



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 7, 2026 – 04:20 AM UTC

PDB ID : 1GKZ / pdb_00001gkz
Title : Branched-chain alpha-ketoacid dehydrogenase kinase (BCK) complexed with ADP
Authors : Machius, M.; Chuang, J.L.; Wynn, R.M.; Tomchick, D.R.; Chuang, D.T.
Deposited on : 2001-08-22
Resolution : 2.20 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
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
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

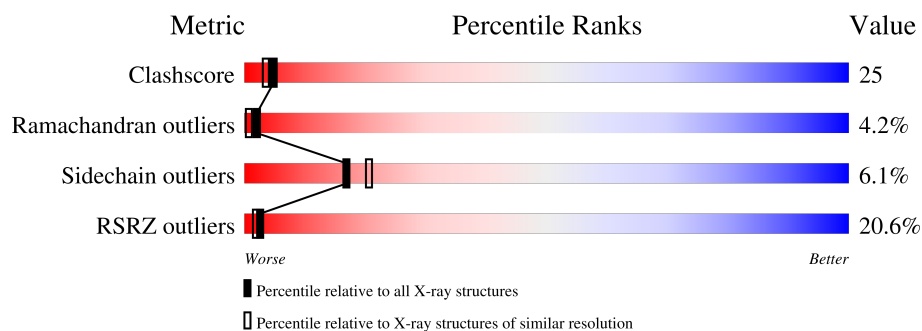
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.20 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	6851 (2.20-2.20)
Ramachandran outliers	187476	6768 (2.20-2.20)
Sidechain outliers	187428	6769 (2.20-2.20)
RSRZ outliers	180081	6166 (2.20-2.20)

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	388	

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
4	XE	A	501	-	-	X	-
4	XE	A	502	-	-	X	-

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 2756 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 [3-METHYL-2-OXOBUTANOATE DEHYDROGENASE [LIPOAMIDE]] KINASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	316	Total	C	N	O	S	42	5	0
			2597	1650	477	457	13			

- Molecule 2 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Mg	0	0
			1	1		

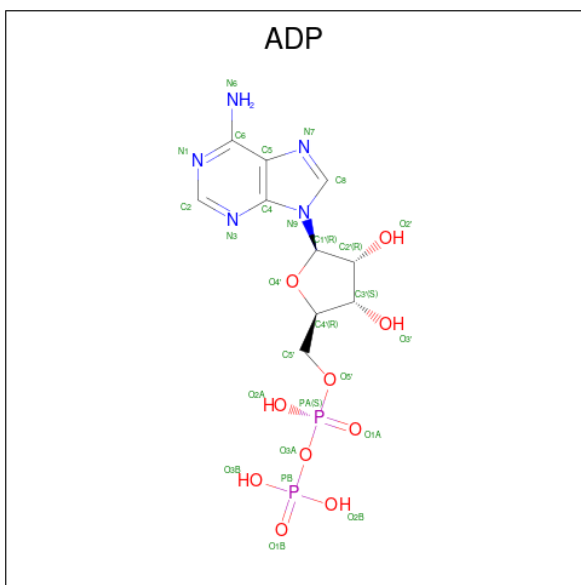
- Molecule 3 is POTASSIUM ION (CCD ID: K) (formula: K).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	K	0	0
			1	1		

- Molecule 4 is XENON (CCD ID: XE) (formula: Xe).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	2	Total	Xe	0	0
			2	2		

- Molecule 5 is ADENOSINE-5'-DIPHOSPHATE (CCD ID: ADP) (formula: C₁₀H₁₅N₅O₁₀P₂).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	A	1	Total	C	N	O	P	0	0
			27	10	5	10	2		

- Molecule 6 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	3	Total Cl 3 3	0	0

