Full wwPDB X-ray Structure Validation Report ⓘ

Apr 29, 2025 – 07:22 AM EDT

PDB ID	:	2ALV / pdb_00002alv
Title	:	X-ray structural analysis of SARS coronavirus 3CL proteinase in complex with designed anti-viral inhibitors
Authors	:	Ghosh, A.K.; Xi, K.; Ratia, K.; Santarsiero, B.D.; Fu, W.; Harcourt, B.H.; Rota, P.A.; Baker, S.C.; Johnson, M.E.; Mesecar, A.D.
Deposited on	:	2005-08-08
Resolution	:	1.90 Å(reported)

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

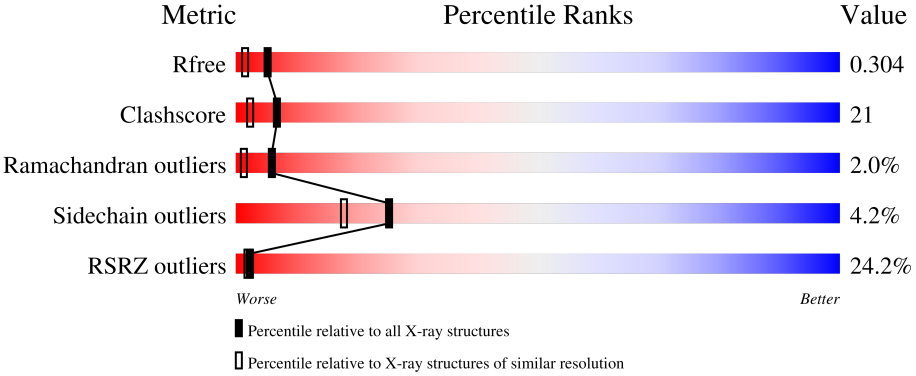
MolProbity	:	4-5-2 with Phenix2.0rc1
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.006 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.43.1

1 Overall quality at a glance

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

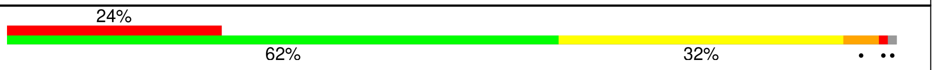
The reported resolution of this entry is 1.90 Å.

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	7293 (1.90-1.90)
Clashscore	180529	8090 (1.90-1.90)
Ramachandran outliers	177936	8022 (1.90-1.90)
Sidechain outliers	177891	8022 (1.90-1.90)
RSRZ outliers	164620	7292 (1.90-1.90)

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	306	

2 Entry composition

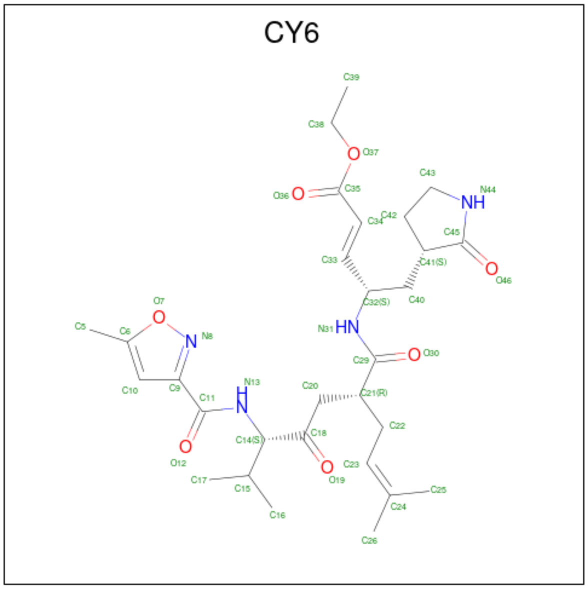
There are 3 unique types of molecules in this entry. The entry contains 2576 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Replicase polyprotein 1ab.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	302	2386	1507	408	444	27	1	7	0

- Molecule 2 is N-((3S,6R)-6-((S,E)-4-ETHOXYCARBONYL-1-((S)-2-OXOPYRROLIDIN-3-YL)BUT-3-EN-2-YLCARBAMOYL)-2,9-DIMETHYL-4-OXODEC-8-EN-3-YL)-5-METHYLISOXAZOLE-3-CARBOXAMIDE (CCD ID: CY6) (formula: $C_{29}H_{42}N_4O_7$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
2	A	1	40	29	4	7	0	0

- Molecule 3 is water.

