Full wwPDB NMR Structure Validation Report (i)

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PDB ID	:	1OO9 / pdb_00001oo9
Title	:	Orientation in Solution of MMP-3 Catalytic Domain and N-TIMP-1 from Residual Dipolar Couplings
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Deposited on	:	2003-03-03

This is a Full wwPDB NMR 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/NMRValidationReportHelp
with specific help available everywhere you see the (i) 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 (i)) were used in the production of this report:

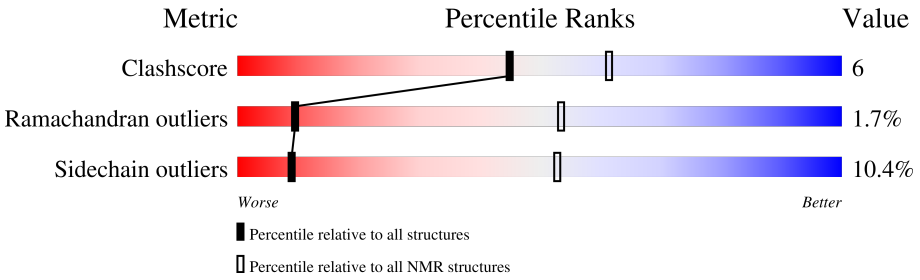
MolProbity	:	4-5-2 with Phenix2.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
wwPDB-RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
wwPDB-ShiftChecker	:	v1.2
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	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:
SOLUTION NMR

The overall completeness of chemical shifts assignment was not calculated.

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)	NMR archive (#Entries)
Clashscore	229148	14424
Ramachandran outliers	224038	12848
Sidechain outliers	223484	12823

The table below summarises the geometric issues observed across the polymeric chains and their fit to the experimental data. The red, orange, yellow and green segments indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria. A cyan segment indicates the fraction of residues that are not part of the well-defined cores, and 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 <=5%

Mol	Chain	Length	Quality of chain
1	A	168	77% 21% .
2	B	126	67% 26% 5% .

2 Ensemble composition and analysis (i)

This entry contains 1 models. Identification of well-defined residues and clustering analysis are not possible.

3 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 4526 atoms, of which 2189 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Stromelysin-1.

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	168	2577	861	1239	223	252	2	0

- Molecule 2 is a protein called Metalloproteinase inhibitor 1.

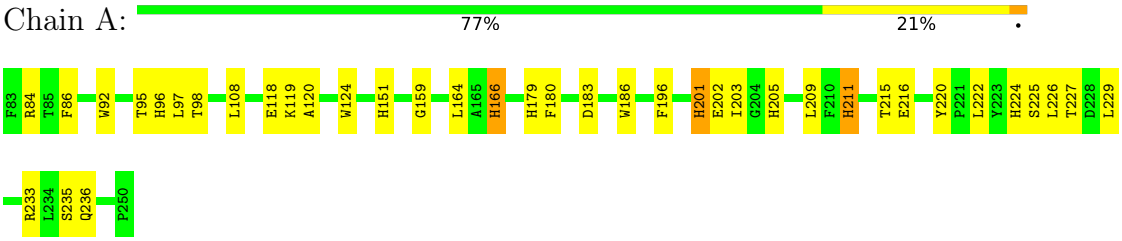
Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
2	B	126	1949	635	950	172	183	9	0

4 Residue-property plots (i)

These plots are provided for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic is the same as shown in the summary in section 1 of this report. The second graphic shows the sequence where residues are colour-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 outliers are shown as green connectors. Residues which are classified as ill-defined in the NMR ensemble, are shown in cyan with an underline colour-coded according to the previous scheme. Residues which were present in the experimental sample, but not modelled in the final structure are shown in grey.

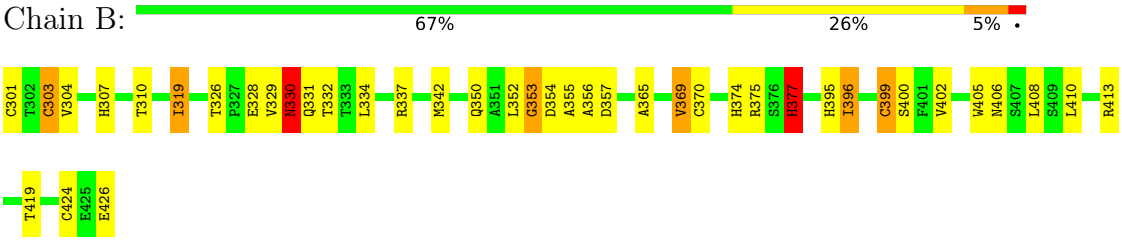
• Molecule 1: Stromelysin-1

Chain A:



• Molecule 2: Metalloproteinase inhibitor 1

Chain B:



5 Refinement protocol and experimental data overview

The models were refined using the following method: *RIGID BODY MINIMIZATION FOLLOWED BY RESTRAINED SIMULATED ANNEALING.*

Of the 25 calculated structures, 1 were deposited, based on the following criterion: *lowest energy structure.*

The following table shows the software used for structure solution, optimisation and refinement.

