W O R L D W I D E
wwPDB
PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report (i)

Jun 3, 2024 – 09:25 PM JST

PDB ID	:	8XGB
Title	:	Crystal structure of human secretory glutaminyl cyclase in complex with (S)-1-(1H-benzo[d]imidazol-5-yl)-5-(4-propoxyphenyl)imidazolidin-2-one
Authors	:	Li, G.-B.; Wang, X.-Y.
Deposited on	:	2023-12-15
Resolution	:	3.24 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	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36.2
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)	:	2.36.2

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 3.24 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.
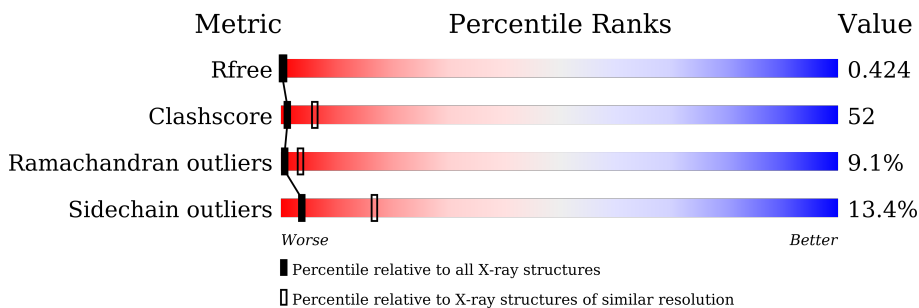
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1619 (3.28-3.20)
Clashscore	141614	1755 (3.28-3.20)
Ramachandran outliers	138981	1728 (3.28-3.20)
Sidechain outliers	138945	1727 (3.28-3.20)

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 <=5%

Mol	Chain	Length	Quality of chain
1	B	331	25% 56% 15% ··

2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 5191 atoms, of which 2549 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 Glutaminyl-peptide cyclotransferase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	B	323	Total	C	H	N	O	S	10	0	0
			5139	1673	2529	450	478	9			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	31	ALA	-	expression tag	UNP Q16769

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	B	1	Total	Zn	0	0
			1	1		

- Molecule 3 is (5 {S})-1-(3 {H}-benzimidazol-5-yl)-5-(4-propoxyphenyl)imidazolidin-2-one (three-letter code: A1D49) (formula: $C_{19}H_{20}N_4O_2$) (labeled as "Ligand of Interest" by depositor).

A1D49
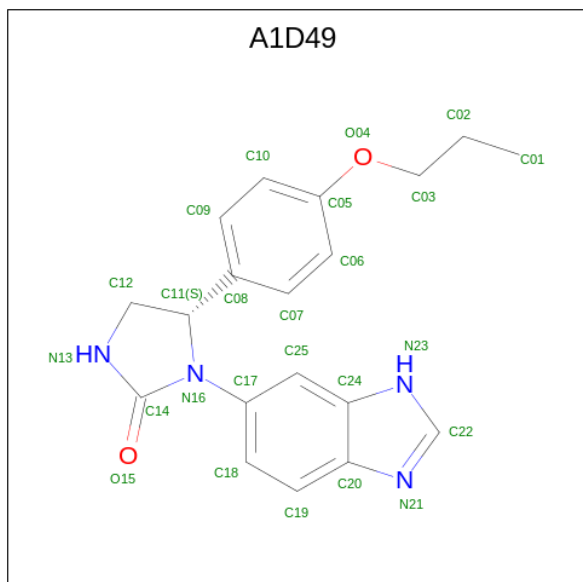
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	B	1	Total 45	C 19	H 20	N 4	O 2	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	6	Total 6	O 6	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. 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. 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: Glutaminyl-peptide cyclotransferase

Chain B:
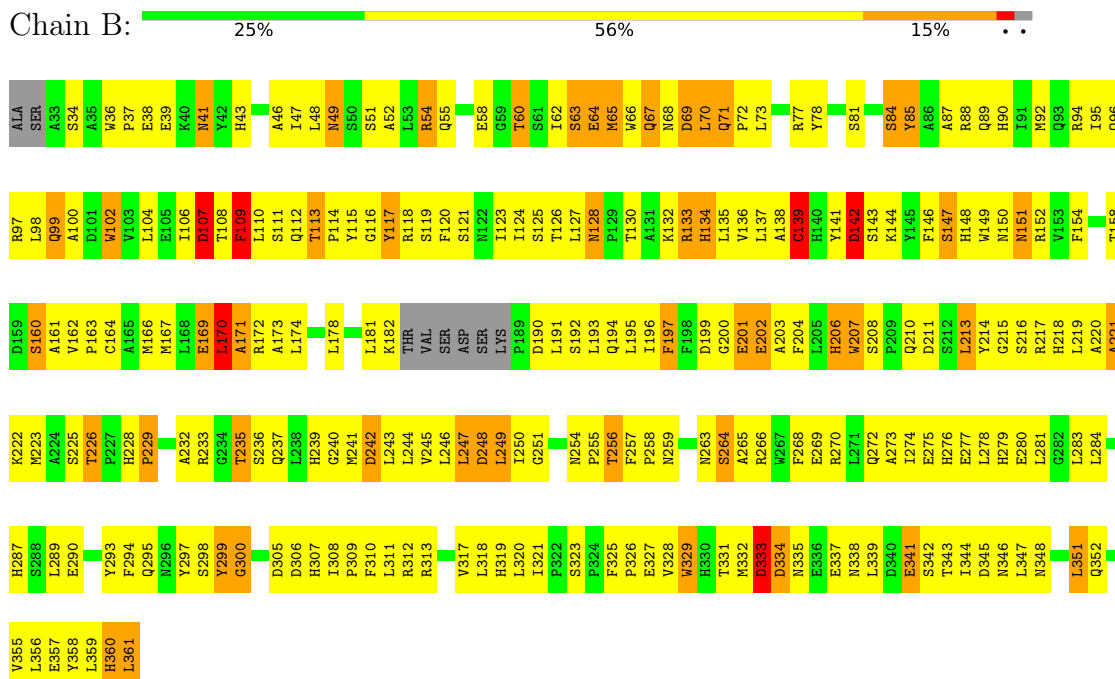
4 Data and refinement statistics (i)

