Full wwPDB X-ray Structure Validation Report ⓘ

Mar 17, 2026 – 11:23 PM UTC

PDB ID	:	6Q0W / pdb_00006q0w
Title	:	Structure of DDB1-DDA1-DCAF15 complex bound to Indisulam and RBM39
Authors	:	Faust, T.; Yoon, H.; Nowak, R.P.; Donovan, K.A.; Li, Z.; Cai, Q.; Eleuteri, N.A.; Zhang, T.; Gray, N.S.; Fischer, E.S.
Deposited on	:	2019-08-02
Resolution	:	2.90 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

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

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

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

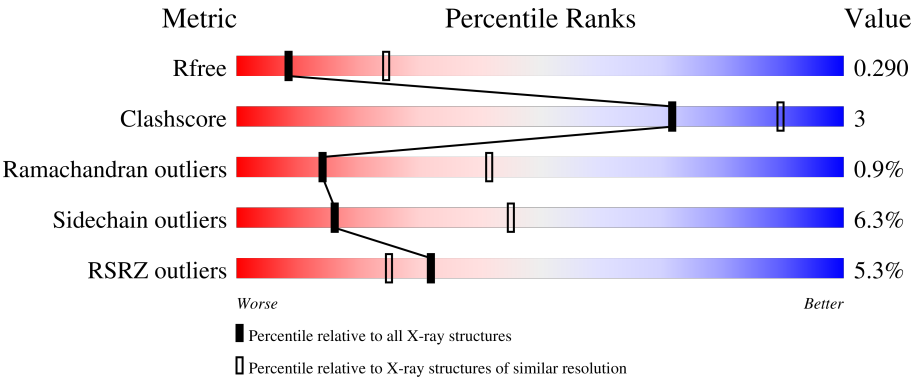
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.90 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	2481 (2.90-2.90)
Clashscore	190562	2690 (2.90-2.90)
Ramachandran outliers	187476	2623 (2.90-2.90)
Sidechain outliers	187428	2625 (2.90-2.90)
RSRZ outliers	180081	2481 (2.90-2.90)

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	864	4% 78% 11% • 10%
2	B	276	6% 62% 12% • 25%
3	C	263	4% 60% 12% 27%
4	D	107	3% 65% 7% • 26%
5	E	126	3% 38% 9% • 51%

2 Entry composition (i)

There are 8 unique types of molecules in this entry. The entry contains 10558 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 DNA damage-binding protein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	781	Total	C	N	O	S	0	0	0
			6151	3902	1037	1178	34			

There are 34 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-27	MET	-	initiating methionine	UNP Q16531
A	-26	GLY	-	expression tag	UNP Q16531
A	-25	SER	-	expression tag	UNP Q16531
A	-24	SER	-	expression tag	UNP Q16531
A	-23	HIS	-	expression tag	UNP Q16531
A	-22	HIS	-	expression tag	UNP Q16531
A	-21	HIS	-	expression tag	UNP Q16531
A	-20	HIS	-	expression tag	UNP Q16531
A	-19	HIS	-	expression tag	UNP Q16531
A	-18	HIS	-	expression tag	UNP Q16531
A	-17	SER	-	expression tag	UNP Q16531
A	-16	ALA	-	expression tag	UNP Q16531
A	-15	ALA	-	expression tag	UNP Q16531
A	-14	HIS	-	expression tag	UNP Q16531
A	-13	ILE	-	expression tag	UNP Q16531
A	-12	VAL	-	expression tag	UNP Q16531
A	-11	MET	-	expression tag	UNP Q16531
A	-10	VAL	-	expression tag	UNP Q16531
A	-9	ASP	-	expression tag	UNP Q16531
A	-8	ALA	-	expression tag	UNP Q16531
A	-7	TYR	-	expression tag	UNP Q16531
A	-6	LYS	-	expression tag	UNP Q16531
A	-5	PRO	-	expression tag	UNP Q16531
A	-4	THR	-	expression tag	UNP Q16531
A	-3	LYS	-	expression tag	UNP Q16531
A	-2	GLY	-	expression tag	UNP Q16531
A	-1	GLY	-	expression tag	UNP Q16531

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Chain	Residue	Modelled	Actual	Comment	Reference
A	0	ARG	-	expression tag	UNP Q16531
A	700	GLY	-	linker	UNP Q16531
A	701	ASN	-	linker	UNP Q16531
A	702	GLY	-	linker	UNP Q16531
A	703	ASN	-	linker	UNP Q16531
A	704	SER	-	linker	UNP Q16531
A	705	GLY	-	linker	UNP Q16531

- Molecule 2 is a protein called DDB1- and CUL4-associated factor 15.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	208	Total	C	N	O	S	0	0	0
			1696	1097	291	298	10			

There are 49 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-15	MET	-	initiating methionine	UNP Q66K64
B	-14	ASP	-	expression tag	UNP Q66K64
B	-13	TRP	-	expression tag	UNP Q66K64
B	-12	SER	-	expression tag	UNP Q66K64
B	-11	HIS	-	expression tag	UNP Q66K64
B	-10	PRO	-	expression tag	UNP Q66K64
B	-9	GLN	-	expression tag	UNP Q66K64
B	-8	PHE	-	expression tag	UNP Q66K64
B	-7	GLU	-	expression tag	UNP Q66K64
B	-6	LYS	-	expression tag	UNP Q66K64
B	-5	SER	-	expression tag	UNP Q66K64
B	-4	ALA	-	expression tag	UNP Q66K64
B	-3	VAL	-	expression tag	UNP Q66K64
B	-2	GLY	-	expression tag	UNP Q66K64
B	-1	LEU	-	expression tag	UNP Q66K64
B	0	ASN	-	expression tag	UNP Q66K64
B	1	ASP	-	expression tag	UNP Q66K64
B	2	ILE	-	expression tag	UNP Q66K64
B	3	PHE	-	expression tag	UNP Q66K64
B	4	GLU	-	expression tag	UNP Q66K64
B	5	ALA	-	expression tag	UNP Q66K64
B	6	GLN	-	expression tag	UNP Q66K64
B	7	LYS	-	expression tag	UNP Q66K64
B	8	ILE	-	expression tag	UNP Q66K64
B	9	GLU	-	expression tag	UNP Q66K64

