



# wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 5, 2026 – 12:24 PM UTC

PDB ID : 2O8A / pdb\_00002o8a  
Title : rat PP1c $\gamma$  complexed with mouse inhibitor-2  
Authors : Hurley, T.D.  
Deposited on : 2006-12-12  
Resolution : 2.61 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 : 4-5-2 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

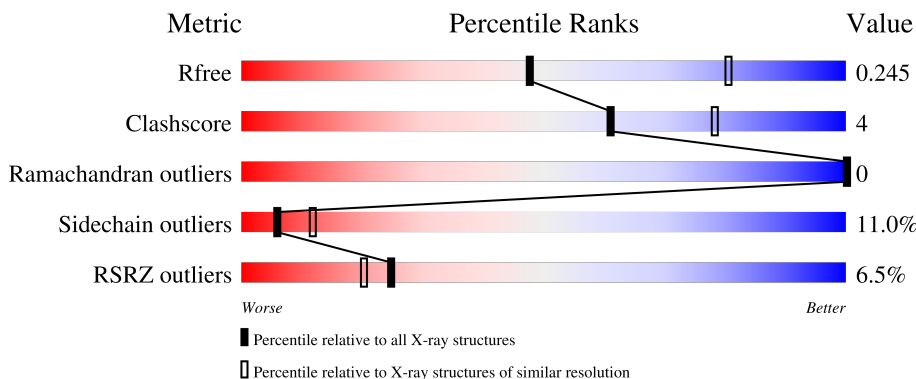
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.61 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	4951 (2.64-2.60)
Clashscore	190562	5303 (2.64-2.60)
Ramachandran outliers	187476	5217 (2.64-2.60)
Sidechain outliers	187428	5217 (2.64-2.60)
RSRZ outliers	180081	4950 (2.64-2.60)

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  $\leq 5\%$ . 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	329	
1	B	329	
2	I	206	
2	J	206	

## 2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 5842 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 PP1-gamma catalytic subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	295	2380	1527	399	436	18	0	0	0
1	B	295	2380	1527	399	436	18	0	0	0

There are 14 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-5	MET	-	initiating methionine	UNP P63088
A	-4	HIS	-	expression tag	UNP P63088
A	-3	HIS	-	expression tag	UNP P63088
A	-2	HIS	-	expression tag	UNP P63088
A	-1	HIS	-	expression tag	UNP P63088
A	0	HIS	-	expression tag	UNP P63088
A	1	HIS	-	expression tag	UNP P63088
B	-5	MET	-	initiating methionine	UNP P63088
B	-4	HIS	-	expression tag	UNP P63088
B	-3	HIS	-	expression tag	UNP P63088
B	-2	HIS	-	expression tag	UNP P63088
B	-1	HIS	-	expression tag	UNP P63088
B	0	HIS	-	expression tag	UNP P63088
B	1	HIS	-	expression tag	UNP P63088

- Molecule 2 is a protein called Protein phosphatase inhibitor 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	I	59	495	309	93	91	2	0	0	0
2	J	58	487	305	92	88	2	0	0	0

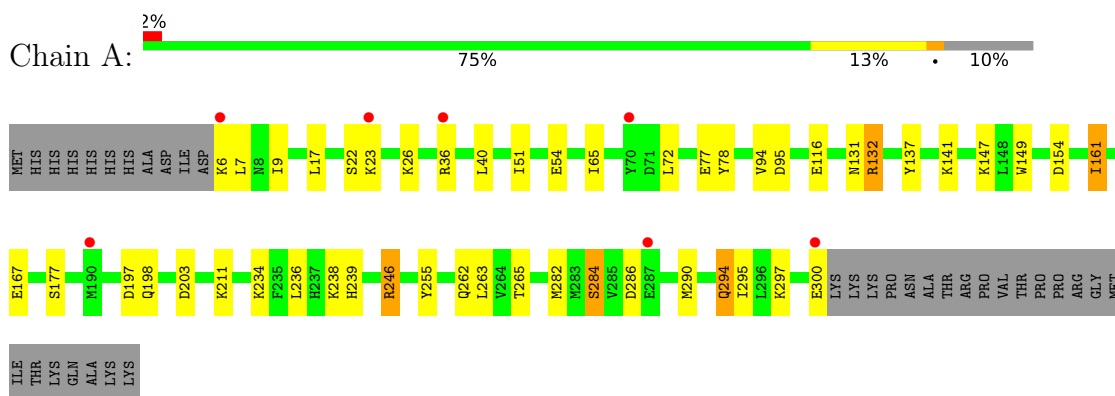
- Molecule 3 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	47	Total O 47 47	0	0
3	I	5	Total O 5 5	0	0
3	B	38	Total O 38 38	0	0
3	J	10	Total O 10 10	0	0

