



# wwPDB X-ray Structure Validation Summary Report ⓘ

Apr 29, 2024 – 05:06 pm BST

PDB ID : 1WAO  
Title : PP5 structure  
Authors : Barford, D.  
Deposited on : 2004-10-27  
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](mailto: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>.

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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
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

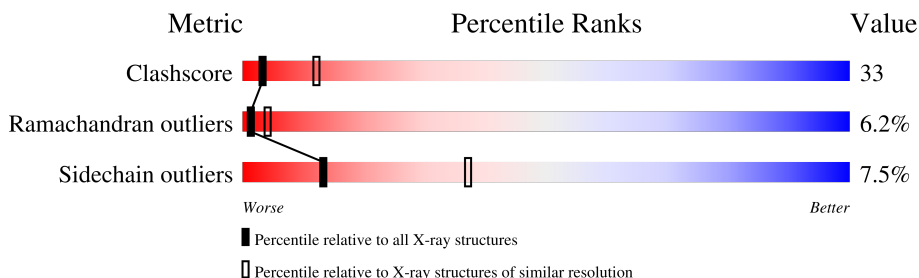
# 1 Overall quality at a glance

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))
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (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 of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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  $\leq 5\%$ .

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	1	477	 47% 44% 7% ..
1	2	477	 53% 39% 6% ..
1	3	477	 41% 49% 8% ..
1	4	477	 51% 39% 8% .

## 2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 15082 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 PHOSPHATASE 5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	1	471	Total	C	N	O	S	0	0	0
			3781	2407	641	712	21			
1	2	469	Total	C	N	O	S	0	0	0
			3768	2399	639	710	20			
1	3	471	Total	C	N	O	S	0	0	0
			3778	2405	641	712	20			
1	4	466	Total	C	N	O	S	0	0	0
			3747	2386	635	706	20			

- Molecule 2 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	1	2	Total	Mn	0	0
			2	2		
2	2	2	Total	Mn	0	0
			2	2		
2	3	2	Total	Mn	0	0
			2	2		
2	4	2	Total	Mn	0	0
			2	2		

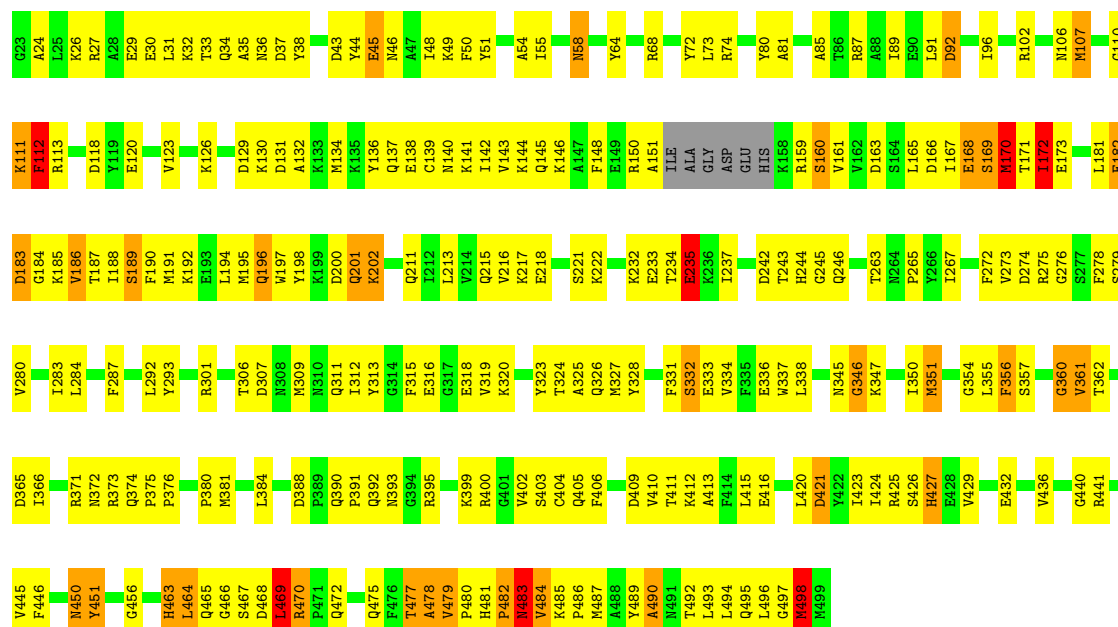
### 3 Residue-property plots

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. 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. 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.

