Full wwPDB X-ray Structure Validation Report ⓘ

Oct 21, 2024 – 07:18 AM EDT

PDB ID	:	2AM1
Title	:	sp protein ligand 1
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Deposited on	:	2005-08-08
Resolution	:	2.50 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references ⓘ) were used in the production of this report:

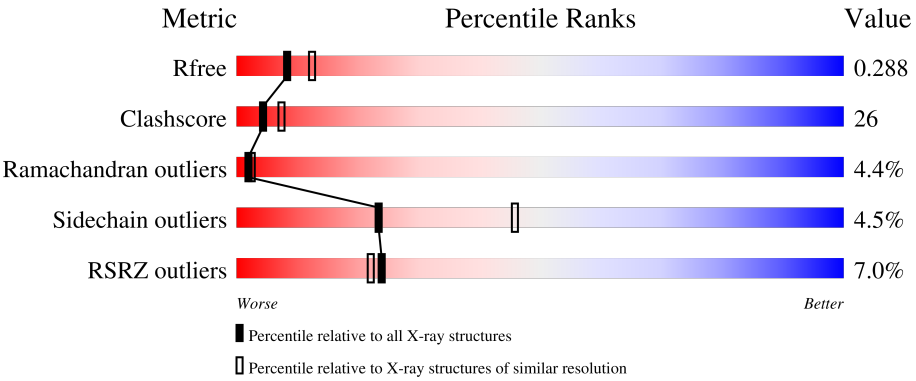
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh &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

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	5504 (2.50-2.50)
Clashscore	180529	6282 (2.50-2.50)
Ramachandran outliers	177936	6191 (2.50-2.50)
Sidechain outliers	177891	6193 (2.50-2.50)
RSRZ outliers	164620	5504 (2.50-2.50)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	454	7% 57% 37% 6%

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	A	501	-	X	-	-

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 3675 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.

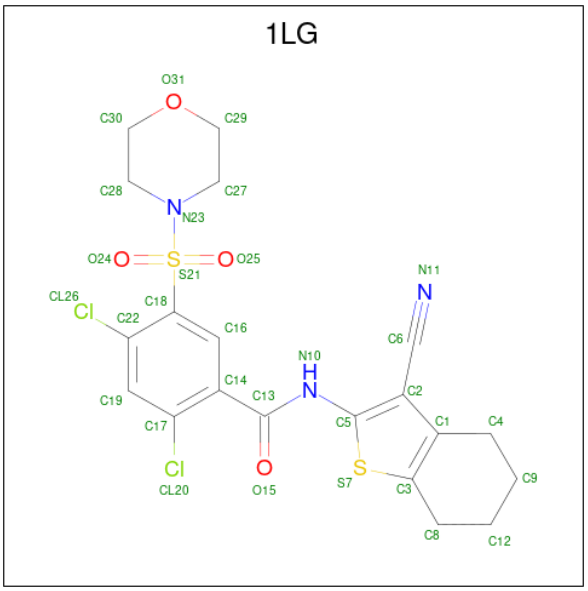
- Molecule 1 is a protein called UDP-N-acetylmuramoylalanine-D-glutamyl-lysine-D-alanyl-D -alanine ligase, MurF protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	Se			
1	A	454	3499	2224	574	689	12	0	0	0

There are 12 discrepancies between the modelled and reference sequences:

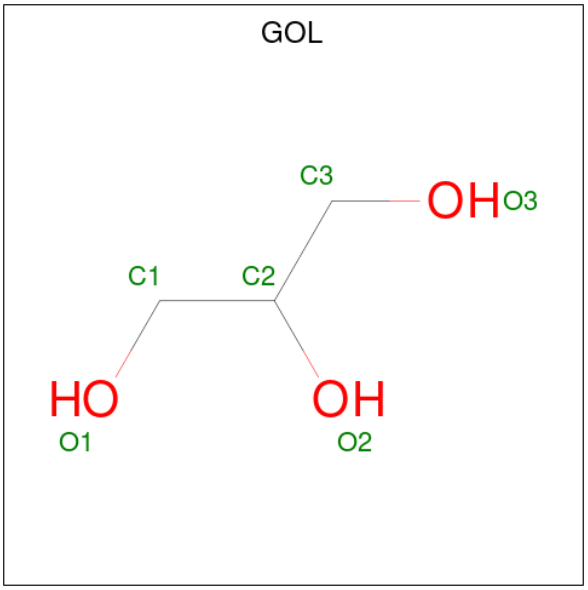
Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MSE	MET	modified residue	GB 15459176
A	117	MSE	MET	modified residue	GB 15459176
A	148	MSE	MET	modified residue	GB 15459176
A	159	MSE	MET	modified residue	GB 15459176
A	203	MSE	MET	modified residue	GB 15459176
A	209	MSE	MET	modified residue	GB 15459176
A	279	MSE	MET	modified residue	GB 15459176
A	332	MSE	MET	modified residue	GB 15459176
A	357	MSE	MET	modified residue	GB 15459176
A	371	MSE	MET	modified residue	GB 15459176
A	400	MSE	MET	modified residue	GB 15459176
A	443	MSE	MET	modified residue	GB 15459176

