



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 9, 2026 – 07:01 PM UTC

PDB ID : 1ZXJ / pdb_00001zxj
Title : Crystal structure of the hypothetical Mycoplasma protein, MPN555
Authors : Schulze-Gahmen, U.; Aono, S.; Shengfeng, C.; Yokota, H.; Kim, R.; Kim, S.-H.; Berkeley Structural Genomics Center (BSGC)
Deposited on : 2005-06-08
Resolution : 2.80 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

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 : **NOT EXECUTED**
Xtrriage (Phenix) : 2.0
EDS : **NOT EXECUTED**
Buster-report : **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

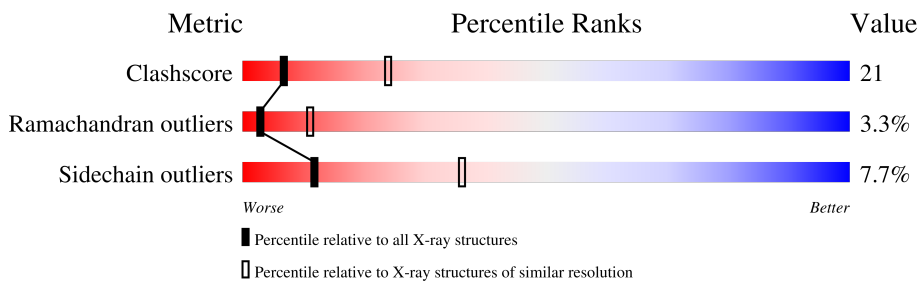
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.80 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	4276 (2.80-2.80)
Ramachandran outliers	187476	4196 (2.80-2.80)
Sidechain outliers	187428	4198 (2.80-2.80)

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	218	47% (green), 35% (yellow), 6% (orange), 12% (grey)
1	B	218	50% (green), 24% (yellow), 2% (orange), 22% (grey)
1	C	218	56% (green), 31% (yellow), 1% (orange), 12% (grey)
1	D	218	49% (green), 35% (yellow), 1% (orange), 1% (red), 11% (grey)

2 Entry composition i

There are 2 unique types of molecules in this entry. The entry contains 5910 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 Hypothetical protein MG377 homolog.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	192	1537	987	258	287	5	0	0	0
1	B	171	1340	870	228	238	4	0	0	0
1	C	192	1510	972	254	279	5	0	0	0
1	D	193	1509	971	255	278	5	0	0	0

There are 100 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MET	-	cloning artifact	UNP P75223
A	2	GLY	-	cloning artifact	UNP P75223
A	3	SER	-	cloning artifact	UNP P75223
A	4	SER	-	cloning artifact	UNP P75223
A	5	HIS	-	expression tag	UNP P75223
A	6	HIS	-	expression tag	UNP P75223
A	7	HIS	-	expression tag	UNP P75223
A	8	HIS	-	expression tag	UNP P75223
A	9	HIS	-	expression tag	UNP P75223
A	10	HIS	-	expression tag	UNP P75223
A	11	ASP	-	cloning artifact	UNP P75223
A	12	TYR	-	cloning artifact	UNP P75223
A	13	ASP	-	cloning artifact	UNP P75223
A	14	ILE	-	cloning artifact	UNP P75223
A	15	PRO	-	cloning artifact	UNP P75223
A	16	THR	-	cloning artifact	UNP P75223
A	17	THR	-	cloning artifact	UNP P75223
A	18	GLU	-	cloning artifact	UNP P75223
A	19	ASN	-	cloning artifact	UNP P75223
A	20	LEU	-	cloning artifact	UNP P75223
A	21	TYR	-	cloning artifact	UNP P75223

