Full wwPDB X-ray Structure Validation Report (i)

Dec 16, 2023 – 09:23 pm GMT

PDB ID	:	3ZM6
Title	:	CRYSTAL STRUCTURE OF MURF LIGASE IN COMPLEX WITH CYANOTHIOPHENE INHIBITOR
Authors	:	Hrast, M.; Turk, S.; Sosic, I.; Knez, D.; Randall, C.P.; Barreteau, H.; Contreras-Martel, C.; Dessen, A.; ONeill, A.J.; Mengin-Lecreulx, D.; Blanot, D.; Gobec, S.
Deposited on	:	2013-02-05
Resolution	:	1.84 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 (i) 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 (i)) were used in the production of this report:

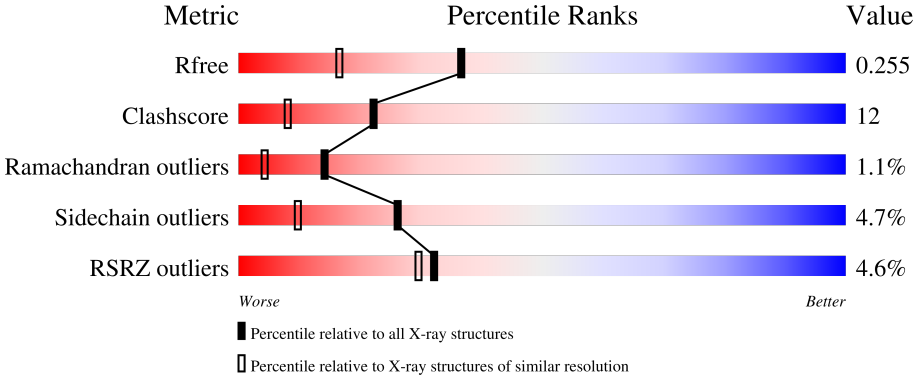
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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 1.84 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	4003 (1.86-1.82)
Clashscore	141614	4233 (1.86-1.82)
Ramachandran outliers	138981	4185 (1.86-1.82)
Sidechain outliers	138945	4186 (1.86-1.82)
RSRZ outliers	127900	3957 (1.86-1.82)

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	465	5% 79% 15% • •

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 3919 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.

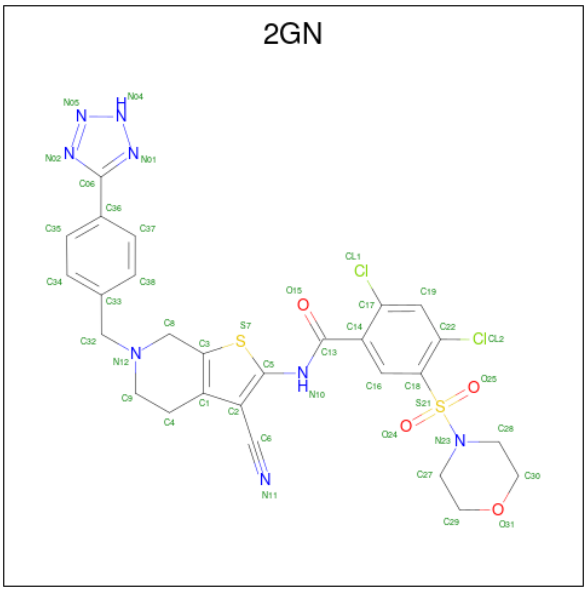
- Molecule 1 is a protein called UDP-N-ACETYLMURAMOYL-TRIPEPTIDE--D-ALANYL -D-ALANINE LIGASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	454	3577	2275	587	703	12	0	9	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	458	ARG	-	expression tag	UNP Q8DNV6
A	459	SER	-	expression tag	UNP Q8DNV6
A	460	HIS	-	expression tag	UNP Q8DNV6
A	461	HIS	-	expression tag	UNP Q8DNV6
A	462	HIS	-	expression tag	UNP Q8DNV6
A	463	HIS	-	expression tag	UNP Q8DNV6
A	464	HIS	-	expression tag	UNP Q8DNV6
A	465	HIS	-	expression tag	UNP Q8DNV6

- Molecule 2 is N-(6-(4-(2h-tetrazol-5-yl)benzyl)-3-cyano-4,5,6,7-tetrahydrothieno[2,3-c]pyridin-2-yl)-2,4-dichloro-5-(morpholinosulfonyl)benzamide (three-letter code: 2GN) (formula: $C_{27}H_{24}Cl_2N_8O_4S_2$).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
			Total	C	Cl	N	O	S		
2	A	1	43	27	2	8	4	2	0	0

- Molecule 3 is water.

