Full wwPDB X-ray Structure Validation Report (i)

Jun 19, 2024 – 09:56 AM EDT

PDB ID	:	4DSZ
Title	:	Crystal Structure of DPP-IV with Compound C2
Authors	:	Xiong, B.; Zhu, L.R.; Chen, D.Q.; Zhao, Y.L.; Jiang, F.; Shen, J.K.
Deposited on	:	2012-02-20
Resolution	:	3.20 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:

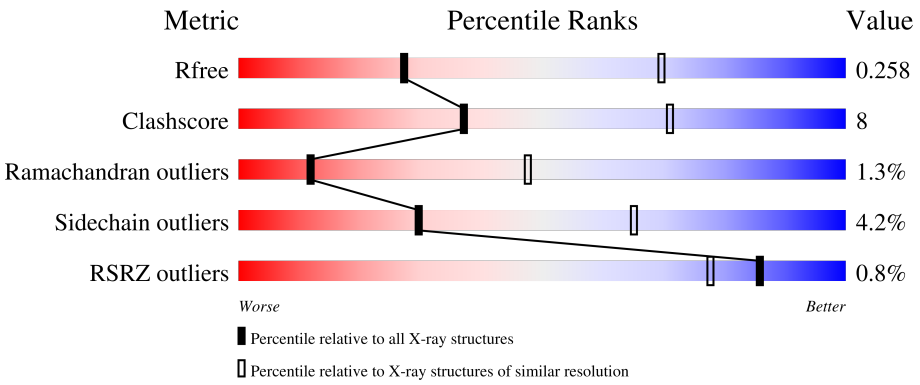
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	2.37.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

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 3.20 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	1133 (3.20-3.20)
Clashscore	141614	1253 (3.20-3.20)
Ramachandran outliers	138981	1234 (3.20-3.20)
Sidechain outliers	138945	1233 (3.20-3.20)
RSRZ outliers	127900	1095 (3.20-3.20)

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	728	% 76% 21% • •
1	B	728	% 77% 21% • •

2 Entry composition (i)

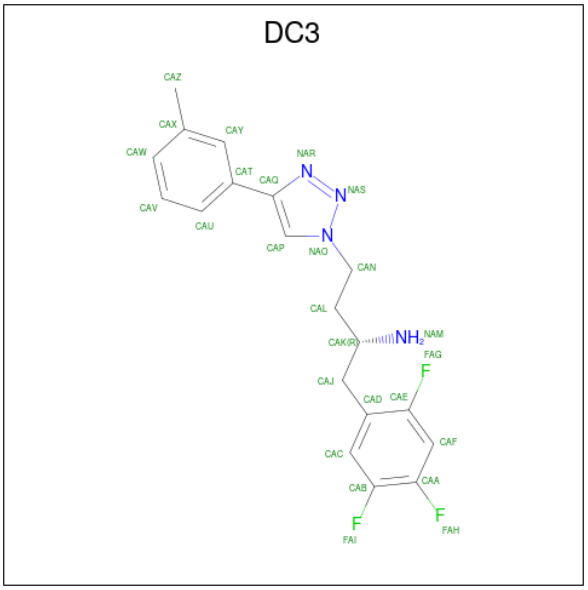
There are 2 unique types of molecules in this entry. The entry contains 11914 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Dipeptidyl peptidase 4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	724	5931	3807	975	1123	26	0	0	0
1	B	724	5931	3807	975	1123	26	0	0	0

- Molecule 2 is (2R)-4-[4-(3-methylphenyl)-1H-1,2,3-triazol-1-yl]-1-(2,4,5-trifluorophenyl)butan-2-amine (three-letter code: DC3) (formula: $C_{19}H_{19}F_3N_4$).



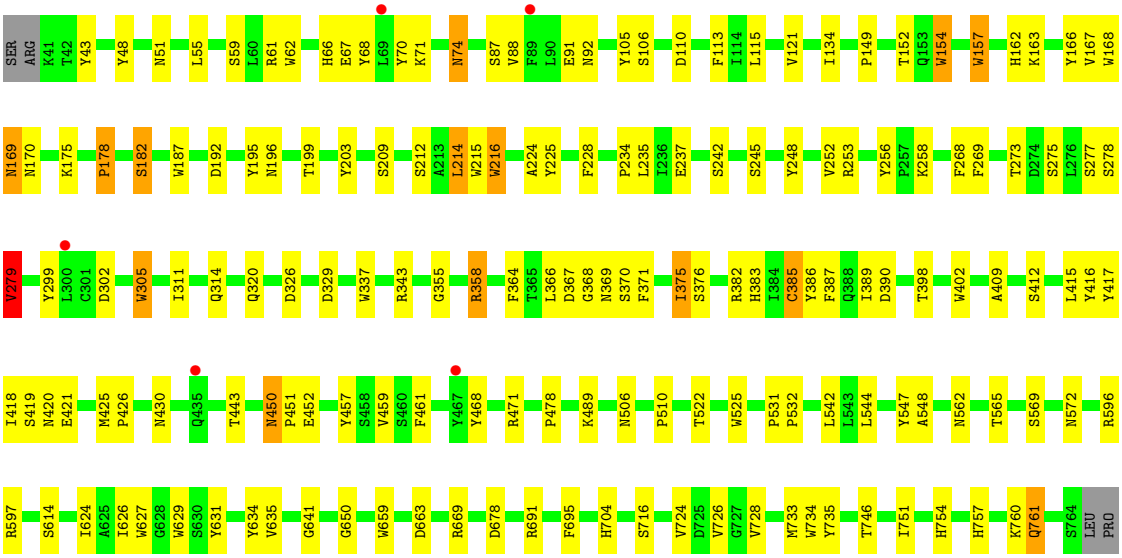
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	F	N		
2	A	1	26	19	3	4	0	0
2	B	1	26	19	3	4	0	0

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.

