



Full wwPDB X-ray Structure Validation Report ⓘ

Jan 31, 2016 – 09:58 PM GMT

PDB ID : 1RIN
Title : X-RAY CRYSTAL STRUCTURE OF A PEA LECTIN-TRIMANNOSIDE
COMPLEX AT 2.6 ANGSTROMS RESOLUTION
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Deposited on : 1993-01-27
Resolution : 2.60 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 (RC4), CSD as536be (2015)
Xtriage (Phenix) : **NOT EXECUTED**
EDS : **NOT EXECUTED**
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk26865

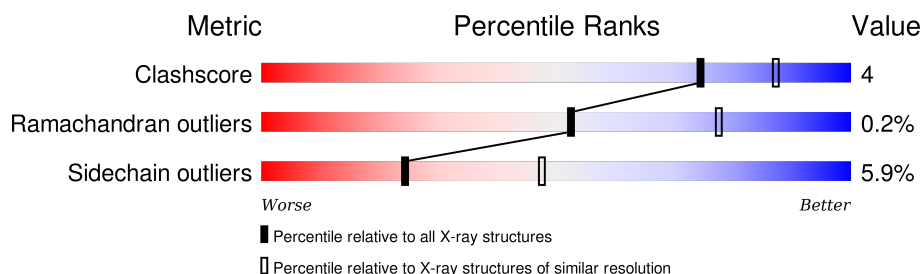
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.60 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	102246	2679 (2.60-2.60)
Ramachandran outliers	100387	2635 (2.60-2.60)
Sidechain outliers	100360	2635 (2.60-2.60)

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.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	180	 82% 17% •
1	C	180	 81% 18% •
2	B	49	 76% 20% •
2	D	49	 82% 16% •

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 3678 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 PEA LECTIN.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
1	A	180	Total	C	N	O	0	0	0
			1409	899	230	280			
1	C	180	Total	C	N	O	0	0	0
			1409	899	230	280			

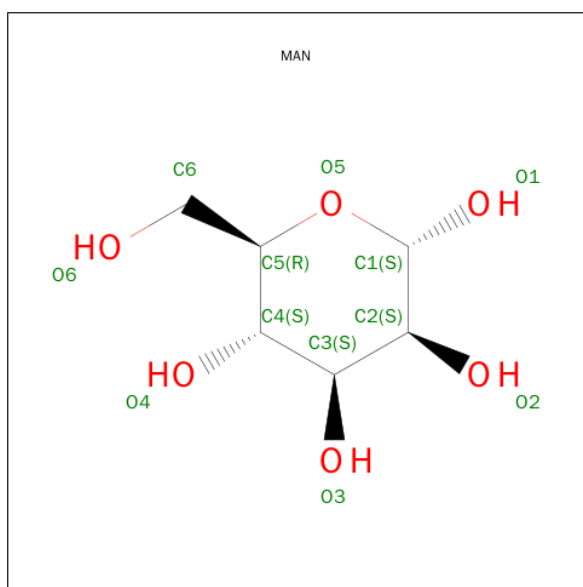
There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	114	GLU	GLN	CONFLICT	UNP P02867
C	114	GLU	GLN	CONFLICT	UNP P02867

- Molecule 2 is a protein called PEA LECTIN.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	B	47	Total	C	N	O	0	0	0
			367	236	57	74			
2	D	49	Total	C	N	O	0	0	0
			378	242	59	77			

- Molecule 3 is SUGAR (ALPHA-D-MANNOSE) (three-letter code: MAN) (formula: C₆H₁₂O₆).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 12 6 6	0	0
3	C	1	Total C O 12 6 6	0	0

- Molecule 4 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total Mn 1 1	0	0
4	C	1	Total Mn 1 1	0	0

- Molecule 5 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total Ca 1 1	0	0
5	C	1	Total Ca 1 1	0	0

- Molecule 6 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	44	Total O 44 44	0	0

