Full wwPDB X-ray Structure Validation Report ⓘ

Feb 6, 2025 – 04:08 PM EST

PDB ID	:	9BLV
Title	:	Proteus vulgaris tryptophan indole-lyase complexed with L-Trp and benzimidazole
Authors	:	Phillips, R.S.
Deposited on	:	2024-05-01
Resolution	:	1.78 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:

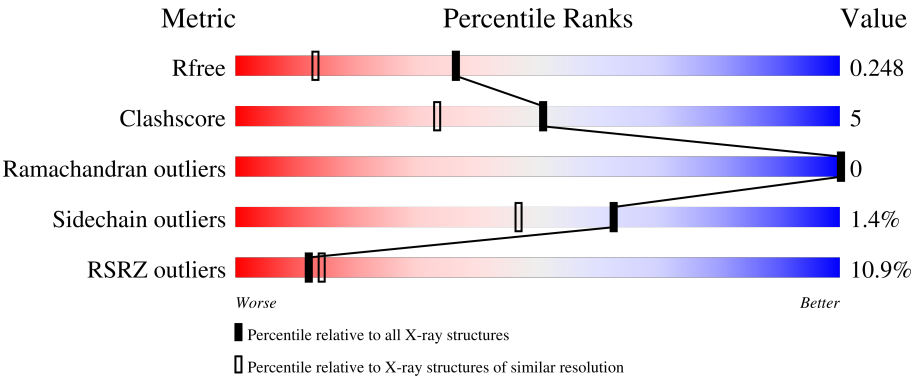
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.21
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.004 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.40

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 1.78 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	1191 (1.78-1.78)
Clashscore	180529	1282 (1.78-1.78)
Ramachandran outliers	177936	1270 (1.78-1.78)
Sidechain outliers	177891	1270 (1.78-1.78)
RSRZ outliers	164620	1191 (1.78-1.78)

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	467	7% 87% 11%
1	B	467	9% 85% 14%
1	C	467	12% 84% 13%
1	D	467	15% 82% 15%

2 Entry composition (i)

There are 8 unique types of molecules in this entry. The entry contains 15824 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.

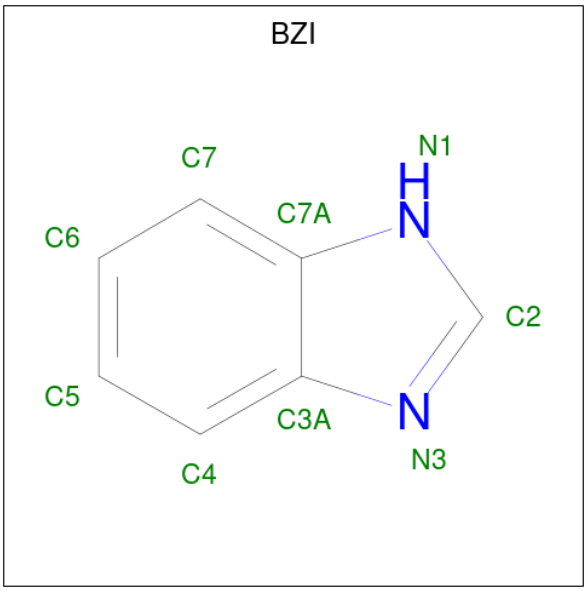
- Molecule 1 is a protein called Tryptophanase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	458	Total	C	N	O	S	0	5	0
			3666	2347	625	676	18			
1	B	465	Total	C	N	O	S	0	6	0
			3728	2385	632	693	18			
1	C	458	Total	C	N	O	S	0	7	0
			3683	2360	626	679	18			
1	D	458	Total	C	N	O	S	0	7	0
			3681	2358	626	677	20			

- Molecule 2 is POTASSIUM ION (three-letter code: K) (formula: K).

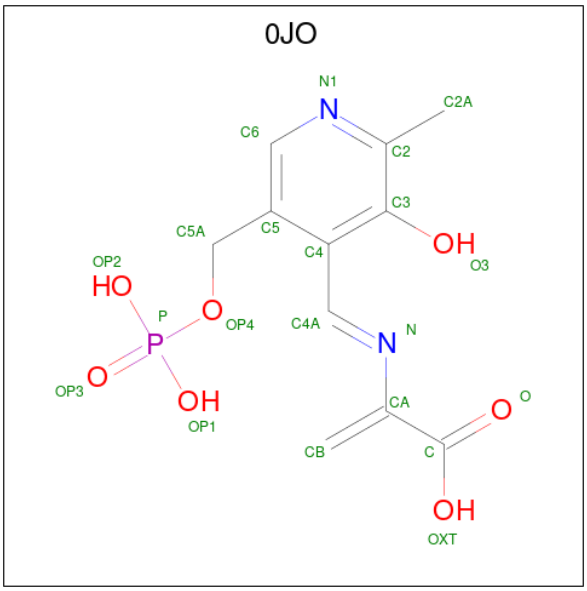
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	2	Total	K	0	0
			2	2		
2	C	2	Total	K	0	0
			2	2		

- Molecule 3 is BENZIMIDAZOLE (three-letter code: BZI) (formula: $C_7H_6N_2$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C N 9 7 2	0	0
3	D	1	Total C N 9 7 2	0	0

- Molecule 4 is 2-{[(E)-{3-hydroxy-2-methyl-5-[(phosphonooxy)methyl]pyridin-4-yl}methylidene]amino}prop-2-enoic acid (three-letter code: 0JO) (formula: $C_{11}H_{13}N_2O_7P$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C N O P 21 11 2 7 1	0	0

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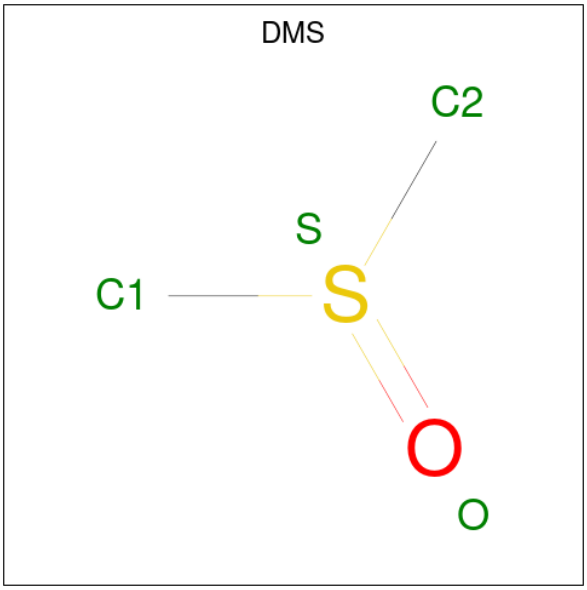
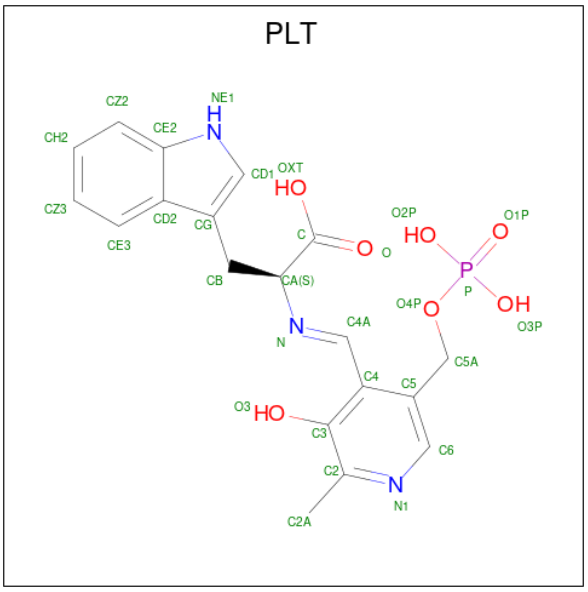
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	D	1	Total	C	N	O	P	0	0
			21	11	2	7	1		

- Molecule 5 is DIMETHYL SULFOXIDE (three-letter code: DMS) (formula: C_2H_6OS).



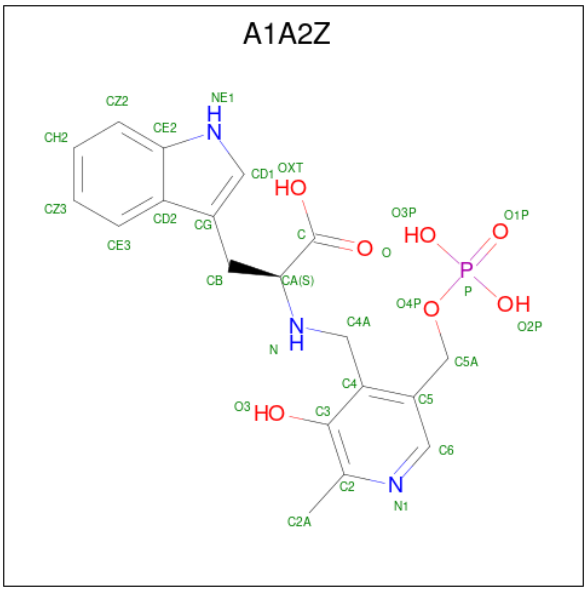
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total	C	O	S	0	0
			4	2	1	1		
5	B	1	Total	C	O	S	0	0
			4	2	1	1		

- Molecule 6 is [3-HYDROXY-2-METHYL-5-PHOSPHONOOXYMETHYL-PYRIDIN-4-YL METHYL]-L-TRYPTOPHANE (three-letter code: PLT) (formula: $C_{19}H_{20}N_3O_7P$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
6	B	1	30	19	3	7	1	0	0

- Molecule 7 is N-({3-hydroxy-2-methyl-5-[(phosphonooxy)methyl]pyridin-4-yl}methyl)-L-tryptophan (three-letter code: A1A2Z) (formula: $C_{19}H_{22}N_3O_7P$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
7	C	1	30	19	3	7	1	0	0

- Molecule 8 is water.

