Full wwPDB X-ray Structure Validation Report ⓘ

Jul 14, 2025 – 12:09 PM EDT

PDB ID	:	9OBI / pdb_00009obi
Title	:	Room Temperature X-Ray Structure of HIV-1 Protease in Complex with Inhibitor GRL-075-24A
Authors	:	Bhandari, D.; Kovalevsky, A.; Ghosh, A.K.
Deposited on	:	2025-04-22
Resolution	:	1.70 Å(reported)

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

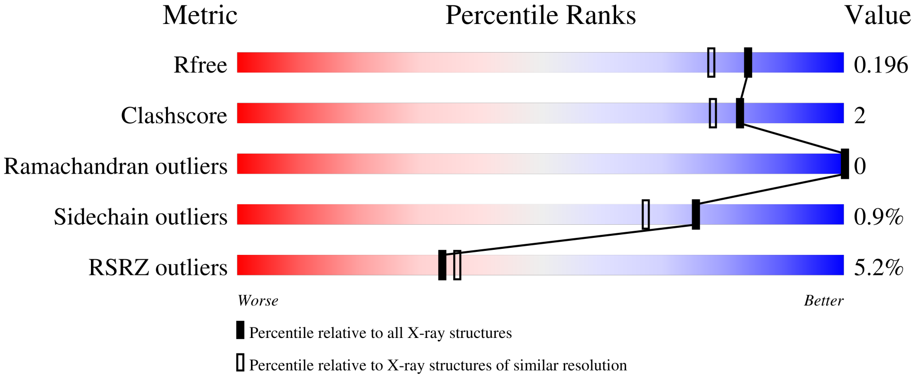
MolProbity	:	4-5-2 with Phenix2.0rc1
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.006 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.44

1 Overall quality at a glance (i)

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

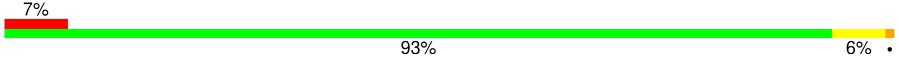
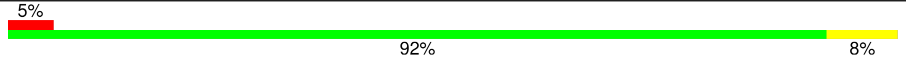
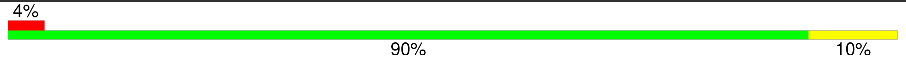
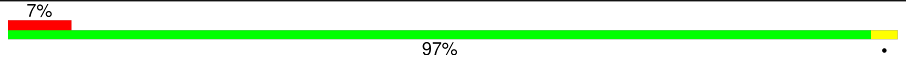
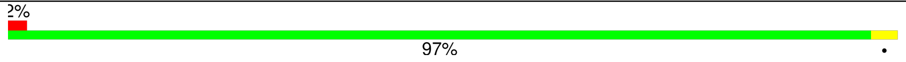
The reported resolution of this entry is 1.70 Å.

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.



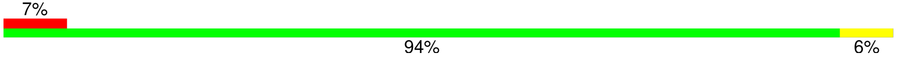
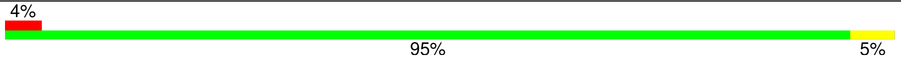
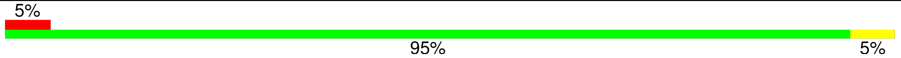
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	5161 (1.70-1.70)
Clashscore	180529	5671 (1.70-1.70)
Ramachandran outliers	177936	5594 (1.70-1.70)
Sidechain outliers	177891	5594 (1.70-1.70)
RSRZ outliers	164620	5159 (1.70-1.70)

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	99	
1	B	99	
1	C	99	
1	D	99	
1	E	99	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	F	99	
1	G	99	
1	H	99	

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 6817 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 Protease.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
1	A	99	Total C N O S 773 501 132 138 2	0	2	0
1	B	99	Total C N O S 756 490 130 134 2	0	0	0
1	C	99	Total C N O S 763 495 131 135 2	0	1	0
1	D	99	Total C N O S 756 490 130 134 2	0	0	0
1	E	99	Total C N O S 756 490 130 134 2	0	0	0
1	F	99	Total C N O S 783 506 137 138 2	0	3	0
1	G	99	Total C N O S 756 490 130 134 2	0	0	0
1	H	99	Total C N O S 783 506 137 138 2	0	3	0

There are 40 discrepancies between the modelled and reference sequences:

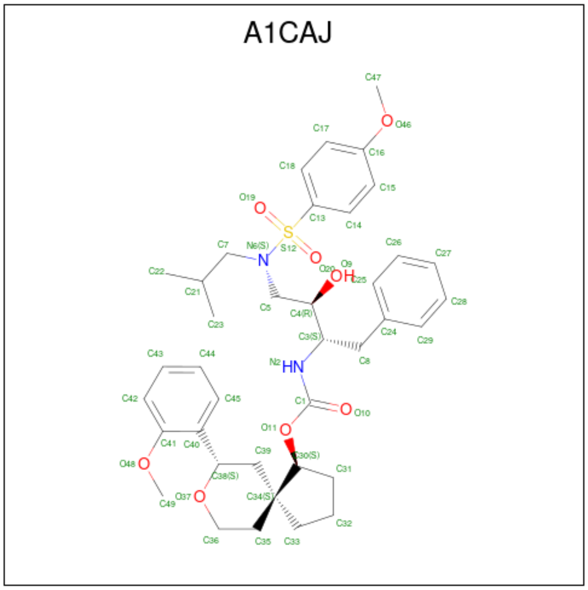
Chain	Residue	Modelled	Actual	Comment	Reference
A	7	LYS	GLN	engineered mutation	UNP Q5RZ08
A	33	ILE	LEU	engineered mutation	UNP Q5RZ08
A	63	ILE	LEU	engineered mutation	UNP Q5RZ08
A	67	ALA	CYS	engineered mutation	UNP Q5RZ08
A	95	ALA	CYS	engineered mutation	UNP Q5RZ08
B	107	LYS	GLN	engineered mutation	UNP Q5RZ08
B	133	ILE	LEU	engineered mutation	UNP Q5RZ08
B	163	ILE	LEU	engineered mutation	UNP Q5RZ08
B	167	ALA	CYS	engineered mutation	UNP Q5RZ08
B	195	ALA	CYS	engineered mutation	UNP Q5RZ08
C	7	LYS	GLN	engineered mutation	UNP Q5RZ08
C	33	ILE	LEU	engineered mutation	UNP Q5RZ08
C	63	ILE	LEU	engineered mutation	UNP Q5RZ08