Property	Value	Source
Space group	H 3	Depositor
Cell constants a, b, c, α, β, γ	156.42Å 156.42Å 80.93Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	31.24 – 3.24 31.24 – 3.24	Depositor EDS
% Data completeness (in resolution range)	99.4 (31.24-3.24) 99.4 (31.24-3.24)	Depositor EDS
R_{merge}	0.17	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	9.72 (at 3.24Å)	Xtriage
Refinement program	PHENIX (1.10.1_2155: ???)	Depositor
R, R_{free}	0.321 , 0.418 0.329 , 0.424	Depositor DCC
R_{free} test set	970 reflections (8.32%)	wwPDB-VP
Wilson B-factor (Å^2)	36.4	Xtriage
Anisotropy	0.457	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 22.1	EDS
L-test for twinning[2]	$< |L| > = 0.39, < L^2 > = 0.22$	Xtriage
Estimated twinning fraction	0.458 for h,-h-k,-l	Xtriage
F_o,F_c correlation	0.71	EDS
Total number of atoms	5191	wwPDB-VP
Average B, all atoms (Å^2)	35.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.22% of the height of the origin peak. No significant pseudotranslation is detected.*

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[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: ZN, A1D49

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	B	0.94	6/2687 (0.2%)	0.99	7/3656 (0.2%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	B	0	2

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	139	CYS	CB-SG	-6.54	1.71	1.82
1	B	201	GLU	CB-CG	5.92	1.63	1.52
1	B	109	PHE	CD1-CE1	-5.66	1.27	1.39
1	B	214	TYR	CE2-CZ	-5.33	1.31	1.38
1	B	210	GLN	CG-CD	5.09	1.62	1.51
1	B	197	PHE	CD2-CE2	-5.04	1.29	1.39

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	107	ASP	CB-CG-OD2	-7.08	111.93	118.30
1	B	213	LEU	CA-CB-CG	6.95	131.29	115.30
1	B	333	ASP	CB-CG-OD1	-6.42	112.53	118.30
1	B	133	ARG	NE-CZ-NH2	5.71	123.16	120.30
1	B	69	ASP	CB-CG-OD2	5.51	123.26	118.30
1	B	54	ARG	NE-CZ-NH1	5.02	122.81	120.30
1	B	361	LEU	CA-CB-CG	5.01	126.83	115.30

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	134	HIS	Peptide
1	B	333	ASP	Peptide

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	B	2610	2529	2529	270	0
2	B	1	0	0	0	0
3	B	25	20	0	2	0
4	B	6	0	0	3	0
All	All	2642	2549	2529	270	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 52.

