



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 05:41 PM UTC

PDB ID : 1MUO / pdb_00001muo
Title : CRYSTAL STRUCTURE OF AURORA-2, AN ONCOGENIC SERINE-THREONINE KINASE
Authors : Cheetham, G.M.T.; Knegtel, R.M.A.; Coll, J.T.; Renwick, S.B.; Swenson, L.; Weber, P.; Lippke, J.A.; Austen, D.A.
Deposited on : 2002-09-24
Resolution : 2.90 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)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

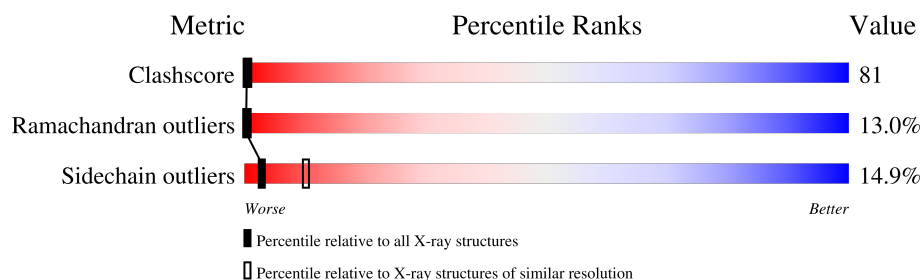
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.90 Å.

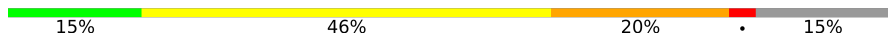
Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	190562	2690 (2.90-2.90)
Ramachandran outliers	187476	2623 (2.90-2.90)
Sidechain outliers	187428	2625 (2.90-2.90)

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 $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	297	

2 Entry composition [i](#)

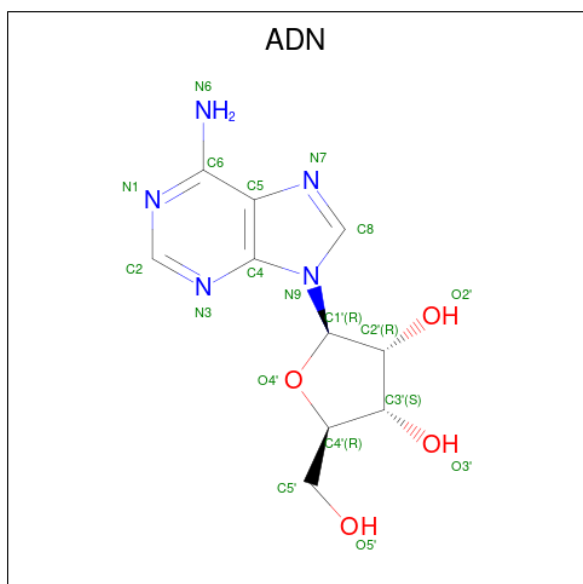
There are 2 unique types of molecules in this entry. The entry contains 2029 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Aurora-related kinase 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	251	2010	1296	347	361	6	0	0	0

- Molecule 2 is ADENOSINE (CCD ID: ADN) (formula: $C_{10}H_{13}N_5O_4$).



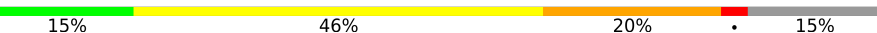
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
2	A	1	19	10	5	4	0	0

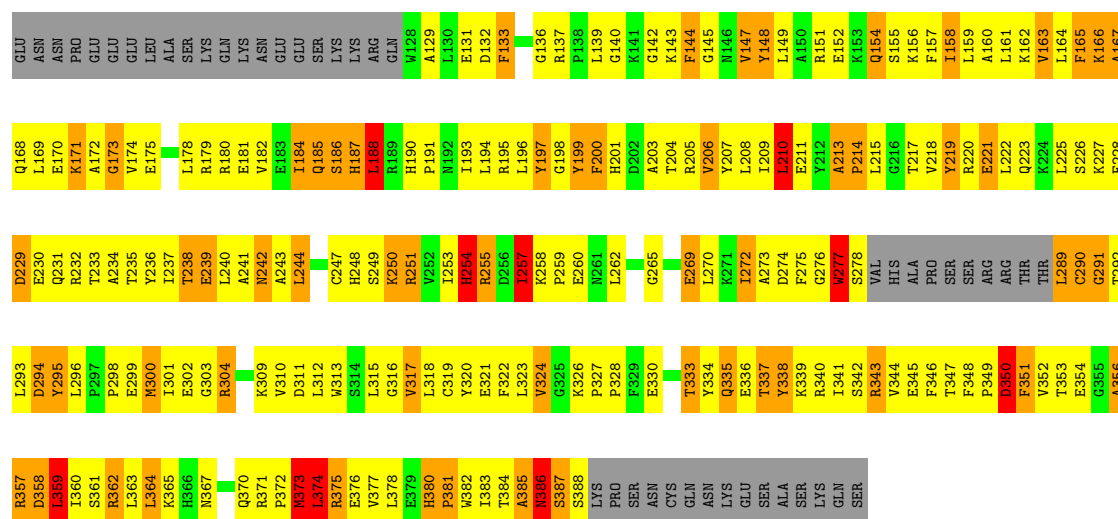
3 Residue-property plots

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. 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. 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.

