



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 1, 2026 – 08:04 AM UTC

PDB ID : 1OEU / pdb_00001oeu
Title : Oxidation state of protein tyrosine phosphatase 1B
Authors : van Montfort, R.L.M.; Congreve, M.; Tisi, D.; Carr, R.; Jhoti, H.
Deposited on : 2003-03-31
Resolution : 2.50 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)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

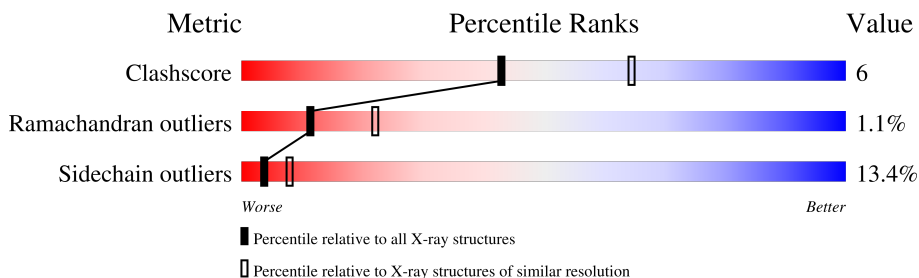
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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	190562	6492 (2.50-2.50)
Ramachandran outliers	187476	6378 (2.50-2.50)
Sidechain outliers	187428	6380 (2.50-2.50)

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 $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	321	 65% 20% • 12%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 2476 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 PROTEIN-TYROSINE PHOSPHATASE, NON-RECEPTOR TYPE 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	281	Total	C	N	O	S	0	0	1
			2291	1453	396	427	15			

- Molecule 2 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

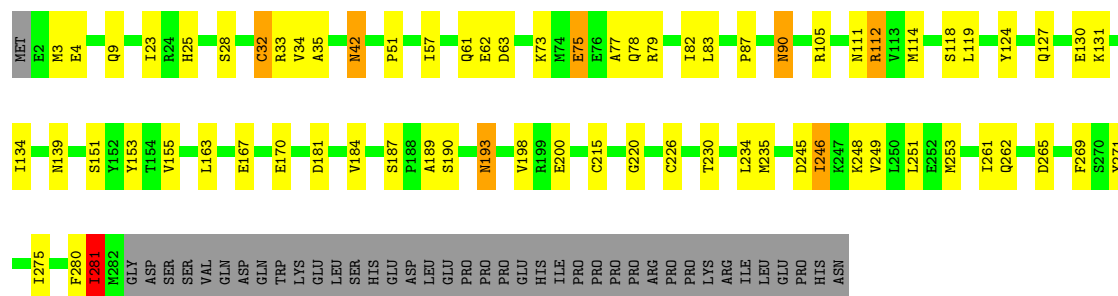
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Mg	0	0
			1	1		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	184	Total	O	0	0
			184	184		

Note EDS was not executed.

Chain A: 65% 20% • 12%



4 Data and refinement statistics

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

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α , β , γ	88.91Å 88.91Å 104.64Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	76.70 – 2.50	Depositor
% Data completeness (in resolution range)	95.9 (76.70-2.50)	Depositor
R_{merge}	0.17	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	REFMAC 5.1.29	Depositor
R, R_{free}	0.196 , 0.270	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	2476	wwPDB-VP
Average B, all atoms (Å ²)	25.0	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: CSD, MG

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	0.99	5/2335 (0.2%)	1.10	3/3148 (0.1%)

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	235	MET	SD-CE	7.10	1.97	1.79
1	A	281	ILE	C-N	-6.55	1.24	1.33
1	A	114	MET	SD-CE	6.39	1.95	1.79
1	A	181	ASP	CA-C	-5.61	1.45	1.52
1	A	23	ILE	CA-CB	5.23	1.60	1.54

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	198	VAL	N-CA-C	-5.27	105.71	110.82
1	A	32	CYS	N-CA-C	-5.20	102.62	110.06
1	A	112	ARG	N-CA-C	-5.04	103.06	110.52

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	2291	0	2262	28	0
2	A	1	0	0	0	0
3	A	184	0	0	3	0
All	All	2476	0	2262	28	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 6.

