



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 14, 2017 – 03:17 am GMT

PDB ID : 4HMZ
Title : Crystal Structure of ChmJ, a 3'-monoepimerase from *Streptomyces bikiniensis*
in complex with dTDP-quinovose
Authors : Holden, H.M.; Kubiak, R.L.
Deposited on : 2012-10-18
Resolution : 2.00 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

<http://wwpdb.org/validation/2016/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
Mogul : 1.7.2 (RC1), CSD as538be (2017)
Xtriage (Phenix) : 1.9-1692
EDS : trunk28620
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)
Refmac : 5.8.0135
CCP4 : 6.5.0
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : recalc28949

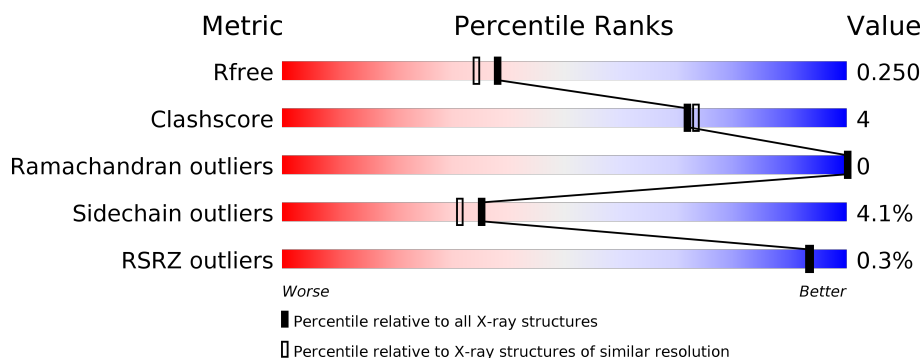
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.00 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}	100719	6609 (2.00-2.00)
Clashscore	112137	7775 (2.00-2.00)
Ramachandran outliers	110173	7679 (2.00-2.00)
Sidechain outliers	110143	7678 (2.00-2.00)
RSRZ outliers	101464	6696 (2.00-2.00)

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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	200	<div> <div style="width: 100%;"> <div style="width: 88%;"></div> <div style="width: 10%;"></div> <div style="width: 2%;"></div> </div> <div>88% 10% ..</div> </div>
1	B	200	<div> <div style="width: 100%;"> <div style="width: 87%;"></div> <div style="width: 13%;"></div> <div style="width: 0%;"></div> </div> <div>87% 13% ..</div> </div>
1	C	200	<div> <div style="width: 100%;"> <div style="width: 83%;"></div> <div style="width: 16%;"></div> <div style="width: 1%;"></div> </div> <div>83% 16% ..</div> </div>
1	D	200	<div> <div style="width: 100%;"> <div style="width: 87%;"></div> <div style="width: 11%;"></div> <div style="width: 2%;"></div> </div> <div>87% 11% ..</div> </div>

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 6861 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 Putative 3-epimerase in D-allose pathway.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	198	Total	C	N	O	S	0	1	0
			1560	980	283	293	4			
1	B	199	Total	C	N	O	S	0	0	0
			1559	980	282	293	4			
1	C	200	Total	C	N	O	S	0	4	0
			1593	1002	290	297	4			
1	D	200	Total	C	N	O	S	0	3	0
			1596	1004	296	292	4			

There are 16 discrepancies between the modelled and reference sequences:

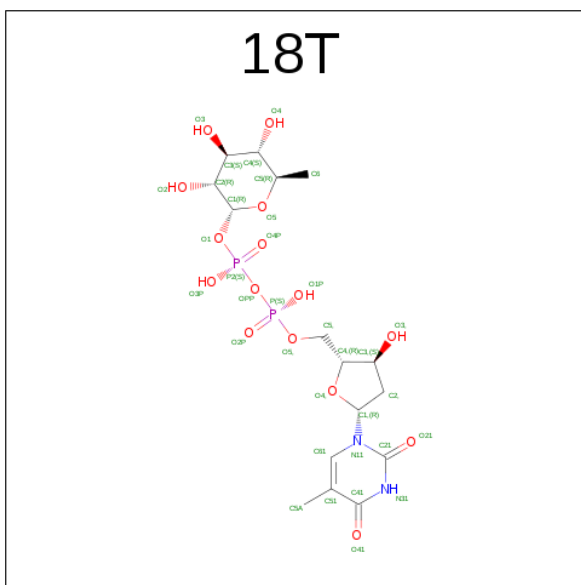
Chain	Residue	Modelled	Actual	Comment	Reference
A	197	LEU	-	EXPRESSION TAG	UNP Q5SFD1
A	198	GLU	-	EXPRESSION TAG	UNP Q5SFD1
A	199	HIS	-	EXPRESSION TAG	UNP Q5SFD1
A	200	HIS	-	EXPRESSION TAG	UNP Q5SFD1
B	197	LEU	-	EXPRESSION TAG	UNP Q5SFD1
B	198	GLU	-	EXPRESSION TAG	UNP Q5SFD1
B	199	HIS	-	EXPRESSION TAG	UNP Q5SFD1
B	200	HIS	-	EXPRESSION TAG	UNP Q5SFD1
C	197	LEU	-	EXPRESSION TAG	UNP Q5SFD1
C	198	GLU	-	EXPRESSION TAG	UNP Q5SFD1
C	199	HIS	-	EXPRESSION TAG	UNP Q5SFD1
C	200	HIS	-	EXPRESSION TAG	UNP Q5SFD1
D	197	LEU	-	EXPRESSION TAG	UNP Q5SFD1
D	198	GLU	-	EXPRESSION TAG	UNP Q5SFD1
D	199	HIS	-	EXPRESSION TAG	UNP Q5SFD1
D	200	HIS	-	EXPRESSION TAG	UNP Q5SFD1

- Molecule 2 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C₂H₆O₂).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			4	2	2		
2	A	1	Total	C	O	0	0
			4	2	2		
2	B	1	Total	C	O	0	0
			4	2	2		
2	C	1	Total	C	O	0	0
			4	2	2		
2	C	1	Total	C	O	0	0
			4	2	2		
2	D	1	Total	C	O	0	0
			4	2	2		
2	D	1	Total	C	O	0	0
			4	2	2		

- Molecule 3 is [(2R,3S,5R)-3-HYDROXY-5-(5-METHYL-2,4-DIOXO-3,4-DIHYDROPYRIMIDIN-1(2H)-YL)TETRAHYDROFURAN-2-YL]METHYL (2R,3R,4S,5S,6R)-3,4,5-TRIHYDROXY-6-METHYLTETRAHYDRO-2H-PYRAN-2-YL DIHYDROGEN DIPHOSPHATE (three-letter code: 18T) (formula: C₁₆H₂₆N₂O₁₅P₂).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total 35	C 16	N 2	O 15	P 2	0	0
3	B	1	Total 35	C 16	N 2	O 15	P 2	0	0
3	C	1	Total 35	C 16	N 2	O 15	P 2	0	0
3	D	1	Total 35	C 16	N 2	O 15	P 2	0	0

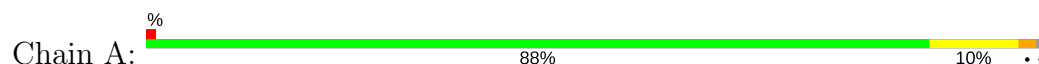
- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	123	Total O 123 123	0	0
4	B	99	Total O 99 99	0	0
4	C	79	Total O 79 79	0	0
4	D	84	Total O 84 84	0	0

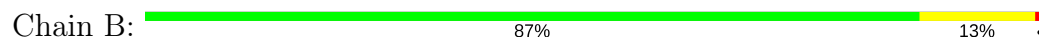
3 Residue-property plots [i](#)

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.

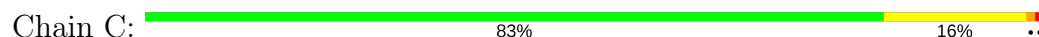
- Molecule 1: Putative 3-epimerase in D-allose pathway



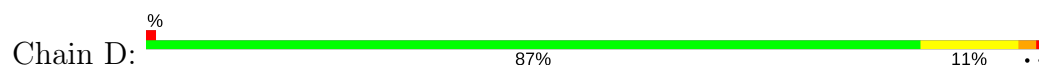
- Molecule 1: Putative 3-epimerase in D-allose pathway



