Full wwPDB X-ray Structure Validation Report (i)

Mar 3, 2024 – 06:10 PM EST

PDB ID	:	6D3H
Title	:	FT_T dioxygenase with bound dichlorprop
Authors	:	Rydel, T.J.; Halls, C.E.
Deposited on	:	2018-04-16
Resolution	:	2.03 Å(reported)

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

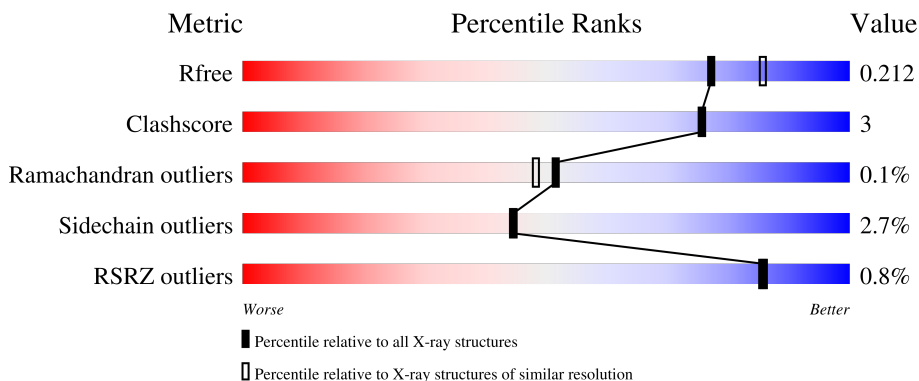|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance (i)

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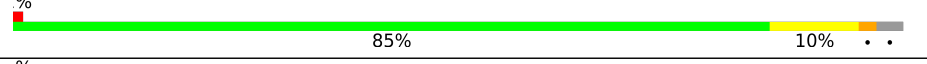
X-RAY DIFFRACTION

The reported resolution of this entry is 2.03 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		0.212
Clashscore		3
Ramachandran outliers		0.1%
Sidechain outliers		2.7%
RSRZ outliers		0.8%

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	10434 (2.04-2.00)
Clashscore	141614	11643 (2.04-2.00)
Ramachandran outliers	138981	11493 (2.04-2.00)
Sidechain outliers	138945	11492 (2.04-2.00)
RSRZ outliers	127900	10220 (2.04-2.00)

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	295	.% 84% 12% · ·
1	B	295	.% 87% 8% · ·
1	I	295	.% 85% 10% · ·
1	M	295	.% 83% 11% · ·

2 Entry composition ⓘ

There are 6 unique types of molecules in this entry. The entry contains 10298 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 FT_T dioxygenase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	286	Total	C	N	O	S	0	1	0
			2292	1457	394	430	11			
1	B	286	Total	C	N	O	S	0	1	0
			2292	1457	394	430	11			
1	I	286	Total	C	N	O	S	0	2	0
			2297	1461	394	430	12			
1	M	287	Total	C	N	O	S	0	2	0
			2305	1465	396	433	11			

• Molecule 2 is (2R)-2-(2,4-dichlorophenoxy)propanoic acid (three-letter code: FTV) (formula: $C_9H_8Cl_2O_3$).
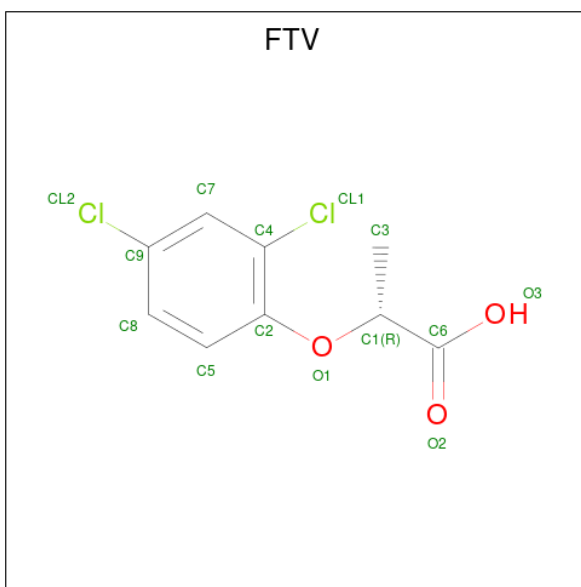
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	Cl	O	0	0
			14	9	2	3		
2	B	1	Total	C	Cl	O	0	0
			14	9	2	3		

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W O R L D W I D E
wwPDB
PROTEIN DATA BANK

