Full wwPDB X-ray Structure Validation Report (i)

Oct 20, 2025 – 02:37 AM JST

PDB ID	:	9UBI / pdb_00009ubi
Title	:	Crystal structure of FERONIA kinase and Ferovicin inhibitor
Authors	:	Sun, M.Z.; Fan, J.P.; Lei, X.G.
Deposited on	:	2025-04-03
Resolution	:	1.90 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 (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 (i)) were used in the production of this report:

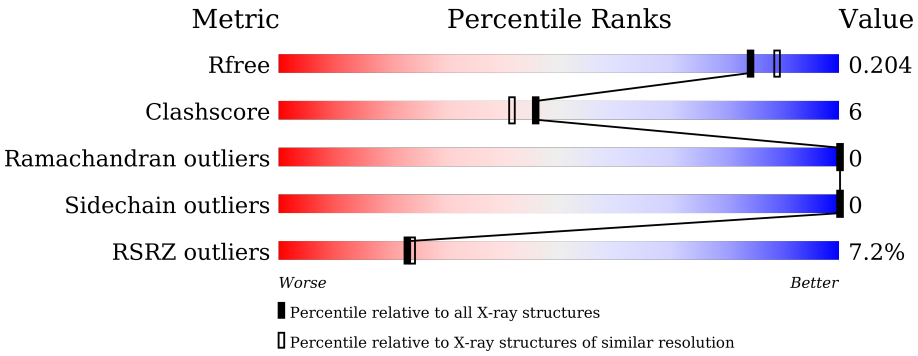
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.46

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 1.90 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}	164625	7293 (1.90-1.90)
Clashscore	180529	8090 (1.90-1.90)
Ramachandran outliers	177936	8022 (1.90-1.90)
Sidechain outliers	177891	8022 (1.90-1.90)
RSRZ outliers	164620	7292 (1.90-1.90)

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	327	8% 78% 9% 13%
1	B	327	4% 76% 10% 14%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 4941 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 Receptor-like protein kinase FERONIA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	B	282	Total	C	N	O	S	0	0	0
			2257	1442	388	411	16			
1	A	286	Total	C	N	O	S	0	0	0
			2269	1447	391	415	16			

There are 48 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	494	MET	-	initiating methionine	UNP Q9SCZ4
B	495	GLY	-	expression tag	UNP Q9SCZ4
B	496	SER	-	expression tag	UNP Q9SCZ4
B	497	SER	-	expression tag	UNP Q9SCZ4
B	498	HIS	-	expression tag	UNP Q9SCZ4
B	499	HIS	-	expression tag	UNP Q9SCZ4
B	500	HIS	-	expression tag	UNP Q9SCZ4
B	501	HIS	-	expression tag	UNP Q9SCZ4
B	502	HIS	-	expression tag	UNP Q9SCZ4
B	503	HIS	-	expression tag	UNP Q9SCZ4
B	504	SER	-	expression tag	UNP Q9SCZ4
B	505	SER	-	expression tag	UNP Q9SCZ4
B	506	GLY	-	expression tag	UNP Q9SCZ4
B	507	LEU	-	expression tag	UNP Q9SCZ4
B	508	GLU	-	expression tag	UNP Q9SCZ4
B	509	VAL	-	expression tag	UNP Q9SCZ4
B	510	LEU	-	expression tag	UNP Q9SCZ4
B	511	PHE	-	expression tag	UNP Q9SCZ4
B	512	GLN	-	expression tag	UNP Q9SCZ4
B	513	GLY	-	expression tag	UNP Q9SCZ4
B	514	PRO	-	expression tag	UNP Q9SCZ4
B	515	GLU	-	expression tag	UNP Q9SCZ4
B	516	ALA	-	expression tag	UNP Q9SCZ4
B	517	SER	-	expression tag	UNP Q9SCZ4
A	494	MET	-	initiating methionine	UNP Q9SCZ4

