



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 12:00 PM UTC

PDB ID : 5O2C / pdb_00005o2c
Title : Crystal structure of WNK3 kinase and CCT1 didomain in a unphosphorylated state
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Deposited on : 2017-05-19
Resolution : 2.40 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
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

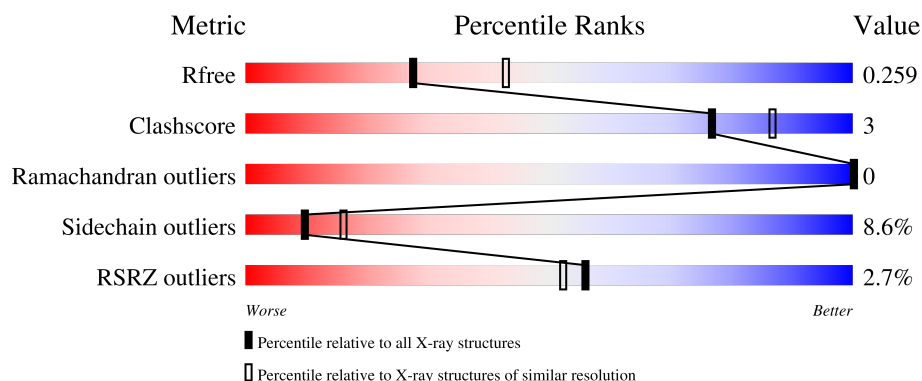
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

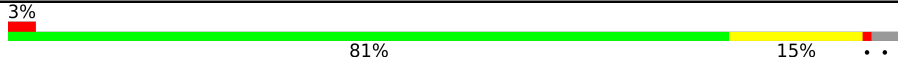
The reported resolution of this entry is 2.40 Å.

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	4912 (2.40-2.40)
Clashscore	190562	5391 (2.40-2.40)
Ramachandran outliers	187476	5320 (2.40-2.40)
Sidechain outliers	187428	5321 (2.40-2.40)
RSRZ outliers	180081	4916 (2.40-2.40)

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	380	

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 3096 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.

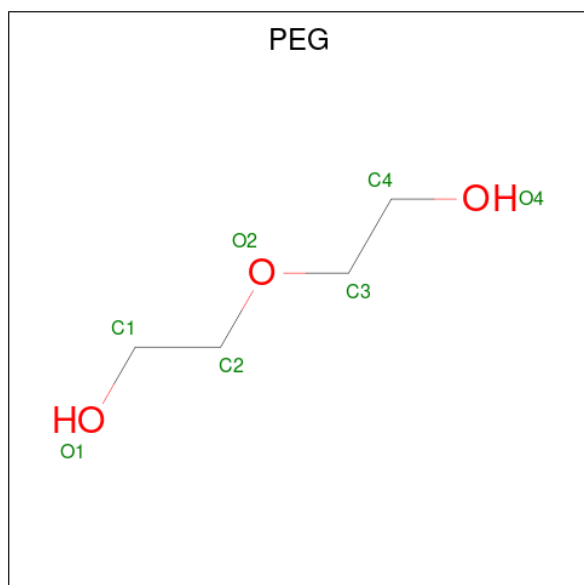
- Molecule 1 is a protein called Serine/threonine-protein kinase WNK3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	368	2948	1870	498	560	20	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	121	SER	-	expression tag	UNP Q9BYP7
A	122	MET	-	expression tag	UNP Q9BYP7

- Molecule 2 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: $C_4H_{10}O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			7	4	3		

- Molecule 3 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).

