



## wwPDB EM Validation Summary Report ⓘ

Nov 14, 2022 – 03:17 PM JST

PDB ID : 6J6H  
EMDB ID : EMD-0687  
Title : Cryo-EM structure of the yeast B\*-a1 complex at an average resolution of 3.6 angstrom  
Authors : Wan, R.; Bai, R.; Yan, C.; Lei, J.; Shi, Y.  
Deposited on : 2019-01-15  
Resolution : 3.60 Å(reported)

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

We welcome your comments at [validation@mail.wwpdb.org](mailto: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:

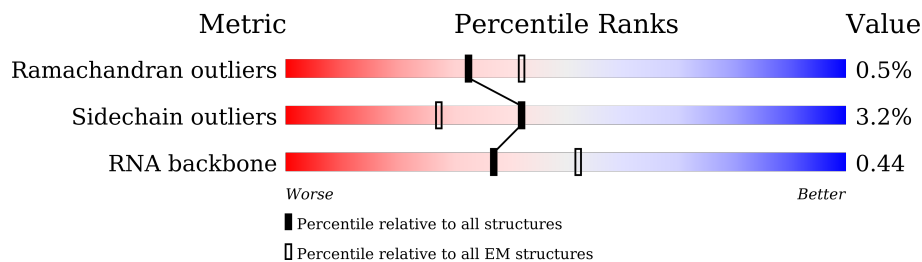
EMDB validation analysis : 0.0.1.dev43  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal 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 3.60 Å.

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



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

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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	2413	
2	C	1008	
3	J	135	
4	O	451	
5	P	379	
6	Q	364	
7	R	339	
8	S	175	

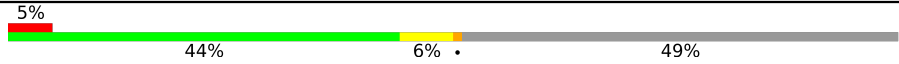

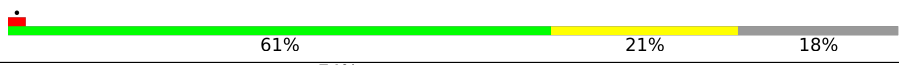
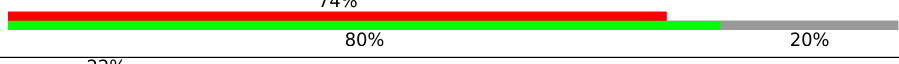
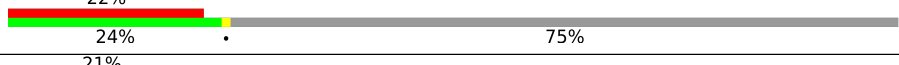

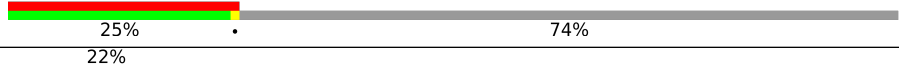

*Continued on next page...*

Continued from previous page...

Mol	Chain	Length	Quality of chain
9	T	157	99%
10	Z	577	21% 77% 23%
11	c	590	38% 72% 26%
12	d	687	11% 80% 18%
13	I	215	47% 53%
14	n	455	5% 95%
15	H	235	96%
16	B	679	5% 91%
17	D	214	57% 26% 16%
18	E	112	56% 36% 8%
19	L	1175	13% 11% 6% 82%
20	v	859	21% 82% 16%
21	a	111	68% 75% 24%
22	b	238	58% 68% 29%
23	t	175	84% 81% 8% 11%
24	i	94	76% 21%
24	u	94	73% 78% 21%
25	m	146	7% 75% 6% 18%
25	z	146	57% 74% 26%
26	j	77	5% 86% 12%
26	x	77	94% 95%
27	h	86	79% 21%
27	w	86	72% 79% 21%
28	e	110	85% 85% 7% 8%
28	g	110	6% 85% 6% 8%

Continued on next page...

*Continued from previous page...*

Mol	Chain	Length	Quality of chain
29	k	196	
29	s	196	
30	l	101	
30	y	101	
31	o	503	
31	p	503	
31	q	503	
31	r	503	

## 2 Entry composition [i](#)

There are 35 unique types of molecules in this entry. The entry contains 76847 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 Pre-mRNA-splicing factor 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	1913	15793	10154	2714	2868	57	0	0

- Molecule 2 is a protein called Pre-mRNA-splicing factor SNU114.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	C	920	7348	4733	1223	1362	30	0	0

- Molecule 3 is a protein called Pre-mRNA-splicing factor CWC21.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
3	J	27	190	112	38	40	0	0

- Molecule 4 is a protein called Pre-mRNA-splicing factor PRP46.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	O	357	2810	1777	493	530	10	0	0

- Molecule 5 is a protein called Pre-mRNA-processing protein 45.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	P	205	1608	1003	294	304	7	0	0

- Molecule 6 is a protein called Pre-mRNA-splicing factor SLT11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	Q	292	2301	1461	399	426	15	0	0

- Molecule 7 is a protein called Pre-mRNA-splicing factor CWC2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	R	261	2089	1320	369	388	12	0	0

- Molecule 8 is a protein called Pre-mRNA-splicing factor CWC15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	S	70	567	355	113	98	1	0	0

- Molecule 9 is a protein called Pre-mRNA-splicing factor BUD31.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	T	157	1291	808	240	232	11	0	0

- Molecule 10 is a protein called Pre-mRNA-splicing factor CWC22.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	Z	447	3651	2343	602	688	18	0	0

- Molecule 11 is a protein called Pre-mRNA-splicing factor CEF1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	c	436	2978	1843	552	575	8	0	0

- Molecule 12 is a protein called Pre-mRNA-splicing factor CLF1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	d	566	3881	2433	707	732	9	0	0

- Molecule 13 is a protein called Pre-mRNA-splicing factor SYF2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	I	102	822	504	152	165	1	0	0

- Molecule 14 is a protein called Pre-mRNA-processing factor 17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
14	n	23	199	122	41	35	1	0	0

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

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
15	H	9	94	65	17	12	0	0

- Molecule 16 is a RNA chain called ACT1 pre-mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
16	B	60	1266	567	213	426	60	0	0

- Molecule 17 is a RNA chain called U5 snRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
17	D	179	3795	1699	660	1258	178	0	0

- Molecule 18 is a RNA chain called U6 snRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
18	E	103	2192	982	391	716	103	0	0

- Molecule 19 is a RNA chain called U2 snRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
19	L	209	4405	1972	737	1487	209	0	0

- Molecule 20 is a protein called Pre-mRNA-splicing factor SYF1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	v	722	4625	2893	825	895	12	0	0

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

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
21	a	84	416	248	84	84	0	0

- Molecule 22 is a protein called U2 small nuclear ribonucleoprotein A'.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
22	b	169	841	503	169	169	0	0

- Molecule 23 is a protein called Pre-mRNA-splicing factor SNT309.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
23	t	156	926	585	160	180	1	0	0

- Molecule 24 is a protein called Small nuclear ribonucleoprotein E.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
24	u	74	526	346	87	90	3	0	0
24	i	74	541	358	90	90	3	0	0

- Molecule 25 is a protein called Small nuclear ribonucleoprotein Sm D1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
25	m	119	917	575	163	176	3	0	0
25	z	108	824	521	142	158	3	0	0

- Molecule 26 is a protein called Small nuclear ribonucleoprotein G.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
26	j	75	552	350	98	103	1	0	0
26	x	75	552	350	98	103	1	0	0

- Molecule 27 is a protein called Small nuclear ribonucleoprotein F.



Mol	Chain	Residues	Atoms					AltConf	Trace
27	h	68	Total	C	N	O	S	0	0
			518	337	96	84	1		
27	w	68	Total	C	N	O	S	0	0
			518	337	96	84	1		

- Molecule 28 is a protein called Small nuclear ribonucleoprotein Sm D2.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	g	101	Total	C	N	O	S	0	0
			785	504	149	128	4		
28	e	101	Total	C	N	O	S	0	0
			785	504	149	128	4		

- Molecule 29 is a protein called Small nuclear ribonucleoprotein-associated protein B.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	k	100	Total	C	N	O	S	0	0
			809	514	150	142	3		
29	s	93	Total	C	N	O	S	0	0
			749	476	138	132	3		

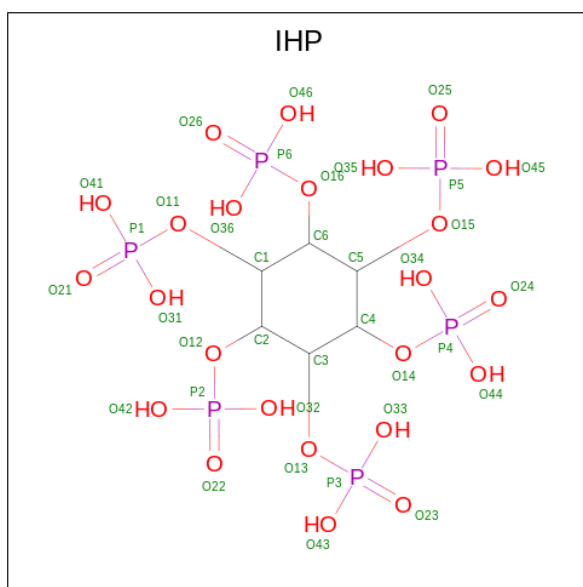
- Molecule 30 is a protein called Small nuclear ribonucleoprotein Sm D3.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	l	83	Total	C	N	O	S	0	0
			641	408	111	120	2		
30	y	81	Total	C	N	O	S	0	0
			616	394	107	113	2		

- Molecule 31 is a protein called Pre-mRNA-processing factor 19.

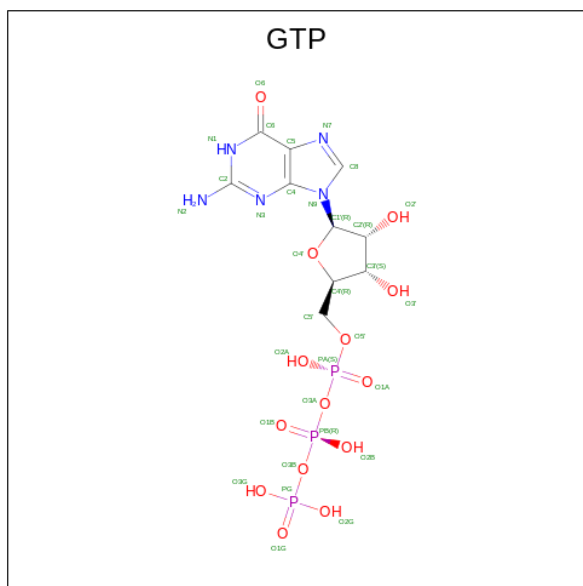
Mol	Chain	Residues	Atoms					AltConf	Trace
31	r	125	Total	C	N	O	S	0	0
			823	521	133	167	2		
31	p	128	Total	C	N	O	S	0	0
			843	532	136	173	2		
31	q	129	Total	C	N	O	S	0	0
			850	537	137	174	2		
31	o	126	Total	C	N	O	S	0	0
			830	525	134	169	2		

- Molecule 32 is INOSITOL HEXAKISPHOSPHATE (three-letter code: IHP) (formula: C<sub>6</sub>H<sub>18</sub>O<sub>24</sub>P<sub>6</sub>).