All (270) 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:B:152:ARG:NH2	1:B:332:MET:O	1.77	1.16
1:B:73:LEU:O	1:B:77:ARG:NH1	1.89	1.05
1:B:154:PHE:O	4:B:501:HOH:O	1.77	1.00
1:B:236:SER:O	1:B:239:HIS:N	2.02	0.91
1:B:216:SER:OG	1:B:306:ASP:OD1	1.91	0.88
1:B:326:PRO:O	4:B:502:HOH:O	1.93	0.86
1:B:109:PHE:CE1	1:B:120:PHE:HB2	2.13	0.84
1:B:139:CYS:SG	1:B:164:CYS:N	2.54	0.80
1:B:242:ASP:OD1	1:B:358:TYR:OH	2.02	0.77
1:B:126:THR:OG1	1:B:194:GLN:OE1	2.05	0.74
1:B:344:ILE:O	1:B:348:ASN:N	2.20	0.74
1:B:134:HIS:HD2	1:B:193:LEU:O	1.72	0.73
1:B:274:ILE:HG22	1:B:278:LEU:HD12	1.72	0.71
1:B:144:LYS:O	4:B:501:HOH:O	2.10	0.69
1:B:219:LEU:O	1:B:222:LYS:N	2.25	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:51:SER:OG	1:B:51:SER:O	2.08	0.69
1:B:297:TYR:CG	1:B:297:TYR:O	2.45	0.69
1:B:138:ALA:O	1:B:139:CYS:HB3	1.91	0.68
1:B:248:ASP:O	1:B:249:LEU:HB2	1.93	0.68
1:B:309:PRO:O	1:B:313:ARG:NH1	2.21	0.67
1:B:63:SER:O	1:B:64:GLU:C	2.34	0.66
1:B:163:PRO:HG3	1:B:250:ILE:HD12	1.78	0.66
1:B:46:ALA:CB	1:B:360:HIS:HA	2.25	0.66
1:B:55:GLN:O	1:B:58:GLU:N	2.23	0.64
1:B:95:ILE:HD13	1:B:125:SER:OG	1.97	0.64
1:B:134:HIS:CD2	1:B:193:LEU:O	2.51	0.64
1:B:305:ASP:O	1:B:308:ILE:HG12	1.97	0.64
1:B:94:ARG:O	1:B:98:LEU:HD11	1.99	0.63
1:B:110:LEU:HA	1:B:118:ARG:O	1.99	0.63
1:B:256:THR:O	1:B:256:THR:OG1	2.18	0.62
1:B:148:HIS:HA	1:B:152:ARG:O	2.00	0.61
1:B:347:LEU:O	1:B:351:LEU:HD23	2.01	0.61
1:B:136:VAL:O	1:B:137:LEU:HD12	1.99	0.61
1:B:202:GLU:OE1	3:B:402:A1D49:N21	2.33	0.61
1:B:321:ILE:HG23	1:B:321:ILE:O	2.00	0.61
1:B:203:ALA:CB	1:B:211:ASP:O	2.50	0.60
1:B:246:LEU:O	1:B:320:LEU:N	2.35	0.60
1:B:117:TYR:O	1:B:118:ARG:HG2	2.02	0.60
1:B:220:ALA:HB2	1:B:310:PHE:CE2	2.36	0.60
1:B:39:GLU:O	1:B:133:ARG:NH2	2.34	0.60
1:B:89:GLN:OE1	1:B:89:GLN:HA	2.01	0.60
1:B:84:SER:O	1:B:87:ALA:N	2.35	0.60
1:B:137:LEU:HB3	1:B:167:MET:HE3	1.84	0.59
1:B:265:ALA:O	1:B:268:PHE:N	2.36	0.59
1:B:251:GLY:HA2	1:B:344:ILE:HD11	1.84	0.59
1:B:117:TYR:O	1:B:118:ARG:CG	2.51	0.58
1:B:359:LEU:O	1:B:360:HIS:HB2	2.03	0.58
1:B:203:ALA:HB1	1:B:211:ASP:O	2.04	0.58
1:B:228:HIS:HA	1:B:229:PRO:C	2.24	0.58
1:B:95:ILE:HA	1:B:98:LEU:HD13	1.86	0.57
1:B:213:LEU:O	1:B:217:ARG:HG3	2.05	0.57
1:B:343:THR:HG22	1:B:347:LEU:HD12	1.86	0.57
1:B:255:PRO:HB2	1:B:257:PHE:CZ	2.39	0.57
1:B:170:LEU:HD23	1:B:171:ALA:N	2.20	0.57
1:B:47:ILE:HG23	1:B:47:ILE:O	2.05	0.56
1:B:201:GLU:O	1:B:202:GLU:O	2.23	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:65:MET:CG	1:B:69:ASP:HB2	2.35	0.56
1:B:202:GLU:OE2	3:B:402:A1D49:C22	2.54	0.56
1:B:95:ILE:CG2	1:B:95:ILE:O	2.54	0.55
1:B:333:ASP:O	1:B:335:ASN:OD1	2.23	0.55
1:B:123:ILE:HB	1:B:197:PHE:HB2	1.88	0.55
1:B:150:ASN:O	1:B:151:ASN:HB3	2.06	0.55
1:B:98:LEU:N	1:B:98:LEU:HD12	2.22	0.55
1:B:102:TRP:CZ3	1:B:125:SER:O	2.59	0.55
1:B:39:GLU:HB3	1:B:133:ARG:NH1	2.22	0.55
1:B:308:ILE:HB	1:B:309:PRO:HD3	1.89	0.55
