



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 07:50 PM UTC

PDB ID : 3G2M / pdb_00003g2m
Title : Crystal Structure of the Glycopeptide N-methyltransferase MtfA
Authors : Shi, R.; Matte, A.; Cygler, M.; Montreal-Kingston Bacterial Structural Genomics Initiative (BSGI)
Deposited on : 2009-01-31
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

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

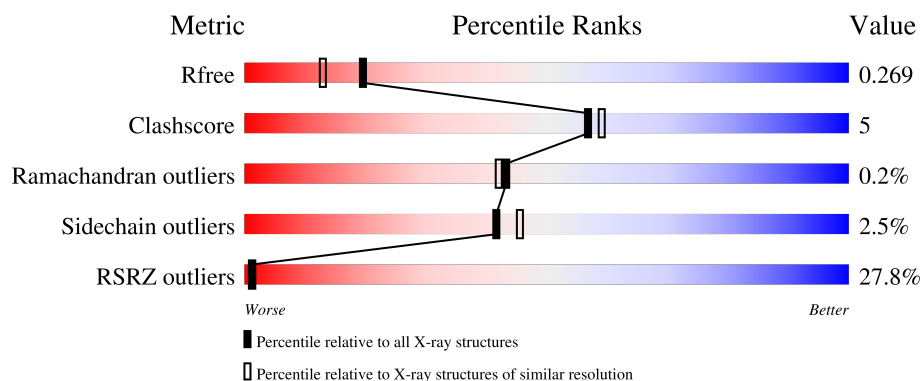
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.00 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))
R_{free}	180053	10052 (2.00-2.00)
Clashscore	190562	11152 (2.00-2.00)
Ramachandran outliers	187476	11031 (2.00-2.00)
Sidechain outliers	187428	11029 (2.00-2.00)
RSRZ outliers	180081	10067 (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 ≥ 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	299	
1	B	299	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 3575 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 PCZA361.24.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	232	Total	C	N	O	S	Se	0	2	0
			1777	1119	315	335	3	5			
1	B	214	Total	C	N	O	S	Se	0	2	0
			1655	1034	299	316	1	5			

There are 38 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-18	MSE	-	expression tag	UNP O52805
A	-17	GLY	-	expression tag	UNP O52805
A	-16	SER	-	expression tag	UNP O52805
A	-15	SER	-	expression tag	UNP O52805
A	-14	HIS	-	expression tag	UNP O52805
A	-13	HIS	-	expression tag	UNP O52805
A	-12	HIS	-	expression tag	UNP O52805
A	-11	HIS	-	expression tag	UNP O52805
A	-10	HIS	-	expression tag	UNP O52805
A	-9	HIS	-	expression tag	UNP O52805
A	-8	SER	-	expression tag	UNP O52805
A	-7	GLY	-	expression tag	UNP O52805
A	-6	GLY	-	expression tag	UNP O52805
A	-5	LEU	-	expression tag	UNP O52805
A	-4	VAL	-	expression tag	UNP O52805
A	-3	PRO	-	expression tag	UNP O52805
A	-2	ARG	-	expression tag	UNP O52805
A	-1	GLY	-	expression tag	UNP O52805
A	0	SER	-	expression tag	UNP O52805
B	-18	MSE	-	expression tag	UNP O52805
B	-17	GLY	-	expression tag	UNP O52805
B	-16	SER	-	expression tag	UNP O52805
B	-15	SER	-	expression tag	UNP O52805
B	-14	HIS	-	expression tag	UNP O52805
B	-13	HIS	-	expression tag	UNP O52805

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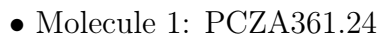
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Chain	Residue	Modelled	Actual	Comment	Reference
B	-12	HIS	-	expression tag	UNP O52805
B	-11	HIS	-	expression tag	UNP O52805
B	-10	HIS	-	expression tag	UNP O52805
B	-9	HIS	-	expression tag	UNP O52805
B	-8	SER	-	expression tag	UNP O52805
B	-7	GLY	-	expression tag	UNP O52805
B	-6	GLY	-	expression tag	UNP O52805
B	-5	LEU	-	expression tag	UNP O52805
B	-4	VAL	-	expression tag	UNP O52805
B	-3	PRO	-	expression tag	UNP O52805
B	-2	ARG	-	expression tag	UNP O52805
B	-1	GLY	-	expression tag	UNP O52805
B	0	SER	-	expression tag	UNP O52805

- Molecule 2 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	24	Total O 24 24	0	0
2	B	119	Total O 119 119	0	0

