



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 20, 2018 – 10:56 pm GMT

PDB ID : 2DXY  
Title : Structure of the complex of C-terminal lobe of bovine lactoferrin with trehalose at 2.0 Å resolution  
Authors : Mir, R.; Singh, N.; Sinha, M.; Sharma, S.; Bhushan, A.; Singh, T.P.  
Deposited on : 2006-09-03  
Resolution : 2.03 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](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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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 : 1.7.3 (157068), CSD as539be (2018)  
Xtrriage (Phenix) : **NOT EXECUTED**  
EDS : **NOT EXECUTED**  
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : trunk30686

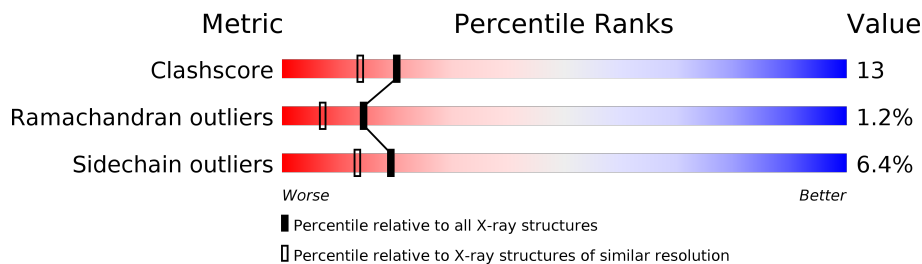
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.03 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	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	122078	10352 (2.04-2.00)
Ramachandran outliers	120005	10234 (2.04-2.00)
Sidechain outliers	119972	10233 (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 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.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	345	 77% 19% ..

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
9	TRE	A	1151	X	X	-	-

## 2 Entry composition [i](#)

There are 10 unique types of molecules in this entry. The entry contains 3034 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.

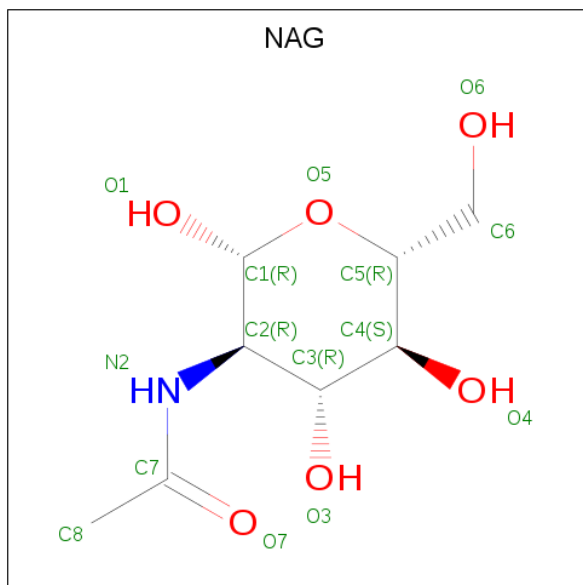
- Molecule 1 is a protein called Lactotransferrin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	341	2605	1622	454	508	21	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	565	LYS	ASN	SEE REMARK 999	UNP P24627
A	608	GLU	LYS	SEE REMARK 999	UNP P24627

- Molecule 2 is N-ACETYL-D-GLUCOSAMINE (three-letter code: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>).



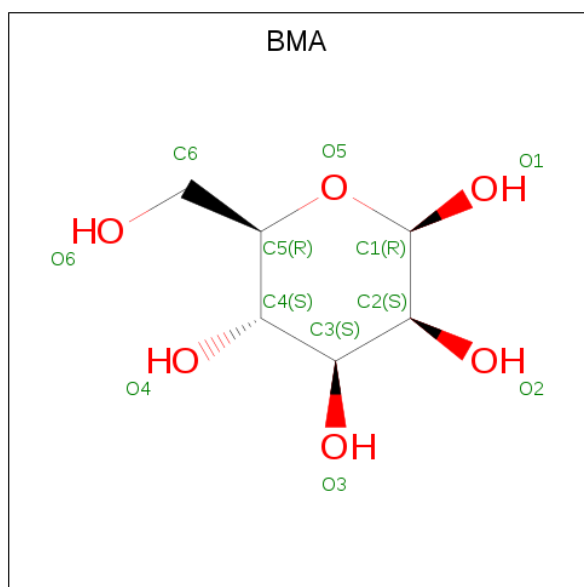
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
2	A	1	14	8	1	5	0	0
2	A	1	14	8	1	5	0	0