1:B:194:GLN:O	1:B:195:LEU:HD23	2.07	0.55
1:B:95:ILE:HG21	1:B:104:LEU:HD21	1.89	0.54
1:B:146:PHE:HD2	1:B:154:PHE:CD2	2.24	0.54
1:B:121:SER:O	1:B:141:TYR:OH	2.18	0.54
1:B:41:ASN:OD1	1:B:41:ASN:N	2.41	0.54
1:B:46:ALA:HB3	1:B:360:HIS:HA	1.89	0.54
1:B:136:VAL:HG21	1:B:241:MET:HG2	1.89	0.54
1:B:299:TYR:CG	1:B:300:GLY:N	2.76	0.54
1:B:162:VAL:HG12	1:B:163:PRO:HD3	1.90	0.54
1:B:39:GLU:HB3	1:B:133:ARG:CZ	2.38	0.54
1:B:206:HIS:O	1:B:207:TRP:C	2.46	0.54
1:B:166:MET:SD	1:B:250:ILE:HG21	2.49	0.53
1:B:201:GLU:CG	1:B:306:ASP:OD2	2.57	0.53
1:B:97:ARG:HG2	1:B:97:ARG:O	2.08	0.53
1:B:256:THR:OG1	1:B:323:SER:O	2.26	0.53
1:B:337:GLU:O	1:B:339:LEU:N	2.41	0.53
1:B:202:GLU:OE1	1:B:202:GLU:HA	2.09	0.52
1:B:170:LEU:O	1:B:173:ALA:N	2.43	0.52
1:B:114:PRO:O	1:B:115:TYR:CD1	2.62	0.52
1:B:310:PHE:O	1:B:313:ARG:HB2	2.09	0.52
1:B:240:GLY:O	1:B:242:ASP:N	2.42	0.52
1:B:192:SER:O	1:B:359:LEU:HD21	2.10	0.52
1:B:109:PHE:N	1:B:109:PHE:CD1	2.77	0.52
1:B:207:TRP:O	1:B:208:SER:HB3	2.10	0.52
1:B:246:LEU:HD23	1:B:247:LEU:O	2.10	0.52
1:B:63:SER:O	1:B:64:GLU:O	2.27	0.52
1:B:68:ASN:HB3	1:B:94:ARG:NH2	2.25	0.52
1:B:206:HIS:O	1:B:207:TRP:O	2.27	0.52
1:B:36:TRP:HA	1:B:39:GLU:CD	2.31	0.51
1:B:114:PRO:O	1:B:115:TYR:HD1	1.94	0.51
1:B:352:GLN:O	1:B:356:LEU:HG	2.10	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:66:TRP:O	1:B:71:GLN:HG3	2.11	0.51
1:B:95:ILE:HG21	1:B:125:SER:OG	2.10	0.51
1:B:245:VAL:HA	1:B:318:LEU:HB3	1.93	0.51
1:B:139:CYS:SG	1:B:163:PRO:HB2	2.51	0.50
1:B:325:PHE:CD2	1:B:329:TRP:CD1	2.99	0.50
1:B:325:PHE:HD2	1:B:329:TRP:CD1	2.30	0.50
1:B:147:SER:O	1:B:332:MET:CE	2.60	0.50
1:B:62:ILE:HG23	1:B:63:SER:N	2.27	0.50
1:B:84:SER:O	1:B:85:TYR:C	2.50	0.50
1:B:36:TRP:CE3	1:B:132:LYS:HB3	2.46	0.50
1:B:236:SER:O	1:B:239:HIS:HB2	2.12	0.50
1:B:60:THR:CG2	1:B:60:THR:O	2.60	0.50
1:B:49:ASN:O	1:B:52:ALA:N	2.32	0.49
1:B:211:ASP:O	1:B:211:ASP:OD2	2.30	0.49
1:B:138:ALA:O	1:B:167:MET:SD	2.69	0.49
1:B:337:GLU:C	1:B:339:LEU:H	2.16	0.49
1:B:181:LEU:HD21	1:B:361:LEU:HD11	1.93	0.49
1:B:268:PHE:CZ	1:B:294:PHE:HB3	2.46	0.49
1:B:228:HIS:HB2	1:B:237:GLN:HG3	1.94	0.49
1:B:256:THR:O	1:B:258:PRO:HD3	2.12	0.49
1:B:169:GLU:OE1	1:B:169:GLU:O	2.31	0.49
1:B:194:GLN:C	1:B:195:LEU:HD23	2.33	0.49
1:B:107:ASP:O	1:B:107:ASP:OD2	2.31	0.49
1:B:46:ALA:HB2	1:B:360:HIS:HA	1.94	0.48
1:B:70:LEU:O	1:B:72:PRO:N	2.46	0.48
1:B:166:MET:SD	1:B:344:ILE:HG23	2.53	0.48
1:B:331:THR:C	1:B:333:ASP:H	2.15	0.48
1:B:343:THR:CG2	1:B:347:LEU:HD12	2.42	0.48
1:B:259:ASN:OD1	1:B:259:ASN:O	2.30	0.48
1:B:308:ILE:HD13	1:B:311:LEU:HD23	1.95	0.48
1:B:160:SER:OG	1:B:163:PRO:HG2	2.13	0.48
1:B:136:VAL:C	1:B:137:LEU:HD12	2.33	0.48
1:B:229:PRO:HD2	1:B:232:ALA:HB2	1.96	0.48
1:B:310:PHE:O	1:B:313:ARG:N	2.45	0.48
1:B:102:TRP:HZ3	1:B:125:SER:O	1.96	0.48
1:B:146:PHE:CD2	1:B:154:PHE:CD2	3.02	0.48
1:B:219:LEU:CD1	1:B:223:MET:HG3	2.43	0.48
1:B:337:GLU:HA	1:B:337:GLU:OE1	2.13	0.48
