



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 4, 2026 – 10:24 PM UTC

PDB ID : 7FSG / pdb_00007fsg
Title : SDCBP PanDDA analysis group deposition – The PDZ domains of SDCBP in complex with Z56772132
Authors : Bradshaw, W.J.; Katis, V.L.; Bountra, C.; von Delft, F.; Brennan, P.E.
Deposited on : 2023-01-24
Resolution : 2.02 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 : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

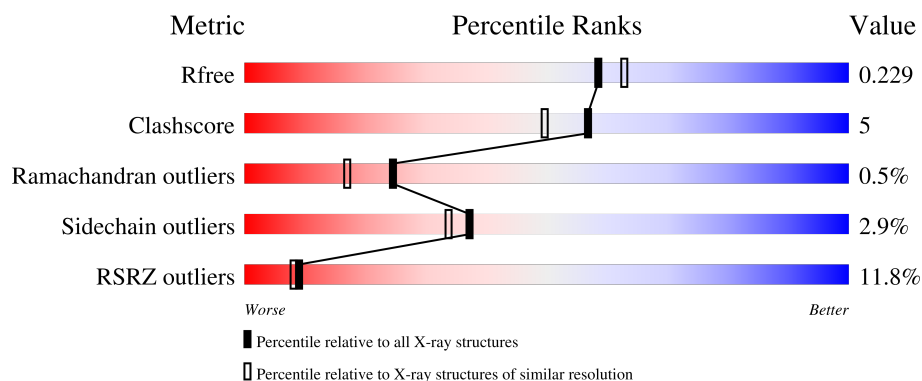
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.02 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}	180053	13299 (2.04-2.00)
Clashscore	190562	1022 (2.02-2.02)
Ramachandran outliers	187476	1014 (2.02-2.02)
Sidechain outliers	187428	1014 (2.02-2.02)
RSRZ outliers	180081	13314 (2.04-2.00)

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	18% 82% 14% ..
1	B	195	5% 88% 10% ..
1	C	195	15% 80% 17% ..
1	D	195	9% 80% 17% ..

2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 6478 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
1	A	191	Total	C	N	O	S	0	1	0
			1481	935	262	275	9			
1	B	193	Total	C	N	O	S	0	1	0
			1495	943	264	279	9			
1	C	193	Total	C	N	O	S	0	3	0
			1514	953	270	282	9			
1	D	191	Total	C	N	O	S	0	3	0
			1498	944	265	280	9			

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 (CCD ID: EDO) (formula: C₂H₆O₂).



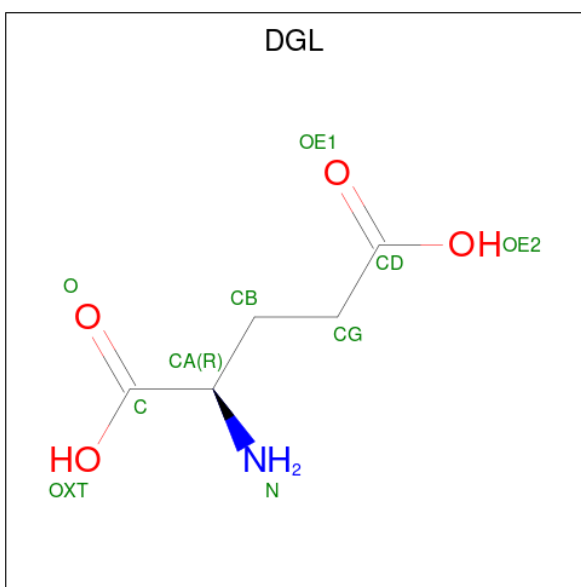
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			4	2	2		
2	B	1	Total	C	O	0	0
			4	2	2		
2	B	1	Total	C	O	0	0
			4	2	2		
2	C	1	Total	C	O	0	0
			4	2	2		
2	C	1	Total	C	O	0	0
			4	2	2		
2	C	1	Total	C	O	0	0
			4	2	2		
2	D	1	Total	C	O	0	0
			4	2	2		
2	D	1	Total	C	O	0	0
			4	2	2		

- Molecule 3 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



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

- Molecule 4 is D-GLUTAMIC ACID (CCD ID: DGL) (formula: C₅H₉NO₄).



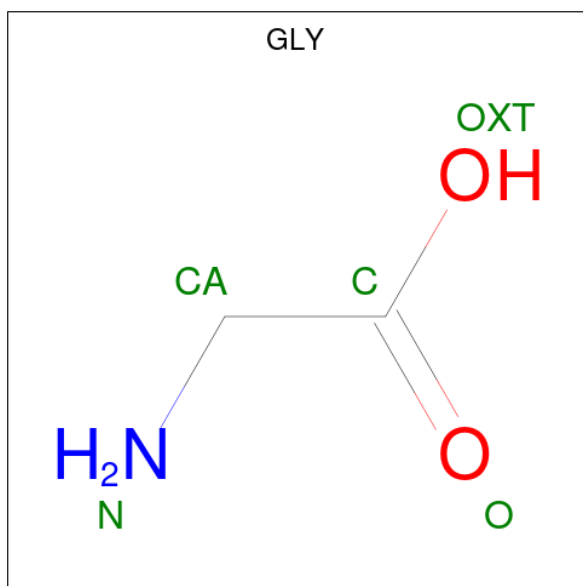
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	B	1	Total	C	N	O	0	0
			10	5	1	4		

