



# wwPDB X-ray Structure Validation Summary Report ⓘ

Feb 1, 2016 – 07:50 AM GMT

PDB ID : 3CAY  
Title : Crystal structure of Lipopeptide Detergent (LPD-12)  
Authors : Ho, D.N.; Pomroy, N.C.; Cuesta-Seijo, J.A.; Prive, G.G.  
Deposited on : 2008-02-20  
Resolution : 1.20 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.  
We welcome your comments at [validation@mail.wwpdb.org](mailto: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.

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

MolProbity : 4.02b-467  
Mogul : 1.7 (RC4), CSD as536be (2015)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20026688  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
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) : trunk26865

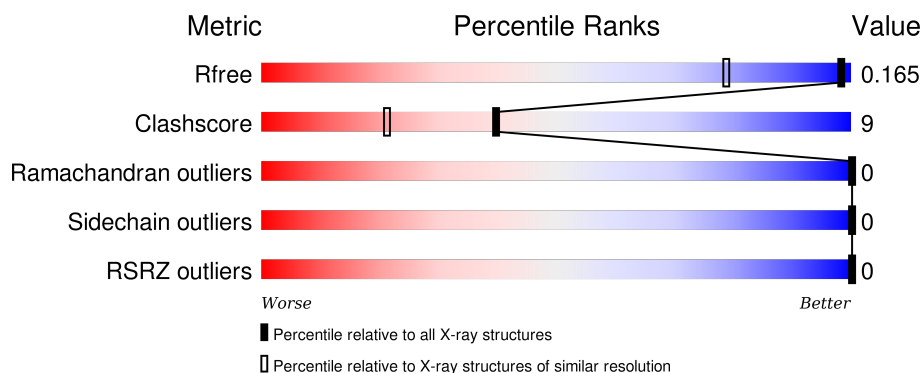
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 1.20 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.





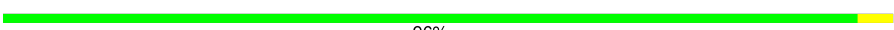

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	91344	1495 (1.26-1.14)
Clashscore	102246	1607 (1.26-1.14)
Ramachandran outliers	100387	1540 (1.26-1.14)
Sidechain outliers	100360	1538 (1.26-1.14)
RSRZ outliers	91569	1500 (1.26-1.14)

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  $\geq 3$ , 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	27	<div> <div>93%</div> <div>7%</div> </div>
1	B	27	<div> <div>81%</div> <div>19%</div> </div>
1	C	27	<div> <div>85%</div> <div>15%</div> </div>
1	D	27	<div> <div>93%</div> <div>7%</div> </div>
1	E	27	<div> <div>93%</div> <div>7%</div> </div>

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Mol	Chain	Length	Quality of chain
1	F	27	 93% 7%
1	G	27	 93% 7%
1	H	27	 89% 11%
1	I	27	 96% .
1	J	27	 89% 11%
1	K	27	 85% 15%
1	L	27	 96% .

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	LMT	B	502	-	-	-	X
2	LMT	B	504	-	-	-	X
2	LMT	C	503	-	-	-	X
2	LMT	C	505	-	-	-	X
2	LMT	C	511	-	-	-	X
2	LMT	E	507	-	-	-	X
2	LMT	F	509	-	-	-	X
2	LMT	G	508	-	-	-	X
2	LMT	G	510	-	-	-	X
2	LMT	H	501	-	-	-	X
2	LMT	I	514	-	-	-	X
2	LMT	I	515	-	-	-	X
2	LMT	K	519	-	-	-	X
2	LMT	L	521	-	-	-	X

