Full wwPDB X-ray Structure Validation Report (i)

May 23, 2020 – 06:09 am BST

PDB ID	:	6GQJ
Title	:	Crystal structure of human c-KIT kinase domain in complex with AZD3229-analogue (compound 18)
Authors	:	Schimpl, M.; Hardy, C.J.; Ogg, D.J.; Overman, R.C.; Packer, M.J.; Kettle, J.G.; Anjum, R.; Barry, E.; Bhavsar, D.; Brown, C.; Campbell, A.; Goldberg, K.; Grondine, M.; Guichard, S.; Hunt, T.; Jones, O.; Li, X.; Moleva, O.; Pearson, S.; Shao, W.; Smith, A.; Smith, J.; Stead, D.; Stokes, S.; Tucker, M.; Ye, Y.
Deposited on	:	2018-06-07
Resolution	:	2.33 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 (i) symbol.

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

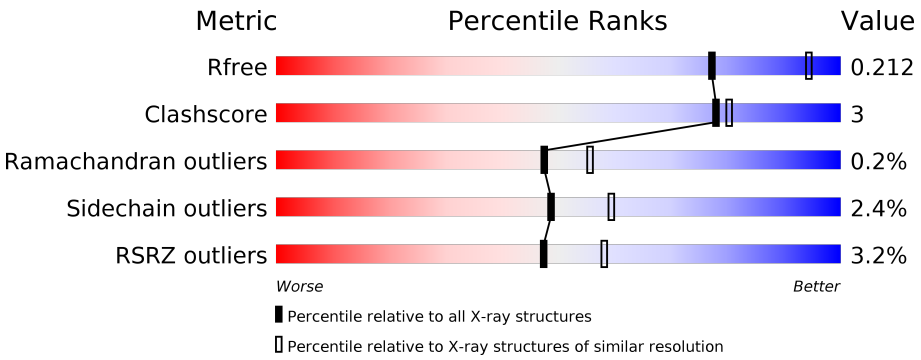
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.11
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.11

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 2.33 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}	130704	2096 (2.36-2.32)
Clashscore	141614	2193 (2.36-2.32)
Ramachandran outliers	138981	2159 (2.36-2.32)
Sidechain outliers	138945	2160 (2.36-2.32)
RSRZ outliers	127900	2067 (2.36-2.32)

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 on 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	327	2% 83% 8% 9%
1	B	327	4% 83% 6% 11%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 4992 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 Mast/stem cell growth factor receptor Kit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	298	2377	1526	395	440	16	0	2	0
1	B	292	2328	1495	387	430	16	0	1	0

There are 184 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	547	GLY	-	expression tag	UNP P10721
A	548	SER	-	expression tag	UNP P10721
A	549	HIS	-	expression tag	UNP P10721
A	550	MET	-	expression tag	UNP P10721
A	563	SER	ILE	engineered mutation	UNP P10721
A	569	SER	VAL	engineered mutation	UNP P10721
A	609	GLN	TYR	engineered mutation	UNP P10721
A	631	SER	LEU	engineered mutation	UNP P10721
A	651	GLU	MET	engineered mutation	UNP P10721
A	662	HIS	ILE	engineered mutation	UNP P10721
A	688	GLU	SER	conflict	UNP P10721
A	690	VAL	ILE	conflict	UNP P10721
A	691	PRO	CYS	conflict	UNP P10721
A	692	TYR	SER	conflict	UNP P10721
A	?	-	GLN	deletion	UNP P10721
A	?	-	GLU	deletion	UNP P10721
A	?	-	ASP	deletion	UNP P10721
A	?	-	HIS	deletion	UNP P10721
A	?	-	ALA	deletion	UNP P10721
A	?	-	GLU	deletion	UNP P10721
A	?	-	ALA	deletion	UNP P10721
A	?	-	ALA	deletion	UNP P10721
A	?	-	LEU	deletion	UNP P10721
A	?	-	TYR	deletion	UNP P10721
A	?	-	LYS	deletion	UNP P10721

