



Full wwPDB EM Validation Report ⓘ

Nov 20, 2022 – 07:22 PM EST

PDB ID : 7MOQ
EMDB ID : EMD-23926
Title : The structure of the Tetrahymena thermophila outer dynein arm on doublet microtubule
Authors : Kubo, S.; Yang, S.K.; Ichikawa, M.; Bui, K.H.
Deposited on : 2021-05-03
Resolution : 8.00 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

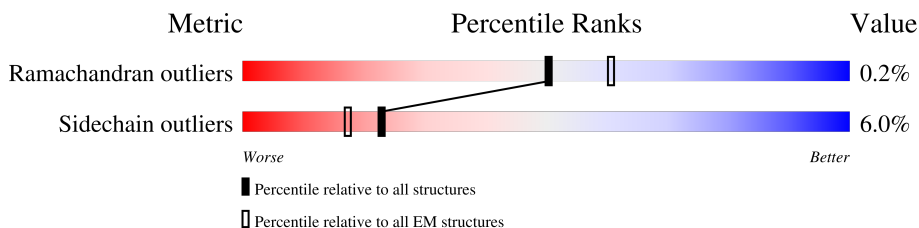
EMDB validation analysis : 0.0.1.dev43
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.31.2

1 Overall quality at a glance

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

The reported resolution of this entry is 8.00 Å.

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



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

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 $\leq 5\%$. 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	A	4168	8% 92%
2	B	4594	23% 87% 11%
3	C	4620	27% 89% 10%
4	D	667	50% 50%
4	d	667	19% 81%
5	E	670	9% 64% 35%
5	e	670	16% 84%
6	F	133	72% 26%
7	G	159	59% 40%


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Mol	Chain	Length	Quality of chain
8	H	92	91% 6% 8%
9	I	110	81% 19%
10	J	93	90% 9% 10%
11	K	111	86% 9% 14%
12	L	111	87% 18% 13%
13	M	87	99% 5%
14	N	132	83% 12% 17%
15	O	117	93% 26% 5%
16	P	110	93% 12% 6%
17	Q	443	79% 5% 15% 5%
17	U	443	79% 33% 15% 5%
17	Y	443	79% 44% 15% 5%
17	q	443	79% 9% 15% 5%
17	u	443	79% 63% 15% 5%
17	y	443	79% 79% 15% 5%
18	R	449	83% 8% 12%
18	S	449	83% 8% 12%
18	W	449	83% 46% 12%
18	r	449	83% 11% 12%
18	s	449	83% 34% 12%
18	w	449	83% 74% 12%
19	T	309	42% 58%
20	V	130	75% 15% 25%
20	x	130	78% 14% 22%
21	X	555	75% 12% 25%

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Mol	Chain	Length	Quality of chain
22	Z	538	 <p>A horizontal bar chart representing the quality of chain. The bar is divided into three segments: a red segment on the left labeled '10%', a green segment in the middle labeled '21%', and a grey segment on the right labeled '78%'. The segments are stacked horizontally, with the red segment starting from the left edge of the bar.</p>

2 Entry composition [i](#)

There are 27 unique types of molecules in this entry. The entry contains 129847 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 Dynein-1-alpha heavy chain, flagellar inner arm I1 complex protein, putative.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	340	2698	1720	458	508	12	0	0

- Molecule 2 is a protein called Outer arm dynein beta heavy chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	4091	33080	21201	5547	6175	157	0	0

- Molecule 3 is a protein called Dynein heavy chain, outer arm protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	4159	33529	21421	5645	6289	174	0	0

- Molecule 4 is a protein called Dynein intermediate chain 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	331	2669	1719	439	493	18	0	0
4	d	128	957	597	170	187	3	0	0

- Molecule 5 is a protein called Flagellar outer dynein arm intermediate protein, putative.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	E	436	3264	2059	565	621	19	0	0
5	e	109	684	414	132	138		0	0

- Molecule 6 is a protein called Dynein light chain roadblock-type 2 protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	F	98	Total	C	N	O	S	0	0
			781	493	137	149	2		

- Molecule 7 is a protein called Dynein light chain roadblock-type 2 protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	95	Total	C	N	O	S	0	0
			744	468	128	147	1		

- Molecule 8 is a protein called Dynein light chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	H	85	Total	C	N	O	S	0	0
			702	453	115	130	4		

- Molecule 9 is a protein called Dynein light chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	I	89	Total	C	N	O	S	0	0
			694	443	111	136	4		

- Molecule 10 is a protein called Dynein light chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	J	84	Total	C	N	O	S	0	0
			702	459	114	125	4		

- Molecule 11 is a protein called Dynein light chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	K	95	Total	C	N	O	S	0	0
			803	525	134	139	5		

- Molecule 12 is a protein called Dynein light chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	L	97	Total	C	N	O	S	0	0
			773	506	131	133	3		

- Molecule 13 is a protein called Dynein light chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	M	86	726	472	122	128	4	0	0

- Molecule 14 is a protein called Dynein light chain 2A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	N	109	897	581	154	159	3	0	0

- Molecule 15 is a protein called Dynein light chain tctex-type 1 protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	O	111	878	558	143	174	3	0	0

- Molecule 16 is a protein called Thioredoxin.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	P	103	847	549	134	161	3	0	0

- Molecule 17 is a protein called Tubulin beta chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	Q	420	3287	2068	563	628	28	0	0
17	U	420	3287	2068	563	628	28	0	0
17	Y	420	3287	2068	563	628	28	0	0
17	u	420	3287	2068	563	628	28	0	0
17	q	420	3287	2068	563	628	28	0	0
17	y	420	3287	2068	563	628	28	0	0

- Molecule 18 is a protein called Tubulin alpha chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	R	429	3342	2118	568	634	22	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
18	S	429	Total	C	N	O	S	0	0
			3342	2118	568	634	22		
18	W	429	Total	C	N	O	S	0	0
			3342	2118	568	634	22		
18	s	429	Total	C	N	O	S	0	0
			3342	2118	568	634	22		
18	r	429	Total	C	N	O	S	0	0
			3342	2118	568	634	22		
18	w	429	Total	C	N	O	S	0	0
			3342	2118	568	634	22		

- Molecule 19 is a protein called Outer dynein arm docking complex protein oda protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	T	131	Total	C	N	O	S	0	0
			1057	655	181	215	6		

- Molecule 20 is a protein called Docking complex 1/2 protein.

Mol	Chain	Residues	Atoms				AltConf	Trace
20	V	98	Total	C	N	O	0	0
			490	294	98	98		
20	x	101	Total	C	N	O	0	0
			505	303	101	101		

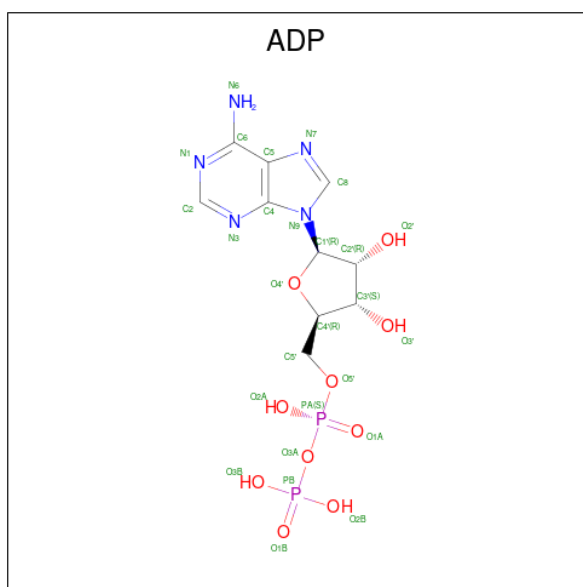
- Molecule 21 is a protein called Docking complex 1 protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	X	140	Total	C	N	O	S	0	0
			1149	719	210	218	2		

- Molecule 22 is a protein called Outer dynein arm docking complex protein oda protein.

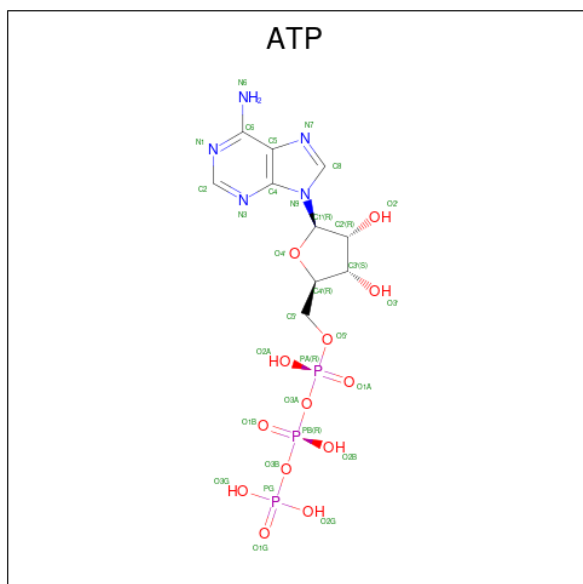
Mol	Chain	Residues	Atoms					AltConf	Trace
22	Z	117	Total	C	N	O	S	0	0
			993	614	191	186	2		

- Molecule 23 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).

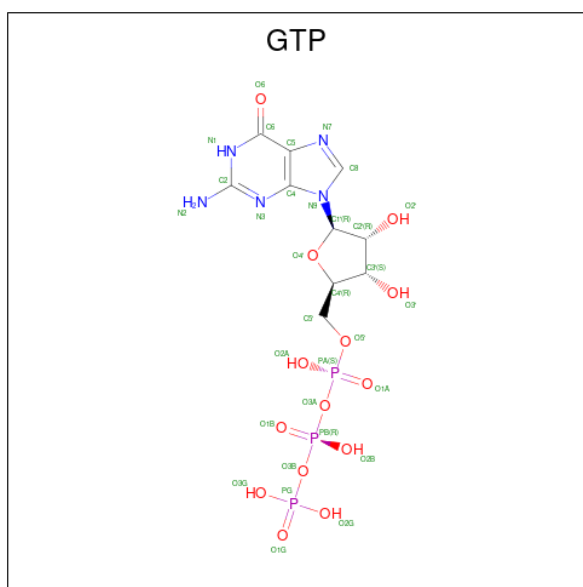


Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
23	C	1	54	20	10	20	4	0
23	C	1	54	20	10	20	4	0

- Molecule 24 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).



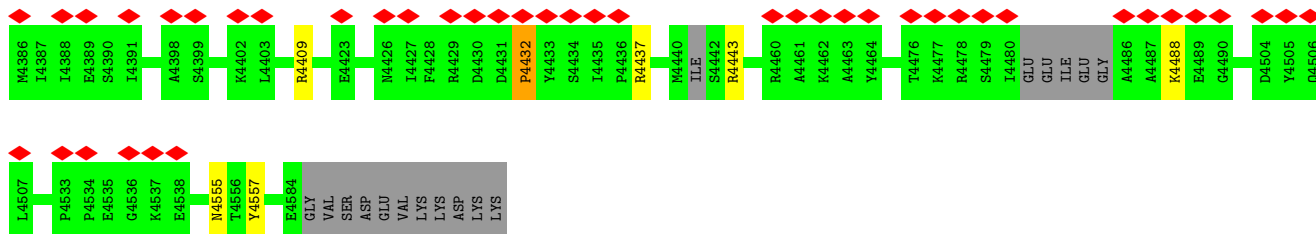
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
24	C	1	31	10	5	13	3	0



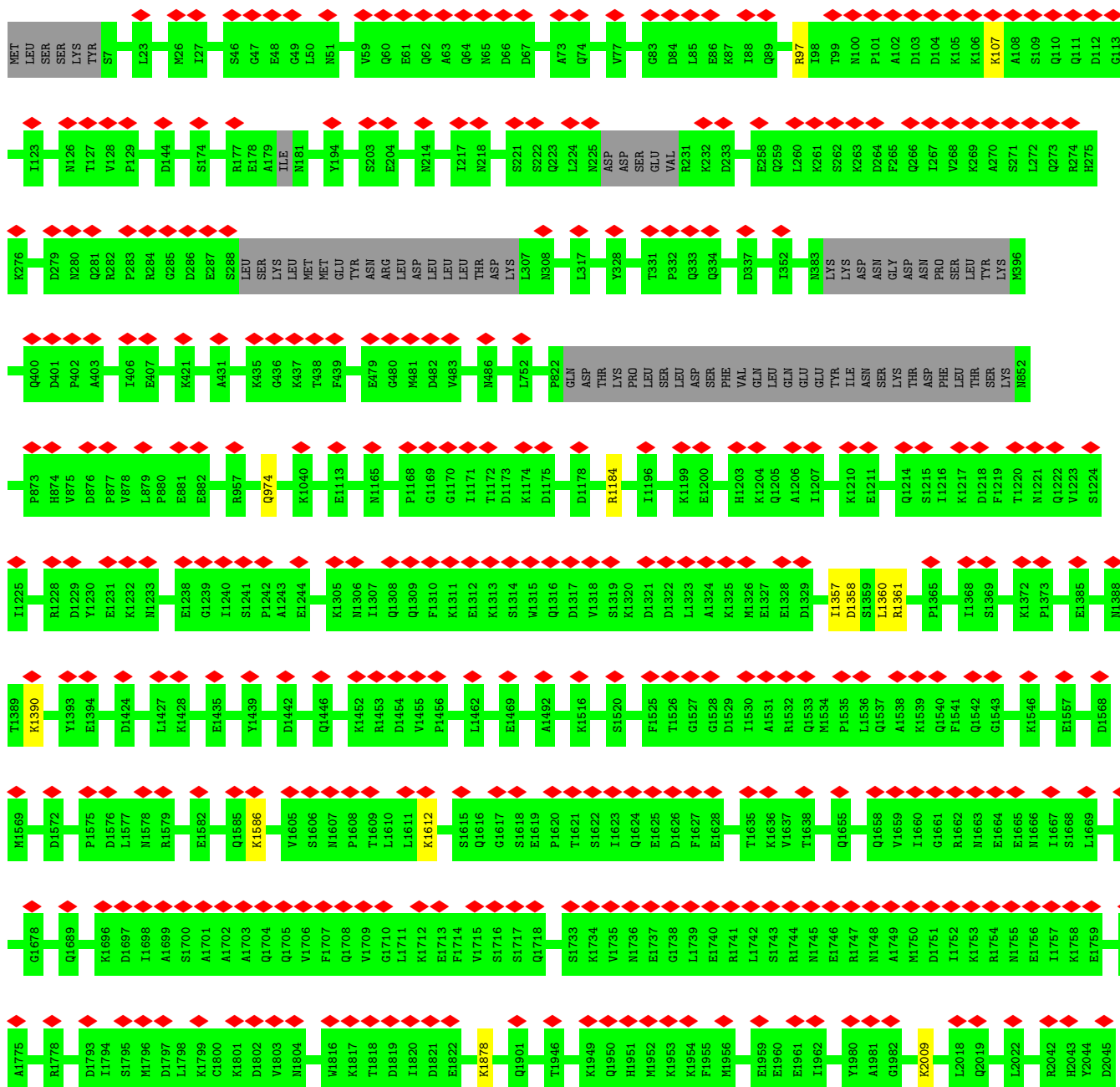
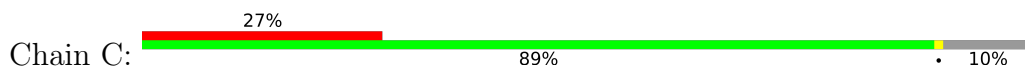
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
26	R	1	Total	C	N	O	P	0
			32	10	5	14	3	
26	S	1	Total	C	N	O	P	0
			32	10	5	14	3	
26	W	1	Total	C	N	O	P	0
			32	10	5	14	3	
26	s	1	Total	C	N	O	P	0
			32	10	5	14	3	
26	r	1	Total	C	N	O	P	0
			32	10	5	14	3	
26	w	1	Total	C	N	O	P	0
			32	10	5	14	3	

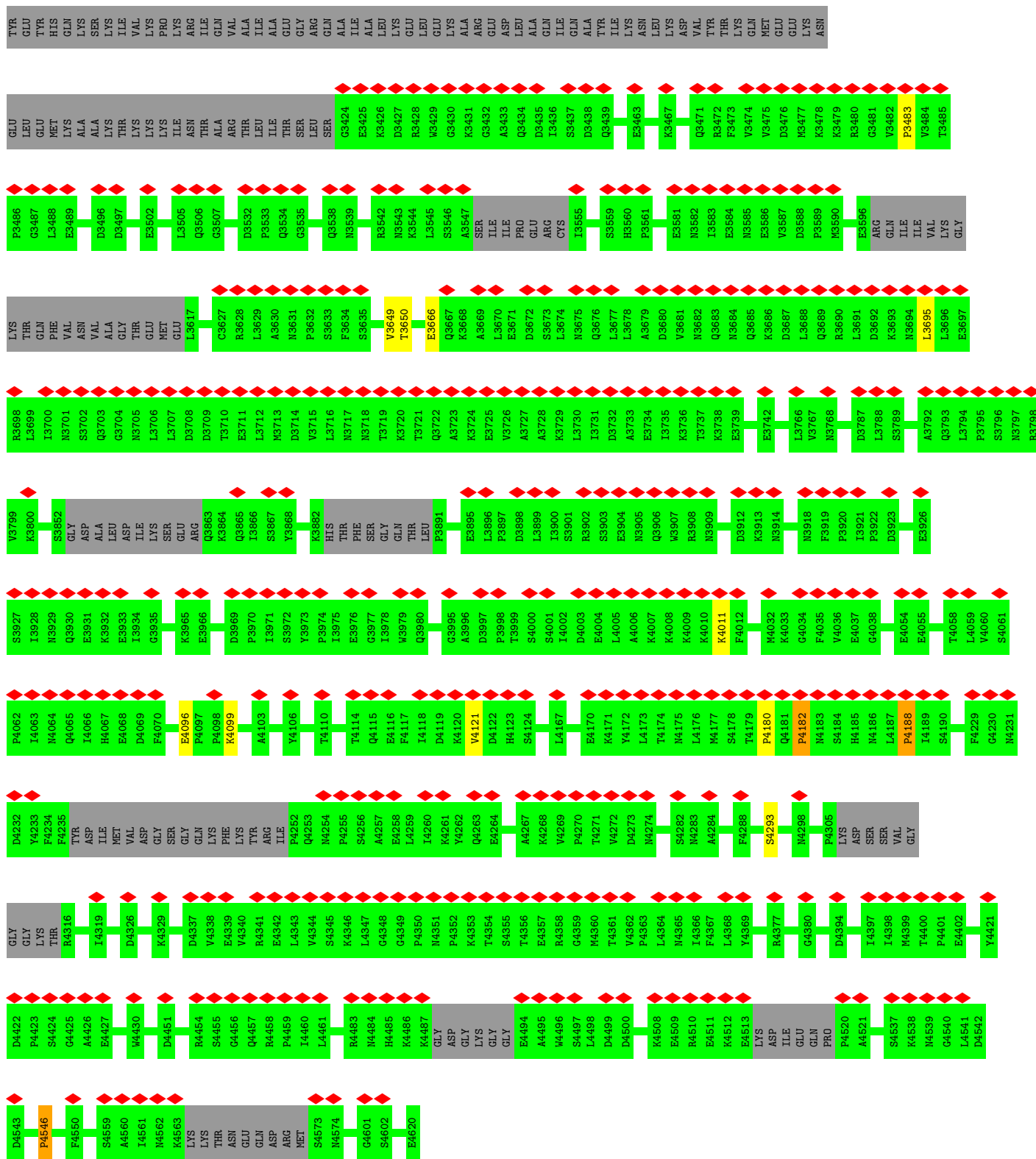
- Molecule 27 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
27	R	1	Total	Mg	0
			1	1	
27	S	1	Total	Mg	0
			1	1	
27	W	1	Total	Mg	0
			1	1	
27	s	1	Total	Mg	0
			1	1	
27	r	1	Total	Mg	0
			1	1	
27	w	1	Total	Mg	0
			1	1	



