Full wwPDB X-ray Structure Validation Report ⓘ

May 16, 2020 – 09:03 pm BST

PDB ID	:	5HWM
Title	:	Crystal structure of keto-deoxy-D-galactarate dehydratase complexed with 2-oxoadipic acid
Authors	:	Taberman, H.; Parkkinen, T.; Hakulinen, N.; Rouvinen, J.
Deposited on	:	2016-01-29
Resolution	:	2.10 Å(reported)

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

|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.11
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)	:	2.11

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 2.10 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		0.279
Clashscore		4
Ramachandran outliers		0.1%
Sidechain outliers		2.3%
RSRZ outliers		7.3%

Worse   *Better*

■ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution
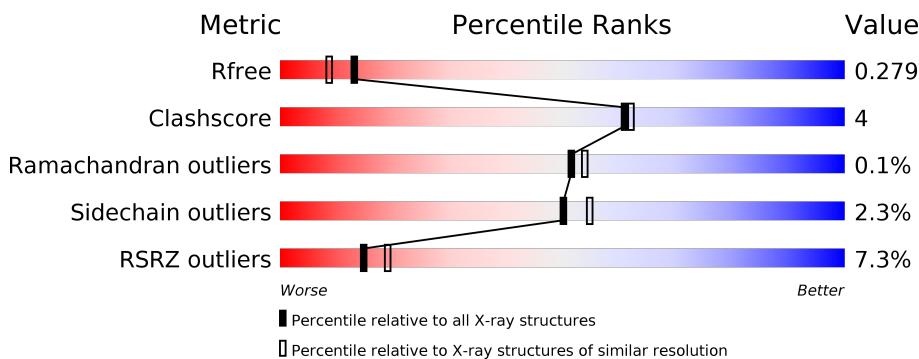
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	5197 (2.10-2.10)
Clashscore	141614	5710 (2.10-2.10)
Ramachandran outliers	138981	5647 (2.10-2.10)
Sidechain outliers	138945	5648 (2.10-2.10)
RSRZ outliers	127900	5083 (2.10-2.10)

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	311	3% 85% 11% ••
1	B	311	2% 88% 9% •
1	C	311	6% 87% 10% •
1	D	311	17% 87% 10% •
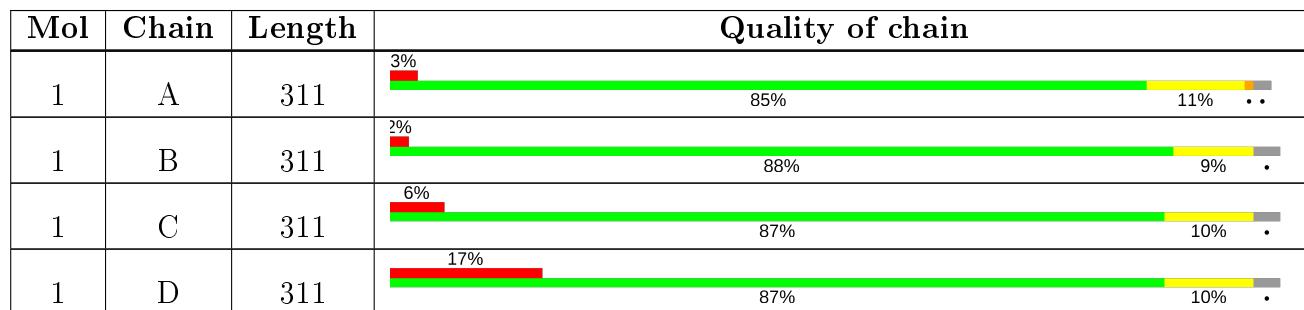
2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 19294 atoms, of which 9411 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 Probable 5-dehydro-4-deoxyglucarate dehydratase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	304	Total	C	H	N	O	S	0	19	0
			4813	1533	2417	410	438	15			
1	B	303	Total	C	H	N	O	S	0	11	0
			4703	1497	2362	401	430	13			
1	C	301	Total	C	H	N	O	S	0	8	0
			4612	1476	2302	389	431	14			
1	D	303	Total	C	H	N	O	S	0	8	0
			4649	1486	2328	390	430	15			