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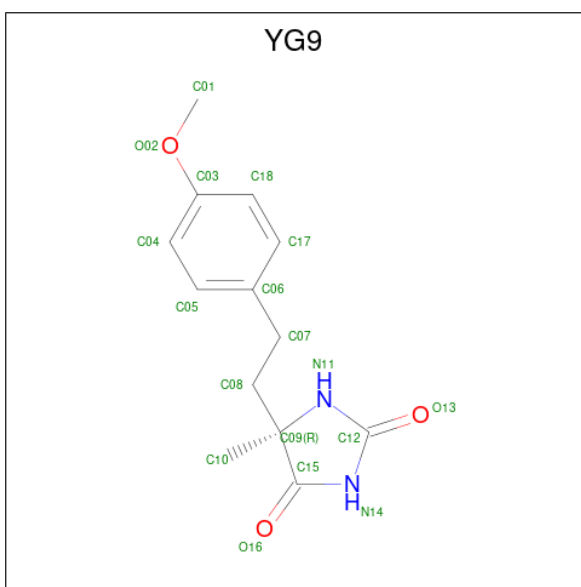
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	D	1	Total	C	N	O	0	0
			10	5	1	4		

- Molecule 5 is GLYCINE (CCD ID: GLY) (formula: $C_2H_5NO_2$).



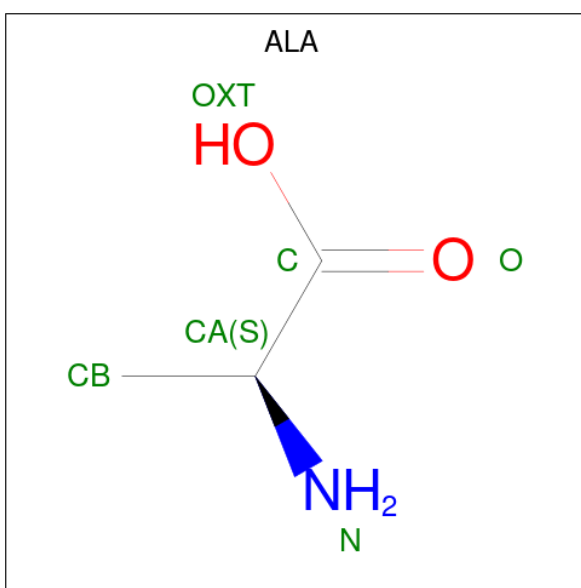
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	C	1	Total	C	N	O	0	0
			5	2	1	2		
5	D	1	Total	C	N	O	0	0
			5	2	1	2		
5	D	1	Total	C	N	O	0	0
			5	2	1	2		
5	D	1	Total	C	N	O	0	0
			5	2	1	2		

- Molecule 6 is (5R)-5-[2-(4-methoxyphenyl)ethyl]-5-methylimidazolidine-2,4-dione (CCD ID: YG9) (formula: $C_{13}H_{16}N_2O_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	D	1	Total	C	N	O	0	0
			18	13	2	3		
6	D	1	Total	C	N	O	0	0
			18	13	2	3		

- Molecule 7 is ALANINE (CCD ID: ALA) (formula: $C_3H_7NO_2$).



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

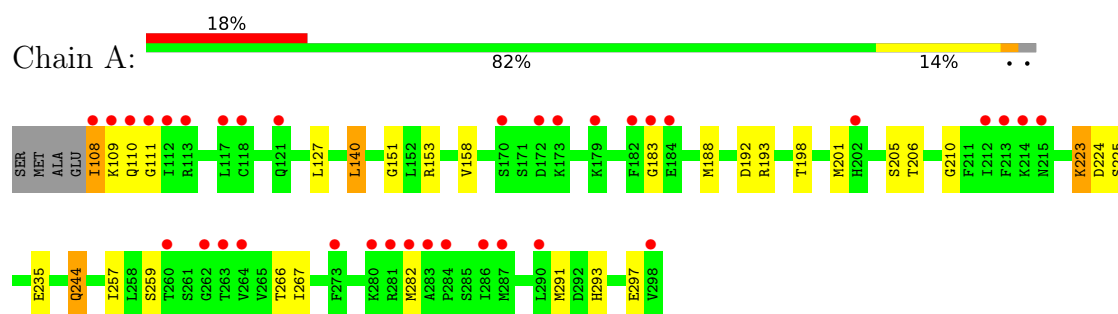
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	44	Total 44	O 44	0	0
8	B	113	Total 113	O 113	0	1
8	C	90	Total 91	O 91	0	1
8	D	113	Total 113	O 113	0	0

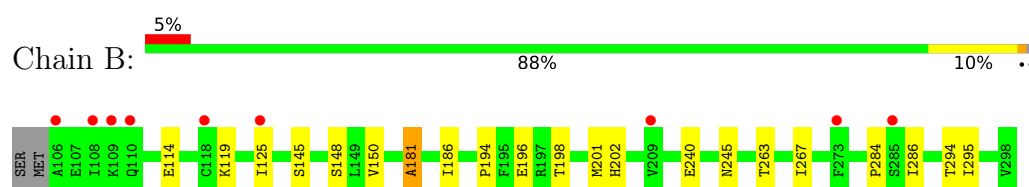
3 Residue-property plots [i](#)

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.