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	I	1	Total	C	Cl	O	0	0
			14	9	2	3		
2	M	1	Total	C	Cl	O	0	0
			14	9	2	3		

- Molecule 3 is COBALT (II) ION (three-letter code: CO) (formula: Co).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Co	0	0
			1	1		
3	B	1	Total	Co	0	0
			1	1		
3	I	1	Total	Co	0	0
			1	1		
3	M	1	Total	Co	0	0
			1	1		

- Molecule 4 is 2-OXOGLUTARIC ACID (three-letter code: AKG) (formula: $C_5H_6O_5$).
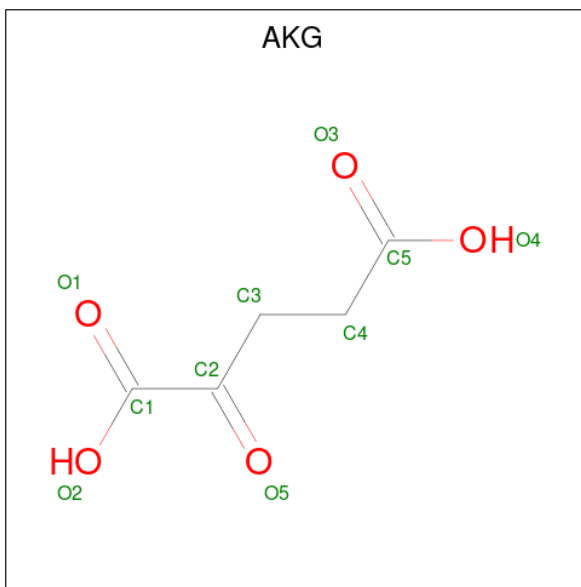
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			10	5	5		
4	B	1	Total	C	O	0	0
			10	5	5		
4	I	1	Total	C	O	0	0
			10	5	5		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	M	1	Total 10	C 5	O 5	0	0

• Molecule 5 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total 1	Cl 1	0	0
5	B	1	Total 1	Cl 1	0	0
5	I	1	Total 1	Cl 1	0	0
5	M	1	Total 1	Cl 1	0	0

• Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	245	Total 245	O 245	0	0
6	B	260	Total 260	O 260	0	0
6	I	240	Total 240	O 240	0	0
6	M	263	Total 263	O 263	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: FT_T dioxygenase
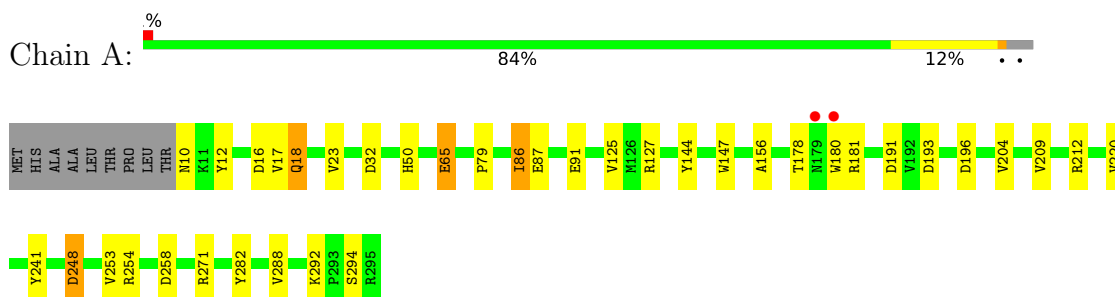
- Molecule 1: FT_T dioxygenase

- Molecule 1: FT_T dioxygenase

- Molecule 1: FT_T dioxygenase

R212 V220 Q226 L236 D248 K256 K257 D258 R271 V288 S294 R295
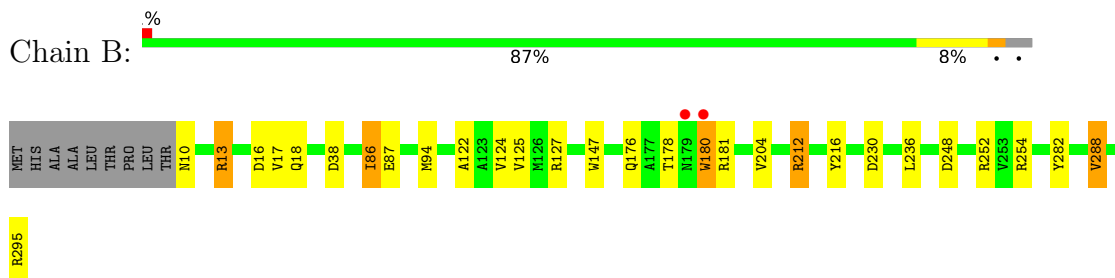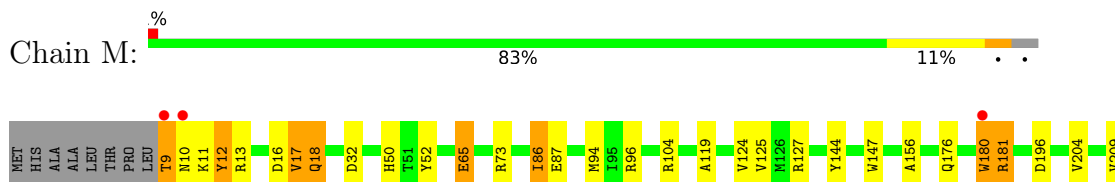
4 Data and refinement statistics ⓘ