There are 36 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	2	ASP	ASN	conflict	UNP Q8UB77
A	304	TRP	-	expression tag	UNP Q8UB77
A	305	SER	-	expression tag	UNP Q8UB77
A	306	HIS	-	expression tag	UNP Q8UB77
A	307	PRO	-	expression tag	UNP Q8UB77
A	308	GLN	-	expression tag	UNP Q8UB77
A	309	PHE	-	expression tag	UNP Q8UB77
A	310	GLU	-	expression tag	UNP Q8UB77
A	311	LYS	-	expression tag	UNP Q8UB77
B	2	ASP	ASN	conflict	UNP Q8UB77
B	304	TRP	-	expression tag	UNP Q8UB77
B	305	SER	-	expression tag	UNP Q8UB77
B	306	HIS	-	expression tag	UNP Q8UB77
B	307	PRO	-	expression tag	UNP Q8UB77
B	308	GLN	-	expression tag	UNP Q8UB77
B	309	PHE	-	expression tag	UNP Q8UB77
B	310	GLU	-	expression tag	UNP Q8UB77
B	311	LYS	-	expression tag	UNP Q8UB77
C	2	ASP	ASN	conflict	UNP Q8UB77
C	304	TRP	-	expression tag	UNP Q8UB77
C	305	SER	-	expression tag	UNP Q8UB77

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Chain	Residue	Modelled	Actual	Comment	Reference
C	306	HIS	-	expression tag	UNP Q8UB77
C	307	PRO	-	expression tag	UNP Q8UB77
C	308	GLN	-	expression tag	UNP Q8UB77
C	309	PHE	-	expression tag	UNP Q8UB77
C	310	GLU	-	expression tag	UNP Q8UB77
C	311	LYS	-	expression tag	UNP Q8UB77
D	2	ASP	ASN	conflict	UNP Q8UB77
D	304	TRP	-	expression tag	UNP Q8UB77
D	305	SER	-	expression tag	UNP Q8UB77
D	306	HIS	-	expression tag	UNP Q8UB77
D	307	PRO	-	expression tag	UNP Q8UB77
D	308	GLN	-	expression tag	UNP Q8UB77
D	309	PHE	-	expression tag	UNP Q8UB77
D	310	GLU	-	expression tag	UNP Q8UB77
D	311	LYS	-	expression tag	UNP Q8UB77

- Molecule 2 is 2-OXOADIPIC ACID (three-letter code: OOG) (formula: $C_6H_8O_5$).
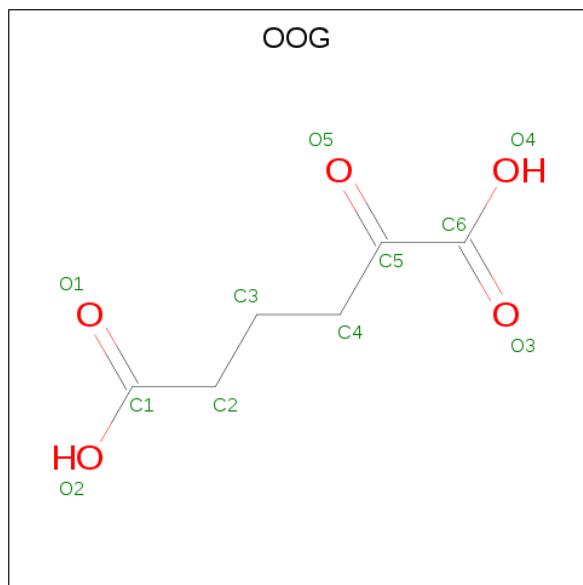
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total 20	C 12	O 8	0	1
2	B	1	Total 20	C 12	O 8	0	1
2	C	1	Total 10	C 6	O 4	0	0
2	D	1	Total 10	C 6	O 4	0	0