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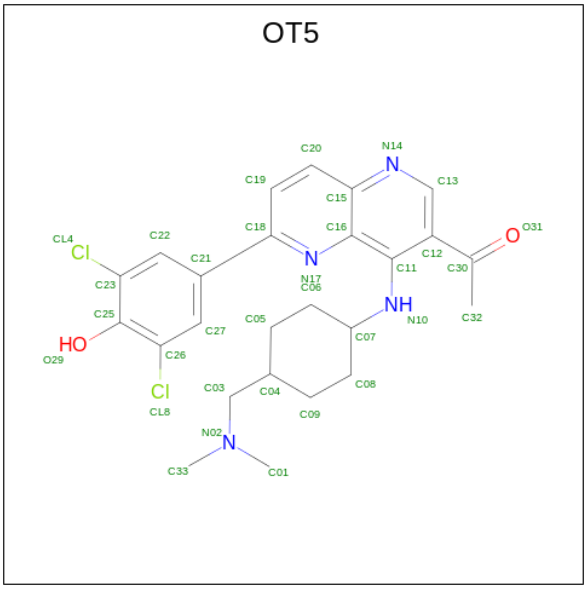
Chain	Residue	Modelled	Actual	Comment	Reference
A	495	GLY	-	expression tag	UNP Q9SCZ4
A	496	SER	-	expression tag	UNP Q9SCZ4
A	497	SER	-	expression tag	UNP Q9SCZ4
A	498	HIS	-	expression tag	UNP Q9SCZ4
A	499	HIS	-	expression tag	UNP Q9SCZ4
A	500	HIS	-	expression tag	UNP Q9SCZ4
A	501	HIS	-	expression tag	UNP Q9SCZ4
A	502	HIS	-	expression tag	UNP Q9SCZ4
A	503	HIS	-	expression tag	UNP Q9SCZ4
A	504	SER	-	expression tag	UNP Q9SCZ4
A	505	SER	-	expression tag	UNP Q9SCZ4
A	506	GLY	-	expression tag	UNP Q9SCZ4
A	507	LEU	-	expression tag	UNP Q9SCZ4
A	508	GLU	-	expression tag	UNP Q9SCZ4
A	509	VAL	-	expression tag	UNP Q9SCZ4
A	510	LEU	-	expression tag	UNP Q9SCZ4
A	511	PHE	-	expression tag	UNP Q9SCZ4
A	512	GLN	-	expression tag	UNP Q9SCZ4
A	513	GLY	-	expression tag	UNP Q9SCZ4
A	514	PRO	-	expression tag	UNP Q9SCZ4
A	515	GLU	-	expression tag	UNP Q9SCZ4
A	516	ALA	-	expression tag	UNP Q9SCZ4
A	517	SER	-	expression tag	UNP Q9SCZ4

- Molecule 2 is 1-[6-(3,5-dichloro-4-hydroxyphenyl)-4-({trans-4-[(dimethylamino)methyl]cyclohexyl}amino)-1,5-naphthyridin-3-yl]ethanone (CCD ID: OT5) (formula: $C_{25}H_{28}Cl_2N_4O_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	B	1	Total	C	Cl	N	O	0	0
			33	25	2	4	2		
2	A	1	Total	C	Cl	N	O	0	0
			33	25	2	4	2		

- Molecule 3 is water.

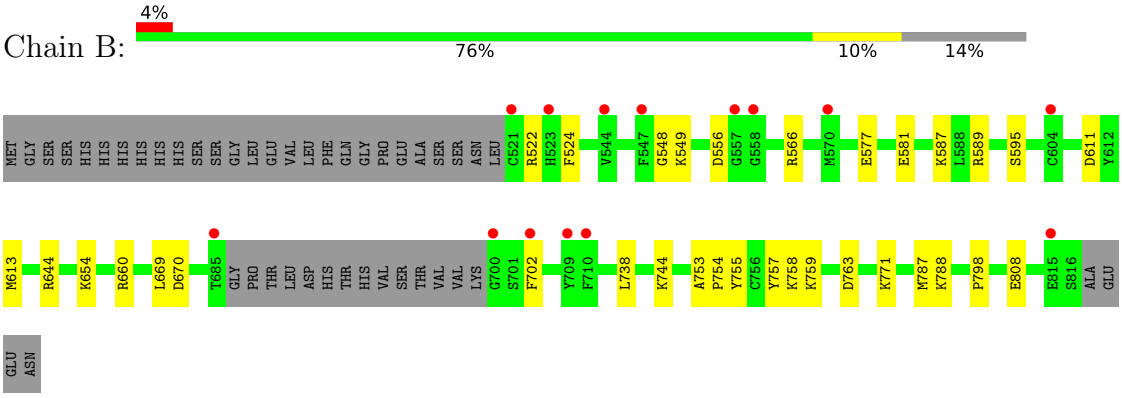
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	189	Total	O	0	0
			189	189		
3	A	160	Total	O	0	0
			160	160		

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.

