



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 24, 2018 – 06:45 PM EDT

PDB ID : 5WI8  
Title : Crystal structure of murine 4-1BB from HEK293T cells in P21 space group  
Authors : Zajonc, D.M.; Bitra, A.  
Deposited on : 2017-07-18  
Resolution : 2.95 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)  
Xtriage (Phenix) : 1.13  
EDS : rb-20031633  
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)  
Refmac : 5.8.0158  
CCP4 : 7.0 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : rb-20031633

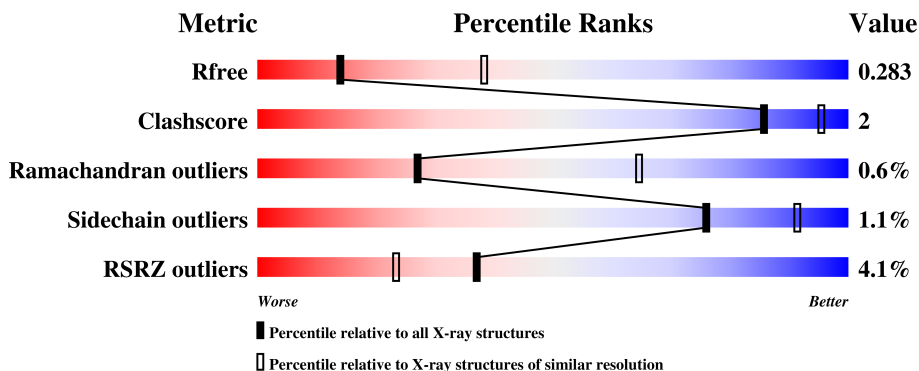
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.95 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))
$R_{free}$	111664	2641 (3.00-2.92)
Clashscore	122126	2988 (3.00-2.92)
Ramachandran outliers	120053	2892 (3.00-2.92)
Sidechain outliers	120020	2895 (3.00-2.92)
RSRZ outliers	108989	2527 (3.00-2.92)

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	143	 3% 88% 5% • 5%
1	B	143	 5% 90% 5% 6%
1	C	143	 3% 91% • 6%
1	D	143	 5% 92% • 6%

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
4	BMA	C	404	-	-	-	X

## 2 Entry composition i

There are 8 unique types of molecules in this entry. The entry contains 4333 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 Tumor necrosis factor receptor superfamily member 9.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	136	984	594	176	194	20	0	0	0
1	B	135	969	585	177	187	20	0	0	0
1	C	134	993	599	181	193	20	0	0	0
1	D	134	977	586	179	192	20	0	0	0

There are 24 discrepancies between the modelled and reference sequences:

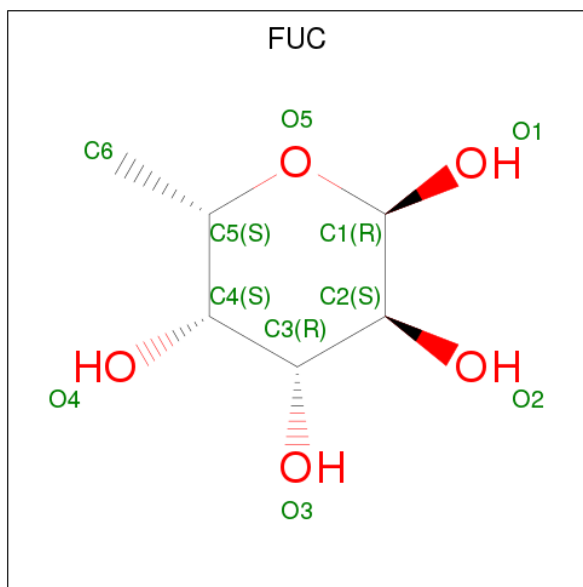
Chain	Residue	Modelled	Actual	Comment	Reference
A	22	LEU	-	expression tag	UNP P20334
A	23	GLU	-	expression tag	UNP P20334
A	161	LEU	-	expression tag	UNP P20334
A	162	VAL	-	expression tag	UNP P20334
A	163	PRO	-	expression tag	UNP P20334
A	164	ARG	-	expression tag	UNP P20334
B	22	LEU	-	expression tag	UNP P20334
B	23	GLU	-	expression tag	UNP P20334
B	161	LEU	-	expression tag	UNP P20334
B	162	VAL	-	expression tag	UNP P20334
B	163	PRO	-	expression tag	UNP P20334
B	164	ARG	-	expression tag	UNP P20334
C	22	LEU	-	expression tag	UNP P20334
C	23	GLU	-	expression tag	UNP P20334
C	161	LEU	-	expression tag	UNP P20334
C	162	VAL	-	expression tag	UNP P20334
C	163	PRO	-	expression tag	UNP P20334
C	164	ARG	-	expression tag	UNP P20334
D	22	LEU	-	expression tag	UNP P20334
D	23	GLU	-	expression tag	UNP P20334
D	161	LEU	-	expression tag	UNP P20334