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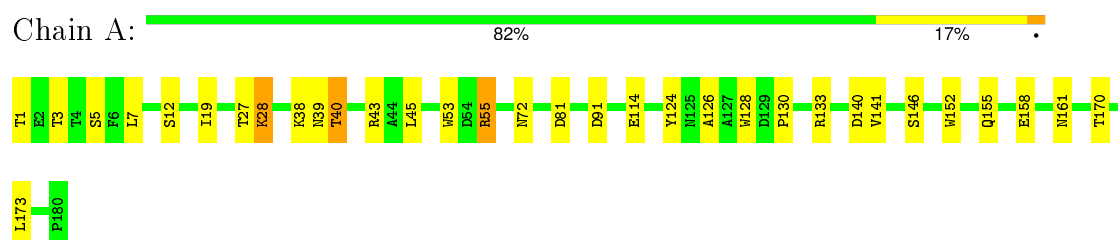
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	B	8	Total 8	O 8	0	0
6	C	31	Total 31	O 31	0	0
6	D	4	Total 4	O 4	0	0

3 Residue-property plots [i](#)

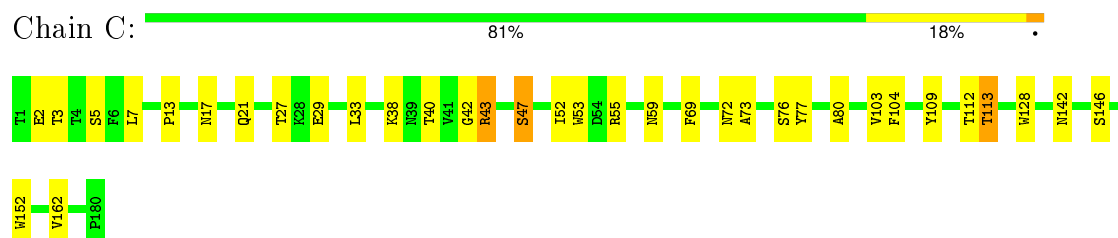
These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according 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.

Note EDS was not executed.

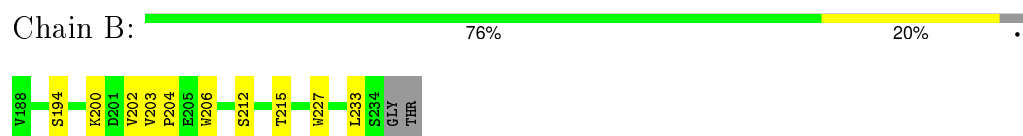
• Molecule 1: PEA LECTIN



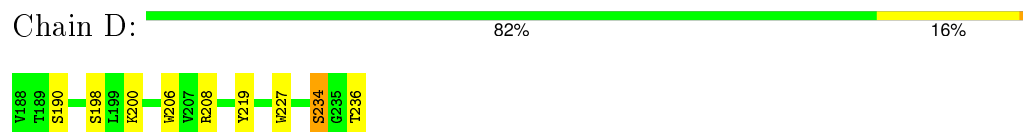
• Molecule 1: PEA LECTIN



• Molecule 2: PEA LECTIN



• Molecule 2: PEA LECTIN



4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section will therefore be incomplete.

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	64.30Å 73.40Å 108.50Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	(Not available) – 2.60	Depositor
% Data completeness (in resolution range)	(Not available) ((Not available)-2.60)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	X-PLOR	Depositor
R, R_{free}	0.183 , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	3678	wwPDB-VP
Average B, all atoms (Å ²)	26.0	wwPDB-VP

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: CA, MN, MAN

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	0.76	0/1443	1.46	15/1970 (0.8%)
1	C	0.79	0/1443	1.52	17/1970 (0.9%)
2	B	0.95	0/377	1.60	5/515 (1.0%)
2	D	0.95	0/388	1.53	9/530 (1.7%)
All	All	0.81	0/3651	1.51	46/4985 (0.9%)

There are no bond length outliers.