Note EDS was not executed.

• Molecule 1: Aurora-related kinase 1

Chain A: 



4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 32 2 1	Depositor
Cell constants a, b, c, α , β , γ	86.20 Å 86.20 Å 75.40 Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	18.00 – 2.90	Depositor
% Data completeness (in resolution range)	85.9 (18.00-2.90)	Depositor
R_{merge}	0.07	Depositor
R_{sym}	0.06	Depositor
Refinement program	CNS	Depositor
R, R_{free}	0.240 , 0.290	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	2029	wwPDB-VP
Average B, all atoms (Å ²)	81.0	wwPDB-VP

5 Model quality

5.1 Standard geometry

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

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	0.90	2/2060 (0.1%)	1.35	37/2793 (1.3%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	277	TRP	N-CA	6.58	1.54	1.46
1	A	165	PHE	CA-C	-5.78	1.45	1.53

All (37) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	338	TYR	N-CA-C	-12.16	98.06	111.07
1	A	213	ALA	CA-C-N	10.23	130.98	119.32
1	A	213	ALA	C-N-CA	10.23	130.98	119.32
1	A	175	GLU	N-CA-C	-8.56	101.87	111.71
1	A	257	ILE	N-CA-C	8.09	126.16	109.34
1	A	185	GLN	N-CA-C	-7.37	103.27	111.82
1	A	156	LYS	N-CA-C	-7.15	104.14	112.86
1	A	210	LEU	N-CA-C	6.93	119.71	109.24
1	A	324	VAL	N-CA-C	6.84	117.91	111.48
1	A	380	HIS	CA-C-N	6.83	128.38	119.84
1	A	380	HIS	C-N-CA	6.83	128.38	119.84
1	A	333	THR	N-CA-C	6.70	120.97	110.32
1	A	277	TRP	N-CA-C	6.34	124.30	110.80
1	A	219	TYR	N-CA-C	-6.24	103.41	111.02
1	A	277	TRP	CA-C-N	6.22	132.90	121.70
1	A	277	TRP	C-N-CA	6.22	132.90	121.70
1	A	243	ALA	N-CA-C	-6.08	104.66	111.28
1	A	356	ALA	N-CA-C	-6.06	102.29	111.56
1	A	239	GLU	N-CA-C	-6.01	104.42	110.97

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	251	ARG	N-CA-C	5.86	118.35	111.02
1	A	373	MET	N-CA-C	-5.84	102.99	110.53
1	A	295	TYR	N-CA-C	5.77	120.46	112.90
1	A	184	ILE	N-CA-C	5.73	116.38	110.82
1	A	181	GLU	N-CA-C	-5.73	105.04	111.28
1	A	277	TRP	CB-CA-C	-5.72	99.03	110.42
1	A	359	LEU	N-CA-C	-5.60	105.18	111.28
1	A	386	ASN	N-CA-C	-5.44	101.59	109.59
1	A	165	PHE	CA-C-N	-5.26	111.49	121.54
1	A	165	PHE	C-N-CA	-5.26	111.49	121.54
1	A	276	GLY	CA-C-N	5.11	131.29	121.54
1	A	276	GLY	C-N-CA	5.11	131.29	121.54
1	A	166	LYS	CA-CB-CG	-5.09	103.92	114.10
1	A	260	GLU	N-CA-C	5.06	118.23	111.75
1	A	289	LEU	CA-C-N	-5.06	111.88	121.54
1	A	289	LEU	C-N-CA	-5.06	111.88	121.54
1	A	214	PRO	N-CA-C	5.05	121.27	113.75
1	A	277	TRP	O-C-N	5.04	129.29	122.59

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	2010	0	1960	325	2
2	A	19	0	13	2	0
All	All	2029	0	1973	325	2

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 81.