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Chain	Residue	Modelled	Actual	Comment	Reference
A	22	PHE	-	cloning artifact	UNP P75223
A	23	GLN	-	cloning artifact	UNP P75223
A	24	GLY	-	cloning artifact	UNP P75223
A	25	HIS	-	cloning artifact	UNP P75223
B	1	MET	-	cloning artifact	UNP P75223
B	2	GLY	-	cloning artifact	UNP P75223
B	3	SER	-	cloning artifact	UNP P75223
B	4	SER	-	cloning artifact	UNP P75223
B	5	HIS	-	expression tag	UNP P75223
B	6	HIS	-	expression tag	UNP P75223
B	7	HIS	-	expression tag	UNP P75223
B	8	HIS	-	expression tag	UNP P75223
B	9	HIS	-	expression tag	UNP P75223
B	10	HIS	-	expression tag	UNP P75223
B	11	ASP	-	cloning artifact	UNP P75223
B	12	TYR	-	cloning artifact	UNP P75223
B	13	ASP	-	cloning artifact	UNP P75223
B	14	ILE	-	cloning artifact	UNP P75223
B	15	PRO	-	cloning artifact	UNP P75223
B	16	THR	-	cloning artifact	UNP P75223
B	17	THR	-	cloning artifact	UNP P75223
B	18	GLU	-	cloning artifact	UNP P75223
B	19	ASN	-	cloning artifact	UNP P75223
B	20	LEU	-	cloning artifact	UNP P75223
B	21	TYR	-	cloning artifact	UNP P75223
B	22	PHE	-	cloning artifact	UNP P75223
B	23	GLN	-	cloning artifact	UNP P75223
B	24	GLY	-	cloning artifact	UNP P75223
B	25	HIS	-	cloning artifact	UNP P75223
C	1	MET	-	cloning artifact	UNP P75223
C	2	GLY	-	cloning artifact	UNP P75223
C	3	SER	-	cloning artifact	UNP P75223
C	4	SER	-	cloning artifact	UNP P75223
C	5	HIS	-	expression tag	UNP P75223
C	6	HIS	-	expression tag	UNP P75223
C	7	HIS	-	expression tag	UNP P75223
C	8	HIS	-	expression tag	UNP P75223
C	9	HIS	-	expression tag	UNP P75223
C	10	HIS	-	expression tag	UNP P75223
C	11	ASP	-	cloning artifact	UNP P75223
C	12	TYR	-	cloning artifact	UNP P75223
C	13	ASP	-	cloning artifact	UNP P75223

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Chain	Residue	Modelled	Actual	Comment	Reference
C	14	ILE	-	cloning artifact	UNP P75223
C	15	PRO	-	cloning artifact	UNP P75223
C	16	THR	-	cloning artifact	UNP P75223
C	17	THR	-	cloning artifact	UNP P75223
C	18	GLU	-	cloning artifact	UNP P75223
C	19	ASN	-	cloning artifact	UNP P75223
C	20	LEU	-	cloning artifact	UNP P75223
C	21	TYR	-	cloning artifact	UNP P75223
C	22	PHE	-	cloning artifact	UNP P75223
C	23	GLN	-	cloning artifact	UNP P75223
C	24	GLY	-	cloning artifact	UNP P75223
C	25	HIS	-	cloning artifact	UNP P75223
D	1	MET	-	cloning artifact	UNP P75223
D	2	GLY	-	cloning artifact	UNP P75223
D	3	SER	-	cloning artifact	UNP P75223
D	4	SER	-	cloning artifact	UNP P75223
D	5	HIS	-	expression tag	UNP P75223
D	6	HIS	-	expression tag	UNP P75223
D	7	HIS	-	expression tag	UNP P75223
D	8	HIS	-	expression tag	UNP P75223
D	9	HIS	-	expression tag	UNP P75223
D	10	HIS	-	expression tag	UNP P75223
D	11	ASP	-	cloning artifact	UNP P75223
D	12	TYR	-	cloning artifact	UNP P75223
D	13	ASP	-	cloning artifact	UNP P75223
D	14	ILE	-	cloning artifact	UNP P75223
D	15	PRO	-	cloning artifact	UNP P75223
D	16	THR	-	cloning artifact	UNP P75223
D	17	THR	-	cloning artifact	UNP P75223
D	18	GLU	-	cloning artifact	UNP P75223
D	19	ASN	-	cloning artifact	UNP P75223
D	20	LEU	-	cloning artifact	UNP P75223
D	21	TYR	-	cloning artifact	UNP P75223
D	22	PHE	-	cloning artifact	UNP P75223
D	23	GLN	-	cloning artifact	UNP P75223
D	24	GLY	-	cloning artifact	UNP P75223
D	25	HIS	-	cloning artifact	UNP P75223

- Molecule 2 is water.

