



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 26, 2026 – 12:00 AM UTC

PDB ID : 6LON / pdb_00006lon
Title : Crystal structure of HPSG
Authors : Liu, J.; Zhang, Y.; Yuchi, Z.
Deposited on : 2020-01-06
Resolution : 2.20 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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

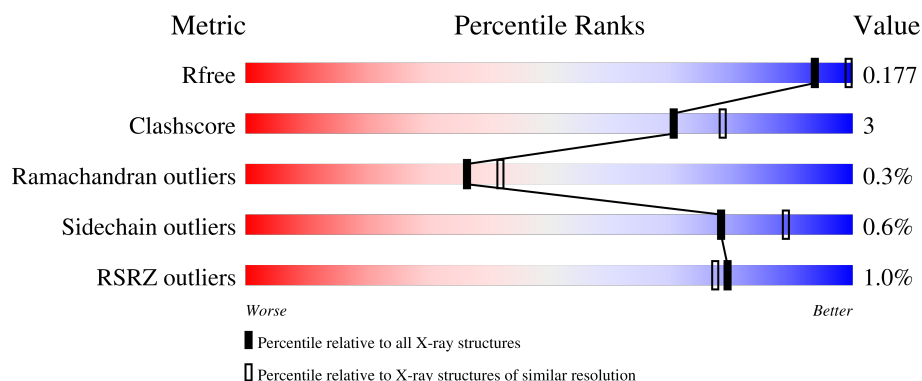
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.20 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	6164 (2.20-2.20)
Clashscore	190562	6851 (2.20-2.20)
Ramachandran outliers	187476	6768 (2.20-2.20)
Sidechain outliers	187428	6769 (2.20-2.20)
RSRZ outliers	180081	6166 (2.20-2.20)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	824	0.1% 88% 9% .
1	B	824	0.1% 91% 6% .
1	C	824	2% 88% 9% .
1	D	824	92% 5% .

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
3	GOL	C	905	-	X	-	-
3	GOL	C	910	-	-	X	-
3	GOL	D	913	-	X	-	-

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 52749 atoms, of which 24877 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.

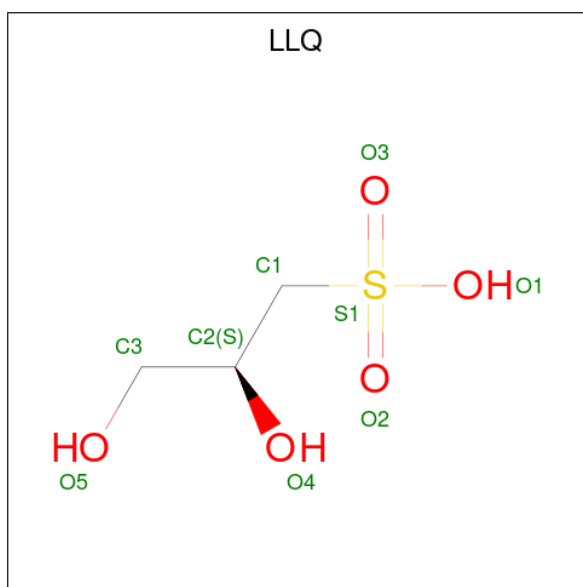
- Molecule 1 is a protein called PFL2/glycerol dehydratase family glyceryl radical enzyme.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	B	802	Total	C	H	N	O	S	0	4	0
			12444	4028	6100	1086	1194	36			
1	A	804	Total	C	H	N	O	S	0	4	0
			12463	4035	6104	1091	1197	36			
1	C	804	Total	C	H	N	O	S	0	6	0
			12427	4031	6073	1090	1196	37			
1	D	804	Total	C	H	N	O	S	0	6	0
			12578	4058	6184	1100	1199	37			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	129	ALA	THR	engineered mutation	UNP E5Y7I4
B	130	ALA	ASP	engineered mutation	UNP E5Y7I4
B	131	ALA	MET	engineered mutation	UNP E5Y7I4
B	132	ALA	GLN	engineered mutation	UNP E5Y7I4
A	129	ALA	THR	engineered mutation	UNP E5Y7I4
A	130	ALA	ASP	engineered mutation	UNP E5Y7I4
A	131	ALA	MET	engineered mutation	UNP E5Y7I4
A	132	ALA	GLN	engineered mutation	UNP E5Y7I4
C	129	ALA	THR	engineered mutation	UNP E5Y7I4
C	130	ALA	ASP	engineered mutation	UNP E5Y7I4
C	131	ALA	MET	engineered mutation	UNP E5Y7I4
C	132	ALA	GLN	engineered mutation	UNP E5Y7I4
D	129	ALA	THR	engineered mutation	UNP E5Y7I4
D	130	ALA	ASP	engineered mutation	UNP E5Y7I4
D	131	ALA	MET	engineered mutation	UNP E5Y7I4
D	132	ALA	GLN	engineered mutation	UNP E5Y7I4

- Molecule 2 is (2 {S})-2,3-bis(oxidanyl)propane-1-sulfonic acid (CCD ID: LLQ) (formula: C₃H₈O₅S) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	B	1	Total	C	H	O	S	0	0
			16	3	7	5	1		
2	A	1	Total	C	H	O	S	0	0
			16	3	7	5	1		
2	C	1	Total	C	H	O	S	0	0
			16	3	7	5	1		
2	D	1	Total	C	H	O	S	0	0
			16	3	7	5	1		

- Molecule 3 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	B	1	Total	C	H	O	0	0
			14	3	8	3		
3	B	1	Total	C	H	O	0	0
			13	3	7	3		
3	B	1	Total	C	H	O	0	0
			12	3	6	3		
3	B	1	Total	C	H	O	0	0
			11	3	5	3		
3	B	1	Total	C	H	O	0	0
			14	3	8	3		
3	B	1	Total	C	H	O	0	0
			13	3	7	3		
3	B	1	Total	C	H	O	0	0
			13	3	7	3		
3	B	1	Total	C	H	O	0	0
			14	3	8	3		
3	B	1	Total	C	H	O	0	0
			13	3	7	3		
3	B	1	Total	C	H	O	0	0
			14	3	8	3		
3	B	1	Total	C	H	O	0	0
			13	3	7	3		
3	B	1	Total	C	H	O	0	0
			14	3	8	3		
3	B	1	Total	C	H	O	0	0
			13	3	7	3		
3	A	1	Total	C	H	O	0	0
			14	3	8	3		
3	A	1	Total	C	H	O	0	0
			14	3	8	3		
3	A	1	Total	C	H	O	0	0
			14	3	8	3		
3	A	1	Total	C	H	O	0	0
			13	3	7	3		
3	A	1	Total	C	H	O	0	0
			13	3	7	3		
3	A	1	Total	C	H	O	0	0
			13	3	7	3		
3	A	1	Total	C	H	O	0	0
			11	3	5	3		

