



Full wwPDB X-ray Structure Validation Report ⓘ

May 21, 2020 – 12:45 am BST

PDB ID : 5Q SX
Title : PanDDA analysis group deposition – Crystal Structure of human STAG1 in complex with Z2856434812
Authors : Newman, J.A.; Katis, V.L.; Gavard, A.E.; von Delft, F.; Arrowsmith, C.H.; Edwards, A.; Bountra, C.; Gileadi, O.
Deposited on : 2019-07-16
Resolution : 2.34 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

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

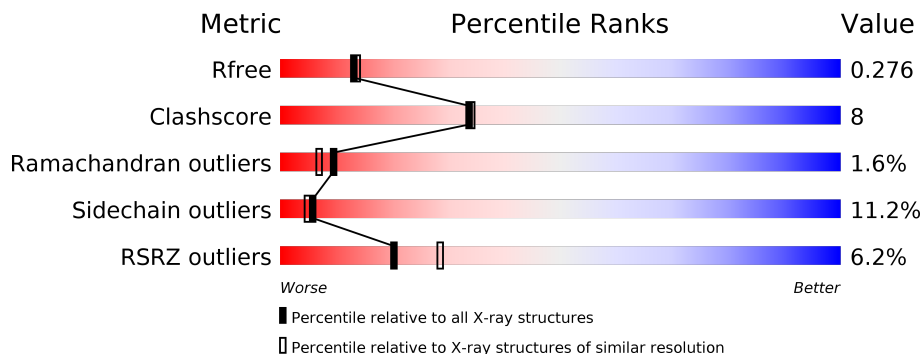
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.34 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	2096 (2.36-2.32)
Clashscore	141614	2193 (2.36-2.32)
Ramachandran outliers	138981	2159 (2.36-2.32)
Sidechain outliers	138945	2160 (2.36-2.32)
RSRZ outliers	127900	2067 (2.36-2.32)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	339	 6% 68% 16% •• 12%
1	B	339	 6% 66% 18% • 12%
1	C	339	 6% 71% 17% • 7%
1	D	339	 4% 70% 17% • 8%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit crite-

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	O3M	C	501	-	-	-	X
2	O3M	D	501	-	-	-	X

2 Entry composition i

There are 3 unique types of molecules in this entry. The entry contains 10244 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.

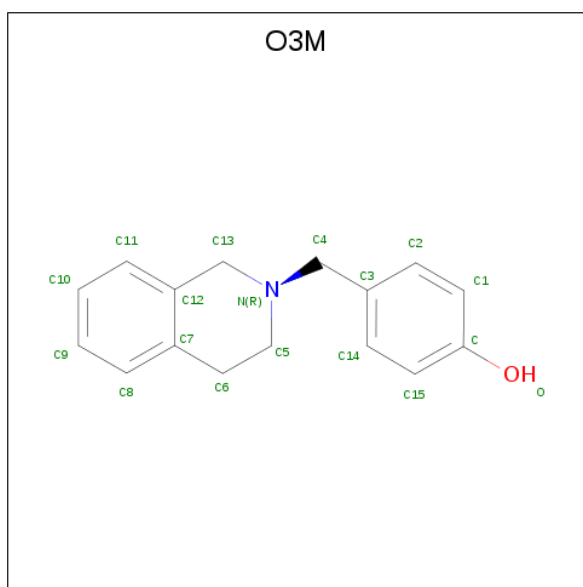
- Molecule 1 is a protein called Cohesin subunit SA-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	C	315	2587	1644	447	475	21	0	0	0
1	A	297	2433	1550	417	446	20	0	0	0
1	B	298	2452	1566	418	448	20	0	0	0
1	D	311	2561	1627	439	475	20	0	0	0

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	82	SER	-	expression tag	UNP Q8WVM7
C	83	MET	-	expression tag	UNP Q8WVM7
C	84	GLY	-	expression tag	UNP Q8WVM7
C	85	GLY	-	expression tag	UNP Q8WVM7
A	82	SER	-	expression tag	UNP Q8WVM7
A	83	MET	-	expression tag	UNP Q8WVM7
A	84	GLY	-	expression tag	UNP Q8WVM7
A	85	GLY	-	expression tag	UNP Q8WVM7
B	82	SER	-	expression tag	UNP Q8WVM7
B	83	MET	-	expression tag	UNP Q8WVM7
B	84	GLY	-	expression tag	UNP Q8WVM7
B	85	GLY	-	expression tag	UNP Q8WVM7
D	82	SER	-	expression tag	UNP Q8WVM7
D	83	MET	-	expression tag	UNP Q8WVM7
D	84	GLY	-	expression tag	UNP Q8WVM7
D	85	GLY	-	expression tag	UNP Q8WVM7

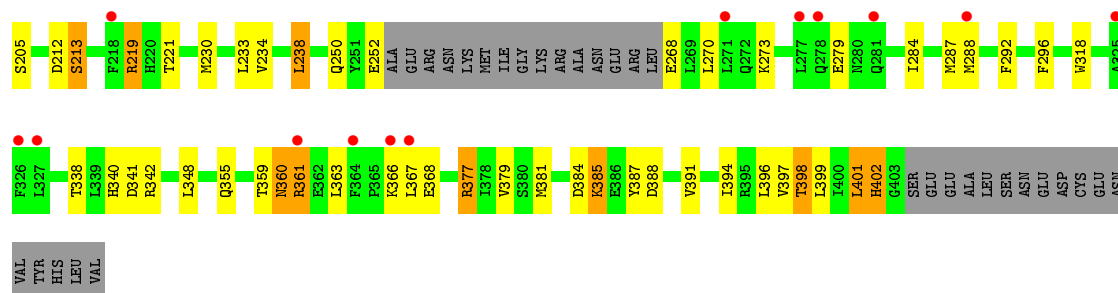
- Molecule 2 is 4-[(3,4-dihydroisoquinolin-2(1H)-yl)methyl]phenol (three-letter code: O3M) (formula: C₁₆H₁₇NO) (labeled as "Ligand of Interest" by author).