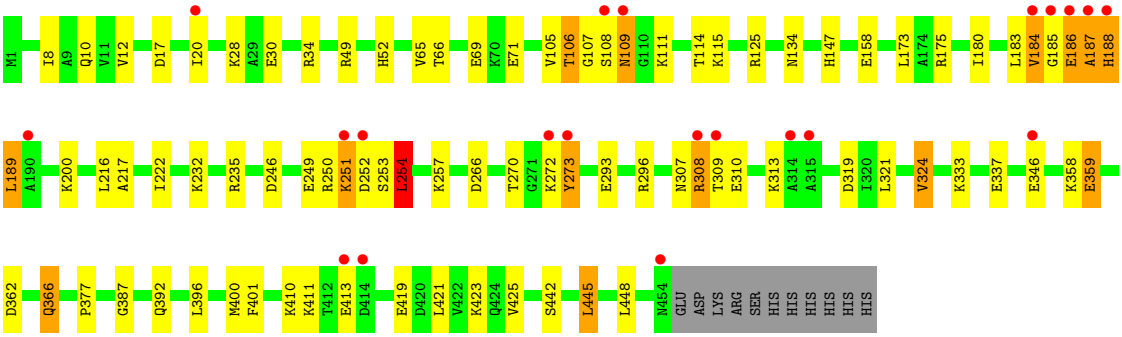
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
3	A	299	299	299	0	0

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: UDP-N-ACETYLMURAMOYL-TRIPEPTIDE--D-ALANYL-D-ALANINE LIGASE

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	116.16Å 116.16Å 160.29Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	47.99 – 1.84 47.99 – 1.84	Depositor EDS
% Data completeness (in resolution range)	93.5 (47.99-1.84) 93.5 (47.99-1.84)	Depositor EDS
R_{merge}	0.04	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.31 (at 1.84Å)	Xtriage
Refinement program	REFMAC 5.6.0117	Depositor
R, R_{free}	0.224 , 0.255 0.224 , 0.255	Depositor DCC
R_{free} test set	5274 reflections (10.10%)	wwPDB-VP
Wilson B-factor (Å^2)	23.7	Xtriage
Anisotropy	0.030	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 33.5	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	3919	wwPDB-VP
Average B, all atoms (Å^2)	37.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.46% 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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: 2GN

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	0.65	0/3662	0.75	2/4956 (0.0%)

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	A	0	2

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	254	LEU	CA-CB-CG	6.48	130.20	115.30
1	A	49	ARG	NE-CZ-NH2	5.14	122.87	120.30

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	106	THR	Peptide
1	A	188	HIS	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	3577	0	3602	80	0
2	A	43	0	24	7	0
3	A	299	0	0	24	0
All	All	3919	0	3626	85	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 12.

All (85) 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:71:GLU:HB2	3:A:2069:HOH:O	1.48	1.11
1:A:251:LYS:HG3	1:A:252:ASP:H	1.17	1.08
1:A:232:LYS:HE3	3:A:2201:HOH:O	1.55	1.04
1:A:251:LYS:CG	1:A:252:ASP:H	1.69	1.03
1:A:251:LYS:HG3	1:A:252:ASP:N	1.79	0.96
1:A:309:THR:CG2	1:A:324:VAL:HG23	1.95	0.94
1:A:366:GLN:HB2	3:A:2259:HOH:O	1.64	0.94
1:A:358:LYS:HG2	3:A:2127:HOH:O	1.64	0.94
1:A:188:HIS:CD2	1:A:189:LEU:H	1.96	0.82
1:A:410:LYS:HE3	3:A:2293:HOH:O	1.79	0.82
1:A:309:THR:HG21	1:A:324:VAL:HG23	1.63	0.81
1:A:410:LYS:CE	3:A:2293:HOH:O	2.29	0.79
1:A:175[A]:ARG:HD2	3:A:2173:HOH:O	1.82	0.78
1:A:309:THR:HG21	1:A:324:VAL:H	1.48	0.77
1:A:52:HIS:HE1	1:A:69:GLU:H	1.32	0.75
1:A:358:LYS:HE3	3:A:2253:HOH:O	1.88	0.73
1:A:108:SER:OG	1:A:158:GLU:OE1	2.05	0.73
2:A:500:2GN:N01	3:A:2059:HOH:O	2.22	0.72
1:A:293[B]:GLU:OE1	1:A:296:ARG:NH1	2.22	0.72
1:A:293[A]:GLU:HG2	3:A:2223:HOH:O	1.91	0.70
1:A:184:VAL:HG12	1:A:185:GLY:H	1.57	0.69
1:A:251:LYS:CG	1:A:252:ASP:N	2.37	0.69
1:A:52:HIS:CE1	1:A:69:GLU:H	2.12	0.68
1:A:183:LEU:HB3	3:A:2180:HOH:O	1.93	0.67
1:A:184:VAL:HG12	1:A:185:GLY:N	2.10	0.67
1:A:34:ARG:HG3	2:A:500:2GN:H321	1.77	0.66
1:A:308:ARG:HB3	1:A:308:ARG:HH11	1.59	0.66
1:A:108:SER:HB3	1:A:308:ARG:HD3	1.78	0.65
2:A:500:2GN:H38	2:A:500:2GN:H91	1.80	0.64

