



Full wwPDB X-ray Structure Validation Report ⓘ

May 30, 2023 – 06:10 PM EDT

PDB ID : 8GCZ
Title : Crystal Structure of HIV-1 LM/HT Clade A/E CRF01 GP120 Core in Complex with ZXC-I-090
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Deposited on : 2023-03-03
Resolution : 2.40 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.33
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) : 2.33

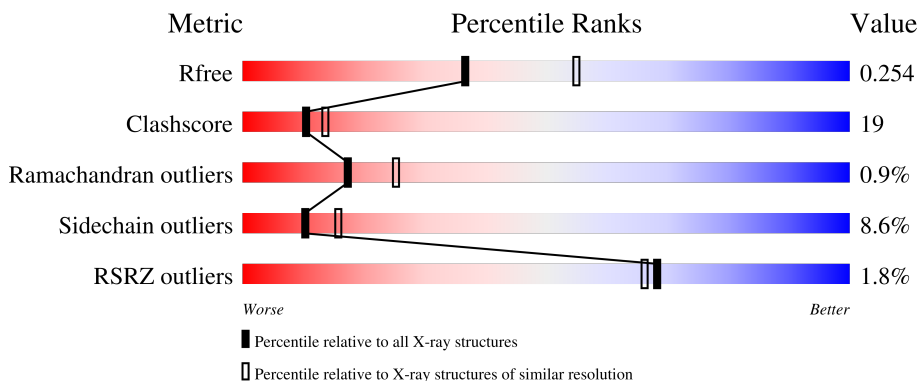
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.40 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	3907 (2.40-2.40)
Clashscore	141614	4398 (2.40-2.40)
Ramachandran outliers	138981	4318 (2.40-2.40)
Sidechain outliers	138945	4319 (2.40-2.40)
RSRZ outliers	127900	3811 (2.40-2.40)

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 $\leq 5\%$. 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	355	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	NAG	A	509	-	-	-	X

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 2899 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 HIV-1 LM/HT Clade A/E CRF01 gp120 core.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	340	2665	1674	461	507	23	0	0	0

There are 9 discrepancies between the modelled and reference sequences:

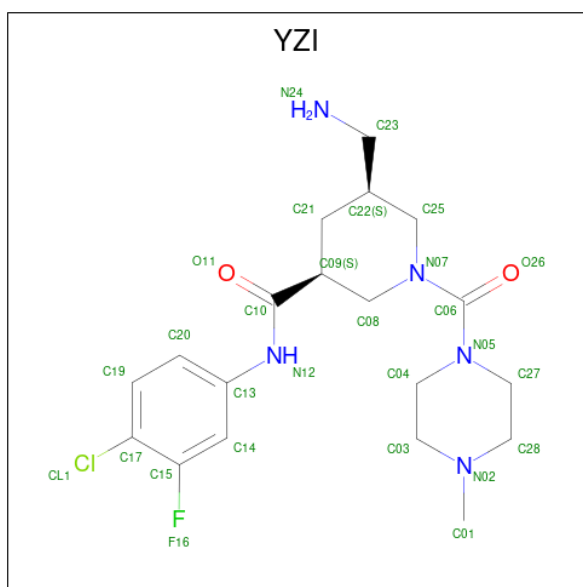
Chain	Residue	Modelled	Actual	Comment	Reference
A	42	VAL	-	expression tag	UNP A0A0M3KKW9
A	43	PRO	-	expression tag	UNP A0A0M3KKW9
A	61	TYR	HIS	engineered mutation	UNP A0A0M3KKW9
A	105	HIS	GLN	engineered mutation	UNP A0A0M3KKW9
A	108	ILE	VAL	engineered mutation	UNP A0A0M3KKW9
A	375	THR	HIS	engineered mutation	UNP A0A0M3KKW9
A	474	ASP	ASN	engineered mutation	UNP A0A0M3KKW9
A	475	MET	ILE	engineered mutation	UNP A0A0M3KKW9
A	476	ARG	LYS	engineered mutation	UNP A0A0M3KKW9

- Molecule 2 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C₈H₁₅NO₆).



