



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 14, 2017 – 02:59 am GMT

PDB ID : 5EQP
Title : Crystal structure of choline kinase alpha-1 bound by 6-[(4-methyl-1,4-diazepan-1-yl)methyl]quinoline (compound 37)
Authors : Zhou, T.; Zhu, X.; Dalgarno, D.C.
Deposited on : 2015-11-13
Resolution : 2.35 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

<http://wwpdb.org/validation/2016/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity	:	4.02b-467
Mogul	:	1.7.2 (RC1), CSD as538be (2017)
Xtriage (Phenix)	:	1.9-1692
EDS	:	trunk28620
Percentile statistics	:	20161228.v01 (using entries in the PDB archive December 28th 2016)
Refmac	:	5.8.0135
CCP4	:	6.5.0
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	recalc28949

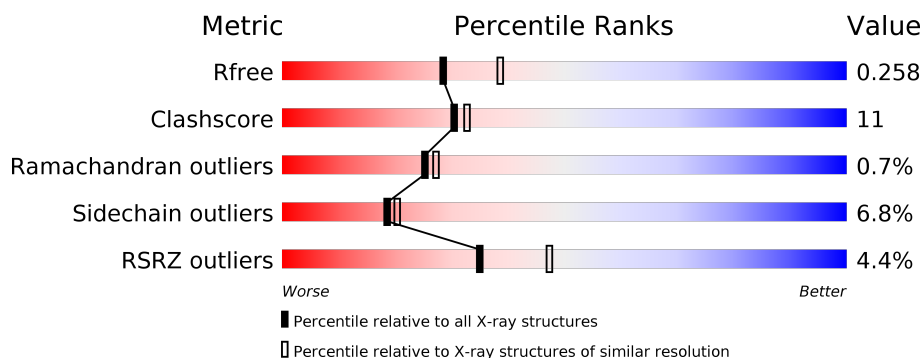
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.35 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}	100719	1522 (2.38-2.34)
Clashscore	112137	1626 (2.38-2.34)
Ramachandran outliers	110173	1605 (2.38-2.34)
Sidechain outliers	110143	1606 (2.38-2.34)
RSRZ outliers	101464	1528 (2.38-2.34)

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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. 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	
1	B	401	

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	5R9	A	501	-	-	-	X

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 5920 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	352	Total	C	N	O	S	0	0	0
			2925	1892	492	525	16			
1	B	349	Total	C	N	O	S	0	0	0
			2906	1881	489	520	16			

There are 36 discrepancies between the modelled and reference sequences:

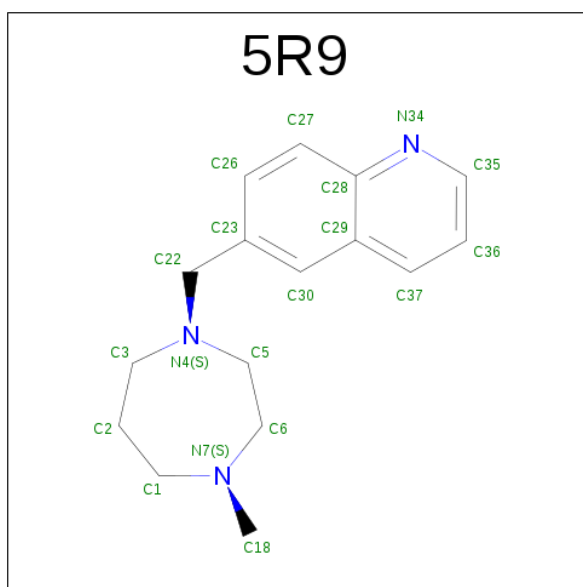
Chain	Residue	Modelled	Actual	Comment	Reference
A	57	GLY	-	expression tag	UNP P35790
A	58	SER	-	expression tag	UNP P35790
A	59	SER	-	expression tag	UNP P35790
A	60	HIS	-	expression tag	UNP P35790
A	61	HIS	-	expression tag	UNP P35790
A	62	HIS	-	expression tag	UNP P35790
A	63	HIS	-	expression tag	UNP P35790
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

Continued on next page...

