

wwPDB EM Validation Summary Report (i)

Nov 19, 2022 – 11:05 PM EST

PDB ID 7MIZ : EMDB ID EMD-23869 : Title : Atomic structure of cortical microtubule from Toxoplasma gondii Authors Wang, X.; Brown, A.; Sibley, L.D.; Zhang, R. : Deposited on 2021-04-18 : 3.40 Å(reported) Resolution : Based on initial models 4FYU, 6U42, 3JAS :

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

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

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

The following versions of software and data (see references (1)) were used in the production of this report:

EMDB validation analysis	:	0.0.1. dev 43
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 (i)

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

The reported resolution of this entry is 3.40 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.



Motric	Whole archive	EM structures		
INTEGI IC	$(\# {\rm Entries})$	$(\# { m Entries})$		
Clashscore	158937	4297		
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 <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	0	351	5% • 94%
1	1	351	5% • 94%
1	10	351	5% • 94%
1	11	351	6% 94%
1	12	351	5% • 94%
1	13	351	6% 94%
1	14	351	6% 94%
1	15	351	6% 94%



Mol	Chain	Length	Quality of chain		
1	16	351	6% • 94%		
1	17	351	6% • 94%		
1	18	351	6% 94%		
1	19	351	6% • 94%		
1	2	351	6% 94%		
1	20	351	6% • 94%		
1	21	351	6% • 94%		
1	22	351	5% • 94%		
1	23	351	5% • 94%		
1	3	351	6% • 94%		
1	4	351	6% • 94%		
1	5	351	6% 94%		
1	6	351	6% 94%		
1	7	351	5% • 94%		
1	8	351	6% 94%		
1	9	351	5% • 94%		
2	A0	453	76%	18%	6%
2	A2	453	75%	19%	6%
2	A4	453	80%	14%	• 6%
2	A6	453	78%	17%	6%
2	A8	453	76%	18%	6%
2	B0	453	79%	15%	6%
2	B2	453	80%	15%	6%
2	B4	453	74%	20%	6%
2	B6	453	77%	17%	• 6%



Mol	Chain	Length	Quality of chain		
2	B8	453	74%	19%	• 6%
2	C0	453	74%	21%	6%
2	C2	453	74%	20%	6%
2	C4	453	6 8%	26%	6%
2	C6	453	• 70%	25%	6%
2	C8	453	• 80%	14%	6%
2	D0	453	82%	12%	6%
2	D2	453	81%	13%	6%
2	D4	453	20%	1/1%	6%
2	D6	453	70%	159/	6%
2	D0	453	/9%	12%	0%
2	Do	455	82%	13%	6%
2	EU	453	82%	13%	6%
2	E2	453	80%	14%	6%
2	E4	453	77%	16%	• 6%
2	E6	453	78%	16%	6%
2	E8	453	72%	23%	6%
2	F0	453	75%	19%	6%
3	A1	449	74%	21%	5%
3	A3	449	76%	18%	5%
3	A5	449	76%	19%	5%
3	A7	449	80%	15%	5%
3	A9	449	74%	20%	5%
<u>२</u>	R1	//0	700/	170/	E 0/
<u>ა</u>		449	/8%	1/%	<u> </u>
3	В3	449	77%	18%	5%
3	B5	449	78%	17%	5%



Mol	Chain	Length	Quality of chain		
3	B7	449	78%	16%	5%
3	B9	449	77%	17%	5%
3	C1	449	72%	22%	5%
3	C3	449	72%	23%	5%
3	C5	449	72%	23%	5%
3	C7	449	71%	24%	5%
3	С9	449	77%	18%	5%
3	D1	449	78%	17%	5%
3	D3	449	78%	17%	5%
3	D5	449	73%	22%	• 5%
3	D7	449	75%	20%	5%
3	D9	449	77%	17%	5%
3	E1	449	82%	13%	5%
3	E3	449	79%	16%	5%
3	E5	449	73%	21%	5%
3	E7	449	78%	16%	• 5%
3	E9	449	73%	21%	5%
3	F1	449	71%	23%	5%
4	a	220	67%	32%	
4	h	220	5%	32%	
1	0	220		5270	0%
<u>т</u> Л	d	220	91%		970
- <u>+</u>	u	220	9 1%		9%
4	e r	220	90%		9%
4	1	220	90%	· ·	9%
4	g	220	90%	•	9%



Mol	Chain	Length	Quality of chain	
4	h	220	90%	• 9%
4	i	220	91%	9%
4	j	220	91%	9%
4	m	220	90%	• 9%
4	n	220	89%	• 9%
4	0	220	90%	• 9%
4	р	220	90%	• 9%
4	q	220	90%	• 9%
4	r	220	90%	• 9%
4	s	220	91%	9%
4	t	220	90%	• 9%
4	u	220	90%	• 9%
4	v	220	90%	• 9%
5	k	189	73% •	26%
5	l	189	71% . 2	26%
5	W	189	75%	24%
5	х	189	75% •	24%



2 Entry composition (i)

There are 8 unique types of molecules in this entry. The entry contains 214754 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.

Mol	Chain	Residues		Ato	\mathbf{ms}			AltConf	Trace
1	0	22	Total	С	Ν	Ο	S	0	0
1	0	22	174	114	28	31	1	0	0
1	1	00	Total	С	Ν	Ο	S	0	0
	1	22	174	114	28	31	1	0	0
1	0	22	Total	С	Ν	Ο	S	0	0
1	2	22	174	114	28	31	1	0	0
1	2	22	Total	С	Ν	Ο	S	0	0
	5		174	114	28	31	1	0	0
1	4	22	Total	С	Ν	Ο	S	0	0
1	4		174	114	28	31	1	0	0
1	5	<u> </u>	Total	С	Ν	Ο	S	0	0
1	5		174	114	28	31	1	0	0
1	6	99	Total	С	Ν	Ο	\mathbf{S}	0	0
	0		174	114	28	31	1	0	0
1	7	22	Total	С	Ν	Ο	\mathbf{S}	0	0
-	•		174	114	28	31	1		0
1	8	22	Total	С	Ν	Ο	\mathbf{S}	0	0
	0		174	114	28	31	1		
1	9	22	Total	С	Ν	Ο	\mathbf{S}	0	0
-			174	114	28	31	1		
1	10	22	Total	С	Ν	Ο	\mathbf{S}	0	0
	10		174	114	28	31	1		
1	11	22	Total	С	Ν	Ο	S	0	0
			174	114	28	31	1	<u> </u>	
1	12	22	Total	С	Ν	0	S	0	0
			174	114	28	31	1		
1	13	22	Total	С	N	0	S	0	0
			174	114	28	31	1	_	
1	14	22	Total	C	N	U ai	S	0	0
			174	114	28	31	1 		
1	15	22	Total	C	N	U 01	S	0	0
			174	114	28	31	<u>I</u>		
1	16	22	Total	\mathbf{C}_{114}	N	\mathbf{O}	S	0	0
1 10	10 22	174	114	28	31	T		~	

• Molecule 1 is a protein called Microtubule associated protein SPM1.



Mol	Chain	Residues		Atc	\mathbf{ms}			AltConf	Trace
1	17	22	Total	С	Ν	Ο	S	0	0
	1 11		174	114	28	31	1	0	0
1	18	22	Total	С	Ν	Ο	\mathbf{S}	0	0
1	10		174	114	28	31	1	0	0
1	10	22	Total	С	Ν	Ο	\mathbf{S}	0	0
1	1 19		174	114	28	31	1	0	0
1	20	22	Total	С	Ν	Ο	\mathbf{S}	0	0
1	20		174	114	28	31	1		0
1	91	22	Total	С	Ν	Ο	\mathbf{S}	0	0
1	21		174	114	28	31	1	0	0
1	<u> </u>	20	Total	С	Ν	Ο	S	0	0
	20	160	105	26	28	1	0	U	
1	93	20	Total	С	N	0	S	0	0
	23		160	105	26	28	1		U

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
0	93	ARG	PRO	conflict	UNP A0A7J6K285
1	93	ARG	PRO	conflict	UNP A0A7J6K285
2	93	ARG	PRO	conflict	UNP A0A7J6K285
3	93	ARG	PRO	conflict	UNP A0A7J6K285
4	93	ARG	PRO	conflict	UNP A0A7J6K285
5	93	ARG	PRO	conflict	UNP A0A7J6K285
6	93	ARG	PRO	conflict	UNP A0A7J6K285
7	93	ARG	PRO	conflict	UNP A0A7J6K285
8	93	ARG	PRO	conflict	UNP A0A7J6K285
9	93	ARG	PRO	conflict	UNP A0A7J6K285
10	93	ARG	PRO	conflict	UNP A0A7J6K285
11	93	ARG	PRO	conflict	UNP A0A7J6K285
12	93	ARG	PRO	conflict	UNP A0A7J6K285
13	93	ARG	PRO	conflict	UNP A0A7J6K285
14	93	ARG	PRO	conflict	UNP A0A7J6K285
15	93	ARG	PRO	conflict	UNP A0A7J6K285
16	93	ARG	PRO	conflict	UNP A0A7J6K285
17	93	ARG	PRO	conflict	UNP A0A7J6K285
18	93	ARG	PRO	conflict	UNP A0A7J6K285
19	93	ARG	PRO	conflict	UNP A0A7J6K285
20	93	ARG	PRO	conflict	UNP A0A7J6K285
21	93	ARG	PRO	conflict	UNP A0A7J6K285
22	93	ARG	PRO	conflict	UNP A0A7J6K285
23	93	ARG	PRO	conflict	UNP A0A7J6K285



• Molecule 2 is a protein called Tubulin alpha chain.

Mol	Chain	Residues		At	oms			AltConf	Trace
9	4.0	128	Total	С	Ν	0	S	0	0
	AU	420	3325	2105	569	625	26	0	
2	Δ.2	428	Total	С	Ν	0	S	0	0
2	$\Lambda 2$	420	3325	2105	569	625	26	0	0
2	ΔΛ	428	Total	С	Ν	0	\mathbf{S}	0	0
2	114	420	3325	2105	569	625	26	0	0
2	A6	428	Total	\mathbf{C}	Ν	Ο	\mathbf{S}	0	0
	110	420	3325	2105	569	625	26	0	0
2	Δ.8	428	Total	\mathbf{C}	Ν	Ο	\mathbf{S}	0	0
	110	420	3325	2105	569	625	26	0	0
2	BO	428	Total	\mathbf{C}	Ν	Ο	\mathbf{S}	0	0
	D0	420	3325	2105	569	625	26	0	0
2	B2	428	Total	\mathbf{C}	Ν	Ο	\mathbf{S}	0	0
		420	3325	2105	569	625	26	0	0
2	B4	428	Total	\mathbf{C}	Ν	Ο	\mathbf{S}	0	0
	DT	420	3325	2105	569	625	26	0	0
2	B6	428	Total	\mathbf{C}	Ν	Ο	\mathbf{S}	0	0
	D0	420	3325	2105	569	625	26	0	0
2	B8	428	Total	\mathbf{C}	Ν	Ο	\mathbf{S}	0	0
	D 0	420	3325	2105	569	625	26	0	0
2	CO	428	Total	\mathbf{C}	Ν	Ο	\mathbf{S}	0	0
	00	420	3325	2105	569	625	26	0	0
2	C2	428	Total	\mathbf{C}	Ν	Ο	\mathbf{S}	0	0
		420	3325	2105	569	625	26	0	0
2	C4	428	Total	\mathbf{C}	Ν	Ο	\mathbf{S}	0	0
		120	3325	2105	569	625	26	0	
2	C6	428	Total	\mathbf{C}	Ν	Ο	\mathbf{S}	0	0
	00	120	3325	2105	569	625	26	0	
2	C8	428	Total	\mathbf{C}	Ν	Ο	\mathbf{S}	0	0
_			3325	2105	569	625	26	Ŭ	
2	D0	428	Total	\mathbf{C}	Ν	Ο	\mathbf{S}	0	0
	DU	120	3325	2105	569	625	26	0	0
2	D2	428	Total	\mathbf{C}	Ν	Ο	\mathbf{S}	0	0
			3325	2105	569	625	26	Ŭ	
2	D4	428	Total	\mathbf{C}	Ν	Ο	\mathbf{S}	0	0
		120	3325	2105	569	625	26	Ŭ	
2	D6	428	Total	С	Ν	Ο	S	0	0
	D0 428	3325	2105	569	625	26			
2	2 D8	428	Total	С	Ν	Ο	S	0	0
			3325	2105	569	625	26		
2	2 E0	428	Total	\mathbf{C}	Ν	Ο	S	0	0
			3325	2105	569	625	26		



Mol	Chain	Residues		At	oms			AltConf	Trace	
9 F9	428	Total	С	Ν	0	S	0	0		
2	112	420	3325	2105	569	625	26	0	0	
2	E4	428	Total	С	Ν	Ο	\mathbf{S}	0	0	
	124	420	3325	2105	569	625	26	0	0	
9	Γc	2 F6	F6 428	Total	С	Ν	0	\mathbf{S}	0	0
	EO	420	3325	2105	569	625	26	0	0	
9	F8	428	Total	С	Ν	0	\mathbf{S}	0	0	
	Eo	420	3325	2105	569	625	26	0	0	
2 F(FO	498	Total	С	Ν	0	S	0	0	
	I'U	420	3325	2105	569	625	26	0		

• Molecule 3 is a protein called Tubulin beta chain.