- Molecule 2 is 2,4-DICHLORO-N-(3-CYANO-4,5,6,7-TETRAHYDRO-BENZOTHIOPHEN-2YL)-5-(MORPHOLINE-4-SULFONYL)-BENZAMIDE (three-letter code: 1LG) (formula: $C_{20}H_{19}Cl_2N_3O_4S_2$).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	A	1	Total	C	Cl	N	O	S	0	0
			31	20	2	3	4	2		

- Molecule 3 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	O		0	0
			6	3	3			

- Molecule 4 is water.

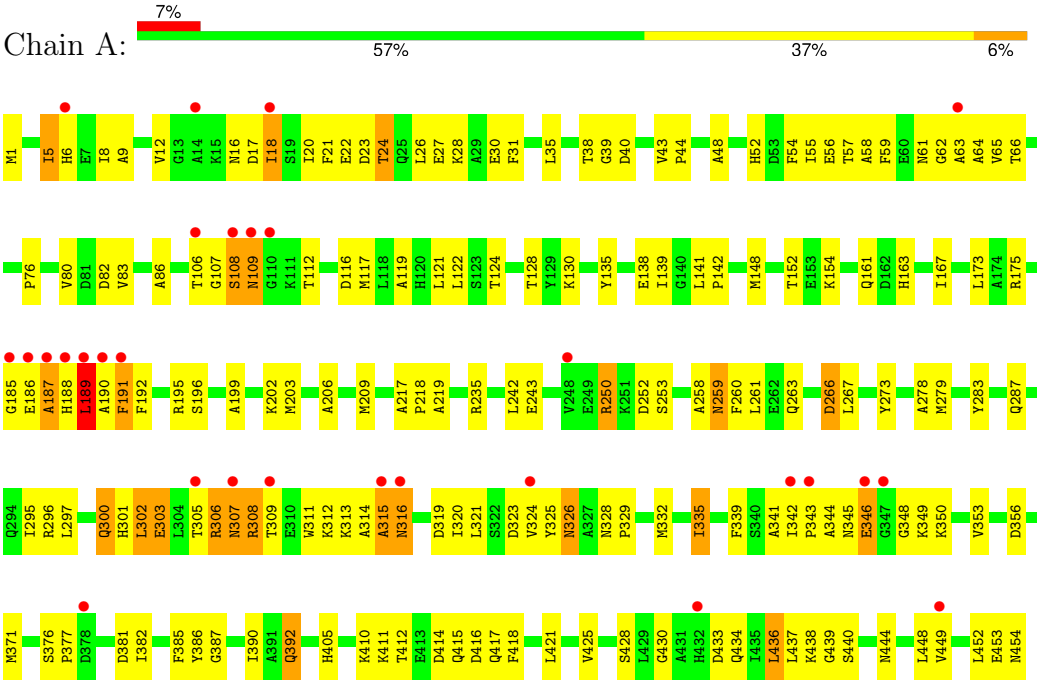
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	139	Total	O	0	0
			139	139		

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: UDP-N-acetylmuramoylalanine-D-glutamyl-lysine-D-alanyl-D-alanine ligase, MurF protein

Chain A:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 61 2 2	Depositor
Cell constants a, b, c, α, β, γ	116.27Å 116.27Å 161.39Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	20.00 – 2.50 20.00 – 2.50	Depositor EDS
% Data completeness (in resolution range)	99.3 (20.00-2.50) 99.1 (20.00-2.50)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	5.19 (at 2.50Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.238 , 0.290 0.234 , 0.288	Depositor DCC
R_{free} test set	1166 reflections (5.13%)	wwPDB-VP
Wilson B-factor (Å^2)	47.6	Xtriage
Anisotropy	0.141	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 48.1	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	3675	wwPDB-VP
Average B, all atoms (Å^2)	51.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.97% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

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

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 1LG, GOL

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	0/3546	0.62	0/4785

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3499	0	3480	184	0
2	A	31	0	19	5	0
3	A	6	0	4	0	0
4	A	139	0	0	6	0
All	All	3675	0	3503	185	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 26.