• Molecule 3 is FORMIC ACID (three-letter code: FMT) (formula: CH_2O_2).
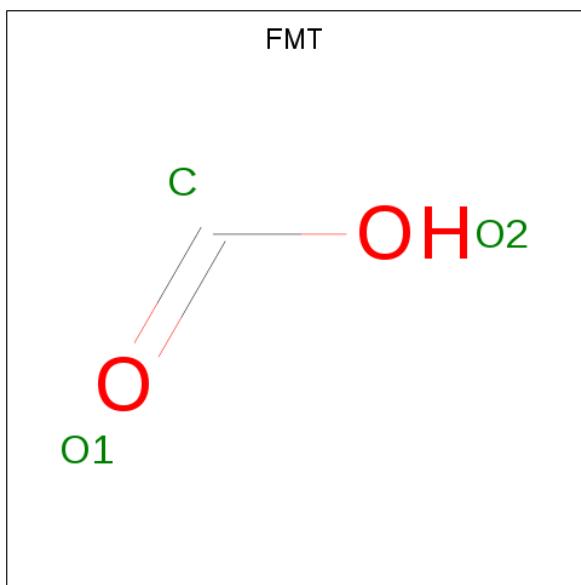
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	C	1	Total 4	C 1	H 1	O 2	0	0
3	D	1	Total 4	C 1	H 1	O 2	0	0

• Molecule 4 is water.

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	157	Total 157	O 157	0	1
4	B	168	Total 168	O 168	0	0
4	C	73	Total 74	O 74	0	1
4	D	50	Total 50	O 50	0	0