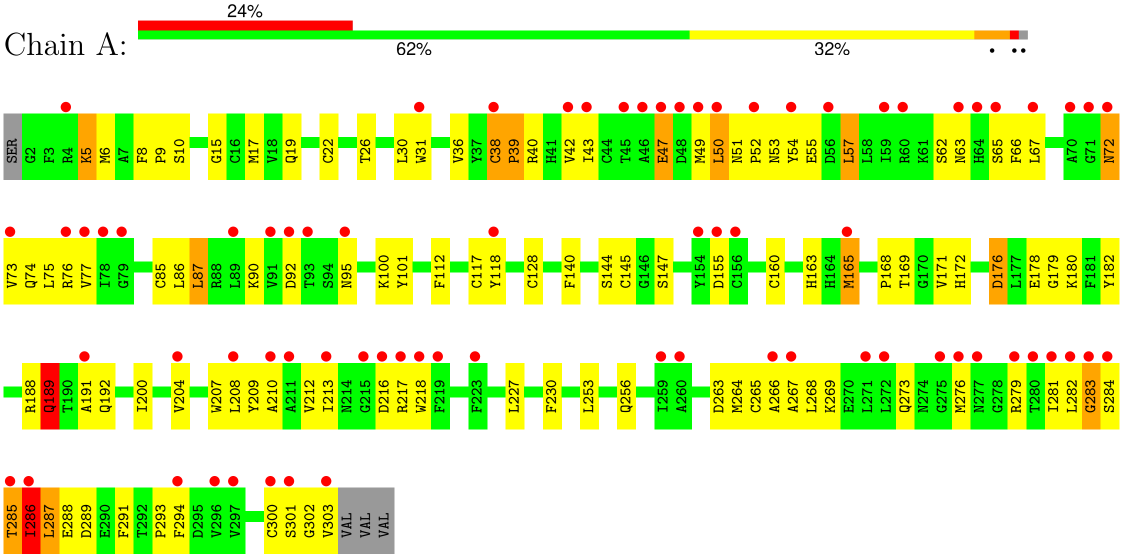
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
3	A	150	150	150	0	0

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: Replicase polyprotein 1ab

Chain A:



4 Data and refinement statistics ⓘ

Property	**Value**	**Source**
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	107.10Å 83.24Å 53.70Å 90.00° 104.41° 90.00°	Depositor
Resolution (Å)	20.00 – 1.90 20.00 – 1.90	Depositor EDS
% Data completeness (in resolution range)	98.7 (20.00-1.90) 98.6 (20.00-1.90)	Depositor EDS
R_{merge}	0.04	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.18 (at 1.88Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.255 , 0.315 0.250 , 0.304	Depositor DCC
R_{free} test set	1759 reflections (4.95%)	wwPDB-VP
Wilson B-factor (Å^2)	36.3	Xtriage
Anisotropy	0.346	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 45.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	2576	wwPDB-VP
Average B, all atoms (Å^2)	50.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.82% 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: CY6

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	0.96	7/2438 (0.3%)	1.21	17/3311 (0.5%)

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	1

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	160	CYS	CB-SG	-9.17	1.51	1.81
1	A	200	ILE	CA-C	6.54	1.58	1.53
1	A	286[A]	ILE	N-CA	-5.45	1.40	1.46
1	A	286[B]	ILE	N-CA	-5.45	1.40	1.46
1	A	147	SER	N-CA	5.24	1.52	1.46
1	A	160	CYS	CA-C	-5.11	1.46	1.52
1	A	145	CYS	N-CA	5.07	1.52	1.46