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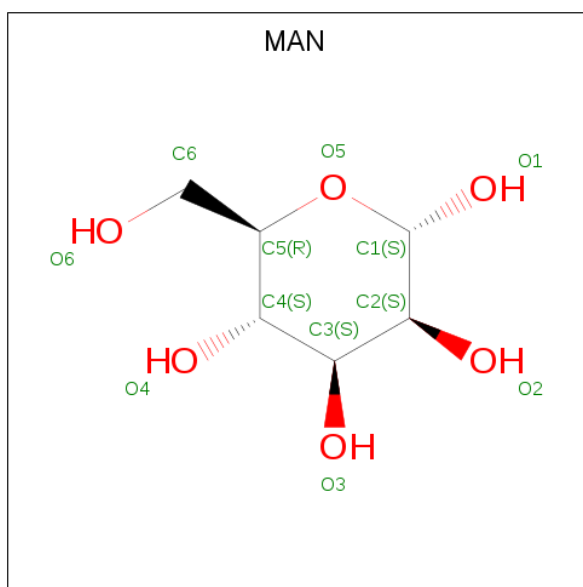
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 3 is BETA-D-MANNOSE (three-letter code: BMA) (formula: C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			11	6	5		
3	A	1	Total	C	O	0	0
			11	6	5		

- Molecule 4 is ALPHA-D-MANNOSE (three-letter code: MAN) (formula: C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>).

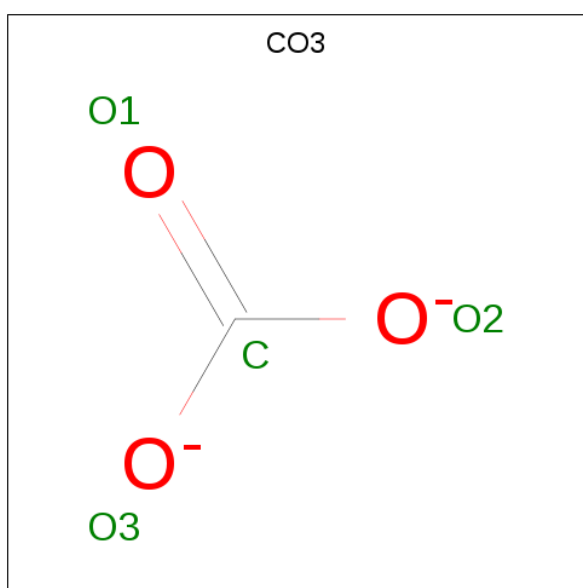


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 11 6 5	0	0

- Molecule 5 is FE (III) ION (three-letter code: FE) (formula: Fe).

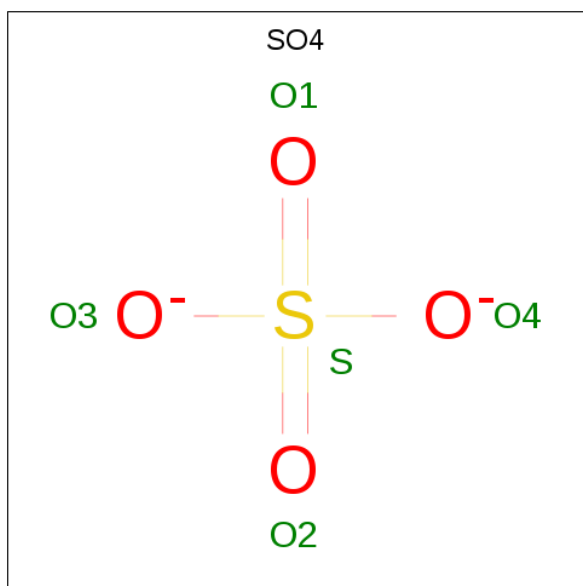
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total Fe 1 1	0	0

- Molecule 6 is CARBONATE ION (three-letter code: CO3) (formula: CO<sub>3</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			4	1	3		

- Molecule 7 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).