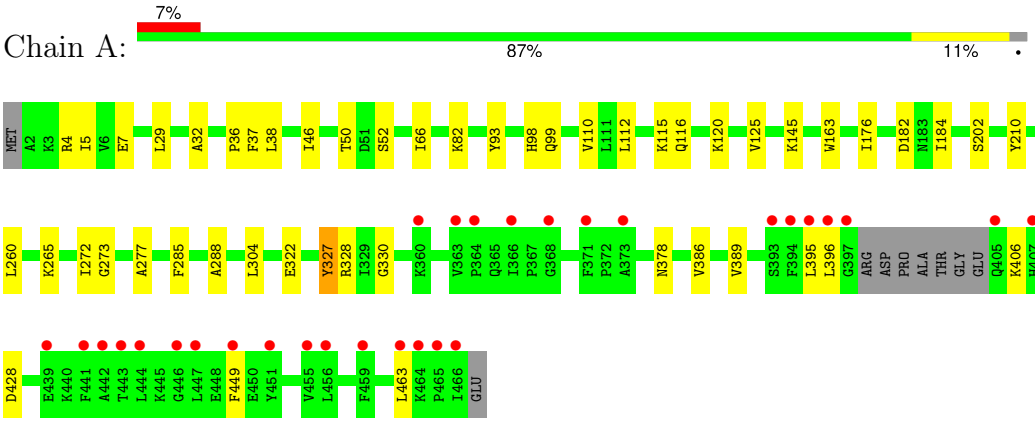
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	212	Total O 212 212	0	1
8	B	227	Total O 227 227	0	3
8	C	261	Total O 261 261	0	7
8	D	234	Total O 234 234	0	4

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.

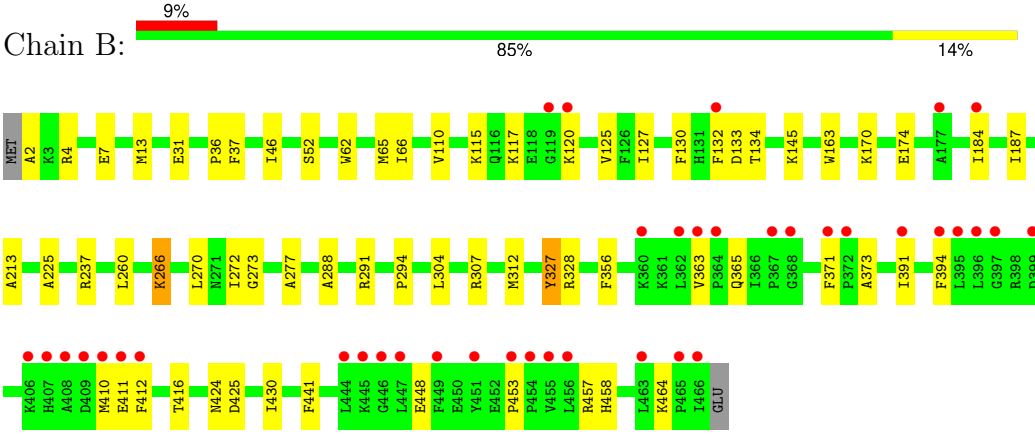
• Molecule 1: Tryptophanase

Chain A:



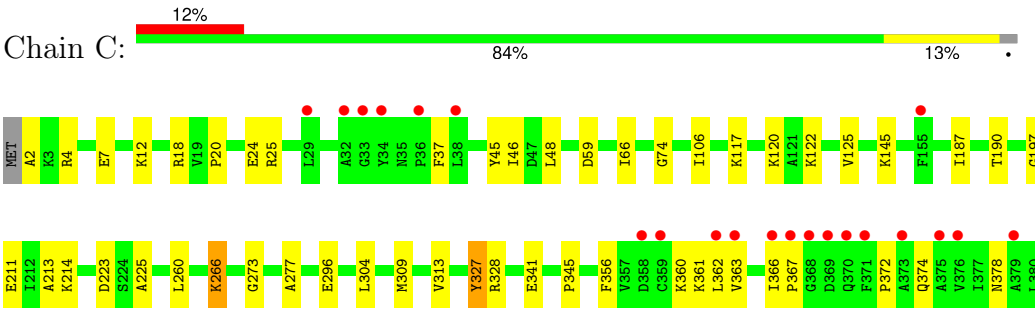
• Molecule 1: Tryptophanase

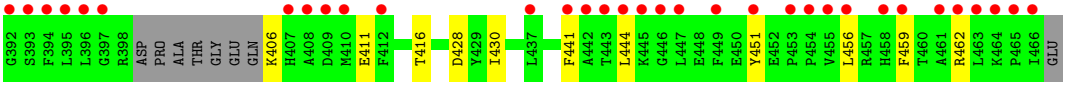
Chain B:



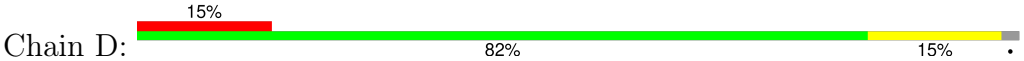
• Molecule 1: Tryptophanase

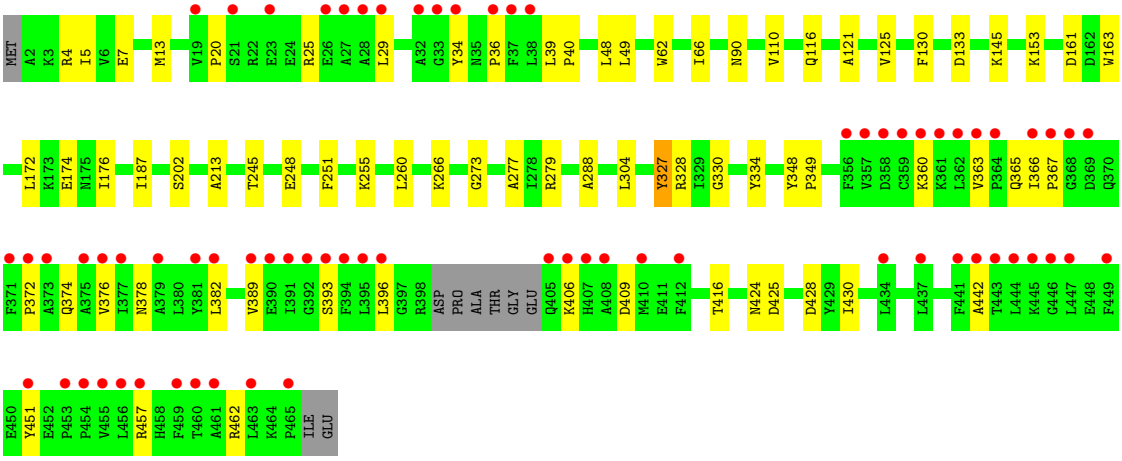
Chain C:





• Molecule 1: Tryptophanase





4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	113.52Å 109.96Å 144.98Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	56.76 – 1.78 56.76 – 1.78	Depositor EDS
% Data completeness (in resolution range)	54.3 (56.76-1.78) 54.7 (56.76-1.78)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.28 (at 1.77Å)	Xtriage
Refinement program	PHENIX 1.21.1_5286	Depositor
R, R_{free}	0.198 , 0.247 0.198 , 0.248	Depositor DCC
R_{free} test set	8677 reflections (5.11%)	wwPDB-VP
Wilson B-factor (Å^2)	19.9	Xtriage
Anisotropy	0.076	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 44.0	EDS
L-test for twinning[2]	$< \|L\| > = 0.47$, $< L^2 > = 0.30$	Xtriage
Estimated twinning fraction	0.000 for k,h,-l	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	15824	wwPDB-VP
Average B, all atoms (Å^2)	33.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 44.05 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.6130e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[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: DMS, 0JO, K, PLT, A1A2Z, BZI

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	0.33	0/3759	0.53	0/5072
1	B	0.31	0/3818	0.52	0/5156
1	C	0.31	0/3777	0.53	0/5097
1	D	0.32	0/3778	0.54	0/5096
All	All	0.32	0/15132	0.53	0/20421

