



wwPDB X-ray Structure Validation Summary Report ⓘ

Dec 25, 2017 – 12:13 PM EST

PDB ID : 5YKS
Title : Crystal structure of sucrose nonfermenting-related kinase (SNRK)
Authors : Wang, Y.L.; Wang, J.; Wu, J.W.
Deposited on : 2017-10-16
Resolution : 2.90 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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
Xtriage (Phenix)	:	1.9-1692
EDS	:	rb-20030736
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)	:	rb-20030736

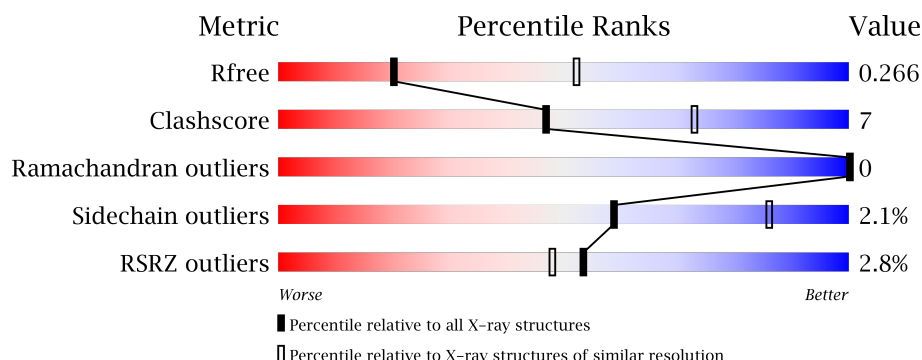
1 Overall quality at a glance

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))
R_{free}	100719	1586 (2.90-2.90)
Clashscore	112137	1807 (2.90-2.90)
Ramachandran outliers	110173	1768 (2.90-2.90)
Sidechain outliers	110143	1770 (2.90-2.90)
RSRZ outliers	101464	1596 (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 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	377	
1	B	377	

2 Entry composition [i](#)

There is only 1 type of molecule in this entry. The entry contains 4818 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 SNF-related serine/threonine-protein kinase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	312	Total	C	N	O	S	0	0	0
			2345	1513	395	423	14			
1	B	325	Total	C	N	O	S	0	0	0
			2473	1586	418	455	14			

There are 42 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-20	GLY	-	expression tag	UNP Q9NRH2
A	-19	SER	-	expression tag	UNP Q9NRH2
A	-18	SER	-	expression tag	UNP Q9NRH2
A	-17	HIS	-	expression tag	UNP Q9NRH2
A	-16	HIS	-	expression tag	UNP Q9NRH2
A	-15	HIS	-	expression tag	UNP Q9NRH2
A	-14	HIS	-	expression tag	UNP Q9NRH2
A	-13	HIS	-	expression tag	UNP Q9NRH2
A	-12	HIS	-	expression tag	UNP Q9NRH2
A	-11	SER	-	expression tag	UNP Q9NRH2
A	-10	GLN	-	expression tag	UNP Q9NRH2
A	-9	ASP	-	expression tag	UNP Q9NRH2
A	-8	LEU	-	expression tag	UNP Q9NRH2
A	-7	GLU	-	expression tag	UNP Q9NRH2
A	-6	VAL	-	expression tag	UNP Q9NRH2
A	-5	LEU	-	expression tag	UNP Q9NRH2
A	-4	PHE	-	expression tag	UNP Q9NRH2
A	-3	GLN	-	expression tag	UNP Q9NRH2
A	-2	GLY	-	expression tag	UNP Q9NRH2
A	-1	PRO	-	expression tag	UNP Q9NRH2
A	0	HIS	-	expression tag	UNP Q9NRH2
B	-20	GLY	-	expression tag	UNP Q9NRH2
B	-19	SER	-	expression tag	UNP Q9NRH2
B	-18	SER	-	expression tag	UNP Q9NRH2
B	-17	HIS	-	expression tag	UNP Q9NRH2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-16	HIS	-	expression tag	UNP Q9NRH2
B	-15	HIS	-	expression tag	UNP Q9NRH2
B	-14	HIS	-	expression tag	UNP Q9NRH2
B	-13	HIS	-	expression tag	UNP Q9NRH2
B	-12	HIS	-	expression tag	UNP Q9NRH2
B	-11	SER	-	expression tag	UNP Q9NRH2
B	-10	GLN	-	expression tag	UNP Q9NRH2
B	-9	ASP	-	expression tag	UNP Q9NRH2
B	-8	LEU	-	expression tag	UNP Q9NRH2
B	-7	GLU	-	expression tag	UNP Q9NRH2
B	-6	VAL	-	expression tag	UNP Q9NRH2
B	-5	LEU	-	expression tag	UNP Q9NRH2
B	-4	PHE	-	expression tag	UNP Q9NRH2
B	-3	GLN	-	expression tag	UNP Q9NRH2
B	-2	GLY	-	expression tag	UNP Q9NRH2
B	-1	PRO	-	expression tag	UNP Q9NRH2
B	0	HIS	-	expression tag	UNP Q9NRH2