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

- Molecule 33 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula:  $C_{10}H_{16}N_5O_{14}P_3$ ).



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

- Molecule 34 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
34	C	1	Total 1	Mg 1	0
34	E	5	Total 5	Mg 5	0

- Molecule 35 is ZINC ION (three-letter code: ZN) (formula: Zn).

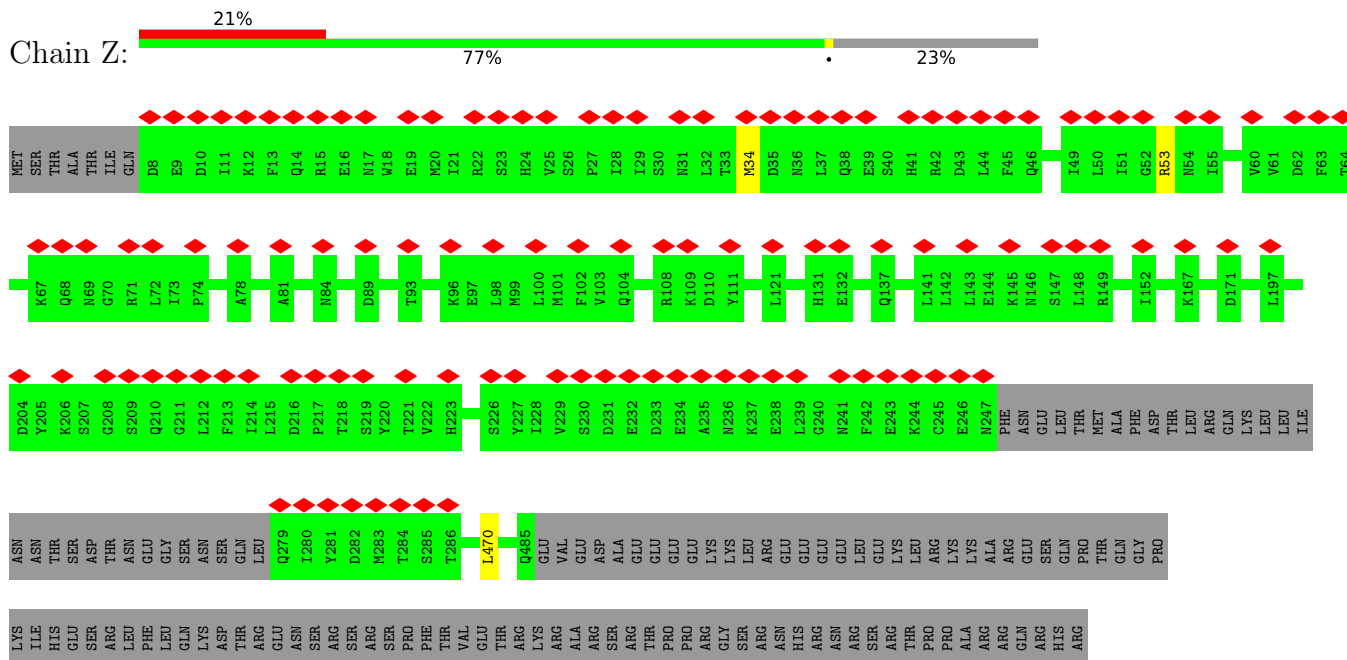
Mol	Chain	Residues	Atoms		AltConf
35	Q	2	Total 2	Zn 2	0
35	R	1	Total 1	Zn 1	0
35	T	3	Total 3	Zn 3	0



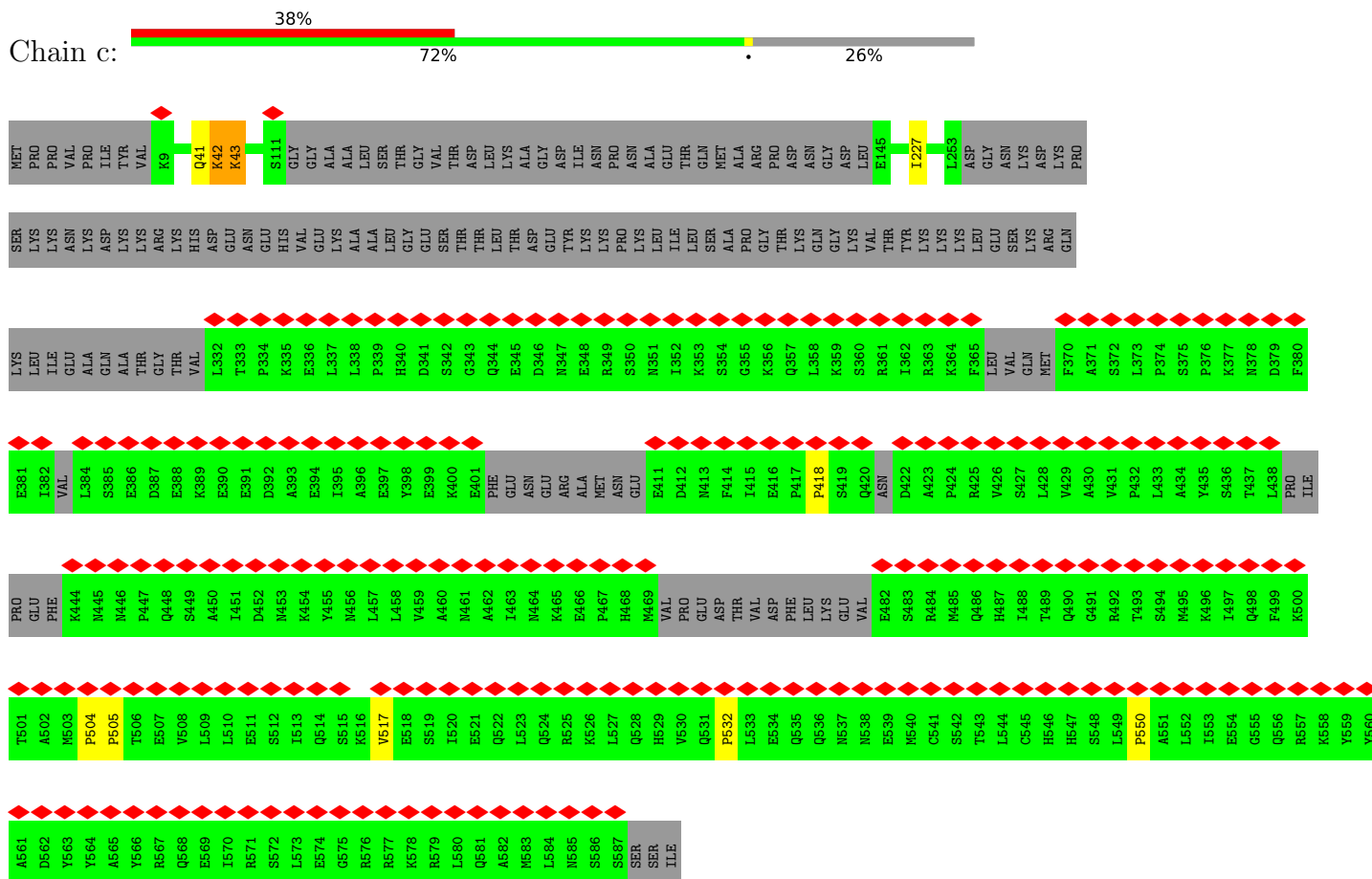




- Molecule 10: Pre-mRNA-splicing factor CWC22



- Molecule 11: Pre-mRNA-splicing factor CEF1



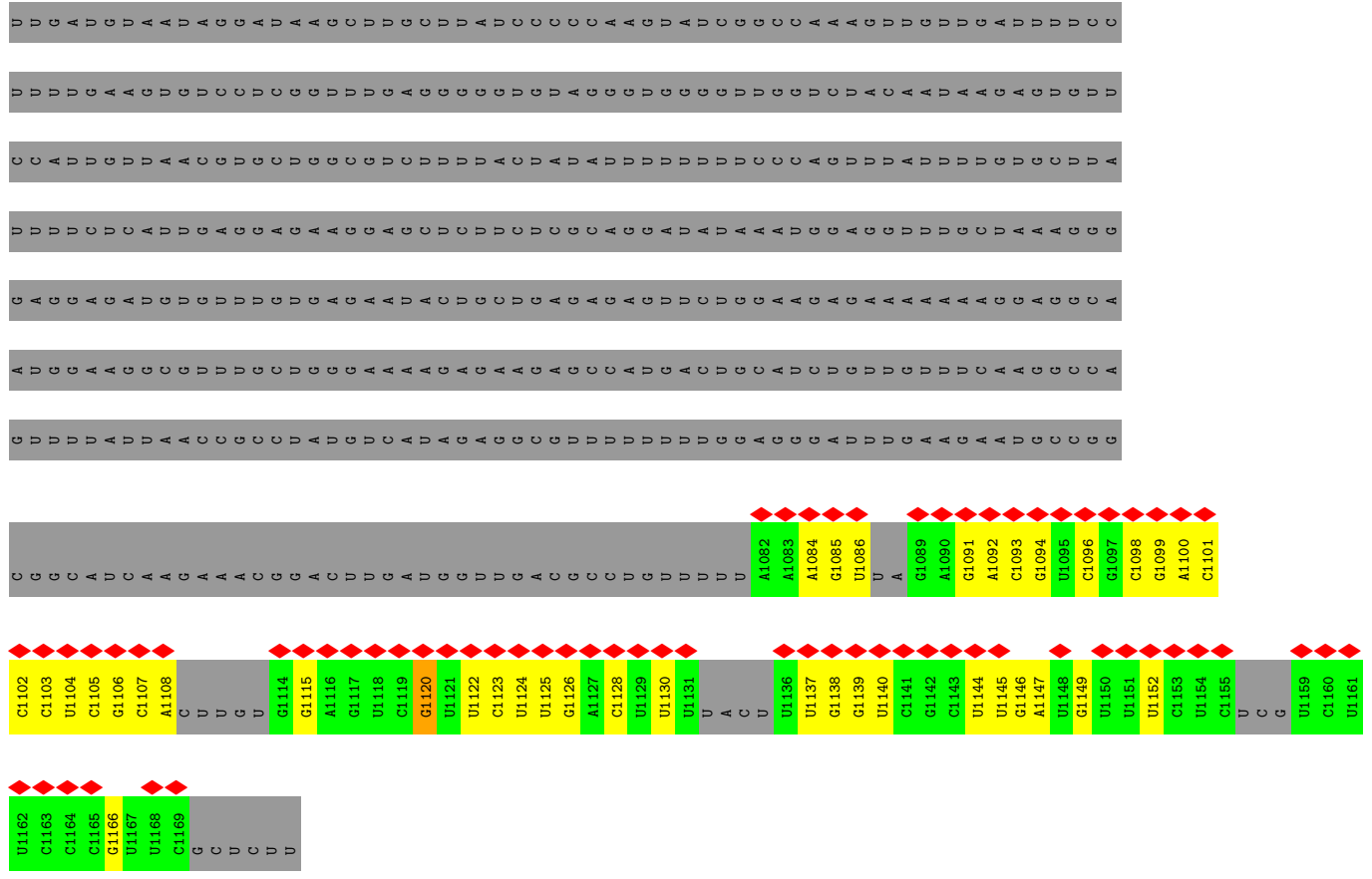
- Molecule 12: Pre-mRNA-splicing factor CLF1