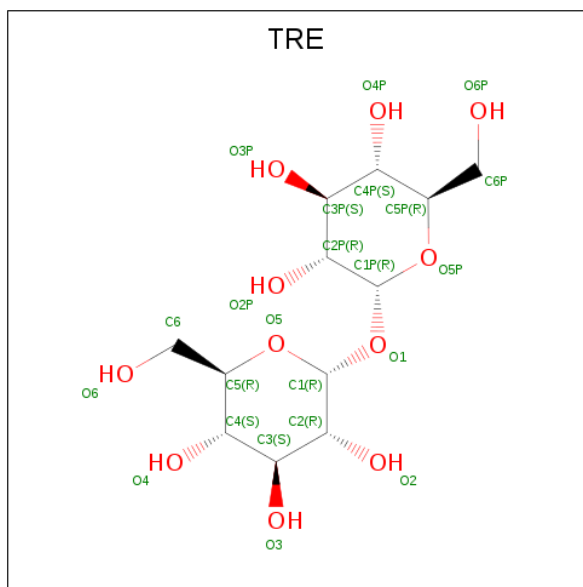


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	A	1	Total	O	S	0	0
			5	4	1		

- Molecule 8 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	2	Total	Zn	0	0
			2	2		

- Molecule 9 is TREHALOSE (three-letter code: TRE) (formula: C<sub>12</sub>H<sub>22</sub>O<sub>11</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
9	A	1	Total	C	O	0	0
			23	12	11		

- Molecule 10 is water.

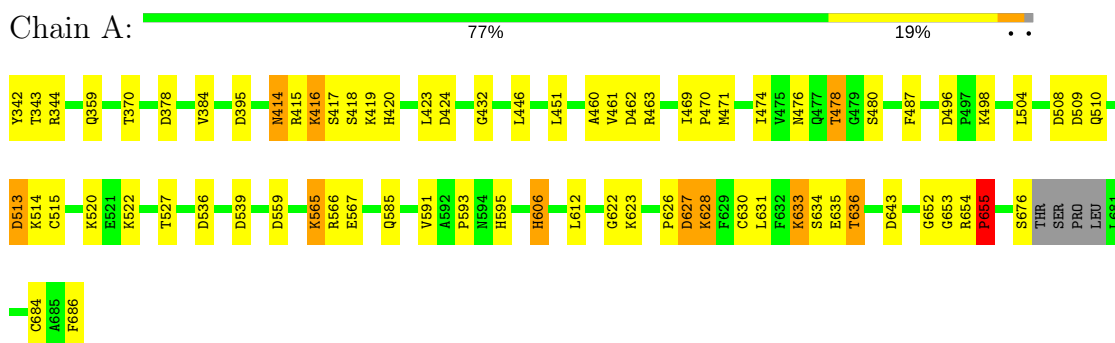
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	A	291	Total	O	0	0
			291	291		

### 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.

Note EDS was not executed.

- Molecule 1: Lactotransferrin





## 4 Data and refinement statistics

Xtrriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	63.37Å 50.41Å 65.91Å 90.00° 107.81° 90.00°	Depositor
Resolution (Å)	63.25 – 2.03	Depositor
% Data completeness (in resolution range)	97.5 (63.25-2.03)	Depositor
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
Refinement program	REFMAC 5.0	Depositor
R, $R_{free}$	0.169 , 0.211	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	3034	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	37.0	wwPDB-VP

## 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: CO3, BMA, NAG, TRE, ZN, SO4, MAN, FE

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	0.69	1/2653 (0.0%)	0.91	7/3591 (0.2%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	384	VAL	CB-CG1	5.06	1.63	1.52

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	655	PRO	CA-N-CD	-10.05	97.43	111.50
1	A	378	ASP	CB-CG-OD2	6.73	124.36	118.30
1	A	536	ASP	CB-CG-OD2	6.15	123.83	118.30
1	A	424	ASP	CB-CG-OD2	6.12	123.81	118.30
1	A	513	ASP	CB-CG-OD2	5.80	123.52	118.30
1	A	627	ASP	CB-CG-OD2	5.45	123.20	118.30
1	A	539	ASP	CB-CG-OD2	5.24	123.02	118.30

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	2605	0	2519	70	0
2	A	70	0	61	1	0
3	A	22	0	20	1	0
4	A	11	0	9	0	0
5	A	1	0	0	0	0
6	A	4	0	0	0	0
7	A	5	0	0	0	0
8	A	2	0	0	0	0
9	A	23	0	6	6	0
10	A	291	0	0	23	0
All	All	3034	0	2615	72	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 13.

