



# Full wwPDB X-ray Structure Validation Report ⓘ

Jan 31, 2016 – 07:15 PM GMT

PDB ID : 1ERK  
Title : STRUCTURE OF SIGNAL-REGULATED KINASE  
Authors : Harkins, P.C.; Goldsmith, E.J.  
Deposited on : 1996-08-06  
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](mailto: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.

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

MolProbity : 4.02b-467  
Mogul : 1.7 (RC4), CSD as536be (2015)  
Xtriage (Phenix) : **NOT EXECUTED**  
EDS : **NOT EXECUTED**  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : trunk26865

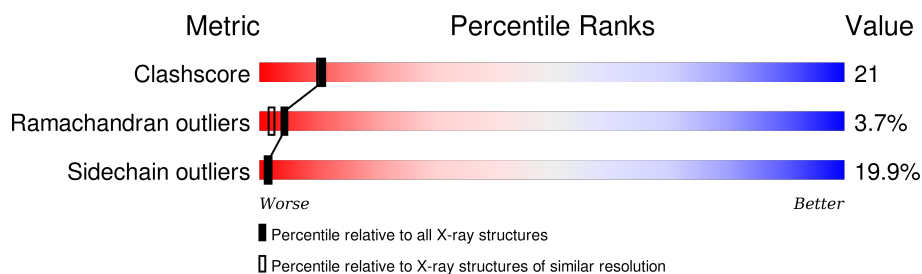
# 1 Overall quality at a glance

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))
Clashscore	102246	4452 (2.30-2.30)
Ramachandran outliers	100387	4410 (2.30-2.30)
Sidechain outliers	100360	4409 (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 on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	364	

## 2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 2899 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 EXTRACELLULAR REGULATED KINASE 2.

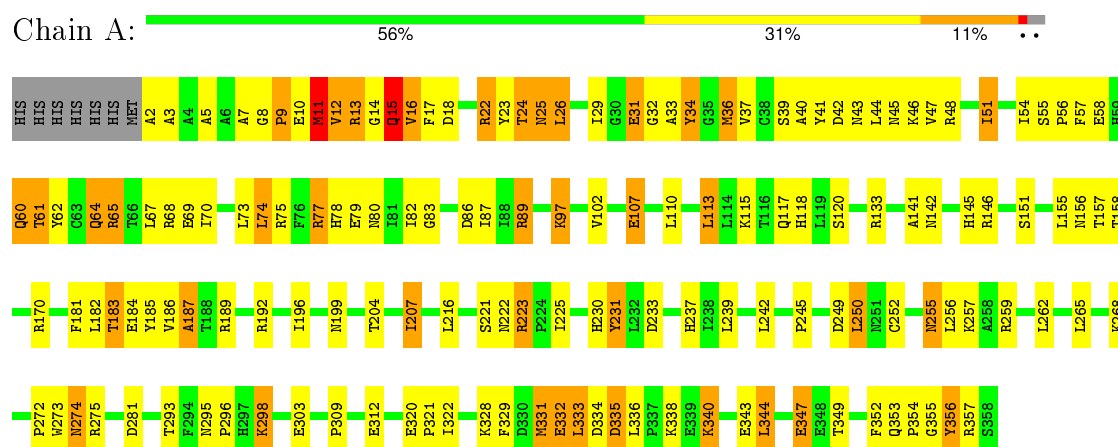
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	357	2899	1859	497	528	15	0	0	0

### 3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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.

Note EDS was not executed.

#### • Molecule 1: EXTRACELLULAR REGULATED KINASE 2



## 4 Data and refinement statistics

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

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	49.32Å 71.42Å 61.25Å 90.00° 109.75° 90.00°	Depositor
Resolution (Å)	7.50 – 2.30	Depositor
% Data completeness (in resolution range)	96.0 (7.50-2.30)	Depositor
$R_{merge}$	0.07	Depositor
$R_{sym}$	(Not available)	Depositor
Refinement program	X-PLOR	Depositor
R, $R_{free}$	0.209 , 0.267	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	2899	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	27.0	wwPDB-VP

## 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	0.36	0/2969	0.58	0/4023

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	2899	0	2897	123	0
All	All	2899	0	2897	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 21.

