Full wwPDB X-ray Structure Validation Report ⓘ

Oct 26, 2024 – 09:12 AM EDT

PDB ID	:	5I74
Title	:	X-ray structure of the ts3 human serotonin transporter complexed with Br-citalopram at the central site
Authors	:	Coleman, J.A.; Green, E.M.; Gouaux, E.
Deposited on	:	2016-02-16
Resolution	:	3.40 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:

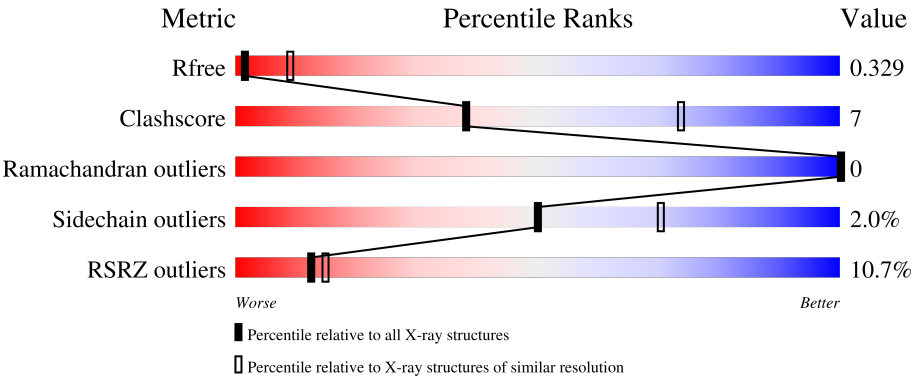
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

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 3.40 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	1140 (3.46-3.34)
Clashscore	180529	1172 (3.46-3.34)
Ramachandran outliers	177936	1172 (3.46-3.34)
Sidechain outliers	177891	1172 (3.46-3.34)
RSRZ outliers	164620	1140 (3.46-3.34)

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	549	8% 82% 16%
2	B	221	15% 79% 19%
3	C	214	12% 79% 21%

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 criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
8	HEX	A	704	-	-	-	X

2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 7610 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 Sodium-dependent serotonin transporter.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	542	Total	C	N	O	S	0	0	0
			4207	2809	652	722	24			

There are 11 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	74	GLY	-	cloning artifact	UNP P31645
A	75	SER	-	cloning artifact	UNP P31645
A	110	ALA	TYR	engineered mutation	UNP P31645
A	291	ALA	ILE	engineered mutation	UNP P31645
A	439	SER	THR	engineered mutation	UNP P31645
A	554	ALA	CYS	engineered mutation	UNP P31645
A	580	ALA	CYS	engineered mutation	UNP P31645
A	619	LEU	-	cloning artifact	UNP P31645
A	620	VAL	-	cloning artifact	UNP P31645
A	621	PRO	-	cloning artifact	UNP P31645
A	622	ARG	-	cloning artifact	UNP P31645

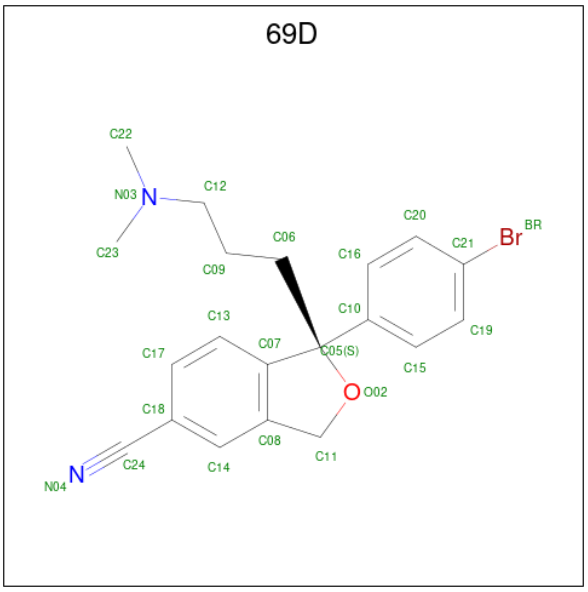
- Molecule 2 is a protein called 8B6 antibody, heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	218	Total	C	N	O	S	0	0	0
			1643	1038	266	331	8			

- Molecule 3 is a protein called 8B6 antibody, light chain.

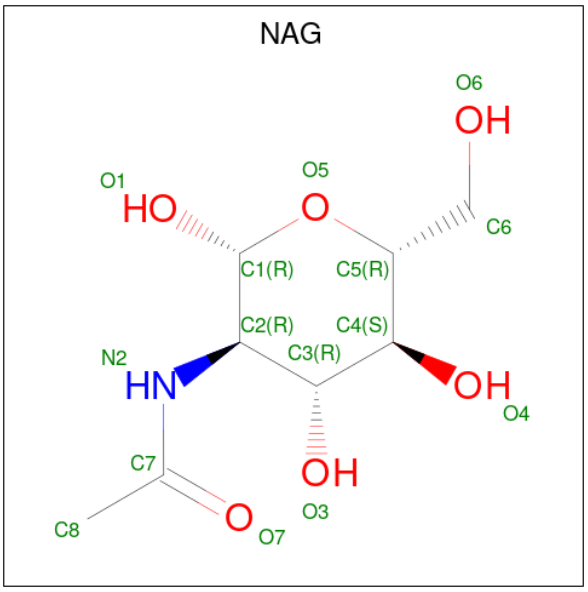
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	214	Total	C	N	O	S	0	0	0
			1662	1037	280	337	8			

- Molecule 4 is (1S)-1-(4-bromophenyl)-1-[3-(dimethylamino)propyl]-1,3-dihydro-2-benzofuran-5-carbonitrile (three-letter code: 69D) (formula: $C_{20}H_{21}BrN_2O$).