All (325) 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:373:MET:SD	1:A:374:LEU:HG	1.90	1.11
1:A:333:THR:HG23	1:A:336:GLU:H	1.11	1.10
1:A:233:THR:HG21	1:A:323:LEU:CD2	1.83	1.09
1:A:339:LYS:O	1:A:343:ARG:HB3	1.58	1.03
1:A:161:LEU:HD11	1:A:207:TYR:HB3	1.37	1.00
1:A:289:LEU:O	1:A:291:GLY:N	1.94	1.00
1:A:380:HIS:HB3	1:A:383:ILE:HD13	1.42	1.00
1:A:233:THR:HG21	1:A:323:LEU:HD21	1.03	1.00
1:A:233:THR:CG2	1:A:323:LEU:HD21	1.92	1.00
1:A:290:CYS:O	1:A:292:THR:N	1.95	0.99
1:A:254:HIS:O	1:A:255:ARG:HG3	1.62	0.99
1:A:374:LEU:HD12	1:A:375:ARG:H	1.26	0.98
1:A:139:LEU:HD21	1:A:149:LEU:HG	1.41	0.97
1:A:327:PRO:HG2	1:A:330:GLU:HB2	1.47	0.95
1:A:240:LEU:HD21	1:A:257:ILE:HD11	1.46	0.94
1:A:204:THR:HG23	1:A:205:ARG:HG2	1.47	0.93
1:A:320:TYR:HB2	1:A:360:ILE:HD11	1.50	0.93
1:A:161:LEU:HD12	1:A:208:LEU:O	1.69	0.93
1:A:321:GLU:HG3	1:A:326:LYS:C	1.96	0.91
1:A:213:ALA:O	2:A:1:ADN:H2	1.70	0.91
1:A:335:GLN:NE2	1:A:335:GLN:H	1.69	0.89
1:A:354:GLU:HA	1:A:357:ARG:HD2	1.57	0.84
1:A:190:HIS:HB3	1:A:193:ILE:HD12	1.58	0.83
1:A:318:LEU:HG	1:A:322:PHE:CZ	2.14	0.82
1:A:247:CYS:O	1:A:250:LYS:HE2	1.79	0.82
1:A:335:GLN:H	1:A:335:GLN:HE21	1.25	0.81
1:A:221:GLU:CD	1:A:232:ARG:HH22	1.90	0.80
1:A:129:ALA:HB3	1:A:132:ASP:OD1	1.81	0.80
1:A:333:THR:HG23	1:A:336:GLU:N	1.95	0.80
1:A:217:THR:CG2	1:A:220:ARG:HG2	2.11	0.79
1:A:374:LEU:CD1	1:A:375:ARG:H	1.95	0.79
1:A:161:LEU:HD21	1:A:207:TYR:CD2	2.17	0.79
1:A:208:LEU:HB3	1:A:210:LEU:HD11	1.63	0.78
1:A:354:GLU:O	1:A:354:GLU:HG2	1.84	0.77
1:A:231:GLN:O	1:A:235:THR:HG22	1.86	0.76
1:A:295:TYR:OH	1:A:321:GLU:OE1	2.04	0.75
1:A:343:ARG:CD	1:A:345:GLU:HB2	2.17	0.75
1:A:272:ILE:C	1:A:272:ILE:HD12	2.11	0.75
1:A:317:VAL:HG13	1:A:328:PRO:HD2	1.69	0.74
1:A:162:LYS:HB3	1:A:208:LEU:HB2	1.70	0.74
1:A:166:LYS:HB2	1:A:204:THR:O	1.87	0.73
1:A:166:LYS:O	1:A:168:GLN:N	2.22	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:242:ASN:N	1:A:242:ASN:HD22	1.85	0.73
1:A:343:ARG:HD2	1:A:345:GLU:HB2	1.69	0.73
1:A:220:ARG:HD3	1:A:223:GLN:OE1	1.89	0.72
1:A:364:LEU:O	1:A:364:LEU:HD22	1.88	0.72
1:A:301:ILE:HD12	1:A:338:TYR:HD2	1.55	0.72
1:A:320:TYR:HB2	1:A:360:ILE:CD1	2.18	0.71
1:A:254:HIS:O	1:A:255:ARG:CG	2.37	0.71
1:A:229:ASP:O	1:A:233:THR:HG22	1.91	0.70
1:A:337:THR:O	1:A:341:ILE:N	2.21	0.70
1:A:254:HIS:CE1	1:A:274:ASP:HB2	2.26	0.70
1:A:359:LEU:HD13	1:A:359:LEU:C	2.16	0.70
1:A:248:HIS:HE1	1:A:311:ASP:OD2	1.73	0.70
1:A:333:THR:HG22	1:A:336:GLU:HB2	1.73	0.69
1:A:194:LEU:HA	1:A:211:GLU:OE1	1.93	0.69
1:A:317:VAL:O	1:A:320:TYR:HB3	1.93	0.69
1:A:293:LEU:O	1:A:295:TYR:N	2.26	0.69
1:A:364:LEU:O	1:A:364:LEU:HD13	1.93	0.69
1:A:344:VAL:HG12	1:A:344:VAL:O	1.93	0.68
1:A:316:GLY:HA2	1:A:363:LEU:HD23	1.74	0.68
1:A:158:ILE:HD13	1:A:158:ILE:H	1.58	0.68
1:A:208:LEU:CB	1:A:210:LEU:HD11	2.22	0.68