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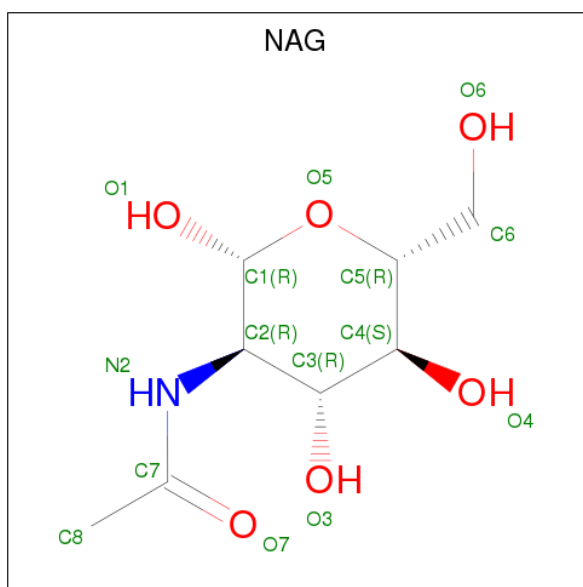
Chain	Residue	Modelled	Actual	Comment	Reference
D	162	VAL	-	expression tag	UNP P20334
D	163	PRO	-	expression tag	UNP P20334
D	164	ARG	-	expression tag	UNP P20334

- Molecule 2 is ALPHA-L-FUCOSE (three-letter code: FUC) (formula: C<sub>6</sub>H<sub>12</sub>O<sub>5</sub>).



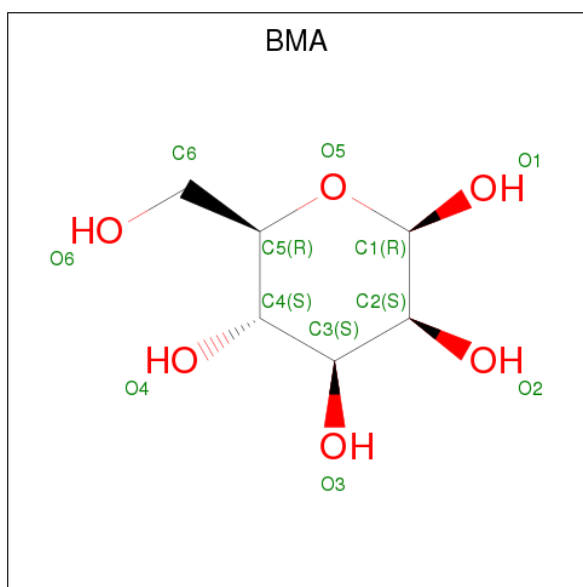
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf	
2	A	1	Total	C	O	0	0
			10	6	4		
2	B	1	Total	C	O	0	0
			10	6	4		
2	D	1	Total	C	O	0	0
			10	6	4		

- Molecule 3 is N-ACETYL-D-GLUCOSAMINE (three-letter code: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>).



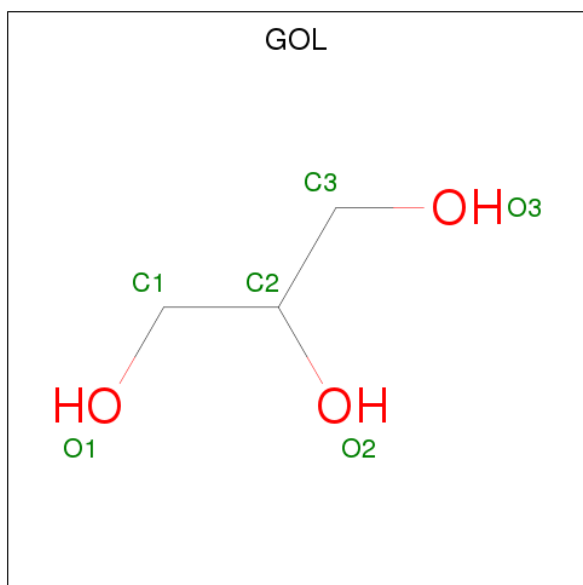
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
3	A	1	14	8	1	5	0	0
3	A	1	14	8	1	5	0	0
3	B	1	14	8	1	5	0	0
3	B	1	14	8	1	5	0	0
3	B	1	14	8	1	5	0	0
3	C	1	14	8	1	5	0	0
3	C	1	14	8	1	5	0	0
3	D	1	14	8	1	5	0	0
3	D	1	14	8	1	5	0	0