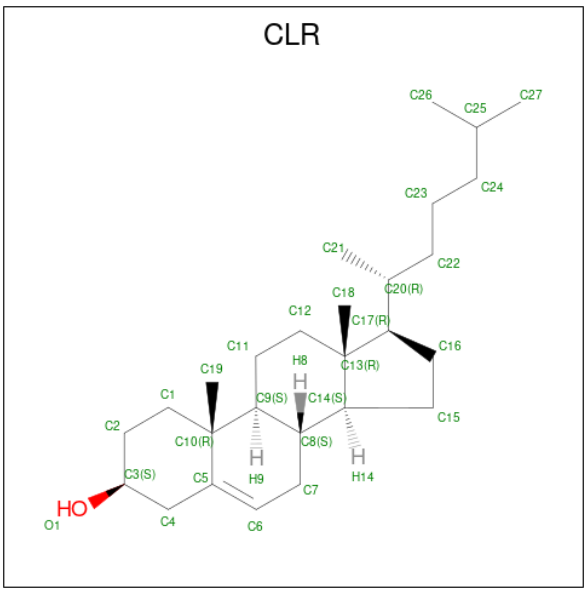
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	Br	C	N	O	0	0
			24	1	20	2	1		

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).



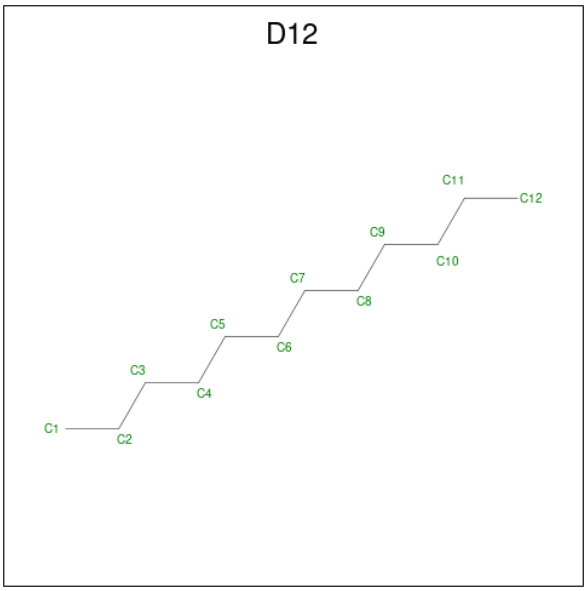
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total	C	N	O	0	0
			14	8	1	5		
5	A	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 6 is CHOLESTEROL (three-letter code: CLR) (formula: $C_{27}H_{46}O$).



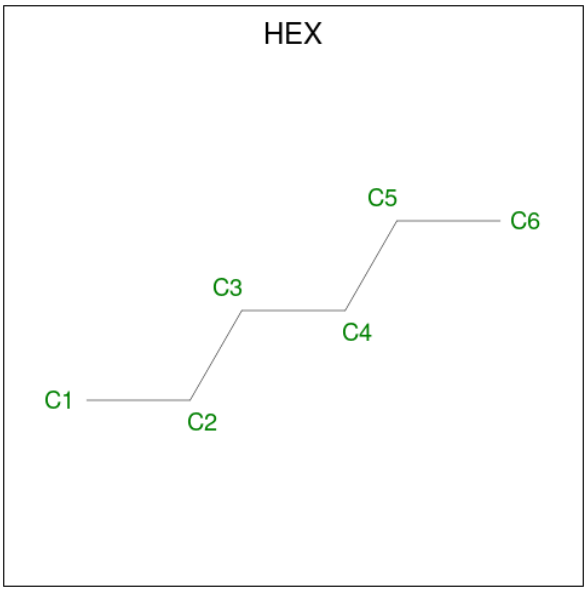
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total C O 28 27 1	0	0

- Molecule 7 is DODECANE (three-letter code: D12) (formula: $C_{12}H_{26}$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	1	Total C 12 12	0	0

- Molecule 8 is HEXANE (three-letter code: HEX) (formula: C_6H_{14}).



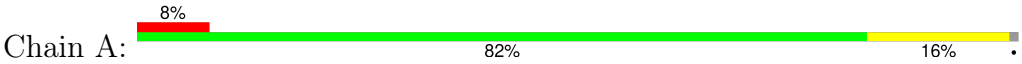
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	1	Total C 6 6	0	0

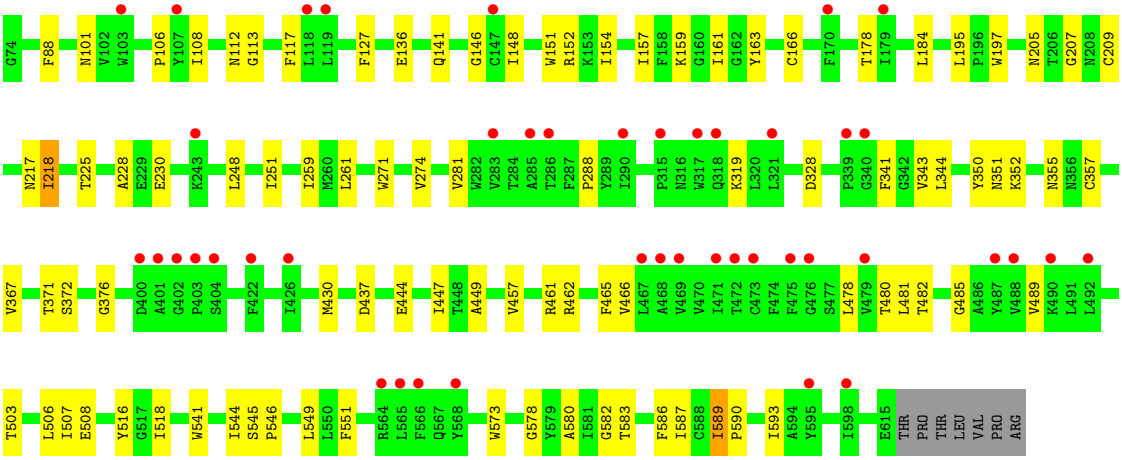
3 Residue-property plots (i)