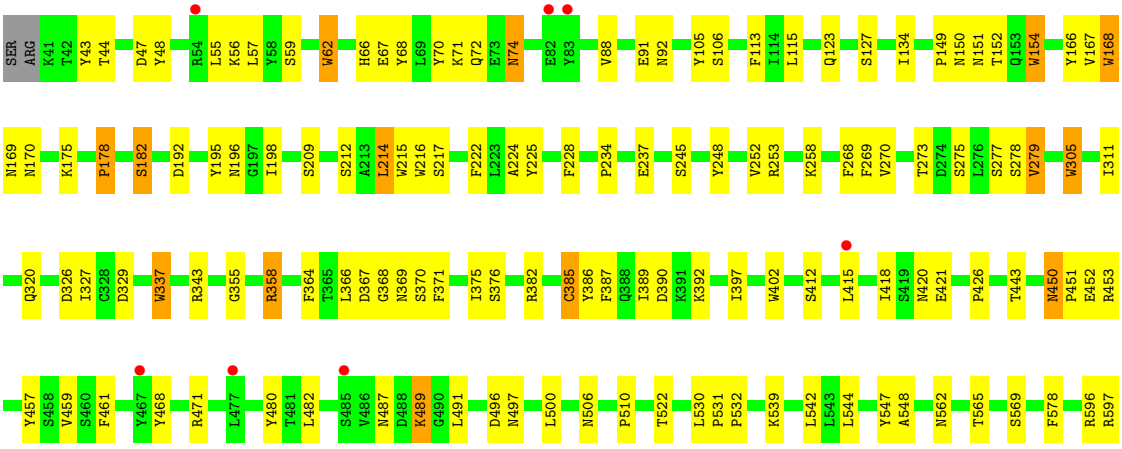
• Molecule 1: Dipeptidyl peptidase 4

Chain A:



• Molecule 1: Dipeptidyl peptidase 4

Chain B:



F601
A609
G617
I624
A625
I626
W627
G628
W629
S630
Y631
Y634
V635
V639
G645
G650
W659
R669
D678
H704
F713
V726
G727
V728
W734
T746
H750
I751
Y752
M755
S756
H757
K760
Q761
S764
LEU
PRO

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 32	Depositor
Cell constants a, b, c, α, β, γ	79.55Å 79.55Å 290.41Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	29.22 – 3.20 29.22 – 3.20	Depositor EDS
% Data completeness (in resolution range)	99.4 (29.22-3.20) 99.5 (29.22-3.20)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.26 (at 3.18Å)	Xtriage
Refinement program	REFMAC 5.6.0117	Depositor
R, R_{free}	0.190 , 0.260 0.186 , 0.258	Depositor DCC
R_{free} test set	1712 reflections (5.08%)	wwPDB-VP
Wilson B-factor (Å^2)	91.9	Xtriage
Anisotropy	0.056	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 51.0	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	0.011 for -h,-k,l 0.105 for h,-h-k,-l 0.029 for -k,-h,-l	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	11914	wwPDB-VP
Average B, all atoms (Å^2)	105.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.49% 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: DC3

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	0.63	10/6102 (0.2%)	0.70	0/8299
1	B	0.62	7/6102 (0.1%)	0.68	0/8299
All	All	0.63	17/12204 (0.1%)	0.69	0/16598

All (17) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	337	TRP	CD2-CE2	6.44	1.49	1.41
1	B	337	TRP	CD2-CE2	6.08	1.48	1.41
1	B	734	TRP	CD2-CE2	6.05	1.48	1.41
1	A	525	TRP	CD2-CE2	5.87	1.48	1.41
1	A	154	TRP	CD2-CE2	5.86	1.48	1.41
1	A	187	TRP	CD2-CE2	5.73	1.48	1.41
1	B	305	TRP	CD2-CE2	5.67	1.48	1.41
1	A	734	TRP	CD2-CE2	5.58	1.48	1.41
1	B	154	TRP	CD2-CE2	5.46	1.48	1.41
1	A	305	TRP	CD2-CE2	5.42	1.47	1.41
1	B	62	TRP	CD2-CE2	5.42	1.47	1.41
1	A	157	TRP	CD2-CE2	5.40	1.47	1.41
1	A	659	TRP	CD2-CE2	5.34	1.47	1.41
1	B	168	TRP	CD2-CE2	5.24	1.47	1.41
1	A	168	TRP	CD2-CE2	5.13	1.47	1.41
1	B	659	TRP	CD2-CE2	5.12	1.47	1.41
1	A	216	TRP	CD2-CE2	5.11	1.47	1.41

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	5931	0	5649	93	0
1	B	5931	0	5649	95	0
2	A	26	0	19	0	0
2	B	26	0	19	0	0
All	All	11914	0	11336	182	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 8.