1:A:265:GLY:HA3	1:A:269:GLU:OE2	1.93	0.68
1:A:383:ILE:O	1:A:387:SER:HB2	1.94	0.68
1:A:384:THR:O	1:A:385:ALA:HB3	1.94	0.68
1:A:185:GLN:HA	1:A:188:LEU:HB2	1.76	0.67
1:A:346:PHE:CE2	1:A:364:LEU:HD21	2.29	0.67
1:A:172:ALA:O	1:A:174:VAL:N	2.28	0.67
1:A:250:LYS:NZ	1:A:250:LYS:HB3	2.08	0.67
1:A:359:LEU:HB2	1:A:380:HIS:CE1	2.30	0.67
1:A:289:LEU:O	1:A:290:CYS:C	2.33	0.66
1:A:377:VAL:HG23	1:A:378:LEU:H	1.59	0.66
1:A:242:ASN:HD21	1:A:378:LEU:HD11	1.60	0.66
1:A:190:HIS:ND1	1:A:191:PRO:HD2	2.11	0.66
1:A:367:ASN:HB3	1:A:370:GLN:HG3	1.78	0.66
1:A:145:GLY:HA3	1:A:163:VAL:O	1.95	0.66
1:A:242:ASN:ND2	1:A:378:LEU:HD21	2.11	0.66
1:A:165:PHE:HB2	1:A:168:GLN:HG2	1.77	0.65
1:A:166:LYS:O	1:A:167:ALA:C	2.39	0.65
1:A:215:LEU:HD12	1:A:265:GLY:O	1.95	0.65
1:A:333:THR:OG1	1:A:335:GLN:NE2	2.30	0.65
1:A:250:LYS:HD2	1:A:250:LYS:O	1.95	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:320:TYR:CE2	1:A:324:VAL:HG21	2.31	0.65
1:A:361:SER:HA	1:A:364:LEU:CD1	2.26	0.65
1:A:220:ARG:HA	1:A:223:GLN:HG2	1.79	0.64
1:A:217:THR:HG23	1:A:220:ARG:H	1.63	0.64
1:A:240:LEU:HD21	1:A:257:ILE:CD1	2.25	0.64
1:A:350:ASP:O	1:A:351:PHE:HB3	1.97	0.64
1:A:136:GLY:N	1:A:149:LEU:O	2.28	0.64
1:A:354:GLU:HA	1:A:357:ARG:CD	2.28	0.63
1:A:164:LEU:N	1:A:164:LEU:HD12	2.12	0.63
1:A:383:ILE:N	1:A:383:ILE:HD12	2.14	0.63
1:A:234:ALA:O	1:A:238:THR:HG22	1.99	0.63
1:A:359:LEU:HD21	1:A:377:VAL:HG12	1.79	0.63
1:A:373:MET:SD	1:A:374:LEU:CG	2.79	0.62
1:A:242:ASN:ND2	1:A:378:LEU:HD11	2.14	0.62
1:A:247:CYS:HA	1:A:250:LYS:CE	2.29	0.62
1:A:377:VAL:HG23	1:A:378:LEU:N	2.15	0.62
1:A:166:LYS:C	1:A:168:GLN:N	2.58	0.62
1:A:229:ASP:O	1:A:233:THR:CG2	2.48	0.61
1:A:333:THR:CG2	1:A:336:GLU:H	2.01	0.61
1:A:359:LEU:HD23	1:A:380:HIS:CG	2.36	0.61
1:A:143:LYS:H	1:A:278:SER:HB2	1.65	0.61
1:A:317:VAL:HG13	1:A:328:PRO:CD	2.29	0.61
1:A:132:ASP:HB2	1:A:133:PHE:CE1	2.36	0.61
1:A:190:HIS:CB	1:A:193:ILE:HD12	2.29	0.59
1:A:290:CYS:O	1:A:291:GLY:C	2.45	0.59
1:A:383:ILE:H	1:A:383:ILE:CD1	2.15	0.59
1:A:365:LYS:HB2	1:A:371:ARG:CZ	2.32	0.59
1:A:210:LEU:N	1:A:210:LEU:HD12	2.17	0.59
1:A:335:GLN:NE2	1:A:335:GLN:N	2.44	0.59
1:A:321:GLU:HG3	1:A:327:PRO:N	2.16	0.59
1:A:356:ALA:O	1:A:360:ILE:HG22	2.03	0.58
1:A:199:TYR:CE2	1:A:201:HIS:HD2	2.21	0.58
1:A:333:THR:CG2	1:A:336:GLU:HB2	2.32	0.58
1:A:161:LEU:HD21	1:A:207:TYR:HD2	1.66	0.58
1:A:384:THR:O	1:A:385:ALA:CB	2.50	0.58
1:A:293:LEU:HD12	1:A:334:TYR:HD1	1.69	0.58
1:A:170:GLU:C	1:A:172:ALA:H	2.11	0.58
1:A:383:ILE:HD12	1:A:383:ILE:H	1.69	0.57
1:A:290:CYS:SG	1:A:334:TYR:CD1	2.97	0.57
1:A:241:ALA:O	1:A:244:LEU:HB2	2.05	0.57
1:A:349:PRO:HG2	1:A:352:VAL:HG23	1.86	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:158:ILE:O	1:A:159:LEU:HD22	2.05	0.56
1:A:364:LEU:HD22	1:A:364:LEU:C	2.30	0.56
1:A:161:LEU:HD12	1:A:208:LEU:C	2.30	0.56
1:A:239:GLU:OE2	1:A:270:LEU:HB2	2.05	0.56