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: Sodium-dependent serotonin transporter

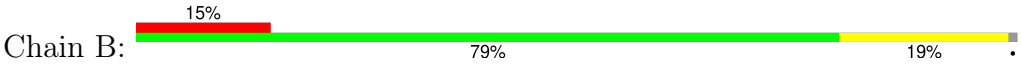
Chain A:

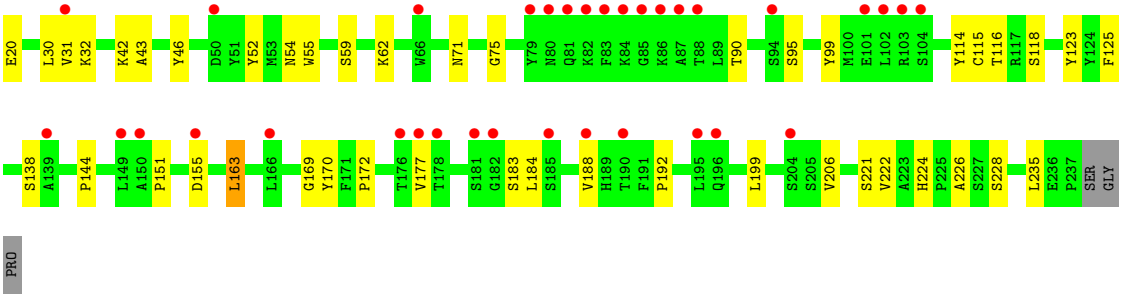




• Molecule 2: 8B6 antibody, heavy chain

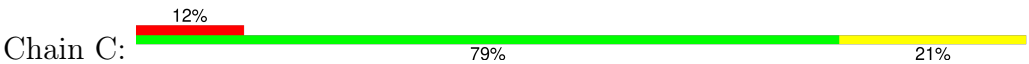
Chain B:

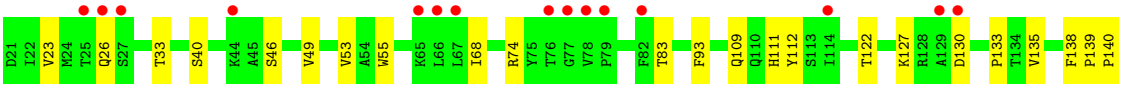


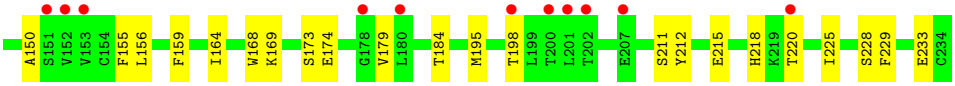


• Molecule 3: 8B6 antibody, light chain

Chain C:






A150
S151
V152
V153
C154
F155
L156
F159
I164
W168
K169
S173
E174
G178
V179
L180
T184
M195
T198
L199
T200
L201
T202
E207
S211
Y212
E215
H218
K219
T220
I225
S228
F229
E233
C234

4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α, β, γ	129.59Å 164.00Å 140.17Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	101.68 – 3.40 101.68 – 3.40	Depositor EDS
% Data completeness (in resolution range)	99.2 (101.68-3.40) 99.3 (101.68-3.40)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.36 (at 3.41Å)	Xtriage
Refinement program	PHENIX dev_1634	Depositor
R, R_{free}	0.249 , 0.296 0.261 , 0.329	Depositor DCC
R_{free} test set	1043 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	143.5	Xtriage
Anisotropy	0.161	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 209.8	EDS
L-test for twinning[2]	$< \|L\| > = 0.39$, $< L^2 > = 0.22$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.87	EDS
Total number of atoms	7610	wwPDB-VP
Average B, all atoms (Å^2)	209.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.93% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: HEX, NAG, D12, 69D, CLR

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	0.25	0/4340	0.38	0/5934
2	B	0.24	0/1688	0.45	0/2309
3	C	0.25	0/1700	0.46	0/2307
All	All	0.25	0/7728	0.42	0/10550

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	4207	0	4101	50	0
2	B	1643	0	1589	28	0
3	C	1662	0	1585	24	0
4	A	24	0	0	1	0
5	A	28	0	26	2	0
6	A	28	0	46	4	0
7	A	12	0	26	1	0
8	A	6	0	14	0	0
All	All	7610	0	7387	102	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 7.