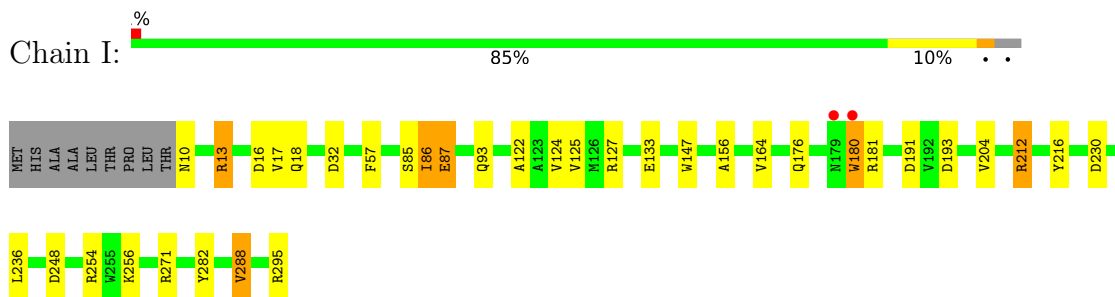| Property	Value	Source
Space group	P 64	Depositor
Cell constants a, b, c, α, β, γ	138.16Å 138.16Å 148.52Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	46.60 – 2.03 46.59 – 2.03	Depositor EDS
% Data completeness (in resolution range)	99.6 (46.60-2.03) 99.6 (46.59-2.03)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.12	Depositor
$< I/\sigma(I) >$ [1]	3.75 (at 2.03Å)	Xtriage
Refinement program	REFMAC 5.5.0102	Depositor
R, R_{free}	0.170 , 0.211 0.172 , 0.212	Depositor DCC
R_{free} test set	5183 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å^2)	25.8	Xtriage
Anisotropy	0.051	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 30.5	EDS
L-test for twinning[2]	$< |L| > = 0.52, < L^2 > = 0.36$	Xtriage
Estimated twinning fraction	0.478 for h,-h-k,-l	Xtriage
F_o,F_c correlation	0.97	EDS
Total number of atoms	10298	wwPDB-VP
Average B, all atoms (Å^2)	26.0	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 46.90 % 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 1.0722e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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[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: CO, AKG, CL, FTV

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	1.28	9/2355 (0.4%)	1.07	16/3206 (0.5%)
1	B	1.29	4/2355 (0.2%)	1.08	13/3206 (0.4%)
1	I	1.29	7/2363 (0.3%)	1.09	13/3216 (0.4%)
1	M	1.29	8/2371 (0.3%)	1.08	17/3228 (0.5%)
All	All	1.29	28/9444 (0.3%)	1.08	59/12856 (0.5%)

All (28) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	M	65	GLU	CB-CG	-6.51	1.39	1.52
1	I	282	TYR	CD2-CE2	6.48	1.49	1.39
1	M	12	TYR	CD2-CE2	6.43	1.49	1.39
1	M	18	GLN	CG-CD	6.34	1.65	1.51
1	A	18	GLN	CG-CD	6.21	1.65	1.51
1	A	253	VAL	CB-CG2	6.20	1.65	1.52
1	A	12	TYR	CD2-CE2	6.14	1.48	1.39
1	M	144	TYR	CD1-CE1	6.03	1.48	1.39
1	I	216	TYR	CD2-CE2	6.00	1.48	1.39
1	B	122	ALA	CA-CB	5.95	1.65	1.52
1	M	220	VAL	CB-CG2	5.92	1.65	1.52
1	B	282	TYR	CD2-CE2	5.87	1.48	1.39
1	B	282	TYR	CD1-CE1	5.81	1.48	1.39
1	A	156	ALA	CA-CB	5.63	1.64	1.52
1	I	87	GLU	CD-OE2	5.62	1.31	1.25
1	M	119	ALA	CA-CB	5.58	1.64	1.52
1	A	87	GLU	CB-CG	5.46	1.62	1.52
1	I	122	ALA	CA-CB	5.44	1.63	1.52
1	A	220	VAL	CB-CG2	5.43	1.64	1.52
1	I	57	PHE	CE1-CZ	5.43	1.47	1.37
1	A	23	VAL	CB-CG2	5.40	1.64	1.52
1	A	144	TYR	CD1-CE1	5.38	1.47	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	216	TYR	CD2-CE2	5.31	1.47	1.39
1	A	241	TYR	CD1-CE1	5.25	1.47	1.39
1	M	87	GLU	CD-OE2	5.07	1.31	1.25
1	M	156	ALA	CA-CB	5.05	1.63	1.52
1	I	164	VAL	CB-CG1	5.04	1.63	1.52
1	I	156	ALA	CA-CB	5.02	1.62	1.52