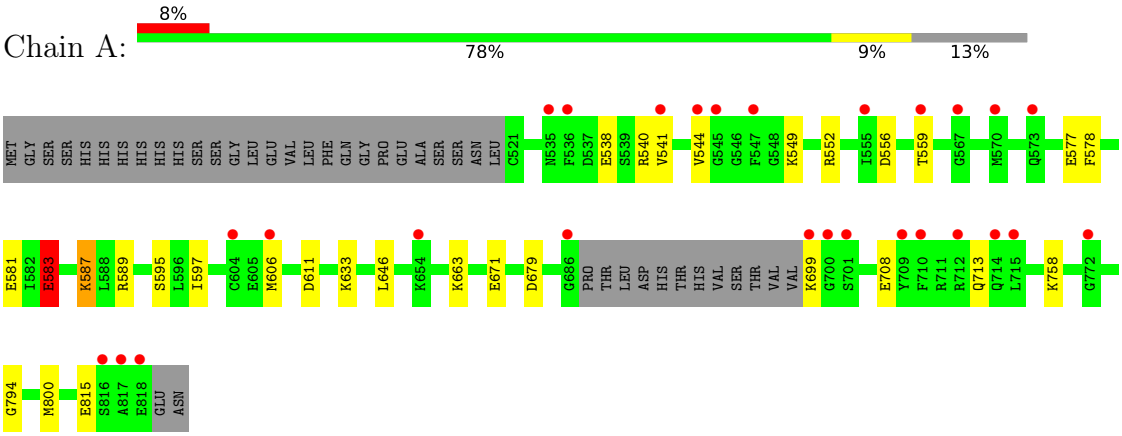
• Molecule 1: Receptor-like protein kinase FERONIA

Chain B:



• Molecule 1: Receptor-like protein kinase FERONIA

Chain A:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	61.79Å 83.11Å 61.99Å 90.00° 93.38° 90.00°	Depositor
Resolution (Å)	49.64 – 1.90 49.64 – 1.90	Depositor EDS
% Data completeness (in resolution range)	98.5 (49.64-1.90) 96.4 (49.64-1.90)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	0.42 (at 1.58Å)	Xtriage
Refinement program	PHENIX 1.19.2_4158	Depositor
R, R_{free}	0.171 , 0.203 0.174 , 0.204	Depositor DCC
R_{free} test set	1983 reflections (2.32%)	wwPDB-VP
Wilson B-factor (Å^2)	22.9	Xtriage
Anisotropy	0.279	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 44.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	0.011 for l,-k,h	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	4941	wwPDB-VP
Average B, all atoms (Å^2)	34.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.43% 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: OT5

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	0.37	0/2320	0.67	4/3127 (0.1%)
1	B	0.35	0/2308	0.65	3/3109 (0.1%)
All	All	0.36	0/4628	0.66	7/6236 (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
1	A	0	1

There are no bond length outliers.

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	583	GLU	CG-CD-OE2	-9.35	96.89	118.40
1	B	660	ARG	CB-CG-CD	6.55	126.37	111.30
1	A	583	GLU	CB-CA-C	-6.40	100.75	110.92
1	B	660	ARG	CA-CB-CG	5.89	125.88	114.10
1	A	583	GLU	CG-CD-OE1	5.64	131.38	118.40
1	B	660	ARG	CG-CD-NE	5.57	124.26	112.00
1	A	587	LYS	CB-CG-CD	-5.50	98.66	111.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	583	GLU	Sidechain

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	2269	0	2237	20	0
1	B	2257	0	2245	24	0
2	A	33	0	28	5	0
2	B	33	0	28	4	0
3	A	160	0	0	4	0
3	B	189	0	0	2	0
All	All	4941	0	4538	52	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 6.