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	3666	0	3661	28	0
1	B	3728	0	3706	45	0
1	C	3683	0	3672	38	0
1	D	3681	0	3677	45	0
2	A	2	0	0	0	0
2	C	2	0	0	0	0
3	A	9	0	6	3	0
3	D	9	0	6	1	0
4	A	21	0	10	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	D	21	0	10	1	0
5	A	4	0	6	0	0
5	B	4	0	6	0	0
6	B	30	0	17	3	0
7	C	30	0	0	0	0
8	A	212	0	0	2	0
8	B	227	0	0	4	0
8	C	261	0	0	3	0
8	D	234	0	0	2	0
All	All	15824	0	14777	150	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 (150) 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:C:273:GLY:HA2	1:C:304:LEU:HD21	1.70	0.72
1:C:360:LYS:HB2	8:C:602[B]:HOH:O	1.90	0.69
1:B:62:TRP:CD1	1:D:13:MET:HE2	2.27	0.69
1:B:273:GLY:HA2	1:B:304:LEU:HD21	1.75	0.69
1:D:360:LYS:HD2	1:D:376:VAL:HG21	1.76	0.68
1:C:20:PRO:O	1:C:25:ARG:NH1	2.27	0.67
1:D:273:GLY:HA2	1:D:304:LEU:HD21	1.76	0.67
1:A:395:LEU:HD11	3:A:503:BZI:H7	1.76	0.67
1:D:374:GLN:NE2	1:D:378:ASN:OD1	2.26	0.64
1:D:187:ILE:HD12	1:D:213:ALA:HB2	1.81	0.63
1:C:117:LYS:O	1:C:120:LYS:NZ	2.32	0.62
1:A:125:VAL:HG12	1:A:145:LYS:HB3	1.82	0.61
1:D:20:PRO:O	1:D:25:ARG:NH1	2.32	0.61
1:C:207:LYS:NZ	1:C:211:GLU:OE2	2.32	0.61
1:C:360:LYS:HD2	8:C:602[B]:HOH:O	2.01	0.61
1:D:365:GLN:NE2	1:D:442:ALA:O	2.34	0.60
1:D:279:ARG:NH1	8:D:604:HOH:O	2.36	0.59
1:C:345:PRO:HG3	1:C:361:LYS:HD3	1.85	0.58
1:D:396:LEU:HG	1:D:406:LYS:HB3	1.86	0.58
1:C:260:LEU:HG	1:C:277:ALA:HB3	1.85	0.58
1:C:360:LYS:HE3	1:C:411:GLU:HG2	1.85	0.58
1:C:106:ILE:HD11	1:C:296:GLU:HG3	1.86	0.57
1:C:48:LEU:HD11	1:C:430:ILE:HD13	1.86	0.56
1:C:125:VAL:HG12	1:C:145:LYS:HB3	1.88	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:245:THR:N	1:D:248:GLU:OE1	2.29	0.56
1:B:424:ASN:ND2	1:D:425:ASP:OD2	2.39	0.54
1:B:170:LYS:NZ	1:B:174:GLU:OE2	2.39	0.54
1:C:4[B]:ARG:NH2	1:C:428:ASP:OD2	2.39	0.54
1:B:115:LYS:NZ	1:B:184[A]:ILE:O	2.40	0.54
1:B:448:GLU:O	1:B:464:LYS:N	2.38	0.54
1:C:225:ALA:HB1	1:C:266:LYS:HD3	1.90	0.54
1:D:110:VAL:HG21	1:D:288:ALA:HA	1.90	0.53
1:B:373:ALA:HB2	1:B:411:GLU:HG3	1.91	0.53
1:B:4[A]:ARG:NH2	1:B:425:ASP:OD1	2.42	0.53
1:A:82:LYS:NZ	8:A:606:HOH:O	2.40	0.53
1:D:49:LEU:HD12	1:D:389:VAL:HB	1.92	0.52
1:C:363:VAL:HG11	1:C:444:LEU:HD11	1.91	0.52
1:B:125:VAL:HG12	1:B:145:LYS:HB3	1.92	0.52
1:C:7:GLU:HG3	1:C:327[B]:TYR:CZ	2.45	0.52
1:A:210:TYR:CE1	1:A:214:LYS:HE3	2.45	0.51
1:B:365:GLN:NE2	1:B:441:PHE:O	2.43	0.51
1:D:116:GLN:HG2	1:D:121:ALA:HB3	1.93	0.51
1:D:7:GLU:HG3	1:D:327[B]:TYR:CZ	2.46	0.51
1:A:396:LEU:HG	1:A:406:LYS:HD2	1.93	0.50
1:A:120:LYS:HD2	1:A:182:ASP:HB3	1.93	0.50
1:D:4[B]:ARG:NH2	1:D:425:ASP:OD1	2.38	0.50
1:C:406:LYS:N	8:C:623:HOH:O	2.44	0.50
1:C:187:ILE:HD12	1:C:213:ALA:HB2	1.93	0.50
1:B:291:ARG:O	1:B:294:PRO:HD2	2.12	0.49
1:B:453:PRO:HG2	1:B:457:ARG:HA	1.94	0.49
1:D:266:LYS:HZ1	4:D:502:0JO:C4A	2.26	0.49
1:B:457:ARG:HG2	8:B:765:HOH:O	2.12	0.49
1:A:176:ILE:HA	1:A:184:ILE:HD11	1.94	0.49
1:B:7:GLU:HG3	1:B:327[B]:TYR:CZ	2.47	0.49
1:D:174:GLU:OE2	8:D:601:HOH:O	2.20	0.48
1:A:112:LEU:O	1:A:116:GLN:HG2	2.14	0.48
1:B:187:ILE:HD12	1:B:213:ALA:HB2	1.94	0.48
1:B:197:GLY:HA2	1:B:356:PHE:CE1	2.49	0.48
1:B:448:GLU:N	1:B:464:LYS:O	2.41	0.48
1:D:363:VAL:HG11	1:D:366:ILE:HD12	1.95	0.48
1:C:122:LYS:HD3	1:C:122:LYS:HA	1.58	0.48
1:B:115:LYS:NZ	1:B:184[B]:ILE:O	2.47	0.47
1:A:110:VAL:HG21	1:A:288:ALA:HA	1.95	0.47
1:A:449:PHE:HA	1:A:463:LEU:HD23	1.96	0.47
1:A:36:PRO:HG2	8:A:630:HOH:O	2.12	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:273:GLY:HA2	1:A:304:LEU:HD21	1.96	0.47
1:D:409:ASP:N	1:D:409:ASP:OD1	2.46	0.47
1:D:360:LYS:HD3	1:D:360:LYS:HA	1.63	0.47
1:A:389:VAL:HG21	3:A:503:BZI:H5	1.97	0.47
1:C:18:ARG:NH2	1:C:24:GLU:OE1	2.48	0.47
1:B:117:LYS:O	1:B:120:LYS:NZ	2.41	0.47
1:C:374:GLN:NE2	1:C:378:ASN:OD1	2.46	0.47
1:B:62:TRP:O	1:B:66:ILE:HG12	2.15	0.47
1:B:425:ASP:OD2	1:D:424:ASN:ND2	2.39	0.47
1:D:260:LEU:HG	1:D:277:ALA:HB3	1.97	0.47
1:D:25:ARG:NH2	1:D:382:LEU:O	2.41	0.46
1:A:7:GLU:HG3	1:A:327[B]:TYR:CZ	2.51	0.46
1:A:265:LYS:HD2	1:A:272:ILE:HA	1.98	0.46
1:D:393:SER:O	1:D:457:ARG:NH2	2.45	0.46
1:C:362:LEU:O	1:C:441:PHE:HB3	2.16	0.46
1:C:367:PRO:O	1:C:372:PRO:HD3	2.16	0.46
1:C:451:TYR:HB3	1:C:462:ARG:HB2	1.98	0.46
1:C:197:GLY:HA2	1:C:356:PHE:CE1	2.51	0.46
1:D:90:ASN:HB2	1:D:251:PHE:CE1	2.51	0.45
1:B:66:ILE:O	1:C:12:LYS:HE2	2.16	0.45
1:B:391:ILE:HB	1:B:412:PHE:HB2	1.99	0.45
1:D:133[B]:ASP:CG	3:D:501:BZI:HN1	2.20	0.45
1:D:153:LYS:HD2	1:D:161:ASP:CG	2.38	0.45
1:B:65:MET:HE2	1:B:307:ARG:HD2	1.99	0.45
1:B:66:ILE:HG13	1:C:66:ILE:CD1	2.46	0.44
1:D:29:LEU:HD11	1:D:34:TYR:HA	1.98	0.44
1:C:2:ALA:N	1:C:341:GLU:OE2	2.50	0.44
1:C:309:MET:O	1:C:313:VAL:HG23	2.18	0.44
1:D:4[B]:ARG:NH2	1:D:428:ASP:OD2	2.38	0.44
1:D:367:PRO:O	1:D:372:PRO:HD3	2.18	0.44
3:A:503:BZI:N3	4:A:504:0JO:H2	2.32	0.44
1:B:260:LEU:HG	1:B:277:ALA:HB3	1.99	0.44
1:D:36:PRO:HA	1:D:39:LEU:HD12	1.99	0.44
1:D:4[B]:ARG:HG3	1:D:334:TYR:CE1	2.53	0.43
1:C:74:GLY:HA3	1:D:40:PRO:HA	2.00	0.43
1:C:190:THR:HA	1:C:223:ASP:HB3	1.99	0.43
1:A:5:ILE:HD12	1:A:330:GLY:HA3	2.00	0.43
1:A:98:HIS:CD2	1:A:99:GLN:HG2	2.53	0.43
1:B:66:ILE:HG13	1:C:66:ILE:HD12	2.00	0.43
1:C:45:TYR:CD2	1:C:46:ILE:HG13	2.53	0.43
1:D:163:TRP:CD2	1:D:202:SER:HB3	2.52	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:4[A]:ARG:NH2	1:A:428:ASP:OD2	2.46	0.43
1:A:66:ILE:CD1	1:D:66:ILE:HG13	2.49	0.43
1:D:125:VAL:HG12	1:D:145:LYS:HB2	2.00	0.43
1:B:110:VAL:HG21	1:B:288:ALA:HA	2.00	0.43
1:B:127:ILE:O	1:B:187:ILE:HA	2.18	0.43
1:C:456:LEU:HD23	1:C:459:PHE:HE2	1.84	0.43
1:A:46:ILE:HB	1:A:386:VAL:HG22	2.01	0.43
1:D:5:ILE:HD12	1:D:330:GLY:HA3	2.00	0.43
1:A:29:LEU:HD21	1:A:378:ASN:HB3	2.01	0.42
4:A:504:0JO:H3	4:A:504:0JO:H4	1.70	0.42
1:B:36:PRO:HG2	8:B:655:HOH:O	2.18	0.42
1:B:31:GLU:HG3	8:B:758:HOH:O	2.19	0.42
1:A:93:TYR:HB3	1:A:285:PHE:CD1	2.54	0.42
1:B:13:MET:HE2	1:D:62:TRP:CD1	2.53	0.42
1:B:133[A]:ASP:OD1	1:B:134:THR:N	2.53	0.42
1:B:410:MET:HG3	1:B:411:GLU:H	1.85	0.42
1:C:210:TYR:CZ	1:C:214:LYS:HE2	2.55	0.42
1:B:52:SER:HB2	6:B:502:PLT:HA	2.02	0.42
1:B:270:LEU:HD11	1:B:312:MET:HA	2.02	0.42
1:A:163:TRP:CD2	1:A:202:SER:HB3	2.55	0.41
1:B:266:LYS:HE2	6:B:502:PLT:HA	2.02	0.41
1:C:59:ASP:N	1:C:59:ASP:OD1	2.53	0.41
1:A:50:THR:HG23	1:A:52:SER:H	1.85	0.41
1:A:115:LYS:HE3	1:A:120:LYS:HZ1	1.86	0.41
1:B:225:ALA:HB1	1:B:266:LYS:HZ2	1.85	0.41
1:B:163:TRP:CH2	1:B:237:ARG:HB2	2.54	0.41
1:C:366:ILE:HB	1:C:372:PRO:HB3	2.02	0.41
1:A:235:LYS:HE2	1:A:322:GLU:OE1	2.21	0.41
6:B:502:PLT:O	6:B:502:PLT:HE3	2.21	0.41
1:A:260:LEU:HG	1:A:277:ALA:HB3	2.03	0.41
1:D:172:LEU:O	1:D:176:ILE:HG13	2.21	0.41
1:D:255:LYS:O	1:D:279:ARG:NH2	2.50	0.41
1:B:371:PHE:HE1	1:B:457:ARG:NH2	2.19	0.41
1:B:2:ALA:N	8:B:636:HOH:O	2.54	0.41
1:B:46:ILE:HG21	1:B:430:ILE:HD11	2.02	0.41
1:B:394:PHE:CE2	1:B:458:HIS:HA	2.56	0.41
1:B:272:ILE:HD12	1:B:272:ILE:HA	1.89	0.40
1:D:48:LEU:HD11	1:D:430:ILE:HD13	2.02	0.40
1:B:132[B]:PHE:CG	1:B:133[B]:ASP:N	2.89	0.40
1:D:348:TYR:CD1	1:D:349:PRO:HA	2.56	0.40
1:A:32:ALA:HB1	1:A:38:LEU:HB2	2.04	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:210:TYR:CE1	1:C:214:LYS:HE2	2.57	0.40
1:D:451:TYR:HB3	1:D:462:ARG:HB2	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	459/467 (98%)	443 (96%)	16 (4%)	0	100	100
1	B	469/467 (100%)	453 (97%)	16 (3%)	0	100	100
1	C	461/467 (99%)	445 (96%)	16 (4%)	0	100	100
1	D	461/467 (99%)	441 (96%)	20 (4%)	0	100	100
All	All	1850/1868 (99%)	1782 (96%)	68 (4%)	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	384/386 (100%)	379 (99%)	5 (1%)	65	50
1	B	390/386 (101%)	381 (98%)	9 (2%)	45	26
1	C	386/386 (100%)	380 (98%)	6 (2%)	58	41

