



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 12:07 PM UTC

PDB ID : 5EQE / pdb_00005eqe
Title : Crystal structure of choline kinase alpha-1 bound by [4-[(4-methyl-1,4-diazepan-1-yl)methyl]phenyl]methanamine (compound 11)
Authors : Zhou, T.; Zhu, X.; Dalgarno, D.C.
Deposited on : 2015-11-12
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 : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

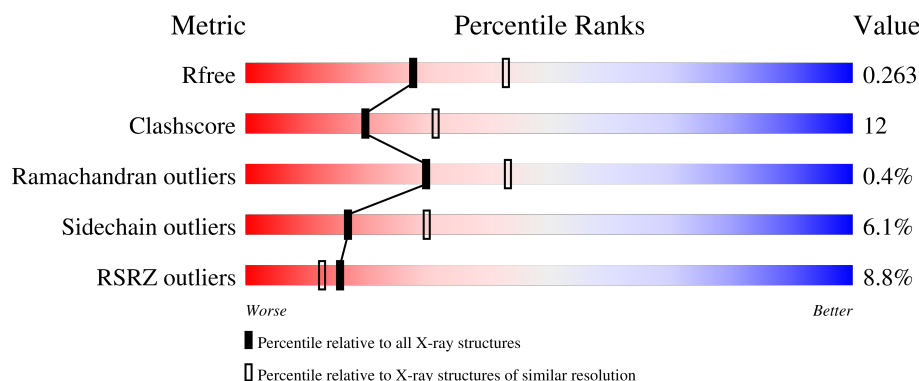
1 Overall quality at a glance

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}	180053	4912 (2.40-2.40)
Clashscore	190562	5391 (2.40-2.40)
Ramachandran outliers	187476	5320 (2.40-2.40)
Sidechain outliers	187428	5321 (2.40-2.40)
RSRZ outliers	180081	4916 (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	401	4% 63% 21% • 12%
1	B	401	11% 64% 20% • 14%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 5948 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 Choline kinase alpha.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	353	Total	C	N	O	S	0	0	0
			2936	1899	493	528	16			
1	B	344	Total	C	N	O	S	0	0	0
			2863	1855	480	512	16			

There are 36 discrepancies between the modelled and reference sequences:

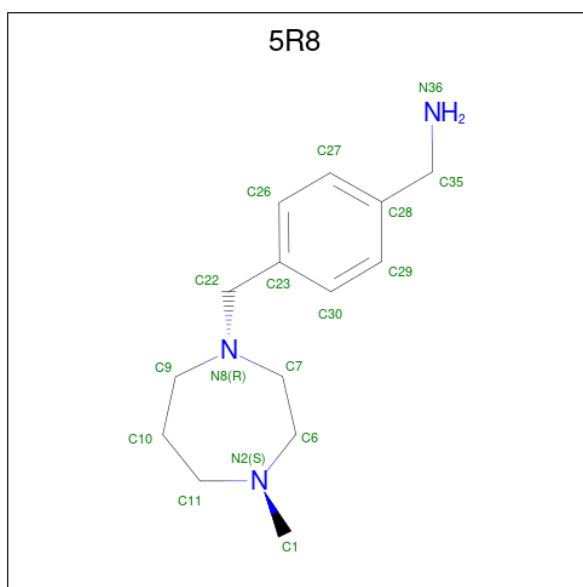
Chain	Residue	Modelled	Actual	Comment	Reference
A	57	GLY	-	expression tag	UNP P35790
A	58	SER	-	expression tag	UNP P35790
A	59	SER	-	expression tag	UNP P35790
A	60	HIS	-	expression tag	UNP P35790
A	61	HIS	-	expression tag	UNP P35790
A	62	HIS	-	expression tag	UNP P35790
A	63	HIS	-	expression tag	UNP P35790
A	64	HIS	-	expression tag	UNP P35790
A	65	HIS	-	expression tag	UNP P35790
A	66	SER	-	expression tag	UNP P35790
A	67	SER	-	expression tag	UNP P35790
A	68	GLY	-	expression tag	UNP P35790
A	69	LEU	-	expression tag	UNP P35790
A	70	VAL	-	expression tag	UNP P35790
A	71	PRO	-	expression tag	UNP P35790
A	72	ARG	-	expression tag	UNP P35790
A	73	GLY	-	expression tag	UNP P35790
A	74	SER	-	expression tag	UNP P35790
B	57	GLY	-	expression tag	UNP P35790
B	58	SER	-	expression tag	UNP P35790
B	59	SER	-	expression tag	UNP P35790
B	60	HIS	-	expression tag	UNP P35790
B	61	HIS	-	expression tag	UNP P35790
B	62	HIS	-	expression tag	UNP P35790
B	63	HIS	-	expression tag	UNP P35790