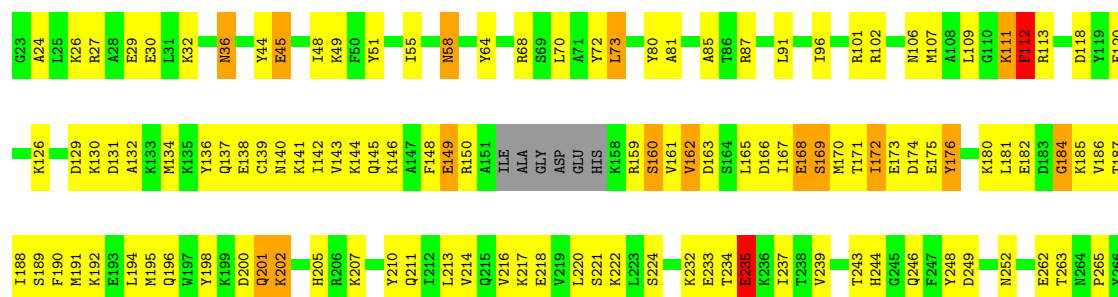
#### • Molecule 1: SERINE/THREONINE PROTEIN PHOSPHATASE 5

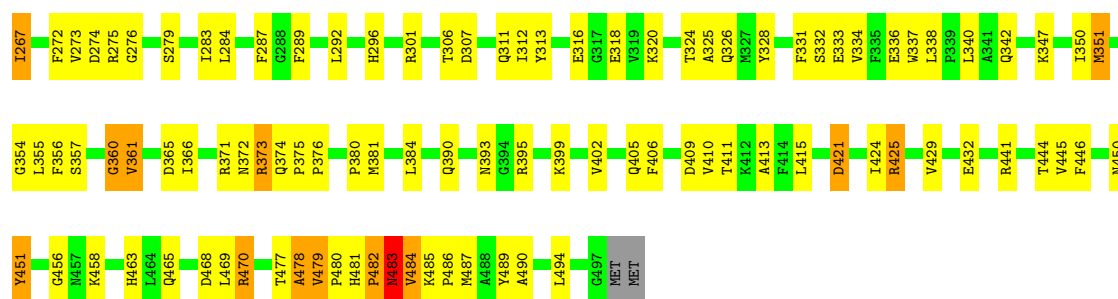
Chain 1: 



#### • Molecule 1: SERINE/THREONINE PROTEIN PHOSPHATASE 5

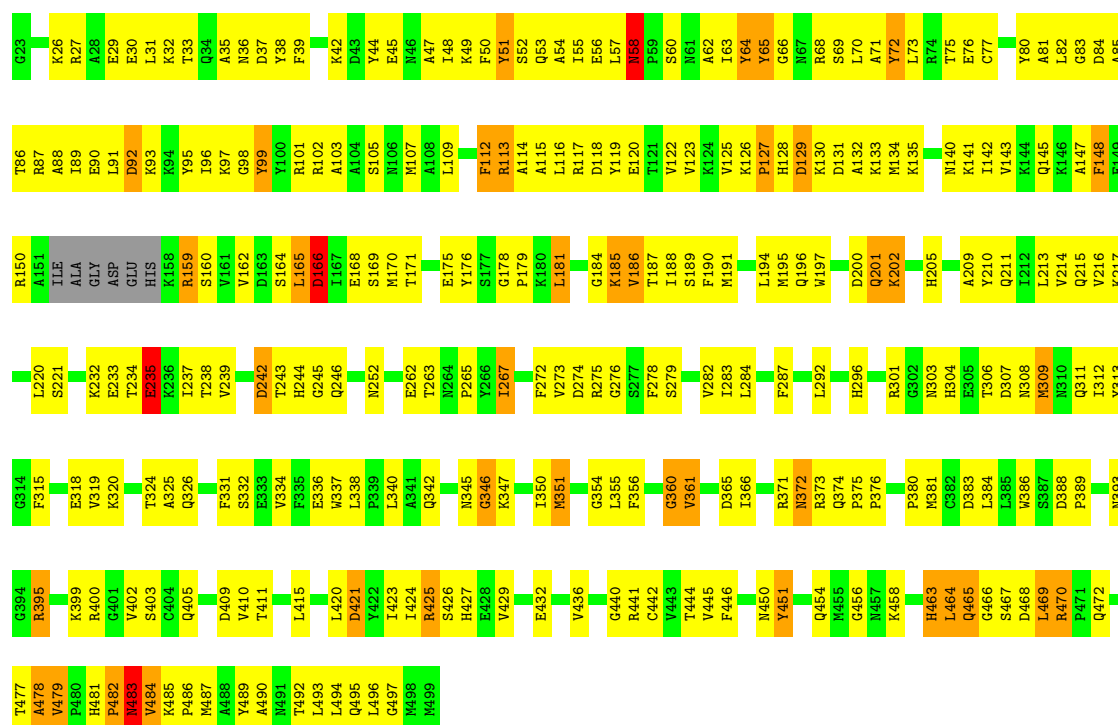
Chain 2: 





