



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 7, 2023 – 04:59 PM EST

PDB ID : 7FSS
Title : SDCBP PanDDA analysis group deposition – The PDZ domains of SDCBP in complex with Z839706072
Authors : Bradshaw, W.J.; Katis, V.L.; Bountra, C.; von Delft, F.; Brennan, P.E.
Deposited on : 2023-01-24
Resolution : 2.11 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 : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.32.1
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) : 2.32.1

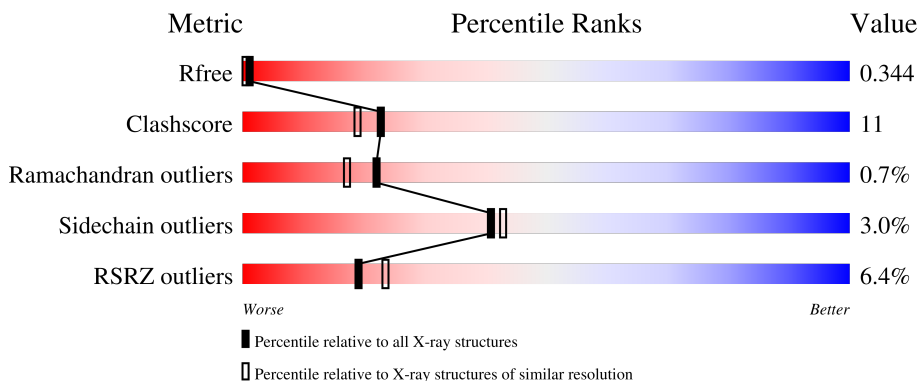
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.11 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	6241 (2.14-2.10)
Clashscore	141614	6778 (2.14-2.10)
Ramachandran outliers	138981	6705 (2.14-2.10)
Sidechain outliers	138945	6706 (2.14-2.10)
RSRZ outliers	127900	6112 (2.14-2.10)

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 $\leq 5\%$. 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	195	
1	B	195	
1	C	195	
1	D	195	

2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 6365 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 Syntenin-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	191	1481	935	262	275	9	0	1	0
1	B	193	1495	943	264	279	9	0	1	0
1	C	193	1514	953	270	282	9	0	3	0
1	D	191	1481	935	262	275	9	0	1	0

There are 8 discrepancies between the modelled and reference sequences:

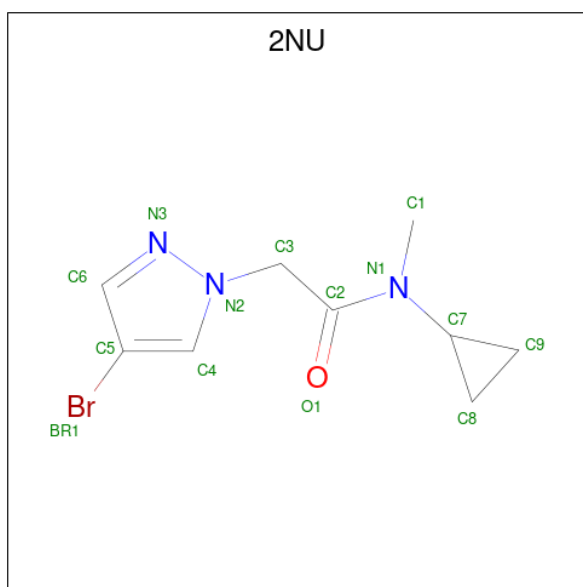
Chain	Residue	Modelled	Actual	Comment	Reference
A	104	SER	-	expression tag	UNP O00560
A	105	MET	-	expression tag	UNP O00560
B	104	SER	-	expression tag	UNP O00560
B	105	MET	-	expression tag	UNP O00560
C	104	SER	-	expression tag	UNP O00560
C	105	MET	-	expression tag	UNP O00560
D	104	SER	-	expression tag	UNP O00560
D	105	MET	-	expression tag	UNP O00560

- Molecule 2 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C₂H₆O₂).



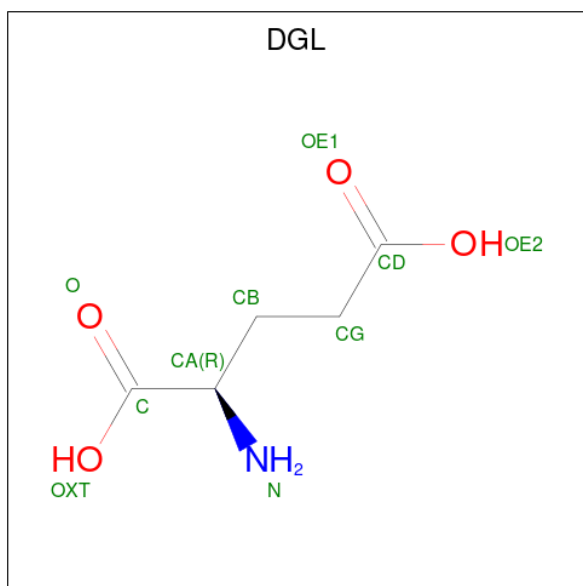
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0
2	C	1	Total C O 4 2 2	0	0
2	C	1	Total C O 4 2 2	0	0
2	C	1	Total C O 4 2 2	0	0
2	D	1	Total C O 4 2 2	0	0
2	D	1	Total C O 4 2 2	0	0

- Molecule 3 is 2-(4-bromanylpyrazol-1-yl)- {N}-cyclopropyl- {N}-methyl-ethanamide (three-letter code: 2NU) (formula: C₉H₁₂BrN₃O) (labeled as "Ligand of Interest" by depositor).