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Chain	Residue	Modelled	Actual	Comment	Reference
B	64	HIS	-	expression tag	UNP P35790
B	65	HIS	-	expression tag	UNP P35790
B	66	SER	-	expression tag	UNP P35790
B	67	SER	-	expression tag	UNP P35790
B	68	GLY	-	expression tag	UNP P35790
B	69	LEU	-	expression tag	UNP P35790
B	70	VAL	-	expression tag	UNP P35790
B	71	PRO	-	expression tag	UNP P35790
B	72	ARG	-	expression tag	UNP P35790
B	73	GLY	-	expression tag	UNP P35790
B	74	SER	-	expression tag	UNP P35790

- Molecule 2 is [4-[(4-methyl-1,4-diazepan-1-yl)methyl]phenyl]methanamine (CCD ID: 5R8) (formula: C₁₄H₂₃N₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	N	0	0
			17	14	3		
2	B	1	Total	C	N	0	0
			17	14	3		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	62	Total	O	0	0
			62	62		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	53	Total	O	0	0
			53	53		

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	55.67Å 120.88Å 131.21Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	50.00 – 2.40 50.00 – 2.40	Depositor EDS
% Data completeness (in resolution range)	94.1 (50.00-2.40) 94.1 (50.00-2.40)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.67 (at 2.39Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.225 , 0.263 0.225 , 0.263	Depositor DCC
R_{free} test set	1742 reflections (4.95%)	wwPDB-VP
Wilson B-factor (Å ²)	34.4	Xtriage
Anisotropy	0.376	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 47.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	5948	wwPDB-VP
Average B, all atoms (Å ²)	39.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.57% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 5R8

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	0.42	0/3012	0.73	0/4055
1	B	0.42	0/2937	0.72	0/3952
All	All	0.42	0/5949	0.73	0/8007

There are no bond length outliers.

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	2936	0	2908	76	0
1	B	2863	0	2841	62	0
2	A	17	0	23	0	0
2	B	17	0	23	2	0
3	A	62	0	0	5	0
3	B	53	0	0	3	0
All	All	5948	0	5795	134	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 12.