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	160	CYS	CB-CA-C	-14.87	84.68	109.65
1	A	39	PRO	N-CA-C	-9.50	94.98	111.23
1	A	100	LYS	N-CA-C	-8.28	98.03	110.28
1	A	182	TYR	N-CA-C	-7.27	97.40	109.46
1	A	178	GLU	N-CA-C	-6.79	104.61	113.17
1	A	8	PHE	CA-C-N	6.61	126.96	119.83

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	8	PHE	C-N-CA	6.61	126.96	119.83
1	A	5[A]	LYS	N-CA-C	-6.49	100.04	109.59
1	A	5[B]	LYS	N-CA-C	-6.49	100.04	109.59
1	A	165	MET	N-CA-C	6.46	118.67	108.79
1	A	9	PRO	N-CA-C	-5.96	101.84	111.03
1	A	10	SER	N-CA-C	5.93	120.52	113.16
1	A	176	ASP	N-CA-C	-5.93	102.17	110.35
1	A	155	ASP	N-CA-C	5.63	120.43	113.50
1	A	200	ILE	CB-CA-C	-5.60	106.30	112.68
1	A	263	ASP	N-CA-C	-5.44	105.33	111.25
1	A	87	LEU	N-CA-C	-5.12	101.34	109.59

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	286[B]	ILE	Mainchain

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	2386	0	2337	101	0
2	A	40	0	41	6	0
3	A	150	0	0	6	0
All	All	2576	0	2378	101	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 21.

All (101) 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:303:VAL:O	1:A:303:VAL:HG13	1.60	0.99
1:A:264[A]:MET:HE3	1:A:267:ALA:HB3	1.50	0.92

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:76:ARG:HB3	1:A:92:ASP:OD2	1.73	0.88
1:A:264[A]:MET:HE3	1:A:264[A]:MET:O	1.73	0.88
1:A:38[A]:CYS:SG	1:A:39:PRO:O	2.32	0.87
1:A:264[A]:MET:CE	1:A:267:ALA:HB3	2.06	0.86
1:A:276:MET:CE	1:A:281:ILE:HG13	2.11	0.80
1:A:208:LEU:HD13	1:A:264[A]:MET:HE2	1.62	0.80
1:A:269:LYS:O	1:A:273:GLN:HG3	1.84	0.77
1:A:112:PHE:CZ	1:A:128[B]:CYS:SG	2.78	0.76
1:A:303:VAL:O	1:A:303:VAL:CG1	2.33	0.76
1:A:49:MET:HB3	1:A:189:GLN:HG3	1.67	0.75
1:A:19:GLN:HE21	1:A:26:THR:HG21	1.53	0.73
1:A:72:ASN:HD22	1:A:73:VAL:H	1.35	0.73
1:A:50:LEU:HD13	1:A:50:LEU:N	2.04	0.72
1:A:276:MET:HE1	1:A:281:ILE:HG13	1.69	0.72
1:A:72:ASN:HD22	1:A:72:ASN:N	1.87	0.70
1:A:72:ASN:ND2	1:A:73:VAL:H	1.89	0.70
1:A:112:PHE:CE1	1:A:128[B]:CYS:SG	2.86	0.69
1:A:65:SER:HB3	3:A:1276:HOH:O	1.93	0.68
1:A:213:ILE:HG21	1:A:300:CYS:HB3	1.78	0.66
1:A:40:ARG:HG3	1:A:54:TYR:CE2	2.31	0.65
1:A:168:PRO:CG	2:A:1145:CY6:H52	2.28	0.63
1:A:276:MET:HE3	1:A:281:ILE:HG13	1.79	0.63
1:A:53:ASN:OD1	1:A:55:GLU:HB2	2.00	0.62
1:A:168:PRO:HG3	2:A:1145:CY6:H52	1.83	0.60
1:A:212:VAL:HA	1:A:216:ASP:O	2.04	0.58
1:A:73:VAL:HG12	1:A:74:GLN:N	2.18	0.57
1:A:63:ASN:HB3	1:A:77:VAL:O	2.05	0.57
1:A:66:PHE:HB2	1:A:77:VAL:HG21	1.85	0.56
1:A:207:TRP:CZ3	1:A:287:LEU:HA	2.40	0.56
1:A:265[A]:CYS:O	1:A:268:LEU:N	2.39	0.56
1:A:72:ASN:ND2	1:A:73:VAL:N	2.54	0.56
1:A:40:ARG:HA	1:A:87:LEU:HG	1.89	0.55
1:A:72:ASN:HD22	1:A:73:VAL:N	2.04	0.55
1:A:281:ILE:C	1:A:283:GLY:H	2.15	0.55
1:A:209:TYR:HB2	1:A:253:LEU:HD13	1.89	0.55
1:A:208:LEU:CD1	1:A:264[A]:MET:HE2	2.33	0.54
1:A:213:ILE:HG12	1:A:256:GLN:NE2	2.22	0.54
1:A:43:ILE:HD12	1:A:57:LEU:HB3	1.89	0.54
1:A:72:ASN:N	1:A:72:ASN:ND2	2.51	0.53
1:A:209:TYR:CE2	1:A:264[B]:MET:HE2	2.43	0.53
1:A:51:ASN:N	1:A:52:PRO:CD	2.71	0.52

