Full wwPDB X-ray Structure Validation Report ⓘ

Dec 4, 2023 – 08:31 am GMT

PDB ID	:	1EAX
Title	:	Crystal structure of MTSP1 (matriptase)
Authors	:	Friedrich, R.; Bode, W.
Deposited on	:	2001-07-17
Resolution	:	1.30 Å(reported)

The following versions of software and data (see references ⓘ) were used in the production of this report:

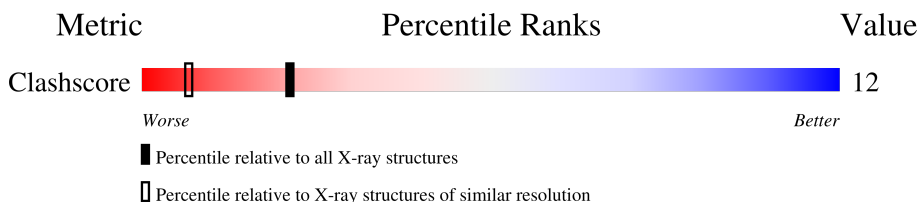|		
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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 1.30 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		12

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	141614	1101 (1.30-1.30)

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	A	241	87% 12%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	BEN	A	818	-	X	-	-

2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 2259 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 SUPPRESSOR OF TUMORIGENICITY 14.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	241	Total	C	N	O	S	14	0	0
			1864	1179	328	347	10			

- Molecule 2 is SULFATE ION (three-letter code: SO4) (formula: O_4S).

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	S	0	0
			5	4	1		

- Molecule 3 is BENZAMIDINE (three-letter code: BEN) (formula: $C_7H_8N_2$).

BEN
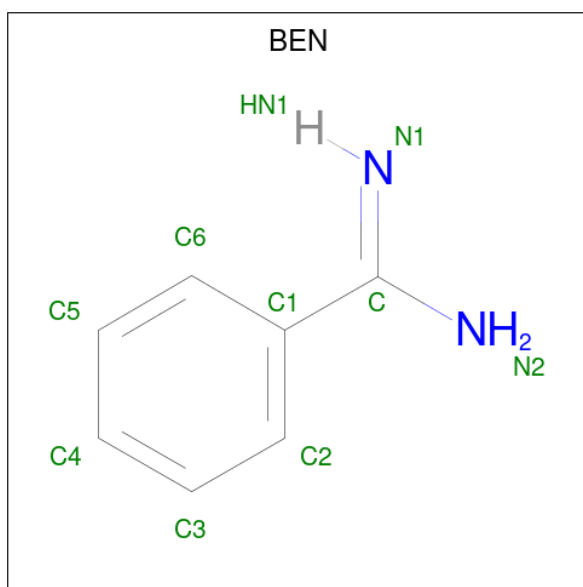
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total 9	C 7	N 2	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	381	Total 381	O 381	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: SUPPRESSOR OF TUMORIGENICITY 14

Chain A:
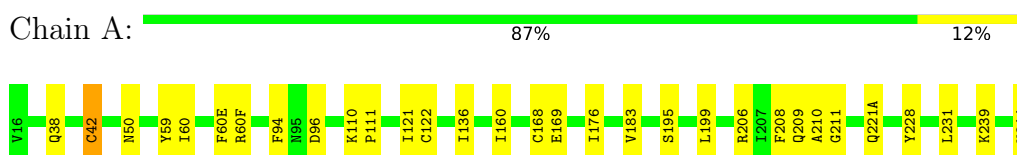
4 Data and refinement statistics ⓘ

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

Property	Value	Source
Space group	C 2 2 2	Depositor
Cell constants a, b, c, α, β, γ	66.92Å 141.60Å 51.94Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	17.75 – 1.30	Depositor
% Data completeness (in resolution range)	96.2 (17.75-1.30)	Depositor
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	CNS 1.0	Depositor
R, R_{free}	0.184 , 0.193	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	2259	wwPDB-VP
Average B, all atoms (Å^2)	13.0	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: SO4, BEN

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	0.47	0/1916	0.76	1/2606 (0.0%)

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	A	0	1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	42	CYS	CA-CB-SG	5.29	123.53	114.00

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	59	TYR	Sidechain

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.

WORLDWIDE
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PROTEIN DATA BANK

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1864	0	1781	43	0
2	A	5	0	0	0	0
3	A	9	0	7	1	0
4	A	381	0	0	8	2
All	All	2259	0	1788	44	2

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 12.

