8	B	1028	THR
8	B	1030	ARG
8	B	1062	LEU
8	B	1063	LEU
8	B	1087	SER
8	B	1100	LEU
8	B	1101	ASN
8	B	1102	ARG
8	B	1125	SER
8	B	1135	LEU
8	B	1143	ILE
8	B	1165	ILE
8	B	1166	ARG
8	B	1186	LEU
8	B	1187	SER
8	B	1224	LEU
8	B	1225	VAL
8	B	1234	LEU
8	B	1240	LEU
8	B	1241	LEU
8	B	1244	LYS
8	B	1248	ASP
8	B	1250	HIS
8	B	1262	LEU
8	B	1278	CYS
8	B	1287	ARG
8	B	1301	LEU
8	B	1312	LEU
8	B	1320	LEU
8	B	1337	ASN
8	B	1368	LEU
8	B	1375	ARG
8	B	1399	ASP
8	B	1406	VAL
8	B	1408	LEU

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Mol	Chain	Res	Type
8	B	1413	SER
8	B	1419	LEU
8	B	1421	LYS
8	B	1425	ILE
8	B	1430	GLU
8	B	1436	SER
8	B	1441	GLN
8	B	1442	ARG
8	B	1443	LYS
8	B	1455	GLU
8	B	1456	VAL
8	B	1474	MET
8	B	1477	ILE
8	B	1480	GLN
8	B	1481	ILE
8	B	1482	GLU
8	B	1492	SER
8	B	1567	LYS
8	B	1580	CYS
8	B	1629	ARG
8	B	1655	ASN
8	B	1682	TYR
8	B	1683	ASP
8	B	1707	GLN
8	B	1713	PHE
8	B	1728	LEU
8	B	1734	ASP
8	B	1742	THR
8	B	1747	ASN
8	B	1756	THR
8	B	1762	ARG
8	B	1779	ARG
8	B	1781	LEU
8	B	1788	LEU
8	B	1817	MET
8	B	1823	TYR
8	B	1826	TYR
8	B	1829	ILE
8	B	1834	MET
8	B	1840	THR
8	B	1842	VAL
8	B	1863	HIS

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Mol	Chain	Res	Type
8	B	1865	ASP
8	B	1936	LEU
8	B	1956	LYS
8	B	1957	ASP
8	B	1969	GLU
8	B	1970	HIS
8	B	1988	MET
8	B	1996	LEU
8	B	1999	LEU
8	B	2000	THR
8	B	2017	ILE
8	B	2027	ASP
8	B	2029	ILE
8	B	2031	SER
8	B	2047	VAL
8	B	2055	LEU
8	B	2070	ASP
8	B	2082	LEU
8	B	2084	LEU
8	B	2092	LEU
8	B	2095	VAL
8	B	2102	HIS
8	B	2105	THR
8	B	2109	MET
8	B	2121	LYS
8	B	2125	ASP
9	C	168	THR
9	C	824	THR
10	D	102	LYS
13	G	79	LYS
14	H	156	ARG
14	H	259	PHE
14	H	333	GLN
14	H	344	LYS
14	H	387	MET
14	H	481	PHE
14	H	494	LEU
16	J	302	VAL
18	L	80	LYS
18	L	130	ARG
18	L	131	ILE
19	M	222	ARG

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Mol	Chain	Res	Type
21	O	261	LYS
23	R	1	MET
24	S	366	TYR
24	S	436	TYR
25	T	548	PHE
25	T	606	TRP
25	T	724	LEU
26	U	90	TYR
26	U	544	ASN
26	U	881	HIS
26	U	960	ASP
26	U	986	SER
26	U	1021	LEU
26	U	1206	TYR
26	U	1283	HIS
26	U	1343	LYS
28	W	120	ILE
32	c	305	ASP
40	o	336	ARG
40	o	436	THR
40	o	515	ASP
40	o	522	TYR
40	o	552	VAL
36	r	43	ASP
42	w	119	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (117) such sidechains are listed below:

Mol	Chain	Res	Type
4	7	301	ASN
4	7	394	GLN
7	A	160	HIS
7	A	210	HIS
7	A	270	ASN
7	A	434	HIS
7	A	505	ASN
7	A	664	HIS
7	A	675	GLN
7	A	755	HIS
7	A	775	ASN
7	A	792	HIS
7	A	834	HIS

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Mol	Chain	Res	Type
7	A	994	ASN
7	A	1014	ASN
7	A	1024	HIS
7	A	1096	HIS
7	A	1129	ASN
7	A	1159	ASN
7	A	1169	GLN
7	A	1296	GLN
7	A	1337	GLN
7	A	1394	GLN
7	A	1468	ASN
7	A	1476	GLN
7	A	1586	HIS
7	A	1599	GLN
7	A	1658	GLN
7	A	1717	ASN
7	A	1946	ASN
7	A	1947	ASN
7	A	2123	GLN
7	A	2300	ASN
7	A	2306	HIS
8	B	425	ASN
9	C	82	GLN
9	C	137	HIS
9	C	154	HIS
9	C	175	GLN
9	C	477	HIS
9	C	557	GLN
9	C	680	ASN
9	C	924	GLN
14	H	171	ASN
14	H	474	HIS
14	H	499	GLN
14	H	553	HIS
14	H	600	ASN
16	J	191	HIS
16	J	216	ASN
16	J	269	GLN
16	J	417	ASN
16	J	446	ASN
16	J	451	HIS
16	J	500	HIS

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Mol	Chain	Res	Type
17	K	84	ASN
19	M	82	GLN
20	N	101	ASN
20	N	165	GLN
20	N	225	ASN
21	O	245	GLN
22	P	56	ASN
23	R	20	GLN
24	S	221	ASN
24	S	250	GLN
24	S	311	GLN
25	T	601	GLN
25	T	739	ASN
25	T	744	GLN
26	U	393	ASN
28	W	43	GLN
28	W	72	ASN
29	Y	15	ASN
31	b	76	ASN
32	c	84	HIS
32	c	85	GLN
32	c	154	HIS
32	c	156	GLN
32	c	171	ASN
32	c	344	GLN
35	f	41	ASN
37	h	64	ASN
38	i	31	HIS
38	i	148	ASN
39	j	39	ASN
39	j	91	ASN
31	k	76	ASN
37	l	64	ASN
39	m	49	ASN
33	n	16	HIS
33	n	40	ASN
33	n	45	ASN
40	o	145	ASN
40	o	147	GLN
40	o	250	GLN
40	o	402	GLN
40	o	462	HIS

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Mol	Chain	Res	Type
40	o	479	GLN
34	p	19	ASN
34	p	88	GLN
35	q	68	ASN
36	r	26	HIS
41	s	192	ASN
42	t	9	ASN
42	t	94	GLN
42	t	95	GLN
42	u	45	GLN
42	u	79	GLN
42	v	14	HIS
42	v	43	ASN
42	v	79	GLN
42	v	101	GLN
42	w	22	ASN
42	w	37	ASN
43	y	131	GLN
43	y	172	HIS
43	y	215	ASN

5.3.3 RNA

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	2	117/189 (61%)	30 (25%)	5 (4%)
11	E	14/14 (100%)	5 (35%)	1 (7%)
15	I	39/113 (34%)	19 (48%)	2 (5%)
2	5	73/116 (62%)	24 (32%)	2 (2%)
3	6	96/106 (90%)	37 (38%)	5 (5%)
All	All	339/538 (63%)	115 (33%)	15 (4%)

All (115) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	2	16	U
1	2	17	U
1	2	19	G
1	2	20	G
1	2	24	A
1	2	25	G
1	2	29	A