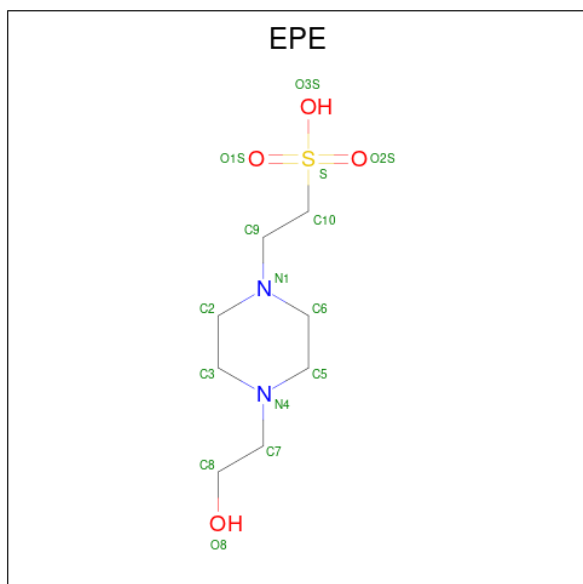
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
2	A	1	14	8	1	5	0	0
2	A	1	14	8	1	5	0	0
2	A	1	14	8	1	5	0	0
2	A	1	14	8	1	5	0	0
2	A	1	14	8	1	5	0	0
2	A	1	14	8	1	5	0	0
2	A	1	14	8	1	5	0	0
2	A	1	14	8	1	5	0	0
2	A	1	14	8	1	5	0	0
2	A	1	14	8	1	5	0	0
2	A	1	14	8	1	5	0	0
2	A	1	14	8	1	5	0	0

- Molecule 3 is (3S,5S)-5-(aminomethyl)-N-(4-chloro-3-fluorophenyl)-1-(4-methylpiperazine-1-carbonyl)piperidine-3-carboxamide (three-letter code: YZI) (formula: C₁₉H₂₇ClFN₅O₂) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	Cl	F	N			O
3	A	1	28	19	1	1	5	2	0	0

- Molecule 4 is 4-(2-HYDROXYETHYL)-1-PIPERAZINE ETHANESULFONIC ACID (three-letter code: EPE) (formula: $C_8H_{18}N_2O_4S$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
4	A	1	15	8	2	4	1	0	0

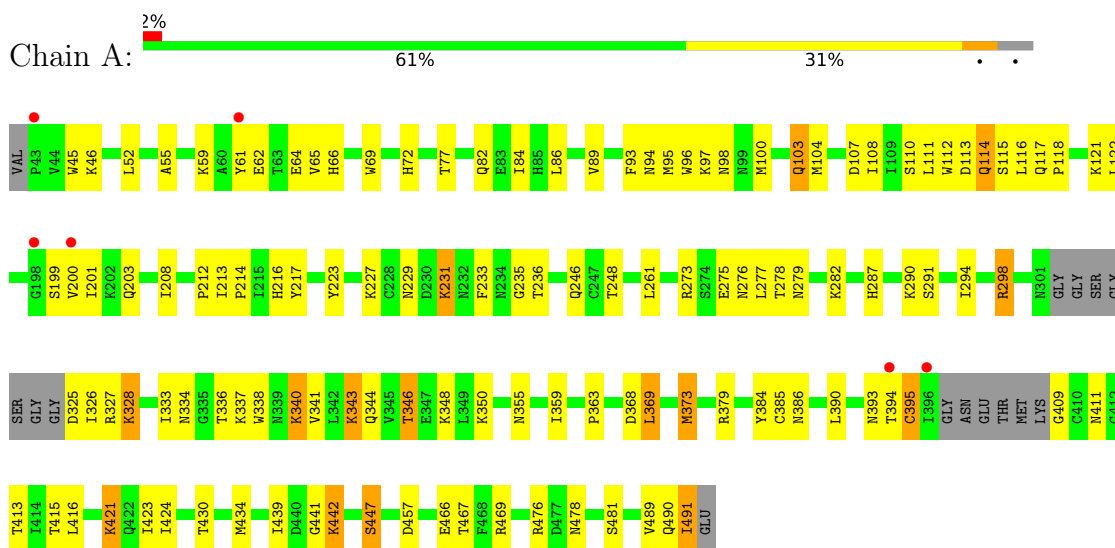
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	23	Total	O	0	0
			23	23		

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: HIV-1 LM/HT Clade A/E CRF01 gp120 core



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	61.78Å 65.93Å 91.18Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	45.59 – 2.40 45.59 – 2.40	Depositor EDS
% Data completeness (in resolution range)	97.7 (45.59-2.40) 97.8 (45.59-2.40)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.35 (at 2.39Å)	Xtrriage
Refinement program	PHENIX (1.19.1_4122: ???)	Depositor
R, R_{free}	0.238 , 0.267 0.236 , 0.254	Depositor DCC
R_{free} test set	729 reflections (4.90%)	wwPDB-VP
Wilson B-factor (Å ²)	57.4	Xtrriage
Anisotropy	0.540	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.27 , 34.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	2899	wwPDB-VP
Average B, all atoms (Å ²)	63.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.21% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ 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: YZI, NAG, EPE

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	1.04	0/2722	0.80	1/3696 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	395	CYS	CA-CB-SG	5.43	123.78	114.00

There are no chirality outliers.