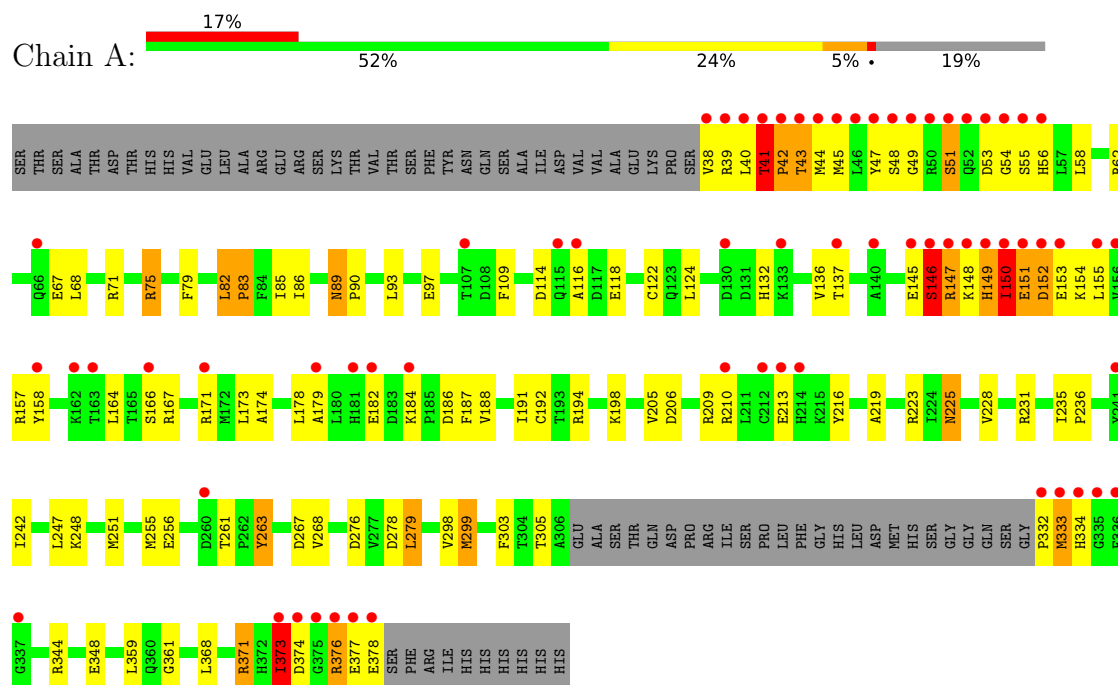
- Molecule 7 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	125	Total O 125 125	0	0

3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: [3-METHYL-2-OXOBUTANOATE DEHYDROGENASE [LIPOAMIDE]] KINASE



4 Data and refinement statistics

Property	Value	Source
Space group	P 42 21 2	Depositor
Cell constants a, b, c, α , β , γ	128.92Å 128.92Å 74.11Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	40.77 – 2.20 40.77 – 2.20	Depositor EDS
% Data completeness (in resolution range)	95.4 (40.77-2.20) 95.4 (40.77-2.20)	Depositor EDS
R_{merge}	0.03	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.12 (at 2.20Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.237 , 0.268 0.228 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å ²)	48.7	Xtriage
Anisotropy	0.034	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 59.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	2756	wwPDB-VP
Average B, all atoms (Å ²)	59.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.12% 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: K, ADP, CL, MG, XE

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	1.01	8/2654 (0.3%)	1.27	27/3583 (0.8%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	149	HIS	CB-CG	10.12	1.64	1.50
1	A	150	ILE	N-CA	9.94	1.58	1.46
1	A	149	HIS	CA-C	9.91	1.66	1.52
1	A	153	GLU	C-N	-9.52	1.19	1.33
1	A	299	MET	SD-CE	-6.86	1.62	1.79
1	A	149	HIS	C-N	5.59	1.41	1.33
1	A	146	SER	CA-C	5.24	1.59	1.52
1	A	150	ILE	C-N	5.24	1.40	1.33

All (27) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	148	LYS	N-CA-C	-18.59	88.46	113.18
1	A	149	HIS	CA-CB-CG	10.15	123.95	113.80
1	A	145	GLU	O-C-N	-9.36	112.30	122.03
1	A	150	ILE	N-CA-C	8.72	127.49	109.34
1	A	242	ILE	N-CA-C	8.55	118.62	110.42