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Atom-1	**Atom-2**	**Interatomic distance (Å)**	**Clash overlap (Å)**
1:A:76:ARG:HH11	1:A:76:ARG:HG3	1.74	0.52
1:A:31:TRP:CZ2	1:A:75:LEU:HD21	2.45	0.52
1:A:191:ALA:HA	2:A:1145:CY6:C5	2.40	0.51
1:A:26:THR:O	2:A:1145:CY6:H392	2.11	0.51
1:A:38[A]:CYS:SG	1:A:42:VAL:HG11	2.51	0.51
1:A:209:TYR:CB	1:A:253:LEU:HD13	2.41	0.51
1:A:22:CYS:SG	1:A:66:PHE:CD1	3.05	0.50
1:A:288:GLU:HG2	1:A:291:PHE:CD2	2.46	0.50
1:A:208:LEU:HD13	1:A:264[A]:MET:CE	2.37	0.49
1:A:188:ARG:NH2	3:A:1225:HOH:O	2.46	0.49
1:A:264[A]:MET:HE1	1:A:267:ALA:HB3	1.90	0.49
1:A:118:TYR:CE1	1:A:144:SER:HB3	2.47	0.49
1:A:207:TRP:CE2	1:A:288:GLU:HB3	2.48	0.49
1:A:218:TRP:CB	1:A:279:ARG:HH21	2.26	0.48
1:A:207:TRP:HZ3	1:A:287:LEU:HA	1.77	0.48
1:A:17:MET:HG3	1:A:117:CYS:SG	2.54	0.48
1:A:40:ARG:HG3	1:A:54:TYR:CD2	2.48	0.48
1:A:15:GLY:HA3	3:A:1274:HOH:O	2.14	0.47
1:A:40:ARG:HD3	1:A:85:CYS:HA	1.95	0.47
1:A:180:LYS:NZ	1:A:180:LYS:HB3	2.28	0.47
1:A:73:VAL:CG1	1:A:74:GLN:N	2.77	0.47
1:A:300:CYS:C	1:A:302:GLY:H	2.23	0.47
1:A:72:ASN:ND2	1:A:72:ASN:H	2.13	0.47
1:A:6:MET:HE3	1:A:6:MET:HB2	1.75	0.46
1:A:86:LEU:HG	1:A:179:GLY:HA2	1.97	0.46
1:A:31:TRP:CE2	1:A:75:LEU:HD21	2.51	0.46
1:A:264[A]:MET:O	1:A:264[A]:MET:CE	2.56	0.46
1:A:50:LEU:N	1:A:50:LEU:CD1	2.77	0.45
1:A:40:ARG:O	1:A:43:ILE:HG12	2.15	0.45
1:A:165:MET:HE1	1:A:192:GLN:NE2	2.32	0.45
1:A:230:PHE:CD1	1:A:265[B]:CYS:HB3	2.51	0.45
1:A:17:MET:HE2	3:A:1188:HOH:O	2.17	0.45
1:A:168:PRO:HG2	2:A:1145:CY6:H52	1.98	0.45
1:A:204:VAL:O	1:A:207:TRP:HB3	2.18	0.44
1:A:140:PHE:HB3	1:A:144:SER:OG	2.17	0.44
1:A:294:PHE:CD2	1:A:294:PHE:C	2.94	0.44
1:A:265[A]:CYS:O	1:A:266:ALA:C	2.60	0.44
1:A:163:HIS:CE1	1:A:172:HIS:HB3	2.53	0.44
1:A:288:GLU:HG2	1:A:291:PHE:CE2	2.52	0.44
1:A:38[A]:CYS:SG	1:A:42:VAL:CG1	3.06	0.44
1:A:72:ASN:ND2	1:A:73:VAL:HG23	2.33	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:192:GLN:N	2:A:1145:CY6:H53	2.33	0.44
1:A:62:SER:HA	3:A:1290:HOH:O	2.18	0.43
1:A:22:CYS:SG	1:A:66:PHE:CE1	3.12	0.43
1:A:169:THR:OG1	1:A:171:VAL:HG22	2.19	0.43
1:A:31:TRP:CD2	1:A:95:ASN:HB2	2.54	0.43
1:A:90:LYS:N	1:A:90:LYS:HD2	2.34	0.42
1:A:207:TRP:O	1:A:210:ALA:HB3	2.20	0.42
1:A:300:CYS:O	1:A:302:GLY:N	2.53	0.42
1:A:289:ASP:OD1	1:A:289:ASP:C	2.62	0.41
1:A:176:ASP:HB2	3:A:1154:HOH:O	2.20	0.41
1:A:227:LEU:HD12	1:A:227:LEU:HA	1.79	0.41
1:A:30:LEU:O	1:A:36:VAL:HA	2.19	0.41
1:A:50:LEU:HD13	1:A:50:LEU:H	1.84	0.41
1:A:281:ILE:O	1:A:282:LEU:HB2	2.19	0.41
1:A:101:TYR:CD1	1:A:101:TYR:C	2.98	0.40
1:A:285:THR:O	1:A:285:THR:OG1	2.39	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	307/306 (100%)	289 (94%)	12 (4%)	6 (2%)	6 1