1:A:360:ILE:C	1:A:362:ARG:H	2.14	0.56
1:A:166:LYS:O	1:A:169:LEU:N	2.39	0.56
1:A:242:ASN:HD21	1:A:378:LEU:HD21	1.70	0.56
1:A:293:LEU:HD23	1:A:296:LEU:HD12	1.87	0.56
1:A:139:LEU:CD2	1:A:149:LEU:HG	2.26	0.55
1:A:152:GLU:HG2	1:A:154:GLN:H	1.72	0.55
1:A:320:TYR:C	1:A:320:TYR:CD2	2.85	0.55
1:A:346:PHE:HE2	1:A:364:LEU:HD21	1.72	0.55
1:A:194:LEU:HD12	1:A:211:GLU:OE1	2.07	0.55
1:A:360:ILE:O	1:A:363:LEU:N	2.26	0.55
1:A:133:PHE:CD1	1:A:133:PHE:N	2.74	0.55
1:A:242:ASN:N	1:A:242:ASN:ND2	2.54	0.55
1:A:172:ALA:O	1:A:173:GLY:C	2.51	0.54
1:A:233:THR:O	1:A:237:ILE:HG12	2.07	0.54
1:A:374:LEU:HD12	1:A:375:ARG:N	2.10	0.54
1:A:190:HIS:CG	1:A:191:PRO:HD2	2.42	0.54
1:A:235:THR:O	1:A:238:THR:HG23	2.08	0.54
1:A:312:LEU:N	1:A:312:LEU:HD22	2.23	0.54
1:A:182:VAL:O	1:A:186:SER:HB3	2.08	0.54
1:A:348:PHE:CZ	1:A:357:ARG:HA	2.43	0.54
1:A:340:ARG:O	1:A:345:GLU:N	2.36	0.54
1:A:170:GLU:O	1:A:172:ALA:N	2.40	0.53
1:A:387:SER:O	1:A:388:SER:O	2.26	0.53
1:A:337:THR:O	1:A:341:ILE:HG13	2.07	0.53
1:A:340:ARG:HA	1:A:345:GLU:HB3	1.91	0.53
1:A:144:PHE:CG	1:A:277:TRP:O	2.61	0.53
1:A:290:CYS:C	1:A:292:THR:N	2.66	0.53
1:A:318:LEU:HG	1:A:322:PHE:CE2	2.43	0.53
1:A:196:LEU:O	1:A:197:TYR:C	2.52	0.53
1:A:145:GLY:HA3	1:A:164:LEU:HA	1.91	0.53
1:A:339:LYS:O	1:A:343:ARG:CB	2.46	0.53
1:A:361:SER:O	1:A:371:ARG:NH2	2.35	0.52
1:A:373:MET:O	1:A:374:LEU:C	2.52	0.52
1:A:312:LEU:O	1:A:363:LEU:HG	2.10	0.52
1:A:386:ASN:O	1:A:387:SER:HB2	2.08	0.52
1:A:157:PHE:CD1	1:A:158:ILE:HD13	2.44	0.52
1:A:327:PRO:CG	1:A:330:GLU:HB2	2.30	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:360:ILE:C	1:A:362:ARG:N	2.63	0.52
1:A:162:LYS:CG	1:A:208:LEU:HD12	2.39	0.52
1:A:327:PRO:HG2	1:A:330:GLU:CB	2.30	0.52
1:A:348:PHE:HZ	1:A:360:ILE:CG2	2.23	0.52
1:A:158:ILE:C	1:A:159:LEU:HD22	2.34	0.51
1:A:200:PHE:CE1	1:A:209:ILE:HD11	2.45	0.51
1:A:383:ILE:N	1:A:383:ILE:CD1	2.73	0.51
1:A:190:HIS:HB3	1:A:193:ILE:CD1	2.34	0.51
1:A:348:PHE:CZ	1:A:360:ILE:HG21	2.46	0.51
1:A:254:HIS:O	1:A:255:ARG:CB	2.56	0.51
1:A:356:ALA:O	1:A:358:ASP:N	2.44	0.51
1:A:136:GLY:O	1:A:148:TYR:HB3	2.10	0.51
1:A:273:ALA:O	1:A:277:TRP:HH2	1.94	0.51
1:A:380:HIS:C	1:A:382:TRP:H	2.19	0.51
1:A:320:TYR:CZ	1:A:324:VAL:HG21	2.46	0.50
1:A:343:ARG:NH1	1:A:345:GLU:HG2	2.26	0.50
1:A:351:PHE:CD1	1:A:351:PHE:C	2.89	0.50
1:A:165:PHE:HB2	1:A:168:GLN:CG	2.40	0.50
1:A:144:PHE:O	1:A:165:PHE:CD1	2.64	0.50
1:A:348:PHE:HZ	1:A:360:ILE:HG21	1.76	0.50
1:A:360:ILE:HG23	1:A:361:SER:N	2.26	0.50
1:A:220:ARG:HH21	1:A:220:ARG:HG3	1.77	0.49
1:A:321:GLU:HG3	1:A:326:LYS:CA	2.42	0.49
1:A:304:ARG:HG2	1:A:304:ARG:HH11	1.78	0.49
1:A:310:VAL:HG23	1:A:311:ASP:N	2.27	0.49
1:A:361:SER:HA	1:A:364:LEU:HD11	1.95	0.49
1:A:375:ARG:O	1:A:376:GLU:C	2.55	0.49
1:A:359:LEU:HD23	1:A:380:HIS:CD2	2.48	0.49
1:A:380:HIS:CG	1:A:381:PRO:HD2	2.48	0.49