- Molecule 1: PCZA361.24



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	127.44Å 71.68Å 75.19Å 90.00° 103.02° 90.00°	Depositor
Resolution (Å)	50.00 – 2.00 50.00 – 2.00	Depositor EDS
% Data completeness (in resolution range)	98.2 (50.00-2.00) 98.6 (50.00-2.00)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.52 (at 2.00Å)	Xtriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.238 , 0.271 0.237 , 0.269	Depositor DCC
R_{free} test set	2240 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å ²)	35.1	Xtriage
Anisotropy	0.412	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 43.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	3575	wwPDB-VP
Average B, all atoms (Å ²)	41.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.18% 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 [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	0.49	0/1808	0.78	4/2440 (0.2%)
1	B	0.47	0/1680	0.75	0/2259
All	All	0.48	0/3488	0.77	4/4699 (0.1%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	61	GLY	CA-C-N	7.31	128.97	119.84
1	A	61	GLY	C-N-CA	7.31	128.97	119.84
1	A	65	GLY	CA-C-N	5.54	125.48	119.78
1	A	65	GLY	C-N-CA	5.54	125.48	119.78

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	1777	0	1771	19	0
1	B	1655	0	1648	13	0
2	A	24	0	0	0	0
2	B	119	0	0	2	0
All	All	3575	0	3419	31	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 5.

All (31) 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:62:PRO:CB	1:A:63:VAL:HA	1.88	1.02
1:A:62:PRO:HB2	1:A:63:VAL:HA	1.01	1.00
1:A:62:PRO:HB2	1:A:63:VAL:CA	1.93	0.99
1:B:128:LEU:H	1:B:160:HIS:HE1	1.21	0.86
1:B:128:LEU:H	1:B:160:HIS:CE1	2.08	0.71
1:B:229:ARG:HG2	1:B:229:ARG:HH11	1.58	0.69
1:A:11:ARG:HG2	1:A:16:ASP:OD1	1.95	0.65
1:B:128:LEU:N	1:B:160:HIS:HE1	1.97	0.62
1:A:60:THR:O	1:A:62:PRO:HD2	2.02	0.60
1:A:166:LYS:HG3	1:A:168:LEU:HD21	1.84	0.57
1:B:59:ARG:HG3	1:B:267:LEU:HD23	1.87	0.57
1:A:168:LEU:CD1	1:A:269:GLU:HG2	2.35	0.56
1:A:62:PRO:CB	1:A:63:VAL:CA	2.67	0.52
1:A:18:LEU:HD11	1:A:214:HIS:CD2	2.43	0.52
1:A:147:GLU:OE1	2:B:317:HOH:O	2.19	0.52
1:A:136:VAL:HG12	1:A:168:LEU:HB2	1.91	0.52
1:A:9:PRO:HG2	1:A:28:LEU:HG	1.92	0.50
1:A:95:THR:HG23	1:A:120[A]:GLN:HE22	1.76	0.50
1:A:218:GLU:HA	1:A:223:PHE:CE1	2.47	0.49
1:A:95:THR:CG2	1:A:120[A]:GLN:HE22	2.26	0.48
1:B:60:THR:CG2	1:B:63:VAL:HG13	2.44	0.48
1:A:55:GLU:HG3	1:A:255:PHE:CD1	2.49	0.47
1:B:229:ARG:HH11	1:B:229:ARG:CG	2.27	0.44
1:A:166:LYS:HG3	1:A:168:LEU:CD2	2.47	0.44
1:A:214:HIS:NE2	1:B:199:HIS:HE1	2.14	0.44
1:B:174:SER:HB3	1:B:232:LEU:HD21	2.00	0.43
1:A:55:GLU:HG3	1:A:255:PHE:CG	2.54	0.43
1:B:126:PHE:CE2	1:B:156:SER:HB3	2.53	0.43
1:B:60:THR:HG23	1:B:63:VAL:HG13	2.00	0.42
1:B:208:ILE:HD13	2:B:309:HOH:O	2.20	0.42
1:B:56:PHE:HA	1:B:267:LEU:HD21	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	224/299 (75%)	216 (96%)	7 (3%)	1 (0%)	30	27
1	B	206/299 (69%)	202 (98%)	4 (2%)	0	100	100
All	All	430/598 (72%)	418 (97%)	11 (3%)	1 (0%)	43	42

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	62	PRO

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	189/233 (81%)	187 (99%)	2 (1%)	65	73
1	B	174/233 (75%)	167 (96%)	7 (4%)	28	27
All	All	363/466 (78%)	354 (98%)	9 (2%)	42	45

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	22	VAL
1	A	267	LEU
1	B	60	THR
1	B	63	VAL
1	B	111	ASP

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Mol	Chain	Res	Type
1	B	136	VAL
1	B	188	LEU
1	B	227	THR
1	B	267	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	209	GLN
1	B	120	GLN
1	B	160	HIS
1	B	199	HIS
1	B	209	GLN
1	B	252	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 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