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Mol	Chain	Res	Type
1	2	30	A
1	2	32	U
1	2	40	C
1	2	41	U
1	2	46	U
1	2	47	U
1	2	51	A
1	2	53	U
1	2	54	U
1	2	96	A
1	2	97	G
1	2	99	U
1	2	100	U
1	2	101	U
1	2	102	U
1	2	103	U
1	2	104	G
1	2	105	G
1	2	106	A
1	2	109	U
1	2	157	G
1	2	171	U
1	2	178	A
2	5	10	U
2	5	11	U
2	5	20	G
2	5	21	A
2	5	34	U
2	5	35	U
2	5	36	C
2	5	38	C
2	5	39	C
2	5	42	U
2	5	45	C
2	5	47	A
2	5	52	U
2	5	53	U
2	5	57	G
2	5	69	A
2	5	86	C
2	5	89	U
2	5	91	U

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Mol	Chain	Res	Type
2	5	92	U
2	5	93	U
2	5	94	U
2	5	95	G
2	5	96	A
3	6	6	C
3	6	7	G
3	6	8	C
3	6	9	U
3	6	11	C
3	6	12	G
3	6	26	U
3	6	28	A
3	6	29	A
3	6	33	G
3	6	34	G
3	6	35	A
3	6	37	C
3	6	38	G
3	6	41	A
3	6	44	G
3	6	45	A
3	6	46	G
3	6	48	A
3	6	49	G
3	6	51	U
3	6	54	G
3	6	56	A
3	6	58	G
3	6	59	G
3	6	60	C
3	6	61	C
3	6	62	C
3	6	67	G
3	6	68	C
3	6	74	U
3	6	79	C
3	6	81	C
3	6	84	A
3	6	85	U
3	6	87	C
3	6	88	G

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Mol	Chain	Res	Type
11	E	-11	G
11	E	-7	C
11	E	-6	C
11	E	1	C
11	E	2	U
15	I	5	G
15	I	14	A
15	I	16	G
15	I	17	U
15	I	83	A
15	I	87	U
15	I	88	G
15	I	89	U
15	I	90	C
15	I	91	A
15	I	92	U
15	I	93	A
15	I	95	U
15	I	96	U
15	I	97	A
15	I	98	U
15	I	99	C
15	I	112	A
15	I	113	G

All (15) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	2	39	U
1	2	46	U
1	2	95	A
1	2	102	U
1	2	105	G
2	5	92	U
2	5	95	G
3	6	5	U
3	6	33	G
3	6	37	C
3	6	50	A
3	6	58	G
11	E	-12	G
15	I	90	C

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Mol	Chain	Res	Type
15	I	95	U

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

2 non-standard protein/DNA/RNA residues are 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	$\#\|Z\| > 2$
17	SEP	K	224	17	8,9,10	1.54	1 (12%)	8,12,14	1.58	1 (12%)
17	SEP	K	232	17	8,9,10	1.57	1 (12%)	8,12,14	1.47	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
17	SEP	K	224	17	-	0/5/8/10	-
17	SEP	K	232	17	-	3/5/8/10	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
17	K	232	SEP	P-O1P	3.39	1.61	1.50
17	K	224	SEP	P-O1P	3.34	1.61	1.50

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
17	K	224	SEP	P-OG-CB	-3.83	107.75	118.30
17	K	232	SEP	P-OG-CB	-2.85	110.45	118.30
17	K	232	SEP	OG-CB-CA	2.46	110.54	108.14

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
17	K	232	SEP	CB-OG-P-O2P
17	K	232	SEP	CB-OG-P-O3P
17	K	232	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, 15 are monoatomic - leaving 3 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	$\#\|Z\| > 2$
47	ATP	7	702	45	26,33,33	0.92	1 (3%)	31,52,52	1.55	5 (16%)
48	GTP	C	1500	45	26,34,34	1.24	1 (3%)	32,54,54	1.70	7 (21%)
50	IHP	c	601	-	36,36,36	0.74	0	54,60,60	0.91	3 (5%)

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
47	ATP	7	702	45	-	0/18/38/38	0/3/3/3
48	GTP	C	1500	45	-	5/18/38/38	0/3/3/3
50	IHP	c	601	-	-	6/30/54/54	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
48	C	1500	GTP	C5-C6	-4.41	1.38	1.47
47	7	702	ATP	O4'-C1'	2.08	1.44	1.41

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
48	C	1500	GTP	PA-O3A-PB	-4.43	117.62	132.83
47	7	702	ATP	PB-O3B-PG	-4.34	117.95	132.83
47	7	702	ATP	N3-C2-N1	-4.09	122.29	128.68
48	C	1500	GTP	PB-O3B-PG	-3.51	120.78	132.83
48	C	1500	GTP	C5-C6-N1	3.47	120.07	113.95
47	7	702	ATP	C4-C5-N7	-3.29	105.97	109.40
50	c	601	IHP	C5-C4-C3	3.07	117.13	110.41
48	C	1500	GTP	C8-N7-C5	2.99	108.69	102.99
48	C	1500	GTP	C2-N1-C6	-2.98	119.62	125.10
50	c	601	IHP	C6-C1-C2	-2.95	103.96	110.41
48	C	1500	GTP	C3'-C2'-C1'	2.85	105.26	100.98
47	7	702	ATP	PA-O3A-PB	-2.73	123.47	132.83
48	C	1500	GTP	O6-C6-C5	-2.38	119.72	124.37
47	7	702	ATP	O4'-C1'-C2'	-2.30	103.57	106.93
50	c	601	IHP	C4-C3-C2	2.06	114.92	110.41

There are no chirality outliers.

All (11) torsion outliers are listed below:

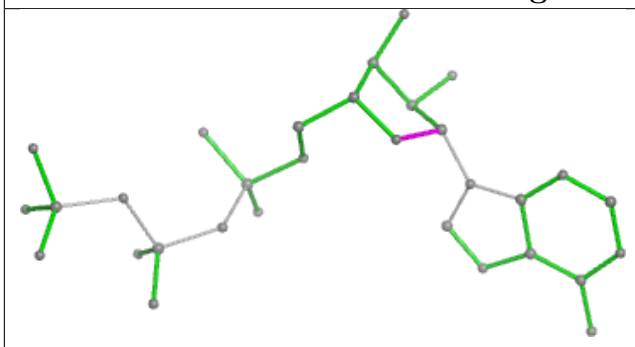
Mol	Chain	Res	Type	Atoms
48	C	1500	GTP	C5'-O5'-PA-O3A
48	C	1500	GTP	C5'-O5'-PA-O1A
48	C	1500	GTP	C5'-O5'-PA-O2A
50	c	601	IHP	C2-O12-P2-O42
50	c	601	IHP	C5-O15-P5-O25
50	c	601	IHP	C6-O16-P6-O26
48	C	1500	GTP	C3'-C4'-C5'-O5'
48	C	1500	GTP	O4'-C4'-C5'-O5'
50	c	601	IHP	C1-O11-P1-O31
50	c	601	IHP	C1-O11-P1-O41
50	c	601	IHP	C6-O16-P6-O46

There are no ring outliers.