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

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	B	4	Total O 4 4	0	0
2	C	1	Total O 1 1	0	0
2	D	7	Total O 7 7	0	0

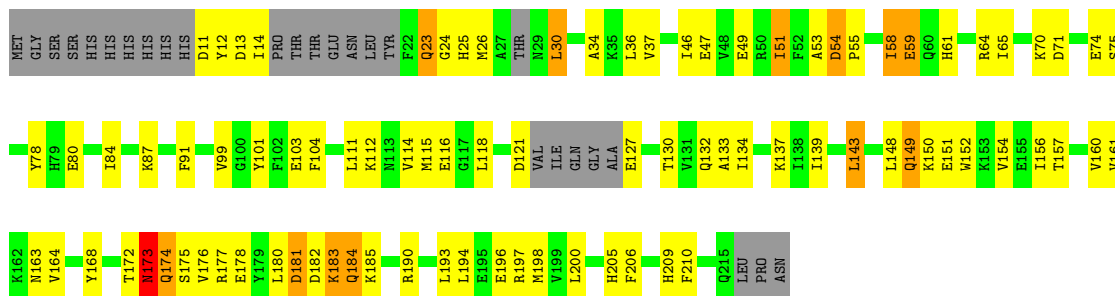
3 Residue-property plots

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.

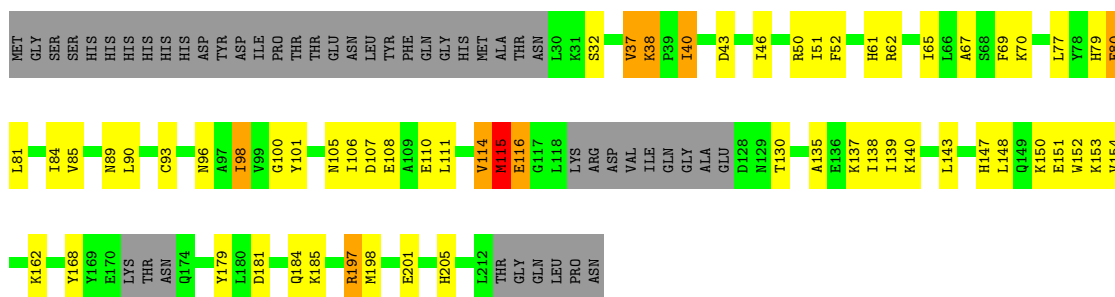
- Molecule 1: Hypothetical protein MG377 homolog

Chain A: 



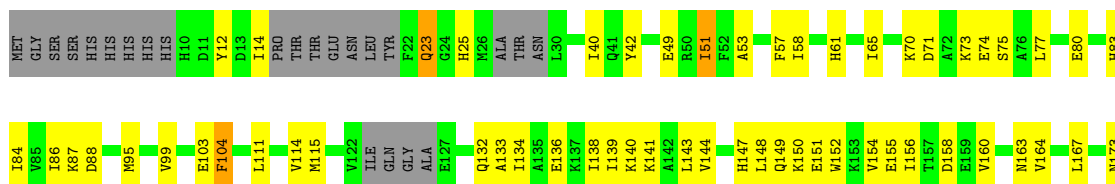
- Molecule 1: Hypothetical protein MG377 homolog

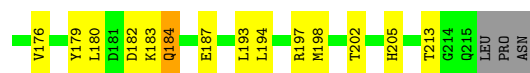
Chain B: 



- Molecule 1: Hypothetical protein MG377 homolog

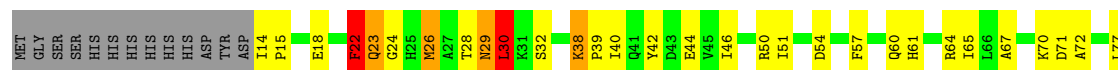
Chain C: 





- Molecule 1: Hypothetical protein MG377 homolog

Chain D: 49% 35% 11%



4 Data and refinement statistics

EDS was not executed - this section is therefore incomplete.

