Full wwPDB X-ray Structure Validation Report (i)

Jan 30, 2021 – 08:52 PM EST

PDB ID	:	3N4F
Title	:	CRYSTAL STRUCTURE OF Mandelate racemase/muconate lactonizing protein from Geobacillus sp. Y412MC10
Authors	:	Malashkevich, V.N.; Toro, R.; Sauder, J.M.; Burley, S.K.; Almo, S.C.; New York SGX Research Center for Structural Genomics (NYSGXRC)
Deposited on	:	2010-05-21
Resolution	:	1.88 Å(reported)

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

|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.16
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.16

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 1.88 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
Rfree		0.252
Clashscore		6
Ramachandran outliers		0.2%
Sidechain outliers		1.9%
RSRZ outliers		5.9%

Worse   *Better*

▮ Percentile relative to all X-ray structures

❘ Percentile relative to X-ray structures of similar resolution
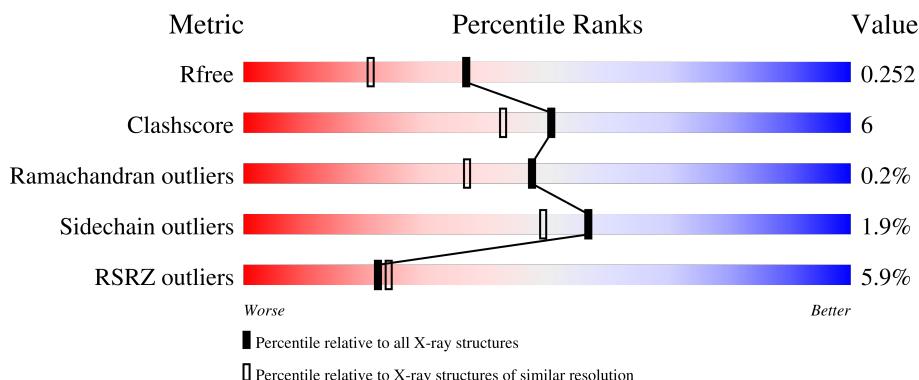
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	9470 (1.90-1.86)
Clashscore	141614	10282 (1.90-1.86)
Ramachandran outliers	138981	10152 (1.90-1.86)
Sidechain outliers	138945	10152 (1.90-1.86)
RSRZ outliers	127900	9303 (1.90-1.86)

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% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	392	5% / 87% / 11% / ••
1	B	392	6% / 86% / 11% / ••
1	C	392	3% / 88% / 9% / ••
1	D	392	9% / 84% / 11% / • •

W O R L D W I D E
wwPDB
PROTEIN DATA BANK
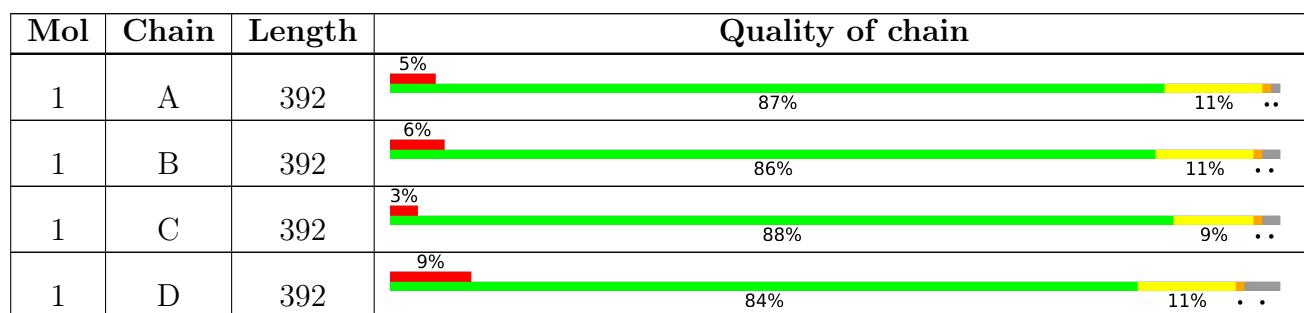
2 Entry composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 13659 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 Mandelate racemase/muconate lactonizing protein.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	390	Total	C	N	O	S	Se	0	5	0
			3111	1970	550	581	3	7			
1	B	386	Total	C	N	O	S	Se	0	4	0
			3069	1941	540	577	3	8			
1	C	386	Total	C	N	O	S	Se	0	3	0
			3061	1940	537	574	3	7			
1	D	376	Total	C	N	O	S	Se	0	4	0
			3001	1905	525	561	3	7			