All (102) 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)
4:A:700:69D:O02	4:A:700:69D:C11	1.69	1.37
2:B:30:LEU:HD22	2:B:172:PRO:HD3	1.68	0.76
1:A:141:GLN:NE2	1:A:357:CYS:SG	2.61	0.74
1:A:205:ASN:ND2	1:A:209:CYS:SG	2.62	0.73
1:A:108:ILE:HD11	1:A:328:ASP:HB3	1.70	0.72
1:A:589:ILE:HG23	1:A:590:PRO:HD3	1.71	0.72
2:B:71:ASN:O	2:B:75:GLY:N	2.26	0.67
1:A:447:ILE:HD13	1:A:466:VAL:HG22	1.76	0.67
2:B:71:ASN:O	2:B:75:GLY:CA	2.42	0.67
2:B:192:PRO:HD3	3:C:184:THR:HG22	1.78	0.66
1:A:152:ARG:HH21	1:A:159:LYS:HZ1	1.47	0.62
1:A:127:PHE:HB3	1:A:544:ILE:HG21	1.81	0.62
3:C:211:SER:HA	3:C:229:PHE:O	2.00	0.61
1:A:352:LYS:HB2	1:A:355:ASN:HB2	1.83	0.61
2:B:71:ASN:O	2:B:75:GLY:HA2	2.00	0.61
1:A:444:GLU:OE1	1:A:462:ARG:NH2	2.34	0.60
2:B:30:LEU:HB2	2:B:172:PRO:HG3	1.83	0.60
3:C:135:VAL:HA	3:C:155:PHE:O	2.01	0.59
1:A:184:LEU:HD21	1:A:261:LEU:HD23	1.85	0.59
2:B:59:SER:HB2	2:B:62:LYS:HB2	1.84	0.59
3:C:49:VAL:HG13	3:C:112:TYR:CE1	2.39	0.58
5:A:701:NAG:HO3	2:B:20:GLU:N	2.02	0.57
1:A:157:ILE:HB	1:A:593:ILE:HG12	1.87	0.57
2:B:54:ASN:ND2	2:B:118:SER:OG	2.36	0.56
3:C:55:TRP:HB2	3:C:68:ILE:HB	1.86	0.56
3:C:164:ILE:HB	3:C:218:HIS:HD2	1.71	0.56
1:A:101:ASN:ND2	1:A:372:SER:OG	2.34	0.55
3:C:215:GLU:HA	3:C:225:ILE:O	2.06	0.55
1:A:148:ILE:HG13	1:A:449:ALA:HB1	1.87	0.55
1:A:207:GLY:HA3	5:A:701:NAG:H82	1.87	0.55
2:B:42:LYS:NZ	2:B:95:SER:O	2.38	0.54
2:B:224:HIS:O	2:B:228:SER:N	2.40	0.53
1:A:113:GLY:H	1:A:319:LYS:HG3	1.73	0.52
1:A:88:PHE:HE2	1:A:350:TYR:HB2	1.74	0.52
2:B:163:LEU:HB3	2:B:235:LEU:HD22	1.91	0.52
1:A:478:LEU:HD23	1:A:481:LEU:HD12	1.92	0.52
3:C:74:ARG:HH21	3:C:83:THR:HG22	1.75	0.52
1:A:580:ALA:HB1	6:A:702:CLR:H241	1.93	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:259:ILE:HG21	1:A:481:LEU:HD11	1.93	0.50
1:A:573:TRP:CE3	6:A:702:CLR:H71	2.45	0.50
2:B:177:VAL:HA	2:B:221:SER:O	2.11	0.50
1:A:341:PHE:HD2	1:A:343:VAL:HG23	1.76	0.50
1:A:106:PRO:HG3	1:A:376:GLY:HA2	1.93	0.50
1:A:88:PHE:HZ	1:A:274:VAL:HB	1.77	0.49
3:C:130:ASP:HB3	3:C:220:THR:HG22	1.94	0.49
3:C:140:PRO:HG2	3:C:150:ALA:HB1	1.94	0.49
1:A:151:TRP:HZ2	1:A:508:GLU:HG2	1.78	0.48
2:B:151:PRO:HG3	3:C:138:PHE:HE2	1.77	0.48
3:C:212:TYR:O	3:C:228:SER:HA	2.14	0.48
2:B:116:THR:OG1	2:B:125:PHE:HB3	2.13	0.48
1:A:573:TRP:CZ3	6:A:702:CLR:H71	2.49	0.48
3:C:23:VAL:H	3:C:46:SER:HB3	1.79	0.48
1:A:178:THR:HG21	1:A:480:THR:HB	1.96	0.48
1:A:178:THR:HG22	1:A:259:ILE:HD12	1.95	0.47
1:A:583:THR:HA	1:A:586:PHE:CZ	2.49	0.47
3:C:133:PRO:HB3	3:C:159:PHE:HB3	1.97	0.47
1:A:506:LEU:HD23	1:A:549:LEU:HB2	1.96	0.47
1:A:146:GLY:HA3	1:A:449:ALA:HA	1.95	0.47
1:A:518:ILE:HD11	1:A:541:TRP:CE3	2.49	0.47
1:A:218:ILE:H	1:A:218:ILE:HD13	1.80	0.46
1:A:447:ILE:HA	1:A:465:PHE:HE2	1.80	0.46
1:A:197:TRP:HB2	1:A:228:ALA:HA	1.97	0.46
2:B:144:PRO:HB3	2:B:170:TYR:HB3	1.98	0.45
1:A:288:PRO:HA	1:A:430:MET:HG3	1.98	0.45
2:B:188:VAL:HG22	2:B:206:VAL:HB	1.98	0.44
1:A:251:ILE:HA	1:A:482:THR:HA	1.99	0.44
1:A:583:THR:O	1:A:587:ILE:HG23	2.18	0.43
6:A:702:CLR:H162	6:A:702:CLR:H231	2.00	0.43
1:A:136:GLU:HG2	1:A:344:LEU:HD12	2.00	0.43
1:A:163:TYR:O	1:A:166:CYS:HB2	2.19	0.43
1:A:485:GLY:O	1:A:489:VAL:HG23	2.18	0.43
2:B:32:LYS:HG2	2:B:138:SER:HA	2.00	0.43
3:C:26:GLN:NE2	3:C:122:THR:OG1	2.52	0.43
1:A:195:LEU:HD12	1:A:195:LEU:H	1.82	0.43
2:B:183:SER:HA	2:B:184:LEU:HA	1.50	0.42
2:B:90:THR:OG1	2:B:99:TYR:HB2	2.19	0.42
3:C:179:VAL:HA	3:C:198:THR:O	2.19	0.42
1:A:112:ASN:O	1:A:117:PHE:HB2	2.20	0.42
1:A:154:ILE:HG23	1:A:516:TYR:HB2	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:55:TRP:HA	2:B:114:TYR:O	2.19	0.42
2:B:123:TYR:HB3	3:C:111:HIS:HB2	2.01	0.42
3:C:156:LEU:HD13	3:C:195:MET:HG3	2.01	0.42
3:C:169:LYS:HA	3:C:173:SER:O	2.19	0.42
2:B:54:ASN:O	2:B:115:CYS:HA	2.20	0.42
1:A:225:THR:OG1	1:A:230:GLU:OE2	2.28	0.41
1:A:367:VAL:O	1:A:371:THR:OG1	2.30	0.41
1:A:545:SER:HB2	1:A:546:PRO:HD3	2.02	0.41
3:C:33:THR:O	3:C:127:LYS:N	2.39	0.41
1:A:503:THR:O	1:A:507:ILE:HG12	2.21	0.41
1:A:578:GLY:O	1:A:582:GLY:N	2.48	0.41
2:B:169:GLY:HA2	2:B:199:LEU:HB3	2.03	0.41
2:B:177:VAL:HG22	2:B:222:VAL:HG22	2.02	0.41
2:B:224:HIS:CE1	2:B:226:ALA:HB3	2.55	0.41
3:C:40:SER:HA	3:C:93:PHE:O	2.20	0.41
2:B:52:TYR:HE1	2:B:71:ASN:HB2	1.85	0.41
3:C:168:TRP:O	3:C:174:GLU:HA	2.21	0.41
1:A:161:ILE:HD11	1:A:507:ILE:HG22	2.04	0.40
2:B:43:ALA:HB1	2:B:46:TYR:CE1	2.56	0.40
7:A:703:D12:H21	7:A:703:D12:H52	1.93	0.40
3:C:212:TYR:HB2	3:C:229:PHE:CE1	2.55	0.40
3:C:139:PRO:HB3	3:C:229:PHE:CE2	2.56	0.40
1:A:141:GLN:OE1	1:A:351:ASN:ND2	2.55	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	540/549 (98%)	519 (96%)	21 (4%)	0	100	100
2	B	216/221 (98%)	209 (97%)	7 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	C	212/214 (99%)	199 (94%)	13 (6%)	0	100	100
All	All	968/984 (98%)	927 (96%)	41 (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	428/462 (93%)	418 (98%)	10 (2%)	45	67
2	B	190/193 (98%)	187 (98%)	3 (2%)	58	75
3	C	189/190 (100%)	186 (98%)	3 (2%)	58	75
All	All	807/845 (96%)	791 (98%)	16 (2%)	50	70