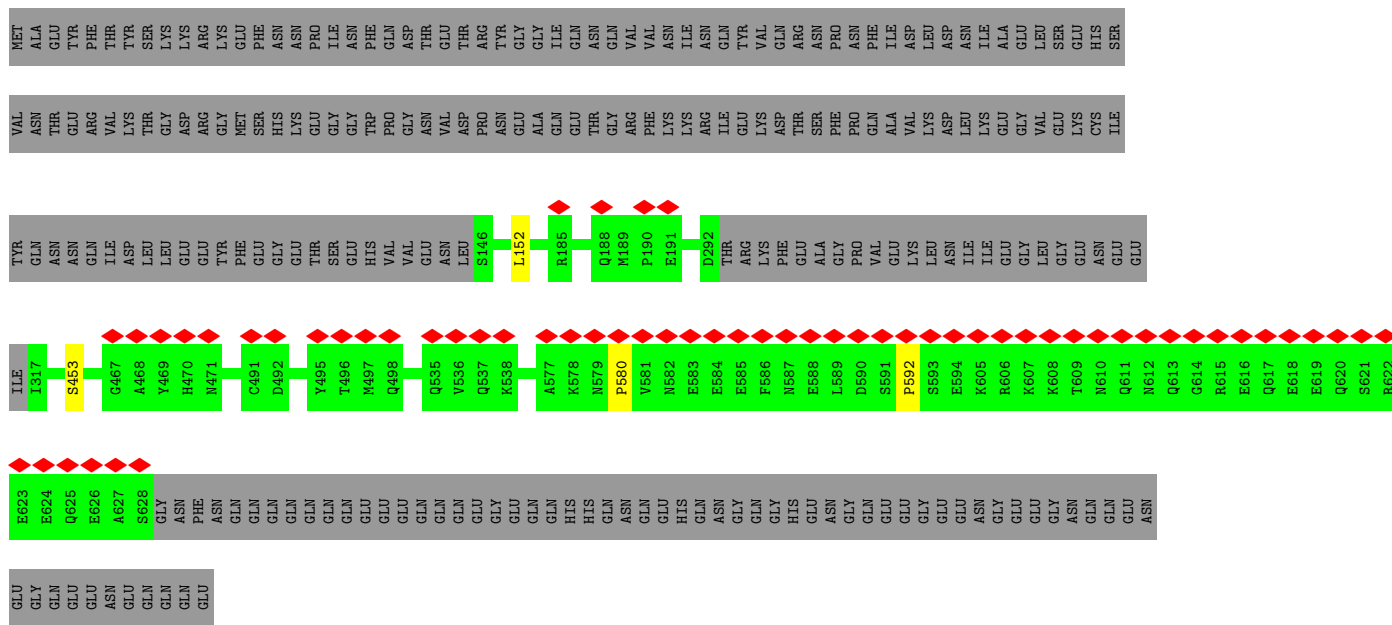
• Molecule 3: Dynein heavy chain, outer arm protein



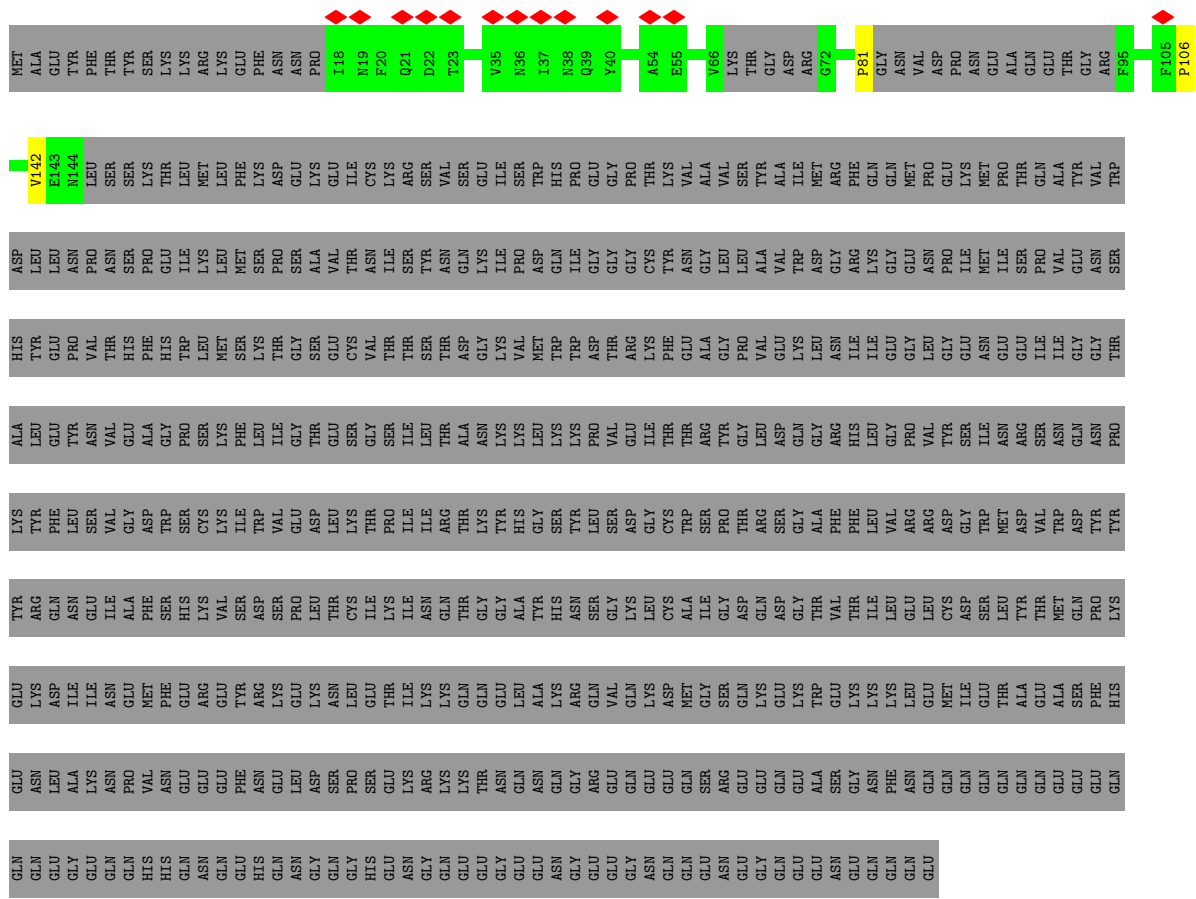


• Molecule 4: Dynein intermediate chain 2



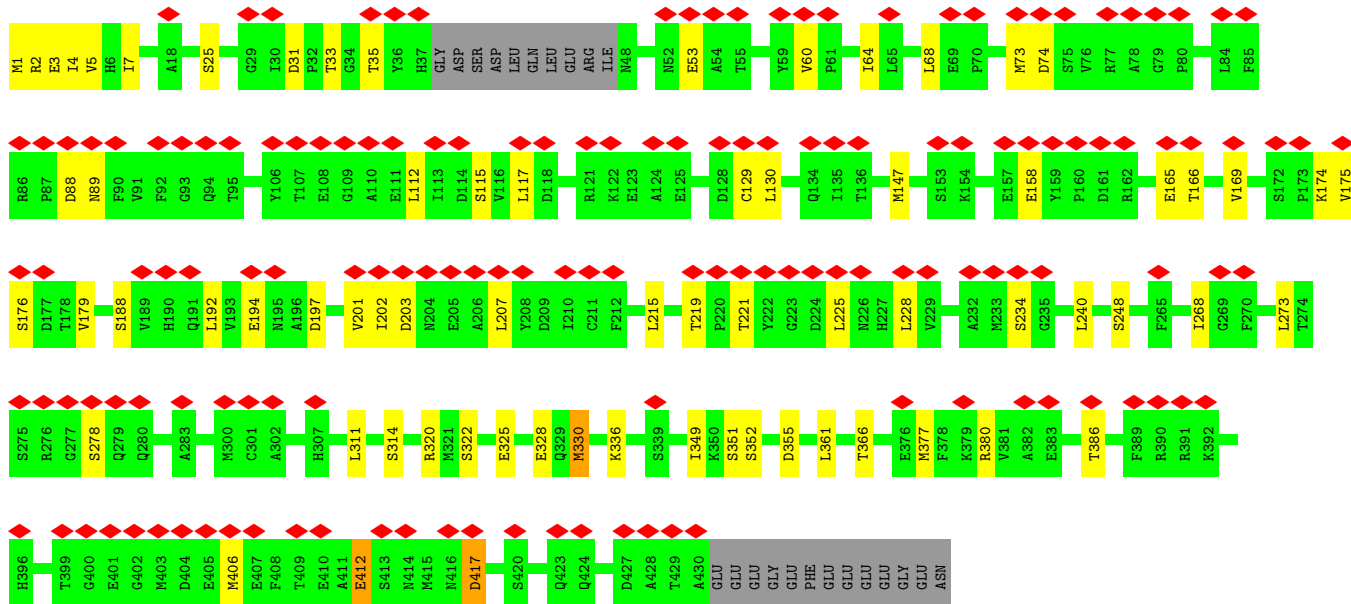
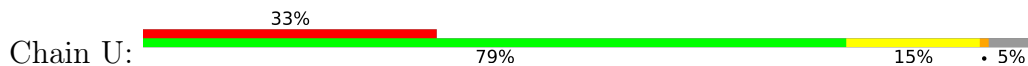


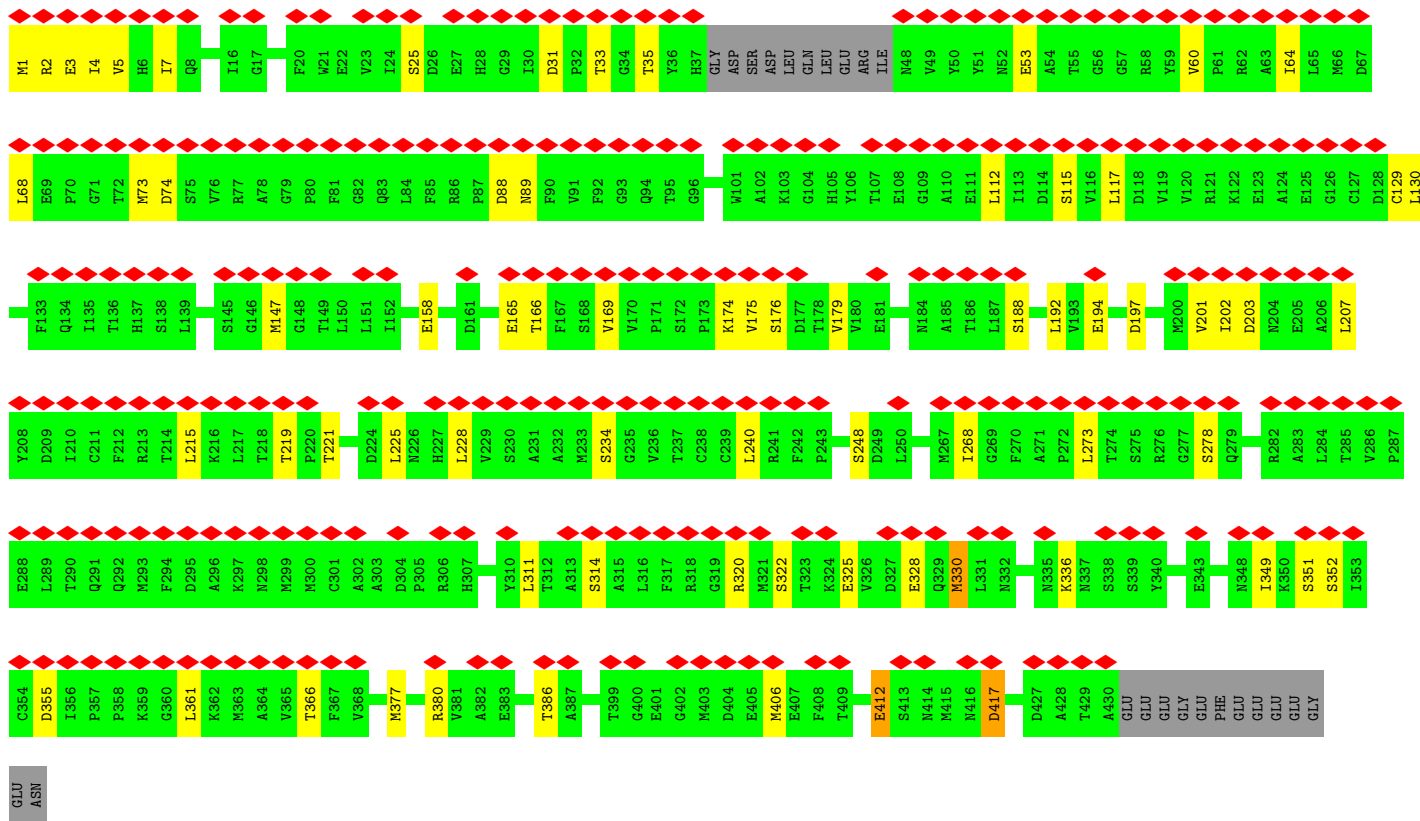
• Molecule 5: Flagellar outer dynein arm intermediate protein, putative



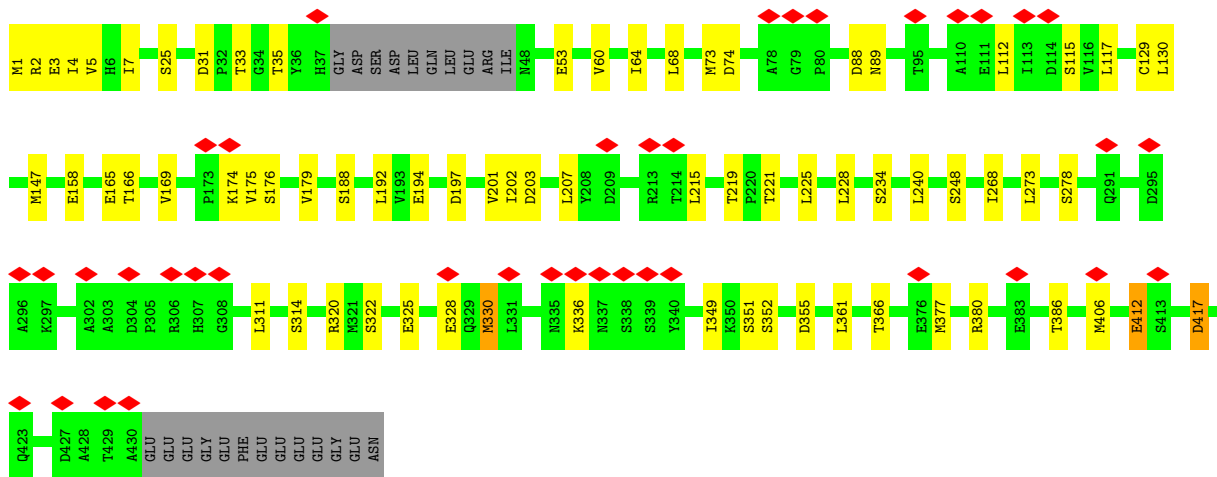
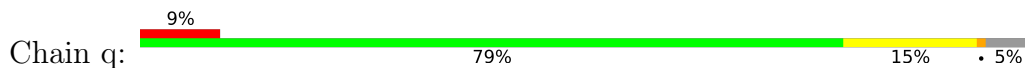
• Molecule 6: Dynein light chain roadblock-type 2 protein

• Molecule 17: Tubulin beta chain

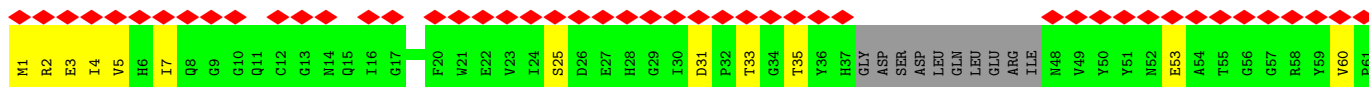
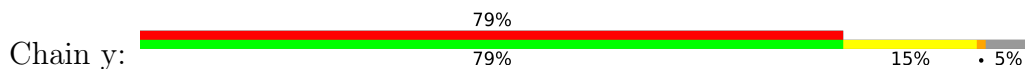


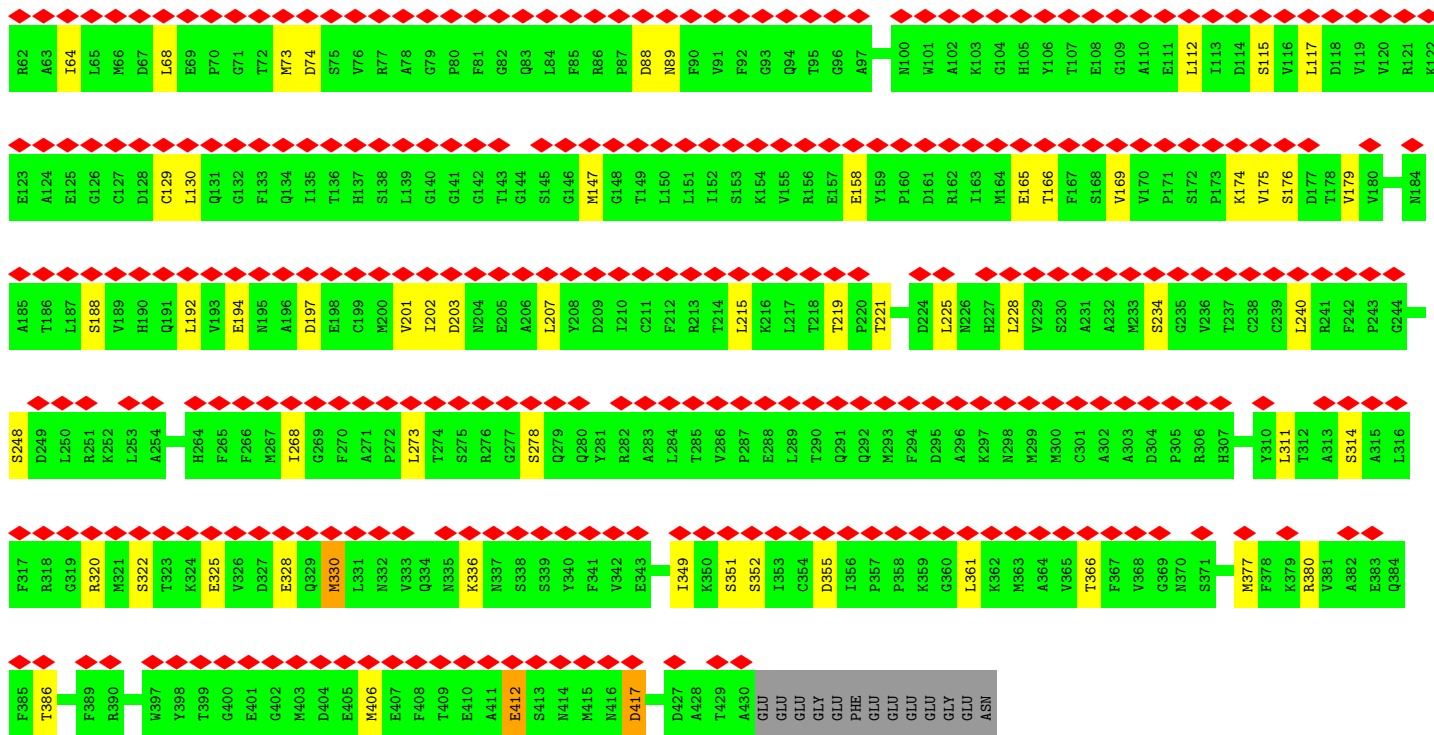


• Molecule 17: Tubulin beta chain

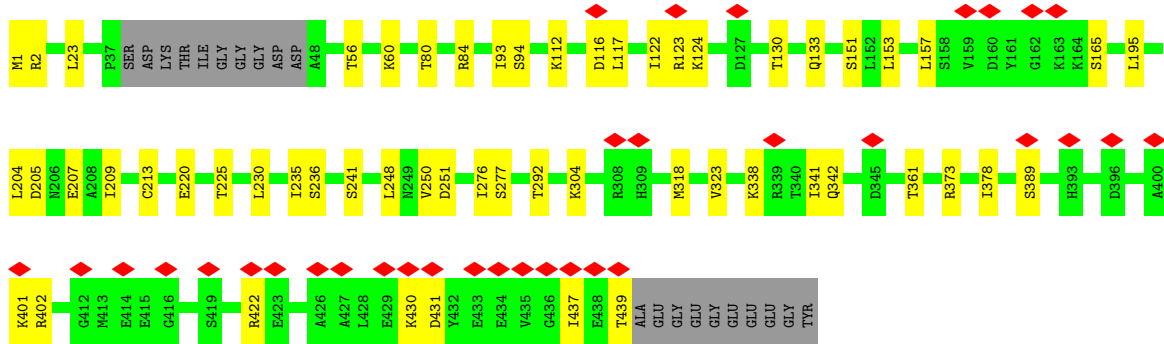
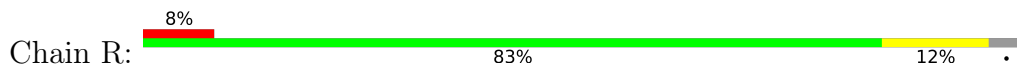


• Molecule 17: Tubulin beta chain

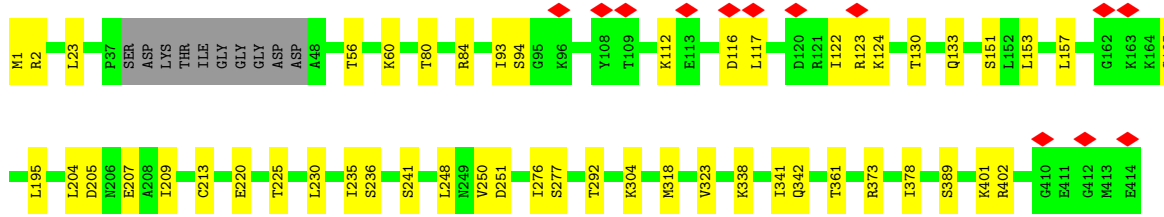
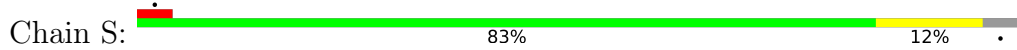