All (72) 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:416:LYS:HD3	10:A:2136:HOH:O	1.37	1.22
1:A:514:LYS:HD3	10:A:2034:HOH:O	1.44	1.14
1:A:359:GLN:HG2	10:A:2130:HOH:O	1.68	0.92
1:A:416:LYS:HE2	10:A:2065:HOH:O	1.71	0.89
1:A:478:THR:HG21	10:A:2040:HOH:O	1.83	0.79
1:A:342:TYR:HB2	10:A:2099:HOH:O	1.84	0.77
1:A:635:GLU:O	1:A:636:THR:HG22	1.84	0.76
1:A:565:LYS:HD3	1:A:567:GLU:H	1.50	0.76
1:A:606:HIS:CE1	10:A:2283:HOH:O	2.40	0.74
1:A:478:THR:CG2	1:A:480:SER:HB3	2.18	0.73
1:A:474:ILE:O	1:A:478:THR:HB	1.89	0.72
1:A:416:LYS:HG2	10:A:2065:HOH:O	1.92	0.69
1:A:606:HIS:HB3	10:A:2088:HOH:O	1.95	0.65
1:A:654:ARG:HG2	10:A:2077:HOH:O	1.97	0.64
1:A:460:ALA:HB3	1:A:463:ARG:HD3	1.80	0.64
1:A:652:GLY:HA2	10:A:2073:HOH:O	1.99	0.63
1:A:344:ARG:HG2	1:A:344:ARG:HH11	1.63	0.63
1:A:565:LYS:CD	1:A:567:GLU:H	2.12	0.62
1:A:654:ARG:N	1:A:655:PRO:CD	2.66	0.59
1:A:626:PRO:HA	1:A:630:CYS:SG	2.42	0.58
1:A:565:LYS:HD3	1:A:567:GLU:N	2.19	0.58
1:A:344:ARG:HG2	1:A:344:ARG:NH1	2.18	0.57
1:A:565:LYS:HE2	1:A:566:ARG:N	2.20	0.56
1:A:461:VAL:O	1:A:462:ASP:HB2	2.07	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:522:LYS:NZ	10:A:2124:HOH:O	2.39	0.55
1:A:395:ASP:HA	1:A:595:HIS:CD2	2.41	0.55
1:A:344:ARG:NH1	1:A:370:THR:HG21	2.22	0.54
1:A:513:ASP:OD2	1:A:520:LYS:NZ	2.27	0.51
1:A:565:LYS:CE	1:A:567:GLU:H	2.24	0.50
1:A:510:GLN:HG3	10:A:2175:HOH:O	2.10	0.50
1:A:606:HIS:CE1	10:A:2259:HOH:O	2.63	0.50
1:A:343:THR:HG23	10:A:2115:HOH:O	2.12	0.49
1:A:478:THR:HG22	1:A:480:SER:HB3	1.93	0.49
3:A:8:BMA:H3	10:A:2184:HOH:O	2.13	0.48
1:A:593:PRO:HB3	9:A:1151:TRE:O2P	2.13	0.48
1:A:416:LYS:CD	10:A:2136:HOH:O	2.20	0.48
1:A:633:LYS:HA	1:A:633:LYS:HD3	1.48	0.48
1:A:508:ASP:OD1	1:A:508:ASP:C	2.53	0.47
1:A:591:VAL:CG2	9:A:1151:TRE:H6P1	2.44	0.47
1:A:342:TYR:C	1:A:344:ARG:H	2.17	0.47
1:A:419:LYS:HB2	10:A:2249:HOH:O	2.14	0.47
1:A:591:VAL:HG22	9:A:1151:TRE:H6P1	1.97	0.47
1:A:627:ASP:HA	10:A:2225:HOH:O	2.14	0.46
1:A:628:LYS:HG3	10:A:2291:HOH:O	2.15	0.46
1:A:478:THR:HG23	1:A:480:SER:HB3	1.98	0.46
1:A:593:PRO:HA	9:A:1151:TRE:C3P	2.46	0.45
1:A:636:THR:N	1:A:643:ASP:OD2	2.49	0.45
1:A:636:THR:HG23	1:A:636:THR:O	2.17	0.45
1:A:478:THR:HG22	1:A:480:SER:N	2.32	0.45
1:A:416:LYS:HG2	1:A:416:LYS:H	1.58	0.45
1:A:593:PRO:HB3	9:A:1151:TRE:C2P	2.47	0.44
1:A:471:MET:HE1	1:A:487:PHE:HE2	1.81	0.44
1:A:415:ARG:NH2	1:A:432:GLY:O	2.49	0.44
1:A:508:ASP:O	1:A:510:GLN:N	2.51	0.43
1:A:612:LEU:HA	1:A:612:LEU:HD23	1.81	0.43
1:A:417:SER:OG	1:A:418:SER:N	2.51	0.43
2:A:2:NAG:H61	2:A:3:NAG:H82	2.00	0.43
1:A:496:ASP:OD1	1:A:498:LYS:HG2	2.18	0.43
1:A:432:GLY:HA3	9:A:1151:TRE:O4P	2.18	0.43
1:A:414:ASN:HD22	1:A:414:ASN:HA	1.64	0.43
1:A:342:TYR:HB3	10:A:2115:HOH:O	2.18	0.43
1:A:344:ARG:HH11	1:A:344:ARG:CG	2.31	0.42
1:A:565:LYS:CD	1:A:567:GLU:HB2	2.49	0.42
1:A:527:THR:HG21	10:A:2247:HOH:O	2.20	0.42
1:A:469:ILE:N	1:A:470:PRO:HD2	2.35	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:565:LYS:HE2	1:A:566:ARG:HB2	2.01	0.41
1:A:471:MET:HE2	1:A:474:ILE:HD12	2.03	0.41
1:A:636:THR:HG21	10:A:2030:HOH:O	2.21	0.41
1:A:342:TYR:C	1:A:344:ARG:N	2.73	0.41
1:A:420:HIS:HB3	1:A:423:LEU:HD12	2.03	0.41
1:A:446:LEU:HD11	1:A:451:LEU:HD23	2.02	0.40
1:A:653:GLY:C	1:A:655:PRO:HD3	2.42	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	337/345 (98%)	319 (95%)	14 (4%)	4 (1%)	<b>14</b>   <b>7</b>