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	H	O	0	0
			14	3	8	3		
3	A	1	Total	C	H	O	0	0
			13	3	7	3		
3	A	1	Total	C	H	O	0	0
			13	3	7	3		
3	A	1	Total	C	H	O	0	0
			13	3	7	3		
3	A	1	Total	C	H	O	0	0
			13	3	7	3		
3	A	1	Total	C	H	O	0	0
			13	3	7	3		
3	A	1	Total	C	H	O	0	0
			14	3	8	3		
3	A	1	Total	C	H	O	0	0
			13	3	7	3		
3	A	1	Total	C	H	O	0	0
			14	3	8	3		
3	A	1	Total	C	H	O	0	0
			14	3	8	3		
3	C	1	Total	C	H	O	0	0
			14	3	8	3		
3	C	1	Total	C	H	O	0	0
			13	3	7	3		
3	C	1	Total	C	H	O	0	0
			13	3	7	3		
3	C	1	Total	C	H	O	0	0
			14	3	8	3		
3	C	1	Total	C	H	O	0	0
			13	3	7	3		
3	C	1	Total	C	H	O	0	0
			13	3	7	3		
3	C	1	Total	C	H	O	0	0
			14	3	8	3		
3	C	1	Total	C	H	O	0	0
			13	3	7	3		
3	C	1	Total	C	H	O	0	0
			14	3	8	3		
3	C	1	Total	C	H	O	0	0
			13	3	7	3		
3	D	1	Total	C	H	O	0	0
			12	3	6	3		

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	D	1	Total	C	H	O	0	0
			13	3	7	3		
3	D	1	Total	C	H	O	0	0
			12	3	6	3		
3	D	1	Total	C	H	O	0	0
			12	3	6	3		
3	D	1	Total	C	H	O	0	0
			11	3	5	3		
3	D	1	Total	C	H	O	0	0
			12	3	6	3		
3	D	1	Total	C	H	O	0	0
			13	3	7	3		
3	D	1	Total	C	H	O	0	0
			14	3	8	3		
3	D	1	Total	C	H	O	0	0
			13	3	7	3		
3	D	1	Total	C	H	O	0	0
			14	3	8	3		
3	D	1	Total	C	H	O	0	0
			14	3	8	3		
3	D	1	Total	C	H	O	0	0
			14	3	8	3		

- Molecule 4 is SODIUM ION (CCD ID: NA) (formula: Na).

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

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	B	536	Total	O	0	0
			536	536		
5	A	544	Total	O	0	0
			544	544		

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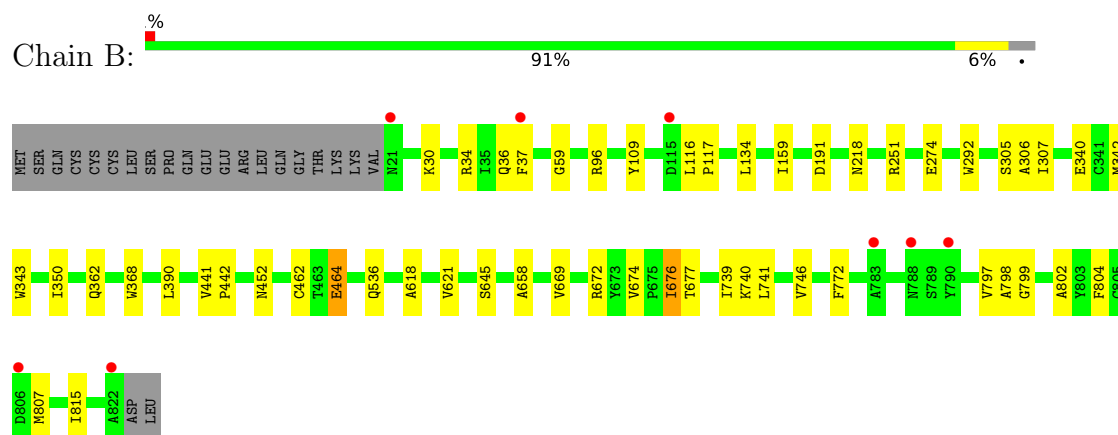
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	C	423	Total 423	O 423	0	0
5	D	554	Total 554	O 554	0	0

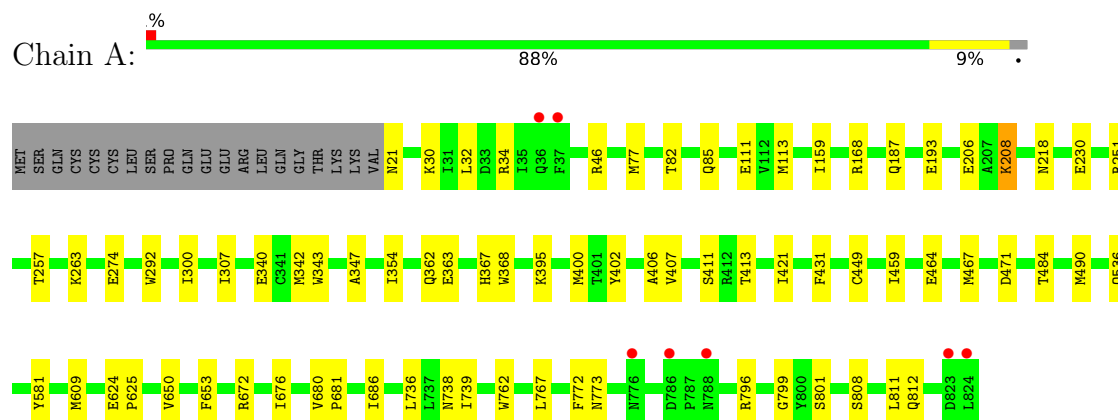
3 Residue-property plots

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.

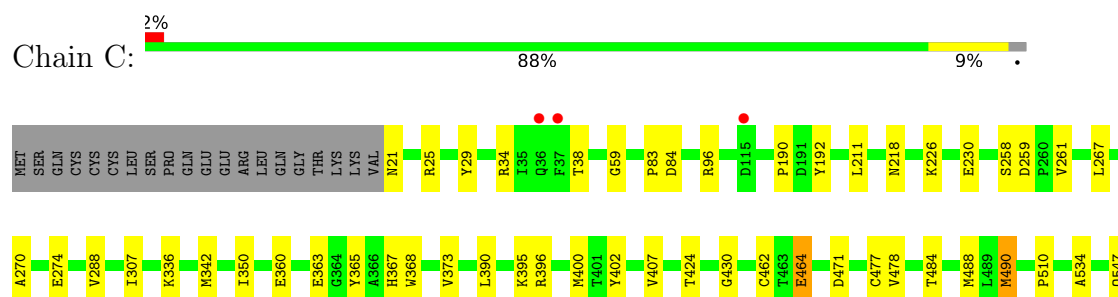
- Molecule 1: PFL2/glycerol dehydratase family glycyl radical enzyme

