



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 08:31 AM UTC

PDB ID : 1BUV / pdb_00001buu
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 : 1998-09-07
Resolution : 2.75 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
Xtriage (Phenix) : **NOT EXECUTED**
EDS : **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

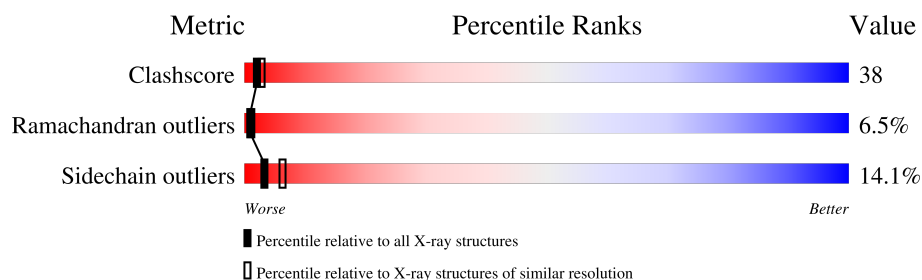
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.75 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	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	190562	1044 (2.76-2.76)
Ramachandran outliers	187476	1024 (2.76-2.76)
Sidechain outliers	187428	1024 (2.76-2.76)

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	M	174	
2	T	184	

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 2839 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 PROTEIN (MEMBRANE-TYPE MATRIX METALLOPROTEINASE (CDMT1-MMP)).

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

- Molecule 2 is a protein called PROTEIN (METALLOPROTEINASE INHIBITOR (TIMP-2)).

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

- Molecule 3 is CALCIUM ION (CCD ID: CA) (formula: Ca).

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

- Molecule 4 is ZINC ION (CCD ID: ZN) (formula: Zn).

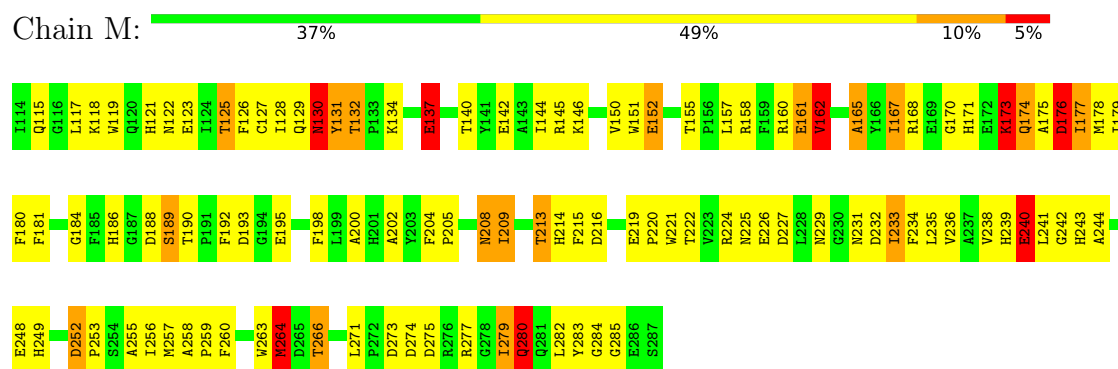
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	M	2	Total	Zn	0	0
			2	2		

3 Residue-property plots

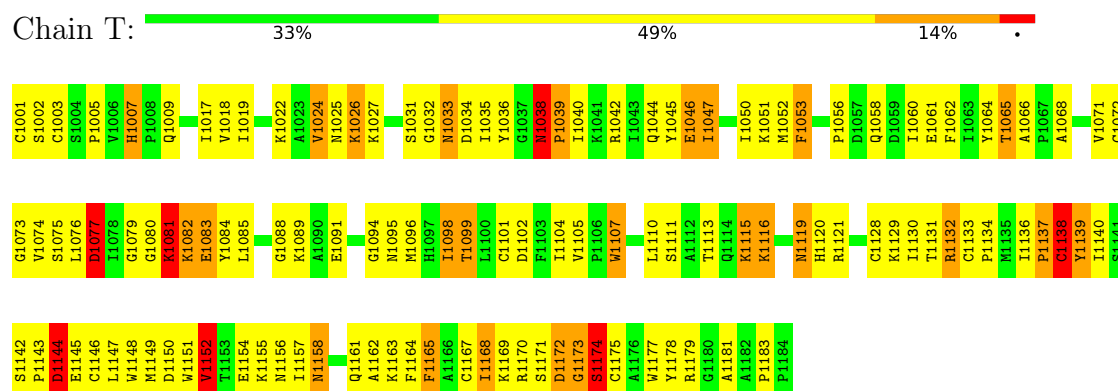
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded 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: PROTEIN (MEMBRANE-TYPE MATRIX METALLOPROTEINASE (CDMT1-MMP))