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Chain	Residue	Modelled	Actual	Comment	Reference
B	10	TRP	-	expression tag	UNP Q66K64
B	11	HIS	-	expression tag	UNP Q66K64
B	12	GLU	-	expression tag	UNP Q66K64
B	13	GLY	-	expression tag	UNP Q66K64
B	14	GLY	-	expression tag	UNP Q66K64
B	15	GLY	-	expression tag	UNP Q66K64
B	16	GLY	-	expression tag	UNP Q66K64
B	17	SER	-	expression tag	UNP Q66K64
B	18	GLY	-	expression tag	UNP Q66K64
B	19	GLU	-	expression tag	UNP Q66K64
B	20	ASN	-	expression tag	UNP Q66K64
B	21	LEU	-	expression tag	UNP Q66K64
B	22	TYR	-	expression tag	UNP Q66K64
B	23	PHE	-	expression tag	UNP Q66K64
B	24	GLN	-	expression tag	UNP Q66K64
B	25	GLY	-	expression tag	UNP Q66K64
B	26	GLY	-	expression tag	UNP Q66K64
B	27	GLY	-	expression tag	UNP Q66K64
B	28	ARG	-	expression tag	UNP Q66K64
B	29	MET	-	expression tag	UNP Q66K64
B	30	GLY	-	expression tag	UNP Q66K64
B	31	ARG	-	expression tag	UNP Q66K64
B	32	ARG	-	expression tag	UNP Q66K64
B	33	ARG	-	expression tag	UNP Q66K64

- Molecule 3 is a protein called DDB1- and CUL4-associated factor 15.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	192	Total	C	N	O	S	0	0	0
			1545	992	256	290	7			

There are 45 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	338	MET	-	initiating methionine	UNP Q66K64
C	339	ASP	-	expression tag	UNP Q66K64
C	340	TRP	-	expression tag	UNP Q66K64
C	341	SER	-	expression tag	UNP Q66K64
C	342	HIS	-	expression tag	UNP Q66K64
C	343	PRO	-	expression tag	UNP Q66K64
C	344	GLN	-	expression tag	UNP Q66K64
C	345	PHE	-	expression tag	UNP Q66K64

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Chain	Residue	Modelled	Actual	Comment	Reference
C	346	GLU	-	expression tag	UNP Q66K64
C	347	LYS	-	expression tag	UNP Q66K64
C	348	SER	-	expression tag	UNP Q66K64
C	349	ALA	-	expression tag	UNP Q66K64
C	350	VAL	-	expression tag	UNP Q66K64
C	351	GLY	-	expression tag	UNP Q66K64
C	352	LEU	-	expression tag	UNP Q66K64
C	353	ASN	-	expression tag	UNP Q66K64
C	354	ASP	-	expression tag	UNP Q66K64
C	355	ILE	-	expression tag	UNP Q66K64
C	356	PHE	-	expression tag	UNP Q66K64
C	357	GLU	-	expression tag	UNP Q66K64
C	358	ALA	-	expression tag	UNP Q66K64
C	359	GLN	-	expression tag	UNP Q66K64
C	360	LYS	-	expression tag	UNP Q66K64
C	361	ILE	-	expression tag	UNP Q66K64
C	362	GLU	-	expression tag	UNP Q66K64
C	363	TRP	-	expression tag	UNP Q66K64
C	364	HIS	-	expression tag	UNP Q66K64
C	365	GLU	-	expression tag	UNP Q66K64
C	366	GLY	-	expression tag	UNP Q66K64
C	367	GLY	-	expression tag	UNP Q66K64
C	368	GLY	-	expression tag	UNP Q66K64
C	369	GLY	-	expression tag	UNP Q66K64
C	370	SER	-	expression tag	UNP Q66K64
C	371	GLY	-	expression tag	UNP Q66K64
C	372	GLU	-	expression tag	UNP Q66K64
C	373	ASN	-	expression tag	UNP Q66K64
C	374	LEU	-	expression tag	UNP Q66K64
C	375	TYR	-	expression tag	UNP Q66K64
C	376	PHE	-	expression tag	UNP Q66K64
C	377	GLN	-	expression tag	UNP Q66K64
C	378	GLY	-	expression tag	UNP Q66K64
C	379	GLY	-	expression tag	UNP Q66K64
C	380	GLY	-	expression tag	UNP Q66K64
C	381	ARG	-	expression tag	UNP Q66K64
C	382	MET	-	expression tag	UNP Q66K64

- Molecule 4 is a protein called RNA-binding protein 39.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	D	79	Total	C	N	O	S	0	0	0
			616	390	106	115	5			