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
C	67	ALA	CYS	engineered mutation	UNP Q5RZ08
C	95	ALA	CYS	engineered mutation	UNP Q5RZ08
D	107	LYS	GLN	engineered mutation	UNP Q5RZ08
D	133	ILE	LEU	engineered mutation	UNP Q5RZ08
D	163	ILE	LEU	engineered mutation	UNP Q5RZ08
D	167	ALA	CYS	engineered mutation	UNP Q5RZ08
D	195	ALA	CYS	engineered mutation	UNP Q5RZ08
E	7	LYS	GLN	engineered mutation	UNP Q5RZ08
E	33	ILE	LEU	engineered mutation	UNP Q5RZ08
E	63	ILE	LEU	engineered mutation	UNP Q5RZ08
E	67	ALA	CYS	engineered mutation	UNP Q5RZ08
E	95	ALA	CYS	engineered mutation	UNP Q5RZ08
F	107	LYS	GLN	engineered mutation	UNP Q5RZ08
F	133	ILE	LEU	engineered mutation	UNP Q5RZ08
F	163	ILE	LEU	engineered mutation	UNP Q5RZ08
F	167	ALA	CYS	engineered mutation	UNP Q5RZ08
F	195	ALA	CYS	engineered mutation	UNP Q5RZ08
G	7	LYS	GLN	engineered mutation	UNP Q5RZ08
G	33	ILE	LEU	engineered mutation	UNP Q5RZ08
G	63	ILE	LEU	engineered mutation	UNP Q5RZ08
G	67	ALA	CYS	engineered mutation	UNP Q5RZ08
G	95	ALA	CYS	engineered mutation	UNP Q5RZ08
H	107	LYS	GLN	engineered mutation	UNP Q5RZ08
H	133	ILE	LEU	engineered mutation	UNP Q5RZ08
H	163	ILE	LEU	engineered mutation	UNP Q5RZ08
H	167	ALA	CYS	engineered mutation	UNP Q5RZ08
H	195	ALA	CYS	engineered mutation	UNP Q5RZ08

- Molecule 2 is (1S,5S,7S)-7-(2-methoxyphenyl)-8-oxaspiro[4.5]decan-1-yl {(2S,3R)-3-hydroxy -4-[(4-methoxybenzene-1-sulfonyl)(2-methylpropyl)amino]-1-phenylbutan-2-yl}carbamate (CCD ID: A1CAJ) (formula: $C_{38}H_{50}N_2O_8S$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	B	1	Total C N O S 49 38 2 8 1	0	0
2	D	1	Total C N O S 49 38 2 8 1	0	0
2	E	1	Total C N O S 49 38 2 8 1	0	0
2	G	1	Total C N O S 49 38 2 8 1	0	0

- Molecule 3 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	E	1	Total Cl 1 1	0	0
3	G	1	Total Cl 1 1	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	60	Total O 60 60	0	0
4	B	59	Total O 59 59	0	0
4	C	58	Total O 58 58	0	0

Continued on next page...

Continued from previous page...

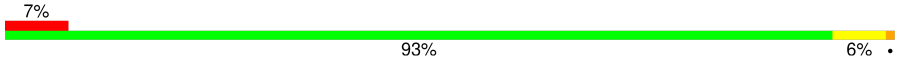
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	D	68	Total O 68 68	0	0
4	E	59	Total O 59 59	0	0
4	F	62	Total O 62 62	0	0
4	G	63	Total O 63 63	0	0
4	H	64	Total O 64 64	0	0

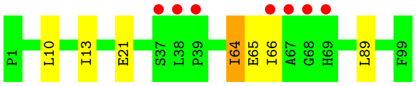
3 Residue-property plots ⓘ

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: Protease

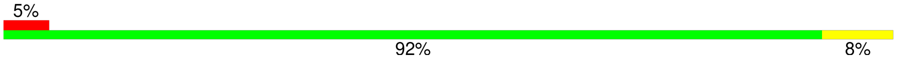
Chain A:

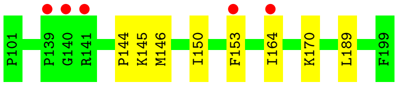




- Molecule 1: Protease

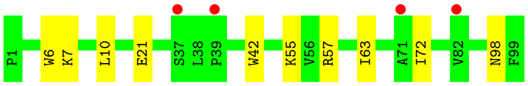
Chain B:





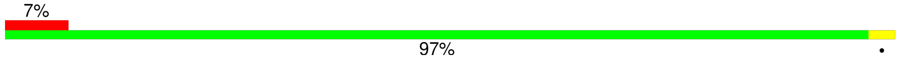
- Molecule 1: Protease

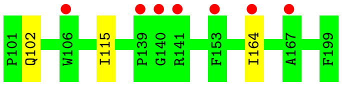
Chain C:



- Molecule 1: Protease

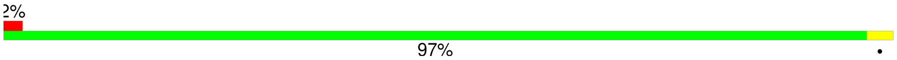
Chain D:

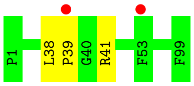




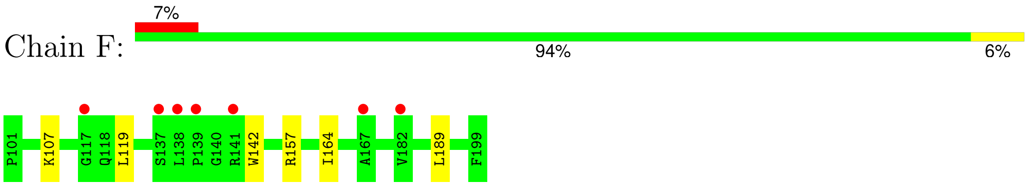
- Molecule 1: Protease

Chain E:

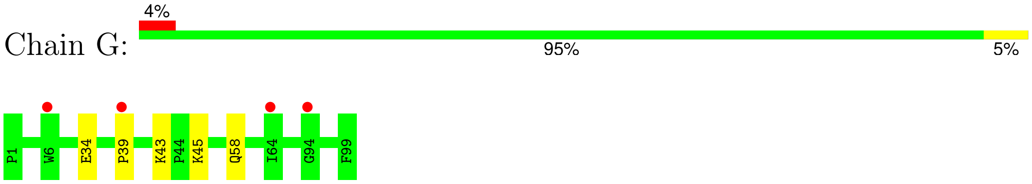




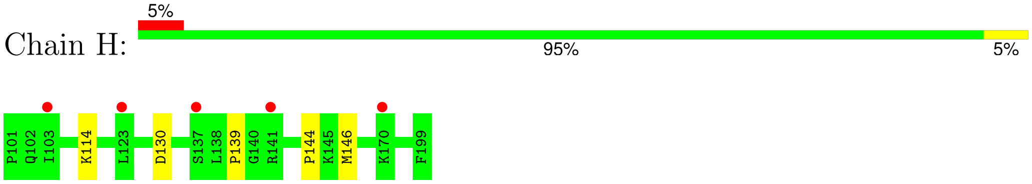
- Molecule 1: Protease



- Molecule 1: Protease



- Molecule 1: Protease



4 Data and refinement statistics ⓘ

Property	**Value**	**Source**
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	68.09Å 69.49Å 89.43Å 90.00° 90.06° 90.00°	Depositor
Resolution (Å)	27.32 – 1.70 27.32 – 1.70	Depositor EDS
% Data completeness (in resolution range)	99.3 (27.32-1.70) 99.5 (27.32-1.70)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.22 (at 1.70Å)	Xtriage
Refinement program	PHENIX (1.19.2_4158: ???)	Depositor
R, R_{free}	0.168 , 0.198 0.171 , 0.196	Depositor DCC
R_{free} test set	4578 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å^2)	15.7	Xtriage
Anisotropy	0.204	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 44.7	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	0.000 for -k,-h,-l 0.000 for k,h,-l 0.126 for h,-k,-l	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	6817	wwPDB-VP
Average B, all atoms (Å^2)	22.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 53.35 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 4.2711e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

---

[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: CL, A1CAJ

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	0.46	0/786	0.67	0/1063
1	B	0.55	3/769 (0.4%)	0.65	0/1040
1	C	0.40	0/776	0.67	0/1050
1	D	0.44	0/769	0.62	0/1040
1	E	0.41	0/769	0.64	0/1040
1	F	0.40	0/796	0.63	0/1075
1	G	0.43	0/769	0.64	0/1040
1	H	0.42	0/796	0.66	0/1075
All	All	0.44	3/6230 (0.0%)	0.65	0/8423

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	146	MET	C-O	-5.66	1.17	1.23
1	B	144	PRO	C-O	-5.22	1.18	1.23
1	B	145	LYS	C-O	-5.10	1.17	1.23

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	773	0	827	6	0
1	B	756	0	809	3	0
1	C	763	0	819	9	0
1	D	756	0	809	2	0
1	E	756	0	811	1	0
1	F	783	0	839	2	0
1	G	756	0	811	3	0
1	H	783	0	839	5	0
2	B	49	0	0	0	0
2	D	49	0	0	0	0
2	E	49	0	0	0	0
2	G	49	0	0	0	0
3	E	1	0	0	0	0
3	G	1	0	0	0	0
4	A	60	0	0	0	0
4	B	59	0	0	0	0
4	C	58	0	0	0	0
4	D	68	0	0	0	0
4	E	59	0	0	0	0
4	F	62	0	0	0	0
4	G	63	0	0	1	0
4	H	64	0	0	2	0
All	All	6817	0	6564	29	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 2.

All (29) 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:13:ILE:HB	1:A:64[A]:ILE:HD11	1.73	0.70
1:A:64[A]:ILE:HG21	1:A:89:LEU:HD13	1.82	0.60
1:G:45:LYS:HD3	1:G:58:GLN:OE1	2.04	0.57
1:A:64[A]:ILE:HD13	1:A:65[A]:GLU:N	2.20	0.56
1:A:64[A]:ILE:HD12	1:A:66:ILE:CG1	2.35	0.55
1:F:164:ILE:HG21	1:F:189:LEU:HD13	1.91	0.52
1:C:98:ASN:OD1	1:D:102:GLN:HG3	2.10	0.51
1:B:164:ILE:HG21	1:B:189:LEU:HD13	1.91	0.51
1:H:130:ASP:HB3	4:H:224:HOH:O	2.11	0.50
1:A:10:LEU:HD22	1:A:21:GLU:HG2	1.92	0.50
1:A:64[A]:ILE:HD13	1:A:64[A]:ILE:C	2.37	0.50
1:C:7:LYS:HE3	1:C:7:LYS:HB2	1.37	0.47

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:63:ILE:HD13	1:C:72:ILE:HB	1.97	0.47
1:D:115:ILE:HD12	1:D:164:ILE:HD11	1.97	0.47
1:G:43:LYS:HE2	1:G:43:LYS:HB3	1.62	0.45
1:C:42:TRP:CE2	1:C:57:ARG:HD2	2.53	0.44
1:E:38:LEU:HD22	1:E:39:PRO:HD2	2.00	0.44
1:C:10:LEU:HD22	1:C:21:GLU:HG2	1.99	0.43
1:G:34:GLU:HB3	4:G:230:HOH:O	2.18	0.43
1:H:146:MET:HE3	1:H:146:MET:HB3	1.77	0.43
1:C:42:TRP:CD2	1:C:57:ARG:HD2	2.54	0.43
1:H:114:LYS:HE2	1:H:114:LYS:HB2	1.67	0.42
1:B:170:LYS:HB2	1:B:170:LYS:HE2	1.81	0.42
1:F:142:TRP:CE2	1:F:157[B]:ARG:HD2	2.55	0.42
1:C:63:ILE:CD1	1:C:72:ILE:HB	2.50	0.41
1:C:6:TRP:CZ2	1:H:144:PRO:HD3	2.56	0.41
1:C:55:LYS:HE3	1:C:55:LYS:HB3	1.84	0.41
1:H:139:PRO:HG3	4:H:259:HOH:O	2.21	0.40
1:B:153:PHE:CD1	1:B:153:PHE:C	3.00	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	A	99/99 (100%)	98 (99%)	1 (1%)	0	100	100
1	B	97/99 (98%)	97 (100%)	0	0	100	100
1	C	98/99 (99%)	98 (100%)	0	0	100	100
1	D	97/99 (98%)	97 (100%)	0	0	100	100
1	E	97/99 (98%)	97 (100%)	0	0	100	100
1	F	100/99 (101%)	99 (99%)	1 (1%)	0	100	100
1	G	97/99 (98%)	97 (100%)	0	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	H	100/99 (101%)	100 (100%)	0	0	100	100
All	All	785/792 (99%)	783 (100%)	2 (0%)	0	100	100

There are no Ramachandran outliers to report.