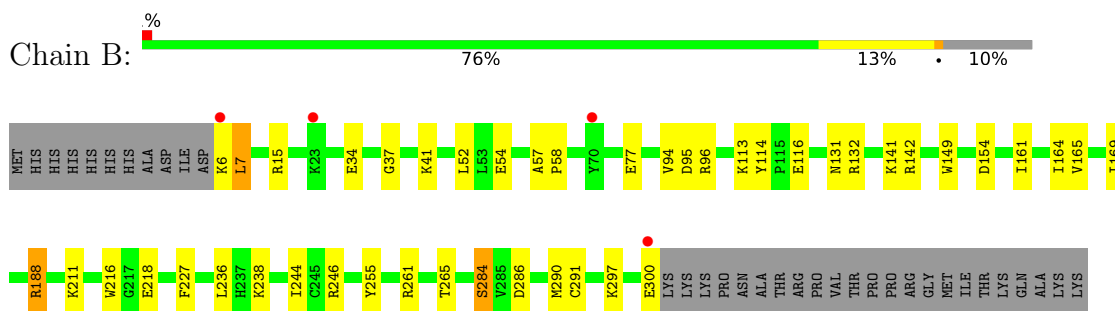
### 3 Residue-property plots [i](#)

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.

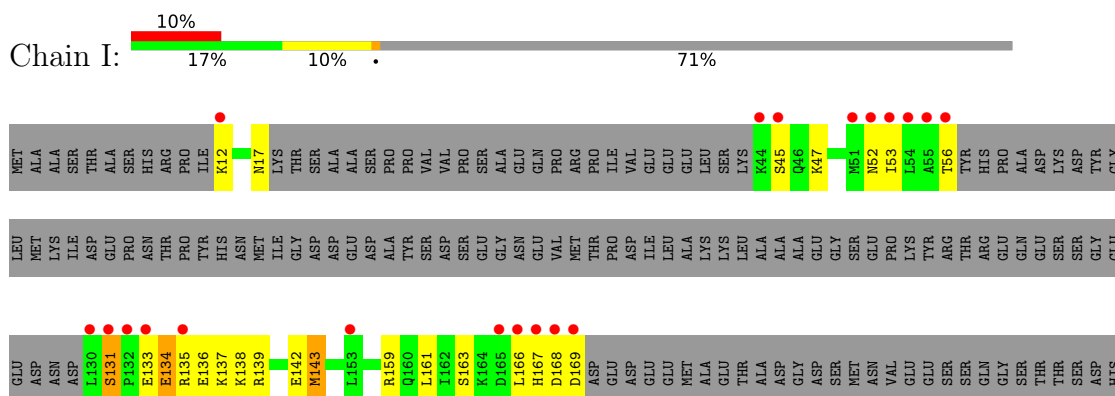
- Molecule 1: Serine/threonine-protein phosphatase PP1-gamma catalytic subunit



- Molecule 1: Serine/threonine-protein phosphatase PP1-gamma catalytic subunit



- Molecule 2: Protein phosphatase inhibitor 2



LEU  
GLN  
HIS  
LYS  
SER  
GLN  
SER  
SER

• Molecule 2: Protein phosphatase inhibitor 2



MET ALA ALA SER THR ALA SER HIS ARG PRO ILE K12 K16 N17 LYS THR SER ALA ALA SER PRO PRO VAL VAL PRO PRO ALA GLU GLN PRO ARG PRO ILE VAL GLU GLU LEU SER LYS K44 K47 T56 TYR HIS PRO PRO ALA ASP LYS ASP TYR GLY LEU MET ASP ILE ASP