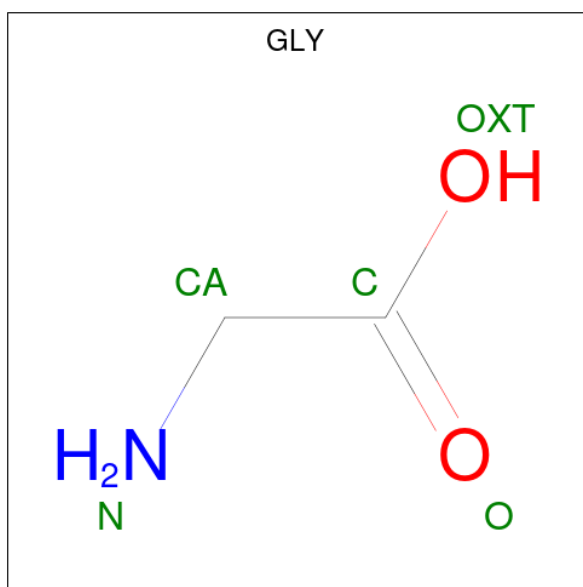
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	Br	C	N	O		
3	B	1	14	1	9	3	1	0	0

- Molecule 4 is D-GLUTAMIC ACID (three-letter code: DGL) (formula: $C_5H_9NO_4$).



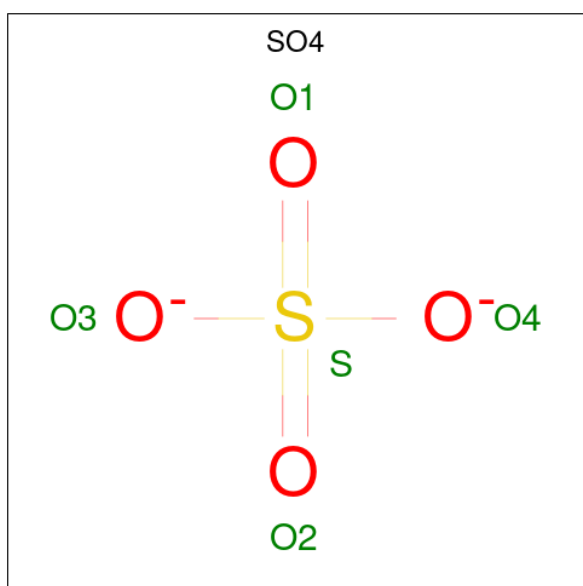
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
4	B	1	10	5	1	4	0	0
4	D	1	10	5	1	4	0	0

- Molecule 5 is GLYCINE (three-letter code: GLY) (formula: $C_2H_5NO_2$).



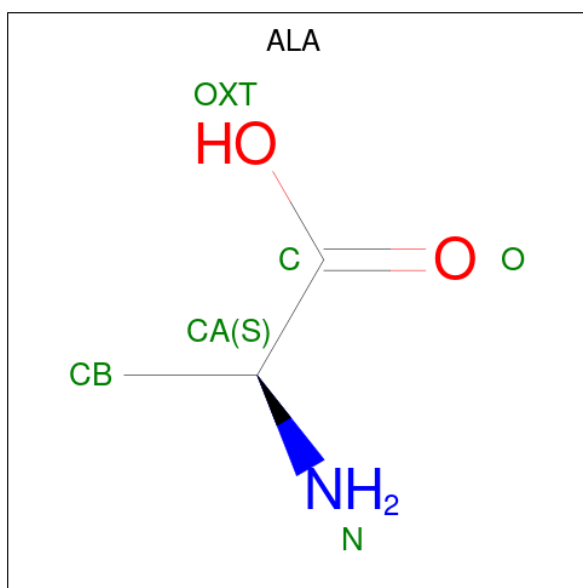
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	
			Total	C	N			O
5	C	1	5	2	1	2	0	0
5	D	1	5	2	1	2	0	0

- Molecule 6 is SULFATE ION (three-letter code: SO₄) (formula: O₄S).



Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O S		
6	D	1	5	4 1	0	0
6	D	1	5	4 1	0	0

- Molecule 7 is ALANINE (three-letter code: ALA) (formula: $C_3H_7NO_2$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
7	D	1	6	3	1	2	0	0

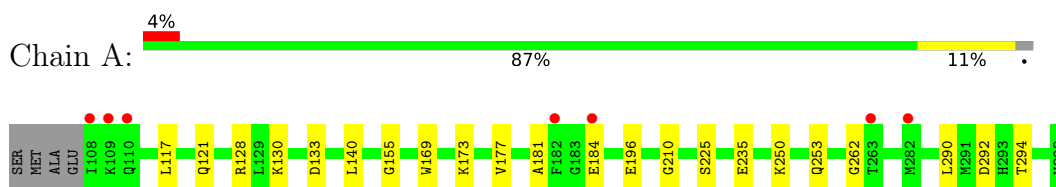
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
8	A	50	50	50	0	0
8	B	98	98	98	0	0
8	C	69	70	70	0	1
8	D	84	84	84	0	1

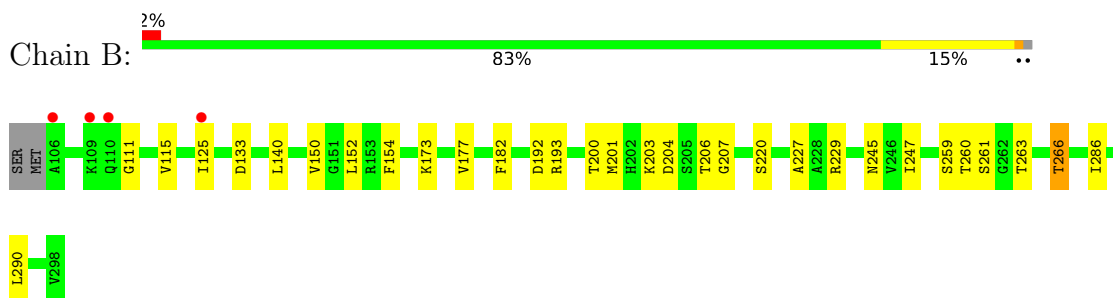
3 Residue-property plots [i](#)

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.