All (185) 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:314:ALA:HB2	1:A:320:ILE:HD11	1.33	1.05
1:A:190:ALA:HB2	1:A:342:ILE:HG12	1.41	0.97
1:A:349:LYS:HB3	1:A:433:ASP:OD1	1.63	0.96
1:A:138:GLU:HG2	1:A:139:ILE:HD12	1.55	0.89
1:A:371:MSE:HA	1:A:371:MSE:HE2	1.61	0.81
1:A:243:GLU:N	1:A:279:MSE:HE1	1.95	0.81
1:A:421:LEU:O	1:A:425:VAL:HG23	1.82	0.79
1:A:314:ALA:HB1	1:A:452:LEU:O	1.85	0.77
1:A:309:THR:HG22	1:A:324:VAL:H	1.50	0.76
1:A:190:ALA:HB2	1:A:342:ILE:CG1	2.14	0.76
1:A:5:ILE:HD11	1:A:18:ILE:HG23	1.67	0.75
1:A:183:LEU:HG	1:A:184:VAL:H	1.52	0.74
1:A:187:ALA:O	1:A:189:LEU:HG	1.88	0.72
1:A:17:ASP:O	1:A:18:ILE:HB	1.89	0.71
1:A:258:ALA:HB1	1:A:279:MSE:HE3	1.70	0.71
1:A:449:VAL:O	1:A:453:GLU:HG3	1.90	0.70
1:A:353:VAL:HB	1:A:437:LEU:HD23	1.73	0.68
1:A:243:GLU:H	1:A:279:MSE:HE1	1.56	0.68
1:A:326:ASN:HD21	2:A:1000:1LG:H282	1.59	0.68
1:A:116:ASP:OD2	1:A:305:THR:HG21	1.94	0.68
1:A:183:LEU:HG	1:A:184:VAL:N	2.08	0.68
1:A:386:TYR:CZ	1:A:411:LYS:HD2	2.29	0.68
1:A:325:TYR:O	1:A:326:ASN:HB2	1.94	0.67
1:A:5:ILE:CD1	1:A:18:ILE:HD12	2.25	0.66
1:A:185:GLY:HA3	1:A:195:ARG:HE	1.60	0.65
1:A:39:GLY:HA2	1:A:64:ALA:HB2	1.77	0.65
1:A:9:ALA:CB	1:A:18:ILE:HG13	2.26	0.64
1:A:242:LEU:HB3	1:A:279:MSE:HE2	1.79	0.64
1:A:314:ALA:O	1:A:316:ASN:N	2.31	0.63
1:A:206:ALA:HA	1:A:209:MSE:HE2	1.81	0.63
1:A:109:ASN:HD21	1:A:273:TYR:HE1	1.47	0.62
1:A:302:LEU:O	1:A:303:GLU:CB	2.47	0.62
1:A:297:LEU:O	1:A:300:GLN:HB2	1.99	0.62
1:A:386:TYR:CE1	1:A:411:LYS:HB2	2.34	0.62
1:A:22:GLU:O	1:A:23:ASP:HB3	2.00	0.62
1:A:312:LYS:O	1:A:313:LYS:HG2	2.00	0.62
1:A:293:GLU:HG3	4:A:1119:HOH:O	1.99	0.61
1:A:52:HIS:HE1	1:A:69:GLU:H	1.49	0.61
1:A:434:GLN:HG3	4:A:1007:HOH:O	2.00	0.61
1:A:436:LEU:HD23	1:A:437:LEU:N	2.16	0.61
1:A:323:ASP:HB3	1:A:438:LYS:HD3	1.83	0.60
1:A:52:HIS:CE1	1:A:69:GLU:H	2.19	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:12:VAL:HG11	1:A:80:VAL:HG11	1.83	0.60
1:A:259:ASN:HD22	1:A:259:ASN:N	1.97	0.60
1:A:22:GLU:OE2	1:A:24:THR:HB	2.02	0.60
1:A:250:ARG:CG	1:A:253:SER:HB2	2.32	0.59
1:A:12:VAL:HG12	1:A:12:VAL:O	2.01	0.59
1:A:108:SER:O	1:A:109:ASN:HB2	2.02	0.59
1:A:219:ALA:HA	1:A:235:ARG:NH1	2.17	0.59
1:A:314:ALA:HB2	1:A:320:ILE:CD1	2.21	0.58
1:A:448:LEU:O	1:A:452:LEU:HG	2.04	0.58
1:A:183:LEU:CG	1:A:184:VAL:N	2.66	0.58
1:A:112:THR:OG1	1:A:117:MSE:HE3	2.04	0.58
1:A:349:LYS:NZ	1:A:428:SER:O	2.36	0.57
1:A:21:PHE:CD2	1:A:76:PRO:HA	2.39	0.57
1:A:410:LYS:HB2	1:A:417:GLN:HE21	1.69	0.57
1:A:250:ARG:HG3	1:A:253:SER:HB2	1.86	0.57
1:A:65:VAL:HG22	1:A:66:THR:N	2.20	0.56
1:A:161:GLN:HB3	1:A:167:ILE:HG13	1.86	0.56
1:A:250:ARG:HG2	1:A:250:ARG:HH11	1.69	0.56
1:A:1:MSE:HG3	1:A:28:LYS:HA	1.88	0.56
1:A:411:LYS:NZ	1:A:444:ASN:HD22	2.04	0.55