All (182) 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:253:ARG:HH12	1:B:253:ARG:HH12	1.15	0.93
1:B:343:ARG:HG2	1:B:389:ILE:HG22	1.67	0.76
1:B:66:HIS:HD2	1:B:67:GLU:HG3	1.54	0.73
1:A:343:ARG:HG2	1:A:389:ILE:HG22	1.69	0.72
1:A:596:ARG:NH2	1:A:678:ASP:OD1	2.22	0.72
1:A:175:LYS:HG3	1:A:182:SER:HB3	1.72	0.71
1:A:320:GLN:OE1	1:A:669:ARG:HG3	1.91	0.70
1:A:66:HIS:HD2	1:A:67:GLU:HG3	1.57	0.68
1:B:66:HIS:CD2	1:B:67:GLU:HG3	2.29	0.67
1:B:596:ARG:NH2	1:B:678:ASP:OD1	2.29	0.66
1:B:175:LYS:HG3	1:B:182:SER:HB3	1.78	0.65
1:A:224:ALA:HB1	1:A:268:PHE:CZ	2.33	0.64
1:B:329:ASP:OD2	1:B:343:ARG:NH1	2.30	0.64
1:A:66:HIS:CD2	1:A:67:GLU:HG3	2.33	0.62
1:A:195:TYR:HB2	1:A:228:PHE:HB2	1.82	0.61
1:B:320:GLN:OE1	1:B:669:ARG:HG3	2.01	0.61
1:B:368:GLY:O	1:B:389:ILE:HD11	2.01	0.60
1:A:368:GLY:O	1:A:389:ILE:HD11	2.01	0.60
1:B:418:ILE:HD11	1:B:459:VAL:HG12	1.84	0.60
1:B:113:PHE:CZ	1:B:178:PRO:HG2	2.37	0.59
1:A:277:SER:C	1:A:279:VAL:H	2.06	0.59
1:A:726:VAL:HG23	1:A:728:VAL:HG23	1.85	0.58
1:B:277:SER:C	1:B:279:VAL:H	2.06	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:224:ALA:HB1	1:B:268:PHE:CZ	2.39	0.57
1:B:305:TRP:CE2	1:B:311:ILE:HD12	2.38	0.57
1:A:626:ILE:O	1:A:650:GLY:HA2	2.04	0.57
1:B:113:PHE:CE1	1:B:178:PRO:HG2	2.40	0.57
1:B:453:ARG:NH2	1:B:496:ASP:O	2.35	0.57
1:A:510:PRO:HD3	1:A:569:SER:HB2	1.87	0.57
1:A:154:TRP:CE2	1:A:212:SER:HB3	2.40	0.56
1:A:420:ASN:HD22	1:A:426:PRO:HA	1.69	0.56
1:A:329:ASP:OD2	1:A:343:ARG:NH1	2.38	0.56
1:A:343:ARG:HG2	1:A:389:ILE:CG2	2.36	0.55
1:B:88:VAL:HG21	1:B:91:GLU:HG2	1.88	0.55
1:B:154:TRP:CE2	1:B:212:SER:HB3	2.41	0.55
1:A:113:PHE:CE1	1:A:178:PRO:HG2	2.41	0.55
1:B:726:VAL:HG23	1:B:728:VAL:HG23	1.89	0.55
1:B:175:LYS:HD2	1:B:182:SER:HB3	1.89	0.54
1:B:626:ILE:O	1:B:650:GLY:HA2	2.06	0.54
1:A:461:PHE:CD1	1:A:468:TYR:HB3	2.43	0.54
1:A:225:TYR:CE2	1:A:269:PHE:HB2	2.43	0.53
1:A:532:PRO:HD3	1:A:569:SER:HA	1.90	0.53
1:A:113:PHE:CZ	1:A:178:PRO:HG2	2.43	0.53
1:A:169:ASN:O	1:A:170:ASN:HB2	2.08	0.52
1:A:248:TYR:CE1	1:B:258:LYS:HD2	2.44	0.52
1:B:461:PHE:CD1	1:B:468:TYR:HB3	2.44	0.52
1:B:343:ARG:HG2	1:B:389:ILE:CG2	2.39	0.52
1:A:225:TYR:CZ	1:A:269:PHE:HB2	2.44	0.52
1:B:420:ASN:HD22	1:B:426:PRO:HA	1.74	0.52
1:A:542:LEU:HD23	1:A:624:ILE:HG23	1.92	0.51
1:A:88:VAL:HG21	1:A:91:GLU:HG2	1.92	0.51
1:A:224:ALA:HB1	1:A:268:PHE:HZ	1.74	0.51
1:B:364:PHE:CD1	1:B:371:PHE:HB3	2.45	0.51
1:B:195:TYR:HB2	1:B:228:PHE:HB2	1.93	0.51
1:A:110:ASP:OD2	1:A:162:HIS:ND1	2.33	0.50
1:A:305:TRP:CE2	1:A:311:ILE:HD12	2.46	0.50
1:A:55:LEU:HD22	1:A:478:PRO:HG2	1.94	0.50
1:B:43:TYR:CD2	1:B:565:THR:HG22	2.47	0.50
1:B:150:ASN:O	1:B:151:ASN:HB2	2.13	0.49
1:B:369:ASN:O	1:B:389:ILE:HG13	2.11	0.49
1:A:149:PRO:HD2	1:A:166:TYR:CE1	2.48	0.49