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



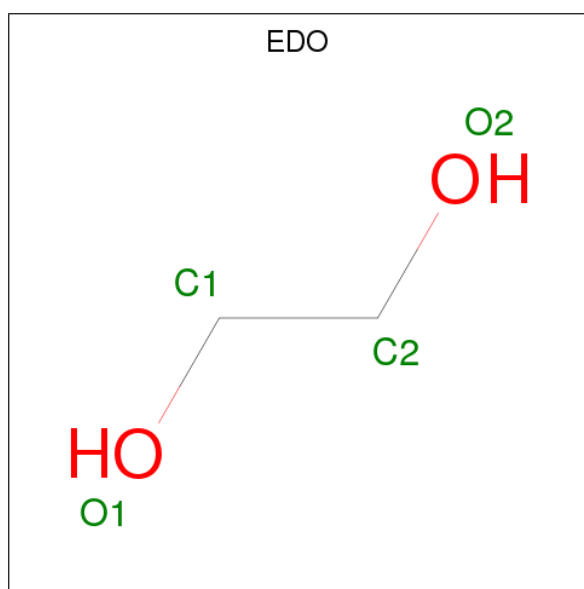
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 11 6 5	0	0
4	B	1	Total C O 11 6 5	0	0
4	C	1	Total C O 11 6 5	0	0
4	D	1	Total C O 11 6 5	0	0

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula:  $C_3H_8O_3$ ).



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

- Molecule 6 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>).



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

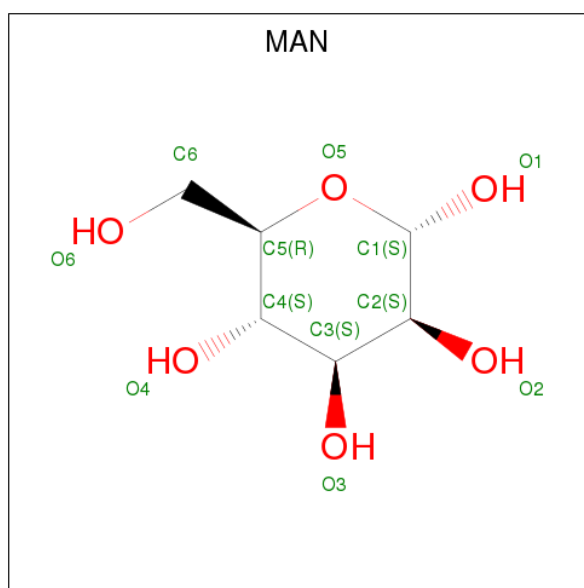
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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	B	1	Total	C	O	0	0
			4	2	2		
6	C	1	Total	C	O	0	0
			4	2	2		
6	D	1	Total	C	O	0	0
			4	2	2		
6	D	1	Total	C	O	0	0
			4	2	2		
6	D	1	Total	C	O	0	0
			4	2	2		

- Molecule 7 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
7	B	1	Total	C	O	0	0
			11	6	5		
7	C	1	Total	C	O	0	0
			11	6	5		
7	D	1	Total	C	O	0	0
			11	6	5		

- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	27	Total	O	0	0
			27	27		

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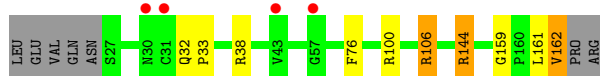
<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>ZeroOcc</b>	<b>AltConf</b>
8	B	25	Total 25	O 25	0	0
8	C	18	Total 18	O 18	0	0
8	D	21	Total 21	O 21	0	0

### 3 Residue-property plots [i](#)

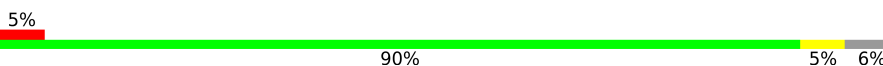
These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are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

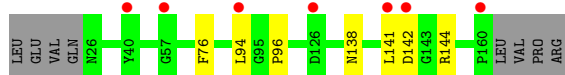
- Molecule 1: Tumor necrosis factor receptor superfamily member 9

Chain A: 



- Molecule 1: Tumor necrosis factor receptor superfamily member 9

Chain B: 



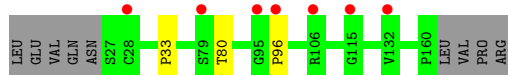
- Molecule 1: Tumor necrosis factor receptor superfamily member 9

