Full wwPDB X-ray Structure Validation Report ⓘ

Aug 29, 2020 – 04:00 PM BST

PDB ID	:	6FPF
Title	:	Structure of the Ustilago maydis chorismate mutase 1
Authors	:	Altegoer, F.; Steinchen, W.; Bange, G.
Deposited on	:	2018-02-09
Resolution	:	2.20 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 following versions of software and data (see references ⓘ) were used in the production of this report:

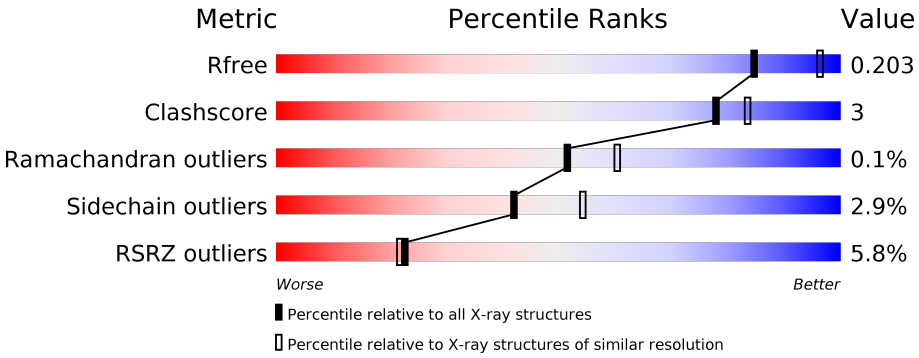
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.13
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.13

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.20 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))
R_{free}	130704	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

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 on 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	278	3% 79% 12% • 8%
1	C	278	7% 80% 11% • 8%
1	D	278	2% 78% 12% • 8%
1	E	278	10% 74% 15% • 8%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 8957 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 Chromosome 16, whole genome shotgun sequence.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	257	Total	C	N	O	S	0	2	0
			2039	1285	363	388	3			
1	C	255	Total	C	N	O	S	0	2	0
			2022	1275	360	384	3			
1	D	257	Total	C	N	O	S	0	1	0
			2030	1280	361	386	3			
1	E	256	Total	C	N	O	S	0	2	0
			2030	1280	364	383	3			

There are 36 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	16	MET	-	initiating methionine	UNP A0A0D1DWQ2
A	286	LEU	-	expression tag	UNP A0A0D1DWQ2
A	287	GLU	-	expression tag	UNP A0A0D1DWQ2
A	288	HIS	-	expression tag	UNP A0A0D1DWQ2
A	289	HIS	-	expression tag	UNP A0A0D1DWQ2
A	290	HIS	-	expression tag	UNP A0A0D1DWQ2
A	291	HIS	-	expression tag	UNP A0A0D1DWQ2
A	292	HIS	-	expression tag	UNP A0A0D1DWQ2
A	293	HIS	-	expression tag	UNP A0A0D1DWQ2
C	16	MET	-	initiating methionine	UNP A0A0D1DWQ2
C	286	LEU	-	expression tag	UNP A0A0D1DWQ2
C	287	GLU	-	expression tag	UNP A0A0D1DWQ2
C	288	HIS	-	expression tag	UNP A0A0D1DWQ2
C	289	HIS	-	expression tag	UNP A0A0D1DWQ2
C	290	HIS	-	expression tag	UNP A0A0D1DWQ2
C	291	HIS	-	expression tag	UNP A0A0D1DWQ2
C	292	HIS	-	expression tag	UNP A0A0D1DWQ2
C	293	HIS	-	expression tag	UNP A0A0D1DWQ2
D	16	MET	-	initiating methionine	UNP A0A0D1DWQ2
D	286	LEU	-	expression tag	UNP A0A0D1DWQ2
D	287	GLU	-	expression tag	UNP A0A0D1DWQ2