- Molecule 2: PROTEIN (METALLOPROTEINASE INHIBITOR (TIMP-2))



4 Data and refinement statistics

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 3.8	Depositor
R, R_{free}	0.189 , 0.248	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	2839	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: CA, ZN

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	0.72	2/1449 (0.1%)	1.27	22/1968 (1.1%)
2	T	0.78	1/1467 (0.1%)	1.33	20/1982 (1.0%)
All	All	0.75	3/2916 (0.1%)	1.30	42/3950 (1.1%)

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 (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	T	1144	ASP	C-N	10.39	1.48	1.33
1	M	176	ASP	C-N	-5.74	1.25	1.33
1	M	162	VAL	C-N	5.40	1.40	1.33

All (42) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	T	1173	GLY	O-C-N	9.01	134.41	122.70
1	M	242	GLY	N-CA-C	-8.65	102.02	112.49
2	T	1121	ARG	N-CA-C	7.84	121.95	112.38
1	M	188	ASP	N-CA-C	7.82	118.56	108.24
2	T	1173	GLY	CA-C-N	7.76	136.36	121.54
2	T	1173	GLY	C-N-CA	7.76	136.36	121.54

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	M	193	ASP	N-CA-C	7.37	122.39	112.88
2	T	1174	SER	O-C-N	-7.27	112.92	122.59
2	T	1053	PHE	N-CA-C	7.16	119.09	111.28
2	T	1152	VAL	N-CA-C	6.96	117.05	110.30
1	M	252	ASP	CA-C-N	6.83	126.30	118.85
1	M	252	ASP	C-N-CA	6.83	126.30	118.85
1	M	121	HIS	N-CA-C	6.75	119.33	109.07
1	M	260	PHE	N-CA-C	6.73	119.48	109.59
1	M	130	ASN	N-CA-C	6.42	116.93	108.07
1	M	229	ASN	N-CA-C	-6.31	103.53	111.11
2	T	1038	ASN	CA-C-N	6.29	126.24	119.76
2	T	1038	ASN	C-N-CA	6.29	126.24	119.76
1	M	168	ARG	N-CA-C	6.14	118.22	110.24
1	M	240	GLU	N-CA-C	6.11	117.60	111.07
2	T	1165	PHE	N-CA-C	6.05	119.56	109.95
2	T	1007	HIS	CA-C-N	6.01	127.35	119.84
2	T	1007	HIS	C-N-CA	6.01	127.35	119.84
1	M	258	ALA	CA-C-N	5.98	127.32	119.84
1	M	258	ALA	C-N-CA	5.98	127.32	119.84
2	T	1139	TYR	N-CA-C	-5.91	105.17	113.20
1	M	161	GLU	N-CA-C	-5.62	104.55	111.40
2	T	1003	CYS	N-CA-C	5.52	118.63	110.46
2	T	1119	ASN	N-CA-C	-5.51	107.20	114.04
1	M	280	GLN	N-CA-C	-5.43	104.78	111.40
1	M	266	THR	N-CA-C	5.41	119.97	112.45
2	T	1058	GLN	N-CA-C	5.40	115.67	108.38
1	M	165	ALA	N-CA-C	5.25	117.07	110.24
2	T	1025	ASN	N-CA-C	-5.22	104.39	111.55
1	M	225	ASN	N-CA-C	5.19	118.90	112.47
1	M	132	THR	CA-C-N	5.18	124.68	119.19
1	M	132	THR	C-N-CA	5.18	124.68	119.19
1	M	208	ASN	CB-CA-C	-5.15	110.61	116.54
2	T	1085	LEU	N-CA-C	-5.12	100.11	108.76
2	T	1099	THR	N-CA-C	5.09	116.92	109.24
2	T	1039	PRO	N-CA-C	5.08	119.06	111.14
1	M	226	GLU	N-CA-C	-5.02	105.70	111.07

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	M	176	ASP	Mainchain

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Mol	Chain	Res	Type	Group
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	95	0
2	T	1432	0	1397	120	0
3	M	2	0	0	0	0
4	M	2	0	0	0	0
All	All	2839	0	2681	205	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 38.