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	226	MET	-	initiating methionine	UNP Q14498
D	227	GLY	-	expression tag	UNP Q14498
D	228	SER	-	expression tag	UNP Q14498
D	229	SER	-	expression tag	UNP Q14498
D	230	HIS	-	expression tag	UNP Q14498
D	231	HIS	-	expression tag	UNP Q14498
D	232	HIS	-	expression tag	UNP Q14498
D	233	HIS	-	expression tag	UNP Q14498
D	234	HIS	-	expression tag	UNP Q14498
D	235	HIS	-	expression tag	UNP Q14498
D	236	SER	-	expression tag	UNP Q14498
D	237	ALA	-	expression tag	UNP Q14498
D	238	VAL	-	expression tag	UNP Q14498
D	239	ASP	-	expression tag	UNP Q14498
D	240	GLU	-	expression tag	UNP Q14498
D	241	ASN	-	expression tag	UNP Q14498
D	242	LEU	-	expression tag	UNP Q14498
D	243	TYR	-	expression tag	UNP Q14498
D	244	PHE	-	expression tag	UNP Q14498
D	245	GLN	-	expression tag	UNP Q14498
D	246	GLY	-	expression tag	UNP Q14498
D	247	GLY	-	expression tag	UNP Q14498
D	248	GLY	-	expression tag	UNP Q14498
D	249	ARG	-	expression tag	UNP Q14498

- Molecule 5 is a protein called DET1- and DDB1-associated protein 1.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
5	E	62	Total	C	N	O	0	0	0
			520	336	91	93			

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	-23	MET	-	initiating methionine	UNP Q9BW61
E	-22	GLY	-	expression tag	UNP Q9BW61
E	-21	SER	-	expression tag	UNP Q9BW61
E	-20	SER	-	expression tag	UNP Q9BW61
E	-19	HIS	-	expression tag	UNP Q9BW61
E	-18	HIS	-	expression tag	UNP Q9BW61
E	-17	HIS	-	expression tag	UNP Q9BW61

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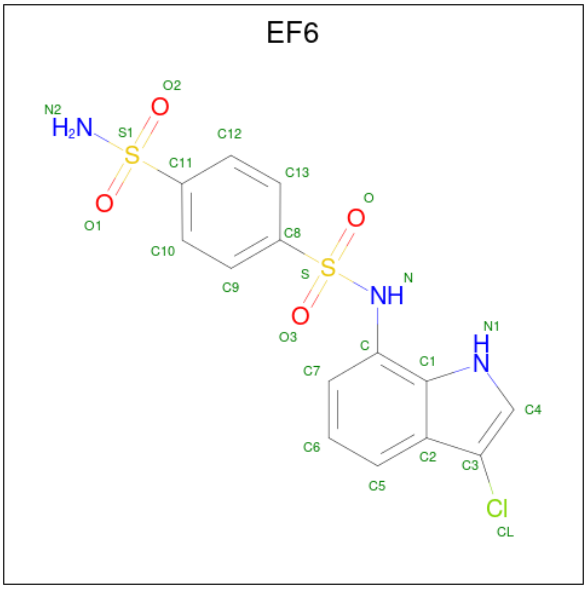
Chain	Residue	Modelled	Actual	Comment	Reference
E	-16	HIS	-	expression tag	UNP Q9BW61
E	-15	HIS	-	expression tag	UNP Q9BW61
E	-14	HIS	-	expression tag	UNP Q9BW61
E	-13	SER	-	expression tag	UNP Q9BW61
E	-12	ALA	-	expression tag	UNP Q9BW61
E	-11	VAL	-	expression tag	UNP Q9BW61
E	-10	ASP	-	expression tag	UNP Q9BW61
E	-9	GLU	-	expression tag	UNP Q9BW61
E	-8	ASN	-	expression tag	UNP Q9BW61
E	-7	LEU	-	expression tag	UNP Q9BW61
E	-6	TYR	-	expression tag	UNP Q9BW61
E	-5	PHE	-	expression tag	UNP Q9BW61
E	-4	GLN	-	expression tag	UNP Q9BW61
E	-3	GLY	-	expression tag	UNP Q9BW61
E	-2	GLY	-	expression tag	UNP Q9BW61
E	-1	GLY	-	expression tag	UNP Q9BW61
E	0	ARG	-	expression tag	UNP Q9BW61

- Molecule 6 is N 1 -(3-chloro-1H-indol-7-yl)benzene-1,4-disulfonamide (CCD ID: EF6) (formula: $C_{14}H_{12}ClN_3O_4S_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
			Total	C	Cl	N	O	S		
6	B	1	24	14	1	3	4	2	0	0

- Molecule 7 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	B	1	Total Zn 1 1	0	0

- Molecule 8 is water.

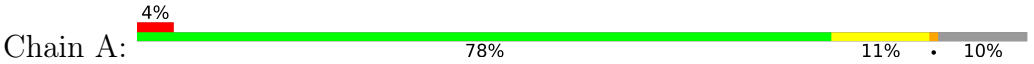
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	4	Total O 4 4	0	0
8	D	1	Total O 1 1	0	0