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Chain	Residue	Modelled	Actual	Comment	Reference
D	288	HIS	-	expression tag	UNP A0A0D1DWQ2
D	289	HIS	-	expression tag	UNP A0A0D1DWQ2
D	290	HIS	-	expression tag	UNP A0A0D1DWQ2
D	291	HIS	-	expression tag	UNP A0A0D1DWQ2
D	292	HIS	-	expression tag	UNP A0A0D1DWQ2
D	293	HIS	-	expression tag	UNP A0A0D1DWQ2
E	16	MET	-	initiating methionine	UNP A0A0D1DWQ2
E	286	LEU	-	expression tag	UNP A0A0D1DWQ2
E	287	GLU	-	expression tag	UNP A0A0D1DWQ2
E	288	HIS	-	expression tag	UNP A0A0D1DWQ2
E	289	HIS	-	expression tag	UNP A0A0D1DWQ2
E	290	HIS	-	expression tag	UNP A0A0D1DWQ2
E	291	HIS	-	expression tag	UNP A0A0D1DWQ2
E	292	HIS	-	expression tag	UNP A0A0D1DWQ2
E	293	HIS	-	expression tag	UNP A0A0D1DWQ2

- Molecule 2 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total Mn 1 1	0	0

- Molecule 3 is water.

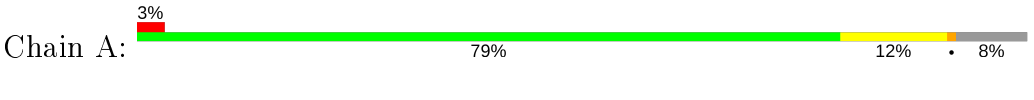
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	239	Total O 239 239	0	0
3	C	219	Total O 219 219	0	0
3	D	213	Total O 213 213	0	0
3	E	164	Total O 164 164	0	0

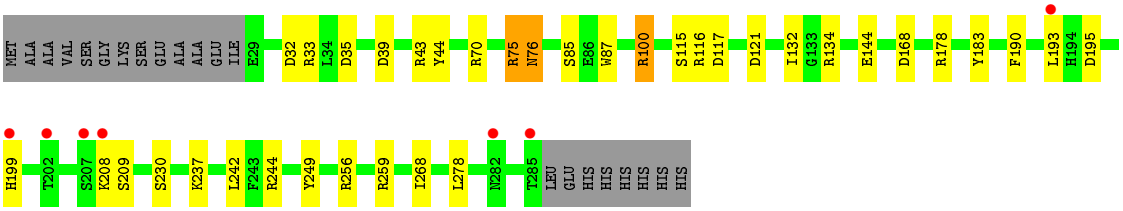
3 Residue-property plots (i)

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: Chromosome 16, whole genome shotgun sequence

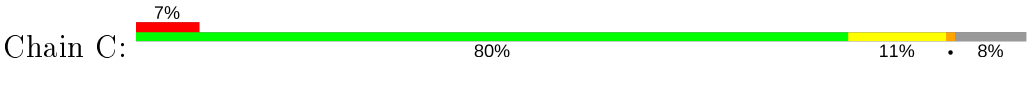
Chain A:

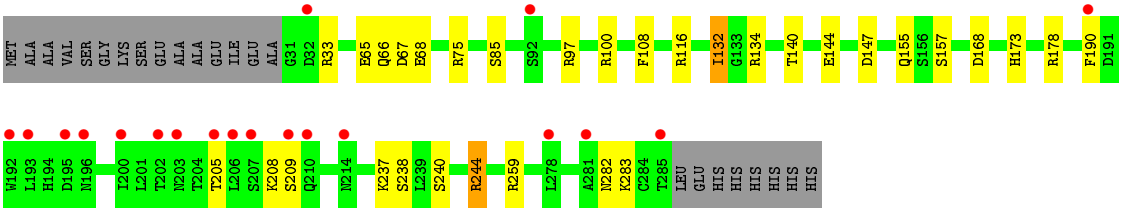




- Molecule 1: Chromosome 16, whole genome shotgun sequence

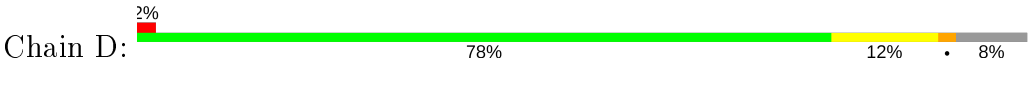
Chain C:

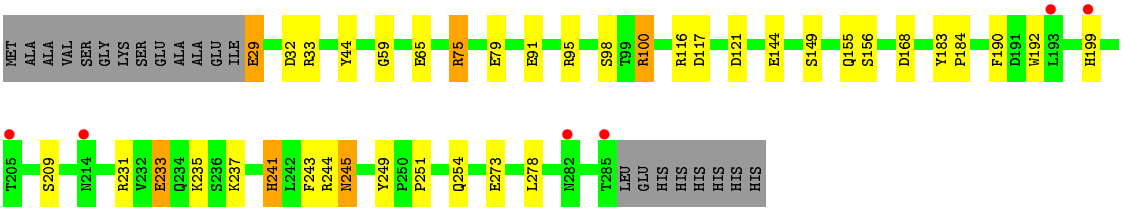




- Molecule 1: Chromosome 16, whole genome shotgun sequence

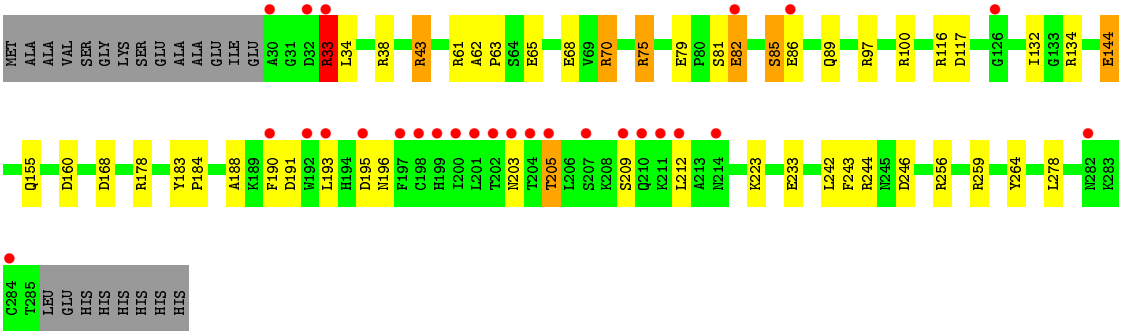
Chain D:





- Molecule 1: Chromosome 16, whole genome shotgun sequence

Chain E:


MET ALA ALA VAL SER GLY LYS SER GLU ALA ALA GLU ILE GLU A30 G31 D32 R33 L34 R38 R43 R61 A62 P63 S64 E65 E68 V69 R70 R75 E79 P80 S81 E82 S85 E86 Q89 R97 R100 R116 D117 G126 I132 G133 R134 E144
Q155 D160 D168 R178 Y183 P184 A188 K189 F190 D191 W192 L193 H194 D195 N196 F197 C198 H199 I200 L201 T202 N203 T204 T205 L206 S207 K208 S209 Q210 K211 L212 A213 N214 K223 E233 L242 F243 R244 N245 D246 R256 R259 Y264 L278 N282 K283
C284 T285 LEU GLU HIS HIS HIS HIS HIS HIS

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 2 21 21	Depositor
Cell constants a, b, c, α, β, γ	82.77Å 83.48Å 186.73Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.74 – 2.20 49.74 – 1.90	Depositor EDS
% Data completeness (in resolution range)	99.9 (49.74-2.20) 99.5 (49.74-1.90)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.21 (at 1.90Å)	Xtriage
Refinement program	REFMAC 5.8.0189	Depositor
R, R_{free}	0.155 , 0.203 0.165 , 0.203	Depositor DCC
R_{free} test set	5251 reflections (5.11%)	wwPDB-VP
Wilson B-factor (Å^2)	29.2	Xtriage
Anisotropy	0.139	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 49.0	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	0.005 for k,h,-l	Xtriage
F_o,F_c correlation	0.97	EDS
Total number of atoms	8957	wwPDB-VP
Average B, all atoms (Å^2)	35.0	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 21.87 % 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 6.4049e-03. 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: MN

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	1.54	18/2078 (0.9%)	1.35	24/2829 (0.8%)
1	C	1.42	12/2061 (0.6%)	1.35	19/2806 (0.7%)
1	D	1.54	20/2069 (1.0%)	1.32	18/2817 (0.6%)
1	E	1.40	8/2069 (0.4%)	1.36	28/2816 (1.0%)
All	All	1.48	58/8277 (0.7%)	1.35	89/11268 (0.8%)