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Chain	Residue	Modelled	Actual	Comment	Reference
A	?	-	ASN	deletion	UNP P10721
A	?	-	LEU	deletion	UNP P10721
A	?	-	LEU	deletion	UNP P10721
A	?	-	HIS	deletion	UNP P10721
A	?	-	SER	deletion	UNP P10721
A	?	-	LYS	deletion	UNP P10721
A	?	-	GLU	deletion	UNP P10721
A	?	-	SER	deletion	UNP P10721
A	?	-	SER	deletion	UNP P10721
A	?	-	CYS	deletion	UNP P10721
A	?	-	SER	deletion	UNP P10721
A	?	-	ASP	deletion	UNP P10721
A	?	-	SER	deletion	UNP P10721
A	?	-	THR	deletion	UNP P10721
A	?	-	ASN	deletion	UNP P10721
A	?	-	GLU	deletion	UNP P10721
A	?	-	TYR	deletion	UNP P10721
A	?	-	MET	deletion	UNP P10721
A	?	-	ASP	deletion	UNP P10721
A	?	-	MET	deletion	UNP P10721
A	?	-	LYS	deletion	UNP P10721
A	?	-	PRO	deletion	UNP P10721
A	?	-	GLY	deletion	UNP P10721
A	?	-	VAL	deletion	UNP P10721
A	?	-	SER	deletion	UNP P10721
A	?	-	TYR	deletion	UNP P10721
A	?	-	VAL	deletion	UNP P10721
A	?	-	VAL	deletion	UNP P10721
A	?	-	PRO	deletion	UNP P10721
A	?	-	THR	deletion	UNP P10721
A	?	-	LYS	deletion	UNP P10721
A	?	-	ALA	deletion	UNP P10721
A	?	-	ASP	deletion	UNP P10721
A	?	-	LYS	deletion	UNP P10721
A	?	-	ARG	deletion	UNP P10721
A	?	-	ARG	deletion	UNP P10721
A	?	-	SER	deletion	UNP P10721
A	?	-	VAL	deletion	UNP P10721
A	?	-	ARG	deletion	UNP P10721
A	?	-	ILE	deletion	UNP P10721
A	?	-	GLY	deletion	UNP P10721
A	?	-	SER	deletion	UNP P10721

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Chain	Residue	Modelled	Actual	Comment	Reference
A	?	-	TYR	deletion	UNP P10721
A	?	-	ILE	deletion	UNP P10721
A	?	-	GLU	deletion	UNP P10721
A	?	-	ARG	deletion	UNP P10721
A	?	-	ASP	deletion	UNP P10721
A	?	-	VAL	deletion	UNP P10721
A	?	-	THR	deletion	UNP P10721
A	?	-	PRO	deletion	UNP P10721
A	754	VAL	ALA	conflict	UNP P10721
A	755	ALA	ILE	conflict	UNP P10721
A	756	PRO	MET	conflict	UNP P10721
A	759	LEU	-	insertion	UNP P10721
A	760	TYR	ASP	conflict	UNP P10721
A	761	LYS	GLU	conflict	UNP P10721
A	762	ASP	LEU	conflict	UNP P10721
A	763	PHE	ALA	conflict	UNP P10721
A	765	THR	ASP	conflict	UNP P10721
A	768	HIS	ASP	engineered mutation	UNP P10721
A	804	ASN	ARG	engineered mutation	UNP P10721
A	825	ASP	VAL	engineered mutation	UNP P10721
A	844	SER	CYS	engineered mutation	UNP P10721
A	890	SER	LEU	engineered mutation	UNP P10721
A	894	TYR	HIS	engineered mutation	UNP P10721
A	912	ASP	LEU	engineered mutation	UNP P10721
A	923	ASP	LEU	engineered mutation	UNP P10721
B	547	GLY	-	expression tag	UNP P10721
B	548	SER	-	expression tag	UNP P10721
B	549	HIS	-	expression tag	UNP P10721
B	550	MET	-	expression tag	UNP P10721
B	563	SER	ILE	engineered mutation	UNP P10721
B	569	SER	VAL	engineered mutation	UNP P10721
B	609	GLN	TYR	engineered mutation	UNP P10721
B	631	SER	LEU	engineered mutation	UNP P10721
B	651	GLU	MET	engineered mutation	UNP P10721
B	662	HIS	ILE	engineered mutation	UNP P10721
B	688	GLU	SER	conflict	UNP P10721
B	690	VAL	ILE	conflict	UNP P10721
B	691	PRO	CYS	conflict	UNP P10721
B	692	TYR	SER	conflict	UNP P10721
B	?	-	GLN	deletion	UNP P10721
B	?	-	GLU	deletion	UNP P10721
B	?	-	ASP	deletion	UNP P10721