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	622	GLY
1	A	634	SER
1	A	509	ASP
1	A	684	CYS

#### 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	282/286 (99%)	264 (94%)	18 (6%)	19 13

All (18) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	414	ASN
1	A	416	LYS
1	A	476	ASN
1	A	478	THR
1	A	504	LEU
1	A	515	CYS
1	A	559	ASP
1	A	565	LYS
1	A	585	GLN
1	A	606	HIS
1	A	623	LYS
1	A	628	LYS
1	A	631	LEU
1	A	633	LYS
1	A	636	THR
1	A	655	PRO
1	A	676	SER
1	A	686	PHE

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	414	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

Of 14 ligands modelled in this entry, 3 are monoatomic - leaving 11 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$
2	NAG	A	1001	1	14,14,15	0.86	1 (7%)	17,19,21	1.45	1 (5%)
9	TRE	A	1151	-	24,24,24	6.08	14 (58%)	35,35,35	4.18	30 (85%)
6	CO3	A	1999	5	0,3,3	0.00	-	0,3,3	0.00	-
2	NAG	A	2	1,2	14,14,15	0.77	1 (7%)	17,19,21	2.21	3 (17%)
7	SO4	A	2000	-	4,4,4	0.13	0	6,6,6	0.19	0
2	NAG	A	3	3,2	14,14,15	0.60	0	17,19,21	1.36	3 (17%)
3	BMA	A	4	2	11,11,12	0.60	0	15,15,17	1.31	3 (20%)
2	NAG	A	5	1,2	14,14,15	1.09	1 (7%)	17,19,21	1.44	3 (17%)
2	NAG	A	6	2,4	14,14,15	0.70	0	17,19,21	1.46	3 (17%)
4	MAN	A	7	3,2	11,11,12	0.75	0	15,15,17	2.48	6 (40%)
3	BMA	A	8	4	11,11,12	0.62	0	15,15,17	1.85	4 (26%)