All (58) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	273	GLU	CD-OE1	-8.49	1.16	1.25
1	A	44	TYR	CE2-CZ	-8.37	1.27	1.38
1	A	85	SER	CB-OG	-7.56	1.32	1.42
1	D	116	ARG	NE-CZ	-7.50	1.23	1.33
1	E	68	GLU	CD-OE2	-7.22	1.17	1.25
1	C	240	SER	CB-OG	-6.99	1.33	1.42
1	D	245	ASN	N-CA	6.89	1.60	1.46
1	D	91	GLU	CD-OE1	6.85	1.33	1.25
1	E	243	PHE	CG-CD2	-6.85	1.28	1.38
1	A	76	ASN	CB-CG	-6.80	1.35	1.51
1	E	144	GLU	CD-OE2	-6.75	1.18	1.25
1	A	39	ASP	CB-CG	6.50	1.65	1.51
1	E	233	GLU	CG-CD	6.50	1.61	1.51
1	C	116	ARG	CZ-NH2	-6.46	1.24	1.33
1	D	254	GLN	CG-CD	6.36	1.65	1.51
1	A	178	ARG	CZ-NH1	-6.34	1.24	1.33
1	C	85	SER	CB-OG	-6.24	1.34	1.42
1	C	238	SER	CB-OG	-6.23	1.34	1.42
1	A	144	GLU	CD-OE1	-6.21	1.18	1.25
1	E	264	TYR	CG-CD1	-6.12	1.31	1.39
1	D	144	GLU	CG-CD	6.06	1.61	1.51
1	A	43	ARG	CD-NE	-6.03	1.36	1.46

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	183	TYR	CG-CD1	-5.92	1.31	1.39
1	A	43	ARG	CZ-NH1	-5.88	1.25	1.33
1	A	116	ARG	CZ-NH2	-5.83	1.25	1.33
1	C	116	ARG	CD-NE	-5.69	1.36	1.46
1	D	273	GLU	CD-OE2	-5.68	1.19	1.25
1	D	233	GLU	CD-OE2	-5.64	1.19	1.25
1	D	98	SER	CB-OG	-5.59	1.34	1.42
1	D	29	GLU	CD-OE2	5.55	1.31	1.25
1	D	243	PHE	CG-CD2	-5.55	1.30	1.38
1	D	156	SER	CB-OG	5.53	1.49	1.42
1	A	268	ILE	CA-CB	-5.52	1.42	1.54
1	D	251	PRO	CA-C	5.49	1.63	1.52
1	C	157	SER	CA-CB	5.48	1.61	1.52
1	D	75	ARG	CD-NE	-5.48	1.37	1.46
1	C	68	GLU	CD-OE2	-5.46	1.19	1.25
1	A	237	LYS	C-O	-5.44	1.13	1.23
1	D	249	TYR	CG-CD2	-5.44	1.32	1.39
1	D	44	TYR	CG-CD1	-5.43	1.32	1.39
1	A	43	ARG	CZ-NH2	-5.42	1.26	1.33
1	C	75	ARG	CZ-NH1	5.42	1.40	1.33
1	D	149	SER	CB-OG	5.36	1.49	1.42
1	A	249	TYR	CE1-CZ	-5.34	1.31	1.38
1	D	116	ARG	CZ-NH2	-5.33	1.26	1.33
1	D	116	ARG	CD-NE	-5.33	1.37	1.46
1	E	116	ARG	CD-NE	-5.30	1.37	1.46
1	A	115	SER	CB-OG	-5.28	1.35	1.42
1	C	132	ILE	CB-CG1	-5.28	1.39	1.54
1	C	140	THR	CB-CG2	5.26	1.69	1.52
1	E	85	SER	CB-OG	-5.26	1.35	1.42
1	C	108	PHE	CG-CD1	5.23	1.46	1.38
1	D	235	LYS	CD-CE	-5.21	1.38	1.51
1	E	75	ARG	CD-NE	-5.18	1.37	1.46
1	A	87	TRP	CE2-CZ2	-5.16	1.30	1.39
1	A	230	SER	CA-CB	5.15	1.60	1.52
1	C	144	GLU	CD-OE2	-5.15	1.20	1.25
1	A	256	ARG	CZ-NH1	5.13	1.39	1.33

