Full wwPDB EM Validation Report ⓘ

Nov 5, 2024 – 06:21 PM EST

PDB ID	:	5T62
EMDB ID	:	EMD-8362
Title	:	Nmd3 is a structural mimic of eIF5A, and activates the cpGTPase Lsg1 during 60S ribosome biogenesis: 60S-Nmd3-Tif6-Lsg1 Complex
Authors	:	Malyutin, A.G.; Musalgaonkar, S.; Patchett, S.; Frank, J.; Johnson, A.W.
Deposited on	:	2016-09-01
Resolution	:	3.10 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:

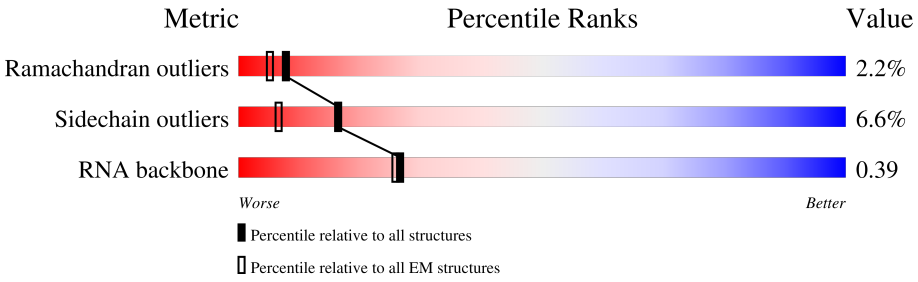
EMDB validation analysis	:	FAILED
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

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 3.10 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%

Mol	Chain	Length	Quality of chain
1	X	264	84% · 15%
2	A	3396	69% 25% 6%
3	B	121	77% 23%
4	C	158	75% 25%
5	D	254	94% 6% ·
6	E	387	93% 7%
7	F	362	92% 8%
8	G	297	94% 5% ·
9	H	176	85% · 11%

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Mol	Chain	Length	Quality of chain
10	I	244	85% 6% 9%
11	J	256	82% 9% 9%
12	K	191	91% 9%
13	L	221	86% 9% 5%
14	M	174	90% 6%
15	N	199	88% 8%
16	O	138	90% 9%
17	a	204	95% 5%
18	b	199	96%
19	c	184	93% 6%
20	d	186	95% 5%
21	e	189	94% 6%
22	f	172	92% 8%
23	g	160	91% 8%
24	h	121	79% 17%
25	i	137	96%
26	j	155	61% 37%
27	k	142	79% 6% 15%
28	l	127	93% 6%
29	m	136	93% 6%
30	n	149	88% 11%
31	o	59	88% 8%
32	p	105	90% 8%
33	q	113	89% 7%
34	r	130	91% 7%

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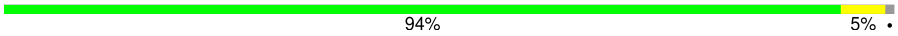
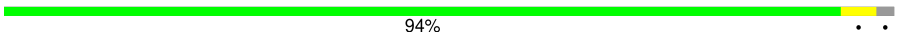
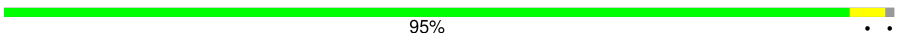
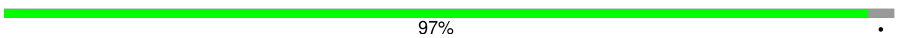
Mol	Chain	Length	Quality of chain
35	s	107	
36	t	121	
37	u	120	
38	v	100	
39	w	88	
40	x	78	
41	y	51	
42	z	128	
43	Q	106	
44	R	92	
45	S	217	
46	V	524	
47	W	651	

2 Entry composition (i)

There are 51 unique types of molecules in this entry. The entry contains 131766 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 protein called Eukaryotic translation initiation factor 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	X	224	1633	1019	279	328	7	0	0

There are 19 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
X	-18	MET	-	initiating methionine	UNP Q12522
X	-17	GLY	-	expression tag	UNP Q12522
X	-16	SER	-	expression tag	UNP Q12522
X	-15	SER	-	expression tag	UNP Q12522
X	-14	HIS	-	expression tag	UNP Q12522
X	-13	HIS	-	expression tag	UNP Q12522
X	-12	HIS	-	expression tag	UNP Q12522
X	-11	HIS	-	expression tag	UNP Q12522
X	-10	HIS	-	expression tag	UNP Q12522
X	-9	HIS	-	expression tag	UNP Q12522
X	-8	SER	-	expression tag	UNP Q12522
X	-7	LEU	-	expression tag	UNP Q12522
X	-6	ARG	-	expression tag	UNP Q12522
X	-5	ARG	-	expression tag	UNP Q12522
X	-4	ALA	-	expression tag	UNP Q12522
X	-3	SER	-	expression tag	UNP Q12522
X	-2	LEU	-	expression tag	UNP Q12522
X	-1	GLY	-	expression tag	UNP Q12522
X	0	SER	-	expression tag	UNP Q12522

- Molecule 2 is a RNA chain called TPA_inf: Saccharomyces cerevisiae S288C chromosome XII, complete sequence.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	A	3204	68535	30613	12358	22360	3204	0	0

- Molecule 3 is a RNA chain called 5S Ribosomal RNA.

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

- Molecule 4 is a RNA chain called 5.8S Ribosomal RNA.

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

- Molecule 5 is a protein called 60S ribosomal protein L2-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	D	252	Total	C	N	O	S	0	0
			1914	1191	388	334	1		

- Molecule 6 is a protein called 60S ribosomal protein L3.

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

- Molecule 7 is a protein called 60S ribosomal protein L4-A.

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

- Molecule 8 is a protein called 60S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	G	296	Total	C	N	O	S	0	0
			2375	1501	414	458	2		

- Molecule 9 is a protein called 60S ribosomal protein L6-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	H	156	Total	C	N	O	S	0	0
			1239	800	222	216	1		

- Molecule 10 is a protein called 60S ribosomal protein L7-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	I	222	Total	C	N	O	S	0	0
			1784	1151	324	308	1		

- Molecule 11 is a protein called 60S ribosomal protein L8-A.

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

- Molecule 12 is a protein called 60S ribosomal protein L9-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	K	191	Total	C	N	O	S	0	0
			1518	963	274	277	4		

- Molecule 13 is a protein called 60S ribosomal protein L10.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	L	211	Total	C	N	O	S	0	0
			1705	1083	322	294	6		

- Molecule 14 is a protein called 60S ribosomal protein L11-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	M	169	Total	C	N	O	S	0	0
			1353	847	253	249	4		

- Molecule 15 is a protein called 60S ribosomal protein L13-A.

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

- Molecule 16 is a protein called 60S ribosomal protein L14-A.

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

- Molecule 17 is a protein called 60S ribosomal protein L15-A.

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

- Molecule 18 is a protein called 60S ribosomal protein L16-A.

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

- Molecule 19 is a protein called 60S ribosomal protein L17-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
19	c	183	Total	C	N	O	0	0
			1420	882	281	257		

- Molecule 20 is a protein called 60S ribosomal protein L18-A.

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

- Molecule 21 is a protein called 60S ribosomal protein L19-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
21	e	188	Total	C	N	O	0	0
			1521	935	326	260		

- Molecule 22 is a protein called 60S ribosomal protein L20-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	f	172	Total	C	N	O	S	0	0
			1445	930	267	244	4		

- Molecule 23 is a protein called 60S ribosomal protein L21-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	g	159	Total	C	N	O	S	0	0
			1276	805	246	221	4		

- Molecule 24 is a protein called 60S ribosomal protein L22-A.

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

- Molecule 25 is a protein called 60S ribosomal protein L23-A.

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

- Molecule 26 is a protein called 60S ribosomal protein L24-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	j	98	Total	C	N	O	S	0	0
			699	443	137	118	1		

- Molecule 27 is a protein called 60S ribosomal protein L25.

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

- Molecule 28 is a protein called 60S ribosomal protein L26-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
28	l	126	Total	C	N	O	0	0
			993	625	192	176		

- Molecule 29 is a protein called 60S ribosomal protein L27-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
29	m	135	Total	C	N	O	0	0
			1092	710	202	180		

- Molecule 30 is a protein called 60S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	n	148	Total	C	N	O	S	0	0
			1173	749	231	190	3		

- Molecule 31 is a protein called 60S ribosomal protein L29.

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

- Molecule 32 is a protein called 60S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	p	97	Total 743	C 479	N 124	O 139	S 1	0	0

- Molecule 33 is a protein called 60S ribosomal protein L31-A.

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

- Molecule 34 is a protein called 60S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	r	127	Total 1020	C 647	N 205	O 167	S 1	0	0

- Molecule 35 is a protein called 60S ribosomal protein L33-A.

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

- Molecule 36 is a protein called 60S ribosomal protein L34-A.

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

- Molecule 37 is a protein called 60S ribosomal protein L35-A.

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

- Molecule 38 is a protein called 60S ribosomal protein L36-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	v	99	Total	C	N	O	S	0	0
			771	481	156	132	2		

- Molecule 39 is a protein called 60S ribosomal protein L37-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	w	87	Total	C	N	O	S	0	0
			681	414	148	114	5		

- Molecule 40 is a protein called 60S ribosomal protein L38.

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

- Molecule 41 is a protein called 60S ribosomal protein L39.

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

- Molecule 42 is a protein called Ubiquitin-60S ribosomal protein L40.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	z	52	Total	C	N	O	S	0	0
			417	259	86	67	5		

- Molecule 43 is a protein called 60S ribosomal protein L42-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	Q	105	Total	C	N	O	S	0	0
			847	534	170	138	5		

- Molecule 44 is a protein called 60S ribosomal protein L43-A.

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

- Molecule 45 is a protein called Ribosomal Protein uL1.

Mol	Chain	Residues	Atoms				AltConf	Trace
45	S	210	Total	C	N	O	0	0
			1050	630	210	210		

- Molecule 46 is a protein called 60S ribosomal export protein NMD3.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	V	350	Total	C	N	O	S	0	0
			2713	1729	468	504	12		

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
V	-5	HIS	-	expression tag	UNP P38861
V	-4	HIS	-	expression tag	UNP P38861
V	-3	HIS	-	expression tag	UNP P38861
V	-2	HIS	-	expression tag	UNP P38861
V	-1	HIS	-	expression tag	UNP P38861
V	0	HIS	-	expression tag	UNP P38861

- Molecule 47 is a protein called Large subunit GTPase 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	W	306	Total	C	N	O	S	0	0
			2236	1432	390	409	5		

There are 77 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
W	135	UNK	ARG	conflict	UNP P53145
W	136	UNK	PRO	conflict	UNP P53145
W	137	UNK	GLU	conflict	UNP P53145
W	138	UNK	TRP	conflict	UNP P53145
W	139	UNK	ASN	conflict	UNP P53145
W	140	UNK	GLU	conflict	UNP P53145
W	141	UNK	GLY	conflict	UNP P53145
W	142	UNK	MET	conflict	UNP P53145
W	143	UNK	SER	conflict	UNP P53145
W	144	UNK	LYS	conflict	UNP P53145
W	145	UNK	PHE	conflict	UNP P53145
W	146	UNK	GLN	conflict	UNP P53145
W	147	UNK	LEU	conflict	UNP P53145
W	148	UNK	ASP	conflict	UNP P53145
W	149	UNK	ARG	conflict	UNP P53145

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Chain	Residue	Modelled	Actual	Comment	Reference
W	150	UNK	GLN	conflict	UNP P53145
W	151	UNK	GLU	conflict	UNP P53145
W	152	UNK	LYS	conflict	UNP P53145
W	153	UNK	GLU	conflict	UNP P53145
W	154	UNK	ALA	conflict	UNP P53145
W	155	UNK	PHE	conflict	UNP P53145
W	156	UNK	LEU	conflict	UNP P53145
W	157	UNK	GLU	conflict	UNP P53145
W	158	UNK	TRP	conflict	UNP P53145
W	159	UNK	ARG	conflict	UNP P53145
W	160	UNK	ARG	conflict	UNP P53145
W	161	UNK	LYS	conflict	UNP P53145
W	162	UNK	LEU	conflict	UNP P53145
W	163	UNK	ALA	conflict	UNP P53145
W	164	UNK	HIS	conflict	UNP P53145
W	165	UNK	LEU	conflict	UNP P53145
W	166	UNK	GLN	conflict	UNP P53145
W	167	UNK	GLU	conflict	UNP P53145
W	168	UNK	SER	conflict	UNP P53145
W	169	UNK	ASN	conflict	UNP P53145
W	170	UNK	GLU	conflict	UNP P53145
W	171	UNK	ASP	conflict	UNP P53145
W	172	UNK	LEU	conflict	UNP P53145
W	173	UNK	LEU	conflict	UNP P53145
W	174	UNK	LEU	conflict	UNP P53145
W	175	UNK	THR	conflict	UNP P53145
W	276	UNK	LEU	conflict	UNP P53145
W	277	UNK	GLU	conflict	UNP P53145
W	278	UNK	GLU	conflict	UNP P53145
W	279	UNK	LEU	conflict	UNP P53145
W	280	UNK	PHE	conflict	UNP P53145
W	281	UNK	LEU	conflict	UNP P53145
W	282	UNK	SER	conflict	UNP P53145
W	283	UNK	LYS	conflict	UNP P53145
W	284	UNK	ALA	conflict	UNP P53145
W	285	UNK	PRO	conflict	UNP P53145
W	286	UNK	ASN	conflict	UNP P53145
W	287	UNK	GLU	conflict	UNP P53145
W	288	UNK	PRO	conflict	UNP P53145
W	289	UNK	LEU	conflict	UNP P53145
W	290	UNK	LEU	conflict	UNP P53145
W	291	UNK	PRO	conflict	UNP P53145

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Chain	Residue	Modelled	Actual	Comment	Reference
W	292	UNK	PRO	conflict	UNP P53145
W	293	UNK	LEU	conflict	UNP P53145
W	294	UNK	PRO	conflict	UNP P53145
W	295	UNK	GLY	conflict	UNP P53145
W	296	UNK	GLN	conflict	UNP P53145
W	297	UNK	PRO	conflict	UNP P53145
W	298	UNK	PRO	conflict	UNP P53145
W	299	UNK	LEU	conflict	UNP P53145
W	504	UNK	HIS	conflict	UNP P53145
W	641	ALA	-	expression tag	UNP P53145
W	642	ALA	-	expression tag	UNP P53145
W	643	ALA	-	expression tag	UNP P53145
W	644	LEU	-	expression tag	UNP P53145
W	645	GLU	-	expression tag	UNP P53145
W	646	HIS	-	expression tag	UNP P53145
W	647	HIS	-	expression tag	UNP P53145
W	648	HIS	-	expression tag	UNP P53145
W	649	HIS	-	expression tag	UNP P53145
W	650	HIS	-	expression tag	UNP P53145
W	651	HIS	-	expression tag	UNP P53145

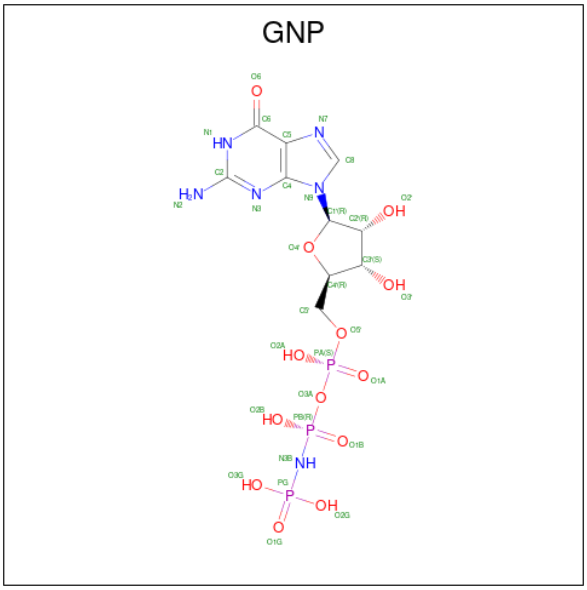
- Molecule 48 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	AltConf
48	A	148	Total Mg 148 148	0
48	B	5	Total Mg 5 5	0
48	C	2	Total Mg 2 2	0
48	D	1	Total Mg 1 1	0
48	a	1	Total Mg 1 1	0
48	c	1	Total Mg 1 1	0
48	i	1	Total Mg 1 1	0
48	W	1	Total Mg 1 1	0

- Molecule 49 is POTASSIUM ION (three-letter code: K) (formula: K).