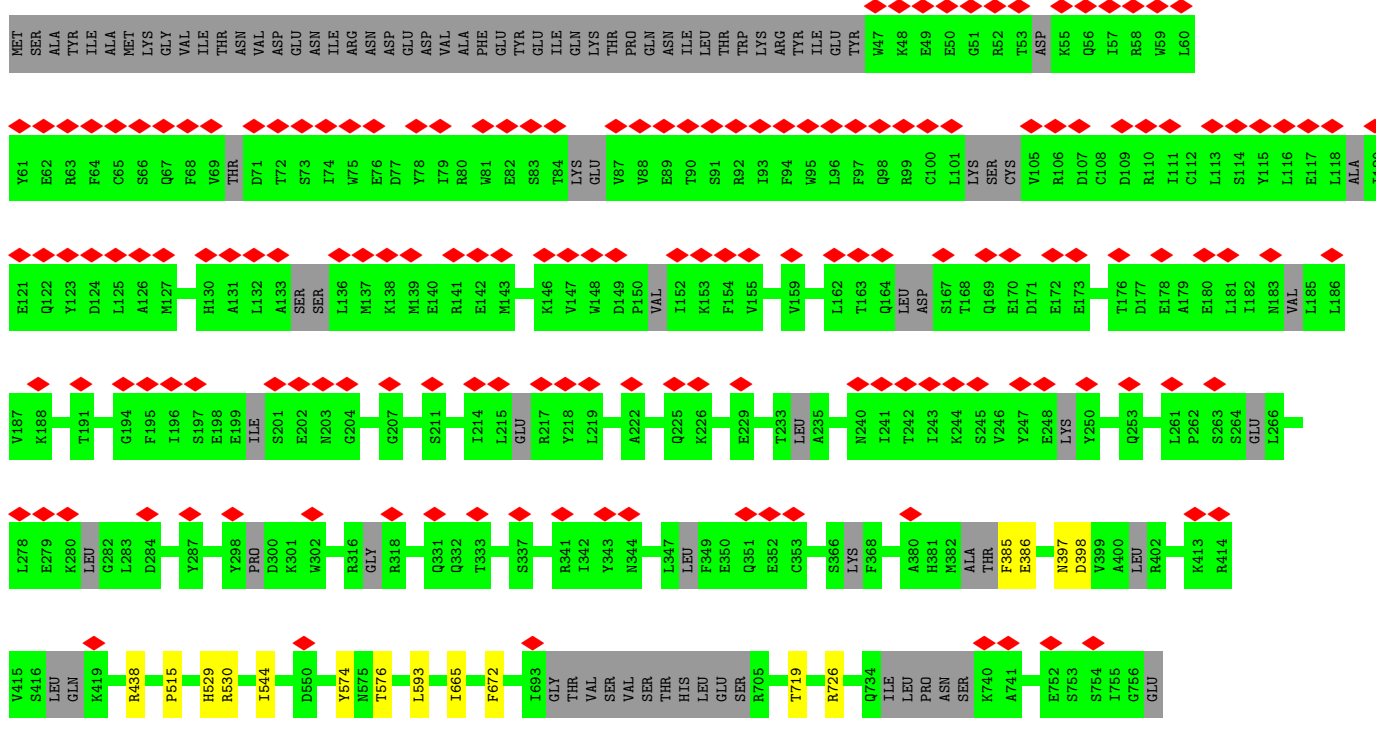
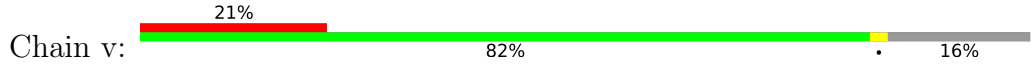


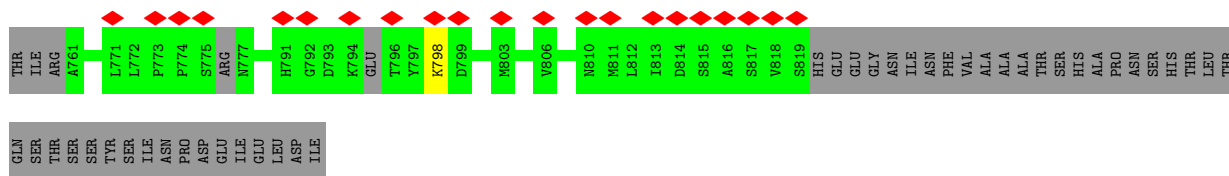




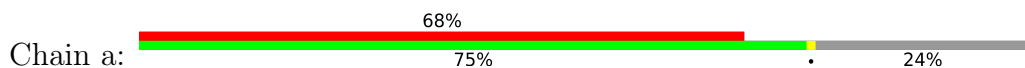


• Molecule 20: Pre-mRNA-splicing factor SYF1

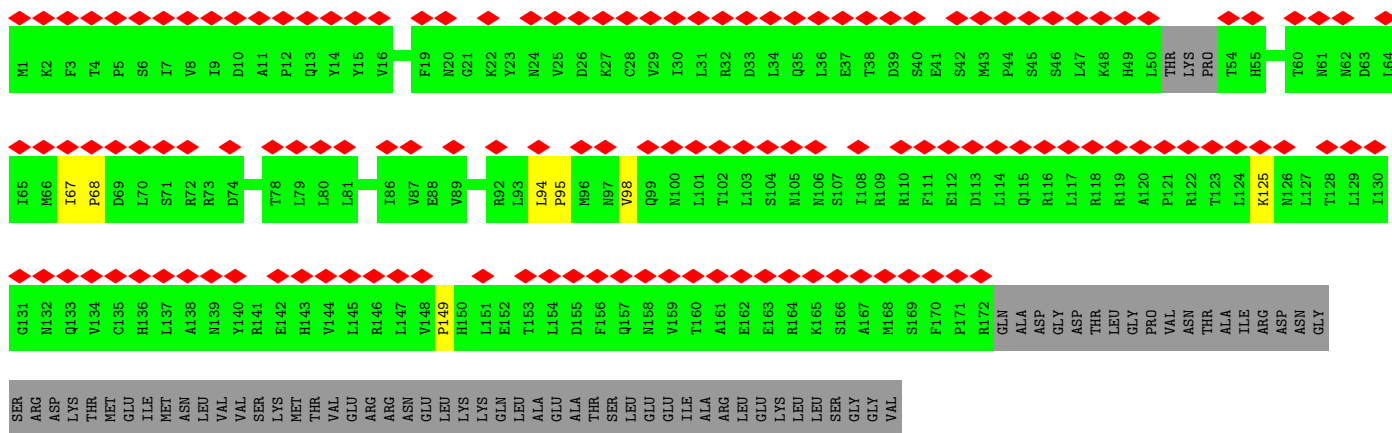




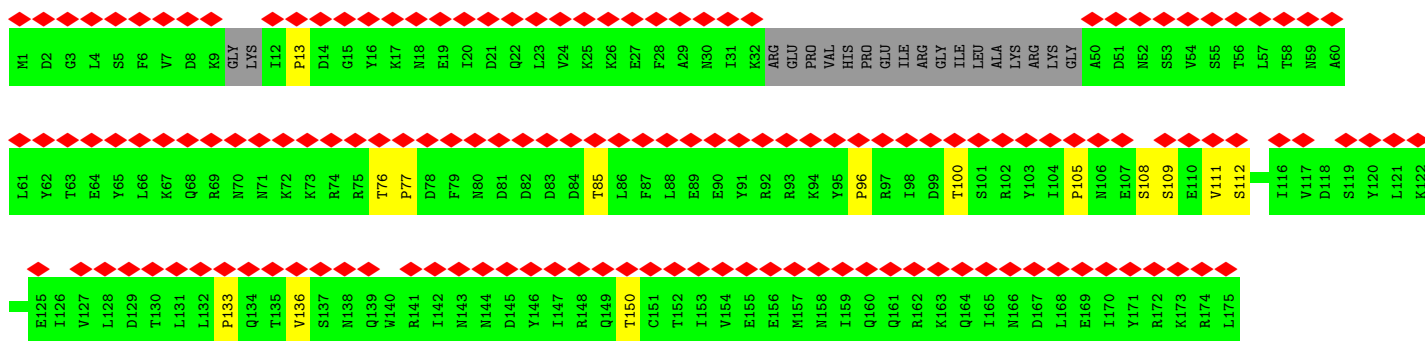
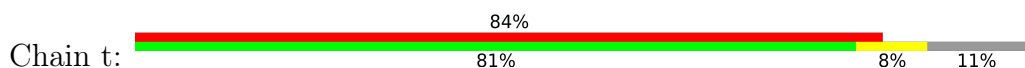
• Molecule 21: U2 small nuclear ribonucleoprotein B''



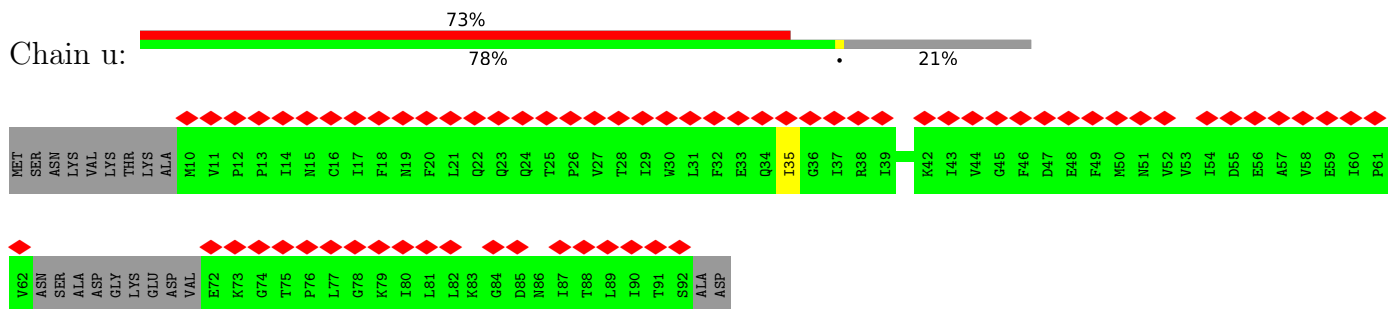
• Molecule 22: U2 small nuclear ribonucleoprotein A'



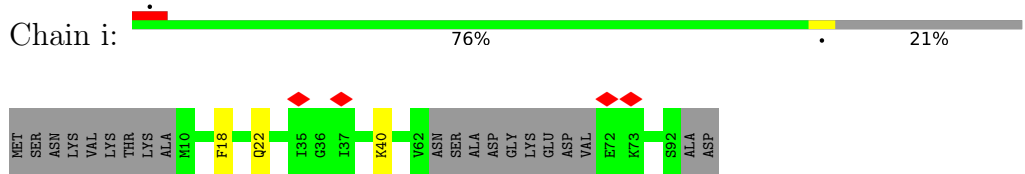
• Molecule 23: Pre-mRNA-splicing factor SNT309