There are no planarity outliers.

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	2665	0	2592	103	0
2	A	168	0	156	3	0
3	A	28	0	0	0	0
4	A	15	0	17	2	0
5	A	23	0	0	4	0
All	All	2899	0	2765	105	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 19.

All (105) 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:117:GLN:HG3	1:A:203:GLN:HE22	1.12	1.11
1:A:117:GLN:CG	1:A:203:GLN:HE22	1.74	1.01
1:A:368:ASP:O	1:A:369:LEU:HB2	1.62	1.00
1:A:117:GLN:HG3	1:A:203:GLN:NE2	1.85	0.91
1:A:350:LYS:HD3	1:A:355:ASN:HA	1.62	0.82
1:A:423:ILE:HG12	1:A:434:MET:HG3	1.63	0.81
1:A:69:TRP:CD1	1:A:111:LEU:HA	2.19	0.78
1:A:86:LEU:HB2	1:A:89:VAL:HG11	1.69	0.75
1:A:52:LEU:HD12	1:A:103:GLN:OE1	1.86	0.75
1:A:384:TYR:CD1	1:A:421:LYS:HG3	2.25	0.72
1:A:363:PRO:O	1:A:469:ARG:NH1	2.25	0.70
1:A:413:THR:O	5:A:601:HOH:O	2.09	0.69
1:A:113:ASP:O	1:A:117:GLN:NE2	2.25	0.69
1:A:275:GLU:OE1	1:A:282:LYS:NZ	2.25	0.69
1:A:466:GLU:HA	1:A:466:GLU:OE1	1.92	0.68
1:A:227:LYS:HE3	1:A:229:ASN:HD21	1.60	0.65
1:A:110:SER:O	1:A:114:GLN:HG3	1.97	0.65
1:A:409:GLY:N	5:A:604:HOH:O	2.30	0.64
4:A:514:EPE:H51	4:A:514:EPE:O8	1.97	0.63
1:A:298:ARG:HD2	1:A:298:ARG:O	1.99	0.62
1:A:98:ASN:OD1	1:A:100:MET:HG3	2.00	0.61
1:A:373:MET:HG2	1:A:385:CYS:C	2.21	0.61
1:A:373:MET:CG	1:A:385:CYS:O	2.49	0.60
1:A:384:TYR:CE1	1:A:421:LYS:HG3	2.35	0.60
1:A:478:ASN:O	1:A:481:SER:HB3	2.02	0.59
1:A:275:GLU:OE1	1:A:282:LYS:CE	2.50	0.59
1:A:104:MET:HG3	1:A:217:TYR:CE2	2.38	0.59
1:A:95:MET:HG2	1:A:235:GLY:O	2.02	0.58
1:A:112:TRP:CE3	1:A:116:LEU:HD23	2.39	0.58
1:A:246:GLN:OE1	1:A:246:GLN:N	2.25	0.58
1:A:200:VAL:HG23	1:A:200:VAL:O	2.04	0.57
1:A:491:ILE:C	1:A:491:ILE:HD12	2.24	0.57
1:A:294:ILE:HG13	1:A:333:ILE:HD11	1.87	0.57
1:A:373:MET:HG3	1:A:385:CYS:O	2.05	0.56
1:A:112:TRP:CZ3	1:A:116:LEU:HD23	2.40	0.56
1:A:294:ILE:O	1:A:294:ILE:HG23	2.06	0.56
1:A:89:VAL:HG13	1:A:89:VAL:O	2.06	0.55
1:A:337:LYS:HE3	2:A:507:NAG:O5	2.06	0.55
1:A:59:LYS:HB3	1:A:61:TYR:CE2	2.41	0.55
1:A:117:GLN:OE1	1:A:118:PRO:HD2	2.06	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:336:THR:OG1	1:A:337:LYS:N	2.40	0.54
1:A:298:ARG:NH2	1:A:439:ILE:O	2.40	0.53
1:A:340:LYS:O	1:A:344:GLN:HG3	2.09	0.53
1:A:217:TYR:O	1:A:248:THR:HG23	2.10	0.52
1:A:84:ILE:O	1:A:84:ILE:HG22	2.08	0.52
1:A:373:MET:CG	1:A:385:CYS:C	2.78	0.52
1:A:108:ILE:N	1:A:108:ILE:HD13	2.25	0.52
1:A:338:TRP:CZ2	1:A:390:LEU:HB3	2.45	0.52
1:A:65:VAL:HB	1:A:115:SER:HB3	1.93	0.51
1:A:393:ASN:HD22	1:A:395:CYS:HB2	1.75	0.51