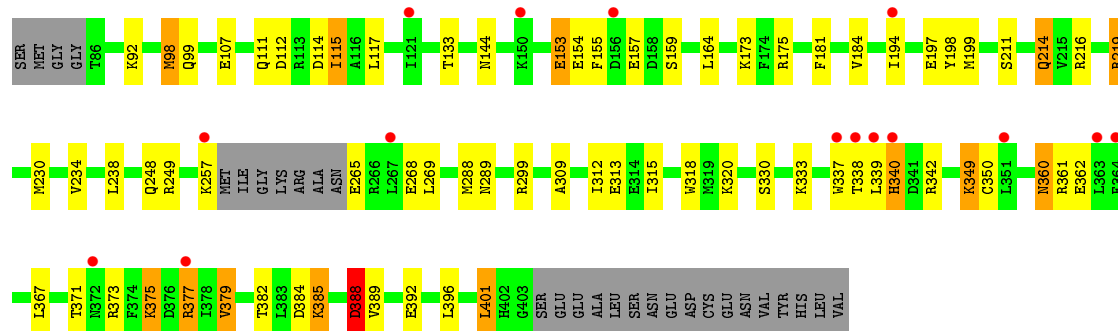
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
2	C	1	18	16	1	1	0	0
2	B	1	18	16	1	1	0	0
2	D	1	18	16	1	1	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
3	C	42	42	42	0	0
3	A	37	37	37	0	0
3	B	26	26	26	0	0
3	D	52	52	52	0	0



- Molecule 1: Cohesin subunit SA-1



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	66.72Å 72.40Å 118.43Å 94.82° 98.37° 115.51°	Depositor
Resolution (Å)	115.57 – 2.34 115.57 – 2.34	Depositor EDS
% Data completeness (in resolution range)	96.4 (115.57-2.34) 96.4 (115.57-2.34)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.23 (at 2.34Å)	Xtrriage
Refinement program	REFMAC 5.8.0238	Depositor
R, R_{free}	0.212 , 0.275 0.217 , 0.276	Depositor DCC
R_{free} test set	3950 reflections (4.96%)	wwPDB-VP
Wilson B-factor (Å ²)	64.8	Xtrriage
Anisotropy	0.051	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 55.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.35$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	10244	wwPDB-VP
Average B, all atoms (Å ²)	84.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.76% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ 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: O3M

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	0.74	0/2470	0.83	1/3319 (0.0%)
1	B	0.71	0/2493	0.84	0/3353
1	C	0.70	0/2629	0.84	1/3535 (0.0%)
1	D	0.69	0/2603	0.87	0/3501
All	All	0.71	0/10195	0.84	2/13708 (0.0%)

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 (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
1	A	175	ARG	NE-CZ-NH1	6.38	123.49	120.30
1	C	196	ASP	CB-CA-C	5.79	121.98	110.40