• Molecule 18: Tubulin alpha chain

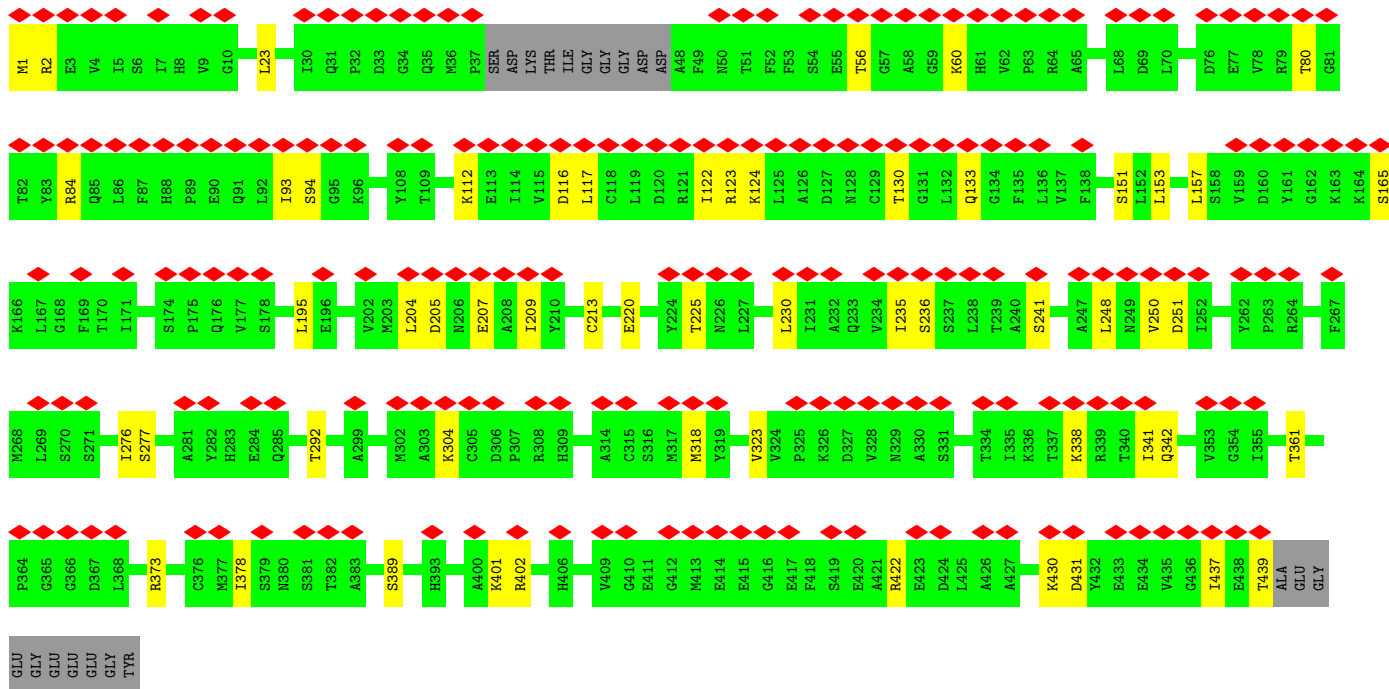
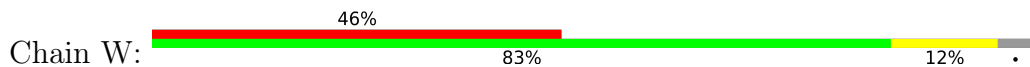


• Molecule 18: Tubulin alpha chain

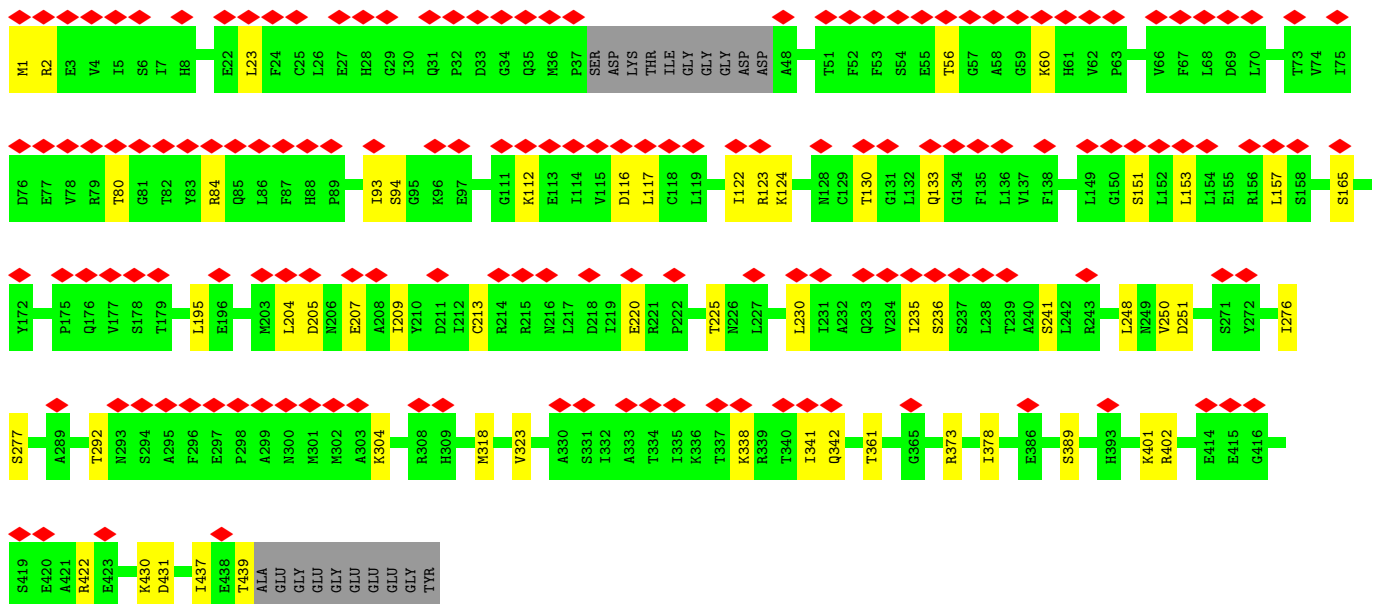
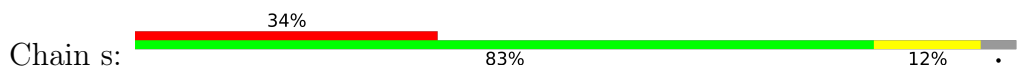




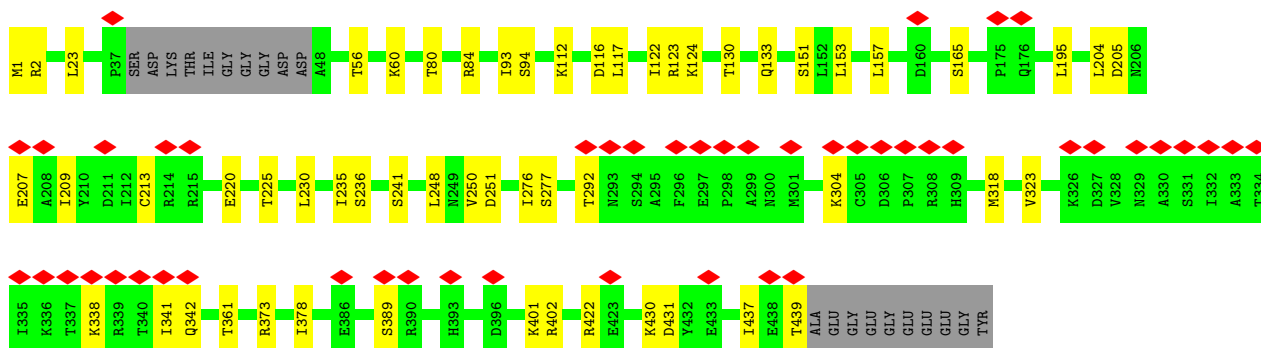
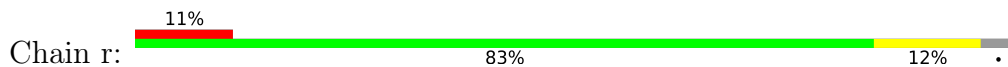
• Molecule 18: Tubulin alpha chain



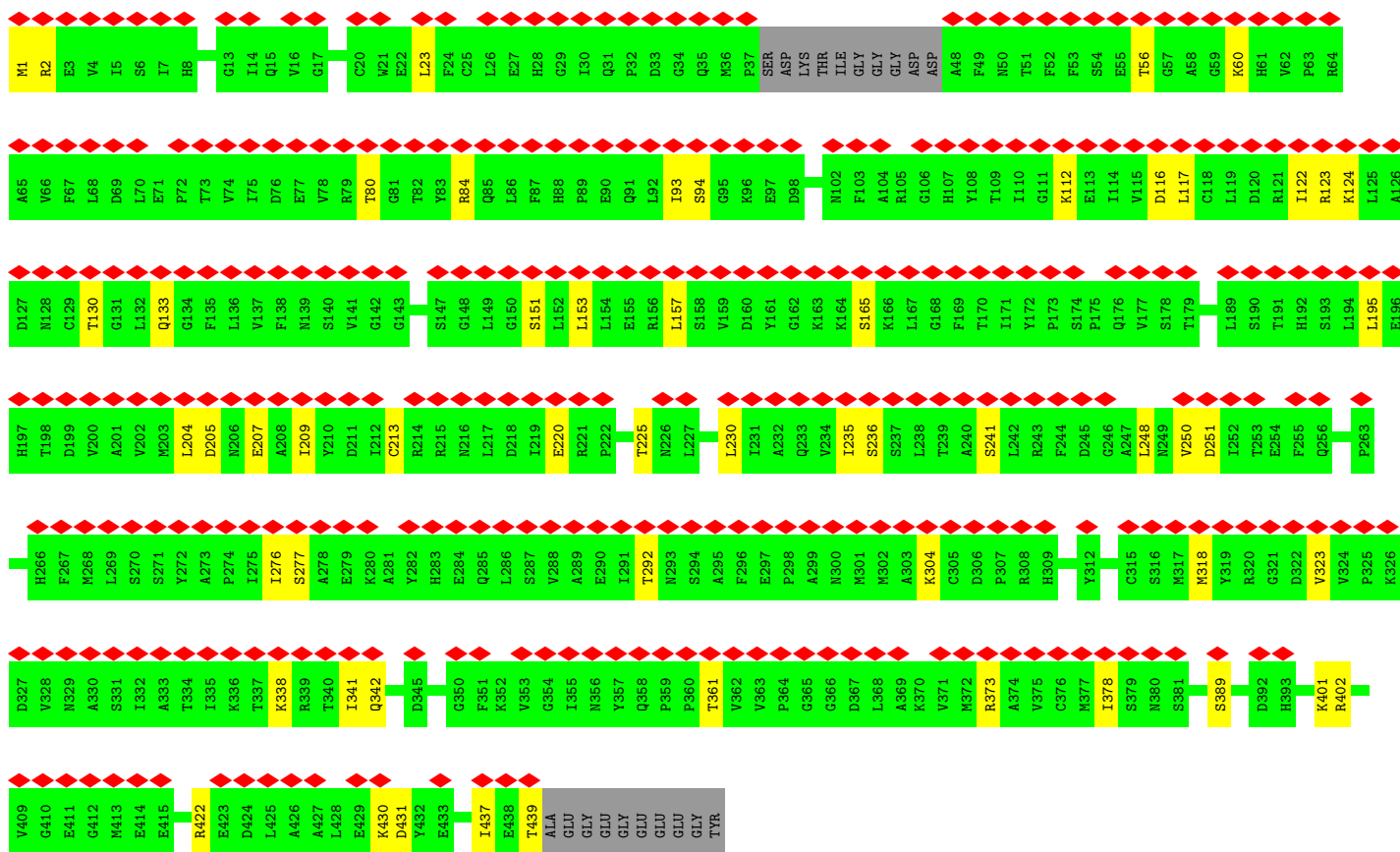
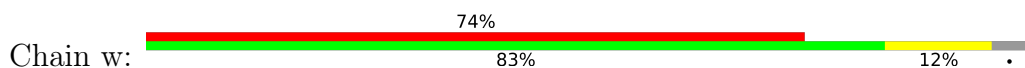
• Molecule 18: Tubulin alpha chain



• Molecule 18: Tubulin alpha chain



• Molecule 18: Tubulin alpha chain



• Molecule 19: Outer dynein arm docking complex protein oda protein



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	139548	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	45	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	59000	Depositor
Image detector	GATAN K2 QUANTUM (4k x 4k)	Depositor
Maximum map value	14.861	Depositor
Minimum map value	-5.362	Depositor
Average map value	0.626	Depositor
Map value standard deviation	2.312	Depositor
Recommended contour level	3.1	Depositor
Map size (Å)	313.95, 232.05, 461.37	wwPDB
Map dimensions	169, 85, 115	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	2.73, 2.73, 2.73	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MG, ADP, GDP, GTP, ATP

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	A	0.31	0/2778	0.57	0/3776
2	B	0.31	3/33725 (0.0%)	0.52	11/45530 (0.0%)
3	C	0.28	0/34189	0.49	11/46162 (0.0%)
4	D	0.32	0/2737	0.52	0/3707
4	d	0.34	0/973	0.50	0/1319
5	E	0.31	0/3334	0.55	4/4523 (0.1%)
5	e	0.27	0/687	0.57	2/940 (0.2%)
6	F	0.28	0/793	0.51	0/1070
7	G	0.27	0/751	0.52	0/1014
8	H	0.28	0/718	0.46	0/965
9	I	0.28	0/705	0.51	0/954
10	J	0.29	0/723	0.45	0/966
11	K	0.29	0/828	0.50	0/1114
12	L	0.28	0/790	0.50	0/1063
13	M	0.27	0/743	0.45	0/996
14	N	0.31	0/915	0.55	0/1229
15	O	0.28	0/891	0.47	0/1209
16	P	0.30	0/866	0.49	0/1171
17	Q	0.32	0/3359	0.63	4/4546 (0.1%)
17	U	0.32	0/3359	0.63	4/4546 (0.1%)
17	Y	0.32	0/3359	0.63	4/4546 (0.1%)
17	q	0.32	0/3359	0.63	4/4546 (0.1%)
17	u	0.32	0/3359	0.63	4/4546 (0.1%)
17	y	0.32	0/3359	0.63	4/4546 (0.1%)
18	R	0.31	0/3413	0.56	0/4625
18	S	0.31	0/3413	0.56	0/4625
18	W	0.31	0/3413	0.56	0/4625
18	r	0.31	0/3413	0.56	0/4625
18	s	0.31	0/3413	0.56	0/4625
18	w	0.31	0/3413	0.56	0/4625
19	T	0.27	0/1070	0.43	0/1436
21	X	0.28	0/1164	0.51	3/1556 (0.2%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
22	Z	0.28	0/998	0.50	0/1323
All	All	0.30	3/131010 (0.0%)	0.54	55/177049 (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
1	A	0	1
2	B	0	11
3	C	0	3
18	R	0	1
18	S	0	1
18	W	0	1
18	r	0	1
18	s	0	1
18	w	0	1
22	Z	0	1
All	All	0	22

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	77	GLN	N-CA	9.52	1.65	1.46
2	B	1330	TRP	CB-CG	7.05	1.62	1.50
2	B	2592	TYR	CD1-CE1	-5.02	1.31	1.39

All (55) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	1330	TRP	CA-CB-CG	9.26	131.29	113.70
5	E	152	LEU	CB-CG-CD1	-9.24	95.29	111.00
2	B	956	LEU	CA-CB-CG	-9.19	94.17	115.30
2	B	4432	PRO	N-CA-CB	9.03	114.13	103.30
3	C	1878	LYS	CD-CE-NZ	-8.63	91.85	111.70
3	C	3695	LEU	CA-CB-CG	8.18	134.11	115.30
2	B	1416	LEU	CA-CB-CG	-7.63	97.75	115.30
2	B	164	LEU	CA-CB-CG	7.52	132.60	115.30
5	E	152	LEU	CA-CB-CG	7.14	131.74	115.30
3	C	4182	PRO	N-CA-CB	6.88	111.56	103.30
3	C	4188	PRO	N-CA-CB	6.81	111.47	103.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
17	U	417	ASP	CB-CG-OD1	-6.77	112.20	118.30
17	Y	417	ASP	CB-CG-OD1	-6.77	112.20	118.30
17	Q	417	ASP	CB-CG-OD1	-6.77	112.21	118.30
17	u	417	ASP	CB-CG-OD1	-6.75	112.23	118.30
17	y	417	ASP	CB-CG-OD1	-6.71	112.26	118.30
17	q	417	ASP	CB-CG-OD1	-6.66	112.30	118.30
2	B	3703	PRO	N-CA-CB	6.66	111.29	103.30
2	B	4008	PRO	N-CA-CB	6.42	111.00	103.30
3	C	2978	PRO	N-CA-CB	6.36	110.93	103.30
3	C	2979	PRO	N-CA-CB	6.29	110.85	103.30
17	Q	202	ILE	CG1-CB-CG2	-6.28	97.59	111.40
17	u	202	ILE	CG1-CB-CG2	-6.27	97.60	111.40
17	q	202	ILE	CG1-CB-CG2	-6.27	97.61	111.40
17	Y	202	ILE	CG1-CB-CG2	-6.27	97.61	111.40
17	U	202	ILE	CG1-CB-CG2	-6.26	97.63	111.40
17	y	202	ILE	CG1-CB-CG2	-6.25	97.64	111.40
5	e	81	PRO	N-CA-CB	6.16	110.69	103.30
3	C	4180	PRO	N-CA-CB	6.15	110.68	103.30
3	C	4546	PRO	N-CA-CB	6.10	110.62	103.30
2	B	2557	PRO	N-CA-CB	6.01	110.51	103.30
5	e	106	PRO	N-CA-CB	5.92	110.41	103.30
2	B	2461	PHE	CB-CA-C	5.84	122.08	110.40
17	u	412	GLU	CA-CB-CG	5.75	126.05	113.40
17	q	412	GLU	CA-CB-CG	5.74	126.03	113.40
3	C	3483	PRO	N-CA-CB	5.74	110.19	103.30
3	C	2805	PRO	N-CA-CB	5.73	110.18	103.30
17	U	412	GLU	CA-CB-CG	5.73	126.00	113.40
17	Y	412	GLU	CA-CB-CG	5.73	126.00	113.40
17	Q	412	GLU	CA-CB-CG	5.72	125.97	113.40
17	y	412	GLU	CA-CB-CG	5.71	125.95	113.40
2	B	1652	PRO	N-CA-CB	5.63	110.05	103.30
5	E	592	PRO	N-CA-CB	5.62	110.04	103.30
5	E	580	PRO	N-CA-CB	5.61	110.03	103.30
17	u	330	MET	CA-CB-CG	5.60	122.81	113.30
17	Q	330	MET	CA-CB-CG	5.59	122.81	113.30
17	U	330	MET	CA-CB-CG	5.59	122.80	113.30
2	B	3951	PRO	N-CA-CB	5.58	110.00	103.30
17	y	330	MET	CA-CB-CG	5.58	122.78	113.30
17	q	330	MET	CA-CB-CG	5.57	122.77	113.30
17	Y	330	MET	CA-CB-CG	5.56	122.75	113.30
21	X	184	ASP	CB-CG-OD2	5.23	123.00	118.30
21	X	200	ASP	CB-CG-OD2	5.22	123.00	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
21	X	210	ASP	CB-CG-OD2	5.15	122.93	118.30
3	C	2879	LEU	C-N-CA	-5.08	108.99	121.70

There are no chirality outliers.