1:A:55:ILE:O	1:A:58:ALA:HB3	2.07	0.55
1:A:266:ASP:O	1:A:267:LEU:HD12	2.05	0.55
1:A:188:HIS:HB2	1:A:342:ILE:HG23	1.89	0.55
1:A:23:ASP:HB2	4:A:1109:HOH:O	2.06	0.55
1:A:314:ALA:HA	1:A:453:GLU:HA	1.89	0.55
1:A:323:ASP:OD2	1:A:335:ILE:HG13	2.07	0.54
1:A:141:LEU:HB3	1:A:142:PRO:HD3	1.89	0.54
1:A:128:THR:HG22	1:A:154:LYS:HB2	1.90	0.54
1:A:339:PHE:CE2	1:A:436:LEU:HB2	2.42	0.54
1:A:175:ARG:HH11	1:A:175:ARG:HG2	1.73	0.53
1:A:267:LEU:HD21	1:A:278:ALA:HB2	1.89	0.53
1:A:56:GLU:HG2	4:A:1054:HOH:O	2.09	0.53
1:A:167:ILE:HD12	1:A:202:LYS:HA	1.91	0.53
1:A:341:ALA:O	1:A:343:PRO:HD3	2.09	0.53
1:A:344:ALA:HB1	1:A:348:GLY:HA2	1.90	0.52
1:A:315:ALA:O	1:A:316:ASN:HB2	2.09	0.52
1:A:414:ASP:HB2	1:A:415:GLN:NE2	2.24	0.52
1:A:21:PHE:CE2	1:A:76:PRO:HA	2.45	0.52
1:A:410:LYS:HD3	1:A:415:GLN:HG3	1.92	0.52
1:A:17:ASP:O	1:A:18:ILE:CB	2.57	0.52
1:A:138:GLU:HG2	1:A:139:ILE:CD1	2.33	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:5:ILE:HG13	1:A:6:HIS:N	2.25	0.51
1:A:190:ALA:O	1:A:192:PHE:N	2.42	0.51
1:A:219:ALA:HA	1:A:235:ARG:HH11	1.76	0.51
1:A:283:TYR:O	1:A:287:GLN:HG2	2.10	0.51
1:A:309:THR:HG22	1:A:323:ASP:HA	1.92	0.51
1:A:122:LEU:HB3	1:A:128:THR:HG21	1.93	0.50
1:A:430:GLY:N	1:A:433:ASP:OD2	2.42	0.50
1:A:12:VAL:HG11	1:A:86:ALA:HB1	1.92	0.50
1:A:392:GLN:HG2	4:A:1002:HOH:O	2.12	0.49
1:A:206:ALA:HA	1:A:209:MSE:CE	2.42	0.49
1:A:8:ILE:O	1:A:12:VAL:HG23	2.12	0.49
1:A:186:GLU:CB	1:A:189:LEU:HB3	2.42	0.49
1:A:390:ILE:HG12	1:A:390:ILE:O	2.12	0.49
1:A:314:ALA:HB1	1:A:452:LEU:C	2.33	0.49
1:A:106:THR:O	1:A:106:THR:HG23	2.13	0.49
1:A:190:ALA:C	1:A:192:PHE:H	2.15	0.49
1:A:410:LYS:HD3	1:A:415:GLN:CG	2.43	0.48
1:A:163:HIS:HE1	1:A:191:PHE:CD1	2.31	0.48
1:A:12:VAL:CG1	1:A:80:VAL:HG11	2.44	0.48
1:A:9:ALA:HB2	1:A:18:ILE:HG13	1.94	0.48
1:A:410:LYS:CB	1:A:417:GLN:HE21	2.27	0.48
1:A:17:ASP:OD2	1:A:20:ILE:HG13	2.14	0.48
1:A:69:GLU:OE2	1:A:82:ASP:HA	2.14	0.48
1:A:108:SER:O	1:A:109:ASN:CB	2.62	0.47
1:A:17:ASP:CG	1:A:18:ILE:N	2.68	0.47
1:A:175:ARG:HG2	1:A:175:ARG:NH1	2.28	0.47
1:A:363:GLN:HG3	1:A:366:GLN:HE21	1.80	0.47
1:A:412:THR:OG1	1:A:415:GLN:NE2	2.47	0.47
1:A:199:ALA:O	1:A:203:MSE:HG2	2.15	0.47
1:A:107:GLY:O	1:A:108:SER:O	2.32	0.47
1:A:250:ARG:CG	1:A:250:ARG:HH11	2.27	0.46
1:A:290:VAL:HG12	1:A:295:ILE:HG13	1.97	0.46
1:A:387:GLY:HA2	1:A:411:LYS:HB3	1.97	0.46
1:A:6:HIS:HB2	4:A:1109:HOH:O	2.15	0.46
1:A:138:GLU:O	1:A:142:PRO:HG2	2.16	0.46
1:A:356:ASP:OD1	1:A:390:ILE:HG22	2.15	0.46
1:A:27:GLU:HB3	1:A:40:ASP:OD1	2.16	0.46
1:A:135:TYR:CD2	2:A:1000:1LG:H291	2.51	0.46
1:A:328:ASN:HB2	1:A:329:PRO:HD2	1.98	0.46
1:A:381:ASP:O	1:A:382:ILE:HG13	2.16	0.46
1:A:439:GLY:O	1:A:440:SER:C	2.53	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:259:ASN:N	1:A:259:ASN:ND2	2.64	0.46