There are 44 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MSE	-	expression tag	UNP D3EID5
A	2	SER	-	expression tag	UNP D3EID5
A	3	LEU	-	expression tag	UNP D3EID5
A	385	GLU	-	expression tag	UNP D3EID5
A	386	GLY	-	expression tag	UNP D3EID5
A	387	HIS	-	expression tag	UNP D3EID5
A	388	HIS	-	expression tag	UNP D3EID5
A	389	HIS	-	expression tag	UNP D3EID5
A	390	HIS	-	expression tag	UNP D3EID5
A	391	HIS	-	expression tag	UNP D3EID5
A	392	HIS	-	expression tag	UNP D3EID5
B	1	MSE	-	expression tag	UNP D3EID5
B	2	SER	-	expression tag	UNP D3EID5
B	3	LEU	-	expression tag	UNP D3EID5
B	385	GLU	-	expression tag	UNP D3EID5
B	386	GLY	-	expression tag	UNP D3EID5
B	387	HIS	-	expression tag	UNP D3EID5
B	388	HIS	-	expression tag	UNP D3EID5
B	389	HIS	-	expression tag	UNP D3EID5
B	390	HIS	-	expression tag	UNP D3EID5
B	391	HIS	-	expression tag	UNP D3EID5

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
B	392	HIS	-	expression tag	UNP D3EID5
C	1	MSE	-	expression tag	UNP D3EID5
C	2	SER	-	expression tag	UNP D3EID5
C	3	LEU	-	expression tag	UNP D3EID5
C	385	GLU	-	expression tag	UNP D3EID5
C	386	GLY	-	expression tag	UNP D3EID5
C	387	HIS	-	expression tag	UNP D3EID5
C	388	HIS	-	expression tag	UNP D3EID5
C	389	HIS	-	expression tag	UNP D3EID5
C	390	HIS	-	expression tag	UNP D3EID5
C	391	HIS	-	expression tag	UNP D3EID5
C	392	HIS	-	expression tag	UNP D3EID5
D	1	MSE	-	expression tag	UNP D3EID5
D	2	SER	-	expression tag	UNP D3EID5
D	3	LEU	-	expression tag	UNP D3EID5
D	385	GLU	-	expression tag	UNP D3EID5
D	386	GLY	-	expression tag	UNP D3EID5
D	387	HIS	-	expression tag	UNP D3EID5
D	388	HIS	-	expression tag	UNP D3EID5
D	389	HIS	-	expression tag	UNP D3EID5
D	390	HIS	-	expression tag	UNP D3EID5
D	391	HIS	-	expression tag	UNP D3EID5
D	392	HIS	-	expression tag	UNP D3EID5

- Molecule 2 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	B	2	Total 2	Mg 2	0	0
2	A	2	Total 2	Mg 2	0	0
2	D	2	Total 2	Mg 2	0	0
2	C	2	Total 2	Mg 2	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	394	Total 394	O 394	0	0

Continued on next page...

Continued from previous page...

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	328	Total 328	O 328	0	0
3	C	450	Total 450	O 450	0	0
3	D	237	Total 237	O 237	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 and electron density. 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. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). 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.