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	D	386/386 (100%)	381 (99%)	5 (1%)	65 50
All	All	1546/1544 (100%)	1521 (98%)	25 (2%)	62 41

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	37	PHE
1	A	327[A]	TYR
1	A	327[B]	TYR
1	A	328	ARG
1	A	416	THR
1	B	37	PHE
1	B	130	PHE
1	B	195	SER
1	B	266	LYS
1	B	327[A]	TYR
1	B	327[B]	TYR
1	B	328	ARG
1	B	363	VAL
1	B	416	THR
1	C	37	PHE
1	C	266	LYS
1	C	327[A]	TYR
1	C	327[B]	TYR
1	C	328	ARG
1	C	416	THR
1	D	130	PHE
1	D	327[A]	TYR
1	D	327[B]	TYR
1	D	328	ARG
1	D	416	THR

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

Mol	Chain	Res	Type
1	A	116	GLN

5.3.3 RNA

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)

Of 12 ligands modelled in this entry, 4 are monoatomic - leaving 8 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	$\#\|Z\| > 2$
3	BZI	A	503	-	8,10,10	0.94	0	6,13,13	1.20	1 (16%)
5	DMS	A	505	-	3,3,3	0.60	0	3,3,3	0.25	0
7	A1A2Z	C	503	1	31,32,32	0.61	0	39,46,46	0.96	3 (7%)
6	PLT	B	502	-	31,32,32	0.68	0	40,46,46	1.49	3 (7%)
4	0JO	D	502	-	20,21,21	1.40	2 (10%)	23,30,30	0.62	0
3	BZI	D	501	-	8,10,10	0.96	0	6,13,13	1.48	1 (16%)
4	0JO	A	504	-	20,21,21	1.39	2 (10%)	23,30,30	0.60	0
5	DMS	B	501	-	3,3,3	0.58	0	3,3,3	0.14	0

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
3	BZI	A	503	-	-	-	0/2/2/2
7	A1A2Z	C	503	1	-	4/18/19/19	0/3/3/3
6	PLT	B	502	-	-	3/18/19/19	0/3/3/3
4	0JO	D	502	-	-	0/11/15/15	0/1/1/1
3	BZI	D	501	-	-	-	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	0JO	A	504	-	-	0/11/15/15	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	D	502	0JO	CA-C	-5.17	1.40	1.50
4	A	504	0JO	CA-C	-5.04	1.41	1.50
4	A	504	0JO	OXT-C	-3.08	1.22	1.30
4	D	502	0JO	OXT-C	-3.06	1.22	1.30

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	B	502	PLT	CA-N-C4A	7.26	127.55	116.77
6	B	502	PLT	CB-CA-N	3.34	114.72	109.49
3	D	501	BZI	C6-C7-C7A	-2.78	116.29	120.09
7	C	503	A1A2Z	O2P-P-O3P	2.15	115.88	107.80
7	C	503	A1A2Z	C4A-C4-C5	2.12	122.06	119.75
3	A	503	BZI	C6-C7-C7A	-2.05	117.28	120.09
6	B	502	PLT	CH2-CZ2-CE2	-2.03	117.31	120.09
7	C	503	A1A2Z	C4A-N-CA	2.02	117.64	113.84

There are no chirality outliers.

All (7) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	B	502	PLT	C-CA-N-C4A
6	B	502	PLT	CB-CA-N-C4A
7	C	503	A1A2Z	C-CA-N-C4A
7	C	503	A1A2Z	C5-C4-C4A-N
7	C	503	A1A2Z	C3-C4-C4A-N
6	B	502	PLT	C-CA-CB-CG
7	C	503	A1A2Z	CB-CA-N-C4A

There are no ring outliers.

5 monomers are involved in 9 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	503	BZI	3	0
6	B	502	PLT	3	0
4	D	502	0JO	1	0

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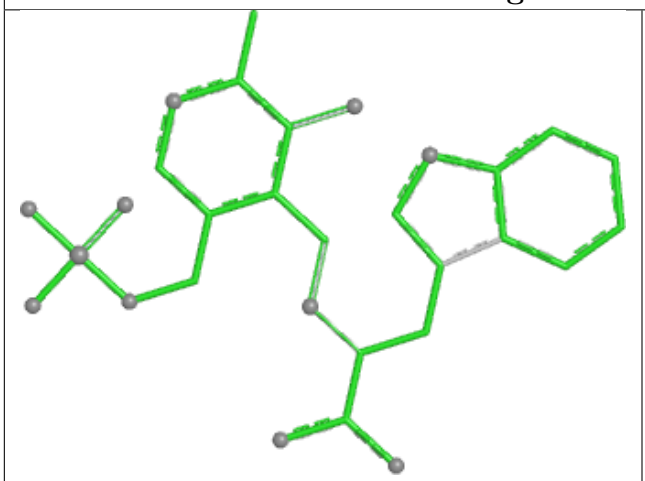
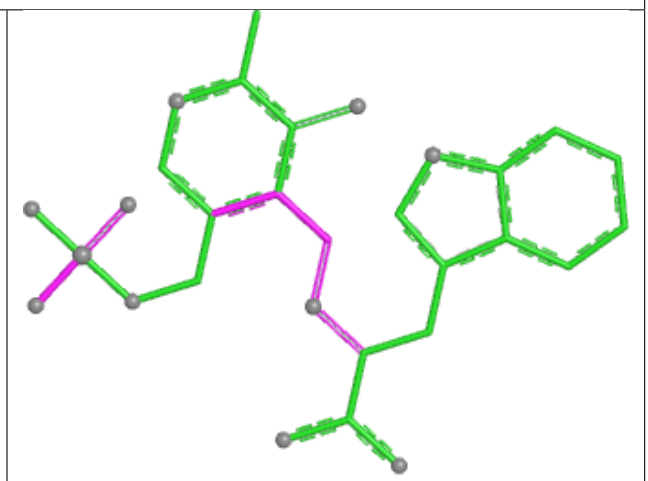
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	501	BZI	1	0
4	A	504	0JO	2	0

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.