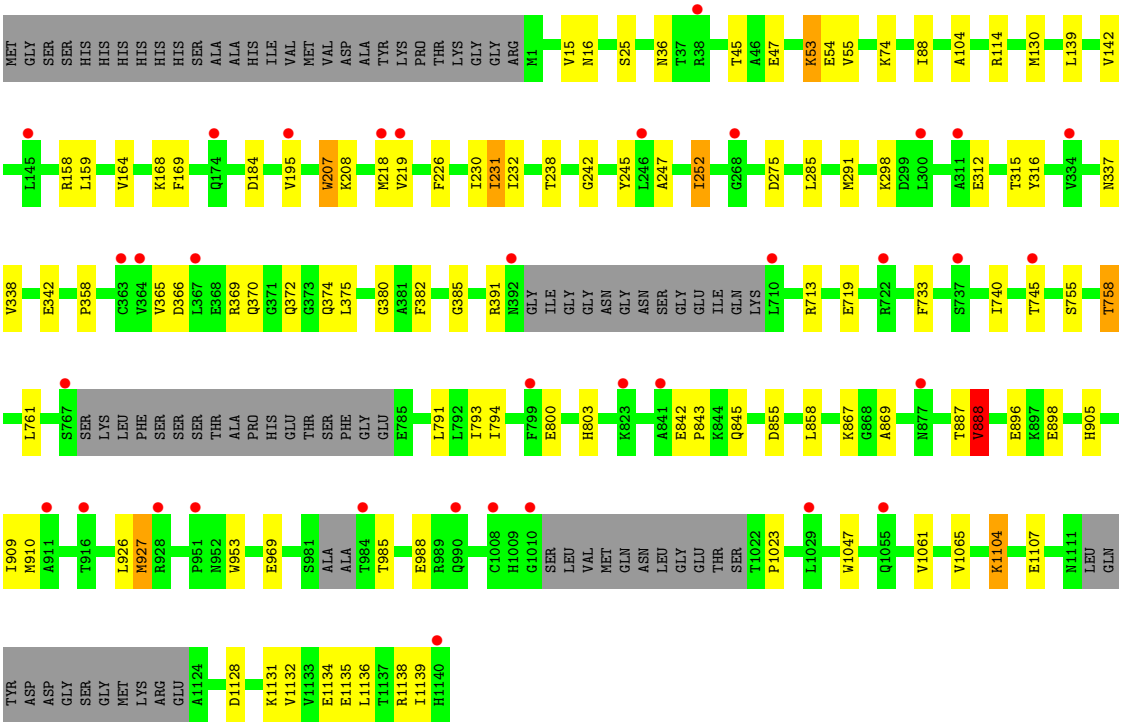
3 Residue-property plots (i)

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 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: DNA damage-binding protein 1

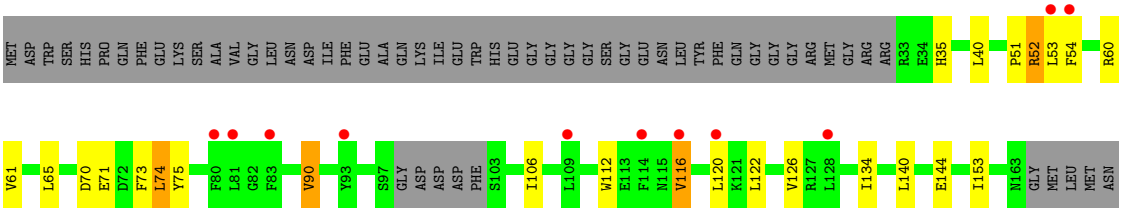
Chain A:

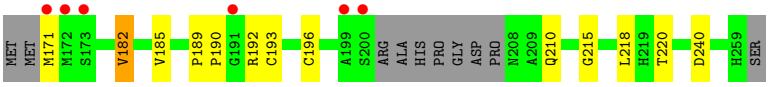




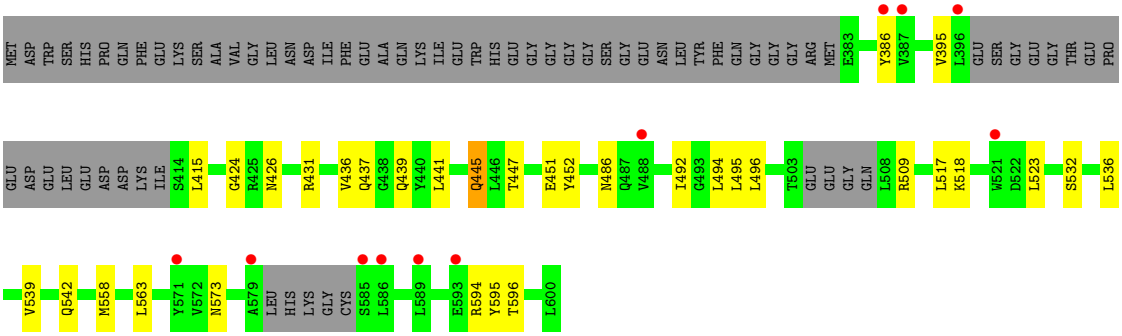
• Molecule 2: DDB1- and CUL4-associated factor 15

Chain B:

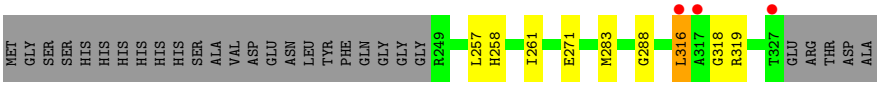




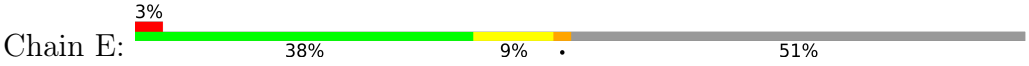
• Molecule 3: DDB1- and CUL4-associated factor 15