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	132.37Å 45.59Å 153.93Å 90.00° 111.40° 90.00°	Depositor
Resolution (Å)	19.81 – 2.80	Depositor
% Data completeness (in resolution range)	94.4 (19.81-2.80)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	0.08	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.57 (at 2.81Å)	Xtrriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.248 , 0.322	Depositor
Wilson B-factor (Å ²)	52.1	Xtrriage
Anisotropy	0.298	Xtrriage
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	5910	wwPDB-VP
Average B, all atoms (Å ²)	50.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 44.70 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.4688e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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	0.59	0/1562	0.99	8/2107 (0.4%)
1	B	0.54	0/1364	1.00	7/1845 (0.4%)
1	C	0.54	0/1535	0.94	6/2073 (0.3%)
1	D	0.56	0/1535	1.05	10/2077 (0.5%)
All	All	0.56	0/5996	1.00	31/8102 (0.4%)

There are no bond length outliers.

The worst 5 of 31 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	29	ASN	N-CA-C	-8.77	100.03	113.89
1	D	77	LEU	N-CA-C	7.33	119.06	111.14
1	B	67	ALA	N-CA-C	-7.27	104.43	113.38
1	D	23	GLN	N-CA-C	7.05	121.50	112.34
1	B	52	PHE	N-CA-C	6.92	119.55	108.41

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	1537	0	1489	87	0
1	B	1340	0	1290	47	0
1	C	1510	0	1436	49	0
1	D	1509	0	1435	68	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	A	2	0	0	0	0
2	B	4	0	0	0	0
2	C	1	0	0	1	0
2	D	7	0	0	1	0
All	All	5910	0	5650	247	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 21.

The worst 5 of 247 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:172:THR:HG22	1:A:173:ASN:H	1.15	1.06
1:B:198:MET:HE2	1:B:198:MET:HA	1.42	1.01
1:B:114:VAL:HG21	1:B:139:ILE:HD11	1.44	0.99
1:D:111:LEU:HG	1:D:115:MET:HE2	1.46	0.95
1:C:198:MET:HE2	1:C:198:MET:HA	1.48	0.93

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	184/218 (84%)	166 (90%)	13 (7%)	5 (3%)	4	15
1	B	165/218 (76%)	148 (90%)	14 (8%)	3 (2%)	6	23
1	C	184/218 (84%)	165 (90%)	14 (8%)	5 (3%)	4	15
1	D	187/218 (86%)	155 (83%)	21 (11%)	11 (6%)	1	3
All	All	720/872 (83%)	634 (88%)	62 (9%)	24 (3%)	3	11

5 of 24 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	37	VAL
1	A	173	ASN
1	B	115	MET
1	C	173	ASN
1	C	176	VAL

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	160/196 (82%)	147 (92%)	13 (8%)	11	33
1	B	133/196 (68%)	122 (92%)	11 (8%)	10	32
1	C	151/196 (77%)	143 (95%)	8 (5%)	20	52
1	D	150/196 (76%)	136 (91%)	14 (9%)	8	27
All	All	594/784 (76%)	548 (92%)	46 (8%)	12	36

5 of 46 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	158	ASP
1	D	44	GLU
1	C	184	GLN
1	D	29	ASN
1	D	90	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 31 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	147	HIS
1	D	96	ASN
1	B	205	HIS
1	D	163	ASN
1	C	184	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](#)

Mogul was not executed - this section is therefore empty.

5.5 Carbohydrates [i](#)

Mogul was not executed - this section is therefore empty.

5.6 Ligand geometry [i](#)

Mogul was not executed - this section is therefore empty.

5.7 Other polymers [i](#)

Mogul was not executed - this section is therefore empty.

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](#)

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.