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	83/81 (102%)	81 (98%)	2 (2%)	44	27
1	B	81/81 (100%)	80 (99%)	1 (1%)	67	56
1	C	82/81 (101%)	82 (100%)	0	100	100
1	D	81/81 (100%)	81 (100%)	0	100	100
1	E	81/81 (100%)	80 (99%)	1 (1%)	67	56
1	F	84/81 (104%)	81 (96%)	3 (4%)	30	14
1	G	81/81 (100%)	80 (99%)	1 (1%)	67	56
1	H	84/81 (104%)	84 (100%)	0	100	100
All	All	657/648 (101%)	649 (99%)	8 (1%)	75	56

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	64[A]	ILE
1	A	64[B]	ILE
1	B	150	ILE
1	E	41	ARG
1	F	107[A]	LYS
1	F	107[B]	LYS
1	F	119	LEU
1	G	39	PRO

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	161	GLN
1	C	2	GLN
1	C	98	ASN
1	D	169	HIS
1	D	198	ASN
1	E	61	GLN
1	E	92	GLN
1	F	161	GLN
1	H	188	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 6 ligands modelled in this entry, 2 are monoatomic - leaving 4 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	$\#\|Z\| > 2$
2	A1CAJ	E	101	-	52,53,53	1.20	3 (5%)	69,75,75	0.71	1 (1%)
2	A1CAJ	D	201	-	52,53,53	1.14	3 (5%)	69,75,75	0.67	0
2	A1CAJ	G	101	-	52,53,53	1.18	3 (5%)	69,75,75	0.74	2 (2%)
2	A1CAJ	B	401	-	52,53,53	1.20	3 (5%)	69,75,75	0.70	1 (1%)

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	A1CAJ	E	101	-	-	4/44/69/69	0/5/5/5
2	A1CAJ	D	201	-	-	4/44/69/69	0/5/5/5
2	A1CAJ	G	101	-	-	5/44/69/69	0/5/5/5
2	A1CAJ	B	401	-	-	4/44/69/69	0/5/5/5

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	401	A1CAJ	O19-S12	4.49	1.48	1.43
2	E	101	A1CAJ	O19-S12	4.46	1.48	1.43
2	G	101	A1CAJ	S12-N6	4.12	1.69	1.63
2	G	101	A1CAJ	O19-S12	3.92	1.47	1.43
2	D	201	A1CAJ	S12-N6	3.90	1.68	1.63
2	D	201	A1CAJ	O19-S12	3.90	1.47	1.43
2	B	401	A1CAJ	S12-N6	3.74	1.68	1.63
2	E	101	A1CAJ	S12-N6	3.50	1.68	1.63
2	E	101	A1CAJ	O20-S12	3.46	1.47	1.43
2	G	101	A1CAJ	O20-S12	3.26	1.47	1.43
2	B	401	A1CAJ	O20-S12	3.14	1.46	1.43
2	D	201	A1CAJ	O20-S12	3.03	1.46	1.43

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	G	101	A1CAJ	C21-C7-N6	2.59	115.41	112.41
2	E	101	A1CAJ	C21-C7-N6	2.32	115.10	112.41
2	B	401	A1CAJ	C21-C7-N6	2.26	115.03	112.41
2	G	101	A1CAJ	O9-C4-C3	-2.15	105.64	109.88

There are no chirality outliers.

All (17) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	E	101	A1CAJ	O37-C38-C40-C41
2	E	101	A1CAJ	O37-C38-C40-C45
2	G	101	A1CAJ	C39-C38-C40-C41
2	B	401	A1CAJ	C39-C38-C40-C45

Continued on next page...

Continued from previous page...

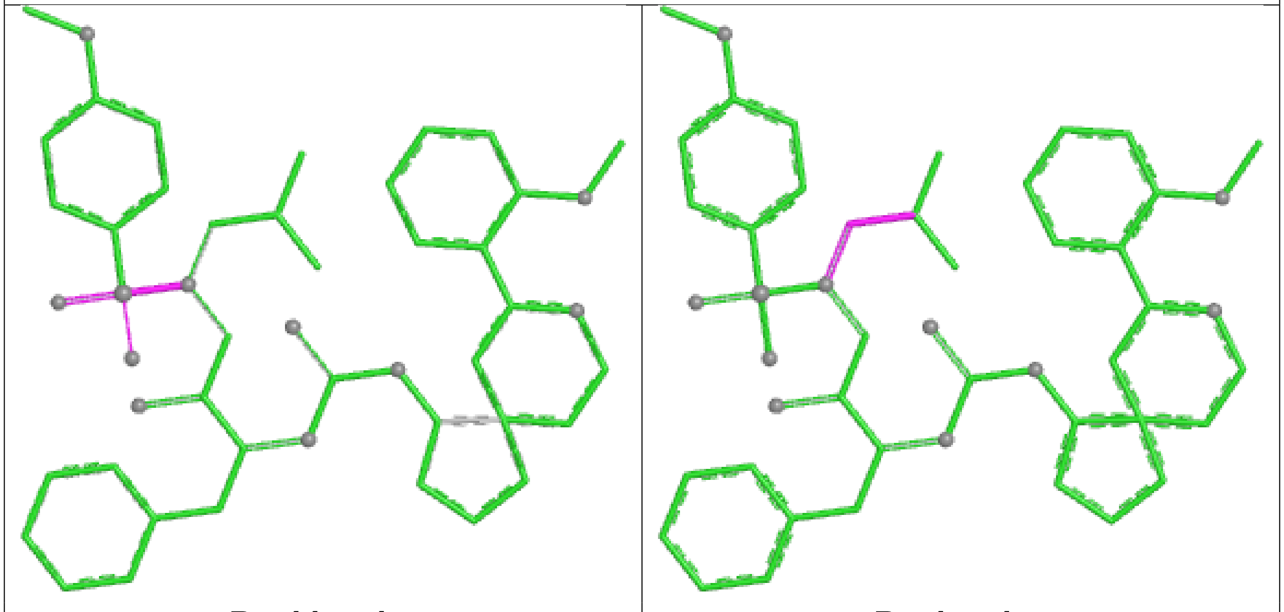
Mol	Chain	Res	Type	Atoms
2	B	401	A1CAJ	O37-C38-C40-C45
2	D	201	A1CAJ	C39-C38-C40-C45
2	D	201	A1CAJ	O37-C38-C40-C45
2	G	101	A1CAJ	C39-C38-C40-C45
2	G	101	A1CAJ	O37-C38-C40-C45
2	B	401	A1CAJ	C39-C38-C40-C41
2	B	401	A1CAJ	O37-C38-C40-C41
2	D	201	A1CAJ	C39-C38-C40-C41
2	D	201	A1CAJ	O37-C38-C40-C41
2	G	101	A1CAJ	O37-C38-C40-C41
2	G	101	A1CAJ	C7-N6-S12-O19
2	E	101	A1CAJ	C39-C38-C40-C45
2	E	101	A1CAJ	C7-N6-S12-O19