All (134) 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:270:ARG:HH11	1:A:270:ARG:HG3	1.14	1.12
1:B:383:LEU:HD21	1:B:405:MET:HE1	1.38	1.02
1:A:83:PRO:HG2	1:A:113:ILE:HG23	1.54	0.89
1:A:88:ARG:HA	1:A:91:ALA:HB3	1.65	0.79
1:A:270:ARG:HH11	1:A:270:ARG:CG	1.95	0.78
1:A:178:VAL:HG12	1:B:178:VAL:HG22	1.66	0.77
1:A:308:GLN:NE2	1:A:310:GLY:H	1.83	0.77
1:A:270:ARG:HG3	1:A:270:ARG:NH1	1.95	0.76
1:B:123:MET:HE3	1:B:123:MET:H	1.49	0.76
1:B:116:ILE:HD11	1:B:126:GLN:HB2	1.69	0.75
1:A:393:LEU:O	1:A:398:LYS:HE3	1.86	0.75
1:B:145:LEU:HD12	1:B:146:ARG:H	1.53	0.73
1:B:357:GLU:H	1:B:357:GLU:CD	1.98	0.72
1:A:308:GLN:HE21	1:A:310:GLY:H	1.38	0.71
1:B:305:ASN:HD21	1:B:337:ASN:HD22	1.37	0.71
1:A:204:ARG:HD2	1:A:206:GLU:OE1	1.92	0.69
1:A:83:PRO:HG2	1:A:113:ILE:CG2	2.23	0.68
1:B:451:GLN:HE21	1:B:451:GLN:HA	1.58	0.68
1:B:267:GLU:OE1	1:B:269:SER:HB3	1.94	0.68
1:B:145:LEU:HD12	1:B:146:ARG:N	2.10	0.67
1:B:383:LEU:HD21	1:B:405:MET:CE	2.22	0.66
1:B:308:GLN:HE21	1:B:310:GLY:H	1.46	0.64
1:B:316:GLU:HA	1:B:319:GLU:OE1	1.99	0.62
1:A:84:GLU:O	1:A:87:THR:O	2.18	0.62
1:B:430:ILE:HG13	1:B:431:SER:N	2.13	0.61
1:B:423:TRP:O	1:B:427:GLN:HG2	2.01	0.61
1:B:305:ASN:ND2	1:B:337:ASN:HD22	1.99	0.61
1:B:345:ASN:ND2	1:B:420:TRP:HE1	2.00	0.60
1:A:145:LEU:HD13	1:A:147:LEU:HD11	1.83	0.59
1:B:116:ILE:HD11	1:B:126:GLN:HE21	1.68	0.59
1:B:250:PHE:CZ	1:B:290:ARG:HA	2.39	0.58
1:A:245:GLU:OE1	1:B:104:ARG:NH2	2.37	0.57
1:B:177:MET:HG2	1:B:178:VAL:HG23	1.86	0.57
1:B:420:TRP:CZ3	2:B:501:5R8:H3	2.41	0.56
1:A:87:THR:HG21	3:A:657:HOH:O	2.06	0.55
1:B:339:ARG:NH2	1:B:405:MET:HE2	2.21	0.55
1:A:88:ARG:HD3	1:A:88:ARG:C	2.32	0.55
1:A:277:LEU:HD13	1:A:425:ILE:HD11	1.88	0.54
1:A:126:GLN:HG3	1:A:142:LYS:HD3	1.88	0.54
1:A:87:THR:O	1:A:88:ARG:CB	2.55	0.54
1:B:87:THR:HA	1:B:90:ARG:HB2	1.90	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:144:LEU:C	1:A:144:LEU:HD23	2.33	0.54
1:A:259:GLU:O	1:A:263:ILE:HG23	2.08	0.53
1:A:88:ARG:HB2	1:A:113:ILE:HG21	1.90	0.53
1:A:178:VAL:HG23	1:A:179:LEU:HD12	1.91	0.53
1:A:367:ARG:NH1	3:A:602:HOH:O	2.41	0.52
1:A:87:THR:O	1:A:88:ARG:HB3	2.08	0.52
1:A:119:GLY:C	1:A:120:LEU:HD12	2.35	0.52
1:A:116:ILE:HD11	1:A:126:GLN:HB2	1.90	0.52
1:A:265:PHE:HB2	1:A:271:ILE:HG12	1.92	0.51
1:B:357:GLU:CD	1:B:357:GLU:N	2.68	0.51
1:B:277:LEU:HD13	1:B:425:ILE:HD11	1.93	0.51
1:A:80:ASP:O	1:A:82:GLN:N	2.44	0.51
1:A:371:THR:O	1:A:375:GLN:HG3	2.09	0.51
1:A:125:PHE:CE2	1:A:147:LEU:HD13	2.46	0.50
1:B:179:LEU:HD22	1:B:242:PHE:CD1	2.47	0.50
1:A:125:PHE:HE2	1:A:147:LEU:HD13	1.76	0.50
1:A:120:LEU:HD12	1:A:120:LEU:N	2.27	0.49
1:A:266:THR:O	1:A:267:GLU:C	2.54	0.49
1:B:179:LEU:HD22	1:B:242:PHE:CE1	2.47	0.49
1:A:147:LEU:HD12	1:A:147:LEU:N	2.27	0.49
1:B:282:LEU:N	1:B:283:PRO:CD	2.76	0.49
1:A:190:ARG:O	1:A:191:SER:HB2	2.13	0.49
1:B:332:GLU:HB3	3:B:645:HOH:O	2.12	0.48
1:A:360:PRO:O	1:A:361:PHE:HB2	2.13	0.48
1:B:383:LEU:HB2	1:B:384:PRO:HD3	1.94	0.48
1:A:256:TYR:O	1:A:260:VAL:HG23	2.14	0.48
1:B:124:LEU:HD22	1:B:144:LEU:HD21	1.96	0.48
1:B:223:ASP:HB2	3:B:653:HOH:O	2.13	0.48