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	359	THR	Peptide

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	2433	0	2457	40	0
1	B	2452	0	2471	49	0
1	C	2587	0	2602	39	0
1	D	2561	0	2568	56	0
2	B	18	0	0	1	0
2	C	18	0	0	1	0
2	D	18	0	0	0	0
3	A	37	0	0	5	0
3	B	26	0	0	1	0
3	C	42	0	0	4	0
3	D	52	0	0	6	0
All	All	10244	0	10098	171	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 (171) 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:D:338:THR:HG22	1:D:350:CYS:SG	1.70	1.30
1:C:197:GLU:N	3:C:601:HOH:O	1.69	1.21
1:B:279:GLU:OE1	3:B:601:HOH:O	1.66	1.11
1:D:98:MET:SD	3:D:645:HOH:O	2.08	1.09
1:D:340:HIS:CE1	1:D:377:ARG:HG2	2.01	0.96
1:D:338:THR:CG2	1:D:350:CYS:SG	2.57	0.93
1:B:91:VAL:HG22	1:D:98:MET:CE	2.10	0.81
1:C:379:VAL:HG13	1:D:379:VAL:HG13	1.64	0.79
1:D:384:ASP:O	1:D:385:LYS:HB3	1.82	0.79
1:D:107:GLU:HG3	3:D:649:HOH:O	1.85	0.76
2:C:501:O3M:C2	2:C:501:O3M:C13	2.65	0.74
1:B:284:ILE:HG22	1:B:288:MET:HE3	1.69	0.74
1:B:384:ASP:O	1:B:385:LYS:HB2	1.88	0.73
1:B:91:VAL:HG22	1:D:98:MET:HE1	1.69	0.73
1:D:312:ILE:HG13	1:D:338:THR:HG21	1.69	0.73
1:D:340:HIS:CE1	1:D:377:ARG:CG	2.72	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:265:GLU:N	3:D:601:HOH:O	2.21	0.72
1:A:360:ASN:C	3:A:501:HOH:O	2.28	0.72
1:D:388:ASP:OD2	1:D:389:VAL:N	2.26	0.68
1:C:86:THR:HG21	3:A:532:HOH:O	1.96	0.66
1:B:230:MET:HG2	1:B:318:TRP:CZ2	2.31	0.66
1:C:384:ASP:O	1:C:385:LYS:HB2	1.96	0.65
1:D:248:GLN:HA	1:D:248:GLN:OE1	1.96	0.64
1:A:369:LEU:HD21	1:A:373:ARG:NH2	2.14	0.63
1:C:126:GLN:NE2	3:C:604:HOH:O	2.32	0.62
1:D:230:MET:HG2	1:D:318:TRP:CZ2	2.34	0.62
1:B:394:ILE:O	1:B:398:THR:HG22	2.00	0.62
1:D:384:ASP:O	1:D:385:LYS:CB	2.48	0.61
1:A:359:THR:O	1:A:360:ASN:HB2	2.01	0.61
1:D:234:VAL:HA	1:D:288:MET:CE	2.31	0.60
1:D:388:ASP:OD2	1:D:388:ASP:C	2.39	0.59
1:C:91:VAL:HG22	1:A:98:MET:HE1	1.83	0.59
1:D:112:ASP:HB3	1:D:115:ILE:HD12	1.84	0.59
1:D:360:ASN:HD21	1:D:362:GLU:HB2	1.67	0.59
1:C:162:TYR:CD1	1:C:217:ALA:HB2	2.38	0.58
1:C:340:HIS:CE1	1:C:377:ARG:HG3	2.39	0.58
1:B:284:ILE:HA	1:B:287:MET:CE	2.33	0.58
1:B:355:GLN:O	1:B:359:THR:HG23	2.03	0.57
1:C:384:ASP:O	1:C:385:LYS:CB	2.52	0.57
1:B:230:MET:HG2	1:B:318:TRP:CE2	2.40	0.57
1:C:382:THR:OG1	1:D:379:VAL:CG2	2.52	0.57
1:A:388:ASP:O	1:A:392:GLU:HG2	2.05	0.57
1:A:299:ARG:NH1	1:A:302:ASP:OD2	2.33	0.57
1:C:230:MET:HG2	1:C:318:TRP:CE2	2.40	0.56
1:B:128:SER:HA	1:B:221:THR:HG21	1.86	0.56
1:B:233:LEU:HB3	1:B:288:MET:HE2	1.88	0.55
1:D:153:GLU:O	1:D:155:PHE:N	2.39	0.55
1:C:143:GLN:HA	1:C:143:GLN:HE21	1.71	0.54
1:C:91:VAL:HG22	1:A:98:MET:CE	2.37	0.54
1:B:284:ILE:HD13	1:B:287:MET:HE2	1.89	0.54
1:B:360:ASN:C	1:B:361:ARG:O	2.46	0.54
1:B:86:THR:HG22	1:B:89:GLU:H	1.73	0.53
1:B:340:HIS:CE1	1:B:377:ARG:HG3	2.44	0.53
1:C:86:THR:HG22	1:C:89:GLU:H	1.73	0.53
1:C:375:LYS:O	1:C:379:VAL:HB	2.09	0.53
1:B:284:ILE:HG22	1:B:288:MET:CE	2.38	0.52
1:C:342:ARG:HD2	1:C:342:ARG:H	1.74	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:216:ARG:HD3	3:D:635:HOH:O	2.09	0.52
1:B:394:ILE:O	1:B:398:THR:CG2	2.57	0.52
1:D:360:ASN:C	1:D:360:ASN:HD22	2.12	0.52
1:D:114:ASP:OD1	1:D:198:TYR:OH	2.19	0.52
1:A:388:ASP:HB3	3:A:535:HOH:O	2.09	0.51
1:A:379:VAL:HG13	1:B:379:VAL:HG23	1.93	0.51
1:D:339:LEU:O	1:D:377:ARG:NH2	2.41	0.51
1:A:361:ARG:C	1:A:363:LEU:H	2.15	0.50
1:A:360:ASN:N	3:A:501:HOH:O	2.44	0.50
1:A:369:LEU:HD21	1:A:373:ARG:HH22	1.77	0.50
1:A:242:ILE:O	1:A:246:ASN:HB2	2.12	0.50
1:D:98:MET:HE2	1:D:181:PHE:HB2	1.94	0.49
1:B:91:VAL:HG13	1:D:98:MET:HE2	1.94	0.49
1:D:333:LYS:HD2	1:D:337:TRP:CH2	2.47	0.49
1:A:384:ASP:O	1:A:385:LYS:CB	2.60	0.49
1:D:98:MET:HG3	1:D:181:PHE:HA	1.95	0.49
1:D:330:SER:O	1:D:333:LYS:HE3	2.14	0.48
1:A:361:ARG:HG3	3:A:501:HOH:O	2.12	0.48
1:C:200:MET:HE1	1:C:229:LEU:HD21	1.96	0.48
1:C:274:ARG:HG3	3:C:613:HOH:O	2.11	0.48
1:D:211:SER:O	1:D:219:ARG:HG2	2.12	0.48
1:A:166:MET:O	1:A:168:GLY:N	2.47	0.48
1:C:244:GLN:OE1	1:C:281:GLN:OE1	2.32	0.48
1:C:312:ILE:HG13	1:C:338:THR:HG21	1.94	0.48
1:B:201:ASP:O	1:B:205:SER:HB2	2.13	0.48
1:B:284:ILE:HD13	1:B:287:MET:CE	2.44	0.48
1:B:171:TRP:CZ3	1:D:92:LYS:HD2	2.48	0.47
1:B:284:ILE:HA	1:B:287:MET:HE3	1.96	0.47
1:D:214:GLN:HE21	1:D:214:GLN:HA	1.78	0.47
1:C:327:LEU:CD1	1:C:332:LEU:HD11	2.45	0.47
1:D:164:LEU:CD2	1:D:175:ARG:HG3	2.44	0.47
1:A:216:ARG:CD	1:A:304:ILE:HG13	2.45	0.47
1:A:369:LEU:CD2	1:A:373:ARG:NH2	2.77	0.47
1:A:235:ASN:O	1:A:239:ASN:ND2	2.47	0.47
1:C:92:LYS:O	1:C:93:LEU:HB2	2.15	0.46
1:A:270:LEU:N	1:A:270:LEU:HD23	2.31	0.46
1:B:284:ILE:HA	1:B:287:MET:HE2	1.98	0.46
1:D:157:GLU:N	3:D:602:HOH:O	2.43	0.46
1:C:324:ASP:OD2	1:C:324:ASP:N	2.46	0.46
1:B:292:PHE:CE1	1:B:296:PHE:CD1	3.03	0.46
1:B:91:VAL:HA	1:D:98:MET:HE1	1.98	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:382:THR:HB	1:B:397:VAL:HG11	1.98	0.46
1:A:286:ASN:O	1:A:290:SER:OG	2.34	0.45
1:B:117:LEU:O	1:B:121:ILE:HG12	2.16	0.45
1:C:194:ILE:HD11	1:C:200:MET:SD	2.57	0.45
1:D:333:LYS:CD	1:D:337:TRP:CH2	2.99	0.45
1:D:99:GLN:HA	1:D:184:VAL:HG11	1.99	0.45
1:A:175:ARG:HH11	1:A:175:ARG:HG3	1.82	0.45
1:C:394:ILE:O	1:C:398:THR:HG22	2.17	0.44
1:D:234:VAL:HA	1:D:288:MET:HE1	1.98	0.44
1:A:327:LEU:CD2	1:A:363:LEU:HG	2.48	0.44
1:B:238:LEU:HA	1:B:238:LEU:HD12	1.87	0.44
1:C:162:TYR:CD1	1:C:217:ALA:CB	2.99	0.44
1:D:401:LEU:HD23	1:D:401:LEU:HA	1.86	0.44
1:C:379:VAL:HG22	1:D:382:THR:OG1	2.18	0.44
1:B:213:SER:O	1:B:219:ARG:HD3	2.18	0.44
1:A:327:LEU:HD23	1:A:363:LEU:HG	1.99	0.44
1:B:250:GLN:HB3	1:B:270:LEU:HD11	1.99	0.44
1:D:315:ILE:HA	1:D:318:TRP:CE3	2.52	0.43
1:B:230:MET:O	1:B:234:VAL:HG23	2.18	0.43
1:C:196:ASP:C	3:C:601:HOH:O	2.30	0.43
1:C:315:ILE:HA	1:C:318:TRP:CE3	2.53	0.43
1:B:125:ILE:CG2	1:B:132:GLY:HA3	2.49	0.43
1:C:326:PHE:HA	1:C:331:TYR:HD2	1.84	0.43
1:C:379:VAL:CG1	1:D:379:VAL:HG13	2.42	0.43
1:B:384:ASP:O	1:B:385:LYS:CB	2.64	0.43
1:D:360:ASN:C	1:D:360:ASN:ND2	2.72	0.43
1:C:92:LYS:O	1:C:93:LEU:CB	2.67	0.43
1:B:151:MET:O	1:B:154:GLU:HB2	2.19	0.43
1:D:313:GLU:OE1	1:D:349:LYS:NZ	2.51	0.43
1:A:152:THR:O	1:A:154:GLU:N	2.52	0.43
1:A:360:ASN:HD22	1:A:360:ASN:HA	1.65	0.43
2:B:501:O3M:C5	2:B:501:O3M:C14	2.97	0.43
1:B:387:TYR:O	1:B:391:VAL:HG23	2.19	0.42
1:C:342:ARG:CD	1:C:342:ARG:H	2.31	0.42
1:D:342:ARG:NH1	3:D:607:HOH:O	2.52	0.42
1:A:394:ILE:HD12	1:B:401:LEU:HD12	2.01	0.42
1:B:121:ILE:HD11	1:B:202:THR:HG22	2.00	0.42
1:C:186:ILE:HD13	1:C:229:LEU:HD23	2.02	0.42
1:A:227:MET:HB3	1:A:314:GLU:HG2	2.01	0.42
1:D:309:ALA:HB1	1:D:349:LYS:HD3	2.00	0.42
1:A:315:ILE:HA	1:A:318:TRP:CE3	2.54	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:360:ASN:O	1:B:361:ARG:O	2.38	0.42
1:C:230:MET:HG2	1:C:318:TRP:CZ2	2.55	0.42
1:A:112:ASP:HB3	1:A:115:ILE:HD12	2.02	0.42
1:A:226:ALA:CB	1:A:295:ILE:HD13	2.49	0.42
1:B:196:ASP:OD1	1:B:196:ASP:C	2.58	0.42
1:D:371:THR:O	1:D:375:LYS:HB2	2.19	0.42
1:A:387:TYR:O	1:A:388:ASP:HB3	2.21	0.41
1:B:194:ILE:HG22	1:B:195:TYR:CD2	2.55	0.41
1:C:121:ILE:HG12	1:C:206:LEU:HD22	2.02	0.41
1:A:121:ILE:HD12	1:A:206:LEU:HD22	2.02	0.41
1:B:132:GLY:O	1:B:133:THR:HG23	2.20	0.41
1:A:135:ARG:NH1	1:A:137:GLU:OE2	2.46	0.41
1:A:226:ALA:HB2	1:A:295:ILE:HD13	2.01	0.41
1:A:230:MET:HG2	1:A:318:TRP:CZ2	2.56	0.41
1:C:163:PRO:HB3	1:C:171:TRP:CZ3	2.55	0.41
1:A:396:LEU:HD22	1:A:400:ILE:CD1	2.51	0.41
1:D:117:LEU:HA	1:D:117:LEU:HD23	1.89	0.41
1:B:171:TRP:CH2	1:D:92:LYS:HD2	2.56	0.41
1:C:360:ASN:ND2	1:C:363:LEU:HG	2.36	0.41
1:D:249:ARG:HA	1:D:249:ARG:NE	2.36	0.41
1:B:363:LEU:O	1:B:367:LEU:HD22	2.21	0.41
1:D:234:VAL:CA	1:D:288:MET:CE	2.98	0.41
1:B:164:LEU:HA	1:B:164:LEU:HD23	1.97	0.41
1:B:359:THR:HA	1:B:399:LEU:HD22	2.03	0.40
1:A:299:ARG:O	1:A:302:ASP:HB2	2.21	0.40
1:B:381:MET:O	1:B:384:ASP:HB2	2.22	0.40
1:D:388:ASP:O	1:D:392:GLU:HG2	2.21	0.40
1:A:387:TYR:O	1:A:388:ASP:CB	2.69	0.40
1:D:157:GLU:HA	1:D:159:SER:O	2.21	0.40
1:D:98:MET:CE	1:D:181:PHE:HB2	2.51	0.40
1:B:338:THR:O	1:B:341:ASP:HB2	2.22	0.40
1:C:300:TYR:CZ	1:C:334:TYR:HD1	2.40	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	289/339 (85%)	257 (89%)	27 (9%)	5 (2%)	9	6
1	B	292/339 (86%)	272 (93%)	16 (6%)	4 (1%)	11	8
1	C	311/339 (92%)	291 (94%)	14 (4%)	6 (2%)	8	5
1	D	307/339 (91%)	287 (94%)	16 (5%)	4 (1%)	12	9
All	All	1199/1356 (88%)	1107 (92%)	73 (6%)	19 (2%)	9	7