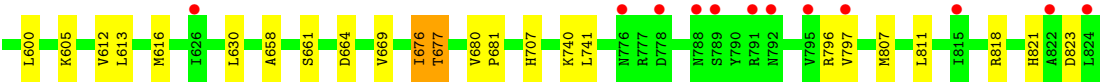


- Molecule 1: PFL2/glycerol dehydratase family glycyl radical enzyme

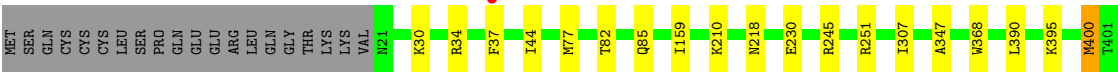


- Molecule 1: PFL2/glycerol dehydratase family glycyl radical enzyme





● Molecule 1: PFL2/glycerol dehydratase family glycyl radical enzyme



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	92.92Å 219.40Å 213.14Å 90.00° 98.04° 90.00°	Depositor
Resolution (Å)	36.25 – 2.20 36.25 – 2.20	Depositor EDS
% Data completeness (in resolution range)	99.7 (36.25-2.20) 95.2 (36.25-2.20)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.84 (at 2.20Å)	Xtriage
Refinement program	PHENIX 1.11.1 _2575	Depositor
R, R_{free}	0.143 , 0.179 0.143 , 0.177	Depositor DCC
R_{free} test set	1999 reflections (0.94%)	wwPDB-VP
Wilson B-factor (Å ²)	22.4	Xtriage
Anisotropy	0.210	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.44 , 52.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	52749	wwPDB-VP
Average B, all atoms (Å ²)	33.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.96% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: GOL, LLQ, NA

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	0.52	3/6519 (0.0%)	0.63	0/8852
1	B	0.51	1/6508 (0.0%)	0.62	0/8840
1	C	0.50	2/6519 (0.0%)	0.62	4/8855 (0.0%)
1	D	0.52	0/6567	0.64	0/8914
All	All	0.52	6/26113 (0.0%)	0.63	4/35461 (0.0%)

The worst 5 of 6 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	797	VAL	C-O	-11.54	1.12	1.24
1	C	664	ASP	C-O	-6.43	1.16	1.24
1	C	797	VAL	C-O	-6.04	1.18	1.24
1	A	413	THR	C-O	-5.91	1.16	1.24
1	A	208	LYS	C-O	-5.75	1.17	1.24

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	797	VAL	CA-C-N	6.28	131.50	122.40
1	C	797	VAL	C-N-CA	6.28	131.50	122.40
1	C	477	CYS	CA-C-N	5.16	127.61	120.49
1	C	477	CYS	C-N-CA	5.16	127.61	120.49

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	6359	6104	6110	45	0
1	B	6344	6100	6090	35	0
1	C	6354	6073	6078	53	0
1	D	6394	6184	6166	31	0
2	A	9	7	0	0	0
2	B	9	7	0	0	0
2	C	9	7	0	0	0
2	D	9	7	0	0	0
3	A	102	124	136	8	0
3	B	90	108	120	4	0
3	C	60	74	80	14	0
3	D	72	82	95	7	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
5	A	544	0	0	5	0
5	B	536	0	0	0	0
5	C	423	0	0	6	0
5	D	554	0	0	5	0
All	All	27872	24877	24875	172	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 3.

The worst 5 of 172 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:77:MET:HE1	1:A:300:ILE:HD11	1.54	0.90
1:A:77:MET:HE3	5:A:1120:HOH:O	1.73	0.89
1:C:661:SER:HA	3:C:903:GOL:H11	1.58	0.83
1:A:113:MET:HE1	1:A:354:ILE:HD12	1.66	0.77
1:C:363:GLU:HB2	1:C:677:THR:HG21	1.71	0.72

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	806/824 (98%)	781 (97%)	23 (3%)	2 (0%)	43	51
1	B	804/824 (98%)	783 (97%)	19 (2%)	2 (0%)	43	51
1	C	808/824 (98%)	776 (96%)	29 (4%)	3 (0%)	30	34
1	D	808/824 (98%)	780 (96%)	26 (3%)	2 (0%)	43	51
All	All	3226/3296 (98%)	3120 (97%)	97 (3%)	9 (0%)	36	42

5 of 9 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	307	ILE
1	A	307	ILE
1	C	307	ILE
1	C	605	LYS
1	D	307	ILE

5.3.2 Protein sidechains ⓘ

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	662/708 (94%)	658 (99%)	4 (1%)	78	89
1	B	662/708 (94%)	660 (100%)	2 (0%)	86	93
1	C	659/708 (93%)	655 (99%)	4 (1%)	78	89
1	D	672/708 (95%)	665 (99%)	7 (1%)	68	81
All	All	2655/2832 (94%)	2638 (99%)	17 (1%)	78	89

5 of 17 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	512	ARG
1	D	797	VAL
1	C	471	ASP
1	C	490	MET
1	C	677	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 16 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	711	HIS
1	D	496	HIS
1	A	813	ASN
1	D	362	GLN
1	A	784	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](#)

Of 62 ligands modelled in this entry, 4 are monoatomic - leaving 58 for Mogul analysis.