There are no ring outliers.

No monomer is involved in short contacts.

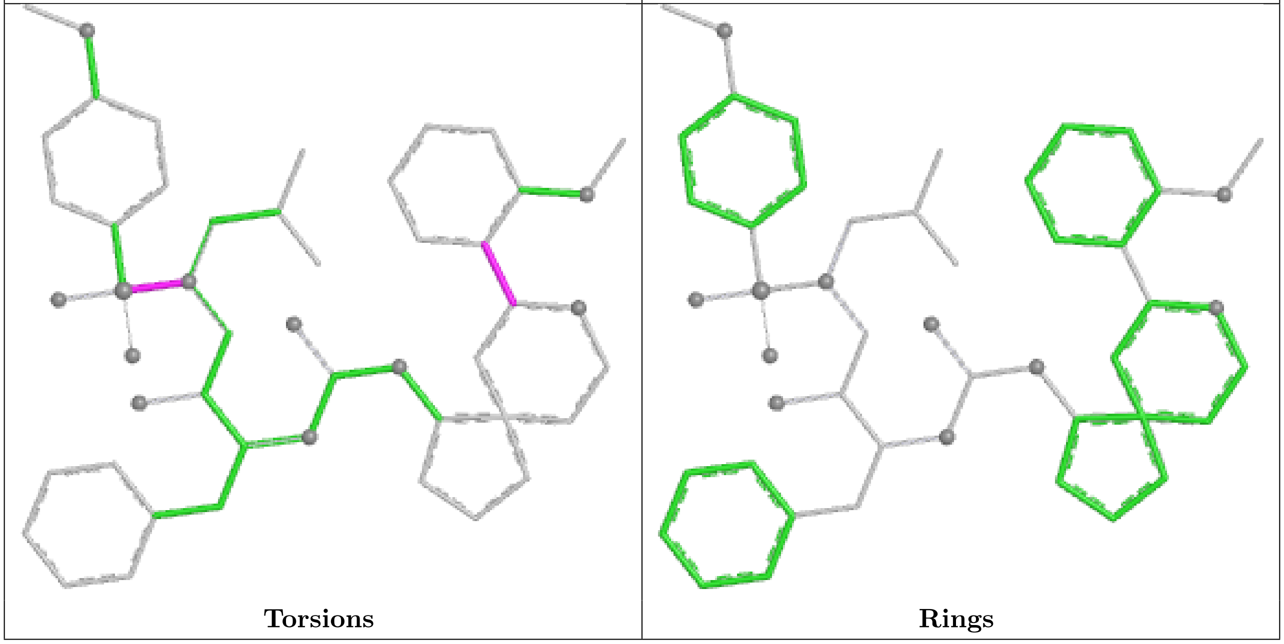
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less 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 A1CAJ E 101