All (205) 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
2:T:1170:ARG:NH2	2:T:1173:GLY:O	2.01	0.93
1:M:130:ASN:HD21	1:M:181:PHE:H	1.15	0.90
1:M:160:ARG:CZ	1:M:162:VAL:HG21	2.00	0.90
2:T:1033:ASN:HA	2:T:1039:PRO:HA	1.54	0.87
2:T:1147:LEU:HB3	2:T:1149:MET:HE2	1.59	0.85
1:M:117:LEU:HD12	1:M:204:PHE:HB3	1.59	0.84
1:M:117:LEU:HB2	1:M:205:PRO:HD2	1.59	0.84
2:T:1065:THR:HG21	2:T:1074:VAL:O	1.80	0.81
2:T:1151:TRP:O	2:T:1155:LYS:HD3	1.81	0.81
2:T:1026:LYS:HB2	2:T:1045:TYR:CD1	2.18	0.76
1:M:130:ASN:HD21	1:M:181:PHE:N	1.81	0.76
2:T:1017:ILE:HD13	2:T:1060:ILE:HD11	1.67	0.75
1:M:202:ALA:HB2	1:M:240:GLU:HG3	1.69	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:T:1052:MET:SD	2:T:1056:PRO:O	2.47	0.73
1:M:127:CYS:SG	1:M:165:ALA:HB2	2.30	0.72
2:T:1115:LYS:HG2	2:T:1116:LYS:N	2.05	0.71
2:T:1138:CYS:SG	2:T:1138:CYS:O	2.48	0.71
2:T:1050:ILE:HG22	2:T:1051:LYS:HG2	1.73	0.70
1:M:151:TRP:CZ3	1:M:279:ILE:HG12	2.26	0.70
1:M:130:ASN:ND2	1:M:181:PHE:H	1.89	0.69
2:T:1072:CYS:HB3	2:T:1099:THR:OG1	1.94	0.68
1:M:215:PHE:CE1	1:M:236:VAL:HG12	2.21	0.68
2:T:1128:CYS:SG	2:T:1169:LYS:HG3	2.34	0.68
1:M:127:CYS:SG	1:M:165:ALA:N	2.67	0.67
2:T:1088:GLY:HA3	2:T:1098:ILE:HD11	1.76	0.67
1:M:142:GLU:CB	1:M:145:ARG:HH21	2.07	0.67
1:M:151:TRP:HZ3	1:M:279:ILE:HG12	1.60	0.67
2:T:1071:VAL:O	2:T:1072:CYS:HB2	1.95	0.67
2:T:1045:TYR:OH	2:T:1075:SER:HA	1.95	0.66
1:M:200:ALA:O	2:T:1001:CYS:HA	1.96	0.66
2:T:1099:THR:HG23	2:T:1101:CYS:H	1.59	0.65
2:T:1026:LYS:HA	2:T:1045:TYR:HA	1.79	0.65
2:T:1151:TRP:O	2:T:1155:LYS:HA	1.97	0.64
2:T:1161:GLN:HA	2:T:1165:PHE:HD2	1.61	0.64
2:T:1168:ILE:H	2:T:1168:ILE:HD13	1.62	0.63
2:T:1022:LYS:HE2	2:T:1081:LYS:HA	1.80	0.63
2:T:1168:ILE:HD11	2:T:1178:TYR:CB	2.26	0.62
2:T:1142:SER:HB2	2:T:1145:GLU:HB2	1.80	0.62
2:T:1031:SER:OG	2:T:1032:GLY:N	2.33	0.62
2:T:1034:ASP:OD1	2:T:1040:ILE:HG12	1.99	0.62
2:T:1168:ILE:CD1	2:T:1178:TYR:HB2	2.26	0.61
2:T:1089:LYS:O	2:T:1096:MET:HB2	2.00	0.61
2:T:1169:LYS:HA	2:T:1174:SER:O	2.01	0.61
2:T:1060:ILE:HA	2:T:1094:GLY:O	2.01	0.61
2:T:1181:ALA:O	2:T:1183:PRO:HD3	2.02	0.60
1:M:129:GLN:HB2	1:M:180:PHE:HB3	1.83	0.60
1:M:142:GLU:HA	1:M:145:ARG:HE	1.67	0.60
2:T:1170:ARG:NH1	2:T:1172:ASP:HB2	2.17	0.60
1:M:221:TRP:HH2	1:M:236:VAL:HG11	1.67	0.59