These plots are drawn for all protein, RNA and DNA 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 ($\text{RSRZ} > 2$). 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.

- Chain A:
-
- 72% 11% 17%
- 3%
- GLY SER HIS HIS HIS H-12 S-11 Q-3 H0 M1 ALA PHE LYS ARG GLY TYR ASP GLY LYS ILE ALA GLY LEU TYR ASP LEU ASP LYS LEU GLY ARG G25 K41 Y42 A43 T57 L69 H72 P73 V76 D83 K87 L88 E93 I94 I104 E108 H125 S128 K132 V136 D139 L140 K141 N144 F161 SER ASN LYS PHE GLN PRO GLY LYS LEU THR SER CYS GLY S177 I185 L186 D189 A193 V196 S200 L201 G202 G211 Q216 E217 A218 L224 V234

- Chain B:
-
- 2% 68% 17% 14%
- GLY SER SER HIS HIS HIS HIS HIS S-11 Q-10 G-2 P-1 H0 M1 ALA GLY LYS PHE ARG LYS GLY TYR ASP LYS ILE ALA GLY LEU TYR ASP LYS ASP LYS THR LEU GLY ARG G25 V30 K31 E40 K41 V46 K49 L52 H59 L60 F61 Q62 R65 C66

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	91.92Å 99.08Å 118.66Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.30 – 2.90 29.30 – 2.88	Depositor EDS
% Data completeness (in resolution range)	95.8 (29.30-2.90) 95.2 (29.30-2.88)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.69 (at 2.90Å)	Xtriage
Refinement program	PHENIX (1.10.1_2155)	Depositor
R, R_{free}	0.222 , 0.267 0.219 , 0.266	Depositor DCC
R_{free} test set	1153 reflections (4.89%)	DCC
Wilson B-factor (Å ²)	71.7	Xtriage
Anisotropy	0.529	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.30 , 48.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	4818	wwPDB-VP
Average B, all atoms (Å ²)	72.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.45% 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

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	0.41	0/2392	0.57	0/3252
1	B	0.45	0/2523	0.62	0/3432
All	All	0.43	0/4915	0.60	0/6684

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

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	2345	0	2232	27	0
1	B	2473	0	2346	40	0
All	All	4818	0	4578	67	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 7.

The worst 5 of 67 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:128:SER:HA	1:A:260:LEU:HD13	1.59	0.82
1:A:136:VAL:HG11	1:A:193:ALA:HB1	1.80	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:62:GLN:HG2	1:B:307:ILE:HG13	1.84	0.59
1:B:254:PRO:HA	1:B:257:ARG:HG3	1.86	0.58
1:B:76:VAL:HG13	1:B:93:GLU:HB3	1.85	0.58

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	304/377 (81%)	292 (96%)	12 (4%)	0	100	100
1	B	317/377 (84%)	296 (93%)	21 (7%)	0	100	100
All	All	621/754 (82%)	588 (95%)	33 (5%)	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	233/332 (70%)	229 (98%)	4 (2%)	66	89
1	B	251/332 (76%)	245 (98%)	6 (2%)	54	84
All	All	484/664 (73%)	474 (98%)	10 (2%)	59	86

5 of 10 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	66	CYS
1	B	96	ASP
1	B	153	LEU
1	A	317	LEU
1	B	128	SER

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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 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](#)

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	312/377 (82%)	0.09	12 (3%) 41 35	43, 74, 114, 127	0
1	B	325/377 (86%)	-0.12	6 (1%) 69 66	43, 66, 97, 122	0
All	All	637/754 (84%)	-0.02	18 (2%) 53 48	43, 70, 106, 127	0

The worst 5 of 18 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	189	ASP	3.7
1	B	-11	SER	3.5
1	B	191	TYR	3.1
1	A	189	ASP	2.9
1	A	218	ALA	2.9

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](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.