All (52) 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:663:LYS:NZ	1:A:699:LYS:O	2.07	0.86
1:A:671:GLU:OE1	3:A:1001:HOH:O	1.94	0.85
1:B:549:LYS:NZ	3:B:1001:HOH:O	1.87	0.81
1:A:679:ASP:OD2	3:A:1002:HOH:O	2.02	0.76
1:B:548:GLY:HA3	1:B:566:ARG:O	1.89	0.73
1:B:654:LYS:HD3	1:B:654:LYS:H	1.59	0.67
1:B:654:LYS:HD3	1:B:654:LYS:N	2.11	0.64
2:B:901:OT5:C32	2:B:901:OT5:H10	2.15	0.58
1:A:577:GLU:O	1:A:581:GLU:HG3	2.03	0.58
1:B:595:SER:HB2	1:B:611:ASP:OD1	2.03	0.58
1:A:556:ASP:OD2	3:A:1003:HOH:O	2.16	0.57
2:A:901:OT5:N17	2:A:901:OT5:H07	2.19	0.57
1:A:633:LYS:HE2	1:A:815:GLU:HG2	1.85	0.57
2:A:901:OT5:H10	2:A:901:OT5:C32	2.19	0.56
1:A:544:VAL:HG23	1:A:549:LYS:HG2	1.88	0.56
1:B:522:ARG:HD3	1:B:524:PHE:CZ	2.41	0.55
1:A:556:ASP:O	1:A:559:THR:HG22	2.09	0.53
1:B:702:PHE:HB3	1:B:738:LEU:HD22	1.90	0.53
1:B:758:LYS:NZ	3:B:1003:HOH:O	2.39	0.53
1:A:758:LYS:NZ	3:A:1008:HOH:O	2.42	0.53
1:A:708:GLU:HG2	1:A:713:GLN:HG3	1.92	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:901:OT5:H07	2:A:901:OT5:H22	1.92	0.51
1:A:597:ILE:HD11	1:A:611:ASP:OD1	2.10	0.51
1:A:538:GLU:HA	1:A:541:VAL:HG23	1.93	0.50
1:A:540:ARG:HD3	1:A:552:ARG:NH1	2.26	0.50
1:B:613:MET:HE3	1:B:669:LEU:C	2.37	0.49
1:B:754:PRO:HA	1:B:787:MET:SD	2.52	0.49
2:B:901:OT5:H07	2:B:901:OT5:H27	1.95	0.49
1:B:577:GLU:O	1:B:581:GLU:HG3	2.13	0.49
2:A:901:OT5:H10	2:A:901:OT5:H322	1.79	0.48
2:B:901:OT5:H10	2:B:901:OT5:H322	1.78	0.48
1:B:587:LYS:HZ3	1:B:654:LYS:HE2	1.78	0.47
2:B:901:OT5:H07	2:B:901:OT5:N17	2.29	0.47
2:A:901:OT5:N17	2:A:901:OT5:C07	2.77	0.47
1:B:522:ARG:NH2	1:B:556:ASP:OD2	2.49	0.46
1:B:763:ASP:O	1:B:771:LYS:HE2	2.16	0.46
1:B:644:ARG:NH2	1:B:808:GLU:OE2	2.37	0.44
1:B:589:ARG:HG2	1:A:589:ARG:HG3	2.00	0.44
1:B:757:TYR:HD2	1:B:787:MET:HE2	1.82	0.43
1:A:646:LEU:HB2	1:A:800:MET:HE2	2.00	0.43
1:A:595:SER:HB2	1:A:611:ASP:OD2	2.18	0.43
1:B:654:LYS:H	1:B:654:LYS:CD	2.26	0.43
1:A:556:ASP:HB2	1:A:559:THR:HG22	2.01	0.42
1:A:578:PHE:CD1	1:A:606:MET:HG2	2.54	0.42
1:A:583:GLU:O	1:A:587:LYS:NZ	2.49	0.42
1:B:613:MET:HE3	1:B:670:ASP:N	2.35	0.42
1:B:755:TYR:CZ	1:B:759:LYS:HD2	2.54	0.42
1:A:708:GLU:OE1	1:A:794:GLY:N	2.40	0.42
1:B:744:LYS:HB3	1:B:744:LYS:HE2	1.72	0.42
1:B:702:PHE:HB3	1:B:738:LEU:CD2	2.50	0.41
1:B:788:LYS:HB3	1:B:798:PRO:HD3	2.03	0.40
1:B:753:ALA:HB3	1:B:754:PRO:HD3	2.03	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	282/327 (86%)	276 (98%)	6 (2%)	0	100	100
1	B	278/327 (85%)	275 (99%)	3 (1%)	0	100	100
All	All	560/654 (86%)	551 (98%)	9 (2%)	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 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	240/281 (85%)	240 (100%)	0	100	100
1	B	242/281 (86%)	242 (100%)	0	100	100
All	All	482/562 (86%)	482 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	634	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 oligosaccharides 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	OT5	B	901	-	36,36,36	1.44	7 (19%)	45,52,52	1.62	6 (13%)
2	OT5	A	901	-	36,36,36	1.47	6 (16%)	45,52,52	1.56	10 (22%)

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	OT5	B	901	-	-	10/16/26/26	0/4/4/4
2	OT5	A	901	-	-	10/16/26/26	0/4/4/4

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	901	OT5	C11-C16	-3.44	1.37	1.43
2	A	901	OT5	C20-C15	-3.35	1.36	1.41
2	B	901	OT5	C20-C15	-3.28	1.36	1.41
2	A	901	OT5	C16-C15	-3.23	1.38	1.42
2	B	901	OT5	C11-C16	-3.07	1.37	1.43
2	B	901	OT5	C13-N14	2.84	1.36	1.31
2	B	901	OT5	C12-C30	2.82	1.54	1.48
2	A	901	OT5	C12-C30	2.72	1.54	1.48
2	B	901	OT5	C16-C15	-2.48	1.39	1.42
2	A	901	OT5	C12-C11	-2.46	1.37	1.41