All (22) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	282	ARG	Peptide
2	B	1415	ILE	Peptide
2	B	2135	PRO	Peptide
2	B	2229	LYS	Peptide
2	B	2454	ASP	Peptide
2	B	2461	PHE	Peptide
2	B	2583	MET	Peptide
2	B	3048	PHE	Peptide
2	B	3538	GLN	Peptide
2	B	4049	THR	Peptide
2	B	4555	ASN	Peptide
2	B	966	LYS	Peptide
3	C	2876	LEU	Peptide
3	C	3666	GLU	Peptide
3	C	974	GLN	Peptide
18	R	401	LYS	Peptide
18	S	401	LYS	Peptide
18	W	401	LYS	Peptide
22	Z	195	ILE	Peptide
18	r	401	LYS	Peptide
18	s	401	LYS	Peptide
18	w	401	LYS	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	A	336/4168 (8%)	292 (87%)	43 (13%)	1 (0%)	41	77
2	B	4037/4594 (88%)	3637 (90%)	384 (10%)	16 (0%)	34	72
3	C	4127/4620 (89%)	3813 (92%)	305 (7%)	9 (0%)	47	81
4	D	323/667 (48%)	286 (88%)	37 (12%)	0	100	100
4	d	122/667 (18%)	114 (93%)	8 (7%)	0	100	100
5	E	426/670 (64%)	370 (87%)	56 (13%)	0	100	100
5	e	103/670 (15%)	88 (85%)	14 (14%)	1 (1%)	15	55
6	F	96/133 (72%)	83 (86%)	13 (14%)	0	100	100
7	G	93/159 (58%)	80 (86%)	13 (14%)	0	100	100
8	H	83/92 (90%)	81 (98%)	2 (2%)	0	100	100
9	I	87/110 (79%)	79 (91%)	8 (9%)	0	100	100
10	J	82/93 (88%)	77 (94%)	5 (6%)	0	100	100
11	K	93/111 (84%)	81 (87%)	12 (13%)	0	100	100
12	L	95/111 (86%)	90 (95%)	5 (5%)	0	100	100
13	M	84/87 (97%)	82 (98%)	2 (2%)	0	100	100
14	N	107/132 (81%)	99 (92%)	8 (8%)	0	100	100
15	O	109/117 (93%)	103 (94%)	6 (6%)	0	100	100
16	P	101/110 (92%)	97 (96%)	4 (4%)	0	100	100
17	Q	416/443 (94%)	389 (94%)	27 (6%)	0	100	100
17	U	416/443 (94%)	389 (94%)	27 (6%)	0	100	100
17	Y	416/443 (94%)	389 (94%)	27 (6%)	0	100	100
17	q	416/443 (94%)	389 (94%)	27 (6%)	0	100	100
17	u	416/443 (94%)	389 (94%)	27 (6%)	0	100	100
17	y	416/443 (94%)	389 (94%)	27 (6%)	0	100	100
18	R	425/449 (95%)	408 (96%)	17 (4%)	0	100	100
18	S	425/449 (95%)	408 (96%)	17 (4%)	0	100	100
18	W	425/449 (95%)	408 (96%)	17 (4%)	0	100	100
18	r	425/449 (95%)	408 (96%)	17 (4%)	0	100	100
18	s	425/449 (95%)	408 (96%)	17 (4%)	0	100	100
18	w	425/449 (95%)	408 (96%)	17 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
19	T	127/309 (41%)	109 (86%)	16 (13%)	2 (2%)	9	44
21	X	138/555 (25%)	133 (96%)	5 (4%)	0	100	100
22	Z	113/538 (21%)	110 (97%)	1 (1%)	2 (2%)	8	40
All	All	15928/24065 (66%)	14686 (92%)	1211 (8%)	31 (0%)	50	81

All (31) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	283	THR
2	B	1651	ASN
2	B	1652	PRO
2	B	2030	PRO
2	B	2461	PHE
2	B	2462	ASN
2	B	2557	PRO
2	B	3703	PRO
2	B	4008	PRO
2	B	4432	PRO
3	C	2978	PRO
3	C	2979	PRO
3	C	3650	THR
3	C	4182	PRO
3	C	4188	PRO
3	C	4546	PRO
22	Z	196	ILE
5	e	142	VAL
2	B	2031	ASP
3	C	2877	THR
19	T	188	PRO
2	B	2006	PRO
2	B	4557	TYR
3	C	3649	VAL
3	C	4121	VAL
19	T	129	ASP
2	B	1774	LYS
2	B	3923	PRO
2	B	3049	HIS
22	Z	195	ILE
2	B	2584	VAL

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	291/3691 (8%)	288 (99%)	3 (1%)	76	86
2	B	3646/4145 (88%)	3599 (99%)	47 (1%)	69	81
3	C	3699/4196 (88%)	3670 (99%)	29 (1%)	81	89
4	D	297/609 (49%)	297 (100%)	0	100	100
4	d	89/609 (15%)	88 (99%)	1 (1%)	73	84
5	E	322/597 (54%)	321 (100%)	1 (0%)	92	95
5	e	42/597 (7%)	42 (100%)	0	100	100
6	F	87/109 (80%)	85 (98%)	2 (2%)	50	70
7	G	86/149 (58%)	85 (99%)	1 (1%)	71	83
8	H	76/83 (92%)	75 (99%)	1 (1%)	69	81
9	I	76/95 (80%)	76 (100%)	0	100	100
10	J	74/82 (90%)	74 (100%)	0	100	100
11	K	81/97 (84%)	81 (100%)	0	100	100
12	L	86/99 (87%)	86 (100%)	0	100	100
13	M	77/78 (99%)	77 (100%)	0	100	100
14	N	96/119 (81%)	96 (100%)	0	100	100
15	O	98/104 (94%)	96 (98%)	2 (2%)	55	74
16	P	97/104 (93%)	96 (99%)	1 (1%)	76	86
17	Q	356/376 (95%)	286 (80%)	70 (20%)	1	8
17	U	356/376 (95%)	286 (80%)	70 (20%)	1	8
17	Y	356/376 (95%)	286 (80%)	70 (20%)	1	8
17	q	356/376 (95%)	286 (80%)	70 (20%)	1	8
17	u	356/376 (95%)	286 (80%)	70 (20%)	1	8
17	y	356/376 (95%)	286 (80%)	70 (20%)	1	8
18	R	363/376 (96%)	308 (85%)	55 (15%)	3	14
18	S	363/376 (96%)	308 (85%)	55 (15%)	3	14

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
18	W	363/376 (96%)	308 (85%)	55 (15%)	3	14
18	r	363/376 (96%)	308 (85%)	55 (15%)	3	14
18	s	363/376 (96%)	308 (85%)	55 (15%)	3	14
18	w	363/376 (96%)	308 (85%)	55 (15%)	3	14
19	T	118/271 (44%)	118 (100%)	0	100	100
21	X	122/502 (24%)	121 (99%)	1 (1%)	81	89
22	Z	108/491 (22%)	107 (99%)	1 (1%)	78	87
All	All	13982/21339 (66%)	13142 (94%)	840 (6%)	23	44

All (840) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	31	LYS
1	A	189	ARG
1	A	282	ARG
2	B	171	LYS
2	B	296	LYS
2	B	450	LYS
2	B	461	LYS
2	B	851	LYS
2	B	1093	ARG
2	B	1126	LYS
2	B	1410	PHE
2	B	1492	LYS
2	B	1590	LYS
2	B	1883	CYS
2	B	1957	ARG
2	B	1969	GLN
2	B	2005	ASN
2	B	2023	ARG
2	B	2029	VAL
2	B	2032	LEU
2	B	2084	ARG
2	B	2132	LYS
2	B	2495	LYS
2	B	2531	ARG
2	B	2556	ARG
2	B	2587	LYS
2	B	2614	LYS
2	B	2642	ARG

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Mol	Chain	Res	Type
2	B	2702	LYS
2	B	2849	LYS
2	B	2944	ARG
2	B	3049	HIS
2	B	3082	MET
2	B	3549	GLN
2	B	3551	GLU
2	B	3552	ASN
2	B	3669	LEU
2	B	3805	ARG
2	B	3814	ARG
2	B	4003	LYS
2	B	4056	LYS
2	B	4103	LEU
2	B	4121	ASP
2	B	4122	LYS
2	B	4125	LYS
2	B	4127	LYS
2	B	4409	ARG
2	B	4437	ARG
2	B	4443	ARG
2	B	4488	LYS
3	C	97	ARG
3	C	107	LYS
3	C	1184	ARG
3	C	1357	ILE
3	C	1358	ASP
3	C	1360	LEU
3	C	1361	ARG
3	C	1390	LYS
3	C	1586	LYS
3	C	1612	LYS
3	C	2009	LYS
3	C	2118	LYS
3	C	2225	LYS
3	C	2298	LEU
3	C	2312	LYS
3	C	2335	ARG
3	C	2342	LYS
3	C	2414	LYS
3	C	2441	LYS
3	C	2603	LYS

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Mol	Chain	Res	Type
3	C	2663	LYS
3	C	2854	ARG
3	C	2900	LYS
3	C	3007	LYS
3	C	3020	ASN
3	C	4011	LYS
3	C	4096	GLU
3	C	4099	LYS
3	C	4293	SER
5	E	453	SER
6	F	78	ARG
6	F	80	ARG
7	G	91	LYS
8	H	22	LYS
15	O	60	LYS
15	O	90	ASP
16	P	12	LYS
17	Q	1	MET
17	Q	2	ARG
17	Q	3	GLU
17	Q	4	ILE
17	Q	5	VAL
17	Q	7	ILE
17	Q	25	SER
17	Q	31	ASP
17	Q	33	THR
17	Q	35	THR
17	Q	53	GLU
17	Q	60	VAL
17	Q	64	ILE
17	Q	68	LEU
17	Q	73	MET
17	Q	74	ASP
17	Q	88	ASP
17	Q	89	ASN
17	Q	112	LEU
17	Q	115	SER
17	Q	117	LEU
17	Q	129	CYS
17	Q	130	LEU
17	Q	147	MET
17	Q	158	GLU

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Mol	Chain	Res	Type
17	Q	165	GLU
17	Q	166	THR
17	Q	169	VAL
17	Q	174	LYS
17	Q	175	VAL
17	Q	176	SER
17	Q	179	VAL
17	Q	188	SER
17	Q	192	LEU
17	Q	194	GLU
17	Q	197	ASP
17	Q	201	VAL
17	Q	203	ASP
17	Q	207	LEU
17	Q	215	LEU
17	Q	219	THR
17	Q	221	THR
17	Q	225	LEU
17	Q	228	LEU
17	Q	234	SER
17	Q	240	LEU
17	Q	248	SER
17	Q	268	ILE
17	Q	273	LEU
17	Q	278	SER
17	Q	311	LEU
17	Q	314	SER
17	Q	320	ARG
17	Q	322	SER
17	Q	325	GLU
17	Q	328	GLU
17	Q	330	MET
17	Q	336	LYS
17	Q	349	ILE
17	Q	351	SER
17	Q	352	SER
17	Q	355	ASP
17	Q	361	LEU
17	Q	366	THR
17	Q	377	MET
17	Q	380	ARG
17	Q	386	THR

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Mol	Chain	Res	Type
17	Q	406	MET
17	Q	412	GLU
17	Q	417	ASP
18	R	1	MET
18	R	2	ARG
18	R	23	LEU
18	R	56	THR
18	R	60	LYS
18	R	80	THR
18	R	84	ARG
18	R	93	ILE
18	R	94	SER
18	R	112	LYS
18	R	116	ASP
18	R	117	LEU
18	R	122	ILE
18	R	123	ARG
18	R	124	LYS
18	R	130	THR
18	R	133	GLN
18	R	151	SER
18	R	153	LEU
18	R	157	LEU
18	R	165	SER
18	R	195	LEU
18	R	204	LEU
18	R	205	ASP
18	R	207	GLU
18	R	209	ILE
18	R	213	CYS
18	R	220	GLU
18	R	225	THR
18	R	230	LEU
18	R	235	ILE
18	R	236	SER
18	R	241	SER
18	R	248	LEU
18	R	250	VAL
18	R	251	ASP
18	R	276	ILE
18	R	277	SER
18	R	292	THR

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Mol	Chain	Res	Type
18	R	304	LYS
18	R	318	MET
18	R	323	VAL
18	R	338	LYS
18	R	341	ILE
18	R	342	GLN
18	R	361	THR
18	R	373	ARG
18	R	378	ILE
18	R	389	SER
18	R	402	ARG
18	R	422	ARG
18	R	430	LYS
18	R	431	ASP
18	R	437	ILE
18	R	439	THR
18	S	1	MET
18	S	2	ARG
18	S	23	LEU
18	S	56	THR
18	S	60	LYS
18	S	80	THR
18	S	84	ARG
18	S	93	ILE
18	S	94	SER
18	S	112	LYS
18	S	116	ASP
18	S	117	LEU
18	S	122	ILE
18	S	123	ARG
18	S	124	LYS
18	S	130	THR
18	S	133	GLN
18	S	151	SER
18	S	153	LEU
18	S	157	LEU
18	S	165	SER
18	S	195	LEU
18	S	204	LEU
18	S	205	ASP
18	S	207	GLU
18	S	209	ILE

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Mol	Chain	Res	Type
18	S	213	CYS
18	S	220	GLU
18	S	225	THR
18	S	230	LEU
18	S	235	ILE
18	S	236	SER
18	S	241	SER
18	S	248	LEU
18	S	250	VAL
18	S	251	ASP
18	S	276	ILE
18	S	277	SER
18	S	292	THR
18	S	304	LYS
18	S	318	MET
18	S	323	VAL
18	S	338	LYS
18	S	341	ILE
18	S	342	GLN
18	S	361	THR
18	S	373	ARG
18	S	378	ILE
18	S	389	SER
18	S	402	ARG
18	S	422	ARG
18	S	430	LYS
18	S	431	ASP
18	S	437	ILE
18	S	439	THR
17	U	1	MET
17	U	2	ARG
17	U	3	GLU
17	U	4	ILE
17	U	5	VAL
17	U	7	ILE
17	U	25	SER
17	U	31	ASP
17	U	33	THR
17	U	35	THR
17	U	53	GLU
17	U	60	VAL
17	U	64	ILE

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Mol	Chain	Res	Type
17	U	68	LEU
17	U	73	MET
17	U	74	ASP
17	U	88	ASP
17	U	89	ASN
17	U	112	LEU
17	U	115	SER
17	U	117	LEU
17	U	129	CYS
17	U	130	LEU
17	U	147	MET
17	U	158	GLU
17	U	165	GLU
17	U	166	THR
17	U	169	VAL
17	U	174	LYS
17	U	175	VAL
17	U	176	SER
17	U	179	VAL
17	U	188	SER
17	U	192	LEU
17	U	194	GLU
17	U	197	ASP
17	U	201	VAL
17	U	203	ASP
17	U	207	LEU
17	U	215	LEU
17	U	219	THR
17	U	221	THR
17	U	225	LEU
17	U	228	LEU
17	U	234	SER
17	U	240	LEU
17	U	248	SER
17	U	268	ILE
17	U	273	LEU
17	U	278	SER
17	U	311	LEU
17	U	314	SER
17	U	320	ARG
17	U	322	SER
17	U	325	GLU

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Mol	Chain	Res	Type
17	U	328	GLU
17	U	330	MET
17	U	336	LYS
17	U	349	ILE
17	U	351	SER
17	U	352	SER
17	U	355	ASP
17	U	361	LEU
17	U	366	THR
17	U	377	MET
17	U	380	ARG
17	U	386	THR
17	U	406	MET
17	U	412	GLU
17	U	417	ASP
18	W	1	MET
18	W	2	ARG
18	W	23	LEU
18	W	56	THR
18	W	60	LYS
18	W	80	THR
18	W	84	ARG
18	W	93	ILE
18	W	94	SER
18	W	112	LYS
18	W	116	ASP
18	W	117	LEU
18	W	122	ILE
18	W	123	ARG
18	W	124	LYS
18	W	130	THR
18	W	133	GLN
18	W	151	SER
18	W	153	LEU
18	W	157	LEU
18	W	165	SER
18	W	195	LEU
18	W	204	LEU
18	W	205	ASP
18	W	207	GLU
18	W	209	ILE
18	W	213	CYS

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Mol	Chain	Res	Type
18	W	220	GLU
18	W	225	THR
18	W	230	LEU
18	W	235	ILE
18	W	236	SER
18	W	241	SER
18	W	248	LEU
18	W	250	VAL
18	W	251	ASP
18	W	276	ILE
18	W	277	SER
18	W	292	THR
18	W	304	LYS
18	W	318	MET
18	W	323	VAL
18	W	338	LYS
18	W	341	ILE
18	W	342	GLN
18	W	361	THR
18	W	373	ARG
18	W	378	ILE
18	W	389	SER
18	W	402	ARG
18	W	422	ARG
18	W	430	LYS
18	W	431	ASP
18	W	437	ILE
18	W	439	THR
21	X	154	LYS
17	Y	1	MET
17	Y	2	ARG
17	Y	3	GLU
17	Y	4	ILE
17	Y	5	VAL
17	Y	7	ILE
17	Y	25	SER
17	Y	31	ASP
17	Y	33	THR
17	Y	35	THR
17	Y	53	GLU
17	Y	60	VAL
17	Y	64	ILE

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Mol	Chain	Res	Type
17	Y	68	LEU
17	Y	73	MET
17	Y	74	ASP
17	Y	88	ASP
17	Y	89	ASN
17	Y	112	LEU
17	Y	115	SER
17	Y	117	LEU
17	Y	129	CYS
17	Y	130	LEU
17	Y	147	MET
17	Y	158	GLU
17	Y	165	GLU
17	Y	166	THR
17	Y	169	VAL
17	Y	174	LYS
17	Y	175	VAL
17	Y	176	SER
17	Y	179	VAL
17	Y	188	SER
17	Y	192	LEU
17	Y	194	GLU
17	Y	197	ASP
17	Y	201	VAL
17	Y	203	ASP
17	Y	207	LEU
17	Y	215	LEU
17	Y	219	THR
17	Y	221	THR
17	Y	225	LEU
17	Y	228	LEU
17	Y	234	SER
17	Y	240	LEU
17	Y	248	SER
17	Y	268	ILE
17	Y	273	LEU
17	Y	278	SER
17	Y	311	LEU
17	Y	314	SER
17	Y	320	ARG
17	Y	322	SER
17	Y	325	GLU

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Mol	Chain	Res	Type
17	Y	328	GLU
17	Y	330	MET
17	Y	336	LYS
17	Y	349	ILE
17	Y	351	SER
17	Y	352	SER
17	Y	355	ASP
17	Y	361	LEU
17	Y	366	THR
17	Y	377	MET
17	Y	380	ARG
17	Y	386	THR
17	Y	406	MET
17	Y	412	GLU
17	Y	417	ASP
22	Z	180	LYS
4	d	124	LYS
18	s	1	MET
18	s	2	ARG
18	s	23	LEU
18	s	56	THR
18	s	60	LYS
18	s	80	THR
18	s	84	ARG
18	s	93	ILE
18	s	94	SER
18	s	112	LYS
18	s	116	ASP
18	s	117	LEU
18	s	122	ILE
18	s	123	ARG
18	s	124	LYS
18	s	130	THR
18	s	133	GLN
18	s	151	SER
18	s	153	LEU
18	s	157	LEU
18	s	165	SER
18	s	195	LEU
18	s	204	LEU
18	s	205	ASP
18	s	207	GLU

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Mol	Chain	Res	Type
18	s	209	ILE
18	s	213	CYS
18	s	220	GLU
18	s	225	THR
18	s	230	LEU
18	s	235	ILE
18	s	236	SER
18	s	241	SER
18	s	248	LEU
18	s	250	VAL
18	s	251	ASP
18	s	276	ILE
18	s	277	SER
18	s	292	THR
18	s	304	LYS
18	s	318	MET
18	s	323	VAL
18	s	338	LYS
18	s	341	ILE
18	s	342	GLN
18	s	361	THR
18	s	373	ARG
18	s	378	ILE
18	s	389	SER
18	s	402	ARG
18	s	422	ARG
18	s	430	LYS
18	s	431	ASP
18	s	437	ILE
18	s	439	THR
17	u	1	MET
17	u	2	ARG
17	u	3	GLU
17	u	4	ILE
17	u	5	VAL
17	u	7	ILE
17	u	25	SER
17	u	31	ASP
17	u	33	THR
17	u	35	THR
17	u	53	GLU
17	u	60	VAL

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Mol	Chain	Res	Type
17	u	64	ILE
17	u	68	LEU
17	u	73	MET
17	u	74	ASP
17	u	88	ASP
17	u	89	ASN
17	u	112	LEU
17	u	115	SER
17	u	117	LEU
17	u	129	CYS
17	u	130	LEU
17	u	147	MET
17	u	158	GLU
17	u	165	GLU
17	u	166	THR
17	u	169	VAL
17	u	174	LYS
17	u	175	VAL
17	u	176	SER
17	u	179	VAL
17	u	188	SER
17	u	192	LEU
17	u	194	GLU
17	u	197	ASP
17	u	201	VAL
17	u	203	ASP
17	u	207	LEU
17	u	215	LEU
17	u	219	THR
17	u	221	THR
17	u	225	LEU
17	u	228	LEU
17	u	234	SER
17	u	240	LEU
17	u	248	SER
17	u	268	ILE
17	u	273	LEU
17	u	278	SER
17	u	311	LEU
17	u	314	SER
17	u	320	ARG
17	u	322	SER

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Mol	Chain	Res	Type
17	u	325	GLU
17	u	328	GLU
17	u	330	MET
17	u	336	LYS
17	u	349	ILE
17	u	351	SER
17	u	352	SER
17	u	355	ASP
17	u	361	LEU
17	u	366	THR
17	u	377	MET
17	u	380	ARG
17	u	386	THR
17	u	406	MET
17	u	412	GLU
17	u	417	ASP
18	r	1	MET
18	r	2	ARG
18	r	23	LEU
18	r	56	THR
18	r	60	LYS
18	r	80	THR
18	r	84	ARG
18	r	93	ILE
18	r	94	SER
18	r	112	LYS
18	r	116	ASP
18	r	117	LEU
18	r	122	ILE
18	r	123	ARG
18	r	124	LYS
18	r	130	THR
18	r	133	GLN
18	r	151	SER
18	r	153	LEU
18	r	157	LEU
18	r	165	SER
18	r	195	LEU
18	r	204	LEU
18	r	205	ASP
18	r	207	GLU
18	r	209	ILE

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Mol	Chain	Res	Type
18	r	213	CYS
18	r	220	GLU
18	r	225	THR
18	r	230	LEU
18	r	235	ILE
18	r	236	SER
18	r	241	SER
18	r	248	LEU
18	r	250	VAL
18	r	251	ASP
18	r	276	ILE
18	r	277	SER
18	r	292	THR
18	r	304	LYS
18	r	318	MET
18	r	323	VAL
18	r	338	LYS
18	r	341	ILE
18	r	342	GLN
18	r	361	THR
18	r	373	ARG
18	r	378	ILE
18	r	389	SER
18	r	402	ARG
18	r	422	ARG
18	r	430	LYS
18	r	431	ASP
18	r	437	ILE
18	r	439	THR
17	q	1	MET
17	q	2	ARG
17	q	3	GLU
17	q	4	ILE
17	q	5	VAL
17	q	7	ILE
17	q	25	SER
17	q	31	ASP
17	q	33	THR
17	q	35	THR
17	q	53	GLU
17	q	60	VAL
17	q	64	ILE

Continued on next page...