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	149	HIS	CA-C-N	8.36	137.01	121.97
1	A	149	HIS	C-N-CA	8.36	137.01	121.97
1	A	268	VAL	N-CA-C	-7.83	97.04	108.71
1	A	235	ILE	CA-C-N	-7.27	112.30	119.64
1	A	235	ILE	C-N-CA	-7.27	112.30	119.64
1	A	89	ASN	CA-C-N	7.10	128.72	119.84
1	A	89	ASN	C-N-CA	7.10	128.72	119.84
1	A	153	GLU	CA-C-N	6.63	134.51	121.58
1	A	153	GLU	C-N-CA	6.63	134.51	121.58
1	A	219	ALA	CA-C-N	-6.61	113.18	119.85
1	A	219	ALA	C-N-CA	-6.61	113.18	119.85
1	A	166	SER	N-CA-C	-6.58	104.19	111.36
1	A	149	HIS	CB-CA-C	6.03	121.79	109.67
1	A	188	VAL	N-CA-C	-5.87	98.26	106.53
1	A	279	LEU	N-CA-C	-5.62	100.01	109.07
1	A	236	PRO	N-CA-C	5.54	121.88	114.18
1	A	361	GLY	N-CA-C	-5.44	107.84	114.92
1	A	109	PHE	N-CA-C	-5.42	103.20	109.93
1	A	278	ASP	N-CA-C	5.25	116.27	108.86
1	A	146	SER	CA-C-N	5.15	131.38	121.54
1	A	146	SER	C-N-CA	5.15	131.38	121.54
1	A	47	TYR	N-CA-C	5.04	117.52	109.96

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	263	TYR	Sidechain

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	2597	0	2629	130	0
2	A	1	0	0	0	0
3	A	1	0	0	0	0
4	A	2	0	0	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	27	0	12	2	0
6	A	3	0	0	0	0
7	A	125	0	0	5	0
All	All	2756	0	2641	131	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 25.