1:A:724:VAL:HG22	1:B:750:HIS:CG	2.48	0.49
1:B:154:TRP:CD2	1:B:212:SER:HB3	2.48	0.49
1:B:169:ASN:O	1:B:170:ASN:HB2	2.12	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:367:ASP:OD1	1:B:368:GLY:N	2.46	0.49
1:B:420:ASN:ND2	1:B:426:PRO:HA	2.27	0.49
1:A:631:TYR:O	1:A:634:TYR:HB3	2.13	0.49
1:B:450:ASN:O	1:B:452:GLU:N	2.47	0.48
1:A:175:LYS:CG	1:A:182:SER:HB3	2.42	0.48
1:A:548:ALA:HB3	1:A:635:VAL:HG21	1.96	0.48
1:A:192:ASP:HA	1:A:195:TYR:OH	2.14	0.48
1:A:258:LYS:HD2	1:B:248:TYR:CE1	2.49	0.48
1:A:547:TYR:O	1:A:548:ALA:HB3	2.13	0.48
1:B:532:PRO:HD3	1:B:569:SER:HA	1.95	0.48
1:A:59:SER:O	1:A:70:TYR:CD1	2.67	0.47
1:A:367:ASP:OD1	1:A:368:GLY:N	2.47	0.47
1:A:175:LYS:HD2	1:A:182:SER:HB3	1.96	0.47
1:B:224:ALA:HB1	1:B:268:PHE:HZ	1.77	0.47
1:A:418:ILE:HD11	1:A:459:VAL:HG12	1.97	0.46
1:B:74:ASN:HB3	1:B:92:ASN:CB	2.45	0.46
1:A:170:ASN:O	1:A:196:ASN:HB2	2.15	0.46
1:B:578:PHE:CD2	1:B:609:ALA:HB2	2.50	0.46
1:A:62:TRP:CE3	1:A:68:TYR:HB3	2.51	0.46
1:B:74:ASN:HB3	1:B:92:ASN:HB2	1.98	0.46
1:A:235:LEU:HD13	1:A:253:ARG:HB3	1.96	0.46
1:B:216:TRP:HZ3	1:B:273:THR:HG21	1.81	0.46
1:A:364:PHE:CD1	1:A:371:PHE:HB3	2.51	0.46
1:A:355:GLY:HA3	1:A:358:ARG:O	2.16	0.45
1:B:170:ASN:O	1:B:196:ASN:HB2	2.15	0.45
1:B:355:GLY:HA3	1:B:358:ARG:O	2.16	0.45
1:A:733:MET:CE	1:A:754:HIS:CE1	3.00	0.45
1:A:248:TYR:CE2	1:B:234:PRO:HB2	2.51	0.45
1:B:192:ASP:HA	1:B:195:TYR:OH	2.16	0.45
1:A:106:SER:HB3	1:A:115:LEU:HB3	1.98	0.45
1:B:375:ILE:HG22	1:B:376:SER:N	2.31	0.45
1:B:487:ASN:HD21	1:B:489:LYS:HG2	1.82	0.45
1:A:74:ASN:HB3	1:A:92:ASN:HB2	1.99	0.45
1:B:149:PRO:HD2	1:B:166:TYR:CE1	2.52	0.45
1:B:327:ILE:HD12	1:B:389:ILE:HG23	1.98	0.45
1:B:71:LYS:HD2	1:B:105:TYR:HE2	1.83	0.44
1:A:199:THR:HG22	1:A:203:TYR:HB3	1.98	0.44
1:B:225:TYR:CZ	1:B:269:PHE:HB2	2.53	0.44
1:B:457:TYR:HA	1:B:471:ARG:O	2.18	0.44
1:A:74:ASN:HB3	1:A:92:ASN:CB	2.47	0.44
1:A:234:PRO:HB2	1:B:248:TYR:CE2	2.52	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:544:LEU:HD12	1:A:544:LEU:HA	1.71	0.44
1:B:55:LEU:HD23	1:B:500:LEU:HD22	1.98	0.44
1:B:106:SER:HB3	1:B:115:LEU:HB3	2.00	0.44
1:A:425:MET:HA	1:A:426:PRO:HD3	1.88	0.44
1:A:457:TYR:HA	1:A:471:ARG:O	2.18	0.44
1:B:48:TYR:CE1	1:B:562:ASN:HA	2.52	0.44
1:B:225:TYR:CE2	1:B:269:PHE:HB2	2.53	0.44
1:A:597:ARG:HH11	1:A:597:ARG:HG2	1.82	0.44
1:A:695:PHE:HB3	1:A:728:VAL:HG11	1.99	0.44
1:B:635:VAL:O	1:B:639:VAL:HG23	2.18	0.44
1:B:237:GLU:HA	1:B:252:VAL:O	2.18	0.44
1:A:216:TRP:HZ3	1:A:273:THR:HG21	1.82	0.43
1:A:277:SER:C	1:A:279:VAL:N	2.72	0.43
1:A:409:ALA:HB3	1:A:416:TYR:HD1	1.83	0.43
1:B:370:SER:HB2	1:B:386:TYR:CE1	2.53	0.43
1:B:631:TYR:O	1:B:634:TYR:HB3	2.18	0.43
1:A:59:SER:O	1:A:70:TYR:HD1	1.99	0.43
1:A:216:TRP:O	1:A:305:TRP:CD1	2.71	0.43