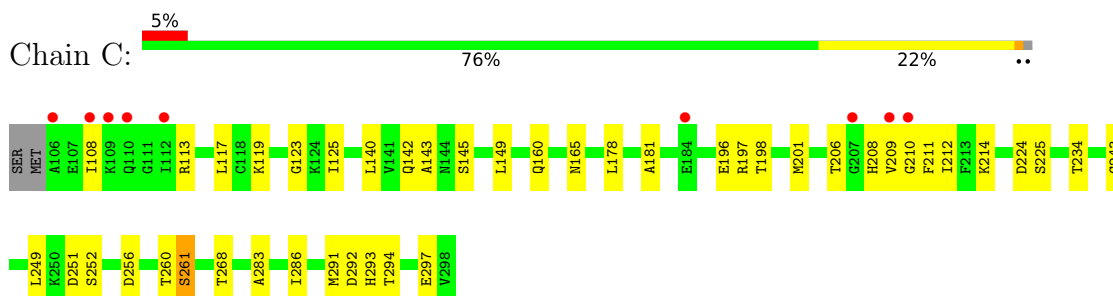
- Molecule 1: Syntenin-1



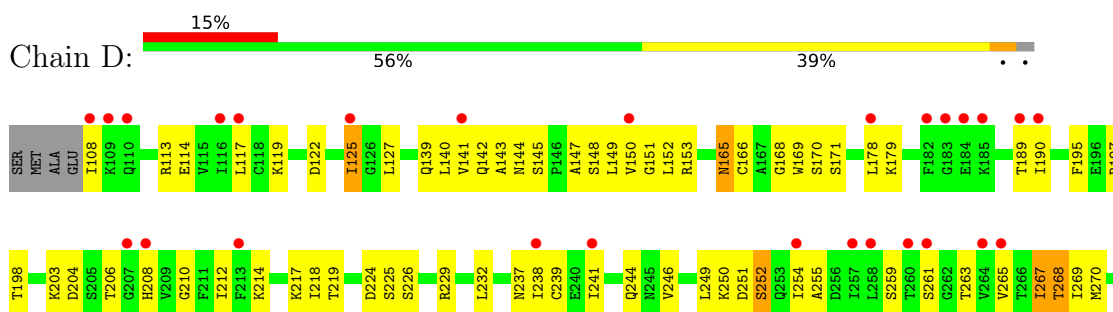
- Molecule 1: Syntenin-1

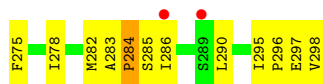


- Molecule 1: Syntenin-1



- Molecule 1: Syntenin-1





4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	80.13Å 49.38Å 116.28Å 90.00° 94.84° 90.00°	Depositor
Resolution (Å)	115.87 – 2.11 115.87 – 2.11	Depositor EDS
% Data completeness (in resolution range)	99.7 (115.87-2.11) 99.7 (115.87-2.11)	Depositor EDS
R_{merge}	0.13	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.17 (at 2.10Å)	Xtrriage
Refinement program	REFMAC 5.8.0403	Depositor
R, R_{free}	0.257 , 0.343 0.263 , 0.344	Depositor DCC
R_{free} test set	2577 reflections (4.90%)	wwPDB-VP
Wilson B-factor (Å ²)	39.6	Xtrriage
Anisotropy	0.117	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 40.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	6365	wwPDB-VP
Average B, all atoms (Å ²)	49.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 28.60 % 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 1.7909e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: DGL, 2NU, EDO, SO4

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.37	0/1502	0.71	0/2019
1	B	0.36	0/1516	0.74	0/2038
1	C	0.36	0/1535	0.71	0/2063
1	D	0.41	0/1502	0.76	0/2019
All	All	0.38	0/6055	0.73	0/8139

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	B	0	1
1	C	0	1
All	All	0	2

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	111	GLY	Peptide
1	C	113	ARG	Sidechain

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1481	0	1530	14	0
1	B	1495	0	1541	22	0
1	C	1514	0	1558	32	0
1	D	1481	0	1530	78	0
2	A	4	0	6	0	0
2	B	8	0	12	0	0
2	C	12	0	18	1	0
2	D	8	0	12	0	0
3	B	14	0	0	2	0
4	B	10	0	7	0	0
4	D	10	0	7	0	0
5	C	5	0	2	0	0
5	D	5	0	2	0	0
6	D	10	0	0	1	0
7	D	6	0	4	0	0
8	A	50	0	0	2	0
8	B	98	0	0	4	0
8	C	70	0	0	3	0
8	D	84	0	0	22	0
All	All	6365	0	6229	141	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 11.