All (46) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	128	TRP	CD1-CG-CD2	9.06	113.55	106.30
1	C	53	TRP	CD1-CG-CD2	8.56	113.15	106.30
1	C	128	TRP	CE2-CD2-CG	-8.55	100.46	107.30
1	A	53	TRP	CD1-CG-CD2	8.55	113.14	106.30
1	C	152	TRP	CD1-CG-CD2	8.06	112.75	106.30
1	A	152	TRP	CD1-CG-CD2	7.83	112.56	106.30
2	D	206	TRP	CD1-CG-CD2	7.78	112.52	106.30
1	C	43	ARG	NE-CZ-NH1	7.74	124.17	120.30
1	C	53	TRP	CE2-CD2-CG	-7.73	101.12	107.30
1	A	133	ARG	NE-CZ-NH1	7.57	124.08	120.30
2	B	227	TRP	CD1-CG-CD2	7.40	112.22	106.30
2	B	206	TRP	CD1-CG-CD2	7.29	112.13	106.30
1	A	53	TRP	CE2-CD2-CG	-7.19	101.55	107.30
2	B	206	TRP	CE2-CD2-CG	-7.15	101.58	107.30
1	C	43	ARG	NE-CZ-NH2	-7.12	116.74	120.30
1	A	128	TRP	CE2-CD2-CG	-7.11	101.62	107.30
1	A	55	ARG	NE-CZ-NH2	-7.09	116.75	120.30
2	B	227	TRP	CE2-CD2-CG	-6.98	101.72	107.30
2	D	206	TRP	CE2-CD2-CG	-6.94	101.75	107.30
1	A	128	TRP	CD1-CG-CD2	6.86	111.78	106.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	152	TRP	CE2-CD2-CG	-6.78	101.88	107.30
1	A	128	TRP	CG-CD2-CE3	6.59	139.83	133.90
2	D	227	TRP	CD1-CG-CD2	6.50	111.50	106.30
2	D	227	TRP	CE2-CD2-CG	-6.47	102.12	107.30
1	C	128	TRP	CG-CD2-CE3	6.33	139.60	133.90
1	C	152	TRP	CE2-CD2-CG	-6.27	102.28	107.30
1	C	109	TYR	CB-CG-CD1	-6.25	117.25	121.00
2	D	234	SER	CB-CA-C	-6.07	98.57	110.10
1	C	80	ALA	O-C-N	-5.92	113.23	122.70
1	C	128	TRP	CG-CD1-NE1	-5.91	104.19	110.10
1	C	112	THR	CA-CB-CG2	5.73	120.42	112.40
1	A	128	TRP	CB-CG-CD1	-5.71	119.58	127.00
2	B	200	LYS	CB-CG-CD	-5.68	96.83	111.60
1	A	53	TRP	CG-CD1-NE1	-5.59	104.51	110.10
1	C	55	ARG	NE-CZ-NH1	5.54	123.07	120.30
1	A	55	ARG	NE-CZ-NH1	5.46	123.03	120.30
1	A	152	TRP	CG-CD1-NE1	-5.41	104.69	110.10
2	D	208	ARG	NE-CZ-NH2	5.39	123.00	120.30
1	C	112	THR	CA-CB-OG1	-5.37	97.73	109.00
1	A	133	ARG	NE-CZ-NH2	-5.31	117.65	120.30
1	C	152	TRP	CG-CD1-NE1	-5.19	104.91	110.10
2	D	200	LYS	CB-CG-CD	-5.19	98.11	111.60
1	C	77	TYR	CB-CG-CD1	5.18	124.11	121.00
1	A	55	ARG	CA-CB-CG	5.17	124.76	113.40
2	D	234	SER	N-CA-CB	5.08	118.12	110.50
2	D	200	LYS	CA-CB-CG	5.06	124.54	113.40