Mol	Chain	Residues		At	oms			AltConf	Trace
0	Λ 1	496	Total	С	Ν	0	S	0	0
3	AI	420	3331	2094	569	641	27	0	0
2	٨.2	496	Total	С	Ν	0	S	0	0
0	AJ	420	3331	2094	569	641	27	0	0
2	15	496	Total	С	Ν	0	\mathbf{S}	0	0
0	AJ	420	3331	2094	569	641	27	0	0
2	Δ7	496	Total	С	Ν	0	S	0	0
0	A	420	3331	2094	569	641	27	0	0
3	4.0	496	Total	С	Ν	0	S	0	0
0	A9	420	3331	2094	569	641	27	0	0
3	R1	496	Total	С	Ν	0	S	0	0
0	DI	420	3331	2094	569	641	27	0	0
3	B3	496	Total	С	Ν	0	S	0	0
0	D0	420	3331	2094	569	641	27	0	0
3	R5	496	Total	С	Ν	0	S	0	0
0	D0	420	3331	2094	569	641	27	0	0
3	B7	496	Total	С	Ν	0	S	0	0
0	Di	420	3331	2094	569	641	27	0	0
3	B0	496	Total	С	Ν	0	\mathbf{S}	0	0
0	D9	420	3331	2094	569	641	27	0	0
3	C1	496	Total	С	Ν	0	\mathbf{S}	0	0
0	UI	420	3331	2094	569	641	27	0	0
3	C3	496	Total	С	Ν	0	\mathbf{S}	0	0
J	U.J	420	3331	2094	569	641	27	U	U
3	C5	426	Total	С	Ν	0	S	0	0
J	0.5	420	3331	2094	569	641	27	U	0
3	C7	426	Total	C	Ν	0	S	0	0
J	UI	420	3331	2094	569	641	27	U	U



Mol	Chain	Residues		At	oms			AltConf	Trace
9	CO	496	Total	С	Ν	0	S	0	0
0	09	420	3331	2094	569	641	27	0	0
9	D1	496	Total	С	Ν	0	S	0	0
0	DI	420	3331	2094	569	641	27	0	0
2	D2	496	Total	С	Ν	0	S	0	0
0	Do	420	3331	2094	569	641	27	0	0
2	D5	496	Total	С	Ν	0	S	0	0
0	D0	420	3331	2094	569	641	27	0	0
2	D7	496	Total	С	Ν	0	S	0	0
5	Di	420	3331	2094	569	641	27	0	0
2	ро	496	Total	С	Ν	0	S	0	0
5	D9	420	3331	2094	569	641	27	0	0
2	F1	426	Total	С	Ν	0	S	0	0
5	171	420	3331	2094	569	641	27	0	0
2	F3	496	Total	С	Ν	0	S	0	0
5	E9	420	3331	2094	569	641	27	0	0
2	F5	496	Total	С	Ν	0	S	0	0
5	E9	420	3331	2094	569	641	27	0	0
2	\mathbf{F}^{7}	496	Total	С	Ν	0	S	0	0
5		420	3331	2094	569	641	27	0	0
2	FO	496	Total	С	Ν	0	S	0	0
J	<u>Б</u> Э	420	3331	2094	569	641	27	U	0
2	F1	426	Total	С	Ν	0	S	0	0
0		420	3331	2094	569	641	27	U	

• Molecule 4 is a protein called PDI family protein.

Mol	Chain	Residues		At	oms			AltConf	Trace
4	9	150	Total	С	Ν	0	S	0	0
4	a	150	1198	763	213	217	5	0	0
4	h	150	Total	С	Ν	0	S	0	0
4	D	150	1198	763	213	217	5	0	0
4	0	201	Total	С	Ν	0	S	0	0
4	C	201	1608	1021	283	297	7	0	0
4	d	201	Total	С	Ν	0	S	0	0
4	u	201	1608	1021	283	297	7	0	0
4	0	201	Total	С	Ν	0	S	0	0
4	е	201	1608	1021	283	297	7	0	0
4	f	201	Total	С	Ν	0	S	0	0
4	1	201	1608	1021	283	297	7	0	0
4	ď	201	Total	С	Ν	0	S	0	0
4	g	201	1608	1021	283	297	7	0	U



Mol	Chain	Residues		At	oms			AltConf	Trace
4	1	001	Total	С	Ν	0	S	0	0
4	n	201	1608	1021	283	297	$\overline{7}$	0	0
4	<u>.</u>	901	Total	С	Ν	0	S	0	0
4	1	201	1608	1021	283	297	7	0	0
4	<u>.</u>	901	Total	С	Ν	0	S	0	0
4	J	201	1608	1021	283	297	7	0	0
4	-	201	Total	С	Ν	0	S	0	0
4	0	201	1608	1021	283	297	7	0	0
4		201	Total	С	Ν	0	S	0	0
4	р	201	1608	1021	283	297	7	0	0
4	~	201	Total	С	Ν	0	S	0	0
4	q	201	1608	1021	283	297	7	0	U
4		201	Total	С	Ν	0	S	0	0
4	1	201	1608	1021	283	297	7	0	
4	G	201	Total	С	Ν	0	S	0	0
4	5	201	1608	1021	283	297	$\overline{7}$	0	U
4	+	201	Total	С	Ν	0	S	0	0
4	U	201	1608	1021	283	297	$\overline{7}$	0	0
4		201	Total	С	Ν	0	S	0	0
4	u	201	1608	1021	283	297	7	0	0
4		201	Total	С	Ν	0	S	0	0
4	V	201	1608	1021	283	297	7	0	0
4	n	201	Total	С	Ν	0	S	0	0
4	11	201	1608	1021	283	297	7	0	U
4	m	201	Total	С	Ν	0	S	0	0
4	111	201	1608	1021	283	297	7		U

• Molecule 5 is a protein called PDI family protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	ŀ	120	Total	С	Ν	0	S	0	0
0	K	159	1140	738	203	195	4	0	0
5	1	120	Total	С	Ν	0	S	0	0
0	1	159	1140	738	203	195	4	0	0
Б		149	Total	С	Ν	0	S	0	0
0	W	140	1172	755	207	205	5	0	0
F		149	Total	С	Ν	0	S	0	0
0	X	140	1172	755	207	205	5	0	0

There are 92 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
k	167	SER	-	insertion	UNP A0A7J6K232



Continu	ieu jioni pre	corous page			
Chain	Residue	Modelled	Actual	Comment	Reference
k	168	ALA	-	insertion	UNP A0A7J6K232
k	169	GLN	-	insertion	UNP A0A7J6K232
k	170	ARG	-	insertion	UNP A0A7J6K232
k	171	LEU	-	insertion	UNP A0A7J6K232
k	172	ARG	-	insertion	UNP A0A7J6K232
k	173	THR	-	insertion	UNP A0A7J6K232
k	174	LEU	-	insertion	UNP A0A7J6K232
k	175	ASN	-	insertion	UNP A0A7J6K232
k	176	ASP	-	insertion	UNP A0A7J6K232
k	177	ALA	-	insertion	UNP A0A7J6K232
k	178	THR	-	insertion	UNP A0A7J6K232
k	179	ASP	-	insertion	UNP A0A7J6K232
k	180	PRO	-	insertion	UNP A0A7J6K232
k	181	TRP	-	insertion	UNP A0A7J6K232
k	182	LYS	-	insertion	UNP A0A7J6K232
k	183	LYS	-	insertion	UNP A0A7J6K232
k	184	ARG	-	insertion	UNP A0A7J6K232
k	185	LEU	-	insertion	UNP A0A7J6K232
k	186	PRO	-	insertion	UNP A0A7J6K232
k	187	GLN	-	insertion	UNP A0A7J6K232
k	188	ASN	-	insertion	UNP A0A7J6K232
k	189	VAL	-	insertion	UNP A0A7J6K232
1	167	SER	-	insertion	UNP A0A7J6K232
1	168	ALA	-	insertion	UNP A0A7J6K232
1	169	GLN	-	insertion	UNP A0A7J6K232
1	170	ARG	-	insertion	UNP A0A7J6K232
1	171	LEU	-	insertion	UNP A0A7J6K232
1	172	ARG	-	insertion	UNP A0A7J6K232
1	173	THR	-	insertion	UNP A0A7J6K232
1	174	LEU	-	insertion	UNP A0A7J6K232
1	175	ASN	-	insertion	UNP A0A7J6K232
1	176	ASP	-	insertion	UNP A0A7J6K232
1	177	ALA	-	insertion	UNP A0A7J6K232
1	178	THR	-	insertion	UNP A0A7J6K232
1	179	ASP	-	insertion	UNP A0A7J6K232
1	180	PRO	-	insertion	UNP A0A7J6K232
1	181	TRP	-	insertion	UNP A0A7J6K232
1	182	LYS	-	insertion	UNP A0A7J6K232
1	183	LYS	-	insertion	UNP A0A7J6K232
1	184	ARG	-	insertion	UNP A0A7J6K232
1	185	LEU	-	insertion	UNP A0A7J6K232
1	186	PRO	-	insertion	UNP A0A7J6K232



Continu	ieu from pre	corous puye			
Chain	Residue	Modelled	Actual	Comment	Reference
1	187	GLN	-	insertion	UNP A0A7J6K232
1	188	ASN	-	insertion	UNP A0A7J6K232
1	189	VAL	-	insertion	UNP A0A7J6K232
W	167	SER	-	insertion	UNP A0A7J6K232
W	168	ALA	-	insertion	UNP A0A7J6K232
W	169	GLN	-	insertion	UNP A0A7J6K232
W	170	ARG	-	insertion	UNP A0A7J6K232
W	171	LEU	-	insertion	UNP A0A7J6K232
W	172	ARG	-	insertion	UNP A0A7J6K232
W	173	THR	-	insertion	UNP A0A7J6K232
W	174	LEU	-	insertion	UNP A0A7J6K232
W	175	ASN	-	insertion	UNP A0A7J6K232
W	176	ASP	-	insertion	UNP A0A7J6K232
W	177	ALA	-	insertion	UNP A0A7J6K232
W	178	THR	-	insertion	UNP A0A7J6K232
W	179	ASP	-	insertion	UNP A0A7J6K232
W	180	PRO	-	insertion	UNP A0A7J6K232
W	181	TRP	-	insertion	UNP A0A7J6K232
W	182	LYS	-	insertion	UNP A0A7J6K232
W	183	LYS	-	insertion	UNP A0A7J6K232
W	184	ARG	-	insertion	UNP A0A7J6K232
W	185	LEU	-	insertion	UNP A0A7J6K232
W	186	PRO	-	insertion	UNP A0A7J6K232
W	187	GLN	-	insertion	UNP A0A7J6K232
W	188	ASN	-	insertion	UNP A0A7J6K232
W	189	VAL	-	insertion	UNP A0A7J6K232
X	167	SER	-	insertion	UNP A0A7J6K232
x	168	ALA	-	insertion	UNP A0A7J6K232
X	169	GLN	-	insertion	UNP A0A7J6K232
X	170	ARG	-	insertion	UNP A0A7J6K232
x	171	LEU	-	insertion	UNP A0A7J6K232
X	172	ARG	-	insertion	UNP A0A7J6K232
X	173	THR	-	insertion	UNP A0A7J6K232
X	174	LEU	-	insertion	UNP A0A7J6K232
X	175	ASN	-	insertion	UNP A0A7J6K232
X	176	ASP	-	insertion	UNP A0A7J6K232
X	177	ALA	-	insertion	UNP A0A7J6K232
x	178	THR	-	insertion	UNP A0A7J6K232
x	179	ASP	-	insertion	UNP A0A7J6K232
x	180	PRO	-	insertion	UNP A0A7J6K232
x	181	TRP	-	insertion	UNP A0A7J6K232
x	182	LYS	-	insertion	UNP A0A7J6K232



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Chain	Residue	Modelled	Actual	Comment	Reference					
X	183	LYS	-	insertion	UNP A0A7J6K232					
X	184	ARG	-	insertion	UNP A0A7J6K232					
X	185	LEU	-	insertion	UNP A0A7J6K232					
X	186	PRO	-	insertion	UNP A0A7J6K232					
X	187	GLN	-	insertion	UNP A0A7J6K232					
X	188	ASN	-	insertion	UNP A0A7J6K232					
X	189	VAL	-	insertion	UNP A0A7J6K232					

• Molecule 6 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula: $C_{10}H_{16}N_5O_{14}P_3$).