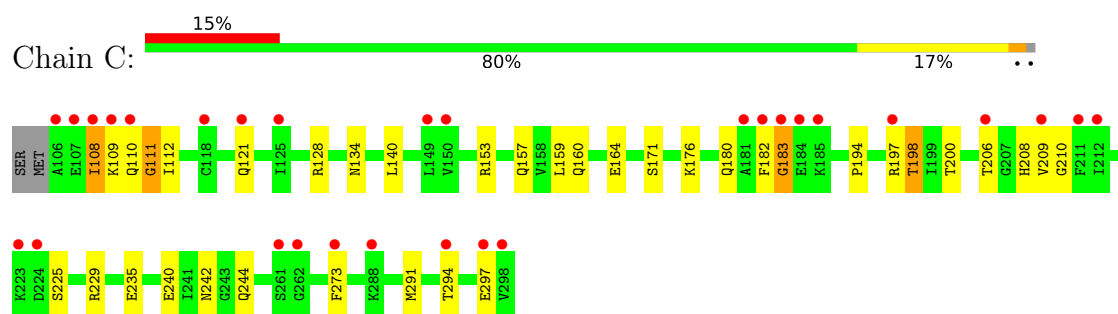
• Molecule 1: Syntenin-1



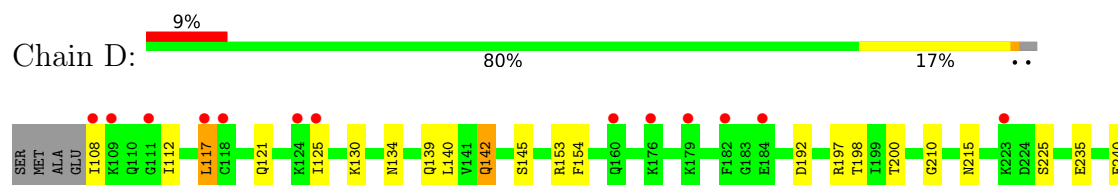
• Molecule 1: Syntenin-1



• 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	81.04Å 49.51Å 115.58Å 90.00° 94.74° 90.00°	Depositor
Resolution (Å)	115.18 – 2.02 115.18 – 2.02	Depositor EDS
% Data completeness (in resolution range)	99.7 (115.18-2.02) 99.7 (115.18-2.02)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.41 (at 2.02Å)	Xtriage
Refinement program	REFMAC 5.8.0267	Depositor
R, R_{free}	0.201 , 0.252 (Not available) , 0.229	Depositor DCC
R_{free} test set	2943 reflections (4.87%)	wwPDB-VP
Wilson B-factor (Å ²)	36.2	Xtriage
Anisotropy	0.184	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 35.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	6478	wwPDB-VP
Average B, all atoms (Å ²)	43.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 25.23 % 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 3.2988e-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, YG9, 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	1.19	0/1502	1.49	6/2019 (0.3%)
1	B	1.23	3/1516 (0.2%)	1.48	3/2038 (0.1%)
1	C	1.21	2/1535 (0.1%)	1.48	8/2063 (0.4%)
1	D	1.33	5/1519 (0.3%)	1.49	6/2042 (0.3%)
All	All	1.24	10/6072 (0.2%)	1.49	23/8162 (0.3%)

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	C	0	1

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	240	GLU	C-O	7.75	1.33	1.23
1	D	192	ASP	C-O	7.67	1.32	1.24
1	D	130	LYS	C-O	6.62	1.31	1.23
1	B	196	GLU	C-O	-6.60	1.15	1.23
1	C	134	ASN	C-O	6.08	1.32	1.23
1	D	296	PRO	C-O	-5.94	1.16	1.24
1	B	240	GLU	C-O	5.84	1.30	1.23
1	B	181	ALA	C-O	-5.68	1.17	1.24
1	C	194	PRO	C-O	-5.66	1.17	1.24
1	D	142	GLN	C-O	5.53	1.30	1.24

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	266	THR	CA-CB-OG1	-8.61	96.68	109.60
1	C	200	THR	CA-CB-OG1	-6.32	100.12	109.60
1	D	200	THR	CA-CB-OG1	-6.14	100.39	109.60
1	B	263	THR	CA-CB-OG1	-6.09	100.46	109.60
1	B	198	THR	CA-CB-OG1	-6.00	100.60	109.60
1	A	198	THR	CA-CB-OG1	-5.93	100.70	109.60
1	A	127	LEU	N-CA-CB	-5.81	101.04	110.81
1	C	235	GLU	N-CA-CB	-5.78	103.52	112.30
1	A	244	GLN	CB-CG-CD	-5.57	103.13	112.60
1	D	112	ILE	N-CA-CB	-5.49	103.51	111.52
1	B	194	PRO	CB-CA-C	-5.48	103.68	111.68
1	C	134	ASN	CA-CB-CG	-5.38	107.22	112.60
1	D	153	ARG	CG-CD-NE	-5.38	100.16	112.00
1	C	171	SER	CA-C-N	5.36	127.41	120.44
1	C	171	SER	C-N-CA	5.36	127.41	120.44
1	D	134	ASN	CA-CB-CG	-5.29	107.31	112.60
1	D	235	GLU	CB-CA-C	5.27	119.21	111.73
1	C	153	ARG	CG-CD-NE	-5.27	100.41	112.00
1	D	271	PRO	CA-C-O	-5.22	115.46	121.36
1	A	224	ASP	CA-CB-CG	5.21	117.81	112.60
1	C	242	ASN	CA-C-O	-5.18	115.97	122.03
1	C	198	THR	CA-CB-OG1	-5.12	101.93	109.60
1	A	206	THR	CA-CB-OG1	-5.09	101.97	109.60