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:105[B]:VAL:HG23	1:A:180:ILE:HB	1.79	0.63
1:A:175[A]:ARG:NH1	3:A:2173:HOH:O	2.32	0.62
1:A:109:ASN:ND2	1:A:109:ASN:N	2.48	0.61
1:A:358:LYS:C	1:A:359:GLU:HG2	2.18	0.61
1:A:410:LYS:HE2	3:A:2293:HOH:O	1.98	0.61
1:A:251:LYS:HG2	1:A:252:ASP:H	1.64	0.59
1:A:188:HIS:CD2	1:A:189:LEU:N	2.70	0.59
1:A:109:ASN:ND2	1:A:109:ASN:H	2.00	0.59
2:A:500:2GN:H91	2:A:500:2GN:C38	2.33	0.59
1:A:346:GLU:HG3	3:A:2246:HOH:O	2.03	0.58
1:A:421:LEU:HD21	1:A:448:LEU:HD22	1.87	0.56
1:A:109:ASN:N	1:A:109:ASN:HD22	2.04	0.55
1:A:200:LYS:NZ	3:A:2186:HOH:O	2.39	0.54
2:A:500:2GN:S7	2:A:500:2GN:O15	2.65	0.54
2:A:500:2GN:C38	2:A:500:2GN:C9	2.85	0.54
1:A:254:LEU:C	1:A:254:LEU:HD23	2.27	0.54
1:A:249:GLU:HB3	3:A:2213:HOH:O	2.10	0.51
1:A:387:GLY:HA2	1:A:411:LYS:HB3	1.92	0.51
1:A:442:SER:HB3	3:A:2253:HOH:O	2.10	0.50
1:A:185:GLY:O	1:A:187:ALA:N	2.45	0.50
1:A:158:GLU:OE2	1:A:308:ARG:NH2	2.47	0.48
1:A:217:ALA:O	1:A:235:ARG:HA	2.13	0.48
1:A:257:LYS:HA	3:A:2214:HOH:O	2.14	0.48
1:A:108:SER:OG	1:A:158:GLU:CD	2.52	0.48
1:A:310:GLU:O	1:A:321:LEU:HD12	2.13	0.48
1:A:250:ARG:NH2	1:A:253:SER:OG	2.47	0.47
1:A:173:LEU:C	1:A:173:LEU:HD23	2.35	0.47
1:A:175[A]:ARG:CD	3:A:2173:HOH:O	2.53	0.47
1:A:183:LEU:HD11	1:A:222:ILE:CG2	2.45	0.47
1:A:17:ASP:HB3	3:A:2016:HOH:O	2.15	0.46
1:A:392:GLN:NE2	3:A:2275:HOH:O	2.43	0.46
1:A:272:LYS:HG3	3:A:2218:HOH:O	2.16	0.46
1:A:8:ILE:O	1:A:12:VAL:HG22	2.16	0.46
1:A:134:ASN:HA	1:A:308:ARG:NH2	2.31	0.46
1:A:111:LYS:HE2	1:A:307:ASN:HB2	1.98	0.45
1:A:105[A]:VAL:HG12	1:A:106:THR:O	2.17	0.45
1:A:358:LYS:CE	3:A:2253:HOH:O	2.57	0.44
1:A:34:ARG:CG	2:A:500:2GN:H321	2.47	0.44
1:A:216:LEU:HD12	1:A:216:LEU:N	2.33	0.44
1:A:313:LYS:NZ	1:A:319:ASP:OD1	2.50	0.44
1:A:186:GLU:HG3	1:A:189:LEU:HD23	2.00	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:421:LEU:O	1:A:425:VAL:HG23	2.18	0.43
1:A:183:LEU:HD11	1:A:222:ILE:HG21	2.00	0.43
1:A:30:GLU:OE2	1:A:147:HIS:HE1	2.02	0.42
1:A:445:LEU:HD23	1:A:445:LEU:HA	1.93	0.42
1:A:111:LYS:N	3:A:2113:HOH:O	2.52	0.41
1:A:273:TYR:CD1	1:A:273:TYR:N	2.73	0.41
1:A:333:LYS:HE3	1:A:337:GLU:OE2	2.21	0.41
1:A:65:VAL:HG22	1:A:66:THR:N	2.34	0.41
1:A:377:PRO:HA	1:A:401:PHE:CE2	2.56	0.41
1:A:396:LEU:O	1:A:400:MET:HG2	2.20	0.41
1:A:109:ASN:HB3	1:A:184:VAL:HG13	2.03	0.40
1:A:125:ARG:HE	1:A:125:ARG:HB3	1.76	0.40
1:A:105[B]:VAL:HG21	1:A:114[B]:THR:OG1	2.21	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	461/465 (99%)	438 (95%)	18 (4%)	5 (1%)	14 4