1:B:510:PRO:HD3	1:B:569:SER:HB2	1.99	0.43
1:B:547:TYR:O	1:B:548:ALA:HB3	2.17	0.43
1:A:71:LYS:HD2	1:A:105:TYR:HE2	1.82	0.43
1:B:123:GLN:HB3	1:B:127:SER:OG	2.17	0.43
1:B:214:LEU:HA	1:B:215:TRP:CE3	2.53	0.43
1:A:420:ASN:ND2	1:A:426:PRO:HA	2.34	0.43
1:A:256:TYR:CZ	1:A:663:ASP:HB3	2.53	0.43
1:B:217:SER:HB3	1:B:222:PHE:HB2	1.99	0.43
1:A:43:TYR:CD2	1:A:565:THR:HG22	2.52	0.43
1:A:383:HIS:HB3	1:A:398:THR:OG1	2.19	0.43
1:B:62:TRP:CE3	1:B:68:TYR:HB3	2.54	0.43
1:B:72:GLN:O	1:B:74:ASN:N	2.51	0.43
1:B:539:LYS:HD3	1:B:617:GLY:O	2.19	0.43
1:A:415:LEU:HD23	1:A:415:LEU:C	2.39	0.42
1:A:385:CYS:HB3	1:A:387:PHE:CE1	2.54	0.42
1:A:418:ILE:HA	1:A:430:ASN:O	2.18	0.42
1:A:450:ASN:O	1:A:452:GLU:N	2.52	0.42
1:A:735:TYR:OH	1:A:751:ILE:HA	2.20	0.42
1:B:277:SER:C	1:B:279:VAL:N	2.72	0.42
1:A:154:TRP:CD2	1:A:212:SER:HB3	2.55	0.42
1:A:370:SER:HB2	1:A:386:TYR:CE1	2.54	0.42
1:B:59:SER:O	1:B:70:TYR:CD1	2.73	0.42
1:B:542:LEU:HD23	1:B:624:ILE:HG23	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:152:THR:HG23	1:B:167:VAL:O	2.20	0.42
1:B:149:PRO:HG2	1:B:168:TRP:CD1	2.55	0.42
1:B:760:LYS:O	1:B:761:GLN:C	2.58	0.42
1:B:56:LYS:HB2	1:B:497:ASN:OD1	2.20	0.42
1:A:214:LEU:HA	1:A:215:TRP:CE3	2.55	0.42
1:A:641:GLY:O	1:A:691:ARG:HB3	2.20	0.42
1:A:760:LYS:O	1:A:761:GLN:C	2.59	0.42
1:B:175:LYS:CG	1:B:182:SER:HB3	2.46	0.41
1:B:392:LYS:HB3	1:B:392:LYS:HE2	1.89	0.41
1:A:152:THR:HG23	1:A:167:VAL:O	2.20	0.41
1:A:302:ASP:HB3	1:A:314:GLN:HB2	2.01	0.41
1:B:752:TYR:CD1	1:B:755:MET:HE3	2.55	0.41
1:A:74:ASN:CB	1:A:92:ASN:HB2	2.50	0.41
1:B:544:LEU:HD12	1:B:544:LEU:HA	1.81	0.41
1:A:369:ASN:O	1:A:389:ILE:HG13	2.20	0.41
1:A:375:ILE:HG22	1:A:376:SER:N	2.35	0.41
1:A:417:TYR:CE2	1:A:419:SER:HB3	2.55	0.41
1:B:597:ARG:HD2	1:B:601:PHE:CE2	2.56	0.41
1:B:74:ASN:CB	1:B:92:ASN:HB2	2.51	0.41
1:B:279:VAL:O	1:B:279:VAL:HG13	2.19	0.41
1:A:48:TYR:CE1	1:A:562:ASN:HA	2.56	0.41
1:B:195:TYR:HB3	1:B:198:ILE:O	2.20	0.41
1:A:157:TRP:HA	1:A:163:LYS:O	2.21	0.41
1:A:417:TYR:HE2	1:A:419:SER:HB3	1.85	0.41
1:A:531:PRO:HB3	1:A:572:ASN:HA	2.02	0.41
1:B:415:LEU:C	1:B:415:LEU:HD23	2.42	0.41
1:B:597:ARG:HH11	1:B:597:ARG:HG2	1.86	0.41
1:A:402:TRP:NE1	1:A:421:GLU:HG3	2.36	0.41
1:B:402:TRP:NE1	1:B:421:GLU:HG3	2.35	0.41
1:B:270:VAL:HG11	1:B:337:TRP:CZ2	2.56	0.40
1:B:59:SER:O	1:B:70:TYR:HD1	2.03	0.40
1:B:44:THR:O	1:B:47:ASP:HB2	2.21	0.40
1:B:385:CYS:HB3	1:B:387:PHE:CE1	2.56	0.40
1:B:530:LEU:HA	1:B:531:PRO:HD3	1.89	0.40
1:A:237:GLU:HA	1:A:252:VAL:O	2.21	0.40
1:B:57:LEU:HA	1:B:480:TYR:CZ	2.56	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	722/728 (99%)	647 (90%)	66 (9%)	9 (1%)	13	49
1	B	722/728 (99%)	647 (90%)	65 (9%)	10 (1%)	11	46
All	All	1444/1456 (99%)	1294 (90%)	131 (9%)	19 (1%)	12	47

