WORLDWIDE PDB

PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report (i)

Aug 29, 2023 – 07:27 AM EDT

PDB ID	:	3MDB
Title	:	Crystal structure of the ternary complex of full length centaurin alpha-1, KIF13B FHA domain, and IP4
Authors	:	Shen, L.; Tong, Y.; Tempel, W.; MacKenzie, F.; Arrowsmith, C.H.; Edwards, A.M.; Bountra, C.; Weigelt, J.; Bochkarev, A.; Park, H.; Structural Genomics Consortium (SGC)
Deposited on	:	2010-03-30
Resolution	:	2.95 Å(reported)

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

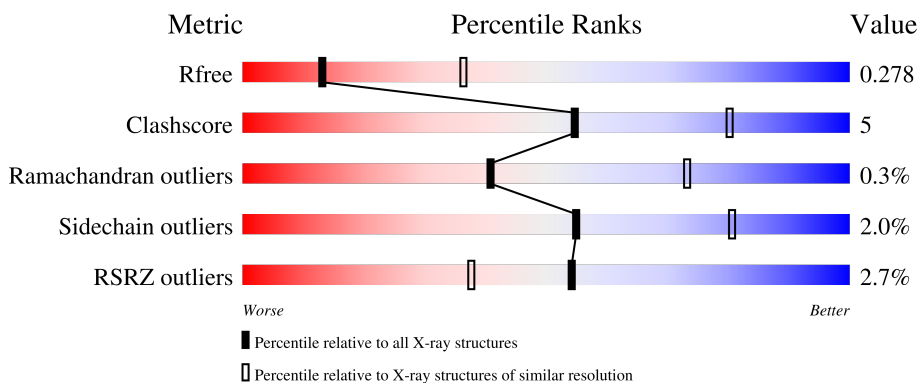|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35

1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.95 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	Percentile Ranks	Value
Rfree		0.278
Clashscore		5
Ramachandran outliers		0.3%
Sidechain outliers		2.0%
RSRZ outliers		2.7%

Worse — *Better*

▌ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	3104 (3.00-2.92)
Clashscore	141614	3462 (3.00-2.92)
Ramachandran outliers	138981	3340 (3.00-2.92)
Sidechain outliers	138945	3343 (3.00-2.92)
RSRZ outliers	127900	2986 (3.00-2.92)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower 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 electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	124	2% — 65% / 13% · 21%
1	B	124	5% — 61% / 15% · 23%
2	C	392	3% — 81% / 12% 7%
2	D	392	2% — 80% / 10% · 10%

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2 Entry composition ⓘ

There are 5 unique types of molecules in this entry. The entry contains 7107 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, 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 Kinesin-like protein KIF13B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	98	Total	C	N	O	S	0	0	0
			737	468	129	135	5			
1	B	95	Total	C	N	O	S	0	0	0
			716	458	124	129	5			

There are 36 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	422	MET	-	expression tag	UNP Q9NQT8
A	423	HIS	-	expression tag	UNP Q9NQT8
A	424	HIS	-	expression tag	UNP Q9NQT8
A	425	HIS	-	expression tag	UNP Q9NQT8
A	426	HIS	-	expression tag	UNP Q9NQT8
A	427	HIS	-	expression tag	UNP Q9NQT8
A	428	HIS	-	expression tag	UNP Q9NQT8
A	429	SER	-	expression tag	UNP Q9NQT8
A	430	SER	-	expression tag	UNP Q9NQT8
A	431	GLY	-	expression tag	UNP Q9NQT8
A	432	ARG	-	expression tag	UNP Q9NQT8
A	433	GLU	-	expression tag	UNP Q9NQT8
A	434	ASN	-	expression tag	UNP Q9NQT8
A	435	LEU	-	expression tag	UNP Q9NQT8
A	436	TYR	-	expression tag	UNP Q9NQT8
A	437	PHE	-	expression tag	UNP Q9NQT8
A	438	GLN	-	expression tag	UNP Q9NQT8
A	439	GLY	-	expression tag	UNP Q9NQT8
B	422	MET	-	expression tag	UNP Q9NQT8
B	423	HIS	-	expression tag	UNP Q9NQT8
B	424	HIS	-	expression tag	UNP Q9NQT8
B	425	HIS	-	expression tag	UNP Q9NQT8
B	426	HIS	-	expression tag	UNP Q9NQT8
B	427	HIS	-	expression tag	UNP Q9NQT8
B	428	HIS	-	expression tag	UNP Q9NQT8