GLU PRO ASN THR TYR HIS ASN MET ILE GLY ASP ASP GLU ASP TYR ASP SER ASP SER GLU GLY VAL MET THR PRO ASP ASP ILE LEU LEU ALA ALA ALA GLY SER PRO LYS TYR ARG THR ARG GLU GLN GLU SER SER GLY GLU ASP ASP ILE ASP L130

S131 P132 E133 E134 R135 E136 K137 Q140 F141 E142 M143 K144 L153 K156 K164 D165 L166 H167 D168 ASP GLU ASP GLU MET VAL GLU SER SER SER GLN THR THR THR SER ASP HIS LEU GLN HIS LYS SER GLN SER

SER

## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	95.46Å 103.81Å 151.38Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	41.70 – 2.61 41.70 – 2.61	Depositor EDS
% Data completeness (in resolution range)	95.4 (41.70-2.61) 95.6 (41.70-2.61)	Depositor EDS
$R_{merge}$	0.09	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.00 (at 2.61Å)	Xtrriage
Refinement program	REFMAC	Depositor
R, $R_{free}$	0.216 , 0.254 0.208 , 0.245	Depositor DCC
$R_{free}$ test set	2248 reflections (4.82%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	45.7	Xtrriage
Anisotropy	0.387	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 21.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	5842	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	47.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.36% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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	0.55	0/2434	0.87	1/3286 (0.0%)
1	B	0.55	0/2434	0.87	0/3286
2	I	0.64	0/499	0.90	0/658
2	J	0.62	0/491	1.00	0/647
All	All	0.56	0/5858	0.89	1/7877 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	22	SER	N-CA-C	5.07	116.88	110.33

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	2380	0	2351	18	0
1	B	2380	0	2351	16	0
2	I	495	0	507	10	0
2	J	487	0	503	8	0
3	A	47	0	0	1	0
3	B	38	0	0	0	0
3	I	5	0	0	0	0
3	J	10	0	0	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	5842	0	5712	48	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 4.

The worst 5 of 48 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)
2:J:131:SER:HB3	2:J:134:GLU:HB2	1.73	0.69
1:B:286:ASP:OD1	1:B:290:MET:HB3	1.97	0.65
1:A:284:SER:HB2	1:A:294:GLN:HE22	1.61	0.64
2:I:131:SER:HB2	2:I:134:GLU:HB2	1.78	0.64
2:I:52:ASN:O	2:I:56:THR:HG23	1.99	0.61

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	293/329 (89%)	277 (94%)	16 (6%)	0	100	100
1	B	293/329 (89%)	276 (94%)	17 (6%)	0	100	100
2	I	53/206 (26%)	51 (96%)	2 (4%)	0	100	100
2	J	52/206 (25%)	52 (100%)	0	0	100	100
All	All	691/1070 (65%)	656 (95%)	35 (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	261/291 (90%)	236 (90%)	25 (10%)	8	16
1	B	261/291 (90%)	241 (92%)	20 (8%)	12	25
2	I	54/181 (30%)	38 (70%)	16 (30%)	0	0
2	J	53/181 (29%)	45 (85%)	8 (15%)	3	5
All	All	629/944 (67%)	560 (89%)	69 (11%)	6	12

5 of 69 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	261	ARG
1	B	297	LYS
2	J	156	LYS
1	A	300	GLU
1	A	297	LYS

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	239	HIS
1	B	27	ASN
1	B	117	ASN
1	B	145	ASN
1	B	239	HIS

### 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 [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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	295/329 (89%)	-0.03	7 (2%) 59 54	30, 42, 59, 73	0
1	B	295/329 (89%)	-0.04	4 (1%) 73 70	30, 42, 59, 73	0
2	I	59/206 (28%)	1.54	20 (33%) 1 1	36, 62, 82, 85	0
2	J	58/206 (28%)	1.45	15 (25%) 1 1	35, 63, 82, 85	0
All	All	707/1070 (66%)	0.22	46 (6%) 25 20	30, 44, 71, 85	0

The worst 5 of 46 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	I	130	LEU	6.1
2	J	130	LEU	5.7
2	J	167	HIS	5.6
2	J	133	GLU	4.8
2	J	168	ASP	4.7

### 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.