Chain C: 



- Molecule 1: Tumor necrosis factor receptor superfamily member 9

Chain D: 



## 4 Data and refinement statistics i

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	65.01Å 61.76Å 110.75Å 90.00° 91.53° 90.00°	Depositor
Resolution (Å)	40.00 – 2.95 36.90 – 2.95	Depositor EDS
% Data completeness (in resolution range)	91.0 (40.00-2.95) 91.1 (36.90-2.95)	Depositor EDS
$R_{merge}$	0.13	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.29 (at 2.95Å)	Xtrriage
Refinement program	REFMAC 5.8.0135	Depositor
R, $R_{free}$	0.235 , 0.279 0.238 , 0.283	Depositor DCC
$R_{free}$ test set	881 reflections (5.16%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	69.7	Xtrriage
Anisotropy	0.120	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 54.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	0.036 for h,-k,-l	Xtrriage
$F_o, F_c$ correlation	0.89	EDS
Total number of atoms	4333	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	74.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.87% 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, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality i

### 5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: GOL, BMA, NAG, EDO, FUC, 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	0.49	0/1005	0.78	2/1363 (0.1%)
1	B	0.49	0/990	0.75	0/1341
1	C	0.45	0/1014	0.70	0/1369
1	D	0.46	0/998	0.72	0/1350
All	All	0.47	0/4007	0.74	2/5423 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	38	ARG	NE-CZ-NH1	6.33	123.47	120.30
1	A	144	ARG	NE-CZ-NH1	5.32	122.96	120.30

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts i

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	984	0	871	7	0
1	B	969	0	856	12	0
1	C	993	0	908	3	0
1	D	977	0	863	2	0
2	A	10	0	10	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	10	0	10	0	0
2	D	10	0	10	0	0
3	A	28	0	23	0	0
3	B	42	0	36	0	0
3	C	28	0	24	0	0
3	D	28	0	23	0	0
4	A	11	0	10	0	0
4	B	11	0	9	0	0
4	C	11	0	9	0	0
4	D	11	0	9	0	0
5	A	30	0	40	0	0
5	B	12	0	16	0	0
5	C	6	0	8	0	0
5	D	6	0	8	0	0
6	A	4	0	6	0	0
6	B	12	0	18	0	0
6	C	4	0	6	0	0
6	D	12	0	18	0	0
7	B	11	0	10	0	0
7	C	11	0	10	0	0
7	D	11	0	10	0	0
8	A	27	0	0	1	0
8	B	25	0	0	0	0
8	C	18	0	0	0	0
8	D	21	0	0	0	0
All	All	4333	0	3821	19	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 2.

All (19) 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:B:142:ASP:CB	1:B:144:ARG:HH11	1.74	0.98
1:B:142:ASP:HB3	1:B:144:ARG:HH11	1.33	0.93
1:B:142:ASP:CB	1:B:144:ARG:NH1	2.36	0.88
1:B:142:ASP:HB2	1:B:144:ARG:NH1	2.03	0.73
1:B:142:ASP:HB3	1:B:144:ARG:HG3	1.70	0.72
1:B:142:ASP:HB3	1:B:144:ARG:NH1	2.06	0.65
1:A:76:PHE:CD2	1:C:33:PRO:HD2	2.33	0.64
1:A:106:ARG:NH2	8:A:301:HOH:O	2.37	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:142:ASP:HB2	1:B:144:ARG:HH12	1.77	0.49
1:B:76:PHE:CD1	1:D:80:THR:HG21	2.49	0.48
1:A:144:ARG:HD3	1:A:159:GLY:O	2.14	0.47
1:A:76:PHE:CD1	1:C:80:THR:HG21	2.51	0.45
1:B:142:ASP:OD2	1:B:144:ARG:NH1	2.51	0.44
1:A:32:GLN:HB3	1:A:33:PRO:HD2	2.00	0.43
1:B:138:ASN:HB3	1:B:141:LEU:HG	2.02	0.42
1:A:161:LEU:O	1:A:162:VAL:HG22	2.20	0.41
1:A:76:PHE:CE2	1:C:33:PRO:HG2	2.56	0.41
1:B:76:PHE:CD2	1:D:33:PRO:HD2	2.55	0.41
1:B:142:ASP:CG	1:B:144:ARG:HH11	2.22	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	134/143 (94%)	129 (96%)	5 (4%)	0	100	100
1	B	133/143 (93%)	128 (96%)	4 (3%)	1 (1%)	21	58
1	C	132/143 (92%)	127 (96%)	4 (3%)	1 (1%)	21	58
1	D	132/143 (92%)	125 (95%)	6 (4%)	1 (1%)	21	58
All	All	531/572 (93%)	509 (96%)	19 (4%)	3 (1%)	27	64