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
3	GOL	B	902	-	5,5,5	0.45	0	5,5,5	0.57	0
3	GOL	D	910	-	5,5,5	0.51	0	5,5,5	0.59	0
3	GOL	A	919	-	5,5,5	0.08	0	5,5,5	0.50	0
3	GOL	A	909	-	5,5,5	0.27	0	5,5,5	0.46	0
3	GOL	B	904	-	5,5,5	0.41	0	5,5,5	0.51	0
3	GOL	B	912	-	5,5,5	0.82	0	5,5,5	0.56	0
3	GOL	D	904	-	5,5,5	0.50	0	5,5,5	0.46	0
3	GOL	C	904	-	5,5,5	0.77	0	5,5,5	0.69	0
3	GOL	A	913	-	5,5,5	0.36	0	5,5,5	0.56	0
3	GOL	C	906	-	5,5,5	0.23	0	5,5,5	0.89	0
3	GOL	B	908	-	5,5,5	0.40	0	5,5,5	0.39	0
3	GOL	B	915	-	5,5,5	0.31	0	5,5,5	1.20	0
3	GOL	B	906	-	5,5,5	0.55	0	5,5,5	0.51	0
3	GOL	A	912	-	5,5,5	0.42	0	5,5,5	0.95	0
3	GOL	A	915	-	5,5,5	0.26	0	5,5,5	0.60	0
3	GOL	C	908	-	5,5,5	0.16	0	5,5,5	0.81	0
3	GOL	A	906	-	5,5,5	0.32	0	5,5,5	1.05	0
3	GOL	D	909	-	5,5,5	0.51	0	5,5,5	0.93	0
3	GOL	B	910	-	5,5,5	0.40	0	5,5,5	0.68	0
3	GOL	B	903	-	5,5,5	0.56	0	5,5,5	1.24	1 (20%)
3	GOL	C	903	-	5,5,5	0.80	0	5,5,5	2.03	2 (40%)
3	GOL	D	908	-	5,5,5	0.36	0	5,5,5	1.10	1 (20%)
3	GOL	A	908	-	5,5,5	0.67	0	5,5,5	1.03	1 (20%)
3	GOL	A	910	-	5,5,5	0.41	0	5,5,5	0.73	0
3	GOL	B	905	-	5,5,5	0.24	0	5,5,5	1.24	0
3	GOL	B	914	-	5,5,5	0.22	0	5,5,5	0.31	0
3	GOL	D	905	-	5,5,5	0.58	0	5,5,5	0.90	0
3	GOL	A	905	-	5,5,5	0.35	0	5,5,5	0.70	0
3	GOL	A	914	-	5,5,5	0.18	0	5,5,5	0.72	0
3	GOL	A	907	-	5,5,5	0.56	0	5,5,5	1.28	1 (20%)
3	GOL	C	905	-	5,5,5	0.75	0	5,5,5	1.83	2 (40%)
3	GOL	B	911	-	5,5,5	0.45	0	5,5,5	1.37	1 (20%)
2	LLQ	D	901	-	7,8,8	1.51	2 (28%)	8,11,11	2.18	2 (25%)
2	LLQ	A	901	-	7,8,8	1.38	0	8,11,11	2.33	3 (37%)
3	GOL	A	917	-	5,5,5	0.42	0	5,5,5	0.68	0
3	GOL	C	911	-	5,5,5	0.43	0	5,5,5	0.84	0
3	GOL	D	902	-	5,5,5	0.33	0	5,5,5	0.85	0
3	GOL	C	902	-	5,5,5	0.36	0	5,5,5	0.91	0
3	GOL	B	907	-	5,5,5	0.48	0	5,5,5	0.53	0
2	LLQ	C	901	-	7,8,8	1.45	1 (14%)	8,11,11	2.52	4 (50%)
3	GOL	A	904	-	5,5,5	0.13	0	5,5,5	0.48	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	GOL	C	907	-	5,5,5	0.38	0	5,5,5	1.05	0
3	GOL	D	907	-	5,5,5	0.48	0	5,5,5	0.48	0
3	GOL	D	911	-	5,5,5	0.36	0	5,5,5	0.67	0
3	GOL	B	913	-	5,5,5	0.31	0	5,5,5	1.39	0
3	GOL	A	911	-	5,5,5	0.54	0	5,5,5	0.87	0
2	LLQ	B	901	-	7,8,8	1.58	2 (28%)	8,11,11	2.65	3 (37%)
3	GOL	D	913	-	5,5,5	1.63	1 (20%)	5,5,5	3.09	3 (60%)
3	GOL	B	917	-	5,5,5	0.31	0	5,5,5	0.94	0
3	GOL	D	906	-	5,5,5	0.39	0	5,5,5	0.74	0
3	GOL	A	918	-	5,5,5	0.29	0	5,5,5	1.31	1 (20%)
3	GOL	D	914	-	5,5,5	0.40	0	5,5,5	0.66	0
3	GOL	B	909	-	5,5,5	0.56	0	5,5,5	1.02	0
3	GOL	D	903	-	5,5,5	0.31	0	5,5,5	0.65	0
3	GOL	A	903	-	5,5,5	0.15	0	5,5,5	0.84	0
3	GOL	C	910	-	5,5,5	0.16	0	5,5,5	1.34	1 (20%)
3	GOL	C	909	-	5,5,5	0.35	0	5,5,5	0.54	0
3	GOL	A	902	-	5,5,5	0.24	0	5,5,5	0.69	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
3	GOL	B	902	-	-	0/4/4/4	-
3	GOL	D	910	-	-	0/4/4/4	-
3	GOL	A	919	-	-	2/4/4/4	-
3	GOL	A	909	-	-	0/4/4/4	-
3	GOL	B	904	-	-	0/4/4/4	-
3	GOL	B	912	-	-	2/4/4/4	-
3	GOL	D	904	-	-	0/4/4/4	-
3	GOL	C	904	-	-	3/4/4/4	-
3	GOL	A	913	-	-	2/4/4/4	-
3	GOL	C	906	-	-	2/4/4/4	-
3	GOL	B	908	-	-	2/4/4/4	-
3	GOL	B	915	-	-	0/4/4/4	-
3	GOL	B	906	-	-	4/4/4/4	-
3	GOL	A	912	-	-	0/4/4/4	-
3	GOL	A	915	-	-	3/4/4/4	-
3	GOL	C	908	-	-	0/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	GOL	A	906	-	-	2/4/4/4	-
3	GOL	D	909	-	-	1/4/4/4	-
3	GOL	B	910	-	-	2/4/4/4	-
3	GOL	B	903	-	-	2/4/4/4	-
3	GOL	C	903	-	-	1/4/4/4	-
3	GOL	D	908	-	-	2/4/4/4	-
3	GOL	A	908	-	-	0/4/4/4	-
3	GOL	A	910	-	-	0/4/4/4	-
3	GOL	B	905	-	-	2/4/4/4	-
3	GOL	B	914	-	-	2/4/4/4	-
3	GOL	D	905	-	-	2/4/4/4	-
3	GOL	A	905	-	-	0/4/4/4	-
3	GOL	A	914	-	-	2/4/4/4	-
3	GOL	A	907	-	-	0/4/4/4	-
3	GOL	C	905	-	-	4/4/4/4	-
3	GOL	B	911	-	-	0/4/4/4	-
2	LLQ	D	901	-	-	5/7/7/7	-
2	LLQ	A	901	-	-	2/7/7/7	-
3	GOL	A	917	-	-	2/4/4/4	-
3	GOL	C	911	-	-	3/4/4/4	-
3	GOL	D	902	-	-	0/4/4/4	-
3	GOL	C	902	-	-	0/4/4/4	-
3	GOL	B	907	-	-	2/4/4/4	-
2	LLQ	C	901	-	-	0/7/7/7	-
3	GOL	A	904	-	-	2/4/4/4	-
3	GOL	C	907	-	-	2/4/4/4	-
3	GOL	D	907	-	-	2/4/4/4	-
3	GOL	D	911	-	-	3/4/4/4	-
3	GOL	B	913	-	-	2/4/4/4	-
3	GOL	A	911	-	-	2/4/4/4	-
2	LLQ	B	901	-	-	1/7/7/7	-
3	GOL	D	913	-	-	4/4/4/4	-
3	GOL	B	917	-	-	3/4/4/4	-
3	GOL	D	906	-	-	2/4/4/4	-
3	GOL	A	918	-	-	2/4/4/4	-
3	GOL	D	914	-	-	0/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	GOL	B	909	-	-	2/4/4/4	-
3	GOL	D	903	-	-	0/4/4/4	-
3	GOL	A	903	-	-	2/4/4/4	-
3	GOL	C	910	-	-	1/4/4/4	-
3	GOL	C	909	-	-	0/4/4/4	-
3	GOL	A	902	-	-	0/4/4/4	-