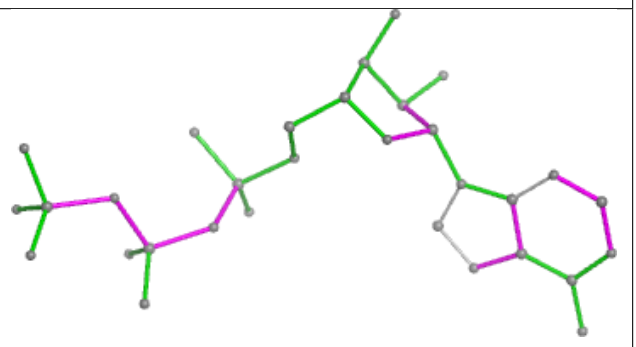
No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

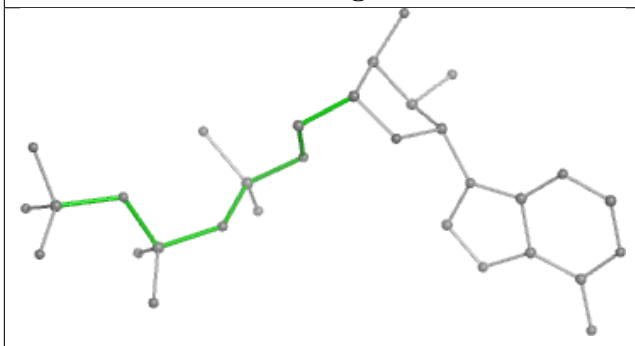
Ligand ATP 7 702



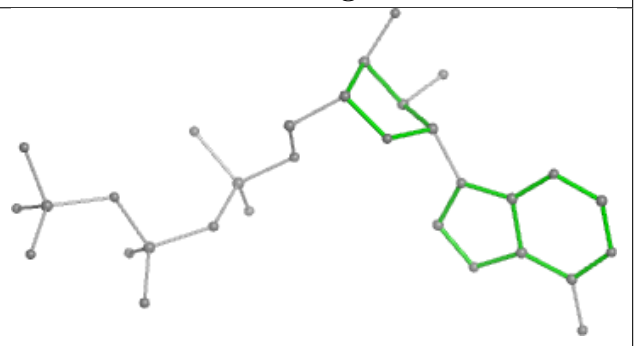
Bond lengths



Bond angles

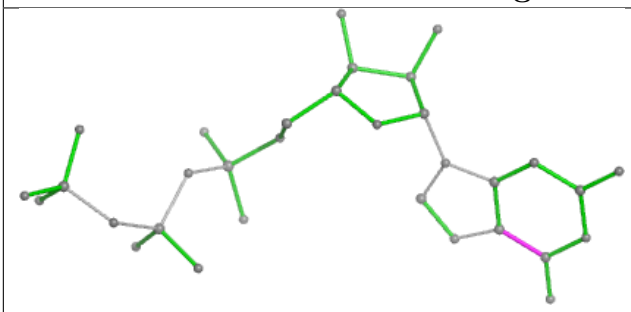


Torsions

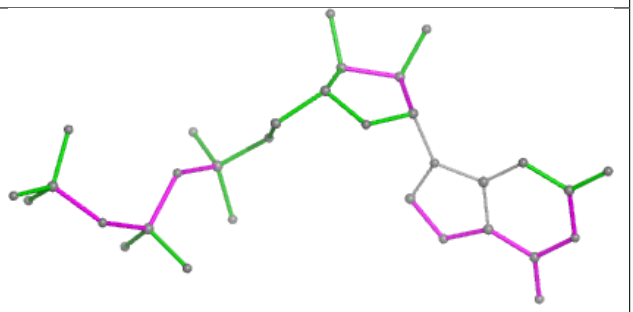


Rings

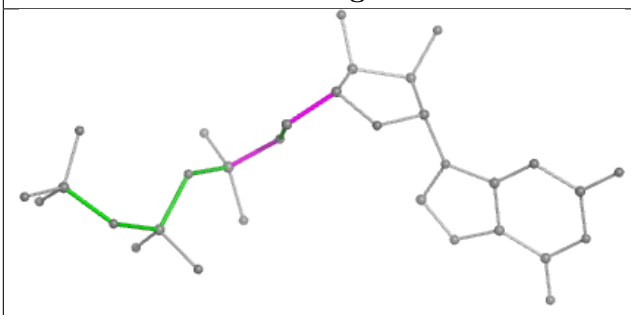
Ligand GTP C 1500



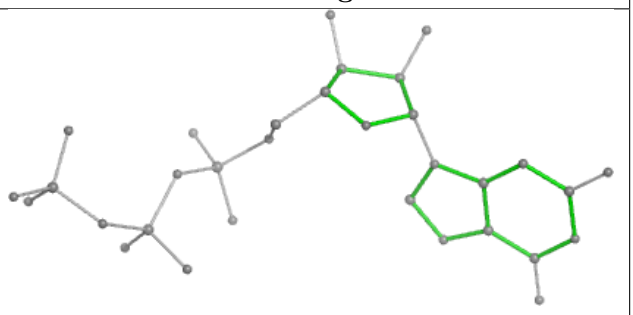
Bond lengths



Bond angles

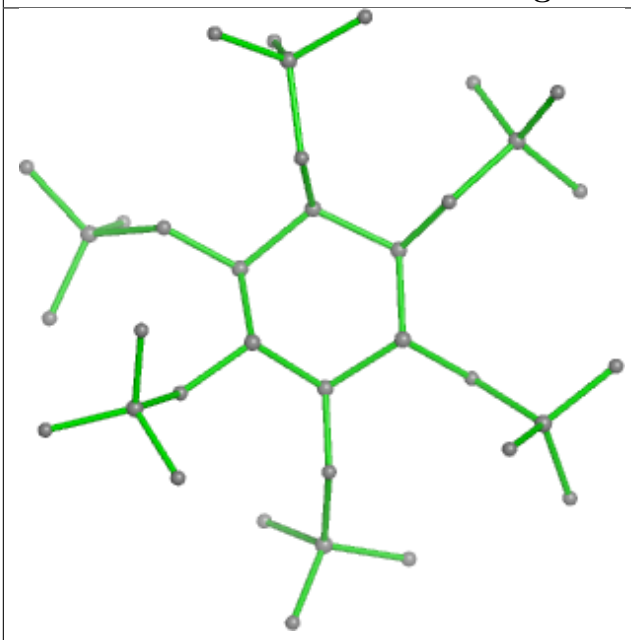


Torsions

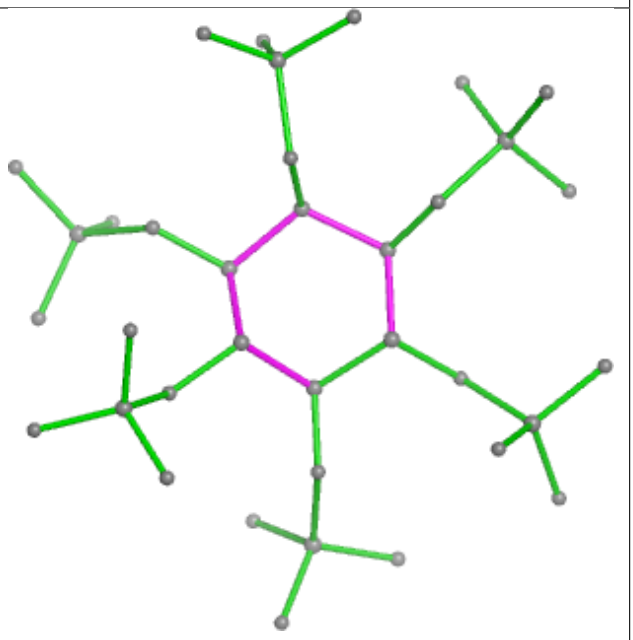


Rings

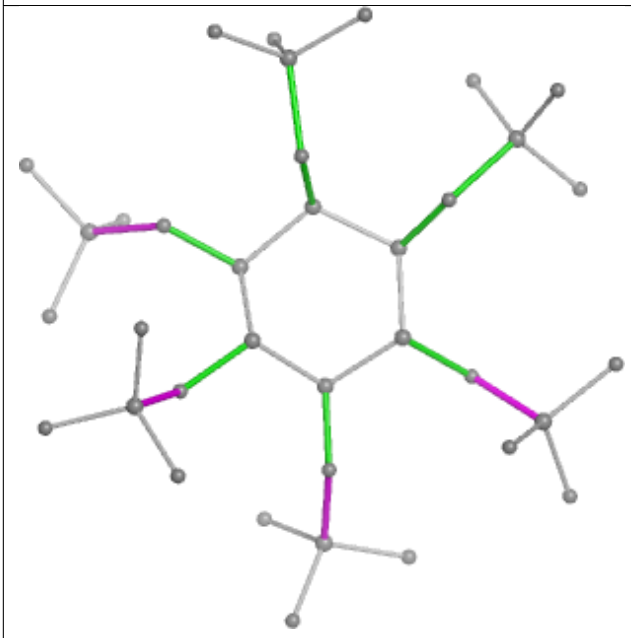
Ligand IHP c 601



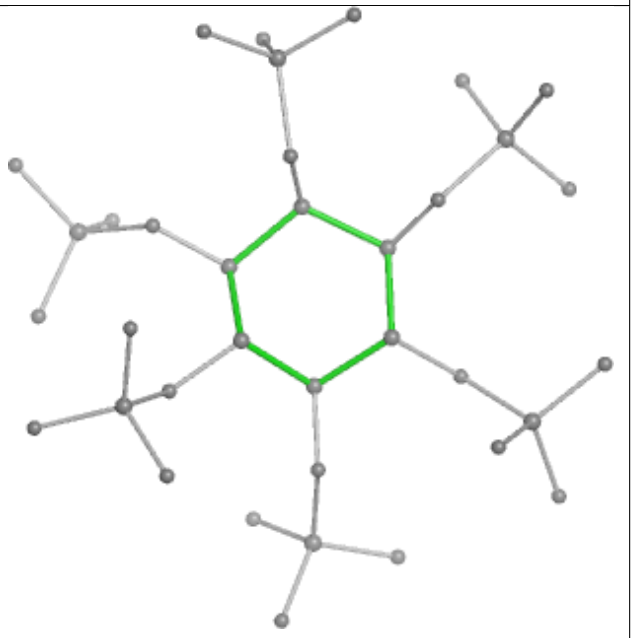
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
15	I	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	I	83:A	O3’	84:U	P	83.48

