



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 12:02 PM UTC

PDB ID : 6BHC / pdb_00006bhc
Title : Crystal structure of pseduokinase PEAK1 (Sugen Kinase 269)
Authors : Ha, B.H.; Boggon, T.J.
Deposited on : 2017-10-30
Resolution : 2.30 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
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

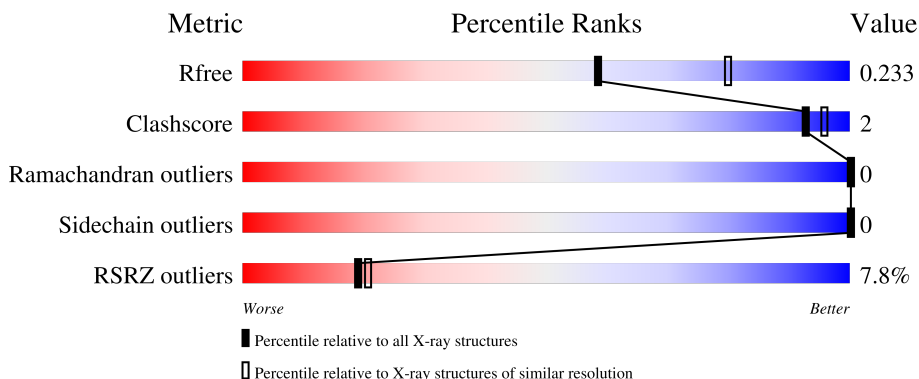
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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	6319 (2.30-2.30)
Clashscore	190562	6919 (2.30-2.30)
Ramachandran outliers	187476	6854 (2.30-2.30)
Sidechain outliers	187428	6854 (2.30-2.30)
RSRZ outliers	180081	6325 (2.30-2.30)

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	438	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 3084 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 Pseudopodium-enriched atypical kinase 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	371	2982	1900	519	545	18	0	1	0

There are 53 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1271	MET	-	expression tag	UNP Q9H792
A	?	-	ASP	deletion	UNP Q9H792
A	?	-	ASP	deletion	UNP Q9H792
A	?	-	PRO	deletion	UNP Q9H792
A	?	-	GLU	deletion	UNP Q9H792
A	?	-	LYS	deletion	UNP Q9H792
A	?	-	ASP	deletion	UNP Q9H792
A	?	-	GLU	deletion	UNP Q9H792
A	?	-	ASP	deletion	UNP Q9H792
A	?	-	ASP	deletion	UNP Q9H792
A	?	-	MET	deletion	UNP Q9H792
A	?	-	GLU	deletion	UNP Q9H792
A	?	-	GLU	deletion	UNP Q9H792
A	?	-	THR	deletion	UNP Q9H792
A	?	-	GLU	deletion	UNP Q9H792
A	?	-	GLU	deletion	UNP Q9H792
A	?	-	ASP	deletion	UNP Q9H792
A	?	-	ALA	deletion	UNP Q9H792
A	?	-	LYS	deletion	UNP Q9H792
A	?	-	GLY	deletion	UNP Q9H792
A	?	-	GLU	deletion	UNP Q9H792
A	?	-	THR	deletion	UNP Q9H792
A	?	-	ASP	deletion	UNP Q9H792
A	?	-	GLY	deletion	UNP Q9H792
A	?	-	LYS	deletion	UNP Q9H792
A	?	-	ASN	deletion	UNP Q9H792
A	?	-	PRO	deletion	UNP Q9H792

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Chain	Residue	Modelled	Actual	Comment	Reference
A	?	-	LYS	deletion	UNP Q9H792
A	?	-	PRO	deletion	UNP Q9H792
A	?	-	CYS	deletion	UNP Q9H792
A	?	-	SER	deletion	UNP Q9H792
A	?	-	GLU	deletion	UNP Q9H792
A	?	-	ALA	deletion	UNP Q9H792
A	?	-	ALA	deletion	UNP Q9H792
A	?	-	SER	deletion	UNP Q9H792
A	?	-	SER	deletion	UNP Q9H792
A	?	-	GLN	deletion	UNP Q9H792
A	?	-	LYS	deletion	UNP Q9H792
A	?	-	GLU	deletion	UNP Q9H792
A	?	-	ASN	deletion	UNP Q9H792
A	?	-	GLN	deletion	UNP Q9H792
A	?	-	GLY	deletion	UNP Q9H792
A	?	-	VAL	deletion	UNP Q9H792
A	?	-	MET	deletion	UNP Q9H792
A	1542	THR	SER	engineered mutation	UNP Q9H792
A	1744	LEU	-	expression tag	UNP Q9H792
A	1745	GLU	-	expression tag	UNP Q9H792
A	1746	HIS	-	expression tag	UNP Q9H792
A	1747	HIS	-	expression tag	UNP Q9H792
A	1748	HIS	-	expression tag	UNP Q9H792
A	1749	HIS	-	expression tag	UNP Q9H792
A	1750	HIS	-	expression tag	UNP Q9H792
A	1751	HIS	-	expression tag	UNP Q9H792