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	186	GLU
1	A	251	LYS
1	A	107	GLY
1	A	184	VAL
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	392/394 (100%)	373 (95%)	19 (5%)	25 9

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

Mol	Chain	Res	Type
1	A	10	GLN
1	A	20	ILE
1	A	28	LYS
1	A	109	ASN
1	A	115	LYS
1	A	189	LEU
1	A	246	ASP
1	A	254	LEU
1	A	266	ASP
1	A	270	THR
1	A	273	TYR
1	A	308	ARG
1	A	324	VAL
1	A	359	GLU
1	A	366	GLN
1	A	413	GLU
1	A	419[A]	GLU
1	A	419[B]	GLU
1	A	445	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	52	HIS
1	A	109	ASN
1	A	163	HIS
1	A	188	HIS
1	A	277	ASN
1	A	307	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)

1 ligand is 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	2GN	A	500	-	45,48,48	2.62	10 (22%)	59,70,70	3.48	21 (35%)

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	2GN	A	500	-	-	10/26/47/47	0/6/6/6

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	500	2GN	C18-S21	-11.42	1.63	1.78
2	A	500	2GN	C2-C1	5.65	1.49	1.41
2	A	500	2GN	S21-N23	4.83	1.70	1.63

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	500	2GN	N04-N05	4.81	1.40	1.32
2	A	500	2GN	N01-N04	4.09	1.41	1.34
2	A	500	2GN	N02-N05	3.93	1.40	1.34
2	A	500	2GN	C13-N10	3.81	1.45	1.35
2	A	500	2GN	C8-C3	-3.39	1.48	1.51
2	A	500	2GN	C27-N23	-3.31	1.44	1.47
2	A	500	2GN	C06-N01	2.09	1.36	1.33

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	500	2GN	C30-C28-N23	-12.85	100.61	108.18
2	A	500	2GN	C8-N12-C9	12.56	125.97	109.91
2	A	500	2GN	C29-C27-N23	-8.42	103.22	108.18
2	A	500	2GN	C4-C9-N12	8.20	119.99	111.07
2	A	500	2GN	C3-C1-C2	-4.91	108.65	113.57
2	A	500	2GN	C18-C22-CL2	4.19	124.56	121.49
2	A	500	2GN	N02-N05-N04	-4.17	106.81	109.53
2	A	500	2GN	N01-N04-N05	-4.14	106.83	109.53
2	A	500	2GN	C06-N02-N05	4.10	108.51	104.87
2	A	500	2GN	O24-S21-O25	-4.08	112.91	119.52
2	A	500	2GN	C06-N01-N04	3.85	108.29	104.87
2	A	500	2GN	C32-N12-C9	3.71	119.31	111.06
2	A	500	2GN	C1-C2-C6	-3.45	122.28	126.02
2	A	500	2GN	C5-N10-C13	-3.35	118.35	126.64
2	A	500	2GN	C27-N23-C28	3.11	115.61	112.17
2	A	500	2GN	O24-S21-C18	3.00	113.16	107.36
2	A	500	2GN	C19-C17-C14	-2.61	119.65	121.58
2	A	500	2GN	C3-C8-N12	-2.59	108.49	111.64
2	A	500	2GN	C16-C14-C17	2.29	120.53	117.92
2	A	500	2GN	C19-C22-CL2	-2.28	114.82	118.49
2	A	500	2GN	C32-C33-C34	-2.01	116.99	120.77

There are no chirality outliers.