All (59) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	I	212	ARG	NE-CZ-NH2	-12.49	114.06	120.30
1	B	212	ARG	NE-CZ-NH2	-11.96	114.32	120.30
1	M	212	ARG	NE-CZ-NH1	10.83	125.72	120.30
1	A	212	ARG	NE-CZ-NH1	10.67	125.63	120.30
1	I	212	ARG	NE-CZ-NH1	10.13	125.36	120.30
1	B	212	ARG	NE-CZ-NH1	9.30	124.95	120.30
1	A	212	ARG	NE-CZ-NH2	-9.14	115.73	120.30
1	M	212	ARG	NE-CZ-NH2	-8.96	115.82	120.30
1	A	254	ARG	NE-CZ-NH2	-7.92	116.34	120.30
1	I	254	ARG	NE-CZ-NH2	-7.79	116.41	120.30
1	B	125	VAL	CG1-CB-CG2	7.68	123.19	110.90
1	A	65	GLU	CA-CB-CG	7.47	129.83	113.40
1	M	271	ARG	NE-CZ-NH2	-7.44	116.58	120.30
1	I	125	VAL	CG1-CB-CG2	7.44	122.80	110.90
1	I	288	VAL	CG1-CB-CG2	7.08	122.22	110.90
1	M	17	VAL	CG1-CB-CG2	7.07	122.21	110.90
1	B	124	VAL	CG1-CB-CG2	7.04	122.17	110.90
1	M	125	VAL	CG1-CB-CG2	7.03	122.15	110.90
1	M	124	VAL	CG1-CB-CG2	7.02	122.14	110.90
1	A	125	VAL	CG1-CB-CG2	6.77	121.73	110.90
1	A	196	ASP	CB-CG-OD1	6.72	124.34	118.30
1	B	252	ARG	NE-CZ-NH1	-6.66	116.97	120.30
1	M	32	ASP	CB-CG-OD2	-6.60	112.36	118.30
1	A	17	VAL	CG1-CB-CG2	6.51	121.31	110.90
1	I	86	ILE	CB-CA-C	-6.46	98.68	111.60
1	A	258	ASP	CB-CG-OD2	-6.43	112.52	118.30
1	I	124	VAL	CG1-CB-CG2	6.41	121.15	110.90
1	B	254	ARG	NE-CZ-NH2	-6.32	117.14	120.30
1	A	32	ASP	CB-CG-OD1	6.30	123.97	118.30
1	I	295	ARG	NE-CZ-NH1	6.27	123.44	120.30
1	I	32	ASP	CB-CG-OD2	-6.21	112.72	118.30
1	B	86	ILE	CB-CA-C	-6.20	99.20	111.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	M	196	ASP	CB-CG-OD1	6.20	123.88	118.30
1	B	17	VAL	CG1-CB-CG2	6.18	120.79	110.90
1	A	86	ILE	CB-CA-C	-6.16	99.27	111.60
1	B	288	VAL	CA-CB-CG2	6.14	120.11	110.90
1	B	230	ASP	CB-CG-OD2	-5.98	112.92	118.30
1	M	86	ILE	CB-CA-C	-5.90	99.79	111.60
1	B	288	VAL	CG1-CB-CG2	5.86	120.27	110.90
1	M	288	VAL	CG1-CB-CG2	5.75	120.10	110.90
1	M	73	ARG	NE-CZ-NH2	-5.70	117.45	120.30
1	I	17	VAL	CG1-CB-CG2	5.67	119.97	110.90
1	M	32	ASP	CB-CG-OD1	5.62	123.36	118.30
1	A	288	VAL	CG1-CB-CG2	5.60	119.86	110.90
1	A	125	VAL	CA-CB-CG1	5.57	119.25	110.90
1	B	230	ASP	CB-CG-OD1	5.55	123.30	118.30
1	A	32	ASP	CB-CG-OD2	-5.43	113.41	118.30
1	M	288	VAL	CA-CB-CG1	5.40	119.00	110.90
1	M	258	ASP	CB-CG-OD2	-5.28	113.55	118.30
1	M	125	VAL	CA-CB-CG1	5.26	118.79	110.90
1	A	288	VAL	CA-CB-CG1	5.21	118.72	110.90
1	M	124	VAL	CA-CB-CG2	5.20	118.70	110.90
1	B	38	ASP	CB-CG-OD2	5.18	122.96	118.30
1	A	248	ASP	CB-CG-OD2	-5.17	113.65	118.30
1	M	65	GLU	CA-CB-CG	5.17	124.77	113.40
1	I	230	ASP	CB-CG-OD1	5.15	122.94	118.30
1	A	17	VAL	CA-CB-CG2	5.15	118.63	110.90
1	I	271	ARG	NE-CZ-NH1	5.06	122.83	120.30
1	I	125	VAL	CA-CB-CG1	5.05	118.47	110.90