Bond lengths

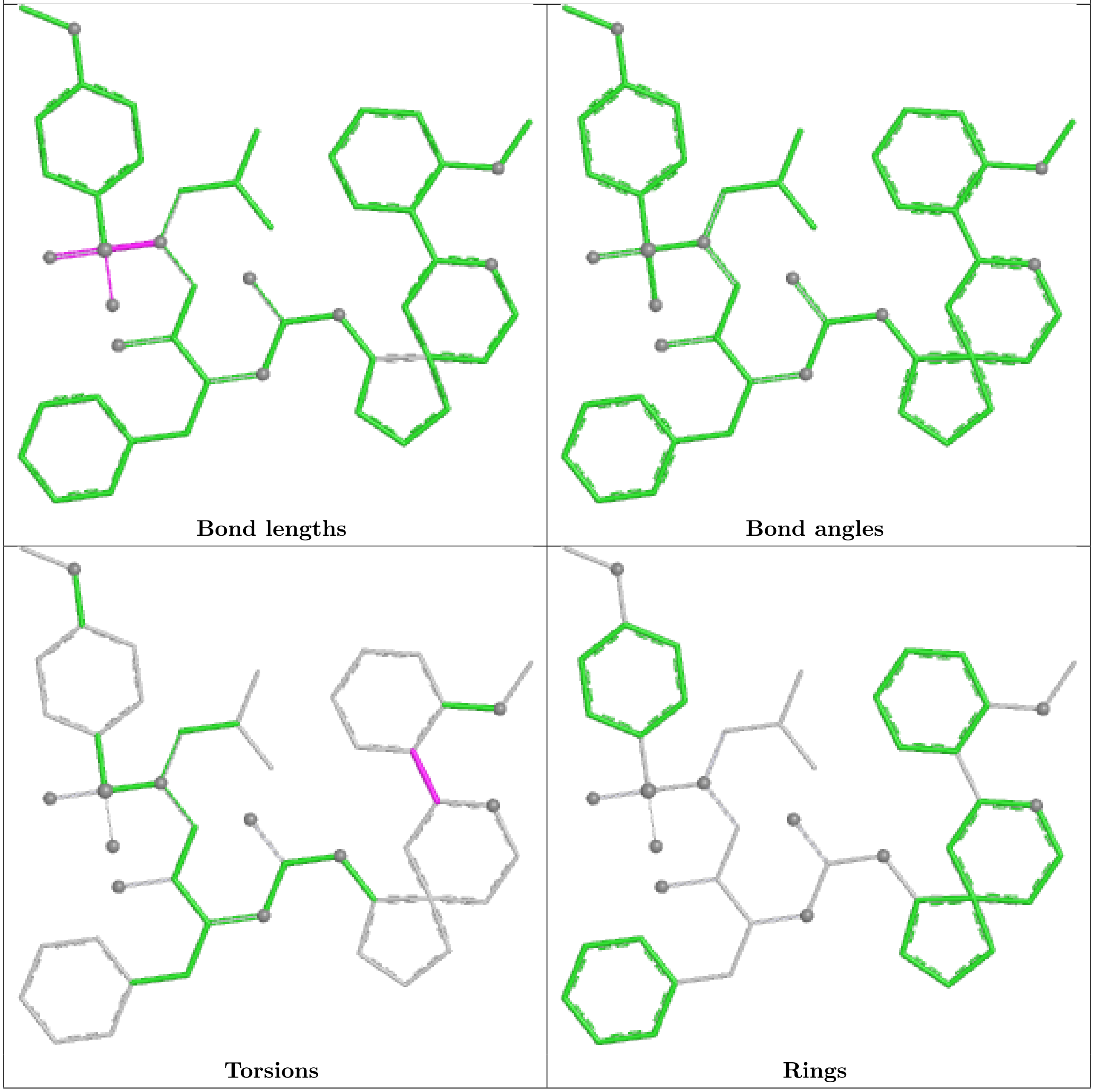
Bond angles



Torsions

Rings

Ligand A1CAJ D 201



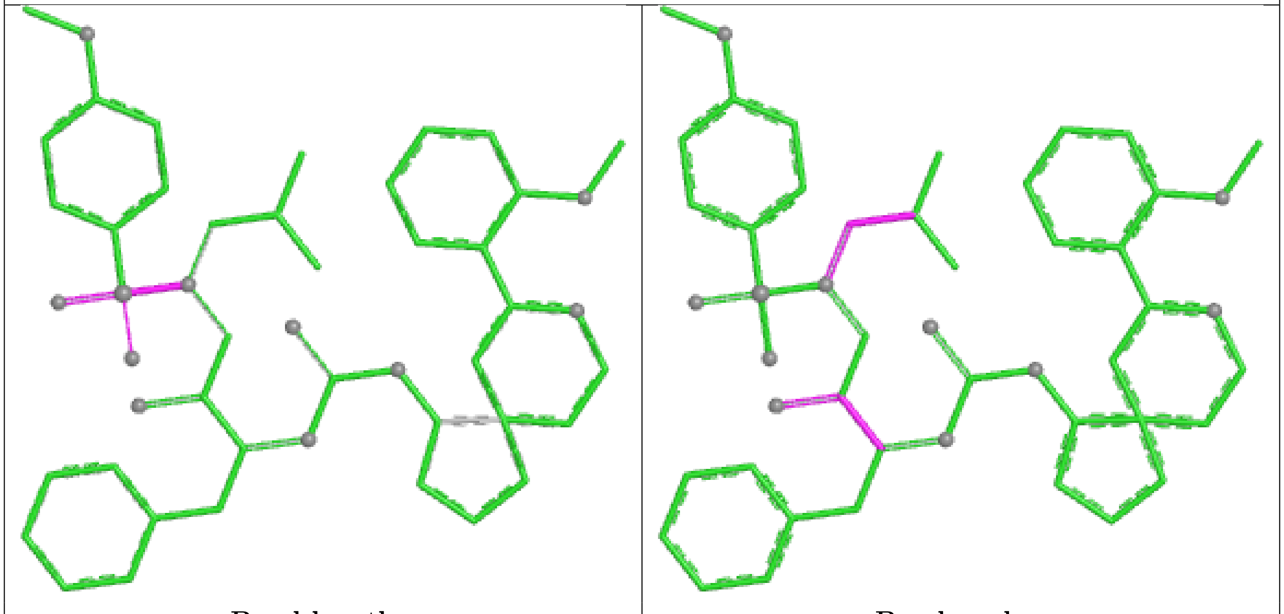
Bond lengths

Bond angles

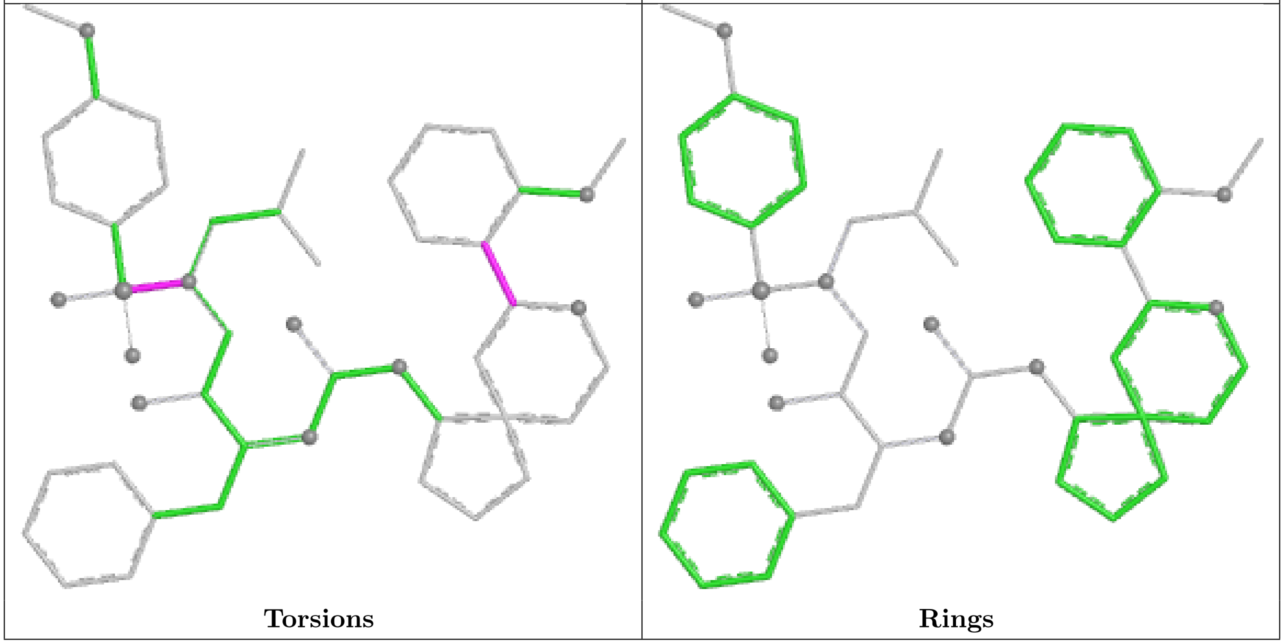
Torsions

Rings

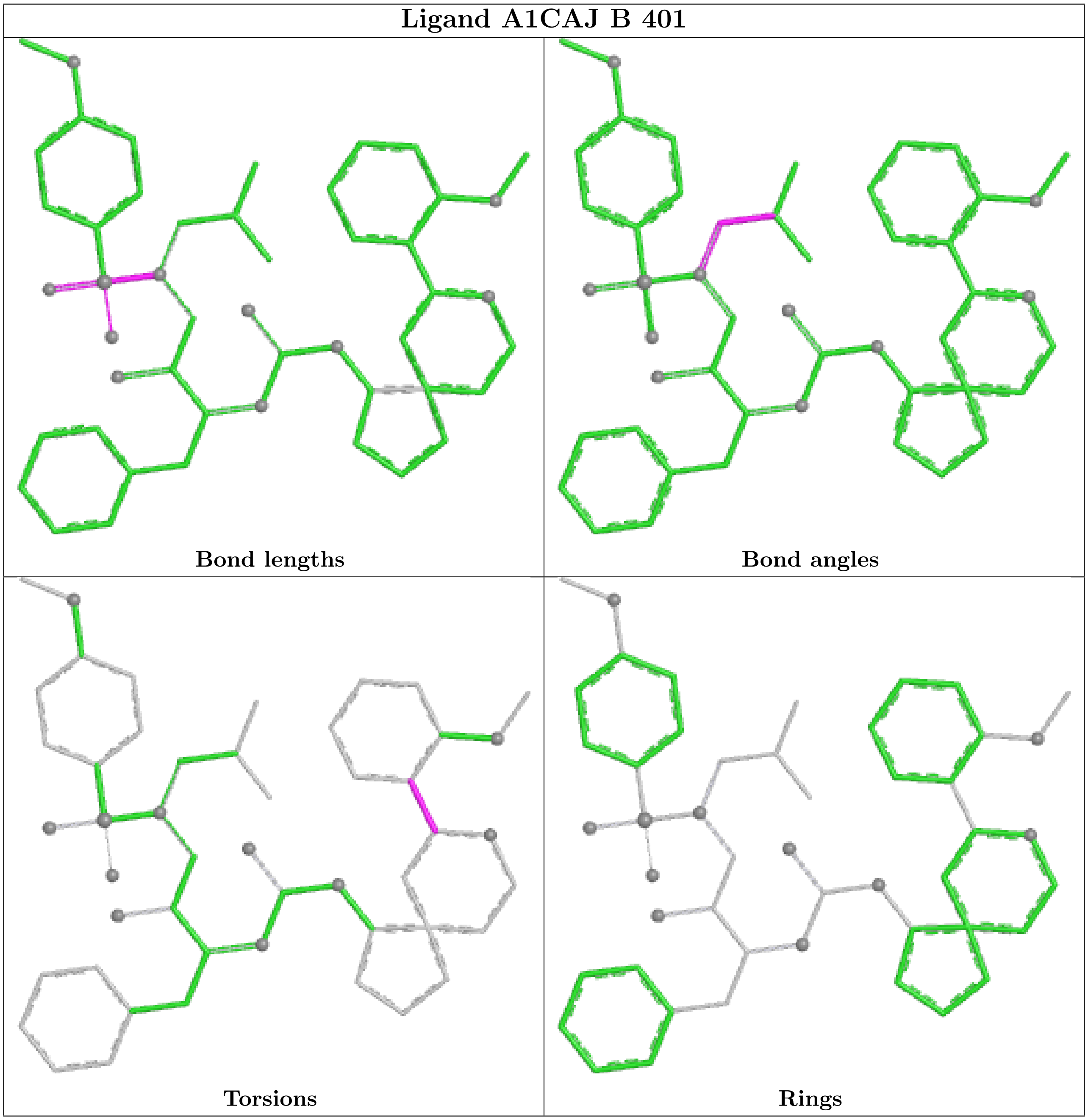
Ligand A1CAJ G 101



Bond lengths **Bond angles**



Torsions **Rings**


Ligand A1CAJ B 401

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 ⓘ

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	99/99 (100%)	0.31	7 (7%)	23	24	9, 18, 35, 43	2 (2%)
1	B	99/99 (100%)	0.33	5 (5%)	34	37	10, 21, 40, 71	0
1	C	99/99 (100%)	0.27	4 (4%)	43	46	8, 18, 36, 39	1 (1%)
1	D	99/99 (100%)	0.42	7 (7%)	23	24	10, 21, 39, 74	0
1	E	99/99 (100%)	0.36	2 (2%)	64	68	10, 21, 39, 49	0
1	F	99/99 (100%)	0.38	7 (7%)	23	24	9, 18, 35, 43	3 (3%)
1	G	99/99 (100%)	0.24	4 (4%)	43	46	10, 20, 36, 52	0
1	H	99/99 (100%)	0.29	5 (5%)	34	37	8, 18, 34, 45	3 (3%)
All	All	792/792 (100%)	0.32	41 (5%)	34	36	8, 19, 37, 74	9 (1%)