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	1409	0	1358	18	0
1	C	1409	0	1358	12	0
2	B	367	0	346	7	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	378	0	356	3	0
3	A	12	0	12	0	0
3	C	12	0	12	0	0
4	A	1	0	0	0	0
4	C	1	0	0	0	0
5	A	1	0	0	0	0
5	C	1	0	0	0	0
6	A	44	0	0	2	0
6	B	8	0	0	0	0
6	C	31	0	0	0	0
6	D	4	0	0	1	0
All	All	3678	0	3442	28	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 (28) 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:C:17:ASN:O	1:C:47:SER:HB2	2.04	0.57
1:C:33:LEU:O	1:C:42:GLY:HA3	2.06	0.56
1:A:7:LEU:HB3	1:C:3:THR:HB	1.91	0.53
1:A:27:THR:HG23	1:A:28:LYS:O	2.09	0.53
1:A:114:GLU:O	2:B:203:VAL:HG12	2.10	0.51
1:C:21:GLN:HB2	1:C:43:ARG:HB2	1.93	0.51
1:C:38:LYS:HG3	2:D:219:TYR:CD2	2.48	0.48
1:A:28:LYS:H	1:A:28:LYS:HD3	1.79	0.48
1:C:69:PHE:HE1	1:C:162:VAL:HG21	1.80	0.47
1:A:43:ARG:HD2	2:B:212:SER:HB3	1.98	0.46
1:C:113:THR:HB	1:C:142:ASN:HD22	1.81	0.46
1:A:130:PRO:HD2	6:A:255:HOH:O	2.15	0.46
2:D:234:SER:HB3	2:D:236:THR:HG23	1.97	0.45
1:C:73:ALA:HB1	6:D:23:HOH:O	2.16	0.45
1:C:103:VAL:HG23	1:C:104:PHE:CD2	2.51	0.45
1:A:141:VAL:HG13	2:B:202:VAL:HG11	1.99	0.44
1:C:59:ASN:HD21	2:D:236:THR:H	1.64	0.44
1:A:7:LEU:O	1:C:2:GLU:HA	2.18	0.43
1:A:114:GLU:HB3	2:B:204:PRO:HD3	2.00	0.43
1:A:1:THR:HA	2:B:233:LEU:O	2.19	0.42
1:A:19:ILE:HB	1:A:45:LEU:HB2	2.01	0.42
1:A:3:THR:HB	1:C:7:LEU:HB3	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:38:LYS:HG2	1:A:39:ASN:ND2	2.35	0.42
1:A:40:THR:HG22	2:B:215:THR:OG1	2.20	0.41
1:A:155:GLN:HB3	1:A:158:GLU:HG3	2.03	0.41
1:A:173:LEU:O	2:B:194:SER:HA	2.21	0.41
1:A:124:TYR:CZ	1:A:126:ALA:HA	2.55	0.41
1:A:140:ASP:HA	6:A:264:HOH:O	2.19	0.41

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	178/180 (99%)	165 (93%)	13 (7%)	0	100	100
1	C	178/180 (99%)	169 (95%)	8 (4%)	1 (1%)	30	56
2	B	45/49 (92%)	44 (98%)	1 (2%)	0	100	100
2	D	47/49 (96%)	45 (96%)	2 (4%)	0	100	100
All	All	448/458 (98%)	423 (94%)	24 (5%)	1 (0%)	52	77

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	29	GLU

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	155/155 (100%)	144 (93%)	11 (7%)	18	36
1	C	155/155 (100%)	145 (94%)	10 (6%)	21	42
2	B	41/42 (98%)	41 (100%)	0	100	100
2	D	42/42 (100%)	40 (95%)	2 (5%)	31	58
All	All	393/394 (100%)	370 (94%)	23 (6%)	24	47

All (23) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	5	SER
1	A	12	SER
1	A	28	LYS
1	A	40	THR
1	A	55	ARG
1	A	72	ASN
1	A	81	ASP
1	A	91	ASP
1	A	146	SER
1	A	161	ASN
1	A	170	THR
1	C	5	SER
1	C	13	PRO
1	C	27	THR
1	C	40	THR
1	C	47	SER
1	C	52	ILE
1	C	72	ASN
1	C	76	SER
1	C	113	THR
1	C	146	SER
2	D	190	SER
2	D	198	SER

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	16	GLN
1	A	142	ASN
1	A	155	GLN

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Mol	Chain	Res	Type
1	A	161	ASN
1	C	59	ASN
1	C	142	ASN
1	C	161	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](#)

Of 6 ligands modelled in this entry, 4 are monoatomic - leaving 2 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	$\# Z > 2$
3	MAN	A	250	-	12,12,12	0.72	0	17,17,17	0.75	0
3	MAN	C	250	-	12,12,12	0.62	0	17,17,17	0.89	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
3	MAN	A	250	-	-	0/2/22/22	0/1/1/1
3	MAN	C	250	-	-	0/2/22/22	0/1/1/1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
3	C	250	MAN	O1-C1-C2	2.14	114.95	109.21

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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 will therefore be empty.

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

EDS was not executed - this section will therefore be empty.

6.3 Carbohydrates [i](#)

EDS was not executed - this section will therefore be empty.

6.4 Ligands [i](#)

EDS was not executed - this section will therefore be empty.

6.5 Other polymers [i](#)

EDS was not executed - this section will therefore be empty.