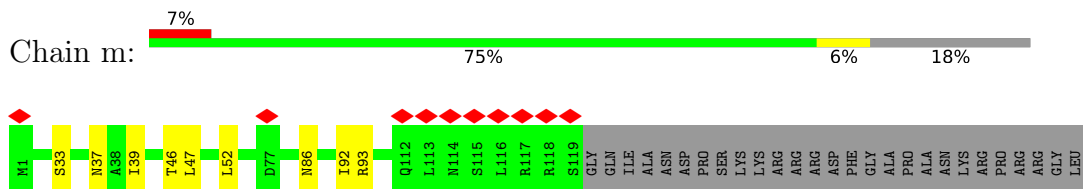
• Molecule 24: Small nuclear ribonucleoprotein E



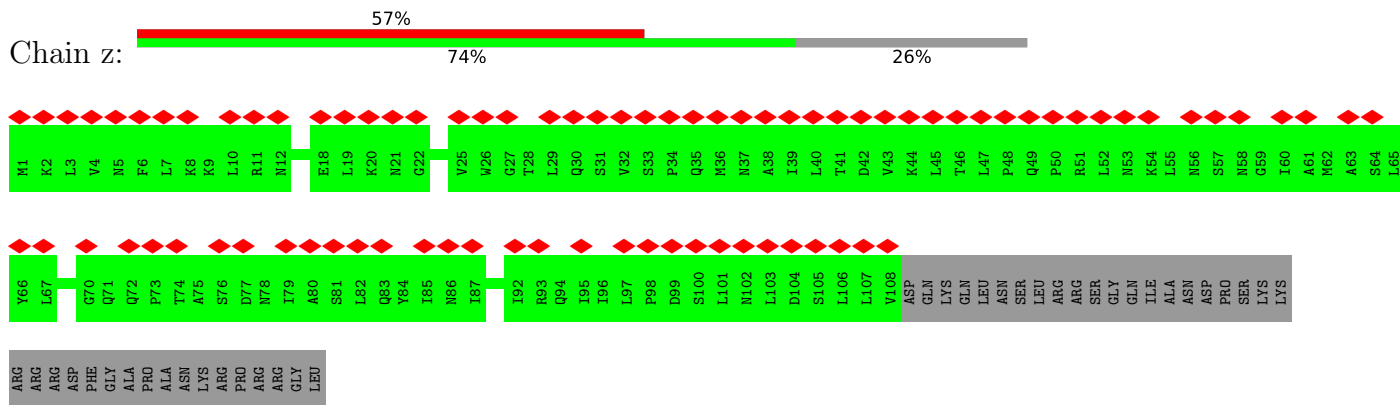
• Molecule 24: Small nuclear ribonucleoprotein E



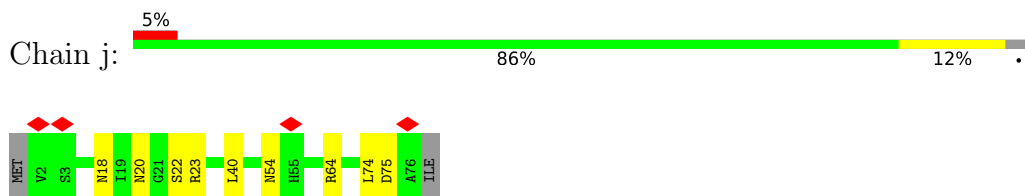
• Molecule 25: Small nuclear ribonucleoprotein Sm D1



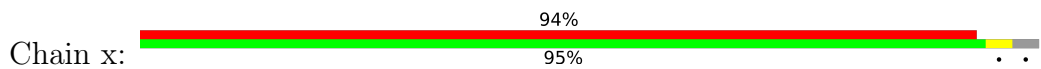
• Molecule 25: Small nuclear ribonucleoprotein Sm D1



• Molecule 26: Small nuclear ribonucleoprotein G

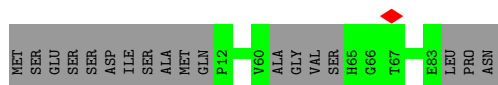
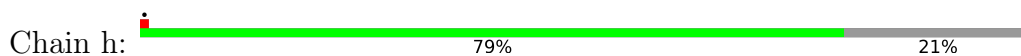


• Molecule 26: Small nuclear ribonucleoprotein G

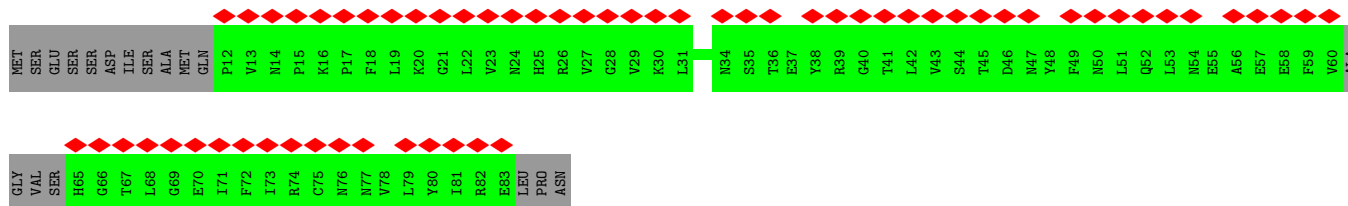
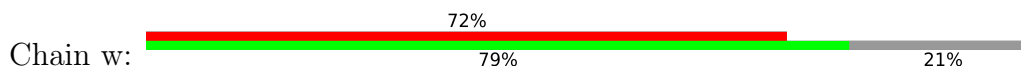




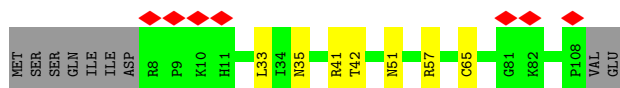
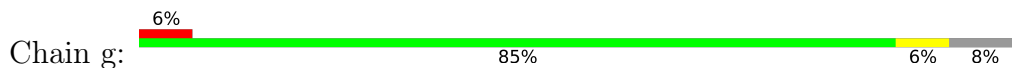
• Molecule 27: Small nuclear ribonucleoprotein F



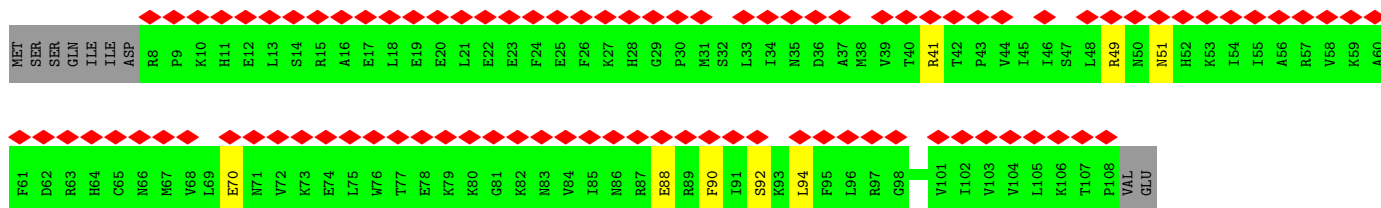
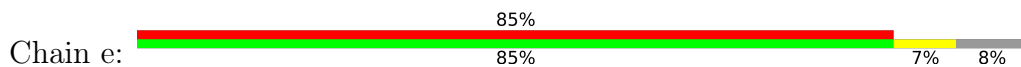
• Molecule 27: Small nuclear ribonucleoprotein F



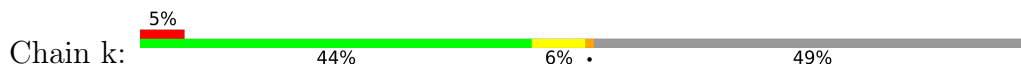
• Molecule 28: Small nuclear ribonucleoprotein Sm D2



• Molecule 28: Small nuclear ribonucleoprotein Sm D2



• Molecule 29: Small nuclear ribonucleoprotein-associated protein B











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

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

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

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

ASP  
GLY  
GLY  
ILE  
ALA  
ALA  
ILE  
LEU  
LYS  
THR  
ASN  
ASP  
SER  
PHE  
ASN  
PHE  
VAL  
ALA  
LEU  
THR  
PRO

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	555036	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 ( $e^-/\text{\AA}^2$ )	49.3	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.255	Depositor
Minimum map value	-0.117	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.007	Depositor
Recommended contour level	0.024	Depositor
Map size (Å)	532.0, 532.0, 532.0	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.33, 1.33, 1.33	Depositor

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: SEP, ZN, IHP, GTP, 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	A	0.47	0/16198	0.58	0/21958
2	C	0.46	0/7503	0.59	0/10159
3	J	0.39	0/191	0.56	0/254
4	O	0.53	0/2872	0.61	0/3902
5	P	0.38	0/1629	0.51	0/2194
6	Q	0.36	0/2339	0.61	0/3154
7	R	0.42	0/2135	0.56	0/2871
8	S	0.31	0/581	0.52	0/776
9	T	0.49	0/1315	0.58	0/1759
10	Z	0.32	0/3712	0.53	0/5004
11	c	0.32	0/2996	0.44	0/4033
12	d	0.33	0/3931	0.48	0/5356
13	I	0.33	0/826	0.46	0/1097
14	n	0.39	0/194	0.50	0/256
15	H	0.33	0/98	0.35	0/130
16	B	0.57	0/1411	0.99	0/2191
17	D	0.68	0/4239	0.87	0/6598
18	E	0.70	0/2452	0.81	0/3817
19	L	0.37	1/4904 (0.0%)	0.77	0/7607
20	v	0.42	0/4662	0.51	0/6358
21	a	0.42	0/415	0.56	0/577
22	b	0.68	0/839	0.70	0/1169
23	t	0.29	0/924	0.42	0/1244
24	i	0.29	0/551	0.50	0/750
24	u	0.29	0/535	0.48	0/730
25	m	0.35	0/926	0.55	0/1257
25	z	0.30	0/833	0.53	0/1134
26	j	0.45	0/557	0.54	0/756
26	x	0.34	0/557	0.51	0/756
27	h	0.28	0/529	0.50	0/715
27	w	0.28	0/529	0.50	0/715
28	e	0.38	0/799	0.52	0/1078

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
28	g	0.40	0/799	0.55	0/1078
29	k	0.41	0/815	0.60	0/1092
29	s	0.35	0/755	0.59	0/1014
30	l	0.49	0/650	0.57	0/879
30	y	0.31	0/625	0.50	0/847
31	o	0.28	0/835	0.50	0/1126
31	p	0.25	0/848	0.51	0/1143
31	q	0.30	0/856	0.52	0/1155
31	r	0.29	0/828	0.54	0/1117
All	All	0.45	1/79193 (0.0%)	0.61	0/109806

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
19	L	1120	G	O3'-P	-5.54	1.54	1.61

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

## 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	1905/2413 (79%)	1826 (96%)	68 (4%)	11 (1%)	25	64
2	C	914/1008 (91%)	881 (96%)	33 (4%)	0	100	100
3	J	25/135 (18%)	23 (92%)	2 (8%)	0	100	100