All (89) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	116	ARG	NE-CZ-NH1	16.49	128.54	120.30
1	A	70	ARG	NE-CZ-NH2	12.42	126.51	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	D	244	ARG	NE-CZ-NH2	-12.21	114.19	120.30
1	E	43[A]	ARG	NE-CZ-NH1	12.12	126.36	120.30
1	E	43[B]	ARG	NE-CZ-NH1	12.12	126.36	120.30
1	D	244	ARG	NE-CZ-NH1	11.96	126.28	120.30
1	A	43	ARG	NE-CZ-NH2	-11.57	114.51	120.30
1	C	134	ARG	NE-CZ-NH1	11.47	126.04	120.30
1	A	70	ARG	NE-CZ-NH1	-11.22	114.69	120.30
1	C	100	ARG	NE-CZ-NH1	-11.15	114.72	120.30
1	E	134	ARG	NE-CZ-NH1	10.85	125.72	120.30
1	E	100	ARG	NE-CZ-NH1	10.60	125.60	120.30
1	C	178	ARG	NE-CZ-NH1	9.56	125.08	120.30
1	C	75	ARG	NE-CZ-NH2	-9.54	115.53	120.30
1	E	43[A]	ARG	NE-CZ-NH2	-9.23	115.68	120.30
1	E	43[B]	ARG	NE-CZ-NH2	-9.23	115.68	120.30
1	C	116	ARG	NE-CZ-NH2	-9.21	115.69	120.30
1	C	116	ARG	CG-CD-NE	-8.87	93.18	111.80
1	A	134	ARG	NE-CZ-NH1	8.74	124.67	120.30
1	C	33	ARG	NE-CZ-NH1	8.74	124.67	120.30
1	C	97	ARG	NE-CZ-NH2	-8.74	115.93	120.30
1	C	97	ARG	NE-CZ-NH1	8.73	124.67	120.30
1	C	134	ARG	NE-CZ-NH2	-8.71	115.94	120.30
1	D	116	ARG	NE-CZ-NH2	-8.67	115.96	120.30
1	D	33	ARG	NE-CZ-NH1	8.59	124.60	120.30
1	E	70	ARG	NE-CZ-NH2	8.53	124.57	120.30
1	E	116	ARG	CG-CD-NE	-8.37	94.23	111.80
1	A	43	ARG	CG-CD-NE	-8.34	94.28	111.80
1	A	100	ARG	NE-CZ-NH1	8.19	124.39	120.30
1	E	97	ARG	NE-CZ-NH2	-7.89	116.36	120.30
1	E	246	ASP	CB-CG-OD1	7.60	125.14	118.30
1	E	61	ARG	NE-CZ-NH1	7.33	123.97	120.30
1	D	117	ASP	CB-CG-OD1	-7.33	111.71	118.30
1	D	231	ARG	NE-CZ-NH2	-7.29	116.65	120.30
1	A	43	ARG	NE-CZ-NH1	7.20	123.90	120.30
1	E	75	ARG	NE-CZ-NH2	-7.16	116.72	120.30
1	D	33	ARG	NE-CZ-NH2	-7.13	116.74	120.30
1	D	75	ARG	NE-CZ-NH2	-7.09	116.75	120.30
1	A	35	ASP	CB-CG-OD2	-6.99	112.01	118.30
1	A	168	ASP	CB-CG-OD1	6.96	124.56	118.30
1	C	33	ARG	NE-CZ-NH2	-6.93	116.83	120.30
1	A	116	ARG	NE-CZ-NH1	6.90	123.75	120.30
1	E	33	ARG	CB-CA-C	6.88	124.16	110.40