3 Residue-property plots ⓘ

These plots are drawn for all protein, RNA and DNA 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: Probable 5-dehydro-4-deoxyglucarate dehydratase
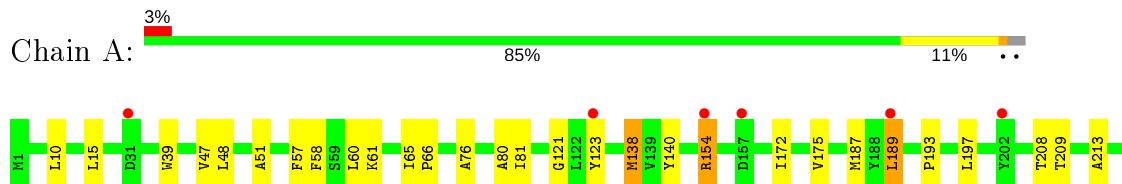
- Molecule 1: Probable 5-dehydro-4-deoxyglucarate dehydratase
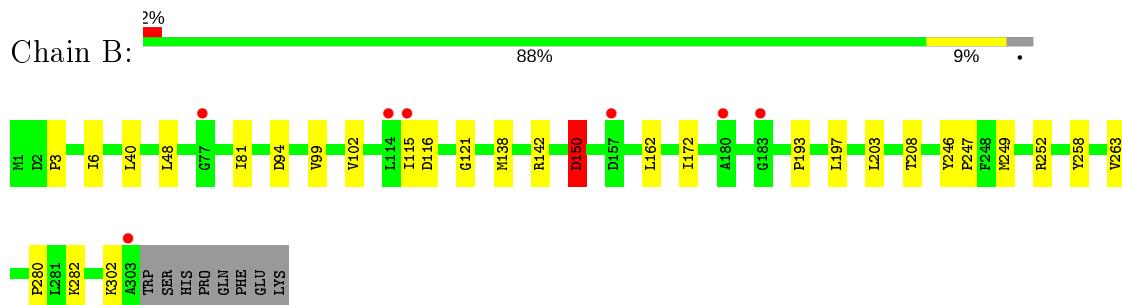
- Molecule 1: Probable 5-dehydro-4-deoxyglucarate dehydratase
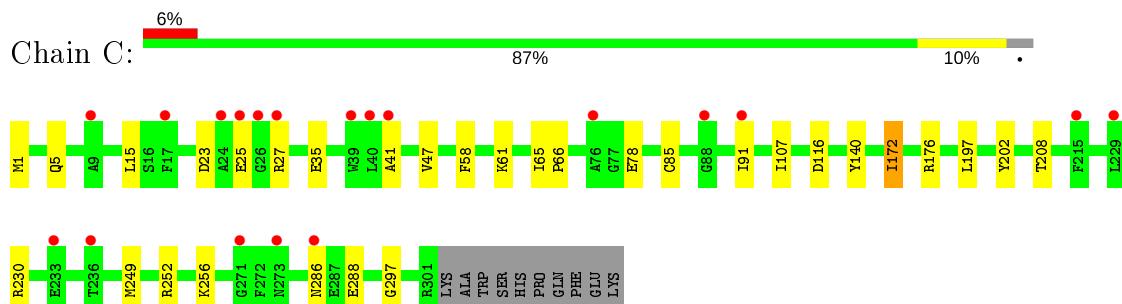
- Molecule 1: Probable 5-dehydro-4-deoxyglucarate dehydratase
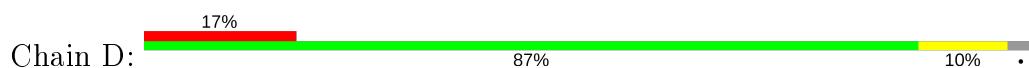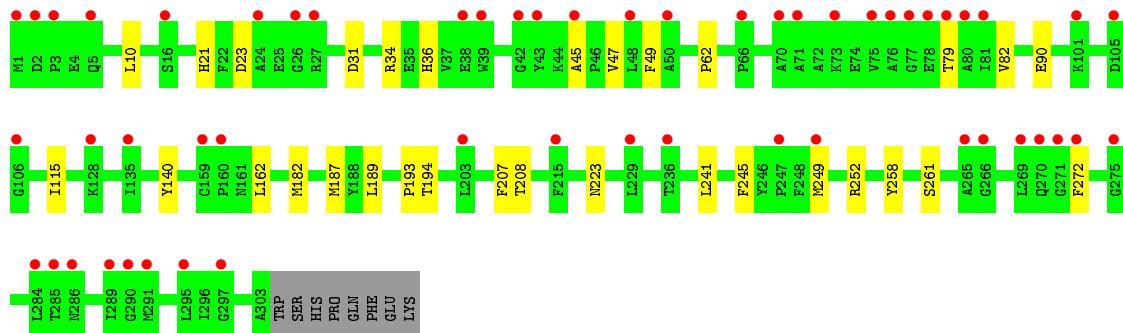
4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	169.52Å 119.03Å 74.28Å 90.00° 112.24° 90.00°	Depositor
Resolution (Å)	47.88 – 2.10 47.88 – 2.10	Depositor EDS
% Data completeness (in resolution range)	96.1 (47.88-2.10) 96.1 (47.88-2.10)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$<I/\sigma(I)>$ [1]	1.70 (at 2.10Å)	Xtriage
Refinement program	PHENIX dev_1803	Depositor
R, R_{free}	0.199 , 0.278 0.201 , 0.279	Depositor DCC
R_{free} test set	3840 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	28.2	Xtriage
Anisotropy	0.388	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 47.8	EDS
L-test for twinning[2]	$<|L|> = 0.46$, $<L^2> = 0.29$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	19294	wwPDB-VP
Average B, all atoms (Å^2)	38.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.69% of the height of the origin peak. No significant pseudotranslation is detected.*

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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 (i)

5.1 Standard geometry (i)

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

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	0.80	1/2504 (0.0%)	0.84	0/3388
1	B	0.79	1/2424 (0.0%)	0.83	2/3279 (0.1%)
1	C	0.62	0/2374	0.68	0/3216
1	D	0.54	0/2398	0.67	0/3245
All	All	0.70	2/9700 (0.0%)	0.76	2/13128 (0.0%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	213	ALA	CA-CB	-5.92	1.40	1.52
1	B	263	VAL	CB-CG2	5.54	1.64	1.52

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	150	ASP	CB-CG-OD1	5.40	123.16	118.30
1	B	142	ARG	NE-CZ-NH1	5.25	122.93	120.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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	2396	2417	2355	32	0
1	B	2341	2362	2328	20	0
1	C	2310	2302	2282	21	0
1	D	2321	2328	2301	20	0
2	A	20	0	12	1	0
2	B	20	0	12	1	0
2	C	10	0	6	0	0
2	D	10	0	6	2	0
3	C	3	1	1	0	0
3	D	3	1	1	0	0
4	A	157	0	0	5	1
4	B	168	0	0	4	1
4	C	74	0	0	3	0
4	D	50	0	0	2	0
All	All	9883	9411	9304	85	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 4.