All (10) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	500	2GN	C28-N23-S21-O25
2	A	500	2GN	C33-C32-N12-C9
2	A	500	2GN	C28-N23-S21-C18
2	A	500	2GN	C22-C18-S21-O24
2	A	500	2GN	C28-N23-S21-O24

Continued on next page...

Continued from previous page...

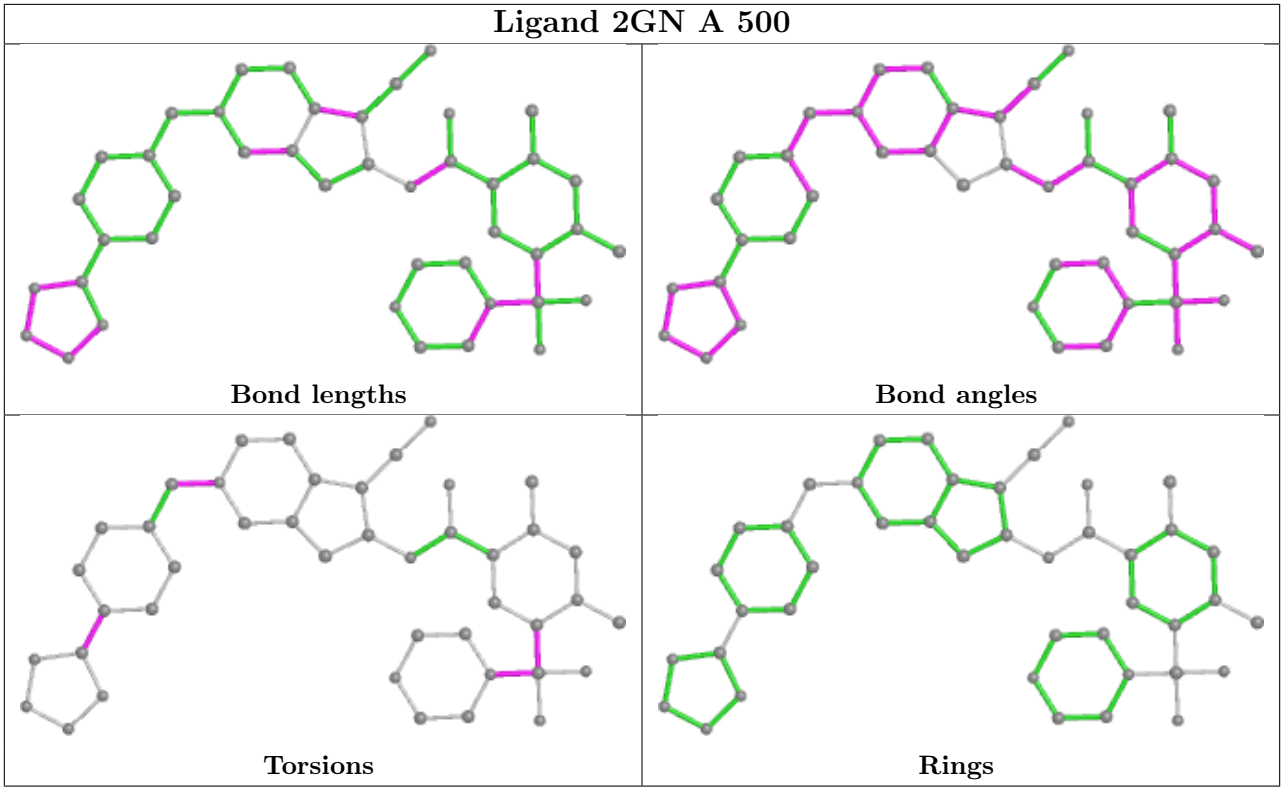
Mol	Chain	Res	Type	Atoms
2	A	500	2GN	N01-C06-C36-C37
2	A	500	2GN	N01-C06-C36-C35
2	A	500	2GN	N02-C06-C36-C35
2	A	500	2GN	N02-C06-C36-C37
2	A	500	2GN	C22-C18-S21-N23

There are no ring outliers.

1 monomer is involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	500	2GN	7	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.