Mol	Chain	Residues	Atoms					AltConf
6	4.0	1	Total	С	Ν	0	Р	0
0	AU	L	32	10	5	14	3	0
6	12	1	Total	С	Ν	Ο	Р	0
0	ΛL	I	32	10	5	14	3	0
6	Δ.4	1	Total	С	Ν	Ο	Р	0
0	Λ4	I	32	10	5	14	3	0
6	46	1	Total	С	Ν	Ο	Р	0
0	ЛО	T	32	10	5	14	3	0
6	4.8	1	Total	С	Ν	Ο	Р	0
0	ЛО	1	32	10	5	14	3	0
6	BU	1	Total	С	Ν	Ο	Р	0
0	DU	1	32	10	5	14	3	0
6	BJ	1	Total	С	Ν	Ο	Р	0
0		1	32	10	5	14	3	0



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Mol	Chain	Residues		Ato	oms			AltConf
G	D4	1	Total	С	Ν	0	Р	0
0	D4	1	32	10	5	14	3	0
G	De	1	Total	С	Ν	0	Р	0
0	B0	1	32	10	5	14	3	0
G	Do	1	Total	С	Ν	Ο	Р	0
0	Dð	1	32	10	5	14	3	0
G	CO	1	Total	С	Ν	0	Р	0
0	CO	1	32	10	5	14	3	0
6	Co	1	Total	С	Ν	0	Р	0
0	02	1	32	10	5	14	3	0
6	C4	1	Total	С	Ν	0	Р	0
0	04	1	32	10	5	14	3	0
6	CG	1	Total	С	Ν	0	Р	0
0	CO	1	32	10	5	14	3	0
6	Co	1	Total	С	Ν	0	Р	0
0	08	1	32	10	5	14	3	0
G	D0	1	Total	С	Ν	Ο	Р	0
0	D0	1	32	10	5	14	3	0
G	Da	1	Total	С	Ν	0	Р	0
0	D2	1	32	10	5	14	3	0
G	D4	1	Total	С	Ν	0	Р	0
0	D4	1	32	10	5	14	3	0
6	De	1	Total	С	Ν	0	Р	0
0	D0	1	32	10	5	14	3	0
6	٦٩	1	Total	С	Ν	0	Р	0
0	D8	1	32	10	5	14	3	0
6	FO	1	Total	С	Ν	0	Р	0
0	EU	1	32	10	5	14	3	0
6	ГO	1	Total	С	Ν	0	Р	0
0	$\mathbf{E}Z$	1	32	10	5	14	3	0
6	F 4	1	Total	С	Ν	0	Р	0
0	£/4	1	32	10	5	14	3	0
6	FG	1	Total	С	Ν	Ο	Р	Ο
U	ĽО	1	32	10	5	14	3	U
G	гo	1	Total	С	Ν	Ο	Р	0
	ĽО	1	32	10	5	14	3	U
6	FO	1	Total	С	Ν	Ο	Р	Ο
0	ΓU	L	32	10	5	14	3	U

• Molecule 7 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).



Mol	Chain	Residues	Ator	ns	AltConf
7	A0	1	Total 1	Mg 1	0
7	A2	1	Total 1	Mg 1	0
7	A4	1	Total 1	Mg 1	0
7	A6	1	Total 1	Mg 1	0
7	A8	1	Total 1	Mg 1	0
7	B0	1	Total 1	Mg 1	0
7	B2	1	Total 1	Mg 1	0
7	Β4	1	Total 1	Mg 1	0
7	B6	1	Total 1	Mg 1	0
7	B8	1	Total 1	Mg 1	0
7	С0	1	Total 1	Mg 1	0
7	C2	1	Total 1	Mg 1	0
7	C4	1	Total 1	Mg 1	0
7	C6	1	Total 1	Mg 1	0
7	C8	1	Total 1	Mg 1	0
7	D0	1	Total	Mg 1	0
7	D2	1	Total	Mg 1	0
7	D4	1	Total 1	Mg 1	0
7	D6	1	Total 1	Mg 1	0
7	D8	1	Total 1	Mg 1	0
7	E0	1	Total 1	Mg 1	0
7	E2	1	Total 1	Mg	0



Continued from previous page...

Mol	Chain	Residues	Atoms	AltConf
7	E4	1	Total Mg 1 1	0
7	E6	1	Total Mg 1 1	0
7	E8	1	Total Mg 1 1	0
7	F0	1	Total Mg 1 1	0

• Molecule 8 is GUANOSINE-5'-DIPHOSPHATE (three-letter code: GDP) (formula: $C_{10}H_{15}N_5O_{11}P_2$).



Mol	Chain	Residues		AltConf				
0	Δ.1	1	Total	С	Ν	0	Р	0
0	AI	L	28	10	5	11	2	0
8	Λ 3	1	Total	С	Ν	0	Р	0
0	Aə	T	28	10	5	11	2	0
0	15	1	Total	С	Ν	0	Р	0
0	Að	1	28	10	5	11	2	0
0	Δ7	1	Total	С	Ν	0	Р	0
0	Λ (L	28	10	5	11	2	0
8	4.0	1	Total	С	Ν	0	Р	0
0	A9	T	28	10	5	11	2	0
8	R1	1	Total	С	Ν	Ο	Р	0
0	DI	L	28	10	5	11	2	0
8	B3	1	Total	С	N	0	Р	0
	D9	L	28	10	5	11	2	0



Continued from previous page...

Mol	Chain	Residues	_	AltConf				
0	DF	1	Total	С	Ν	Ο	Р	0
0	B9	1	28	10	5	11	2	0
8	D7	1	Total	С	Ν	Ο	Р	0
	Bí	1	28	10	5	11	2	0
8	DO	1	Total	С	Ν	Ο	Р	0
	D9	L	28	10	5	11	2	0
0	C1	1	Total	С	Ν	Ο	Р	0
0	U1	L	28	10	5	11	2	0
0	<u>C</u> 2	1	Total	Total C N		0	Р	0
0	\bigcirc	L	28	10	5	11	2	0
0	C5	1	Total	С	Ν	Ο	Р	0
0	03	L	28	10	5	11	2	0
0	C7	1	Total	С	Ν	0	Р	0
0	01	L	28	10	5	11	2	0
8	CO	1	Total	С	Ν	Ο	Р	0
0	09	T	28	10	5	11	2	0
8	D1	1	Total	С	Ν	0	Р	0
		1	28	10	5	11	2	0
8	D3	1	Total	С	Ν	Ο	Р	0
		T	28	10	5	11	2	0
8	D5	1	Total	С	Ν	Ο	Р	0
0	D0	T	28	10	5	11	2	0
8	D7	1	Total	С	Ν	Ο	Р	0
0	Di	T	28	10	5	11	2	0
8	DQ	1	Total	С	Ν	Ο	Р	0
0	20	I	28	10	5	11	2	0
8	E1	1	Total	\mathbf{C}	Ν	Ο	Р	0
0	1.71	I	28	10	5	11	2	0
8	E3	1	Total	\mathbf{C}	Ν	Ο	Р	0
	<u>Е</u> Э	T	28	10	5	11	2	0
8	$\mathbf{E5}$	1	Total	\mathbf{C}	Ν	Ο	Р	0
0	L0	I	28	10	5	11	2	0
8	$\mathbf{E7}$	1	Total	\mathbf{C}	Ν	Ο	Р	0
		1	28	10	5	11	2	0
8	EQ	1	Total	\mathbf{C}	Ν	Ο	Р	0
	LU	1	28	10	5	11	2	0
8	F1	1	Total	\mathbf{C}	Ν	Ο	Р	0
ð	L T T		28	10	5	11	2	0



3 Residue-property plots (i)

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

• Molecule 1: Microtubule associated protein SPM1





• Molecule 1: Microtubule associated protein SPM1

Chain 2: 6% 94% SISTER SI NAME OF A DESCRIPTION O • Molecule 1: Microtubule associated protein SPM1 Chain 3: 6% 94% A CALLED AND A CALLED A CALL • Molecule 1: Microtubule associated protein SPM1 Chain 4: 6% • 94%



• Molecule 1: Microtubule associated protein SPM1 Chain 5: 6% 94% • Molecule 1: Microtubule associated protein SPM1 Chain 6: 6% 94% MET MET ASN ASN ASN ASN ASN ASN ASN LLYS SER ASN CLYS SER TTYR CGUU CGUU CGUU CGUU CGUU CCYS SER ASS ASS CCYS SER AASN TTYR TTYR TTYR TTYR TTYR AASN CGUU CGUU CGUU CCS SER CCYS SER SER CCYS SER CCYS SER CCYS SE



• Molecule 1: Microtubule associated protein SPM1



MET MET GLY GLY SERRA SE





• Molecule 1: Microtubule associated protein SPM1

Chain 12: 5% 94% PRICE AND ADDRESS AND ADDRESS AND ADDRESS AND ADDRESS AND ADDRESS ADDR • Molecule 1: Microtubule associated protein SPM1 Chain 13: 6% 94% PRO VALI TTHR GUNAL CULU VAL LLEU PRO GUU PRO FLEU PRO GUU PRO GUU PRO GUU VAL LLEU VAL R PRO GUU VAL R PRO CO CO PRO CO PRO CO PRO CO PRO CO PRO CO C • Molecule 1: Microtubule associated protein SPM1 Chain 14: 6% 94%



• Molecule 1: Microtubule associated protein SPM1

 Chain 15:
 6%
 94%

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 6%
 94%

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• Molecule 1: Microtubule associated protein SPM1

• Molecule 1: Microtubule associated protein SPM1



Cha	in 1	7:	6%•										94%	Ď											
MET SER GLY	GLY ASN SFF	ASN THR	PRO LYS LYS	LEU PRO SER	GLU GLU	GLY SER ASD	TYR CI.V	TYR PRO	GLN GLN	PR0 GLN	LYS TYR	PRO LEU	SER GLU	ALA GLU	PRO ASP	TYR SER	ALA CYS	CYS LYS	GLY ASN	ASP ALA	TYR LYS	GLY ALA SEP	HIS 01.Y	THR VAL	GLN
SER HIS PRO	GLU GLU ATA	GLN	TYR ALA GLY	ALA ALA ALA	GLY ALA	GLU THR	GLN	GLY ARG	GLU ARG	VAL ALA	ALA ASP	GLN PRD	ARG ALA	GLY ASP	VAL PRO	ALA ARG	ARG LEU	LEU	ASP	VAL ASP	GLU ALA	ARG	GLN	PRO SER	ARG HIS
PRO GLY TYR	CYS VAL GUII	GLU	CYS THR CYS	GLY MET HIS	LYS CYS	ILE PRO SED	ARG ALA	PRO VAL	PRO PHE	THR GLY	SER THR	GLN TYR ARG	GLU GLU	VAL	LYS PRO	LEU PRO	PRO PRO	GLN	VAL SER	GLN VAL	THR	PRO PRO SED	LEU PRO	GLU	ALA GLU
SER SER TYR	ARG THR GI II	PHE VAL	ALA LYS PRO	LEU PRO PRO	PRO ALA	LYS PHE SFB	GLU VAL	LYS	PRO PRO	THR LEU	PRO PHE	GLU SLH	SER ALA TVD	ARG THR	ASP TYR	VAL PRO	LYS PRO	LEU PRO	GLU VAL	ALA LYS	PRO VAL	GLU VAL T VS	LEU PRO	P237	<mark>0244</mark> Տ245
C246 P258	PRO VAL GI M	THR VAL	GLU VAL LYS	LEU PRO PRO	SER LEU	PRO PHE	GLY SFR	THR	TYR ARG	ASP GLU	PHE GLN	VAL LYS PRO	LEU PRO	ALA THR	LYS VAL	THR GLU	VAL LYS	PRO	PRO SER	PRO	PHE	ALA THR SEP	MET	ARG	ASP TYR
VAL ALA LYS	SER ASN PRO	ILE CYS	PRO VAL SER	LYS LEU PRO	GLN TYR	PRO ALA ATA	THR TYR	PRO GLN	ASN HIS	VAL PHE	TRP ASP	ASP THR	CLN GLN	TYR											
• M	olec	ule	1: N	Aicr	otu	ıbul	le a	sso	cia	teo	ł pr	ote	in S	PM	1 1										
Cha	in 1	8:	6%										94%												
MET SER GLY	GLY ASN SFR	ASN THR	PRO LYS LYS	LEU PRO SER	GLU GLU	GLY SER ASD	TYR CI.Y	TYR PRO	GLN GLN	PR0 GLN	LYS TYR	PRO T.YS	SER GLU	ALA GLU	PRO ASP	TYR SER	ALA CYS	CYS LYS	GLY ASN	ASP ALA	TYR LYS	GLY ALA SEP	HIS ULY	THR VAL	GLN
SER HIS PRO	GLU GLU	GLN	TYR ALA GLY	ALA ALA ALA	GLY ALA	GLU THR	GLN	GLY ARG	GLU ARG	VAL ALA	ALA ASP	GLN GLN	ALA	GLY ASP	VAL PRO	ALA ARG	ARG LEU	LEU	ASP	VAL ASP	GLU ALA	ARG	GLN	PRO SER	ARG HIS
PRO GLY TYR	CYS VAL GIII	GLU	CYS THR CYS	GLY MET HIS	LYS CYS	ILE PRO SED	ARG ALA	PRO VAL	PRO PHE	THR GLY	SER THR	GLN ARG	GLU GLU	VAL	LYS PRO	LEU PRO	PRO PRO	GLN	VAL SER	GLN	THR	PRO PRO SED	LEU PRO	PHE GLU	ALA GLU
SER SER TYR	ARG THR GI II	PHE	ALA LYS PRO	LEU PRO PRO	PR0 ALA	LYS PHE EFD	GLU VAI.	LYS LEU	PRO PRO	THR LEU	PRO PHE	GLU SLH	SER ALA TVD	ARG THR	ASP TYR	VAL PRO	LYS PRO	LEU PRO	VAL	ALA LYS	PR0 VAL	GLU VAL TVS	LEU PRO	P237	P255
P258 PRO VAL	GLN THR VAI	GLU VAL	LYS LEU PRO	PRO SER LEU	PRO PHE	GLY GLY	THR	TYR	ASP GLU	PHE	VAL LYS	LEU PRO	PRO ALA	LYS VAL	THR GLU	VAL LYS	LEU PRO	PRO SER	PRO	PHE ASP	ALA THR	SER MET TVD	ARG	ASP TYR	VAL ALA
LYS SER ASN	PRO ILE CVS	PRO VAL	SER LYS LEU	PRO GLN TYR	PRO ALA	ALA THR TVB	PRO GLN	ASN HIS	VAL PHE	TRP ASP	PRO ASP	LYS	TRP TYR												
• M	olec	ule	1: N	Aicr	otu	ıbul	le a	sso	cia	teo	ł pr	ote	in S	PM	[1										
Cha	in 1	9:	6%•		-		-	-	-	-		-	94%	ò	-	-	-	-	-	-	-	-	-		
MET SER GLY	GLY ASN SFR	ASN THR	PRO LYS LYS	LEU PRO SER	GLU GLU	GLY SER ASD	TYR TYR CI.Y	TYR PRO	GLN GLN	PR0 GLN	LYS TYR	PRO T.YS	SER GLU	ALA GLU	PRO	TYR SER	ALA CYS	CYS	GLY ASN	ASP ALA	TYR LYS	GLY ALA SEP	HIS 111	THR VAL	GLN
SER HIS PRO	GLU GLU	GLN	TYR ALA GLY	ALA ALA ALA	GLY ALA	GLU THR	GLN	GLY ARG	GLU ARG	VAL ALA	ALA ASP	GLN GLN PRD	ALA	GLY ASP	VAL	ALA ARG	ARG LEU	HIS	ASP	VAL ASP	GLU ALA	ARG	GLN SER	PRO SER	ARG HIS
PRO GLY TYR	CYS VAL	GLU	CYS THR CYS	GLY MET HIS	LYS CYS	TLE PRO SEE	ARG	PRO VAL	PRO PHE	THR GLY	SER THR	GLN TYR ARG	GLU GLU	VAL	LYS PRO	LEU PRO	PRO PRO	GLN	VAL SER	GLN	LEU	PRO PRO SEE	LEU PRO	PHE	ALA GLU





