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	901	OT5	C26-CL8	2.40	1.79	1.73
2	A	901	OT5	C13-N14	2.31	1.35	1.31
2	B	901	OT5	C12-C11	-2.20	1.38	1.41

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	901	OT5	C16-C11-N10	4.61	125.04	117.07
2	B	901	OT5	C32-C30-C12	4.21	126.15	119.91
2	A	901	OT5	C16-C11-N10	3.79	123.61	117.07
2	A	901	OT5	C32-C30-C12	3.60	125.24	119.91
2	B	901	OT5	C19-C20-C15	-3.01	117.05	120.84
2	A	901	OT5	C20-C15-C16	2.91	122.63	119.40
2	B	901	OT5	C20-C15-C16	2.90	122.61	119.40
2	A	901	OT5	C21-C27-C26	-2.73	117.63	120.35
2	A	901	OT5	O31-C30-C12	-2.70	117.00	120.56
2	B	901	OT5	C27-C21-C18	-2.65	116.75	120.59
2	A	901	OT5	C22-C21-C18	-2.62	116.80	120.59
2	B	901	OT5	O31-C30-C12	-2.58	117.16	120.56
2	A	901	OT5	C19-C20-C15	-2.28	117.97	120.84
2	A	901	OT5	C27-C26-CL8	2.27	122.15	118.49
2	A	901	OT5	C27-C21-C22	2.12	121.44	118.31
2	A	901	OT5	C12-C13-N14	-2.02	122.40	125.14

There are no chirality outliers.

All (20) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	901	OT5	N02-C03-C04-C05
2	B	901	OT5	N02-C03-C04-C09
2	B	901	OT5	C13-C12-C30-O31
2	B	901	OT5	C13-C12-C30-C32
2	A	901	OT5	N02-C03-C04-C05
2	A	901	OT5	N02-C03-C04-C09
2	A	901	OT5	C13-C12-C30-O31
2	A	901	OT5	C13-C12-C30-C32
2	A	901	OT5	C12-C11-N10-C07
2	B	901	OT5	C11-C12-C30-O31
2	B	901	OT5	C11-C12-C30-C32
2	A	901	OT5	C11-C12-C30-O31
2	A	901	OT5	C11-C12-C30-C32
2	B	901	OT5	C04-C03-N02-C01

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Mol	Chain	Res	Type	Atoms
2	B	901	OT5	C04-C03-N02-C33
2	A	901	OT5	C04-C03-N02-C01
2	A	901	OT5	C04-C03-N02-C33
2	B	901	OT5	C16-C11-N10-C07
2	A	901	OT5	C16-C11-N10-C07
2	B	901	OT5	C12-C11-N10-C07

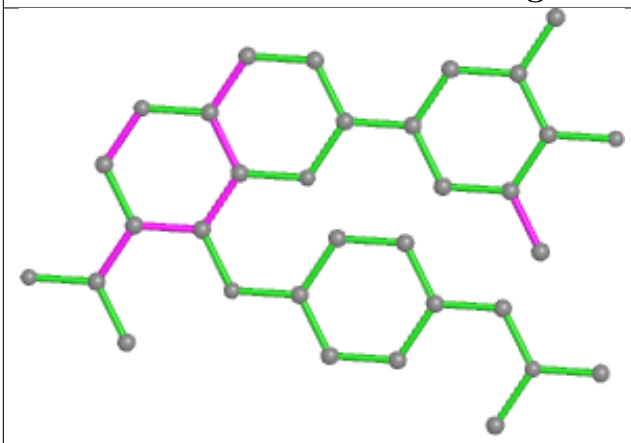
There are no ring outliers.

2 monomers are involved in 9 short contacts:

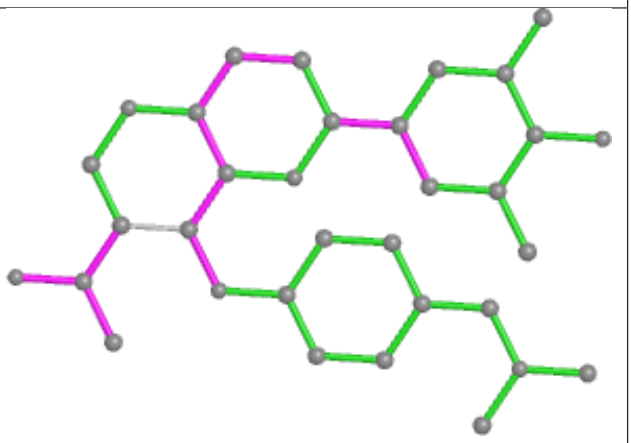
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	901	OT5	4	0
2	A	901	OT5	5	0

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.