1	E	242	LEU	CB-CG-CD2	6.57	122.17	111.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	E	160	ASP	CB-CG-OD2	6.47	124.13	118.30
1	E	75	ARG	NE-CZ-NH1	6.47	123.53	120.30
1	D	199	HIS	N-CA-CB	-6.28	99.30	110.60
1	D	32	ASP	CB-CG-OD2	-6.27	112.66	118.30
1	E	242	LEU	CB-CG-CD1	-6.17	100.51	111.00
1	D	100	ARG	NE-CZ-NH2	-6.17	117.22	120.30
1	A	117	ASP	CB-CG-OD1	6.16	123.84	118.30
1	A	121	ASP	CB-CG-OD1	6.11	123.80	118.30
1	D	95	ARG	NE-CZ-NH1	6.11	123.35	120.30
1	C	259	ARG	NE-CZ-NH1	6.07	123.33	120.30
1	E	100	ARG	NH1-CZ-NH2	-6.06	112.74	119.40
1	D	75	ARG	NE-CZ-NH1	6.05	123.32	120.30
1	D	100	ARG	NE-CZ-NH1	5.97	123.29	120.30
1	E	134	ARG	NE-CZ-NH2	-5.83	117.38	120.30
1	E	117	ASP	CB-CG-OD1	-5.82	113.06	118.30
1	E	256	ARG	NE-CZ-NH2	-5.76	117.42	120.30
1	A	75	ARG	NE-CZ-NH1	5.75	123.18	120.30
1	E	61	ARG	NE-CZ-NH2	-5.75	117.42	120.30
1	E	116	ARG	CB-CA-C	-5.68	99.03	110.40
1	A	85	SER	N-CA-CB	-5.68	101.98	110.50
1	A	32	ASP	CB-CG-OD1	5.67	123.40	118.30
1	C	132	ILE	CG1-CB-CG2	-5.59	99.11	111.40
1	C	100	ARG	CG-CD-NE	-5.58	100.09	111.80
1	D	121	ASP	CB-CG-OD1	5.53	123.28	118.30
1	A	115	SER	CB-CA-C	5.50	120.56	110.10
1	D	117	ASP	CB-CG-OD2	5.45	123.20	118.30
1	E	117	ASP	CB-CA-C	-5.43	99.53	110.40
1	C	100	ARG	NE-CZ-NH2	5.42	123.01	120.30
1	A	33	ARG	NE-CZ-NH1	5.40	123.00	120.30
1	A	256	ARG	NE-CZ-NH2	-5.38	117.61	120.30
1	E	246	ASP	CB-CG-OD2	-5.36	113.47	118.30
1	A	199	HIS	N-CA-CB	-5.32	101.03	110.60
1	C	259	ARG	NE-CZ-NH2	-5.31	117.65	120.30
1	C	237	LYS	CD-CE-NZ	-5.29	99.54	111.70
1	A	100	ARG	CB-CG-CD	-5.21	98.04	111.60
1	A	195	ASP	CB-CG-OD1	5.17	122.95	118.30
1	A	116	ARG	NE-CZ-NH2	-5.14	117.73	120.30
1	A	242	LEU	CB-CA-C	-5.13	100.46	110.20
1	D	241	HIS	CB-CA-C	-5.12	100.17	110.40
1	E	97	ARG	NE-CZ-NH1	5.11	122.86	120.30
1	D	192	TRP	CA-CB-CG	5.11	123.41	113.70
1	C	75	ARG	CD-NE-CZ	-5.11	116.45	123.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	E	178	ARG	NE-CZ-NH1	5.05	122.82	120.30
1	A	75	ARG	NE-CZ-NH2	-5.05	117.78	120.30
1	E	195	ASP	CB-CG-OD1	5.01	122.81	118.30