All (131) 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:147:ARG:HG2	1:A:150:ILE:CB	1.73	1.17
1:A:147:ARG:HG2	1:A:150:ILE:HB	1.10	1.09
1:A:38:VAL:HG11	1:A:48:SER:HB2	1.30	1.07
1:A:147:ARG:CG	1:A:150:ILE:HB	1.94	0.96
1:A:147:ARG:HA	1:A:150:ILE:H	1.30	0.95
1:A:147:ARG:HG2	1:A:150:ILE:CA	2.04	0.87
1:A:147:ARG:C	1:A:150:ILE:HG22	2.01	0.86
1:A:38:VAL:HG12	1:A:39:ARG:HG2	1.58	0.85
1:A:150:ILE:HG13	1:A:151:GLU:N	1.92	0.84
1:A:147:ARG:HA	1:A:150:ILE:HG22	1.61	0.82
1:A:147:ARG:CA	1:A:150:ILE:HG22	2.12	0.80
1:A:86:ILE:HG12	1:A:146:SER:HB2	1.65	0.78
1:A:41:THR:CB	1:A:42:PRO:HD3	2.15	0.77
1:A:42:PRO:CD	1:A:44:MET:HG2	2.16	0.75
1:A:58:LEU:HB3	1:A:62:ARG:NH1	2.01	0.75
1:A:373:ILE:HG22	1:A:374:ASP:N	2.03	0.74
1:A:299:MET:HE2	1:A:344[A]:ARG:HD3	1.70	0.74
1:A:44:MET:HB3	1:A:71:ARG:HH22	1.53	0.73
1:A:276:ASP:O	1:A:376:ARG:HA	1.87	0.73
1:A:41:THR:OG1	1:A:42:PRO:HD3	1.88	0.72
1:A:38:VAL:HG21	1:A:48:SER:H	1.54	0.72
1:A:147:ARG:HA	1:A:150:ILE:N	2.03	0.72
1:A:58:LEU:HB3	1:A:62:ARG:HH12	1.56	0.71
1:A:39:ARG:HG3	1:A:191:ILE:CD1	2.22	0.70
1:A:179:ALA:O	1:A:182:GLU:HG3	1.91	0.69
1:A:42:PRO:HD2	1:A:44:MET:HG2	1.74	0.68
1:A:167:ARG:HH11	1:A:167:ARG:HG2	1.56	0.68
1:A:223[A]:ARG:HD3	1:A:267:ASP:OD2	1.96	0.66
1:A:38:VAL:HG12	1:A:39:ARG:N	2.10	0.66
1:A:248:LYS:HE3	1:A:333:MET:O	1.95	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:151:GLU:O	1:A:152:ASP:C	2.41	0.64
1:A:62:ARG:HD2	7:A:2003:HOH:O	1.98	0.64
4:A:501:XE:XE	4:A:502:XE:XE	3.72	0.63
1:A:118:GLU:OE2	1:A:122:CYS:SG	2.57	0.63
1:A:83:PRO:HG2	1:A:151:GLU:HG2	1.81	0.62
1:A:151:GLU:CG	1:A:155:LEU:HD13	2.29	0.62
1:A:51:SER:HA	1:A:56:HIS:ND1	2.15	0.62
1:A:167:ARG:HG2	1:A:167:ARG:NH1	2.16	0.61
1:A:44:MET:CB	1:A:71:ARG:HH22	2.14	0.61
1:A:83:PRO:CG	1:A:151:GLU:HG2	2.31	0.61
1:A:209:ARG:O	1:A:213:GLU:HG3	2.00	0.60
1:A:42:PRO:HD3	1:A:44:MET:HG2	1.83	0.59
1:A:152:ASP:HB3	1:A:155:LEU:HB2	1.84	0.59
1:A:231:ARG:NH1	7:A:2068:HOH:O	2.34	0.59
1:A:223[B]:ARG:HG3	1:A:223[B]:ARG:HH11	1.68	0.58
1:A:299:MET:HE2	1:A:344[B]:ARG:NE	2.19	0.58
1:A:344[A]:ARG:NH2	7:A:2103:HOH:O	2.34	0.58
1:A:299:MET:HE2	1:A:344[A]:ARG:CD	2.34	0.58
1:A:371:ARG:CG	1:A:371:ARG:HH11	2.16	0.58
1:A:184:LYS:HE2	1:A:187:PHE:CE1	2.37	0.58
1:A:247:LEU:O	1:A:251:MET:HG3	2.05	0.57
1:A:378:GLU:HA	7:A:2121:HOH:O	2.04	0.57
1:A:40:LEU:HD12	1:A:40:LEU:N	2.19	0.57
1:A:147:ARG:HG2	1:A:150:ILE:HA	1.86	0.57
1:A:75:ARG:HH11	1:A:75:ARG:HG3	1.70	0.56
1:A:38:VAL:CG1	1:A:48:SER:HB2	2.21	0.56
1:A:332:PRO:O	1:A:333:MET:HB3	2.05	0.56
1:A:147:ARG:CA	1:A:150:ILE:H	2.10	0.55
1:A:39:ARG:HG3	1:A:191:ILE:HD13	1.88	0.55
1:A:298:VAL:HA	1:A:303:PHE:HD2	1.71	0.55
1:A:42:PRO:HD2	1:A:44:MET:H	1.72	0.55
1:A:146:SER:O	1:A:147:ARG:HB2	2.05	0.55
1:A:151:GLU:O	1:A:152:ASP:O	2.24	0.55
1:A:67:GLU:HG3	1:A:71:ARG:HE	1.72	0.55
1:A:209:ARG:HG2	1:A:251:MET:HE1	1.89	0.54
1:A:79:PHE:HA	1:A:82:LEU:HD22	1.90	0.54
1:A:225:ASN:C	1:A:225:ASN:HD22	2.16	0.54