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Chain	Residue	Modelled	Actual	Comment	Reference
B	429	SER	-	expression tag	UNP Q9NQT8
B	430	SER	-	expression tag	UNP Q9NQT8
B	431	GLY	-	expression tag	UNP Q9NQT8
B	432	ARG	-	expression tag	UNP Q9NQT8
B	433	GLU	-	expression tag	UNP Q9NQT8
B	434	ASN	-	expression tag	UNP Q9NQT8
B	435	LEU	-	expression tag	UNP Q9NQT8
B	436	TYR	-	expression tag	UNP Q9NQT8
B	437	PHE	-	expression tag	UNP Q9NQT8
B	438	GLN	-	expression tag	UNP Q9NQT8
B	439	GLY	-	expression tag	UNP Q9NQT8

- Molecule 2 is a protein called Arf-GAP with dual PH domain-containing protein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	365	Total 2883	C 1843	N 510	O 517	S 13	0	0	0
2	D	353	Total 2730	C 1753	N 471	O 494	S 12	0	0	0

There are 38 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	-17	MET	-	expression tag	UNP O75689
C	-16	HIS	-	expression tag	UNP O75689
C	-15	HIS	-	expression tag	UNP O75689
C	-14	HIS	-	expression tag	UNP O75689
C	-13	HIS	-	expression tag	UNP O75689
C	-12	HIS	-	expression tag	UNP O75689
C	-11	HIS	-	expression tag	UNP O75689
C	-10	SER	-	expression tag	UNP O75689
C	-9	SER	-	expression tag	UNP O75689
C	-8	GLY	-	expression tag	UNP O75689
C	-7	ARG	-	expression tag	UNP O75689
C	-6	GLU	-	expression tag	UNP O75689
C	-5	ASN	-	expression tag	UNP O75689
C	-4	LEU	-	expression tag	UNP O75689
C	-3	TYR	-	expression tag	UNP O75689
C	-2	PHE	-	expression tag	UNP O75689
C	-1	GLN	-	expression tag	UNP O75689
C	0	GLY	-	expression tag	UNP O75689
C	241	SER	GLY	SEE REMARK 999	UNP O75689

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-17	MET	-	expression tag	UNP O75689
D	-16	HIS	-	expression tag	UNP O75689
D	-15	HIS	-	expression tag	UNP O75689
D	-14	HIS	-	expression tag	UNP O75689
D	-13	HIS	-	expression tag	UNP O75689
D	-12	HIS	-	expression tag	UNP O75689
D	-11	HIS	-	expression tag	UNP O75689
D	-10	SER	-	expression tag	UNP O75689
D	-9	SER	-	expression tag	UNP O75689
D	-8	GLY	-	expression tag	UNP O75689
D	-7	ARG	-	expression tag	UNP O75689
D	-6	GLU	-	expression tag	UNP O75689
D	-5	ASN	-	expression tag	UNP O75689
D	-4	LEU	-	expression tag	UNP O75689
D	-3	TYR	-	expression tag	UNP O75689
D	-2	PHE	-	expression tag	UNP O75689
D	-1	GLN	-	expression tag	UNP O75689
D	0	GLY	-	expression tag	UNP O75689
D	241	SER	GLY	SEE REMARK 999	UNP O75689

- Molecule 3 is UNKNOWN ATOM OR ION (three-letter code: UNX) (formula: X).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	2	Total 2	X 2	2	0
3	B	1	Total 1	X 1	1	0
3	C	3	Total 3	X 3	3	0
3	D	5	Total 5	X 5	5	0

- Molecule 4 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	C	1	Total 1	Zn 1	0	0
4	D	1	Total 1	Zn 1	0	0

- Molecule 5 is (2R)-3-{[(R)-{[(1S,2S,3R,4S,5S,6S)-2,6-dihydroxy-3,4,5-tris(phosphonooxy) cyclohexyl]oxy}(hydroxy)phosphoryl]oxy}propane -1,2-diyl dioctanoate (three-letter code:

IP9) (formula: $C_{25}H_{50}O_{22}P_4$).
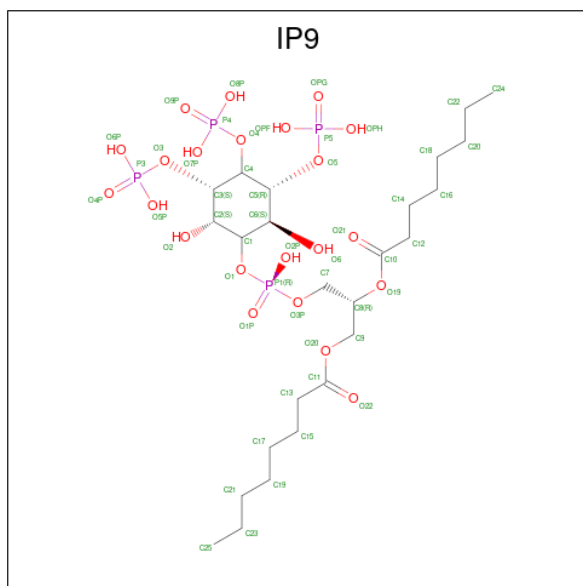
| Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	C	1	Total 28	C 6	O 18	P 4	0	0

3 Residue-property plots ⓘ

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 electron 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 dot above a residue indicates a poor fit to the electron density (RSRZ > 2). 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.

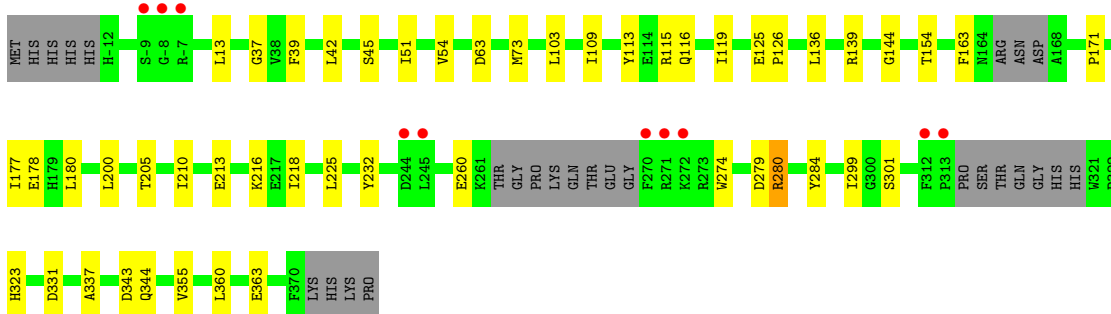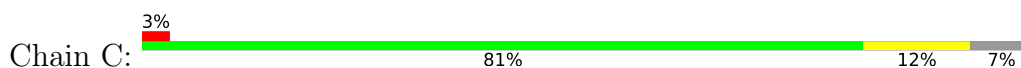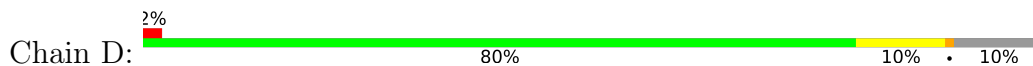• Molecule 1: Kinesin-like protein KIF13B
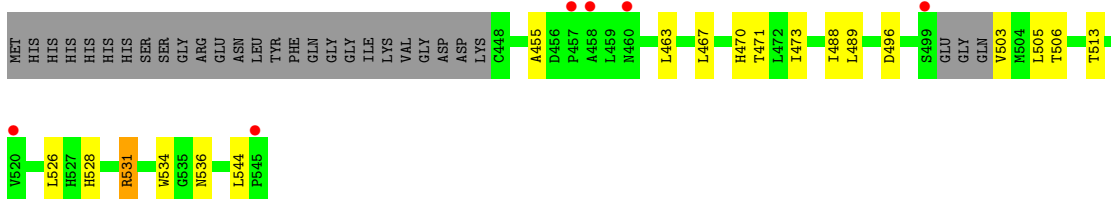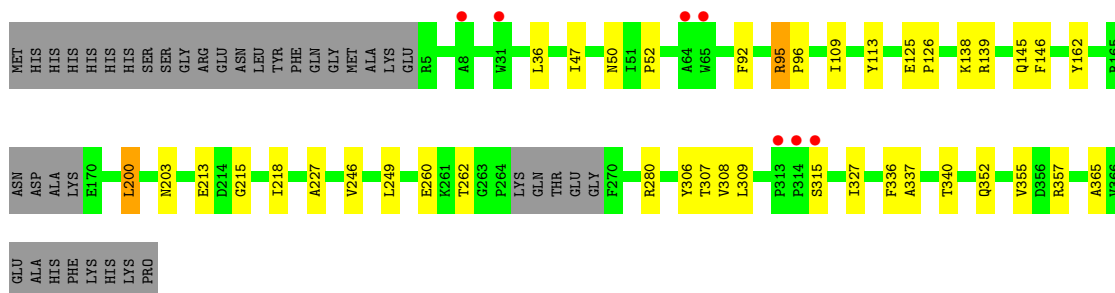
Chain A:

• Molecule 1: Kinesin-like protein KIF13B

Chain B:

• Molecule 2: Arf-GAP with dual PH domain-containing protein 1

Chain C:

• Molecule 2: Arf-GAP with dual PH domain-containing protein 1

Chain D:

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, α, β, γ	115.80Å 115.80Å 189.27Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.44 – 2.95 29.44 – 2.95	Depositor EDS
% Data completeness (in resolution range)	100.0 (29.44-2.95) 100.0 (29.44-2.95)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.27 (at 2.95Å)	Xtriage
Refinement program	REFMAC 5.5.0102	Depositor
R, R_{free}	0.225 , 0.277 0.226 , 0.278	Depositor DCC
R_{free} test set	977 reflections (3.52%)	wwPDB-VP
Wilson B-factor (Å^2)	63.6	Xtriage
Anisotropy	0.046	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 33.3	EDS
L-test for twinning [2]	$< |L| > = 0.49, < L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.91	EDS
Total number of atoms	7107	wwPDB-VP
Average B, all atoms (Å^2)	60.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.18% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5   Model quality ⓘ

5.1   Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: IP9, ZN, UNX

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	0.50	0/754	0.63	0/1029
1	B	0.51	0/731	0.58	0/999
2	C	0.58	0/2966	0.61	0/4018
2	D	0.56	0/2812	0.57	0/3819
All	All	0.56	0/7263	0.59	0/9865

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2   Too-close contacts ⓘ

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	A	737	0	693	12	0
1	B	716	0	688	15	0
2	C	2883	0	2660	27	0
2	D	2730	0	2480	19	0
3	A	2	0	0	0	0
3	B	1	0	0	0	0
3	C	3	0	0	0	0
3	D	5	0	0	0	0
4	C	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	D	1	0	0	0	0
5	C	28	0	8	1	0
All	All	7107	0	6529	71	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 5.