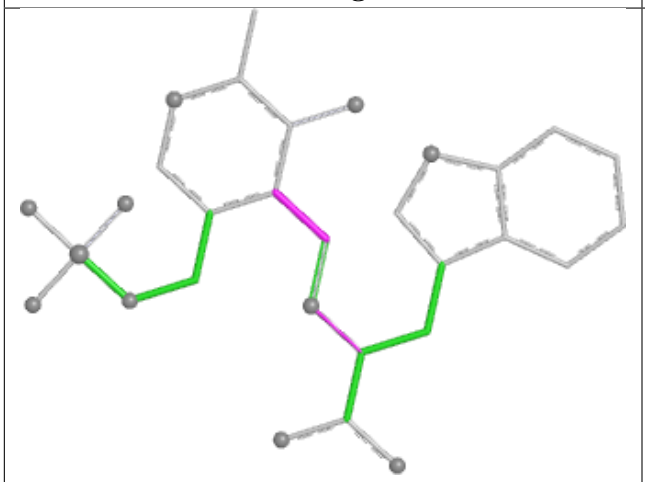
Ligand A1A2Z C 503



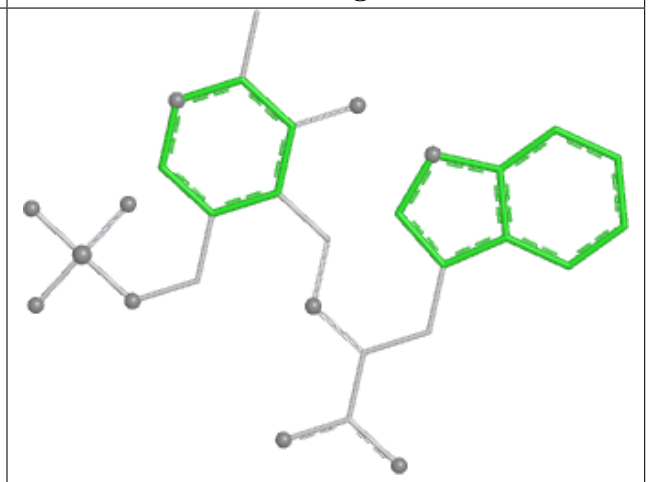
Bond lengths



Bond angles

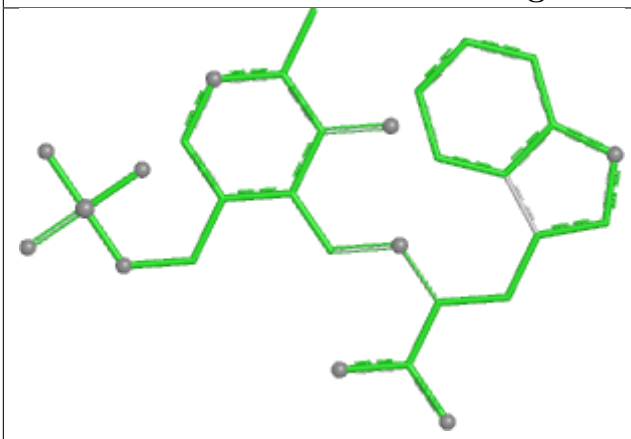


Torsions

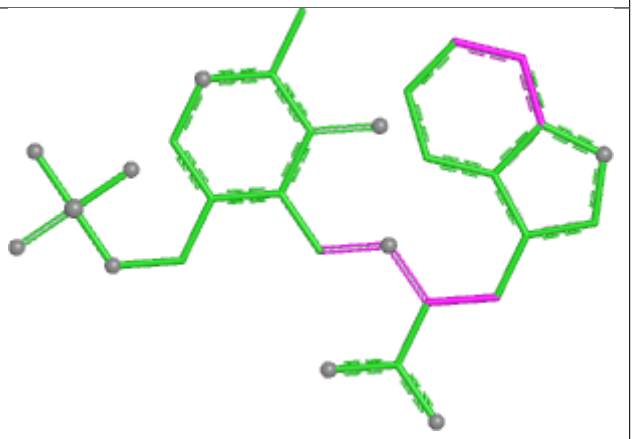


Rings

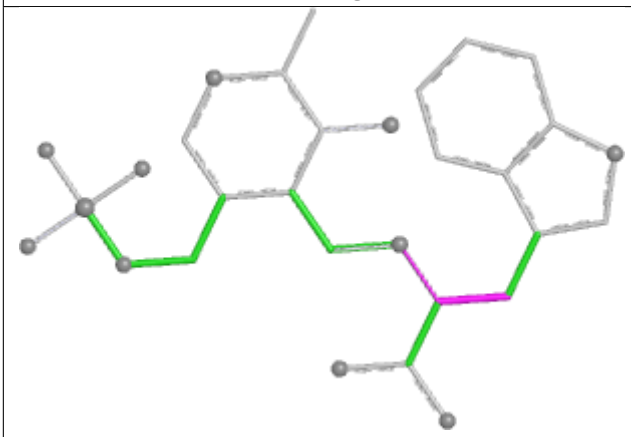
Ligand PLT B 502



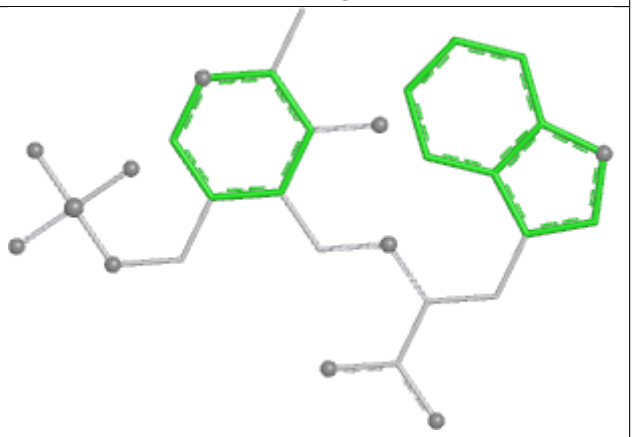
Bond lengths



Bond angles

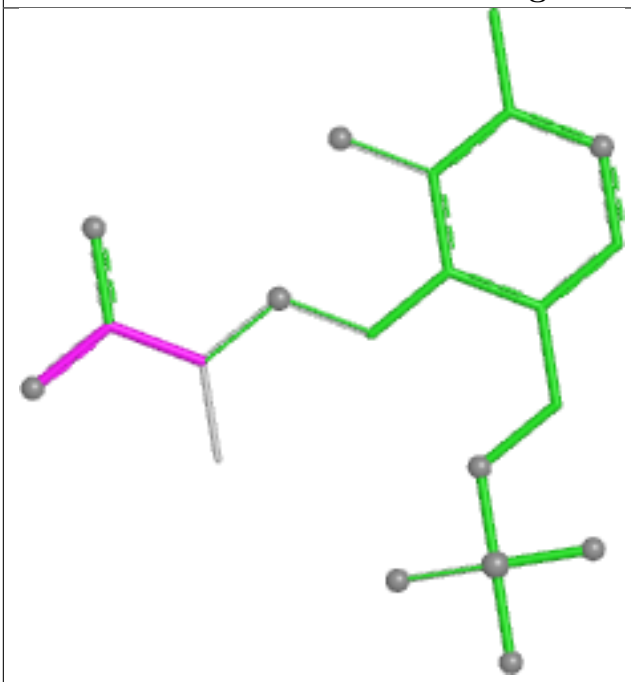


Torsions

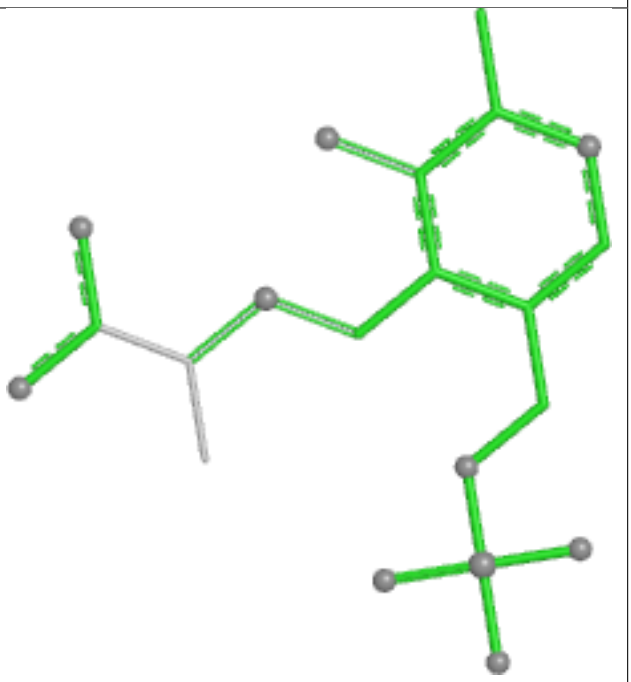


Rings

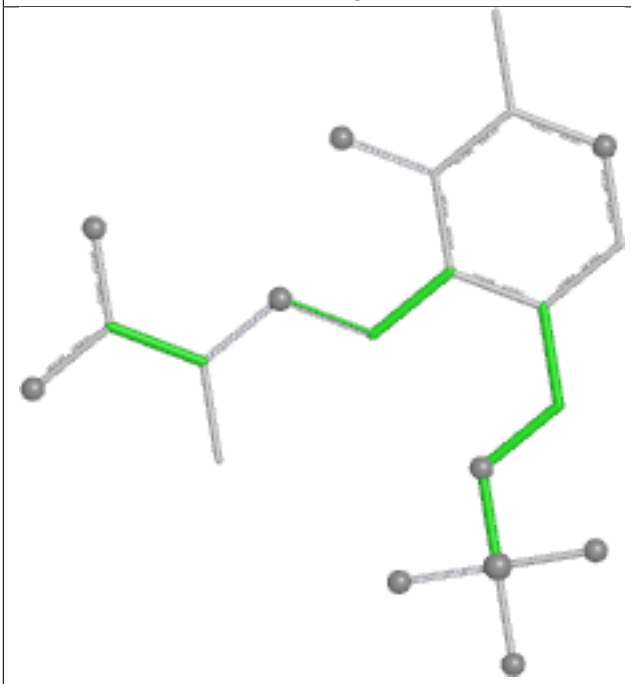
Ligand 0JO D 502



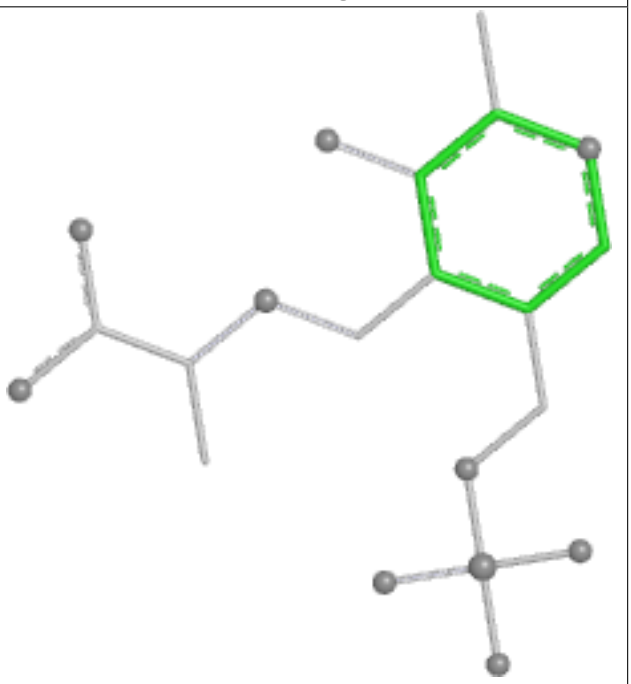
Bond lengths



Bond angles

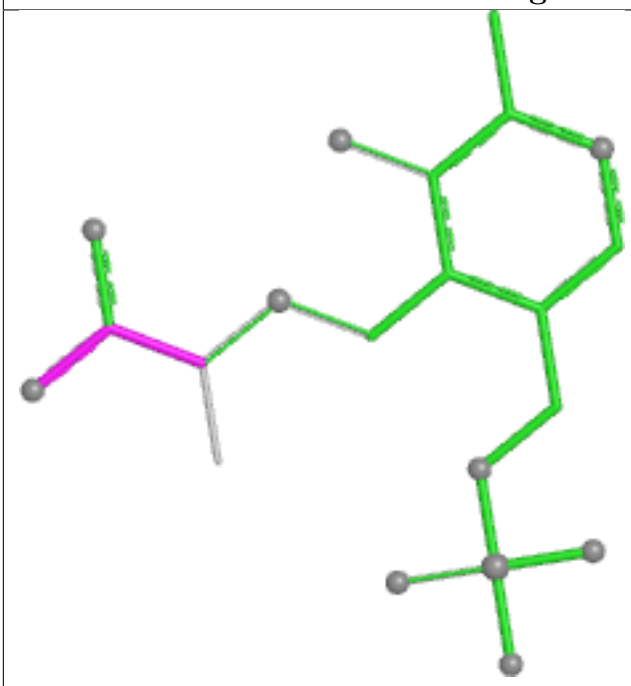


Torsions

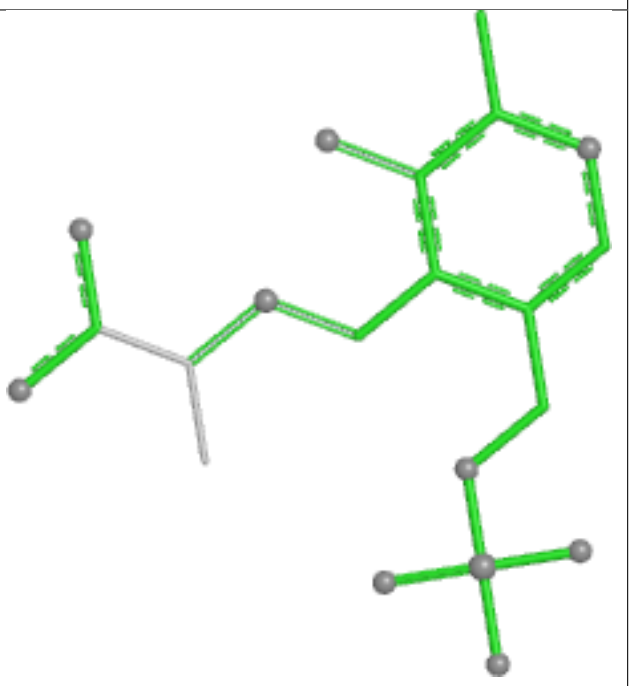


Rings

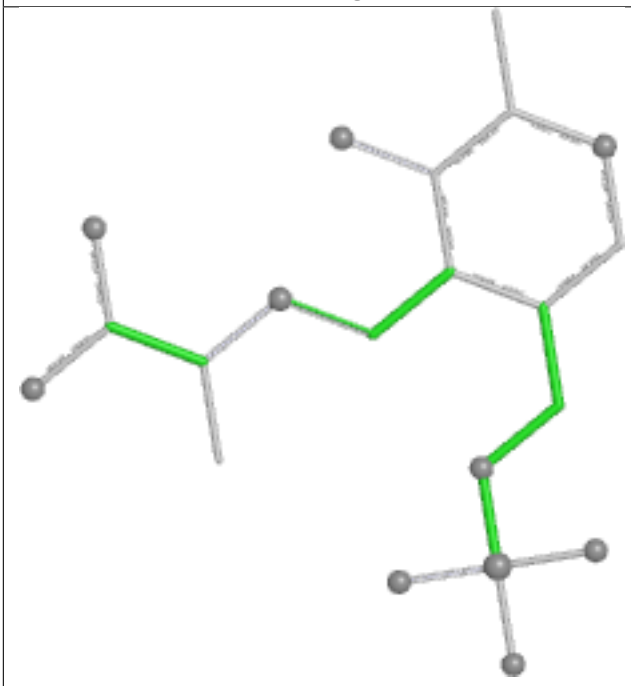
Ligand 0JO A 504



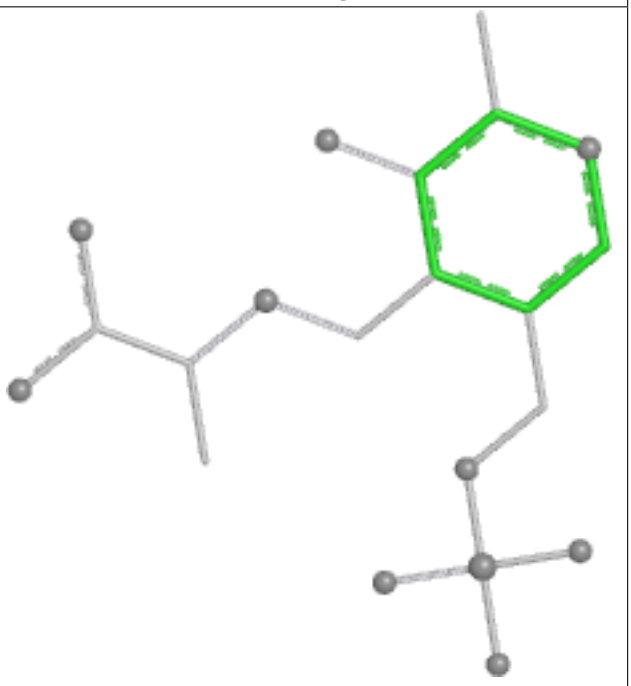
Bond lengths



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	458/467 (98%)	0.16	31 (6%)	25 30	11, 26, 62, 92	5 (1%)
1	B	465/467 (99%)	0.40	43 (9%)	16 19	11, 28, 69, 99	6 (1%)
1	C	458/467 (98%)	0.43	57 (12%)	9 11	13, 28, 70, 108	7 (1%)
1	D	458/467 (98%)	0.43	70 (15%)	6 6	9, 25, 82, 109	7 (1%)
All	All	1839/1868 (98%)	0.36	201 (10%)	12 14	9, 27, 72, 109	25 (1%)