1:A:217:THR:HG22	1:A:220:ARG:HG2	1.90	0.48
1:A:161:LEU:HD11	1:A:207:TYR:CB	2.25	0.48
1:A:161:LEU:CD1	1:A:207:TYR:HB3	2.25	0.48
1:A:164:LEU:O	1:A:206:VAL:HG13	2.12	0.48
1:A:217:THR:HG22	1:A:220:ARG:CG	2.43	0.48
1:A:155:SER:C	1:A:157:PHE:N	2.69	0.48
1:A:196:LEU:O	1:A:196:LEU:HG	2.14	0.48
1:A:289:LEU:C	1:A:291:GLY:N	2.69	0.48
1:A:221:GLU:CG	1:A:232:ARG:HH22	2.27	0.48
1:A:227:LYS:NZ	1:A:351:PHE:CE1	2.79	0.48
1:A:247:CYS:HA	1:A:250:LYS:NZ	2.29	0.48
1:A:311:ASP:O	1:A:315:LEU:HB2	2.14	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:235:THR:HB	1:A:387:SER:HA	1.95	0.48
1:A:335:GLN:O	1:A:337:THR:N	2.46	0.48
1:A:140:GLY:HA3	2:A:1:ADN:H4'	1.95	0.47
1:A:354:GLU:CA	1:A:357:ARG:HD2	2.38	0.47
1:A:198:GLY:H	1:A:209:ILE:HB	1.79	0.47
1:A:293:LEU:O	1:A:294:ASP:C	2.57	0.47
1:A:289:LEU:HD12	1:A:289:LEU:HA	1.80	0.47
1:A:162:LYS:HG2	1:A:208:LEU:HD12	1.95	0.47
1:A:170:GLU:C	1:A:172:ALA:N	2.73	0.47
1:A:253:ILE:HD12	1:A:253:ILE:N	2.30	0.47
1:A:272:ILE:HD12	1:A:272:ILE:O	2.14	0.47
1:A:161:LEU:HA	1:A:208:LEU:O	2.15	0.47
1:A:300:MET:O	1:A:303:GLY:N	2.36	0.47
1:A:362:ARG:HH12	1:A:376:GLU:HG2	1.80	0.47
1:A:367:ASN:CB	1:A:370:GLN:HG3	2.44	0.47
1:A:235:THR:HG23	1:A:236:TYR:N	2.30	0.47
1:A:272:ILE:C	1:A:272:ILE:CD1	2.78	0.47
1:A:336:GLU:O	1:A:337:THR:OG1	2.28	0.46
1:A:242:ASN:HD22	1:A:242:ASN:H	1.63	0.46
1:A:319:CYS:HA	1:A:322:PHE:CD2	2.51	0.46
1:A:377:VAL:O	1:A:378:LEU:C	2.57	0.46
1:A:254:HIS:ND1	1:A:274:ASP:OD1	2.49	0.46
1:A:316:GLY:CA	1:A:363:LEU:HD23	2.43	0.46
1:A:218:VAL:O	1:A:222:LEU:N	2.42	0.46
1:A:232:ARG:HA	1:A:235:THR:CG2	2.46	0.46
1:A:377:VAL:O	1:A:380:HIS:N	2.34	0.46
1:A:250:LYS:O	1:A:250:LYS:CD	2.64	0.46
1:A:158:ILE:H	1:A:158:ILE:CD1	2.26	0.46
1:A:185:GLN:HG3	1:A:275:PHE:CE2	2.51	0.46
1:A:186:SER:O	1:A:187:HIS:HB2	2.16	0.46
1:A:249:SER:C	1:A:251:ARG:H	2.23	0.46
1:A:354:GLU:HA	1:A:357:ARG:HB2	1.98	0.46
1:A:362:ARG:O	1:A:372:PRO:CD	2.63	0.46
1:A:250:LYS:HB3	1:A:250:LYS:HZ3	1.81	0.46
1:A:254:HIS:HE1	1:A:274:ASP:HB2	1.76	0.46
1:A:182:VAL:O	1:A:186:SER:CB	2.64	0.45
1:A:131:GLU:O	1:A:131:GLU:HG2	2.15	0.45
1:A:221:GLU:OE1	1:A:225:LEU:HD13	2.16	0.45
1:A:144:PHE:HB2	1:A:277:TRP:O	2.16	0.45
1:A:147:VAL:HG13	1:A:147:VAL:O	2.16	0.45
1:A:180:ARG:O	1:A:184:ILE:HG13	2.16	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:356:ALA:C	1:A:358:ASP:N	2.73	0.45
1:A:178:LEU:O	1:A:179:ARG:HB2	2.16	0.45
1:A:342:SER:O	1:A:344:VAL:HG23	2.17	0.45
1:A:178:LEU:C	1:A:180:ARG:H	2.24	0.45
1:A:147:VAL:O	1:A:147:VAL:HG22	2.16	0.44
1:A:204:THR:HG23	1:A:205:ARG:N	2.31	0.44
1:A:273:ALA:HB1	1:A:275:PHE:HE1	1.83	0.44
1:A:225:LEU:O	1:A:226:SER:HB3	2.16	0.44
1:A:365:LYS:HB2	1:A:371:ARG:NH2	2.31	0.44
1:A:231:GLN:O	1:A:235:THR:CG2	2.63	0.44
1:A:232:ARG:C	1:A:235:THR:HG22	2.43	0.44
1:A:195:ARG:HG2	1:A:196:LEU:N	2.33	0.44