1:A:17:ASP:CG	1:A:18:ILE:H	2.19	0.45
1:A:306:ARG:O	1:A:308:ARG:N	2.49	0.45
1:A:307:ASN:O	1:A:308:ARG:CB	2.63	0.45
1:A:62:GLY:O	1:A:63:ALA:C	2.55	0.45
1:A:339:PHE:CZ	1:A:436:LEU:HB2	2.52	0.45
1:A:371:MSE:HA	1:A:371:MSE:CE	2.40	0.45
1:A:263:GLN:HB3	1:A:296:ARG:HH11	1.81	0.45
1:A:65:VAL:HG22	1:A:66:THR:H	1.81	0.44
1:A:385:PHE:HD1	1:A:390:ILE:HD11	1.82	0.44
1:A:339:PHE:O	1:A:350:LYS:NZ	2.46	0.44
1:A:43:VAL:HA	1:A:44:PRO:HD2	1.78	0.44
1:A:6:HIS:HB2	1:A:23:ASP:OD2	2.17	0.44
1:A:44:PRO:HG2	1:A:83:VAL:HG21	2.00	0.44
1:A:309:THR:HG22	1:A:324:VAL:N	2.25	0.44
1:A:309:THR:CG2	1:A:323:ASP:HA	2.48	0.44
1:A:416:ASP:OD1	1:A:418:PHE:HB2	2.18	0.44
1:A:266:ASP:C	1:A:267:LEU:HD12	2.38	0.43
1:A:305:THR:O	1:A:306:ARG:C	2.56	0.43
1:A:411:LYS:HZ2	1:A:444:ASN:HD22	1.63	0.43
1:A:38:THR:HA	1:A:62:GLY:HA3	1.99	0.43
1:A:54:PHE:CD1	1:A:54:PHE:N	2.86	0.43
1:A:410:LYS:H	1:A:417:GLN:HE21	1.67	0.43
1:A:121:LEU:O	1:A:124:THR:HG23	2.19	0.43
1:A:135:TYR:CG	2:A:1000:1LG:H291	2.54	0.43
1:A:261:LEU:HD22	1:A:292:GLU:HG3	2.00	0.43
1:A:385:PHE:HD1	1:A:390:ILE:CD1	2.31	0.43
1:A:436:LEU:CD2	1:A:437:LEU:N	2.82	0.43
1:A:326:ASN:ND2	2:A:1000:1LG:H282	2.31	0.43
1:A:23:ASP:OD1	1:A:23:ASP:O	2.37	0.43
1:A:139:ILE:C	1:A:142:PRO:HD2	2.39	0.43
1:A:410:LYS:H	1:A:417:GLN:NE2	2.16	0.43
1:A:332:MSE:HE2	1:A:438:LYS:HG3	2.00	0.43
1:A:363:GLN:OE1	1:A:363:GLN:HA	2.19	0.42
1:A:119:ALA:CB	1:A:130:LYS:HD3	2.49	0.42
1:A:339:PHE:CD2	1:A:436:LEU:HB2	2.55	0.42
1:A:344:ALA:CB	1:A:348:GLY:HA2	2.49	0.42
1:A:386:TYR:CE2	1:A:411:LYS:HD2	2.54	0.42
1:A:173:LEU:C	1:A:173:LEU:HD23	2.40	0.42
1:A:371:MSE:HE2	1:A:371:MSE:CA	2.41	0.42
2:A:1000:1LG:O15	2:A:1000:1LG:S7	2.77	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:188:HIS:CE1	1:A:311:TRP:NE1	2.88	0.42
1:A:5:ILE:HD11	1:A:18:ILE:HD12	1.99	0.41
1:A:301:HIS:ND1	1:A:301:HIS:O	2.53	0.41
1:A:59:PHE:HA	1:A:63:ALA:HB3	2.01	0.41
1:A:376:SER:HA	1:A:377:PRO:HD3	1.91	0.41
1:A:8:ILE:HD12	1:A:26:LEU:CD1	2.49	0.41
1:A:30:GLU:O	1:A:43:VAL:HG12	2.21	0.41
1:A:181:VAL:O	1:A:218:PRO:HD3	2.21	0.41
1:A:31:PHE:HB3	1:A:43:VAL:HG13	2.02	0.41
1:A:217:ALA:O	1:A:235:ARG:HA	2.20	0.41
1:A:311:TRP:CZ2	1:A:321:LEU:HD22	2.56	0.41
1:A:250:ARG:CG	1:A:250:ARG:NH1	2.83	0.41
1:A:5:ILE:HD12	1:A:18:ILE:HD12	2.03	0.41
1:A:57:THR:O	1:A:61:ASN:ND2	2.53	0.41
1:A:259:ASN:ND2	1:A:260:PHE:H	2.19	0.41
1:A:381:ASP:C	1:A:382:ILE:HG13	2.42	0.41
1:A:48:ALA:CB	1:A:329:PRO:HB2	2.51	0.40
1:A:148:MSE:HG3	1:A:152:THR:OG1	2.21	0.40
1:A:263:GLN:CB	1:A:296:ARG:NH1	2.85	0.40
1:A:311:TRP:HZ3	1:A:319:ASP:O	2.04	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	452/454 (100%)	397 (88%)	35 (8%)	20 (4%)	2 2