Continued from previous page...

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 6-[(4-methyl-1,4-diazepan-1-yl)methyl]quinoline (three-letter code: 5R9) (formula: C₁₆H₂₁N₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	N	0	0
			19	16	3		
2	B	1	Total	C	N	0	0
			19	16	3		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	21	Total	O	0	0
			21	21		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	30	Total	O	0	0
			30	30		

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	55.49Å 120.21Å 130.28Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	50.00 – 2.35 46.99 – 2.35	Depositor EDS
% Data completeness (in resolution range)	93.4 (50.00-2.35) 93.4 (46.99-2.35)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.11 (at 2.34Å)	Xtriage
Refinement program	CNX	Depositor
R, R_{free}	0.227 , 0.264 0.224 , 0.258	Depositor DCC
R_{free} test set	1726 reflections (5.24%)	DCC
Wilson B-factor (Å ²)	43.4	Xtriage
Anisotropy	0.344	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 38.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	5920	wwPDB-VP
Average B, all atoms (Å ²)	49.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.85% 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: 5R9

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	0.37	0/3001	0.52	0/4040
1	B	0.38	0/2982	0.51	0/4014
All	All	0.38	0/5983	0.51	0/8054

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	2

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	287	GLU	Peptide
1	A	288	ASN	Peptide

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2925	0	2898	73	0
1	B	2906	0	2882	50	0
2	A	19	0	21	3	0
2	B	19	0	21	3	0
3	A	21	0	0	0	0
3	B	30	0	0	0	0
All	All	5920	0	5822	123	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 11.

All (123) 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	1.24	1.01
1:A:357:GLU:CD	1:A:357:GLU:H	1.75	0.91
1:A:104:ARG:HG2	1:A:104:ARG:HH11	1.37	0.88
1:A:270:ARG:HH11	1:A:270:ARG:CG	1.93	0.81
1:B:305:ASN:HD21	1:B:337:ASN:HD22	1.28	0.79
1:A:175:GLU:O	1:A:175:GLU:HG3	1.83	0.77
1:B:87:THR:O	1:B:88:ARG:HB3	1.87	0.75
1:B:357:GLU:H	1:B:357:GLU:CD	1.88	0.74
1:A:270:ARG:NH1	1:A:270:ARG:HG3	2.01	0.71
1:A:178:VAL:HG23	1:A:179:LEU:HD12	1.74	0.70
1:B:383:LEU:HD21	1:B:405:MET:CE	2.22	0.70
1:A:367:ARG:O	1:A:367:ARG:HG3	1.91	0.70
1:A:84:GLU:O	1:A:87:THR:O	2.09	0.69
1:B:116:ILE:HD11	1:B:126:GLN:HE21	1.60	0.66
1:A:308:GLN:NE2	1:A:310:GLY:H	1.94	0.65
1:A:256:TYR:O	1:A:260:VAL:HG23	1.97	0.63
1:B:87:THR:O	1:B:89:ARG:N	2.31	0.63
1:B:267:GLU:OE1	1:B:269:SER:HB3	1.98	0.63
1:A:259:GLU:O	1:A:263:ILE:HG23	2.01	0.61
1:A:357:GLU:CD	1:A:357:GLU:N	2.48	0.61
1:A:88:ARG:HA	1:A:91:ALA:HB3	1.82	0.61
1:B:306:ASP:OD1	2:B:501:5R9:C1	2.49	0.61
1:A:277:LEU:HD13	1:A:425:ILE:HD11	1.84	0.60
1:B:357:GLU:CD	1:B:357:GLU:N	2.55	0.59
1:A:82:GLN:N	1:A:83:PRO:HD3	2.16	0.59
1:B:383:LEU:HD21	1:B:405:MET:HE1	1.84	0.58
1:A:87:THR:O	1:A:88:ARG:CB	2.51	0.58
1:A:204:ARG:HD2	1:A:206:GLU:OE1	2.04	0.58