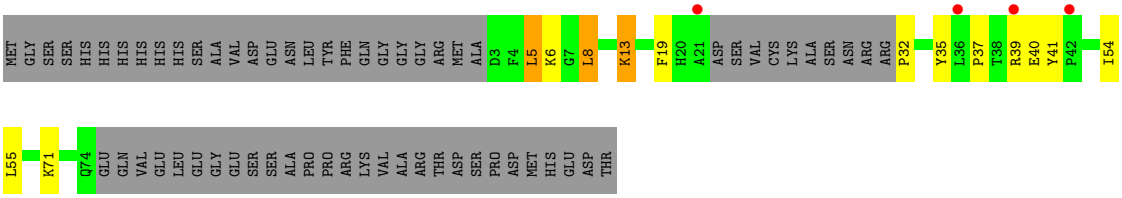


• Molecule 4: RNA-binding protein 39



• Molecule 5: DET1- and DDB1-associated protein 1





4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	93.97Å 81.80Å 260.98Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	46.99 – 2.90 46.99 – 2.90	Depositor EDS
% Data completeness (in resolution range)	99.7 (46.99-2.90) 99.7 (46.99-2.90)	Depositor EDS
R_{merge}	0.16	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.41 (at 2.91Å)	Xtriage
Refinement program	BUSTER 2.10.3	Depositor
R, R_{free}	0.238 , 0.264 0.260 , 0.290	Depositor DCC
R_{free} test set	2197 reflections (4.81%)	wwPDB-VP
Wilson B-factor (Å^2)	83.4	Xtriage
Anisotropy	0.630	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.28 , 74.3	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.92	EDS
Total number of atoms	10558	wwPDB-VP
Average B, all atoms (Å^2)	125.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.30% of the height of the origin peak. No significant pseudotranslation is detected.*

[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: EF6, ZN

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	0.66	0/6259	1.13	10/8464 (0.1%)
2	B	0.71	0/1741	1.14	2/2358 (0.1%)
3	C	0.69	0/1579	1.17	0/2150
4	D	0.71	0/627	1.26	0/838
5	E	0.72	0/533	1.34	4/718 (0.6%)
All	All	0.68	0/10739	1.15	16/14528 (0.1%)

There are no bond length outliers.

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	275	ASP	CA-CB-CG	5.93	118.53	112.60
2	B	54	PHE	CA-C-N	5.77	128.29	120.38
2	B	54	PHE	C-N-CA	5.77	128.29	120.38
1	A	909	ILE	N-CA-C	-5.76	106.09	111.45
1	A	888	VAL	N-CA-CB	5.72	117.90	111.21
5	E	5	LEU	CA-C-N	5.50	128.91	120.82
5	E	5	LEU	C-N-CA	5.50	128.91	120.82
1	A	231	ILE	N-CA-CB	5.49	118.37	111.46
1	A	164	VAL	N-CA-CB	5.38	116.59	110.72
1	A	184	ASP	CA-CB-CG	5.33	117.93	112.60
1	A	312	GLU	N-CA-C	-5.16	105.27	112.45
1	A	337	ASN	CA-C-N	5.05	128.45	120.47
1	A	337	ASN	C-N-CA	5.05	128.45	120.47
5	E	13	LYS	CA-C-N	5.02	127.01	120.28
5	E	13	LYS	C-N-CA	5.02	127.01	120.28
1	A	226	PHE	CA-CB-CG	5.00	118.80	113.80

There are no chirality outliers.

There are no planarity outliers.

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	A	6151	0	6132	46	0
2	B	1696	0	1672	14	0
3	C	1545	0	1520	10	0
4	D	616	0	602	2	0
5	E	520	0	517	6	0
6	B	24	0	0	0	0
7	B	1	0	0	0	0
8	A	4	0	0	0	0
8	D	1	0	0	0	0
All	All	10558	0	10443	69	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 3.