1:A:62:GLU:HG3	1:A:64:GLU:H	1.74	0.51
1:A:491:ILE:HG13	1:A:491:ILE:O	2.10	0.51
1:A:298:ARG:NH1	1:A:441:GLY:O	2.43	0.51
1:A:52:LEU:CD1	1:A:103:GLN:OE1	2.56	0.51
1:A:350:LYS:HD3	1:A:355:ASN:CA	2.38	0.51
1:A:216:HIS:HD2	1:A:248:THR:O	1.94	0.50
1:A:273:ARG:NH2	1:A:287:HIS:ND1	2.44	0.50
1:A:275:GLU:OE1	1:A:282:LYS:HE3	2.11	0.50
1:A:373:MET:CE	2:A:508:NAG:H82	2.42	0.49
1:A:421:LYS:O	1:A:424:ILE:HD11	2.12	0.49
1:A:327:ARG:HH11	1:A:327:ARG:HG3	1.77	0.49
1:A:457:ASP:HB2	1:A:467:THR:HB	1.96	0.48
1:A:104:MET:HG3	1:A:217:TYR:CZ	2.48	0.48
1:A:45:TRP:C	1:A:45:TRP:CD1	2.86	0.47
1:A:373:MET:HG2	1:A:385:CYS:O	2.14	0.47
1:A:107:ASP:OD1	4:A:514:EPE:H52	2.14	0.47
1:A:213:ILE:HB	1:A:214:PRO:CD	2.44	0.47
1:A:223:TYR:CE1	1:A:490:GLN:HB2	2.50	0.46
1:A:95:MET:SD	1:A:235:GLY:HA3	2.56	0.46
1:A:227:LYS:HE3	1:A:229:ASN:ND2	2.29	0.46
1:A:298:ARG:C	1:A:298:ARG:CD	2.84	0.46
1:A:442:LYS:HE3	1:A:442:LYS:HB2	1.36	0.46
1:A:338:TRP:CE2	1:A:390:LEU:HB3	2.51	0.45
1:A:94:ASN:ND2	1:A:97:LYS:HG3	2.31	0.45
1:A:121:LYS:NZ	1:A:201:ILE:HG21	2.32	0.45
1:A:278:THR:HG22	1:A:278:THR:O	2.17	0.44
1:A:52:LEU:CG	1:A:103:GLN:OE1	2.66	0.44
1:A:294:ILE:HG13	1:A:333:ILE:CG1	2.48	0.43
1:A:122:LEU:HD23	1:A:200:VAL:HG12	2.01	0.43
1:A:95:MET:HG3	1:A:96:TRP:CD1	2.53	0.43
1:A:55:ALA:HB1	1:A:77:THR:HA	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:69:TRP:CG	1:A:111:LEU:HG	2.54	0.43
1:A:227:LYS:HG2	1:A:229:ASN:HD21	1.84	0.43
1:A:294:ILE:HG13	1:A:333:ILE:CD1	2.48	0.43
1:A:216:HIS:CD2	1:A:248:THR:O	2.71	0.43
1:A:343:LYS:O	1:A:346:THR:OG1	2.36	0.43
1:A:276:ASN:ND2	1:A:279:ASN:HB2	2.34	0.42
2:A:504:NAG:H61	2:A:512:NAG:O4	2.19	0.42
1:A:393:ASN:O	1:A:395:CYS:N	2.52	0.42
1:A:72:HIS:ND1	1:A:72:HIS:C	2.72	0.42
1:A:415:THR:OG1	5:A:601:HOH:O	2.21	0.41
1:A:66:HIS:CG	1:A:212:PRO:HA	2.55	0.41
1:A:350:LYS:NZ	1:A:355:ASN:O	2.42	0.41
1:A:386:ASN:O	1:A:416:LEU:HD22	2.19	0.41
1:A:93:PHE:HB2	1:A:233:PHE:HZ	1.85	0.41
1:A:447:SER:OG	5:A:602:HOH:O	2.22	0.41
1:A:82:GLN:OE1	1:A:82:GLN:HA	2.20	0.41
1:A:208:ILE:H	1:A:208:ILE:HG13	1.79	0.41
1:A:325:ASP:HB3	1:A:328:LYS:HB2	2.03	0.41
1:A:346:THR:HG22	1:A:359:ILE:HB	2.02	0.41
1:A:413:THR:O	1:A:413:THR:HG22	2.20	0.41
1:A:231:LYS:H	1:A:231:LYS:HG2	1.52	0.40
1:A:489:VAL:O	1:A:489:VAL:HG23	2.21	0.40
1:A:115:SER:HB2	1:A:116:LEU:H	1.61	0.40
1:A:326:ILE:H	1:A:326:ILE:HG12	1.72	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	334/355 (94%)	314 (94%)	17 (5%)	3 (1%)	17 25