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	2292	0	2224	11	0
1	B	2292	0	2224	15	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	I	2297	0	2233	14	0
1	M	2305	0	2239	19	0
2	A	14	0	0	0	0
2	B	14	0	0	0	0
2	I	14	0	0	0	0
2	M	14	0	0	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	I	1	0	0	0	0
3	M	1	0	0	0	0
4	A	10	0	4	0	0
4	B	10	0	4	0	0
4	I	10	0	4	0	0
4	M	10	0	4	0	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
5	I	1	0	0	0	0
5	M	1	0	0	0	0
6	A	245	0	0	4	0
6	B	260	0	0	7	0
6	I	240	0	0	5	0
6	M	263	0	0	9	0
All	All	10298	0	8936	57	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 3.

All (57) 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:M:13:ARG:NH1	6:M:401:HOH:O	1.67	1.28
1:I:180:TRP:CD1	6:I:440:HOH:O	2.01	1.11
1:B:180:TRP:HE3	6:B:639:HOH:O	1.47	0.96
1:I:180:TRP:HD1	6:I:440:HOH:O	1.40	0.95
1:M:248:ASP:CG	6:M:415:HOH:O	2.09	0.89
1:B:16:ASP:HB3	1:B:18:GLN:HE22	1.49	0.78
1:M:9:THR:HG21	1:M:52:TYR:OH	1.88	0.73
1:I:16:ASP:HB3	1:I:18:GLN:HE22	1.55	0.72
1:M:212:ARG:HD3	6:M:572:HOH:O	1.92	0.69
1:I:248:ASP:CG	6:I:407:HOH:O	2.30	0.68
1:M:16:ASP:HB3	1:M:18:GLN:HE22	1.59	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:212:ARG:NH2	6:I:402:HOH:O	2.27	0.66
1:B:248:ASP:CG	6:B:421:HOH:O	2.34	0.65
1:A:16:ASP:HB3	1:A:18:GLN:HE22	1.61	0.65
1:M:248:ASP:CB	6:M:415:HOH:O	2.41	0.65
1:M:256:LYS:HE2	6:M:479:HOH:O	1.97	0.64
1:I:256:LYS:HE3	6:I:501:HOH:O	1.97	0.62
1:M:11:LYS:O	6:M:402:HOH:O	2.15	0.62
1:I:176:GLN:NE2	1:I:181:ARG:HH22	2.01	0.58
1:B:212:ARG:NH2	6:B:408:HOH:O	2.40	0.54
1:B:178:THR:CG2	6:B:423:HOH:O	2.56	0.53
1:A:292:LYS:HG3	6:A:631:HOH:O	2.08	0.53
1:B:178:THR:OG1	6:B:401:HOH:O	2.00	0.52
1:M:226:GLN:OE1	6:M:403:HOH:O	2.19	0.51
1:A:178:THR:O	1:A:181:ARG:NH1	2.44	0.51
1:M:248:ASP:HB2	6:M:415:HOH:O	2.08	0.51
1:A:271:ARG:NH2	6:A:405:HOH:O	2.35	0.50
6:A:483:HOH:O	1:I:13:ARG:HD3	2.11	0.50
1:A:50:HIS:CE1	1:A:209:VAL:HG11	2.48	0.49
1:B:178:THR:HG22	6:B:423:HOH:O	2.13	0.49
1:I:176:GLN:HE22	1:I:181:ARG:HH22	1.62	0.48
1:B:86:ILE:CD1	1:B:94:MET:HG2	2.43	0.48
1:B:176:GLN:NE2	1:B:181:ARG:HH22	2.12	0.48
1:B:180:TRP:CE3	6:B:639:HOH:O	2.36	0.48
1:A:191:ASP:OD2	1:A:193:ASP:HB2	2.14	0.46
1:B:13:ARG:NH1	1:M:96:ARG:HH22	2.14	0.45
1:B:147:TRP:CZ3	1:B:204:VAL:HG21	2.52	0.44
1:M:12:TYR:CD2	1:M:17:VAL:HG13	2.52	0.44