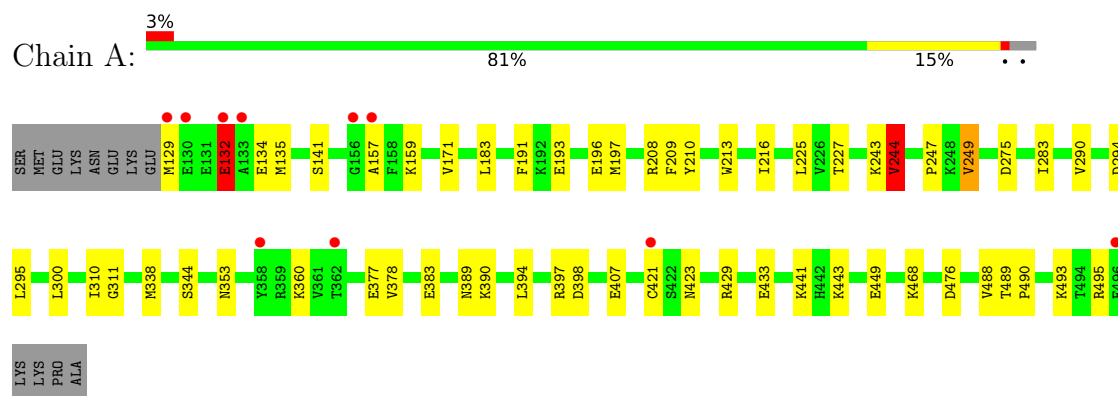


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			6	3	3		
3	A	1	Total	C	O	0	0
			6	3	3		
3	A	1	Total	C	O	0	0
			6	3	3		
3	A	1	Total	C	O	0	0
			6	3	3		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	117	Total	O	0	0
			117	117		

- Molecule 1: Serine/threonine-protein kinase WNK3



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	166.37Å 64.08Å 47.34Å 90.00° 97.16° 90.00°	Depositor
Resolution (Å)	24.47 – 2.40 24.47 – 2.40	Depositor EDS
% Data completeness (in resolution range)	99.5 (24.47-2.40) 99.3 (24.47-2.40)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.97 (at 2.39Å)	Xtriage
Refinement program	BUSTER 2.10.2	Depositor
R, R_{free}	0.185 , 0.254 0.195 , 0.259	Depositor DCC
R_{free} test set	959 reflections (4.92%)	wwPDB-VP
Wilson B-factor (Å ²)	31.7	Xtriage
Anisotropy	0.883	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 56.2	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	3096	wwPDB-VP
Average B, all atoms (Å ²)	44.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.76% 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: GOL, PEG

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	0.82	0/3006	1.33	16/4047 (0.4%)

There are no bond length outliers.

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	191	PHE	CA-CB-CG	7.09	120.89	113.80
1	A	311	GLY	N-CA-C	5.75	118.54	111.93
1	A	132	GLU	CA-C-N	5.74	128.54	120.28
1	A	132	GLU	C-N-CA	5.74	128.54	120.28
1	A	159	LYS	N-CA-C	5.53	118.21	108.75
1	A	389	ASN	CA-C-N	5.53	127.95	120.38
1	A	389	ASN	C-N-CA	5.53	127.95	120.38
1	A	157	ALA	N-CA-C	-5.45	102.82	110.50
1	A	493	LYS	CA-C-N	5.34	127.97	120.28
1	A	493	LYS	C-N-CA	5.34	127.97	120.28
1	A	244	VAL	N-CA-CB	5.27	118.35	110.13
1	A	275	ASP	CA-CB-CG	5.25	117.85	112.60
1	A	476	ASP	CA-C-N	5.21	127.57	120.54
1	A	476	ASP	C-N-CA	5.21	127.57	120.54
1	A	353	ASN	CA-C-N	5.19	127.75	120.28
1	A	353	ASN	C-N-CA	5.19	127.75	120.28

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	2948	0	2944	17	0
2	A	7	0	10	2	0
3	A	24	0	32	5	0
4	A	117	0	0	0	0
All	All	3096	0	2986	17	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 3.

All (17) 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:294:ASP:HA	3:A:602:GOL:H2	1.64	0.78
1:A:244:VAL:HG23	1:A:249:VAL:HG22	1.83	0.59
1:A:338:MET:HE2	1:A:378:VAL:HG13	1.90	0.53
1:A:429:ARG:NE	3:A:605:GOL:H31	2.24	0.52
1:A:243:LYS:CG	2:A:601:PEG:H22	2.40	0.52
1:A:243:LYS:HG3	2:A:601:PEG:H22	1.92	0.51
1:A:397:ARG:HD2	1:A:398:ASP:OD1	2.13	0.49
1:A:310:ILE:HG12	3:A:603:GOL:H31	1.95	0.48
1:A:449:GLU:HG3	3:A:605:GOL:H12	1.94	0.48
1:A:429:ARG:HE	3:A:605:GOL:H31	1.80	0.47
1:A:208:ARG:HG2	1:A:210:TYR:CE1	2.51	0.46
1:A:247:PRO:HB2	1:A:433:GLU:HG2	1.98	0.45
1:A:283:ILE:HG22	1:A:290:VAL:HG12	1.99	0.44
1:A:141:SER:HB3	1:A:213:TRP:CH2	2.54	0.43
1:A:132:GLU:HG2	1:A:135:MET:HE2	2.02	0.42
1:A:209:PHE:HD1	1:A:227:THR:HG22	1.85	0.41
1:A:489:THR:HG22	1:A:490:PRO:HD3	2.03	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	366/380 (96%)	355 (97%)	11 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	324/337 (96%)	296 (91%)	28 (9%)	10	16