All (44) 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:42:CYS:HB2	4:A:2065:HOH:O	0.93	1.11
1:A:168:CYS:SG	1:A:176:ILE:HD13	2.01	1.00
1:A:121:ILE:HD11	1:A:209:GLN:N	1.88	0.88
1:A:121:ILE:HD13	1:A:122:CYS:N	1.93	0.83
1:A:60:ILE:HD12	4:A:2077:HOH:O	1.88	0.74
1:A:121:ILE:HD11	1:A:208:PHE:C	2.09	0.73
1:A:121:ILE:HD12	1:A:209:GLN:HB2	1.71	0.72
1:A:169:GLU:HA	1:A:176:ILE:HD12	1.74	0.69
1:A:121:ILE:CD1	1:A:209:GLN:N	2.54	0.69
1:A:121:ILE:HD13	1:A:122:CYS:O	1.93	0.68
1:A:210:ALA:O	4:A:2340:HOH:O	2.13	0.66
1:A:136:ILE:HD13	1:A:136:ILE:N	2.12	0.64
1:A:110:LYS:HG2	4:A:2207:HOH:O	1.99	0.63
1:A:60(F):ARG:HD2	4:A:2104:HOH:O	2.02	0.59
1:A:50:ASN:HD21	1:A:111:PRO:HG3	1.67	0.59
1:A:206:ARG:HD3	4:A:2336:HOH:O	2.03	0.58
1:A:168:CYS:O	1:A:176:ILE:HD12	2.04	0.57
1:A:121:ILE:CD1	1:A:122:CYS:O	2.51	0.57
1:A:168:CYS:C	1:A:176:ILE:HD12	2.24	0.57
1:A:168:CYS:O	1:A:176:ILE:CD1	2.53	0.56
1:A:60:ILE:HD11	1:A:94:PHE:CE2	2.41	0.56
1:A:239:LYS:HA	1:A:244:VAL:O	2.07	0.55
1:A:60:ILE:HD11	1:A:94:PHE:HE2	1.71	0.55
1:A:168:CYS:SG	1:A:176:ILE:CD1	2.88	0.54
1:A:199:LEU:HD21	1:A:228:TYR:CE2	2.42	0.54
1:A:136:ILE:HD11	1:A:183:VAL:CG1	2.38	0.54
1:A:42:CYS:HB3	1:A:195:SER:O	2.10	0.51
1:A:38:GLN:NE2	1:A:60(E):PHE:CD2	2.80	0.49
1:A:121:ILE:HD11	1:A:208:PHE:CA	2.43	0.48
1:A:169:GLU:CA	1:A:176:ILE:HD12	2.40	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:136:ILE:HD13	1:A:136:ILE:H	1.78	0.48
1:A:221(A):GLN:HG2	4:A:2345:HOH:O	2.14	0.48
1:A:60:ILE:HD13	1:A:96:ASP:CG	2.34	0.47
1:A:168:CYS:C	1:A:176:ILE:CD1	2.82	0.47
1:A:211:GLY:HA2	1:A:231:LEU:HD23	1.94	0.47
1:A:136:ILE:HD11	1:A:183:VAL:HG13	1.96	0.47
1:A:136:ILE:HD13	1:A:160:ILE:O	2.15	0.46
1:A:121:ILE:HD13	1:A:121:ILE:C	2.36	0.45
3:A:818:BEN:N1	4:A:2381:HOH:O	2.36	0.44
1:A:121:ILE:CD1	1:A:209:GLN:H	2.31	0.42
1:A:121:ILE:HD12	1:A:209:GLN:CB	2.45	0.41
1:A:50:ASN:ND2	1:A:111:PRO:HG3	2.33	0.41
1:A:121:ILE:HD11	1:A:208:PHE:HA	2.03	0.41
1:A:239:LYS:HD2	1:A:244:VAL:O	2.20	0.40

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:A:2164:HOH:O	4:A:2164:HOH:O[6_555]	1.16	1.04
4:A:2331:HOH:O	4:A:2331:HOH:O[6_555]	1.60	0.60

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

There are no protein backbone outliers to report in this entry.

5.3.2 Protein sidechains ⓘ

There are no protein residues with a non-rotameric sidechain to report in this entry.

5.3.3 RNA ⓘ

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 monosaccharides in this entry.

5.6 Ligand geometry (i)

2 ligands are modelled in this entry.

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	#$|Z| > 2$
2	SO4	A	717	-	4,4,4	0.22	0	6,6,6	0.27	0
3	BEN	A	818	-	9,9,9	2.19	4 (44%)	7,11,11	1.85	4 (57%)

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. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	BEN	A	818	-	-	4/4/4/4	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	818	BEN	C1-C	3.70	1.54	1.47
3	A	818	BEN	C2-C1	2.84	1.44	1.39
3	A	818	BEN	C6-C1	2.63	1.43	1.39
3	A	818	BEN	C5-C6	2.09	1.43	1.38

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	818	BEN	C1-C-N2	3.11	122.73	118.05
3	A	818	BEN	C6-C1-C2	-2.34	115.26	118.59
3	A	818	BEN	C3-C2-C1	2.07	122.79	120.34
3	A	818	BEN	C5-C6-C1	2.03	122.75	120.34

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	818	BEN	N2-C-C1-C2
3	A	818	BEN	N2-C-C1-C6
3	A	818	BEN	N1-C-C1-C2
3	A	818	BEN	N1-C-C1-C6

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	818	BEN	1	0

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.