• Molecule 1: Mandelate racemase/muconate lactonizing protein
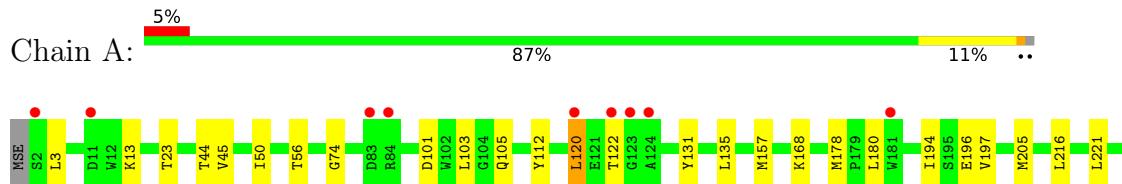
Chain A:

• Molecule 1: Mandelate racemase/muconate lactonizing protein

Chain B:

• Molecule 1: Mandelate racemase/muconate lactonizing protein

Chain C:
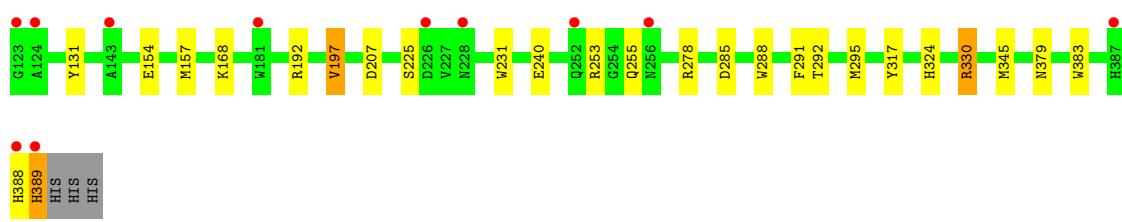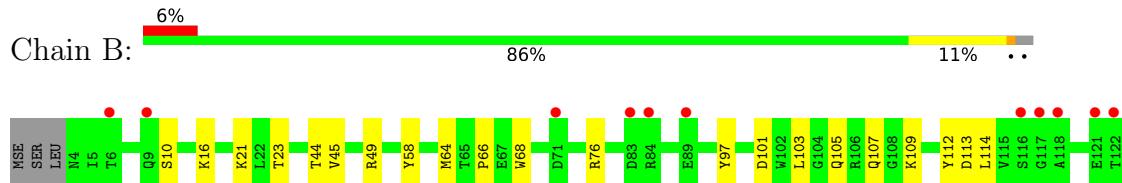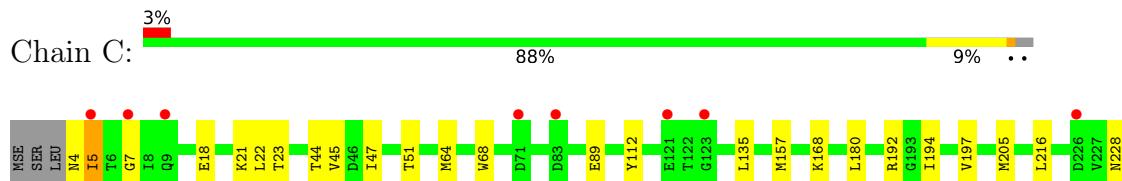
• Molecule 1: Mandelate racemase/muconate lactonizing protein
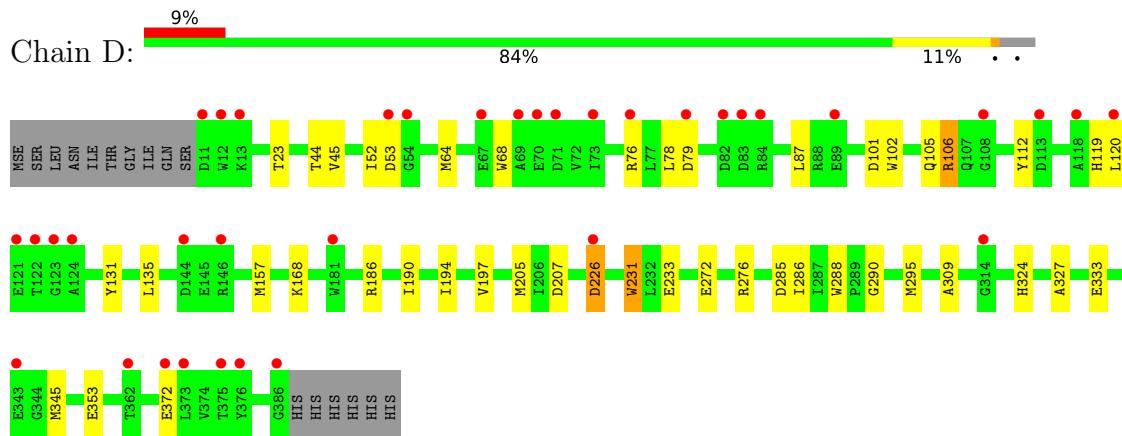
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	155.39Å 66.10Å 151.54Å 90.00° 94.33° 90.00°	Depositor
Resolution (Å)	8.00 – 1.88 8.00 – 1.88	Depositor EDS
% Data completeness (in resolution range)	93.1 (8.00-1.88) 93.1 (8.00-1.88)	Depositor EDS
R_{merge}	0.13	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	19.12 (at 1.88Å)	Xtriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.185 , 0.242 0.194 , 0.252	Depositor DCC
R_{free} test set	5793 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å^2)	15.1	Xtriage
Anisotropy	0.253	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.50 , 57.2	EDS
L-test for twinning[2]	$< |L| > = 0.45, < L^2 > = 0.28$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	13659	wwPDB-VP
Average B, all atoms (Å^2)	19.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 66.71 % 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 5.7857e-06. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