The worst 5 of 6 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	901	LLQ	O3-S1	3.20	1.54	1.45
2	C	901	LLQ	O2-S1	2.68	1.52	1.45
2	D	901	LLQ	O3-S1	2.33	1.51	1.45
3	D	913	GOL	C3-C2	-2.26	1.43	1.51
2	D	901	LLQ	O2-S1	2.16	1.51	1.45

The worst 5 of 26 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	901	LLQ	O2-S1-C1	5.58	115.08	106.76
3	D	913	GOL	C3-C2-C1	-5.54	91.49	111.80
2	C	901	LLQ	O1-S1-C1	4.44	114.55	105.97
2	A	901	LLQ	O2-S1-C1	4.05	112.81	106.76
2	D	901	LLQ	O2-S1-C1	3.93	112.63	106.76

There are no chirality outliers.

5 of 86 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	901	LLQ	C2-C1-S1-O3
2	A	901	LLQ	C2-C1-S1-O1
2	D	901	LLQ	C2-C1-S1-O3
2	D	901	LLQ	C2-C1-S1-O2
3	B	903	GOL	O1-C1-C2-C3

There are no ring outliers.

20 monomers are involved in 31 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	902	GOL	1	0

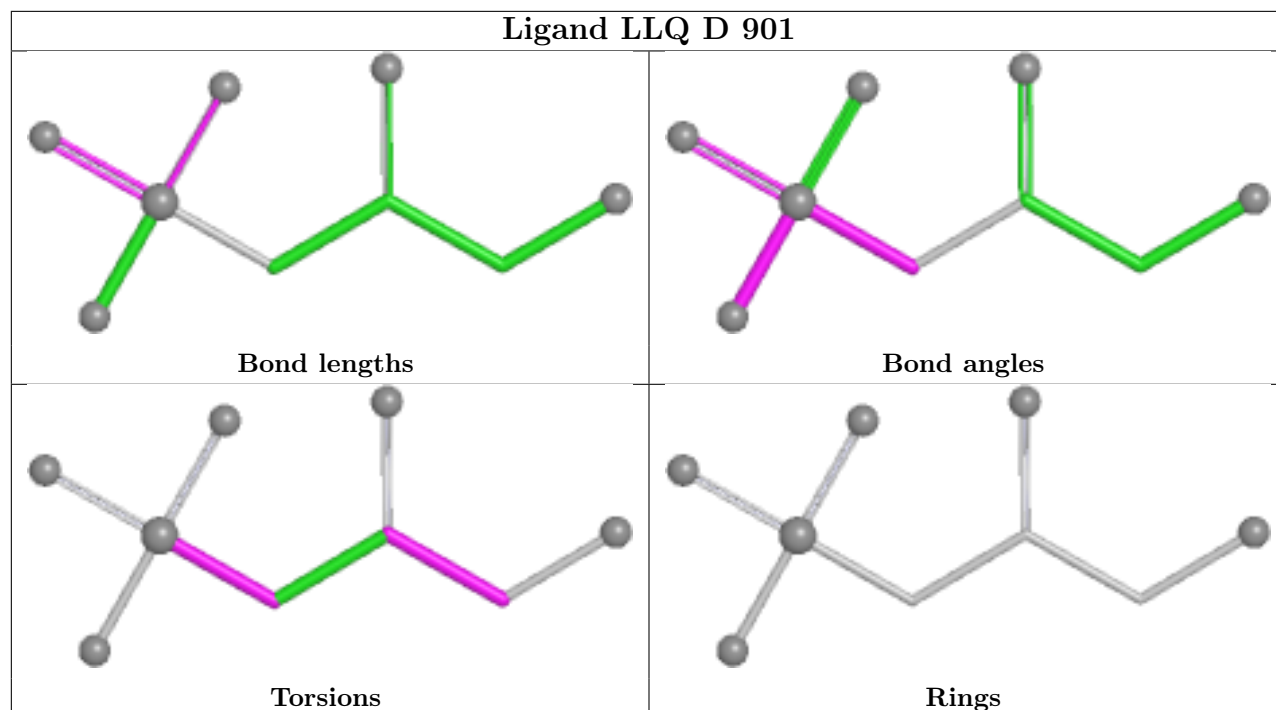
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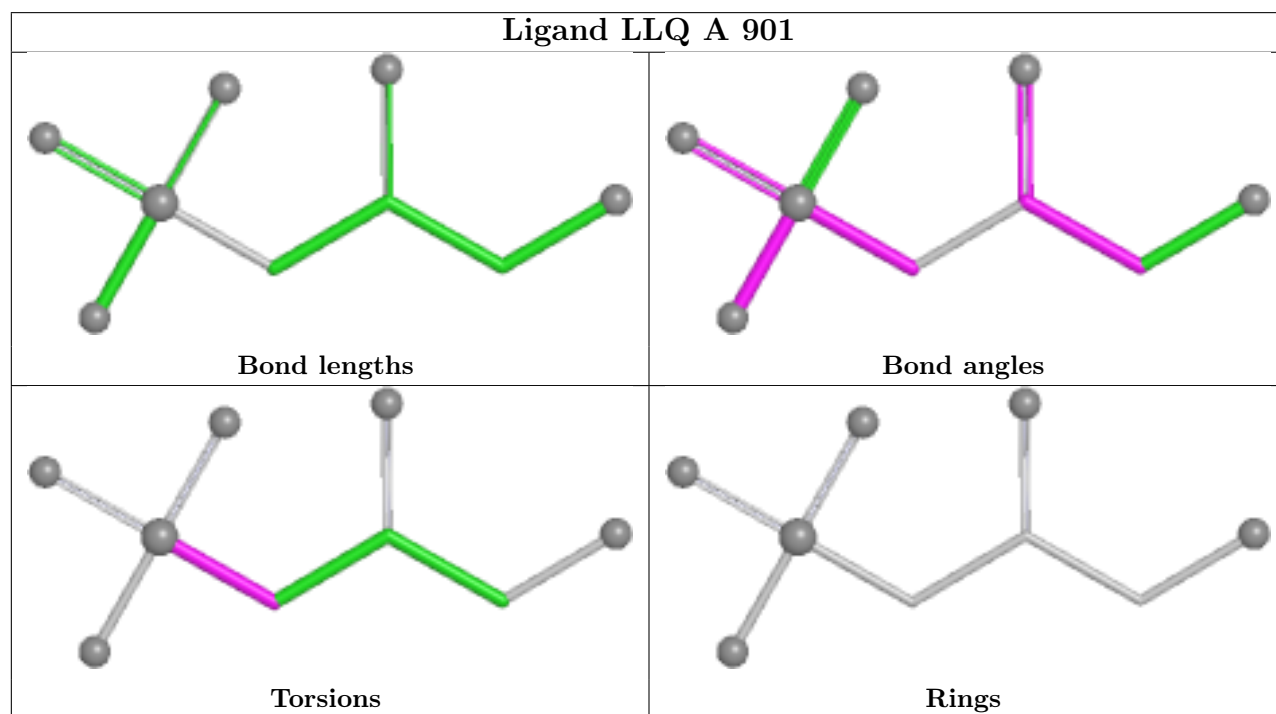
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	910	GOL	1	0
3	A	919	GOL	1	0
3	C	904	GOL	3	0
3	C	906	GOL	2	0
3	A	906	GOL	1	0
3	B	910	GOL	2	0
3	C	903	GOL	3	0
3	D	908	GOL	1	0
3	A	910	GOL	1	0
3	D	905	GOL	1	0
3	A	905	GOL	1	0
3	A	907	GOL	1	0
3	B	913	GOL	1	0
3	A	911	GOL	1	0
3	D	913	GOL	2	0
3	D	914	GOL	2	0
3	C	910	GOL	5	0
3	C	909	GOL	1	0
3	A	902	GOL	2	0