1:B:62:ILE:HD12	1:B:345:ASP:HB2	1.94	0.48
1:B:206:HIS:O	1:B:206:HIS:CG	2.66	0.48
1:B:257:PHE:CE2	1:B:293:TYR:HB3	2.49	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:174:LEU:O	1:B:178:LEU:HD12	2.14	0.47
1:B:108:THR:HA	1:B:120:PHE:O	2.14	0.47
1:B:62:ILE:HD13	1:B:341:GLU:HG3	1.97	0.47
1:B:133:ARG:O	1:B:191:LEU:HA	2.15	0.47
1:B:97:ARG:O	1:B:97:ARG:CG	2.62	0.47
1:B:196:ILE:C	1:B:197:PHE:CD2	2.88	0.47
1:B:305:ASP:O	1:B:308:ILE:CG1	2.63	0.47
1:B:85:TYR:O	1:B:88:ARG:N	2.48	0.47
1:B:106:ILE:HG22	1:B:107:ASP:N	2.29	0.47
1:B:126:THR:HG22	1:B:127:LEU:O	2.15	0.47
1:B:169:GLU:O	1:B:170:LEU:O	2.33	0.47
1:B:135:LEU:CD1	1:B:243:LEU:HD23	2.45	0.47
1:B:277:GLU:O	1:B:281:LEU:HG	2.15	0.46
1:B:37:PRO:C	1:B:39:GLU:H	2.18	0.46
1:B:65:MET:O	1:B:69:ASP:N	2.47	0.46
1:B:90:HIS:O	1:B:90:HIS:CG	2.67	0.46
1:B:226:THR:HG21	1:B:237:GLN:NE2	2.30	0.46
1:B:77:ARG:NH2	1:B:161:ALA:HB2	2.31	0.46
1:B:132:LYS:CG	1:B:190:ASP:OD2	2.63	0.46
1:B:109:PHE:N	1:B:109:PHE:HD1	2.13	0.46
1:B:37:PRO:O	1:B:39:GLU:N	2.47	0.46
1:B:328:VAL:O	1:B:331:THR:HG23	2.16	0.46
1:B:78:TYR:O	1:B:81:SER:OG	2.33	0.45
1:B:127:LEU:O	1:B:128:ASN:C	2.54	0.45
1:B:277:GLU:O	1:B:278:LEU:C	2.55	0.45
1:B:115:TYR:HB3	1:B:118:ARG:HH21	1.81	0.45
1:B:247:LEU:O	1:B:248:ASP:HB2	2.16	0.45
1:B:309:PRO:HA	1:B:312:ARG:HG2	1.97	0.45
1:B:135:LEU:HD23	1:B:355:VAL:HG23	1.97	0.45
1:B:279:HIS:HE1	1:B:289:LEU:N	2.14	0.45
1:B:297:TYR:O	1:B:297:TYR:CD1	2.69	0.45
1:B:113:THR:C	1:B:115:TYR:H	2.19	0.45
1:B:163:PRO:HG2	1:B:248:ASP:HA	1.99	0.45
1:B:48:LEU:HB3	1:B:52:ALA:HB3	1.99	0.45
1:B:63:SER:O	1:B:66:TRP:N	2.49	0.45
1:B:311:LEU:HD12	1:B:311:LEU:O	2.17	0.45
1:B:342:SER:O	1:B:346:ASN:OD1	2.35	0.45
1:B:95:ILE:HG22	1:B:104:LEU:HD11	1.99	0.44
1:B:104:LEU:HA	1:B:124:ILE:O	2.18	0.44
1:B:351:LEU:O	1:B:355:VAL:HG12	2.17	0.44
1:B:147:SER:O	1:B:149:TRP:N	2.42	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:92:MET:O	1:B:96:GLN:N	2.51	0.44
1:B:279:HIS:CE1	1:B:287:HIS:ND1	2.85	0.44
1:B:126:THR:HA	1:B:194:GLN:HA	1.98	0.44
1:B:95:ILE:O	1:B:95:ILE:HG22	2.15	0.44
1:B:139:CYS:SG	1:B:164:CYS:SG	3.16	0.44
1:B:201:GLU:OE2	1:B:202:GLU:CD	2.56	0.44
1:B:99:GLN:OE1	1:B:99:GLN:CA	2.65	0.44
1:B:150:ASN:O	1:B:150:ASN:OD1	2.35	0.44
1:B:98:LEU:CD2	1:B:171:ALA:HB1	2.48	0.43
1:B:182:LYS:O	1:B:182:LYS:HG3	2.18	0.43
1:B:275:GLU:O	1:B:276:HIS:C	2.56	0.43
1:B:54:ARG:NH1	1:B:283:LEU:HD21	2.34	0.43
1:B:344:ILE:O	1:B:345:ASP:C	2.57	0.43
1:B:43:HIS:O	1:B:266:ARG:NH2	2.42	0.43
1:B:199:ASP:O	1:B:200:GLY:O	2.36	0.43
1:B:107:ASP:O	1:B:107:ASP:CG	2.56	0.43
1:B:113:THR:OG1	1:B:204:PHE:CE2	2.65	0.43
1:B:127:LEU:HD13	1:B:181:LEU:HD12	2.00	0.43
1:B:218:HIS:O	1:B:221:ALA:HB3	2.19	0.43
1:B:307:HIS:CE1	1:B:319:HIS:ND1	2.87	0.43
1:B:170:LEU:O	1:B:171:ALA:C	2.56	0.43
1:B:277:GLU:OE1	1:B:277:GLU:HA	2.19	0.43
1:B:36:TRP:N	1:B:37:PRO:CD	2.82	0.43
