



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 6, 2024 – 06:37 AM EDT

PDB ID : 1YJK  
Title : Reduced Peptidylglycine Alpha-Hydroxylating Monooxygenase (PHM) in a New Crystal Form  
Authors : Siebert, X.; Eipper, B.A.; Mains, R.E.; Prigge, S.T.; Blackburn, N.J.; Amzel, L.M.  
Deposited on : 2005-01-14  
Resolution : 2.00 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](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  
Mogul : 2022.3.0, CSD as543be (2022)  
Xtrriage (Phenix) : **NOT EXECUTED**  
EDS : **NOT EXECUTED**  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.39

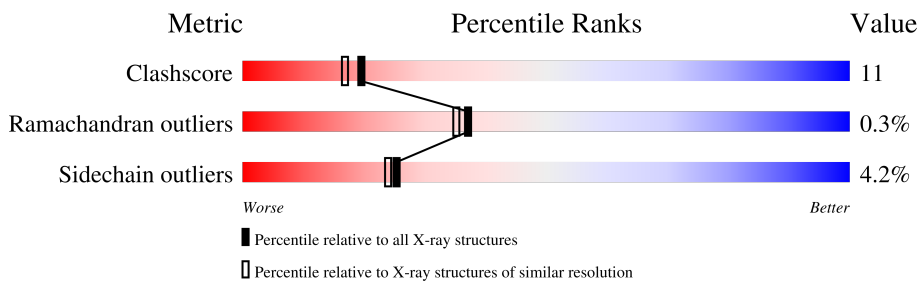
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.00 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	180529	10737 (2.00-2.00)
Ramachandran outliers	177936	10628 (2.00-2.00)
Sidechain outliers	177891	10627 (2.00-2.00)

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	A	306	74% 22% . . .

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 2485 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.

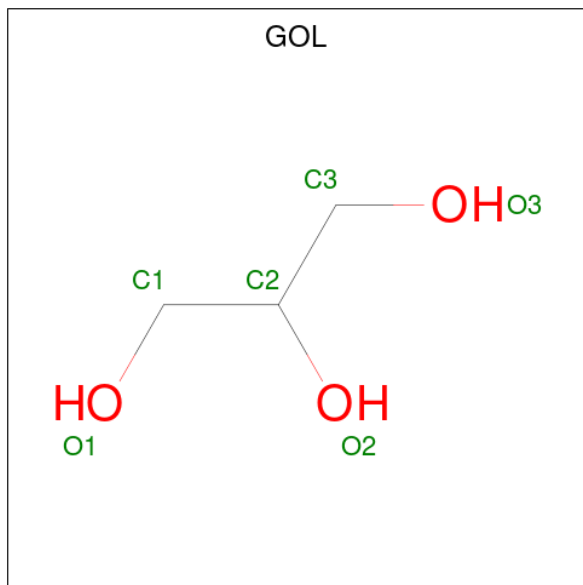
- Molecule 1 is a protein called Peptidyl-glycine alpha-amidating monooxygenase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	303	2369	1513	401	430	25	0	0	0

- Molecule 2 is COPPER (II) ION (three-letter code: CU) (formula: Cu).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	2	Total	Cu	0	0
			2	2		

- Molecule 3 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



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		

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

- Molecule 4 is water.