All (141) 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:152:LEU:O	8:D:401:HOH:O	1.75	1.04
1:D:197:ARG:NH2	8:D:402:HOH:O	1.99	0.94
1:B:133:ASP:OD1	8:B:401:HOH:O	1.87	0.90
1:D:197:ARG:NH1	8:D:406:HOH:O	2.12	0.82
1:D:139:GLN:HG2	1:D:282:MET:HE1	1.64	0.80
1:C:108:ILE:HD12	1:C:198:THR:HG23	1.63	0.80
1:D:198:THR:HG22	1:D:268:THR:OG1	1.83	0.77
1:D:270:MET:SD	1:D:275:PHE:HA	2.26	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:139:GLN:HG2	1:D:282:MET:CE	2.18	0.74
1:C:211:PHE:C	1:C:212:ILE:HD12	2.10	0.72
1:D:237:ASN:OD1	8:D:404:HOH:O	2.09	0.71
1:D:255:ALA:O	8:D:403:HOH:O	2.07	0.71
1:A:292:ASP:OD1	1:A:294:THR:OG1	2.09	0.69
1:D:212:ILE:O	1:D:219:THR:OG1	2.10	0.69
1:A:290:LEU:HD13	1:B:182:PHE:HB2	1.74	0.69
1:D:168:GLY:O	8:D:405:HOH:O	2.10	0.68
1:A:184:GLU:HG2	8:A:443:HOH:O	1.94	0.67
1:A:140:LEU:HD22	1:B:182:PHE:CE1	2.29	0.67
1:B:229:ARG:NH1	8:B:406:HOH:O	2.27	0.67
1:D:204:ASP:OD2	8:D:407:HOH:O	2.13	0.67
1:D:139:GLN:O	1:D:282:MET:HE1	1.94	0.66
1:B:150:VAL:HG12	3:B:301:2NU:BR1	2.51	0.65
1:D:238:ILE:O	8:D:408:HOH:O	2.14	0.65
1:D:203:LYS:HG3	1:D:263:THR:O	1.97	0.65
1:C:261:SER:HB3	8:C:410:HOH:O	1.96	0.64
1:D:153:ARG:HG2	8:D:443:HOH:O	1.97	0.64
1:D:149:LEU:HG	8:D:441:HOH:O	1.97	0.64
1:B:201:MET:SD	1:B:227:ALA:HA	2.37	0.63
1:D:283:ALA:O	1:D:284:PRO:C	2.36	0.63
1:C:108:ILE:CD1	1:C:198:THR:HG23	2.29	0.62
1:D:295:ILE:HD11	1:D:298:VAL:HG12	1.82	0.62
1:D:142:GLN:HB3	1:D:145:SER:HB3	1.81	0.62
1:C:142:GLN:O	1:C:145:SER:OG	2.13	0.61
1:C:206:THR:OG1	1:C:208:HIS:ND1	2.34	0.61
1:C:291:MET:O	1:C:293:HIS:ND1	2.34	0.60
1:D:237:ASN:O	1:D:269:ILE:HA	2.02	0.60
1:D:165:ASN:N	1:D:165:ASN:OD1	2.34	0.60
1:C:249:LEU:HD21	1:C:293:HIS:CD2	2.37	0.60
1:C:210:GLY:HA3	1:C:225:SER:HB2	1.86	0.57
1:B:173:LYS:NZ	8:B:404:HOH:O	2.24	0.57
1:B:200:THR:HG1	1:B:266:THR:HG1	1.51	0.57
1:D:170:SER:HB3	8:D:415:HOH:O	2.05	0.57
1:C:119:LYS:NZ	1:C:181:ALA:O	2.30	0.56
1:D:140:LEU:HD23	1:D:141:VAL:C	2.26	0.56
1:D:145:SER:HA	8:D:414:HOH:O	2.06	0.56
1:D:195:PHE:CD2	1:D:278:ILE:HD11	2.42	0.55
1:D:286:ILE:HG23	1:D:290:LEU:HD12	1.89	0.55
1:D:210:GLY:HA3	1:D:225:SER:HB2	1.88	0.55
1:C:196:GLU:O	1:C:197[B]:ARG:HD3	2.06	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:153:ARG:CG	8:D:443:HOH:O	2.53	0.54
1:D:152:LEU:C	8:D:401:HOH:O	2.34	0.54
1:D:203:LYS:NZ	1:D:259:SER:O	2.39	0.54
1:D:114:GLU:O	8:D:409:HOH:O	2.18	0.54
1:C:251:ASP:OD1	8:C:401:HOH:O	2.19	0.53
1:A:128:ARG:HG2	1:B:182:PHE:CZ	2.43	0.53
1:C:119:LYS:HB3	1:C:123:GLY:HA2	1.91	0.53
1:D:252:SER:HB3	8:D:419:HOH:O	2.10	0.52
1:D:283:ALA:O	1:D:285:SER:N	2.43	0.51
1:D:261:SER:OG	1:D:265:VAL:HG22	2.10	0.51
1:D:250:LYS:O	1:D:254:ILE:HG13	2.10	0.51
1:C:292:ASP:OD1	1:C:294:THR:HG22	2.11	0.51
1:D:214:LYS:O	1:D:217:LYS:N	2.39	0.51
1:D:226:SER:OG	6:D:303:SO4:O2	2.15	0.51
1:D:244:GLN:O	1:D:246:VAL:HG13	2.11	0.50
1:B:286:ILE:HG23	1:B:290:LEU:HD12	1.94	0.50
1:D:170:SER:HB2	8:D:452:HOH:O	2.12	0.50
1:D:141:VAL:HG21	1:D:152:LEU:O	2.12	0.49
1:C:256:ASP:O	1:C:260:THR:HG23	2.13	0.49
1:D:241:ILE:HD11	1:D:254:ILE:HG23	1.94	0.49
1:D:270:MET:SD	1:D:275:PHE:CA	2.99	0.49
1:D:261:SER:CB	1:D:265:VAL:HG22	2.43	0.49
1:C:198:THR:HG22	1:C:268:THR:OG1	2.13	0.49
1:B:204:ASP:O	1:B:207:GLY:N	2.45	0.48
1:A:250:LYS:HG3	1:A:253:GLN:OE1	2.13	0.48