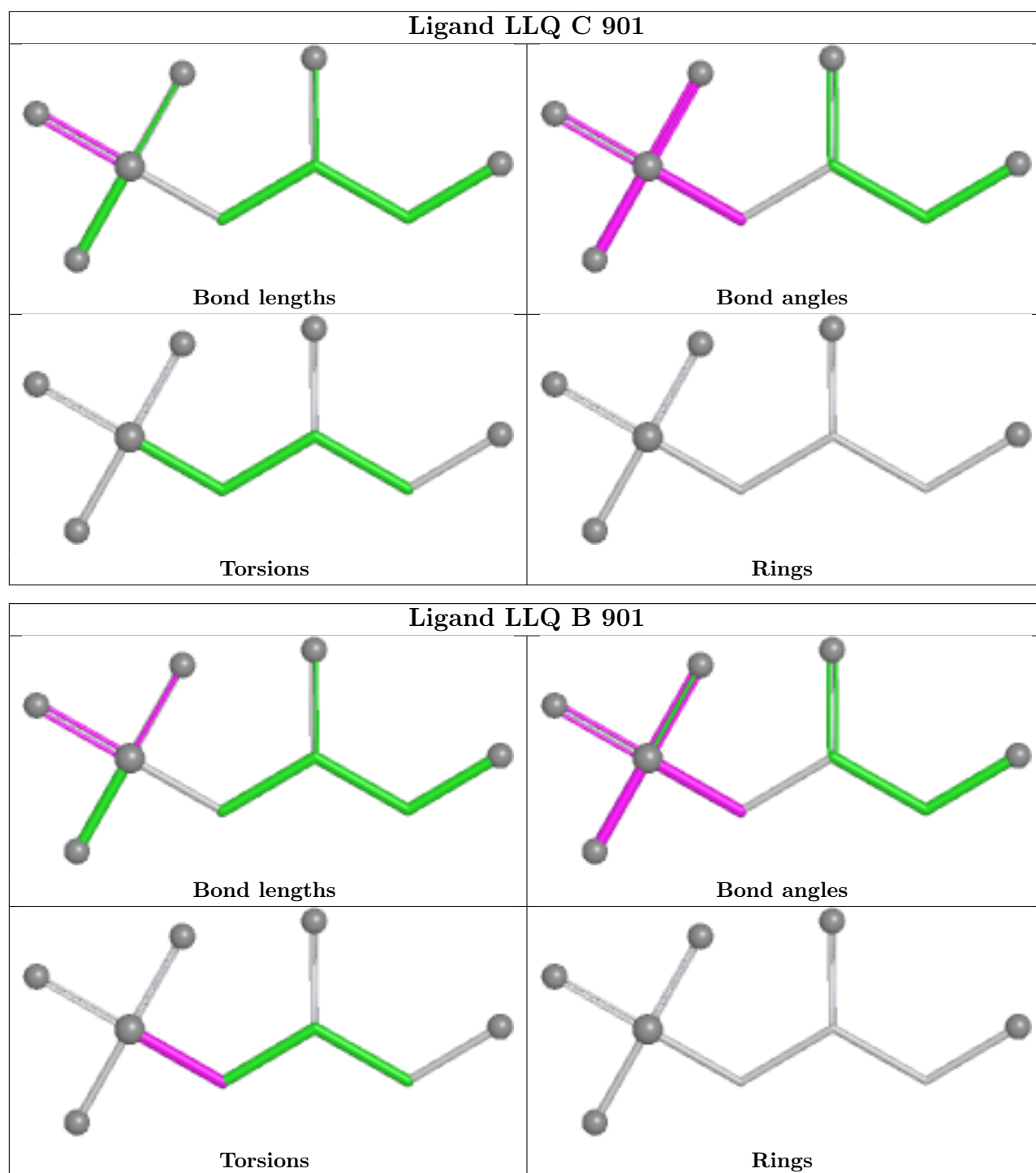
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

Ligand LLQ D 901



Ligand LLQ A 901





5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	804/824 (97%)	-0.83	7 (0%) 81 79	11, 29, 53, 86	2 (0%)
1	B	802/824 (97%)	-0.77	8 (0%) 79 77	13, 30, 55, 83	2 (0%)
1	C	804/824 (97%)	-0.41	15 (1%) 66 63	15, 37, 66, 90	3 (0%)
1	D	804/824 (97%)	-0.88	2 (0%) 91 90	11, 27, 50, 74	3 (0%)
All	All	3214/3296 (97%)	-0.72	32 (0%) 79 77	11, 30, 59, 90	10 (0%)

The worst 5 of 32 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	823	ASP	3.9
1	B	21	ASN	3.2
1	B	115	ASP	3.1
1	C	37	PHE	3.1
1	C	797	VAL	3.1