1:A:53:ASP:O	1:A:55:SER:N	2.41	0.53
1:A:344[B]:ARG:HD2	7:A:2105:HOH:O	2.09	0.53
1:A:344[B]:ARG:O	1:A:348:GLU:HG3	2.09	0.53
1:A:154:LYS:HD3	1:A:158:TYR:OH	2.08	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:58:LEU:O	1:A:62:ARG:HG3	2.09	0.52
1:A:51:SER:HA	1:A:56:HIS:CE1	2.44	0.52
1:A:85:ILE:HD13	1:A:149:HIS:HB3	1.90	0.52
1:A:39:ARG:HH11	1:A:373:ILE:HG21	1.75	0.52
1:A:371:ARG:NH1	1:A:371:ARG:HG2	2.24	0.52
1:A:41:THR:HB	1:A:42:PRO:HD3	1.90	0.52
1:A:136:VAL:HG22	1:A:164:LEU:HD22	1.91	0.51
1:A:147:ARG:HA	1:A:150:ILE:CA	2.40	0.51
1:A:114:ASP:OD1	1:A:116:ALA:HB3	2.11	0.51
1:A:223[B]:ARG:HH11	1:A:223[B]:ARG:CG	2.24	0.50
1:A:68:LEU:HD13	4:A:501:XE:XE	2.90	0.50
1:A:53:ASP:C	1:A:55:SER:N	2.69	0.50
1:A:43:THR:HG22	1:A:43:THR:O	2.12	0.50
1:A:171[A]:ARG:HH11	1:A:171[A]:ARG:HG3	1.77	0.50
1:A:38:VAL:HG11	1:A:48:SER:CB	2.22	0.50
1:A:147:ARG:HA	1:A:150:ILE:CG2	2.36	0.50
1:A:150:ILE:CG1	1:A:151:GLU:N	2.66	0.49
1:A:359:LEU:HD12	1:A:359:LEU:N	2.27	0.49
1:A:373:ILE:CG2	1:A:374:ASP:N	2.75	0.49
1:A:93:LEU:O	1:A:97:GLU:HG3	2.13	0.49
1:A:209:ARG:CG	1:A:251:MET:HE1	2.42	0.48
1:A:344[A]:ARG:O	1:A:348:GLU:HG3	2.14	0.48
1:A:40:LEU:O	1:A:41:THR:HG23	2.13	0.48
1:A:261:THR:HG22	1:A:263:TYR:OH	2.13	0.48
1:A:147:ARG:CD	1:A:150:ILE:HB	2.43	0.48
1:A:40:LEU:HD12	1:A:40:LEU:H	1.79	0.48
1:A:371:ARG:CG	1:A:371:ARG:NH1	2.75	0.47
1:A:151:GLU:HG3	1:A:155:LEU:HD13	1.97	0.47
1:A:334:HIS:HD2	5:A:601:ADP:O3B	1.98	0.47
1:A:179:ALA:O	1:A:182:GLU:CG	2.61	0.47
1:A:147:ARG:CG	1:A:150:ILE:HA	2.45	0.46
1:A:155:LEU:C	1:A:155:LEU:HD23	2.40	0.46
1:A:298:VAL:HA	1:A:303:PHE:CD2	2.50	0.46
1:A:373:ILE:HG22	1:A:374:ASP:H	1.77	0.46
1:A:41:THR:CB	1:A:42:PRO:CD	2.92	0.46
1:A:136:VAL:HG22	1:A:164:LEU:CD2	2.47	0.45
1:A:49:GLY:C	1:A:51:SER:H	2.25	0.44
1:A:206:ASP:HB3	1:A:210:ARG:HH21	1.82	0.44
1:A:83:PRO:HG3	1:A:151:GLU:HG2	1.99	0.44
1:A:147:ARG:CG	1:A:150:ILE:CA	2.89	0.44
1:A:334:HIS:CD2	5:A:601:ADP:O3B	2.70	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:152:ASP:C	1:A:152:ASP:OD2	2.60	0.44
1:A:205:VAL:O	1:A:209:ARG:HG3	2.18	0.44
1:A:186:ASP:CG	1:A:194:ARG:HD3	2.43	0.43
1:A:216:TYR:CD1	1:A:255[A]:MET:HG3	2.53	0.43
1:A:42:PRO:HD2	1:A:43:THR:H	1.83	0.43
1:A:187:PHE:CE2	1:A:192:CYS:HB2	2.54	0.42
1:A:82:LEU:O	1:A:83:PRO:C	2.60	0.42
1:A:154:LYS:HB2	1:A:158:TYR:CZ	2.54	0.42
1:A:373:ILE:HD13	1:A:373:ILE:HA	1.74	0.42
1:A:132:HIS:CG	4:A:502:XE:XE	3.51	0.42
1:A:89:ASN:HA	1:A:90:PRO:HD3	1.89	0.42
1:A:171[A]:ARG:HG3	1:A:171[A]:ARG:NH1	2.35	0.42
1:A:174:ALA:O	1:A:178:LEU:HG	2.19	0.41
1:A:223[B]:ARG:CG	1:A:223[B]:ARG:NH1	2.82	0.41
1:A:53:ASP:C	1:A:55:SER:H	2.29	0.41
1:A:299:MET:HE2	1:A:344[A]:ARG:NE	2.35	0.41
1:A:38:VAL:N	1:A:45:MET:HE2	2.36	0.41
1:A:198:LYS:HD2	1:A:228:VAL:HB	2.03	0.40
1:A:75:ARG:HA	1:A:75:ARG:CZ	2.51	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	317/388 (82%)	291 (92%)	13 (4%)	13 (4%)	2 1