All (20) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	18	ILE

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Mol	Chain	Res	Type
1	A	108	SER
1	A	109	ASN
1	A	183	LEU
1	A	184	VAL
1	A	189	LEU
1	A	302	LEU
1	A	303	GLU
1	A	307	ASN
1	A	315	ALA
1	A	316	ASN
1	A	73	SER
1	A	306	ARG
1	A	346	GLU
1	A	191	PHE
1	A	308	ARG
1	A	345	ASN
1	A	16	ASN
1	A	326	ASN
1	A	187	ALA

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	376/371 (101%)	359 (96%)	17 (4%)	23 46

All (17) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	5	ILE
1	A	24	THR
1	A	35	LEU
1	A	189	LEU
1	A	196	SER
1	A	250	ARG
1	A	252	ASP

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Mol	Chain	Res	Type
1	A	259	ASN
1	A	266	ASP
1	A	300	GLN
1	A	335	ILE
1	A	346	GLU
1	A	363	GLN
1	A	392	GLN
1	A	405	HIS
1	A	436	LEU
1	A	454	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (18) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	6	HIS
1	A	52	HIS
1	A	88	GLN
1	A	109	ASN
1	A	163	HIS
1	A	259	ASN
1	A	277	ASN
1	A	326	ASN
1	A	345	ASN
1	A	366	GLN
1	A	370	GLN
1	A	395	GLN
1	A	399	GLN
1	A	415	GLN
1	A	417	GLN
1	A	441	ASN
1	A	444	ASN
1	A	454	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 oligosaccharides in this entry.