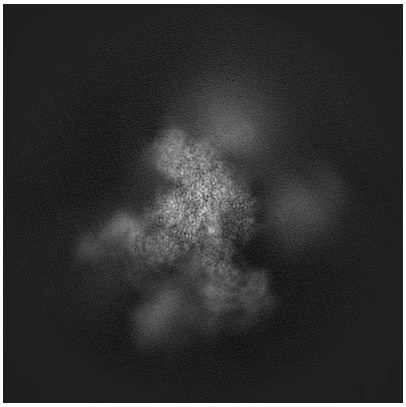
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-4525. These allow visual inspection of the internal detail of the map and identification of artifacts.

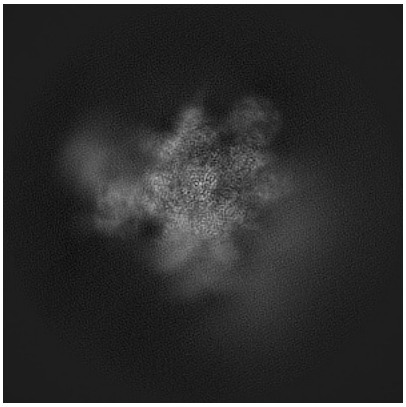
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

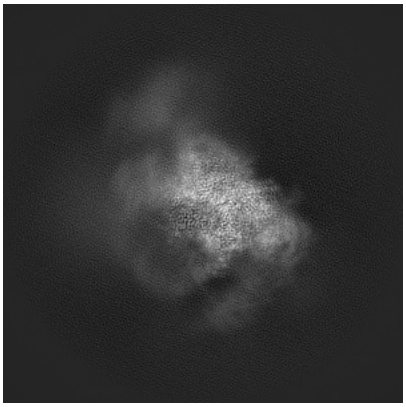
6.1.1 Primary map



X



Y

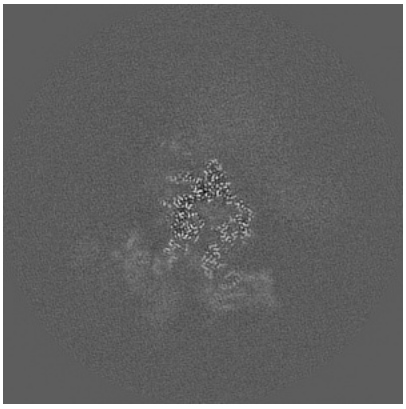


Z

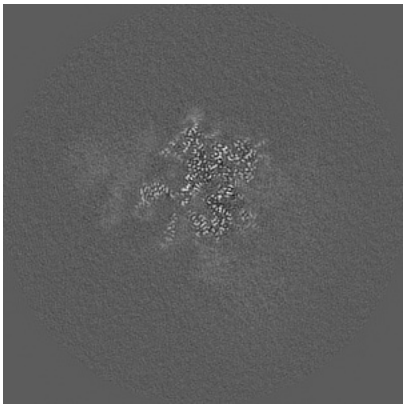
The images above show the map projected in three orthogonal directions.

6.2 Central slices

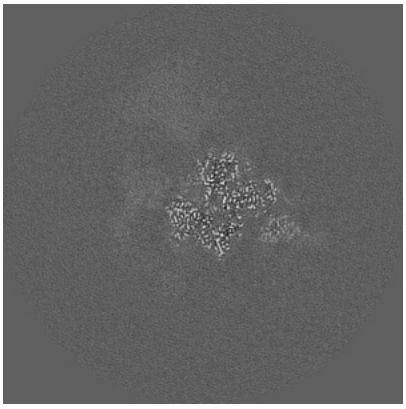
6.2.1 Primary map



X Index: 205



Y Index: 205

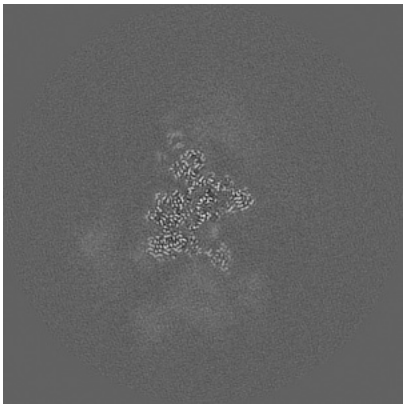


Z Index: 205

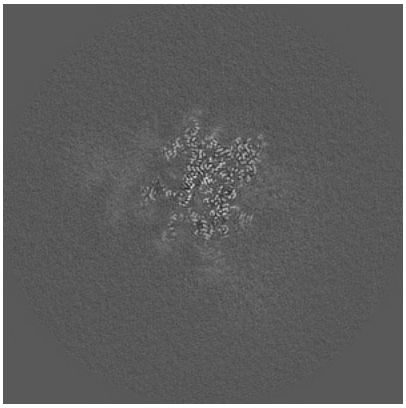
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