2:T:1007:HIS:HE1	2:T:1161:GLN:O	1.85	0.59
1:M:198:PHE:CB	2:T:1101:CYS:SG	2.90	0.59
1:M:132:THR:HG22	1:M:140:THR:OG1	2.03	0.59
1:M:142:GLU:HA	1:M:145:ARG:HH21	1.68	0.59
1:M:234:PHE:O	1:M:238:VAL:HG23	2.04	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:M:129:GLN:HA	1:M:165:ALA:HB3	1.85	0.58
1:M:160:ARG:CZ	1:M:162:VAL:CG2	2.79	0.58
2:T:1161:GLN:HE21	2:T:1177:TRP:NE1	2.02	0.58
2:T:1116:LYS:O	2:T:1120:HIS:HB2	2.04	0.57
1:M:126:PHE:HE1	1:M:128:ILE:HG13	1.69	0.57
1:M:146:LYS:O	1:M:150:VAL:HG23	2.05	0.56
1:M:176:ASP:O	1:M:177:ILE:HG13	2.05	0.56
1:M:151:TRP:HZ2	1:M:238:VAL:O	1.87	0.56
2:T:1033:ASN:CA	2:T:1039:PRO:HA	2.31	0.56
2:T:1007:HIS:CE1	2:T:1162:ALA:HA	2.41	0.56
2:T:1154:GLU:HG3	2:T:1156:ASN:OD1	2.06	0.55
2:T:1138:CYS:C	2:T:1140:ILE:H	2.15	0.55
1:M:198:PHE:CD2	2:T:1072:CYS:SG	3.00	0.54
1:M:224:ARG:HG2	1:M:224:ARG:HH11	1.73	0.54
1:M:142:GLU:CA	1:M:145:ARG:HH21	2.20	0.54
2:T:1165:PHE:CE1	2:T:1179:ARG:HB2	2.42	0.54
1:M:179:ILE:HG12	1:M:213:THR:HG23	1.89	0.54
1:M:115:GLN:O	1:M:248:GLU:HB3	2.08	0.54
1:M:152:GLU:HG2	1:M:157:LEU:O	2.08	0.54
1:M:173:LYS:HA	1:M:178:MET:HE1	1.91	0.53
2:T:1050:ILE:O	2:T:1051:LYS:HD3	2.08	0.53
2:T:1047:ILE:HG13	2:T:1061:GLU:HA	1.89	0.53
1:M:131:TYR:N	1:M:131:TYR:CD1	2.77	0.53
2:T:1143:PRO:O	2:T:1144:ASP:HB2	2.09	0.52
1:M:198:PHE:HA	2:T:1101:CYS:SG	2.49	0.52
2:T:1164:PHE:O	2:T:1179:ARG:HG3	2.09	0.52
2:T:1068:ALA:HB3	2:T:1071:VAL:HG23	1.92	0.52
1:M:213:THR:HG21	1:M:241:LEU:HD23	1.92	0.52
2:T:1009:GLN:HE22	2:T:1167:CYS:H	1.58	0.51
2:T:1066:ALA:O	2:T:1073:GLY:HA3	2.11	0.51
1:M:127:CYS:HB2	1:M:175:ALA:HB3	1.91	0.51
1:M:126:PHE:CZ	1:M:161:GLU:HG2	2.46	0.51
1:M:222:THR:HG21	1:M:227:ASP:O	2.10	0.51
2:T:1017:ILE:HG21	2:T:1060:ILE:CD1	2.40	0.50
2:T:1147:LEU:CB	2:T:1149:MET:HE2	2.36	0.50
1:M:248:GLU:H	1:M:248:GLU:CD	2.19	0.50
1:M:273:ASP:C	1:M:275:ASP:H	2.20	0.50
2:T:1168:ILE:HD13	2:T:1168:ILE:N	2.25	0.50
1:M:198:PHE:CA	2:T:1101:CYS:SG	3.00	0.50
2:T:1158:ASN:OD1	2:T:1163:LYS:HG2	2.11	0.50
2:T:1136:ILE:HA	2:T:1137:PRO:C	2.37	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:T:1072:CYS:HB3	2:T:1099:THR:HG1	1.77	0.50
2:T:1151:TRP:CZ3	2:T:1157:ILE:HG23	2.47	0.49
1:M:209:ILE:N	2:T:1036:TYR:CD2	2.80	0.49