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Chain	Residue	Modelled	Actual	Comment	Reference
B	?	-	HIS	deletion	UNP P10721
B	?	-	ALA	deletion	UNP P10721
B	?	-	GLU	deletion	UNP P10721
B	?	-	ALA	deletion	UNP P10721
B	?	-	ALA	deletion	UNP P10721
B	?	-	LEU	deletion	UNP P10721
B	?	-	TYR	deletion	UNP P10721
B	?	-	LYS	deletion	UNP P10721
B	?	-	ASN	deletion	UNP P10721
B	?	-	LEU	deletion	UNP P10721
B	?	-	LEU	deletion	UNP P10721
B	?	-	HIS	deletion	UNP P10721
B	?	-	SER	deletion	UNP P10721
B	?	-	LYS	deletion	UNP P10721
B	?	-	GLU	deletion	UNP P10721
B	?	-	SER	deletion	UNP P10721
B	?	-	SER	deletion	UNP P10721
B	?	-	CYS	deletion	UNP P10721
B	?	-	SER	deletion	UNP P10721
B	?	-	ASP	deletion	UNP P10721
B	?	-	SER	deletion	UNP P10721
B	?	-	THR	deletion	UNP P10721
B	?	-	ASN	deletion	UNP P10721
B	?	-	GLU	deletion	UNP P10721
B	?	-	TYR	deletion	UNP P10721
B	?	-	MET	deletion	UNP P10721
B	?	-	ASP	deletion	UNP P10721
B	?	-	MET	deletion	UNP P10721
B	?	-	LYS	deletion	UNP P10721
B	?	-	PRO	deletion	UNP P10721
B	?	-	GLY	deletion	UNP P10721
B	?	-	VAL	deletion	UNP P10721
B	?	-	SER	deletion	UNP P10721
B	?	-	TYR	deletion	UNP P10721
B	?	-	VAL	deletion	UNP P10721
B	?	-	VAL	deletion	UNP P10721
B	?	-	PRO	deletion	UNP P10721
B	?	-	THR	deletion	UNP P10721
B	?	-	LYS	deletion	UNP P10721
B	?	-	ALA	deletion	UNP P10721
B	?	-	ASP	deletion	UNP P10721
B	?	-	LYS	deletion	UNP P10721

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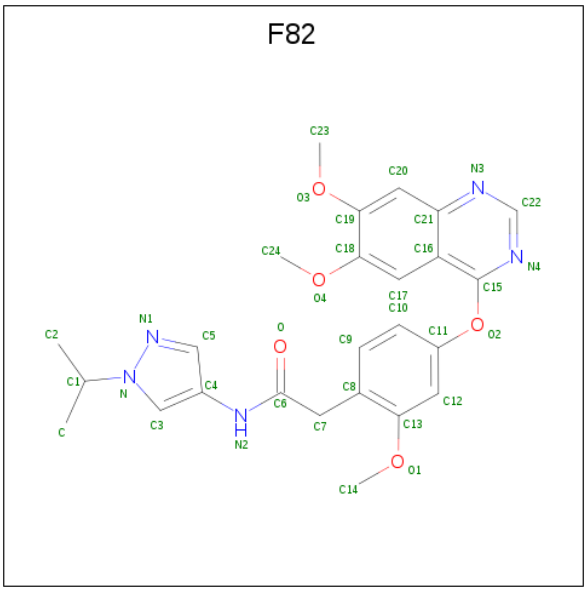
Chain	Residue	Modelled	Actual	Comment	Reference
B	?	-	ARG	deletion	UNP P10721
B	?	-	ARG	deletion	UNP P10721
B	?	-	SER	deletion	UNP P10721
B	?	-	VAL	deletion	UNP P10721
B	?	-	ARG	deletion	UNP P10721
B	?	-	ILE	deletion	UNP P10721
B	?	-	GLY	deletion	UNP P10721
B	?	-	SER	deletion	UNP P10721
B	?	-	TYR	deletion	UNP P10721
B	?	-	ILE	deletion	UNP P10721
B	?	-	GLU	deletion	UNP P10721
B	?	-	ARG	deletion	UNP P10721
B	?	-	ASP	deletion	UNP P10721
B	?	-	VAL	deletion	UNP P10721
B	?	-	THR	deletion	UNP P10721
B	?	-	PRO	deletion	UNP P10721
B	754	VAL	ALA	conflict	UNP P10721
B	755	ALA	ILE	conflict	UNP P10721
B	756	PRO	MET	conflict	UNP P10721
B	759	LEU	-	insertion	UNP P10721
B	760	TYR	ASP	conflict	UNP P10721
B	761	LYS	GLU	conflict	UNP P10721
B	762	ASP	LEU	conflict	UNP P10721
B	763	PHE	ALA	conflict	UNP P10721
B	765	THR	ASP	conflict	UNP P10721
B	768	HIS	ASP	engineered mutation	UNP P10721
B	804	ASN	ARG	engineered mutation	UNP P10721
B	825	ASP	VAL	engineered mutation	UNP P10721
B	844	SER	CYS	engineered mutation	UNP P10721
B	890	SER	LEU	engineered mutation	UNP P10721
B	894	TYR	HIS	engineered mutation	UNP P10721
B	912	ASP	LEU	engineered mutation	UNP P10721
B	923	ASP	LEU	engineered mutation	UNP P10721