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	287	LEU
1	A	47	GLU
1	A	189	GLN
1	A	301	SER
1	A	217	ARG

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Mol	Chain	Res	Type
1	A	283	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	A	266/263 (101%)	253 (95%)	13 (5%)	21	13

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	5[A]	LYS
1	A	5[B]	LYS
1	A	38[A]	CYS
1	A	38[B]	CYS
1	A	47	GLU
1	A	50	LEU
1	A	57	LEU
1	A	67	LEU
1	A	72	ASN
1	A	189	GLN
1	A	284	SER
1	A	285	THR
1	A	293	PRO

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	19	GLN
1	A	72	ASN
1	A	74	GLN
1	A	164	HIS
1	A	189	GLN
1	A	214	ASN
1	A	256	GLN

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Mol	Chain	Res	Type
1	A	274	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 ⓘ

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	CY6	A	1145	1	38,41,41	2.92	16 (42%)	42,55,55	3.12	19 (45%)

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	CY6	A	1145	1	-	11/41/55/55	0/2/2/2

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1145	CY6	C34-C33	11.72	1.58	1.32
2	A	1145	CY6	C10-C6	-6.03	1.31	1.39
2	A	1145	CY6	C23-C24	4.24	1.45	1.32
2	A	1145	CY6	C10-C9	3.94	1.47	1.39
2	A	1145	CY6	O30-C29	3.78	1.30	1.23
2	A	1145	CY6	C40-C32	3.40	1.57	1.53
2	A	1145	CY6	C34-C35	3.03	1.54	1.48
2	A	1145	CY6	C15-C14	2.97	1.63	1.54
2	A	1145	CY6	O19-C18	2.79	1.26	1.21
2	A	1145	CY6	C20-C21	2.59	1.58	1.53
2	A	1145	CY6	C21-C29	2.44	1.55	1.51
2	A	1145	CY6	C9-N8	-2.40	1.28	1.33
2	A	1145	CY6	O37-C35	2.14	1.39	1.34
2	A	1145	CY6	C45-N44	2.13	1.35	1.33
2	A	1145	CY6	C22-C21	2.12	1.58	1.54
2	A	1145	CY6	O36-C35	2.08	1.25	1.21