1:B:315:LEU:O	1:B:318:ARG:HG2	2.15	0.47
1:B:345:ASN:HD21	1:B:420:TRP:HE1	1.62	0.47
1:B:122:ASN:HA	1:B:147:LEU:O	2.13	0.47
1:B:281:ASN:ND2	1:B:284:LEU:HD23	2.30	0.47
1:A:116:ILE:HB	1:A:124:LEU:HB3	1.97	0.47
1:A:304:HIS:O	1:A:305:ASN:HB2	2.14	0.47
1:B:95:CYS:HB3	1:B:103:TRP:CE3	2.49	0.47
1:A:351:MET:SD	1:A:366:ILE:HA	2.55	0.47
1:B:200:PHE:HB2	1:B:201:PRO:CD	2.45	0.46
1:A:394:SER:C	1:A:396:GLU:N	2.73	0.46
1:B:361:PHE:CE1	1:B:434:GLU:HG2	2.50	0.46
1:A:233:ALA:HB2	1:A:382:TYR:CD1	2.50	0.46
1:A:92:TYR:OH	1:A:96:LYS:HE2	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:387:GLN:HG3	1:A:390:PHE:HB2	1.98	0.45
1:A:238:MET:HG2	3:A:646:HOH:O	2.17	0.45
1:A:423:TRP:O	1:A:427:GLN:HG2	2.16	0.45
1:A:277:LEU:HD13	1:A:425:ILE:CD1	2.47	0.45
1:A:195:LYS:H	1:A:207:GLN:HE21	1.64	0.45
1:B:405:MET:HE3	1:B:405:MET:HB2	1.80	0.45
1:A:451:GLN:HE21	1:A:451:GLN:HA	1.81	0.45
1:B:263:ILE:HG12	1:B:429:LYS:HD2	1.97	0.45
1:B:313:LEU:O	1:B:326:LEU:HA	2.17	0.45
1:A:126:GLN:NE2	1:A:142:LYS:CE	2.80	0.44
1:A:192:LEU:HD12	1:A:192:LEU:HA	1.86	0.44
1:B:244:LYS:HD3	1:B:336:TYR:CZ	2.53	0.44
1:A:126:GLN:HE21	1:A:142:LYS:HE2	1.81	0.44
1:B:267:GLU:OE1	1:B:269:SER:CB	2.65	0.43
1:A:148:TYR:CE1	1:A:203:GLY:HA2	2.53	0.43
1:A:420:TRP:O	1:A:424:SER:HB2	2.18	0.43
1:A:190:ARG:HD3	3:A:646:HOH:O	2.18	0.43
1:A:231:LYS:HE2	1:A:326:LEU:O	2.19	0.43
1:B:369:TYR:CG	1:B:370:PRO:HD2	2.52	0.43
1:B:360:PRO:O	1:B:361:PHE:HB2	2.19	0.43
1:A:222:PRO:O	1:A:377:HIS:HE1	2.02	0.43
1:A:126:GLN:NE2	1:A:142:LYS:NZ	2.66	0.43
1:B:107:ARG:NH2	1:B:109:ASP:OD2	2.51	0.43
1:A:303:CYS:SG	1:A:337:ASN:HB3	2.59	0.43
1:B:99:LEU:HD12	1:B:103:TRP:CD2	2.54	0.43
1:B:433:ILE:HG21	2:B:501:5R8:N36	2.34	0.42
1:B:121:SER:CA	1:B:123:MET:HE2	2.49	0.42
1:A:282:LEU:N	1:A:283:PRO:CD	2.82	0.42
1:A:389:ASP:O	1:A:390:PHE:C	2.63	0.42
1:A:276:LYS:O	1:A:279:SER:HB2	2.20	0.42
1:A:427:GLN:O	1:A:431:SER:HB3	2.20	0.42
1:B:358:LYS:O	1:B:359:TYR:C	2.63	0.42
1:A:257:LEU:HD22	1:A:261:LEU:HG	2.01	0.41
1:A:421:GLY:O	1:A:425:ILE:HG13	2.20	0.41
1:B:177:MET:HG2	1:B:178:VAL:N	2.35	0.41
1:B:213:ARG:HD2	1:B:313:LEU:HD23	2.02	0.41
1:A:178:VAL:HG12	1:B:178:VAL:CG2	2.45	0.41
1:A:350:TRP:CZ3	1:A:370:PRO:HB3	2.55	0.41
1:A:81:GLU:O	1:A:83:PRO:HD3	2.20	0.41
1:A:369:TYR:CG	1:A:370:PRO:HD2	2.55	0.41
1:B:225:SER:CB	3:B:614:HOH:O	2.69	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:332:GLU:HB2	3:A:642:HOH:O	2.20	0.41
1:A:88:ARG:NH1	1:A:108:GLU:OE2	2.54	0.41
1:A:221:LEU:HA	1:A:222:PRO:HD3	1.93	0.41
1:B:265:PHE:O	1:B:271:ILE:HD11	2.21	0.41
1:B:319:GLU:H	1:B:319:GLU:HG2	1.35	0.41
1:A:104:ARG:NH2	1:B:245:GLU:OE1	2.51	0.40
1:B:200:PHE:HB2	1:B:201:PRO:HD2	2.03	0.40
1:A:93:LEU:HD23	1:A:93:LEU:HA	1.96	0.40
1:A:282:LEU:HB2	1:A:283:PRO:HD3	2.04	0.40
1:B:88:ARG:NH2	1:B:108:GLU:O	2.52	0.40
1:B:332:GLU:HG2	1:B:333:TYR:CD1	2.56	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	349/401 (87%)	326 (93%)	20 (6%)	3 (1%)	14	22
1	B	340/401 (85%)	320 (94%)	20 (6%)	0	100	100
All	All	689/802 (86%)	646 (94%)	40 (6%)	3 (0%)	30	43