1:M:134:LYS:HE3	1:M:219:GLU:O	2.11	0.49
2:T:1060:ILE:HG23	2:T:1095:ASN:HA	1.94	0.49
2:T:1147:LEU:HB3	2:T:1149:MET:CE	2.36	0.49
1:M:130:ASN:HD22	1:M:130:ASN:C	2.20	0.49
2:T:1080:GLY:C	2:T:1082:LYS:H	2.19	0.49
1:M:280:GLN:HA	1:M:284:GLY:HA3	1.95	0.49
1:M:115:GLN:HB3	1:M:248:GLU:HG3	1.94	0.49
1:M:127:CYS:SG	1:M:165:ALA:CB	3.00	0.49
1:M:140:THR:HA	1:M:233:ILE:CD1	2.43	0.48
1:M:240:GLU:O	1:M:243:HIS:HB2	2.13	0.48
2:T:1017:ILE:HD13	2:T:1060:ILE:CD1	2.42	0.48
2:T:1098:ILE:CG1	2:T:1104:ILE:HD11	2.43	0.48
1:M:119:TRP:NE1	1:M:244:ALA:O	2.46	0.48
2:T:1026:LYS:CB	2:T:1045:TYR:HD1	2.14	0.48
2:T:1005:PRO:HB3	2:T:1157:ILE:HG22	1.95	0.48
2:T:1130:ILE:C	2:T:1130:ILE:HD12	2.39	0.48
2:T:1019:ILE:HG22	2:T:1052:MET:HA	1.96	0.47
2:T:1133:CYS:O	2:T:1152:VAL:HG22	2.13	0.47
2:T:1098:ILE:HG13	2:T:1104:ILE:HD11	1.97	0.47
2:T:1137:PRO:C	2:T:1139:TYR:N	2.73	0.47
1:M:249:HIS:CG	1:M:259:PRO:HD3	2.49	0.47
1:M:118:LYS:NZ	1:M:282:LEU:O	2.48	0.47
2:T:1105:VAL:HG21	2:T:1110:LEU:HD13	1.96	0.47
1:M:160:ARG:HB3	1:M:162:VAL:HG23	1.97	0.47
2:T:1099:THR:N	2:T:1102:ASP:OD2	2.46	0.47
2:T:1161:GLN:HA	2:T:1165:PHE:CD2	2.47	0.46
1:M:273:ASP:C	1:M:275:ASP:N	2.72	0.46
1:M:222:THR:HB	1:M:227:ASP:HB3	1.98	0.46
1:M:222:THR:O	1:M:232:ASP:HA	2.16	0.46
2:T:1066:ALA:HB3	2:T:1073:GLY:CA	2.46	0.46
1:M:155:THR:HG21	1:M:279:ILE:CG2	2.46	0.46
1:M:252:ASP:OD1	1:M:253:PRO:HD2	2.15	0.46
1:M:283:TYR:C	1:M:285:GLY:H	2.24	0.46
2:T:1018:VAL:HG12	2:T:1053:PHE:HB2	1.98	0.46
2:T:1131:THR:HB	2:T:1147:LEU:HD23	1.98	0.46
2:T:1005:PRO:O	2:T:1148:TRP:HZ3	2.00	0.45
2:T:1088:GLY:HA3	2:T:1098:ILE:CD1	2.44	0.45
1:M:180:PHE:CE2	1:M:214:HIS:CD2	3.04	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:M:221:TRP:CH2	1:M:236:VAL:HG11	2.48	0.45
1:M:131:TYR:HB3	1:M:137:GLU:HA	1.98	0.45
1:M:189:SER:O	2:T:1042:ARG:NH2	2.50	0.45
2:T:1007:HIS:HD2	2:T:1009:GLN:H	1.63	0.45
1:M:152:GLU:OE2	1:M:158:ARG:HA	2.17	0.45
2:T:1083:GLU:OE1	2:T:1107:TRP:HB3	2.17	0.45
2:T:1132:ARG:NH1	2:T:1134:PRO:HB3	2.32	0.45
1:M:160:ARG:NH2	1:M:162:VAL:CG2	2.67	0.45
1:M:190:THR:CG2	2:T:1066:ALA:HB2	2.47	0.45
2:T:1146:CYS:HB3	2:T:1177:TRP:CE2	2.51	0.44
1:M:151:TRP:CE3	1:M:279:ILE:HG12	2.52	0.44
1:M:186:HIS:CE1	1:M:192:PHE:CE2	3.05	0.44
2:T:1091:GLU:CB	2:T:1096:MET:HA	2.48	0.44