M266 C1448 P274 C161 P274 C161 P286 L164 R200 E165 P286 L164 P286 L164 P306 E165 P306 L167 P306 L167 P306 L167 P306 L167 P306 L167 P306 L167 P306 P175 P306 P176 P306 P176 P306 P176 P306 P202 P306 P203 P306</

1437 GLU THR ALA GLU GLU GLU GLU GLU GLU GLV ASP GLV TYR TYR

• Molecule 2: Tubulin alpha chain



• Molecule 2: Tubulin alpha chain









• Molecule 2: Tubulin alpha chain



R214 M1 R215 G29 R215 G29 R216 G17 R216 G14 R264 G17 R264 G17 R264 G17 R264 G17 R264 G17 R265 G17 R264 G47 R265 G16 R266 R49 R266 R79 R2306 B68 R331 M100 R331 L125 G332 R106 R333 R156 R333 R164 R333 L126 R336 R49 R336 R49 R333 L126 R334 L136

• Molecule 2: Tubulin alpha chain




• Molecule 3: Tubulin beta chain





GLU GLY ALA

• Molecule 3: Tubulin beta chain



ALA THR ALA GLU

R153 K154 K155 K156 K156 K156 K156 V195 197 198 121 121 121 121 121 121 121 121 123 1318 1318 1318 1318

 \bullet Molecule 3: Tubulin beta chain

GLU GLU GLU GLU FHE ASP ASP GLU GLU MET ALA ALA ALA

23%

5%

Molecule 3: Tubulin beta chain
Chain C5: 72%

ASP ALA ALA ALA ALA CGLU CGLU CGLU CGLU CGLU MET MET MET ALA ALA ALA ALA ALA

• Molecule 3: Tubulin beta chain

THR ALA CLU CLU CLU CLU CLU CLU CLU CLU CLU MET ALA ALA ALA ALA

• Molecule 3: Tubulin beta chain

Chain D1: 78% 17% 5%

V169 M1 P173 V7 V180 C10 V180 C10 V199 V7 N124 N14 V199 R46 V199 R46 V203 E53 V203 D67 N204 E63 N204 N66 A206 N67 N204 M66 A206 N67 N204 N99 V120 N14 V21 N14 V21 N14 V21 N24 V21 N173 L215 N173 L216 N173 L216 N101 Y23 N101 Y23 N101 Y23 N101 Y24 N101 Y23 U103 Y24 N101 Y23 U232 Y24 N101 Y24 N101

 \bullet Molecule 3: Tubulin beta chain

• Molecule 3: Tubulin beta chain

S145 S145 R282 M447 R285 M447 R286 M447 R286 M447 R286 M447 V286 F167 V286 F167 R304 W175 R305 W175 R306 W175 R306 W175 R306 W176 R303 W176 R304 W176 R305 W176 R306 W176 R307 W176 R303 W176 R304 W176 R324 W176 R324 W176 R324 W176 R324 W176 R324 W176 R324</t

 \bullet Molecule 3: Tubulin beta chain

2248 12249 12260 1250 1256 12568 1266 1266 1266 1266 1266 1266 1266 12	q279 q280 x281 A283 A283 2285 C285 C285 C285 C285 C285 C285 C285	N238 R306 7310 1311 1312 A313 R320	K324 D327 M330	V342 V342 K350 C354 D355 D355
L361 F367 F367 F367 F379 C379 C379 C379 C379 C379 C379 C379 C	THR ALA GLU GLU GLU GLU GLU GLU GLU	MEI GLY GLU GLU ALA ALA		
• Molecule 4: PDI family p	rotein			
Chain a:	67%	·	32%	-
MET SER CL/M CL/M PR(O PR(O PR(O PR(O PR(O PR(O PR(O PR(O	ARG ARA LEU MET LEU MET ALA ALA ALA ALA ALA CLU GLU CLU CLU	ALSM LLLE GLIN LLEU PRO PRO ASN ASP MET ASP ASP	LEU 148 R117 R126 R126	R149 V150 M151 K152 GLU TYR GLU
VAL PRO THR TTR TTR CLY TVR CLY TVR CLY CLY CLY CLY CLY CLY CL CL CLY CLY C	ASP ASP GLN PHE HIS HIS ARG PRO PRO THR THR LEU CLU GLU GLU			
• Molecule 4: PDI family p	rotein			
Chain b:	68%		32%	-
MET SER CLIN PRO PRO PRO PRO ALL VAL CLEU CLEU CLEU CLEU CLEU CLEU CLEU CLE	ARG ALA LEU MET CILN GLN ALA ALA ALA ALA CLN GLY CLV CLV	ASM TLE GIN CGIN PRO PRO ASP ASP MET ASP	LEU 148 E120	R149 V150 M151 K152 GLU TYR GLU GLU
VAL PRO THR TTR GLY GLY GLY GLY GLY GLA GL7 T165 M175 M175 M175 M175 M175 M175 M175 M17	E190	01D		
• Molecule 4: PDI family p	rotein			
Chain c:	91%		9%	-
MET S2 S2 S2 M29 GLY GLY GLY GLY M12 B D1 16 D1 16	E155	VAL VAL ARG PRO THR LEU LEU GLU GLN		
• Molecule 4: PDI family p	orotein			
Chain d:	91%		9%	2
MET S2 S2 M29 GLY GLY VAL VAL M35 M35 B137 E137 C154 M35 S154 M35	C188 C188 A207 SER A207 SER C188 C188 C188 C188 C188 C188 C188 C18	ALLA ALLA ALLA ALLA ALLA ALLA ALLA ALL		
• Molecule 4: PDI family p	orotein			
Chain e:	90%		• 9%	-

• Molecule 4: PDI family protein

• Molecule 4: PDI family protein

Chain p:	90%	• 9%
MET 82 117 117 627 617 617 617	CLY VAL NAL NAL NAL ASP CLN ASP CLN CLU CLU CLU CLU CLU CLU CLU CLU	
• Molecule 4	4: PDI family protein	
Chain q:	90%	• 9%
MET S2 A29 GLY GLY GLU GLV VAL	NIS	
• Molecule 4	4: PDI family protein	
Chain r:	90%	9%
MET 82 617 617 617 617 617 71	N35 R97 R97 R97 ASP ASP ASP ASP ASP AC7 SER AC7 CLU CLU CLU CLU CLU CLU	
• Molecule 4	4: PDI family protein	
Chain s:	91%	9%
MET S2 A29 GLY GLY GLY VAL	N35 R125 SER ASP ASP ASP ASP ASP ASP CLU CLU CLU CLU	
• Molecule 4	4: PDI family protein	
Chain t:	90%	9%
MET 22 22 429 6LY 6LY 6LV 7AL VAL	N35 R126 R126 R194 A207 A207 A207 A207 A207 CLU CLU CLU CLU CLU	
• Molecule 4	4: PDI family protein	
Chain u:	90%	• 9%
MET S2 A29 GLY GLY GLU GLU VAL	N35 R126 E155 V161 C188 A207 SER A207 SER A207 C188 A16 C188 A16 C188 A16 C188 A16 C188 A16 C188 A16 C188 A16 C188 A16 C188 A16 C188 A16 C188 A16 C188 A16 C188 A16 C188 A16 C188 A16 C188 A16 C188 A16 C188 A16 C188 A16 C188 A17 C188 A18 C188 A18 C188	
• Molecule 4	4: PDI family protein	
Chain v:	90%	• 9%
MET S2 A29 GLY GLY CLY VAL	N94 N126 R126 T155 T154 T154 T155 A207 SER A207 SER A207 SER A207 SER A207 SER A207 SER CLU CLU CLU CLU CLU CLU CLU CLU	

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	220139	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE	Depositor
	CORRECTION; CTF amplitude correction	
	was performed as part of the 3D reconstruc-	
	tion.	
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{\AA}^2)$	63.7	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	3500	Depositor
Magnification	105000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	2.228	Depositor
Minimum map value	0.000	Depositor
Average map value	0.014	Depositor
Map value standard deviation	0.081	Depositor
Recommended contour level	0.1	Depositor
Map size (Å)	438.4, 438.4, 438.4	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles ($^{\circ}$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.096, 1.096, 1.096	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: GDP, MG, GTP

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

Mol Chain		Bond lengths		Bond angles		
	Ullalli	RMSZ	# Z > 5	RMSZ	# Z > 5	
1	0	0.47	0/181	0.55	0/248	
1	1	0.42	0/181	0.58	0/248	
1	10	0.49	0/181	0.61	0/248	
1	11	0.53	0/181	0.60	0/248	
1	12	0.47	0/181	0.51	0/248	
1	13	0.50	0/181	0.50	0/248	
1	14	0.47	0/181	0.48	0/248	
1	15	0.53	0/181	0.42	0/248	
1	16	0.40	0/181	0.49	0/248	
1	17	0.47	0/181	0.51	0/248	
1	18	0.44	0/181	0.48	0/248	
1	19	0.57	0/181	0.53	0/248	
1	2	0.54	0/181	0.59	0/248	
1	20	0.39	0/181	0.59	0/248	
1	21	0.43	0/181	0.52	0/248	
1	22	0.42	0/166	0.48	0/227	
1	23	0.46	0/166	0.47	0/227	
1	3	0.53	0/181	0.49	0/248	
1	4	0.51	0/181	0.50	0/248	
1	5	0.55	0/181	0.52	0/248	
1	6	0.49	0/181	0.46	0/248	
1	7	0.48	0/181	0.48	0/248	
1	8	0.47	0/181	0.65	0/248	
1	9	0.45	0/181	0.63	0/248	
2	A0	0.42	0/3398	0.61	2/4606~(0.0%)	
2	A2	0.39	0/3398	0.61	1/4606~(0.0%)	
2	A4	0.53	0/3398	0.63	2/4606~(0.0%)	
2	A6	0.48	0/3398	0.62	0/4606	
2	A8	0.50	0/3398	0.60	2/4606~(0.0%)	
2	B0	0.50	0/3398	0.62	4/4606~(0.1%)	
2	B2	0.53	0/3398	0.62	1/4606~(0.0%)	
2	B4	0.52	0/3398	0.63	2/4606~(0.0%)	