1:A:349:PRO:O	1:A:351:PHE:N	2.48	0.44
1:A:220:ARG:O	1:A:223:GLN:HG2	2.18	0.44
1:A:316:GLY:O	1:A:317:VAL:C	2.61	0.44
1:A:151:ARG:HA	1:A:157:PHE:O	2.17	0.44
1:A:250:LYS:O	1:A:250:LYS:CG	2.66	0.44
1:A:217:THR:HG23	1:A:220:ARG:HG2	1.96	0.44
1:A:289:LEU:C	1:A:291:GLY:H	2.23	0.44
1:A:165:PHE:CB	1:A:168:GLN:HG2	2.45	0.44
1:A:179:ARG:H	1:A:182:VAL:HG21	1.82	0.44
1:A:338:TYR:O	1:A:339:LYS:C	2.62	0.43
1:A:356:ALA:O	1:A:357:ARG:C	2.60	0.43
1:A:142:GLY:HA3	1:A:145:GLY:O	2.18	0.43
1:A:244:LEU:O	1:A:247:CYS:HB2	2.18	0.43
1:A:162:LYS:HD2	1:A:208:LEU:CD1	2.49	0.43
1:A:200:PHE:O	1:A:201:HIS:HB3	2.19	0.43
1:A:219:TYR:HA	1:A:259:PRO:HB3	2.00	0.43
1:A:248:HIS:HD2	1:A:373:MET:HE1	1.84	0.43
1:A:312:LEU:N	1:A:312:LEU:CD2	2.81	0.43
1:A:353:THR:HG23	1:A:356:ALA:HB2	2.00	0.43
1:A:346:PHE:CD1	1:A:346:PHE:C	2.96	0.43
1:A:178:LEU:O	1:A:180:ARG:N	2.41	0.43
1:A:205:ARG:HG3	1:A:207:TYR:OH	2.19	0.43
1:A:162:LYS:HD2	1:A:208:LEU:HD12	2.01	0.43
1:A:298:PRO:O	1:A:300:MET:N	2.52	0.42
1:A:166:LYS:C	1:A:168:GLN:H	2.26	0.42
1:A:343:ARG:NH1	1:A:345:GLU:CB	2.82	0.42
1:A:353:THR:HG21	1:A:382:TRP:HE1	1.84	0.42
1:A:257:ILE:HD11	1:A:318:LEU:CD2	2.49	0.42
1:A:374:LEU:O	1:A:375:ARG:C	2.61	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:166:LYS:HG2	1:A:167:ALA:N	2.34	0.42
1:A:363:LEU:HD12	1:A:363:LEU:HA	1.73	0.42
1:A:208:LEU:O	1:A:210:LEU:HD12	2.20	0.42
1:A:218:VAL:HG13	1:A:228:PHE:HZ	1.84	0.42
1:A:301:ILE:HD12	1:A:338:TYR:CD2	2.44	0.42
1:A:302:GLU:C	1:A:304:ARG:H	2.27	0.42
1:A:319:CYS:HA	1:A:322:PHE:HD2	1.84	0.42
1:A:337:THR:HG22	1:A:341:ILE:CD1	2.50	0.42
1:A:159:LEU:HB3	1:A:160:ALA:H	1.51	0.42
1:A:344:VAL:HG13	1:A:364:LEU:HD23	2.00	0.41
1:A:179:ARG:H	1:A:182:VAL:CG2	2.33	0.41
1:A:206:VAL:HG23	1:A:207:TYR:N	2.35	0.41
1:A:323:LEU:HD11	1:A:382:TRP:CH2	2.54	0.41
1:A:162:LYS:CD	1:A:208:LEU:HD12	2.51	0.41
1:A:230:GLU:HA	1:A:233:THR:CG2	2.49	0.41
1:A:204:THR:HG23	1:A:205:ARG:H	1.84	0.41
1:A:380:HIS:C	1:A:382:TRP:N	2.78	0.41
1:A:213:ALA:HA	1:A:214:PRO:HD2	1.65	0.41
1:A:360:ILE:O	1:A:362:ARG:N	2.54	0.41
1:A:164:LEU:HD12	1:A:164:LEU:H	1.83	0.41
1:A:179:ARG:C	1:A:182:VAL:HB	2.45	0.41
1:A:179:ARG:O	1:A:182:VAL:HB	2.21	0.41
1:A:249:SER:OG	1:A:250:LYS:N	2.53	0.41
1:A:293:LEU:C	1:A:295:TYR:N	2.78	0.41
1:A:371:ARG:HB3	1:A:372:PRO:HD2	2.03	0.41
1:A:371:ARG:HE	1:A:371:ARG:HA	1.86	0.41
1:A:386:ASN:O	1:A:387:SER:CB	2.69	0.41
1:A:387:SER:C	1:A:388:SER:O	2.64	0.41
1:A:313:TRP:C	1:A:315:LEU:N	2.78	0.40
1:A:163:VAL:HB	1:A:207:TYR:CD2	2.56	0.40
1:A:196:LEU:HD12	1:A:209:ILE:O	2.20	0.40
1:A:158:ILE:HD13	1:A:158:ILE:N	2.31	0.40
1:A:220:ARG:HH21	1:A:220:ARG:CG	2.34	0.40
1:A:377:VAL:O	1:A:383:ILE:HG12	2.22	0.40
1:A:300:MET:O	1:A:300:MET:HE2	2.20	0.40
1:A:257:ILE:HG13	1:A:262:LEU:HD11	2.04	0.40
1:A:258:LYS:O	1:A:259:PRO:C	2.63	0.40