## 2 Entry composition

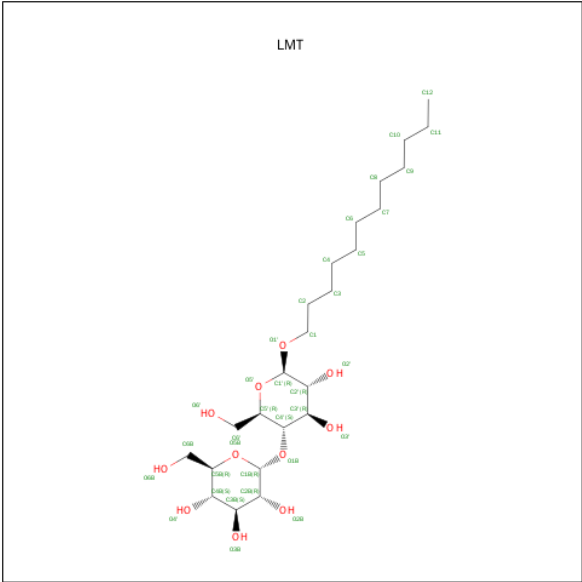
There are 3 unique types of molecules in this entry. The entry contains 3170 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 LPD-12.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
1	A	27	Total	C	N	O	0	0	1
			198	129	32	37			
1	B	27	Total	C	N	O	0	0	1
			200	131	32	37			
1	C	27	Total	C	N	O	0	0	1
			197	128	32	37			
1	D	27	Total	C	N	O	0	1	1
			204	133	33	38			
1	E	27	Total	C	N	O	0	1	1
			196	126	33	37			
1	F	27	Total	C	N	O	0	0	1
			198	129	32	37			
1	G	27	Total	C	N	O	0	0	1
			196	127	32	37			
1	H	27	Total	C	N	O	0	1	1
			205	135	33	37			
1	I	27	Total	C	N	O	0	0	1
			196	127	32	37			
1	J	27	Total	C	N	O	0	1	1
			212	141	33	38			
1	K	27	Total	C	N	O	0	0	1
			199	130	32	37			
1	L	27	Total	C	N	O	0	0	1
			198	129	32	37			

- Molecule 2 is DODECYL-BETA-D-MALTOSIDE (three-letter code: LMT) (formula:  $C_{24}H_{46}O_{11}$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			35	24	11		
2	B	1	Total	C	O	0	0
			13	12	1		
2	B	1	Total	C	O	0	0
			24	18	6		
2	C	1	Total	C	O	0	0
			19	13	6		
2	C	1	Total	C	O	0	0
			13	12	1		
2	C	1	Total	C		0	0
			12	12			
2	D	1	Total	C		0	0
			7	7			
2	E	1	Total	C		0	0
			7	7			
2	F	1	Total	C		0	0
			11	11			
2	G	1	Total	C	O	0	0
			24	18	6		
2	G	1	Total	C		0	0
			10	10			
2	H	1	Total	C	O	0	0
			35	24	11		
2	I	1	Total	C	O	0	0
			23	17	6		
2	I	1	Total	C	O	0	0
			19	13	6		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	J	1	Total C 9 9	0	0
2	K	1	Total C 10 10	0	0
2	K	1	Total C 8 8	0	0
2	K	1	Total C O 13 12 1	0	0
2	K	1	Total C 10 10	0	0
2	L	1	Total C 8 8	0	0
2	L	1	Total C O 23 18 5	0	0
2	L	1	Total C O 26 15 11	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	36	Total O 36 36	0	0
3	B	41	Total O 41 41	0	0
3	C	29	Total O 29 29	0	0
3	D	23	Total O 23 23	0	0
3	E	35	Total O 35 35	0	0
3	F	34	Total O 34 34	0	0
3	G	37	Total O 37 37	0	0
3	H	44	Total O 44 44	0	0
3	I	32	Total O 32 32	0	0
3	J	41	Total O 41 41	0	0
3	K	33	Total O 33 33	0	0

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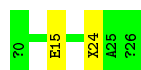
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	L	27	Total	O	0	0
			27	27		

### 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 errors 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: LPD-12

Chain A: 




- Molecule 1: LPD-12

Chain B: 



- Molecule 1: LPD-12

Chain C: 



- Molecule 1: LPD-12

Chain D: 



- Molecule 1: LPD-12

Chain E: 



- Molecule 1: LPD-12

Chain F: 






## ● Molecule 1: LPD-12

Chain G:  93% 7%


## ● Molecule 1: LPD-12

Chain H:  89% 11%


## ● Molecule 1: LPD-12

Chain I:  96% .

## ● Molecule 1: LPD-12

Chain J:  89% 11%

## ● Molecule 1: LPD-12

Chain K:  85% 15%

## ● Molecule 1: LPD-12

Chain L:  96% .

## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	72.48 Å   130.04 Å   42.81 Å 90.00°   90.00°   90.00°	Depositor
Resolution (Å)	10.00 – 1.20 48.40 – 1.20	Depositor EDS
% Data completeness (in resolution range)	(Not available) (10.00-1.20) 95.4 (48.40-1.20)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.04	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.61 (at 1.20 Å)	Xtriage
Refinement program	SHELXL-97	Depositor
R, $R_{free}$	0.134   ,   0.172 0.141   ,   0.165	Depositor DCC
$R_{free}$ test set	6284 reflections (5.46%)	DCC
Wilson B-factor (Å <sup>2</sup> )	9.9	Xtriage
Anisotropy	0.487	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 67.3	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtriage
Outliers	0 of 125798 reflections	Xtriage
$F_o, F_c$ correlation	0.97	EDS
Total number of atoms	3170	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	19.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 9.44% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.375 respectively for untwinned datasets, and 0.333, 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: LMT, O12, ACE, NH2

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	0.68	0/153	1.03	2/201 (1.0%)
1	B	0.77	0/153	0.89	0/201
1	C	0.81	0/153	1.06	1/201 (0.5%)
1	D	0.77	0/153	0.98	0/201
1	E	0.75	0/162	1.04	1/212 (0.5%)
1	F	0.65	0/153	0.98	0/201
1	G	0.74	0/153	0.90	0/201
1	H	0.82	0/162	1.09	2/212 (0.9%)
1	I	0.74	0/153	1.02	1/201 (0.5%)
1	J	0.73	0/153	0.90	0/201
1	K	0.66	0/153	0.82	0/201
1	L	0.66	0/153	0.81	0/201
All	All	0.74	0/1854	0.96	7/2434 (0.3%)

There are no bond length outliers.

The worst 5 of 7 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	15	GLU	OE1-CD-OE2	7.05	131.75	123.30
1	H	15	GLU	OE1-CD-OE2	6.63	131.25	123.30
1	A	15	GLU	CG-CD-OE2	-6.10	106.10	118.30
1	H	15	GLU	CG-CD-OE2	-6.06	106.17	118.30
1	I	8	LYS	CD-CE-NZ	5.95	125.38	111.70

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	198	0	215	4	0
1	B	200	0	222	7	0
1	C	197	0	210	5	0
1	D	204	0	219	9	0
1	E	196	0	208	2	0
1	F	198	0	215	4	0
1	G	196	0	208	3	0
1	H	205	0	230	5	0
1	I	196	0	211	0	0
1	J	212	0	239	5	0
1	K	199	0	217	7	0
1	L	198	0	212	3	0
2	A	35	0	46	0	0
2	B	37	0	60	10	0
2	C	44	0	65	5	0
2	D	7	0	10	3	0
2	E	7	0	10	0	0
2	F	11	0	18	0	0
2	G	34	0	54	2	0
2	H	35	0	46	0	0
2	I	42	0	52	0	0
2	J	9	0	17	2	0
2	K	41	0	72	11	0
2	L	57	0	74	4	0
3	A	36	0	0	1	0
3	B	41	0	0	1	0
3	C	29	0	0	0	0
3	D	23	0	0	0	0
3	E	35	0	0	1	0
3	F	34	0	0	1	0
3	G	37	0	0	0	0
3	H	44	0	0	0	0
3	I	32	0	0	0	0
3	J	41	0	0	0	0
3	K	33	0	0	1	0
3	L	27	0	0	0	0
All	All	3170	0	3130	52	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 9.

The worst 5 of 52 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)
2:G:508:LMT:H61	2:G:510:LMT:H92	1.45	0.98
2:B:502:LMT:H112	2:B:504:LMT:H121	1.59	0.83
1:F:2:O12:H9A	1:H:2:O12:H10	1.65	0.78
2:K:517:LMT:H123	2:K:520:LMT:H92	1.65	0.78
1:J:16:ALA:O	1:J:24[B]:O12:H12B	1.88	0.74