All (28) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	129	MET
1	A	132	GLU
1	A	134	GLU
1	A	171	VAL
1	A	183	LEU
1	A	193	GLU
1	A	196	GLU
1	A	197	MET
1	A	216	ILE
1	A	225	LEU
1	A	244	VAL
1	A	249	VAL
1	A	295	LEU

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Mol	Chain	Res	Type
1	A	300	LEU
1	A	344	SER
1	A	360	LYS
1	A	377	GLU
1	A	383	GLU
1	A	390	LYS
1	A	394	LEU
1	A	407	GLU
1	A	421	CYS
1	A	423	ASN
1	A	441	LYS
1	A	443	LYS
1	A	468	LYS
1	A	488	VAL
1	A	495	ARG

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	188	GLN
1	A	353	ASN
1	A	388	GLN
1	A	423	ASN
1	A	445	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry

5 ligands are 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	$\# Z > 2$
3	GOL	A	604	-	5,5,5	0.23	0	5,5,5	0.33	0
3	GOL	A	603	-	5,5,5	0.47	0	5,5,5	0.79	0
3	GOL	A	602	-	5,5,5	0.34	0	5,5,5	0.66	0
2	PEG	A	601	-	6,6,6	0.64	0	5,5,5	0.94	0
3	GOL	A	605	-	5,5,5	0.40	0	5,5,5	0.85	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
3	GOL	A	604	-	-	2/4/4/4	-
3	GOL	A	603	-	-	1/4/4/4	-
3	GOL	A	602	-	-	2/4/4/4	-
2	PEG	A	601	-	-	3/4/4/4	-
3	GOL	A	605	-	-	4/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (12) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	605	GOL	O1-C1-C2-O2
3	A	605	GOL	O1-C1-C2-C3
3	A	602	GOL	O1-C1-C2-O2
3	A	602	GOL	O1-C1-C2-C3
3	A	605	GOL	C1-C2-C3-O3

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Mol	Chain	Res	Type	Atoms
2	A	601	PEG	O1-C1-C2-O2
3	A	603	GOL	O2-C2-C3-O3
3	A	604	GOL	O1-C1-C2-O2
2	A	601	PEG	C4-C3-O2-C2
3	A	604	GOL	O1-C1-C2-C3
2	A	601	PEG	C1-C2-O2-C3
3	A	605	GOL	O2-C2-C3-O3

There are no ring outliers.

4 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	603	GOL	1	0
3	A	602	GOL	1	0
2	A	601	PEG	2	0
3	A	605	GOL	3	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 [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	368/380 (96%)	0.03	10 (2%) 56 52	18, 40, 75, 109	0

All (10) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	157	ALA	3.4
1	A	129	MET	3.3
1	A	496	GLU	3.2
1	A	362	THR	2.7
1	A	132	GLU	2.5
1	A	358	TYR	2.4
1	A	421	CYS	2.3
1	A	156	GLY	2.2
1	A	133	ALA	2.1
1	A	130	GLU	2.1

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](#)

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($\text{\AA}^2$)	Q<0.9
3	GOL	A	605	6/6	0.71	0.28	57,61,62,65	0
2	PEG	A	601	7/7	0.82	0.17	45,48,55,57	0
3	GOL	A	602	6/6	0.84	0.14	53,58,58,59	0
3	GOL	A	604	6/6	0.88	0.12	47,53,54,56	0
3	GOL	A	603	6/6	0.93	0.09	35,42,45,46	0

6.5 Other polymers [i](#)

There are no such residues in this entry.