All (201) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	412	PHE	7.2
1	C	396	LEU	5.7
1	A	455	VAL	5.6
1	D	391	ILE	5.5
1	B	396	LEU	5.4
1	D	441	PHE	5.4
1	B	447	LEU	5.2
1	B	466	ILE	5.1
1	D	463	LEU	5.1
1	D	371	PHE	5.0
1	C	394	PHE	4.9
1	D	412	PHE	4.9
1	D	359	CYS	4.8
1	D	362	LEU	4.8
1	D	363	VAL	4.7
1	A	397	GLY	4.7
1	B	394	PHE	4.6
1	B	451	TYR	4.6
1	C	391	ILE	4.5
1	D	456	LEU	4.5
1	C	466	ILE	4.5

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Mol	Chain	Res	Type	RSRZ
1	C	456	LEU	4.4
1	D	382	LEU	4.4
1	C	366	ILE	4.4
1	C	375	ALA	4.3
1	B	371	PHE	4.3
1	C	454	PRO	4.3
1	C	451	TYR	4.3
1	B	395	LEU	4.2
1	B	446	GLY	4.1
1	B	455	VAL	4.1
1	C	442	ALA	4.1
1	D	358	ASP	4.1
1	D	389	VAL	4.1
1	B	410	MET	3.9
1	D	394	PHE	3.9
1	D	366	ILE	3.9
1	A	405	GLN	3.9
1	C	363	VAL	3.8
1	D	405	GLN	3.8
1	D	376	VAL	3.7
1	C	371	PHE	3.7
1	D	372	PRO	3.7
1	B	456	LEU	3.7
1	C	447	LEU	3.7
1	D	29	LEU	3.7
1	D	396	LEU	3.7
1	A	394	PHE	3.6
1	B	363	VAL	3.6
1	C	395	LEU	3.6
1	C	463	LEU	3.6
1	D	395	LEU	3.6
1	D	408	ALA	3.5
1	D	437	LEU	3.5
1	D	449	PHE	3.5
1	D	460	THR	3.5
1	B	408	ALA	3.5
1	B	444	LEU	3.5
1	D	444	LEU	3.5
1	D	461	ALA	3.5
1	D	445	LYS	3.5
1	C	444	LEU	3.4
1	C	392	GLY	3.4