Mal	Chain	Bond	lengths	Bond angles		
	Unain	RMSZ	# Z > 5	RMSZ	# Z > 5	
2	B6	0.53	0/3398	0.63	6/4606~(0.1%)	
2	B8	0.55	0/3398	0.66	6/4606~(0.1%)	
2	C0	0.44	0/3398	0.61	1/4606~(0.0%)	
2	C2	0.45	0/3398	0.65	0/4606	
2	C4	0.43	0/3398	0.65	4/4606~(0.1%)	
2	C6	0.44	0/3398	0.68	3/4606~(0.1%)	
2	C8	0.45	0/3398	0.60	1/4606~(0.0%)	
2	D0	0.50	0/3398	0.61	0/4606	
2	D2	0.45	0/3398	0.62	5/4606~(0.1%)	
2	D4	0.52	0/3398	0.62	2/4606~(0.0%)	
2	D6	0.42	0/3398	0.61	3/4606~(0.1%)	
2	D8	0.52	0/3398	0.62	1/4606~(0.0%)	
2	E0	0.37	0/3398	0.56	1/4606~(0.0%)	
2	E2	0.44	0/3398	0.59	0/4606	
2	E4	0.38	0/3398	0.65	6/4606~(0.1%)	
2	E6	0.45	0/3398	0.58	0/4606	
2	E8	0.39	0/3398	0.59	0/4606	
2	F0	0.45	0/3398	0.60	2/4606~(0.0%)	
3	A1	0.47	0/3404	0.66	6/4606~(0.1%)	
3	A3	0.40	0/3404	0.62	3/4606~(0.1%)	
3	A5	0.50	0/3404	0.65	2/4606~(0.0%)	
3	A7	0.45	0/3404	0.61	3/4606~(0.1%)	
3	A9	0.52	0/3404	0.68	6/4606~(0.1%)	
3	B1	0.46	0/3404	0.65	3/4606~(0.1%)	
3	B3	0.54	0/3404	0.62	2/4606~(0.0%)	
3	B5	0.48	0/3404	0.61	1/4606~(0.0%)	
3	B7	0.54	0/3404	0.63	3/4606~(0.1%)	
3	B9	0.50	0/3404	0.63	3/4606~(0.1%)	
3	C1	0.46	0/3404	0.66	3/4606~(0.1%)	
3	C3	0.44	0/3404	0.68	3/4606~(0.1%)	
3	C5	0.44	0/3404	0.65	1/4606~(0.0%)	
3	C7	0.44	0/3404	0.63	2/4606~(0.0%)	
3	C9	0.52	0/3404	0.64	2/4606~(0.0%)	
3	D1	0.49	0/3404	0.64	1/4606~(0.0%)	
3	D3	0.50	0/3404	0.63	2/4606~(0.0%)	
3	D5	0.50	0/3404	0.66	6/4606~(0.1%)	
3	D7	0.51	0/3404	0.65	4/4606~(0.1%)	
3	D9	0.51	0/3404	0.64	4/4606~(0.1%)	
3	E1	0.41	0/3404	0.58	2/4606~(0.0%)	
3	E3	0.45	0/3404	0.62	5/4606~(0.1%)	
3	E5	0.41	0/3404	0.64	3/4606~(0.1%)	
3	E7	0.45	0/3404	0.61	3/4606~(0.1%)	
3	E9	0.41	0/3404	0.64	4/4606~(0.1%)	

Mol Chain		Bond lengths		Bond angles		
	Ullalli	RMSZ	# Z > 5	RMSZ	# Z > 5	
3	F1	0.45	0/3404	0.69	7/4606~(0.2%)	
4	a	0.46	0/1225	0.62	0/1654	
4	b	0.39	0/1225	0.55	0/1654	
4	с	0.50	0/1645	0.64	0/2225	
4	d	0.44	0/1645	0.65	0/2225	
4	е	0.50	0/1645	0.63	0/2225	
4	f	0.47	0/1645	0.61	1/2225~(0.0%)	
4	g	0.50	0/1645	0.65	1/2225~(0.0%)	
4	h	0.48	0/1645	0.58	0/2225	
4	i	0.48	0/1645	0.66	0/2225	
4	j	0.47	0/1645	0.67	1/2225~(0.0%)	
4	m	0.41	0/1645	0.62	1/2225~(0.0%)	
4	n	0.41	0/1645	0.66	3/2225~(0.1%)	
4	0	0.49	0/1645	0.65	1/2225~(0.0%)	
4	р	0.47	0/1645	0.64	1/2225~(0.0%)	
4	q	0.45	0/1645	0.60	0/2225	
4	r	0.49	0/1645	0.60	1/2225~(0.0%)	
4	s	0.41	0/1645	0.61	0/2225	
4	t	0.48	0/1645	0.62	0/2225	
4	u	0.36	0/1645	0.57	1/2225~(0.0%)	
4	V	0.45	0/1645	0.63	0/2225	
5	k	0.37	0/1168	0.59	0/1578	
5	1	0.37	0/1168	0.69	2/1578~(0.1%)	
5	W	0.35	0/1201	0.55	0/1623	
5	Х	0.37	0/1201	0.54	0/1623	
All	All	0.47	0/217964	0.63	152/295182~(0.1%)	

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

Mol	Chain	#Chirality outliers	#Planarity outliers
2	A2	0	1
2	A4	0	2
2	A8	0	1
2	B4	0	1
2	B6	0	1
2	C8	0	1
2	D2	0	1
3	A1	0	1
3	B3	0	1

Mol	Chain	#Chirality outliers	#Planarity outliers
3	B9	0	1
3	E5	0	2
5	1	0	1
All	All	0	14

There are no bond length outliers.

The worst 5 of 152 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	$Observed(^{o})$	$Ideal(^{o})$
2	C6	30	ILE	C-N-CA	10.74	148.56	121.70
3	A9	383	ASP	CB-CG-OD1	8.05	125.55	118.30
3	E9	130	LEU	CA-CB-CG	7.97	133.64	115.30
3	A9	73	MET	CG-SD-CE	-7.75	87.80	100.20
3	D5	41	ASP	CB-CG-OD1	7.71	125.24	118.30

There are no chirality outliers.

5 of 14 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	A1	191	GLN	Peptide
2	A2	401	LYS	Peptide
2	A4	254	GLU	Peptide
2	A4	401	LYS	Peptide
2	A8	401	LYS	Peptide

5.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	0	174	0	171	3	0
1	1	174	0	171	5	0
1	10	174	0	171	3	0
1	11	174	0	171	1	0
1	12	174	0	171	3	0
1	13	174	0	171	1	0
1	14	174	0	171	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	15	174	0	171	1	0
1	16	174	0	171	2	0
1	17	174	0	171	2	0
1	18	174	0	171	1	0
1	19	174	0	171	2	0
1	2	174	0	171	1	0
1	20	174	0	171	2	0
1	21	174	0	171	3	0
1	22	160	0	156	3	0
1	23	160	0	156	3	0
1	3	174	0	171	2	0
1	4	174	0	171	2	0
1	5	174	0	171	2	0
1	6	174	0	171	1	0
1	7	174	0	171	3	0
1	8	174	0	171	1	0
1	9	174	0	171	2	0
2	A0	3325	0	3251	54	0
2	A2	3325	0	3252	54	0
2	A4	3325	0	3252	43	0
2	A6	3325	0	3252	48	0
2	A8	3325	0	3252	54	0
2	B0	3325	0	3252	47	0
2	B2	3325	0	3252	44	0
2	B4	3325	0	3252	62	0
2	B6	3325	0	3252	47	0
2	B8	3325	0	3252	61	0
2	C0	3325	0	3252	65	0
2	C2	3325	0	3252	69	0
2	C4	3325	0	3252	74	0
2	C6	3325	0	3251	69	0
2	C8	3325	0	3252	45	0
2	D0	3325	0	3252	38	0
2	D2	3325	0	3252	39	0
2	D4	3325	0	3252	41	0
2	D6	3325	0	3252	43	0
2	D8	3325	0	3252	38	0
2	E0	3325	0	3252	35	0
2	E2	3325	0	3252	45	0
2	E4	3325	0	3252	55	0
2	E6	3325	0	3252	50	0
2	E8	3325	0	3252	71	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	F0	3325	0	3252	67	0
3	A1	3331	0	3207	58	0
3	A3	3331	0	3209	52	0
3	A5	3331	0	3207	53	0
3	A7	3331	0	3207	41	0
3	A9	3331	0	3207	58	0
3	B1	3331	0	3209	47	0
3	B3	3331	0	3207	50	0
3	B5	3331	0	3207	48	0
3	B7	3331	0	3209	47	0
3	B9	3331	0	3209	44	0
3	C1	3331	0	3209	72	0
3	C3	3331	0	3209	62	0
3	C5	3331	0	3209	65	0
3	C7	3331	0	3209	66	0
3	C9	3331	0	3209	59	0
3	D1	3331	0	3209	50	0
3	D3	3331	0	3207	56	0
3	D5	3331	0	3207	61	0
3	D7	3331	0	3207	63	0
3	D9	3331	0	3207	49	0
3	E1	3331	0	3207	39	0
3	E3	3331	0	3209	44	0
3	E5	3331	0	3207	60	0
3	E7	3331	0	3207	50	0
3	E9	3331	0	3206	68	0
3	F1	3331	0	3207	72	0
4	a	1198	0	1194	0	0
4	b	1198	0	1194	0	0
4	с	1608	0	1590	0	0
4	d	1608	0	1590	0	0
4	е	1608	0	1590	0	0
4	f	1608	0	1590	0	0
4	g	1608	0	1590	0	0
4	h	1608	0	1590	0	0
4	i	1608	0	1590	0	0
4	j	1608	0	1590	0	0
4	m	1608	0	1590	0	0
4	n	1608	0	1590	0	0
4	0	1608	0	1590	0	0
4	р	1608	0	1590	0	0
4	q	1608	0	1590	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	r	1608	0	1590	0	0
4	S	1608	0	1590	0	0
4	t	1608	0	1590	0	0
4	u	1608	0	1590	0	0
4	V	1608	0	1590	0	0
5	k	1140	0	1143	0	0
5	1	1140	0	1143	0	0
5	W	1172	0	1171	0	0
5	X	1172	0	1171	0	0
6	A0	32	0	12	2	0
6	A2	32	0	12	0	0
6	A4	32	0	12	0	0
6	A6	32	0	12	0	0
6	A8	32	0	12	1	0
6	B0	32	0	12	1	0
6	B2	32	0	12	1	0
6	B4	32	0	12	0	0
6	B6	32	0	12	2	0
6	B8	32	0	12	1	0
6	C0	32	0	12	2	0
6	C2	32	0	12	0	0
6	C4	32	0	12	1	0
6	C6	32	0	12	3	0
6	C8	32	0	12	1	0
6	D0	32	0	12	0	0
6	D2	32	0	12	0	0
6	D4	32	0	12	1	0
6	D6	32	0	12	0	0
6	D8	32	0	12	1	0
6	E0	32	0	12	0	0
6	E2	32	0	12	1	0
6	E4	32	0	12	0	0
6	E6	32	0	12	3	0
6	E8	32	0	12	2	0
6	F0	32	0	12	1	0
7	A0	1	0	0	0	0
7	A2	1	0	0	0	0
7	A4	1	0	0	0	0
7	A6	1	0	0	0	0
7	A8	1	0	0	0	0
7	B0	1	0	0	0	0
7	B2	1	0	0	0	0