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:272:PRO:HG2	1:A:275:ARG:HG3	1.31	1.13
1:A:12:VAL:HG12	1:A:13:ARG:HE	1.24	1.00
1:A:57:PHE:HD2	1:A:97:LYS:HZ3	1.18	0.87
1:A:7:ALA:HB2	1:A:26:LEU:HD23	1.58	0.86
1:A:12:VAL:HG12	1:A:13:ARG:NE	1.97	0.79

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:185:TYR:CE2	1:A:187:ALA:HB3	2.16	0.79
1:A:78:HIS:CD2	1:A:80:ASN:H	2.02	0.77
1:A:13:ARG:HA	1:A:15:GLN:HE22	1.48	0.77
1:A:14:GLY:HA2	1:A:36:MET:CE	2.16	0.76
1:A:31:GLU:HG2	1:A:36:MET:HG2	1.68	0.75
1:A:107:GLU:HG2	1:A:156:ASN:HA	1.66	0.75
1:A:22:ARG:O	1:A:22:ARG:HG3	1.87	0.75
1:A:51:ILE:HD13	1:A:102:VAL:HG22	1.68	0.74
1:A:78:HIS:HD2	1:A:80:ASN:H	1.34	0.74
1:A:15:GLN:H	1:A:15:GLN:CD	1.95	0.69
1:A:45:ASN:O	1:A:47:VAL:HG13	1.93	0.68
1:A:54:ILE:HG22	1:A:56:PRO:HD3	1.75	0.67
1:A:29:ILE:HD11	1:A:39:SER:HB2	1.75	0.67
1:A:354:PRO:O	1:A:356:TYR:N	2.29	0.66
1:A:340:LYS:O	1:A:344:LEU:HD22	1.95	0.66
1:A:185:TYR:HE2	1:A:187:ALA:HB3	1.59	0.65
1:A:68:ARG:HG3	1:A:329:PHE:CZ	2.31	0.65
1:A:29:ILE:HG22	1:A:29:ILE:O	1.98	0.63
1:A:5:ALA:HB3	1:A:18:ASP:HA	1.80	0.63
1:A:239:LEU:HB3	1:A:268:LYS:HE3	1.81	0.62
1:A:14:GLY:HA2	1:A:36:MET:HE1	1.80	0.62
1:A:274:ASN:ND2	1:A:275:ARG:HG2	2.17	0.60
1:A:87:ILE:HD12	1:A:352:PHE:CE1	2.37	0.60
1:A:34:TYR:H	1:A:34:TYR:HD1	1.50	0.59
1:A:29:ILE:HD11	1:A:39:SER:CB	2.32	0.59
1:A:133:ARG:HG3	1:A:320:GLU:HG2	1.83	0.58
1:A:221:SER:O	1:A:222:ASN:HB2	2.03	0.58
1:A:9:PRO:HB3	1:A:15:GLN:HG3	1.85	0.58
1:A:17:PHE:CD2	1:A:36:MET:HE3	2.40	0.57
1:A:14:GLY:HA2	1:A:36:MET:SD	2.43	0.57
1:A:10:GLU:O	1:A:11:MET:HB2	2.04	0.57
1:A:225:ILE:HD11	1:A:273:TRP:HZ3	1.69	0.57
1:A:223:ARG:HB2	1:A:223:ARG:HH11	1.68	0.57
1:A:13:ARG:HA	1:A:15:GLN:NE2	2.19	0.56
1:A:61:THR:HG22	1:A:62:TYR:CD1	2.40	0.56
1:A:82:ILE:HG13	1:A:83:GLY:N	2.20	0.56
1:A:196:ILE:HD11	1:A:207:ILE:HD11	1.87	0.56
1:A:113:LEU:HD22	1:A:117:GLN:HB2	1.87	0.56
1:A:181:PHE:HB3	1:A:257:LYS:HE3	1.88	0.55
1:A:245:PRO:HG2	1:A:250:LEU:CD1	2.37	0.55
1:A:204:THR:O	1:A:207:ILE:HB	2.07	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:78:HIS:CD2	1:A:80:ASN:HB2	2.43	0.54
1:A:9:PRO:HA	1:A:14:GLY:HA3	1.90	0.54
1:A:70:ILE:HG23	1:A:74:LEU:HD22	1.90	0.53
1:A:13:ARG:NH1	1:A:34:TYR:HA	2.23	0.53
1:A:57:PHE:HB2	1:A:97:LYS:NZ	2.23	0.53
1:A:184:GLU:HA	1:A:184:GLU:OE1	2.08	0.52
1:A:13:ARG:CZ	1:A:34:TYR:HA	2.39	0.52
1:A:57:PHE:HD2	1:A:97:LYS:NZ	1.99	0.52
1:A:343:GLU:O	1:A:347:GLU:HG2	2.10	0.52
1:A:333:LEU:HD23	1:A:335:ASP:HB2	1.91	0.51
1:A:78:HIS:HD2	1:A:80:ASN:N	2.07	0.51
1:A:2:ALA:O	1:A:3:ALA:HB3	2.10	0.51
1:A:189:ARG:O	1:A:192:ARG:HB2	2.10	0.51
1:A:22:ARG:HG2	1:A:23:TYR:CE2	2.46	0.50
1:A:13:ARG:CA	1:A:15:GLN:HE22	2.21	0.50