1:D:195:PHE:HD2	1:D:278:ILE:HD11	1.79	0.48
1:D:143:ALA:O	1:D:144:ASN:ND2	2.46	0.48
1:B:204:ASP:OD1	1:B:206:THR:OG1	2.27	0.48
1:D:125:ILE:O	1:D:145:SER:HB2	2.14	0.48
1:D:252:SER:CB	8:D:419:HOH:O	2.62	0.47
1:A:133:ASP:HB3	1:C:234:THR:O	2.13	0.47
1:C:210:GLY:HA3	1:C:225:SER:CB	2.43	0.47
1:C:125:ILE:HD11	1:C:178:LEU:HD13	1.96	0.47
1:A:155:GLY:HA3	1:A:196:GLU:OE2	2.15	0.46
1:D:117:LEU:HD21	1:D:147:ALA:HA	1.97	0.46
1:C:160:GLN:HG3	1:C:165:ASN:HA	1.98	0.46
1:D:218:ILE:HD13	1:D:232:LEU:HD11	1.97	0.46
1:C:283:ALA:HB3	1:C:286:ILE:HG12	1.98	0.46
1:D:251:ASP:HA	1:D:254:ILE:HD12	1.97	0.46
1:B:115:VAL:HG21	1:B:152:LEU:HD21	1.98	0.46
1:C:143:ALA:HB2	1:C:292:ASP:HA	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:204:ASP:N	1:D:208:HIS:O	2.48	0.46
1:D:239:CYS:HB2	1:D:268:THR:HG22	1.98	0.46
1:D:189:THR:O	1:D:190:ILE:HD13	2.17	0.45
1:D:295:ILE:HB	1:D:296:PRO:HD2	1.99	0.45
1:D:127:LEU:HD21	1:D:152:LEU:HD13	1.98	0.45
1:D:119:LYS:NZ	1:D:179:LYS:O	2.49	0.45
1:D:166:CYS:HA	1:D:169:TRP:CE2	2.51	0.45
1:C:108:ILE:HD13	1:C:197[B]:ARG:HA	1.98	0.45
1:C:252:SER:HB3	8:D:454:HOH:O	2.17	0.45
1:B:192:ASP:O	1:B:193:ARG:C	2.55	0.45
1:C:206:THR:OG1	1:C:208:HIS:CE1	2.70	0.44
1:B:154:PHE:CD1	1:B:247:ILE:CD1	3.00	0.44
1:C:249:LEU:HD21	1:C:293:HIS:NE2	2.32	0.44
1:B:259:SER:OG	1:B:260:THR:N	2.51	0.44
1:A:169:TRP:CZ3	1:A:177:VAL:HG21	2.53	0.44
1:B:203:LYS:NZ	1:B:259:SER:O	2.51	0.44
1:A:128:ARG:HG2	1:B:182:PHE:CE1	2.52	0.44
1:D:198:THR:HA	1:D:267:ILE:O	2.18	0.43
1:D:197:ARG:HB3	8:D:457:HOH:O	2.18	0.43
1:D:148:SER:O	1:D:151:GLY:N	2.46	0.43
1:A:173:LYS:O	1:A:177:VAL:HG23	2.19	0.43
1:D:244:GLN:HB2	1:D:295:ILE:HG22	2.00	0.43
1:D:142:GLN:HG3	1:D:290:LEU:HD22	2.01	0.43
1:D:197:ARG:O	1:D:268:THR:HA	2.19	0.43
1:D:270:MET:CE	1:D:278:ILE:HD12	2.48	0.42
1:A:210:GLY:HA3	1:A:225:SER:CB	2.49	0.42
1:B:263:THR:HB	8:B:465:HOH:O	2.19	0.42
1:D:113:ARG:HH11	1:D:113:ARG:HB3	1.84	0.42
1:D:125:ILE:HD11	1:D:178:LEU:HD13	2.02	0.42
1:B:173:LYS:O	1:B:177:VAL:HG23	2.19	0.42
1:C:178:LEU:HD23	1:C:178:LEU:HA	1.92	0.42
1:A:121:GLN:HG3	8:A:442:HOH:O	2.19	0.42
1:D:254:ILE:O	1:D:255:ALA:C	2.58	0.42
1:C:243:GLY:O	2:C:301:EDO:O1	2.28	0.42
1:A:235:GLU:OE1	1:A:235:GLU:HA	2.20	0.41
1:D:224:ASP:O	1:D:229:ARG:NH1	2.52	0.41
1:D:284:PRO:CD	8:D:476:HOH:O	2.68	0.41
1:B:150:VAL:CG1	3:B:301:2NU:BR1	3.21	0.41
1:B:245:ASN:OD1	1:B:245:ASN:C	2.58	0.41
1:C:145:SER:O	1:C:149:LEU:HG	2.21	0.41
1:D:108:ILE:HG12	1:D:198:THR:HG23	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:113:ARG:HH11	1:D:113:ARG:CB	2.34	0.41
1:D:125:ILE:HD11	1:D:178:LEU:HD22	2.02	0.41
1:D:203:LYS:HD2	1:D:263:THR:HA	2.02	0.41
1:D:150:VAL:O	8:D:410:HOH:O	2.22	0.40
1:C:214:LYS:HA	1:C:251:ASP:OD2	2.22	0.40
1:D:127:LEU:HD21	1:D:152:LEU:CD1	2.50	0.40
1:C:201:MET:SD	1:C:209:VAL:CG1	3.10	0.40
1:D:140:LEU:HD23	1:D:140:LEU:C	2.42	0.40
1:D:267:ILE:HG13	1:D:268:THR:N	2.37	0.40
1:C:261:SER:CB	8:C:410:HOH:O	2.63	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	190/195 (97%)	180 (95%)	8 (4%)	2 (1%)	14	9
1	B	192/195 (98%)	183 (95%)	8 (4%)	1 (0%)	29	25
1	C	194/195 (100%)	181 (93%)	13 (7%)	0	100	100
1	D	190/195 (97%)	165 (87%)	23 (12%)	2 (1%)	14	9
All	All	766/780 (98%)	709 (93%)	52 (7%)	5 (1%)	22	17