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	2039	0	2059	10	1
1	C	2022	0	2045	10	0
1	D	2030	0	2052	14	0
1	E	2030	0	2053	21	1
2	A	1	0	0	0	0
3	A	239	0	0	3	1
3	C	219	0	0	4	0
3	D	213	0	0	2	1
3	E	164	0	0	3	0
All	All	8957	0	8209	47	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 3.

All (47) 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:D:155:GLN:OE1	3:D:301:HOH:O	1.91	0.89
1:A:100:ARG:NH2	3:A:401:HOH:O	2.12	0.81
1:C:244:ARG:HG3	1:C:244:ARG:NH1	1.97	0.76
1:A:76:ASN:OD1	1:A:76:ASN:C	2.19	0.75
1:C:244:ARG:HH11	1:C:244:ARG:HG3	1.53	0.72
1:E:155:GLN:NE2	3:E:302:HOH:O	2.23	0.71
1:A:100:ARG:HD3	1:D:237:LYS:HD3	1.72	0.71
1:C:244:ARG:HH11	1:C:244:ARG:CG	2.03	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:43[B]:ARG:NH1	3:E:303:HOH:O	2.28	0.66
1:E:144:GLU:OE1	3:E:301:HOH:O	2.14	0.63
1:E:203:ASN:ND2	1:E:205:THR:CG2	2.62	0.62
1:D:237:LYS:O	1:D:241:HIS:HD2	1.82	0.62
1:A:100:ARG:HE	1:D:233:GLU:CD	2.04	0.60
1:C:173:HIS:HE1	3:C:360:HOH:O	1.88	0.57
1:C:155:GLN:NE2	3:C:301:HOH:O	2.18	0.56
1:E:212:LEU:HD12	1:E:278:LEU:CD1	2.37	0.55
1:E:70:ARG:HG3	1:E:70:ARG:HH11	1.72	0.54
1:C:67:ASP:OD2	3:C:302:HOH:O	2.18	0.54
1:E:203:ASN:ND2	1:E:205:THR:HG21	2.22	0.53
1:E:65:GLU:OE2	1:E:168:ASP:OD2	2.29	0.50
1:E:82:GLU:O	1:E:86:GLU:HG3	2.12	0.49
1:E:70:ARG:HH11	1:E:70:ARG:CG	2.27	0.48
1:D:59:GLY:HA2	1:E:43[B]:ARG:HH21	1.79	0.47
1:E:62:ALA:HB1	1:E:63:PRO:HD2	1.96	0.47
1:E:81:SER:O	1:E:85:SER:HB2	2.14	0.47
1:C:66:GLN:HG2	1:C:147:ASP:OD1	2.15	0.47
1:C:282:ASN:OD1	1:C:283:LYS:N	2.48	0.46
1:E:223:LYS:HE3	1:E:223:LYS:HB3	1.61	0.46
1:A:75:ARG:HG2	1:D:241:HIS:HB3	1.98	0.46
1:A:100:ARG:NH1	3:A:408:HOH:O	2.47	0.45
1:A:132:ILE:HD12	1:A:132:ILE:HG23	1.74	0.45
1:E:33:ARG:HD2	1:E:188:ALA:HB2	2.00	0.44
1:A:100:ARG:NE	1:D:233:GLU:HG2	2.32	0.44
1:D:245:ASN:ND2	3:D:302:HOH:O	2.13	0.43
3:A:431:HOH:O	1:E:244:ARG:HD3	2.19	0.43
1:A:100:ARG:HE	1:D:233:GLU:CG	2.31	0.43
1:E:43[B]:ARG:HH11	1:E:43[B]:ARG:HG3	1.83	0.43
1:C:65:GLU:OE2	1:C:168:ASP:OD2	2.36	0.43
1:E:132:ILE:HG21	1:E:132:ILE:HD13	1.72	0.43
1:E:183:TYR:HB3	1:E:184:PRO:CD	2.49	0.43
1:A:100:ARG:HE	1:D:233:GLU:HG2	1.84	0.42
1:D:65:GLU:OE2	1:D:168:ASP:OD2	2.37	0.42
1:D:183:TYR:HB3	1:D:184:PRO:CD	2.49	0.42
1:D:75:ARG:HD3	1:E:75:ARG:O	2.20	0.42
1:E:34:LEU:HD21	1:E:38:ARG:HH21	1.85	0.42
1:D:100:ARG:HH11	1:D:100:ARG:HG3	1.85	0.41
1:C:173:HIS:HD2	3:C:485:HOH:O	2.04	0.41

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)
3:A:628:HOH:O	3:D:454:HOH:O[1_455]	2.16	0.04
1:A:244:ARG:NH2	1:E:79:GLU:OE2[1_455]	2.17	0.03

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	A	257/278 (92%)	253 (98%)	4 (2%)	0	100	100
1	C	255/278 (92%)	249 (98%)	6 (2%)	0	100	100
1	D	256/278 (92%)	249 (97%)	7 (3%)	0	100	100
1	E	256/278 (92%)	247 (96%)	8 (3%)	1 (0%)	34	37
All	All	1024/1112 (92%)	998 (98%)	25 (2%)	1 (0%)	51	60