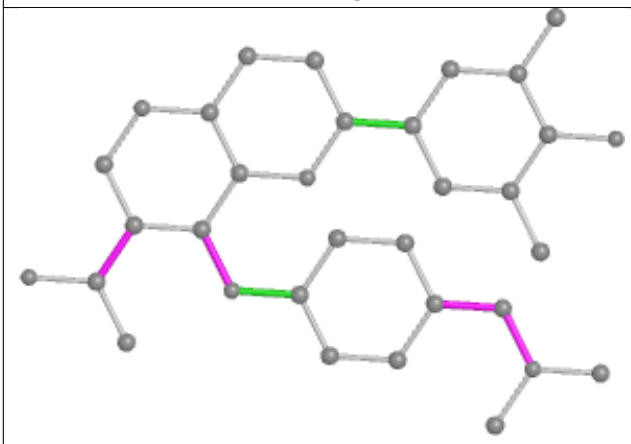
Ligand OT5 B 901



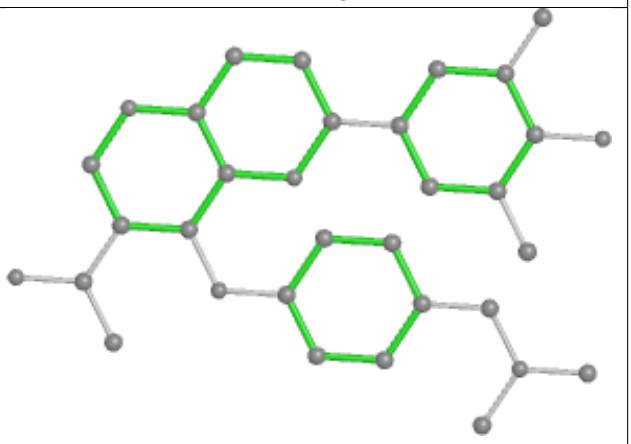
Bond lengths



Bond angles

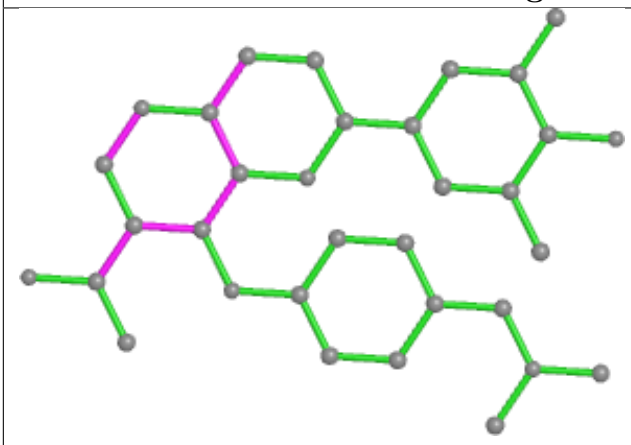


Torsions

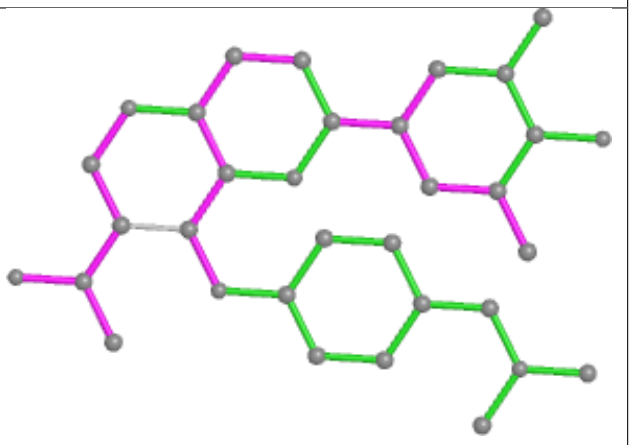


Rings

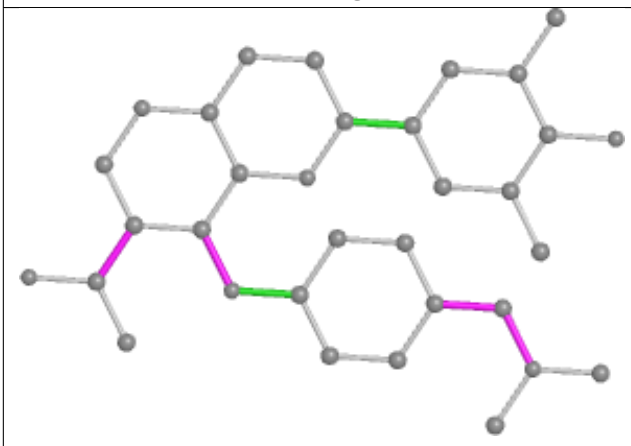
Ligand OT5 A 901



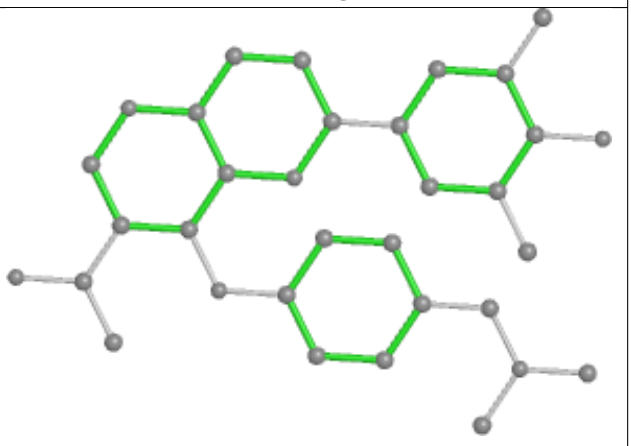
Bond lengths



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	286/327 (87%)	0.37	27 (9%)	15	16	16, 31, 67, 79	0
1	B	282/327 (86%)	0.19	14 (4%)	35	36	16, 29, 56, 74	0
All	All	568/654 (86%)	0.28	41 (7%)	23	24	16, 30, 62, 79	0

All (41) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	715	LEU	3.6
1	A	700	GLY	3.5
1	A	818	GLU	3.5
1	B	557	GLY	3.5
1	B	544	VAL	3.4
1	A	535	ASN	3.1
1	A	686	GLY	3.1
1	B	685	THR	3.0
1	A	817	ALA	2.8
1	A	544	VAL	2.8
1	A	604	CYS	2.8
1	A	559	THR	2.7
1	B	570	MET	2.7