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	C	111	GLY	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	1481	0	1530	15	0
1	B	1495	0	1541	10	0
1	C	1514	0	1558	18	1
1	D	1498	0	1540	14	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	A	4	0	6	0	0
2	B	8	0	12	0	0
2	C	12	0	18	0	0
2	D	8	0	12	0	0
3	B	5	0	0	0	0
3	D	10	0	0	0	0
4	B	10	0	7	0	0
4	D	10	0	7	0	0
5	C	5	0	2	0	0
5	D	15	0	6	0	0
6	D	36	0	0	0	0
7	D	6	0	4	0	0
8	A	44	0	0	1	0
8	B	113	0	0	2	0
8	C	91	0	0	3	0
8	D	113	0	0	2	0
All	All	6478	0	6243	57	1

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

All (57) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:108:ILE:HD12	1:C:198:THR:HG23	1.65	0.76
1:A:201:MET:HE1	1:A:267:ILE:HD12	1.70	0.73
1:D:117:LEU:HD12	1:D:117:LEU:H	1.54	0.72
1:D:256[B]:ASP:O	1:D:260:THR:HG23	1.87	0.71
1:C:206:THR:OG1	1:C:208:HIS:ND1	2.29	0.66
1:B:202:HIS:O	8:B:401:HOH:O	2.15	0.64
1:C:206:THR:HG1	1:C:208:HIS:CE1	2.18	0.62
1:D:117:LEU:HD22	1:D:125:ILE:HG23	1.80	0.61
1:D:248:GLY:HA2	1:D:287:MET:HE3	1.83	0.61
1:A:109:LYS:O	1:A:111:GLY:N	2.33	0.60
1:B:150:VAL:O	8:B:402:HOH:O	2.17	0.59
1:D:215:ASN:O	8:D:601:HOH:O	2.17	0.59
1:A:151:GLY:O	1:A:153:ARG:NH1	2.37	0.57
1:A:140:LEU:HD11	1:A:282:MET:SD	2.45	0.56
1:B:201:MET:HE1	1:B:267:ILE:HD12	1.88	0.56
1:A:108:ILE:N	1:A:108:ILE:HD13	2.21	0.55
1:D:117:LEU:HD12	1:D:117:LEU:N	2.21	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:210:GLY:HA3	1:D:225:SER:HB2	1.89	0.55
1:D:286:ILE:HG23	1:D:290:LEU:HD12	1.89	0.54
1:D:210:GLY:HA3	1:D:225:SER:CB	2.38	0.53
1:C:182:PHE:O	1:C:183:GLY:O	2.29	0.51
1:C:110:GLN:HG3	1:C:111:GLY:H	1.76	0.50
1:B:294:THR:HG22	1:B:295:ILE:O	2.11	0.50
1:D:154:PHE:CD1	1:D:247:ILE:CD1	2.95	0.49
1:A:140:LEU:CD1	1:A:282:MET:SD	3.01	0.49
1:A:201:MET:CE	1:A:267:ILE:HD12	2.43	0.48
1:C:176:LYS:HE2	1:C:180:GLN:NE2	2.28	0.48
1:B:125:ILE:HD11	1:B:186:ILE:CD1	2.44	0.47
1:C:210:GLY:HA3	1:C:225:SER:CB	2.44	0.47
1:C:229:ARG:NH2	8:C:408:HOH:O	2.47	0.47
1:C:210:GLY:HA3	1:C:225:SER:HB2	1.95	0.47
1:A:244:GLN:HE21	1:A:257:ILE:HD13	1.79	0.46
1:A:223:LYS:CE	8:A:409:HOH:O	2.63	0.46
1:D:142:GLN:HB3	1:D:145:SER:HB3	1.98	0.45
1:D:197:ARG:NH2	8:D:602:HOH:O	2.34	0.45
1:C:182:PHE:O	1:C:183:GLY:C	2.59	0.45
1:C:273[B]:PHE:CD1	8:C:423:HOH:O	2.70	0.45
1:B:245:ASN:OD1	1:B:245:ASN:C	2.60	0.44
1:B:119:LYS:NZ	1:B:181:ALA:O	2.45	0.44
1:C:121:GLN:HG2	8:C:456:HOH:O	2.17	0.44
1:C:111:GLY:C	1:C:112:ILE:HG13	2.43	0.43
1:C:240:GLU:HA	1:C:244:GLN:O	2.19	0.42
1:A:291:MET:O	1:A:293:HIS:CE1	2.73	0.42
1:A:235:GLU:OE1	1:A:235:GLU:HA	2.19	0.42
1:A:210:GLY:HA3	1:A:225:SER:HB2	2.02	0.42
1:C:157:GLN:HG2	1:C:159:LEU:HD12	2.02	0.42
1:C:160:GLN:HA	1:C:164:GLU:O	2.19	0.42
1:B:125:ILE:HD11	1:B:186:ILE:HD13	2.01	0.41
1:D:198:THR:HA	1:D:267:ILE:O	2.20	0.41
1:B:201:MET:HE1	1:B:267:ILE:CD1	2.50	0.41
1:C:140:LEU:HD12	1:C:291:MET:HE2	2.03	0.41
1:C:197[A]:ARG:HH11	1:C:197[A]:ARG:HD2	1.74	0.41
1:D:140:LEU:HD23	1:D:140:LEU:C	2.45	0.41
1:A:109:LYS:C	1:A:111:GLY:N	2.79	0.40
1:B:145:SER:H	1:B:148:SER:HG	1.65	0.40
1:A:158:VAL:HG11	1:A:188:MET:HE2	2.02	0.40
1:A:192:ASP:O	1:A:193:ARG:C	2.64	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the sym-

metry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:128:ARG:NH2	1:C:297:GLU:OE1[2_544]	2.09	0.11