- Molecule 2 is 2-[4-(6,7-dimethoxyquinazolin-4-yl)oxy-2-methoxy-phenyl]- {N}-(1-propan -2-ylpyrazol-4-yl)ethanamide (three-letter code: F82) (formula: $C_{25}H_{27}N_5O_5$) (labeled as "Ligand of Interest" by author).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
2	A	1	35	25	5	5	0	0
			Total	C	N	O		
2	B	1	35	25	5	5	0	0

- Molecule 3 is water.

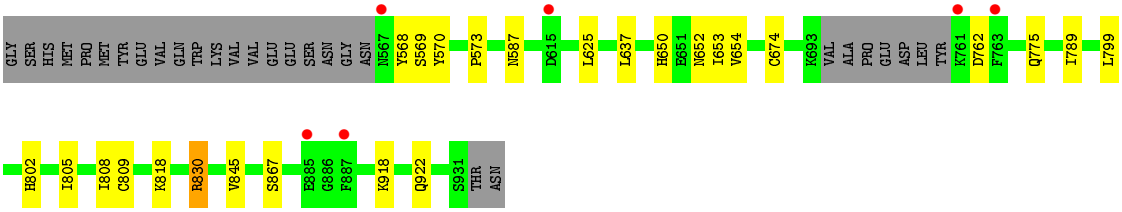
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
3	A	141	141	141	0	0
			Total	O		
3	B	76	76	76	0	0

3 Residue-property plots (i)

These plots are drawn for all protein, RNA and DNA 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.

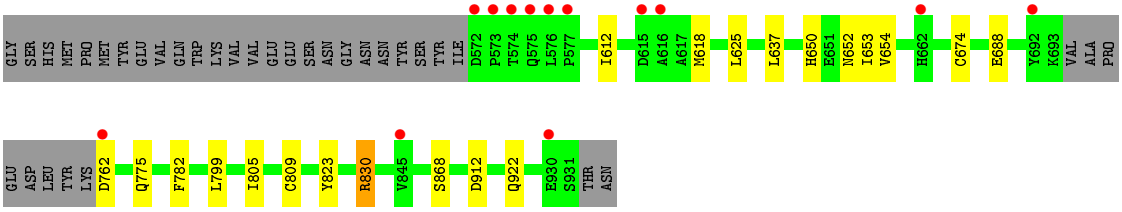
- Molecule 1: Mast/stem cell growth factor receptor Kit

Chain A:



- Molecule 1: Mast/stem cell growth factor receptor Kit

Chain B:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	86.77Å 89.44Å 90.34Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	51.28 – 2.33 51.28 – 2.33	Depositor EDS
% Data completeness (in resolution range)	99.2 (51.28-2.33) 99.2 (51.28-2.33)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.16 (at 2.34Å)	Xtriage
Refinement program	BUSTER 2.11.6	Depositor
R, R_{free}	0.181 , 0.217 0.181 , 0.212	Depositor DCC
R_{free} test set	1536 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å^2)	45.7	Xtriage
Anisotropy	0.181	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.37 , 59.2	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	0.019 for -h,l,k 0.023 for -l,-k,-h 0.011 for k,h,-l 0.000 for k,l,h 0.000 for l,h,k	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	4992	wwPDB-VP
Average B, all atoms (Å^2)	56.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.59% 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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: F82