All (69) 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)
1:A:130:MET:HE2	1:A:169:PHE:HZ	1.49	0.77
3:C:518:LYS:HB2	3:C:532:SER:HB3	1.68	0.76
1:A:207:TRP:HB3	1:A:242:GLY:HA2	1.69	0.75
1:A:53:LYS:HG2	5:E:35:TYR:HB2	1.80	0.64
1:A:888:VAL:HG22	1:A:905:HIS:HB3	1.81	0.62
1:A:130:MET:HE1	1:A:195:VAL:HG11	1.83	0.61
1:A:793:ILE:HD13	1:A:803:HIS:HB3	1.82	0.61
1:A:55:VAL:HG21	1:A:1065:VAL:HG21	1.83	0.60
1:A:755:SER:H	1:A:758:THR:HG22	1.67	0.58
2:B:126:VAL:HG21	2:B:185:VAL:HG11	1.86	0.57
1:A:791:LEU:HD23	1:A:858:LEU:HD21	1.86	0.56
1:A:231:ILE:HG13	1:A:238:THR:OG1	2.06	0.56
1:A:130:MET:HE2	1:A:169:PHE:CZ	2.37	0.55
2:B:61:VAL:HG11	2:B:116:VAL:HG13	1.88	0.55
2:B:182:VAL:HG13	2:B:220:THR:HG23	1.87	0.55
1:A:54:GLU:HB2	5:E:32:PRO:HB2	1.90	0.54
1:A:374:GLN:HG2	1:A:391:ARG:HB3	1.90	0.54
1:A:1136:LEU:O	1:A:1139:ILE:HG12	2.08	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1061:VAL:HG13	1:A:1104:LYS:HD2	1.91	0.52
1:A:218:MET:HG2	1:A:232:ILE:HB	1.92	0.52
1:A:358:PRO:HD2	1:A:380:GLY:HA2	1.92	0.51
1:A:25:SER:HA	1:A:74:LYS:HE3	1.94	0.50
1:A:985:THR:HB	1:A:988:GLU:HG2	1.94	0.49
1:A:927:MET:HG2	1:A:953:TRP:CZ2	2.47	0.49
3:C:415:LEU:H	3:C:445:GLN:HE22	1.59	0.49
1:A:230:ILE:HD11	1:A:285:LEU:HD21	1.95	0.49
1:A:910:MET:HE1	2:B:40:LEU:HD11	1.95	0.48
3:C:492:ILE:HB	3:C:517:LEU:HB2	1.95	0.48
1:A:219:VAL:HG12	1:A:231:ILE:HG22	1.94	0.48
1:A:45:THR:HG23	1:A:47:GLU:H	1.79	0.48
1:A:88:ILE:HG12	1:A:104:ALA:HB3	1.95	0.48
1:A:1128:ASP:O	1:A:1131:LYS:HG3	2.14	0.47
1:A:252:ILE:H	1:A:252:ILE:HG13	1.56	0.47
3:C:486:ASN:HB3	3:C:523:LEU:HB2	1.97	0.47
1:A:1047:TRP:CZ3	1:A:1132:VAL:HG13	2.50	0.47
1:A:843:PRO:HG2	1:A:869:ALA:HB2	1.98	0.46
1:A:382:PHE:HD1	1:A:740:ILE:HD11	1.81	0.46
5:E:35:TYR:CE2	5:E:37:PRO:HG3	2.50	0.46
2:B:70:ASP:HB3	2:B:73:PHE:HD2	1.80	0.45
1:A:374:GLN:HE21	1:A:391:ARG:HD3	1.81	0.45
3:C:494:LEU:HD23	3:C:496:LEU:HD23	1.98	0.45
4:D:257:LEU:HD23	4:D:316:LEU:HD22	1.98	0.45
1:A:369:ARG:HB3	1:A:370:GLN:H	1.70	0.44
1:A:793:ILE:HD11	1:A:858:LEU:HD22	2.00	0.44
1:A:316:TYR:OH	5:E:8:LEU:HB3	2.18	0.44
1:A:733:PHE:HB2	1:A:794:ILE:HG13	2.00	0.44
2:B:90:VAL:HG13	2:B:112:TRP:HB2	2.00	0.43
1:A:385:GLY:HA3	1:A:719:GLU:O	2.17	0.43
1:A:158:ARG:HB2	5:E:54:ILE:HD12	1.99	0.43
1:A:168:LYS:HD3	1:A:219:VAL:HG23	2.00	0.43
1:A:369:ARG:HB2	1:A:372:GLN:HB3	2.01	0.43
1:A:1047:TRP:HZ3	1:A:1132:VAL:HG13	1.83	0.42
1:A:1135:GLU:HA	1:A:1138:ARG:HE	1.84	0.42
3:C:558:MET:HE2	5:E:55:LEU:HD11	2.02	0.42
2:B:60:ARG:HG2	3:C:595:TYR:HB2	2.02	0.42
1:A:365:VAL:HG12	1:A:366:ASP:N	2.34	0.42
1:A:926:LEU:C	1:A:927:MET:HG3	2.45	0.42
2:B:51:PRO:C	2:B:53:LEU:H	2.28	0.42
2:B:112:TRP:HB3	2:B:120:LEU:HB3	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:386:TYR:HB3	3:C:452:TYR:CD1	2.54	0.41
4:D:258:HIS:HB3	4:D:261:ILE:HG12	2.01	0.41
3:C:539:VAL:HG13	3:C:542:GLN:HG3	2.01	0.41
1:A:1104:LYS:O	1:A:1107:GLU:HG2	2.21	0.41
2:B:189:PRO:HA	2:B:190:PRO:HD3	1.98	0.41
1:A:843:PRO:HG3	2:B:35:HIS:HE1	1.86	0.41
1:A:245:TYR:HE1	1:A:247:ALA:HB2	1.87	0.40
2:B:71:GLU:HA	2:B:74:LEU:HD13	2.01	0.40
2:B:193:CYS:HB3	2:B:196:CYS:HB2	2.04	0.40
2:B:144:GLU:HB2	3:C:573:ASN:HB3	2.02	0.40

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 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	769/864 (89%)	743 (97%)	24 (3%)	2 (0%)	36 65
2	B	200/276 (72%)	189 (94%)	8 (4%)	3 (2%)	8 28
3	C	184/263 (70%)	167 (91%)	13 (7%)	4 (2%)	5 20
4	D	77/107 (72%)	73 (95%)	2 (3%)	2 (3%)	4 17
5	E	58/126 (46%)	49 (84%)	8 (14%)	1 (2%)	7 26
All	All	1288/1636 (79%)	1221 (95%)	55 (4%)	12 (1%)	14 41

All (12) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	C	436	VAL
4	D	288	GLY
5	E	39	ARG
2	B	116	VAL

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Mol	Chain	Res	Type
3	C	424	GLY
3	C	439	GLN
1	A	1023	PRO
3	C	426	ASN
1	A	36	ASN
2	B	52	ARG
4	D	318	GLY
2	B	215	GLY

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all 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	684/749 (91%)	651 (95%)	33 (5%)	23 55
2	B	190/242 (78%)	174 (92%)	16 (8%)	10 31
3	C	174/232 (75%)	161 (92%)	13 (8%)	12 37
4	D	65/89 (73%)	61 (94%)	4 (6%)	16 46
5	E	57/112 (51%)	49 (86%)	8 (14%)	3 11
All	All	1170/1424 (82%)	1096 (94%)	74 (6%)	16 45

All (74) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	15	VAL
1	A	16	ASN
1	A	53	LYS
1	A	114	ARG
1	A	139	LEU
1	A	142	VAL
1	A	159	LEU
1	A	207	TRP
1	A	208	LYS
1	A	252	ILE
1	A	291	MET

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Mol	Chain	Res	Type
1	A	298	LYS
1	A	315	THR
1	A	338	VAL
1	A	342	GLU
1	A	375	LEU
1	A	713	ARG
1	A	745	THR
1	A	758	THR
1	A	761	LEU
1	A	800	GLU
1	A	842	GLU
1	A	845	GLN
1	A	855	ASP
1	A	867	LYS
1	A	887	THR
1	A	888	VAL
1	A	896	GLU
1	A	898	GLU
1	A	927	MET
1	A	969	GLU
1	A	1104	LYS
1	A	1134	GLU
2	B	52	ARG
2	B	65	LEU
2	B	74	LEU
2	B	75	TYR
2	B	90	VAL
2	B	106	ILE
2	B	122	LEU
2	B	134	ILE
2	B	140	LEU
2	B	153	ILE
2	B	171	MET
2	B	182	VAL
2	B	192	ARG
2	B	210	GLN
2	B	218	LEU
2	B	240	ASP
3	C	395	VAL
3	C	431	ARG
3	C	437	GLN
3	C	441	LEU