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

- Molecule 50 is PHOSPHOAMINOPHOSPHONIC ACID-GUANYLATE ESTER (three-letter code: GNP) (formula: $C_{10}H_{17}N_6O_{13}P_3$).



Mol	Chain	Residues	Atoms	AltConf
50	W	1	Total C N O P 32 10 6 13 3	0

- Molecule 51 is water.

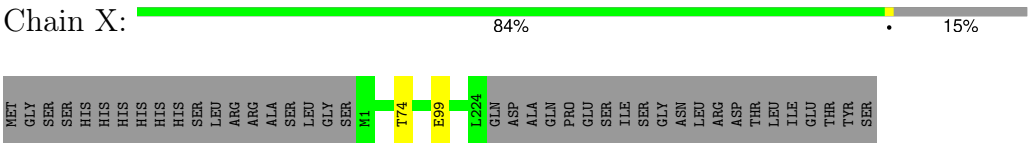
Mol	Chain	Residues	Atoms	AltConf
51	A	5	Total O 5 5	0
51	e	1	Total O 1 1	0

3 Residue-property plots (i)

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

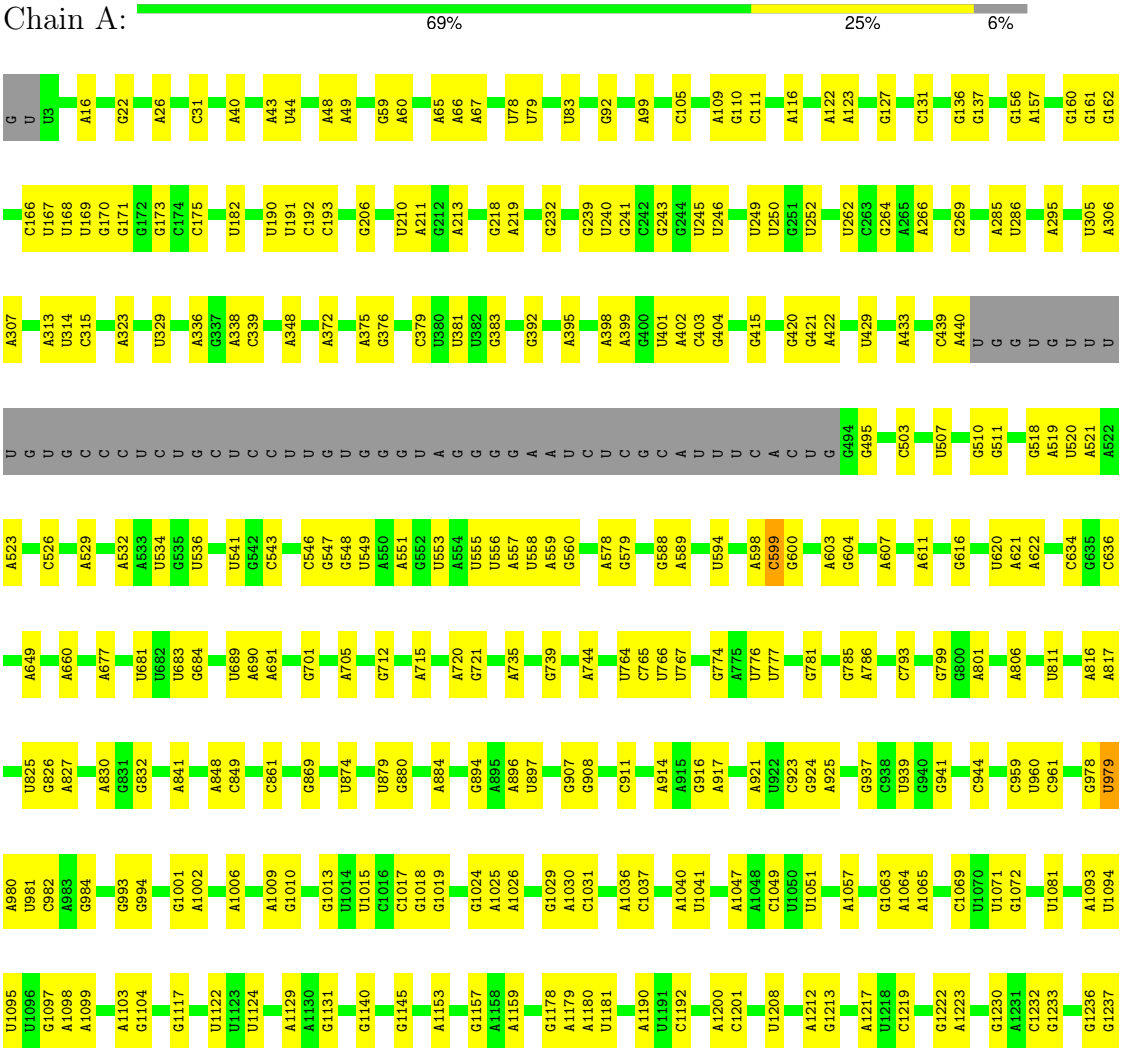
• Molecule 1: Eukaryotic translation initiation factor 6

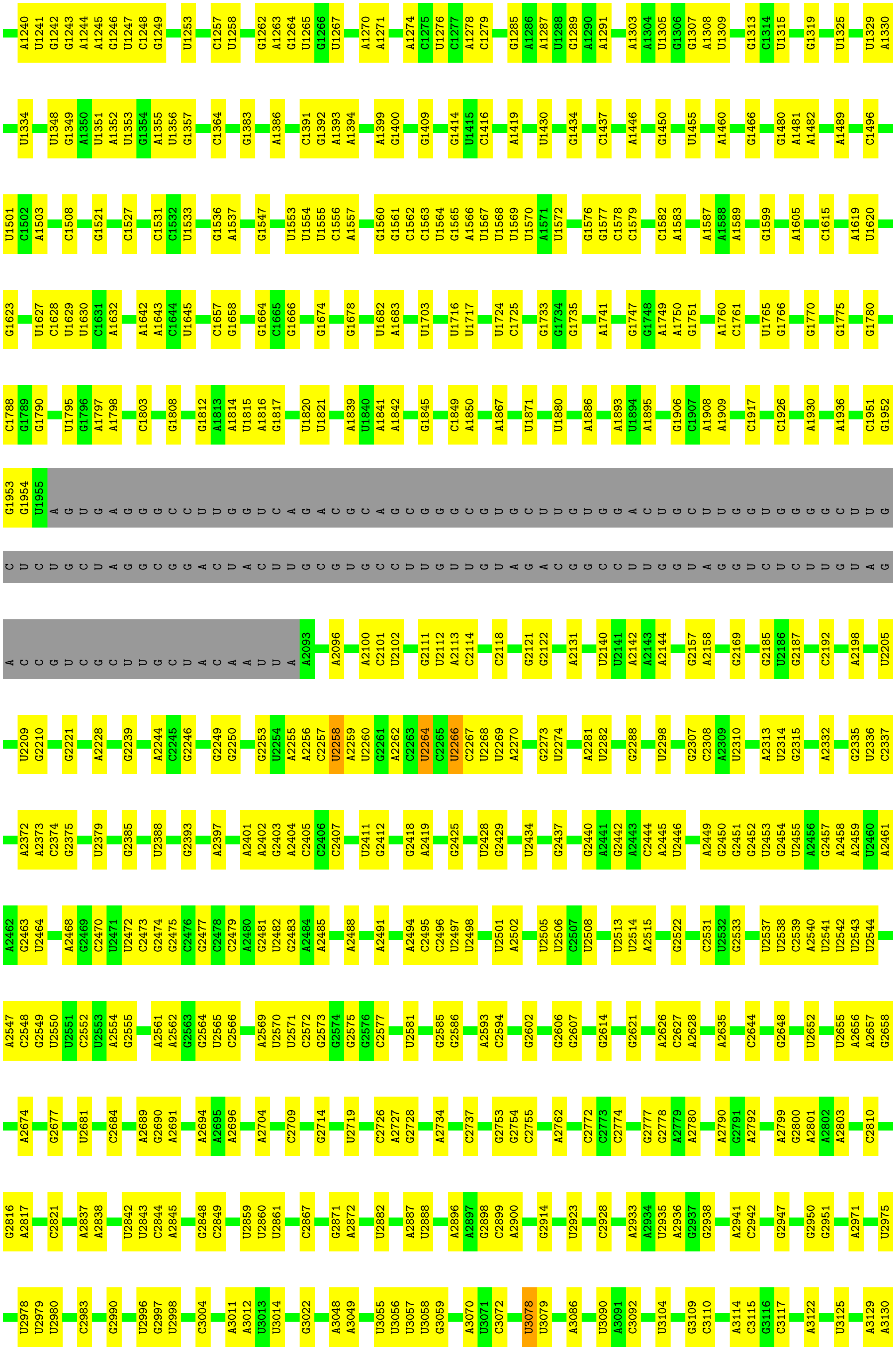
Chain X:

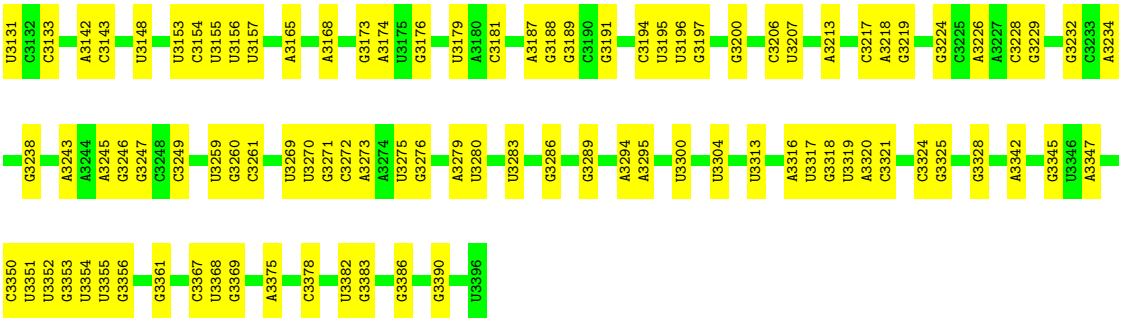


• Molecule 2: TPA_inf: Saccharomyces cerevisiae S288C chromosome XII, complete sequence

Chain A:

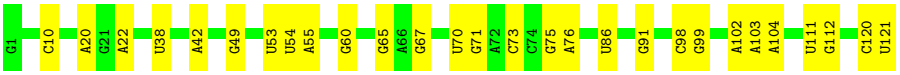



A1240 U1241 G1242 G1243 A1244 A1245 G1246 U1247 C1248 G1249 U1253 C1257 U1258 G1262 A1263 G1264 U1265 G1266 U1267 A1270 A1271 A1274 C1275 U1276 C1277 A1278 C1279 G1285 A1286 A1287 U1288 G1289 A1290 A1291 A1303 A1304 U1305 G1306 G1307 A1308 U1309 G1313 C1314 U1315 G1319 U1325 U1329 A1330
U1334 U1348 G1349 A1350 U1351 A1352 U1353 G1354 A1355 U1356 G1357 C1364 G1383 A1386 C1391 G1392 A1393 A1394 A1399 G1400 G1409 G1414 U1415 C1416 A1419 U1430 G1434 C1437 A1446 G1450 U1455 A1460 G1466 G1480 A1481 A1482 A1489 C1496
U1501 C1502 A1503 C1508 G1521 C1527 C1531 C1532 U1533 G1536 A1537 G1547 U1553 U1554 U1555 C1556 A1557 G1560 G1561 C1562 C1563 U1564 G1565 A1566 U1567 U1568 U1569 U1570 A1571 U1572 G1576 G1577 C1578 C1579 C1582 A1583 A1587 A1588 A1589 G1599 A1605 C1615 A1619 U1620
G1623 U1627 C1628 U1629 U1630 C1631 A1632 A1642 A1643 C1644 U1645 C1657 G1658 G1664 C1665 G1666 G1674 G1678 U1682 A1683 U1703 U1716 U1717 U1724 C1725 G1733 G1734 G1735 A1741 G1747 G1748 A1749 A1750 G1751 A1760 C1761 U1765 G1766 G1770 G1775 G1780
C1788 G1789 G1790 U1795 G1796 A1797 A1798 C1803 G1808 G1812 A1813 A1814 U1815 A1816 G1817 U1820 U1821 A1839 U1840 A1841 A1842 G1845 C1849 A1850 A1867 U1871 U1880 A1886 A1893 U1894 A1895 G1906 C1907 A1908 A1909 C1917 C1926 A1930 A1936 C1951 G1952
G1953 G1954 U1955 A G U G A G G G C C U U G G U C A G A C G G C A G C G G G G C G U G C U U G U G G A C U G C U U G G U G G G G C U U G
C U C U G C U A G G C G G A C U A C U U G C G U G C C U U G U U G U A G A C G G C C U U G G U A G G G U C U C U U G U A G
A C C G U C G C U U G G C U A C A A U U A A2093 A2096 A2100 C2101 U2102 G2111 U2112 A2113 C2114 C2118 G2121 G2122 A2131 U2140 U2141 A2142 A2143 A2144 G2157 A2158 G2169 G2185 U2186 G2187 C2192 A2198 U2205
U2209 G2210 G2221 A2228 G2239 A2244 C2245 G2246 G2249 G2250 G2253 U2254 A2255 A2256 C2257 U2258 A2259 U2260 G2261 A2262 C2263 U2264 C2265 U2266 C2267 U2268 U2269 A2270 G2273 U2274 A2281 U2282 G2288 U2298 G2307 C2308 A2309 U2310 A2313 U2314 G2315 A2332 G2335 U2336 C2337
A2372 A2373 C2374 G2375 U2379 G2385 U2388 G2393 A2397 A2401 A2402 G2403 A2404 C2405 C2406 C2407 U2411 G2412 G2418 A2419 G2425 U2428 G2429 U2434 G2437 G2440 A2441 G2442 A2443 C2444 A2445 U2446 A2449 G2450 G2451 G2452 U2453 G2454 U2455 A2456 G2457 A2458 A2459 U2460 A2461
A2462 G2463 U2464 A2468 G2469 C2470 U2471 U2472 C2473 G2474 G2475 C2476 G2477 C2478 C2479 A2480 G2481 U2482 G2483 A2484 A2485 A2488 A2491 A2494 C2495 C2496 U2497 U2498 U2501 A2502 U2505 U2506 C2507 U2508 U2513 U2514 A2515 G2522 C2531 U2532 G2533 U2537 U2538 C2539 A2540 U2541 U2542 U2543 U2544
A2547 C2548 G2549 U2550 U2551 C2552 U2553 A2554 G2555 A2561 A2562 G2563 G2564 U2565 C2566 A2569 U2570 U2571 C2572 G2573 G2574 G2575 G2576 C2577 U2581 G2585 G2586 A2593 C2594 G2602 G2606 G2607 G2614 G2621 A2626 C2627 A2628 A2635 C2644 G2648 U2652 U2655 A2656 A2657 G2658
A2674 G2677 U2681 C2684 A2689 G2690 A2691 A2694 A2695 A2696 A2704 C2709 G2714 U2719 C2726 A2727 G2728 A2734 C2737 G2753 G2754 C2755 A2762 C2772 C2773 C2774 G2777 G2778 A2779 A2780 A2790 G2791 A2792 A2799 G2800 A2801 A2802 A2803 C2810
G2816 A2817 C2821 A2837 A2838 U2842 U2843 C2844 A2845 G2848 C2849 U2859 U2860 U2861 C2867 G2871 A2872 U2882 A2887 U2888 A2896 A2897 G2898 C2899 A2900 G2914 U2923 C2928 A2933 A2934 U2935 A2936 G2937 G2938 A2941 C2942 G2947 G2950 G2951 A2971 U2975
U2978 U2979 U2980 C2983 G2990 U2996 G2997 U2998 C3004 A3011 A3012 U3013 U3014 G3022 A3048 A3049 U3055 U3056 U3057 U3058 G3059 A3070 U3071 C3072 U3078 U3079 A3086 U3090 A3091 C3092 U3104 G3109 C3110 A3114 C3115 G3116 C3117 A3122 U3125 A3129 A3130