MoiChainNon-HH(model)H(added)ClashesSymm-Clashes7B4100007B81000007B8100007C0100007C2100007C4100007C4100007C6100007D0100007D2100007D4100007D5100007B8100007E0100007E2100007E4100007E4100007E5100007E6100008A128012208A328012008B328012108B328012108B7280120<	Conti	nuea fron	<i>i previous</i>	page			
7 B4 1 0 0 0 0 7 B6 1 0 0 0 0 7 B8 1 0 0 0 0 7 C0 1 0 0 0 0 7 C2 1 0 0 0 0 7 C4 1 0 0 0 0 7 C6 1 0 0 0 0 7 D0 1 0 0 0 0 7 D2 1 0 0 0 0 7 D4 1 0 0 0 0 7 D5 1 0 0 0 0 7 D6 1 0 0 0 0 7 E0 1 0 0 0 0 7 E6 1 0 0 0 0 7 F0 1 0 <td< th=""><th>Mol</th><th>Chain</th><th>Non-H</th><th>H(model)</th><th>H(added)</th><th>Clashes</th><th>Symm-Clashes</th></td<>	Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7 B6 1 0 0 0 0 7 B8 1 0 0 0 0 7 C0 1 0 0 0 0 7 C2 1 0 0 0 0 7 C4 1 0 0 0 0 7 C6 1 0 0 0 0 7 C6 1 0 0 0 0 7 D0 1 0 0 0 0 7 D4 1 0 0 0 0 7 D4 1 0 0 0 0 7 D6 1 0 0 0 0 7 E0 1 0 0 0 0 7 E4 1 0 0 0 0 7 E6 1 0 0 0 0 7 F0 1 0 <td< td=""><td>7</td><td>B4</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></td<>	7	B4	1	0	0	0	0
7 B8 1 0 0 0 0 0 7 C0 1 0 0 0 0 0 7 C2 1 0 0 0 0 0 7 C4 1 0 0 0 0 0 7 C6 1 0 0 0 0 0 7 D0 1 0 0 0 0 0 7 D2 1 0 0 0 0 0 7 D4 1 0 0 0 0 0 7 D6 1 0 0 0 0 0 7 D6 1 0 0 0 0 0 7 E2 1 0 0 0 0 0 7 E6 1 0 0 0 0 0 7 F0 1 0 0 0 0 0 <	7	B6	1	0	0	0	0
7 C0 1 0 0 0 0 0 7 C2 1 0 0 0 0 0 7 C4 1 0 0 0 0 0 7 C6 1 0 0 0 0 0 7 C8 1 0 0 0 0 0 7 D0 1 0 0 0 0 0 7 D4 1 0 0 0 0 0 7 D6 1 0 0 0 0 0 7 D8 1 0 0 0 0 0 7 E0 1 0 0 0 0 0 7 E4 1 0 0 0 0 0 7 F0 1 0 0 0 0	7	B8	1	0	0	0	0
7 C2 1 0 0 0 0 0 7 C4 1 0 0 0 0 0 7 C6 1 0 0 0 0 0 7 C8 1 0 0 0 0 0 7 D0 1 0 0 0 0 0 7 D2 1 0 0 0 0 0 7 D4 1 0 0 0 0 0 7 D6 1 0 0 0 0 0 7 D8 1 0 0 0 0 0 7 E0 1 0 0 0 0 0 7 E4 1 0 0 0 0 0 8 A1 28 0 12 2 0	7	CO	1	0	0	0	0
7 C4 1 0 0 0 0 7 C6 1 0 0 0 0 7 C8 1 0 0 0 0 7 D0 1 0 0 0 0 7 D2 1 0 0 0 0 7 D4 1 0 0 0 0 7 D6 1 0 0 0 0 7 D6 1 0 0 0 0 7 D8 1 0 0 0 0 7 E0 1 0 0 0 0 7 E2 1 0 0 0 0 7 E4 1 0 0 0 0 7 F6 1 0 0 0 0 8 A1 28 0 12 0 0 8 A3 28 0	7	C2	1	0	0	0	0
7 C6 1 0 0 0 0 7 C8 1 0 0 0 0 7 D0 1 0 0 0 0 7 D2 1 0 0 0 0 7 D4 1 0 0 0 0 7 D6 1 0 0 0 0 7 D6 1 0 0 0 0 7 D8 1 0 0 0 0 7 E0 1 0 0 0 0 7 E4 1 0 0 0 0 7 E8 1 0 0 0 0 7 F0 1 0 0 0 0 8 A1 28 0 12 2 0 8 A3 28 0 12 0 0 8 B1 28 0	7	C4	1	0	0	0	0
7 C8 1 0 0 0 0 7 D0 1 0 0 0 0 7 D2 1 0 0 0 0 7 D4 1 0 0 0 0 7 D6 1 0 0 0 0 7 D8 1 0 0 0 0 7 D8 1 0 0 0 0 7 E0 1 0 0 0 0 7 E0 1 0 0 0 0 7 E4 1 0 0 0 0 7 E6 1 0 0 0 0 7 F0 1 0 0 0 0 8 A1 28 0 12 0 0 8 A3 28 0 12 0 0 8 A7 28 0	7	C6	1	0	0	0	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	7	C8	1	0	0	0	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	7	D0	1	0	0	0	0
7 D4 1 0 0 0 0 7 D6 1 0 0 0 0 7 D8 1 0 0 0 0 7 E0 1 0 0 0 0 7 E2 1 0 0 0 0 7 E4 1 0 0 0 0 7 E6 1 0 0 0 0 7 E8 1 0 0 0 0 7 F0 1 0 0 0 0 8 A1 28 0 12 2 0 8 A3 28 0 12 0 0 8 A7 28 0 12 1 0 8 B3 28 0 12 1 0 <td< td=""><td>7</td><td>D2</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></td<>	7	D2	1	0	0	0	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	7	D4	1	0	0	0	0
7 D8 1 0 0 0 0 0 7 E0 1 0 0 0 0 0 7 E2 1 0 0 0 0 0 7 E4 1 0 0 0 0 0 7 E6 1 0 0 0 0 0 7 E8 1 0 0 0 0 0 7 F0 1 0 0 0 0 0 8 A1 28 0 12 2 0 8 A3 28 0 12 0 0 8 A7 28 0 12 0 0 8 B1 28 0 12 1 0 8 B3 28 0 12 1 0 8 B9 28 </td <td>7</td> <td>D6</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td>	7	D6	1	0	0	0	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	7	D8	1	0	0	0	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	7	EO	1	0	0	0	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	7	E2	1	0	0	0	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	7	E4	1	0	0	0	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	7	E6	1	0	0	0	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	7	E8	1	0	0	0	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	7	F0	1	0	0	0	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	8	A1	28	0	12	2	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	8	A3	28	0	12	2	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	8	A5	28	0	12	0	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	8	A7	28	0	12	0	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	8	A9	28	0	12	1	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	8	B1	28	0	12	0	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	8	B3	28	0	12	1	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	8	B5	28	0	12	0	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	8	B7	28	0	12	1	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	8	B9	28	0	12	0	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	8	C1	28	0	12	1	0
8 C5 28 0 12 1 0 8 C7 28 0 12 0 0 8 C9 28 0 12 0 0 8 D1 28 0 12 0 0 8 D3 28 0 12 0 0 8 D5 28 0 12 1 0	8	C3	28	0	12	2	0
8 C7 28 0 12 0 0 8 C9 28 0 12 0 0 8 D1 28 0 12 0 0 8 D3 28 0 12 0 0 8 D3 28 0 12 1 0	8	C5	28	0	12	1	0
8 C9 28 0 12 0 0 8 D1 28 0 12 0 0 8 D3 28 0 12 0 0 8 D5 28 0 12 1 0	8	C7	28	0	12	0	0
8 D1 28 0 12 0 0 8 D3 28 0 12 0 0 8 D5 28 0 12 1 0	8	C9	28	0	12	0	0
8 D3 28 0 12 0 0 8 D5 28 0 12 1 0	8	D1	28	0	12	0	0
8 D5 28 0 12 1 0	8	D3	28	0	12	0	0
	8	D5	28	0	12	1	0
8 D7 28 0 12 0 0	8	D7	28	0	12	0	0
8 D9 28 0 12 0 0	8	D9	28	0	12	0	0
8 E1 28 0 12 0 0	8	E1	28	0	12	0	0
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	8	E3	28	0	12	3	0
8 E5 28 0 12 0 0	8	E5	28	0	12	0	0

	J	1	$I \rightarrow J$			
Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
8	$\mathrm{E7}$	28	0	12	0	0
8	E9	28	0	12	0	0
8	F1	28	0	12	1	0
All	All	214754	0	208287	2539	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 7.

The worst 5 of 2539 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D4:151:CYS:HG	2:D4:193:SER:HG	1.23	0.83
3:A9:248:SER:HA	3:A9:252:LYS:HG2	1.67	0.77
2:E2:88:HIS:HB3	2:E2:91:GLN:HG2	1.65	0.77
2:C6:6:SER:HA	2:C6:136:LEU:HB2	1.67	0.76
2:D0:142:GLY:HA3	2:D0:183:GLU:HG2	1.66	0.76

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Perce	\mathbf{ntiles}
1	0	20/351~(6%)	19~(95%)	1 (5%)	0	100	100
1	1	20/351~(6%)	19~(95%)	1 (5%)	0	100	100
1	10	20/351~(6%)	16 (80%)	4 (20%)	0	100	100
1	11	20/351~(6%)	17~(85%)	3~(15%)	0	100	100
1	12	20/351~(6%)	18 (90%)	2(10%)	0	100	100
1	13	20/351~(6%)	$19 \ (95\%)$	1 (5%)	0	100	100
1	14	20/351~(6%)	19 (95%)	1 (5%)	0	100	100

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Perce	ntiles
1	15	20/351~(6%)	18 (90%)	2(10%)	0	100	100
1	16	20/351~(6%)	19~(95%)	1 (5%)	0	100	100
1	17	20/351~(6%)	19~(95%)	1 (5%)	0	100	100
1	18	20/351~(6%)	19 (95%)	1 (5%)	0	100	100
1	19	20/351~(6%)	19 (95%)	1 (5%)	0	100	100
1	2	20/351~(6%)	19 (95%)	1 (5%)	0	100	100
1	20	20/351~(6%)	18 (90%)	2 (10%)	0	100	100
1	21	20/351~(6%)	19 (95%)	1 (5%)	0	100	100
1	22	18/351~(5%)	16 (89%)	2 (11%)	0	100	100
1	23	18/351~(5%)	16 (89%)	2 (11%)	0	100	100
1	3	20/351~(6%)	18 (90%)	2 (10%)	0	100	100
1	4	20/351~(6%)	19 (95%)	1 (5%)	0	100	100
1	5	20/351~(6%)	18 (90%)	2 (10%)	0	100	100
1	6	20/351~(6%)	19 (95%)	1 (5%)	0	100	100
1	7	20/351~(6%)	19 (95%)	1 (5%)	0	100	100
1	8	20/351~(6%)	18 (90%)	2 (10%)	0	100	100
1	9	20/351~(6%)	19 (95%)	1 (5%)	0	100	100
2	A0	424/453~(94%)	402 (95%)	22 (5%)	0	100	100
2	A2	424/453~(94%)	397 (94%)	27 (6%)	0	100	100
2	A4	424/453~(94%)	398 (94%)	26 (6%)	0	100	100
2	A6	424/453~(94%)	397 (94%)	27 (6%)	0	100	100
2	A8	424/453~(94%)	407 (96%)	17 (4%)	0	100	100
2	B0	424/453~(94%)	406 (96%)	18 (4%)	0	100	100
2	B2	424/453~(94%)	405 (96%)	19 (4%)	0	100	100
2	B4	424/453~(94%)	409 (96%)	15 (4%)	0	100	100
2	B6	424/453~(94%)	409 (96%)	15 (4%)	0	100	100
2	B8	424/453~(94%)	401 (95%)	23 (5%)	0	100	100
2	C0	424/453~(94%)	404 (95%)	20 (5%)	0	100	100
2	C2	424/453~(94%)	400 (94%)	24 (6%)	0	100	100
2	C4	424/453~(94%)	385 (91%)	39 (9%)	0	100	100
2	C6	424/453~(94%)	396~(93%)	28 (7%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Perce	ntiles
2	C8	424/453~(94%)	404 (95%)	20 (5%)	0	100	100
2	D0	424/453~(94%)	402 (95%)	22~(5%)	0	100	100
2	D2	424/453~(94%)	409 (96%)	15~(4%)	0	100	100
2	D4	424/453~(94%)	407 (96%)	17~(4%)	0	100	100
2	D6	424/453~(94%)	410 (97%)	14 (3%)	0	100	100
2	D8	424/453~(94%)	408 (96%)	16 (4%)	0	100	100
2	E0	424/453~(94%)	403 (95%)	21 (5%)	0	100	100
2	E2	424/453~(94%)	404 (95%)	20 (5%)	0	100	100
2	E4	424/453~(94%)	401 (95%)	23~(5%)	0	100	100
2	E6	424/453~(94%)	403 (95%)	21 (5%)	0	100	100
2	E8	424/453~(94%)	403 (95%)	21 (5%)	0	100	100
2	F0	424/453~(94%)	403 (95%)	21 (5%)	0	100	100
3	A1	424/449~(94%)	391 (92%)	33 (8%)	0	100	100
3	A3	424/449~(94%)	403 (95%)	21 (5%)	0	100	100
3	A5	424/449~(94%)	388 (92%)	36 (8%)	0	100	100
3	A7	424/449~(94%)	402 (95%)	22~(5%)	0	100	100
3	A9	424/449~(94%)	398 (94%)	26 (6%)	0	100	100
3	B1	424/449~(94%)	400 (94%)	24 (6%)	0	100	100
3	B3	424/449~(94%)	401 (95%)	23~(5%)	0	100	100
3	B5	424/449~(94%)	400 (94%)	24 (6%)	0	100	100
3	B7	424/449~(94%)	401 (95%)	23 (5%)	0	100	100
3	B9	424/449~(94%)	405 (96%)	19 (4%)	0	100	100
3	C1	424/449~(94%)	402 (95%)	22 (5%)	0	100	100
3	C3	424/449~(94%)	396 (93%)	28 (7%)	0	100	100
3	C5	424/449~(94%)	401 (95%)	23 (5%)	0	100	100
3	C7	424/449~(94%)	394 (93%)	30 (7%)	0	100	100
3	C9	$\overline{424/449}~(94\%)$	398 (94%)	26 (6%)	0	100	100
3	D1	424/449~(94%)	401 (95%)	23 (5%)	0	100	100
3	D3	$\overline{424/449}~(94\%)$	395 (93%)	29 (7%)	0	100	100
3	D5	424/449~(94%)	399 (94%)	25 (6%)	0	100	100
3	D7	$\overline{424/449}~(94\%)$	401 (95%)	23 (5%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Perce	ntiles
3	D9	424/449~(94%)	401 (95%)	23~(5%)	0	100	100
3	E1	424/449~(94%)	403 (95%)	21 (5%)	0	100	100
3	E3	424/449~(94%)	399~(94%)	25~(6%)	0	100	100
3	E5	424/449~(94%)	399~(94%)	25~(6%)	0	100	100
3	$\mathrm{E7}$	424/449~(94%)	402 (95%)	22~(5%)	0	100	100
3	E9	424/449~(94%)	395 (93%)	29 (7%)	0	100	100
3	F1	424/449~(94%)	388 (92%)	36 (8%)	0	100	100
4	a	146/220~(66%)	136 (93%)	10 (7%)	0	100	100
4	b	146/220~(66%)	135 (92%)	11 (8%)	0	100	100
4	с	197/220~(90%)	187 (95%)	10 (5%)	0	100	100
4	d	197/220~(90%)	183 (93%)	14 (7%)	0	100	100
4	е	197/220~(90%)	186 (94%)	11 (6%)	0	100	100
4	f	197/220~(90%)	187 (95%)	10 (5%)	0	100	100
4	g	197/220~(90%)	184 (93%)	13 (7%)	0	100	100
4	h	197/220~(90%)	185 (94%)	12 (6%)	0	100	100
4	i	197/220~(90%)	185 (94%)	12 (6%)	0	100	100
4	j	197/220~(90%)	184 (93%)	13 (7%)	0	100	100
4	m	197/220~(90%)	184 (93%)	13 (7%)	0	100	100
4	n	197/220~(90%)	187 (95%)	10 (5%)	0	100	100
4	О	197/220~(90%)	181 (92%)	16 (8%)	0	100	100
4	р	197/220~(90%)	186 (94%)	11 (6%)	0	100	100
4	q	197/220~(90%)	185 (94%)	12 (6%)	0	100	100
4	r	197/220~(90%)	186 (94%)	11 (6%)	0	100	100
4	s	197/220~(90%)	184 (93%)	13 (7%)	0	100	100
4	t	197/220~(90%)	186 (94%)	11 (6%)	0	100	100
4	u	197/220~(90%)	188 (95%)	9 (5%)	0	100	100
4	v	197/220~(90%)	181 (92%)	16 (8%)	0	100	100
5	k	133/189~(70%)	128 (96%)	5 (4%)	0	100	100
5	1	133/189~(70%)	128 (96%)	5 (4%)	0	100	100
5	W	139/189~(74%)	134 (96%)	5 (4%)	0	100	100
5	x	139/189~(74%)	129 (93%)	10 (7%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percer	ntiles
All	All	26906/37032~(73%)	25394~(94%)	1512 (6%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent side chain 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	Perce	Percentiles	
1	0	20/305~(7%)	20~(100%)	0	100	100	
1	1	20/305~(7%)	20~(100%)	0	100	100	
1	10	20/305~(7%)	20 (100%)	0	100	100	
1	11	20/305~(7%)	20 (100%)	0	100	100	
1	12	20/305~(7%)	20 (100%)	0	100	100	
1	13	20/305~(7%)	20 (100%)	0	100	100	
1	14	20/305~(7%)	20 (100%)	0	100	100	
1	15	20/305~(7%)	20 (100%)	0	100	100	
1	16	20/305~(7%)	20 (100%)	0	100	100	
1	17	20/305~(7%)	20 (100%)	0	100	100	
1	18	20/305~(7%)	20 (100%)	0	100	100	
1	19	20/305~(7%)	20 (100%)	0	100	100	
1	2	20/305~(7%)	20 (100%)	0	100	100	
1	20	20/305~(7%)	20 (100%)	0	100	100	
1	21	20/305~(7%)	20 (100%)	0	100	100	
1	22	18/305~(6%)	18 (100%)	0	100	100	
1	23	18/305~(6%)	18 (100%)	0	100	100	
1	3	20/305~(7%)	20 (100%)	0	100	100	
1	4	20/305~(7%)	20 (100%)	0	100	100	
1	5	20/305~(7%)	20 (100%)	0	100	100	
1	6	20/305~(7%)	20 (100%)	0	100	100	