*Continued on next page...*

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	O	355/451 (79%)	315 (89%)	36 (10%)	4 (1%)	14	53
5	P	197/379 (52%)	192 (98%)	5 (2%)	0	100	100
6	Q	288/364 (79%)	264 (92%)	22 (8%)	2 (1%)	22	61
7	R	259/339 (76%)	248 (96%)	10 (4%)	1 (0%)	34	71
8	S	64/175 (37%)	63 (98%)	1 (2%)	0	100	100
9	T	155/157 (99%)	147 (95%)	8 (5%)	0	100	100
10	Z	443/577 (77%)	427 (96%)	16 (4%)	0	100	100
11	c	418/590 (71%)	396 (95%)	19 (4%)	3 (1%)	22	61
12	d	534/687 (78%)	513 (96%)	18 (3%)	3 (1%)	25	64
13	I	98/215 (46%)	97 (99%)	1 (1%)	0	100	100
14	n	21/455 (5%)	21 (100%)	0	0	100	100
15	H	7/235 (3%)	7 (100%)	0	0	100	100
20	v	666/859 (78%)	642 (96%)	22 (3%)	2 (0%)	41	75
21	a	82/111 (74%)	78 (95%)	3 (4%)	1 (1%)	13	51
22	b	165/238 (69%)	138 (84%)	20 (12%)	7 (4%)	3	25
23	t	150/175 (86%)	145 (97%)	4 (3%)	1 (1%)	22	61
24	i	70/94 (74%)	67 (96%)	3 (4%)	0	100	100
24	u	70/94 (74%)	67 (96%)	3 (4%)	0	100	100
25	m	117/146 (80%)	111 (95%)	6 (5%)	0	100	100
25	z	106/146 (73%)	100 (94%)	6 (6%)	0	100	100
26	j	73/77 (95%)	67 (92%)	5 (7%)	1 (1%)	11	48
26	x	73/77 (95%)	65 (89%)	7 (10%)	1 (1%)	11	48
27	h	64/86 (74%)	60 (94%)	4 (6%)	0	100	100
27	w	64/86 (74%)	61 (95%)	3 (5%)	0	100	100
28	e	99/110 (90%)	95 (96%)	3 (3%)	1 (1%)	15	55
28	g	99/110 (90%)	93 (94%)	4 (4%)	2 (2%)	7	41
29	k	96/196 (49%)	90 (94%)	5 (5%)	1 (1%)	15	55
29	s	89/196 (45%)	83 (93%)	6 (7%)	0	100	100
30	l	81/101 (80%)	79 (98%)	0	2 (2%)	5	36
30	y	79/101 (78%)	75 (95%)	4 (5%)	0	100	100
31	o	120/503 (24%)	115 (96%)	5 (4%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
31	p	122/503 (24%)	118 (97%)	4 (3%)	0	100	100
31	q	125/503 (25%)	116 (93%)	9 (7%)	0	100	100
31	r	119/503 (24%)	112 (94%)	7 (6%)	0	100	100
All	All	8412/13195 (64%)	7997 (95%)	372 (4%)	43 (0%)	32	68

5 of 43 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1575	TRP
1	A	1965	PHE
4	O	372	VAL
12	d	181	ASN
12	d	353	GLU

### 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	1737/2182 (80%)	1695 (98%)	42 (2%)	49	75
2	C	830/910 (91%)	821 (99%)	9 (1%)	73	88
3	J	21/121 (17%)	21 (100%)	0	100	100
4	O	312/397 (79%)	309 (99%)	3 (1%)	76	88
5	P	175/328 (53%)	173 (99%)	2 (1%)	73	88
6	Q	265/332 (80%)	258 (97%)	7 (3%)	46	74
7	R	224/296 (76%)	221 (99%)	3 (1%)	69	86
8	S	57/151 (38%)	55 (96%)	2 (4%)	36	68
9	T	141/141 (100%)	140 (99%)	1 (1%)	84	93
10	Z	417/538 (78%)	414 (99%)	3 (1%)	84	93
11	c	214/525 (41%)	205 (96%)	9 (4%)	30	63
12	d	274/633 (43%)	262 (96%)	12 (4%)	28	63
13	I	92/193 (48%)	90 (98%)	2 (2%)	52	77

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
14	n	19/412 (5%)	19 (100%)	0	100	100
15	H	9/216 (4%)	9 (100%)	0	100	100
20	v	294/786 (37%)	279 (95%)	15 (5%)	24	58
23	t	39/165 (24%)	26 (67%)	13 (33%)	0	2
24	i	55/83 (66%)	52 (94%)	3 (6%)	21	57
24	u	52/83 (63%)	51 (98%)	1 (2%)	57	80
25	m	106/129 (82%)	97 (92%)	9 (8%)	10	41
25	z	95/129 (74%)	95 (100%)	0	100	100
26	j	56/66 (85%)	48 (86%)	8 (14%)	3	21
26	x	56/66 (85%)	55 (98%)	1 (2%)	59	81
27	h	51/77 (66%)	51 (100%)	0	100	100
27	w	51/77 (66%)	51 (100%)	0	100	100
28	e	82/103 (80%)	75 (92%)	7 (8%)	10	41
28	g	82/103 (80%)	77 (94%)	5 (6%)	18	53
29	k	92/176 (52%)	79 (86%)	13 (14%)	3	21
29	s	85/176 (48%)	83 (98%)	2 (2%)	49	75
30	l	72/89 (81%)	53 (74%)	19 (26%)	0	4
30	y	68/89 (76%)	68 (100%)	0	100	100
31	o	60/451 (13%)	57 (95%)	3 (5%)	24	59
31	p	62/451 (14%)	58 (94%)	4 (6%)	17	51
31	q	62/451 (14%)	59 (95%)	3 (5%)	25	60
31	r	60/451 (13%)	57 (95%)	3 (5%)	24	59
All	All	6367/11576 (55%)	6163 (97%)	204 (3%)	42	70

5 of 204 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
23	t	100	THR
28	g	41	ARG
31	q	44	PRO
23	t	111	VAL
25	m	86	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 96 such sidechains are listed below:



Mol	Chain	Res	Type
11	c	31	HIS
25	m	30	GLN
12	d	79	HIS
20	v	397	ASN
26	j	18	ASN

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
16	B	58/679 (8%)	32 (55%)	7 (12%)
17	D	177/214 (82%)	53 (29%)	8 (4%)
18	E	102/112 (91%)	39 (38%)	5 (4%)
19	L	199/1175 (16%)	73 (36%)	9 (4%)
All	All	536/2180 (24%)	197 (36%)	29 (5%)

5 of 197 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
16	B	-11	C
16	B	-10	A
16	B	-9	A
16	B	-5	A
16	B	-3	U

5 of 29 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
17	D	150	U
19	L	1107	C
18	E	49	A
19	L	1092	A
18	E	23	G

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

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

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the

expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
14	SEP	n	73	14	8,9,10	0.63	0	8,12,14	0.60	0

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
14	SEP	n	73	14	-	4/5/8/10	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
14	n	73	SEP	N-CA-CB-OG
14	n	73	SEP	CB-OG-P-O1P
14	n	73	SEP	CB-OG-P-O2P
14	n	73	SEP	CB-OG-P-O3P

There are no ring outliers.

No monomer is involved in short contacts.

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 14 ligands modelled in this entry, 12 are monoatomic - leaving 2 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond

length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
32	IHP	A	3000	-	36,36,36	0.76	0	54,60,60	0.53	0
33	GTP	C	1500	34	26,34,34	0.94	2 (7%)	32,54,54	0.68	0

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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
32	IHP	A	3000	-	-	10/30/54/54	0/1/1/1
33	GTP	C	1500	34	-	0/18/38/38	0/3/3/3

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
33	C	1500	GTP	C5-C6	-2.61	1.42	1.47
33	C	1500	GTP	C8-N7	-2.02	1.31	1.35

There are no bond angle outliers.

There are no chirality outliers.

5 of 10 torsion outliers are listed below:

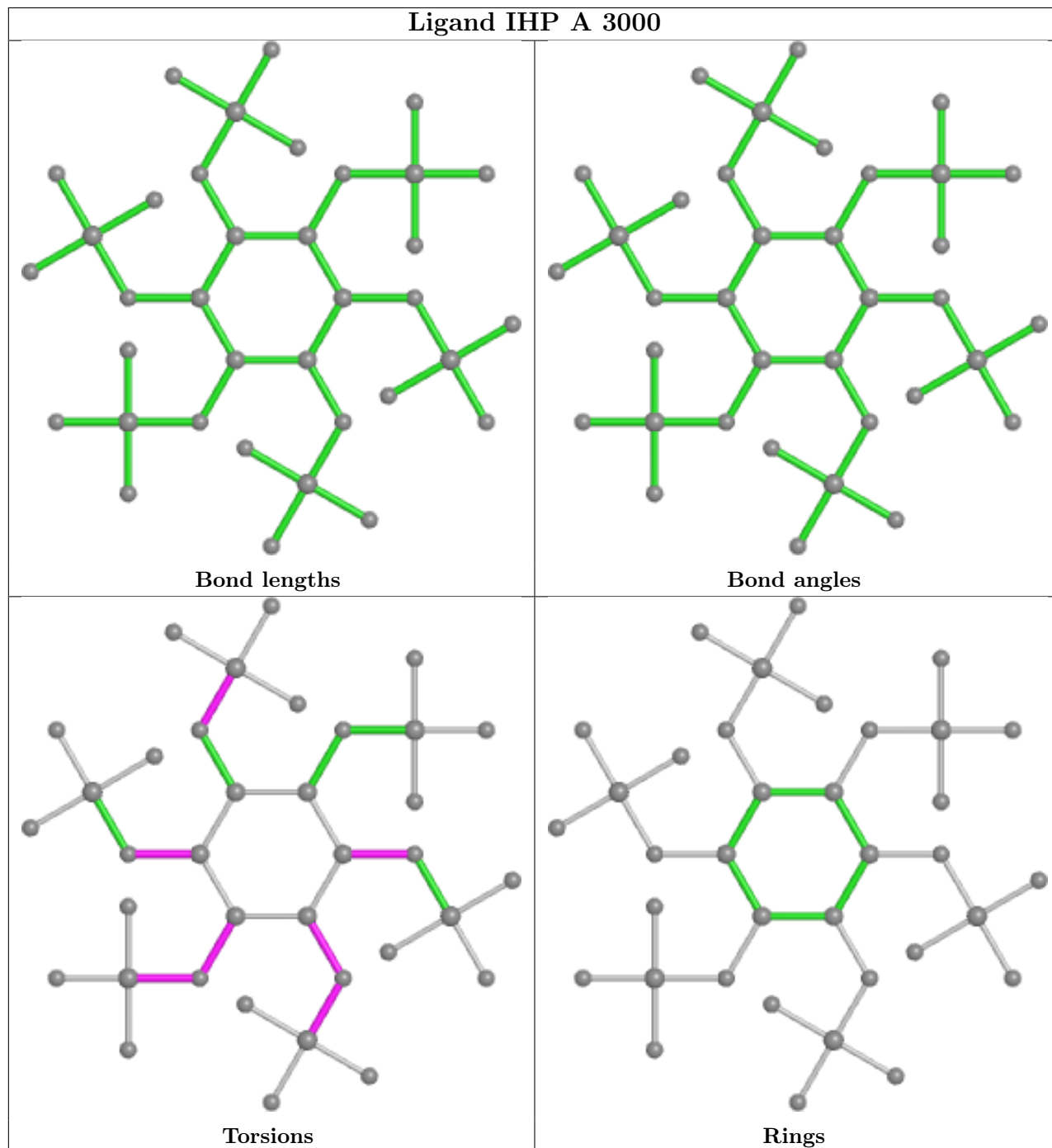
Mol	Chain	Res	Type	Atoms
32	A	3000	IHP	C2-C1-O11-P1
32	A	3000	IHP	C6-C1-O11-P1
32	A	3000	IHP	C6-O16-P6-O26
32	A	3000	IHP	C1-O11-P1-O31
32	A	3000	IHP	C6-O16-P6-O36