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	81	GLU
1	A	88	ARG
1	A	267	GLU

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	318/357 (89%)	298 (94%)	20 (6%)	16	29
1	B	310/357 (87%)	292 (94%)	18 (6%)	18	32
All	All	628/714 (88%)	590 (94%)	38 (6%)	17	30

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

Mol	Chain	Res	Type
1	A	81	GLU
1	A	86	ARG
1	A	87	THR
1	A	88	ARG
1	A	96	LYS
1	A	104	ARG
1	A	108	GLU
1	A	128	SER
1	A	145	LEU
1	A	180	GLU
1	A	192	LEU
1	A	199	ILE
1	A	257	LEU
1	A	270	ARG
1	A	291	SER
1	A	308	GLN
1	A	332	GLU
1	A	396	GLU
1	A	429	LYS
1	A	454	LYS
1	B	88	ARG
1	B	123	MET
1	B	144	LEU
1	B	192	LEU
1	B	202	GLN
1	B	217	GLU
1	B	247	LYS

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Mol	Chain	Res	Type
1	B	258	LYS
1	B	259	GLU
1	B	263	ILE
1	B	264	LYS
1	B	279	SER
1	B	318	ARG
1	B	319	GLU
1	B	331	PHE
1	B	357	GLU
1	B	406	LEU
1	B	451	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	126	GLN
1	A	207	GLN
1	A	288	ASN
1	A	308	GLN
1	A	377	HIS
1	A	410	ASN
1	A	442	GLN
1	A	451	GLN
1	B	112	HIS
1	B	122	ASN
1	B	126	GLN
1	B	305	ASN
1	B	345	ASN
1	B	377	HIS
1	B	392	ASN
1	B	442	GLN
1	B	451	GLN

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 [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

2 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	5R8	A	501	-	18,18,18	1.57	3 (16%)	23,23,23	1.69	7 (30%)
2	5R8	B	501	-	18,18,18	1.37	2 (11%)	23,23,23	1.75	5 (21%)

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	5R8	A	501	-	-	2/6/17/17	0/2/2/2
2	5R8	B	501	-	-	2/6/17/17	0/2/2/2