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	1145	CY6	C32-C33-C34	-11.27	105.81	125.84
2	A	1145	CY6	C33-C32-N31	6.66	122.84	110.36
2	A	1145	CY6	O37-C35-C34	5.10	124.14	111.55
2	A	1145	CY6	C9-C10-C6	-4.68	100.05	106.06
2	A	1145	CY6	C9-C11-N13	4.35	123.56	115.19
2	A	1145	CY6	C22-C21-C20	-4.32	106.91	112.05
2	A	1145	CY6	C20-C21-C29	-3.89	104.17	109.71
2	A	1145	CY6	C14-N13-C11	3.87	129.34	121.53
2	A	1145	CY6	C21-C29-N31	3.59	122.37	116.19
2	A	1145	CY6	O37-C35-O36	-3.50	115.60	122.96
2	A	1145	CY6	C33-C34-C35	-3.25	115.40	122.59
2	A	1145	CY6	O12-C11-C9	-3.09	114.26	121.08
2	A	1145	CY6	O30-C29-C21	-3.09	117.43	122.19
2	A	1145	CY6	C43-C42-C41	-2.94	101.35	105.69
2	A	1145	CY6	C21-C20-C18	2.54	120.76	113.84
2	A	1145	CY6	O46-C45-C41	-2.25	123.61	126.21
2	A	1145	CY6	C26-C24-C25	2.05	119.30	114.59
2	A	1145	CY6	C38-O37-C35	2.01	120.35	116.38
2	A	1145	CY6	C10-C9-N8	2.01	113.61	109.97

There are no chirality outliers.

All (11) torsion outliers are listed below:

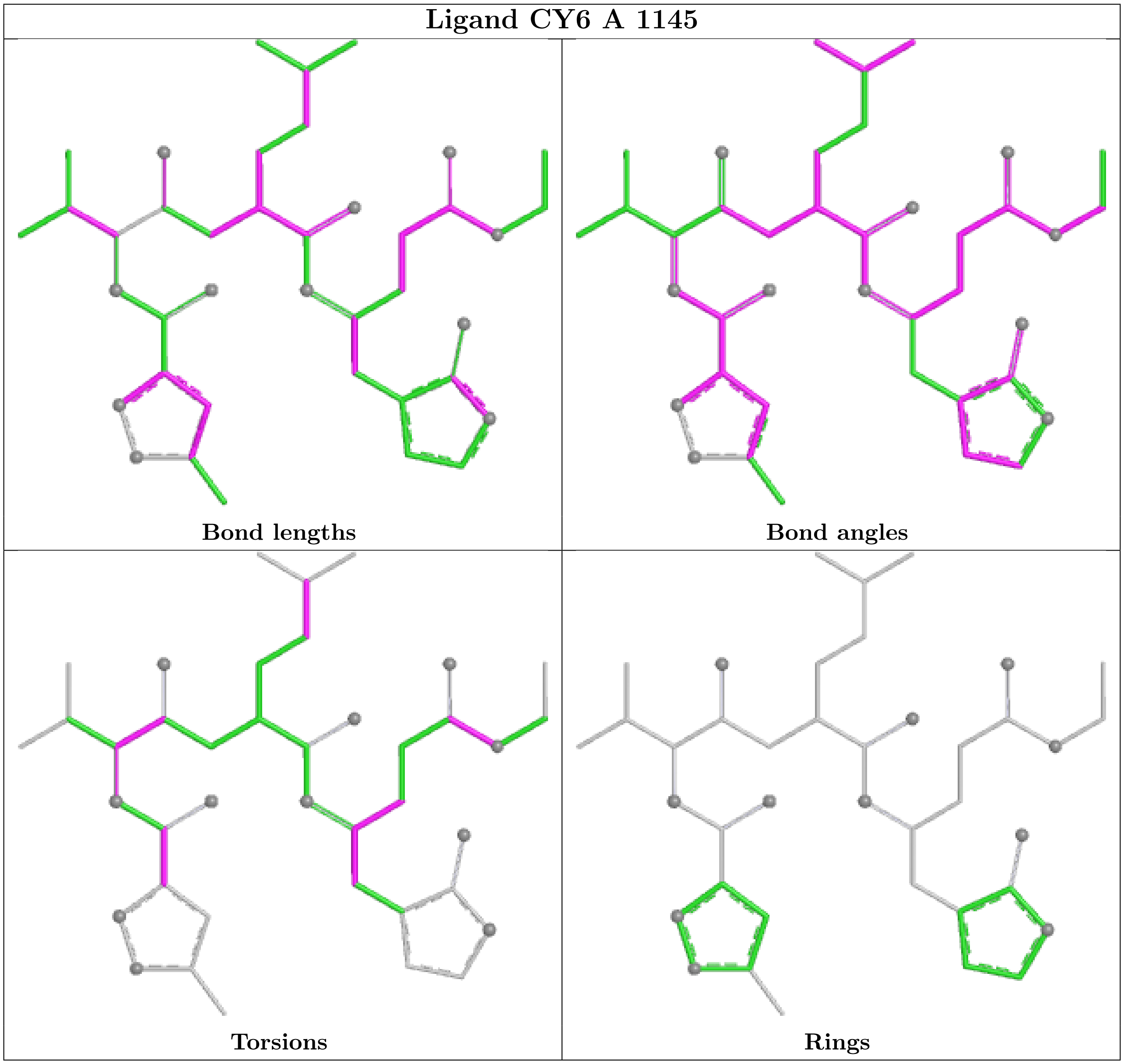
Mol	Chain	Res	Type	Atoms
2	A	1145	CY6	O12-C11-C9-C10
2	A	1145	CY6	N31-C32-C33-C34
2	A	1145	CY6	C33-C32-C40-C41
2	A	1145	CY6	C34-C35-O37-C38
2	A	1145	CY6	O36-C35-O37-C38
2	A	1145	CY6	N31-C32-C40-C41
2	A	1145	CY6	C22-C23-C24-C25
2	A	1145	CY6	C22-C23-C24-C26
2	A	1145	CY6	C40-C32-C33-C34
2	A	1145	CY6	C18-C14-N13-C11
2	A	1145	CY6	N13-C14-C18-O19

There are no ring outliers.

1 monomer is involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1145	CY6	6	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 CY6 A 1145

Bond lengths

Bond angles

Torsions

Rings

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	302/306 (98%)	1.27	73 (24%)	2	2	17, 48, 77, 95	7 (2%)

All (73) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	156[A]	CYS	5.3
1	A	282	LEU	5.1
1	A	286[A]	ILE	4.9
1	A	59	ILE	4.7
1	A	48	ASP	4.6
1	A	211	ALA	4.1
1	A	154	TYR	4.1
1	A	215	GLY	4.0
1	A	38[A]	CYS	4.0
1	A	63	ASN	3.8
1	A	303	VAL	3.8
1	A	277	ASN	3.8
1	A	284	SER	3.6
1	A	275	GLY	3.6
1	A	297	VAL	3.6
1	A	72	ASN	3.4
1	A	294	PHE	3.3
1	A	217	ARG	3.3
1	A	260	ALA	3.3
1	A	218	TRP	3.3
1	A	259	ILE	3.3
1	A	43	ILE	3.2
1	A	219	PHE	3.2
1	A	223	PHE	3.2
1	A	276	MET	3.2
1	A	191	ALA	3.2
1	A	65	SER	3.1