Software name	Classification	Version
XPLOR	refinement	NIH

No chemical shift data was provided.

6 Model quality (i)

6.1 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 (average) 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	1.21	18/1382 (1.3%)	1.16	6/1888 (0.3%)
2	B	1.16	9/1024 (0.9%)	1.45	17/1387 (1.2%)
All	All	1.19	27/2406 (1.1%)	1.29	23/3275 (0.7%)

All bond outliers are listed below. They are sorted according to the Z-score.

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	377	HIS	CE1-NE2	-8.11	1.24	1.32
2	B	395	HIS	CE1-NE2	-8.00	1.24	1.32
1	A	179	HIS	CE1-NE2	-7.96	1.24	1.32
2	B	374	HIS	CE1-NE2	-7.92	1.24	1.32
1	A	205	HIS	CE1-NE2	-7.82	1.24	1.32
1	A	96	HIS	CE1-NE2	-7.78	1.24	1.32
1	A	151	HIS	CE1-NE2	-7.59	1.25	1.32
1	A	211	HIS	CE1-NE2	-7.58	1.25	1.32
1	A	201	HIS	CE1-NE2	-7.46	1.25	1.32
1	A	166	HIS	CE1-NE2	-7.41	1.25	1.32
1	A	224	HIS	CE1-NE2	-7.35	1.25	1.32
2	B	307	HIS	CE1-NE2	-7.21	1.25	1.32
2	B	353	GLY	N-CA	6.10	1.54	1.45
2	B	307	HIS	CD2-NE2	5.94	1.44	1.37
2	B	405	TRP	CG-CD2	5.87	1.54	1.43
1	A	166	HIS	CD2-NE2	5.81	1.44	1.37
1	A	224	HIS	CD2-NE2	5.75	1.44	1.37
1	A	124	TRP	CG-CD2	5.70	1.54	1.43
1	A	211	HIS	CD2-NE2	5.69	1.44	1.37
1	A	201	HIS	CD2-NE2	5.67	1.44	1.37
1	A	96	HIS	CD2-NE2	5.66	1.44	1.37
1	A	151	HIS	CD2-NE2	5.45	1.43	1.37
2	B	374	HIS	CD2-NE2	5.37	1.43	1.37
1	A	92	TRP	CG-CD2	5.26	1.53	1.43
1	A	179	HIS	CG-ND1	-5.25	1.32	1.38
1	A	205	HIS	CD2-NE2	5.16	1.43	1.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	395	HIS	CD2-NE2	5.06	1.43	1.37

All angle outliers are listed below. They are sorted according to the Z-score.

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	330	ASN	CA-CB-CG	-10.29	102.31	112.60
2	B	330	ASN	OD1-CG-ND2	-9.01	113.59	122.60
2	B	357	ASP	CA-CB-CG	8.01	120.61	112.60
2	B	424	CYS	N-CA-C	7.73	119.49	111.14
2	B	365	ALA	N-CA-C	6.95	119.70	111.71
2	B	419	THR	N-CA-C	6.78	121.79	112.90
2	B	303	CYS	N-CA-C	6.61	118.60	108.42
2	B	406	ASN	N-CA-C	5.83	119.49	112.38
1	A	92	TRP	CE2-CD2-CE3	5.78	124.58	118.80
2	B	374	HIS	CG-CD2-NE2	-5.75	101.45	107.20
2	B	319	ILE	N-CA-CB	-5.56	105.73	112.07
1	A	124	TRP	CE2-CD2-CE3	5.53	124.33	118.80
2	B	405	TRP	CE2-CD2-CE3	5.51	124.31	118.80
1	A	186	TRP	CE2-CD2-CE3	5.43	124.23	118.80
2	B	352	LEU	CA-C-N	-5.37	110.89	121.41
2	B	352	LEU	C-N-CA	-5.37	110.89	121.41
2	B	342	MET	N-CA-C	5.37	117.48	109.59
2	B	413	ARG	NE-CZ-NH1	5.15	126.65	121.50
2	B	353	GLY	N-CA-C	5.10	125.27	113.18
1	A	96	HIS	CG-CD2-NE2	-5.05	102.14	107.20
2	B	370	CYS	N-CA-C	5.03	121.52	110.80
1	A	205	HIS	CG-CD2-NE2	-5.01	102.19	107.20
1	A	211	HIS	CG-CD2-NE2	-5.01	102.19	107.20

There are no chirality outliers.

There are no planarity outliers.

6.2 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 each 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 averaged over the ensemble.