All (19) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	74	ASN
1	A	275	SER
1	A	278	SER
1	B	74	ASN
1	B	645	GLY
1	B	713	PHE
1	A	169	ASN
1	A	178	PRO
1	B	275	SER
1	A	279	VAL
1	A	450	ASN
1	B	178	PRO
1	B	278	SER
1	B	279	VAL
1	B	491	LEU
1	B	450	ASN
1	B	451	PRO
1	A	121	VAL
1	A	451	PRO

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	649/653 (99%)	618 (95%)	31 (5%)	25	61
1	B	649/653 (99%)	625 (96%)	24 (4%)	34	68
All	All	1298/1306 (99%)	1243 (96%)	55 (4%)	30	65

All (55) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	51	ASN
1	A	61	ARG
1	A	87	SER
1	A	134	ILE
1	A	182	SER
1	A	209	SER
1	A	214	LEU
1	A	242	SER
1	A	245	SER
1	A	279	VAL
1	A	299	TYR
1	A	326	ASP
1	A	358	ARG
1	A	366	LEU
1	A	375	ILE
1	A	382	ARG
1	A	385	CYS
1	A	390	ASP
1	A	412	SER
1	A	443	THR
1	A	489	LYS
1	A	506	ASN
1	A	522	THR
1	A	614	SER
1	A	627	TRP
1	A	629	TRP
1	A	704	HIS
1	A	716	SER
1	A	746	THR
1	A	757	HIS
1	A	761	GLN
1	B	134	ILE
1	B	182	SER

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Mol	Chain	Res	Type
1	B	209	SER
1	B	214	LEU
1	B	245	SER
1	B	326	ASP
1	B	358	ARG
1	B	366	LEU
1	B	382	ARG
1	B	385	CYS
1	B	390	ASP
1	B	397	ILE
1	B	412	SER
1	B	443	THR
1	B	482	LEU
1	B	489	LYS
1	B	506	ASN
1	B	522	THR
1	B	627	TRP
1	B	629	TRP
1	B	704	HIS
1	B	746	THR
1	B	757	HIS
1	B	761	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	66	HIS
1	A	92	ASN
1	A	286	GLN
1	A	506	ASN
1	A	685	ASN
1	B	66	HIS
1	B	92	ASN
1	B	298	HIS
1	B	430	ASN
1	B	506	ASN
1	B	685	ASN

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 monosaccharides 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	DC3	A	800	-	25,28,28	2.85	6 (24%)	30,39,39	1.73	5 (16%)
2	DC3	B	800	-	25,28,28	2.81	7 (28%)	30,39,39	1.33	3 (10%)

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	DC3	A	800	-	-	3/13/13/13	0/3/3/3
2	DC3	B	800	-	-	4/13/13/13	0/3/3/3

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	800	DC3	CAT-CAQ	-8.99	1.35	1.49
2	A	800	DC3	CAT-CAQ	-8.96	1.35	1.49
2	A	800	DC3	CAJ-CAD	-7.82	1.39	1.51
2	B	800	DC3	CAJ-CAD	-6.87	1.40	1.51
2	A	800	DC3	NAR-NAS	-5.07	1.25	1.34
2	B	800	DC3	FAI-CAB	-4.22	1.24	1.35

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	800	DC3	CAZ-CAX	-3.59	1.40	1.51
2	B	800	DC3	NAR-NAS	-3.57	1.28	1.34
2	A	800	DC3	CAZ-CAX	-3.52	1.40	1.51
2	B	800	DC3	NAS-NAO	-2.86	1.29	1.34
2	B	800	DC3	FAG-CAE	-2.57	1.28	1.35
2	A	800	DC3	NAS-NAO	-2.50	1.30	1.34
2	A	800	DC3	FAG-CAE	-2.42	1.29	1.35

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	800	DC3	NAR-NAS-NAO	5.34	111.19	107.22
2	B	800	DC3	NAR-NAS-NAO	4.64	110.67	107.22
2	A	800	DC3	CAT-CAQ-NAR	3.69	126.85	120.96
2	A	800	DC3	CAC-CAD-CAE	3.63	120.53	116.54
2	A	800	DC3	CAF-CAE-CAD	-2.85	119.36	123.76
2	B	800	DC3	CAC-CAD-CAE	2.51	119.30	116.54
2	B	800	DC3	CAT-CAQ-NAR	2.24	124.53	120.96
2	A	800	DC3	FAG-CAE-CAD	2.15	121.55	117.96

There are no chirality outliers.

All (7) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	800	DC3	CAL-CAN-NAO-CAP
2	B	800	DC3	CAJ-CAK-CAL-CAN
2	B	800	DC3	CAL-CAN-NAO-CAP
2	A	800	DC3	CAL-CAN-NAO-NAS
2	B	800	DC3	CAL-CAN-NAO-NAS
2	B	800	DC3	NAM-CAK-CAL-CAN
2	A	800	DC3	CAK-CAL-CAN-NAO