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	217	ASN
1	A	218	ILE
1	A	248	LEU
1	A	271	TRP
1	A	281	VAL
1	A	437	ASP
1	A	457	VAL
1	A	461	ARG
1	A	551	PHE
1	A	589	ILE
2	B	31	VAL
2	B	155	ASP
2	B	163	LEU
3	C	53	VAL
3	C	109	GLN
3	C	233	GLU

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

Mol	Chain	Res	Type
3	C	26	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains (i)

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

6 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	$\#\|Z\| > 2$
4	69D	A	700	-	26,26,26	6.28	13 (50%)	29,37,37	4.78	10 (34%)
5	NAG	A	705	1	14,14,15	0.25	0	17,19,21	0.40	0
7	D12	A	703	-	11,11,11	0.09	0	10,10,10	0.31	0
6	CLR	A	702	-	31,31,31	0.86	1 (3%)	48,48,48	1.36	6 (12%)
5	NAG	A	701	1	14,14,15	0.23	0	17,19,21	0.52	0
8	HEX	A	704	-	5,5,5	0.14	0	4,4,4	0.60	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
4	69D	A	700	-	-	8/15/27/27	0/3/3/3
5	NAG	A	705	1	-	1/6/23/26	0/1/1/1
7	D12	A	703	-	-	2/9/9/9	-
6	CLR	A	702	-	-	6/10/68/68	0/4/4/4
5	NAG	A	701	1	-	2/6/23/26	0/1/1/1
8	HEX	A	704	-	-	0/3/3/3	-

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	700	69D	C05-C07	-15.15	1.32	1.52
4	A	700	69D	O02-C11	14.68	1.69	1.44
4	A	700	69D	C14-C08	12.60	1.59	1.39
4	A	700	69D	C17-C13	-12.48	1.18	1.38
4	A	700	69D	C17-C18	-12.17	1.14	1.39
4	A	700	69D	C11-C08	6.73	1.59	1.50
4	A	700	69D	O02-C05	4.60	1.51	1.45
4	A	700	69D	C18-C24	4.10	1.53	1.44
4	A	700	69D	C14-C18	-3.29	1.34	1.39
4	A	700	69D	C08-C07	-2.85	1.35	1.39
4	A	700	69D	C13-C07	-2.21	1.36	1.39
4	A	700	69D	BR-C21	2.14	1.94	1.90
4	A	700	69D	C05-C10	2.14	1.57	1.53
6	A	702	CLR	C13-C14	-2.05	1.51	1.55

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	A	700	69D	C11-C08-C07	-16.84	100.00	108.83
4	A	700	69D	C13-C07-C08	-12.66	108.94	120.76
4	A	700	69D	C13-C17-C18	7.87	130.38	120.35
4	A	700	69D	C11-C08-C14	7.44	142.67	129.35
4	A	700	69D	C13-C07-C05	-5.40	122.59	130.29
4	A	700	69D	C17-C13-C07	4.45	130.24	122.02
4	A	700	69D	C14-C08-C07	-4.05	117.33	120.75
4	A	700	69D	C18-C14-C08	-3.51	116.39	120.77
6	A	702	CLR	C8-C7-C6	-3.19	108.34	112.76
6	A	702	CLR	C9-C10-C5	3.12	114.22	109.65
6	A	702	CLR	C13-C14-C8	-2.76	110.50	114.41
6	A	702	CLR	C4-C5-C10	2.45	119.56	116.42
4	A	700	69D	C09-C12-N03	-2.20	108.03	113.71
4	A	700	69D	C17-C18-C14	-2.05	116.71	119.77

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	A	702	CLR	C16-C17-C20	-2.02	109.11	112.18
6	A	702	CLR	C13-C17-C20	-2.02	116.37	119.50

There are no chirality outliers.