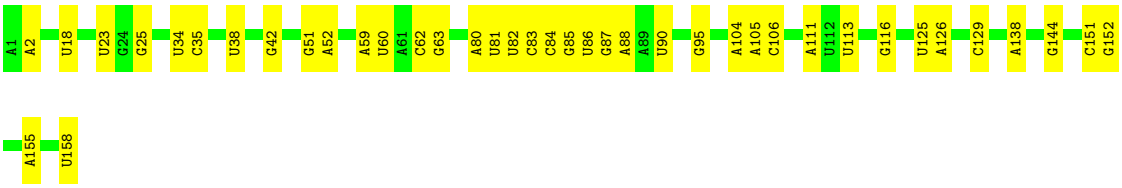
• Molecule 3: 5S Ribosomal RNA

Chain B:



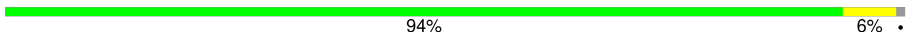
• Molecule 4: 5.8S Ribosomal RNA

Chain C:



• Molecule 5: 60S ribosomal protein L2-A

Chain D:

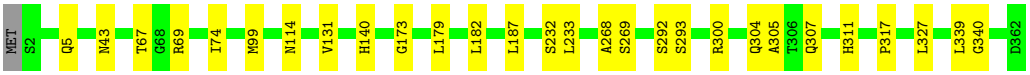


• Molecule 6: 60S ribosomal protein L3

Chain E:

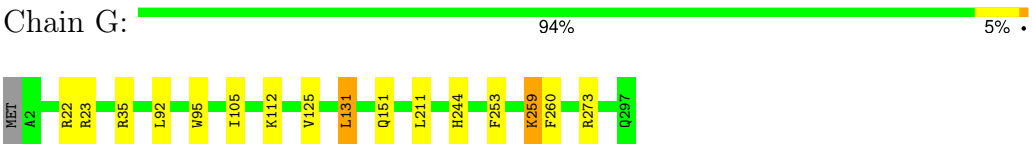
• Molecule 7: 60S ribosomal protein L4-A

Chain F:



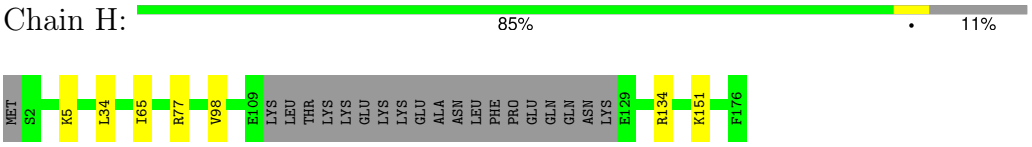
• Molecule 8: 60S ribosomal protein L5

Chain G:



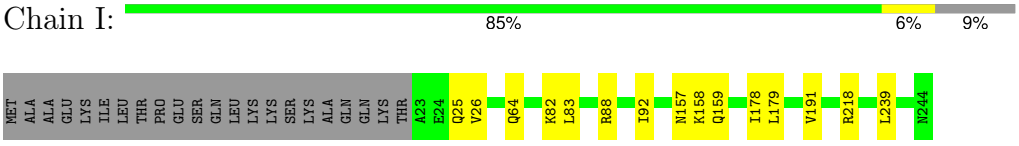
• Molecule 9: 60S ribosomal protein L6-A

Chain H:



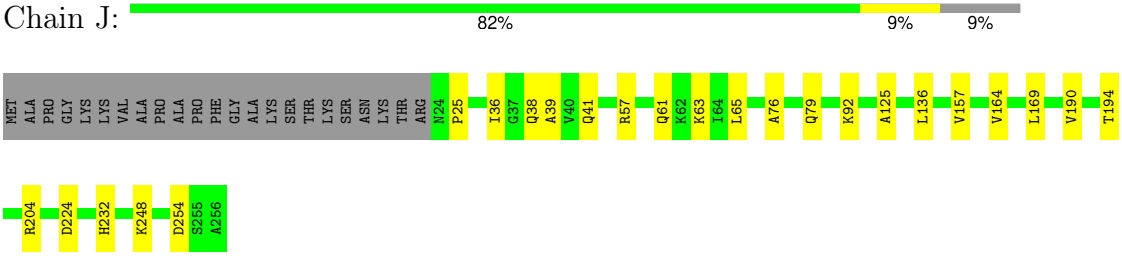
• Molecule 10: 60S ribosomal protein L7-A

Chain I:



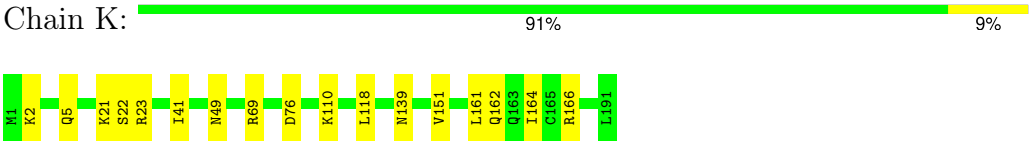
• Molecule 11: 60S ribosomal protein L8-A

Chain J:



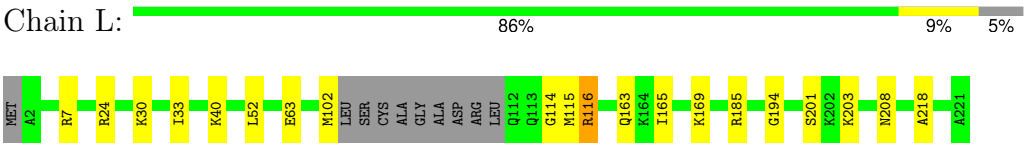
• Molecule 12: 60S ribosomal protein L9-A

Chain K:



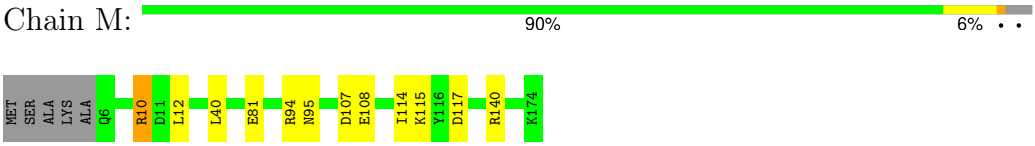
• Molecule 13: 60S ribosomal protein L10

Chain L:



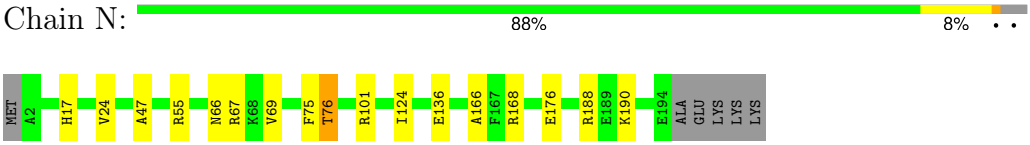
• Molecule 14: 60S ribosomal protein L11-A

Chain M:



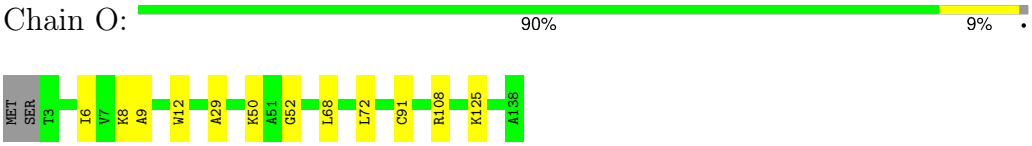
• Molecule 15: 60S ribosomal protein L13-A

Chain N:



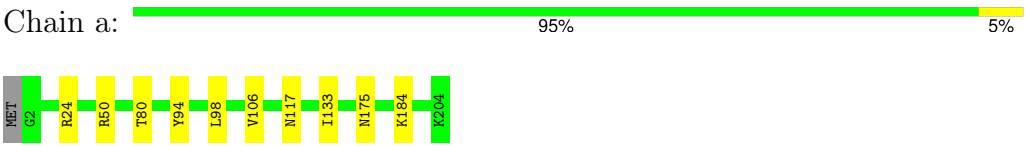
• Molecule 16: 60S ribosomal protein L14-A

Chain O:



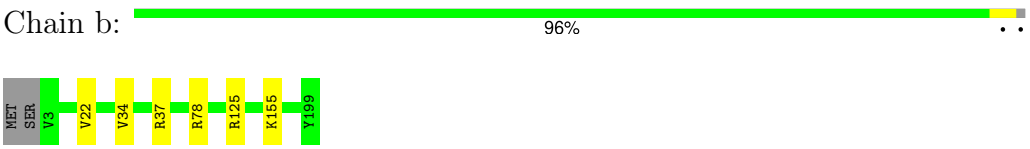
• Molecule 17: 60S ribosomal protein L15-A

Chain a:



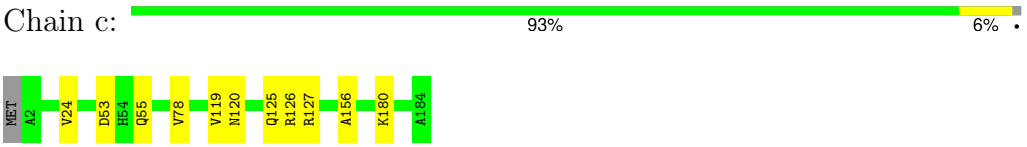
• Molecule 18: 60S ribosomal protein L16-A

Chain b:



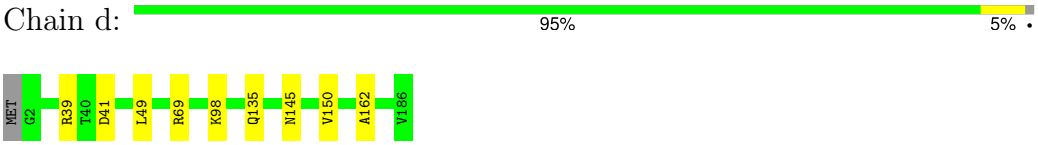
• Molecule 19: 60S ribosomal protein L17-A

Chain c:



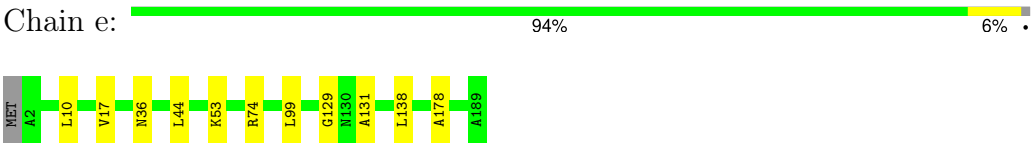
• Molecule 20: 60S ribosomal protein L18-A

Chain d:



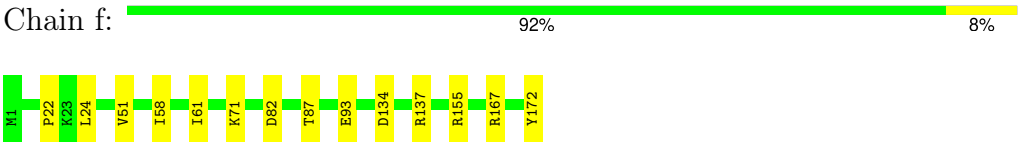
• Molecule 21: 60S ribosomal protein L19-A

Chain e:



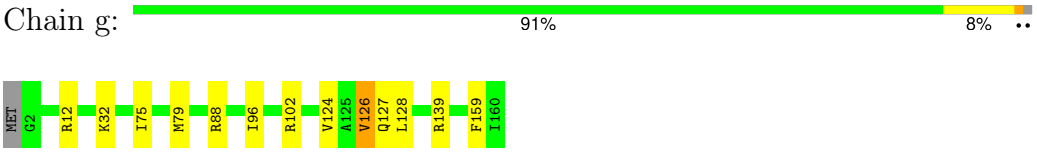
• Molecule 22: 60S ribosomal protein L20-A

Chain f:



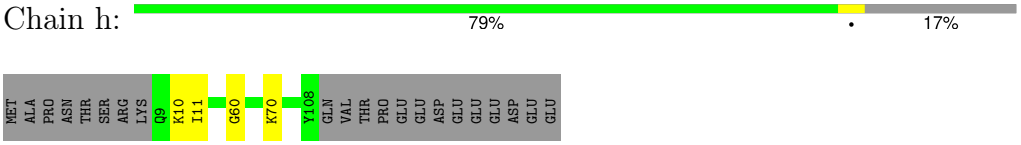
• Molecule 23: 60S ribosomal protein L21-A

Chain g:



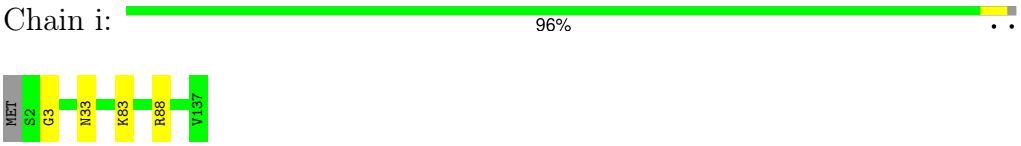
• Molecule 24: 60S ribosomal protein L22-A

Chain h:



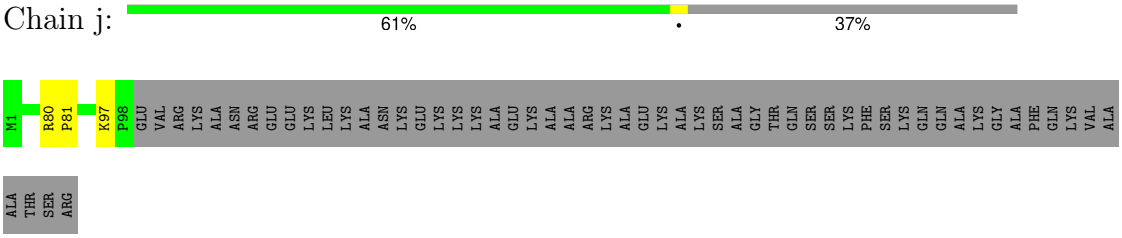
• Molecule 25: 60S ribosomal protein L23-A

Chain i:



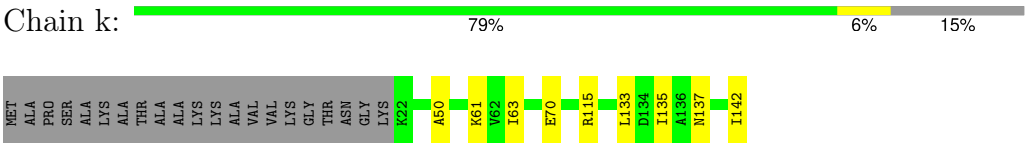
• Molecule 26: 60S ribosomal protein L24-A

Chain j:



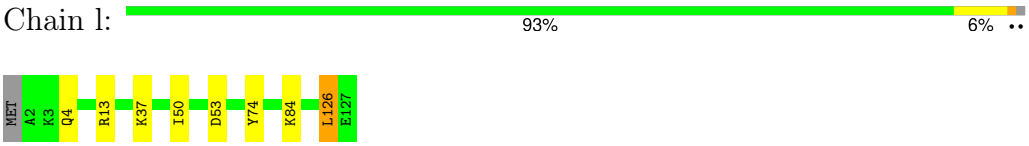
• Molecule 27: 60S ribosomal protein L25

Chain k:



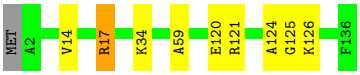
• Molecule 28: 60S ribosomal protein L26-A

Chain l:



• Molecule 29: 60S ribosomal protein L27-A

Chain m:

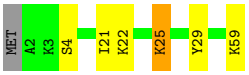


• Molecule 30: 60S ribosomal protein L28

Chain n:

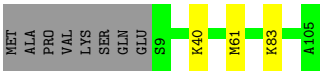
• Molecule 31: 60S ribosomal protein L29

Chain o:



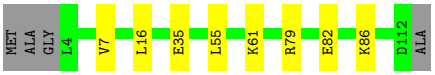
• Molecule 32: 60S ribosomal protein L30

Chain p:



• Molecule 33: 60S ribosomal protein L31-A

Chain q:



• Molecule 34: 60S ribosomal protein L32

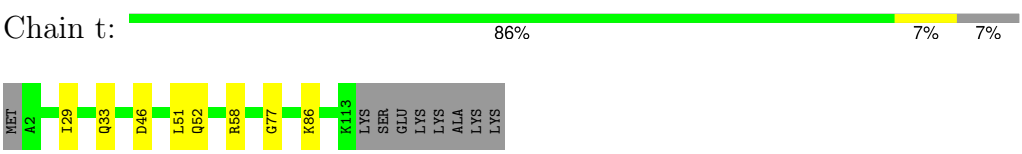
Chain r:

• Molecule 35: 60S ribosomal protein L33-A

Chain s:

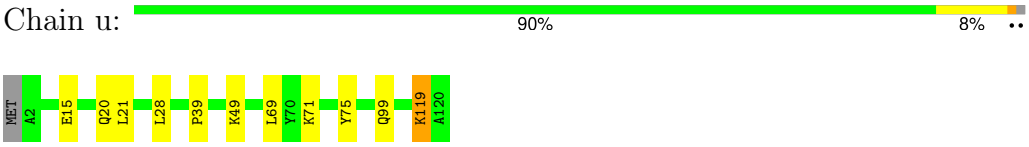
• Molecule 36: 60S ribosomal protein L34-A

Chain t:



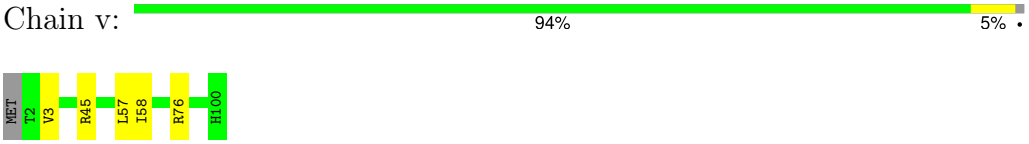
• Molecule 37: 60S ribosomal protein L35-A

Chain u:



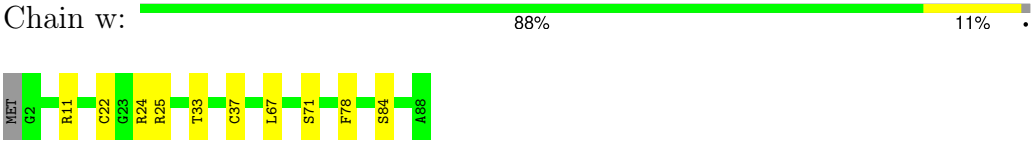
• Molecule 38: 60S ribosomal protein L36-A

Chain v:



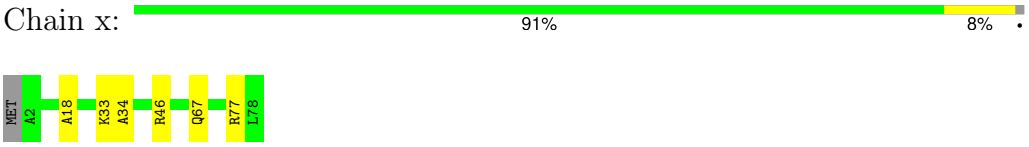
• Molecule 39: 60S ribosomal protein L37-A

Chain w:



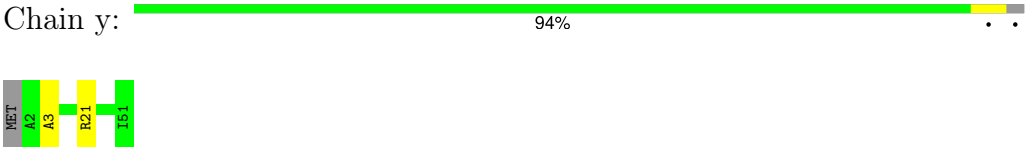
• Molecule 40: 60S ribosomal protein L38

Chain x:



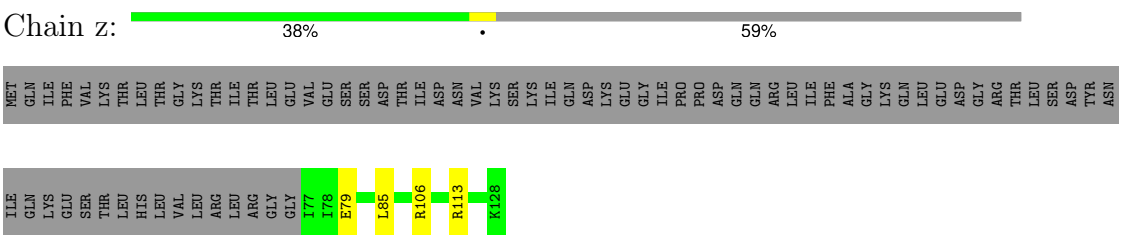
• Molecule 41: 60S ribosomal protein L39

Chain y:



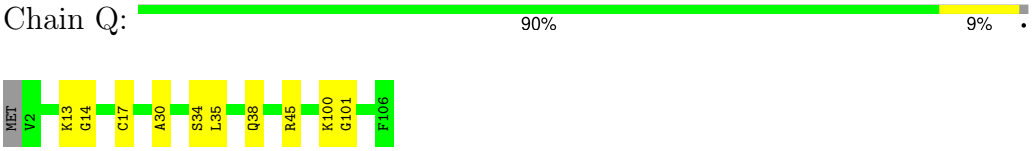
• Molecule 42: Ubiquitin-60S ribosomal protein L40

Chain z:



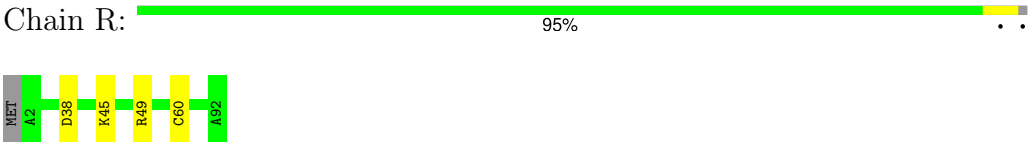
• Molecule 43: 60S ribosomal protein L42-A

Chain Q:



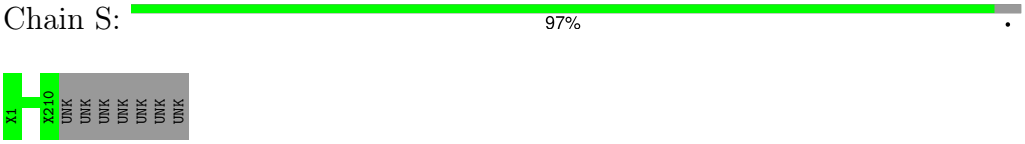
• Molecule 44: 60S ribosomal protein L43-A

Chain R:



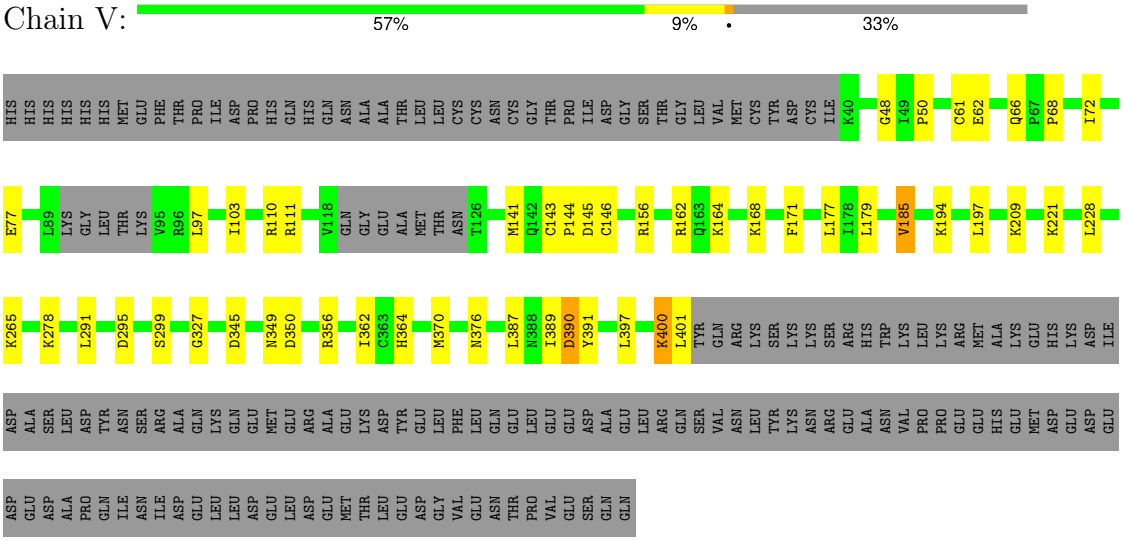
• Molecule 45: Ribosomal Protein uL1

Chain S:



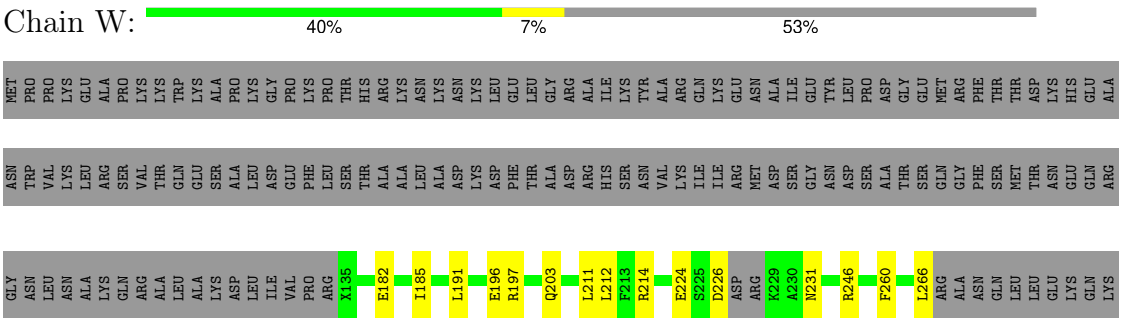
• Molecule 46: 60S ribosomal export protein NMD3

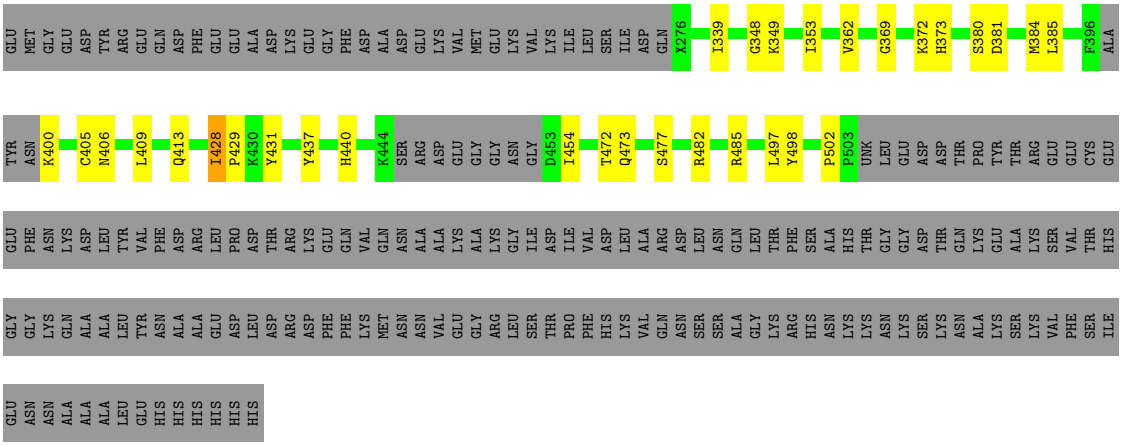
Chain V:



• Molecule 47: Large subunit GTPase 1

Chain W:




GLU MET GLY GLU ASP TYR ARG GLU GLN ASP PHE GLU GLU ALA ASP LYS GLU GLY PHE ASP ALA ASP GLU LYS VAL LYS VAL MET GLU LYS VAL LYS ILE LEU SER ILE ASP GLN X276 I339 G348 K349 I353 V362 G369 K372 H373 S380 D381 M384 L385 F396 ALA
TYR ASN K400 C405 N406 L409 Q413 I428 P429 K430 Y431 Y437 H440 K444 SER ARG ASP GLU GLY GLY ASN GLY D453 I454 T472 Q473 S477 R482 R485 L497 Y498 P502 P503 UNK LEU GLU ASP ASP THR PRO TYR THR ARG GLU GLU CYS GLU
GLU PHE ASN LYS ASP LEU TYR VAL PHE ASP ARG LEU PRO ASP THR ARG LYS GLU GLN VAL GLN ASN ALA ALA LYS ALA LYS GLY ILE ASP ILE VAL ASP LEU ALA ARG ASP LEU ASN GLN LEU THR PHE SER ALA HIS THR GLY GLY ASP THR GLN LYS GLU ALA LYS SER VAL THR HIS
GLY GLY LYS GLN ALA ALA LEU TYR ASN ALA ALA GLU ASP LEU ASP ARG ASP PHE PHE LYS MET ASN ASN VAL GLU GLY ARG LEU SER THR PRO PHE HIS LYS VAL GLN ASN SER SER ALA GLY LYS ARG HIS ASN LYS LYS ASN LYS SER LYS ASN ALA LYS SER LYS VAL PHE SER ILE
GLU ASN ASN ALA ALA LEU GLU HIS HIS HIS HIS HIS HIS

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, POINT	Depositor
Number of particles used	226516, 19411	Depositor
Resolution determination method	FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION, PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TECNAI F30, FEI TITAN KRIOS	Depositor
Voltage (kV)	300, 300	Depositor
Electron dose ($e^-/Å^2$)	40, 59.5	Depositor
Minimum defocus (nm)	1500, Not provided	Depositor
Maximum defocus (nm)	4000, Not provided	Depositor
Magnification	31000, Not provided	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k), GATAN K2 SUMMIT (4k x 4k)	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: PSU, GNP, K, MG

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|>5$	RMSZ	#$\|Z\|>5$
1	X	0.40	0/1653	0.55	0/2255
2	A	0.28	0/76629	0.70	3/119475 (0.0%)
3	B	0.26	0/2883	0.68	0/4491
4	C	0.29	0/3746	0.71	0/5832
5	D	0.41	0/1948	0.68	0/2617
6	E	0.42	0/3146	0.66	0/4228
7	F	0.39	0/2800	0.65	0/3790
8	G	0.41	0/2425	0.62	1/3271 (0.0%)
9	H	0.39	0/1260	0.59	0/1694
10	I	0.43	0/1821	0.63	0/2451
11	J	0.41	0/1836	0.58	0/2481
12	K	0.40	0/1539	0.60	0/2073
13	L	0.41	0/1741	0.61	0/2335
14	M	0.41	0/1374	0.65	0/1842
15	N	0.44	0/1568	0.69	0/2106
16	O	0.38	0/1068	0.61	0/1438
17	a	0.43	0/1757	0.74	0/2354
18	b	0.42	0/1585	0.61	0/2128
19	c	0.40	0/1443	0.66	0/1944
20	d	0.40	0/1465	0.72	0/1965
21	e	0.40	0/1538	0.67	0/2050
22	f	0.41	0/1481	0.64	0/1990
23	g	0.40	0/1300	0.62	0/1743
24	h	0.41	0/812	0.52	0/1099
25	i	0.40	0/1018	0.64	0/1369
26	j	0.41	0/712	0.59	0/958
27	k	0.39	0/979	0.59	0/1321
28	l	0.38	0/1004	0.64	0/1341
29	m	0.39	0/1118	0.56	0/1497
30	n	0.40	0/1204	0.67	0/1612
31	o	0.39	0/473	0.67	0/629
32	p	0.40	0/751	0.55	0/1008

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
33	q	0.39	0/890	0.64	0/1196
34	r	0.39	0/1041	0.67	0/1394
35	s	0.39	0/868	0.69	0/1168
36	t	0.40	0/890	0.71	0/1189
37	u	0.41	0/978	0.65	0/1301
38	v	0.42	0/778	0.62	0/1034
39	w	0.49	0/696	0.81	1/923 (0.1%)
40	x	0.40	0/618	0.57	0/826
41	y	0.41	0/443	0.73	0/588
42	z	0.39	0/423	0.64	0/562
43	Q	0.42	0/860	0.64	0/1136
44	R	0.45	0/701	0.71	0/934
46	V	0.41	0/2766	0.67	2/3759 (0.1%)
47	W	0.46	0/1950	0.68	1/2640 (0.0%)
All	All	0.34	0/139979	0.68	8/206037 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
11	J	0	1
30	n	0	1
31	o	0	1
All	All	0	3

There are no bond length outliers.

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
46	V	143	CYS	C-N-CD	-10.95	96.51	120.60
47	W	369	GLY	N-CA-C	6.68	129.79	113.10
46	V	50	PRO	N-CA-CB	5.54	109.94	103.30
2	A	599	C	C2'-C3'-O3'	5.33	122.23	113.70
2	A	979	U	C2'-C3'-O3'	5.25	122.10	113.70
2	A	3078	U	C4'-C3'-O3'	5.08	123.17	113.00
8	G	131	LEU	CA-CB-CG	5.05	126.91	115.30
39	w	11	ARG	NE-CZ-NH1	5.01	122.81	120.30

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
11	J	76	ALA	Peptide
30	n	46	ASP	Peptide
31	o	4	SER	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	
1	X	222/264 (84%)	202 (91%)	20 (9%)	0	100	100
5	D	250/254 (98%)	226 (90%)	22 (9%)	2 (1%)	16	48
6	E	384/387 (99%)	346 (90%)	31 (8%)	7 (2%)	7	29
7	F	359/362 (99%)	311 (87%)	32 (9%)	16 (4%)	2	12
8	G	294/297 (99%)	265 (90%)	25 (8%)	4 (1%)	9	34
9	H	152/176 (86%)	133 (88%)	16 (10%)	3 (2%)	6	26
10	I	220/244 (90%)	200 (91%)	14 (6%)	6 (3%)	4	21
11	J	231/256 (90%)	207 (90%)	17 (7%)	7 (3%)	3	19
12	K	189/191 (99%)	169 (89%)	17 (9%)	3 (2%)	8	31
13	L	207/221 (94%)	186 (90%)	16 (8%)	5 (2%)	5	22
14	M	167/174 (96%)	143 (86%)	19 (11%)	5 (3%)	3	19
15	N	191/199 (96%)	168 (88%)	18 (9%)	5 (3%)	4	21
16	O	134/138 (97%)	119 (89%)	10 (8%)	5 (4%)	2	16
17	a	201/204 (98%)	188 (94%)	11 (6%)	2 (1%)	13	42
18	b	195/199 (98%)	184 (94%)	11 (6%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
19	c	181/184 (98%)	163 (90%)	17 (9%)	1 (1%)	22 53
20	d	183/186 (98%)	162 (88%)	18 (10%)	3 (2%)	8 31
21	e	186/189 (98%)	173 (93%)	9 (5%)	4 (2%)	5 24
22	f	170/172 (99%)	156 (92%)	11 (6%)	3 (2%)	7 29
23	g	157/160 (98%)	141 (90%)	13 (8%)	3 (2%)	6 27
24	h	98/121 (81%)	79 (81%)	17 (17%)	2 (2%)	6 26
25	i	134/137 (98%)	124 (92%)	9 (7%)	1 (1%)	19 51
26	j	96/155 (62%)	81 (84%)	12 (12%)	3 (3%)	3 19
27	k	119/142 (84%)	107 (90%)	11 (9%)	1 (1%)	16 48
28	l	124/127 (98%)	115 (93%)	7 (6%)	2 (2%)	8 31
29	m	133/136 (98%)	111 (84%)	18 (14%)	4 (3%)	3 19
30	n	146/149 (98%)	126 (86%)	13 (9%)	7 (5%)	2 11
31	o	56/59 (95%)	48 (86%)	5 (9%)	3 (5%)	1 9
32	p	95/105 (90%)	88 (93%)	7 (7%)	0	100 100
33	q	107/113 (95%)	98 (92%)	6 (6%)	3 (3%)	4 20
34	r	125/130 (96%)	121 (97%)	3 (2%)	1 (1%)	16 48
35	s	104/107 (97%)	95 (91%)	7 (7%)	2 (2%)	6 27
36	t	110/121 (91%)	102 (93%)	6 (6%)	2 (2%)	7 29
37	u	117/120 (98%)	109 (93%)	4 (3%)	4 (3%)	3 17
38	v	97/100 (97%)	88 (91%)	8 (8%)	1 (1%)	13 42
39	w	85/88 (97%)	77 (91%)	6 (7%)	2 (2%)	5 22
40	x	75/78 (96%)	67 (89%)	5 (7%)	3 (4%)	2 14
41	y	48/51 (94%)	44 (92%)	3 (6%)	1 (2%)	5 25
42	z	50/128 (39%)	47 (94%)	2 (4%)	1 (2%)	6 26
43	Q	103/106 (97%)	88 (85%)	10 (10%)	5 (5%)	2 11
44	R	89/92 (97%)	83 (93%)	6 (7%)	0	100 100
46	V	344/524 (66%)	302 (88%)	27 (8%)	15 (4%)	2 12
47	W	231/651 (36%)	198 (86%)	25 (11%)	8 (4%)	3 16
All	All	6959/7997 (87%)	6240 (90%)	564 (8%)	155 (2%)	8 24

All (155) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
6	E	351	LEU
10	I	159	GLN
11	J	157	VAL
15	N	47	ALA
17	a	184	LYS
21	e	131	ALA
23	g	124	VAL
26	j	81	PRO
30	n	78	LEU
33	q	61	LYS
43	Q	30	ALA
46	V	72	ILE
46	V	97	LEU
46	V	110	ARG
46	V	144	PRO
46	V	185	VAL
46	V	389	ILE
46	V	400	LYS
47	W	348	GLY
47	W	498	TYR
6	E	187	SER
6	E	347	SER
6	E	348	ARG
7	F	182	LEU
7	F	269	SER
7	F	293	SER
7	F	305	ALA
10	I	178	ILE
14	M	10	ARG
14	M	95	ASN
14	M	114	ILE
15	N	76	THR
16	O	8	LYS
16	O	29	ALA
20	d	41	ASP
20	d	98	LYS
26	j	97	LYS
28	l	84	LYS
30	n	66	ALA
35	s	88	ASN
36	t	77	GLY
46	V	77	GLU
46	V	390	ASP

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Mol	Chain	Res	Type
47	W	454	ILE
7	F	140	HIS
7	F	173	GLY
7	F	232	SER
7	F	233	LEU
7	F	268	ALA
8	G	259	LYS
8	G	260	PHE
10	I	158	LYS
11	J	25	PRO
11	J	36	ILE
15	N	166	ALA
22	f	167	ARG
23	g	159	PHE
31	o	25	LYS
35	s	91	ALA
37	u	39	PRO
38	v	3	VAL
40	x	18	ALA
43	Q	34	SER
46	V	62	GLU
46	V	194	LYS
47	W	380	SER
47	W	502	PRO
5	D	144	ASN
7	F	292	SER
7	F	311	HIS
8	G	253	PHE
9	H	5	LYS
11	J	39	ALA
11	J	79	GLN
11	J	125	ALA
12	K	2	LYS
12	K	22	SER
12	K	110	LYS
13	L	24	ARG
13	L	116	ARG
13	L	218	ALA
14	M	117	ASP
15	N	66	ASN
16	O	9	ALA
19	c	156	ALA

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Mol	Chain	Res	Type
20	d	162	ALA
21	e	53	LYS
22	f	24	LEU
27	k	50	ALA
28	l	126	LEU
29	m	59	ALA
30	n	56	VAL
30	n	117	ARG
31	o	29	TYR
33	q	82	GLU
34	r	12	LYS
37	u	75	TYR
40	x	33	LYS
40	x	34	ALA
41	y	3	ALA
42	z	79	GLU
43	Q	17	CYS
46	V	349	ASN
47	W	381	ASP
47	W	428	ILE
5	D	125	ALA
6	E	155	ALA
7	F	5	GLN
9	H	151	LYS
10	I	25	GLN
14	M	108	GLU
15	N	75	PHE
17	a	94	TYR
21	e	178	ALA
22	f	22	PRO
24	h	11	ILE
29	m	17	ARG
30	n	47	LYS
31	o	21	ILE
37	u	99	GLN
37	u	119	LYS
39	w	78	PHE
46	V	68	PRO
6	E	317	ILE
7	F	131	VAL
7	F	317	PRO
7	F	339	LEU

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Mol	Chain	Res	Type
8	G	125	VAL
10	I	26	VAL
29	m	124	ALA
30	n	15	VAL
33	q	7	VAL
36	t	46	ASP
39	w	84	SER
47	W	429	PRO
6	E	141	GLY
11	J	164	VAL
24	h	60	GLY
25	i	3	GLY
46	V	327	GLY
7	F	340	GLY
13	L	114	GLY
26	j	80	ARG
46	V	48	GLY
9	H	98	VAL
21	e	129	GLY
29	m	125	GLY
10	I	191	VAL
13	L	194	GLY
16	O	6	ILE
16	O	52	GLY
30	n	116	GLY
43	Q	14	GLY
23	g	126	VAL
43	Q	101	GLY

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	X	177/227 (78%)	175 (99%)	2 (1%)	70 84
5	D	193/196 (98%)	181 (94%)	12 (6%)	15 43
6	E	320/323 (99%)	300 (94%)	20 (6%)	15 42