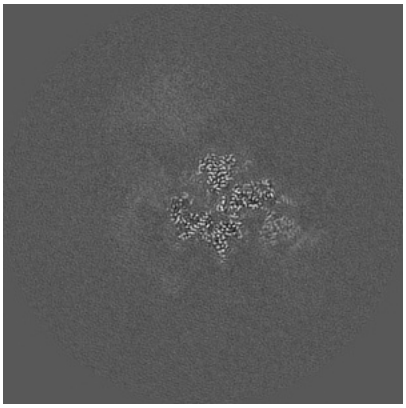
6.3.1 Primary map



X Index: 231



Y Index: 203

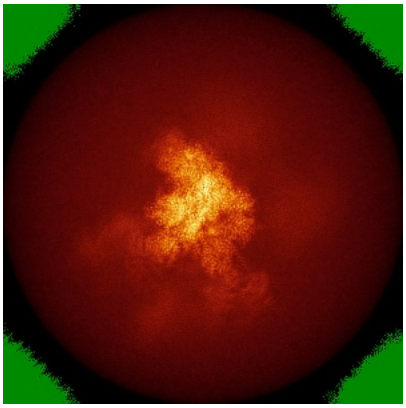


Z Index: 202

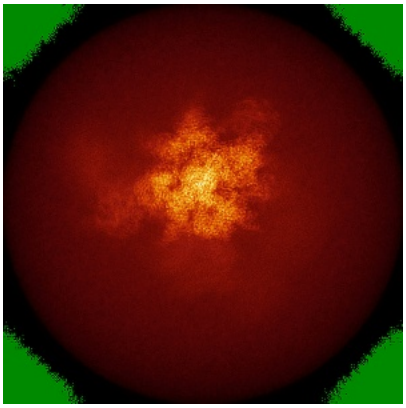
The images above show the largest variance slices of the map in three orthogonal directions.

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

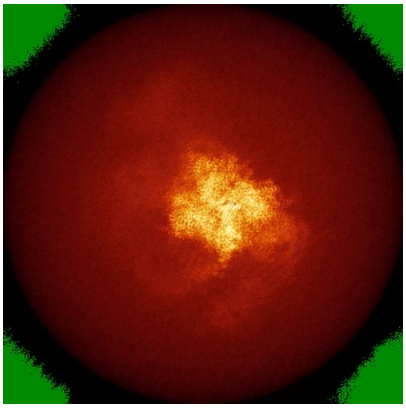
6.4.1 Primary map



X



Y

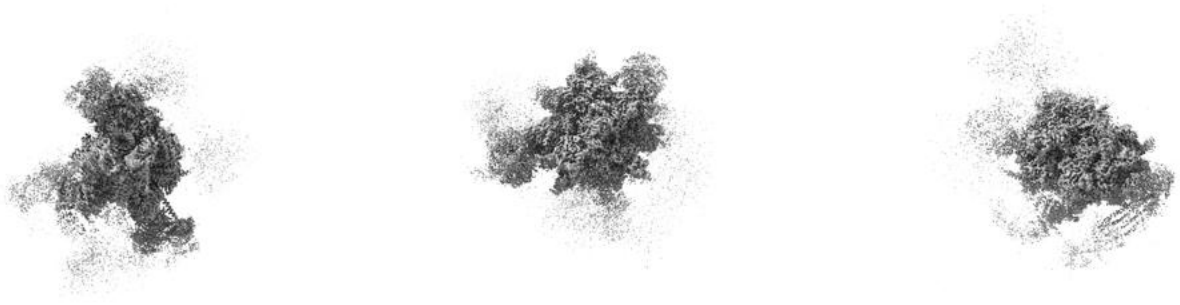


Z

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 0.024. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

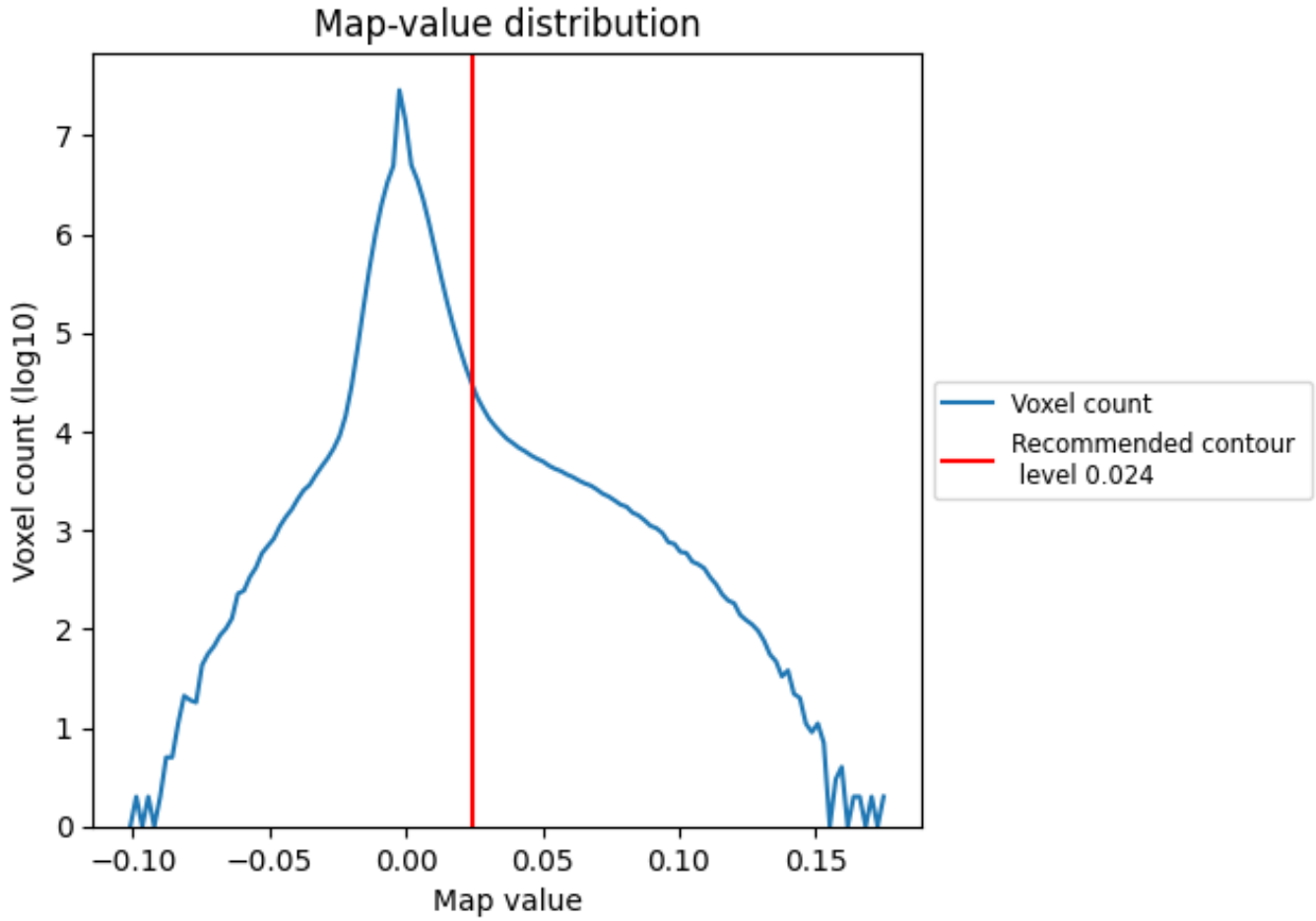
6.6 Mask visualisation (i)