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	454/465 (97%)	0.02	21 (4%) 32 29	15, 32, 75, 97	0

All (21) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	315	ALA	7.4
1	A	413	GLU	7.4
1	A	187	ALA	7.3
1	A	414	ASP	4.8
1	A	184	VAL	4.3
1	A	454	ASN	4.2
1	A	109	ASN	3.9
1	A	252	ASP	3.6
1	A	309	THR	3.6
1	A	308	ARG	3.5
1	A	273	TYR	3.2
1	A	188	HIS	2.9
1	A	346	GLU	2.9
1	A	314	ALA	2.8
1	A	185	GLY	2.7
1	A	272	LYS	2.5
1	A	251	LYS	2.5
1	A	190	ALA	2.4
1	A	20	ILE	2.4
1	A	186	GLU	2.2
1	A	108	SER	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)

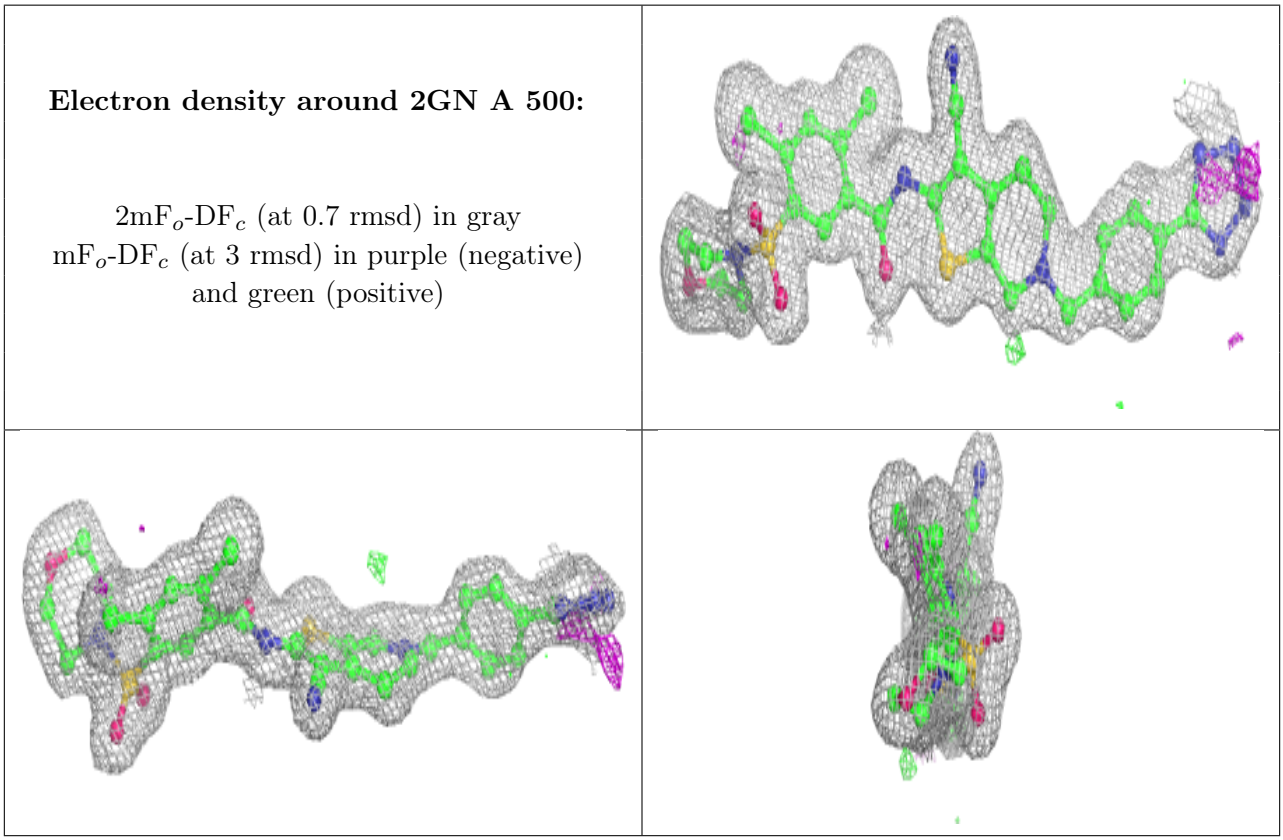
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	2GN	A	500	43/43	0.98	0.10	18,23,56,62	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 2GN A 500:

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.