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	23/27 (85%)	23 (100%)	0	0	100	100
1	B	23/27 (85%)	23 (100%)	0	0	100	100
1	C	23/27 (85%)	23 (100%)	0	0	100	100
1	D	23/27 (85%)	23 (100%)	0	0	100	100
1	E	24/27 (89%)	24 (100%)	0	0	100	100
1	F	23/27 (85%)	23 (100%)	0	0	100	100
1	G	23/27 (85%)	23 (100%)	0	0	100	100
1	H	24/27 (89%)	24 (100%)	0	0	100	100
1	I	23/27 (85%)	23 (100%)	0	0	100	100
1	J	23/27 (85%)	23 (100%)	0	0	100	100
1	K	23/27 (85%)	23 (100%)	0	0	100	100
1	L	23/27 (85%)	23 (100%)	0	0	100	100
All	All	278/324 (86%)	278 (100%)	0	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	9/9 (100%)	9 (100%)	0	100	100
1	B	9/9 (100%)	9 (100%)	0	100	100
1	C	9/9 (100%)	9 (100%)	0	100	100
1	D	9/9 (100%)	9 (100%)	0	100	100
1	E	10/9 (111%)	10 (100%)	0	100	100
1	F	9/9 (100%)	9 (100%)	0	100	100
1	G	9/9 (100%)	9 (100%)	0	100	100
1	H	10/9 (111%)	10 (100%)	0	100	100
1	I	9/9 (100%)	9 (100%)	0	100	100
1	J	9/9 (100%)	9 (100%)	0	100	100
1	K	9/9 (100%)	9 (100%)	0	100	100
1	L	9/9 (100%)	9 (100%)	0	100	100
All	All	110/108 (102%)	110 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

26 non-standard protein/DNA/RNA residues 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$
1	O12	A	2	1	17,18,21	0.53	0	17,19,23	0.68	0
1	O12	A	24	1	19,20,21	0.93	1 (5%)	19,21,23	2.02	5 (26%)
1	O12	B	2	1	19,20,21	0.61	0	19,21,23	1.50	4 (21%)
1	O12	B	24	1	19,20,21	0.67	0	19,21,23	1.44	3 (15%)
1	O12	C	2	1	18,19,21	0.57	0	18,20,23	1.23	3 (16%)
1	O12	C	24	1	17,18,21	0.75	0	17,19,23	1.17	1 (5%)
1	O12	D	2[A]	-	12,13,21	0.75	0	12,14,23	1.99	4 (33%)
1	O12	D	2[B]	-	12,13,21	0.56	0	12,14,23	1.48	1 (8%)
1	O12	D	24	1	19,20,21	0.86	1 (5%)	19,21,23	2.20	6 (31%)
1	O12	E	2	1	11,12,21	0.68	0	11,13,23	1.84	2 (18%)
1	O12	E	24	1	17,18,21	0.50	0	17,19,23	1.07	1 (5%)
1	O12	F	2	1	17,18,21	0.73	0	17,19,23	1.97	4 (23%)
1	O12	F	24	1	19,20,21	0.71	0	19,21,23	1.04	2 (10%)
1	O12	G	2	1	16,17,21	0.74	1 (6%)	16,18,23	1.08	2 (12%)
1	O12	G	24	1	18,19,21	0.55	0	18,20,23	0.78	0
1	O12	H	2	1	19,20,21	0.60	0	19,21,23	0.86	0
1	O12	H	24	1	18,19,21	0.73	0	18,20,23	1.35	3 (16%)
1	O12	I	2	1	15,16,21	0.57	0	15,17,23	0.99	1 (6%)
1	O12	I	24	1	19,20,21	0.54	0	19,21,23	0.93	1 (5%)
1	O12	J	2	1	13,14,21	0.67	0	13,15,23	2.02	4 (30%)
1	O12	J	24[A]	-	19,20,21	0.44	0	19,21,23	0.87	0
1	O12	J	24[B]	-	19,20,21	0.48	0	19,21,23	1.11	2 (10%)
1	O12	K	2	1	19,20,21	0.49	0	19,21,23	1.13	2 (10%)
1	O12	K	24	1	18,19,21	0.46	0	18,20,23	0.82	0
1	O12	L	2	1	18,19,21	1.14	1 (5%)	18,20,23	1.49	4 (22%)
1	O12	L	24	1	18,19,21	0.49	0	18,20,23	0.99	1 (5%)