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
7	F	288/289 (100%)	276 (96%)	12 (4%)	25	56
8	G	244/245 (100%)	231 (95%)	13 (5%)	19	48
9	H	134/153 (88%)	130 (97%)	4 (3%)	36	64
10	I	186/205 (91%)	177 (95%)	9 (5%)	21	51
11	J	187/208 (90%)	171 (91%)	16 (9%)	8	31
12	K	171/171 (100%)	157 (92%)	14 (8%)	9	33
13	L	177/187 (95%)	161 (91%)	16 (9%)	8	29
14	M	147/150 (98%)	139 (95%)	8 (5%)	18	47
15	N	154/159 (97%)	141 (92%)	13 (8%)	9	32
16	O	107/109 (98%)	100 (94%)	7 (6%)	14	41
17	a	175/176 (99%)	167 (95%)	8 (5%)	23	52
18	b	160/162 (99%)	154 (96%)	6 (4%)	28	59
19	c	140/146 (96%)	130 (93%)	10 (7%)	12	39
20	d	150/151 (99%)	144 (96%)	6 (4%)	27	58
21	e	153/154 (99%)	146 (95%)	7 (5%)	23	52
22	f	156/156 (100%)	145 (93%)	11 (7%)	12	39
23	g	136/137 (99%)	125 (92%)	11 (8%)	9	33
24	h	87/107 (81%)	85 (98%)	2 (2%)	45	70
25	i	104/105 (99%)	101 (97%)	3 (3%)	37	65
26	j	57/129 (44%)	57 (100%)	0	100	100
27	k	104/118 (88%)	96 (92%)	8 (8%)	10	35
28	l	109/110 (99%)	102 (94%)	7 (6%)	14	42
29	m	115/116 (99%)	109 (95%)	6 (5%)	19	48
30	n	118/119 (99%)	108 (92%)	10 (8%)	8	32
31	o	46/47 (98%)	43 (94%)	3 (6%)	14	41
32	p	81/88 (92%)	78 (96%)	3 (4%)	29	59
33	q	92/97 (95%)	87 (95%)	5 (5%)	18	47
34	r	109/111 (98%)	101 (93%)	8 (7%)	11	37
35	s	90/91 (99%)	83 (92%)	7 (8%)	10	35
36	t	95/103 (92%)	89 (94%)	6 (6%)	15	42
37	u	104/105 (99%)	96 (92%)	8 (8%)	10	35

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
38	v	81/82 (99%)	77 (95%)	4 (5%)	21 51
39	w	70/71 (99%)	63 (90%)	7 (10%)	6 24
40	x	68/69 (99%)	65 (96%)	3 (4%)	24 54
41	y	45/46 (98%)	44 (98%)	1 (2%)	47 71
42	z	47/116 (40%)	44 (94%)	3 (6%)	14 42
43	Q	90/91 (99%)	85 (94%)	5 (6%)	17 46
44	R	71/72 (99%)	67 (94%)	4 (6%)	17 46
46	V	291/473 (62%)	254 (87%)	37 (13%)	3 15
47	W	209/502 (42%)	171 (82%)	38 (18%)	1 6
All	All	5838/6672 (88%)	5455 (93%)	383 (7%)	16 41

All (383) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	X	74	THR
1	X	99	GLU
5	D	23	ARG
5	D	48	ILE
5	D	52	SER
5	D	116	VAL
5	D	122	ASP
5	D	128	ARG
5	D	160	SER
5	D	207	VAL
5	D	223	SER
5	D	227	ARG
5	D	230	VAL
5	D	246	LEU
6	E	10	ARG
6	E	25	ILE
6	E	74	GLU
6	E	84	VAL
6	E	85	VAL
6	E	103	THR
6	E	162	VAL
6	E	169	THR
6	E	211	GLN
6	E	235	THR
6	E	238	LEU

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Mol	Chain	Res	Type
6	E	242	THR
6	E	252	ILE
6	E	296	THR
6	E	305	ILE
6	E	318	LYS
6	E	328	ILE
6	E	331	ASN
6	E	332	ARG
6	E	382	THR
7	F	43	ASN
7	F	67	THR
7	F	69	ARG
7	F	74	ILE
7	F	99	MET
7	F	114	ASN
7	F	179	LEU
7	F	187	LEU
7	F	300	ARG
7	F	304	GLN
7	F	307	GLN
7	F	327	LEU
8	G	22	ARG
8	G	23	ARG
8	G	35	ARG
8	G	92	LEU
8	G	95	TRP
8	G	105	ILE
8	G	112	LYS
8	G	131	LEU
8	G	151	GLN
8	G	211	LEU
8	G	244	HIS
8	G	259	LYS
8	G	273	ARG
9	H	34	LEU
9	H	65	ILE
9	H	77	ARG
9	H	134	ARG
10	I	64	GLN
10	I	82	LYS
10	I	83	LEU
10	I	88	ARG

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Mol	Chain	Res	Type
10	I	92	ILE
10	I	157	ASN
10	I	179	LEU
10	I	218	ARG
10	I	239	LEU
11	J	38	GLN
11	J	41	GLN
11	J	57	ARG
11	J	61	GLN
11	J	63	LYS
11	J	65	LEU
11	J	92	LYS
11	J	136	LEU
11	J	169	LEU
11	J	190	VAL
11	J	194	THR
11	J	204	ARG
11	J	224	ASP
11	J	232	HIS
11	J	248	LYS
11	J	254	ASP
12	K	5	GLN
12	K	21	LYS
12	K	23	ARG
12	K	41	ILE
12	K	49	ASN
12	K	69	ARG
12	K	76	ASP
12	K	118	LEU
12	K	139	ASN
12	K	151	VAL
12	K	161	LEU
12	K	162	GLN
12	K	164	ILE
12	K	166	ARG
13	L	7	ARG
13	L	30	LYS
13	L	33	ILE
13	L	40	LYS
13	L	52	LEU
13	L	63	GLU
13	L	102	MET

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Mol	Chain	Res	Type
13	L	115	MET
13	L	116	ARG
13	L	163	GLN
13	L	165	ILE
13	L	169	LYS
13	L	185	ARG
13	L	201	SER
13	L	203	LYS
13	L	208	ASN
14	M	10	ARG
14	M	12	LEU
14	M	40	LEU
14	M	81	GLU
14	M	94	ARG
14	M	107	ASP
14	M	115	LYS
14	M	140	ARG
15	N	17	HIS
15	N	24	VAL
15	N	55	ARG
15	N	67	ARG
15	N	69	VAL
15	N	76	THR
15	N	101	ARG
15	N	124	ILE
15	N	136	GLU
15	N	168	ARG
15	N	176	GLU
15	N	188	ARG
15	N	190	LYS
16	O	12	TRP
16	O	50	LYS
16	O	68	LEU
16	O	72	LEU
16	O	91	CYS
16	O	108	ARG
16	O	125	LYS
17	a	24	ARG
17	a	50	ARG
17	a	80	THR
17	a	98	LEU
17	a	106	VAL

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Mol	Chain	Res	Type
17	a	117	ASN
17	a	133	ILE
17	a	175	ASN
18	b	22	VAL
18	b	34	VAL
18	b	37	ARG
18	b	78	ARG
18	b	125	ARG
18	b	155	LYS
19	c	24	VAL
19	c	53	ASP
19	c	55	GLN
19	c	78	VAL
19	c	119	VAL
19	c	120	ASN
19	c	125	GLN
19	c	126	ARG
19	c	127	ARG
19	c	180	LYS
20	d	39	ARG
20	d	49	LEU
20	d	69	ARG
20	d	135	GLN
20	d	145	ASN
20	d	150	VAL
21	e	10	LEU
21	e	17	VAL
21	e	36	ASN
21	e	44	LEU
21	e	74	ARG
21	e	99	LEU
21	e	138	LEU
22	f	51	VAL
22	f	58	ILE
22	f	61	ILE
22	f	71	LYS
22	f	82	ASP
22	f	87	THR
22	f	93	GLU
22	f	134	ASP
22	f	137	ARG
22	f	155	ARG

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Mol	Chain	Res	Type
22	f	172	TYR
23	g	12	ARG
23	g	32	LYS
23	g	75	ILE
23	g	79	MET
23	g	88	ARG
23	g	96	ILE
23	g	102	ARG
23	g	126	VAL
23	g	127	GLN
23	g	128	LEU
23	g	139	ARG
24	h	10	LYS
24	h	70	LYS
25	i	33	ASN
25	i	83	LYS
25	i	88	ARG
27	k	61	LYS
27	k	63	ILE
27	k	70	GLU
27	k	115	ARG
27	k	133	LEU
27	k	135	ILE
27	k	137	ASN
27	k	142	ILE
28	l	4	GLN
28	l	13	ARG
28	l	37	LYS
28	l	50	ILE
28	l	53	ASP
28	l	74	TYR
28	l	126	LEU
29	m	14	VAL
29	m	17	ARG
29	m	34	LYS
29	m	120	GLU
29	m	121	ARG
29	m	126	LYS
30	n	4	ARG
30	n	7	LYS
30	n	10	LYS
30	n	34	MET

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Mol	Chain	Res	Type
30	n	42	ARG
30	n	60	TYR
30	n	78	LEU
30	n	115	LYS
30	n	120	ASN
30	n	130	VAL
31	o	22	LYS
31	o	25	LYS
31	o	59	LYS
32	p	40	LYS
32	p	61	MET
32	p	83	LYS
33	q	16	LEU
33	q	35	GLU
33	q	55	LEU
33	q	79	ARG
33	q	86	LYS
34	r	19	ARG
34	r	33	ARG
34	r	47	ARG
34	r	73	THR
34	r	75	LEU
34	r	87	MET
34	r	125	ARG
34	r	128	LEU
35	s	31	LYS
35	s	59	VAL
35	s	70	LYS
35	s	73	ARG
35	s	81	VAL
35	s	86	ARG
35	s	98	VAL
36	t	29	ILE
36	t	33	GLN
36	t	51	LEU
36	t	52	GLN
36	t	58	ARG
36	t	86	LYS
37	u	15	GLU
37	u	20	GLN
37	u	21	LEU
37	u	28	LEU

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Mol	Chain	Res	Type
37	u	49	LYS
37	u	69	LEU
37	u	71	LYS
37	u	119	LYS
38	v	45	ARG
38	v	57	LEU
38	v	58	ILE
38	v	76	ARG
39	w	22	CYS
39	w	24	ARG
39	w	25	ARG
39	w	33	THR
39	w	37	CYS
39	w	67	LEU
39	w	71	SER
40	x	46	ARG
40	x	67	GLN
40	x	77	ARG
41	y	21	ARG
42	z	85	LEU
42	z	106	ARG
42	z	113	ARG
43	Q	13	LYS
43	Q	35	LEU
43	Q	38	GLN
43	Q	45	ARG
43	Q	100	LYS
44	R	38	ASP
44	R	45	LYS
44	R	49	ARG
44	R	60	CYS
46	V	61	CYS
46	V	66	GLN
46	V	103	ILE
46	V	111	ARG
46	V	141	MET
46	V	145	ASP
46	V	146	CYS
46	V	156	ARG
46	V	162	ARG
46	V	164	LYS
46	V	168	LYS

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Mol	Chain	Res	Type
46	V	171	PHE
46	V	177	LEU
46	V	179	LEU
46	V	185	VAL
46	V	197	LEU
46	V	209	LYS
46	V	221	LYS
46	V	228	LEU
46	V	265	LYS
46	V	278	LYS
46	V	291	LEU
46	V	295	ASP
46	V	299	SER
46	V	345	ASP
46	V	350	ASP
46	V	356	ARG
46	V	362	ILE
46	V	364	HIS
46	V	370	MET
46	V	376	ASN
46	V	387	LEU
46	V	390	ASP
46	V	391	TYR
46	V	397	LEU
46	V	400	LYS
46	V	401	LEU
47	W	182	GLU
47	W	185	ILE
47	W	191	LEU
47	W	196	GLU
47	W	197	ARG
47	W	203	GLN
47	W	211	LEU
47	W	212	LEU
47	W	214	ARG
47	W	224	GLU
47	W	226	ASP
47	W	231	ASN
47	W	246	ARG
47	W	260	PHE
47	W	266	LEU
47	W	339	ILE

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Mol	Chain	Res	Type
47	W	349	LYS
47	W	353	ILE
47	W	362	VAL
47	W	372	LYS
47	W	373	HIS
47	W	384	MET
47	W	385	LEU
47	W	400	LYS
47	W	405	CYS
47	W	406	ASN
47	W	409	LEU
47	W	413	GLN
47	W	428	ILE
47	W	431	TYR
47	W	437	TYR
47	W	440	HIS
47	W	472	THR
47	W	473	GLN
47	W	477	SER
47	W	482	ARG
47	W	485	ARG
47	W	497	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (38) such sidechains are listed below:

Mol	Chain	Res	Type
5	D	209	HIS
6	E	182	GLN
6	E	184	ASN
6	E	319	ASN
7	F	114	ASN
7	F	221	ASN
8	G	63	GLN
9	H	138	GLN
9	H	167	ASN
10	I	64	GLN
10	I	244	ASN
11	J	192	GLN
12	K	8	GLN
12	K	163	GLN
13	L	12	GLN
13	L	59	GLN

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Mol	Chain	Res	Type
13	L	95	HIS
15	N	137	GLN
18	b	31	GLN
19	c	120	ASN
19	c	125	GLN
20	d	9	GLN
20	d	73	GLN
20	d	145	ASN
29	m	57	HIS
33	q	57	GLN
37	u	68	GLN
37	u	104	GLN
37	u	108	GLN
40	x	67	GLN
46	V	163	GLN
46	V	231	GLN
47	W	209	ASN
47	W	375	GLN
47	W	440	HIS
47	W	442	GLN
47	W	473	GLN
47	W	500	ASN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
2	A	3201/3396 (94%)	839 (26%)	100 (3%)
3	B	120/121 (99%)	25 (20%)	3 (2%)
4	C	157/158 (99%)	39 (24%)	3 (1%)
All	All	3478/3675 (94%)	903 (25%)	106 (3%)

All (903) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
2	A	16	A
2	A	22	G
2	A	26	A
2	A	31	C
2	A	40	A
2	A	43	A
2	A	44	U

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Mol	Chain	Res	Type
2	A	48	A
2	A	49	A
2	A	59	G
2	A	60	A
2	A	65	A
2	A	66	A
2	A	67	A
2	A	78	U
2	A	79	U
2	A	83	U
2	A	92	G
2	A	99	A
2	A	105	C
2	A	109	A
2	A	110	G
2	A	111	C
2	A	116	A
2	A	122	A
2	A	123	A
2	A	127	G
2	A	131	C
2	A	136	G
2	A	137	G
2	A	156	G
2	A	157	A
2	A	160	G
2	A	161	G
2	A	162	G
2	A	166	C
2	A	167	U
2	A	168	U
2	A	170	G
2	A	171	G
2	A	173	G
2	A	175	C
2	A	182	U
2	A	190	U
2	A	191	U
2	A	192	C
2	A	193	C
2	A	206	G
2	A	210	U