1:A:3:ALA:C	1:A:5:ALA:H	2.13	0.50
1:A:22:ARG:HG2	1:A:23:TYR:CZ	2.47	0.50
1:A:64:GLN:NE2	1:A:334:ASP:HA	2.27	0.50
1:A:42:ASP:O	1:A:46:LYS:N	2.45	0.49
1:A:41:TYR:OH	1:A:46:LYS:HD2	2.12	0.49
1:A:24:THR:OG1	1:A:43:ASN:ND2	2.44	0.49
1:A:70:ILE:O	1:A:74:LEU:HB2	2.13	0.49
1:A:82:ILE:HG13	1:A:83:GLY:H	1.78	0.48
1:A:31:GLU:HA	1:A:36:MET:HA	1.94	0.48
1:A:86:ASP:HB3	1:A:102:VAL:HB	1.96	0.48
1:A:230:HIS:NE2	1:A:233:ASP:HB2	2.29	0.48
1:A:9:PRO:C	1:A:11:MET:H	2.16	0.48
1:A:336:LEU:HD13	1:A:340:LYS:CG	2.43	0.48
1:A:331:MET:HG2	1:A:332:GLU:N	2.29	0.48
1:A:230:HIS:CD2	1:A:233:ASP:HB2	2.49	0.48
1:A:107:GLU:H	1:A:107:GLU:CD	2.17	0.48
1:A:89:ARG:NH2	1:A:353:GLN:HG3	2.29	0.47
1:A:68:ARG:HG3	1:A:329:PHE:HZ	1.80	0.47
1:A:25:ASN:O	1:A:40:ALA:HA	2.15	0.47
1:A:293:THR:HG21	1:A:298:LYS:HB3	1.96	0.47
1:A:9:PRO:CB	1:A:15:GLN:HG3	2.45	0.47
1:A:34:TYR:CD2	1:A:54:ILE:HG23	2.50	0.46
1:A:356:TYR:CD1	1:A:356:TYR:N	2.82	0.46
1:A:357:ARG:HA	1:A:357:ARG:NE	2.30	0.46
1:A:34:TYR:CD1	1:A:34:TYR:N	2.84	0.45
1:A:3:ALA:HA	1:A:16:VAL:CG1	2.46	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:141:ALA:O	1:A:142:ASN:HB2	2.15	0.45
1:A:357:ARG:HE	1:A:357:ARG:HA	1.81	0.45
1:A:309:PRO:O	1:A:312:GLU:HG2	2.16	0.45
1:A:9:PRO:HB3	1:A:15:GLN:N	2.31	0.45
1:A:34:TYR:CE2	1:A:62:TYR:HB3	2.51	0.45
1:A:107:GLU:N	1:A:107:GLU:CD	2.70	0.45
1:A:60:GLN:HE21	1:A:60:GLN:C	2.19	0.45
1:A:12:VAL:HG11	1:A:32:GLY:O	2.17	0.44
1:A:2:ALA:N	1:A:18:ASP:OD2	2.50	0.44
1:A:113:LEU:CD2	1:A:117:GLN:HB2	2.48	0.44
1:A:57:PHE:O	1:A:338:LYS:HD2	2.17	0.44
1:A:9:PRO:HA	1:A:14:GLY:CA	2.48	0.44
1:A:15:GLN:N	1:A:15:GLN:CD	2.68	0.44
1:A:107:GLU:HG2	1:A:156:ASN:CA	2.43	0.44
1:A:183:THR:O	1:A:231:TYR:OH	2.31	0.44
1:A:87:ILE:HD13	1:A:349:THR:HG22	2.00	0.44
1:A:249:ASP:O	1:A:252:CYS:HB2	2.18	0.44
1:A:17:PHE:HD2	1:A:36:MET:HE3	1.81	0.43
1:A:9:PRO:HB3	1:A:15:GLN:CG	2.48	0.43
1:A:78:HIS:CE1	1:A:321:PRO:HG2	2.54	0.43
1:A:239:LEU:HB2	1:A:268:LYS:NZ	2.34	0.43
1:A:331:MET:O	1:A:333:LEU:N	2.52	0.42
1:A:78:HIS:HD2	1:A:80:ASN:HB2	1.82	0.42
1:A:334:ASP:OD1	1:A:334:ASP:N	2.53	0.42
1:A:245:PRO:HG2	1:A:250:LEU:HD11	2.02	0.42
1:A:65:ARG:O	1:A:69:GLU:HB3	2.19	0.42
1:A:145:HIS:O	1:A:146:ARG:HB2	2.19	0.41
1:A:207:ILE:HA	1:A:207:ILE:HD12	1.90	0.41
1:A:295:ASN:HA	1:A:296:PRO:HD2	1.93	0.41
1:A:281:ASP:C	1:A:281:ASP:OD1	2.59	0.41
1:A:255:ASN:C	1:A:255:ASN:HD22	2.24	0.41
1:A:77:ARG:HG3	1:A:77:ARG:NH1	2.35	0.41
1:A:3:ALA:C	1:A:5:ALA:N	2.74	0.41
1:A:182:LEU:HA	1:A:231:TYR:HE2	1.86	0.41
1:A:45:ASN:HB2	1:A:47:VAL:HG22	2.03	0.40
1:A:17:PHE:HD2	1:A:36:MET:CE	2.34	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	355/364 (98%)	305 (86%)	37 (10%)	13 (4%)	<b>4</b> <b>2</b>