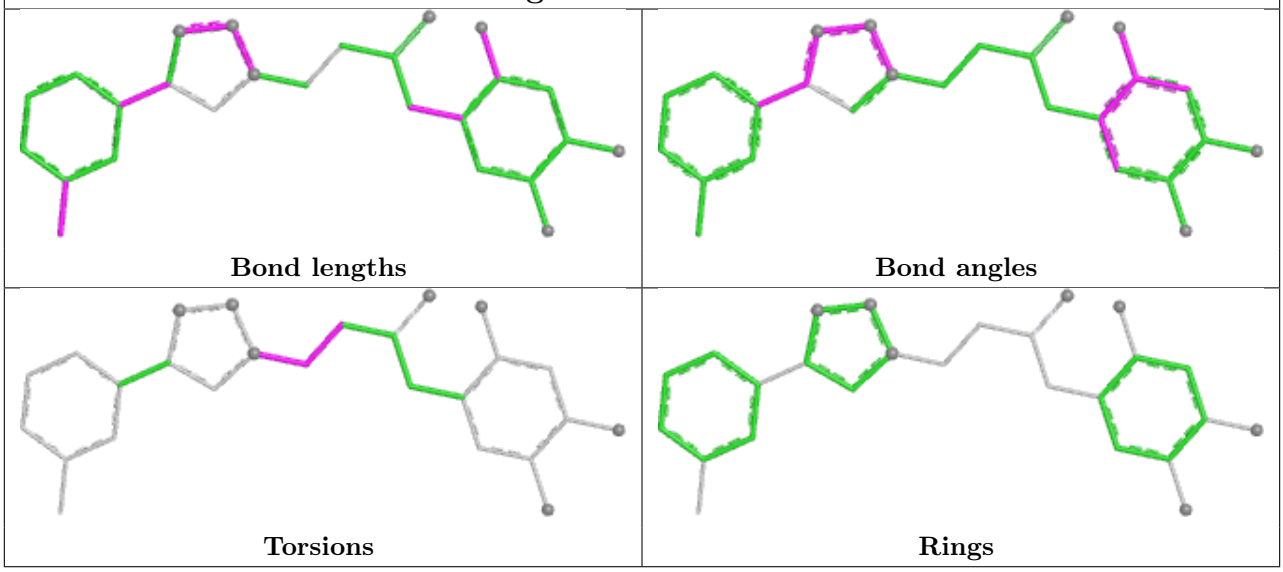
There are no ring outliers.

No monomer is involved in short contacts.

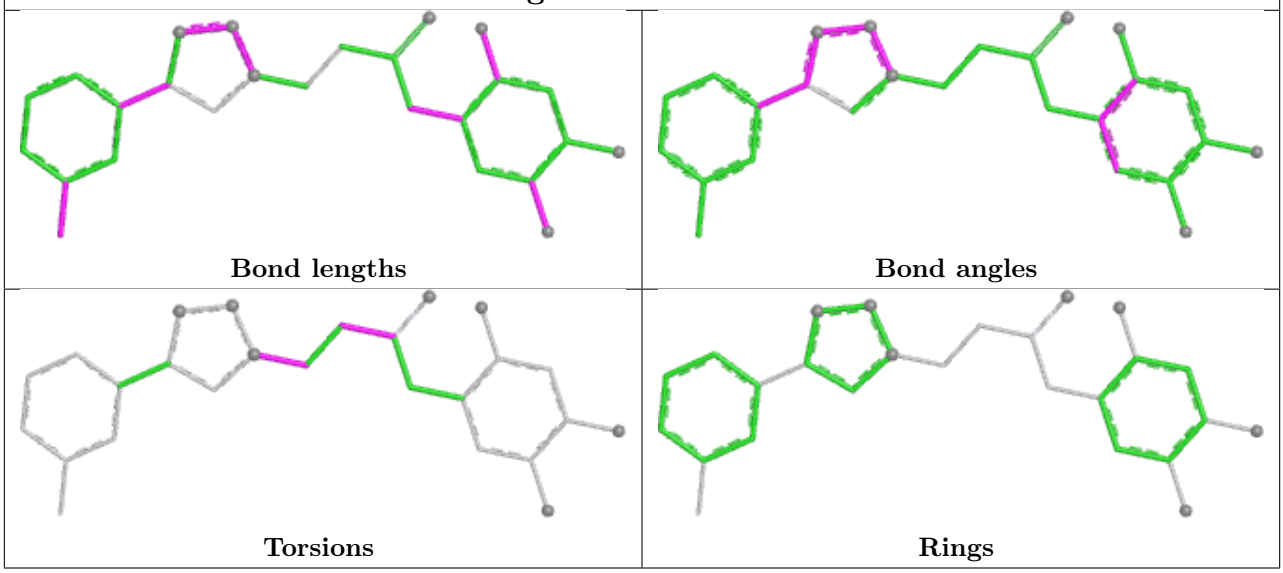
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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 DC3 A 800



Ligand DC3 B 800



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	724/728 (99%)	-0.02	5 (0%)	87	81	60, 100, 143, 184	0
1	B	724/728 (99%)	-0.02	7 (0%)	82	72	60, 106, 150, 223	0
All	All	1448/1456 (99%)	-0.02	12 (0%)	86	78	60, 103, 147, 223	0

All (12) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	83	TYR	5.0
1	A	467	TYR	4.7
1	B	54	ARG	2.8
1	A	435	GLN	2.7
1	B	415	LEU	2.5
1	A	89	PHE	2.4
1	B	82	GLU	2.4
1	B	467	TYR	2.2
1	A	69	LEU	2.2
1	A	300	LEU	2.1
1	B	485	SER	2.1
1	B	477	LEU	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 monosaccharides in this entry.