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	0.53	0/2441	0.67	0/3301
1	B	0.50	0/2391	0.66	0/3232
All	All	0.52	0/4832	0.66	0/6533

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 (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	2377	0	2331	16	0
1	B	2328	0	2295	13	0
2	A	35	0	0	0	0
2	B	35	0	0	0	0
3	A	141	0	0	2	0
3	B	76	0	0	0	0
All	All	4992	0	4626	27	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 (27) 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:654:VAL:HB	3:A:1179:HOH:O	1.63	0.97
1:B:650:HIS:HD2	1:B:652:ASN:H	1.36	0.71
1:B:775:GLN:HE22	1:B:805:ILE:HA	1.56	0.69
1:A:775:GLN:HE22	1:A:805:ILE:HA	1.57	0.69
1:A:654:VAL:HG21	1:A:799:LEU:HD12	1.78	0.66
1:A:570:TYR:CE2	1:A:789:ILE:HD11	2.31	0.66
1:A:650:HIS:HD2	1:A:652:ASN:H	1.42	0.65
1:B:654:VAL:HG21	1:B:799:LEU:HD12	1.79	0.64
1:A:650:HIS:CD2	1:A:652:ASN:H	2.16	0.64
1:B:650:HIS:CD2	1:B:652:ASN:H	2.19	0.58
1:A:568:TYR:CE1	1:A:573:PRO:HG2	2.41	0.55
1:B:625:LEU:HG	1:B:637:LEU:HD22	1.92	0.51
1:B:654:VAL:HG21	1:B:809:CYS:HB3	1.93	0.50
1:A:654:VAL:HG21	1:A:809:CYS:HB3	1.94	0.49
1:A:625:LEU:HG	1:A:637:LEU:HD22	1.94	0.49
1:B:653:ILE:HD13	1:B:782:PHE:HD2	1.78	0.48
1:A:674:CYS:SG	1:B:674:CYS:CB	3.04	0.46
1:B:823:TYR:HB3	1:B:830:ARG:HG2	1.98	0.46
1:A:653:ILE:HD13	1:A:808:ILE:HB	1.97	0.46
1:B:653:ILE:HD13	1:B:782:PHE:CD2	2.52	0.45
1:B:612:ILE:HD12	1:B:618:MET:HB3	1.98	0.45
1:A:568:TYR:CD1	1:A:573:PRO:HG2	2.52	0.44
1:A:569:SER:HB2	1:A:789:ILE:HD12	2.00	0.43
1:A:818:LYS:HA	1:A:830:ARG:HD3	2.01	0.42
1:A:674:CYS:SG	1:B:674:CYS:HB2	2.61	0.41
1:A:802:HIS:HD2	3:A:1231:HOH:O	2.04	0.41
1:B:654:VAL:CG2	1:B:799:LEU:HD12	2.49	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	296/327 (90%)	289 (98%)	6 (2%)	1 (0%)	41	47
1	B	289/327 (88%)	283 (98%)	6 (2%)	0	100	100
All	All	585/654 (89%)	572 (98%)	12 (2%)	1 (0%)	47	55

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	762	ASP

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	258/285 (90%)	252 (98%)	6 (2%)	50	61
1	B	254/285 (89%)	248 (98%)	6 (2%)	49	59
All	All	512/570 (90%)	500 (98%)	12 (2%)	49	61

All (12) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	587	ASN
1	A	830	ARG
1	A	845	VAL
1	A	867	SER
1	A	918	LYS
1	A	922	GLN
1	B	688	GLU
1	B	762	ASP
1	B	830	ARG
1	B	868	SER
1	B	912	ASP
1	B	922	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	587	ASN
1	A	650	HIS
1	A	652	ASN
1	A	655	ASN
1	A	775	GLN
1	A	927	GLN
1	B	587	ASN
1	B	650	HIS
1	B	652	ASN
1	B	655	ASN
1	B	775	GLN
1	B	802	HIS
1	B	927	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 carbohydrates in this entry.