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

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

6.3 Carbohydrates [i](#)

There are no 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($\text{\AA}^2$)	Q<0.9
3	GOL	A	913	6/6	0.80	0.13	41,50,58,60	0
3	GOL	B	917	6/6	0.81	0.14	32,43,58,61	0
3	GOL	A	910	6/6	0.82	0.15	38,48,59,60	0
3	GOL	C	903	6/6	0.82	0.18	30,41,45,53	0
3	GOL	B	913	6/6	0.83	0.21	32,44,51,59	0
3	GOL	B	902	6/6	0.83	0.16	32,42,57,59	0
3	GOL	A	906	6/6	0.83	0.14	31,40,49,59	0
3	GOL	C	911	6/6	0.83	0.14	34,47,58,61	0
3	GOL	B	912	6/6	0.85	0.16	34,45,55,56	0
3	GOL	A	908	6/6	0.85	0.12	30,38,45,45	0
3	GOL	C	909	6/6	0.85	0.14	36,44,48,51	0
3	GOL	A	902	6/6	0.85	0.12	35,46,59,67	0
3	GOL	D	911	6/6	0.85	0.13	38,46,55,60	0
3	GOL	D	914	6/6	0.85	0.14	33,44,57,65	0
3	GOL	B	907	6/6	0.86	0.15	34,44,53,61	0
3	GOL	D	909	6/6	0.86	0.16	25,39,54,58	0
3	GOL	C	906	6/6	0.86	0.13	35,43,59,59	0
3	GOL	D	913	6/6	0.86	0.20	28,38,59,60	0
3	GOL	A	914	6/6	0.86	0.12	37,44,54,57	0
3	GOL	C	907	6/6	0.87	0.12	35,45,52,63	0
3	GOL	B	915	6/6	0.87	0.13	39,46,53,55	0
3	GOL	C	910	6/6	0.87	0.17	36,48,58,58	0
3	GOL	A	915	6/6	0.87	0.14	36,48,59,60	0
3	GOL	D	904	6/6	0.87	0.12	33,40,48,52	0
3	GOL	A	919	6/6	0.87	0.18	30,46,58,63	0
3	GOL	D	910	6/6	0.87	0.16	32,42,50,57	0
3	GOL	A	904	6/6	0.87	0.12	34,41,56,58	0
3	GOL	C	905	6/6	0.87	0.13	33,40,48,56	0
3	GOL	B	909	6/6	0.87	0.15	37,46,55,56	0
3	GOL	C	902	6/6	0.88	0.14	29,47,54,61	0
3	GOL	A	918	6/6	0.88	0.15	34,42,62,62	0
3	GOL	A	912	6/6	0.89	0.12	29,40,51,51	0
3	GOL	B	914	6/6	0.89	0.12	38,49,61,62	0
3	GOL	D	903	6/6	0.89	0.14	31,39,49,50	0
3	GOL	B	903	6/6	0.89	0.12	25,37,50,60	0
3	GOL	D	907	6/6	0.89	0.12	35,43,51,57	0
3	GOL	A	911	6/6	0.90	0.11	31,40,48,48	0
3	GOL	D	905	6/6	0.90	0.13	19,39,46,46	0
3	GOL	C	908	6/6	0.91	0.09	34,41,50,60	0
3	GOL	B	904	6/6	0.91	0.09	32,41,48,48	0
3	GOL	D	908	6/6	0.91	0.10	30,38,47,47	0
3	GOL	A	903	6/6	0.91	0.11	30,38,49,59	0
3	GOL	A	909	6/6	0.92	0.10	32,39,46,46	0

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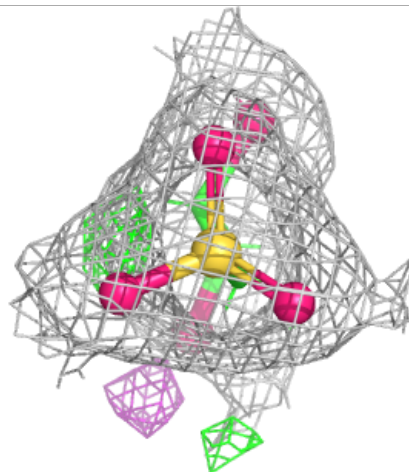
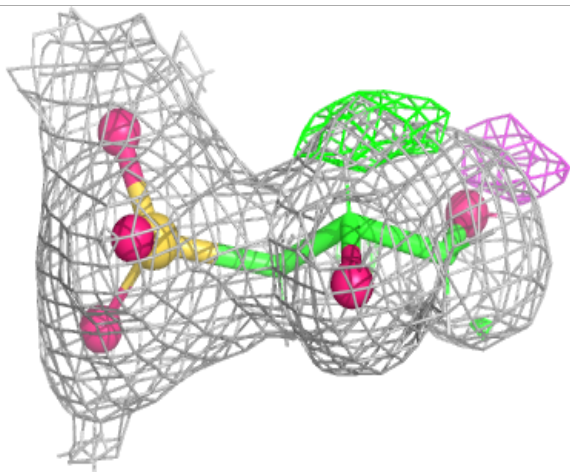
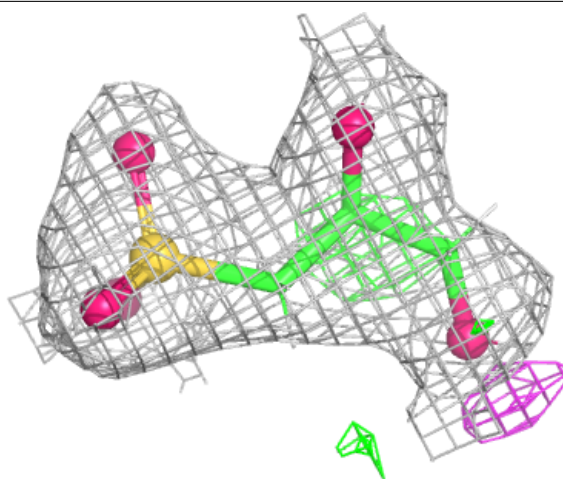
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	GOL	B	910	6/6	0.92	0.12	29,36,51,61	0
3	GOL	A	907	6/6	0.92	0.12	34,40,46,47	0
3	GOL	B	911	6/6	0.92	0.12	26,38,50,50	0
3	GOL	A	917	6/6	0.93	0.10	32,41,58,60	0
3	GOL	A	905	6/6	0.93	0.10	22,37,45,45	0
3	GOL	B	906	6/6	0.94	0.11	21,42,51,51	0
3	GOL	B	908	6/6	0.94	0.08	31,40,52,56	0
3	GOL	C	904	6/6	0.95	0.08	30,41,54,55	0
3	GOL	B	905	6/6	0.95	0.07	29,34,46,46	0
3	GOL	D	906	6/6	0.96	0.06	30,36,42,44	0
3	GOL	D	902	6/6	0.96	0.08	26,33,38,47	0
2	LLQ	A	901	9/9	0.98	0.06	18,26,45,47	0
2	LLQ	C	901	9/9	0.98	0.07	25,38,49,49	0
4	NA	C	912	1/1	0.98	0.03	24,24,24,24	0
2	LLQ	D	901	9/9	0.99	0.05	14,26,43,52	0
4	NA	B	916	1/1	0.99	0.02	20,20,20,20	0
4	NA	A	916	1/1	0.99	0.04	21,21,21,21	0
2	LLQ	B	901	9/9	0.99	0.07	22,35,49,49	0
4	NA	D	912	1/1	0.99	0.03	20,20,20,20	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.