1	A	536	PHE	2.6
1	B	558	GLY	2.6
1	A	709	TYR	2.6
1	B	547	PHE	2.6
1	A	547	PHE	2.5
1	B	709	TYR	2.5
1	A	699	LYS	2.5
1	B	521	CYS	2.5
1	B	604	CYS	2.4
1	A	570	MET	2.4
1	A	606	MET	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	702	PHE	2.3
1	A	545	GLY	2.3
1	A	701	SER	2.3
1	A	555	ILE	2.2
1	A	772	GLY	2.2
1	B	523	HIS	2.2
1	A	710	PHE	2.2
1	A	567	GLY	2.2
1	B	710	PHE	2.2
1	A	714	GLN	2.2
1	A	816	SER	2.1
1	B	700	GLY	2.1
1	B	815	GLU	2.1
1	A	654	LYS	2.1
1	A	541	VAL	2.1
1	A	573	GLN	2.1
1	A	712	ARG	2.1

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)

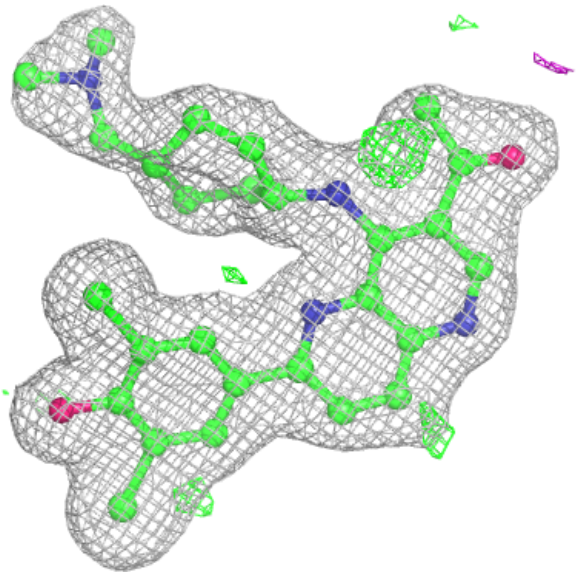
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

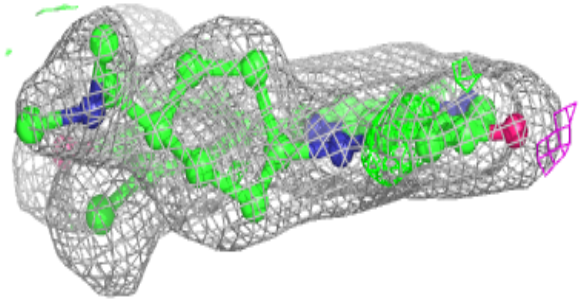
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	OT5	B	901	33/33	0.95	0.09	20,28,49,51	0
2	OT5	A	901	33/33	0.95	0.08	21,31,51,55	0