5.6 Ligand geometry (i)

2 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
2	F82	A	1001	-	36,38,38	0.54	0	44,53,53	1.00	3 (6%)
2	F82	B	1001	-	36,38,38	0.62	1 (2%)	44,53,53	0.80	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
2	F82	A	1001	-	-	2/20/22/22	0/4/4/4
2	F82	B	1001	-	-	2/20/22/22	0/4/4/4

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1001	F82	C3-C4	-2.03	1.36	1.38

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	1001	F82	C3-N-C1	4.66	129.61	125.48
2	B	1001	F82	C4-N2-C6	-3.68	121.05	127.50
2	A	1001	F82	C4-N2-C6	-2.75	122.69	127.50
2	A	1001	F82	C11-O2-C15	2.41	122.91	118.16

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1001	F82	C-C1-N-N1
2	B	1001	F82	C-C1-N-C3
2	A	1001	F82	C6-C7-C8-C9
2	B	1001	F82	C6-C7-C8-C9

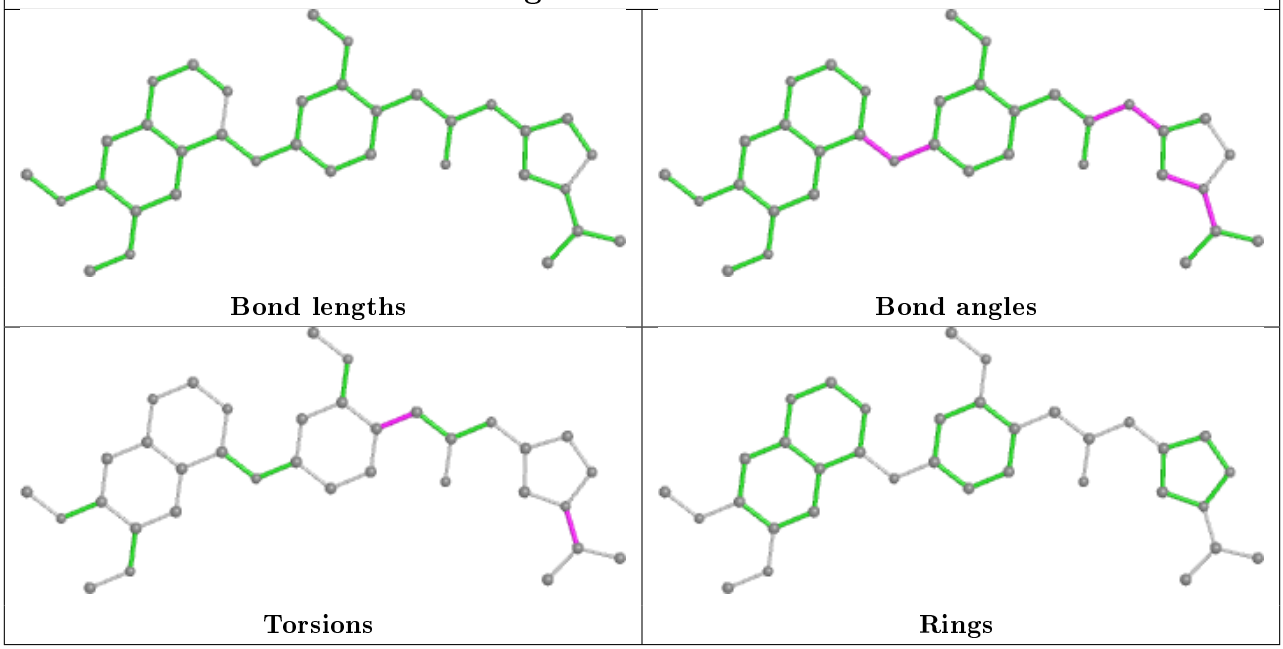
There are no ring outliers.

No monomer is involved in short contacts.