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	E	191	ASP

5.3.2 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 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	230/244 (94%)	224 (97%)	6 (3%)	46	58
1	C	229/244 (94%)	223 (97%)	6 (3%)	46	58
1	D	229/244 (94%)	224 (98%)	5 (2%)	52	65

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	E	228/244 (93%)	219 (96%)	9 (4%)	32 41
All	All	916/976 (94%)	890 (97%)	26 (3%)	42 56

All (26) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	190	PHE
1	A	193	LEU
1	A	208	LYS
1	A	209	SER
1	A	259	ARG
1	A	278	LEU
1	C	132	ILE
1	C	190	PHE
1	C	205	THR
1	C	208	LYS
1	C	209	SER
1	C	244	ARG
1	D	29	GLU
1	D	79	GLU
1	D	190	PHE
1	D	209	SER
1	D	278	LEU
1	E	33	ARG
1	E	82	GLU
1	E	89	GLN
1	E	190	PHE
1	E	193	LEU
1	E	196	ASN
1	E	205	THR
1	E	209	SER
1	E	259	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	173	HIS
1	C	224	GLN
1	D	241	HIS
1	E	194	HIS
1	E	203	ASN

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 1 ligands modelled in this entry, 1 is 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, 95^{th} 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(Å^2)	Q<0.9
1	A	257/278 (92%)	-0.28	7 (2%) 54 52	13, 27, 63, 91	0
1	C	255/278 (91%)	-0.02	19 (7%) 14 13	14, 30, 78, 96	0
1	D	257/278 (92%)	-0.33	6 (2%) 60 58	14, 28, 59, 86	0
1	E	256/278 (92%)	0.10	27 (10%) 6 5	14, 34, 87, 110	0
All	All	1025/1112 (92%)	-0.13	59 (5%) 23 22	13, 30, 78, 110	0

All (59) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	193	LEU	5.9
1	E	205	THR	5.6
1	E	202	THR	4.6
1	E	192	TRP	4.4
1	C	192	TRP	4.0
1	E	195	ASP	3.9
1	C	205	THR	3.7
1	E	203	ASN	3.7
1	E	204	THR	3.7
1	A	282	ASN	3.6
1	E	126	GLY	3.5
1	C	203	ASN	3.5
1	E	32	ASP	3.5
1	E	214	ASN	3.4
1	E	33	ARG	3.4
1	C	200	ILE	3.4
1	E	190	PHE	3.3
1	C	202	THR	3.1
1	E	284	CYS	2.9
1	C	195	ASP	2.9
1	C	209	SER	2.9

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Mol	Chain	Res	Type	RSRZ
1	E	198	CYS	2.8
1	E	30	ALA	2.8
1	C	207	SER	2.8
1	D	282	ASN	2.8
1	E	210	GLN	2.7
1	E	211	LYS	2.7
1	C	206	LEU	2.7
1	E	82	GLU	2.7
1	C	32	ASP	2.7
1	D	199	HIS	2.6
1	D	193	LEU	2.6
1	E	209	SER	2.6
1	E	201	LEU	2.5
1	E	207	SER	2.5
1	C	281	ALA	2.5
1	D	205	THR	2.5
1	E	86	GLU	2.4
1	A	193	LEU	2.3
1	C	193	LEU	2.3
1	E	212	LEU	2.3
1	A	202	THR	2.3
1	C	214	ASN	2.3
1	C	190	PHE	2.3
1	A	208	LYS	2.3
1	A	285	THR	2.2
1	E	199	HIS	2.2
1	A	199	HIS	2.2
1	E	282	ASN	2.2
1	C	210	GLN	2.2
1	E	197	PHE	2.2
1	C	285	THR	2.2
1	D	285	THR	2.2
1	D	214	ASN	2.1
1	C	92	SER	2.1
1	C	278	LEU	2.1
1	C	196	ASN	2.0
1	A	207	SER	2.0
1	E	200	ILE	2.0

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

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

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, 95^{th} 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	MN	A	301	1/1	0.98	0.09	57,57,57,57	0

6.5 Other polymers (i)

There are no such residues in this entry.