All (19) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	93	LEU
1	A	360	ASN
1	B	361	ARG
1	D	153	GLU
1	C	259	ILE
1	C	362	GLU
1	C	385	LYS
1	A	153	GLU
1	A	385	LYS
1	A	388	ASP
1	B	385	LYS
1	D	385	LYS
1	D	388	ASP
1	C	361	ARG
1	B	368	GLU
1	D	154	GLU
1	C	258	MET
1	B	402	HIS
1	A	387	TYR

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	269/306 (88%)	240 (89%)	29 (11%)	6	5
1	B	271/306 (89%)	245 (90%)	26 (10%)	8	7
1	C	284/306 (93%)	245 (86%)	39 (14%)	3	3
1	D	283/306 (92%)	253 (89%)	30 (11%)	6	5
All	All	1107/1224 (90%)	983 (89%)	124 (11%)	6	5

All (124) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	86	THR
1	C	98	MET
1	C	111	GLN
1	C	113	ARG
1	C	136	ILE
1	C	143	GLN
1	C	155	PHE
1	C	166	MET
1	C	196	ASP
1	C	212	ASP
1	C	218	PHE
1	C	219	ARG
1	C	229	LEU
1	C	238	LEU
1	C	241	SER
1	C	252	GLU
1	C	256	ASN
1	C	259	ILE
1	C	261	LYS
1	C	262	ARG
1	C	266	ARG
1	C	281	GLN
1	C	283	GLU
1	C	286	ASN
1	C	290	SER
1	C	323	SER
1	C	324	ASP
1	C	327	LEU
1	C	342	ARG
1	C	363	LEU
1	C	368	GLU
1	C	373	ARG
1	C	375	LYS