---

[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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

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	0.58	0/3194	0.64	1/4317 (0.0%)
1	B	0.54	1/3147 (0.0%)	0.64	2/4253 (0.0%)
1	C	0.59	0/3136	0.65	0/4240
1	D	0.44	0/3079	0.57	0/4162
All	All	0.54	1/12556 (0.0%)	0.63	3/16972 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	330	ARG	CZ-NH2	-5.51	1.25	1.33

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	330	ARG	NE-CZ-NH1	9.88	125.24	120.30
1	B	330	ARG	NE-CZ-NH2	-9.71	115.44	120.30
1	A	389	HIS	N-CA-C	5.46	125.73	111.00

There are no chirality outliers.

There are no planarity outliers.

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	A	3111	0	3012	40	1
1	B	3069	0	2962	33	0
1	C	3061	0	2963	35	0
1	D	3001	0	2901	31	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
2	C	2	0	0	0	0
2	D	2	0	0	0	0
3	A	394	0	0	8	0
3	B	328	0	0	7	0
3	C	450	0	0	7	0
3	D	237	0	0	7	0
All	All	13659	0	11838	136	1

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 (136) 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:B:157[B]:MSE:HE3	1:B:197:VAL:HG13	1.36	1.06
1:C:345:MSE:SE	3:C:1613:HOH:O	2.23	1.05
1:B:345:MSE:SE	3:B:1560:HOH:O	2.26	1.02
1:A:390:HIS:ND1	1:A:391:HIS:CD2	2.30	0.99
1:A:345:MSE:SE	3:A:494:HOH:O	2.35	0.93
1:C:45:VAL:HG11	3:C:1613:HOH:O	1.67	0.93
1:A:250:LEU:HD13	3:A:1603:HOH:O	1.72	0.90
1:A:157:MSE:HG2	3:A:1182:HOH:O	1.72	0.89
1:A:386:GLY:O	1:A:387:HIS:HB2	1.69	0.89
1:D:345:MSE:SE	3:D:1554:HOH:O	2.42	0.87
1:C:271:ILE:HD13	1:C:282[B]:LEU:CD2	2.06	0.86
1:D:45:VAL:HG11	3:D:1554:HOH:O	1.76	0.84
1:B:45:VAL:HG11	3:B:1560:HOH:O	1.78	0.83
1:B:16:LYS:HD2	1:B:388:HIS:O	1.83	0.77
1:A:178:MSE:SE	3:A:1570:HOH:O	2.56	0.74
1:B:292:THR:HA	1:B:295:MSE:HE2	1.69	0.74
1:D:106:ARG:HG2	3:D:1512:HOH:O	1.87	0.73
1:C:23:THR:HG22	1:C:44:THR:HG22	1.70	0.72
1:C:7:GLY:HA2	3:C:1576:HOH:O	1.90	0.72
1:A:180:LEU:HD11	1:A:216[B]:LEU:HD11	1.70	0.71
1:A:74:GLY:HA3	1:A:389:HIS:HA	1.72	0.71
1:A:257:VAL:HB	3:A:1603:HOH:O	1.93	0.68