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Mol	Chain	Res	Type
17	q	68	LEU
17	q	73	MET
17	q	74	ASP
17	q	88	ASP
17	q	89	ASN
17	q	112	LEU
17	q	115	SER
17	q	117	LEU
17	q	129	CYS
17	q	130	LEU
17	q	147	MET
17	q	158	GLU
17	q	165	GLU
17	q	166	THR
17	q	169	VAL
17	q	174	LYS
17	q	175	VAL
17	q	176	SER
17	q	179	VAL
17	q	188	SER
17	q	192	LEU
17	q	194	GLU
17	q	197	ASP
17	q	201	VAL
17	q	203	ASP
17	q	207	LEU
17	q	215	LEU
17	q	219	THR
17	q	221	THR
17	q	225	LEU
17	q	228	LEU
17	q	234	SER
17	q	240	LEU
17	q	248	SER
17	q	268	ILE
17	q	273	LEU
17	q	278	SER
17	q	311	LEU
17	q	314	SER
17	q	320	ARG
17	q	322	SER
17	q	325	GLU

Continued on next page...

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Mol	Chain	Res	Type
17	q	328	GLU
17	q	330	MET
17	q	336	LYS
17	q	349	ILE
17	q	351	SER
17	q	352	SER
17	q	355	ASP
17	q	361	LEU
17	q	366	THR
17	q	377	MET
17	q	380	ARG
17	q	386	THR
17	q	406	MET
17	q	412	GLU
17	q	417	ASP
18	w	1	MET
18	w	2	ARG
18	w	23	LEU
18	w	56	THR
18	w	60	LYS
18	w	80	THR
18	w	84	ARG
18	w	93	ILE
18	w	94	SER
18	w	112	LYS
18	w	116	ASP
18	w	117	LEU
18	w	122	ILE
18	w	123	ARG
18	w	124	LYS
18	w	130	THR
18	w	133	GLN
18	w	151	SER
18	w	153	LEU
18	w	157	LEU
18	w	165	SER
18	w	195	LEU
18	w	204	LEU
18	w	205	ASP
18	w	207	GLU
18	w	209	ILE
18	w	213	CYS

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Mol	Chain	Res	Type
18	w	220	GLU
18	w	225	THR
18	w	230	LEU
18	w	235	ILE
18	w	236	SER
18	w	241	SER
18	w	248	LEU
18	w	250	VAL
18	w	251	ASP
18	w	276	ILE
18	w	277	SER
18	w	292	THR
18	w	304	LYS
18	w	318	MET
18	w	323	VAL
18	w	338	LYS
18	w	341	ILE
18	w	342	GLN
18	w	361	THR
18	w	373	ARG
18	w	378	ILE
18	w	389	SER
18	w	402	ARG
18	w	422	ARG
18	w	430	LYS
18	w	431	ASP
18	w	437	ILE
18	w	439	THR
17	y	1	MET
17	y	2	ARG
17	y	3	GLU
17	y	4	ILE
17	y	5	VAL
17	y	7	ILE
17	y	25	SER
17	y	31	ASP
17	y	33	THR
17	y	35	THR
17	y	53	GLU
17	y	60	VAL
17	y	64	ILE
17	y	68	LEU

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Mol	Chain	Res	Type
17	y	73	MET
17	y	74	ASP
17	y	88	ASP
17	y	89	ASN
17	y	112	LEU
17	y	115	SER
17	y	117	LEU
17	y	129	CYS
17	y	130	LEU
17	y	147	MET
17	y	158	GLU
17	y	165	GLU
17	y	166	THR
17	y	169	VAL
17	y	174	LYS
17	y	175	VAL
17	y	176	SER
17	y	179	VAL
17	y	188	SER
17	y	192	LEU
17	y	194	GLU
17	y	197	ASP
17	y	201	VAL
17	y	203	ASP
17	y	207	LEU
17	y	215	LEU
17	y	219	THR
17	y	221	THR
17	y	225	LEU
17	y	228	LEU
17	y	234	SER
17	y	240	LEU
17	y	248	SER
17	y	268	ILE
17	y	273	LEU
17	y	278	SER
17	y	311	LEU
17	y	314	SER
17	y	320	ARG
17	y	322	SER
17	y	325	GLU
17	y	328	GLU

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Mol	Chain	Res	Type
17	y	330	MET
17	y	336	LYS
17	y	349	ILE
17	y	351	SER
17	y	352	SER
17	y	355	ASP
17	y	361	LEU
17	y	366	THR
17	y	377	MET
17	y	380	ARG
17	y	386	THR
17	y	406	MET
17	y	412	GLU
17	y	417	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (257) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	12	GLN
1	A	44	ASN
1	A	55	ASN
1	A	184	ASN
1	A	284	ASN
1	A	343	ASN
2	B	45	ASN
2	B	54	GLN
2	B	60	ASN
2	B	77	GLN
2	B	134	GLN
2	B	138	ASN
2	B	156	ASN
2	B	160	GLN
2	B	167	GLN
2	B	223	ASN
2	B	236	ASN
2	B	322	HIS
2	B	335	ASN
2	B	404	ASN
2	B	437	ASN
2	B	553	GLN
2	B	666	ASN
2	B	724	HIS

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Mol	Chain	Res	Type
2	B	876	GLN
2	B	894	ASN
2	B	922	ASN
2	B	935	ASN
2	B	1034	ASN
2	B	1104	ASN
2	B	1175	ASN
2	B	1189	GLN
2	B	1258	ASN
2	B	1323	ASN
2	B	1332	GLN
2	B	1428	ASN
2	B	1435	GLN
2	B	1449	GLN
2	B	1516	ASN
2	B	1530	ASN
2	B	1586	GLN
2	B	1770	ASN
2	B	1945	GLN
2	B	1993	GLN
2	B	2038	ASN
2	B	2069	GLN
2	B	2178	HIS
2	B	2203	ASN
2	B	2290	ASN
2	B	2345	ASN
2	B	2380	GLN
2	B	2462	ASN
2	B	2638	GLN
2	B	2693	ASN
2	B	2704	GLN
2	B	2764	GLN
2	B	2788	HIS
2	B	2907	ASN
2	B	2923	ASN
2	B	2927	ASN
2	B	2928	ASN
2	B	2952	GLN
2	B	3015	ASN
2	B	3076	GLN
2	B	3081	ASN
2	B	3130	GLN

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Mol	Chain	Res	Type
2	B	3132	GLN
2	B	3148	ASN
2	B	3540	GLN
2	B	3552	ASN
2	B	3680	GLN
2	B	3681	ASN
2	B	3714	GLN
2	B	3820	HIS
2	B	3861	ASN
2	B	3903	ASN
2	B	3944	ASN
2	B	3961	GLN
2	B	4021	GLN
2	B	4177	GLN
2	B	4184	ASN
2	B	4198	HIS
2	B	4243	ASN
2	B	4325	ASN
2	B	4341	ASN
2	B	4357	ASN
3	C	39	ASN
3	C	51	ASN
3	C	62	GLN
3	C	74	GLN
3	C	89	GLN
3	C	111	GLN
3	C	126	ASN
3	C	152	GLN
3	C	218	ASN
3	C	278	HIS
3	C	350	HIS
3	C	357	ASN
3	C	424	ASN
3	C	468	GLN
3	C	477	ASN
3	C	575	ASN
3	C	678	HIS
3	C	741	ASN
3	C	809	ASN
3	C	864	GLN
3	C	971	ASN
3	C	974	GLN

Continued on next page...

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Mol	Chain	Res	Type
3	C	975	GLN
3	C	1098	GLN
3	C	1186	ASN
3	C	1214	GLN
3	C	1306	ASN
3	C	1388	ASN
3	C	1395	ASN
3	C	1426	GLN
3	C	1444	GLN
3	C	1578	ASN
3	C	1705	GLN
3	C	1721	GLN
3	C	1736	ASN
3	C	1745	ASN
3	C	1755	ASN
3	C	1760	HIS
3	C	1762	ASN
3	C	1791	GLN
3	C	1860	GLN
3	C	1916	GLN
3	C	1950	GLN
3	C	2028	ASN
3	C	2220	ASN
3	C	2221	ASN
3	C	2333	ASN
3	C	2408	HIS
3	C	2420	GLN
3	C	2483	HIS
3	C	2521	ASN
3	C	2573	GLN
3	C	2606	GLN
3	C	2691	HIS
3	C	2886	ASN
3	C	3434	GLN
3	C	3517	ASN
3	C	3523	ASN
3	C	3539	ASN
3	C	3560	HIS
3	C	3585	ASN
3	C	3689	GLN
3	C	3694	ASN
3	C	3703	GLN

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Mol	Chain	Res	Type
3	C	3717	ASN
3	C	4065	GLN
3	C	4115	GLN
3	C	4298	ASN
3	C	4351	ASN
3	C	4471	GLN
3	C	4479	GLN
3	C	4562	ASN
3	C	4574	ASN
4	D	535	GLN
5	E	204	ASN
5	E	471	ASN
5	E	498	GLN
5	E	518	ASN
6	F	72	ASN
7	G	70	HIS
7	G	98	ASN
7	G	129	GLN
8	H	36	ASN
9	I	26	ASN
9	I	48	ASN
9	I	76	GLN
10	J	23	ASN
10	J	40	ASN
10	J	59	HIS
10	J	65	HIS
11	K	91	ASN
11	K	93	ASN
12	L	28	GLN
12	L	81	ASN
13	M	26	ASN
13	M	54	ASN
13	M	60	ASN
14	N	57	ASN
15	O	39	ASN
15	O	44	ASN
15	O	48	GLN
15	O	78	HIS
16	P	79	HIS
17	Q	6	HIS
17	Q	8	GLN
17	Q	99	ASN

Continued on next page...

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Mol	Chain	Res	Type
17	Q	105	HIS
17	Q	307	HIS
17	Q	396	HIS
18	R	31	GLN
18	R	133	GLN
18	S	31	GLN
18	S	133	GLN
19	T	165	ASN
17	U	6	HIS
17	U	8	GLN
17	U	48	ASN
17	U	99	ASN
17	U	105	HIS
17	U	307	HIS
17	U	396	HIS
18	W	31	GLN
18	W	133	GLN
21	X	150	ASN
21	X	199	HIS
21	X	209	HIS
21	X	213	HIS
17	Y	6	HIS
17	Y	8	GLN
17	Y	48	ASN
17	Y	94	GLN
17	Y	105	HIS
17	Y	307	HIS
17	Y	396	HIS
22	Z	85	GLN
22	Z	93	GLN
22	Z	147	ASN
22	Z	162	GLN
22	Z	176	ASN
4	d	164	ASN
5	e	52	ASN
18	s	31	GLN
18	s	133	GLN
17	u	6	HIS
17	u	8	GLN
17	u	48	ASN
17	u	99	ASN
17	u	105	HIS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
17	u	307	HIS
17	u	334	GLN
17	u	396	HIS
18	r	31	GLN
18	r	133	GLN
17	q	6	HIS
17	q	8	GLN
17	q	48	ASN
17	q	99	ASN
17	q	105	HIS
17	q	307	HIS
17	q	334	GLN
17	q	396	HIS
18	w	31	GLN
18	w	133	GLN
17	y	6	HIS
17	y	8	GLN
17	y	48	ASN
17	y	94	GLN
17	y	105	HIS
17	y	307	HIS
17	y	334	GLN
17	y	396	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 21 ligands modelled in this entry, 6 are monoatomic - leaving 15 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
25	GDP	u	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.33	4 (13%)
24	ATP	C	4702	-	26,33,33	1.01	2 (7%)	31,52,52	1.56	4 (12%)
25	GDP	y	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.34	4 (13%)
26	GTP	s	501	27	26,34,34	1.13	2 (7%)	32,54,54	1.56	7 (21%)
26	GTP	r	501	27	26,34,34	1.12	2 (7%)	32,54,54	1.56	7 (21%)
26	GTP	R	501	27	26,34,34	1.12	2 (7%)	32,54,54	1.56	7 (21%)
23	ADP	C	4701	-	24,29,29	0.95	1 (4%)	29,45,45	2.81	8 (27%)
26	GTP	W	501	27	26,34,34	1.12	2 (7%)	32,54,54	1.56	7 (21%)
25	GDP	U	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.33	4 (13%)
25	GDP	q	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.33	4 (13%)
26	GTP	w	501	27	26,34,34	1.12	2 (7%)	32,54,54	1.56	7 (21%)
25	GDP	Y	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.33	4 (13%)
23	ADP	C	4703	-	24,29,29	1.59	4 (16%)	29,45,45	3.98	13 (44%)
25	GDP	Q	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.34	4 (13%)
26	GTP	S	501	27	26,34,34	1.13	2 (7%)	32,54,54	1.56	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
25	GDP	u	501	-	-	2/12/32/32	0/3/3/3
24	ATP	C	4702	-	-	1/18/38/38	0/3/3/3
25	GDP	y	501	-	-	2/12/32/32	0/3/3/3
26	GTP	s	501	27	-	3/18/38/38	0/3/3/3
26	GTP	r	501	27	-	3/18/38/38	0/3/3/3
26	GTP	R	501	27	-	3/18/38/38	0/3/3/3
23	ADP	C	4701	-	-	5/12/32/32	0/3/3/3
26	GTP	W	501	27	-	3/18/38/38	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
25	GDP	U	501	-	-	2/12/32/32	0/3/3/3
25	GDP	q	501	-	-	2/12/32/32	0/3/3/3
26	GTP	w	501	27	-	3/18/38/38	0/3/3/3
25	GDP	Y	501	-	-	2/12/32/32	0/3/3/3
23	ADP	C	4703	-	-	4/12/32/32	0/3/3/3
25	GDP	Q	501	-	-	2/12/32/32	0/3/3/3
26	GTP	S	501	27	-	3/18/38/38	0/3/3/3

All (25) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
26	s	501	GTP	C5-C6	-4.02	1.39	1.47
26	r	501	GTP	C5-C6	-4.00	1.39	1.47
26	S	501	GTP	C5-C6	-3.99	1.39	1.47
26	w	501	GTP	C5-C6	-3.99	1.39	1.47
26	W	501	GTP	C5-C6	-3.98	1.39	1.47
26	R	501	GTP	C5-C6	-3.97	1.39	1.47
23	C	4703	ADP	O4'-C4'	3.83	1.53	1.45
23	C	4703	ADP	C5-C4	3.81	1.51	1.40
23	C	4701	ADP	C5-C4	2.72	1.48	1.40
24	C	4702	ATP	C5-C4	2.44	1.47	1.40
25	y	501	GDP	C6-N1	-2.34	1.34	1.37
25	Q	501	GDP	C6-N1	-2.29	1.34	1.37
25	u	501	GDP	C6-N1	-2.29	1.34	1.37
25	q	501	GDP	C6-N1	-2.29	1.34	1.37
25	U	501	GDP	C6-N1	-2.27	1.34	1.37
25	Y	501	GDP	C6-N1	-2.25	1.34	1.37
24	C	4702	ATP	C2-N3	2.22	1.35	1.32
26	S	501	GTP	C2-N3	2.19	1.38	1.33
26	s	501	GTP	C2-N3	2.18	1.38	1.33
26	R	501	GTP	C2-N3	2.16	1.38	1.33
26	r	501	GTP	C2-N3	2.16	1.38	1.33
26	w	501	GTP	C2-N3	2.16	1.38	1.33
26	W	501	GTP	C2-N3	2.16	1.38	1.33
23	C	4703	ADP	C5'-C4'	2.13	1.58	1.51
23	C	4703	ADP	C3'-C4'	-2.06	1.47	1.53

All (91) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
23	C	4703	ADP	O4'-C1'-C2'	-14.20	86.18	106.93
23	C	4701	ADP	O5'-PA-O1A	-8.60	75.47	109.07
23	C	4703	ADP	C2'-C3'-C4'	-8.40	86.32	102.64
23	C	4701	ADP	O2A-PA-O1A	7.06	147.16	112.24
23	C	4703	ADP	C1'-N9-C4	6.74	138.49	126.64
23	C	4701	ADP	O2A-PA-O5'	-5.99	79.94	107.75
23	C	4703	ADP	C4-C5-N7	-5.23	103.95	109.40
23	C	4701	ADP	C4-C5-N7	-4.76	104.44	109.40
23	C	4703	ADP	C3'-C2'-C1'	4.68	108.03	100.98
23	C	4703	ADP	O5'-C5'-C4'	4.30	123.80	108.99
23	C	4703	ADP	PA-O3A-PB	-4.09	118.80	132.83
24	C	4702	ATP	PA-O3A-PB	-4.08	118.82	132.83
26	r	501	GTP	PA-O3A-PB	-3.91	119.40	132.83
26	W	501	GTP	PA-O3A-PB	-3.91	119.42	132.83
26	R	501	GTP	PA-O3A-PB	-3.91	119.42	132.83
26	s	501	GTP	PA-O3A-PB	-3.90	119.43	132.83
26	w	501	GTP	PA-O3A-PB	-3.90	119.44	132.83
26	S	501	GTP	PA-O3A-PB	-3.90	119.45	132.83
24	C	4702	ATP	N3-C2-N1	-3.61	123.03	128.68
25	Y	501	GDP	PA-O3A-PB	-3.59	120.51	132.83
25	Q	501	GDP	PA-O3A-PB	-3.59	120.52	132.83
25	u	501	GDP	PA-O3A-PB	-3.59	120.52	132.83
25	q	501	GDP	PA-O3A-PB	-3.58	120.54	132.83
25	y	501	GDP	PA-O3A-PB	-3.58	120.54	132.83
25	U	501	GDP	PA-O3A-PB	-3.57	120.56	132.83
23	C	4703	ADP	O4'-C4'-C5'	3.48	120.82	109.37
24	C	4702	ATP	PB-O3B-PG	-3.32	121.44	132.83
23	C	4703	ADP	O4'-C4'-C3'	-3.28	98.63	105.11
25	y	501	GDP	C3'-C2'-C1'	3.25	105.88	100.98
25	u	501	GDP	C3'-C2'-C1'	3.25	105.87	100.98
25	Q	501	GDP	C3'-C2'-C1'	3.24	105.86	100.98
23	C	4701	ADP	PA-O3A-PB	-3.23	121.73	132.83
25	q	501	GDP	C3'-C2'-C1'	3.23	105.84	100.98
25	Y	501	GDP	C3'-C2'-C1'	3.22	105.83	100.98
25	U	501	GDP	C3'-C2'-C1'	3.20	105.80	100.98
26	W	501	GTP	C5-C6-N1	3.19	119.58	113.95
26	w	501	GTP	C5-C6-N1	3.18	119.56	113.95
26	r	501	GTP	C5-C6-N1	3.18	119.56	113.95
26	S	501	GTP	C5-C6-N1	3.16	119.54	113.95
26	s	501	GTP	C5-C6-N1	3.16	119.54	113.95
26	R	501	GTP	C5-C6-N1	3.15	119.52	113.95
26	W	501	GTP	PB-O3B-PG	-3.13	122.10	132.83
26	w	501	GTP	PB-O3B-PG	-3.12	122.11	132.83