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Mol	Chain	Res	Type
1	C	377	ARG
1	C	379	VAL
1	C	388	ASP
1	C	396	LEU
1	C	398	THR
1	C	401	LEU
1	A	111	GLN
1	A	115	ILE
1	A	133	THR
1	A	136	ILE
1	A	137	GLU
1	A	161	ASP
1	A	175	ARG
1	A	196	ASP
1	A	212	ASP
1	A	218	PHE
1	A	230	MET
1	A	235	ASN
1	A	250	GLN
1	A	271	LEU
1	A	274	ARG
1	A	275	LYS
1	A	290	SER
1	A	293	LYS
1	A	330	SER
1	A	333	LYS
1	A	342	ARG
1	A	348	LEU
1	A	360	ASN
1	A	362	GLU
1	A	373	ARG
1	A	375	LYS
1	A	379	VAL
1	A	396	LEU
1	A	401	LEU
1	B	86	THR
1	B	131	ARG
1	B	136	ILE
1	B	170	GLN
1	B	172	LYS
1	B	175	ARG
1	B	186	ILE

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Mol	Chain	Res	Type
1	B	196	ASP
1	B	199	MET
1	B	212	ASP
1	B	213	SER
1	B	219	ARG
1	B	238	LEU
1	B	252	GLU
1	B	268	GLU
1	B	273	LYS
1	B	342	ARG
1	B	348	LEU
1	B	360	ASN
1	B	366	LYS
1	B	377	ARG
1	B	388	ASP
1	B	396	LEU
1	B	398	THR
1	B	401	LEU
1	B	402	HIS
1	D	98	MET
1	D	111	GLN
1	D	115	ILE
1	D	133	THR
1	D	144	ASN
1	D	173	LYS
1	D	194	ILE
1	D	197	GLU
1	D	199	MET
1	D	214	GLN
1	D	219	ARG
1	D	238	LEU
1	D	257	LYS
1	D	268	GLU
1	D	269	LEU
1	D	289	ASN
1	D	299	ARG
1	D	320	LYS
1	D	340	HIS
1	D	349	LYS
1	D	360	ASN
1	D	361	ARG
1	D	367	LEU

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Mol	Chain	Res	Type
1	D	373	ARG
1	D	375	LYS
1	D	377	ARG
1	D	379	VAL
1	D	388	ASP
1	D	396	LEU
1	D	401	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	143	GLN
1	C	250	GLN
1	C	256	ASN
1	C	289	ASN
1	A	190	GLN
1	A	239	ASN
1	A	281	GLN
1	A	343	GLN
1	A	360	ASN
1	B	281	GLN
1	D	99	GLN
1	D	214	GLN
1	D	340	HIS
1	D	360	ASN
1	D	372	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 carbohydrates in this entry.

5.6 Ligand geometry

3 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	O3M	B	501	-	20,20,20	1.28	2 (10%)	27,27,27	1.31	5 (18%)
2	O3M	C	501	-	20,20,20	2.04	6 (30%)	27,27,27	1.88	7 (25%)
2	O3M	D	501	-	20,20,20	1.46	4 (20%)	27,27,27	1.80	8 (29%)

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	O3M	B	501	-	-	0/4/13/13	0/3/3/3
2	O3M	C	501	-	-	0/4/13/13	0/3/3/3
2	O3M	D	501	-	-	0/4/13/13	0/3/3/3

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	501	O3M	C8-C7	-5.18	1.30	1.39
2	C	501	O3M	C12-C7	-4.11	1.32	1.40
2	C	501	O3M	C9-C8	-3.03	1.32	1.38
2	C	501	O3M	C6-C7	-2.88	1.46	1.51
2	D	501	O3M	C4-C3	-2.78	1.46	1.51
2	C	501	O3M	C10-C11	-2.73	1.33	1.38
2	B	501	O3M	C4-C3	-2.62	1.46	1.51
2	D	501	O3M	C4-N	2.33	1.52	1.47
2	D	501	O3M	C5-C6	2.32	1.56	1.51
2	C	501	O3M	C4-N	-2.10	1.43	1.47
2	D	501	O3M	C13-N	2.09	1.50	1.47
2	B	501	O3M	C6-C7	-2.06	1.47	1.51

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	501	O3M	C6-C5-N	-4.99	105.64	111.07
2	D	501	O3M	C6-C5-N	-4.41	106.27	111.07
2	C	501	O3M	C5-C6-C7	-3.36	105.36	111.35
2	D	501	O3M	C4-C3-C14	-3.29	114.58	120.77
2	D	501	O3M	C13-N-C5	3.12	113.90	109.91
2	B	501	O3M	C13-N-C5	-2.92	106.17	109.91
2	C	501	O3M	C4-C3-C14	-2.78	115.53	120.77
2	D	501	O3M	C4-N-C13	-2.61	106.98	111.62
2	C	501	O3M	C2-C1-C	-2.59	117.03	119.88
2	C	501	O3M	C12-C13-N	2.58	115.18	112.14
2	C	501	O3M	C4-N-C5	-2.48	105.53	111.06
2	D	501	O3M	C2-C3-C14	2.48	122.06	118.17
2	B	501	O3M	C6-C5-N	-2.43	108.43	111.07
2	B	501	O3M	C5-C6-C7	-2.41	107.05	111.35
2	B	501	O3M	C3-C4-N	-2.37	108.53	113.12
2	D	501	O3M	C3-C4-N	2.34	117.67	113.12
2	C	501	O3M	C4-N-C13	-2.16	107.79	111.62
2	D	501	O3M	C2-C1-C	-2.14	117.52	119.88
2	B	501	O3M	C4-N-C5	-2.07	106.46	111.06
2	D	501	O3M	C11-C12-C7	2.01	121.45	118.98

There are no chirality outliers.