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	261	SER
1	A	181	ALA
1	D	249	LEU
1	A	262	GLY
1	D	284	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	166/168 (99%)	164 (99%)	2 (1%)	71	77
1	B	167/168 (99%)	163 (98%)	4 (2%)	49	52
1	C	169/168 (101%)	164 (97%)	5 (3%)	41	43
1	D	166/168 (99%)	157 (95%)	9 (5%)	22	19
All	All	668/672 (99%)	648 (97%)	20 (3%)	41	43

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	117	LEU
1	A	130	LYS
1	B	125	ILE
1	B	140	LEU
1	B	220	SER
1	B	266	THR
1	C	117	LEU
1	C	140	LEU
1	C	224	ASP
1	C	261	SER
1	C	297	GLU
1	D	122	ASP
1	D	125	ILE
1	D	165	ASN
1	D	171	SER
1	D	206	THR
1	D	252	SER
1	D	267	ILE
1	D	268	THR
1	D	297	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	180	GLN
1	B	110	GLN
1	C	110	GLN
1	C	139	GLN
1	C	160	GLN
1	D	144	ASN
1	D	202	HIS
1	D	208	HIS
1	D	215	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](#)

16 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	EDO	D	301	-	3,3,3	0.19	0	2,2,2	0.07	0
4	DGL	B	304	-	8,9,9	1.08	0	10,11,11	1.15	0
6	SO4	D	304	-	4,4,4	0.36	0	6,6,6	0.10	0
7	ALA	D	305	-	5,5,5	0.88	0	6,6,6	0.82	0
2	EDO	B	302	-	3,3,3	0.36	0	2,2,2	0.18	0
2	EDO	B	303	-	3,3,3	0.10	0	2,2,2	0.45	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
6	SO4	D	303	-	4,4,4	0.29	0	6,6,6	0.11	0
2	EDO	A	301	-	3,3,3	0.17	0	2,2,2	0.16	0
2	EDO	D	302	-	3,3,3	0.09	0	2,2,2	0.05	0
4	DGL	D	306	-	8,9,9	0.95	0	10,11,11	1.05	0
2	EDO	C	301	-	3,3,3	0.28	0	2,2,2	0.12	0
5	GLY	D	307	-	4,4,4	1.27	1 (25%)	3,4,4	0.99	0
2	EDO	C	302	-	3,3,3	0.28	0	2,2,2	0.24	0
2	EDO	C	303	-	3,3,3	0.25	0	2,2,2	0.56	0
3	2NU	B	301	-	14,15,15	2.62	4 (28%)	15,21,21	3.21	7 (46%)
5	GLY	C	304	-	4,4,4	1.02	0	3,4,4	0.99	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
2	EDO	D	301	-	-	1/1/1/1	-
4	DGL	B	304	-	-	2/9/9/9	-
7	ALA	D	305	-	-	0/4/4/4	-
2	EDO	B	302	-	-	1/1/1/1	-
2	EDO	B	303	-	-	1/1/1/1	-
2	EDO	A	301	-	-	1/1/1/1	-
2	EDO	D	302	-	-	0/1/1/1	-
4	DGL	D	306	-	-	0/9/9/9	-
2	EDO	C	301	-	-	1/1/1/1	-
5	GLY	D	307	-	-	2/2/2/2	-
2	EDO	C	302	-	-	1/1/1/1	-
2	EDO	C	303	-	-	1/1/1/1	-
3	2NU	B	301	-	-	4/11/14/14	0/2/2/2
5	GLY	C	304	-	-	2/2/2/2	-

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	301	2NU	C2-N1	7.61	1.47	1.35
3	B	301	2NU	C4-N2	-3.66	1.31	1.35
3	B	301	2NU	C8-C7	2.60	1.54	1.48
3	B	301	2NU	BR1-C5	2.28	1.94	1.90
5	D	307	GLY	OXT-C	-2.17	1.23	1.30

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	301	2NU	C2-C3-N2	-9.24	99.75	110.76
3	B	301	2NU	C3-N2-C4	-4.98	122.84	129.19
3	B	301	2NU	C7-N1-C2	3.15	126.85	119.59
3	B	301	2NU	C1-N1-C2	-3.07	114.92	122.01
3	B	301	2NU	C3-C2-N1	2.92	124.65	118.47
3	B	301	2NU	O1-C2-N1	-2.36	117.76	121.88
3	B	301	2NU	C6-N3-N2	2.01	106.33	104.23

There are no chirality outliers.