2:T:1170:ARG:HG2	2:T:1171:SER:H	1.83	0.44
1:M:140:THR:HA	1:M:233:ILE:HD11	2.00	0.44
1:M:173:LYS:O	1:M:174:GLN:C	2.60	0.44
1:M:140:THR:O	1:M:144:ILE:HG12	2.18	0.44
2:T:1091:GLU:HB2	2:T:1096:MET:HA	2.00	0.44
2:T:1022:LYS:CE	2:T:1081:LYS:HA	2.47	0.43
2:T:1113:THR:HA	2:T:1116:LYS:HD2	2.00	0.43
2:T:1150:ASP:O	2:T:1154:GLU:HG2	2.18	0.43
1:M:249:HIS:HD2	1:M:257:MET:O	2.01	0.43
2:T:1137:PRO:O	2:T:1139:TYR:N	2.51	0.43
1:M:232:ASP:C	1:M:234:PHE:N	2.75	0.43
2:T:1169:LYS:HG3	2:T:1175:CYS:SG	2.58	0.43
1:M:131:TYR:CB	1:M:137:GLU:HA	2.48	0.43
1:M:155:THR:HG22	1:M:279:ILE:HB	2.00	0.43
2:T:1062:PHE:O	2:T:1095:ASN:HB2	2.19	0.43
2:T:1005:PRO:HG2	2:T:1151:TRP:CE2	2.54	0.43
2:T:1076:LEU:HD13	2:T:1084:TYR:CE1	2.54	0.43
1:M:180:PHE:CZ	1:M:214:HIS:CD2	3.07	0.42
2:T:1170:ARG:HG2	2:T:1171:SER:N	2.34	0.42
1:M:184:GLY:HA2	1:M:192:PHE:O	2.20	0.42
1:M:208:ASN:HB3	2:T:1036:TYR:CD2	2.54	0.42
1:M:123:GLU:OE2	1:M:160:ARG:HD2	2.20	0.42
2:T:1148:TRP:CE2	2:T:1150:ASP:HB2	2.55	0.42
1:M:125:THR:HB	1:M:176:ASP:HB2	2.02	0.42
1:M:129:GLN:HG2	1:M:165:ALA:CB	2.50	0.42
1:M:253:PRO:C	1:M:255:ALA:H	2.28	0.42
2:T:1017:ILE:HG22	2:T:1019:ILE:HG23	2.02	0.42
1:M:151:TRP:CZ2	1:M:238:VAL:O	2.70	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:M:128:ILE:HD11	1:M:144:ILE:HB	2.02	0.41
2:T:1044:GLN:NE2	2:T:1064:TYR:OH	2.54	0.41
2:T:1047:ILE:HD11	2:T:1060:ILE:O	2.20	0.41
2:T:1105:VAL:CG2	2:T:1110:LEU:HD13	2.50	0.41
1:M:157:LEU:HD11	1:M:283:TYR:CD2	2.56	0.41
2:T:1027:LYS:H	2:T:1027:LYS:HG2	1.56	0.41
2:T:1137:PRO:C	2:T:1139:TYR:H	2.28	0.41
1:M:198:PHE:HB3	2:T:1101:CYS:SG	2.60	0.41
1:M:239:HIS:ND1	1:M:256:ILE:O	2.53	0.41
2:T:1024:VAL:HB	2:T:1046:GLU:O	2.21	0.41
1:M:220:PRO:HG2	1:M:231:ASN:HD22	1.86	0.41
2:T:1136:ILE:HG23	2:T:1152:VAL:HG11	2.03	0.41
1:M:263:TRP:CG	1:M:264:MET:N	2.88	0.41
2:T:1129:LYS:O	2:T:1145:GLU:HA	2.21	0.41
2:T:1170:ARG:NH1	2:T:1173:GLY:H	2.19	0.41
1:M:202:ALA:HB2	1:M:213:THR:HB	2.03	0.41
2:T:1077:ASP:C	2:T:1079:GLY:H	2.27	0.41
2:T:1158:ASN:HA	2:T:1162:ALA:HB3	2.03	0.40
2:T:1032:GLY:O	2:T:1033:ASN:OD1	2.38	0.40
2:T:1099:THR:HG23	2:T:1101:CYS:N	2.32	0.40
1:M:216:ASP:O	1:M:221:TRP:NE1	2.50	0.40
2:T:1034:ASP:HB3	2:T:1035:ILE:H	1.69	0.40
2:T:1080:GLY:C	2:T:1082:LYS:N	2.80	0.40

