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wwPDB X-ray Structure Validation Summary Report (i)

Oct 23, 2024 – 05:21 AM EDT

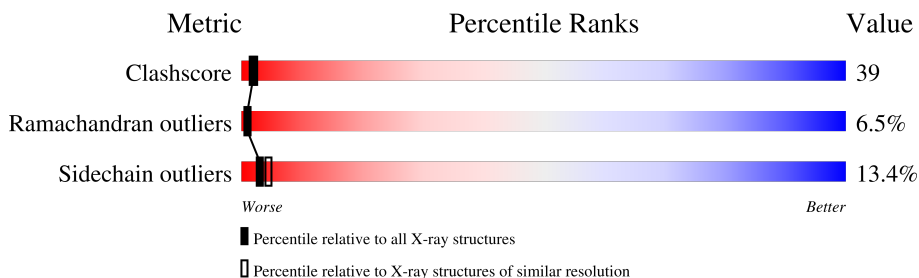|		
PDB ID	:	1BQQ
Title	:	CRYSTAL STRUCTURE OF THE MT1-MMP–TIMP-2 COMPLEX
Authors	:	Fernandez-Catalan, C.; Bode, W.; Huber, R.; Turk, D.; Calvete, J.J.; Lichte, A.; Tschesche, H.; Maskos, K.
Deposited on	:	1998-08-18
Resolution	:	2.75 Å(reported)

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 2.75 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	Percentile Ranks	Value
Clashscore		39
Ramachandran outliers		6.5%
Sidechain outliers		13.4%

Worse   *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	180529	1689 (2.78-2.74)
Ramachandran outliers	177936	1665 (2.78-2.74)
Sidechain outliers	177891	1665 (2.78-2.74)

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 <=5%

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	M	174	41% 46% 10% •
2	T	184	33% 57% 8% •

2 Entry composition ⓘ

There are 5 unique types of molecules in this entry. The entry contains 3150 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 MEMBRANE-TYPE MATRIX METALLOPROTEINASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	M	174	Total 1403	C 897	N 236	O 266	S 4	39	0	0

- Molecule 2 is a protein called METALLOPROTEINASE INHIBITOR 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	T	184	Total 1432	C 905	N 247	O 263	S 17	6	0	0

- Molecule 3 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	M	2	Total 2	Ca 2	0	0

- Molecule 4 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	M	2	Total 2	Zn 2	0	0

- Molecule 5 is water.

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	M	172	Total 172	O 172	0	0
5	T	139	Total 139	O 139	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: MEMBRANE-TYPE MATRIX METALLOPROTEINASE

Chain M:
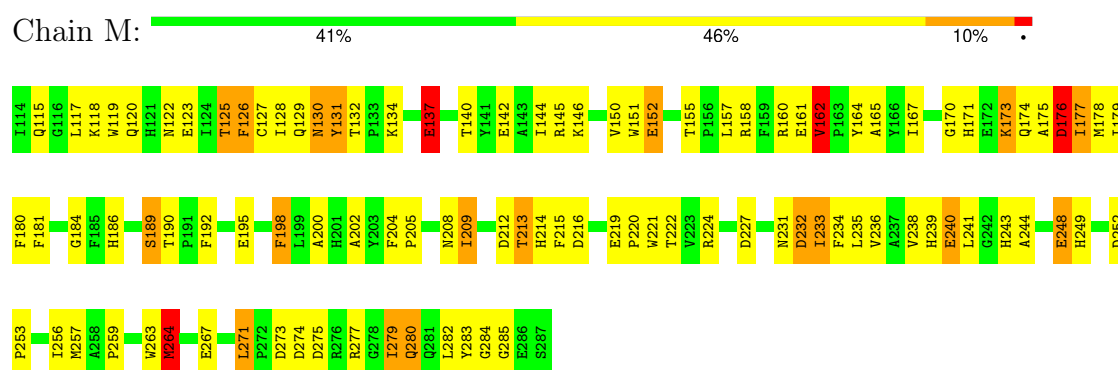
- Molecule 2: METALLOPROTEINASE INHIBITOR 2