All (71) 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:C:136:LEU:HD13	2:C:210:ILE:HD12	1.67	0.77
2:C:200:LEU:HD13	2:C:205:THR:OG1	1.91	0.71
1:A:536:ASN:ND2	2:C:213:GLU:OE1	2.32	0.63
1:B:470:HIS:ND1	1:B:496:ASP:OD1	2.32	0.62
2:D:138:LYS:HE3	2:D:162:TYR:CZ	2.35	0.61
2:D:260:GLU:HB2	2:D:337:ALA:HB3	1.83	0.60
1:B:455:ALA:HB3	1:B:463:LEU:HD12	1.81	0.60
2:D:308:VAL:O	2:D:309:LEU:HD23	2.04	0.58
1:A:503:VAL:HG21	1:A:544:LEU:CD2	2.34	0.57
5:C:375:IP9:O4P	5:C:375:IP9:O9P	2.22	0.57
1:A:493:CYS:SG	1:A:505:LEU:HD21	2.45	0.56
1:A:503:VAL:HG21	1:A:544:LEU:HD21	1.87	0.56
1:B:473:ILE:HD13	1:B:534:TRP:CH2	2.42	0.55
1:A:505:LEU:HD12	1:A:526:LEU:HD11	1.89	0.55
1:A:455:ALA:HA	1:A:461:GLU:OE1	2.08	0.54
2:C:360:LEU:HB2	2:C:363:GLU:HG3	1.89	0.54
1:B:505:LEU:C	1:B:505:LEU:HD23	2.29	0.53
2:C:139:ARG:NH1	2:C:144:GLY:HA2	2.23	0.53
2:C:177:ILE:HD12	2:C:180:LEU:HD12	1.89	0.53
2:C:125:GLU:N	2:C:126:PRO:CD	2.72	0.52
2:C:51:ILE:HG22	2:C:54:VAL:HB	1.91	0.52
1:A:529:GLY:O	1:A:531:ARG:NH1	2.44	0.51
1:B:503:VAL:HG21	1:B:544:LEU:HD21	1.92	0.51
2:C:37:GLY:HA2	2:C:73:MET:SD	2.51	0.51
2:D:47:ILE:HG21	2:D:109:ILE:HD12	1.94	0.50
2:C:116:GLN:HB3	2:C:119:ILE:HD12	1.94	0.49
2:D:125:GLU:N	2:D:126:PRO:CD	2.75	0.49
2:C:260:GLU:HB2	2:C:337:ALA:HB3	1.94	0.49
1:B:505:LEU:HB2	1:B:526:LEU:HD11	1.94	0.49
2:D:215:GLY:O	2:D:218:ILE:HG22	2.12	0.49
2:C:51:ILE:HG22	2:C:51:ILE:O	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:36:LEU:HD13	2:D:113:TYR:CD2	2.48	0.48
2:D:352:GLN:HA	2:D:355:VAL:HG22	1.95	0.48
1:A:493:CYS:SG	1:A:505:LEU:CD2	3.03	0.47
1:B:531:ARG:HH11	1:B:531:ARG:HG3	1.79	0.47
1:B:467:LEU:HD22	1:B:471:THR:HG21	1.95	0.47
2:D:139:ARG:HB2	2:D:146:PHE:CE2	2.48	0.47
2:C:115:ARG:CZ	2:C:216:LYS:HD2	2.44	0.47
2:C:178:GLU:HG3	2:C:232:TYR:CZ	2.50	0.47
1:B:513:THR:HG23	1:B:534:TRP:CD1	2.49	0.47
2:C:163:PHE:CD2	2:C:171:PRO:HA	2.50	0.46
2:D:50:ASN:C	2:D:52:PRO:HD3	2.37	0.45
1:B:488:ILE:HG22	1:B:489:LEU:N	2.31	0.45
1:B:505:LEU:HD23	1:B:506:THR:N	2.33	0.44
1:A:493:CYS:SG	1:A:494:ILE:N	2.91	0.43
2:C:109:ILE:HG23	2:C:113:TYR:HD1	1.83	0.43
2:C:42:LEU:O	2:C:45:SER:OG	2.31	0.43
2:D:92:PHE:CE1	2:D:227:ALA:HB2	2.53	0.43
2:C:301:SER:HA	2:C:355:VAL:HA	2.01	0.43
2:C:125:GLU:N	2:C:126:PRO:HD2	2.34	0.42
2:D:200:LEU:HD23	2:D:203:ASN:HA	2.02	0.42
1:B:531:ARG:HH11	1:B:531:ARG:CG	2.32	0.42
2:D:327:ILE:HD12	2:D:336:PHE:HE1	1.84	0.42
1:A:456:ASP:OD2	1:A:459:LEU:HD12	2.19	0.42
2:D:95:ARG:HA	2:D:96:PRO:HD3	1.86	0.42
2:C:51:ILE:CG2	2:C:54:VAL:HB	2.50	0.41
2:C:218:ILE:HD12	2:C:218:ILE:HA	1.90	0.41
2:D:280:ARG:NH1	2:D:357:ARG:O	2.52	0.41
2:D:306:TYR:O	2:D:307:THR:HG23	2.20	0.41
2:D:246:VAL:HA	2:D:249:LEU:HG	2.01	0.41
2:C:280:ARG:HG2	2:C:299:ILE:O	2.21	0.41
1:B:463:LEU:HD11	2:D:145:GLN:NE2	2.36	0.41
2:C:13:LEU:HD21	2:C:39:PHE:CD2	2.56	0.41
2:C:103:LEU:HD21	2:C:218:ILE:CG2	2.51	0.41
2:C:274:TRP:O	2:C:284:TYR:HA	2.21	0.41
2:C:343:ASP:O	2:C:344:GLN:C	2.60	0.41
1:B:528:HIS:HB2	1:B:544:LEU:HB2	2.02	0.41
1:B:536:ASN:ND2	2:D:213:GLU:OE1	2.54	0.41
2:C:225:LEU:HD23	2:C:225:LEU:HA	1.92	0.41
1:A:470:HIS:ND1	1:A:496:ASP:OD1	2.36	0.40
1:A:448:CYS:SG	1:A:544:LEU:HD22	2.61	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