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:288:ASN:OD1	1:A:288:ASN:O	2.22	0.58
1:A:125:PHE:CE2	1:A:147:LEU:HD13	2.39	0.57
1:B:387:GLN:HG3	1:B:390:PHE:HB2	1.87	0.57
1:B:305:ASN:ND2	1:B:337:ASN:HD22	1.98	0.57
1:A:126:GLN:CG	1:A:142:LYS:HD3	2.35	0.56
1:A:405:MET:O	1:A:409:VAL:HG13	2.05	0.56
1:B:116:ILE:HD11	1:B:126:GLN:HB2	1.87	0.56
1:A:107:ARG:HB2	1:A:110:GLU:HG2	1.87	0.56
1:B:345:ASN:ND2	1:B:420:TRP:HE1	2.04	0.55
1:B:126:GLN:OE1	1:B:142:LYS:HD3	2.06	0.55
1:A:87:THR:O	1:A:88:ARG:HB3	2.06	0.55
1:B:451:GLN:HE21	1:B:451:GLN:HA	1.71	0.54
1:A:83:PRO:HG2	1:A:113:ILE:HG12	1.90	0.54
1:B:267:GLU:OE1	1:B:269:SER:N	2.33	0.54
1:B:219:LEU:HD21	1:B:309:GLU:HB3	1.90	0.54
1:A:96:LYS:O	1:A:104:ARG:NH1	2.42	0.53
1:A:308:GLN:HE21	1:A:310:GLY:H	1.56	0.53
1:A:104:ARG:HG2	1:A:104:ARG:NH1	2.15	0.53
1:A:267:GLU:HG3	1:A:270:ARG:NH1	2.24	0.53
1:A:369:TYR:CG	1:A:370:PRO:HD2	2.45	0.52
1:A:282:LEU:N	1:A:283:PRO:CD	2.72	0.52
1:A:120:LEU:N	1:A:120:LEU:HD12	2.25	0.52
1:A:178:VAL:HG23	1:A:179:LEU:CD1	2.39	0.52
1:A:357:GLU:N	1:A:357:GLU:OE1	2.41	0.52
1:A:125:PHE:HE2	1:A:147:LEU:HD13	1.74	0.51
1:B:227:GLU:HB3	1:B:326:LEU:HD12	1.92	0.51
1:A:304:HIS:O	1:A:305:ASN:HB2	2.09	0.51
1:A:145:LEU:HD22	1:A:147:LEU:HD12	1.93	0.50
1:B:85:PRO:C	1:B:87:THR:H	2.14	0.50
1:A:420:TRP:CH2	2:A:501:5R9:H13	2.47	0.50
1:A:288:ASN:OD1	1:A:288:ASN:C	2.50	0.50
1:A:351:MET:SD	1:A:366:ILE:HA	2.52	0.50
1:A:104:ARG:CG	1:A:104:ARG:HH11	2.14	0.50
1:A:419:LEU:HD23	1:A:419:LEU:C	2.32	0.49
1:B:124:LEU:HD22	1:B:144:LEU:HD21	1.95	0.49
1:A:394:SER:O	1:A:397:GLU:N	2.46	0.48
1:B:430:ILE:HG13	1:B:431:SER:N	2.27	0.48
1:A:117:ARG:NH1	1:A:122:ASN:O	2.46	0.48
1:A:145:LEU:HD13	1:A:147:LEU:HD11	1.95	0.48
1:A:250:PHE:CZ	1:A:290:ARG:HA	2.49	0.48
1:A:393:LEU:O	1:A:398:LYS:HE3	2.14	0.48