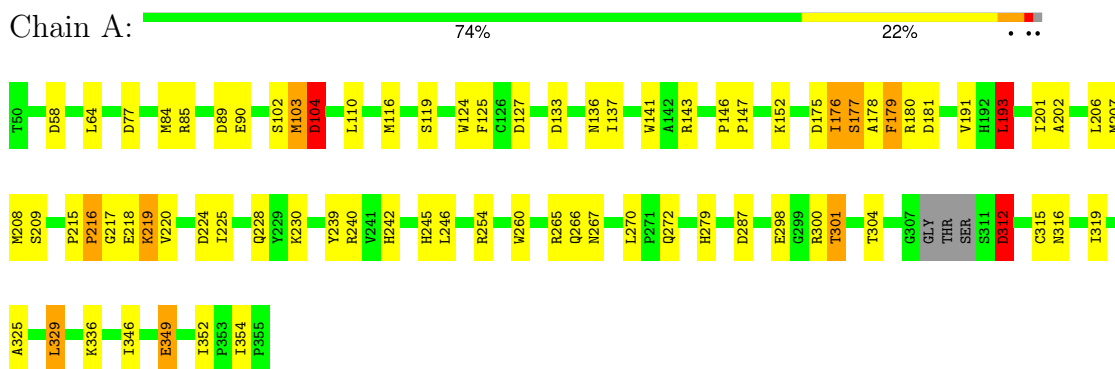
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	84	Total O 84 84	0	0

### 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. 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: Peptidyl-glycine alpha-amidating monooxygenase



## 4 Data and refinement statistics

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

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	59.15Å 66.33Å 69.92Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.22 – 2.00	Depositor
% Data completeness (in resolution range)	99.3 (48.22-2.00)	Depositor
$R_{merge}$	0.05	Depositor
$R_{sym}$	0.05	Depositor
Refinement program	REFMAC	Depositor
R, $R_{free}$	0.196 , 0.260	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	2485	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	33.0	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: GOL, CU

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	1.29	23/2437 (0.9%)	1.16	21/3315 (0.6%)

All (23) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	301	THR	CB-OG1	19.29	1.81	1.43
1	A	217	GLY	C-N	10.35	1.57	1.34
1	A	301	THR	C-O	8.73	1.40	1.23
1	A	218	GLU	CD-OE2	7.42	1.33	1.25
1	A	301	THR	CA-CB	7.34	1.72	1.53
1	A	218	GLU	CD-OE1	7.28	1.33	1.25
1	A	218	GLU	CG-CD	7.26	1.62	1.51
1	A	179	PHE	CE2-CZ	7.13	1.50	1.37
1	A	179	PHE	CG-CD1	-6.70	1.28	1.38
1	A	217	GLY	C-O	6.39	1.33	1.23
1	A	175	ASP	C-N	6.26	1.48	1.34
1	A	179	PHE	CB-CG	6.08	1.61	1.51
1	A	219	LYS	CD-CE	5.96	1.66	1.51
1	A	239	TYR	CD1-CE1	5.85	1.48	1.39
1	A	179	PHE	CA-CB	5.73	1.66	1.53
1	A	177	SER	CB-OG	5.65	1.49	1.42
1	A	349	GLU	CD-OE1	5.57	1.31	1.25
1	A	218	GLU	N-CA	-5.49	1.35	1.46
1	A	202	ALA	CA-CB	5.40	1.63	1.52
1	A	216	PRO	N-CD	5.39	1.55	1.47
1	A	180	ARG	CB-CG	5.25	1.66	1.52
1	A	219	LYS	CE-NZ	5.23	1.62	1.49
1	A	254	ARG	CB-CG	5.08	1.66	1.52

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	85	ARG	NE-CZ-NH2	-13.00	113.80	120.30
1	A	179	PHE	CB-CG-CD2	-9.20	114.36	120.80
1	A	85	ARG	NE-CZ-NH1	8.62	124.61	120.30
1	A	127	ASP	CB-CG-OD2	7.65	125.19	118.30
1	A	89	ASP	CB-CG-OD2	7.49	125.04	118.30
1	A	133	ASP	CB-CG-OD2	7.33	124.90	118.30
1	A	176	ILE	O-C-N	6.92	133.76	122.70
1	A	224	ASP	CB-CG-OD2	6.90	124.51	118.30
1	A	329	LEU	CA-CB-CG	6.86	131.07	115.30
1	A	312	ASP	CB-CG-OD2	6.61	124.25	118.30
1	A	152	LYS	CD-CE-NZ	6.28	126.14	111.70
1	A	104	ASP	CB-CG-OD2	6.23	123.91	118.30
1	A	254	ARG	NE-CZ-NH1	5.73	123.17	120.30
1	A	77	ASP	CB-CG-OD2	5.72	123.45	118.30
1	A	254	ARG	NE-CZ-NH2	-5.62	117.49	120.30
1	A	216	PRO	N-CD-CG	-5.35	95.17	103.20
1	A	181	ASP	CB-CG-OD2	5.20	122.97	118.30
1	A	287	ASP	CB-CG-OD1	5.17	122.95	118.30
1	A	175	ASP	CB-CG-OD2	5.16	122.94	118.30
1	A	193	LEU	CA-CB-CG	5.10	127.02	115.30
1	A	193	LEU	CB-CG-CD2	5.02	119.54	111.00