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Mol	Chain	Res	Type	RSRZ
1	A	443	THR	3.3
1	D	32	ALA	3.3
1	C	34	TYR	3.3
1	C	33	GLY	3.3
1	D	367	PRO	3.3
1	C	455	VAL	3.3
1	B	407	HIS	3.3
1	D	447	LEU	3.3
1	C	446	GLY	3.3
1	D	33	GLY	3.3
1	B	400	PRO	3.3
1	D	369	ASP	3.2
1	B	449	PHE	3.2
1	A	395	LEU	3.2
1	C	459	PHE	3.2
1	B	401	ALA	3.2
1	D	373	ALA	3.2
1	C	449	PHE	3.2
1	C	453	PRO	3.2
1	B	465	PRO	3.1
1	C	367	PRO	3.1
1	C	373	ALA	3.1
1	D	455	VAL	3.1
1	B	368	GLY	3.1
1	C	458	HIS	3.1
1	D	357	VAL	3.0
1	D	443	THR	3.0
1	B	402	THR	3.0
1	D	34	TYR	3.0
1	C	409	ASP	3.0
1	A	442	ALA	3.0
1	C	410	MET	3.0
1	D	451	TYR	3.0
1	D	459	PHE	3.0
1	D	392	GLY	3.0
1	A	371	PHE	2.9
1	C	408	ALA	2.9
1	D	442	ALA	2.9
1	B	454	PRO	2.9
1	D	360	LYS	2.9
1	C	461	ALA	2.9
1	D	393	SER	2.9

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Mol	Chain	Res	Type	RSRZ
1	C	368	GLY	2.9
1	C	36	PRO	2.9
1	B	360	LYS	2.9
1	B	463	LEU	2.8
1	B	397	GLY	2.8
1	D	375	ALA	2.8
1	D	379	ALA	2.8
1	C	29	LEU	2.8
1	C	38	LEU	2.8
1	A	366	ILE	2.8
1	A	466	ILE	2.8
1	D	465	PRO	2.8
1	D	368	GLY	2.8
1	C	32	ALA	2.8
1	C	362	LEU	2.7
1	D	377	ILE	2.7
1	D	407	HIS	2.7
1	A	456	LEU	2.7
1	A	363	VAL	2.7
1	D	434	LEU	2.7
1	B	406	LYS	2.7
1	D	390	GLU	2.7
1	A	449	PHE	2.7
1	C	441	PHE	2.7
1	C	464	LYS	2.7
1	C	437	LEU	2.6
1	D	454	PRO	2.6
1	A	368	GLY	2.6
1	B	403	GLY	2.6
1	B	445	LYS	2.6
1	C	462	ARG	2.6
1	A	396	LEU	2.6
1	C	397	GLY	2.6
1	A	364	PRO	2.5
1	B	399	ASP	2.5
1	A	465	PRO	2.5
1	B	453	PRO	2.5
1	A	447	LEU	2.4
1	C	155	PHE	2.4
1	A	393	SER	2.4
1	B	119	GLY	2.4
1	C	381	TYR	2.4

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Mol	Chain	Res	Type	RSRZ
1	C	376	VAL	2.4
1	D	446	GLY	2.4
1	B	412	PHE	2.4
1	D	23	GLU	2.4
1	B	364	PRO	2.4
1	D	453	PRO	2.4
1	A	444	LEU	2.4
1	B	362	LEU	2.4
1	C	369	ASP	2.4
1	A	439	GLU	2.3
1	B	411	GLU	2.3
1	D	381	TYR	2.3
1	D	410[A]	MET	2.3
1	A	408	ALA	2.3
1	A	464	LYS	2.3
1	B	367	PRO	2.3
1	D	356	PHE	2.3
1	C	358[A]	ASP	2.3
1	C	407	HIS	2.3
1	C	443	THR	2.3
1	D	19	VAL	2.3
1	C	382	LEU	2.3
1	C	393	SER	2.3
1	D	36	PRO	2.2
1	D	364	PRO	2.2
1	A	463	LEU	2.2
1	B	120	LYS	2.2
1	B	372	PRO	2.2
1	C	445	LYS	2.2
1	D	38	LEU	2.2
1	C	359	CYS	2.2
1	A	446	GLY	2.2
1	B	177	ALA	2.1
1	D	457	ARG	2.1
1	A	459	PHE	2.1
1	B	132[A]	PHE	2.1
1	B	409	ASP	2.1
1	D	27	ALA	2.1
1	D	37	PHE	2.1
1	C	465	PRO	2.1
1	D	406	LYS	2.1
1	A	451	TYR	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	441	PHE	2.1
1	A	360	LYS	2.1
1	A	373	ALA	2.0
1	C	379	ALA	2.0
1	D	28	ALA	2.0
1	A	407	HIS	2.0
1	D	26	GLU	2.0
1	D	361	LYS	2.0
1	C	370	GLN	2.0
1	D	21	SER	2.0
1	B	184[A]	ILE	2.0
1	B	391	ILE	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 monosaccharides 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
3	BZI	A	503	9/9	0.76	0.16	32,35,38,40	9
3	BZI	D	501	9/9	0.81	0.14	30,32,34,35	9
5	DMS	A	505	4/4	0.91	0.12	34,38,48,53	0
5	DMS	B	501	4/4	0.94	0.11	31,37,41,41	0
4	0JO	D	502	21/21	0.95	0.09	13,20,36,37	0
6	PLT	B	502	30/30	0.95	0.10	17,32,42,46	0
7	A1A2Z	C	503	30/30	0.95	0.10	15,30,40,42	0
4	0JO	A	504	21/21	0.96	0.07	17,25,32,33	0
2	K	C	502	1/1	0.99	0.03	17,17,17,17	0
2	K	A	501	1/1	0.99	0.05	20,20,20,20	0
2	K	C	501	1/1	0.99	0.05	19,19,19,19	0

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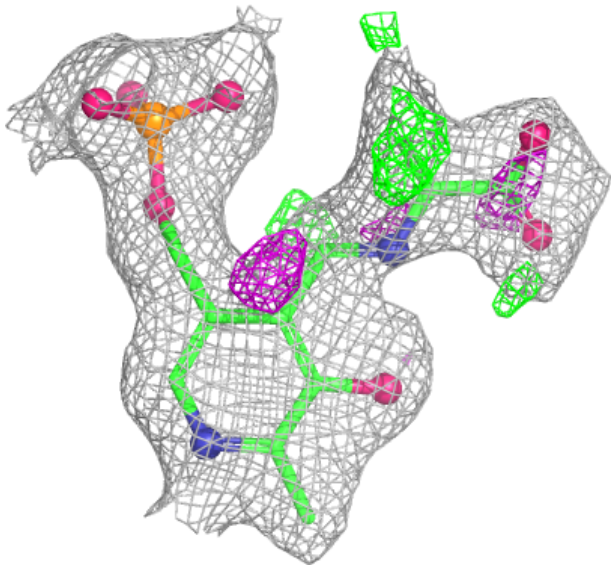
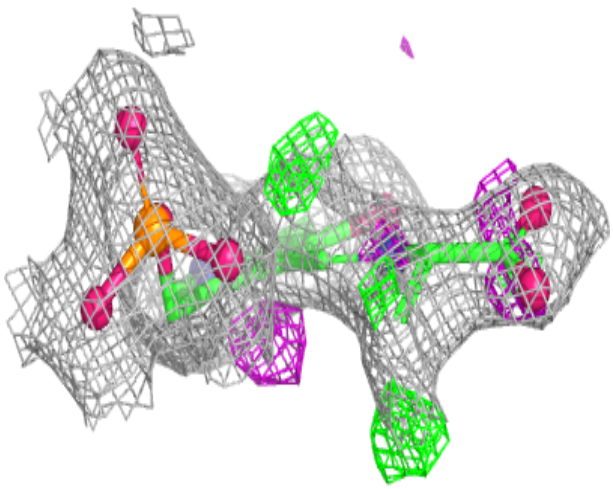
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	K	A	502	1/1	1.00	0.05	17,17,17,17	0

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 0JO D 502:

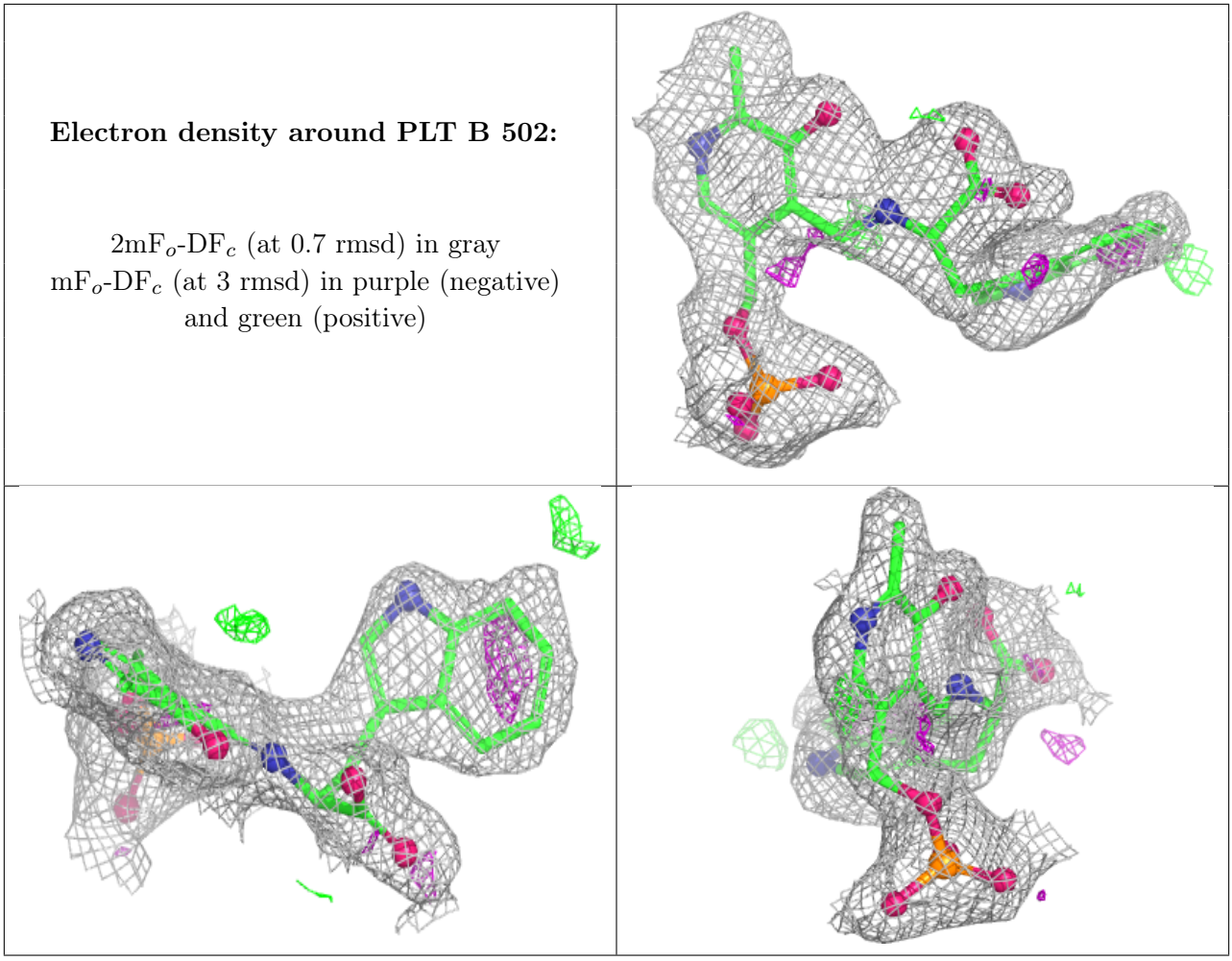
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)





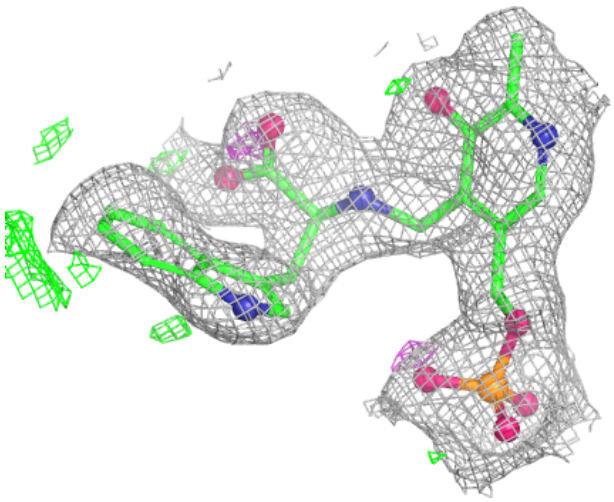
Electron density around PLT B 502:

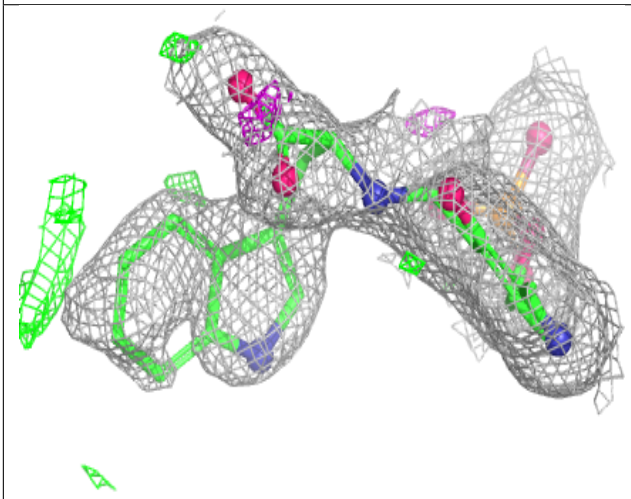
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

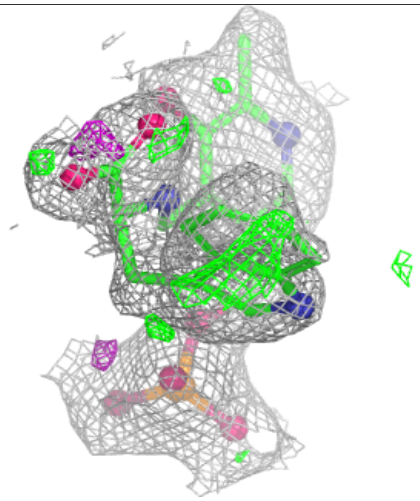


Electron density around A1A2Z C 503:

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

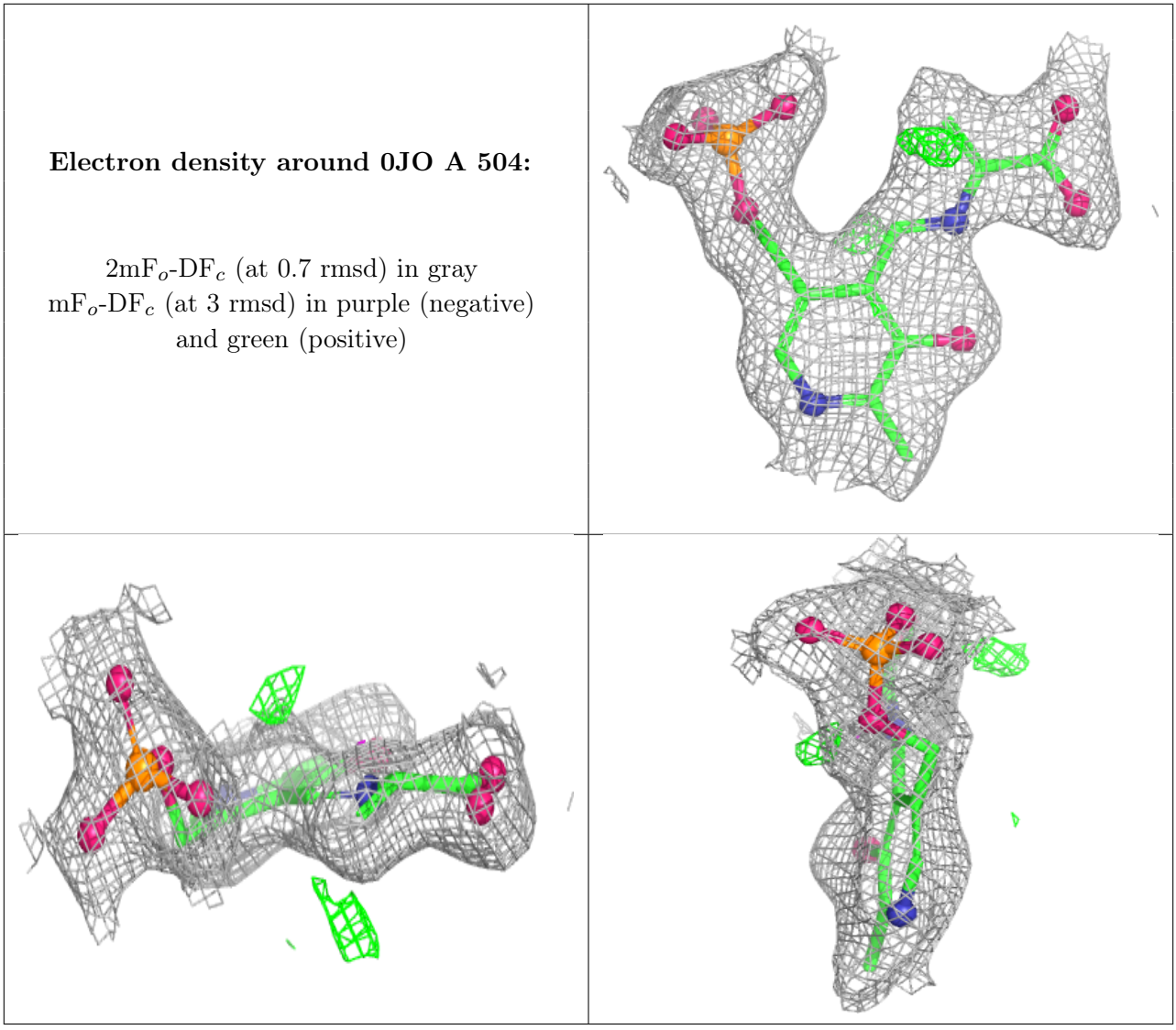






Electron density around 0JO A 504:

$2mF_o$-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.