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

7 Map analysis

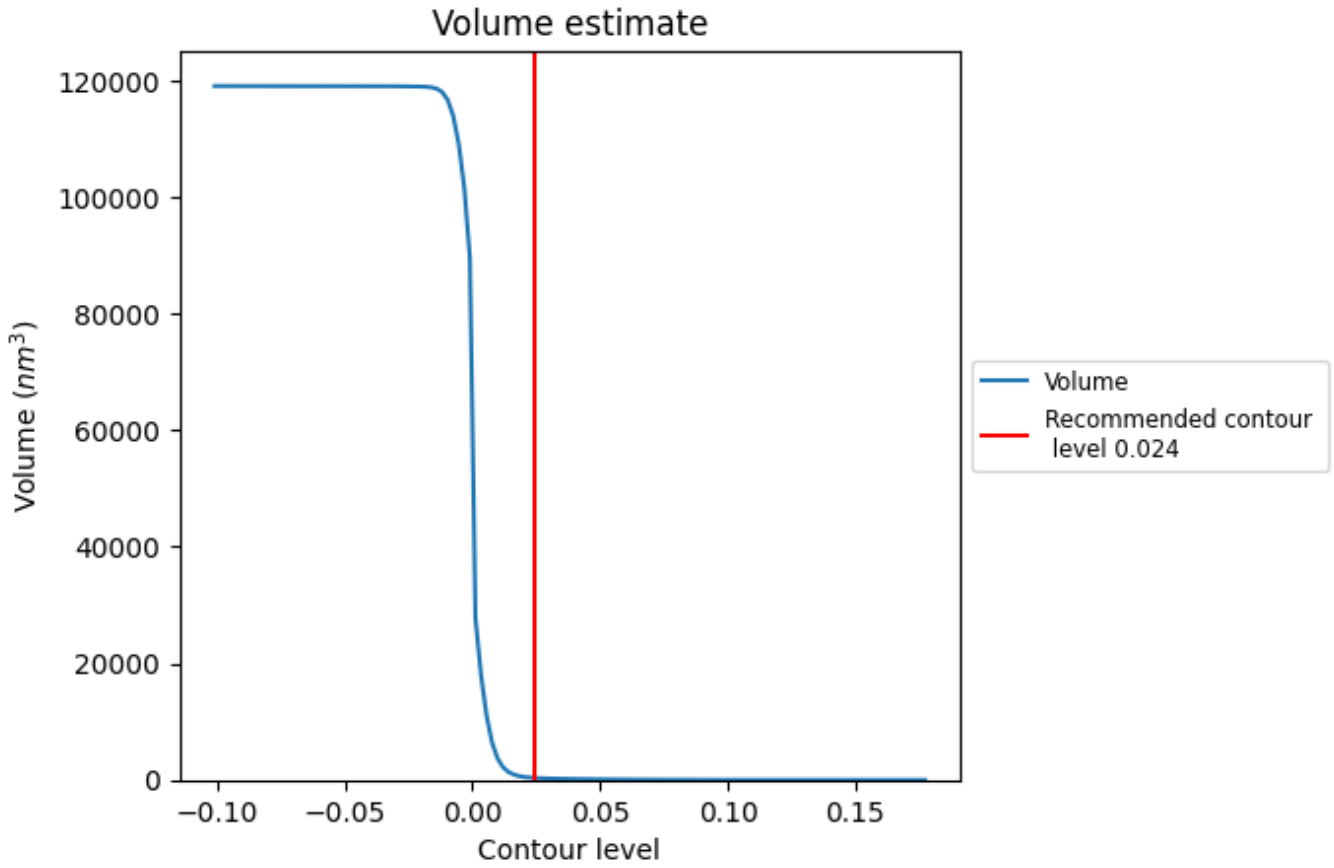
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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

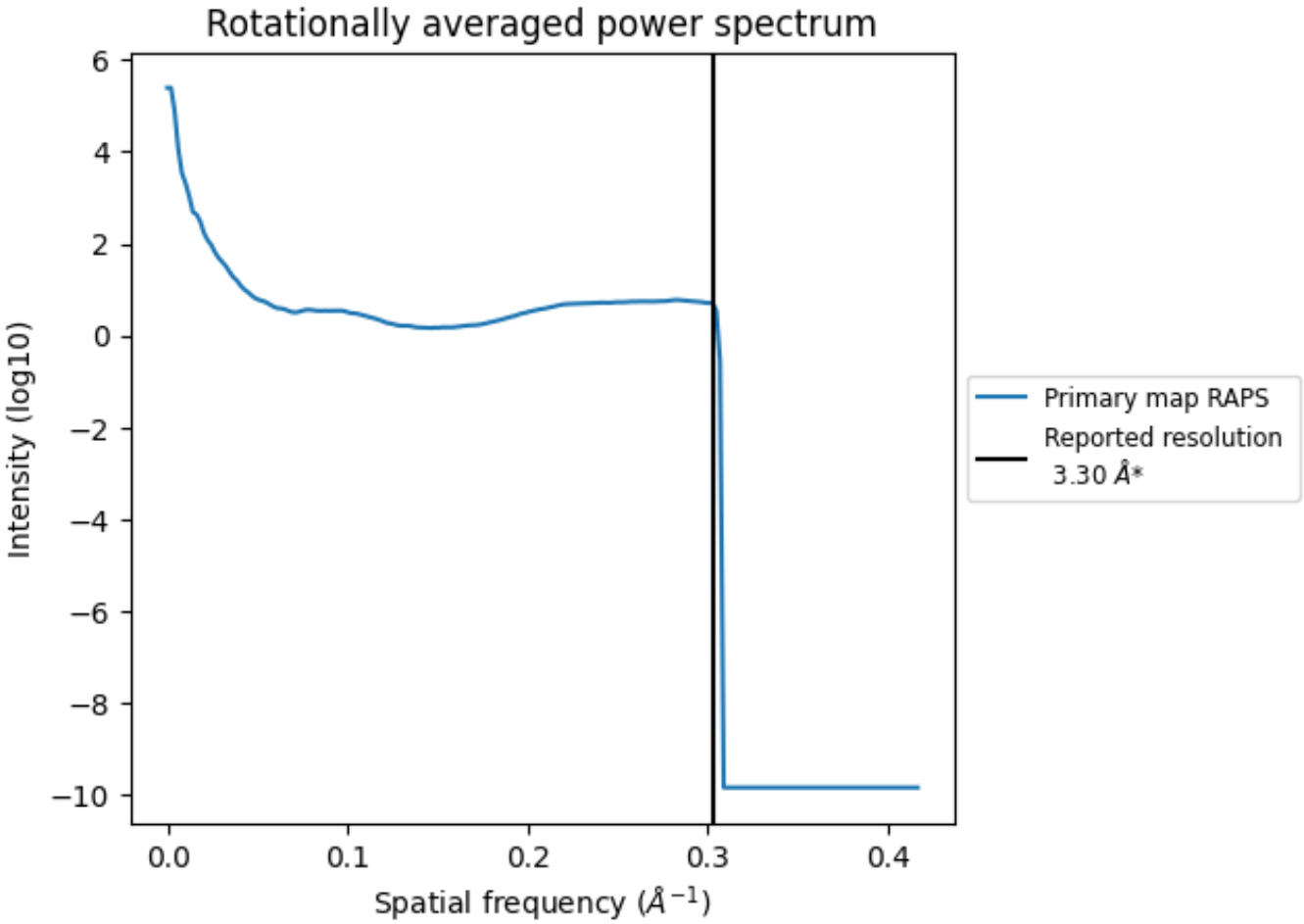
7.2 Volume estimate



The volume at the recommended contour level is 356 nm^3; this corresponds to an approximate mass of 321 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)