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Mol	Chain	Res	Type	RSRZ
1	A	78	ILE	3.1
1	A	93	THR	3.1
1	A	271	LEU	3.1
1	A	50	LEU	3.0
1	A	67	LEU	3.0
1	A	213	ILE	2.9
1	A	210	ALA	2.9
1	A	285	THR	2.8
1	A	47	GLU	2.8
1	A	300	CYS	2.8
1	A	56	ASP	2.8
1	A	216	ASP	2.8
1	A	155	ASP	2.7
1	A	4	ARG	2.6
1	A	266	ALA	2.6
1	A	49	MET	2.6
1	A	45	THR	2.6
1	A	280	THR	2.6
1	A	204	VAL	2.5
1	A	31	TRP	2.5
1	A	64	HIS	2.5
1	A	70	ALA	2.5
1	A	267	ALA	2.5
1	A	52	PRO	2.4
1	A	296	VAL	2.4
1	A	46	ALA	2.4
1	A	92	ASP	2.4
1	A	71	GLY	2.4
1	A	95	ASN	2.3
1	A	165	MET	2.3
1	A	77	VAL	2.3
1	A	279	ARG	2.3
1	A	54	TYR	2.3
1	A	73	VAL	2.2
1	A	91	VAL	2.2
1	A	76	ARG	2.2
1	A	89	LEU	2.1
1	A	118	TYR	2.1
1	A	281	ILE	2.1
1	A	42	VAL	2.1
1	A	272	LEU	2.1
1	A	79	GLY	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	283	GLY	2.1
1	A	208	LEU	2.1
1	A	60	ARG	2.1
1	A	301	SER	2.0

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

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

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

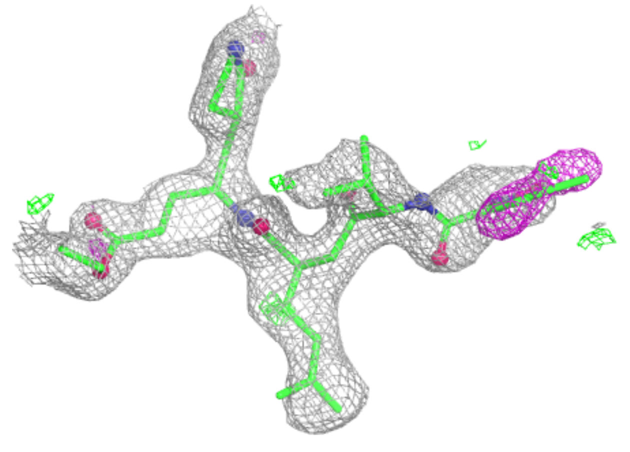
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

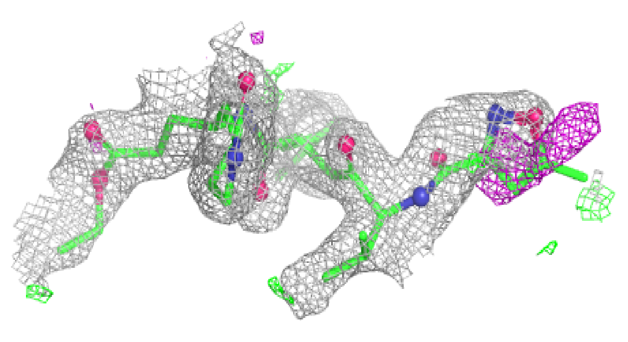
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	CY6	A	1145	40/40	0.83	0.16	43,61,85,85	0

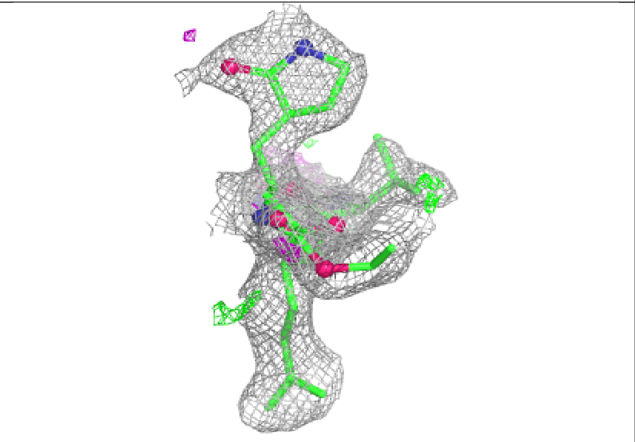
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around CY6 A 1145:

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.