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
1	O12	A	2	1	-	0/16/18/22	0/0/0/0
1	O12	A	24	1	-	0/18/20/22	0/0/0/0
1	O12	B	2	1	-	0/18/20/22	0/0/0/0
1	O12	B	24	1	-	0/18/20/22	0/0/0/0
1	O12	C	2	1	-	0/17/19/22	0/0/0/0
1	O12	C	24	1	-	0/16/18/22	0/0/0/0
1	O12	D	2[A]	-	-	0/11/13/22	0/0/0/0
1	O12	D	2[B]	-	-	0/11/13/22	0/0/0/0
1	O12	D	24	1	-	0/18/20/22	0/0/0/0
1	O12	E	2	1	-	0/10/12/22	0/0/0/0
1	O12	E	24	1	-	0/16/18/22	0/0/0/0
1	O12	F	2	1	-	0/16/18/22	0/0/0/0
1	O12	F	24	1	-	0/18/20/22	0/0/0/0
1	O12	G	2	1	-	0/15/17/22	0/0/0/0
1	O12	G	24	1	-	0/17/19/22	0/0/0/0
1	O12	H	2	1	-	0/18/20/22	0/0/0/0
1	O12	H	24	1	-	0/17/19/22	0/0/0/0
1	O12	I	2	1	-	0/14/16/22	0/0/0/0
1	O12	I	24	1	-	0/18/20/22	0/0/0/0
1	O12	J	2	1	-	0/12/14/22	0/0/0/0
1	O12	J	24[A]	-	-	0/18/20/22	0/0/0/0
1	O12	J	24[B]	-	-	0/18/20/22	0/0/0/0
1	O12	K	2	1	-	0/18/20/22	0/0/0/0
1	O12	K	24	1	-	0/17/19/22	0/0/0/0
1	O12	L	2	1	-	0/17/19/22	0/0/0/0
1	O12	L	24	1	-	0/17/19/22	0/0/0/0

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	L	2	O12	CB-CA	-4.18	1.49	1.53
1	G	2	O12	CB-CA	-2.43	1.51	1.53
1	D	24	O12	O1-C1	2.34	1.28	1.23
1	A	24	O12	O1-C1	2.90	1.29	1.23

The worst 5 of 56 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	24	O12	C2-C1-NE	-6.17	105.73	116.46
1	F	2	O12	CD-NE-C1	-4.90	113.16	122.79
1	E	2	O12	O1-C1-C2	-4.58	114.08	121.98

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	2[A]	O12	C2-C1-NE	-4.44	108.75	116.46
1	D	24	O12	C2-C1-NE	-4.39	108.84	116.46

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

16 monomers are involved in 29 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	24	O12	4	0
1	B	2	O12	2	0
1	C	2	O12	2	0
1	C	24	O12	1	0
1	D	2[A]	O12	4	0
1	D	2[B]	O12	2	0
1	D	24	O12	3	0
1	E	2	O12	2	0
1	F	2	O12	3	0
1	G	2	O12	1	0
1	G	24	O12	2	0
1	H	2	O12	4	0
1	J	24[A]	O12	3	0
1	J	24[B]	O12	2	0
1	K	2	O12	3	0
1	L	24	O12	3	0

## 5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

22 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	LMT	A	512	-	36,36,36	0.63	0	47,47,47	0.90	1 (2%)
2	LMT	B	502	-	12,12,36	0.42	0	11,11,47	1.19	2 (18%)
2	LMT	B	504	-	24,24,36	0.46	0	29,29,47	1.44	2 (6%)
2	LMT	C	503	-	19,19,36	0.85	1 (5%)	24,24,47	2.52	6 (25%)
2	LMT	C	505	-	12,12,36	0.42	0	11,11,47	0.61	0
2	LMT	C	511	-	11,11,36	0.31	0	10,10,47	0.60	0
2	LMT	D	506	-	6,6,36	0.32	0	5,5,47	0.22	0
2	LMT	E	507	-	6,6,36	0.35	0	5,5,47	0.66	0
2	LMT	F	509	-	10,10,36	0.32	0	9,9,47	0.44	0
2	LMT	G	508	-	24,24,36	0.55	0	29,29,47	2.91	7 (24%)
2	LMT	G	510	-	9,9,36	0.33	0	8,8,47	0.44	0
2	LMT	H	501	-	36,36,36	0.88	1 (2%)	47,47,47	1.40	6 (12%)
2	LMT	I	514	-	23,23,36	0.54	0	28,28,47	1.40	4 (14%)
2	LMT	I	515	-	19,19,36	0.87	1 (5%)	24,24,47	1.22	2 (8%)
2	LMT	J	516	-	8,8,36	0.32	0	7,7,47	0.38	0
2	LMT	K	517	-	9,9,36	0.32	0	8,8,47	0.52	0
2	LMT	K	518	-	7,7,36	0.39	0	6,6,47	0.30	0
2	LMT	K	519	-	12,12,36	0.35	0	11,11,47	0.77	0
2	LMT	K	520	-	9,9,36	0.37	0	8,8,47	0.48	0
2	LMT	L	513	-	7,7,36	0.29	0	6,6,47	0.52	0
2	LMT	L	521	-	23,23,36	0.62	0	27,27,47	2.60	9 (33%)
2	LMT	L	522	-	27,27,36	0.89	1 (3%)	38,38,47	1.53	7 (18%)