All (19) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	700	69D	C07-C05-C06-C09
4	A	700	69D	C10-C05-C06-C09
4	A	700	69D	O02-C05-C06-C09
5	A	701	NAG	O5-C5-C6-O6
5	A	701	NAG	C4-C5-C6-O6
4	A	700	69D	C06-C09-C12-N03
6	A	702	CLR	C17-C20-C22-C23
6	A	702	CLR	C21-C20-C22-C23
7	A	703	D12	C5-C6-C7-C8
4	A	700	69D	C06-C05-C10-C15
4	A	700	69D	C06-C05-C10-C16
5	A	705	NAG	O5-C5-C6-O6
4	A	700	69D	O02-C05-C10-C15
6	A	702	CLR	C20-C22-C23-C24
4	A	700	69D	O02-C05-C10-C16
6	A	702	CLR	C23-C24-C25-C26
7	A	703	D12	C4-C5-C6-C7
6	A	702	CLR	C23-C24-C25-C27
6	A	702	CLR	C22-C23-C24-C25

There are no ring outliers.

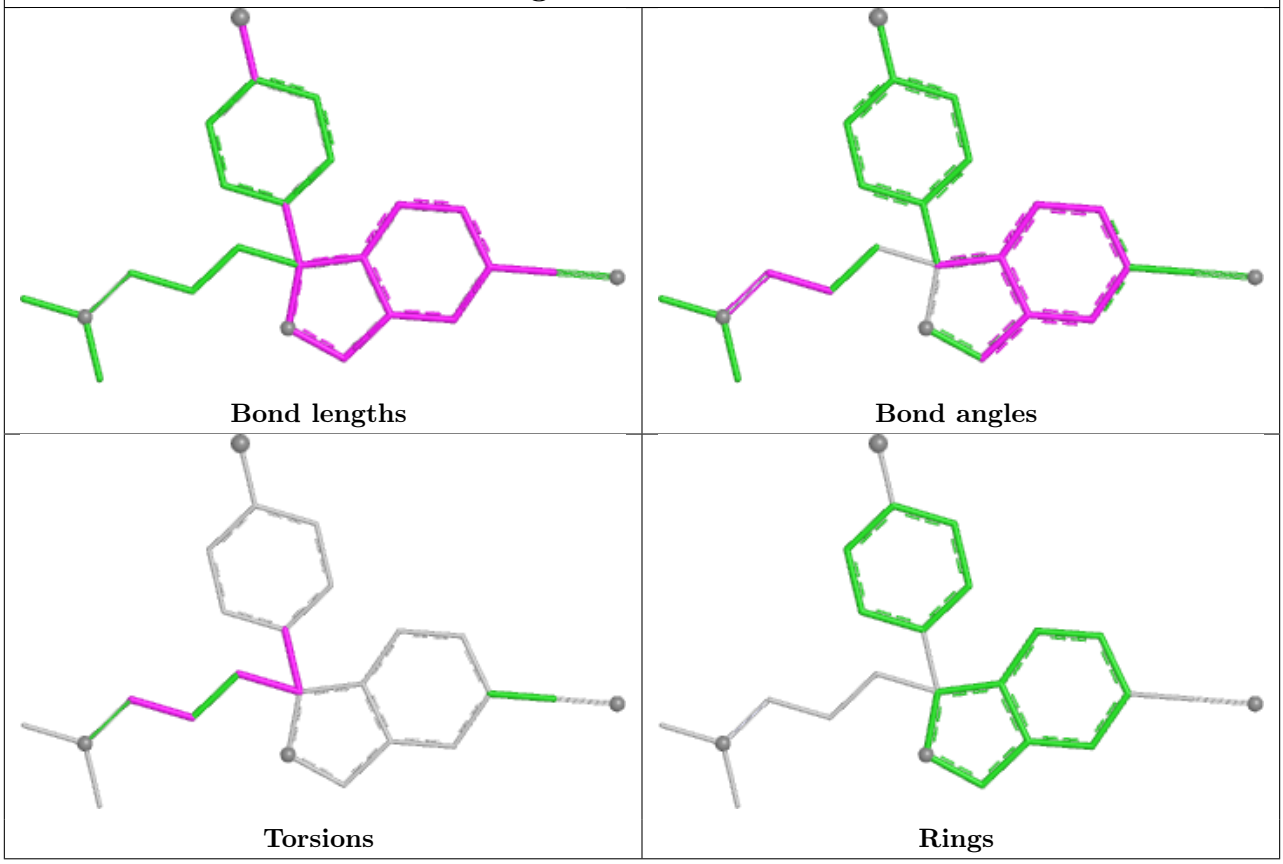
4 monomers are involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	700	69D	1	0
7	A	703	D12	1	0
6	A	702	CLR	4	0
5	A	701	NAG	2	0