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	369	LEU
1	A	394	THR
1	A	411	ASN

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	304/313 (97%)	278 (91%)	26 (9%)	10 16

All (26) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	46	LYS
1	A	103	GLN
1	A	114	GLN
1	A	199	SER
1	A	231	LYS
1	A	236	THR
1	A	261	LEU
1	A	277	LEU
1	A	290	LYS
1	A	291	SER
1	A	298	ARG
1	A	328	LYS
1	A	334	ASN
1	A	340	LYS
1	A	341	VAL
1	A	343	LYS
1	A	346	THR
1	A	348	LYS
1	A	373	MET
1	A	379	ARG
1	A	421	LYS
1	A	430	THR

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Mol	Chain	Res	Type
1	A	442	LYS
1	A	447	SER
1	A	476	ARG
1	A	491	ILE

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	114	GLN
1	A	203	GLN
1	A	216	HIS
1	A	229	ASN
1	A	393	ASN
1	A	462	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](#)

14 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	NAG	A	505	1	14,14,15	0.42	0	17,19,21	0.50	0
2	NAG	A	510	1	14,14,15	0.39	0	17,19,21	0.71	1 (5%)
2	NAG	A	507	1	14,14,15	0.87	1 (7%)	17,19,21	0.70	0
3	YZI	A	513	-	30,30,30	3.25	13 (43%)	39,42,42	2.23	13 (33%)
2	NAG	A	511	1	14,14,15	2.07	2 (14%)	17,19,21	1.71	2 (11%)
2	NAG	A	509	1	14,14,15	0.32	0	17,19,21	0.56	0
2	NAG	A	503	1	14,14,15	0.28	0	17,19,21	0.70	1 (5%)
2	NAG	A	506	1	14,14,15	0.15	0	17,19,21	0.81	1 (5%)
2	NAG	A	504	1	14,14,15	0.22	0	17,19,21	0.69	1 (5%)
2	NAG	A	502	1	14,14,15	0.38	0	17,19,21	0.39	0
2	NAG	A	512	1	14,14,15	0.38	0	17,19,21	0.58	0
2	NAG	A	508	1	14,14,15	0.18	0	17,19,21	0.64	1 (5%)
2	NAG	A	501	1	14,14,15	0.21	0	17,19,21	0.39	0
4	EPE	A	514	-	15,15,15	2.70	1 (6%)	18,20,20	2.49	7 (38%)

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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	A	505	1	-	0/6/23/26	0/1/1/1
2	NAG	A	510	1	-	2/6/23/26	0/1/1/1
2	NAG	A	507	1	-	0/6/23/26	0/1/1/1
3	YZI	A	513	-	-	3/18/40/40	0/3/3/3
2	NAG	A	511	1	-	4/6/23/26	0/1/1/1
2	NAG	A	509	1	-	2/6/23/26	0/1/1/1
2	NAG	A	503	1	-	0/6/23/26	0/1/1/1
2	NAG	A	506	1	-	2/6/23/26	0/1/1/1
2	NAG	A	504	1	-	0/6/23/26	0/1/1/1
2	NAG	A	502	1	-	2/6/23/26	0/1/1/1
2	NAG	A	512	1	-	2/6/23/26	0/1/1/1
2	NAG	A	508	1	-	0/6/23/26	0/1/1/1
2	NAG	A	501	1	-	2/6/23/26	0/1/1/1
4	EPE	A	514	-	-	3/9/19/19	0/1/1/1