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:45:VAL:HG11	3:A:494:HOH:O	1.94	0.67
1:B:112:TYR:H	1:B:324:HIS:HD2	1.43	0.66
1:B:23:THR:HG22	1:B:44:THR:HG22	1.76	0.65
1:D:112:TYR:H	1:D:324:HIS:HD2	1.43	0.65
1:A:45:VAL:HG21	3:A:494:HOH:O	1.97	0.64
1:B:240:GLU:HG3	1:B:278:ARG:HG3	1.80	0.64
1:C:387:HIS:O	1:C:388:HIS:HB2	1.99	0.62
1:C:271:ILE:HD13	1:C:282[B]:LEU:HD21	1.82	0.62
1:A:112:TYR:H	1:A:324:HIS:HD2	1.48	0.62
1:C:112:TYR:H	1:C:324:HIS:HD2	1.47	0.61
1:A:205:MSE:HG2	1:A:231:TRP:CD1	2.35	0.61
1:C:271:ILE:HD13	1:C:282[B]:LEU:HD23	1.82	0.60
1:D:23:THR:HG22	1:D:44:THR:HG22	1.85	0.59
1:A:3:LEU:HD21	1:A:103:LEU:HD13	1.85	0.59
1:C:271:ILE:CD1	1:C:282[B]:LEU:CD2	2.80	0.59
1:A:390:HIS:HB3	1:A:391:HIS:CD2	2.38	0.58
1:B:285:ASP:HB3	1:B:288:TRP:O	2.03	0.58
1:D:205:MSE:HG2	1:D:231:TRP:CG	2.38	0.58
1:B:131:TYR:CE1	1:B:168:LYS:HE2	2.39	0.57
1:C:89:GLU:HG2	3:C:558:HOH:O	2.04	0.57
1:D:45:VAL:HG21	3:D:1554:HOH:O	2.04	0.57
1:A:135:LEU:HD13	1:A:194:ILE:HD13	1.87	0.57
1:C:22:LEU:HD13	1:C:47[A]:ILE:HG12	1.86	0.57
1:B:10:SER:O	1:B:76:ARG:HD3	2.04	0.57
1:A:205:MSE:HG2	1:A:231:TRP:CG	2.40	0.56
1:A:197:VAL:HG13	3:A:1182:HOH:O	2.05	0.56
1:B:103:LEU:HD22	1:B:107:GLN:HE21	1.71	0.55
1:A:389:HIS:O	1:A:390:HIS:HB2	2.05	0.55
1:C:180:LEU:HD11	1:C:216:LEU:HD11	1.89	0.55
1:D:205:MSE:HG2	1:D:231:TRP:CD1	2.41	0.55
1:D:135:LEU:HD13	1:D:194:ILE:HD13	1.89	0.54
1:C:157:MSE:SE	1:C:197:VAL:HG22	2.59	0.53
1:D:102:TRP:CH2	3:D:1512:HOH:O	2.53	0.53
1:C:51:THR:HG21	1:C:389:HIS:HA	1.90	0.53
1:C:168:LYS:HE2	1:C:233:GLU:OE1	2.09	0.53
1:C:205:MSE:HG2	1:C:231:TRP:CG	2.44	0.53
1:A:390:HIS:ND1	1:A:391:HIS:NE2	2.57	0.52
1:A:120:LEU:HD13	1:A:327:ALA:HA	1.91	0.52
1:B:379:ASN:HB3	1:C:372:GLU:HG3	1.91	0.52
1:B:49:ARG:HD3	1:B:58:TYR:CE1	2.44	0.52
1:B:101:ASP:O	1:B:105:GLN:HG2	2.10	0.52