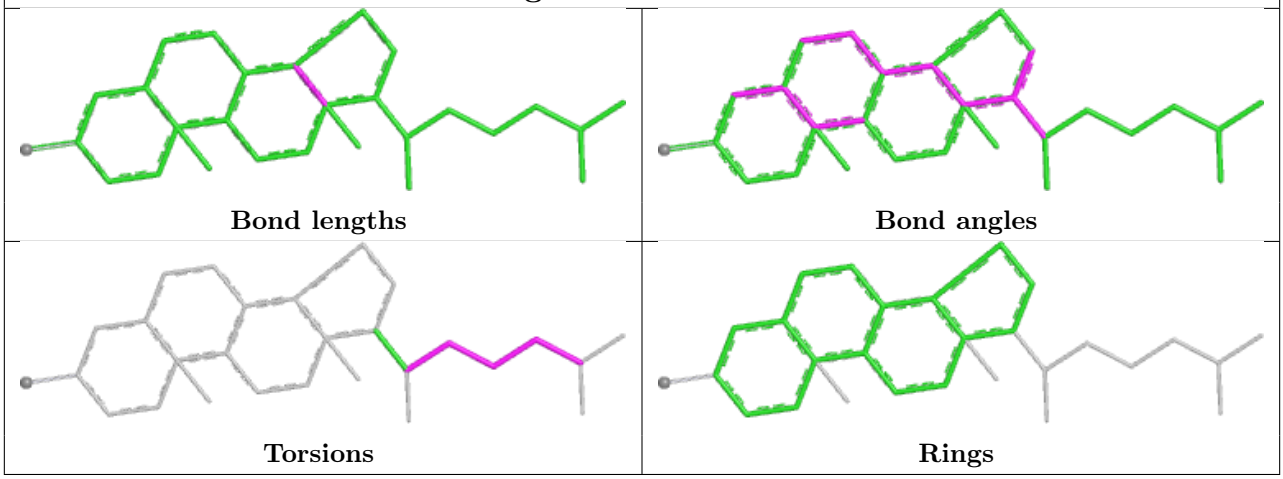
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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 69D A 700



Ligand CLR A 702



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	542/549 (98%)	0.14	44 (8%) 19 20	106, 163, 232, 359	0
2	B	218/221 (98%)	0.82	34 (15%) 6 8	110, 221, 445, 538	0
3	C	214/214 (100%)	0.46	26 (12%) 10 12	137, 240, 585, 730	0
All	All	974/984 (98%)	0.36	104 (10%) 12 15	106, 178, 402, 730	0

All (104) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	85	GLY	10.2
2	B	81	GLN	10.0
3	C	200	THR	8.6
2	B	185	SER	7.9
2	B	84	LYS	7.6
2	B	83	PHE	7.5
2	B	80	ASN	7.5
2	B	86	LYS	7.4
1	A	317	TRP	7.3
1	A	243	LYS	7.3
3	C	78	VAL	7.2
1	A	401	ALA	7.0
2	B	87	ALA	6.9
2	B	88	THR	6.6
3	C	79	PRO	6.5
2	B	103	ARG	6.5
2	B	196	GLN	6.5
3	C	151	SER	6.4
1	A	472	THR	6.1
3	C	77	GLY	6.1
2	B	190	THR	5.9
1	A	565	LEU	5.5
1	A	315	PRO	5.3

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Mol	Chain	Res	Type	RSRZ
2	B	104	SER	5.1
1	A	479	VAL	5.0
2	B	166	LEU	4.9
3	C	27	SER	4.9
2	B	182	GLY	4.9
1	A	403	PRO	4.8
3	C	202	THR	4.8
1	A	468	ALA	4.7
1	A	290	ILE	4.6
2	B	82	LYS	4.5
2	B	149	LEU	4.3
1	A	598	ILE	4.2
1	A	595	TYR	4.1
2	B	79	TYR	4.1
1	A	170	PHE	4.1
2	B	101	GLU	4.0
1	A	475	PHE	4.0
1	A	469	VAL	4.0
1	A	404	SER	4.0
1	A	490	LYS	3.9
1	A	476	GLY	3.9
1	A	566	PHE	3.9
2	B	66	TRP	3.7
1	A	400	ASP	3.7
1	A	473	CYS	3.6
3	C	82	PHE	3.6
1	A	286	THR	3.6
2	B	204	SER	3.5
3	C	65	LYS	3.5
3	C	198	THR	3.5
3	C	153	VAL	3.5
3	C	25	THR	3.4
3	C	178	GLY	3.3
2	B	177	VAL	3.3
2	B	188	VAL	3.3
2	B	176	THR	3.3
1	A	285	ALA	3.3
3	C	180	LEU	3.3
1	A	107	TYR	3.1
3	C	44	LYS	2.8
1	A	402	GLY	2.8
1	A	283	VAL	2.8

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Mol	Chain	Res	Type	RSRZ
1	A	467	LEU	2.7
2	B	195	LEU	2.7
1	A	488	VAL	2.7
2	B	150	ALA	2.7
1	A	321	LEU	2.6
1	A	422	PHE	2.6
2	B	102	LEU	2.6
1	A	103	TRP	2.6
3	C	66	LEU	2.6
3	C	207	GLU	2.6
3	C	220	THR	2.6
1	A	568	TYR	2.5
1	A	339	PRO	2.4
1	A	471	ILE	2.4
1	A	147	CYS	2.3
1	A	492	LEU	2.3
1	A	179	ILE	2.3
2	B	155	ASP	2.3
2	B	31	VAL	2.3
3	C	67	LEU	2.3
2	B	50	ASP	2.2
1	A	426	ILE	2.2
2	B	139	ALA	2.2
3	C	130	ASP	2.2
3	C	76	THR	2.2
2	B	94	SER	2.2
3	C	152	VAL	2.2
1	A	487	TYR	2.1
1	A	340	GLY	2.1
3	C	114	ILE	2.1
1	A	119	LEU	2.1
3	C	201	LEU	2.1
2	B	178	THR	2.1
1	A	318	GLN	2.1
3	C	26	GLN	2.1
3	C	129	ALA	2.1
2	B	181	SER	2.1
1	A	564	ARG	2.1
1	A	118	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 monosaccharides in this entry.