All (13) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	42	PRO
1	A	51	SER

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Mol	Chain	Res	Type
1	A	147	ARG
1	A	150	ILE
1	A	152	ASP
1	A	333	MET
1	A	373	ILE
1	A	377	GLU
1	A	54	GLY
1	A	146	SER
1	A	41	THR
1	A	376	ARG
1	A	43	THR

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	282/340 (83%)	265 (94%)	17 (6%)	17	21

All (17) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	41	THR
1	A	75	ARG
1	A	82	LEU
1	A	83	PRO
1	A	124	LEU
1	A	137	THR
1	A	150	ILE
1	A	151	GLU
1	A	157	ARG
1	A	173	LEU
1	A	225	ASN
1	A	256	GLU
1	A	279	LEU
1	A	305	THR
1	A	368	LEU

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Mol	Chain	Res	Type
1	A	371	ARG
1	A	373	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	104	GLN
1	A	115	GLN
1	A	225	ASN
1	A	292	HIS
1	A	334	HIS

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](#)

Of 8 ligands modelled in this entry, 7 are monoatomic - leaving 1 for Mogul analysis.

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	$\# Z > 2$
5	ADP	A	601	2,3	28,29,29	0.73	1 (3%)	43,45,45	0.90	1 (2%)

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
5	ADP	A	601	2,3	-	2/16/32/32	0/3/3/3

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	601	ADP	PA-O2A	-2.42	1.44	1.55

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	601	ADP	O3B-PB-O1B	2.21	119.43	110.83

There are no chirality outliers.

All (2) torsion outliers are listed below:

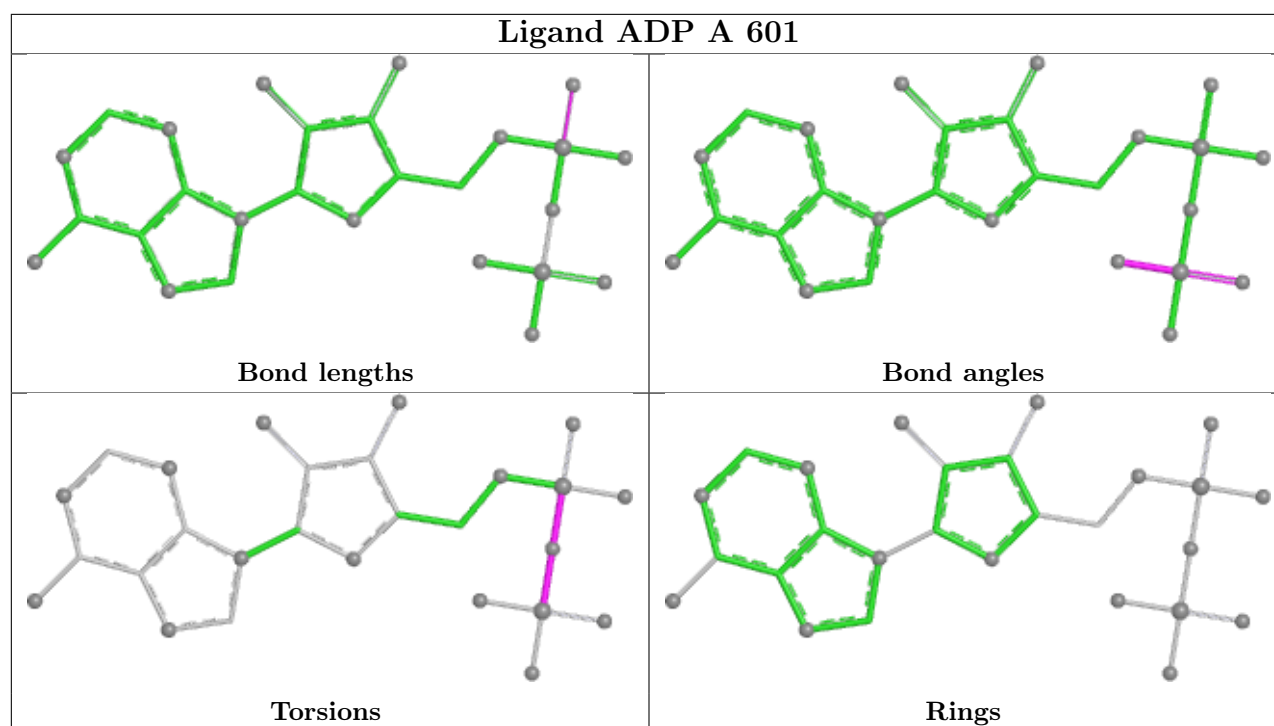
Mol	Chain	Res	Type	Atoms
5	A	601	ADP	PA-O3A-PB-O3B
5	A	601	ADP	PB-O3A-PA-O5'

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	601	ADP	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 [i](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	A	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	153:GLU	C	154:LYS	N	1.19

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	316/388 (81%)	1.17	65 (20%) 2 2	21, 53, 104, 123	14 (4%)

All (65) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	38	VAL	8.9
1	A	374	ASP	6.6
1	A	151	GLU	6.1
1	A	51	SER	6.1
1	A	145	GLU	5.9
1	A	334	HIS	5.7
1	A	150	ILE	5.4
1	A	332	PRO	5.4
1	A	377	GLU	5.4
1	A	375	GLY	5.3
1	A	378	GLU	5.2
1	A	149	HIS	5.1
1	A	42	PRO	4.7
1	A	53	ASP	4.7
1	A	335	GLY	4.7
1	A	373	ILE	4.6
1	A	158	TYR	4.6
1	A	153	GLU	4.2
1	A	40	LEU	4.2
1	A	46	LEU	4.1
1	A	45	MET	4.1
1	A	43	THR	4.0
1	A	156	VAL	4.0
1	A	49	GLY	3.8
1	A	152	ASP	3.7
1	A	148	LYS	3.6
1	A	48	SER	3.5