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	LMT	A	512	-	-	0/21/61/61	0/2/2/2
2	LMT	B	502	-	-	0/10/10/61	0/0/0/2
2	LMT	B	504	-	-	0/15/35/61	0/1/1/2
2	LMT	C	503	-	-	0/10/30/61	0/1/1/2
2	LMT	C	505	-	-	0/10/10/61	0/0/0/2
2	LMT	C	511	-	-	0/9/9/61	0/0/0/2
2	LMT	D	506	-	-	0/4/4/61	0/0/0/2
2	LMT	E	507	-	-	0/4/4/61	0/0/0/2
2	LMT	F	509	-	-	0/8/8/61	0/0/0/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	LMT	G	508	-	-	0/15/35/61	0/1/1/2
2	LMT	G	510	-	-	0/7/7/61	0/0/0/2
2	LMT	H	501	-	-	0/21/61/61	0/2/2/2
2	LMT	I	514	-	-	0/14/34/61	0/1/1/2
2	LMT	I	515	-	-	0/10/30/61	0/1/1/2
2	LMT	J	516	-	-	0/6/6/61	0/0/0/2
2	LMT	K	517	-	-	0/7/7/61	0/0/0/2
2	LMT	K	518	-	-	0/5/5/61	0/0/0/2
2	LMT	K	519	-	-	0/10/10/61	0/0/0/2
2	LMT	K	520	-	-	0/7/7/61	0/0/0/2
2	LMT	L	513	-	-	0/5/5/61	0/0/0/2
2	LMT	L	521	-	-	0/15/31/61	0/1/1/2
2	LMT	L	522	-	-	0/12/52/61	0/2/2/2

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	I	515	LMT	O1'-C1'	2.90	1.45	1.40
2	C	503	LMT	O1'-C1'	2.95	1.45	1.40
2	H	501	LMT	O1'-C1'	3.11	1.45	1.40
2	L	522	LMT	O1'-C1'	3.38	1.46	1.40

The worst 5 of 46 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	L	521	LMT	C1'-O5'-C5'	-7.47	105.63	113.15
2	C	503	LMT	C1-O1'-C1'	-5.83	103.75	113.94
2	L	521	LMT	O5'-C1'-C2'	-4.82	100.39	110.28
2	I	514	LMT	C1-O1'-C1'	-4.69	105.75	113.94
2	H	501	LMT	O5'-C1'-C2'	-4.39	101.26	110.28

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

13 monomers are involved in 29 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	502	LMT	2	0
2	B	504	LMT	9	0
2	C	503	LMT	3	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	505	LMT	2	0
2	D	506	LMT	3	0
2	G	508	LMT	2	0
2	G	510	LMT	2	0
2	J	516	LMT	2	0
2	K	517	LMT	7	0
2	K	518	LMT	2	0
2	K	520	LMT	4	0
2	L	521	LMT	3	0
2	L	522	LMT	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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	23/27 (85%)	-0.34	0 100 100	7, 9, 14, 20	0
1	B	23/27 (85%)	-0.39	0 100 100	8, 11, 21, 27	0
1	C	23/27 (85%)	-0.41	0 100 100	8, 10, 17, 24	0
1	D	23/27 (85%)	-0.33	0 100 100	8, 11, 20, 23	0
1	E	23/27 (85%)	-0.27	0 100 100	9, 11, 19, 25	0
1	F	23/27 (85%)	-0.40	0 100 100	9, 11, 19, 23	0
1	G	23/27 (85%)	-0.31	0 100 100	8, 11, 23, 24	0
1	H	23/27 (85%)	-0.40	0 100 100	7, 8, 16, 20	0
1	I	23/27 (85%)	-0.43	0 100 100	9, 11, 16, 25	0
1	J	23/27 (85%)	-0.37	0 100 100	8, 10, 17, 22	0
1	K	23/27 (85%)	-0.42	0 100 100	9, 10, 17, 20	0
1	L	23/27 (85%)	-0.46	0 100 100	9, 11, 18, 23	0
All	All	276/324 (85%)	-0.38	0 100 100	7, 11, 22, 27	0

There are no RSRZ outliers to report.