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
26	s	501	GTP	PB-O3B-PG	-3.12	122.12	132.83
26	r	501	GTP	PB-O3B-PG	-3.12	122.12	132.83
26	R	501	GTP	PB-O3B-PG	-3.12	122.13	132.83
26	S	501	GTP	PB-O3B-PG	-3.11	122.16	132.83
26	w	501	GTP	C8-N7-C5	2.99	108.68	102.99
26	W	501	GTP	C8-N7-C5	2.98	108.66	102.99
26	R	501	GTP	C8-N7-C5	2.97	108.65	102.99
26	S	501	GTP	C8-N7-C5	2.96	108.63	102.99
26	r	501	GTP	C8-N7-C5	2.96	108.63	102.99
26	s	501	GTP	C8-N7-C5	2.96	108.62	102.99
23	C	4701	ADP	N3-C2-N1	-2.95	124.07	128.68
26	W	501	GTP	C2-N1-C6	-2.95	119.67	125.10
26	w	501	GTP	C2-N1-C6	-2.94	119.68	125.10
26	r	501	GTP	C2-N1-C6	-2.93	119.71	125.10
26	S	501	GTP	C2-N1-C6	-2.93	119.71	125.10
23	C	4703	ADP	O2'-C2'-C1'	2.92	121.63	110.85
26	s	501	GTP	C2-N1-C6	-2.92	119.73	125.10
26	R	501	GTP	C2-N1-C6	-2.91	119.73	125.10
24	C	4702	ATP	C4-C5-N7	-2.86	106.42	109.40
26	S	501	GTP	C3'-C2'-C1'	2.80	105.20	100.98
26	w	501	GTP	C3'-C2'-C1'	2.80	105.19	100.98
26	R	501	GTP	C3'-C2'-C1'	2.79	105.18	100.98
26	W	501	GTP	C3'-C2'-C1'	2.79	105.18	100.98
26	s	501	GTP	C3'-C2'-C1'	2.78	105.16	100.98
26	r	501	GTP	C3'-C2'-C1'	2.77	105.15	100.98
23	C	4703	ADP	N6-C6-N1	2.60	123.96	118.57
25	Q	501	GDP	C8-N7-C5	2.37	107.50	102.99
25	q	501	GDP	C8-N7-C5	2.37	107.50	102.99
25	y	501	GDP	C8-N7-C5	2.36	107.49	102.99
25	U	501	GDP	C8-N7-C5	2.36	107.49	102.99
25	u	501	GDP	C8-N7-C5	2.36	107.48	102.99
25	Y	501	GDP	C8-N7-C5	2.35	107.46	102.99
23	C	4703	ADP	C5-C6-N6	-2.27	116.90	120.35
26	W	501	GTP	O6-C6-C5	-2.16	120.16	124.37
25	y	501	GDP	C5-C6-N1	2.15	117.75	113.95
26	r	501	GTP	O6-C6-C5	-2.15	120.18	124.37
26	w	501	GTP	O6-C6-C5	-2.15	120.18	124.37
25	U	501	GDP	C5-C6-N1	2.14	117.73	113.95
25	Q	501	GDP	C5-C6-N1	2.14	117.73	113.95
26	s	501	GTP	O6-C6-C5	-2.14	120.20	124.37
25	Y	501	GDP	C5-C6-N1	2.13	117.71	113.95
25	q	501	GDP	C5-C6-N1	2.13	117.71	113.95

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
26	R	501	GTP	O6-C6-C5	-2.12	120.22	124.37
26	S	501	GTP	O6-C6-C5	-2.12	120.22	124.37
25	u	501	GDP	C5-C6-N1	2.11	117.68	113.95
23	C	4701	ADP	O3B-PB-O2B	2.03	115.38	107.64
23	C	4701	ADP	C2-N1-C6	2.02	122.20	118.75
23	C	4703	ADP	C2-N1-C6	-2.00	115.33	118.75

There are no chirality outliers.

All (40) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
23	C	4701	ADP	C5'-O5'-PA-O3A
23	C	4701	ADP	O4'-C4'-C5'-O5'
23	C	4701	ADP	C3'-C4'-C5'-O5'
26	R	501	GTP	C5'-O5'-PA-O3A
26	S	501	GTP	C5'-O5'-PA-O3A
26	W	501	GTP	C5'-O5'-PA-O3A
26	s	501	GTP	C5'-O5'-PA-O3A
26	r	501	GTP	C5'-O5'-PA-O3A
26	w	501	GTP	C5'-O5'-PA-O3A
23	C	4703	ADP	O4'-C4'-C5'-O5'
23	C	4703	ADP	C3'-C4'-C5'-O5'
25	Q	501	GDP	C3'-C4'-C5'-O5'
25	U	501	GDP	C3'-C4'-C5'-O5'
25	Y	501	GDP	C3'-C4'-C5'-O5'
25	u	501	GDP	C3'-C4'-C5'-O5'
25	q	501	GDP	C3'-C4'-C5'-O5'
25	y	501	GDP	C3'-C4'-C5'-O5'
23	C	4701	ADP	C5'-O5'-PA-O1A
26	R	501	GTP	C5'-O5'-PA-O1A
26	R	501	GTP	C5'-O5'-PA-O2A
26	S	501	GTP	C5'-O5'-PA-O1A
26	S	501	GTP	C5'-O5'-PA-O2A
26	W	501	GTP	C5'-O5'-PA-O1A
26	W	501	GTP	C5'-O5'-PA-O2A
26	s	501	GTP	C5'-O5'-PA-O1A
26	s	501	GTP	C5'-O5'-PA-O2A
26	r	501	GTP	C5'-O5'-PA-O1A
26	r	501	GTP	C5'-O5'-PA-O2A
26	w	501	GTP	C5'-O5'-PA-O1A
26	w	501	GTP	C5'-O5'-PA-O2A
23	C	4703	ADP	PB-O3A-PA-O2A

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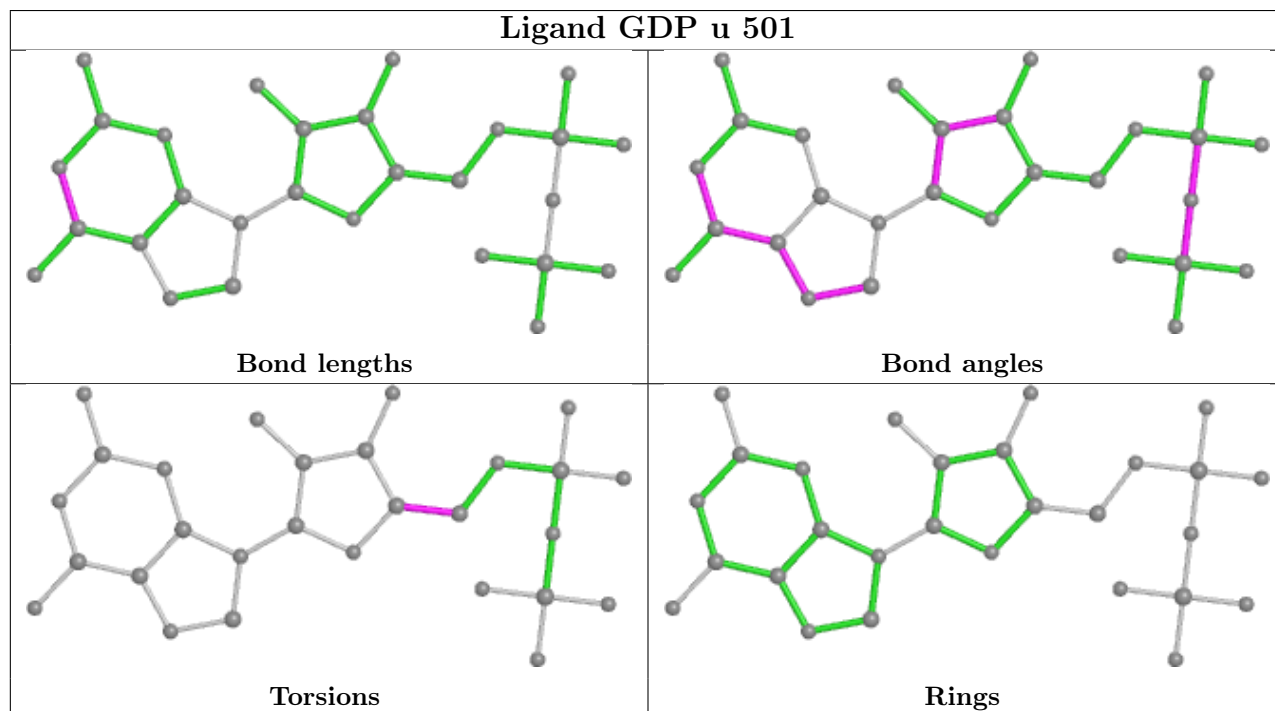
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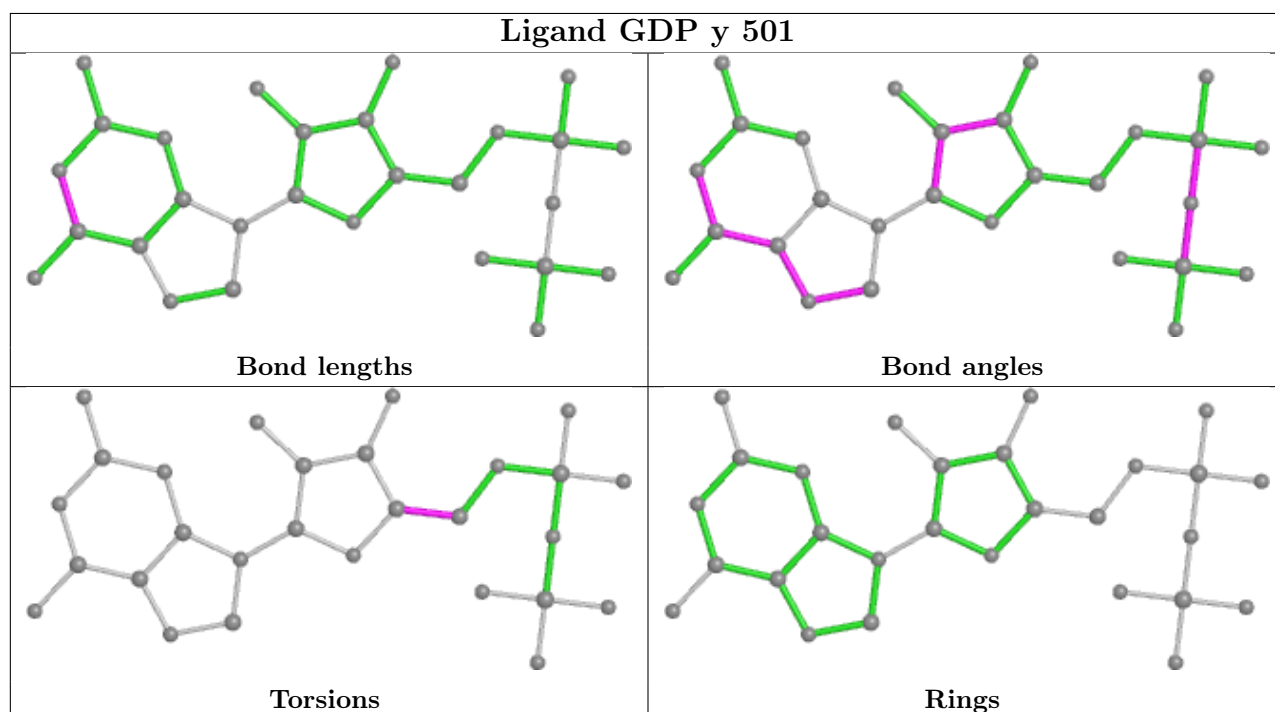
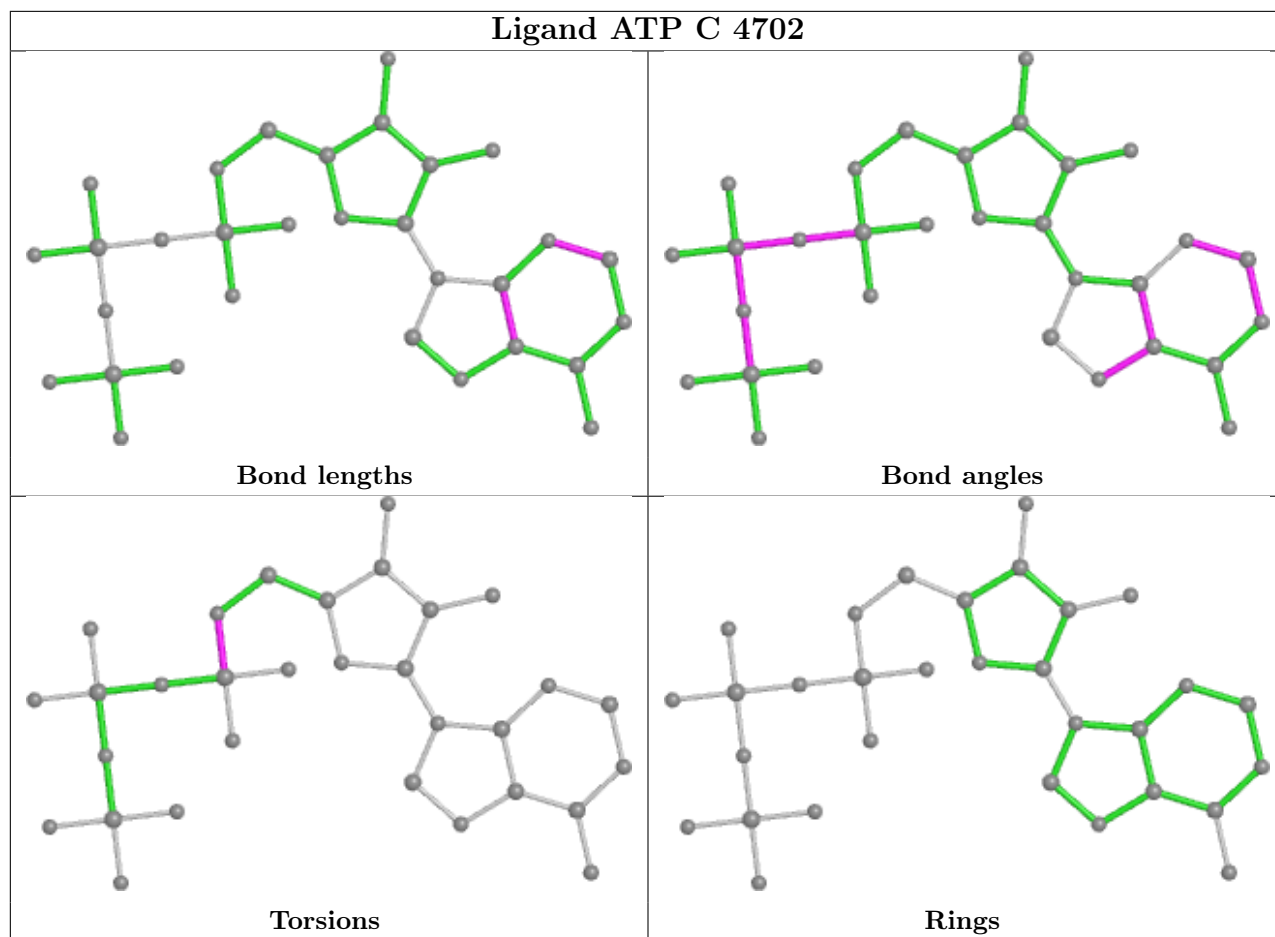
Mol	Chain	Res	Type	Atoms
23	C	4701	ADP	PB-O3A-PA-O1A
25	Q	501	GDP	O4'-C4'-C5'-O5'
25	U	501	GDP	O4'-C4'-C5'-O5'
25	Y	501	GDP	O4'-C4'-C5'-O5'
25	u	501	GDP	O4'-C4'-C5'-O5'
25	q	501	GDP	O4'-C4'-C5'-O5'
25	y	501	GDP	O4'-C4'-C5'-O5'
24	C	4702	ATP	C5'-O5'-PA-O3A
23	C	4703	ADP	C5'-O5'-PA-O1A

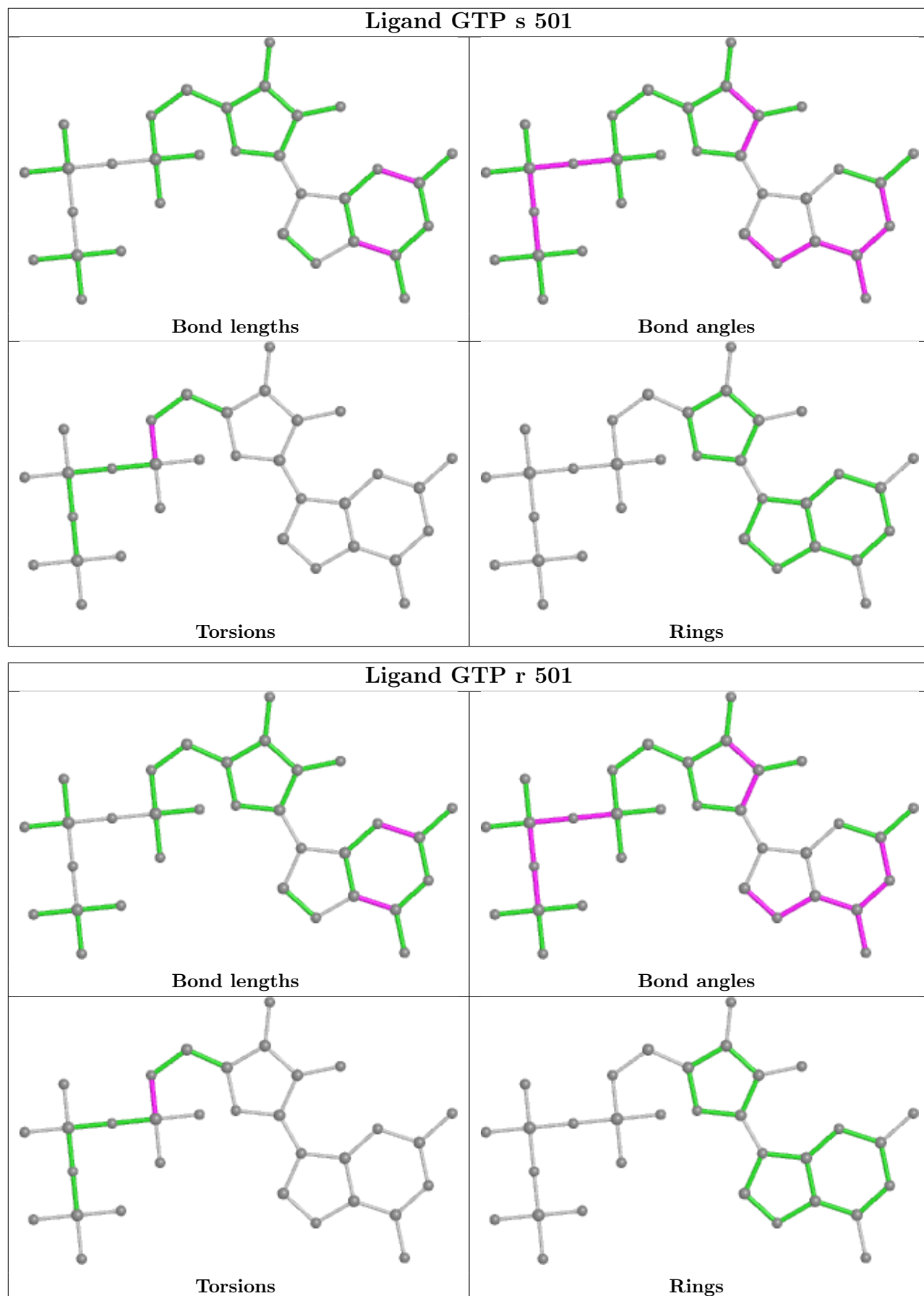
There are no ring outliers.