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	96/124 (77%)	92 (96%)	4 (4%)	0	100	100
1	B	91/124 (73%)	86 (94%)	5 (6%)	0	100	100
2	C	357/392 (91%)	339 (95%)	17 (5%)	1 (0%)	41	73
2	D	347/392 (88%)	328 (94%)	17 (5%)	2 (1%)	25	60
All	All	891/1032 (86%)	845 (95%)	43 (5%)	3 (0%)	41	73

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	D	365	ALA
2	C	279	ASP
2	D	315	SER

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

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	78/110 (71%)	74 (95%)	4 (5%)	24	56
1	B	77/110 (70%)	76 (99%)	1 (1%)	69	87
2	C	278/334 (83%)	273 (98%)	5 (2%)	59	82
2	D	256/334 (77%)	252 (98%)	4 (2%)	62	84
All	All	689/888 (78%)	675 (98%)	14 (2%)	55	80

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	459	LEU
1	A	463	LEU
1	A	502	GLN
1	A	531	ARG
1	B	531	ARG
2	C	63	ASP
2	C	154	THR
2	C	280	ARG
2	C	323	HIS
2	C	331	ASP
2	D	95	ARG
2	D	200	LEU
2	D	262	THR
2	D	340	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 14 ligands modelled in this entry, 11 are unknown and 2 are monoatomic - leaving 1 for Mogul analysis.

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

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
5	IP9	C	375	-	28,28,51	1.78	8 (28%)	42,46,72	0.85	1 (2%)

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
5	IP9	C	375	-	-	3/20/44/73	0/1/1/1

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	C	375	IP9	P5-O5	4.16	1.67	1.59
5	C	375	IP9	P5-OPG	3.84	1.62	1.50
5	C	375	IP9	P1-O2P	2.87	1.65	1.54
5	C	375	IP9	P4-O9P	2.63	1.59	1.50
5	C	375	IP9	P1-O1	2.39	1.63	1.59
5	C	375	IP9	P3-O5P	2.19	1.63	1.54
5	C	375	IP9	P5-OPH	2.18	1.63	1.54
5	C	375	IP9	P3-O6P	2.15	1.63	1.54

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	C	375	IP9	O7P-P4-O4	2.40	116.77	105.99

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	C	375	IP9	C3-O3-P3-O5P
5	C	375	IP9	C4-O4-P4-O9P
5	C	375	IP9	C5-O5-P5-OPG

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	C	375	IP9	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.