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Mol	Chain	Res	Type
2	A	211	A
2	A	213	A
2	A	218	G
2	A	219	A
2	A	232	G
2	A	240	U
2	A	241	G
2	A	243	G
2	A	245	U
2	A	246	U
2	A	249	U
2	A	250	U
2	A	252	U
2	A	262	U
2	A	264	G
2	A	266	A
2	A	269	G
2	A	286	U
2	A	295	A
2	A	305	U
2	A	306	A
2	A	307	A
2	A	313	A
2	A	314	U
2	A	315	C
2	A	323	A
2	A	329	U
2	A	336	A
2	A	338	A
2	A	339	C
2	A	348	A
2	A	372	A
2	A	375	A
2	A	376	G
2	A	379	C
2	A	381	U
2	A	383	G
2	A	392	G
2	A	395	A
2	A	398	A
2	A	399	A
2	A	401	U

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Mol	Chain	Res	Type
2	A	402	A
2	A	403	C
2	A	404	G
2	A	415	G
2	A	420	G
2	A	421	G
2	A	422	A
2	A	429	U
2	A	433	A
2	A	439	C
2	A	440	A
2	A	495	G
2	A	503	C
2	A	507	U
2	A	510	G
2	A	511	G
2	A	519	A
2	A	520	U
2	A	521	A
2	A	523	A
2	A	526	C
2	A	529	A
2	A	532	A
2	A	534	U
2	A	536	U
2	A	541	U
2	A	543	C
2	A	546	C
2	A	547	G
2	A	548	G
2	A	549	U
2	A	551	A
2	A	553	U
2	A	555	U
2	A	556	U
2	A	557	A
2	A	559	A
2	A	560	G
2	A	578	A
2	A	579	G
2	A	588	G
2	A	589	A

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Mol	Chain	Res	Type
2	A	598	A
2	A	599	C
2	A	600	G
2	A	603	A
2	A	604	G
2	A	607	A
2	A	611	A
2	A	616	G
2	A	620	U
2	A	621	A
2	A	622	A
2	A	634	C
2	A	636	C
2	A	649	A
2	A	660	A
2	A	677	A
2	A	681	U
2	A	683	U
2	A	684	G
2	A	689	U
2	A	690	A
2	A	691	A
2	A	701	G
2	A	705	A
2	A	712	G
2	A	715	A
2	A	720	A
2	A	721	G
2	A	735	A
2	A	739	G
2	A	744	A
2	A	764	U
2	A	765	C
2	A	766	U
2	A	767	U
2	A	774	G
2	A	776	U
2	A	777	U
2	A	781	G
2	A	785	G
2	A	786	A
2	A	793	C

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Mol	Chain	Res	Type
2	A	799	G
2	A	801	A
2	A	806	A
2	A	811	U
2	A	816	A
2	A	817	A
2	A	825	U
2	A	826	G
2	A	827	A
2	A	830	A
2	A	832	G
2	A	841	A
2	A	848	A
2	A	849	C
2	A	861	C
2	A	869	G
2	A	874	U
2	A	879	U
2	A	880	G
2	A	884	A
2	A	894	G
2	A	896	A
2	A	897	U
2	A	907	G
2	A	908	G
2	A	911	C
2	A	914	A
2	A	916	G
2	A	917	A
2	A	921	A
2	A	923	C
2	A	924	G
2	A	925	A
2	A	937	G
2	A	939	U
2	A	941	G
2	A	944	C
2	A	959	C
2	A	960	U
2	A	961	C
2	A	978	G
2	A	979	U

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Mol	Chain	Res	Type
2	A	980	A
2	A	981	U
2	A	982	C
2	A	984	G
2	A	994	G
2	A	1001	G
2	A	1002	A
2	A	1006	A
2	A	1009	A
2	A	1010	G
2	A	1013	G
2	A	1015	U
2	A	1017	C
2	A	1018	G
2	A	1019	G
2	A	1024	G
2	A	1025	A
2	A	1026	A
2	A	1029	G
2	A	1030	A
2	A	1031	C
2	A	1036	A
2	A	1037	C
2	A	1040	A
2	A	1041	U
2	A	1047	A
2	A	1049	C
2	A	1051	U
2	A	1057	A
2	A	1063	G
2	A	1064	A
2	A	1065	A
2	A	1069	C
2	A	1071	U
2	A	1072	G
2	A	1081	U
2	A	1093	A
2	A	1094	U
2	A	1095	U
2	A	1097	G
2	A	1098	A
2	A	1099	A

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Mol	Chain	Res	Type
2	A	1103	A
2	A	1104	G
2	A	1117	G
2	A	1122	U
2	A	1124	U
2	A	1129	A
2	A	1131	G
2	A	1140	G
2	A	1145	G
2	A	1153	A
2	A	1157	G
2	A	1159	A
2	A	1178	G
2	A	1179	A
2	A	1180	A
2	A	1181	U
2	A	1190	A
2	A	1192	C
2	A	1200	A
2	A	1201	C
2	A	1208	U
2	A	1212	A
2	A	1213	G
2	A	1217	A
2	A	1219	C
2	A	1222	G
2	A	1223	A
2	A	1230	G
2	A	1232	C
2	A	1233	G
2	A	1236	G
2	A	1237	G
2	A	1240	A
2	A	1241	U
2	A	1242	G
2	A	1243	G
2	A	1244	A
2	A	1245	A
2	A	1246	G
2	A	1247	U
2	A	1248	C
2	A	1249	G

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Mol	Chain	Res	Type
2	A	1253	U
2	A	1257	C
2	A	1258	U
2	A	1262	G
2	A	1263	A
2	A	1264	G
2	A	1265	U
2	A	1267	U
2	A	1270	A
2	A	1271	A
2	A	1274	A
2	A	1276	U
2	A	1278	A
2	A	1279	C
2	A	1285	G
2	A	1287	A
2	A	1289	G
2	A	1291	A
2	A	1303	A
2	A	1305	U
2	A	1307	G
2	A	1309	U
2	A	1313	G
2	A	1315	U
2	A	1319	G
2	A	1325	U
2	A	1330	A
2	A	1334	U
2	A	1348	U
2	A	1349	G
2	A	1351	U
2	A	1352	A
2	A	1353	U
2	A	1356	U
2	A	1357	G
2	A	1364	C
2	A	1383	G
2	A	1386	A
2	A	1392	G
2	A	1393	A
2	A	1394	A
2	A	1399	A

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Mol	Chain	Res	Type
2	A	1400	G
2	A	1409	G
2	A	1414	G
2	A	1416	C
2	A	1419	A
2	A	1430	U
2	A	1434	G
2	A	1437	C
2	A	1446	A
2	A	1450	G
2	A	1455	U
2	A	1460	A
2	A	1466	G
2	A	1481	A
2	A	1482	A
2	A	1489	A
2	A	1496	C
2	A	1501	U
2	A	1503	A
2	A	1508	C
2	A	1521	G
2	A	1527	C
2	A	1531	C
2	A	1533	U
2	A	1536	G
2	A	1537	A
2	A	1547	G
2	A	1555	U
2	A	1556	C
2	A	1557	A
2	A	1560	G
2	A	1561	G
2	A	1562	C
2	A	1563	C
2	A	1564	U
2	A	1565	G
2	A	1566	A
2	A	1567	U
2	A	1568	U
2	A	1569	U
2	A	1570	U
2	A	1572	U

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Mol	Chain	Res	Type
2	A	1576	G
2	A	1577	G
2	A	1578	C
2	A	1579	C
2	A	1582	C
2	A	1583	A
2	A	1587	A
2	A	1589	A
2	A	1599	G
2	A	1605	A
2	A	1615	C
2	A	1619	A
2	A	1620	U
2	A	1623	G
2	A	1627	U
2	A	1628	C
2	A	1629	U
2	A	1630	U
2	A	1632	A
2	A	1642	A
2	A	1643	A
2	A	1645	U
2	A	1657	C
2	A	1658	G
2	A	1664	G
2	A	1666	G
2	A	1674	G
2	A	1678	G
2	A	1682	U
2	A	1683	A
2	A	1703	U
2	A	1716	U
2	A	1717	U
2	A	1724	U
2	A	1725	C
2	A	1733	G
2	A	1735	G
2	A	1741	A
2	A	1747	G
2	A	1749	A
2	A	1750	A
2	A	1751	G

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Mol	Chain	Res	Type
2	A	1760	A
2	A	1761	C
2	A	1765	U
2	A	1766	G
2	A	1770	G
2	A	1775	G
2	A	1780	G
2	A	1788	C
2	A	1790	G
2	A	1795	U
2	A	1797	A
2	A	1798	A
2	A	1803	C
2	A	1808	G
2	A	1812	G
2	A	1814	A
2	A	1815	U
2	A	1816	A
2	A	1817	G
2	A	1820	U
2	A	1821	U
2	A	1839	A
2	A	1841	A
2	A	1842	A
2	A	1845	G
2	A	1849	C
2	A	1850	A
2	A	1867	A
2	A	1871	U
2	A	1880	U
2	A	1886	A
2	A	1893	A
2	A	1895	A
2	A	1906	G
2	A	1908	A
2	A	1909	A
2	A	1917	C
2	A	1926	C
2	A	1930	A
2	A	1936	A
2	A	1951	C
2	A	1952	G

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Mol	Chain	Res	Type
2	A	1953	G
2	A	1954	G
2	A	2096	A
2	A	2100	A
2	A	2101	C
2	A	2102	U
2	A	2111	G
2	A	2113	A
2	A	2114	C
2	A	2118	C
2	A	2121	G
2	A	2122	G
2	A	2131	A
2	A	2140	U
2	A	2142	A
2	A	2158	A
2	A	2169	G
2	A	2185	G
2	A	2187	G
2	A	2192	C
2	A	2198	A
2	A	2205	U
2	A	2210	G
2	A	2221	G
2	A	2228	A
2	A	2239	G
2	A	2244	A
2	A	2246	G
2	A	2250	G
2	A	2253	G
2	A	2255	A
2	A	2256	A
2	A	2257	C
2	A	2258	PSU
2	A	2259	A
2	A	2262	A
2	A	2264	PSU
2	A	2266	PSU
2	A	2267	C
2	A	2268	U
2	A	2269	U
2	A	2270	A

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Mol	Chain	Res	Type
2	A	2273	G
2	A	2274	U
2	A	2281	A
2	A	2282	U
2	A	2288	G
2	A	2298	U
2	A	2307	G
2	A	2308	C
2	A	2310	U
2	A	2313	A
2	A	2314	U
2	A	2315	G
2	A	2332	A
2	A	2335	G
2	A	2336	U
2	A	2337	C
2	A	2372	A
2	A	2373	A
2	A	2374	C
2	A	2375	G
2	A	2379	U
2	A	2385	G
2	A	2388	U
2	A	2393	G
2	A	2397	A
2	A	2401	A
2	A	2402	A
2	A	2403	G
2	A	2404	A
2	A	2405	C
2	A	2407	C
2	A	2411	U
2	A	2412	G
2	A	2418	G
2	A	2419	A
2	A	2425	G
2	A	2428	U
2	A	2429	G
2	A	2434	U
2	A	2437	G
2	A	2440	G
2	A	2442	G

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Mol	Chain	Res	Type
2	A	2444	C
2	A	2445	A
2	A	2446	U
2	A	2449	A
2	A	2450	G
2	A	2451	G
2	A	2452	G
2	A	2453	U
2	A	2454	G
2	A	2455	U
2	A	2457	G
2	A	2458	A
2	A	2459	A
2	A	2461	A
2	A	2463	G
2	A	2464	U
2	A	2468	A
2	A	2470	C
2	A	2472	U
2	A	2473	C
2	A	2474	G
2	A	2475	G
2	A	2477	G
2	A	2479	C
2	A	2481	G
2	A	2482	U
2	A	2483	G
2	A	2485	A
2	A	2488	A
2	A	2491	A
2	A	2494	A
2	A	2495	C
2	A	2496	C
2	A	2497	U
2	A	2498	U
2	A	2501	U
2	A	2502	A
2	A	2505	U
2	A	2506	U
2	A	2508	U
2	A	2513	U
2	A	2514	U

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Mol	Chain	Res	Type
2	A	2515	A
2	A	2522	G
2	A	2531	C
2	A	2533	G
2	A	2537	U
2	A	2538	U
2	A	2539	C
2	A	2540	A
2	A	2541	U
2	A	2542	U
2	A	2543	U
2	A	2544	U
2	A	2547	A
2	A	2548	C
2	A	2549	G
2	A	2550	U
2	A	2552	C
2	A	2554	A
2	A	2555	G
2	A	2561	A
2	A	2562	A
2	A	2564	G
2	A	2565	U
2	A	2566	C
2	A	2569	A
2	A	2570	U
2	A	2571	U
2	A	2572	C
2	A	2573	G
2	A	2575	G
2	A	2577	C
2	A	2581	U
2	A	2585	G
2	A	2586	G
2	A	2593	A
2	A	2594	C
2	A	2602	G
2	A	2606	G
2	A	2607	G
2	A	2614	G
2	A	2621	G
2	A	2626	A

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Mol	Chain	Res	Type
2	A	2628	A
2	A	2635	A
2	A	2648	G
2	A	2652	U
2	A	2656	A
2	A	2657	A
2	A	2658	G
2	A	2674	A
2	A	2677	G
2	A	2681	U
2	A	2684	C
2	A	2689	A
2	A	2690	G
2	A	2691	A
2	A	2694	A
2	A	2696	A
2	A	2704	A
2	A	2709	C
2	A	2714	G
2	A	2719	U
2	A	2726	C
2	A	2727	A
2	A	2728	G
2	A	2734	A
2	A	2737	C
2	A	2753	G
2	A	2754	G
2	A	2755	C
2	A	2762	A
2	A	2772	C
2	A	2774	C
2	A	2777	G
2	A	2778	G
2	A	2780	A
2	A	2790	A
2	A	2792	A
2	A	2799	A
2	A	2800	G
2	A	2801	A
2	A	2803	A
2	A	2810	C
2	A	2816	G

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Mol	Chain	Res	Type
2	A	2817	A
2	A	2821	C
2	A	2837	A
2	A	2838	A
2	A	2842	U
2	A	2843	U
2	A	2844	C
2	A	2845	A
2	A	2848	G
2	A	2849	C
2	A	2860	U
2	A	2861	U
2	A	2867	C
2	A	2871	G
2	A	2872	A
2	A	2882	U
2	A	2887	A
2	A	2888	U
2	A	2896	A
2	A	2898	G
2	A	2899	C
2	A	2900	A
2	A	2914	G
2	A	2923	U
2	A	2928	C
2	A	2933	A
2	A	2935	U
2	A	2936	A
2	A	2938	G
2	A	2941	A
2	A	2942	C
2	A	2947	G
2	A	2951	G
2	A	2971	A
2	A	2975	U
2	A	2978	U
2	A	2979	U
2	A	2980	U
2	A	2983	C
2	A	2990	G
2	A	2996	U
2	A	2997	G