All (13) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	15	GLN
1	A	36	MET
1	A	332	GLU
1	A	355	GLY
1	A	8	GLY
1	A	25	ASN
1	A	31	GLU
1	A	33	ALA
1	A	9	PRO
1	A	11	MET
1	A	12	VAL
1	A	187	ALA
1	A	231	TYR

### 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	317/324 (98%)	254 (80%)	63 (20%)	<b>1</b> <b>1</b>

All (63) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	11	MET
1	A	13	ARG
1	A	15	GLN
1	A	16	VAL
1	A	22	ARG
1	A	24	THR
1	A	26	LEU
1	A	34	TYR
1	A	37	VAL
1	A	44	LEU
1	A	48	ARG
1	A	51	ILE
1	A	55	SER
1	A	58	GLU
1	A	60	GLN
1	A	61	THR
1	A	64	GLN
1	A	65	ARG
1	A	67	LEU
1	A	73	LEU
1	A	74	LEU
1	A	75	ARG
1	A	77	ARG
1	A	79	GLU
1	A	89	ARG
1	A	97	LYS
1	A	107	GLU
1	A	110	LEU
1	A	113	LEU
1	A	115	LYS
1	A	118	HIS
1	A	120	SER
1	A	151	SER
1	A	155	LEU
1	A	157	THR
1	A	158	THR
1	A	170	ARG
1	A	183	THR
1	A	186	VAL
1	A	199	ASN
1	A	207	ILE
1	A	216	LEU
1	A	223	ARG

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Mol	Chain	Res	Type
1	A	237	HIS
1	A	242	LEU
1	A	250	LEU
1	A	255	ASN
1	A	256	LEU
1	A	259	ARG
1	A	262	LEU
1	A	265	LEU
1	A	274	ASN
1	A	298	LYS
1	A	303	GLU
1	A	322	ILE
1	A	328	LYS
1	A	331	MET
1	A	333	LEU
1	A	335	ASP
1	A	340	LYS
1	A	344	LEU
1	A	347	GLU
1	A	356	TYR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	15	GLN
1	A	43	ASN
1	A	60	GLN
1	A	78	HIS
1	A	152	ASN
1	A	178	HIS
1	A	199	ASN
1	A	251	ASN
1	A	255	ASN
1	A	274	ASN

### 5.3.3 RNA ⓘ

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 carbohydrates 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 [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

EDS was not executed - this section will therefore be empty.

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

EDS was not executed - this section will therefore be empty.

### 6.3 Carbohydrates [i](#)

EDS was not executed - this section will therefore be empty.

### 6.4 Ligands [i](#)

EDS was not executed - this section will therefore be empty.

### 6.5 Other polymers [i](#)

EDS was not executed - this section will therefore be empty.