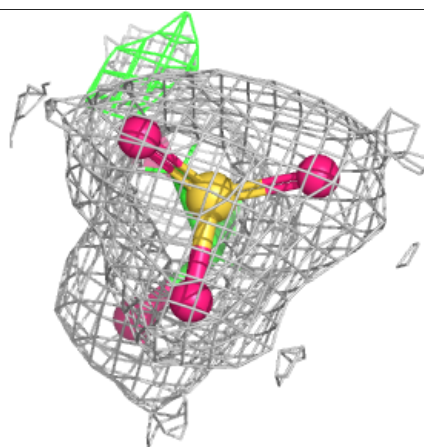
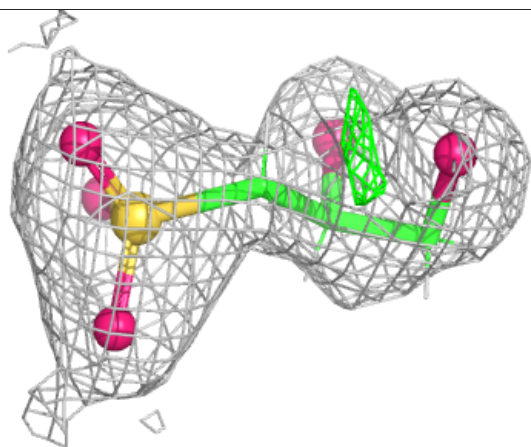
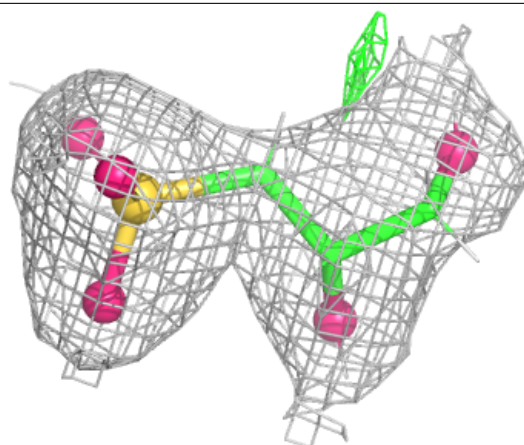
Electron density around LLQ A 901:

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



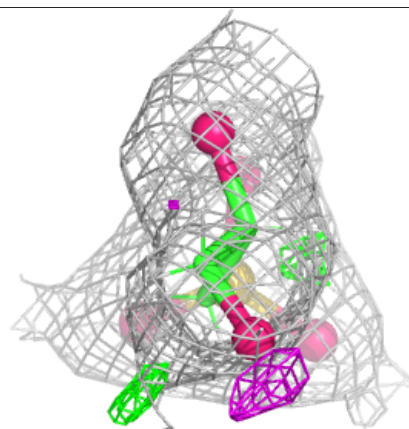
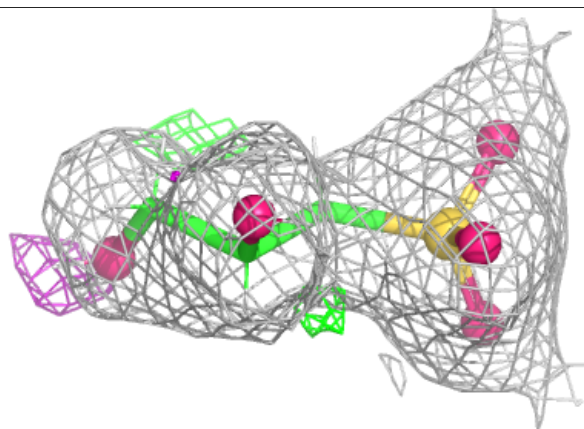
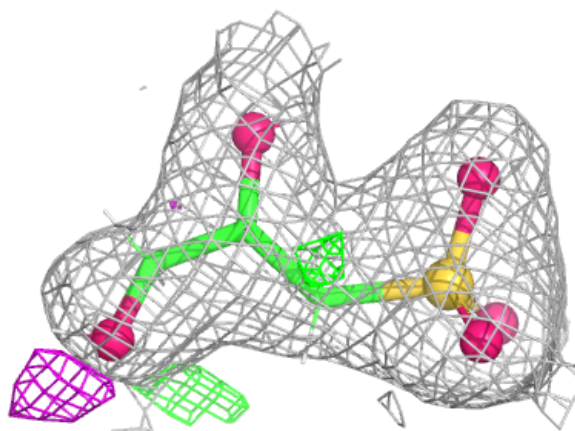
Electron density around LLQ C 901:

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



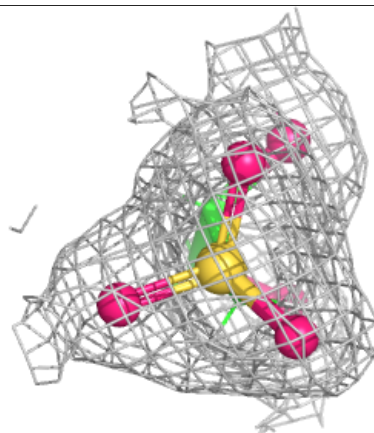
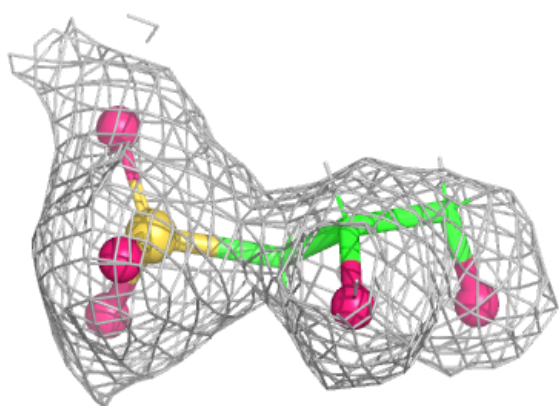
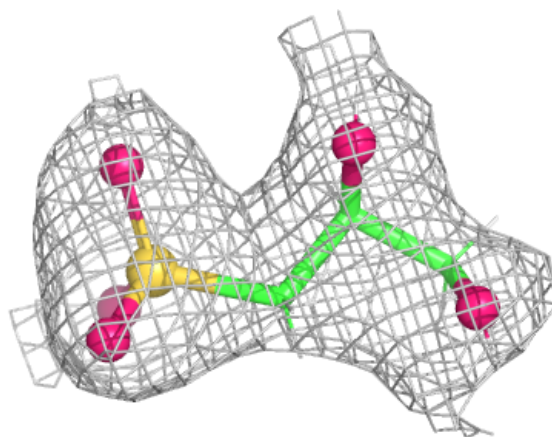
Electron density around LLQ D 901:

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



Electron density around LLQ B 901:

$2mF_o-DF_c$ (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.