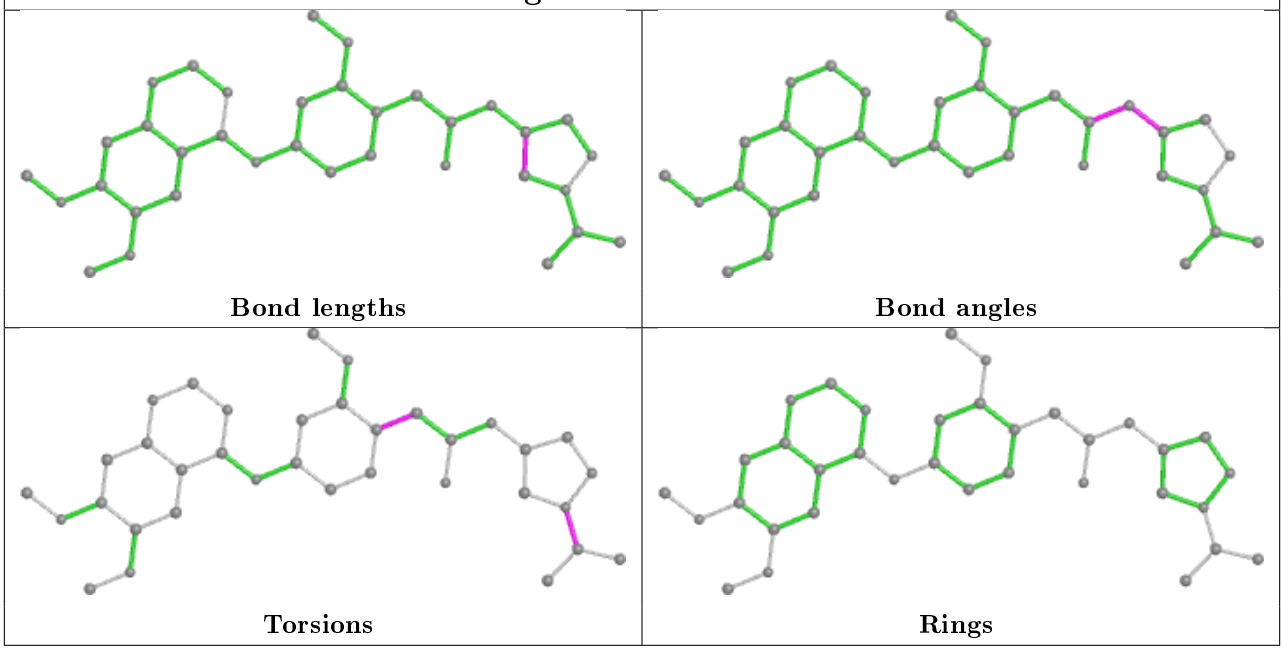
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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 F82 A 1001



Ligand F82 B 1001



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 (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	298/327 (91%)	0.22	6 (2%)	65	74	30, 47, 83, 117	0
1	B	292/327 (89%)	0.34	13 (4%)	33	44	34, 59, 99, 135	0
All	All	590/654 (90%)	0.28	19 (3%)	47	58	30, 53, 94, 135	0

All (19) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	573	PRO	5.8
1	B	576	LEU	4.2
1	B	575	GLN	3.9
1	A	615	ASP	3.3
1	A	761	LYS	3.3
1	B	574	THR	3.2
1	B	692	TYR	3.1
1	B	577	PRO	3.1
1	B	845	VAL	2.8
1	B	572	ASP	2.6
1	B	930	GLU	2.3
1	B	615	ASP	2.3
1	B	762	ASP	2.2
1	A	763	PHE	2.2
1	B	616	ALA	2.2
1	A	567	ASN	2.1
1	B	662	HIS	2.0
1	A	885	GLU	2.0
1	A	887	PHE	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 carbohydrates in this entry.