1:B:295:GLN:HB3	1:B:297:TYR:HD2	1.83	0.43
1:B:345:ASP:O	1:B:348:ASN:HB2	2.19	0.43
1:B:54:ARG:HH11	1:B:283:LEU:HD21	1.84	0.42
1:B:64:GLU:O	1:B:67:GLN:N	2.53	0.42
1:B:95:ILE:HD13	1:B:125:SER:CB	2.49	0.42
1:B:162:VAL:CB	1:B:250:ILE:O	2.67	0.42
1:B:236:SER:O	1:B:237:GLN:C	2.57	0.42
1:B:277:GLU:O	1:B:280:GLU:N	2.52	0.42
1:B:65:MET:HG2	1:B:69:ASP:HB2	2.01	0.42
1:B:98:LEU:HD12	1:B:98:LEU:H	1.84	0.42
1:B:113:THR:O	1:B:115:TYR:N	2.52	0.42
1:B:46:ALA:HB2	1:B:360:HIS:ND1	2.34	0.42
1:B:66:TRP:HZ3	1:B:341:GLU:HA	1.85	0.42
1:B:113:THR:O	1:B:116:GLY:N	2.53	0.42
1:B:158:THR:O	1:B:160:SER:HA	2.18	0.42
1:B:219:LEU:HD11	1:B:223:MET:HE2	2.01	0.42
1:B:328:VAL:O	1:B:329:TRP:C	2.57	0.42
1:B:352:GLN:O	1:B:355:VAL:CG1	2.66	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:196:ILE:HG22	1:B:197:PHE:N	2.35	0.42
1:B:257:PHE:HE2	1:B:293:TYR:HB3	1.83	0.42
1:B:132:LYS:HG3	1:B:190:ASP:OD2	2.20	0.42
1:B:152:ARG:HH21	1:B:332:MET:HB2	1.83	0.42
1:B:196:ILE:O	1:B:197:PHE:CD2	2.73	0.42
1:B:317:VAL:HG12	1:B:319:HIS:N	2.34	0.42
1:B:192:SER:O	1:B:359:LEU:CD2	2.68	0.42
1:B:199:ASP:O	1:B:200:GLY:C	2.58	0.42
1:B:263:ASN:C	1:B:263:ASN:OD1	2.57	0.42
1:B:273:ALA:O	1:B:276:HIS:N	2.53	0.42
1:B:293:TYR:CD2	1:B:347:LEU:HD21	2.54	0.42
1:B:125:SER:O	1:B:194:GLN:HA	2.19	0.42
1:B:245:VAL:HG22	1:B:318:LEU:HB3	2.02	0.42
1:B:299:TYR:CD1	1:B:300:GLY:N	2.88	0.42
1:B:139:CYS:SG	1:B:139:CYS:O	2.77	0.42
1:B:244:LEU:HB3	1:B:317:VAL:HA	2.01	0.42
1:B:162:VAL:HG11	1:B:250:ILE:O	2.20	0.41
1:B:39:GLU:O	1:B:43:HIS:HB2	2.19	0.41
1:B:99:GLN:CD	1:B:99:GLN:N	2.70	0.41
1:B:222:LYS:O	1:B:225:SER:N	2.38	0.41
1:B:255:PRO:HB2	1:B:257:PHE:CE2	2.55	0.41
1:B:139:CYS:SG	1:B:164:CYS:CA	3.08	0.41
1:B:162:VAL:HG12	1:B:163:PRO:CD	2.50	0.41
1:B:318:LEU:HD12	1:B:318:LEU:HA	1.94	0.41
1:B:126:THR:HG23	1:B:134:HIS:NE2	2.35	0.41
1:B:162:VAL:CB	1:B:163:PRO:HD3	2.51	0.41
1:B:228:HIS:O	1:B:235:THR:OG1	2.39	0.41
1:B:135:LEU:HD12	1:B:243:LEU:HB3	2.03	0.41
1:B:54:ARG:O	1:B:58:GLU:CD	2.59	0.41
1:B:351:LEU:HG	1:B:352:GLN:N	2.36	0.41
1:B:39:GLU:OE2	1:B:133:ARG:HD2	2.21	0.41
1:B:65:MET:HB2	1:B:169:GLU:HG3	2.03	0.41
1:B:174:LEU:O	1:B:178:LEU:HG	2.21	0.41
1:B:268:PHE:CE2	1:B:294:PHE:HB3	2.56	0.41
1:B:106:ILE:CG2	1:B:107:ASP:N	2.84	0.41
1:B:162:VAL:HB	1:B:250:ILE:O	2.20	0.41
1:B:247:LEU:HB3	1:B:250:ILE:CD1	2.51	0.40
1:B:273:ALA:O	1:B:274:ILE:C	2.57	0.40
1:B:162:VAL:CG1	1:B:163:PRO:HD3	2.50	0.40
1:B:64:GLU:O	1:B:65:MET:C	2.60	0.40
1:B:62:ILE:O	1:B:63:SER:C	2.59	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:109:PHE:HB3	1:B:218:HIS:CE1	2.56	0.40
1:B:141:TYR:O	1:B:142:ASP:O	2.40	0.40
1:B:148:HIS:O	1:B:151:ASN:N	2.53	0.40
1:B:233:ARG:O	1:B:233:ARG:CG	2.69	0.40
1:B:269:GLU:O	1:B:270:ARG:C	2.60	0.40
1:B:46:ALA:O	1:B:357:GLU:HA	2.21	0.40
1:B:162:VAL:CB	1:B:163:PRO:CD	3.00	0.40
1:B:201:GLU:HG2	1:B:213:LEU:HD23	2.02	0.40
1:B:206:HIS:C	1:B:207:TRP:O	2.59	0.40