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Mol	Chain	Res	Type
3	C	445	GLN
3	C	447	THR
3	C	451	GLU
3	C	495	LEU
3	C	509	ARG
3	C	536	LEU
3	C	563	LEU
3	C	594	ARG
3	C	596	THR
4	D	271	GLU
4	D	283	MET
4	D	316	LEU
4	D	319	ARG
5	E	5	LEU
5	E	6	LYS
5	E	8	LEU
5	E	13	LYS
5	E	19	PHE
5	E	40	GLU
5	E	41	TYR
5	E	71	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (23) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	85	ASN
1	A	149	ASN
1	A	163	HIS
1	A	209	GLN
1	A	319	ASN
1	A	374	GLN
1	A	759	GLN
1	A	810	ASN
1	A	907	ASN
1	A	950	ASN
1	A	970	ASN
2	B	48	GLN
2	B	158	ASN
2	B	241	GLN
3	C	388	ASN
3	C	445	GLN
3	C	455	ASN

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Mol	Chain	Res	Type
3	C	467	GLN
3	C	514	HIS
4	D	260	ASN
4	D	312	ASN
5	E	12	ASN
5	E	61	GLN

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 oligosaccharides in this entry.

5.6 Ligand geometry

Of 2 ligands modelled in this entry, 1 is 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	$\#\|Z\| > 2$
6	EF6	B	501	-	26,26,26	0.49	1 (3%)	38,40,40	0.77	2 (5%)

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	EF6	B	501	-	-	0/17/17/17	0/3/3/3

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	B	501	EF6	C4-C3	2.34	1.39	1.36

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	B	501	EF6	C1-C2-C3	2.81	107.84	106.02
6	B	501	EF6	C3-C4-N1	2.48	110.74	107.28

There are no chirality outliers.

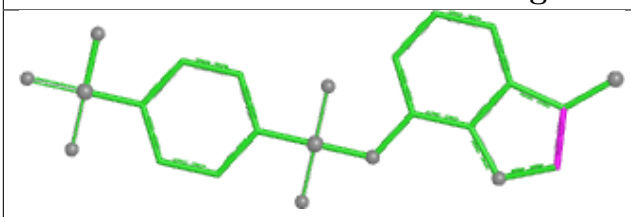
There are no torsion outliers.

There are no ring outliers.

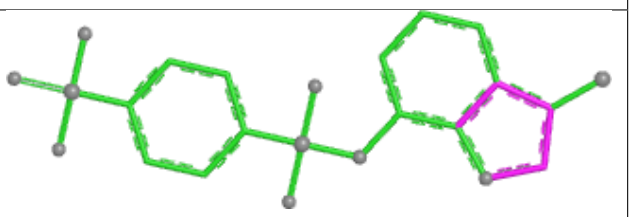
No monomer is involved in short contacts.

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

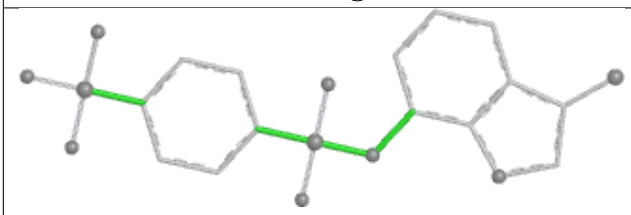
Ligand EF6 B 501



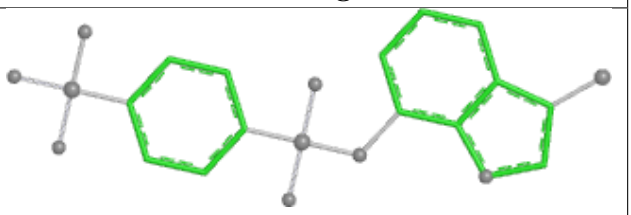
Bond lengths



Bond angles



Torsions



Rings

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 Fit of model and data

6.1 Protein, DNA and RNA chains

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, 95^{th} 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	781/864 (90%)	0.46	35 (4%)	38	30	73, 127, 176, 209	0
2	B	208/276 (75%)	0.57	17 (8%)	17	14	74, 107, 159, 207	0
3	C	192/263 (73%)	0.51	11 (5%)	29	23	72, 105, 194, 221	0
4	D	79/107 (73%)	0.28	3 (3%)	44	36	96, 118, 134, 153	0
5	E	62/126 (49%)	0.66	4 (6%)	25	20	98, 150, 184, 224	0
All	All	1322/1636 (80%)	0.48	70 (5%)	32	25	72, 121, 176, 224	0

All (70) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1010	GLY	6.1
5	E	21	ALA	5.6
3	C	586	LEU	5.0
1	A	951	PRO	4.8
1	A	710	LEU	4.3
2	B	80	PHE	3.8
1	A	246	LEU	3.5
3	C	571	TYR	3.5
1	A	1029	LEU	3.4
1	A	767	SER	3.4
3	C	386	TYR	3.4
2	B	200	SER	3.4
3	C	589	LEU	3.3
4	D	327	THR	3.3
1	A	1008	CYS	3.1
3	C	579	ALA	3.1
2	B	109	LEU	3.1
1	A	363	CYS	3.0
1	A	311	ALA	2.9
2	B	171	MET	2.8