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:178:VAL:HG12	1:B:178:VAL:HG22	1.94	0.48
1:A:202:GLN:OE1	1:A:202:GLN:N	2.47	0.47
1:B:87:THR:C	1:B:89:ARG:N	2.68	0.47
1:B:219:LEU:O	1:B:225:SER:HB3	2.14	0.47
1:A:266:THR:O	1:A:267:GLU:C	2.53	0.46
1:B:306:ASP:OD1	2:B:501:5R9:H9	2.15	0.46
1:A:451:GLN:HA	1:A:451:GLN:HE21	1.79	0.46
1:A:88:ARG:HB2	1:A:113:ILE:HG21	1.97	0.46
1:A:119:GLY:C	1:A:120:LEU:HD12	2.36	0.46
1:B:87:THR:C	1:B:89:ARG:H	2.18	0.46
1:B:383:LEU:HD21	1:B:405:MET:HE3	1.98	0.46
1:A:258:LYS:O	1:A:262:ARG:HG2	2.16	0.45
1:A:395:THR:HA	1:A:398:LYS:HD2	1.99	0.45
1:B:308:GLN:HE21	1:B:310:GLY:H	1.63	0.45
1:A:146:ARG:O	1:A:203:GLY:HA3	2.17	0.45
1:B:178:VAL:O	1:B:182:VAL:HG23	2.16	0.45
1:B:145:LEU:HD12	1:B:146:ARG:N	2.32	0.45
1:A:306:ASP:OD1	2:A:501:5R9:C1	2.64	0.44
2:A:501:5R9:H3	2:A:501:5R9:H6	1.76	0.44
1:B:88:ARG:HG3	1:B:113:ILE:CG2	2.48	0.44
1:A:252:THR:HG22	1:A:256:TYR:CE2	2.52	0.44
1:B:383:LEU:HB2	1:B:384:PRO:HD3	1.98	0.44
1:A:245:GLU:OE1	1:B:104:ARG:NH2	2.47	0.44
1:A:398:LYS:O	1:A:402:LYS:HG3	2.18	0.44
1:A:319:GLU:CD	1:A:319:GLU:H	2.21	0.43
1:A:371:THR:O	1:A:375:GLN:HG3	2.18	0.43
1:B:238:MET:HB2	1:B:238:MET:HE2	1.75	0.43
1:A:379:ILE:HA	1:A:382:TYR:HB3	1.99	0.43
1:B:282:LEU:N	1:B:283:PRO:CD	2.82	0.43
1:B:267:GLU:OE1	1:B:269:SER:CB	2.66	0.42
1:B:423:TRP:O	1:B:427:GLN:HG2	2.20	0.42
1:B:452:LYS:HB3	1:B:452:LYS:HE2	1.86	0.42
1:A:233:ALA:HB2	1:A:382:TYR:CD1	2.54	0.42
1:A:178:VAL:HG23	1:A:179:LEU:N	2.35	0.42
1:B:95:CYS:HB3	1:B:103:TRP:CE3	2.55	0.42
1:B:88:ARG:HA	1:B:91:ALA:HB3	2.02	0.42
1:B:88:ARG:HG3	1:B:113:ILE:HG21	2.02	0.41
1:A:122:ASN:O	1:A:124:LEU:HD13	2.20	0.41
1:B:107:ARG:NH2	1:B:109:ASP:OD2	2.53	0.41
1:A:423:TRP:O	1:A:427:GLN:HG2	2.21	0.41
1:B:318:ARG:C	1:B:320:ASN:N	2.72	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:82:GLN:HA	1:B:83:PRO:HD3	1.45	0.41
1:A:121:SER:O	1:A:148:TYR:O	2.37	0.41
1:B:394:SER:O	1:B:395:THR:C	2.59	0.41
1:A:88:ARG:HG3	1:A:89:ARG:N	2.34	0.41
1:B:250:PHE:CZ	1:B:290:ARG:HA	2.56	0.41
1:B:394:SER:O	1:B:397:GLU:N	2.54	0.41
2:B:501:5R9:H3	2:B:501:5R9:H6	1.71	0.41
1:A:88:ARG:NH1	1:A:108:GLU:OE2	2.53	0.41
1:A:332:GLU:H	1:A:332:GLU:HG2	1.05	0.41
1:A:394:SER:C	1:A:396:GLU:N	2.74	0.41
1:A:221:LEU:HA	1:A:222:PRO:HD3	1.83	0.40
1:B:303:CYS:SG	1:B:337:ASN:HB3	2.62	0.40
1:B:419:LEU:HD23	1:B:419:LEU:C	2.42	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	348/401 (87%)	327 (94%)	19 (6%)	2 (1%)	28	32
1	B	345/401 (86%)	327 (95%)	15 (4%)	3 (1%)	20	21
All	All	693/802 (86%)	654 (94%)	34 (5%)	5 (1%)	25	27