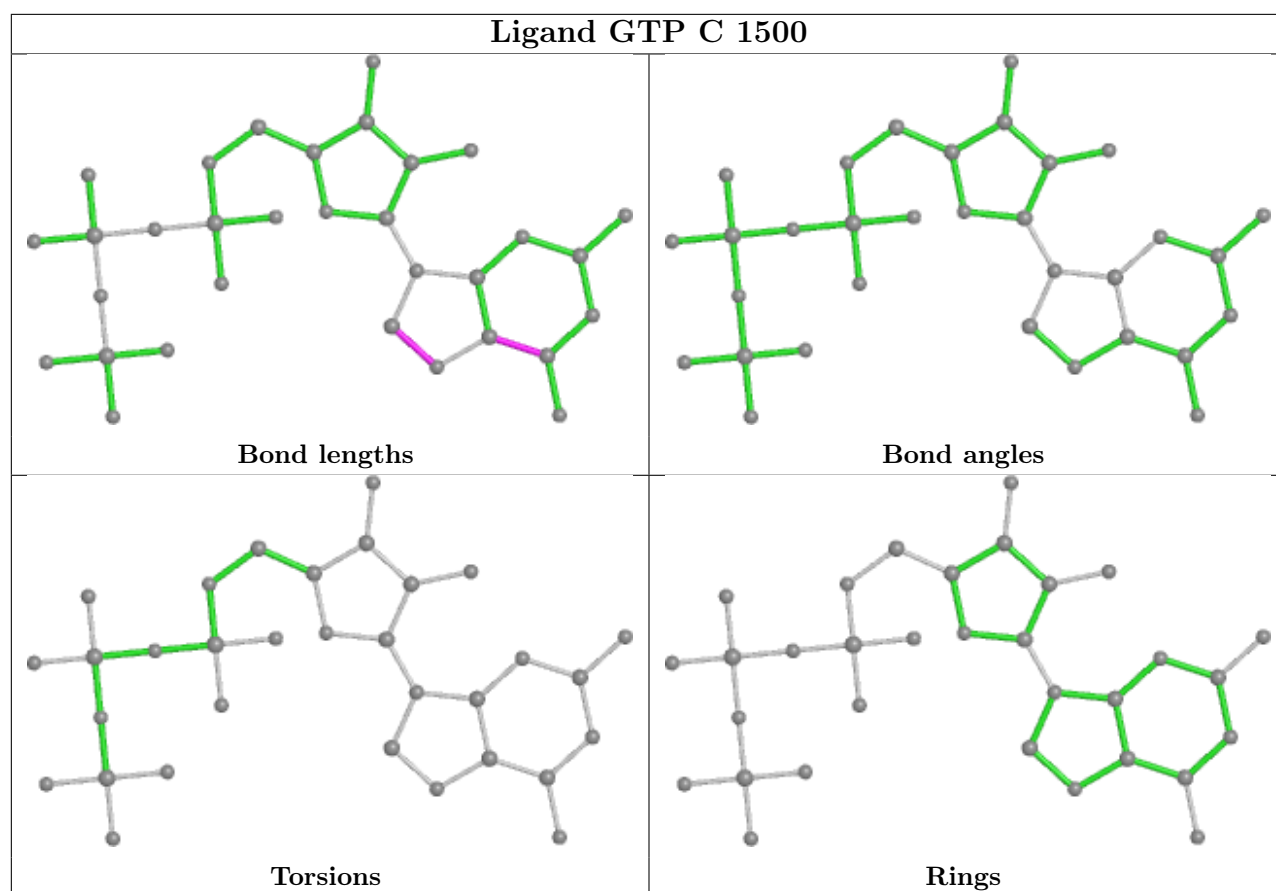
There are no ring outliers.

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 [i](#)

There are no chain breaks in this entry.

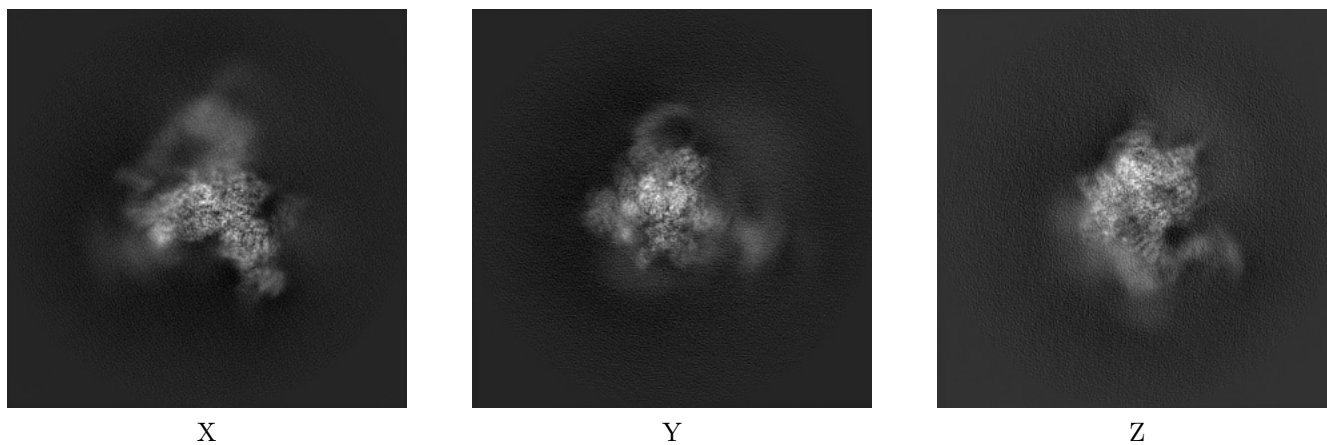
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-0687. 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](#)

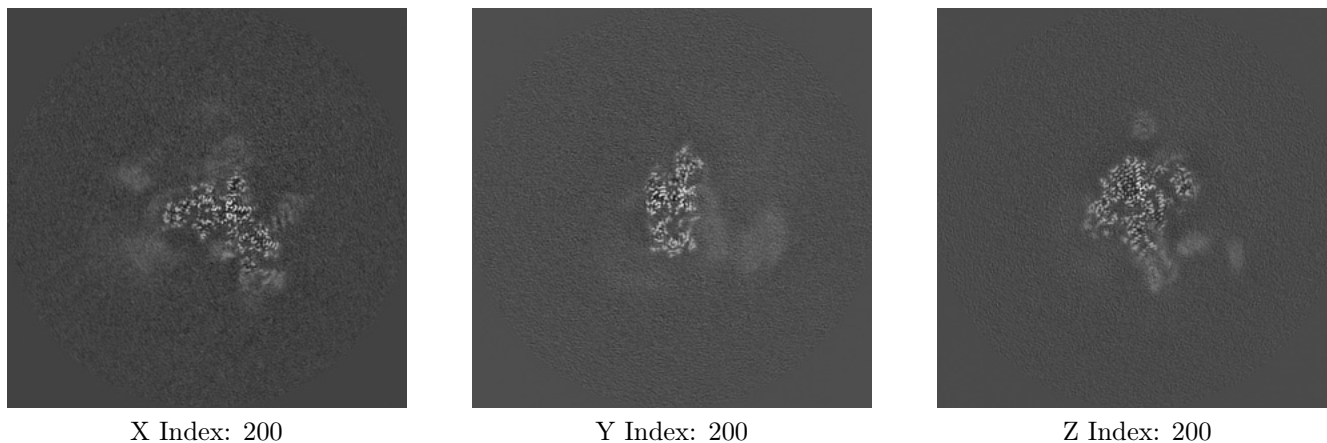
#### 6.1.1 Primary map



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

### 6.2 Central slices [i](#)

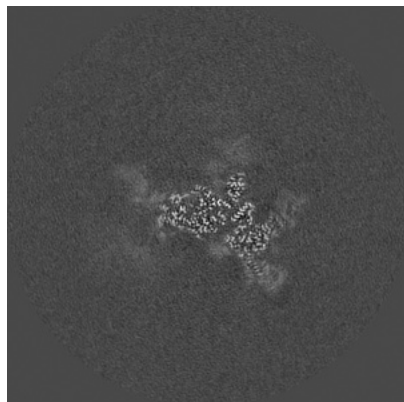
#### 6.2.1 Primary map



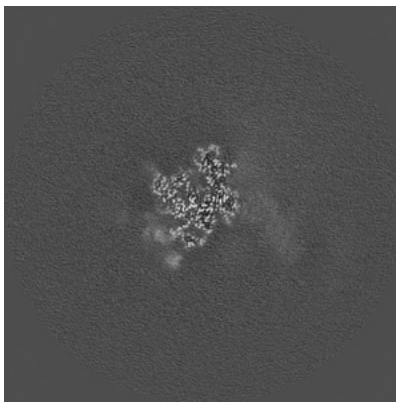
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

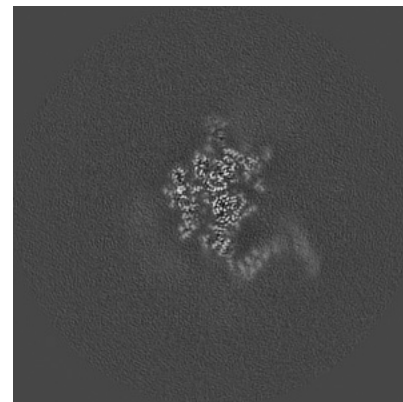
### 6.3.1 Primary map



X Index: 207



Y Index: 228



Z Index: 186

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

## 6.4 Orthogonal surface views [i](#)

### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.024. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