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	2369	0	2295	54	0
2	A	2	0	0	0	0
3	A	30	0	40	2	0
4	A	84	0	0	4	0
All	All	2485	0	2335	54	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 11.

All (54) 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:301:THR:OG1	1:A:301:THR:CB	1.81	1.27
1:A:84:MET:SD	4:A:874:HOH:O	1.93	1.25
1:A:207:MET:HE3	1:A:319:ILE:HD11	1.29	1.11
1:A:207:MET:CE	1:A:319:ILE:HD11	1.85	1.07
1:A:207:MET:HE3	1:A:319:ILE:CD1	1.91	0.99
1:A:103:MET:HE1	1:A:143:ARG:HG3	1.51	0.92
1:A:207:MET:CE	1:A:319:ILE:CD1	2.47	0.92
1:A:245:HIS:HE2	1:A:300:ARG:NH1	1.67	0.91
1:A:245:HIS:NE2	1:A:300:ARG:NH1	2.25	0.83
1:A:103:MET:HA	1:A:103:MET:CE	2.15	0.77
1:A:245:HIS:CE1	1:A:300:ARG:HH12	2.05	0.74
1:A:103:MET:HA	1:A:103:MET:HE3	1.70	0.73
1:A:279:HIS:NE2	3:A:801:GOL:H11	2.06	0.71
1:A:245:HIS:HE2	1:A:300:ARG:HH12	1.26	0.71
1:A:103:MET:CE	1:A:143:ARG:HG3	2.21	0.68
1:A:304:THR:HG23	1:A:312:ASP:HB2	1.76	0.67
1:A:312:ASP:N	1:A:312:ASP:OD1	2.25	0.67
1:A:207:MET:HE2	1:A:319:ILE:CD1	2.30	0.62
1:A:209:SER:HB3	1:A:315:CYS:HB3	1.83	0.60
1:A:279:HIS:NE2	3:A:801:GOL:C1	2.68	0.57
1:A:110:LEU:HD22	1:A:137:ILE:HD11	1.87	0.56
1:A:267:ASN:ND2	1:A:354:ILE:O	2.34	0.55
1:A:349:GLU:HA	1:A:352:ILE:HD12	1.87	0.55
1:A:206:LEU:HG	1:A:208:MET:HG3	1.88	0.54
1:A:191:VAL:HG12	1:A:193:LEU:HD22	1.91	0.53
1:A:304:THR:CG2	1:A:312:ASP:HB2	2.39	0.53
1:A:207:MET:CE	1:A:319:ILE:HD12	2.34	0.51
1:A:219:LYS:HA	1:A:298:GLU:HG3	1.91	0.51
1:A:104:ASP:OD1	1:A:104:ASP:N	2.25	0.51
1:A:228:GLN:NE2	1:A:230:LYS:HE2	2.28	0.48
1:A:246:LEU:HD11	1:A:300:ARG:HH11	1.78	0.48
1:A:266:GLN:OE1	1:A:270:LEU:HD12	2.13	0.47
1:A:178:ALA:HB3	1:A:179:PHE:CE2	2.50	0.47
1:A:176:ILE:HG22	1:A:177:SER:O	2.15	0.47
1:A:103:MET:HE1	1:A:141:TRP:HH2	1.80	0.47
1:A:242:HIS:HB3	1:A:316:ASN:HB2	1.98	0.45
1:A:201:ILE:HG12	1:A:325:ALA:HA	1.98	0.44
1:A:245:HIS:N	1:A:245:HIS:ND1	2.66	0.44
1:A:207:MET:HE3	1:A:319:ILE:HD12	1.87	0.42
1:A:246:LEU:HD11	1:A:300:ARG:HD3	2.01	0.42
1:A:240:ARG:NE	1:A:272:GLN:O	2.51	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:319:ILE:HD13	1:A:319:ILE:HG21	1.90	0.42
1:A:119:SER:HB3	1:A:124:TRP:CD2	2.54	0.42
1:A:246:LEU:HD11	1:A:300:ARG:NH1	2.35	0.42
1:A:116:MET:HB3	4:A:871:HOH:O	2.20	0.42
1:A:146:PRO:HA	1:A:147:PRO:HD3	1.93	0.41
1:A:215:PRO:HA	1:A:216:PRO:HD2	1.95	0.41
1:A:119:SER:HB3	1:A:124:TRP:CE3	2.56	0.41
1:A:219:LYS:HG3	1:A:220:VAL:HG23	2.03	0.41
1:A:225:ILE:HD11	1:A:315:CYS:SG	2.59	0.41
1:A:300:ARG:HG2	4:A:876:HOH:O	2.21	0.41
1:A:260:TRP:CZ3	1:A:346:ILE:HG13	2.56	0.40
1:A:136:ASN:HB3	4:A:837:HOH:O	2.21	0.40
1:A:178:ALA:HB3	1:A:179:PHE:CD2	2.57	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	299/306 (98%)	292 (98%)	6 (2%)	1 (0%)	37 35