Chain T:
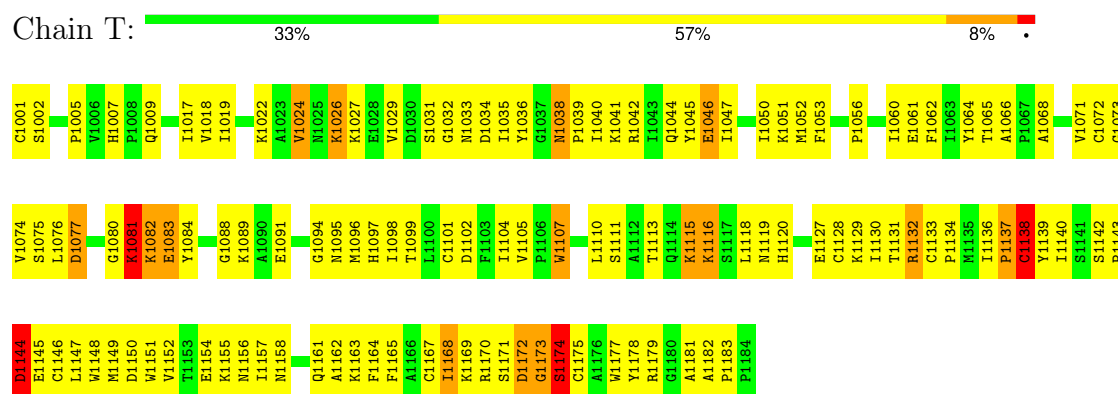
4 Data and refinement statistics (i)

Xtriage (Phenix) and EDS were 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	102.65Å 40.10Å 85.68Å 90.00° 102.30° 90.00°	Depositor
Resolution (Å)	20.00 – 2.75	Depositor
% Data completeness (in resolution range)	97.0 (20.00-2.75)	Depositor
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	X-PLOR 3.843	Depositor
R, R_{free}	0.189 , 0.248	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	3150	wwPDB-VP
Average B, all atoms (Å^2)	24.0	wwPDB-VP

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, CA

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	M	0.58	0/1449	0.80	0/1968
2	T	0.62	1/1467 (0.1%)	0.89	3/1982 (0.2%)
All	All	0.60	1/2916 (0.0%)	0.84	3/3950 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	M	0	1
2	T	0	1
All	All	0	2

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	T	1144	ASP	C-N	6.11	1.48	1.34

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	T	1173	GLY	O-C-N	7.32	134.41	122.70
2	T	1174	SER	O-C-N	-6.12	112.92	122.70
2	T	1173	GLY	C-N-CA	5.86	136.36	121.70

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	M	176	ASP	Mainchain
2	T	1174	SER	Mainchain

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	M	1403	0	1284	96	0
2	T	1432	0	1397	124	0
3	M	2	0	0	0	0
4	M	2	0	0	0	0
5	M	172	0	0	4	0
5	T	139	0	0	9	0
All	All	3150	0	2681	210	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 39.

The worst 5 of 210 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)
2:T:1168:ILE:HD11	2:T:1178:TYR:HB2	1.43	0.98
2:T:1133:CYS:HB3	2:T:1152:VAL:HG21	1.44	0.97
1:M:215:PHE:HE1	1:M:236:VAL:HG12	1.29	0.97
1:M:160:ARG:NH2	1:M:162:VAL:HG21	1.80	0.97
2:T:1026:LYS:HB2	2:T:1045:TYR:HD1	1.31	0.95

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.

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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	M	172/174 (99%)	131 (76%)	29 (17%)	12 (7%)	1	1
2	T	182/184 (99%)	140 (77%)	31 (17%)	11 (6%)	1	1
All	All	354/358 (99%)	271 (77%)	60 (17%)	23 (6%)	1	1

5 of 23 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	M	162	VAL
1	M	167	ILE
1	M	173	LYS
2	T	1137	PRO
2	T	1144	ASP

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	M	143/143 (100%)	117 (82%)	26 (18%)	1	2
2	T	155/155 (100%)	141 (91%)	14 (9%)	8	14
All	All	298/298 (100%)	258 (87%)	40 (13%)	3	4

5 of 40 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	T	1038	ASN
2	T	1116	LYS
2	T	1046	GLU
2	T	1083	GLU
2	T	1132	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 12 such sidechains are listed below:

Mol	Chain	Res	Type
2	T	1014	ASN
2	T	1033	ASN
2	T	1058	GLN
2	T	1044	GLN
1	M	214	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 4 ligands modelled in this entry, 4 are 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 ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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.