All (17) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	514	EPE	C10-S	-10.02	1.63	1.77
3	A	513	YZI	C01-N02	-9.53	1.24	1.46
2	A	511	NAG	O5-C1	-7.34	1.32	1.43
3	A	513	YZI	C06-N07	5.94	1.49	1.36
3	A	513	YZI	C06-N05	5.88	1.49	1.36
3	A	513	YZI	C27-N05	-5.66	1.37	1.47
3	A	513	YZI	O11-C10	-4.31	1.14	1.23
3	A	513	YZI	C10-N12	3.95	1.44	1.35
3	A	513	YZI	C21-C09	-3.83	1.45	1.53
3	A	513	YZI	C03-N02	-3.64	1.38	1.46
3	A	513	YZI	C04-N05	-3.43	1.40	1.47
3	A	513	YZI	C28-N02	-3.14	1.39	1.46
2	A	507	NAG	O5-C1	-3.10	1.38	1.43
3	A	513	YZI	O26-C06	-2.71	1.17	1.22
3	A	513	YZI	C21-C22	-2.52	1.46	1.52
3	A	513	YZI	C08-N07	2.40	1.49	1.46
2	A	511	NAG	C1-C2	-2.09	1.49	1.52

All (27) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	513	YZI	C28-N02-C03	5.99	117.90	109.52
4	A	514	EPE	O1S-S-C10	5.96	114.10	106.92
3	A	513	YZI	C08-C09-C10	5.00	119.45	110.07
3	A	513	YZI	C28-C27-N05	-4.91	99.91	110.44
2	A	511	NAG	C3-C4-C5	4.78	118.76	110.24
2	A	511	NAG	C1-O5-C5	-4.36	106.29	112.19
4	A	514	EPE	O2S-S-C10	4.29	112.08	106.92
4	A	514	EPE	O3S-S-O2S	-4.21	100.99	111.27
3	A	513	YZI	C09-C08-N07	-3.95	102.44	109.88
3	A	513	YZI	C04-C03-N02	3.81	115.11	110.80
4	A	514	EPE	O3S-S-C10	3.77	111.87	105.77
3	A	513	YZI	O26-C06-N07	-3.23	116.70	123.80
3	A	513	YZI	O26-C06-N05	-2.78	117.70	123.80
4	A	514	EPE	O2S-S-O1S	-2.60	104.95	113.95
2	A	510	NAG	C1-O5-C5	2.57	115.68	112.19
3	A	513	YZI	C21-C22-C25	-2.54	107.06	109.66
2	A	506	NAG	C1-O5-C5	2.50	115.58	112.19
2	A	504	NAG	C1-O5-C5	2.44	115.50	112.19
2	A	503	NAG	C1-O5-C5	2.44	115.49	112.19
3	A	513	YZI	C09-C10-N12	2.39	118.53	115.02
3	A	513	YZI	C25-N07-C08	-2.27	109.91	114.49
3	A	513	YZI	C27-N05-C04	-2.25	108.28	112.62

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	513	YZI	C08-N07-C06	2.23	130.27	121.14
4	A	514	EPE	C9-N1-C6	-2.13	105.78	111.23
4	A	514	EPE	C5-C6-N1	2.10	114.94	110.64
3	A	513	YZI	C09-C21-C22	-2.09	104.80	109.89
2	A	508	NAG	C1-O5-C5	2.01	114.92	112.19

There are no chirality outliers.

All (22) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	511	NAG	C1-C2-N2-C7
4	A	514	EPE	C8-C7-N4-C5
2	A	502	NAG	C4-C5-C6-O6
2	A	512	NAG	O5-C5-C6-O6
2	A	502	NAG	O5-C5-C6-O6
2	A	511	NAG	O5-C5-C6-O6
2	A	511	NAG	C4-C5-C6-O6
2	A	512	NAG	C4-C5-C6-O6
2	A	509	NAG	O5-C5-C6-O6
2	A	510	NAG	O5-C5-C6-O6
2	A	509	NAG	C4-C5-C6-O6
2	A	510	NAG	C4-C5-C6-O6
3	A	513	YZI	C21-C22-C23-N24
2	A	501	NAG	C4-C5-C6-O6
2	A	501	NAG	O5-C5-C6-O6
4	A	514	EPE	S-C10-C9-N1
4	A	514	EPE	C8-C7-N4-C3
2	A	511	NAG	C3-C2-N2-C7
2	A	506	NAG	C1-C2-N2-C7
2	A	506	NAG	C3-C2-N2-C7
3	A	513	YZI	N07-C06-N05-C27
3	A	513	YZI	N05-C06-N07-C08

There are no ring outliers.