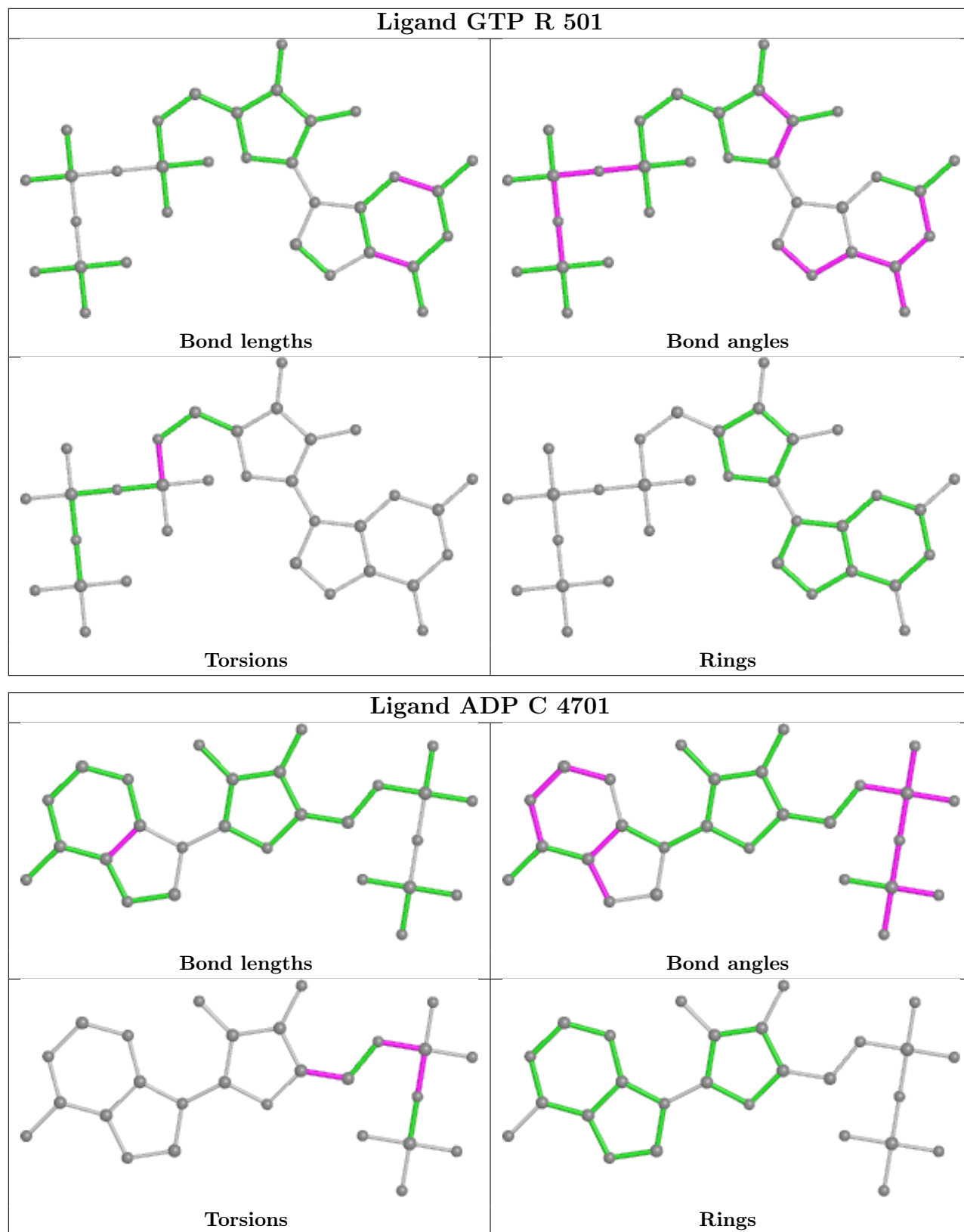
No monomer is involved in short contacts.

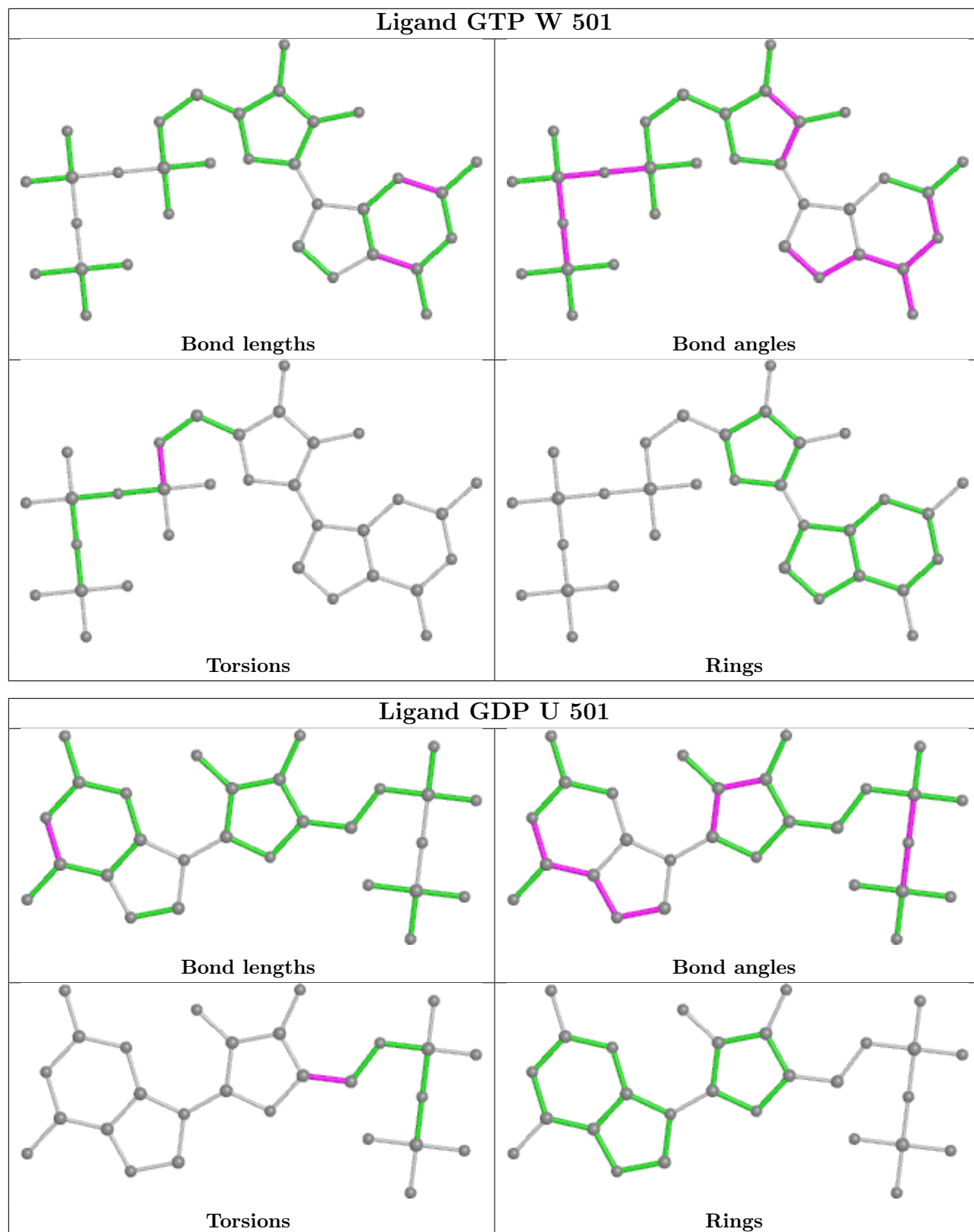
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

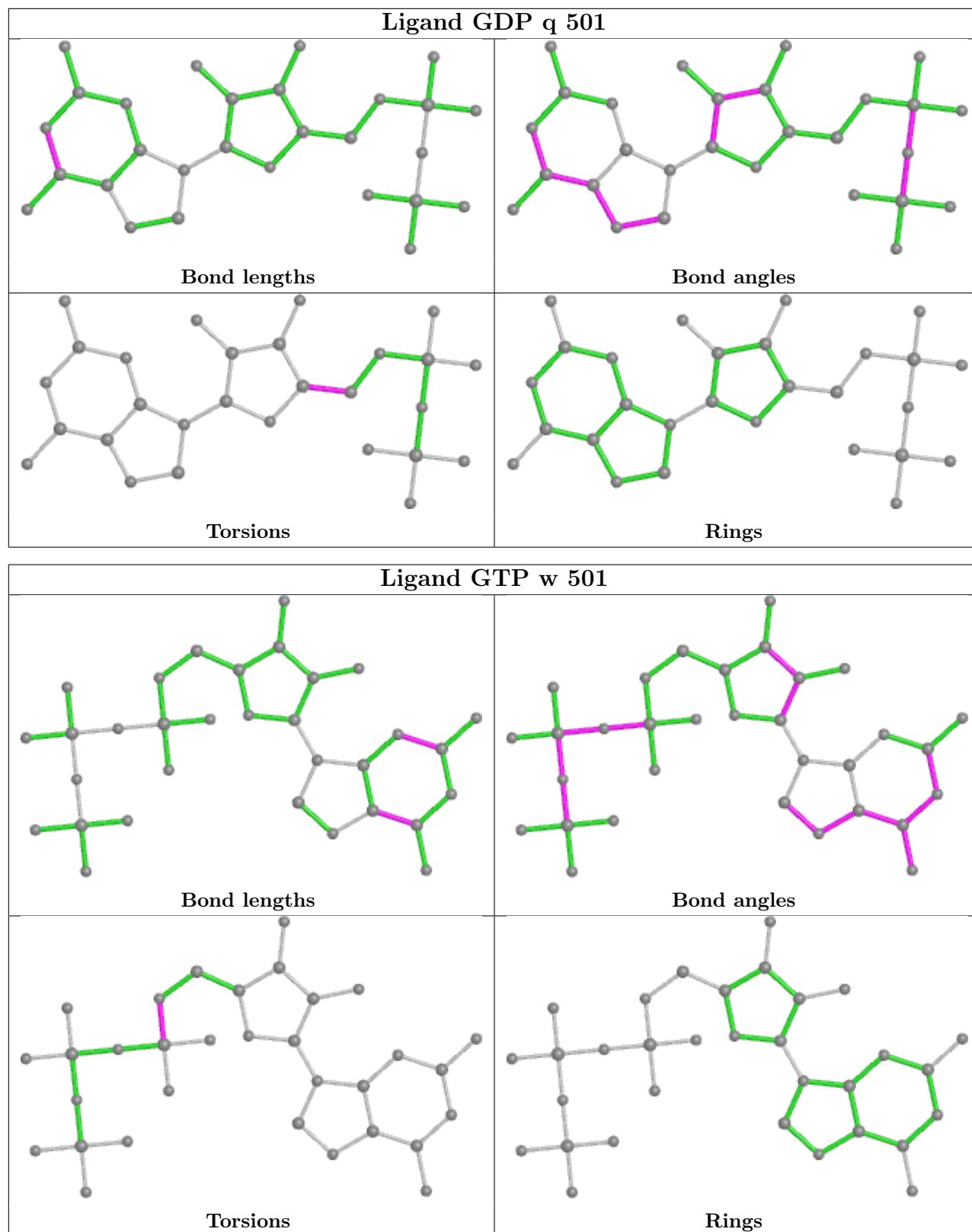


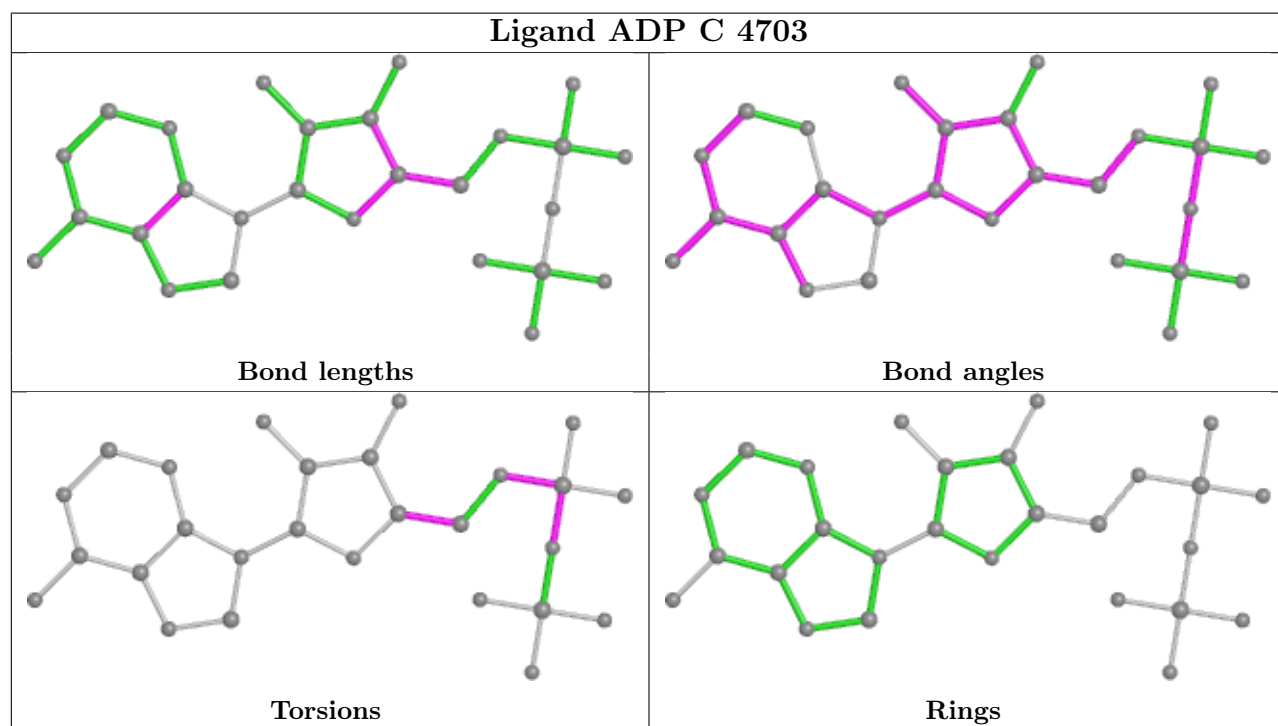
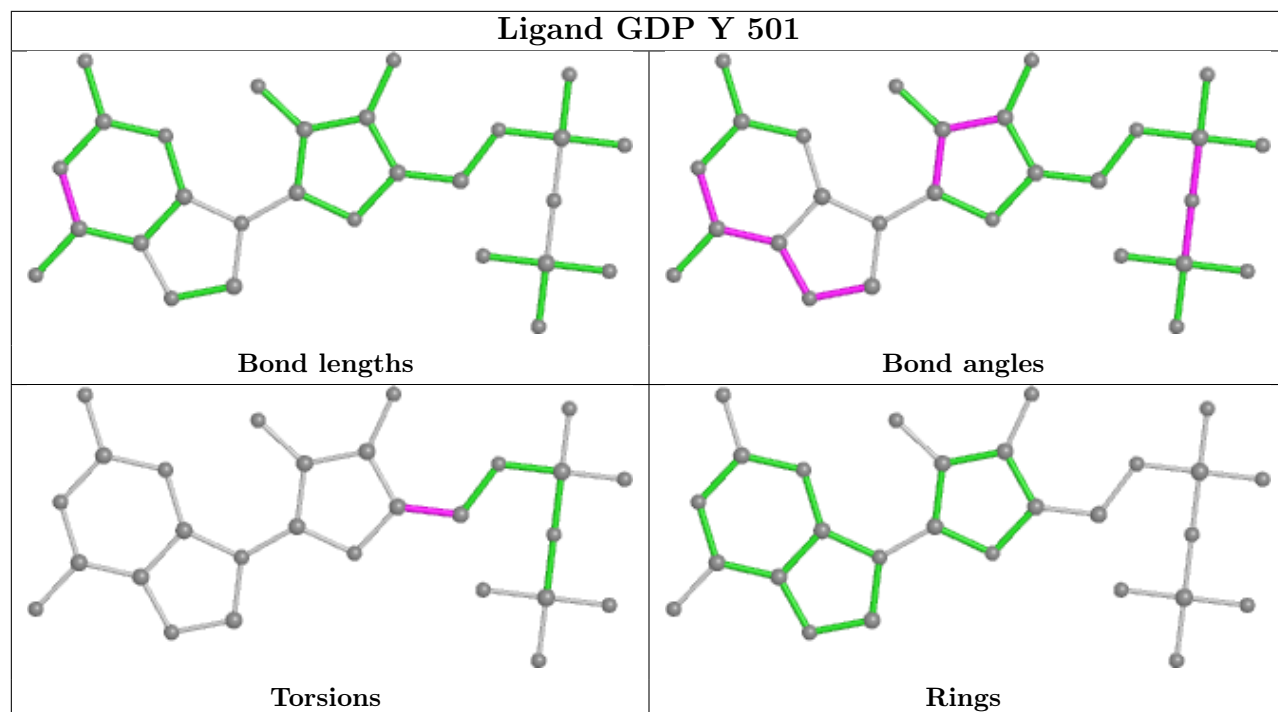


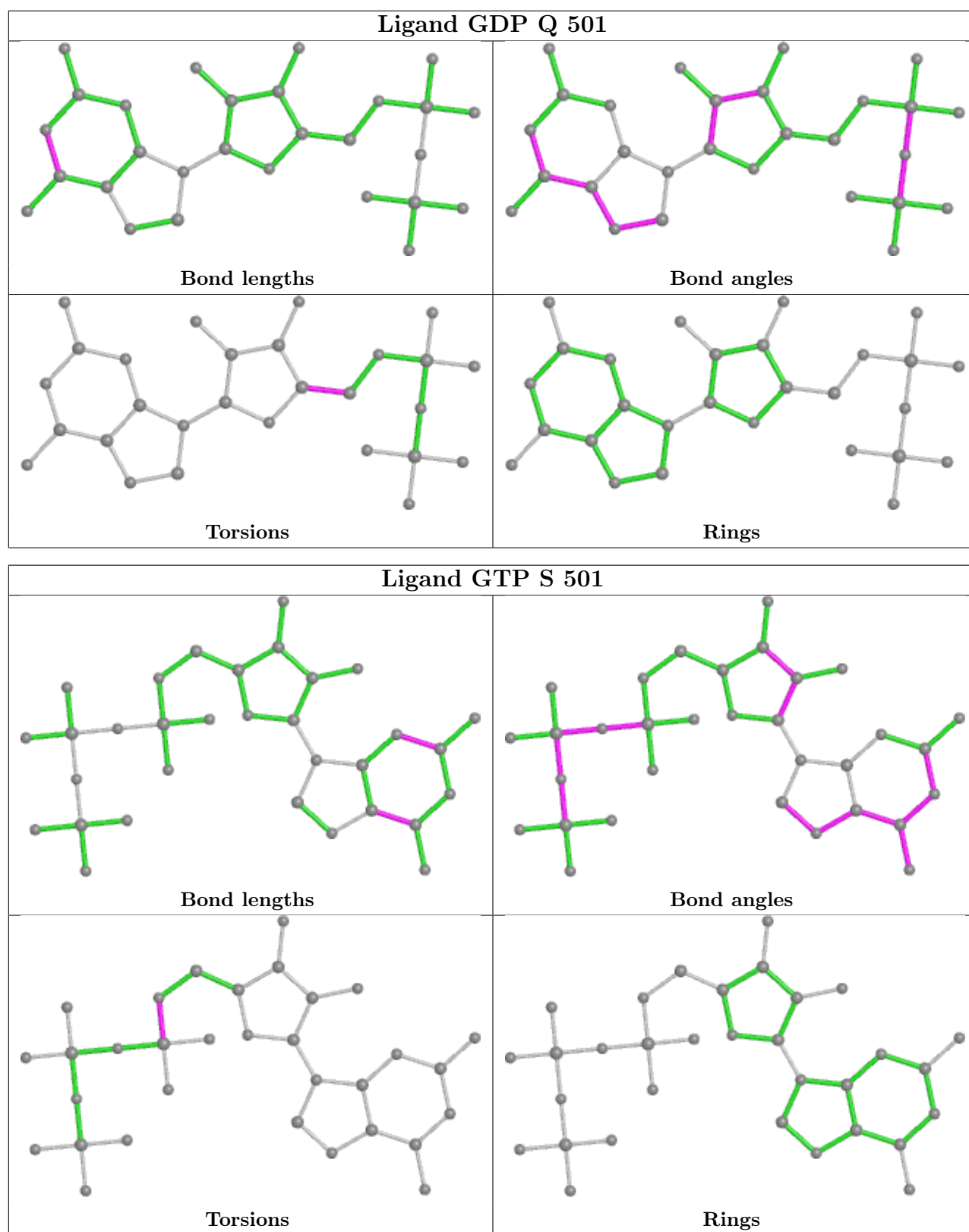












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

The following chains have linkage breaks:

Mol	Chain	Number of breaks
5	E	3
20	V	1
20	x	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	V	161:UNK	C	202:UNK	N	59.24
1	x	161:UNK	C	202:UNK	N	58.84
1	E	566:LEU	C	577:ALA	N	29.14
1	E	531:ARG	C	535:GLN	N	19.87
1	E	594:GLU	C	605:LYS	N	15.83

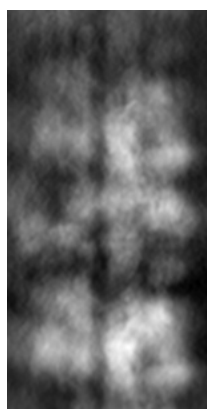
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-23926. These allow visual inspection of the internal detail of the map and identification of artifacts.