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	B	319/331 (96%)	225 (70%)	65 (20%)	29 (9%)	1 3

All (29) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	71	GLN
1	B	84	SER
1	B	85	TYR
1	B	139	CYS
1	B	202	GLU
1	B	207	TRP
1	B	334	ASP
1	B	38	GLU
1	B	70	LEU
1	B	142	ASP
1	B	147	SER
1	B	170	LEU

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Mol	Chain	Res	Type
1	B	215	GLY
1	B	248	ASP
1	B	249	LEU
1	B	360	HIS
1	B	102	TRP
1	B	117	TYR
1	B	221	ALA
1	B	226	THR
1	B	264	SER
1	B	338	ASN
1	B	34	SER
1	B	171	ALA
1	B	298	SER
1	B	64	GLU
1	B	100	ALA
1	B	329	TRP
1	B	300	GLY

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	B	284/291 (98%)	246 (87%)	38 (13%)	4	17

All (38) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	41	ASN
1	B	49	ASN
1	B	60	THR
1	B	63	SER
1	B	65	MET
1	B	67	GLN
1	B	99	GLN
1	B	107	ASP
1	B	109	PHE

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Mol	Chain	Res	Type
1	B	111	SER
1	B	112	GLN
1	B	113	THR
1	B	119	SER
1	B	128	ASN
1	B	130	THR
1	B	142	ASP
1	B	143	SER
1	B	151	ASN
1	B	160	SER
1	B	169	GLU
1	B	170	LEU
1	B	172	ARG
1	B	206	HIS
1	B	229	PRO
1	B	235	THR
1	B	242	ASP
1	B	247	LEU
1	B	254	ASN
1	B	256	THR
1	B	264	SER
1	B	272	GLN
1	B	284	LEU
1	B	290	GLU
1	B	299	TYR
1	B	327	GLU
1	B	334	ASP
1	B	341	GLU
1	B	351	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	307	HIS

5.3.3 RNA (i)

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 monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 2 ligands modelled in this entry, 1 is monoatomic - leaving 1 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	A1D49	B	402	-	26,28,28	2.14	8 (30%)	28,39,39	2.62	7 (25%)

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	A1D49	B	402	-	-	8/12/25/25	0/4/4/4

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	402	A1D49	C12-C11	-6.39	1.49	1.55
3	B	402	A1D49	O15-C14	-4.12	1.15	1.23
3	B	402	A1D49	C14-N13	3.44	1.45	1.34
3	B	402	A1D49	C14-N16	2.97	1.45	1.38
3	B	402	A1D49	C11-N16	-2.57	1.44	1.48
3	B	402	A1D49	C24-C20	-2.34	1.34	1.42
3	B	402	A1D49	C17-N16	2.07	1.46	1.43
3	B	402	A1D49	C07-C08	-2.05	1.35	1.39

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	B	402	A1D49	C18-C17-N16	7.53	128.45	120.13
3	B	402	A1D49	N13-C14-N16	5.68	112.92	106.91
3	B	402	A1D49	C17-N16-C11	5.28	129.93	121.42
3	B	402	A1D49	C17-C25-C24	5.07	124.59	121.02
3	B	402	A1D49	C25-C17-N16	-4.08	115.08	119.47
3	B	402	A1D49	O15-C14-N13	-3.01	122.69	127.18
3	B	402	A1D49	C08-C11-N16	2.13	115.72	112.80

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	402	A1D49	C06-C05-O04-C03
3	B	402	A1D49	C10-C05-O04-C03
3	B	402	A1D49	C02-C03-O04-C05
3	B	402	A1D49	C25-C17-N16-C14
3	B	402	A1D49	C18-C17-N16-C14
3	B	402	A1D49	C07-C08-C11-C12
3	B	402	A1D49	C09-C08-C11-C12
3	B	402	A1D49	C01-C02-C03-O04

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	402	A1D49	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 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 A1D49 B 402
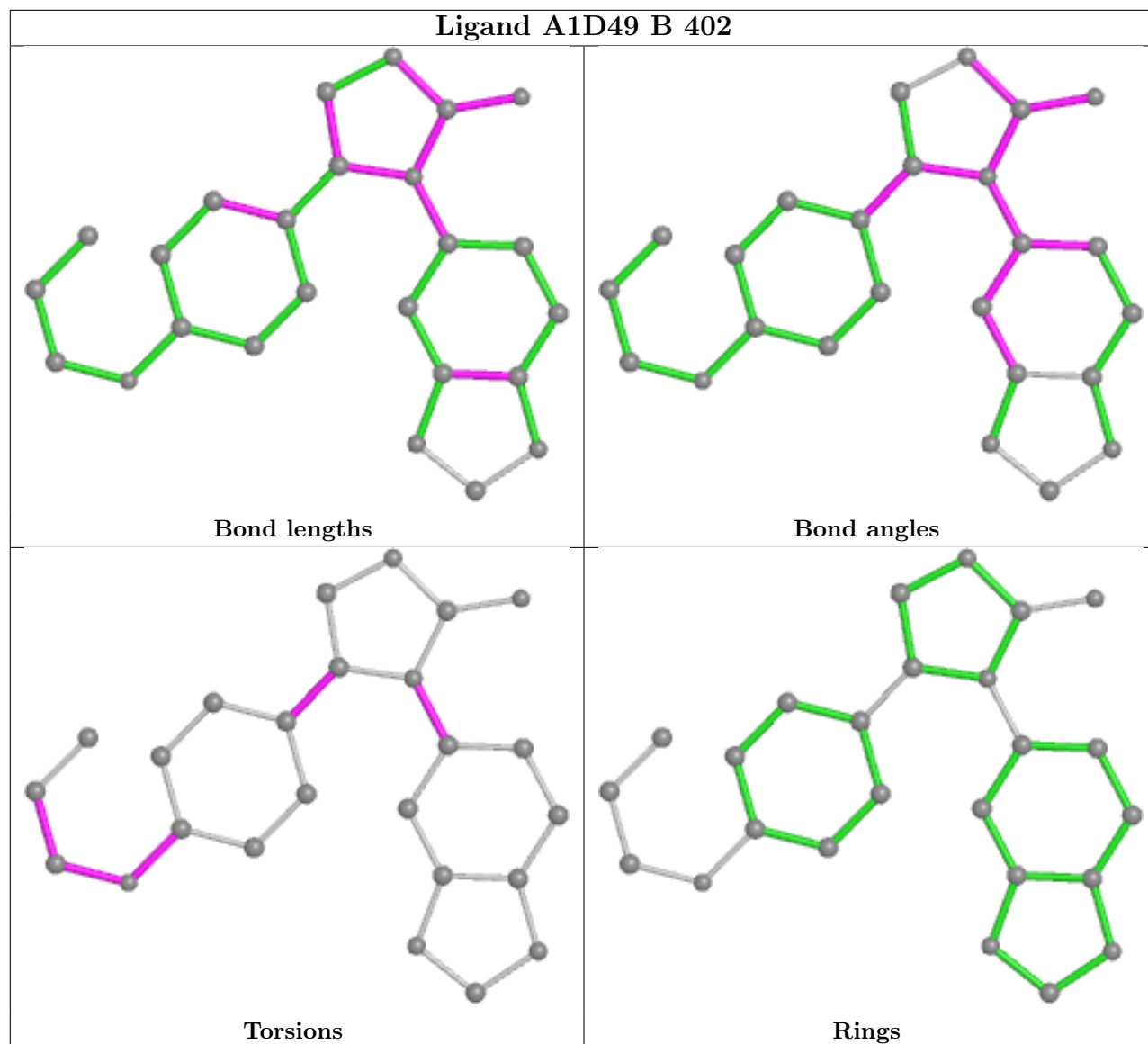
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