1:I:86:ILE:HG22	1:I:87:GLU:N	2.33	0.44
1:A:79:PRO:HD3	1:A:91:GLU:OE1	2.17	0.44
1:B:86:ILE:HG22	1:B:87:GLU:N	2.32	0.44
1:I:85:SER:HA	1:I:93:GLN:HA	2.00	0.43
1:I:256:LYS:HA	1:I:256:LYS:HD3	1.83	0.43
1:I:191:ASP:OD2	1:I:193:ASP:HB2	2.19	0.43
1:A:86:ILE:CD1	1:A:282:TYR:OH	2.67	0.43
1:A:292:LYS:HB3	1:A:292:LYS:HE3	1.87	0.42
1:B:86:ILE:N	1:B:86:ILE:HD13	2.33	0.42
1:M:9:THR:C	6:M:450:HOH:O	2.58	0.42
1:B:13:ARG:HH12	1:M:96:ARG:HH22	1.67	0.42
1:M:147:TRP:CZ3	1:M:204:VAL:HG21	2.56	0.41
1:I:147:TRP:CZ3	1:I:204:VAL:HG21	2.55	0.41
1:M:86:ILE:CD1	1:M:94:MET:HG2	2.51	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:M:176:GLN:NE2	1:M:181:ARG:HH22	2.19	0.41
1:A:271:ARG:NE	6:A:405:HOH:O	2.39	0.41
1:A:147:TRP:CZ3	1:A:204:VAL:HG21	2.57	0.40
1:M:50:HIS:CE1	1:M:209:VAL:HG11	2.57	0.40
1:M:104:ARG:HD2	1:M:180:TRP:CE3	2.57	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	A	285/295 (97%)	278 (98%)	7 (2%)	0	100	100
1	B	285/295 (97%)	279 (98%)	6 (2%)	0	100	100
1	I	286/295 (97%)	281 (98%)	5 (2%)	0	100	100
1	M	287/295 (97%)	282 (98%)	4 (1%)	1 (0%)	41	36
All	All	1143/1180 (97%)	1120 (98%)	22 (2%)	1 (0%)	51	48

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	M	10	ASN

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	250/256 (98%)	244 (98%)	6 (2%)	49	49
1	B	250/256 (98%)	243 (97%)	7 (3%)	43	43
1	I	251/256 (98%)	244 (97%)	7 (3%)	43	43
1	M	252/256 (98%)	245 (97%)	7 (3%)	43	43
All	All	1003/1024 (98%)	976 (97%)	27 (3%)	44	44

All (27) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	10	ASN
1	A	65	GLU
1	A	127	ARG
1	A	180	TRP
1	A	248	ASP
1	A	294	SER
1	B	10	ASN
1	B	13	ARG
1	B	127	ARG
1	B	180	TRP
1	B	236	LEU
1	B	288	VAL
1	B	295	ARG
1	I	10	ASN
1	I	13	ARG
1	I	127	ARG
1	I	133	GLU
1	I	180	TRP
1	I	236	LEU
1	I	288	VAL
1	M	9	THR
1	M	65	GLU
1	M	127	ARG
1	M	180	TRP
1	M	181	ARG
1	M	236	LEU
1	M	294	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	18	GLN

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Mol	Chain	Res	Type
1	A	50	HIS
1	A	64	ASN
1	A	176	GLN
1	B	18	GLN
1	B	50	HIS
1	B	64	ASN
1	B	176	GLN
1	I	18	GLN
1	I	50	HIS
1	I	64	ASN
1	I	176	GLN
1	M	18	GLN
1	M	50	HIS
1	M	64	ASN
1	M	176	GLN

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 16 ligands modelled in this entry, 8 are monoatomic - leaving 8 for Mogul analysis.