All (41) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	39	PRO	8.3
1	A	37	SER	6.4
1	F	137	SER	4.6
1	H	141	ARG	4.3
1	C	39	PRO	4.2
1	A	67	ALA	4.2
1	H	103	ILE	4.1
1	D	106	TRP	4.1
1	G	6	TRP	4.1
1	F	139	PRO	4.1
1	E	39	PRO	3.7
1	C	82[A]	VAL	3.3
1	F	141	ARG	3.2
1	C	37	SER	3.0
1	G	39	PRO	2.9
1	D	164	ILE	2.8

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	D	153	PHE	2.8
1	A	68	GLY	2.7
1	E	53	PHE	2.7
1	B	141	ARG	2.7
1	G	94	GLY	2.7
1	F	182	VAL	2.6
1	H	170	LYS	2.5
1	D	139	PRO	2.5
1	B	153	PHE	2.5
1	F	138	LEU	2.5
1	H	137	SER	2.4
1	D	167	ALA	2.3
1	G	64	ILE	2.3
1	A	66	ILE	2.2
1	D	141	ARG	2.2
1	F	117	GLY	2.2
1	A	69	HIS	2.2
1	B	164	ILE	2.2
1	B	140	GLY	2.2
1	A	38	LEU	2.2
1	H	123	LEU	2.2
1	B	139	PRO	2.1
1	C	71	ALA	2.0
1	F	167	ALA	2.0
1	D	140	GLY	2.0

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

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

6.3 Carbohydrates (i)

There are no oligosaccharides in this entry.