Mol	Chain	Non-H	H(model)	H(added)	Clashes
1	A	1338	1239	1266	10

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Mol	Chain	Non-H	H(model)	H(added)	Clashes
2	B	999	950	969	21
All	All	2337	2189	2235	29

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 clashes are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Clash(Å)	Distance(Å)
2:B:330:ASN:ND2	2:B:337:ARG:CZ	0.85	2.39
2:B:330:ASN:ND2	2:B:337:ARG:NH1	0.79	2.31
2:B:330:ASN:HB2	2:B:337:ARG:HD3	0.76	1.56
2:B:330:ASN:HD22	2:B:337:ARG:CZ	0.73	1.94
2:B:330:ASN:OD1	2:B:331:GLN:N	0.68	2.27
2:B:330:ASN:CG	2:B:337:ARG:NH1	0.61	2.58
1:A:180:PHE:CE2	1:A:202:GLU:OE2	0.58	2.56
1:A:119:LYS:HG3	1:A:196:PHE:CE1	0.57	2.34
2:B:353:GLY:O	2:B:355:ALA:N	0.53	2.42
2:B:410:LEU:HD12	2:B:410:LEU:H	0.53	1.64
2:B:332:THR:HG22	2:B:334:LEU:H	0.52	1.64
1:A:211:HIS:CE1	2:B:301:CYS:O	0.51	2.64
2:B:330:ASN:CG	2:B:331:GLN:N	0.50	2.66
2:B:396:ILE:HD11	2:B:402:VAL:HG21	0.49	1.85
2:B:377:HIS:H	2:B:377:HIS:CD2	0.49	2.26
2:B:330:ASN:ND2	2:B:337:ARG:NH2	0.48	2.60
2:B:304:VAL:O	2:B:304:VAL:HG13	0.48	2.08
1:A:166:HIS:ND1	1:A:166:HIS:C	0.44	2.75
1:A:215:THR:HG22	1:A:220:TYR:CZ	0.43	2.49
1:A:222:LEU:HA	2:B:303:CYS:O	0.43	2.13
2:B:369:VAL:O	2:B:369:VAL:HG13	0.43	2.13
1:A:235:SER:O	1:A:236:GLN:C	0.43	2.61
2:B:329:VAL:HG13	2:B:332:THR:O	0.42	2.14
2:B:330:ASN:HB2	2:B:337:ARG:CD	0.42	2.35
2:B:399:CYS:O	2:B:400:SER:C	0.42	2.63
2:B:304:VAL:O	2:B:304:VAL:CG1	0.41	2.67
1:A:159:GLY:HA2	1:A:183:ASP:OD2	0.41	2.16
1:A:120:ALA:HA	1:A:196:PHE:CE1	0.40	2.51
1:A:201:HIS:CD2	1:A:201:HIS:C	0.40	2.99

6.3 Torsion angles (i)

6.3.1 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 PDB entries followed by that with respect to all NMR entries. 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	166/168 (99%)	147 (89%)	17 (10%)	2 (1%)	13 61
2	B	124/126 (98%)	108 (87%)	13 (10%)	3 (2%)	7 44
All	All	290/294 (99%)	255 (88%)	30 (10%)	5 (2%)	9 53

All 5 Ramachandran outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type
1	A	225	SER
1	A	227	THR
2	B	330	ASN
2	B	354	ASP
2	B	356	ALA

6.3.2 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 PDB entries followed by that with respect to all NMR entries. 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	142/142 (100%)	128 (90%)	14 (10%)	10 54
2	B	109/109 (100%)	97 (89%)	12 (11%)	8 51
All	All	251/251 (100%)	225 (90%)	26 (10%)	9 53

All 26 residues with a non-rotameric sidechain are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type
1	A	84	ARG
1	A	86	PHE

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Mol	Chain	Res	Type
1	A	95	THR
1	A	97	LEU
1	A	98	THR
1	A	108	LEU
1	A	118	GLU
1	A	164	LEU
1	A	203	ILE
1	A	209	LEU
1	A	216	GLU
1	A	226	LEU
1	A	229	LEU
1	A	233	ARG
2	B	310	THR
2	B	319	ILE
2	B	326	THR
2	B	328	GLU
2	B	350	GLN
2	B	369	VAL
2	B	375	ARG
2	B	377	HIS
2	B	396	ILE
2	B	399	CYS
2	B	408	LEU
2	B	426	GLU

6.3.3 RNA

There are no RNA molecules in this entry.

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

There are no non-standard protein/DNA/RNA residues in this entry.

6.5 Carbohydrates

There are no oligosaccharides in this entry.

6.6 Ligand geometry

There are no ligands in this entry.

6.7 Other polymers (i)

There are no such molecules in this entry.

6.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

7 Chemical shift validation (i)

No chemical shift data were provided