6.4 Ligands (i)

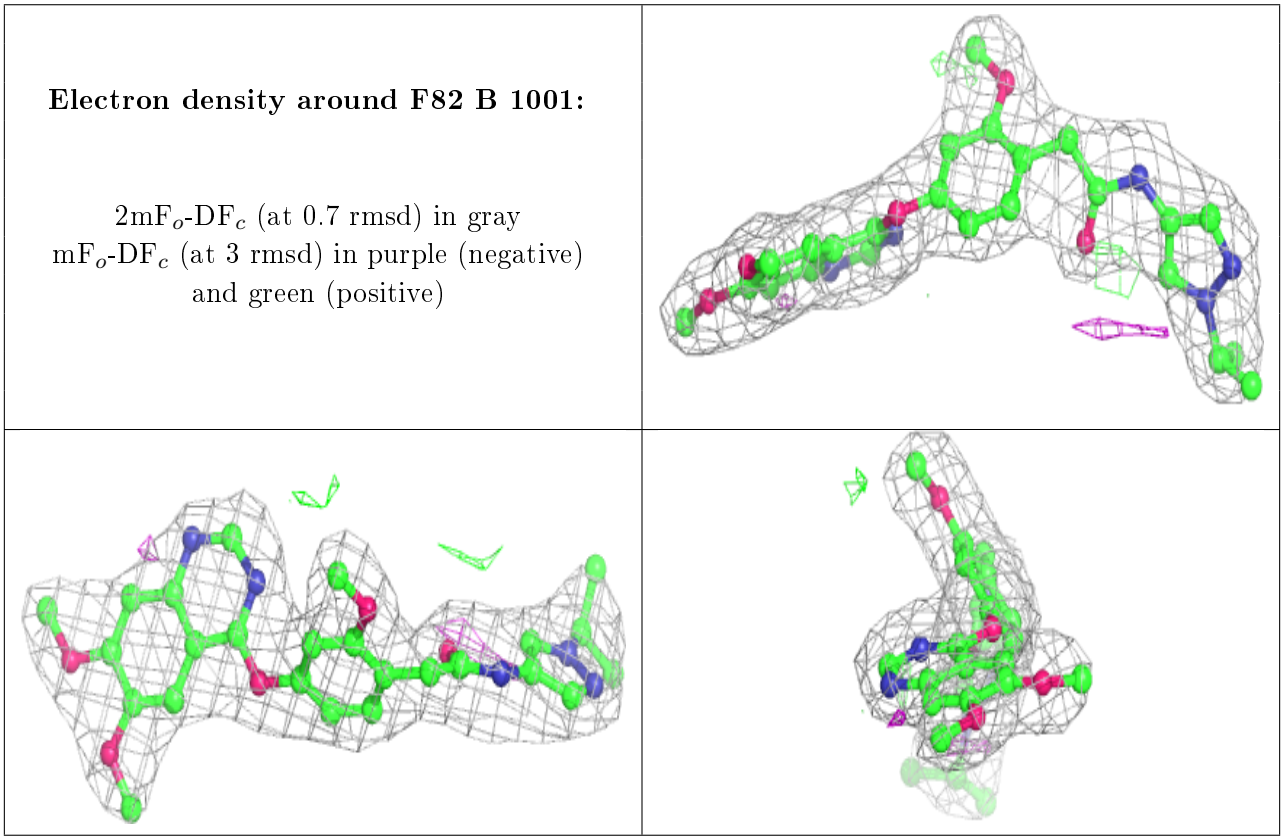
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	F82	B	1001	35/35	0.97	0.13	42,49,59,62	0
2	F82	A	1001	35/35	0.98	0.14	29,38,51,54	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.

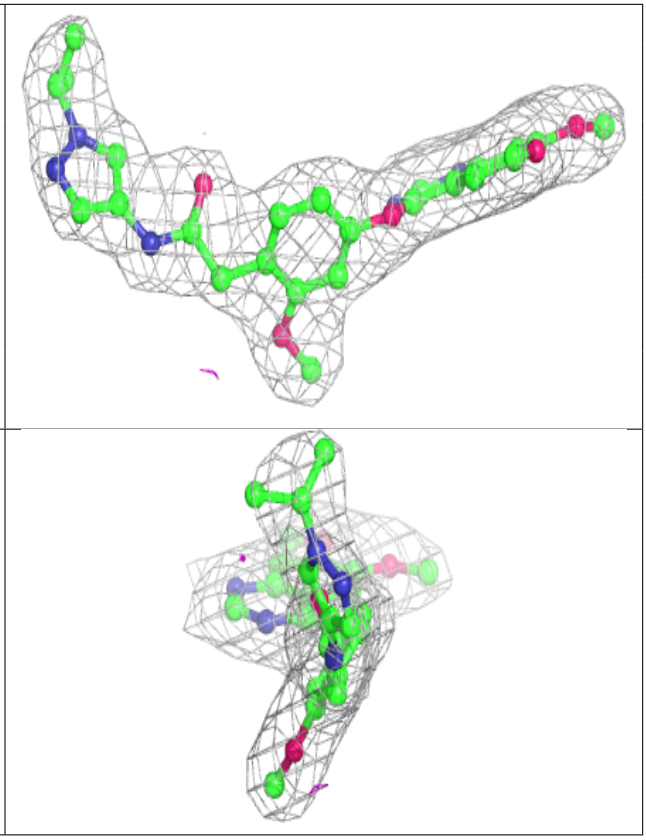
Electron density around F82 B 1001:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative) and green (positive)



Electron density around F82 A 1001:

$2mF_o$-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.