6.4 Ligands (i)

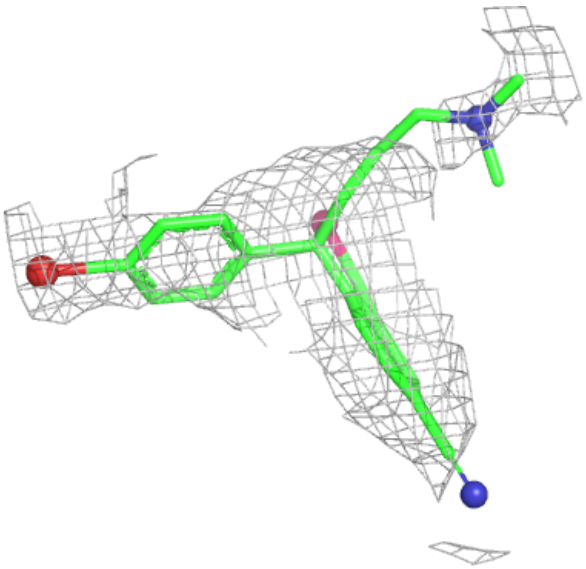
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

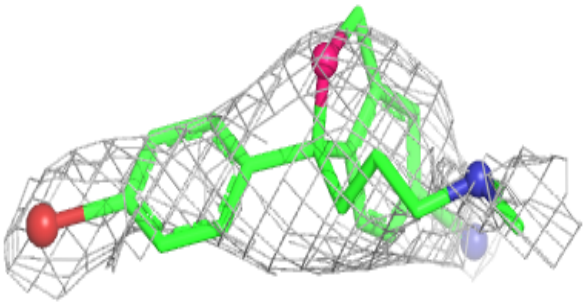
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
8	HEX	A	704	6/6	0.43	0.47	77,106,122,136	0
7	D12	A	703	12/12	0.83	0.22	100,111,126,134	0
4	69D	A	700	24/24	0.85	0.11	119,155,185,275	0
5	NAG	A	705	14/15	0.85	0.09	341,346,348,350	0
6	CLR	A	702	28/28	0.86	0.14	166,215,229,239	0
5	NAG	A	701	14/15	0.94	0.06	99,122,205,206	0

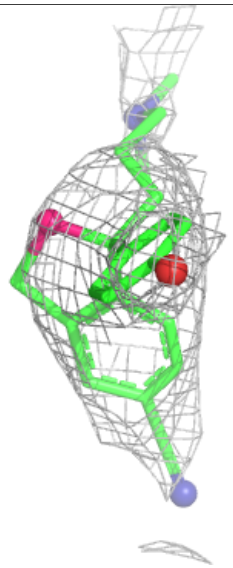
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around 69D A 700:

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

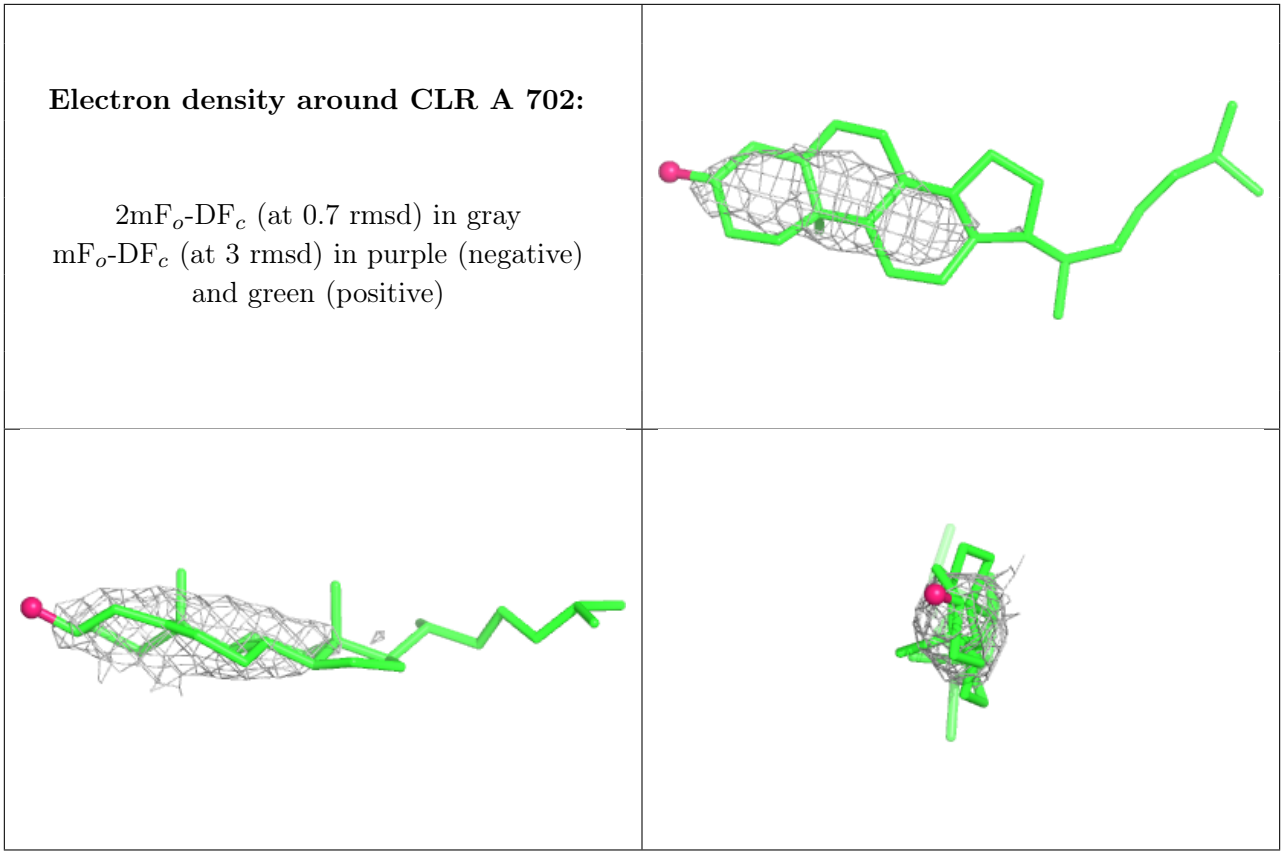






Electron density around CLR A 702:

$2mF_o$-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.