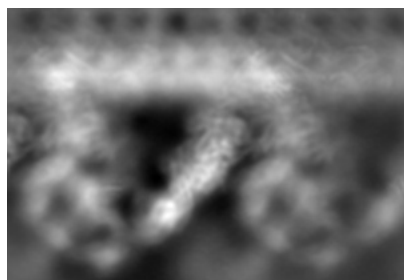
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

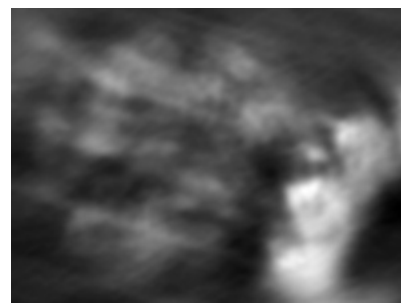
6.1.1 Primary map



X



Y

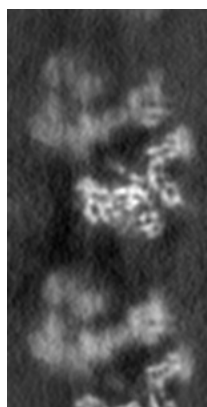


Z

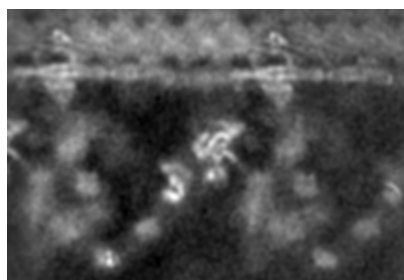
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

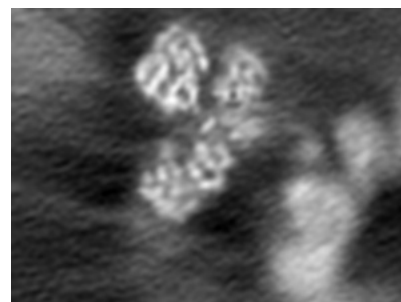
6.2.1 Primary map



X Index: 57



Y Index: 42



Z Index: 84

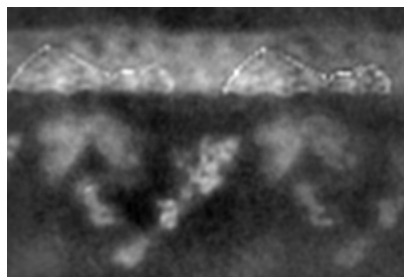
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

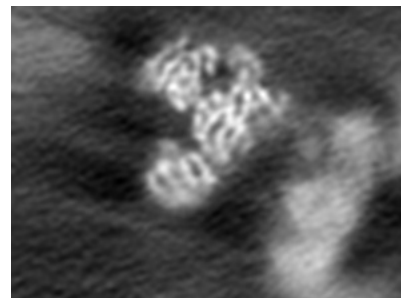
6.3.1 Primary map



X Index: 86



Y Index: 32



Z Index: 88

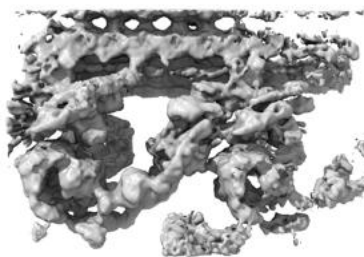
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal surface views [i](#)

6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 3.1. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

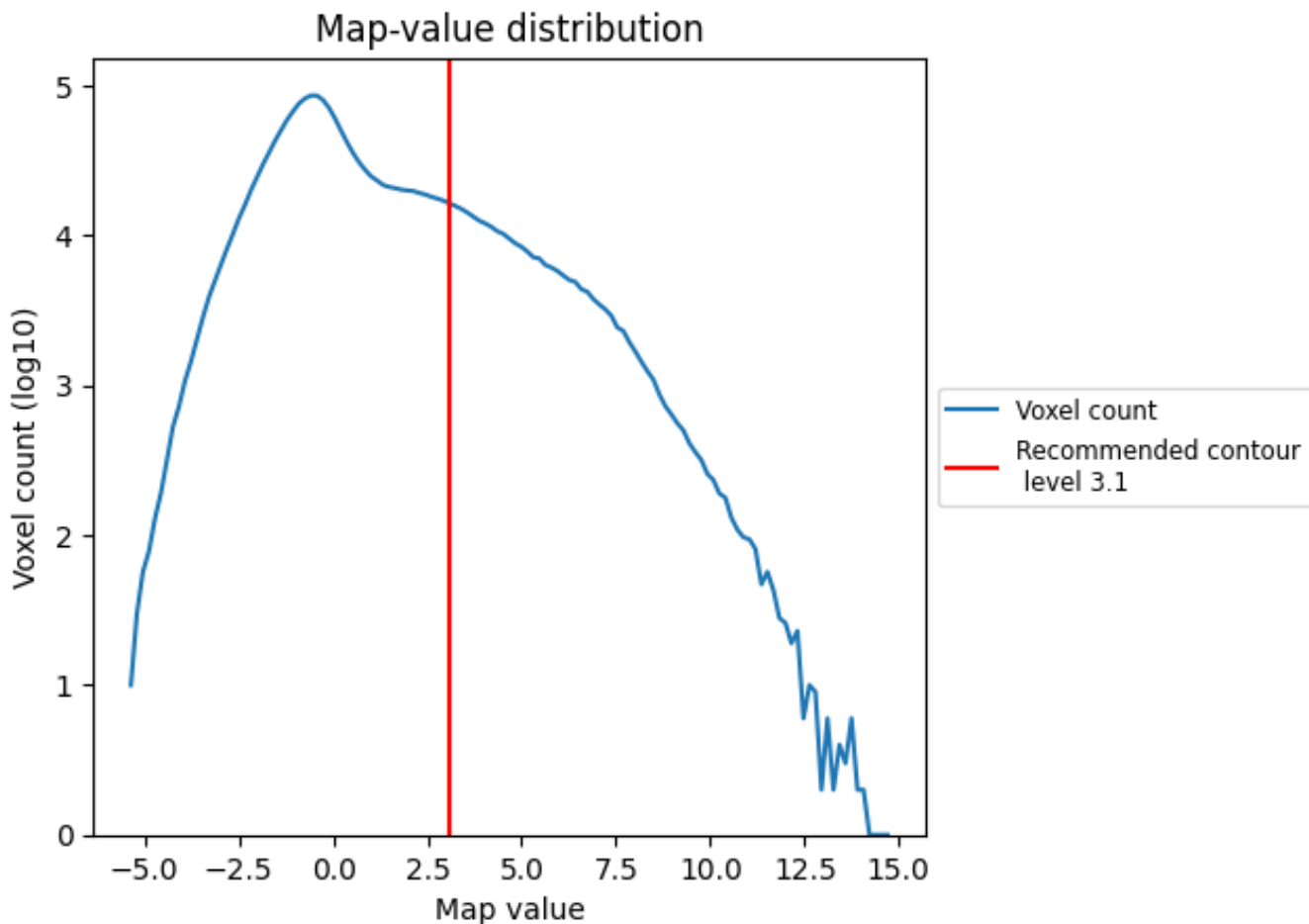
6.5 Mask visualisation

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

7 Map analysis [i](#)

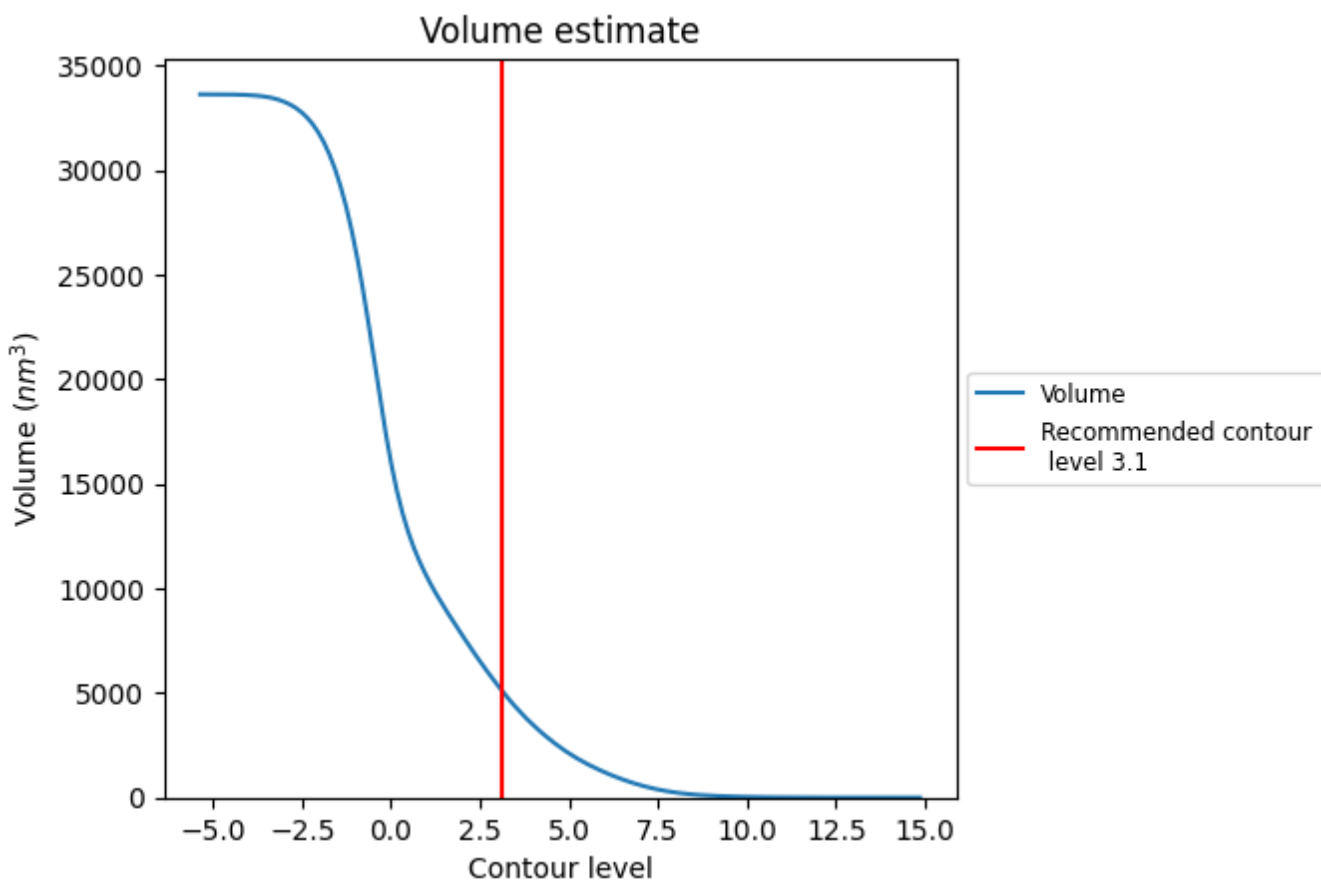
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

7.2 Volume estimate [i](#)



The volume at the recommended contour level is 5148 nm³; this corresponds to an approximate mass of 4650 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](#)

This section was not generated. The rotationally averaged power spectrum is only generated for cubic maps.

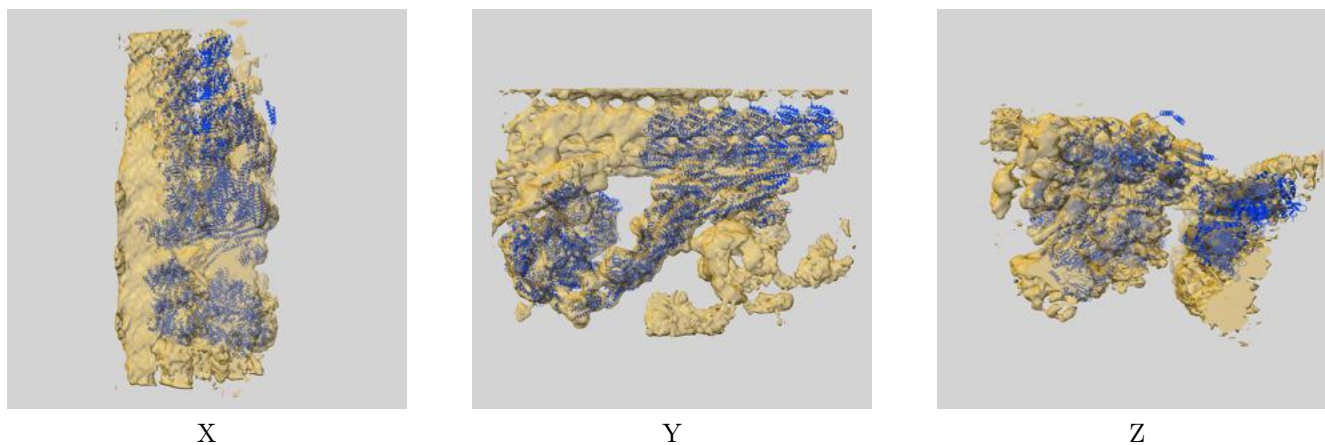
8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

9 Map-model fit [i](#)

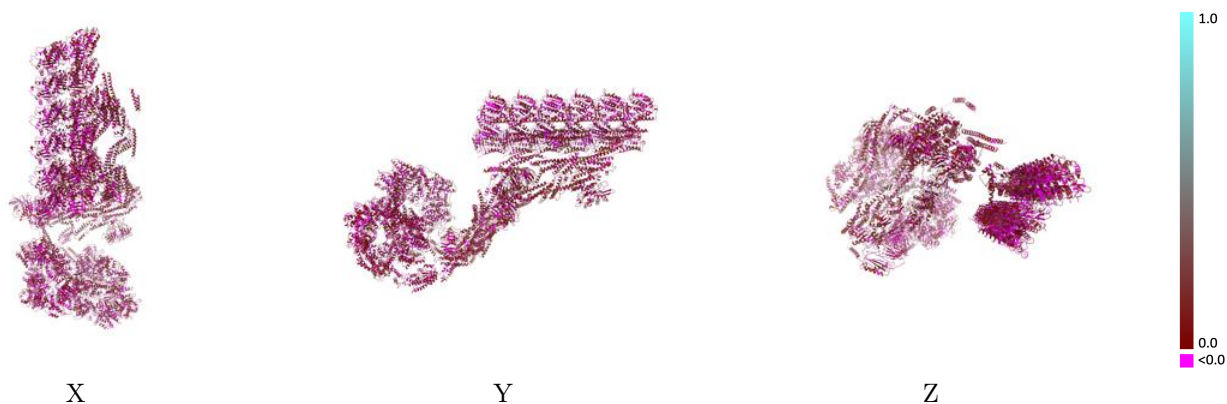
This section contains information regarding the fit between EMDB map EMD-23926 and PDB model 7MOQ. Per-residue inclusion information can be found in section 3 on page 12.

9.1 Map-model overlay [i](#)



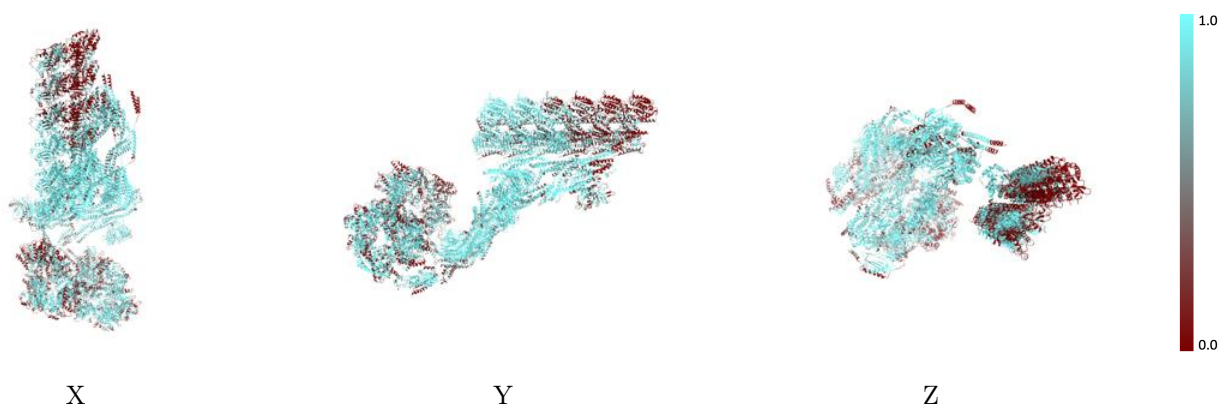
The images above show the 3D surface view of the map at the recommended contour level 3.1 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model [\(i\)](#)



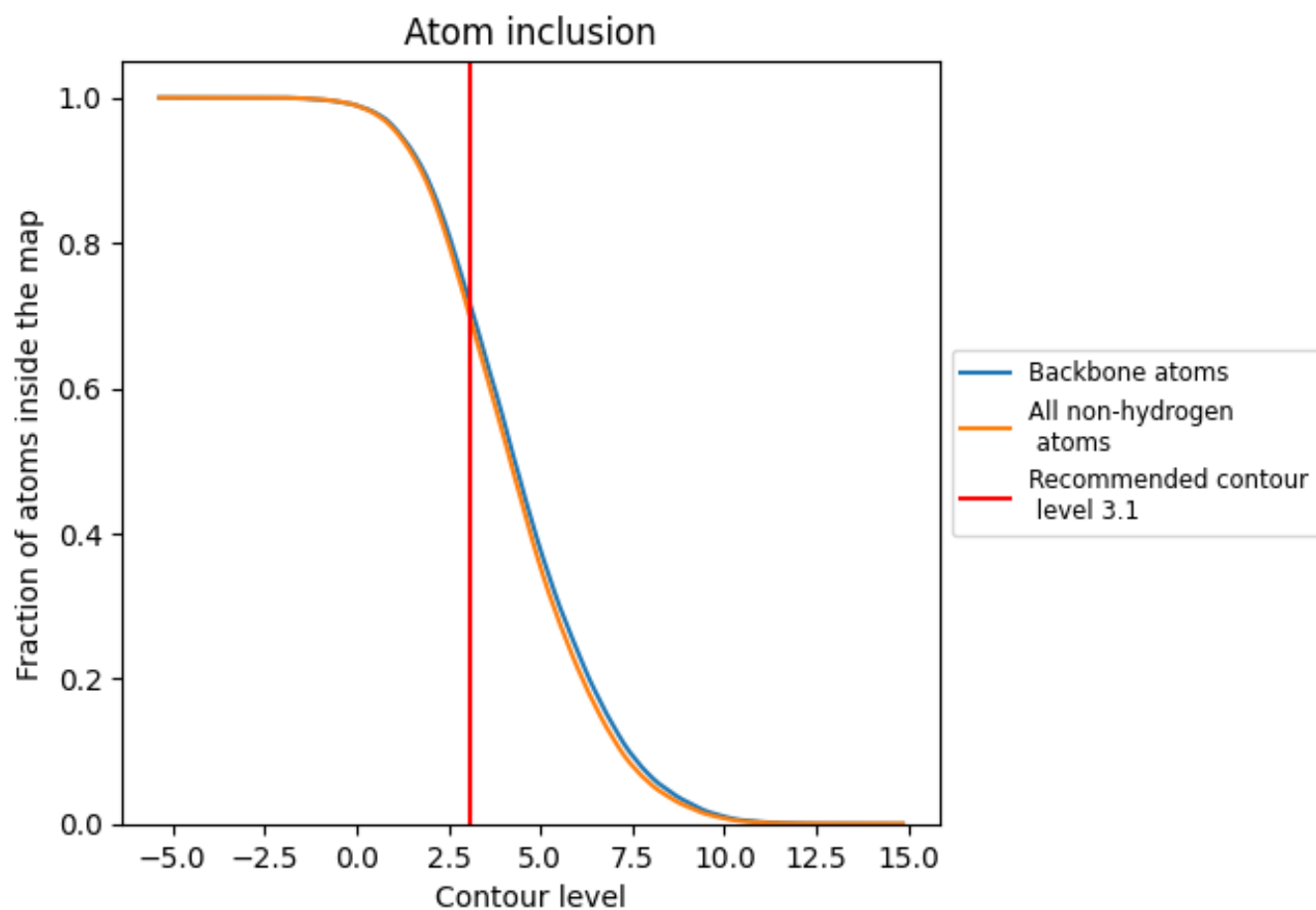
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

9.3 Atom inclusion mapped to coordinate model [\(i\)](#)



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 (3.1).









































































9.4 Atom inclusion [i](#)



At the recommended contour level, 71% of all backbone atoms, 70% 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 (3.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6957	 0.0670
A	 0.9339	 0.0870
B	 0.7122	 0.0750
C	 0.6662	 0.0700
D	 0.9627	 0.1060
E	 0.8603	 0.0950
F	 0.9779	 0.1290
G	 0.9441	 0.1420
H	 0.9360	 0.1260
I	 0.9013	 0.1210
J	 0.8903	 0.0960
K	 0.8679	 0.0410
L	 0.7715	 0.0560
M	 0.9287	 0.0870
N	 0.8144	 0.0540
O	 0.6935	 0.0750
P	 0.8551	 0.0730
Q	 0.9428	 0.0300
R	 0.9134	 0.0270
S	 0.9415	 0.0250
T	 0.8722	 0.0870
U	 0.6192	 0.0270
V	 0.8163	 0.1200
W	 0.4647	 0.0350
X	 0.4591	 0.1170
Y	 0.4905	 0.0460
Z	 0.4943	 0.1210
d	 0.8625	 0.0940
e	 0.8417	 0.1200
q	 0.8906	 0.0480
r	 0.8684	 0.0360
s	 0.6107	 0.0400
u	 0.3230	 0.0620
w	 0.2133	 0.0700
x	 0.8178	 0.1580
y	 0.1663	 0.0460