## 6.5 Mask visualisation

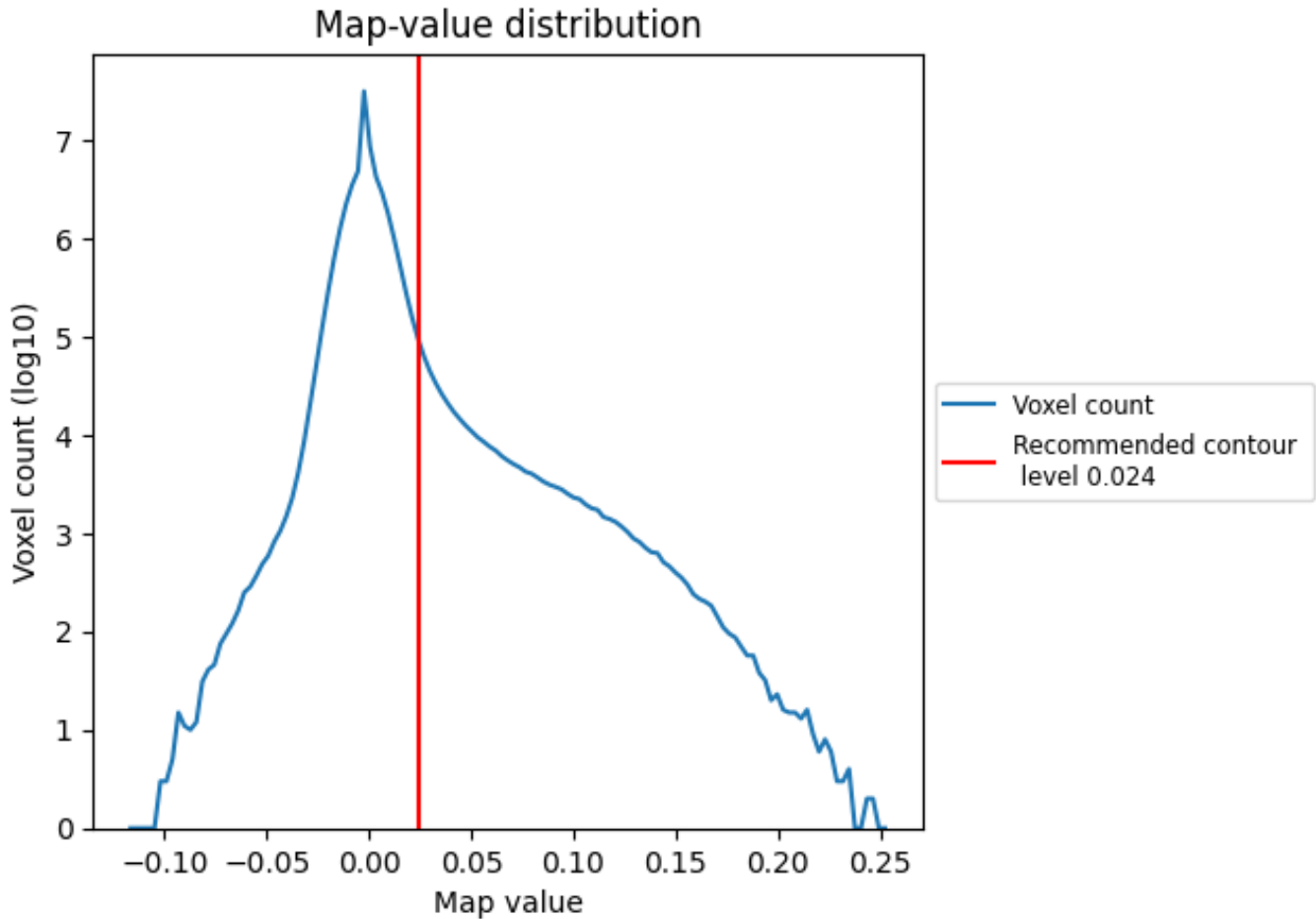
This section was not generated. No masks/segmentation were deposited.



## 7 Map analysis [i](#)

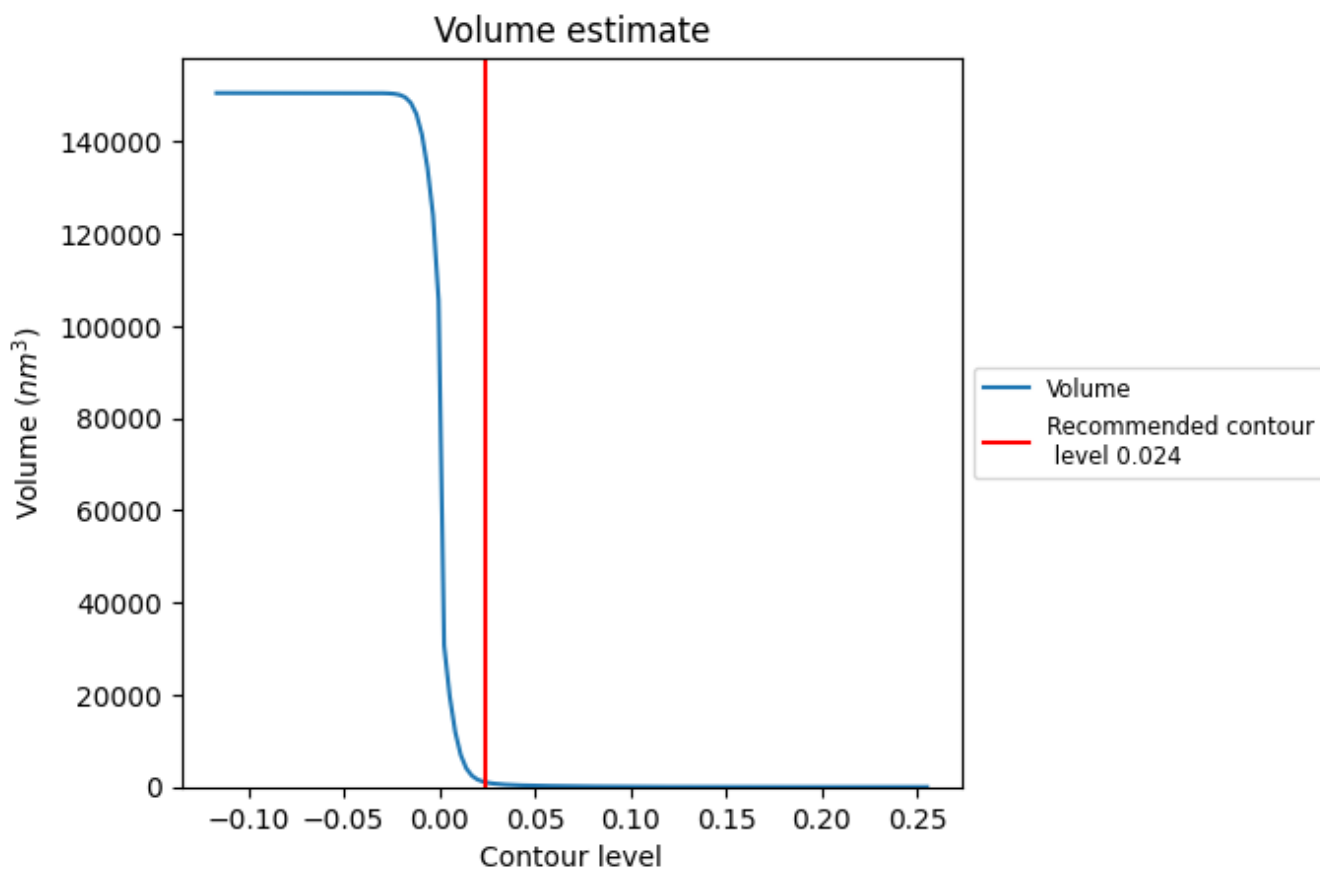
This section contains the results of statistical analysis of the map.

### 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.

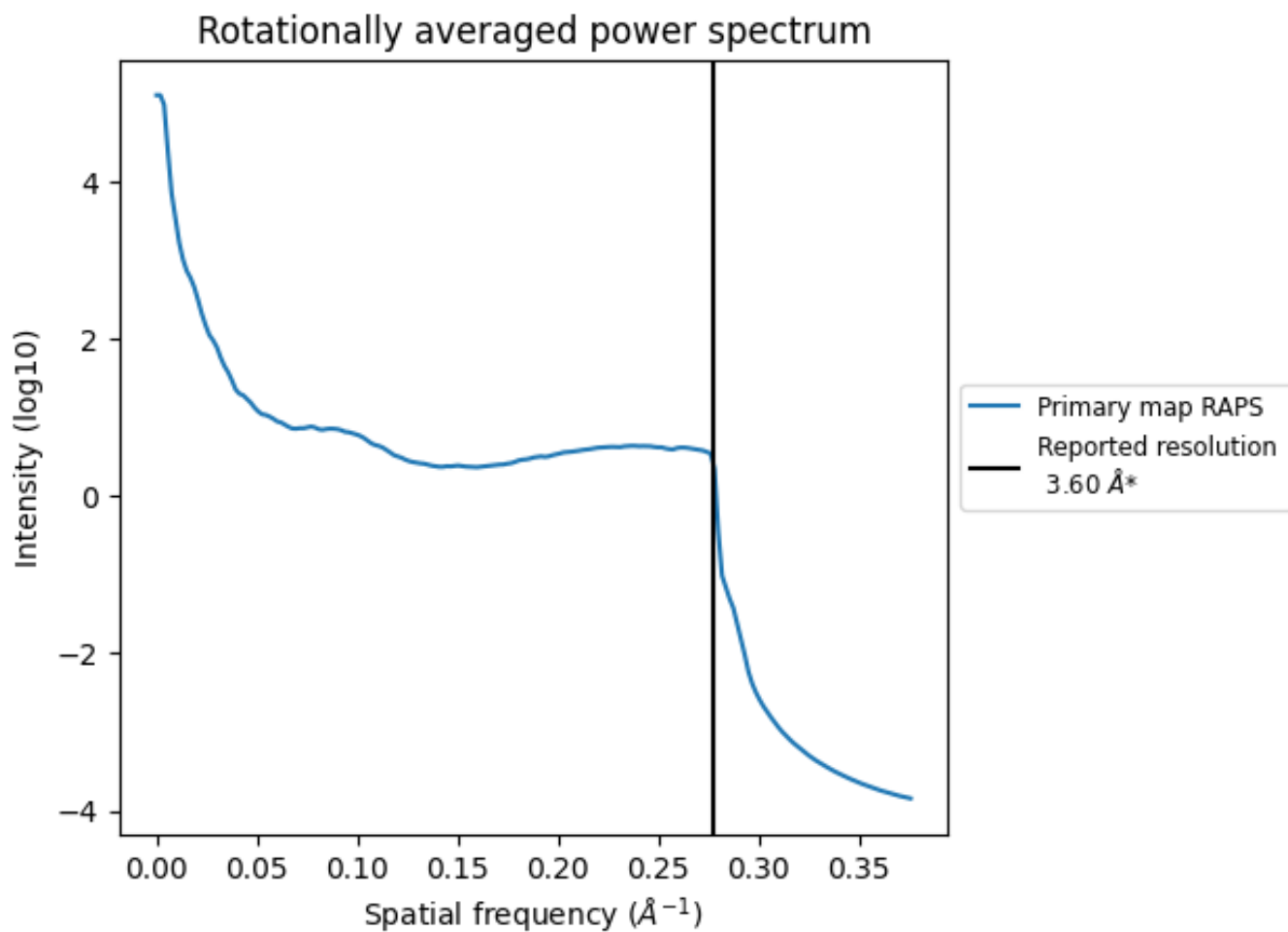
## 7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 1055 nm<sup>3</sup>; this corresponds to an approximate mass of 953 kDa.