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	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

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
All	All	354/358 (99%)	271 (77%)	60 (17%)	23 (6%)	1 1

All (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
2	T	1174	SER
1	M	174	GLN
1	M	176	ASP
2	T	1038	ASN
2	T	1077	ASP
2	T	1107	TRP
2	T	1138	CYS
1	M	171	HIS
1	M	195	GLU
1	M	209	ILE
1	M	264	MET
1	M	137	GLU
1	M	170	GLY
1	M	177	ILE
2	T	1081	LYS
2	T	1082	LYS
2	T	1172	ASP
2	T	1024	VAL

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%)	121 (85%)	22 (15%)	2 4
2	T	155/155 (100%)	135 (87%)	20 (13%)	4 7

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	298/298 (100%)	256 (86%)	42 (14%)	3 6

All (42) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	M	122	ASN
1	M	125	THR
1	M	130	ASN
1	M	131	TYR
1	M	137	GLU
1	M	152	GLU
1	M	162	VAL
1	M	167	ILE
1	M	173	LYS
1	M	176	ASP
1	M	189	SER
1	M	213	THR
1	M	233	ILE
1	M	235	LEU
1	M	240	GLU
1	M	264	MET
1	M	266	THR
1	M	271	LEU
1	M	274	ASP
1	M	277	ARG
1	M	279	ILE
1	M	280	GLN
2	T	1002	SER
2	T	1026	LYS
2	T	1033	ASN
2	T	1038	ASN
2	T	1046	GLU
2	T	1047	ILE
2	T	1065	THR
2	T	1077	ASP
2	T	1081	LYS
2	T	1083	GLU
2	T	1098	ILE
2	T	1111	SER
2	T	1115	LYS
2	T	1116	LYS
2	T	1119	ASN

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Mol	Chain	Res	Type
2	T	1132	ARG
2	T	1138	CYS
2	T	1152	VAL
2	T	1158	ASN
2	T	1168	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	M	130	ASN
1	M	214	HIS
1	M	262	GLN
1	M	280	GLN
2	T	1007	HIS
2	T	1009	GLN
2	T	1014	ASN
2	T	1033	ASN
2	T	1044	GLN
2	T	1058	GLN
2	T	1119	ASN
2	T	1120	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.