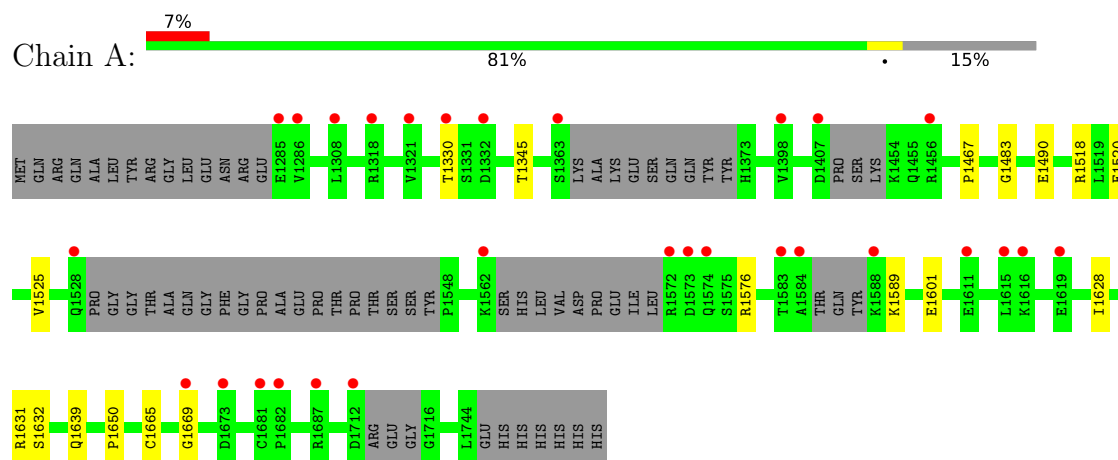
- Molecule 2 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	102	Total O 102 102	0	0

3 Residue-property plots [i](#)

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: Pseudopodium-enriched atypical kinase 1



4 Data and refinement statistics

Property	Value	Source
Space group	P 2 ₁ 2 ₁ 2 ₁	Depositor
Cell constants a, b, c, α , β , γ	58.92Å 72.72Å 103.19Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	42.08 – 2.30 42.08 – 2.30	Depositor EDS
% Data completeness (in resolution range)	98.4 (42.08-2.30) 98.4 (42.08-2.30)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.97 (at 2.29Å)	Xtriage
Refinement program	PHENIX (1.10_2155: ???)	Depositor
R, R_{free}	0.194 , 0.234 0.196 , 0.233	Depositor DCC
R_{free} test set	955 reflections (4.69%)	wwPDB-VP
Wilson B-factor (Å ²)	32.4	Xtriage
Anisotropy	0.169	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 47.9	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	3084	wwPDB-VP
Average B, all atoms (Å ²)	45.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.91% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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	0.09	0/3043	0.26	0/4116

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 [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2982	0	3010	9	0
2	A	102	0	0	0	0
All	All	3084	0	3010	9	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 2.

All (9) 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:1665:CYS:HA	1:A:1669:GLY:HA3	1.83	0.61
1:A:1467:PRO:HA	1:A:1525:VAL:HG12	1.85	0.59
1:A:1576:ARG:NH2	1:A:1601:GLU:OE2	2.41	0.51
1:A:1518:ARG:NH1	1:A:1520:GLU:OE2	2.43	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1589:LYS:NZ	1:A:1650:PRO:O	2.46	0.48
1:A:1330:THR:OG1	1:A:1345:THR:OG1	2.31	0.46
1:A:1628:ILE:HD12	1:A:1639:GLN:HA	1.97	0.46
1:A:1490:GLU:OE1	1:A:1632:SER:OG	2.33	0.44
1:A:1483:GLY:HA2	1:A:1631:ARG:HH21	1.84	0.43

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	358/438 (82%)	350 (98%)	8 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	336/392 (86%)	336 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

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	1386	ASN
1	A	1389	GLN
1	A	1393	HIS
1	A	1455	GLN
1	A	1726	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](#)

There are no ligands in this entry.

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	371/438 (84%)	0.34	29 (7%) 19 21	13, 38, 89, 130	1 (0%)

All (29) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1321	VAL	6.9
1	A	1363	SER	3.6
1	A	1583	THR	3.5
1	A	1669	GLY	3.5
1	A	1584	ALA	3.4
1	A	1687	ARG	2.9
1	A	1574	GLN	2.9
1	A	1712	ASP	2.8
1	A	1456	ARG	2.8
1	A	1562	LYS	2.7
1	A	1572	ARG	2.7
1	A	1407	ASP	2.7
1	A	1573	ASP	2.7
1	A	1528	GLN	2.6
1	A	1673	ASP	2.5
1	A	1681	CYS	2.5
1	A	1611	GLU	2.4
1	A	1285	GLU	2.4
1	A	1616	LYS	2.4
1	A	1615	LEU	2.4
1	A	1398	VAL	2.3
1	A	1682	PRO	2.3
1	A	1330	THR	2.2
1	A	1286	VAL	2.2
1	A	1308	LEU	2.2
1	A	1332	ASP	2.2
1	A	1588	LYS	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	1619	GLU	2.1
1	A	1318	ARG	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.