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Mol	Chain	Res	Type	RSRZ
3	C	521	TRP	2.8
1	A	799	PHE	2.8
1	A	911	ALA	2.8
4	D	316	LEU	2.7
1	A	392	ASN	2.7
1	A	38	ARG	2.7
2	B	93	TYR	2.7
3	C	585	SER	2.7
1	A	928	ARG	2.6
1	A	823	LYS	2.6
2	B	199	ALA	2.5
3	C	396	LEU	2.5
4	D	317	ALA	2.4
2	B	81	LEU	2.4
1	A	334	VAL	2.3
1	A	877	ASN	2.3
3	C	593	GLU	2.3
1	A	218	MET	2.3
2	B	172	MET	2.3
2	B	120	LEU	2.3
2	B	54	PHE	2.3
1	A	990	GLN	2.3
1	A	268	GLY	2.3
2	B	114	PHE	2.3
1	A	364	VAL	2.3
1	A	984	THR	2.2
1	A	219	VAL	2.2
2	B	83	PHE	2.2
1	A	145	LEU	2.2
5	E	36	LEU	2.2
2	B	173	SER	2.2
1	A	300	LEU	2.2
2	B	53	LEU	2.2
5	E	39	ARG	2.2
3	C	387	VAL	2.2
5	E	42	PRO	2.2
1	A	174	GLN	2.1
2	B	116	VAL	2.1
3	C	488	VAL	2.1
1	A	916	THR	2.1
1	A	737	SER	2.1
2	B	128	LEU	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	1140	HIS	2.1
1	A	367	LEU	2.1
1	A	745	THR	2.1
1	A	841	ALA	2.1
2	B	191	GLY	2.0
1	A	195	VAL	2.0
1	A	1055	GLN	2.0
1	A	722	ARG	2.0

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

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

6.3 Carbohydrates (i)

There are no oligosaccharides in this entry.

6.4 Ligands (i)

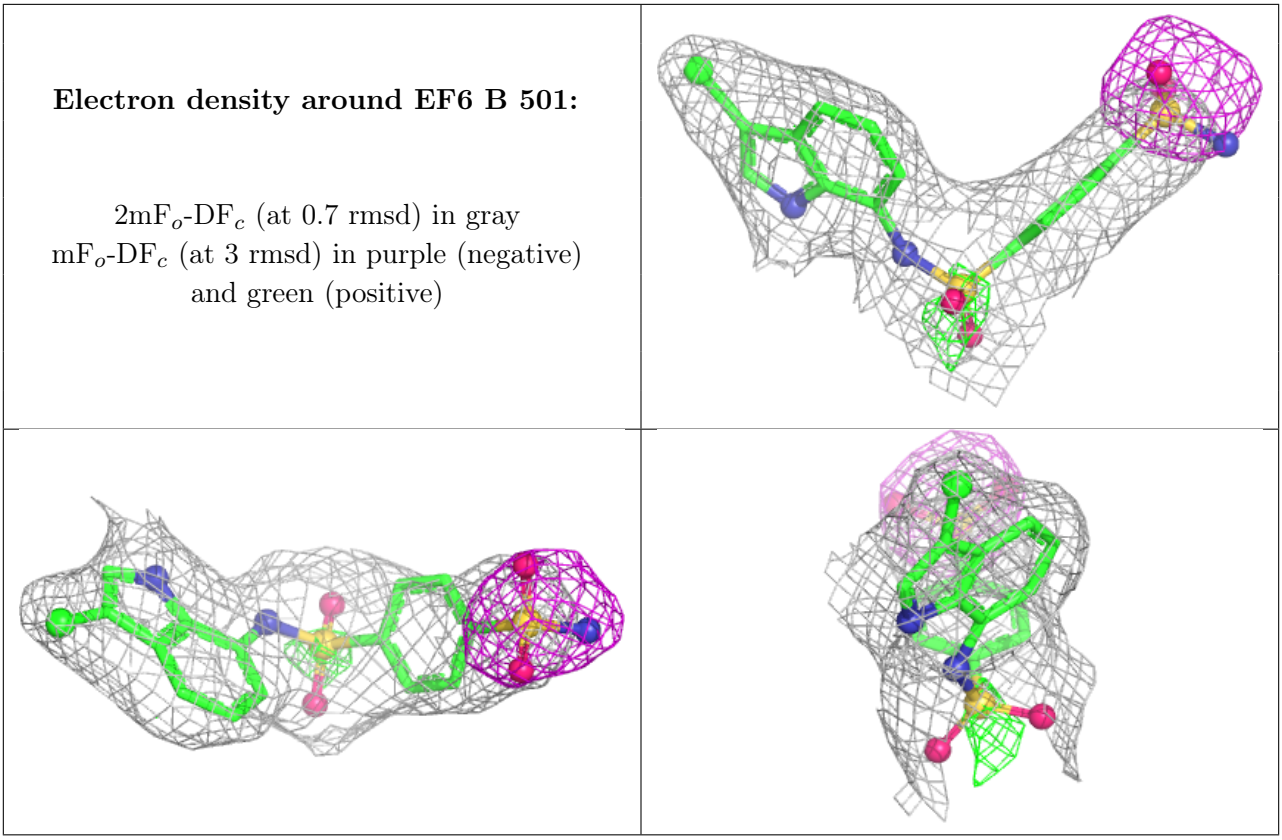
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
6	EF6	B	501	24/24	0.90	0.15	111,113,134,134	0
7	ZN	B	502	1/1	0.99	0.08	132,132,132,132	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around EF6 B 501:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



6.5 Other polymers (i)

There are no such residues in this entry.