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%)	11	5
1	B	192/195 (98%)	188 (98%)	4 (2%)	0	100	100
1	C	194/195 (100%)	186 (96%)	7 (4%)	1 (0%)	24	17
1	D	192/195 (98%)	188 (98%)	3 (2%)	1 (0%)	24	17
All	All	768/780 (98%)	742 (97%)	22 (3%)	4 (0%)	24	17

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	110	GLN
1	A	183	GLY
1	C	183	GLY
1	D	262	GLY

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%)	160 (96%)	6 (4%)	31	26
1	B	167/168 (99%)	164 (98%)	3 (2%)	51	52
1	C	169/168 (101%)	165 (98%)	4 (2%)	43	41
1	D	168/168 (100%)	162 (96%)	6 (4%)	31	26
All	All	670/672 (100%)	651 (97%)	19 (3%)	37	35

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	108	ILE
1	A	140	LEU
1	A	205	SER
1	A	223	LYS
1	A	259	SER
1	A	297	GLU
1	B	114	GLU
1	B	284	PRO
1	B	286	ILE
1	C	108	ILE
1	C	109	LYS
1	C	209	VAL
1	C	294	THR
1	D	108	ILE
1	D	117	LEU
1	D	121	GLN
1	D	139	GLN
1	D	263	THR
1	D	297	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	180	GLN
1	A	215	ASN
1	B	139	GLN
1	B	142	GLN
1	B	160	GLN
1	B	165	ASN
1	B	215	ASN
1	B	230	ASN

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Mol	Chain	Res	Type
1	B	244	GLN
1	C	160	GLN
1	C	180	GLN
1	C	230	ASN
1	C	244	GLN
1	D	215	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

20 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	$\# Z > 2$
5	GLY	D	511	-	4,4,4	1.00	0	3,4,4	1.66	2 (66%)
3	SO4	D	505	-	4,4,4	0.31	0	6,6,6	0.06	0
5	GLY	D	509	-	4,4,4	1.27	1 (25%)	3,4,4	1.34	0
5	GLY	D	510	-	4,4,4	1.00	0	3,4,4	1.55	1 (33%)
5	GLY	C	304	-	4,4,4	0.84	0	3,4,4	1.52	0
2	EDO	C	301	-	3,3,3	0.24	0	2,2,2	0.27	0
6	YG9	D	501	-	17,19,19	2.53	5 (29%)	20,27,27	1.23	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	EDO	C	303	-	3,3,3	0.42	0	2,2,2	0.56	0
2	EDO	B	301	-	3,3,3	0.26	0	2,2,2	0.34	0
4	DGL	B	304	-	8,9,9	1.12	1 (12%)	8,11,11	1.73	1 (12%)
2	EDO	C	302	-	3,3,3	0.36	0	2,2,2	0.35	0
4	DGL	D	508	-	8,9,9	1.00	0	8,11,11	0.91	0
7	ALA	D	507	-	5,5,5	0.87	0	6,6,6	1.59	1 (16%)
2	EDO	D	504	-	3,3,3	0.38	0	2,2,2	0.06	0
2	EDO	D	503	-	3,3,3	0.28	0	2,2,2	0.36	0
2	EDO	A	301	-	3,3,3	0.18	0	2,2,2	0.18	0
3	SO4	D	506	-	4,4,4	0.34	0	6,6,6	0.06	0
6	YG9	D	502	-	17,19,19	2.38	4 (23%)	20,27,27	0.83	1 (5%)
2	EDO	B	302	-	3,3,3	0.20	0	2,2,2	0.21	0
3	SO4	B	303	-	4,4,4	0.32	0	6,6,6	0.06	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	DGL	B	304	-	-	1/9/9/9	-
5	GLY	D	509	-	-	2/2/2/2	-
2	EDO	D	503	-	-	0/1/1/1	-
2	EDO	C	302	-	-	0/1/1/1	-
5	GLY	C	304	-	-	0/2/2/2	-
5	GLY	D	510	-	-	2/2/2/2	-
7	ALA	D	507	-	-	4/4/4/4	-
2	EDO	C	301	-	-	0/1/1/1	-
6	YG9	D	502	-	-	2/8/23/23	0/2/2/2
6	YG9	D	501	-	-	2/8/23/23	0/2/2/2
2	EDO	D	504	-	-	1/1/1/1	-
2	EDO	C	303	-	-	1/1/1/1	-
2	EDO	A	301	-	-	0/1/1/1	-
5	GLY	D	511	-	-	0/2/2/2	-
4	DGL	D	508	-	-	4/9/9/9	-
2	EDO	B	301	-	-	0/1/1/1	-
2	EDO	B	302	-	-	0/1/1/1	-

All (11) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	D	502	YG9	C12-N11	7.51	1.48	1.35
6	D	501	YG9	C12-N11	6.60	1.47	1.35
6	D	501	YG9	C15-N14	5.54	1.45	1.37
6	D	501	YG9	C12-N14	4.11	1.48	1.38
6	D	502	YG9	C15-N14	3.93	1.42	1.37
6	D	502	YG9	C12-N14	3.19	1.46	1.38
6	D	502	YG9	O16-C15	-2.47	1.18	1.22
5	D	509	GLY	OXT-C	-2.44	1.22	1.30
4	B	304	DGL	OXT-C	-2.25	1.23	1.30
6	D	501	YG9	O16-C15	-2.15	1.19	1.22
6	D	501	YG9	C10-C09	2.11	1.57	1.53