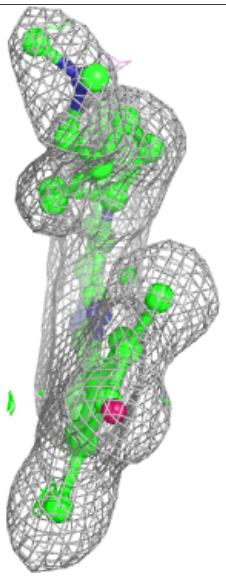
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around OT5 B 901:

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

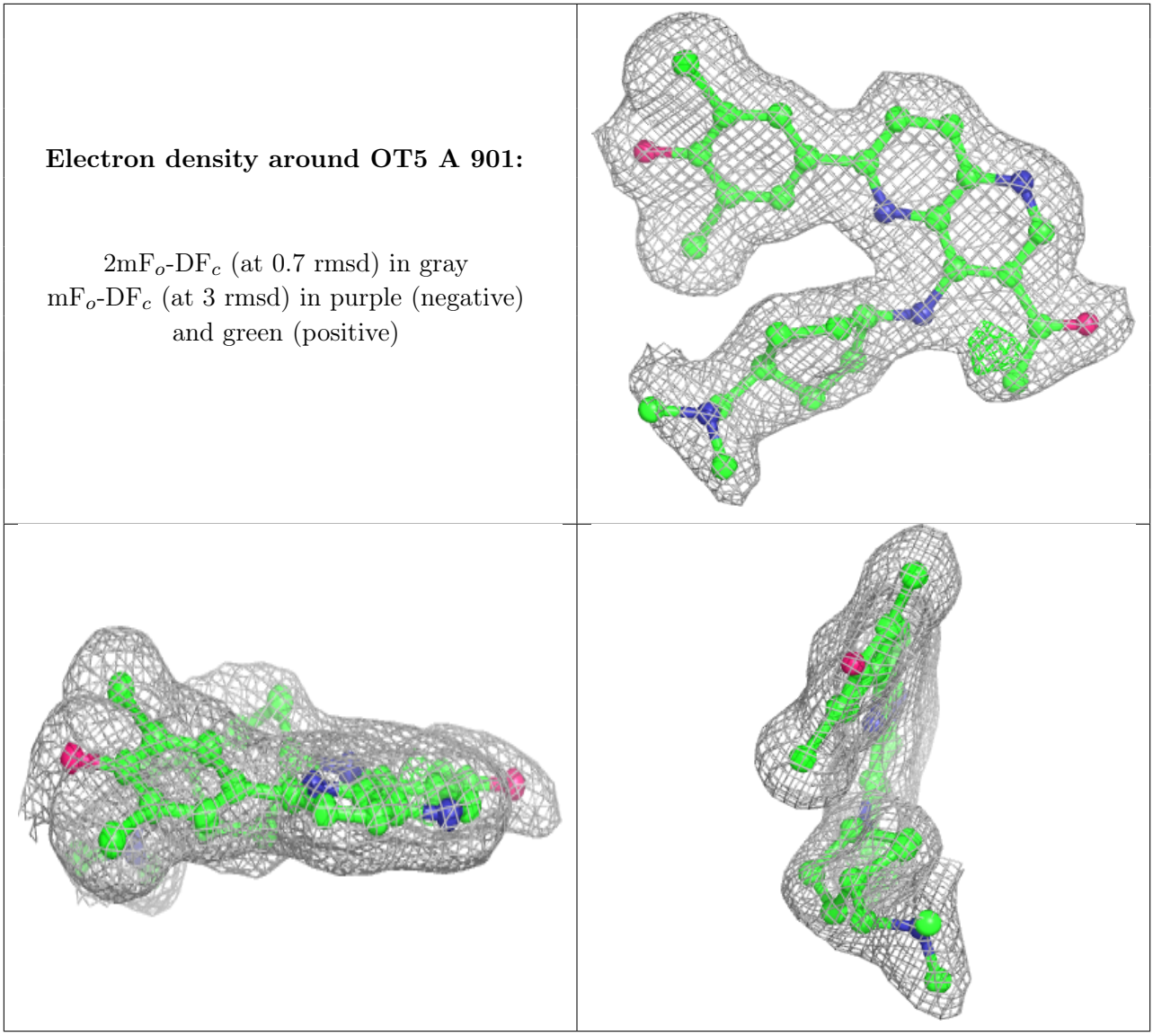






Electron density around OT5 A 901:

$2mF_o$-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.