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. <sup>1,2</sup> means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	A	1001	1	-	0/6/23/26	0/1/1/1
9	TRE	A	1151	-	10/10/10/10	0/8/48/48	0/2/2/2
6	CO3	A	1999	5	-	0/0/0/0	0/0/0/0
2	NAG	A	2	1,2	-	0/6/23/26	0/1/1/1
7	SO4	A	2000	-	-	0/0/0/0	0/0/0/0
2	NAG	A	3	3,2	-	0/6/23/26	0/1/1/1
3	BMA	A	4	2	-	0/2/19/22	0/1/1/1
2	NAG	A	5	1,2	-	0/6/23/26	0/1/1/1
2	NAG	A	6	2,4	-	0/6/23/26	0/1/1/1
4	MAN	A	7	3,2	-	0/2/19/22	0/1/1/1
3	BMA	A	8	4	-	0/2/19/22	0/1/1/1

All (17) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	A	1151	TRE	C4P-C5P	-9.26	1.33	1.53
9	A	1151	TRE	C4-C5	-9.23	1.33	1.53
9	A	1151	TRE	O4P-C4P	-8.49	1.22	1.43
9	A	1151	TRE	O3-C3	-8.36	1.22	1.43
9	A	1151	TRE	O2-C2	-8.34	1.22	1.43
9	A	1151	TRE	O4-C4	-8.33	1.22	1.43
9	A	1151	TRE	O3P-C3P	-8.25	1.22	1.43
9	A	1151	TRE	O2P-C2P	-8.22	1.22	1.43
9	A	1151	TRE	C3-C2	-7.38	1.33	1.52
9	A	1151	TRE	C4-C3	-7.15	1.33	1.52
9	A	1151	TRE	C4P-C3P	-7.11	1.34	1.52
9	A	1151	TRE	C3P-C2P	-7.09	1.34	1.52
9	A	1151	TRE	C1-C2	-6.61	1.33	1.52
9	A	1151	TRE	C1P-C2P	-6.29	1.34	1.52
2	A	1001	NAG	O5-C1	-2.72	1.39	1.43
2	A	2	NAG	C1-C2	2.13	1.55	1.52
2	A	5	NAG	C1-C2	3.42	1.57	1.52

All (56) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	2	NAG	O5-C1-C2	-6.67	102.32	111.52
2	A	1001	NAG	O5-C1-C2	-4.39	105.47	111.52
2	A	6	NAG	O5-C1-C2	-3.45	106.76	111.52
2	A	2	NAG	C3-C4-C5	-3.30	104.34	110.24
3	A	8	BMA	O5-C1-C2	-2.99	106.11	110.78
2	A	6	NAG	C2-N2-C7	-2.91	118.70	122.94
2	A	5	NAG	C2-N2-C7	-2.86	118.78	122.94
2	A	6	NAG	C3-C4-C5	-2.84	105.16	110.24
2	A	5	NAG	O5-C1-C2	-2.48	108.10	111.52
3	A	4	BMA	O5-C1-C2	-2.21	107.33	110.78
2	A	3	NAG	O5-C1-C2	-2.08	108.66	111.52
9	A	1151	TRE	C1P-O1-C1	2.08	118.14	114.40
3	A	4	BMA	C1-O5-C5	2.11	115.09	112.19
4	A	7	MAN	C3-C4-C5	2.21	114.19	110.24
2	A	3	NAG	C1-O5-C5	2.25	115.28	112.19
3	A	8	BMA	O5-C5-C4	2.51	116.94	110.83
3	A	4	BMA	C1-C2-C3	2.59	112.94	109.66
9	A	1151	TRE	C6-C5-C4	2.60	119.15	112.99
2	A	3	NAG	C4-C3-C2	2.83	115.16	111.02
4	A	7	MAN	C2-C3-C4	2.85	115.81	110.87
4	A	7	MAN	O5-C1-C2	3.01	115.47	110.78