5.6 Ligand geometry (i)

2 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	$\#\|Z\| > 2$
3	GOL	A	501	-	5,5,5	4.81	5 (100%)	5,5,5	6.15	3 (60%)
2	1LG	A	1000	-	31,34,34	2.51	9 (29%)	38,50,50	2.04	9 (23%)

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	A	501	-	-	2/4/4/4	-
2	1LG	A	1000	-	-	4/18/37/37	0/4/4/4

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1000	1LG	S21-N23	8.45	1.75	1.63
3	A	501	GOL	C3-C2	-7.88	1.21	1.51
2	A	1000	1LG	C2-C1	5.91	1.49	1.41
3	A	501	GOL	O1-C1	4.47	1.61	1.42
2	A	1000	1LG	C14-C17	3.89	1.44	1.39
2	A	1000	1LG	C18-S21	3.73	1.83	1.78
3	A	501	GOL	C1-C2	-3.70	1.37	1.51
3	A	501	GOL	O3-C3	3.46	1.57	1.42
2	A	1000	1LG	C8-C3	3.13	1.52	1.50
2	A	1000	1LG	C19-C17	3.12	1.43	1.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1000	1LG	C19-C22	2.88	1.43	1.38
2	A	1000	1LG	C5-S7	2.83	1.76	1.72
3	A	501	GOL	O2-C2	-2.81	1.35	1.43
2	A	1000	1LG	C22-C18	2.49	1.43	1.40

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	501	GOL	O3-C3-C2	11.34	161.42	110.38
3	A	501	GOL	O2-C2-C3	7.10	138.59	109.18
2	A	1000	1LG	O25-S21-O24	-5.91	110.37	119.59
2	A	1000	1LG	O25-S21-N23	4.36	110.79	106.69
2	A	1000	1LG	C27-N23-S21	-3.88	109.83	117.06
2	A	1000	1LG	C28-N23-S21	-3.82	109.95	117.06
2	A	1000	1LG	C1-C2-C6	-3.49	122.33	126.02
2	A	1000	1LG	C19-C17-C14	-3.23	118.94	121.59
3	A	501	GOL	O1-C1-C2	3.20	124.78	110.38
2	A	1000	1LG	C30-C28-N23	2.72	110.21	108.27
2	A	1000	1LG	O24-S21-N23	2.35	108.90	106.69
2	A	1000	1LG	C27-N23-C28	-2.21	109.58	112.12

There are no chirality outliers.

All (6) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	501	GOL	C1-C2-C3-O3
2	A	1000	1LG	C28-N23-S21-C18
3	A	501	GOL	O1-C1-C2-O2
2	A	1000	1LG	C22-C18-S21-O24
2	A	1000	1LG	C22-C18-S21-N23
2	A	1000	1LG	C16-C18-S21-O24

There are no ring outliers.

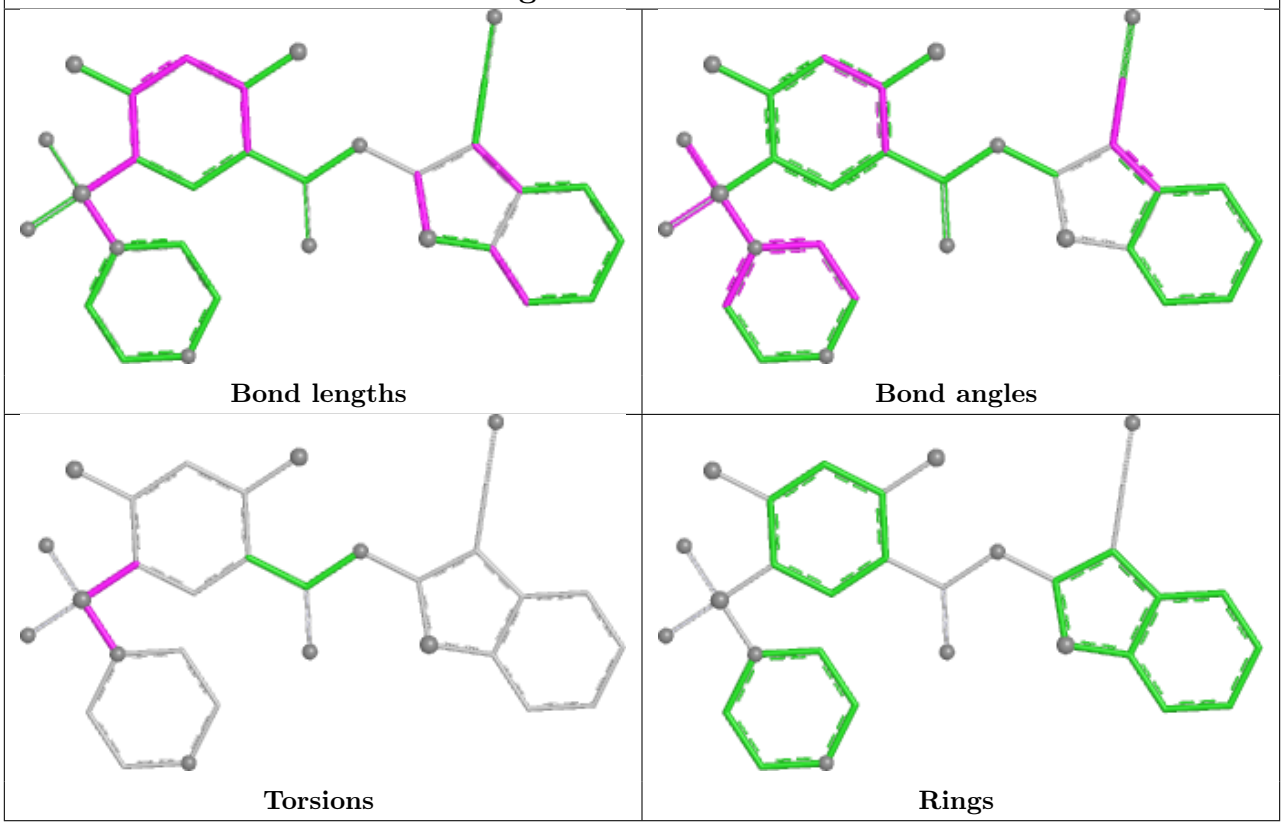
1 monomer is involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1000	1LG	5	0