- Molecule 1: Putative 3-epimerase in D-allose pathway



- Molecule 1: Putative 3-epimerase in D-allose pathway



4 Data and refinement statistics

Property	Value	Source
Space group	I 4	Depositor
Cell constants a, b, c, α , β , γ	140.72Å 140.72Å 117.74Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 2.00 37.05 – 2.00	Depositor EDS
% Data completeness (in resolution range)	94.9 (30.00-2.00) 94.9 (37.05-2.00)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.71 (at 2.00Å)	Xtriage
Refinement program	REFMAC 5.5.0109	Depositor
R, R_{free}	0.199 , 0.249 0.201 , 0.250	Depositor DCC
R_{free} test set	3693 reflections (5.30%)	DCC
Wilson B-factor (Å ²)	18.9	Xtriage
Anisotropy	0.109	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 17.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	0.488 for -k,-h,-l	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	6861	wwPDB-VP
Average B, all atoms (Å ²)	23.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.32% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ 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: EDO, 18T

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	0.49	0/1603	1.17	9/2188 (0.4%)
1	B	0.48	0/1603	1.15	10/2189 (0.5%)
1	C	0.45	0/1651	1.11	8/2254 (0.4%)
1	D	0.45	0/1654	1.08	7/2257 (0.3%)
All	All	0.47	0/6511	1.13	34/8888 (0.4%)

There are no bond length outliers.

All (34) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	23[A]	ARG	NE-CZ-NH1	8.20	124.40	120.30
1	C	23[B]	ARG	NE-CZ-NH1	8.20	124.40	120.30
1	C	87	ARG	NE-CZ-NH1	-7.70	116.45	120.30
1	A	34	ARG	NE-CZ-NH1	7.40	124.00	120.30
1	B	34	ARG	NE-CZ-NH1	6.82	123.71	120.30
1	A	166	ARG	NE-CZ-NH1	6.76	123.68	120.30
1	C	167	ASP	CB-CG-OD2	6.70	124.33	118.30
1	D	95	ARG	NE-CZ-NH1	6.61	123.61	120.30
1	B	24	SER	CB-CA-C	-6.57	97.62	110.10
1	D	23[A]	ARG	NE-CZ-NH2	6.42	123.51	120.30
1	D	23[B]	ARG	NE-CZ-NH2	6.42	123.51	120.30
1	D	23[C]	ARG	NE-CZ-NH2	6.42	123.51	120.30
1	A	166	ARG	NE-CZ-NH2	-6.30	117.15	120.30
1	B	87	ARG	NE-CZ-NH1	6.21	123.41	120.30
1	B	95	ARG	NE-CZ-NH1	6.17	123.38	120.30
1	A	76	ARG	NE-CZ-NH2	-6.11	117.24	120.30
1	A	120	LEU	CB-CG-CD2	6.03	121.25	111.00
1	B	57	ARG	NE-CZ-NH2	-5.96	117.32	120.30
1	B	19	ASP	CB-CG-OD1	5.92	123.63	118.30
1	B	57	ARG	NE-CZ-NH1	5.80	123.20	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	196	ARG	NE-CZ-NH1	5.68	123.14	120.30
1	A	140[A]	ARG	NE-CZ-NH1	-5.67	117.46	120.30
1	A	140[B]	ARG	NE-CZ-NH1	-5.67	117.46	120.30
1	A	128	LEU	CB-CG-CD2	5.66	120.62	111.00
1	B	117	ARG	NE-CZ-NH1	5.47	123.04	120.30
1	B	166	ARG	NE-CZ-NH2	-5.45	117.57	120.30
1	C	179	LEU	CA-CB-CG	5.38	127.67	115.30
1	B	140	ARG	NE-CZ-NH1	-5.27	117.66	120.30
1	C	81	ASP	CB-CG-OD1	5.18	122.96	118.30
1	D	120	LEU	CB-CG-CD2	5.17	119.79	111.00
1	C	178	ARG	NE-CZ-NH2	-5.16	117.72	120.30
1	C	117	ARG	NE-CZ-NH2	-5.15	117.72	120.30
1	D	158	ASP	CB-CG-OD1	5.11	122.90	118.30
1	D	105	ARG	NE-CZ-NH2	-5.01	117.79	120.30

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	1560	0	1493	10	0
1	B	1559	0	1488	11	0
1	C	1593	0	1526	17	0
1	D	1596	0	1537	15	0
2	A	8	0	12	0	0
2	B	4	0	6	0	0
2	C	8	0	12	1	0
2	D	8	0	12	0	0
3	A	35	0	24	0	0
3	B	35	0	24	0	0
3	C	35	0	24	0	0
3	D	35	0	24	0	0
4	A	123	0	0	2	0
4	B	99	0	0	2	0
4	C	79	0	0	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	D	84	0	0	1	0
All	All	6861	0	6182	51	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 4.