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
4	AKG	I	303	3	9,9,9	2.27	3 (33%)	11,11,11	2.04	5 (45%)
2	FTV	I	301	-	14,14,14	1.12	0	19,19,19	1.58	3 (15%)
4	AKG	B	303	3	9,9,9	2.33	2 (22%)	11,11,11	1.37	2 (18%)
4	AKG	M	303	3	9,9,9	1.72	2 (22%)	11,11,11	1.99	3 (27%)
2	FTV	B	301	-	14,14,14	1.12	1 (7%)	19,19,19	1.51	4 (21%)
4	AKG	A	303	3	9,9,9	2.17	3 (33%)	11,11,11	1.95	4 (36%)
2	FTV	M	301	-	14,14,14	1.41	2 (14%)	19,19,19	1.73	5 (26%)
2	FTV	A	301	-	14,14,14	1.47	4 (28%)	19,19,19	1.98	6 (31%)

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
4	AKG	I	303	3	-	2/9/9/9	-
2	FTV	I	301	-	-	6/8/8/8	0/1/1/1
4	AKG	B	303	3	-	2/9/9/9	-
4	AKG	M	303	3	-	1/9/9/9	-
2	FTV	B	301	-	-	6/8/8/8	0/1/1/1
4	AKG	A	303	3	-	1/9/9/9	-
2	FTV	M	301	-	-	6/8/8/8	0/1/1/1
2	FTV	A	301	-	-	6/8/8/8	0/1/1/1

All (17) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	303	AKG	C2-C1	-5.60	1.46	1.53
4	I	303	AKG	C2-C1	-5.29	1.46	1.53
4	A	303	AKG	C2-C1	-4.68	1.47	1.53
4	M	303	AKG	C2-C1	-3.84	1.48	1.53
4	A	303	AKG	O1-C1	3.05	1.30	1.22
2	M	301	FTV	C4-CL1	2.68	1.80	1.73
4	B	303	AKG	O3-C5	2.63	1.30	1.22
4	M	303	AKG	O3-C5	2.62	1.30	1.22
2	B	301	FTV	C9-CL2	2.57	1.80	1.74
4	I	303	AKG	C3-C2	2.44	1.53	1.51
4	A	303	AKG	O2-C1	-2.44	1.23	1.30
2	A	301	FTV	C4-CL1	2.24	1.79	1.73

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	I	303	AKG	O1-C1	2.18	1.28	1.22
2	A	301	FTV	C8-C9	2.15	1.42	1.38
2	M	301	FTV	C9-CL2	2.11	1.79	1.74
2	A	301	FTV	C9-CL2	2.08	1.79	1.74
2	A	301	FTV	O1-C1	2.00	1.46	1.43

All (32) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	M	303	AKG	C3-C2-C1	4.53	124.37	115.97
2	A	301	FTV	C7-C9-CL2	-4.27	113.82	119.15
2	A	301	FTV	C4-C7-C9	-3.47	114.83	118.71
4	A	303	AKG	C3-C2-C1	3.44	122.35	115.97
4	I	303	AKG	C3-C2-C1	3.31	122.11	115.97
4	I	303	AKG	O3-C5-C4	-3.25	112.64	123.08
2	B	301	FTV	C3-C1-C6	3.24	114.62	109.28
2	I	301	FTV	C7-C9-CL2	-3.23	115.11	119.15
2	M	301	FTV	O1-C1-C6	-3.20	107.24	111.34
2	I	301	FTV	C4-C7-C9	-3.14	115.20	118.71
2	A	301	FTV	C3-C1-C6	3.10	114.40	109.28
2	M	301	FTV	C7-C9-CL2	-3.08	115.30	119.15
2	I	301	FTV	C3-C1-C6	3.00	114.23	109.28
4	A	303	AKG	O3-C5-C4	-2.91	113.73	123.08
4	B	303	AKG	C3-C2-C1	2.86	121.28	115.97
4	A	303	AKG	O5-C2-C1	-2.76	115.43	119.43
2	M	301	FTV	C4-C7-C9	-2.64	115.76	118.71
4	B	303	AKG	C3-C4-C5	-2.53	108.17	113.60
2	B	301	FTV	C7-C9-CL2	-2.48	116.05	119.15
2	B	301	FTV	C4-C7-C9	-2.36	116.07	118.71
4	M	303	AKG	O2-C1-C2	2.34	120.38	113.97
4	I	303	AKG	O4-C5-C4	2.31	121.44	114.03
4	A	303	AKG	O4-C5-C4	2.26	121.28	114.03
2	A	301	FTV	O1-C1-C6	-2.23	108.48	111.34
4	I	303	AKG	O2-C1-C2	2.21	120.01	113.97
2	M	301	FTV	O1-C2-C4	2.20	118.06	116.13
4	I	303	AKG	O1-C1-C2	-2.07	118.96	121.72
2	A	301	FTV	O3-C6-O2	-2.05	119.44	124.09
2	A	301	FTV	O3-C6-C1	2.04	121.35	113.89
2	B	301	FTV	O1-C1-C6	-2.02	108.74	111.34
4	M	303	AKG	C4-C3-C2	-2.02	109.23	113.03
2	M	301	FTV	C7-C4-C2	2.01	123.71	121.02

There are no chirality outliers.