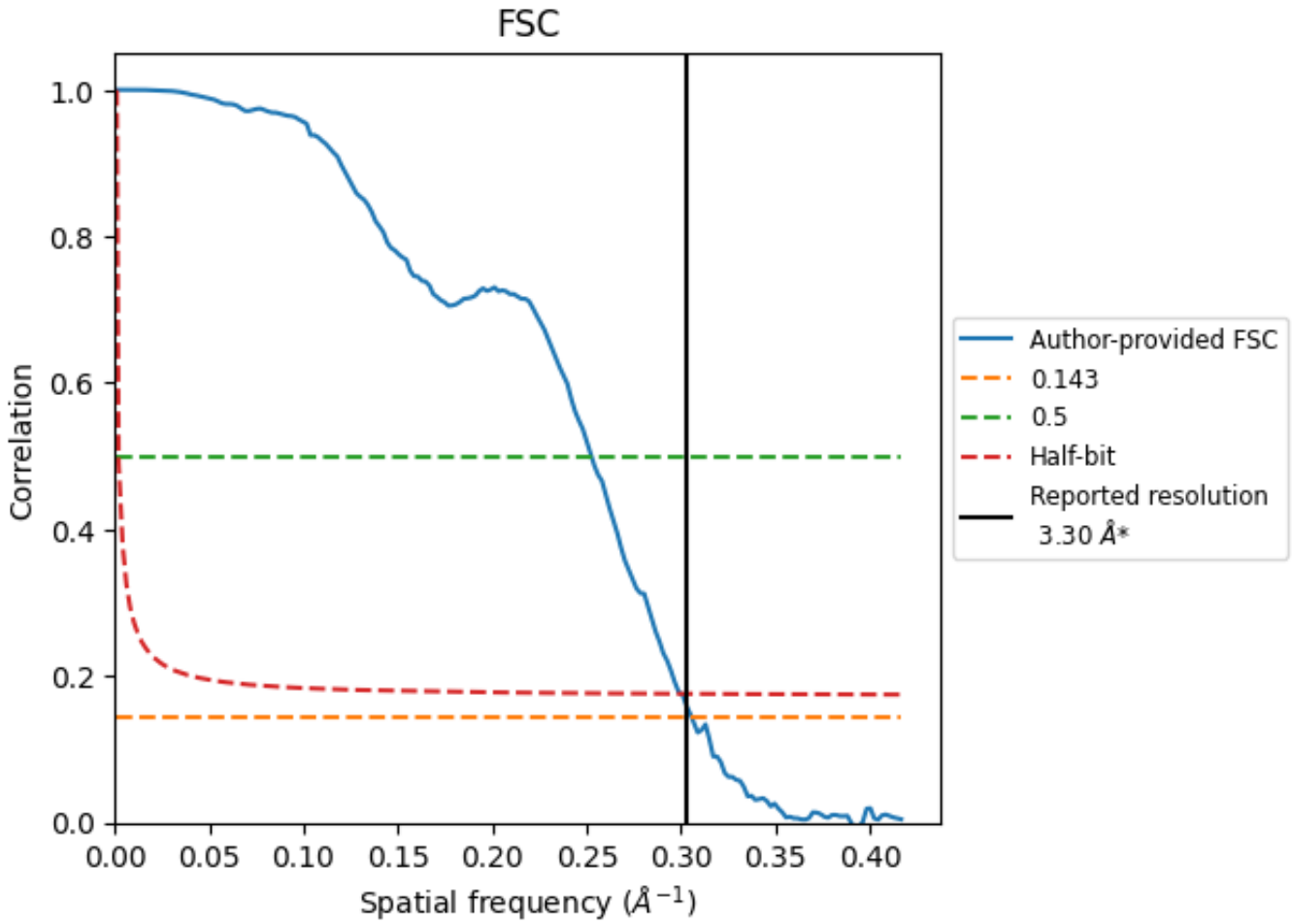


*Reported resolution corresponds to spatial frequency of 0.303 Å^{-1}

8 Fourier-Shell correlation

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

8.1 FSC



*Reported resolution corresponds to spatial frequency of 0.303 Å^{-1}

8.2 Resolution estimates (i)

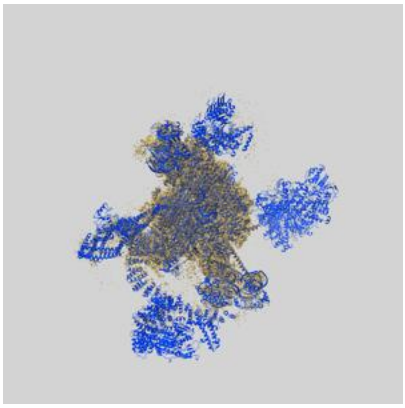
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.30	-	-
Author-provided FSC curve	3.27	3.96	3.33
Unmasked-calculated*	-	-	-

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

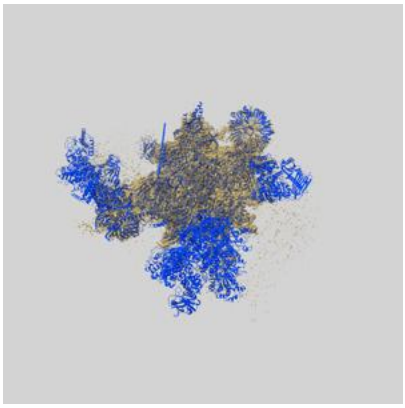
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-4525 and PDB model 6QDV. Per-residue inclusion information can be found in section 3 on page 15.

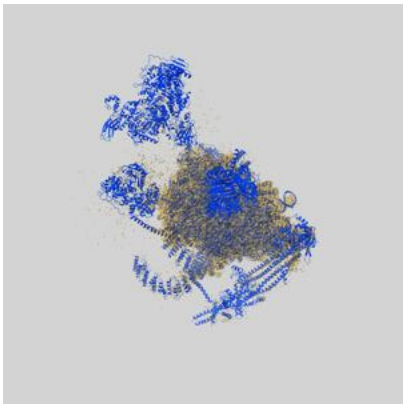
9.1 Map-model overlay



X



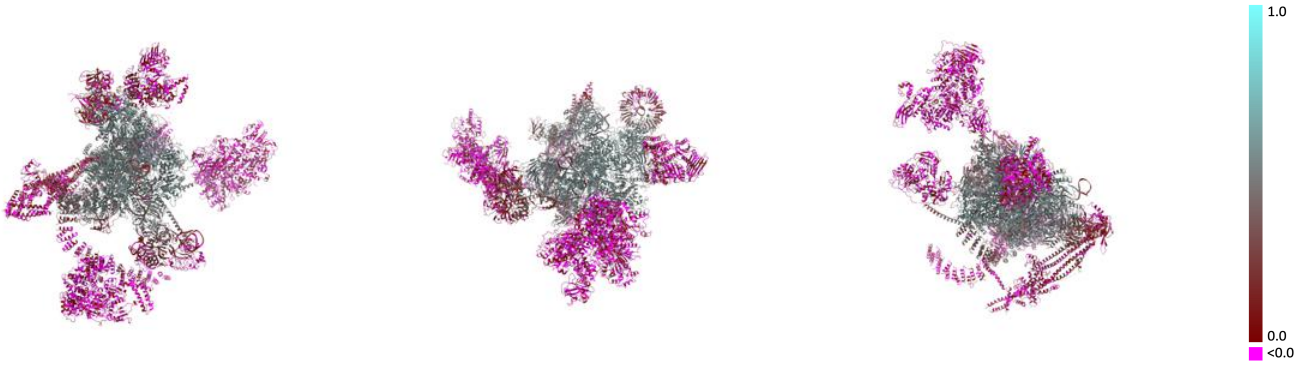
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.024 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.