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

also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand 1LG A 1000



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å^2)	Q<0.9
1	A	442/454 (97%)	0.38	31 (7%) 24 22	19, 49, 85, 105	0

All (31) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	187	ALA	3.8
1	A	324	VAL	3.7
1	A	184	VAL	3.6
1	A	347	GLY	3.6
1	A	14	ALA	3.5
1	A	188	HIS	3.3
1	A	343	PRO	3.3
1	A	248	VAL	3.2
1	A	109	ASN	3.1
1	A	6	HIS	3.1
1	A	307	ASN	3.0
1	A	110	GLY	2.9
1	A	190	ALA	2.6
1	A	346	GLU	2.5
1	A	191	PHE	2.5
1	A	18	ILE	2.4
1	A	72	VAL	2.4
1	A	305	THR	2.4
1	A	315	ALA	2.3
1	A	106	THR	2.3
1	A	432	HIS	2.2
1	A	309	THR	2.2
1	A	378	ASP	2.2
1	A	342	ILE	2.2
1	A	63	ALA	2.2
1	A	185	GLY	2.2
1	A	186	GLU	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	449	VAL	2.1
1	A	108	SER	2.1
1	A	316	ASN	2.1
1	A	189	LEU	2.0

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

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

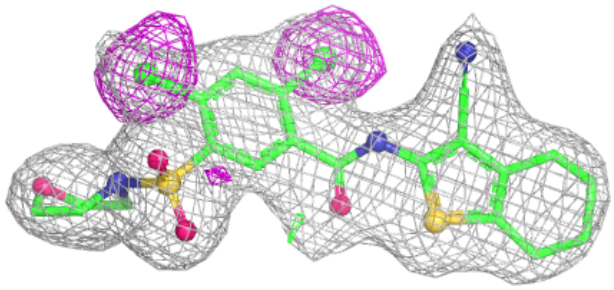
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

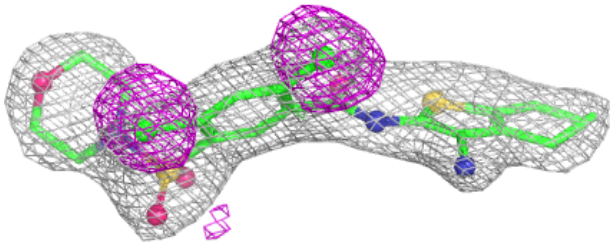
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	GOL	A	501	6/6	0.83	0.14	53,56,57,60	0
2	1LG	A	1000	31/31	0.84	0.12	17,37,43,44	0

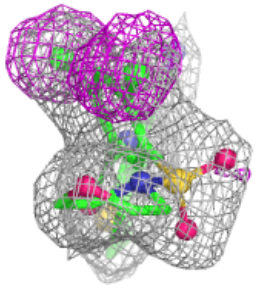
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around 1LG A 1000:

$2mF_o$-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.