All (17) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	301	2NU	C8-C7-N1-C1
3	B	301	2NU	C8-C7-N1-C2
5	C	304	GLY	O-C-CA-N
5	D	307	GLY	O-C-CA-N
5	D	307	GLY	OXT-C-CA-N
5	C	304	GLY	OXT-C-CA-N
2	C	301	EDO	O1-C1-C2-O2
2	C	303	EDO	O1-C1-C2-O2
3	B	301	2NU	C3-C2-N1-C7
2	B	302	EDO	O1-C1-C2-O2
4	B	304	DGL	CA-CB-CG-CD
3	B	301	2NU	C3-C2-N1-C1
2	C	302	EDO	O1-C1-C2-O2
2	B	303	EDO	O1-C1-C2-O2
2	D	301	EDO	O1-C1-C2-O2
4	B	304	DGL	OXT-C-CA-CB
2	A	301	EDO	O1-C1-C2-O2

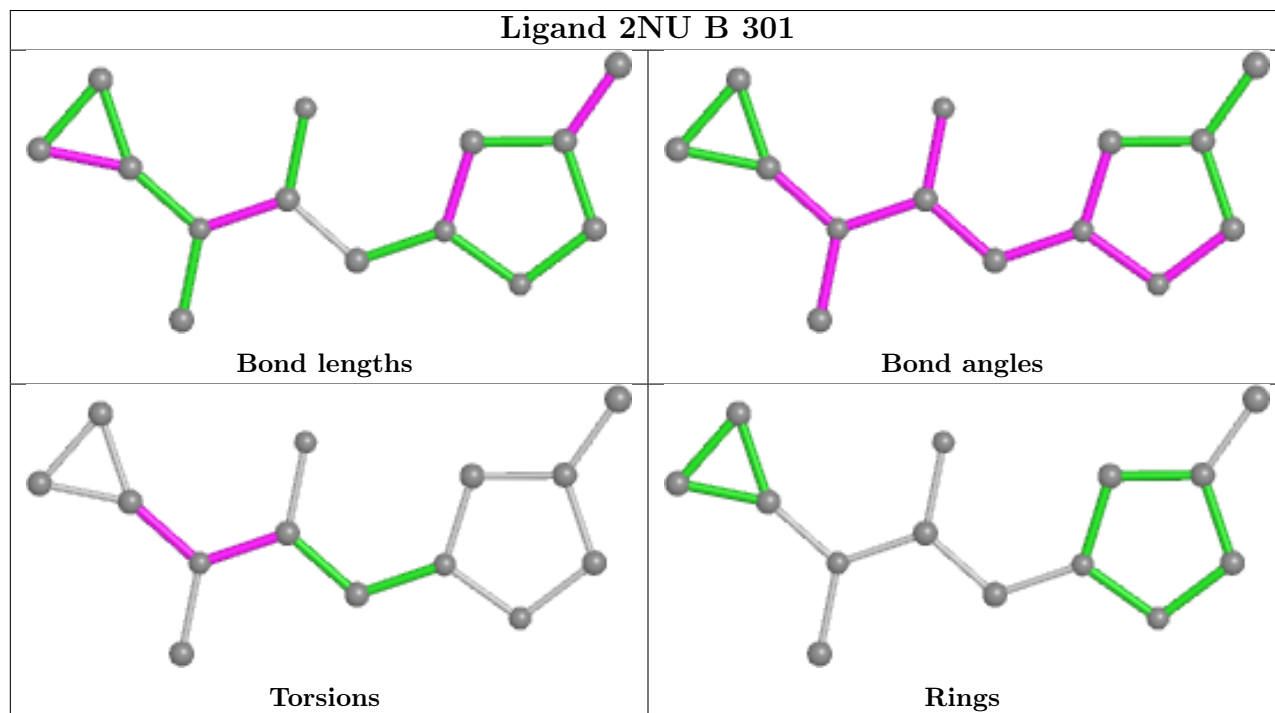
There are no ring outliers.

3 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	D	303	SO4	1	0
2	C	301	EDO	1	0
3	B	301	2NU	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 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	191/195 (97%)	0.33	7 (3%) 41 48	27, 45, 72, 100	0
1	B	193/195 (98%)	0.18	4 (2%) 63 68	26, 43, 63, 96	0
1	C	193/195 (98%)	0.53	9 (4%) 31 36	32, 50, 75, 101	0
1	D	191/195 (97%)	1.08	29 (15%) 2 3	29, 54, 77, 109	0
All	All	768/780 (98%)	0.53	49 (6%) 19 23	26, 48, 74, 109	0

All (49) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	109	LYS	7.5
1	D	182	PHE	7.3
1	D	254	ILE	6.9
1	C	110	GLN	6.1
1	C	108	ILE	4.9
1	D	116	ILE	4.5
1	A	110	GLN	4.3
1	A	108	ILE	4.3
1	D	108	ILE	4.2
1	B	106	ALA	4.2
1	B	110	GLN	4.1
1	A	109	LYS	4.1
1	D	184	GLU	4.0
1	D	189	THR	4.0
1	C	106	ALA	3.9
1	D	190	ILE	3.8
1	A	184	GLU	3.5
1	D	125	ILE	3.3
1	D	257	ILE	3.3
1	D	117	LEU	3.2
1	D	183	GLY	3.2

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Mol	Chain	Res	Type	RSRZ
1	D	213	PHE	3.1
1	D	207	GLY	3.1
1	C	209	VAL	3.0
1	D	260	THR	3.0
1	A	263	THR	2.9
1	D	141	VAL	2.9
1	D	289	SER	2.9
1	D	109	LYS	2.9
1	D	265	VAL	2.8
1	A	282	MET	2.6
1	D	258	LEU	2.6
1	D	150	VAL	2.5
1	C	112	ILE	2.5
1	D	286	ILE	2.5
1	A	182	PHE	2.5
1	D	185	LYS	2.4
1	D	261	SER	2.4
1	D	110	GLN	2.4
1	D	178	LEU	2.4
1	D	264	VAL	2.4
1	D	238	ILE	2.4
1	B	125	ILE	2.2
1	C	210	GLY	2.2
1	D	241	ILE	2.2
1	B	109	LYS	2.1
1	C	184	GLU	2.0
1	D	208	HIS	2.0
1	C	207	GLY	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.