All (85) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:60:LEU:O	4:A:501:HOH:O	2.02	0.76
1:A:273:ASN:OD1	4:A:502:HOH:O	2.05	0.73
1:C:256:LYS:NZ	4:C:503:HOH:O	2.20	0.73
1:C:25:GLU:OE2	1:C:27:ARG:NH1	2.22	0.73
1:D:249[A]:MET:SD	1:D:252:ARG:NH1	2.63	0.71
1:D:187[B]:MET:HE3	1:D:189[B]:LEU:HB2	1.71	0.71
1:C:288:GLU:OE2	4:C:501:HOH:O	2.12	0.67
1:B:302:LYS:NZ	4:B:503:HOH:O	2.22	0.65
1:A:187[A]:MET:SD	1:A:208:THR:HG21	2.38	0.64
1:A:61[B]:LYS:NZ	4:A:503:HOH:O	2.18	0.63
1:B:150:ASP:OD2	4:B:501:HOH:O	2.16	0.62
1:A:61[A]:LYS:NZ	4:A:508:HOH:O	2.33	0.61
1:A:123:TYR:CE1	1:A:154[A]:ARG:HG2	2.36	0.60
1:B:258:TYR:OH	1:B:282:LYS:NZ	2.27	0.60
1:A:197:LEU:HD11	1:A:249[A]:MET:HG3	1.83	0.59
1:B:40:LEU:O	4:B:502:HOH:O	2.17	0.59
1:C:41:ALA:O	4:C:502:HOH:O	2.16	0.59
1:D:207:PHE:O	4:D:501:HOH:O	2.17	0.57
1:C:208:THR:O	1:C:230:ARG:NH2	2.39	0.55
1:A:197:LEU:HD11	1:A:249[A]:MET:CG	2.36	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:197:LEU:HD11	1:B:249[B]:MET:CG	2.38	0.54
1:A:258:TYR:OH	1:A:282[B]:LYS:NZ	2.42	0.53
1:C:176:ARG:HD2	1:C:176:ARG:O	2.10	0.51
1:B:203:LEU:HD12	1:B:208:THR:HA	1.92	0.51
1:A:268:ARG:NE	4:A:515:HOH:O	2.44	0.51
1:C:91:ILE:HD11	1:D:62:PRO:HD3	1.94	0.50
1:D:49:PHE:CE2	1:D:82:VAL:HG11	2.47	0.50
1:A:10:LEU:HD21	1:A:138[A]:MET:CE	2.42	0.49
1:A:252[A]:ARG:HE	1:A:259:ALA:HB2	1.77	0.49
1:D:223:ASN:ND2	4:D:503:HOH:O	2.31	0.49
1:C:65:ILE:HB	1:C:66:PRO:HD3	1.95	0.48
1:C:61:LYS:HE3	1:D:90:GLU:HB3	1.95	0.48
1:C:197:LEU:HD11	1:C:249[A]:MET:HG3	1.96	0.48
1:A:58:PHE:CE1	1:B:115:ILE:HD13	2.50	0.47
1:A:39:TRP:CZ2	1:A:301:ARG:HD2	2.49	0.47
1:C:197:LEU:HD11	1:C:249[A]:MET:CG	2.43	0.47
1:C:197:LEU:HD11	1:C:249[A]:MET:SD	2.55	0.47
1:A:121:GLY:HA3	1:B:280:PRO:O	2.15	0.46
1:B:48:LEU:HB3	1:B:81:ILE:HD13	1.97	0.46
1:D:193:PRO:HA	2:D:401:OOG:O1	2.16	0.46
1:C:15:LEU:HD22	1:C:47:VAL:HB	1.97	0.46
1:A:193:PRO:HA	2:A:401[B]:OOG:C1	2.47	0.45