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	88	ARG
1	A	267	GLU
1	B	319	GLU
1	B	86	ARG
1	B	433	ILE

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	316/357 (88%)	289 (92%)	27 (8%)	12	13
1	B	315/357 (88%)	299 (95%)	16 (5%)	28	33
All	All	631/714 (88%)	588 (93%)	43 (7%)	18	20

All (43) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	82	GLN
1	A	86	ARG
1	A	87	THR
1	A	88	ARG
1	A	89	ARG
1	A	104	ARG
1	A	108	GLU
1	A	145	LEU
1	A	146	ARG
1	A	180	GLU
1	A	192	LEU
1	A	257	LEU
1	A	262	ARG
1	A	267	GLU
1	A	268	GLU
1	A	270	ARG
1	A	288	ASN
1	A	291	SER
1	A	308	GLN
1	A	332	GLU
1	A	357	GLU
1	A	367	ARG
1	A	373	LYS
1	A	392	ASN
1	A	451	GLN
1	A	452	LYS
1	A	454	LYS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	B	86	ARG
1	B	87	THR
1	B	123	MET
1	B	144	LEU
1	B	202	GLN
1	B	217	GLU
1	B	259	GLU
1	B	279	SER
1	B	291	SER
1	B	295	SER
1	B	318	ARG
1	B	319	GLU
1	B	357	GLU
1	B	406	LEU
1	B	430	ILE
1	B	451	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	207	GLN
1	A	308	GLN
1	A	377	HIS
1	A	451	GLN
1	B	126	GLN
1	B	202	GLN
1	B	305	ASN
1	B	308	GLN
1	B	345	ASN
1	B	410	ASN
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

There are no carbohydrates in this entry.

5.6 Ligand geometry

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	5R9	A	501	-	21,21,21	0.87	0	27,28,28	0.83	1 (3%)
2	5R9	B	501	-	21,21,21	0.84	0	27,28,28	0.81	1 (3%)

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	5R9	A	501	-	-	0/4/15/15	0/3/3/3
2	5R9	B	501	-	-	0/4/15/15	0/3/3/3

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	501	5R9	C30-C29-C28	2.05	120.76	118.28
2	B	501	5R9	C30-C29-C28	2.13	120.86	118.28

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	501	5R9	3	0
2	B	501	5R9	3	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	352/401 (87%)	0.09	11 (3%) 49 61	30, 46, 77, 93	0
1	B	349/401 (87%)	0.28	20 (5%) 24 35	24, 44, 87, 113	0
All	All	701/802 (87%)	0.18	31 (4%) 35 47	24, 45, 85, 113	0

All (31) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	120	LEU	7.2
1	B	129	LEU	4.5
1	B	85	PRO	4.4
1	B	86	ARG	4.4
1	B	89	ARG	4.0
1	B	132	THR	3.9
1	B	116	ILE	3.9
1	A	175	GLU	3.7
1	A	320	ASN	3.6
1	A	391	GLU	3.4
1	B	136	LEU	3.3
1	B	111	PHE	3.3
1	A	322	GLU	3.3
1	B	112	HIS	3.1
1	A	84	GLU	3.1
1	A	388	ASN	3.1
1	A	319	GLU	3.0
1	B	177	MET	3.0
1	A	86	ARG	2.9
1	B	124	LEU	2.7
1	B	388	ASN	2.7
1	A	407	LEU	2.7
1	B	268	GLU	2.6
1	B	395	THR	2.5

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	B	130	PRO	2.5
1	B	331	PHE	2.4
1	B	84	GLU	2.3
1	B	121	SER	2.3
1	B	264	LYS	2.3
1	A	118	GLY	2.1
1	A	275	HIS	2.1

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 carbohydrates 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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(Å ²)	Q<0.9
2	5R9	A	501	19/19	0.90	0.15	2.90	43,46,50,51	0
2	5R9	B	501	19/19	0.93	0.14	0.07	35,39,44,44	0

6.5 Other polymers [i](#)

There are no such residues in this entry.