All (51) 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:23[C]:ARG:NH2	1:D:106:ASN:OD1	2.14	0.80
1:B:70:LYS:HE3	4:B:404:HOH:O	1.87	0.73
1:A:117:ARG:HG2	1:A:117:ARG:O	1.90	0.63
1:B:111:LEU:CD2	1:B:117:ARG:HB3	2.29	0.61
1:C:76:ARG:HD2	1:D:76:ARG:HD2	1.84	0.58
1:C:66:PRO:HA	1:C:191:GLN:NE2	2.19	0.58
1:B:51:SER:HB2	1:B:121:SER:OG	2.05	0.56
1:D:12:GLN:NE2	4:D:403:HOH:O	2.42	0.52
1:C:23[A]:ARG:NH2	4:C:413:HOH:O	2.24	0.52
1:D:90:SER:HB2	1:D:185:TYR:HD1	1.75	0.51
1:C:66:PRO:HA	1:C:191:GLN:HE22	1.76	0.51
1:D:13:GLU:HG2	1:D:105:ARG:NH1	2.25	0.50
1:C:143:SER:HB2	1:C:170:ALA:HB2	1.93	0.49
1:B:88:ILE:CD1	1:B:177:GLU:HG3	2.43	0.49
1:C:59:ILE:O	1:C:143:SER:HA	2.13	0.49
1:A:88:ILE:HD11	1:A:177:GLU:HG3	1.95	0.49
1:D:90:SER:HB2	1:D:185:TYR:CD1	2.47	0.49
4:C:471:HOH:O	1:D:26:GLU:HG2	2.12	0.49
1:A:2:HIS:NE2	4:A:403:HOH:O	2.35	0.48
1:B:165:ASP:OD1	1:C:2[B]:HIS:NE2	2.44	0.48
1:D:1:MET:HB3	1:D:10:TRP:HB3	1.95	0.47
1:C:90:SER:HB2	1:C:185:TYR:CD1	2.49	0.47
1:D:59:ILE:O	1:D:143:SER:HA	2.15	0.47
1:B:111:LEU:HD21	1:B:117:ARG:HB3	1.96	0.46
1:C:5:SER:HB2	1:C:95:ARG:HH11	1.80	0.46
1:C:69:ALA:H	1:C:133:SER:HG	1.61	0.45
1:A:59:ILE:O	1:A:143:SER:HA	2.17	0.45
1:C:60:HIS:O	1:C:116:GLY:HA2	2.17	0.45
1:D:51:SER:HB2	1:D:121:SER:OG	2.16	0.45
1:C:51:SER:HB3	1:C:55:ALA:HB3	1.98	0.45
1:C:143:SER:HB2	1:C:170:ALA:CB	2.47	0.44
1:D:17:HIS:O	1:D:23[A]:ARG:HA	2.17	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:16:ILE:CG2	1:C:23[A]:ARG:HD2	2.47	0.44
1:A:158:ASP:N	1:A:158:ASP:OD1	2.47	0.43
1:C:117:ARG:HD3	1:C:117:ARG:C	2.38	0.43
1:B:136:TYR:CZ	1:B:138:PRO:HG3	2.54	0.43
1:C:33:PHE:HB2	2:C:303:EDO:H11	2.00	0.43
1:B:51:SER:HB3	1:B:55:ALA:HB3	2.01	0.43
1:B:196:ARG:NH1	4:B:427:HOH:O	2.41	0.42
1:A:140[B]:ARG:NE	4:A:462:HOH:O	2.22	0.42
1:A:160:GLU:HA	1:A:161:PRO:HD3	1.89	0.42
1:A:60:HIS:O	1:A:116:GLY:HA2	2.20	0.42
1:D:17:HIS:O	1:D:23[C]:ARG:HA	2.19	0.42
1:A:151:LEU:HD23	1:A:151:LEU:HA	1.92	0.42
1:D:60:HIS:O	1:D:116:GLY:HA2	2.19	0.42
1:D:117:ARG:HD3	1:D:117:ARG:C	2.41	0.41
1:A:1:MET:HA	1:A:12:GLN:HE21	1.85	0.41
1:C:8:GLY:HA2	1:C:10:TRP:CZ3	2.56	0.41
1:B:1:MET:HA	1:B:12:GLN:HE21	1.85	0.41
1:B:82:VAL:O	1:B:117:ARG:HA	2.21	0.40
1:D:51:SER:HB3	1:D:55:ALA:HB3	2.03	0.40

There are no symmetry-related clashes.