1:A:76:ALA:CB	1:A:81:ILE:HD11	2.47	0.45
1:A:10:LEU:HD21	1:A:138[A]:MET:HE1	1.97	0.45
1:A:48:LEU:HB3	1:A:81:ILE:HD13	1.98	0.45
1:C:249[A]:MET:SD	1:C:252:ARG:CZ	3.05	0.45
1:A:189[B]:LEU:HD12	1:A:209:THR:HG23	1.99	0.44
1:D:36:HIS:HA	1:D:272:PHE:CD2	2.52	0.44
1:A:280:PRO:O	1:B:121:GLY:HA3	2.18	0.44
1:D:258:TYR:HA	1:D:261:SER:HB2	1.99	0.44
1:A:65[B]:ILE:HB	1:A:66:PRO:HD3	2.00	0.43
1:A:138[B]:MET:CE	1:A:187[B]:MET:SD	3.06	0.43
1:A:172:ILE:HA	1:A:175:VAL:HG22	2.01	0.43
1:C:172:ILE:HD13	1:C:172:ILE:HA	1.93	0.43
1:B:193:PRO:HA	2:B:401[B]:OOG:C1	2.49	0.43
1:A:65[A]:ILE:N	1:A:66:PRO:CD	2.82	0.43
1:A:51:ALA:O	1:A:57:PHE:HB2	2.20	0.42
1:A:65[B]:ILE:N	1:A:66:PRO:CD	2.82	0.42
1:D:45:ALA:O	1:D:79:THR:HG23	2.20	0.42
1:A:197:LEU:HD22	1:A:246:TYR:CE1	2.54	0.42
1:B:246:TYR:HB2	1:B:247:PRO:HD3	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:172:ILE:HG13	1:C:172:ILE:HG13	2.01	0.42
1:D:10:LEU:HD13	1:D:187[B]:MET:HE2	2.01	0.42
1:D:31:ASP:OD1	1:D:34:ARG:NH2	2.53	0.41
1:D:10:LEU:HA	1:D:47:VAL:HG21	2.01	0.41
1:D:249[A]:MET:SD	1:D:252:ARG:CZ	3.08	0.41
1:B:99:VAL:HA	1:B:102:VAL:HG22	2.02	0.41
1:D:21:HIS:CE1	1:D:36:HIS:HB2	2.56	0.41
1:B:48:LEU:HD23	1:B:48:LEU:C	2.40	0.41
1:C:1:MET:HB2	1:C:5:GLN:HB2	2.02	0.41
1:C:58:PHE:CE1	1:D:115:ILE:HD13	2.55	0.41
1:D:241:LEU:HA	1:D:245:PHE:HB2	2.03	0.41
1:A:15:LEU:HD12	1:A:189[B]:LEU:HD13	2.02	0.41
1:A:60:LEU:HD13	1:A:65[B]:ILE:HD13	2.03	0.41
1:B:193:PRO:HB2	1:B:252[B]:ARG:NH1	2.36	0.41
1:A:61[A]:LYS:NZ	1:B:94:ASP:OD2	2.45	0.41
1:D:193:PRO:HA	2:D:401:OOG:C1	2.51	0.41
1:B:3:PRO:HA	1:B:6:ILE:HG22	2.03	0.40
1:C:23:ASP:OD1	1:C:25:GLU:HG3	2.22	0.40
1:C:85:CYS:HB2	1:C:107:ILE:HG23	2.03	0.40
1:A:47:VAL:HG22	1:A:80:ALA:HB3	2.03	0.40
1:B:172:ILE:HG13	1:C:172:ILE:CG1	2.51	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)
4:A:602:HOH:O	4:B:636:HOH:O[1_556]	2.14	0.06