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	501	5R8	C30-C23	2.63	1.44	1.38
2	A	501	5R8	C27-C28	2.48	1.43	1.38
2	B	501	5R8	C27-C26	2.45	1.42	1.38
2	A	501	5R8	C26-C23	2.21	1.43	1.38
2	B	501	5R8	C22-N8	2.01	1.51	1.47

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	501	5R8	C22-N8-C7	4.66	118.67	111.09

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	501	5R8	C22-N8-C7	3.72	117.15	111.09
2	B	501	5R8	C1-N2-C11	3.55	118.82	110.56
2	B	501	5R8	C11-N2-C6	3.52	118.10	112.08
2	B	501	5R8	C23-C22-N8	3.47	120.25	113.15
2	B	501	5R8	C1-N2-C6	3.28	118.19	110.56
2	A	501	5R8	C1-N2-C11	3.10	117.76	110.56
2	A	501	5R8	C23-C22-N8	2.90	119.09	113.15
2	A	501	5R8	C11-N2-C6	2.72	116.74	112.08
2	A	501	5R8	C1-N2-C6	2.58	116.56	110.56
2	A	501	5R8	C22-N8-C9	2.08	114.48	111.09
2	A	501	5R8	C10-C9-N8	-2.08	111.42	115.35

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	5R8	C23-C22-N8-C7
2	A	501	5R8	C23-C22-N8-C9
2	B	501	5R8	C23-C22-N8-C7
2	B	501	5R8	C29-C28-C35-N36

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	501	5R8	2	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

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	353/401 (88%)	0.18	18 (5%) 33 30	21, 35, 68, 83	0
1	B	344/401 (85%)	0.38	43 (12%) 8 6	16, 35, 80, 97	0
All	All	697/802 (86%)	0.28	61 (8%) 15 12	16, 35, 76, 97	0

All (61) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	151	ILE	4.7
1	B	129	LEU	4.3
1	B	388	ASN	4.2
1	B	120	LEU	4.2
1	B	118	GLY	4.1
1	A	84	GLU	4.1
1	B	87	THR	3.9
1	B	113	ILE	3.8
1	A	391	GLU	3.6
1	A	150	ALA	3.6
1	B	109	ASP	3.5
1	B	115	VAL	3.4
1	B	177	MET	3.3
1	B	432	SER	3.2
1	B	121	SER	3.1
1	A	390	PHE	3.1
1	B	107	ARG	3.1
1	B	119	GLY	3.0
1	A	389	ASP	3.0
1	A	177	MET	2.9
1	A	263	ILE	2.9
1	B	267	GLU	2.9
1	B	112	HIS	2.9
1	B	89	ARG	2.8

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Mol	Chain	Res	Type	RSRZ
1	B	124	LEU	2.8
1	A	86	ARG	2.8
1	B	433	ILE	2.7
1	B	105	GLY	2.7
1	B	111	PHE	2.7
1	B	264	LYS	2.7
1	A	266	THR	2.7
1	B	133	THR	2.7
1	B	148	TYR	2.6
1	B	103	TRP	2.6
1	A	83	PRO	2.6
1	B	149	GLY	2.5
1	A	322	GLU	2.5
1	B	114	SER	2.5
1	B	110	GLU	2.5
1	B	106	LEU	2.5
1	A	396	GLU	2.4
1	B	268	GLU	2.4
1	B	108	GLU	2.4
1	B	88	ARG	2.3
1	B	266	THR	2.3
1	A	320	ASN	2.3
1	B	122	ASN	2.3
1	B	429	LYS	2.2
1	B	134	ALA	2.2
1	B	93	LEU	2.2
1	B	265	PHE	2.2
1	B	130	PRO	2.2
1	A	149	GLY	2.2
1	B	132	THR	2.1
1	B	117	ARG	2.1
1	A	388	ASN	2.1
1	B	128	SER	2.1
1	A	87	THR	2.0
1	B	318	ARG	2.0
1	B	137	GLY	2.0
1	A	80	ASP	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 [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, 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($\text{\AA}^2$)	Q<0.9
2	5R8	A	501	17/17	0.85	0.19	51,54,57,57	0
2	5R8	B	501	17/17	0.90	0.15	45,48,56,58	0

6.5 Other polymers [i](#)

There are no such residues in this entry.