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:168:LYS:HE2	1:D:233:GLU:OE1	2.09	0.52
1:D:157:MSE:HG2	3:D:1139:HOH:O	2.10	0.51
1:D:186:ARG:O	1:D:190:ILE:HG12	2.11	0.51
1:D:286:ILE:O	1:D:290:GLY:HA2	2.10	0.51
1:A:101:ASP:O	1:A:105:GLN:HG2	2.11	0.49
1:A:285:ASP:HB3	1:A:288:TRP:O	2.12	0.49
1:B:157[B]:MSE:HE3	1:B:197:VAL:CG1	2.25	0.49
1:C:285:ASP:HB3	1:C:288:TRP:O	2.13	0.49
1:A:389:HIS:HB2	1:A:390:HIS:HD2	1.76	0.49
1:B:330:ARG:HD2	3:B:1510:HOH:O	2.11	0.49
1:C:205:MSE:HG2	1:C:231:TRP:CD1	2.49	0.48
1:C:135:LEU:HD13	1:C:194:ILE:HD13	1.96	0.48
1:A:221:LEU:HD13	1:A:250:LEU:HD21	1.95	0.48
1:C:271:ILE:HG21	1:C:300:LYS:HE3	1.96	0.47
1:A:324:HIS:HE1	1:A:350:TYR:OH	1.97	0.47
1:B:64:MSE:HG3	1:B:68:TRP:CE3	2.50	0.47
1:D:101:ASP:O	1:D:105:GLN:HG2	2.14	0.47
1:D:112:TYR:N	1:D:324:HIS:HD2	2.11	0.47
1:B:388:HIS:NE2	1:D:353:GLU:OE1	2.45	0.47
1:B:317:TYR:HB2	3:B:1560:HOH:O	2.15	0.46
1:D:52:ILE:HB	1:D:102:TRP:CE2	2.50	0.46
1:A:389:HIS:O	1:A:390:HIS:CB	2.64	0.46
1:B:16:LYS:CD	1:B:388:HIS:O	2.59	0.46
1:B:388:HIS:CG	1:B:389:HIS:H	2.33	0.46
1:C:326:SER:O	3:C:1419:HOH:O	2.21	0.45
1:D:285:ASP:HB3	1:D:288:TRP:O	2.15	0.45
1:A:131:TYR:CE1	1:A:168:LYS:HE3	2.51	0.45
1:B:66:PRO:HG3	1:B:383:TRP:CG	2.52	0.45
1:C:324:HIS:HE1	1:C:350:TYR:OH	1.99	0.45
1:C:387:HIS:O	1:C:388:HIS:CB	2.64	0.45
1:A:294:TRP:HB3	1:A:325:LEU:HD21	1.98	0.45
1:B:109:LYS:HE2	3:B:1058:HOH:O	2.17	0.44
1:A:286:ILE:O	1:A:290:GLY:HA2	2.17	0.44
1:C:228:ASN:O	3:C:997:HOH:O	2.21	0.44
1:C:5:ILE:H	1:C:5:ILE:HD12	1.80	0.44
1:D:76:ARG:HB2	1:D:79:ASP:OD2	2.16	0.44
1:D:168:LYS:HD3	1:D:207:ASP:HB2	1.98	0.44
1:B:192[B]:ARG:NH1	3:B:870:HOH:O	2.51	0.44
1:B:168:LYS:HD3	1:B:207:ASP:HB2	2.00	0.44
1:D:226:ASP:N	1:D:226:ASP:OD2	2.51	0.44
1:C:18:GLU:HB3	1:C:378:ILE:HD13	2.00	0.44