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

### 7.3 Rotationally averaged power spectrum [i](#)



\*Reported resolution corresponds to spatial frequency of  $0.278 \text{\AA}^{-1}$

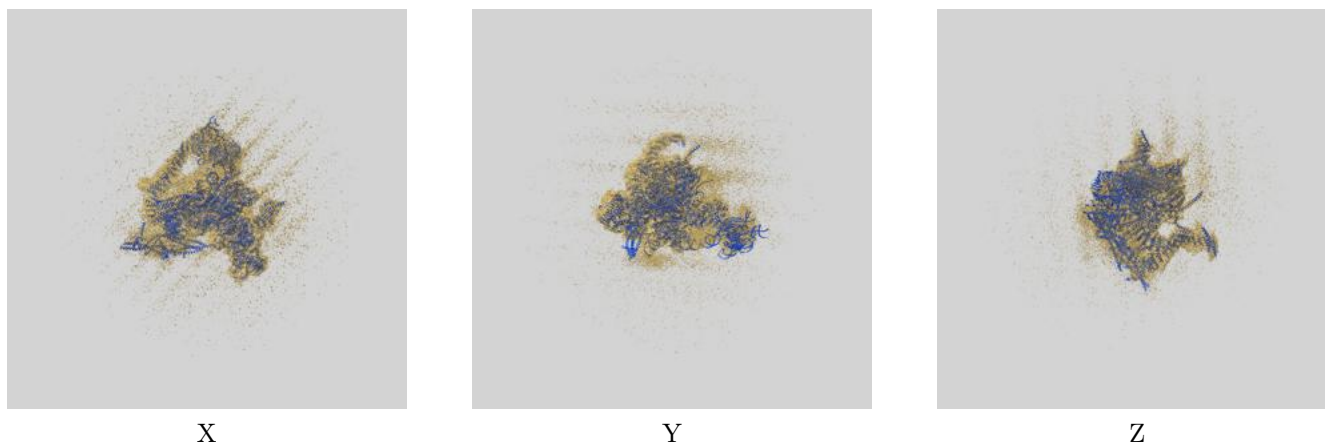
## 8 Fourier-Shell correlation

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

## 9 Map-model fit [i](#)

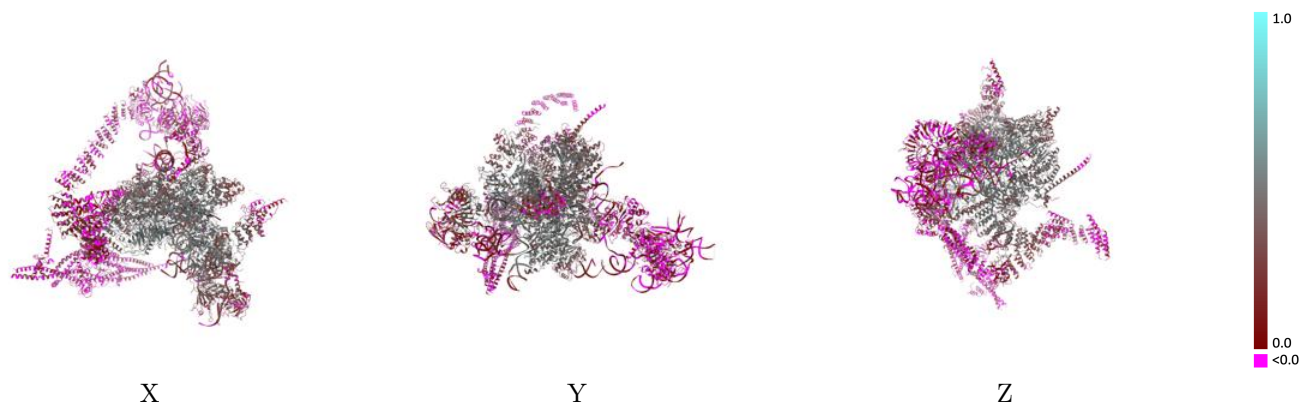
This section contains information regarding the fit between EMDB map EMD-0687 and PDB model 6J6H. Per-residue inclusion information can be found in section [3](#) on page [12](#).

### 9.1 Map-model overlay [i](#)



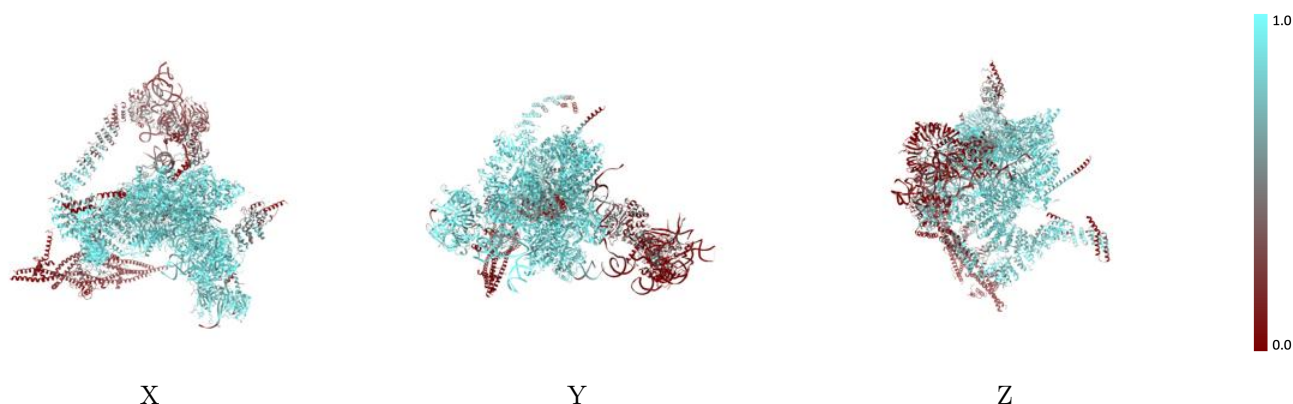
The images above show the 3D surface view of the map at the recommended contour level 0.024 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



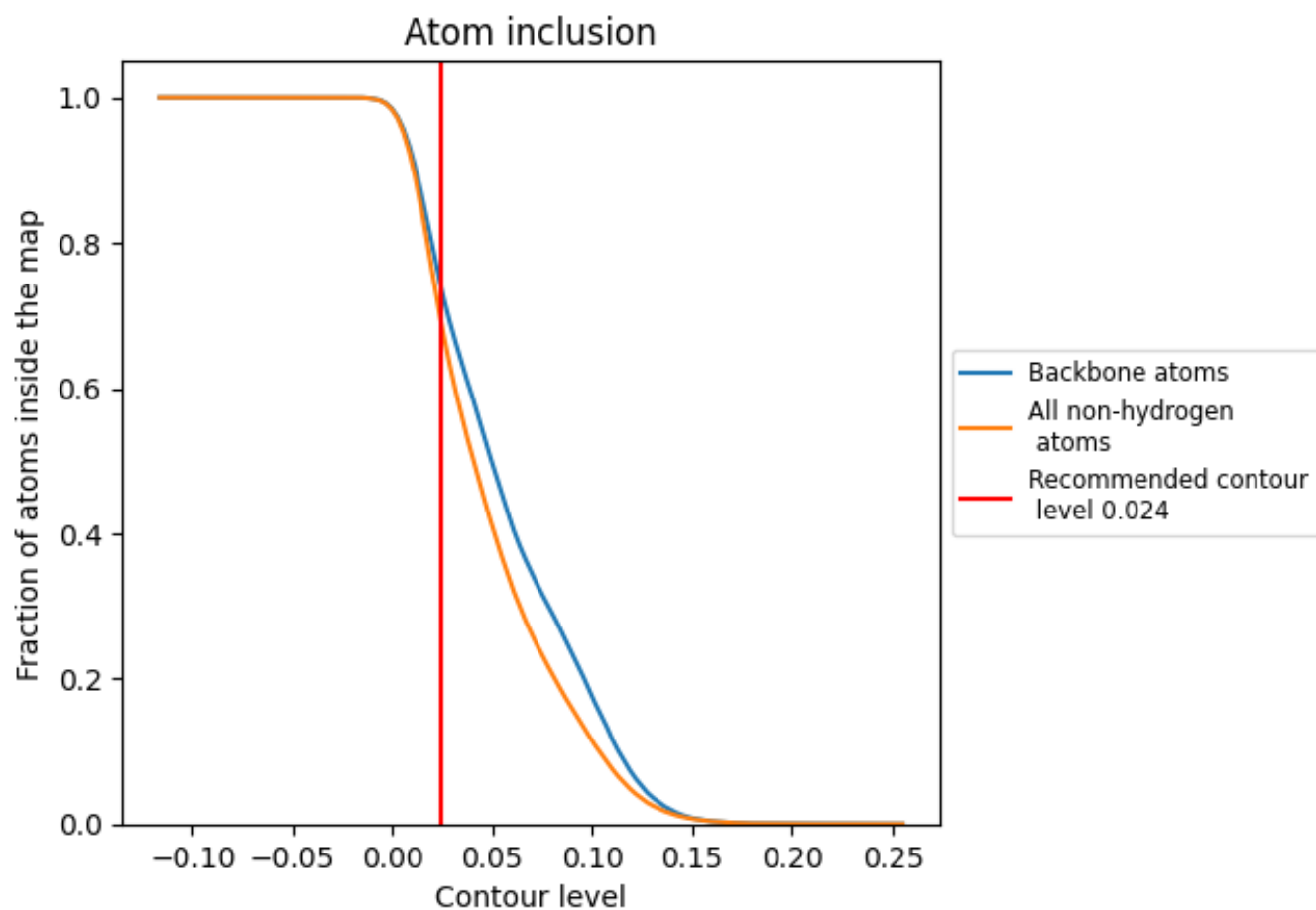
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.024).







































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 74% 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 (0.024) and Q-score for the entire model and for each chain.















Chain	Atom inclusion	Q-score
All	 0.6969	 0.2830
A	 0.8376	 0.4070
B	 0.5972	 0.1860
C	 0.9097	 0.4340
D	 0.9265	 0.2930
E	 0.9795	 0.4190
H	 0.4889	 0.0520
I	 0.8189	 0.3750
J	 0.8235	 0.4640
L	 0.3183	 0.0850
O	 0.9343	 0.4800
P	 0.7828	 0.3760
Q	 0.8445	 0.3440
R	 0.9053	 0.4250
S	 0.7245	 0.4160
T	 0.9300	 0.4620
Z	 0.6185	 0.2660
a	 0.1611	 -0.0220
b	 0.2675	 0.0140
c	 0.5118	 0.2380
d	 0.8191	 0.2660
e	 0.1510	 0.0360
g	 0.7734	 0.1370
h	 0.8718	 0.1560
i	 0.8271	 0.1680
j	 0.8254	 0.2710
k	 0.7541	 0.2690
l	 0.8502	 0.3730
m	 0.7124	 0.1760
n	 0.9683	 0.4070
o	 0.1320	 0.0040
p	 0.1418	 0.0180
q	 0.0165	 0.0040
r	 0.1111	 -0.0050
s	 0.2804	 0.0030



*Continued on next page...*



*Continued from previous page...*

Chain	Atom inclusion	Q-score
t	 0.0768	 0.0120
u	 0.0914	 0.0460
v	 0.7023	 0.1310
w	 0.1538	 0.0330
x	 0.0515	 0.0520
y	 0.1117	 0.0000
z	 0.2417	 0.0270