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	321/311 (103%)	308 (96%)	13 (4%)	0	100	100
1	B	312/311 (100%)	298 (96%)	14 (4%)	0	100	100
1	C	307/311 (99%)	293 (95%)	13 (4%)	1 (0%)	41	41
1	D	309/311 (99%)	299 (97%)	10 (3%)	0	100	100
All	All	1249/1244 (100%)	1198 (96%)	50 (4%)	1 (0%)	51	54

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	297	GLY

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	247/238 (104%)	238 (96%)	9 (4%)	35	36
1	B	240/238 (101%)	236 (98%)	4 (2%)	60	67
1	C	235/238 (99%)	228 (97%)	7 (3%)	41	44
1	D	237/238 (100%)	232 (98%)	5 (2%)	53	59
All	All	959/952 (101%)	934 (97%)	25 (3%)	50	50

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	138[A]	MET
1	A	138[B]	MET
1	A	140	TYR
1	A	154[A]	ARG
1	A	154[B]	ARG
1	A	189[A]	LEU
1	A	189[B]	LEU
1	A	252[A]	ARG
1	A	252[B]	ARG
1	B	116	ASP

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Mol	Chain	Res	Type
1	B	138	MET
1	B	150	ASP
1	B	162	LEU
1	C	35	GLU
1	C	78	GLU
1	C	116	ASP
1	C	140	TYR
1	C	172	ILE
1	C	202	TYR
1	C	286	ASN
1	D	23	ASP
1	D	140	TYR
1	D	162	LEU
1	D	194	THR
1	D	208	THR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	273	ASN

5.3.3   RNA (i)

There are no RNA molecules in this entry.

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

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

5.5   Carbohydrates (i)

There are no carbohydrates in this entry.

5.6   Ligand geometry (i)

8 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and

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the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#|Z| > 2$	Counts	RMSZ	$\#|Z| > 2$
2	OOG	B	401[A]	1	3,9,10	0.12	0	2,10,12	0.99	0
2	OOG	B	401[B]	1	3,9,10	0.18	0	2,10,12	0.69	0
2	OOG	A	401[B]	1	3,9,10	0.41	0	2,10,12	0.33	0
3	FMT	C	402	-	0,2,2	0.00	-	0,1,1	0.00	-
2	OOG	C	401	1	3,9,10	0.14	0	2,10,12	2.08	1 (50%)
2	OOG	A	401[A]	1	3,9,10	0.10	0	2,10,12	1.29	0
2	OOG	D	401	1	3,9,10	0.54	0	2,10,12	0.93	0
3	FMT	D	402	-	0,2,2	0.00	-	0,1,1	0.00	-

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
2	OOG	B	401[A]	1	-	3/3/7/10	-
2	OOG	B	401[B]	1	-	1/3/7/10	-
2	OOG	A	401[B]	1	-	2/3/7/10	-
2	OOG	C	401	1	-	2/3/7/10	-
2	OOG	A	401[A]	1	-	2/3/7/10	-
2	OOG	D	401	1	-	1/3/7/10	-

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	C	401	OOG	C3-C4-C5	-2.70	103.26	113.76

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	401[A]	OOG	C1-C2-C3-C4
2	B	401[B]	OOG	C3-C4-C5-C6

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Mol	Chain	Res	Type	Atoms
2	A	401[B]	OOG	C1-C2-C3-C4
2	A	401[B]	OOG	C3-C4-C5-C6
2	A	401[A]	OOG	C1-C2-C3-C4
2	D	401	OOG	C3-C4-C5-C6
2	B	401[A]	OOG	C2-C3-C4-C5
2	A	401[A]	OOG	C2-C3-C4-C5
2	B	401[A]	OOG	C3-C4-C5-C6
2	C	401	OOG	C3-C4-C5-C6
2	C	401	OOG	C2-C3-C4-C5

There are no ring outliers.