All (30) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	301	FTV	O1-C1-C6-O3
2	B	301	FTV	O1-C1-C6-O2
2	B	301	FTV	C3-C1-C6-O3
2	B	301	FTV	C3-C1-C6-O2
2	I	301	FTV	O1-C1-C6-O3
2	M	301	FTV	O1-C1-C6-O3
2	M	301	FTV	O1-C1-C6-O2
2	M	301	FTV	C3-C1-C6-O3
2	M	301	FTV	C3-C1-C6-O2
4	A	303	AKG	C1-C2-C3-C4
4	B	303	AKG	C1-C2-C3-C4
4	I	303	AKG	C1-C2-C3-C4
4	M	303	AKG	C1-C2-C3-C4
2	A	301	FTV	C3-C1-C6-O3
2	A	301	FTV	C3-C1-C6-O2
2	I	301	FTV	C3-C1-C6-O3
2	I	301	FTV	C3-C1-C6-O2
2	A	301	FTV	O1-C1-C6-O3
2	I	301	FTV	O1-C1-C6-O2
2	B	301	FTV	C3-C1-O1-C2
2	I	301	FTV	C3-C1-O1-C2
2	B	301	FTV	C6-C1-O1-C2
2	A	301	FTV	C3-C1-O1-C2
2	I	301	FTV	C6-C1-O1-C2
2	M	301	FTV	C6-C1-O1-C2
2	M	301	FTV	C3-C1-O1-C2
4	B	303	AKG	O5-C2-C3-C4
2	A	301	FTV	O1-C1-C6-O2
2	A	301	FTV	C6-C1-O1-C2
4	I	303	AKG	C3-C4-C5-O4

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 (i)

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(Å^2)	Q<0.9
1	A	286/295 (96%)	-0.40	2 (0%)	87	87	17, 24, 37, 61	0
1	B	286/295 (96%)	-0.39	2 (0%)	87	87	16, 24, 36, 61	0
1	I	286/295 (96%)	-0.37	2 (0%)	87	87	17, 24, 36, 60	0
1	M	287/295 (97%)	-0.37	3 (1%)	82	82	18, 24, 38, 66	0
All	All	1145/1180 (97%)	-0.38	9 (0%)	86	85	16, 24, 37, 66	0

All (9) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	I	180	TRP	4.1
1	M	9	THR	3.9
1	B	180	TRP	3.9
1	M	180	TRP	3.4
1	A	180	TRP	3.4
1	I	179	ASN	2.6
1	A	179	ASN	2.4
1	B	179	ASN	2.3
1	M	10	ASN	2.1

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	FTV	M	301	14/14	0.95	0.13	24,29,33,40	0
2	FTV	B	301	14/14	0.96	0.13	21,26,32,40	0
2	FTV	I	301	14/14	0.97	0.13	22,26,30,39	0
2	FTV	A	301	14/14	0.97	0.15	25,27,33,40	0
4	AKG	A	303	10/10	0.97	0.10	20,23,26,26	0
4	AKG	M	303	10/10	0.97	0.09	20,24,26,26	0
4	AKG	I	303	10/10	0.98	0.08	18,20,23,24	0
4	AKG	B	303	10/10	0.98	0.10	19,20,24,25	0
5	CL	A	304	1/1	0.98	0.06	25,25,25,25	0
3	CO	B	302	1/1	0.99	0.11	20,20,20,20	0
5	CL	B	304	1/1	0.99	0.06	24,24,24,24	0
5	CL	I	304	1/1	0.99	0.04	25,25,25,25	0
5	CL	M	304	1/1	0.99	0.06	23,23,23,23	0
3	CO	M	302	1/1	1.00	0.10	20,20,20,20	0
3	CO	A	302	1/1	1.00	0.13	21,21,21,21	0
3	CO	I	302	1/1	1.00	0.11	19,19,19,19	0

6.5 Other polymers ⓘ

There are no such residues in this entry.