Mol	Chain	Analysed	Rotameric	Outliers	Perce	ntiles
1	7	20/305~(7%)	20~(100%)	0	100	100
1	8	20/305~(7%)	20~(100%)	0	100	100
1	9	20/305~(7%)	20~(100%)	0	100	100
2	A0	359/379~(95%)	358~(100%)	1 (0%)	92	97
2	A2	359/379~(95%)	359~(100%)	0	100	100
2	A4	359/379~(95%)	357~(99%)	2 (1%)	86	94
2	A6	359/379~(95%)	359~(100%)	0	100	100
2	A8	359/379~(95%)	359 (100%)	0	100	100
2	B0	359/379~(95%)	358 (100%)	1 (0%)	92	97
2	B2	359/379~(95%)	359 (100%)	0	100	100
2	B4	359/379~(95%)	359~(100%)	0	100	100
2	B6	359/379~(95%)	358 (100%)	1 (0%)	92	97
2	B8	359/379~(95%)	358 (100%)	1 (0%)	92	97
2	C0	359/379~(95%)	358 (100%)	1 (0%)	92	97
2	C2	359/379~(95%)	358 (100%)	1 (0%)	92	97
2	C4	359/379~(95%)	355~(99%)	4 (1%)	73	86
2	C6	359/379~(95%)	357~(99%)	2 (1%)	86	94
2	C8	359/379~(95%)	359 (100%)	0	100	100
2	D0	359/379~(95%)	359 (100%)	0	100	100
2	D2	359/379~(95%)	358 (100%)	1 (0%)	92	97
2	D4	359/379~(95%)	358 (100%)	1 (0%)	92	97
2	D6	359/379~(95%)	359 (100%)	0	100	100
2	D8	359/379~(95%)	359 (100%)	0	100	100
2	E0	359/379~(95%)	358 (100%)	1 (0%)	92	97
2	E2	359/379~(95%)	358 (100%)	1 (0%)	92	97
2	E4	359/379~(95%)	357~(99%)	2 (1%)	86	94
2	E6	359/379~(95%)	357~(99%)	2 (1%)	86	94
2	E8	359/379~(95%)	358 (100%)	1 (0%)	92	97
2	F0	359/379~(95%)	358 (100%)	1 (0%)	92	97
3	A1	364/381~(96%)	362 (100%)	2 (0%)	88	94
3	A3	364/381~(96%)	360~(99%)	4 (1%)	73	86

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Mol	Chain	Analysed	Rotameric	Outliers	Perce	ntiles
3	A5	364/381~(96%)	364~(100%)	0	100	100
3	A7	364/381~(96%)	363~(100%)	1 (0%)	92	97
3	A9	364/381~(96%)	364~(100%)	0	100	100
3	B1	364/381~(96%)	364 (100%)	0	100	100
3	B3	364/381~(96%)	362~(100%)	2 (0%)	88	94
3	B5	364/381~(96%)	363 (100%)	1 (0%)	92	97
3	B7	364/381~(96%)	362 (100%)	2 (0%)	88	94
3	B9	364/381~(96%)	363 (100%)	1 (0%)	92	97
3	C1	364/381~(96%)	364 (100%)	0	100	100
3	C3	364/381~(96%)	362 (100%)	2 (0%)	88	94
3	C5	364/381~(96%)	362 (100%)	2 (0%)	88	94
3	C7	364/381~(96%)	363 (100%)	1 (0%)	92	97
3	C9	364/381~(96%)	363 (100%)	1 (0%)	92	97
3	D1	364/381~(96%)	362 (100%)	2 (0%)	88	94
3	D3	364/381~(96%)	363 (100%)	1 (0%)	92	97
3	D5	364/381~(96%)	363 (100%)	1 (0%)	92	97
3	D7	364/381~(96%)	363 (100%)	1 (0%)	92	97
3	D9	364/381~(96%)	363 (100%)	1 (0%)	92	97
3	E1	364/381~(96%)	364 (100%)	0	100	100
3	E3	364/381~(96%)	363~(100%)	1 (0%)	92	97
3	E5	364/381~(96%)	363 (100%)	1 (0%)	92	97
3	$\mathrm{E7}$	364/381~(96%)	360~(99%)	4 (1%)	73	86
3	E9	364/381~(96%)	363 (100%)	1 (0%)	92	97
3	F1	364/381~(96%)	364 (100%)	0	100	100
4	a	130/190~(68%)	128 (98%)	2 (2%)	65	82
4	b	130/190~(68%)	129 (99%)	1 (1%)	81	91
4	с	174/190~(92%)	173 (99%)	1 (1%)	86	94
4	d	174/190~(92%)	173 (99%)	1 (1%)	86	94
4	е	174/190~(92%)	172 (99%)	2 (1%)	73	86
4	f	174/190~(92%)	172 (99%)	2 (1%)	73	86
4	g	174/190~(92%)	172 (99%)	2 (1%)	73	86

Mol	Chain	Analysed	Rotameric	Outliers	Perce	ntiles
4	h	174/190~(92%)	170 (98%)	4 (2%)	50	74
4	i	174/190~(92%)	173~(99%)	1 (1%)	86	94
4	j	174/190~(92%)	174 (100%)	0	100	100
4	m	174/190~(92%)	171 (98%)	3~(2%)	60	80
4	n	174/190~(92%)	172 (99%)	2(1%)	73	86
4	О	174/190~(92%)	173 (99%)	1 (1%)	86	94
4	р	174/190~(92%)	173 (99%)	1 (1%)	86	94
4	q	174/190~(92%)	172 (99%)	2(1%)	73	86
4	r	174/190~(92%)	173 (99%)	1 (1%)	86	94
4	S	174/190~(92%)	173 (99%)	1 (1%)	86	94
4	t	174/190~(92%)	172 (99%)	2 (1%)	73	86
4	u	174/190~(92%)	173 (99%)	1 (1%)	86	94
4	v	174/190~(92%)	171 (98%)	3~(2%)	60	80
5	k	122/164~(74%)	121 (99%)	1 (1%)	81	91
5	1	122/164~(74%)	121 (99%)	1 (1%)	81	91
5	W	127/164~(77%)	126 (99%)	1 (1%)	81	91
5	х	127/164~(77%)	126 (99%)	1 (1%)	81	91
All	All	23164/31536~(74%)	23071 (100%)	93 (0%)	91	95

5 of 93 residues with a non-rotameric sidechain are listed below:

Mol	Chain	\mathbf{Res}	Type
4	a	126	ARG
4	i	117	ARG
4	с	126	ARG
4	g	126	ARG
4	р	126	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 64 such sidechains are listed below:

Mol	Chain	Res	Type
4	t	11	ASN
4	t	181	GLN
3	C7	347	ASN
3	C7	134	GLN

Continued from previous page...

Mol	Chain	Res	Type
4	u	181	GLN

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 78 ligands modelled in this entry, 26 are monoatomic - leaving 52 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).

Mal	Turne	Chain	Dec	Timle	Bond ler		ths	В	ond ang	les
		nes	LIIIK	Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2	
6	GTP	A2	501	7	26,34,34	1.28	2 (7%)	32,54,54	1.64	7 (21%)
6	GTP	C4	501	7	26,34,34	1.36	3 (11%)	32,54,54	1.70	7 (21%)
6	GTP	E6	501	7	26,34,34	1.32	3 (11%)	32,54,54	1.69	7 (21%)
6	GTP	E8	501	7	26,34,34	1.29	3 (11%)	32,54,54	1.80	7 (21%)
6	GTP	C0	501	7	26,34,34	1.35	3 (11%)	32,54,54	1.77	7 (21%)
8	GDP	C3	501	-	24,30,30	1.01	1 (4%)	30,47,47	1.37	4 (13%)
8	GDP	C9	501	-	24,30,30	1.04	1 (4%)	30,47,47	1.42	5 (16%)
8	GDP	E7	501	-	24,30,30	1.03	1 (4%)	30,47,47	1.28	4 (13%)
8	GDP	B1	501	-	24,30,30	1.05	1 (4%)	30,47,47	1.33	3 (10%)
8	GDP	F1	501	-	24,30,30	1.05	1 (4%)	30,47,47	1.42	4 (13%)

Mol	Type	Chain	Bos	Link	Bo	ond leng	ths	B	ond ang	les
	Type	Cilain	nes		Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z >2
8	GDP	B9	501	-	24,30,30	1.06	1 (4%)	30,47,47	1.39	4 (13%)
8	GDP	B3	501	-	24,30,30	1.09	1 (4%)	30,47,47	1.30	3 (10%)
6	GTP	B0	501	7	26,34,34	1.33	2 (7%)	32,54,54	1.65	7 (21%)
6	GTP	D8	501	7	26,34,34	1.35	2 (7%)	32,54,54	1.57	6 (18%)
8	GDP	C1	501	-	24,30,30	1.07	1 (4%)	30,47,47	1.30	4 (13%)
8	GDP	A5	501	-	24,30,30	1.08	2 (8%)	30,47,47	1.34	4 (13%)
8	GDP	B5	501	-	24,30,30	1.06	1 (4%)	30,47,47	1.36	4 (13%)
6	GTP	E2	501	7	26,34,34	1.38	3 (11%)	32,54,54	1.70	7 (21%)
8	GDP	D1	501	-	24,30,30	1.09	1 (4%)	30,47,47	1.42	5 (16%)
6	GTP	A4	501	7	26,34,34	1.43	3 (11%)	32,54,54	1.75	6 (18%)
6	GTP	B8	501	7	26,34,34	1.42	3 (11%)	32,54,54	1.77	7 (21%)
6	GTP	F0	501	7	26,34,34	1.33	3 (11%)	32,54,54	1.76	7 (21%)
8	GDP	E5	501	-	24,30,30	1.03	1 (4%)	30,47,47	1.33	5 (16%)
8	GDP	B7	501	-	24,30,30	1.07	1 (4%)	30,47,47	1.35	3 (10%)
6	GTP	C8	501	7	26,34,34	1.38	3 (11%)	32,54,54	1.76	7 (21%)
6	GTP	D2	501	7	26,34,34	1.35	2 (7%)	32,54,54	1.73	7 (21%)
8	GDP	E9	501	-	24,30,30	1.00	1 (4%)	30,47,47	1.34	4 (13%)
6	GTP	A6	501	7	26,34,34	1.37	3 (11%)	32,54,54	1.74	7 (21%)
6	GTP	D0	501	7	26,34,34	1.40	3 (11%)	32,54,54	1.74	7 (21%)
8	GDP	D5	501	-	24,30,30	1.03	1 (4%)	30,47,47	1.37	5 (16%)
6	GTP	C2	501	7	26,34,34	1.34	2 (7%)	32,54,54	1.74	6 (18%)
8	GDP	D9	501	-	24,30,30	1.07	1 (4%)	30,47,47	1.38	4 (13%)
8	GDP	E3	501	-	24,30,30	1.05	1 (4%)	30,47,47	1.33	4 (13%)
6	GTP	E0	501	7	26,34,34	1.31	2 (7%)	32,54,54	1.76	7 (21%)
8	GDP	A1	501	-	24,30,30	1.06	1 (4%)	30,47,47	1.39	5 (16%)
8	GDP	C7	501	-	24,30,30	1.02	1 (4%)	30,47,47	1.32	4 (13%)
8	GDP	D3	501	-	24,30,30	1.04	1 (4%)	30,47,47	1.37	4 (13%)
6	GTP	C6	501	7	26,34,34	1.37	3 (11%)	32,54,54	1.77	6 (18%)
8	GDP	A9	501	-	24,30,30	1.08	1 (4%)	30,47,47	1.22	4 (13%)
6	GTP	A0	501	7	26,34,34	1.33	3 (11%)	32,54,54	1.54	7 (21%)
8	GDP	D7	501	-	24,30,30	1.10	1 (4%)	30,47,47	1.36	4 (13%)
8	GDP	E1	501	-	24,30,30	1.02	1 (4%)	30,47,47	1.35	4 (13%)
8	GDP	A7	501	-	24,30,30	1.07	1 (4%)	30,47,47	1.40	4 (13%)
8	GDP	C5	501	-	24,30,30	1.00	1 (4%)	30,47,47	1.19	4 (13%)
6	GTP	D4	501	7	26,34,34	1.43	2 (7%)	32,54,54	1.54	6 (18%)