Unable to reproduce the depositors R factor - this section is therefore empty.

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

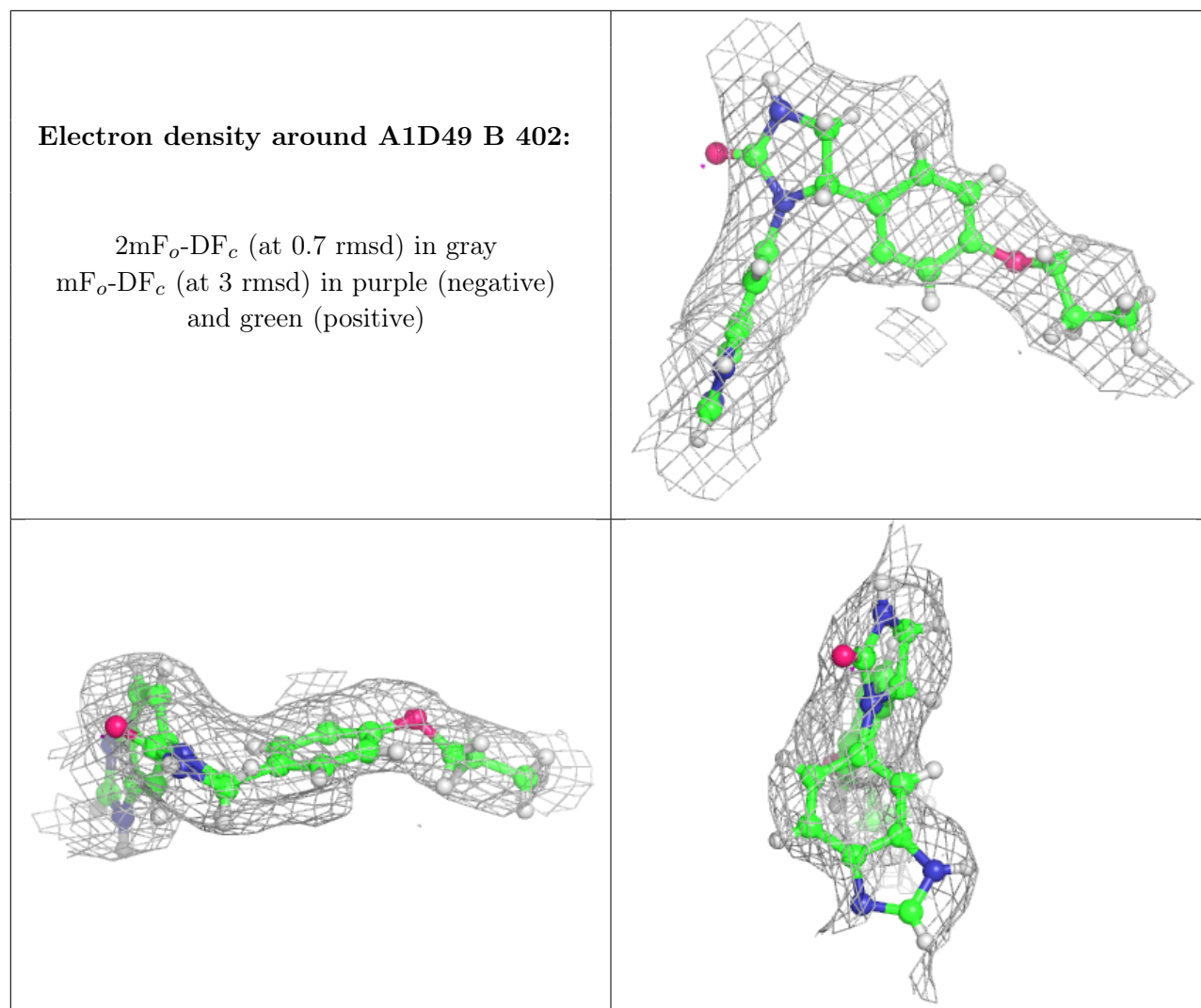Unable to reproduce the depositors R factor - this section is therefore empty.

6.3 Carbohydrates ⓘ

Unable to reproduce the depositors R factor - this section is therefore empty.

6.4 Ligands ⓘ

Unable to reproduce the depositors R factor - this section is therefore empty.

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 A1D49 B 402:

$2mF_o$-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 ⓘ

Unable to reproduce the depositors R factor - this section is therefore empty.