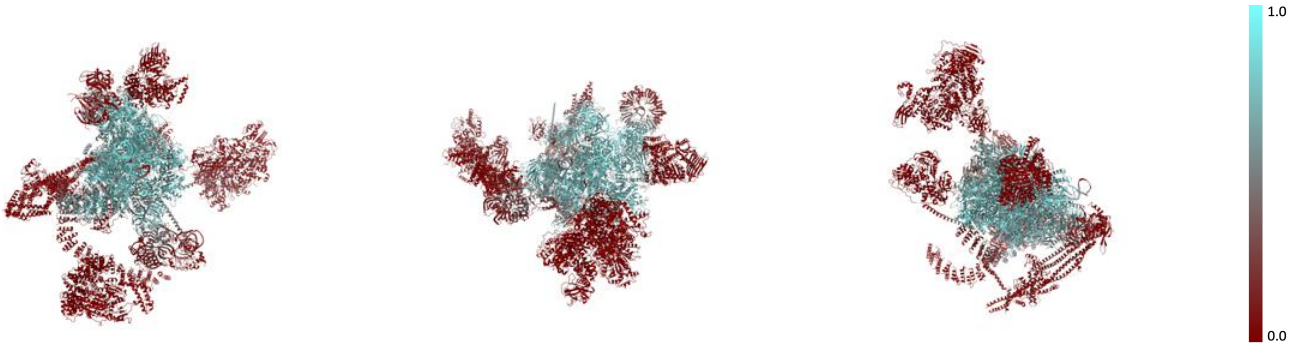
9.2 Q-score mapped to coordinate model



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.

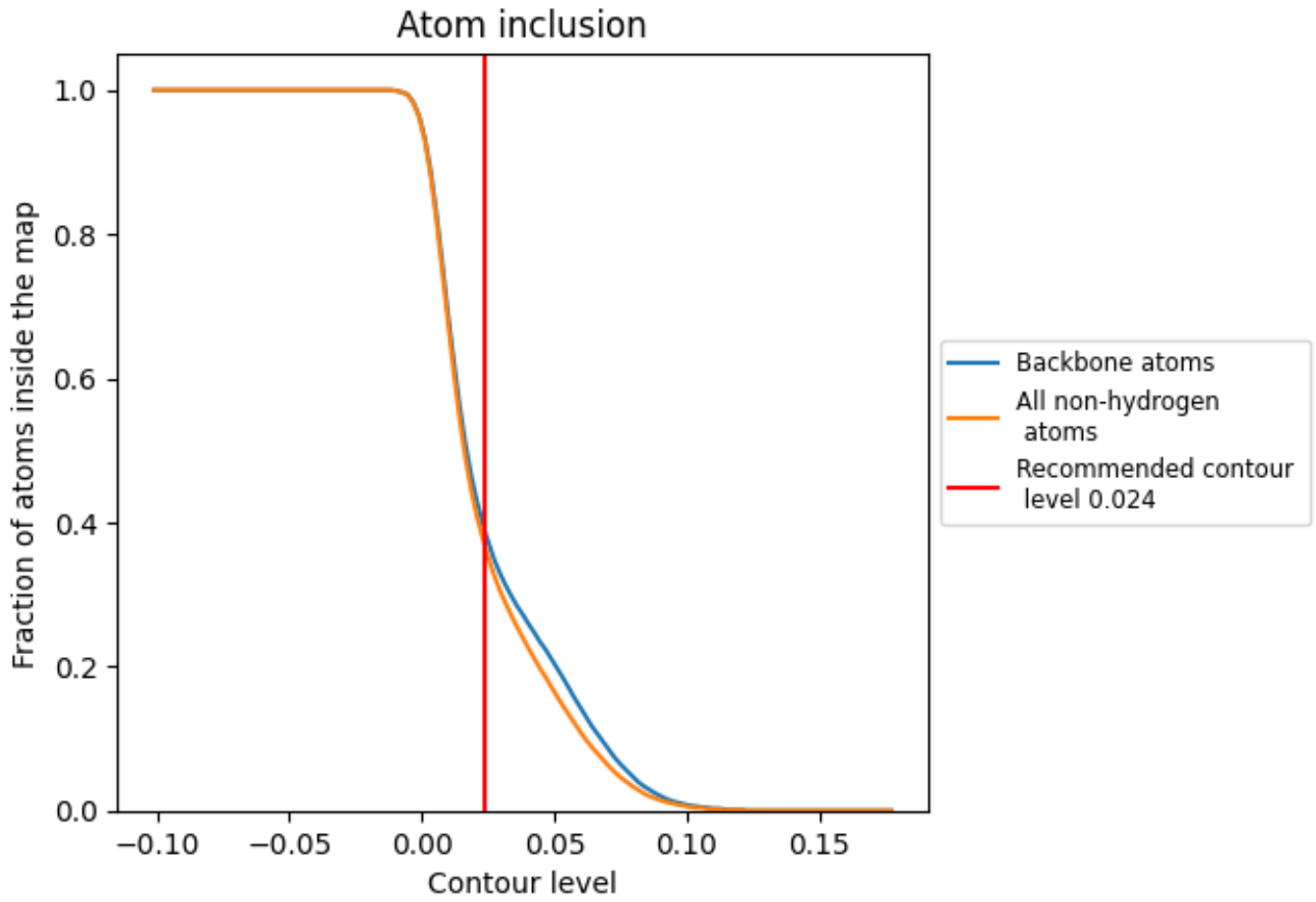
9.3 Atom inclusion mapped to coordinate model



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 (0.024).

9.4 Atom inclusion (i)



At the recommended contour level, 38% of all backbone atoms, 36% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.024) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.3640	0.2780
2	0.4150	0.2640
5	0.7510	0.4540
6	0.7380	0.4570
7	0.0050	0.0600
8	0.0000	-0.0230
9	0.0000	0.0230
A	0.6840	0.4780
B	0.0010	0.0020
C	0.6850	0.5010
D	0.4080	0.3490
E	0.8410	0.5300
F	0.6280	0.4670
G	0.5770	0.5060
H	0.3250	0.2530
I	0.6040	0.3950
J	0.8350	0.5600
K	0.5780	0.4700
L	0.7400	0.5240
M	0.5150	0.4410
N	0.6240	0.4720
O	0.4300	0.3550
P	0.6530	0.5150
R	0.8340	0.5500
S	0.4420	0.3340
T	0.0660	0.1560
U	0.0010	-0.0010
V	0.0730	0.0630
W	0.0210	0.0440
Y	0.0480	0.0930
Z	0.6520	0.5040
b	0.2810	0.2660
c	0.6520	0.4960
d	0.4340	0.3790
e	0.0740	0.1380

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Chain	Atom inclusion	Q-score
f	0.0420	0.1010
g	0.2160	0.2880
h	0.1070	0.1720
i	0.5730	0.4500
j	0.0500	0.0950
k	0.2060	0.2370
l	0.1230	0.1500
m	0.0610	0.0830
n	0.3690	0.3190
o	0.6620	0.4960
p	0.2240	0.2290
q	0.1140	0.1190
r	0.3480	0.3330
s	0.0730	0.1200
t	0.0260	0.0690
u	0.0160	0.0240
v	0.0240	0.1160
w	0.0100	0.0760
y	0.6400	0.4900
z	0.0110	0.1960