6.4 Ligands (i)

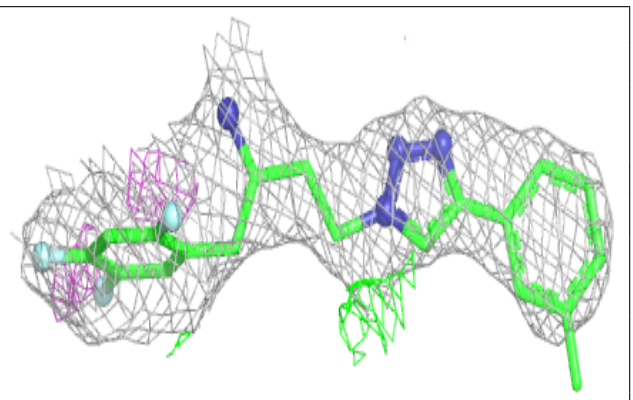
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

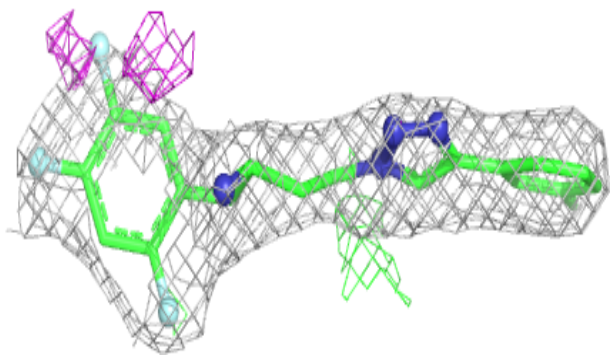
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	DC3	A	800	26/26	0.93	0.46	78,96,128,141	0
2	DC3	B	800	26/26	0.93	0.30	74,91,135,137	0

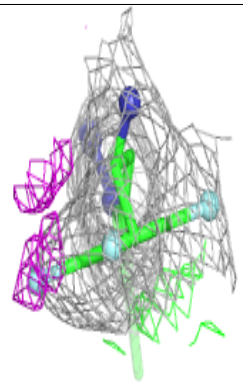
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

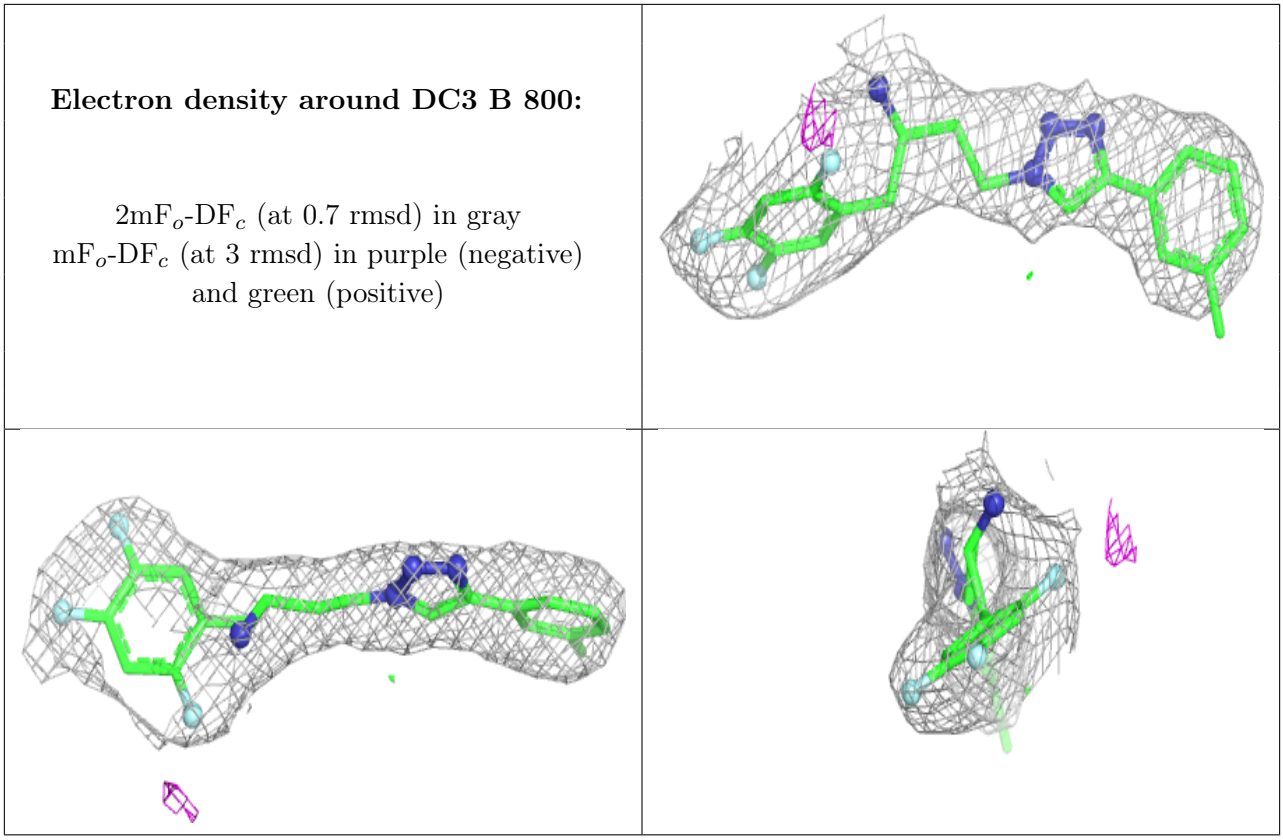
Electron density around DC3 A 800:

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.