### 6.2 Non-standard residues in protein, DNA, RNA chains [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, 95<sup>th</sup> 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(Å <sup>2</sup> )	Q<0.9
1	O12	J	24[B]	21/22	0.93	0.14	-	12,21,33,36	18

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
1	O12	K	2	21/22	0.96	0.10	-	10,18,37,40	0
1	O12	L	24	20/22	0.97	0.09	-	10,16,45,49	0
1	O12	K	24	20/22	0.97	0.09	-	10,23,46,49	0
1	O12	C	2	20/22	0.95	0.11	-	9,29,45,46	0
1	O12	D	24	21/22	0.90	0.11	-	15,29,36,42	0
1	O12	H	2	21/22	0.98	0.10	-	7,15,59,60	0
1	O12	D	2[A]	14/22	0.95	0.14	-	9,17,26,28	11
1	O12	H	24	20/22	0.97	0.08	-	10,26,32,33	0
1	O12	D	2[B]	14/22	0.95	0.14	-	9,16,24,26	11
1	O12	B	24	21/22	0.98	0.07	-	12,16,23,30	0
1	O12	J	2	15/22	0.94	0.15	-	10,35,45,61	0
1	O12	G	24	20/22	0.97	0.07	-	11,15,36,44	0
1	O12	A	2	19/22	0.98	0.07	-	7,9,34,41	0
1	O12	F	24	21/22	0.93	0.13	-	10,35,56,59	0
1	O12	E	24	19/22	0.94	0.10	-	14,21,44,46	0
1	O12	A	24	21/22	0.94	0.12	-	10,36,48,49	0
1	O12	L	2	20/22	0.94	0.11	-	12,34,39,42	0
1	O12	B	2	21/22	0.93	0.11	-	12,35,40,42	0
1	O12	I	2	17/22	0.98	0.07	-	9,13,30,39	0
1	O12	G	2	18/22	0.94	0.12	-	11,43,54,54	0
1	O12	E	2	13/22	0.95	0.15	-	13,32,56,71	0
1	O12	I	24	21/22	0.97	0.09	-	11,14,43,44	0
1	O12	C	24	19/22	0.97	0.08	-	12,19,39,44	0
1	O12	F	2	19/22	0.94	0.10	-	12,25,44,64	0
1	O12	J	24[A]	21/22	0.93	0.14	-	12,23,30,35	18

## 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, 95<sup>th</sup> 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( $\text{\AA}^2$ )	Q<0.9
2	LMT	B	504	24/35	0.75	0.30	20.45	35,54,77,85	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
2	LMT	C	511	12/35	0.91	0.15	18.03	25,35,41,53	0
2	LMT	C	503	19/35	0.74	0.25	13.93	28,50,65,69	0
2	LMT	I	514	23/35	0.74	0.17	12.14	38,46,52,57	0
2	LMT	B	502	13/35	0.85	0.15	9.14	23,31,43,56	0
2	LMT	L	521	23/35	0.84	0.16	9.00	26,38,45,63	0
2	LMT	I	515	19/35	0.83	0.14	7.74	29,33,46,54	0
2	LMT	K	519	13/35	0.92	0.10	7.16	27,29,34,50	0
2	LMT	G	508	24/35	0.74	0.27	6.87	36,63,71,73	0
2	LMT	C	505	13/35	0.84	0.13	6.26	25,37,52,62	0
2	LMT	H	501	35/35	0.92	0.12	5.55	12,15,17,26	0
2	LMT	F	509	11/35	0.67	0.18	5.15	38,40,45,47	0
2	LMT	E	507	7/35	0.85	0.15	2.71	21,23,33,38	0
2	LMT	G	510	10/35	0.92	0.12	2.31	40,43,47,50	0
2	LMT	A	512	35/35	0.97	0.07	0.03	11,12,15,23	0
2	LMT	L	522	26/35	0.83	0.22	-	18,31,62,66	0
2	LMT	K	520	10/35	0.76	0.18	-	41,50,54,58	0
2	LMT	D	506	7/35	0.81	0.15	-	33,49,50,51	0
2	LMT	L	513	8/35	0.61	0.27	-	64,65,68,69	0
2	LMT	J	516	9/35	0.92	0.10	-	29,34,40,46	0
2	LMT	K	517	10/35	0.73	0.19	-	48,52,57,66	0
2	LMT	K	518	8/35	0.70	0.18	-	35,42,47,54	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.