6.1 Protein, DNA and RNA chains

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	227/299 (75%)	1.41	61 (26%)	1 1	21, 40, 56, 62	7 (3%)
1	B	209/299 (69%)	1.75	60 (28%)	1 1	21, 40, 55, 91	7 (3%)
All	All	436/598 (72%)	1.57	121 (27%)	1 1	21, 40, 56, 91	14 (3%)

All (121) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	199	HIS	9.6
1	B	17	VAL	8.7
1	B	18	LEU	8.3
1	A	198	LEU	7.4
1	B	12	THR	7.3
1	A	64	SER	6.9
1	B	15	ALA	6.8
1	A	104	ARG	6.1
1	B	230	ARG	5.7
1	A	47	ALA	5.6
1	B	188	LEU	5.5
1	B	130	LYS	5.5
1	B	211	ILE	5.3
1	A	62	PRO	5.2
1	B	104	ARG	5.2
1	B	234	ALA	5.1
1	B	184	ARG	5.1
1	B	54	ARG	4.8
1	B	189	PRO	4.4
1	B	248	ASP	4.4
1	B	212	THR	4.2
1	B	13	PRO	4.2
1	B	233	LEU	4.1
1	A	205	ALA	4.1

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Mol	Chain	Res	Type	RSRZ
1	B	129	ASP	4.0
1	A	79	PHE	4.0
1	B	63	VAL	4.0
1	B	111	ASP	3.9
1	A	182	LEU	3.9
1	B	126	PHE	3.8
1	A	230	ARG	3.8
1	B	227	THR	3.7
1	A	203	LEU	3.7
1	B	14	HIS	3.6
1	B	66	PRO	3.6
1	B	61	GLY	3.6
1	B	196	TYR	3.6
1	A	224	VAL	3.5
1	B	232	LEU	3.5
1	A	10	VAL	3.5
1	A	22	VAL	3.5
1	A	13	PRO	3.4
1	A	50	THR	3.4
1	B	16	ASP	3.3
1	A	32	TYR	3.3
1	A	184	ARG	3.3
1	B	206	GLU	3.3
1	B	60	THR	3.3
1	A	172	ALA	3.3
1	A	63	VAL	3.2
1	A	27	VAL	3.2
1	A	60	THR	3.2
1	B	183	GLU	3.2
1	A	105	LEU	3.2
1	B	208	ILE	3.2
1	A	223	PHE	3.2
1	A	113	ARG	3.1
1	B	205	ALA	3.1
1	B	228	HIS	3.0
1	A	106	ALA	3.0
1	A	18	LEU	3.0
1	A	204	PRO	3.0
1	A	177	ALA	3.0
1	A	61	GLY	3.0
1	B	194	ARG	2.9
1	A	11	ARG	2.8

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Mol	Chain	Res	Type	RSRZ
1	A	48	ASP	2.8
1	B	207	GLU	2.8
1	A	65	GLY	2.8
1	B	176	ALA	2.8
1	A	112	VAL	2.7
1	B	83	ASP	2.7
1	A	225	VAL	2.7
1	B	172	ALA	2.7
1	B	64	SER	2.7
1	A	262	ARG	2.7
1	A	15	ALA	2.6
1	A	49	GLY	2.6
1	A	218	GLU	2.6
1	A	215	PRO	2.6
1	B	84	LEU	2.6
1	B	258	GLY	2.5
1	A	111	ASP	2.5
1	A	9	PRO	2.5
1	B	186	GLN	2.5
1	B	158	ARG	2.5
1	B	65	GLY	2.4
1	A	114	ASP	2.4
1	A	51	SER	2.4
1	A	110	ALA	2.4
1	A	260	ALA	2.4
1	A	221	ASP	2.4
1	A	12	THR	2.4
1	B	80	PRO	2.4
1	B	125	ALA	2.3
1	B	203	LEU	2.3
1	B	209	GLN	2.3
1	B	195	ARG	2.3
1	A	222	PRO	2.3
1	B	246	GLY	2.3
1	B	262	ARG	2.3
1	B	179	SER	2.3
1	A	29	CYS	2.3
1	B	231	ARG	2.3
1	B	273	PRO	2.3
1	A	58	THR	2.2
1	B	128	LEU	2.2
1	A	14	HIS	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	86	TRP	2.2
1	A	217	ASP	2.2
1	A	57	ALA	2.2
1	A	175	GLU	2.2
1	B	229	ARG	2.1
1	A	211	ILE	2.1
1	A	102[A]	ARG	2.1
1	A	108	ALA	2.1
1	A	86	TRP	2.1
1	B	198	LEU	2.1
1	A	83	ASP	2.0
1	B	261	GLY	2.0
1	A	129	ASP	2.0

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.