6.4 Ligands (i)

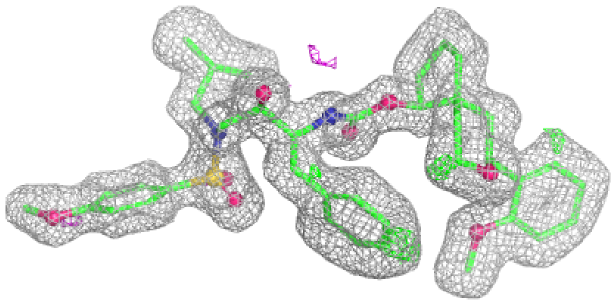
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

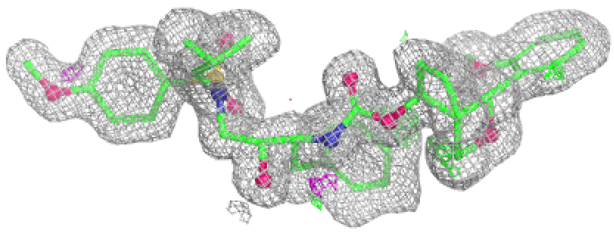
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\mathring{A}^2$)	Q<0.9
2	A1CAJ	B	401	49/49	0.95	0.08	10,13,17,21	0
2	A1CAJ	E	101	49/49	0.96	0.07	9,13,18,19	0
2	A1CAJ	G	101	49/49	0.96	0.07	8,12,17,21	0
2	A1CAJ	D	201	49/49	0.97	0.06	8,12,17,19	0
3	CL	E	102	1/1	0.99	0.18	25,25,25,25	0
3	CL	G	102	1/1	0.99	0.17	25,25,25,25	0

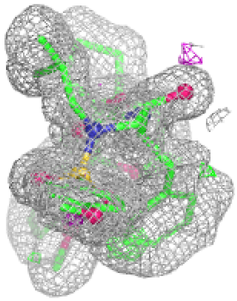
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around A1CAJ B 401:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)

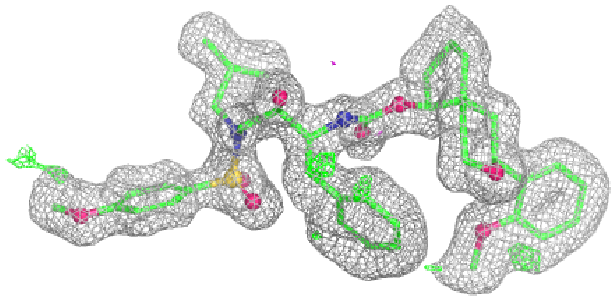


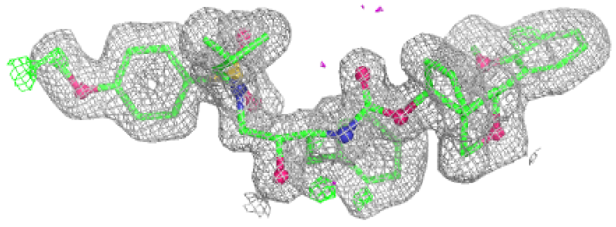


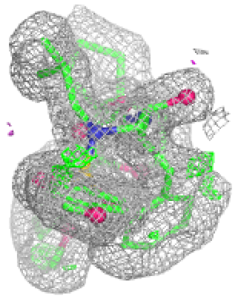


Electron density around A1CAJ E 101:

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

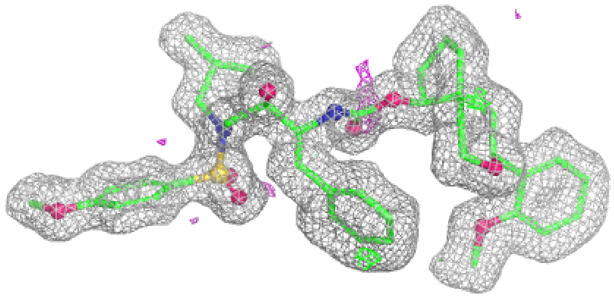


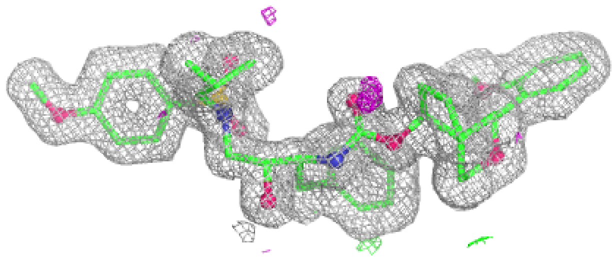


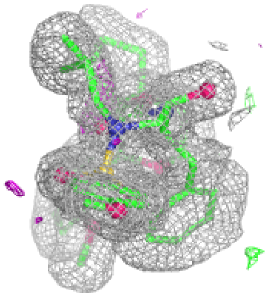


Electron density around A1CAJ G 101:

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

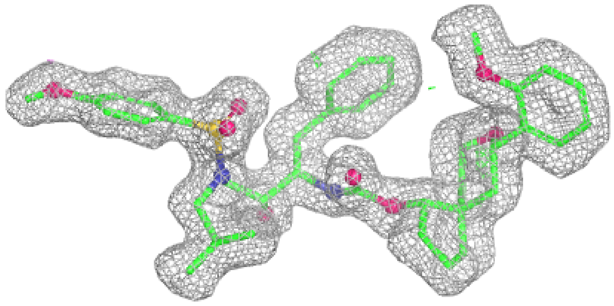


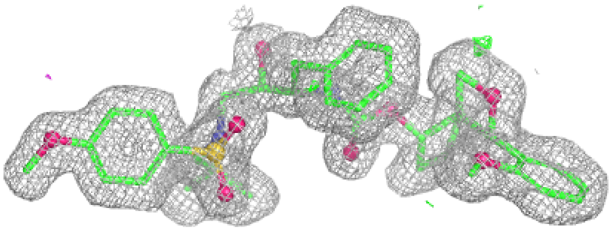


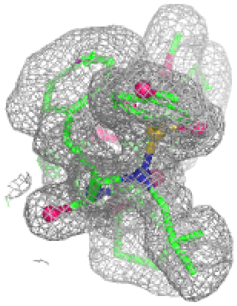


Electron density around A1CAJ D 201:

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 ⓘ

There are no such residues in this entry.