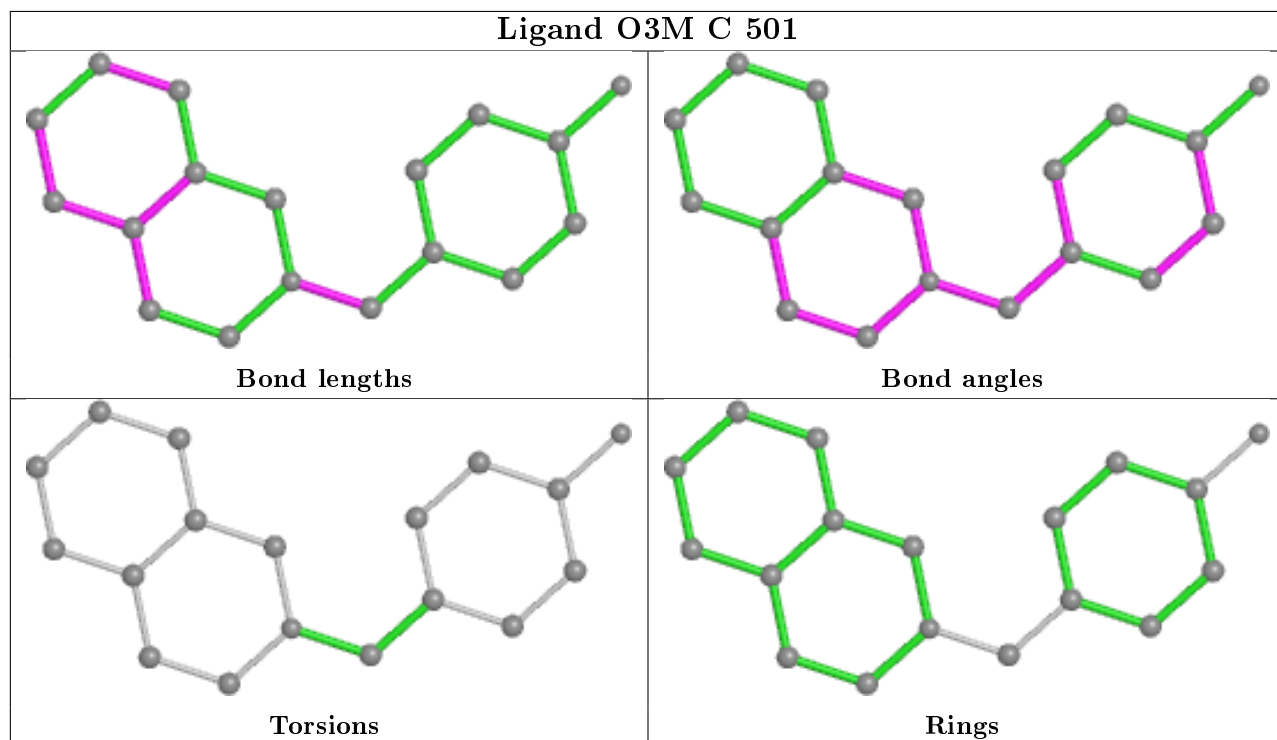
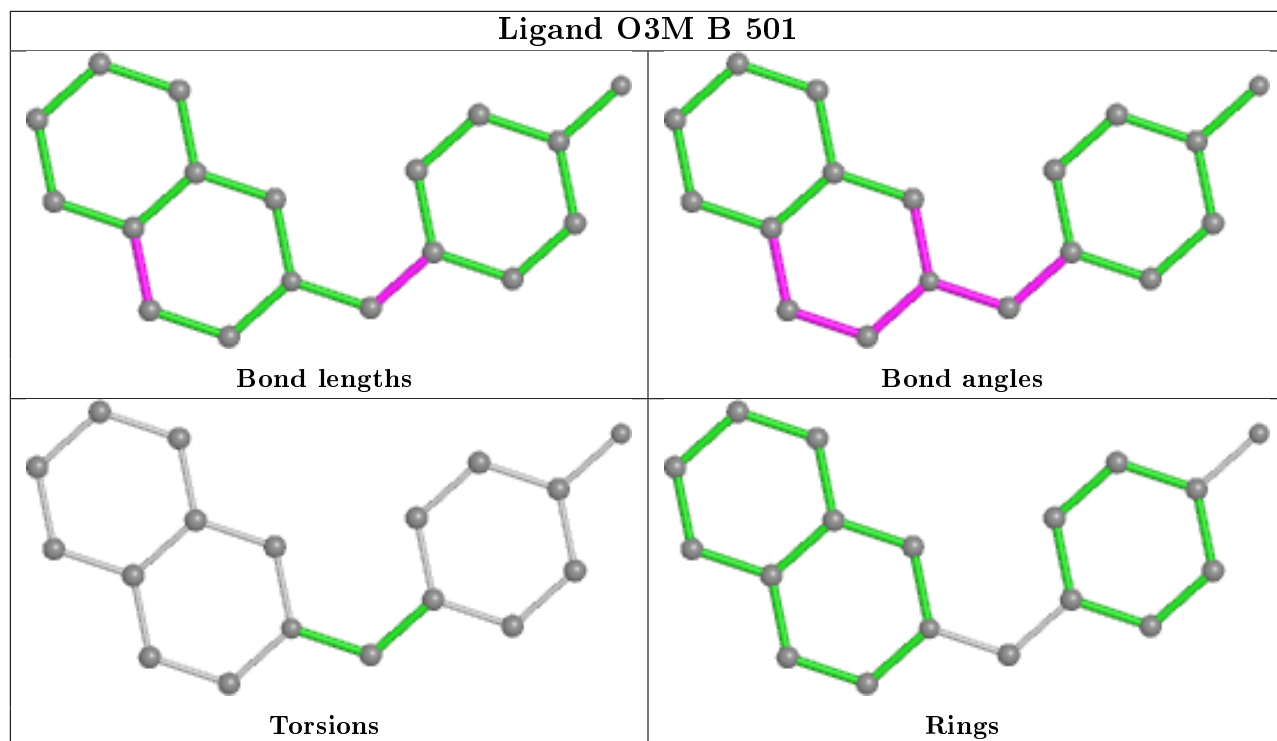
There are no torsion outliers.