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	197/200 (98%)	194 (98%)	3 (2%)	0	100	100
1	B	197/200 (98%)	195 (99%)	2 (1%)	0	100	100
1	C	202/200 (101%)	198 (98%)	4 (2%)	0	100	100
1	D	202/200 (101%)	197 (98%)	5 (2%)	0	100	100
All	All	798/800 (100%)	784 (98%)	14 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	163/164 (99%)	158 (97%)	5 (3%)	45	44
1	B	163/164 (99%)	159 (98%)	4 (2%)	53	54
1	C	168/164 (102%)	156 (93%)	12 (7%)	17	11
1	D	167/164 (102%)	158 (95%)	9 (5%)	26	20
All	All	661/656 (101%)	631 (96%)	30 (4%)	35	27

All (30) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	117	ARG
1	A	120	LEU
1	A	159	ILE
1	A	166	ARG
1	A	198	GLU
1	B	104	GLU
1	B	117	ARG
1	B	120	LEU
1	B	151	LEU
1	C	13	GLU
1	C	23[A]	ARG
1	C	23[B]	ARG
1	C	90	SER
1	C	117	ARG
1	C	120	LEU
1	C	140	ARG
1	C	143	SER
1	C	151	LEU
1	C	166	ARG
1	C	197	LEU
1	C	198	GLU
1	D	23[A]	ARG

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Mol	Chain	Res	Type
1	D	23[B]	ARG
1	D	23[C]	ARG
1	D	90	SER
1	D	117	ARG
1	D	120	LEU
1	D	151	LEU
1	D	190	GLU
1	D	200	HIS

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

Mol	Chain	Res	Type
1	A	12	GLN
1	B	12	GLN
1	C	25	HIS
1	C	191	GLN
1	D	12	GLN

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](#)

11 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 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	EDO	A	301	-	3,3,3	0.52	0	2,2,2	0.78	0
2	EDO	A	302	-	3,3,3	0.55	0	2,2,2	0.48	0
3	18T	A	303	-	29,37,37	0.65	0	41,57,57	1.90	9 (21%)
3	18T	B	301	-	29,37,37	0.68	0	41,57,57	2.08	8 (19%)
2	EDO	B	302	-	3,3,3	0.58	0	2,2,2	0.58	0
2	EDO	C	301	-	3,3,3	0.48	0	2,2,2	0.78	0
3	18T	C	302	-	29,37,37	0.64	0	41,57,57	2.24	9 (21%)
2	EDO	C	303	-	3,3,3	0.56	0	2,2,2	0.38	0
2	EDO	D	301	-	3,3,3	0.56	0	2,2,2	0.40	0
2	EDO	D	302	-	3,3,3	0.54	0	2,2,2	0.68	0
3	18T	D	303	-	29,37,37	0.63	0	41,57,57	2.19	10 (24%)

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	EDO	A	301	-	-	0/1/1/1	0/0/0/0
2	EDO	A	302	-	-	0/1/1/1	0/0/0/0
3	18T	A	303	-	-	0/17/53/53	0/3/3/3
3	18T	B	301	-	-	0/17/53/53	0/3/3/3
2	EDO	B	302	-	-	0/1/1/1	0/0/0/0
2	EDO	C	301	-	-	0/1/1/1	0/0/0/0
3	18T	C	302	-	-	0/17/53/53	0/3/3/3
2	EDO	C	303	-	-	0/1/1/1	0/0/0/0
2	EDO	D	301	-	-	0/1/1/1	0/0/0/0
2	EDO	D	302	-	-	0/1/1/1	0/0/0/0
3	18T	D	303	-	-	0/17/53/53	0/3/3/3

There are no bond length outliers.