All (28) 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:42:ASN:HD22	1:A:42:ASN:C	1.90	0.79
1:A:42:ASN:C	1:A:42:ASN:ND2	2.51	0.62
1:A:111:ASN:ND2	1:A:112:ARG:O	2.33	0.59
1:A:280:PHE:O	1:A:281:ILE:HD12	2.04	0.58
1:A:220:GLY:HA3	1:A:262:GLN:HE21	1.68	0.58
1:A:3:MET:HE3	1:A:246:ILE:HD11	1.87	0.55
1:A:245:ASP:HB3	1:A:248:LYS:HB2	1.88	0.55
1:A:245:ASP:O	1:A:249:VAL:HG23	2.08	0.53
1:A:3:MET:HE2	1:A:275:ILE:HG13	1.89	0.53
1:A:83:LEU:HD11	1:A:226:CYS:SG	2.49	0.52
1:A:269:PHE:CE1	3:A:2182:HOH:O	2.55	0.50
1:A:75:GLU:O	1:A:78:GLN:NE2	2.35	0.48
1:A:32:CYS:HB2	3:A:2026:HOH:O	2.14	0.46
1:A:246:ILE:HD12	1:A:271:TYR:CE2	2.51	0.46
1:A:153:TYR:HE2	1:A:155:VAL:CG2	2.30	0.45
1:A:249:VAL:O	1:A:253:MET:HG3	2.17	0.44
1:A:105:ARG:HG2	1:A:105:ARG:HH11	1.82	0.44
1:A:3:MET:HE3	1:A:246:ILE:CD1	2.48	0.44
1:A:262:GLN:NE2	3:A:2174:HOH:O	2.50	0.43
1:A:246:ILE:HD12	1:A:271:TYR:CZ	2.54	0.43
1:A:77:ALA:O	1:A:78:GLN:C	2.62	0.43
1:A:189:ALA:O	1:A:193:ASN:HB2	2.19	0.42
1:A:105:ARG:HH12	1:A:170:GLU:HG2	1.85	0.42
1:A:57:ILE:HD11	1:A:82:ILE:HG12	2.02	0.42
1:A:87:PRO:HG2	1:A:124:TYR:CD2	2.55	0.41
1:A:280:PHE:O	1:A:281:ILE:CG1	2.69	0.41
1:A:35:ALA:HB2	1:A:51:PRO:HD2	2.02	0.41
1:A:42:ASN:O	1:A:90:ASN:ND2	2.54	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	278/321 (87%)	267 (96%)	8 (3%)	3 (1%)	11	22

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	63	ASP
1	A	261	ILE
1	A	281	ILE

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	253/293 (86%)	219 (87%)	34 (13%)	4	8

All (34) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	4	GLU
1	A	9	GLN
1	A	25	HIS
1	A	28	SER
1	A	33	ARG
1	A	34	VAL
1	A	42	ASN
1	A	61	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	62	GLU
1	A	73	LYS
1	A	75	GLU
1	A	79	ARG
1	A	90	ASN
1	A	118	SER
1	A	119	LEU
1	A	127	GLN
1	A	130	GLU
1	A	131	LYS
1	A	134	ILE
1	A	139	ASN
1	A	151	SER
1	A	163	LEU
1	A	167	GLU
1	A	184	VAL
1	A	187	SER
1	A	190	SER
1	A	193	ASN
1	A	200	GLU
1	A	230	THR
1	A	234	LEU
1	A	246	ILE
1	A	251	LEU
1	A	265	ASP
1	A	281	ILE

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	9	GLN
1	A	21	GLN
1	A	42	ASN
1	A	208	HIS
1	A	262	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

1 non-standard protein/DNA/RNA residue is 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	$\# Z > 2$
1	CSD	A	215	1	4,7,8	3.41	1 (25%)	1,8,10	0.08	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
1	CSD	A	215	1	-	2/2/6/8	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	215	CSD	OD1-SG	-6.52	1.41	1.47

There are no bond angle outliers.

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	215	CSD	CA-CB-SG-OD1
1	A	215	CSD	N-CA-CB-SG

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 1 ligands modelled in this entry, 1 is 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](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

EDS was not executed - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

6.4 Ligands

EDS was not executed - this section is therefore empty.

6.5 Other polymers

EDS was not executed - this section is therefore empty.