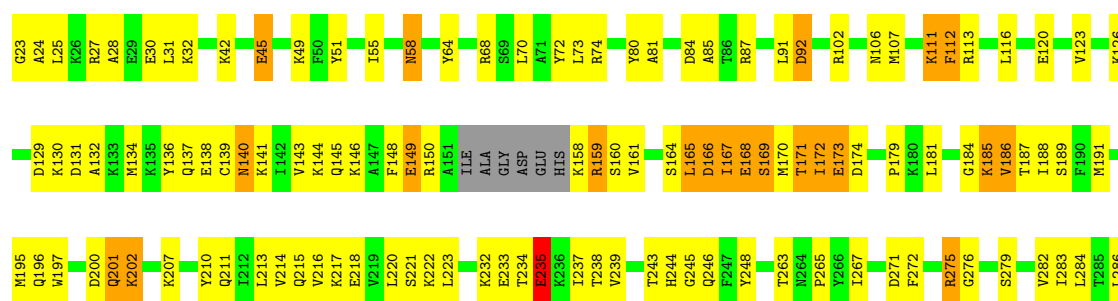
• Molecule 1: SERINE/THREONINE PROTEIN PHOSPHATASE 5

Chain 3: 41% 49% 8% ..



• Molecule 1: SERINE/THREONINE PROTEIN PHOSPHATASE 5

Chain 4: 51% 39% 8% .





## 4 Data and refinement statistics

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

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	51.74Å 117.54Å 200.41Å 90.00° 93.79° 90.00°	Depositor
Resolution (Å)	33.78 – 2.90	Depositor
% Data completeness (in resolution range)	99.0 (33.78-2.90)	Depositor
$R_{merge}$	0.12	Depositor
$R_{sym}$	(Not available)	Depositor
Refinement program	CNS 1.1	Depositor
R, $R_{free}$	0.247 , 0.290	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	15082	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	98.0	wwPDB-VP

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: MN

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	1	0.51	1/3864 (0.0%)	0.69	0/5211
1	2	0.36	0/3850	0.61	0/5191
1	3	0.35	0/3861	0.61	0/5208
1	4	0.48	0/3830	0.69	0/5166
All	All	0.43	1/15405 (0.0%)	0.65	0/20776

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	1	498	MET	CG-SD	5.20	1.94	1.81

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	1	3781	0	3714	257	0
1	2	3768	0	3702	208	0
1	3	3778	0	3707	298	0
1	4	3747	0	3681	224	0
2	1	2	0	0	0	0
2	2	2	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	3	2	0	0	0	0
2	4	2	0	0	0	0
All	All	15082	0	14804	987	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 33.

The worst 5 of 987 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)
1:1:498:MET:SD	1:1:498:MET:CE	2.04	1.46
1:1:165:LEU:HG	1:1:168:GLU:HB2	1.21	1.18
1:4:185:LYS:HE3	1:4:185:LYS:HA	1.36	1.05
1:1:166:ASP:HA	1:1:170:MET:HG3	1.38	1.00
1:1:187:THR:HG22	1:1:189:SER:H	1.27	0.98

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	1	467/477 (98%)	390 (84%)	50 (11%)	27 (6%)	1	5
1	2	463/477 (97%)	387 (84%)	48 (10%)	28 (6%)	1	4
1	3	467/477 (98%)	358 (77%)	77 (16%)	32 (7%)	1	3
1	4	462/477 (97%)	385 (83%)	49 (11%)	28 (6%)	1	4
All	All	1859/1908 (97%)	1520 (82%)	224 (12%)	115 (6%)	1	4

5 of 115 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	1	168	GLU
1	1	169	SER
1	1	172	ILE
1	1	361	VAL
1	1	372	ASN

### 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	1	407/413 (98%)	374 (92%)	33 (8%)	11	33
1	2	406/413 (98%)	382 (94%)	24 (6%)	19	49
1	3	406/413 (98%)	373 (92%)	33 (8%)	11	33
1	4	404/413 (98%)	372 (92%)	32 (8%)	12	34
All	All	1623/1652 (98%)	1501 (92%)	122 (8%)	13	37

5 of 122 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	3	51	TYR
1	4	351	MET
1	3	216	VAL
1	4	275	ARG
1	4	469	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 56 such sidechains are listed below:

Mol	Chain	Res	Type
1	3	46	ASN
1	4	481	HIS
1	3	310	ASN
1	4	450	ASN
1	4	311	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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 8 ligands modelled in this entry, 8 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 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	2	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	2	185:LYS	C	186:VAL	N	2.86

## 6 Fit of model and data [i](#)

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

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

### 6.3 Carbohydrates [i](#)

EDS was not executed - this section is therefore empty.

### 6.4 Ligands [i](#)

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.