5 monomers are involved in 5 short contacts:

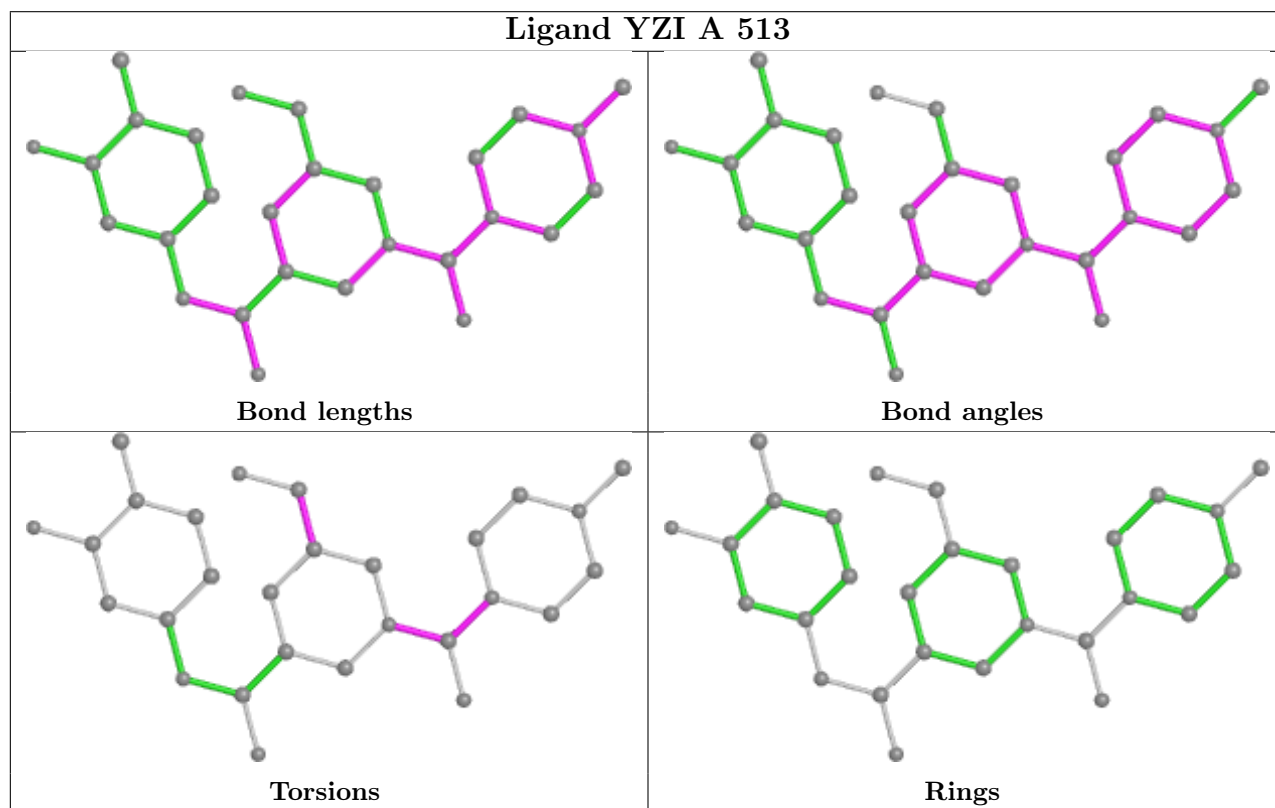
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	507	NAG	1	0
2	A	504	NAG	1	0
2	A	512	NAG	1	0
2	A	508	NAG	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	514	EPE	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 than 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

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	340/355 (95%)	-0.27	6 (1%) 68 66	44, 61, 82, 96	0

All (6) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	394	THR	3.9
1	A	61	TYR	3.3
1	A	198	GLY	2.7
1	A	396	ILE	2.6
1	A	43	PRO	2.0
1	A	200	VAL	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.