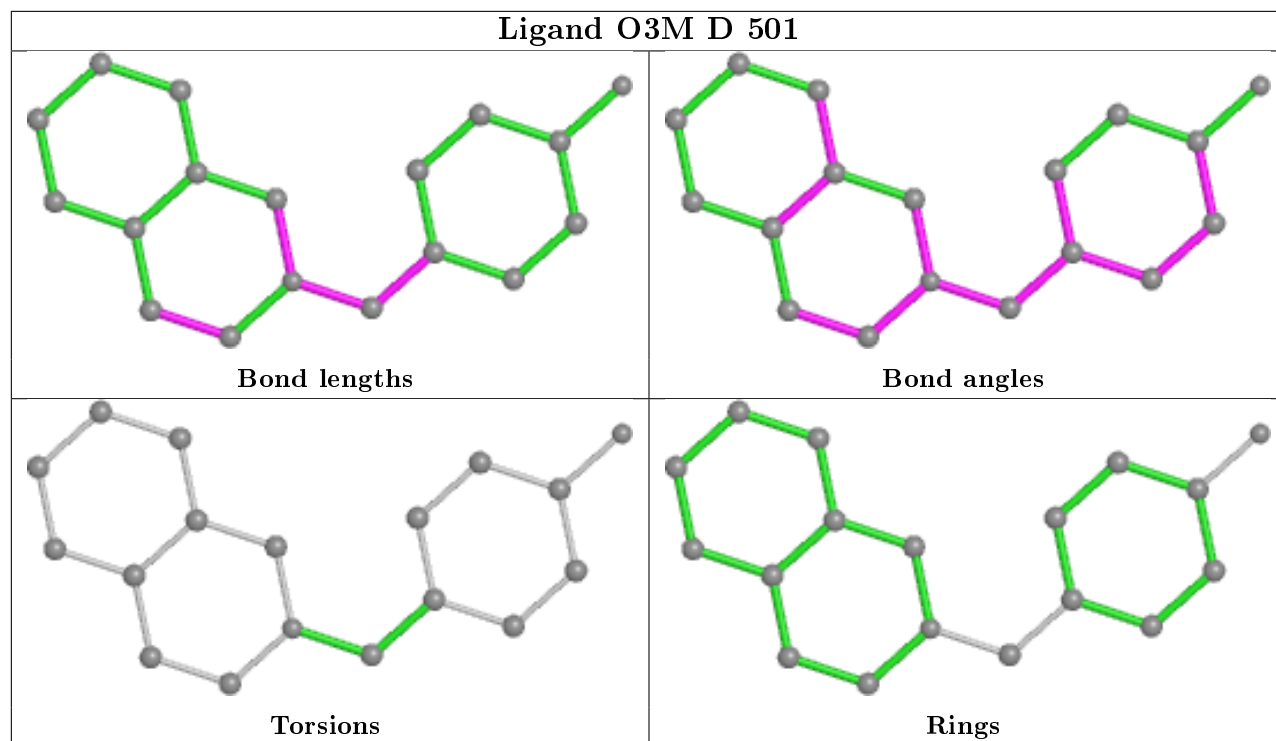
There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	501	O3M	1	0
2	C	501	O3M	1	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 than 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.





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, 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	297/339 (87%)	0.65	19 (6%) 19 27	59, 85, 136, 187	0
1	B	298/339 (87%)	0.55	20 (6%) 17 25	42, 78, 124, 147	10 (3%)
1	C	315/339 (92%)	0.66	22 (6%) 16 24	53, 77, 122, 163	1 (0%)
1	D	311/339 (91%)	0.55	15 (4%) 30 41	34, 70, 120, 161	6 (1%)
All	All	1221/1356 (90%)	0.60	76 (6%) 20 28	34, 78, 125, 187	17 (1%)

All (76) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	263	ALA	8.7
1	C	262	ARG	7.4
1	A	250	GLN	7.1
1	C	259	ILE	6.7
1	A	249	ARG	6.4
1	D	340	HIS	6.1
1	C	267	LEU	6.0
1	B	139	PHE	5.8
1	A	198	TYR	5.4
1	C	131	ARG	5.3
1	C	155	PHE	5.1
1	D	339	LEU	5.0
1	C	271	LEU	4.8
1	D	337	TRP	4.6
1	A	271	LEU	4.6
1	D	338	THR	4.6
1	B	327	LEU	4.5
1	B	136	ILE	4.5
1	B	198	TYR	4.3
1	C	251	TYR	3.8
1	A	247	THR	3.7

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Mol	Chain	Res	Type	RSRZ
1	C	137	GLU	3.6
1	D	364	PHE	3.6
1	A	272	GLN	3.5
1	B	364	PHE	3.4
1	C	258	MET	3.3
1	A	275	LYS	3.2
1	A	153	GLU	3.2
1	A	402	HIS	3.1
1	C	269	LEU	3.0
1	B	111	GLN	3.0
1	B	361	ARG	3.0
1	D	257	LYS	3.0
1	B	281	GLN	2.8
1	C	156	ASP	2.8
1	C	139	PHE	2.8
1	A	281	GLN	2.8
1	C	261	LYS	2.8
1	B	288	MET	2.7
1	D	377	ARG	2.7
1	C	255	ARG	2.7
1	B	131	ARG	2.7
1	C	170	GLN	2.7
1	C	198	TYR	2.7
1	B	278	GLN	2.7
1	D	267	LEU	2.6
1	D	351	LEU	2.6
1	D	150	LYS	2.5
1	A	274	ARG	2.5
1	A	383	LEU	2.5
1	C	134	VAL	2.5
1	A	373	ARG	2.5
1	B	366	LYS	2.5
1	B	155	PHE	2.5
1	A	364	PHE	2.4
1	C	124	PHE	2.4
1	D	372	ASN	2.4
1	A	139	PHE	2.4
1	A	148	ILE	2.4
1	A	124	PHE	2.4
1	C	337	TRP	2.3
1	C	218	PHE	2.3
1	C	171	TRP	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	271	LEU	2.3
1	B	218	PHE	2.2
1	B	326	PHE	2.2
1	B	277	LEU	2.2
1	D	156	ASP	2.2
1	B	121	ILE	2.2
1	B	325	ALA	2.1
1	A	214	GLN	2.0
1	B	367	LEU	2.0
1	D	121	ILE	2.0
1	D	194	ILE	2.0
1	A	93	LEU	2.0
1	D	363	LEU	2.0