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	304	DGL	OXT-C-O	-3.77	115.53	124.08
6	D	501	YG9	C15-N14-C12	-3.51	108.10	111.69
7	D	507	ALA	OXT-C-CA	2.82	123.51	113.79
6	D	502	YG9	C15-N14-C12	-2.27	109.38	111.69
5	D	510	GLY	OXT-C-CA	2.14	121.91	113.38
5	D	511	GLY	OXT-C-O	-2.00	118.18	123.33
5	D	511	GLY	OXT-C-CA	2.00	121.34	113.38

There are no chirality outliers.

All (19) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	D	502	YG9	C07-C08-C09-C15
6	D	501	YG9	C04-C03-O02-C01
6	D	501	YG9	C18-C03-O02-C01
5	D	509	GLY	OXT-C-CA-N
5	D	510	GLY	OXT-C-CA-N
5	D	510	GLY	O-C-CA-N
5	D	509	GLY	O-C-CA-N
7	D	507	ALA	O-C-CA-CB
7	D	507	ALA	OXT-C-CA-CB
2	C	303	EDO	O1-C1-C2-O2
4	D	508	DGL	O-C-CA-CB
4	D	508	DGL	OXT-C-CA-CB
7	D	507	ALA	OXT-C-CA-N
7	D	507	ALA	O-C-CA-N
2	D	504	EDO	O1-C1-C2-O2

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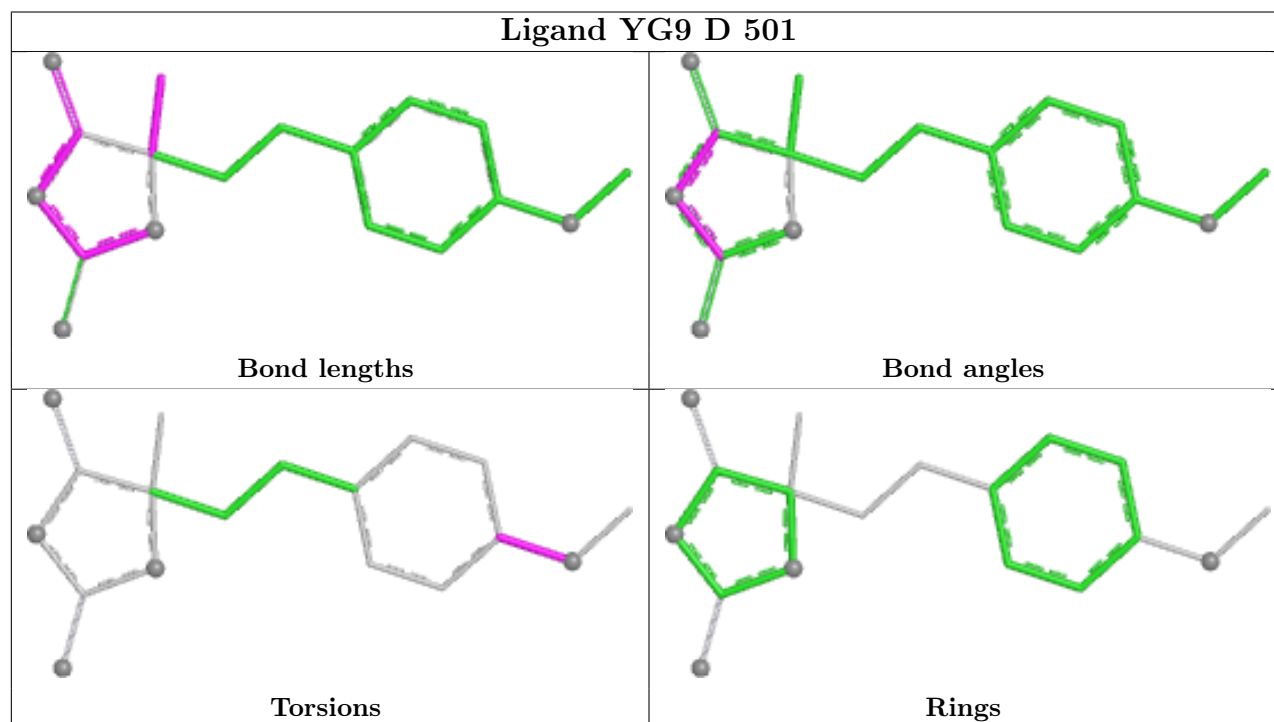
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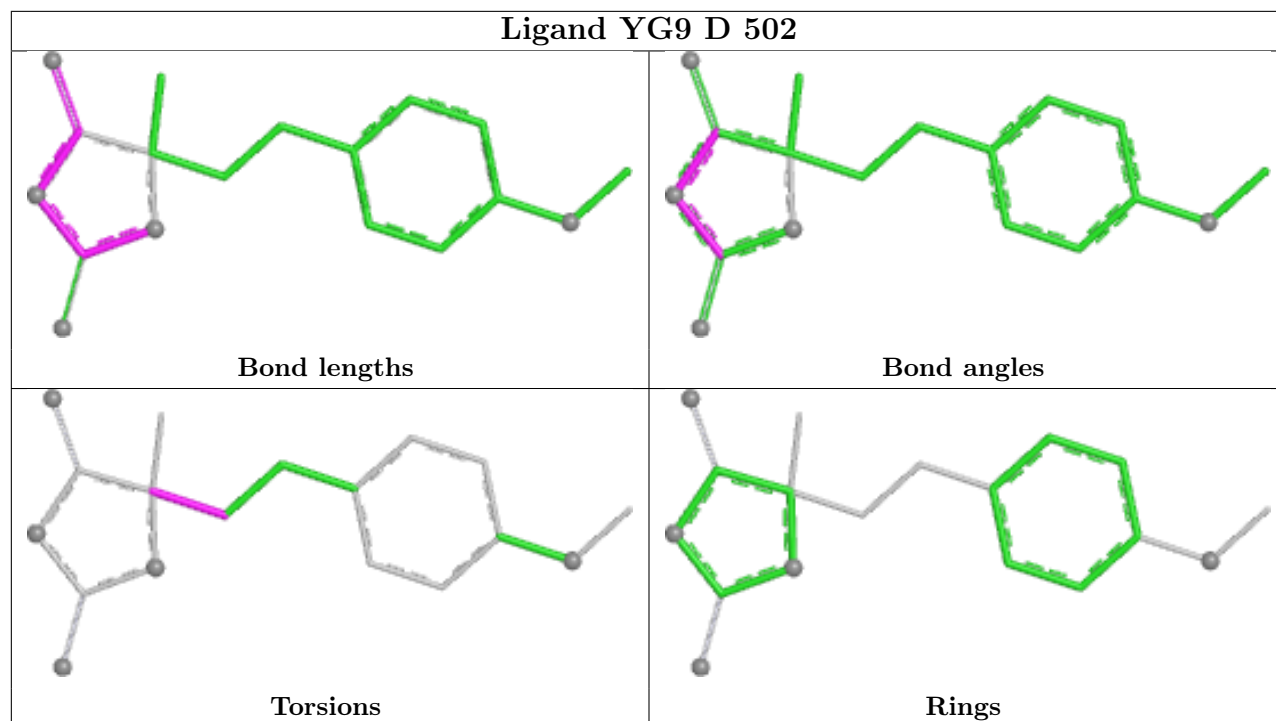
Mol	Chain	Res	Type	Atoms
4	D	508	DGL	CA-CB-CG-CD
4	B	304	DGL	N-CA-CB-CG
4	D	508	DGL	N-CA-CB-CG
6	D	502	YG9	C07-C08-C09-N11