Mal	Turne	Chain	Dec	Jink	Bond lengths			Bond angles		
IVIOI	Type Chain	nes		Counts	RMSZ	# Z >2	Counts	RMSZ	# Z > 2	
6	GTP	A8	501	7	26,34,34	1.37	2 (7%)	32,54,54	1.65	7 (21%)
6	GTP	B6	501	7	26,34,34	1.44	3 (11%)	32,54,54	1.79	6 (18%)
6	GTP	D6	501	7	26,34,34	1.26	2 (7%)	32,54,54	1.60	6 (18%)
6	GTP	E4	501	7	26,34,34	1.26	1 (3%)	32,54,54	1.65	7 (21%)
8	GDP	A3	501	-	24,30,30	1.05	1 (4%)	30,47,47	1.38	3 (10%)
6	GTP	B2	501	7	26,34,34	1.43	3 (11%)	32,54,54	1.77	7 (21%)
6	GTP	B4	501	7	26,34,34	1.44	4 (15%)	32,54,54	1.74	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
6	GTP	A2	501	7	-	7/18/38/38	0/3/3/3
6	GTP	C4	501	7	-	5/18/38/38	0/3/3/3
6	GTP	E6	501	7	-	5/18/38/38	0/3/3/3
6	GTP	E8	501	7	-	6/18/38/38	0/3/3/3
6	GTP	C0	501	7	-	8/18/38/38	0/3/3/3
8	GDP	C3	501	-	-	4/12/32/32	0/3/3/3
8	GDP	C9	501	-	-	3/12/32/32	0/3/3/3
8	GDP	E7	501	-	-	2/12/32/32	0/3/3/3
8	GDP	B1	501	-	-	5/12/32/32	0/3/3/3
8	GDP	F1	501	-	-	4/12/32/32	0/3/3/3
8	GDP	B9	501	-	-	3/12/32/32	0/3/3/3
8	GDP	B3	501	-	-	4/12/32/32	0/3/3/3
6	GTP	B0	501	7	-	6/18/38/38	0/3/3/3
6	GTP	D8	501	7	-	5/18/38/38	0/3/3/3
8	GDP	C1	501	-	-	5/12/32/32	0/3/3/3
8	GDP	A5	501	-	-	3/12/32/32	0/3/3/3
8	GDP	B5	501	-	-	3/12/32/32	0/3/3/3
6	GTP	E2	501	7	-	4/18/38/38	0/3/3/3
8	GDP	D1	501	-	-	3/12/32/32	0/3/3/3
6	GTP	A4	501	7	-	4/18/38/38	0/3/3/3
6	GTP	B8	501	7	-	6/18/38/38	0/3/3/3
6	GTP	F0	501	7	-	7/18/38/38	0/3/3/3

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
8	GDP	E5	501	-	-	2/12/32/32	0/3/3/3
8	GDP	B7	501	-	-	3/12/32/32	0/3/3/3
6	GTP	C8	501	7	-	3/18/38/38	0/3/3/3
6	GTP	D2	501	7	-	6/18/38/38	0/3/3/3
8	GDP	E9	501	-	-	4/12/32/32	0/3/3/3
6	GTP	A6	501	7	-	6/18/38/38	0/3/3/3
6	GTP	D0	501	7	-	3/18/38/38	0/3/3/3
8	GDP	D5	501	-	-	6/12/32/32	0/3/3/3
6	GTP	C2	501	7	-	3/18/38/38	0/3/3/3
8	GDP	D9	501	-	-	5/12/32/32	0/3/3/3
8	GDP	E3	501	-	-	0/12/32/32	0/3/3/3
6	GTP	E0	501	7	-	2/18/38/38	0/3/3/3
8	GDP	A1	501	-	-	6/12/32/32	0/3/3/3
8	GDP	C7	501	-	-	3/12/32/32	0/3/3/3
8	GDP	D3	501	-	-	3/12/32/32	0/3/3/3
6	GTP	C6	501	7	-	4/18/38/38	0/3/3/3
8	GDP	A9	501	-	-	5/12/32/32	0/3/3/3
6	GTP	A0	501	7	-	7/18/38/38	0/3/3/3
8	GDP	D7	501	-	-	4/12/32/32	0/3/3/3
8	GDP	E1	501	-	-	2/12/32/32	0/3/3/3
8	GDP	A7	501	-	-	4/12/32/32	0/3/3/3
8	GDP	C5	501	-	-	5/12/32/32	0/3/3/3
6	GTP	D4	501	7	-	4/18/38/38	0/3/3/3
6	GTP	A8	501	7	-	4/18/38/38	0/3/3/3
6	GTP	B6	501	7	-	6/18/38/38	0/3/3/3
6	GTP	D6	501	7	-	7/18/38/38	0/3/3/3
6	GTP	E4	501	7	-	6/18/38/38	0/3/3/3
8	GDP	A3	501	-	-	1/12/32/32	0/3/3/3
6	GTP	B2	501	7	-	6/18/38/38	0/3/3/3
6	GTP	B4	501	7	-	4/18/38/38	0/3/3/3

The worst 5 of 95 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	A4	501	GTP	C5-C6	-5.12	1.37	1.47
6	D4	501	GTP	C5-C6	-5.06	1.37	1.47

001100	Continuad from proceeder page								
Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)		
6	B4	501	GTP	C5-C6	-4.93	1.37	1.47		
6	A6	501	GTP	C5-C6	-4.92	1.37	1.47		
6	C8	501	GTP	C5-C6	-4.92	1.37	1.47		

The worst 5 of 280 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	$Observed(^{o})$	$Ideal(^{o})$
6	B4	501	GTP	PA-O3A-PB	-5.00	115.67	132.83
6	C8	501	GTP	PA-O3A-PB	-4.94	115.89	132.83
6	B2	501	GTP	PA-O3A-PB	-4.92	115.95	132.83
6	B6	501	GTP	PA-O3A-PB	-4.92	115.95	132.83
6	C2	501	GTP	PA-O3A-PB	-4.82	116.28	132.83

There are no chirality outliers.

5 of 226 torsion outliers are listed below:

Mol	Chain	\mathbf{Res}	Type	Atoms
6	A0	501	GTP	PB-O3A-PA-O5'
6	A0	501	GTP	C5'-O5'-PA-O3A
6	A0	501	GTP	C5'-O5'-PA-O2A
6	A2	501	GTP	C5'-O5'-PA-O1A
6	A2	501	GTP	C5'-O5'-PA-O2A

There are no ring outliers.

27 monomers are involved in 40 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	C4	501	GTP	1	0
6	E6	501	GTP	3	0
6	E8	501	GTP	2	0
6	C0	501	GTP	2	0
8	C3	501	GDP	2	0
8	F1	501	GDP	1	0
8	B3	501	GDP	1	0
6	B0	501	GTP	1	0
6	D8	501	GTP	1	0
8	C1	501	GDP	1	0
6	E2	501	GTP	1	0
6	B8	501	GTP	1	0
6	F0	501	GTP	1	0
8	B7	501	GDP	1	0

Mol	Chain	Res	Type	Clashes	Symm-Clashes				
6	C8	501	GTP	1	0				
8	D5	501	GDP	1	0				
8	E3	501	GDP	3	0				
8	A1	501	GDP	2	0				
6	C6	501	GTP	3	0				
8	A9	501	GDP	1	0				
6	A0	501	GTP	2	0				
8	C5	501	GDP	1	0				
6	D4	501	GTP	1	0				
6	A8	501	GTP	1	0				
6	B6	501	GTP	2	0				
8	A3	501	GDP	2	0				
6	B2	501	GTP	1	0				

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









































































































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-23869. 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



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



The images above show the 3D surface view of the map at the recommended contour level 0.1. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.



6.5 Mask visualisation (i)

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



7 Map analysis (i)

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

7.1 Map-value distribution (i)



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



7.2 Volume estimate (i)



The volume at the recommended contour level is 3014 nm^3 ; this corresponds to an approximate mass of 2723 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 0.294 $\rm \AA^{-1}$



8 Fourier-Shell correlation (i)

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-23869 and PDB model 7MIZ. Per-residue inclusion information can be found in section 3 on page 20.

9.1 Map-model overlay (i)



The images above show the 3D surface view of the map at the recommended contour level 0.1 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 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 (0.1).


9.4 Atom inclusion (i)



At the recommended contour level, 97% of all backbone atoms, 88% of all non-hydrogen atoms, are inside the map.



1.0

0.0 <0.0

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8772	0.4600
0	0.8647	0.4810
1	0.8353	0.4680
10	0.9059	0.4870
11	0.9059	0.4880
12	0.8824	0.4790
13	0.8765	0.4810
14	0.8706	0.4930
15	0.8529	0.4860
16	0.8647	0.4610
17	0.8824	0.4620
18	0.9353	0.4860
19	0.9412	0.4850
2	0.8353	0.4640
20	0.6941	0.4110
21	0.7353	0.4290
22	0.5897	0.3640
23	0.6154	0.3760
3	0.8412	0.4650
4	0.8235	0.4800
5	0.8412	0.4860
6	0.8588	0.4920
7	0.8588	0.4880
8	0.8235	0.4230
9	0.8294	0.4280
A0	0.7810	0.3990
A1	0.8961	0.4390
A2	0.7865	0.3920
A3	0.8564	0.4180
A4	0.8826	0.4680
A5	0.9018	0.4770
A6	0.8920	0.4680
A7	0.8821	0.4700
A8	0.9039	0.4900
A9	0.8970	0.4830

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Chain	Atom inclusion	Q-score
B0	0.8948	0.4860
B1	0.8858	0.4820
B2	0.9105	0.5040
B3	0.8942	0.5030
B4	0.9093	0.5030
B5	0.8873	0.4990
B6	0.9105	0.4990
B7	0.8982	0.5050
B8	0.9175	0.5000
B9	0.9048	0.4990
C0	0.8769	0.4160
C1	0.8491	0.4190
C2	0.8823	0.4190
C3	0.8552	0.4150
C4	0.8617	0.4020
C5	0.8627	0.4040
C6	0.8562	0.4050
C7	0.8676	0.4040
C8	0.8972	0.4740
C9	0.9067	0.4830
D0	0.8863	0.4810
D1	0.9188	0.4890
D2	0.8972	0.4870
D3	0.9203	0.5010
D4	0.8805	0.4960
D5	0.9221	0.5020
D6	0.9078	0.4910
D7	0.9227	0.4990
D8	0.8987	0.5050
D9	0.9200	0.5020
E0	0.8957	0.4680
E1	0.9115	0.4820
E2	0.9099	0.4810
E3	0.9148	0.4910
E4	0.8999	0.4530
E5	0.9079	0.4680
E6	0.9178	0.4730
E7	0.9064	0.4790
E8	0.8714	0.4230
E9	0.8509	0.4190
F0	0.8990	0.4420
F1	0.8530	0.4330

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Chain	Atom inclusion	Q-score
a	0.7829	0.4260
b	0.7786	0.4120
с	0.8408	0.4650
d	0.8490	0.4550
е	0.8777	0.4830
f	0.8904	0.4800
g	0.8841	0.4870
h	0.8815	0.4840
i	0.8822	0.4470
j	0.8822	0.4450
k	0.6916	0.2870
l	0.6826	0.2870
m	0.6828	0.3280
n	0.6803	0.3290
0	0.8892	0.4830
р	0.8847	0.4830
q	0.8955	0.4800
r	0.8936	0.4950
S	0.8987	0.4730
t	0.8975	0.4920
u	0.8745	0.4490
V	0.8771	0.4640
W	0.5565	0.2960
Х	0.6152	0.3200

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