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:197:VAL:HG13	3:D:1139:HOH:O	2.18	0.44
1:A:389:HIS:HB2	1:A:390:HIS:CD2	2.52	0.43
1:B:379:ASN:HB3	1:C:372:GLU:CG	2.48	0.43
1:D:64:MSE:HG3	1:D:68:TRP:CE3	2.52	0.43
1:A:390:HIS:CG	1:A:391:HIS:CD2	3.05	0.43
1:A:390:HIS:HB3	1:A:391:HIS:CB	2.49	0.43
1:A:50:ILE:O	1:A:56:THR:HA	2.19	0.43
1:A:372:GLU:H	1:A:372:GLU:CD	2.21	0.43
1:C:192:ARG:NH1	3:C:510:HOH:O	2.52	0.43
1:B:330:ARG:NH2	3:B:687:HOH:O	2.40	0.42
1:A:390:HIS:HA	1:A:391:HIS:HA	1.77	0.42
1:C:271:ILE:CD1	1:C:282[B]:LEU:HD23	2.46	0.42
1:D:131:TYR:CE1	1:D:168:LYS:HE3	2.54	0.42
1:D:112:TYR:H	1:D:324:HIS:CD2	2.29	0.42
1:D:272:GLU:OE2	1:D:276:ARG:NH2	2.53	0.42
1:D:372:GLU:CD	1:D:372:GLU:H	2.22	0.42
1:D:53:ASP:OD2	1:D:106:ARG:NH2	2.53	0.42
1:A:23:THR:HG22	1:A:44:THR:HG22	2.02	0.41
1:B:389:HIS:CD2	1:B:389:HIS:C	2.94	0.41
1:D:309:ALA:HB2	1:D:333:GLU:HB2	2.03	0.41
1:A:390:HIS:HB3	1:A:391:HIS:CG	2.56	0.41
1:B:21:LYS:HE2	1:B:21:LYS:HB2	1.78	0.41
1:A:387:HIS:HB3	1:A:388:HIS:H	1.59	0.41
1:C:21:LYS:HE2	1:C:21:LYS:HB2	1.95	0.41
1:C:64:MSE:HG3	1:C:68:TRP:CE3	2.56	0.41
1:D:119:HIS:CE1	1:D:327:ALA:O	2.74	0.41
1:B:253:ARG:NH2	1:B:255:GLN:OE1	2.54	0.41
1:A:13:LYS:NZ	1:A:389:HIS:CD2	2.89	0.40
1:B:103:LEU:HD22	1:B:107:GLN:NE2	2.34	0.40
1:B:97:TYR:CZ	1:B:291:PHE:HB2	2.56	0.40
1:C:205:MSE:HG2	1:C:231:TRP:CD2	2.56	0.40

All (1) 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)
1:A:376:TYR:OH	1:A:376:TYR:OH[2_555]	1.80	0.40

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.

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	393/392 (100%)	382 (97%)	9 (2%)	2 (0%)	29	17
1	B	388/392 (99%)	379 (98%)	9 (2%)	0	100	100
1	C	387/392 (99%)	380 (98%)	6 (2%)	1 (0%)	41	30
1	D	378/392 (96%)	372 (98%)	6 (2%)	0	100	100
All	All	1546/1568 (99%)	1513 (98%)	30 (2%)	3 (0%)	47	37

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	387	HIS
1	C	388	HIS
1	A	390	HIS

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	A	319/308 (104%)	313 (98%)	6 (2%)	57	49
1	B	314/308 (102%)	307 (98%)	7 (2%)	52	43
1	C	313/308 (102%)	309 (99%)	4 (1%)	69	64
1	D	305/308 (99%)	298 (98%)	7 (2%)	50	41
All	All	1251/1232 (102%)	1227 (98%)	24 (2%)	57	49

All (24) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	120	LEU
1	A	122	THR
1	A	196	GLU
1	A	231	TRP
1	A	265	LEU
1	A	387	HIS
1	B	113	ASP
1	B	114	LEU
1	B	154	GLU
1	B	197	VAL
1	B	225	SER
1	B	231	TRP
1	B	389	HIS
1	C	4	ASN
1	C	5	ILE
1	C	231	TRP
1	C	389	HIS
1	D	78	LEU
1	D	87	LEU
1	D	106	ARG
1	D	120	LEU
1	D	226	ASP
1	D	231	TRP
1	D	295	MSE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	324	HIS
1	A	389	HIS
1	A	391	HIS
1	B	107	GLN
1	B	324	HIS
1	C	4	ASN
1	C	9	GLN
1	C	324	HIS
1	D	324	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 monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 8 ligands modelled in this entry, 8 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 ⓘ