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less 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%)	1.07	35 (18%) 3 3	13, 46, 76, 99	20 (10%)
1	B	193/195 (98%)	0.26	9 (4%) 36 35	12, 40, 58, 71	5 (2%)
1	C	193/195 (98%)	0.86	29 (15%) 5 5	10, 39, 64, 89	21 (10%)
1	D	191/195 (97%)	0.33	18 (9%) 14 13	11, 35, 54, 80	14 (7%)
All	All	768/780 (98%)	0.63	91 (11%) 9 8	10, 40, 67, 99	60 (7%)

All (91) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	125	ILE	10.6
1	A	111	GLY	9.1
1	A	112	ILE	7.8
1	C	182	PHE	7.8
1	A	109	LYS	7.5
1	C	261	SER	7.5
1	C	150	VAL	7.3
1	A	108	ILE	7.2
1	C	181	ALA	7.1
1	C	121	GLN	6.9
1	B	125	ILE	6.7
1	C	298	VAL	6.5
1	A	298	VAL	6.3
1	A	262	GLY	6.3
1	C	185	LYS	6.2
1	C	294	THR	6.1
1	A	212	ILE	6.1
1	C	209	VAL	6.0
1	C	211	PHE	6.0
1	D	117	LEU	5.9
1	D	125	ILE	5.9

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Mol	Chain	Res	Type	RSRZ
1	A	213	PHE	5.9
1	C	197[A]	ARG	5.9
1	C	212	ILE	5.6
1	D	273[A]	PHE	5.5
1	C	149	LEU	5.4
1	D	160[A]	GLN	5.4
1	A	264	VAL	5.2
1	D	118	CYS	5.2
1	C	223	LYS	5.1
1	C	183	GLY	5.1
1	B	209	VAL	5.0
1	A	260	THR	5.0
1	A	263	THR	4.9
1	A	110	GLN	4.9
1	A	286	ILE	4.9
1	C	184	GLU	4.7
1	A	215	ASN	4.7
1	A	173	LYS	4.6
1	B	285	SER	4.4
1	C	297	GLU	4.4
1	A	182	PHE	4.4
1	A	113	ARG	4.4
1	D	124	LYS	4.4
1	A	283	ALA	4.2
1	A	273[A]	PHE	4.1
1	D	179	LYS	4.0
1	A	170	SER	4.0
1	A	280	LYS	3.9
1	C	106	ALA	3.9
1	B	273[A]	PHE	3.9
1	C	224	ASP	3.9
1	A	214	LYS	3.9
1	D	223	LYS	3.8
1	D	176	LYS	3.7
1	C	108	ILE	3.6
1	D	256[A]	ASP	3.6
1	A	290	LEU	3.4
1	A	172	ASP	3.4
1	C	118	CYS	3.4
1	D	260	THR	3.4
1	A	282	MET	3.0
1	D	261	SER	3.0