Ligand IP9 C 375

Bond lengths

Bond angles

Torsions

Rings
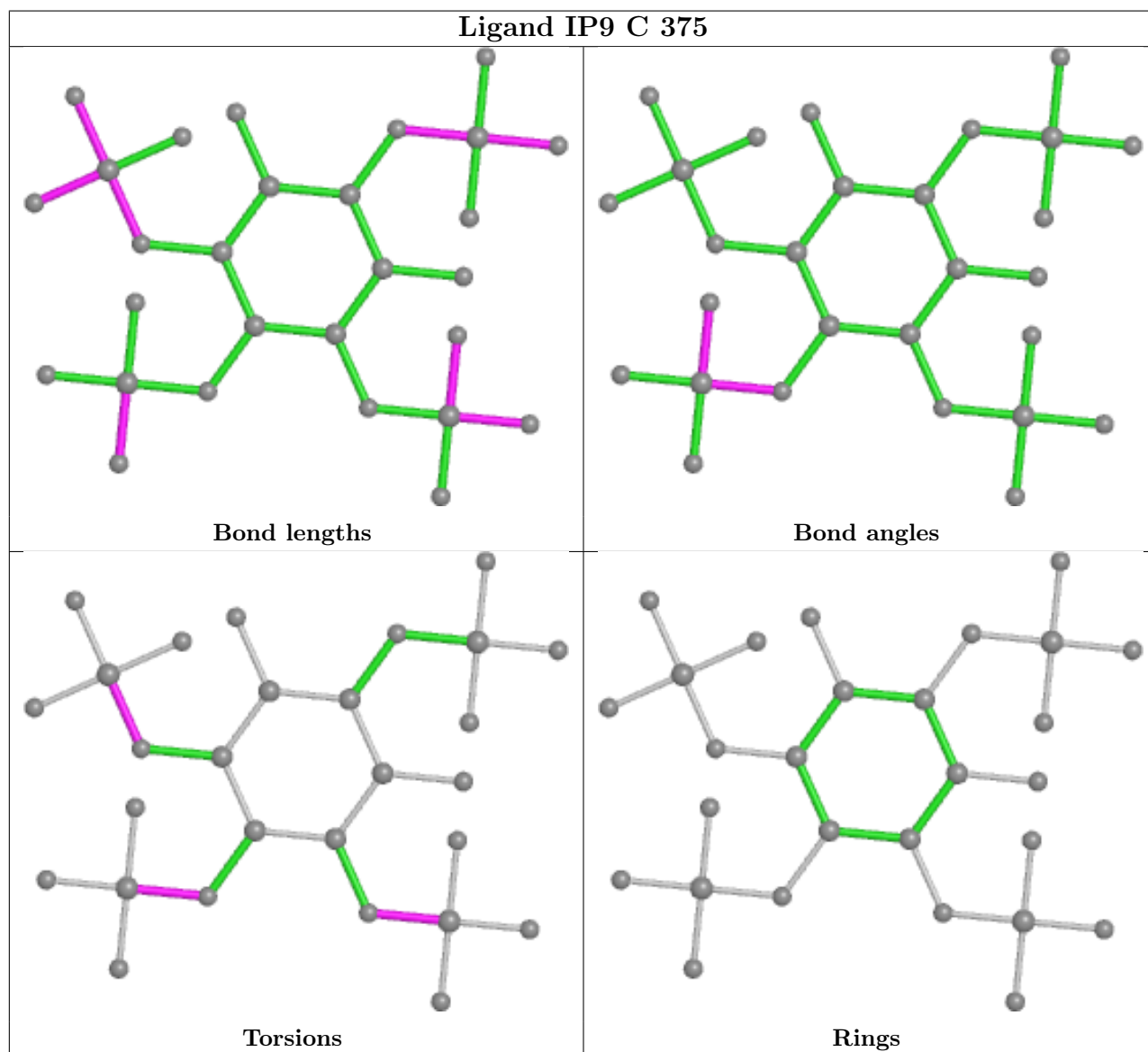
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	98/124 (79%)	-0.07	2 (2%)	65	48	47, 65, 85, 92	0
1	B	95/124 (76%)	0.06	6 (6%)	20	11	51, 73, 91, 100	0
2	C	365/392 (93%)	-0.10	10 (2%)	54	38	30, 55, 92, 101	0
2	D	353/392 (90%)	-0.12	7 (1%)	65	48	35, 58, 91, 107	0
All	All	911/1032 (88%)	-0.09	25 (2%)	54	38	30, 60, 91, 107	0

All (25) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	C	312	PHE	5.6
2	C	-8	GLY	3.9
2	D	315	SER	3.2
2	D	314	PRO	3.1
1	B	520	VAL	3.1
2	C	270	PHE	3.1
2	D	8	ALA	3.1
1	B	545	PRO	3.1
2	C	271	ARG	3.0
1	B	458	ALA	3.0
2	C	-7	ARG	2.9
2	D	65	TRP	2.7
1	B	460	ASN	2.6
2	C	245	LEU	2.6
2	C	-9	SER	2.5
2	D	64	ALA	2.5
2	C	244	ASP	2.5
1	B	499	SER	2.4
2	D	313	PRO	2.3
1	A	544	LEU	2.3
1	B	457	PRO	2.3

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Mol	Chain	Res	Type	RSRZ
2	C	272	LYS	2.3
1	A	545	PRO	2.3
2	D	31	TRP	2.1
2	C	313	PRO	2.1

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

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

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

LIGAND-RSR INFOmissingINFO

6.5 Other polymers ⓘ

There are no such residues in this entry.