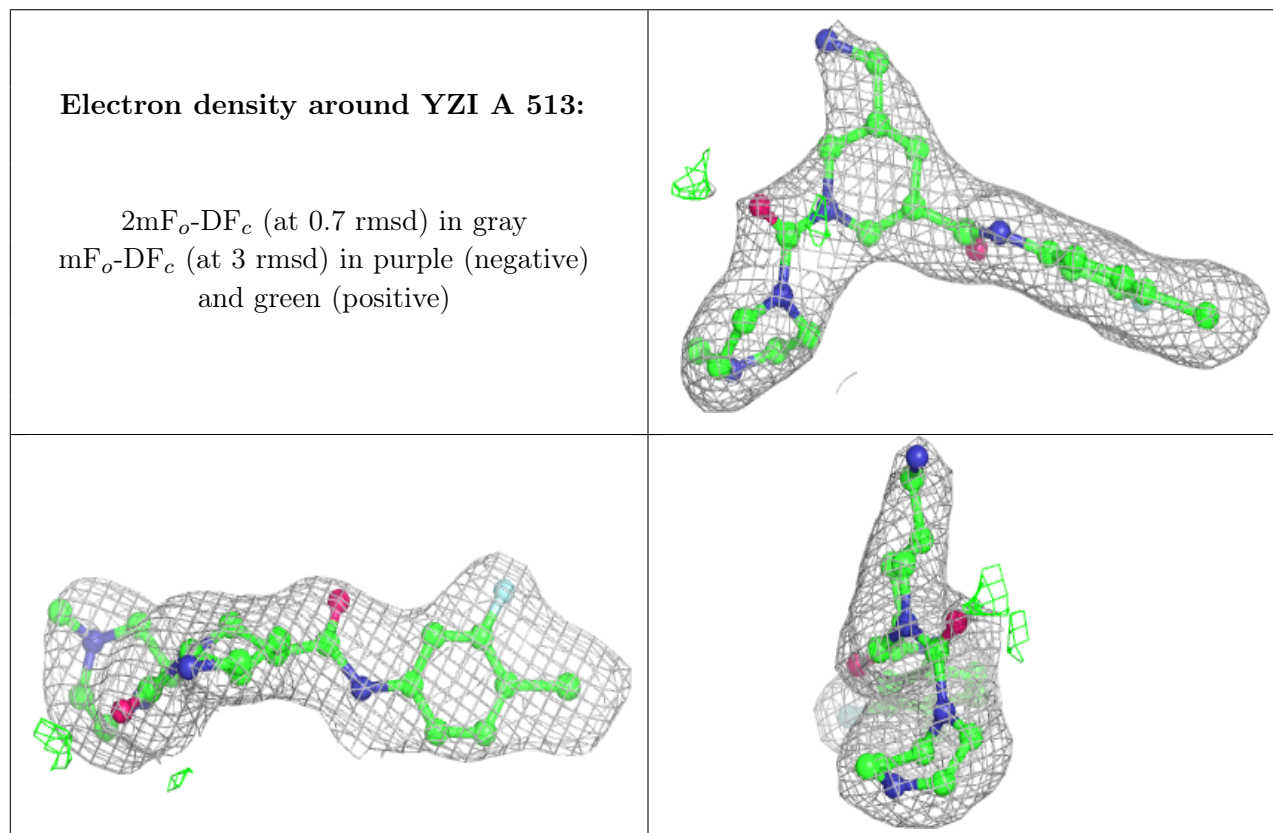
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	NAG	A	509	14/15	0.72	0.40	85,94,103,104	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	NAG	A	510	14/15	0.77	0.26	71,81,87,93	0
2	NAG	A	511	14/15	0.79	0.35	82,85,87,88	0
2	NAG	A	512	14/15	0.82	0.21	86,90,94,95	0
2	NAG	A	502	14/15	0.83	0.32	88,90,93,95	0
2	NAG	A	504	14/15	0.83	0.16	75,80,84,87	0
2	NAG	A	506	14/15	0.85	0.22	66,71,77,77	0
2	NAG	A	507	14/15	0.87	0.23	81,82,86,91	0
2	NAG	A	505	14/15	0.90	0.17	70,71,75,76	0
2	NAG	A	508	14/15	0.92	0.15	61,66,70,72	0
2	NAG	A	501	14/15	0.93	0.12	65,67,69,72	0
3	YZI	A	513	28/28	0.93	0.13	46,58,69,71	0
2	NAG	A	503	14/15	0.96	0.11	51,55,61,63	0
4	EPE	A	514	15/15	0.96	0.13	49,56,64,67	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.



6.5 Other polymers [i](#)

There are no such residues in this entry.