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Mol	Chain	Res	Type	RSRZ
1	A	66	GLN	3.4
1	A	50	ARG	3.3
1	A	147	ARG	3.3
1	A	182	GLU	3.3
1	A	336	PHE	3.2
1	A	333	MET	3.1
1	A	44	MET	3.0
1	A	41	THR	3.0
1	A	56	HIS	2.9
1	A	162	LYS	2.9
1	A	376	ARG	2.9
1	A	52	GLN	2.9
1	A	55	SER	2.9
1	A	116	ALA	2.9
1	A	133	LYS	2.8
1	A	214	HIS	2.6
1	A	54	GLY	2.6
1	A	241	TYR	2.6
1	A	146	SER	2.5
1	A	163	THR	2.5
1	A	115	GLN	2.5
1	A	130	ASP	2.5
1	A	260	ASP	2.5
1	A	155	LEU	2.4
1	A	213	GLU	2.4
1	A	184	LYS	2.4
1	A	137	THR	2.3
1	A	39	ARG	2.3
1	A	166	SER	2.3
1	A	47	TYR	2.3
1	A	337	GLY	2.2
1	A	107	THR	2.2
1	A	179	ALA	2.2
1	A	210	ARG	2.1
1	A	171[A]	ARG	2.1
1	A	140	ALA	2.0
1	A	181	HIS	2.0
1	A	212	CYS	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](#)

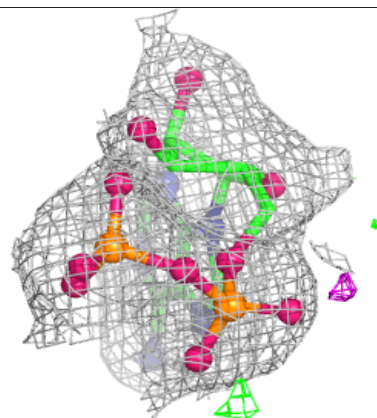
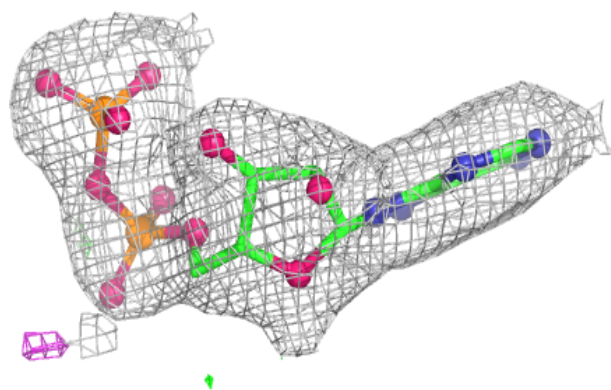
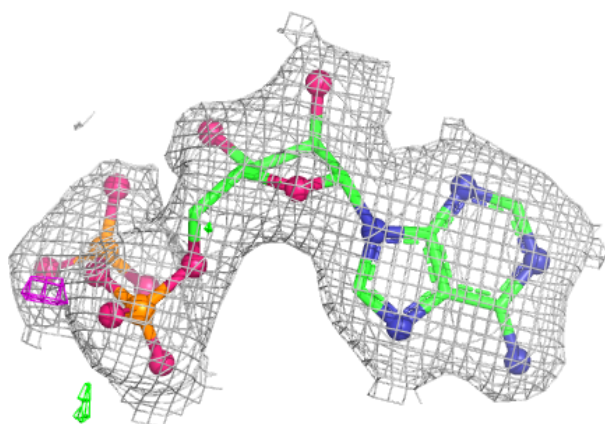
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
6	CL	A	702	1/1	0.88	0.16	95,95,95,95	0
6	CL	A	701	1/1	0.89	0.21	93,93,93,93	0
4	XE	A	502	1/1	0.95	0.18	149,149,149,149	0
6	CL	A	703	1/1	0.95	0.14	106,106,106,106	0
4	XE	A	501	1/1	0.96	0.26	107,107,107,107	0
5	ADP	A	601	27/27	0.97	0.07	41,51,57,59	0
3	K	A	402	1/1	0.97	0.10	54,54,54,54	0
2	MG	A	401	1/1	0.99	0.03	46,46,46,46	0

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

Electron density around ADP A 601:

$2mF_o - DF_c$ (at 0.7 rmsd) in gray
 $mF_o - DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)



6.5 Other polymers ⓘ

There are no such residues in this entry.