3 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	401[B]	OOG	1	0
2	A	401[B]	OOG	1	0
2	D	401	OOG	2	0

5.7 Other polymers (i)

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 (i)

6.1 Protein, DNA and RNA chains (i)

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	304/311 (97%)	0.70	8 (2%)	56	61	17, 27, 41, 60	0
1	B	303/311 (97%)	0.56	7 (2%)	60	65	17, 26, 40, 56	0
1	C	301/311 (96%)	0.76	19 (6%)	20	24	20, 37, 53, 72	0
1	D	303/311 (97%)	1.16	54 (17%)	1	1	25, 44, 67, 103	0
All	All	1211/1244 (97%)	0.79	88 (7%)	15	19	17, 33, 57, 103	0

All (88) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	24	ALA	6.7
1	C	26	GLY	5.8
1	D	271	GLY	5.5
1	D	75	VAL	5.4
1	D	286	ASN	5.3
1	D	289	ILE	4.8
1	D	26	GLY	4.8
1	D	295	LEU	4.7
1	C	76	ALA	4.2
1	D	247	PRO	4.0
1	D	77	GLY	3.9
1	D	24	ALA	3.8
1	D	159	CYS	3.7
1	D	275	GLY	3.6
1	D	81	ILE	3.4
1	C	286	ASN	3.4
1	D	160	PRO	3.3
1	D	297	GLY	3.3
1	D	71	ALA	3.3
1	D	3	PRO	3.2
1	D	48	LEU	3.2

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Mol	Chain	Res	Type	RSRZ
1	D	290	GLY	3.2
1	B	303	ALA	3.2
1	D	101	LYS	3.1
1	D	229	LEU	3.1
1	D	272	PHE	3.1
1	A	273	ASN	3.0
1	D	265	ALA	3.0
1	A	202	TYR	3.0
1	D	270	GLN	3.0
1	D	203	LEU	3.0
1	D	5	GLN	3.0
1	D	42	GLY	2.9
1	D	78	GLU	2.9
1	D	45	ALA	2.9
1	D	79	THR	2.9
1	D	105	ASP	2.8
1	A	304	TRP	2.7
1	D	39	TRP	2.7
1	C	271	GLY	2.7
1	B	157	ASP	2.7
1	D	236	THR	2.7
1	D	16	SER	2.6
1	D	135	ILE	2.6
1	C	39	TRP	2.5
1	D	284	LEU	2.5
1	C	25	GLU	2.5
1	A	123	TYR	2.5
1	D	266	GLY	2.5
1	C	40	LEU	2.4
1	A	189[A]	LEU	2.4
1	B	114	LEU	2.4
1	A	154[A]	ARG	2.4
1	D	128	LYS	2.4
1	D	80	ALA	2.3
1	C	88	GLY	2.3
1	D	285	THR	2.3
1	C	215	PHE	2.3
1	D	215	PHE	2.3
1	D	106	GLY	2.3
1	A	31[A]	ASP	2.3
1	A	157	ASP	2.3
1	B	183	GLY	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	77	GLY	2.3
1	D	27	ARG	2.3
1	D	50	ALA	2.2
1	D	38	GLU	2.2
1	D	291	MET	2.2
1	C	236	THR	2.2
1	C	41	ALA	2.2
1	C	273	ASN	2.2
1	D	2	ASP	2.2
1	D	43	TYR	2.1
1	B	180	ALA	2.1
1	D	66	PRO	2.1
1	D	269	LEU	2.1
1	D	1	MET	2.1
1	D	249[A]	MET	2.1
1	B	115	ILE	2.1
1	C	233	GLU	2.1
1	C	229	LEU	2.1
1	D	73	LYS	2.1
1	D	70	ALA	2.1
1	D	76	ALA	2.1
1	C	27	ARG	2.0
1	C	17	PHE	2.0
1	C	91	ILE	2.0
1	C	9	ALA	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 carbohydrates 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, 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
3	FMT	C	402	3/3	0.71	0.29	48,51,56,68	0
3	FMT	D	402	3/3	0.76	0.30	48,52,56,68	0
2	OOG	A	401[A]	10/11	0.83	0.34	15,24,34,35	10
2	OOG	A	401[B]	10/11	0.83	0.34	18,22,29,29	10
2	OOG	C	401	10/11	0.85	0.20	23,40,44,55	0
2	OOG	D	401	10/11	0.87	0.17	31,41,57,59	0
2	OOG	B	401[A]	10/11	0.89	0.26	14,25,30,31	10
2	OOG	B	401[B]	10/11	0.89	0.26	15,23,30,31	10

6.5 Other polymers (i)

There are no such residues in this entry.