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2		OWAB(Å²)	Q<0.9
1	A	383/392 (97%)	0.17	18 (4%) 31	33	6, 14, 36, 58	0
1	B	379/392 (96%)	0.32	22 (5%) 23	24	8, 17, 37, 51	0
1	C	379/392 (96%)	0.05	13 (3%) 45	46	6, 12, 29, 49	0
1	D	369/392 (94%)	0.54	36 (9%) 7	8	11, 25, 50, 61	0
All	All	1510/1568 (96%)	0.27	89 (5%) 22	24	6, 17, 41, 61	0

All (89) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	388	HIS	6.5
1	B	181	TRP	6.1
1	A	123	GLY	5.0
1	C	7	GLY	5.0
1	B	123	GLY	4.9
1	B	117	GLY	4.7
1	C	389	HIS	4.7
1	D	121	GLU	4.6
1	D	123	GLY	4.4
1	A	83	ASP	4.4
1	D	82	ASP	4.3
1	A	124	ALA	4.3
1	B	388	HIS	4.3
1	D	181[A]	TRP	4.3
1	A	387	HIS	4.2
1	D	122	THR	4.1
1	B	226	ASP	3.8
1	B	6	THR	3.8
1	C	5	ILE	3.8
1	D	79	ASP	3.6
1	B	389	HIS	3.6

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	84	ARG	3.6
1	C	256	ASN	3.5
1	C	123	GLY	3.5
1	C	226	ASP	3.4
1	A	122	THR	3.4
1	B	122	THR	3.4
1	A	391	HIS	3.3
1	A	2	SER	3.3
1	D	124	ALA	3.3
1	A	181	TRP	3.2
1	D	343	GLU	3.2
1	D	376[A]	TYR	3.1
1	A	389	HIS	3.1
1	C	83	ASP	3.1
1	D	118	ALA	3.1
1	D	84	ARG	2.9
1	D	69	ALA	2.9
1	D	83	ASP	2.9
1	B	121	GLU	2.9
1	D	372	GLU	2.9
1	D	12	TRP	2.9
1	B	228	ASN	2.9
1	B	256	ASN	2.9
1	D	71	ASP	2.8
1	D	76	ARG	2.8
1	D	73	ILE	2.8
1	B	71	ASP	2.7
1	B	9	GLN	2.6
1	B	143	ALA	2.6
1	B	83	ASP	2.6
1	D	89	GLU	2.5
1	A	252	GLN	2.5
1	A	288	TRP	2.5
1	C	388	HIS	2.5
1	D	144	ASP	2.5
1	D	314	GLY	2.4
1	A	226	ASP	2.4
1	D	120	LEU	2.4
1	C	121	GLU	2.4
1	D	54	GLY	2.3
1	D	113	ASP	2.3
1	D	13	LYS	2.3

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	256	ASN	2.3
1	B	252	GLN	2.2
1	C	9	GLN	2.2
1	D	373	LEU	2.2
1	B	387	HIS	2.2
1	C	387	HIS	2.2
1	A	11	ASP	2.2
1	C	71	ASP	2.2
1	C	252	GLN	2.2
1	B	84	ARG	2.2
1	B	89	GLU	2.2
1	D	70	GLU	2.2
1	D	386	GLY	2.2
1	D	108	GLY	2.2
1	D	146	ARG	2.2
1	B	118	ALA	2.1
1	D	11	ASP	2.1
1	D	362	THR	2.1
1	D	375	THR	2.1
1	A	390	HIS	2.1
1	D	67	GLU	2.1
1	A	120	LEU	2.1
1	B	124	ALA	2.0
1	D	53	ASP	2.0
1	B	116	SER	2.0
1	D	226	ASP	2.0

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

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

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	MG	D	501	1/1	0.99	0.07	13,13,13,13	0
2	MG	A	502	1/1	0.99	0.05	10,10,10,10	0
2	MG	B	502	1/1	0.99	0.06	15,15,15,15	0
2	MG	C	501	1/1	0.99	0.10	9,9,9,9	0
2	MG	A	501	1/1	0.99	0.05	8,8,8,8	0
2	MG	C	502	1/1	1.00	0.04	8,8,8,8	0
2	MG	B	501	1/1	1.00	0.08	13,13,13,13	0
2	MG	D	502	1/1	1.00	0.03	14,14,14,14	0

6.5 Other polymers (i)

There are no such residues in this entry.