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	7	MAN	C1-C2-C3	3.08	113.55	109.66
9	A	1151	TRE	C1P-C2P-C3P	3.40	117.09	109.98
3	A	8	BMA	C1-O5-C5	3.54	117.06	112.19
9	A	1151	TRE	O5-C1-C2	3.62	118.11	110.34
2	A	2	NAG	C1-O5-C5	3.68	117.25	112.19
9	A	1151	TRE	C6P-C5P-C4P	3.68	121.70	112.99
9	A	1151	TRE	O4-C4-C5	3.69	118.56	109.31
2	A	5	NAG	C1-O5-C5	3.80	117.41	112.19
9	A	1151	TRE	O4P-C4P-C5P	3.80	118.82	109.31
9	A	1151	TRE	O1-C1-O5	3.86	121.60	110.66
9	A	1151	TRE	O3-C3-C2	3.96	119.58	110.34
9	A	1151	TRE	O4-C4-C3	3.99	119.66	110.34
9	A	1151	TRE	C1-C2-C3	4.10	118.55	109.98
9	A	1151	TRE	O2-C2-C1	4.11	120.14	110.06
3	A	8	BMA	C3-C4-C5	4.13	117.63	110.24
9	A	1151	TRE	O3-C3-C4	4.18	120.10	110.34
9	A	1151	TRE	O4P-C4P-C3P	4.26	120.28	110.34
9	A	1151	TRE	O3P-C3P-C4P	4.30	120.38	110.34
9	A	1151	TRE	O2P-C2P-C3P	4.38	120.57	110.34
9	A	1151	TRE	O3P-C3P-C2P	4.39	120.59	110.34
9	A	1151	TRE	O5P-C1P-C2P	4.40	119.78	110.34
9	A	1151	TRE	C4P-C3P-C2P	4.48	118.69	110.83
9	A	1151	TRE	O2-C2-C3	4.49	120.84	110.34
9	A	1151	TRE	O1-C1-C2	4.57	120.19	108.08
9	A	1151	TRE	O2P-C2P-C1P	4.82	121.90	110.06
9	A	1151	TRE	C3P-C4P-C5P	4.96	119.11	110.24
9	A	1151	TRE	C4-C3-C2	4.97	119.54	110.83
9	A	1151	TRE	O5P-C5P-C6P	5.06	119.15	106.43
9	A	1151	TRE	O5P-C5P-C4P	5.14	119.13	109.69
4	A	7	MAN	C1-O5-C5	5.28	119.45	112.19
4	A	7	MAN	O5-C5-C6	5.34	115.60	107.15
9	A	1151	TRE	O5-C5-C4	5.48	119.75	109.69
9	A	1151	TRE	C3-C4-C5	5.74	120.50	110.24
9	A	1151	TRE	O5-C5-C6	5.83	121.08	106.43
9	A	1151	TRE	O1-C1P-C2P	7.44	127.82	108.08

All (10) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
9	A	1151	TRE	C5P
9	A	1151	TRE	C3P
9	A	1151	TRE	C4

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Mol	Chain	Res	Type	Atom
9	A	1151	TRE	C5
9	A	1151	TRE	C2
9	A	1151	TRE	C2P
9	A	1151	TRE	C3
9	A	1151	TRE	C1P
9	A	1151	TRE	C4P
9	A	1151	TRE	C1

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
9	A	1151	TRE	6	0
2	A	2	NAG	1	0
2	A	3	NAG	1	0
3	A	8	BMA	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](#)

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

### 6.3 Carbohydrates [i](#)

EDS was not executed - this section is therefore empty.

### 6.4 Ligands [i](#)

EDS was not executed - this section is therefore empty.

### 6.5 Other polymers [i](#)

EDS was not executed - this section is therefore empty.