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Mol	Chain	Res	Type	RSRZ
1	A	287	MET	3.0
1	A	183	GLY	2.8
1	A	284	PRO	2.8
1	C	288	LYS	2.8
1	B	106	ALA	2.8
1	A	117	LEU	2.8
1	C	206	THR	2.7
1	D	108	ILE	2.7
1	B	110	GLN	2.6
1	B	118	CYS	2.6
1	A	202	HIS	2.6
1	D	182	PHE	2.6
1	C	107	GLU	2.6
1	C	262	GLY	2.6
1	C	273[A]	PHE	2.5
1	B	109	LYS	2.5
1	C	109	LYS	2.4
1	C	110	GLN	2.3
1	A	281	ARG	2.2
1	A	179	LYS	2.2
1	A	184	GLU	2.1
1	A	121	GLN	2.1
1	D	111	GLY	2.1
1	A	118	CYS	2.1
1	D	184	GLU	2.1
1	B	108	ILE	2.1
1	D	264	VAL	2.0
1	D	109	LYS	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 oligosaccharides 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,

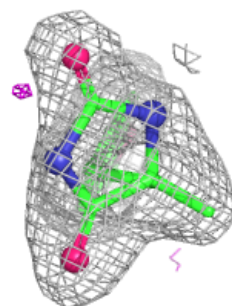
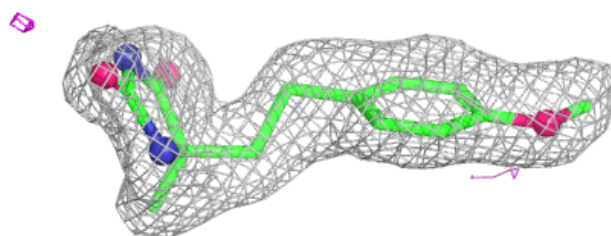
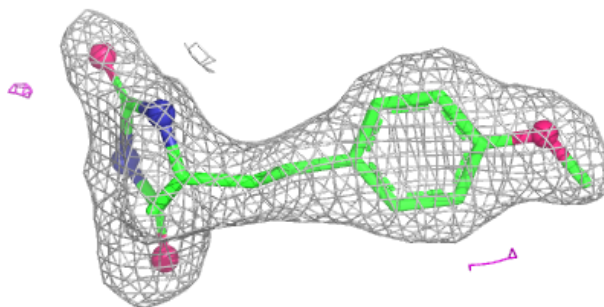
median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
5	GLY	D	510	5/5	0.67	0.18	48,58,59,63	0
4	DGL	D	508	10/10	0.75	0.17	43,68,74,76	0
3	SO4	B	303	5/5	0.76	0.14	95,95,106,107	0
7	ALA	D	507	6/6	0.79	0.20	56,71,77,78	0
5	GLY	D	511	5/5	0.82	0.15	60,61,64,66	0
2	EDO	C	303	4/4	0.86	0.21	58,63,69,70	0
3	SO4	D	505	5/5	0.86	0.12	71,81,88,91	0
5	GLY	C	304	5/5	0.88	0.10	47,48,50,54	0
3	SO4	D	506	5/5	0.88	0.15	57,59,76,78	0
5	GLY	D	509	5/5	0.90	0.15	68,69,71,75	0
4	DGL	B	304	10/10	0.90	0.10	44,61,67,68	0
6	YG9	D	502	18/18	0.91	0.10	27,28,30,30	18
6	YG9	D	501	18/18	0.91	0.11	26,28,30,30	18
2	EDO	C	302	4/4	0.93	0.10	39,40,43,46	0
2	EDO	C	301	4/4	0.93	0.11	34,36,38,40	0
2	EDO	B	301	4/4	0.94	0.11	34,38,39,42	0
2	EDO	D	503	4/4	0.95	0.08	26,26,26,30	0
2	EDO	D	504	4/4	0.95	0.07	35,37,37,37	0
2	EDO	B	302	4/4	0.96	0.08	32,38,42,43	0
2	EDO	A	301	4/4	0.96	0.10	45,46,47,49	0

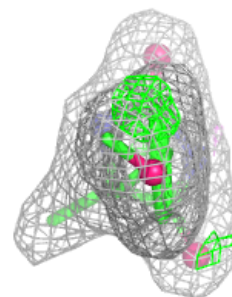
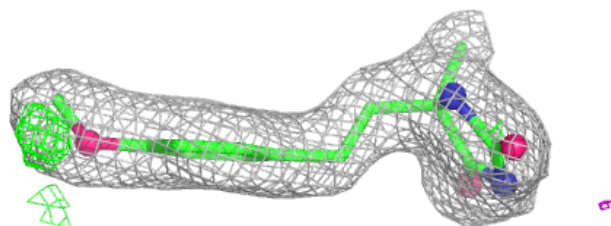
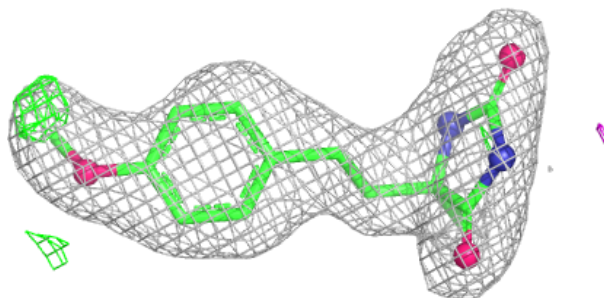
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around YG9 D 502:

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

**Electron density around YG9 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.