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

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

6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

6.4 Ligands [i](#)

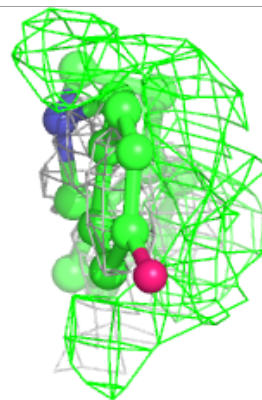
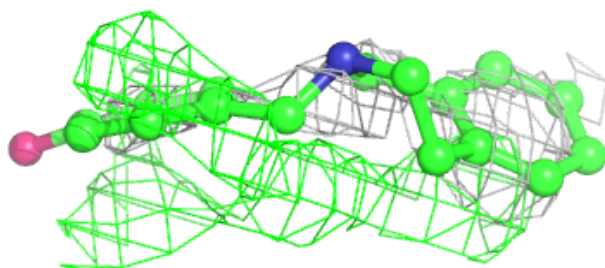
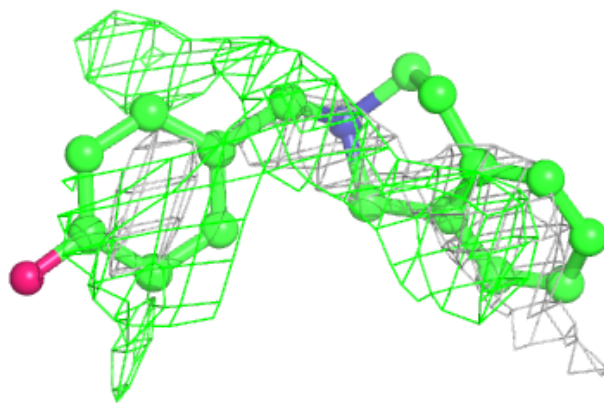
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	O3M	C	501	18/18	0.73	0.53	58,68,79,83	18
2	O3M	D	501	18/18	0.78	0.50	41,48,55,56	18
2	O3M	B	501	18/18	0.90	0.50	48,54,66,72	18

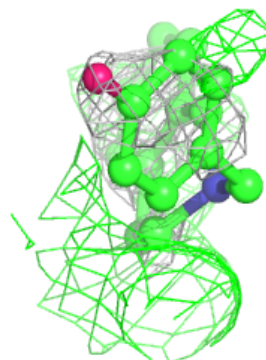
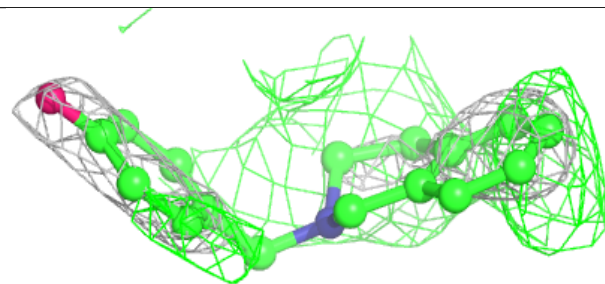
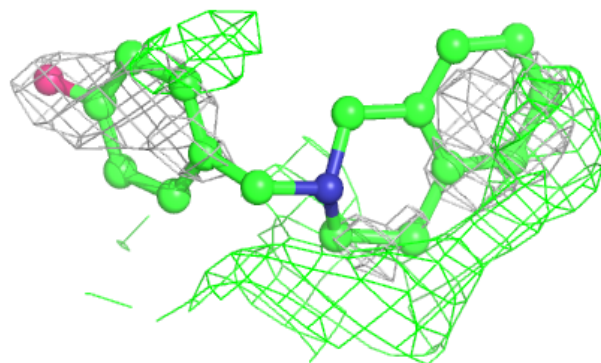
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

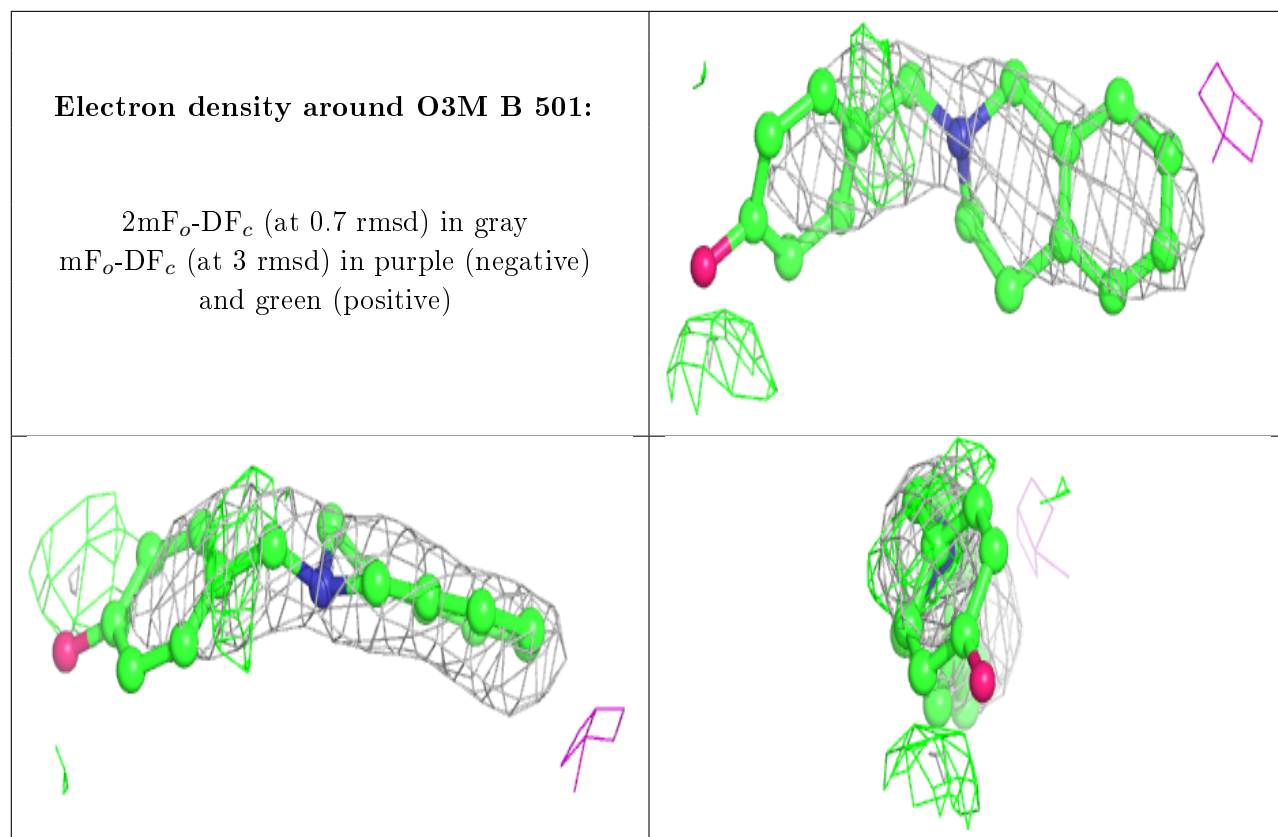
Electron density around O3M C 501:

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

**Electron density around O3M D 501:**

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





6.5 Other polymers [i](#)

There are no such residues in this entry.