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:300:MET:CE	1:A:300:MET:CE[6_765]	1.56	0.64
1:A:335:GLN:OE1	1:A:342:SER:OG[6_765]	2.17	0.03

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	247/297 (83%)	167 (68%)	48 (19%)	32 (13%)	0 0

All (32) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	147	VAL
1	A	167	ALA
1	A	171	LYS
1	A	187	HIS
1	A	188	LEU
1	A	255	ARG
1	A	290	CYS
1	A	291	GLY
1	A	294	ASP
1	A	304	ARG
1	A	350	ASP
1	A	351	PHE
1	A	374	LEU
1	A	385	ALA
1	A	173	GLY
1	A	203	ALA
1	A	254	HIS
1	A	257	ILE
1	A	277	TRP
1	A	299	GLU
1	A	357	ARG
1	A	387	SER

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Mol	Chain	Res	Type
1	A	144	PHE
1	A	186	SER
1	A	337	THR
1	A	197	TYR
1	A	309	LYS
1	A	229	ASP
1	A	317	VAL
1	A	375	ARG
1	A	154	GLN
1	A	381	PRO

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	208/264 (79%)	177 (85%)	31 (15%)	3 10

All (31) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	133	PHE
1	A	137	ARG
1	A	148	TYR
1	A	158	ILE
1	A	163	VAL
1	A	171	LYS
1	A	188	LEU
1	A	199	TYR
1	A	200	PHE
1	A	206	VAL
1	A	210	LEU
1	A	221	GLU
1	A	238	THR
1	A	242	ASN
1	A	244	LEU
1	A	250	LYS

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Mol	Chain	Res	Type
1	A	254	HIS
1	A	269	GLU
1	A	272	ILE
1	A	300	MET
1	A	335	GLN
1	A	343	ARG
1	A	347	THR
1	A	350	ASP
1	A	358	ASP
1	A	359	LEU
1	A	362	ARG
1	A	364	LEU
1	A	373	MET
1	A	374	LEU
1	A	386	ASN

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	146	ASN
1	A	185	GLN
1	A	201	HIS
1	A	231	GLN
1	A	242	ASN
1	A	248	HIS
1	A	335	GLN
1	A	370	GLN

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

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	ADN	A	1	-	21,21,21	0.25	0	31,31,31	0.38	0

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	ADN	A	1	-	-	0/6/22/22	0/3/3/3

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1	ADN	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

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

6.4 Ligands

EDS was not executed - this section is therefore empty.

6.5 Other polymers

EDS was not executed - this section is therefore empty.