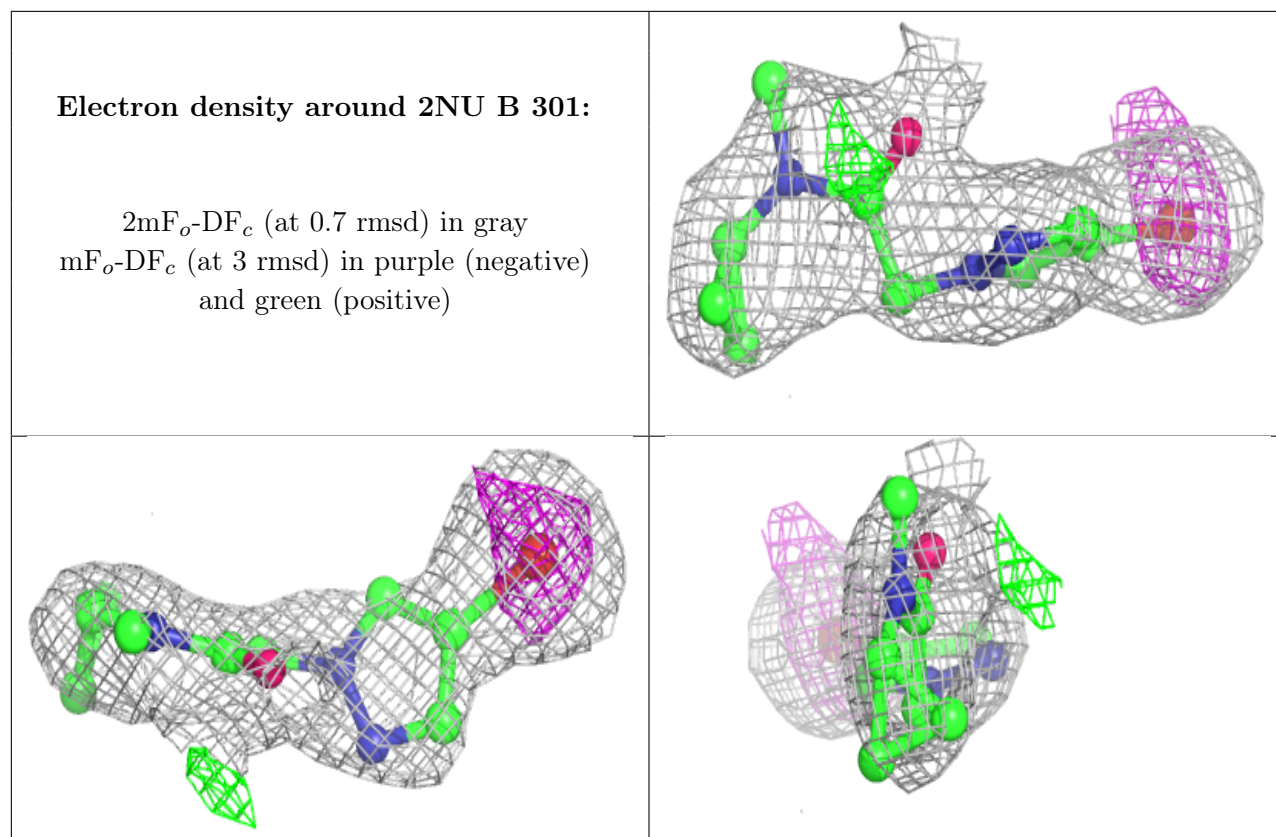
6.4 Ligands [i](#)

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, 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
6	SO4	D	304	5/5	0.70	0.21	91,96,105,108	0
7	ALA	D	305	6/6	0.78	0.23	79,81,81,84	0
4	DGL	D	306	10/10	0.80	0.26	53,80,88,89	0
5	GLY	C	304	5/5	0.85	0.25	51,53,69,72	0
4	DGL	B	304	10/10	0.86	0.30	44,65,69,70	0
5	GLY	D	307	5/5	0.87	0.19	47,51,55,57	0
2	EDO	D	301	4/4	0.87	0.22	39,46,49,56	0
2	EDO	C	301	4/4	0.87	0.17	44,47,47,50	0
2	EDO	B	302	4/4	0.89	0.15	29,36,38,43	0
2	EDO	C	303	4/4	0.91	0.18	49,53,57,58	0
6	SO4	D	303	5/5	0.91	0.15	76,78,86,93	0
3	2NU	B	301	14/14	0.92	0.17	54,58,60,61	14
2	EDO	A	301	4/4	0.93	0.14	45,47,47,49	0
2	EDO	C	302	4/4	0.95	0.16	34,38,41,43	0
2	EDO	D	302	4/4	0.95	0.16	45,51,52,54	0
2	EDO	B	303	4/4	0.97	0.13	37,39,40,40	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.



6.5 Other polymers [i](#)

There are no such residues in this entry.