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Mol	Chain	Res	Type
2	A	2998	U
2	A	3004	C
2	A	3011	A
2	A	3012	A
2	A	3014	U
2	A	3022	G
2	A	3049	A
2	A	3056	U
2	A	3057	U
2	A	3058	U
2	A	3059	G
2	A	3070	A
2	A	3072	C
2	A	3078	U
2	A	3079	U
2	A	3086	A
2	A	3090	U
2	A	3092	C
2	A	3104	U
2	A	3109	G
2	A	3110	C
2	A	3114	A
2	A	3115	C
2	A	3117	C
2	A	3122	A
2	A	3125	U
2	A	3129	A
2	A	3130	A
2	A	3131	U
2	A	3133	C
2	A	3142	A
2	A	3143	C
2	A	3148	U
2	A	3153	U
2	A	3154	C
2	A	3155	U
2	A	3156	U
2	A	3157	U
2	A	3165	A
2	A	3168	A
2	A	3173	G
2	A	3174	A

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Mol	Chain	Res	Type
2	A	3176	G
2	A	3179	U
2	A	3181	C
2	A	3187	A
2	A	3188	G
2	A	3189	G
2	A	3191	G
2	A	3194	C
2	A	3196	U
2	A	3197	G
2	A	3200	G
2	A	3206	C
2	A	3207	U
2	A	3213	A
2	A	3217	C
2	A	3218	A
2	A	3219	G
2	A	3224	G
2	A	3226	A
2	A	3229	G
2	A	3232	G
2	A	3234	A
2	A	3238	G
2	A	3243	A
2	A	3245	A
2	A	3246	G
2	A	3247	G
2	A	3249	C
2	A	3259	U
2	A	3260	G
2	A	3261	C
2	A	3269	U
2	A	3270	U
2	A	3271	G
2	A	3273	A
2	A	3275	U
2	A	3276	G
2	A	3279	A
2	A	3280	U
2	A	3283	U
2	A	3286	G
2	A	3289	G

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Mol	Chain	Res	Type
2	A	3294	A
2	A	3295	A
2	A	3300	U
2	A	3304	U
2	A	3313	U
2	A	3316	A
2	A	3317	U
2	A	3318	G
2	A	3319	U
2	A	3320	A
2	A	3321	C
2	A	3324	C
2	A	3325	G
2	A	3328	G
2	A	3342	A
2	A	3345	G
2	A	3347	A
2	A	3350	C
2	A	3351	U
2	A	3352	U
2	A	3353	G
2	A	3354	U
2	A	3355	U
2	A	3356	G
2	A	3361	G
2	A	3367	C
2	A	3368	U
2	A	3369	G
2	A	3375	A
2	A	3378	C
2	A	3382	U
2	A	3383	G
2	A	3386	G
2	A	3390	G
3	B	10	C
3	B	20	A
3	B	22	A
3	B	38	U
3	B	42	A
3	B	49	G
3	B	53	U
3	B	54	U

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Mol	Chain	Res	Type
3	B	55	A
3	B	60	G
3	B	65	G
3	B	67	G
3	B	70	U
3	B	71	G
3	B	73	C
3	B	75	G
3	B	91	G
3	B	98	C
3	B	99	G
3	B	102	A
3	B	103	A
3	B	104	A
3	B	112	G
3	B	120	C
3	B	121	U
4	C	2	A
4	C	18	U
4	C	23	U
4	C	25	G
4	C	34	U
4	C	35	C
4	C	38	U
4	C	42	G
4	C	51	G
4	C	52	A
4	C	59	A
4	C	60	U
4	C	62	C
4	C	63	G
4	C	80	A
4	C	81	U
4	C	82	U
4	C	83	C
4	C	84	C
4	C	86	U
4	C	87	G
4	C	88	A
4	C	90	U
4	C	95	G
4	C	104	A

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Mol	Chain	Res	Type
4	C	105	A
4	C	106	C
4	C	111	A
4	C	113	U
4	C	116	G
4	C	125	U
4	C	126	A
4	C	129	C
4	C	138	A
4	C	144	G
4	C	151	C
4	C	152	G
4	C	155	A
4	C	158	U

All (106) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
2	A	65	A
2	A	66	A
2	A	78	U
2	A	116	A
2	A	169	U
2	A	239	G
2	A	285	A
2	A	518	G
2	A	547	G
2	A	558	U
2	A	588	G
2	A	594	U
2	A	599	C
2	A	816	A
2	A	896	A
2	A	916	G
2	A	937	G
2	A	960	U
2	A	978	G
2	A	979	U
2	A	993	G
2	A	1064	A
2	A	1097	G
2	A	1103	A

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Mol	Chain	Res	Type
2	A	1263	A
2	A	1308	A
2	A	1329	U
2	A	1352	A
2	A	1355	A
2	A	1391	C
2	A	1480	G
2	A	1482	A
2	A	1553	U
2	A	1554	U
2	A	1556	C
2	A	1562	C
2	A	1576	G
2	A	1643	A
2	A	1716	U
2	A	1795	U
2	A	1815	U
2	A	1816	A
2	A	1820	U
2	A	1841	A
2	A	2101	C
2	A	2112	U
2	A	2144	A
2	A	2157	G
2	A	2158	A
2	A	2209	U
2	A	2249	G
2	A	2258	PSU
2	A	2266	PSU
2	A	2269	U
2	A	2281	A
2	A	2335	G
2	A	2385	G
2	A	2404	A
2	A	2418	G
2	A	2434	U
2	A	2453	U
2	A	2495	C
2	A	2496	C
2	A	2501	U
2	A	2505	U
2	A	2513	U

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Mol	Chain	Res	Type
2	A	2537	U
2	A	2541	U
2	A	2585	G
2	A	2593	A
2	A	2627	C
2	A	2644	C
2	A	2655	U
2	A	2657	A
2	A	2727	A
2	A	2728	G
2	A	2754	G
2	A	2801	A
2	A	2803	A
2	A	2837	A
2	A	2843	U
2	A	2859	U
2	A	2950	G
2	A	2979	U
2	A	2983	C
2	A	3022	G
2	A	3048	A
2	A	3055	U
2	A	3056	U
2	A	3057	U
2	A	3078	U
2	A	3195	U
2	A	3218	A
2	A	3228	C
2	A	3269	U
2	A	3272	C
2	A	3317	U
2	A	3350	C
2	A	3351	U
2	A	3353	G
3	B	76	A
3	B	86	U
3	B	111	U
4	C	80	A
4	C	82	U
4	C	85	G

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

4 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	$\#\|Z\| > 2$
2	PSU	A	2258	2	18,21,22	1.40	2 (11%)	21,30,33	2.10	5 (23%)
2	PSU	A	2264	2	18,21,22	1.34	2 (11%)	21,30,33	2.14	6 (28%)
2	PSU	A	2260	2	18,21,22	1.36	2 (11%)	21,30,33	2.08	4 (19%)
2	PSU	A	2266	2	18,21,22	1.38	2 (11%)	21,30,33	2.13	5 (23%)

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
2	PSU	A	2258	2	-	2/7/25/26	0/2/2/2
2	PSU	A	2264	2	-	1/7/25/26	0/2/2/2
2	PSU	A	2260	2	-	0/7/25/26	0/2/2/2
2	PSU	A	2266	2	-	1/7/25/26	0/2/2/2

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	2264	PSU	C6-C5	3.26	1.38	1.35
2	A	2260	PSU	C6-C5	3.25	1.38	1.35
2	A	2258	PSU	C6-C5	3.25	1.38	1.35
2	A	2266	PSU	C6-C5	3.10	1.38	1.35
2	A	2260	PSU	C4-N3	-2.74	1.33	1.38
2	A	2258	PSU	C4-N3	-2.72	1.33	1.38
2	A	2264	PSU	C4-N3	-2.71	1.33	1.38
2	A	2266	PSU	C4-N3	-2.68	1.33	1.38

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	2260	PSU	N1-C2-N3	6.47	121.99	115.17
2	A	2258	PSU	N1-C2-N3	6.46	121.98	115.17
2	A	2266	PSU	N1-C2-N3	6.39	121.91	115.17
2	A	2264	PSU	N1-C2-N3	6.38	121.90	115.17
2	A	2258	PSU	C4-N3-C2	-4.27	120.48	126.37
2	A	2260	PSU	C4-N3-C2	-4.24	120.53	126.37
2	A	2266	PSU	C4-N3-C2	-4.11	120.70	126.37
2	A	2264	PSU	C4-N3-C2	-4.11	120.71	126.37
2	A	2266	PSU	O2-C2-N1	-3.80	118.87	122.79
2	A	2260	PSU	O2-C2-N1	-3.68	119.00	122.79
2	A	2264	PSU	O2-C2-N1	-3.61	119.07	122.79
2	A	2258	PSU	O2-C2-N1	-3.58	119.10	122.79
2	A	2258	PSU	C5-C6-N1	-2.39	118.83	122.14
2	A	2264	PSU	C3'-C2'-C1'	2.31	104.41	101.69
2	A	2260	PSU	C5-C6-N1	-2.24	119.04	122.14
2	A	2266	PSU	O3'-C3'-C4'	2.23	117.48	111.08
2	A	2264	PSU	C5-C6-N1	-2.22	119.06	122.14
2	A	2264	PSU	O3'-C3'-C4'	-2.16	104.88	111.08
2	A	2266	PSU	C5-C6-N1	-2.13	119.18	122.14
2	A	2258	PSU	O3'-C3'-C4'	2.12	117.17	111.08

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	2258	PSU	C3'-C4'-C5'-O5'
2	A	2258	PSU	O4'-C4'-C5'-O5'
2	A	2264	PSU	C2'-C1'-C5-C4
2	A	2266	PSU	O4'-C1'-C5-C4

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 163 ligands modelled in this entry, 162 are monoatomic - leaving 1 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	$\#\|Z\| > 2$
50	GNP	W	701	48	29,34,34	1.67	3 (10%)	33,54,54	1.85	7 (21%)

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
50	GNP	W	701	48	-	6/14/38/38	0/3/3/3

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
50	W	701	GNP	PG-N3B	4.46	1.75	1.63
50	W	701	GNP	PB-N3B	4.45	1.75	1.63
50	W	701	GNP	C5-C6	4.19	1.48	1.41

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
50	W	701	GNP	C2-N3-C4	5.24	121.14	115.48
50	W	701	GNP	C2-N1-C6	4.44	122.14	115.96
50	W	701	GNP	C5-C6-N1	-4.03	118.04	123.42
50	W	701	GNP	N3-C2-N1	-3.33	122.98	127.21
50	W	701	GNP	C4-C5-N7	-2.53	106.67	109.34
50	W	701	GNP	C4-C5-C6	-2.45	117.49	121.23
50	W	701	GNP	O1B-PB-N3B	-2.21	108.52	111.77

There are no chirality outliers.

All (6) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
50	W	701	GNP	PB-N3B-PG-O1G

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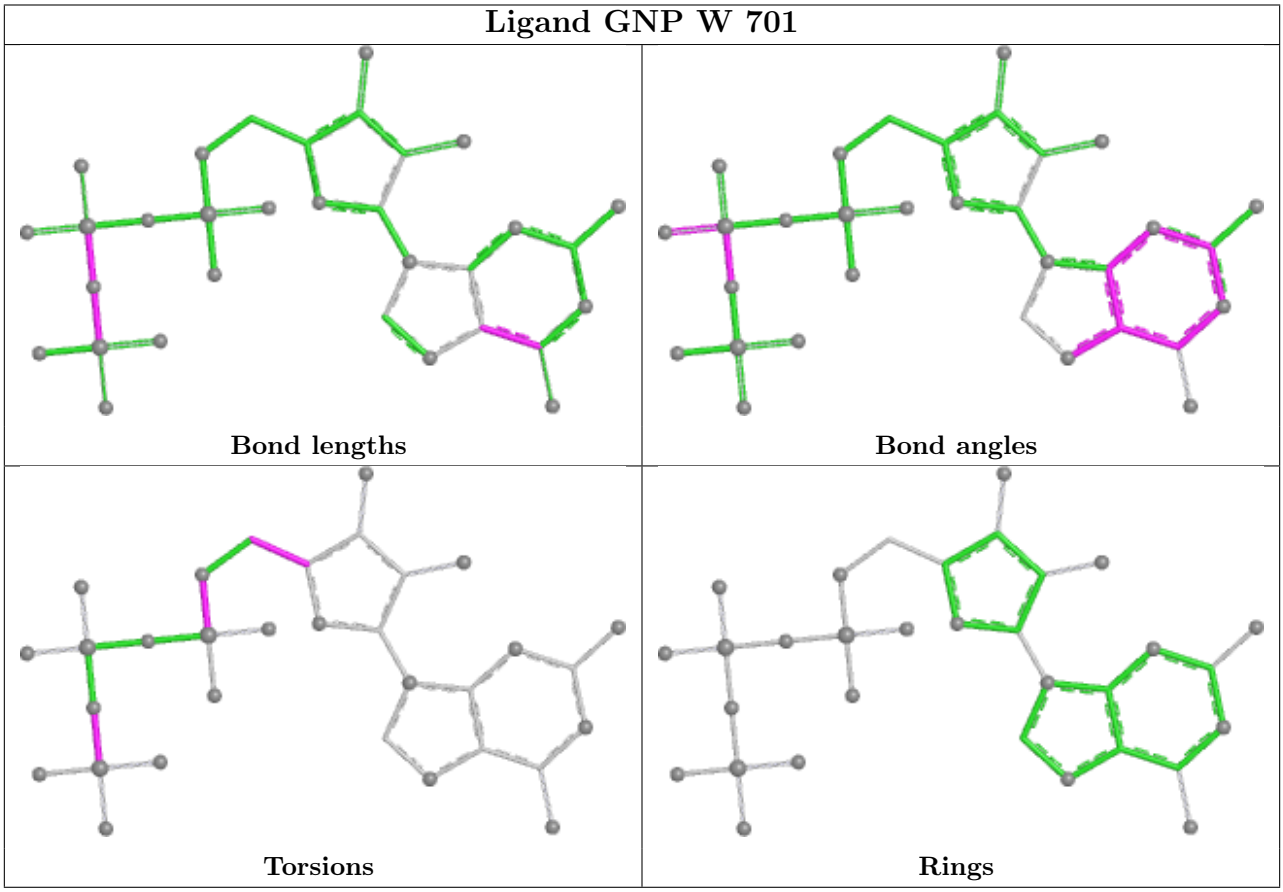
Mol	Chain	Res	Type	Atoms
50	W	701	GNP	C5'-O5'-PA-O3A
50	W	701	GNP	C5'-O5'-PA-O1A
50	W	701	GNP	C5'-O5'-PA-O2A
50	W	701	GNP	O4'-C4'-C5'-O5'
50	W	701	GNP	C3'-C4'-C5'-O5'

There are no ring outliers.

No monomer is involved in short contacts.

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



5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

The following chains have linkage breaks:

Mol	Chain	Number of breaks
47	W	2

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	W	175:UNK	C	180:PRO	N	16.95
1	W	299:UNK	C	337:ILE	N	5.51