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	58	ASP

### 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	259/262 (99%)	248 (96%)	11 (4%)	25 24

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	64	LEU
1	A	90	GLU
1	A	102	SER
1	A	103	MET
1	A	104	ASP
1	A	125	PHE
1	A	193	LEU
1	A	265	ARG
1	A	312	ASP
1	A	329	LEU
1	A	336	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	305	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](#)

Of 7 ligands modelled in this entry, 2 are monoatomic - leaving 5 for Mogul analysis.

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	703	-	5,5,5	0.60	0	5,5,5	1.54	1 (20%)
3	GOL	A	702	-	5,5,5	0.46	0	5,5,5	0.60	0
3	GOL	A	704	-	5,5,5	0.25	0	5,5,5	0.55	0
3	GOL	A	801	-	5,5,5	0.35	0	5,5,5	0.96	0
3	GOL	A	701	-	5,5,5	0.66	0	5,5,5	0.54	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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	GOL	A	703	-	-	3/4/4/4	-
3	GOL	A	702	-	-	1/4/4/4	-
3	GOL	A	704	-	-	2/4/4/4	-
3	GOL	A	801	-	-	4/4/4/4	-
3	GOL	A	701	-	-	2/4/4/4	-

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	703	GOL	O1-C1-C2	-2.76	97.95	110.38

There are no chirality outliers.

All (12) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	703	GOL	O1-C1-C2-C3
3	A	801	GOL	C1-C2-C3-O3
3	A	704	GOL	C1-C2-C3-O3
3	A	703	GOL	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
3	A	801	GOL	O1-C1-C2-O2
3	A	801	GOL	O2-C2-C3-O3
3	A	703	GOL	O2-C2-C3-O3
3	A	704	GOL	O2-C2-C3-O3
3	A	701	GOL	O1-C1-C2-C3
3	A	702	GOL	O1-C1-C2-C3
3	A	801	GOL	O1-C1-C2-C3
3	A	701	GOL	O1-C1-C2-O2

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	801	GOL	2	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

### 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.