All (36) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	302	18T	C51-C41-N31	-7.45	117.03	125.24
3	B	301	18T	C51-C41-N31	-7.13	117.37	125.24
3	D	303	18T	C51-C41-N31	-6.41	118.17	125.24
3	D	303	18T	OPP-P2-O1	-5.65	91.95	102.05

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	302	18T	OPP-P2-O1	-5.62	92.01	102.05
3	A	303	18T	C51-C41-N31	-5.15	119.56	125.24
3	B	301	18T	OPP-P2-O1	-4.56	93.90	102.05
3	D	303	18T	O5-C1-O1	-4.46	105.53	111.36
3	A	303	18T	OPP-P2-O1	-4.11	94.70	102.05
3	C	302	18T	O5-C1-O1	-3.43	106.88	111.36
3	A	303	18T	O4,-C1,-N11	-3.42	102.02	107.78
3	B	301	18T	O4,-C1,-N11	-3.23	102.34	107.78
3	A	303	18T	C4-C3-C2	-2.74	106.01	110.84
3	B	301	18T	O3-C3-C4	-2.56	104.78	110.36
3	A	303	18T	C51-C61-N11	-2.10	119.88	122.15
3	C	302	18T	O3P-P2-O1	2.01	114.56	106.49
3	A	303	18T	C2,-C3,-C4,	2.05	107.10	102.73
3	A	303	18T	C5A-C51-C61	2.05	122.77	118.67
3	B	301	18T	O1P-P-O5,	2.06	117.87	108.14
3	C	302	18T	C5A-C51-C41	2.08	122.57	120.17
3	D	303	18T	O1P-P-O2P	2.32	124.30	112.28
3	C	302	18T	C1-C2-C3	2.32	114.30	109.98
3	A	303	18T	O1P-P-O5,	2.34	119.20	108.14
3	D	303	18T	O5-C5-C4	2.35	113.49	109.62
3	D	303	18T	C1-C2-C3	2.55	114.71	109.98
3	C	302	18T	O1-C1-C2	2.58	113.10	108.38
3	B	301	18T	C4,-O4,-C1,	2.67	115.95	109.42
3	D	303	18T	O4-C4-C3	2.68	116.20	110.36
3	D	303	18T	O1-C1-C2	2.96	113.81	108.38
3	C	302	18T	O5-C5-C6	3.23	113.53	106.69
3	B	301	18T	C2,-C1,-N11	3.33	122.11	114.23
3	D	303	18T	O5-C5-C6	3.71	114.54	106.69
3	B	301	18T	C41-N31-C21	5.33	119.82	115.16
3	A	303	18T	C41-N31-C21	5.59	120.04	115.16
3	D	303	18T	C41-N31-C21	5.84	120.27	115.16
3	C	302	18T	C41-N31-C21	6.95	121.24	115.16

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	303	EDO	1	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	198/200 (99%)	-0.77	1 (0%) 90 90	7, 19, 36, 52	0
1	B	199/200 (99%)	-0.76	0 100 100	9, 19, 35, 56	0
1	C	200/200 (100%)	-0.69	0 100 100	11, 23, 43, 65	0
1	D	200/200 (100%)	-0.67	1 (0%) 90 90	11, 24, 42, 66	0
All	All	797/800 (99%)	-0.72	2 (0%) 93 93	7, 21, 40, 66	0

All (2) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	197	LEU	2.7
1	D	200	HIS	2.1

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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(\AA^2)	Q<0.9
3	18T	C	302	35/35	0.98	0.08	0.24	18,24,29,29	0
2	EDO	B	302	4/4	0.95	0.08	0.08	16,17,20,21	0
3	18T	B	301	35/35	0.99	0.08	0.05	12,16,21,22	0
3	18T	A	303	35/35	0.99	0.07	-0.45	17,21,25,27	0
2	EDO	A	302	4/4	0.96	0.07	-0.53	18,20,21,21	0
2	EDO	C	301	4/4	0.99	0.08	-0.53	12,16,20,25	0
3	18T	D	303	35/35	0.98	0.07	-0.58	18,23,26,30	0
2	EDO	A	301	4/4	0.98	0.07	-0.83	16,18,21,23	0
2	EDO	D	302	4/4	0.99	0.07	-1.00	11,15,17,23	0
2	EDO	D	301	4/4	0.98	0.06	-1.25	20,22,22,23	0
2	EDO	C	303	4/4	0.98	0.06	-1.33	20,21,22,23	0

6.5 Other polymers [i](#)

There are no such residues in this entry.