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	96	PRO
1	B	96	PRO
1	C	96	PRO

### 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	111/127 (87%)	108 (97%)	3 (3%)	48	79
1	B	107/127 (84%)	106 (99%)	1 (1%)	81	93
1	C	115/127 (91%)	114 (99%)	1 (1%)	81	93
1	D	110/127 (87%)	110 (100%)	0	100	100
All	All	443/508 (87%)	438 (99%)	5 (1%)	76	91

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	100	ARG
1	A	106	ARG
1	A	162	VAL
1	B	94	LEU
1	C	45	LYS

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

### 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

36 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	FUC	A	201	3	9,10,11	0.35	0	13,14,16	1.04	1 (7%)
3	NAG	A	202	1,3,2	14,14,15	0.46	0	17,19,21	1.27	2 (11%)
3	NAG	A	203	3,4	14,14,15	0.46	0	17,19,21	1.00	1 (5%)
4	BMA	A	204	3	11,11,12	0.35	0	15,15,17	0.87	1 (6%)
5	GOL	A	205	-	5,5,5	0.37	0	5,5,5	0.58	0
5	GOL	A	206	-	5,5,5	0.40	0	5,5,5	0.42	0
5	GOL	A	207	-	5,5,5	0.35	0	5,5,5	0.25	0
5	GOL	A	208	-	5,5,5	0.39	0	5,5,5	0.35	0
5	GOL	A	209	-	5,5,5	0.34	0	5,5,5	0.28	0
6	EDO	A	210	-	3,3,3	0.50	0	2,2,2	0.14	0
5	GOL	B	201	-	5,5,5	0.27	0	5,5,5	0.18	0
6	EDO	B	202	-	3,3,3	0.47	0	2,2,2	0.23	0
6	EDO	B	203	-	3,3,3	0.45	0	2,2,2	0.46	0
6	EDO	B	204	-	3,3,3	0.53	0	2,2,2	0.29	0
2	FUC	B	205	3	9,10,11	0.33	0	13,14,16	0.57	0
3	NAG	B	206	1,3,2	14,14,15	0.26	0	17,19,21	0.89	0
3	NAG	B	207	3,4	14,14,15	0.42	0	17,19,21	1.17	3 (17%)
4	BMA	B	208	3,7	11,11,12	0.37	0	15,15,17	1.11	2 (13%)
7	MAN	B	209	4	11,11,12	0.47	0	15,15,17	1.97	4 (26%)
3	NAG	B	210	1	14,14,15	0.47	0	17,19,21	1.03	1 (5%)
5	GOL	B	211	-	5,5,5	0.36	0	5,5,5	0.35	0
6	EDO	C	401	-	3,3,3	0.48	0	2,2,2	0.32	0
3	NAG	C	402	1,3	14,14,15	0.51	0	17,19,21	1.53	3 (17%)
3	NAG	C	403	3,4	14,14,15	0.44	0	17,19,21	1.03	1 (5%)
4	BMA	C	404	3,7	11,11,12	0.61	0	15,15,17	1.31	1 (6%)
7	MAN	C	405	4	11,11,12	0.56	0	15,15,17	1.48	2 (13%)
5	GOL	C	406	-	5,5,5	0.26	0	5,5,5	0.26	0
6	EDO	D	401	-	3,3,3	0.46	0	2,2,2	0.36	0
6	EDO	D	402	-	3,3,3	0.49	0	2,2,2	0.11	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
6	EDO	D	403	-	3,3,3	0.55	0	2,2,2	0.24	0
2	FUC	D	404	3	9,10,11	0.59	0	13,14,16	1.40	1 (7%)
3	NAG	D	405	1,3,2	14,14,15	0.60	0	17,19,21	1.76	3 (17%)
3	NAG	D	406	3,4	14,14,15	0.54	0	17,19,21	1.12	2 (11%)
4	BMA	D	407	3,7	11,11,12	0.45	0	15,15,17	0.95	0
7	MAN	D	408	4	11,11,12	0.39	0	15,15,17	0.83	0
5	GOL	D	409	-	5,5,5	0.35	0	5,5,5	0.28	0

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	FUC	A	201	3	-	0/0/17/20	0/1/1/1
3	NAG	A	202	1,3,2	-	0/6/23/26	0/1/1/1
3	NAG	A	203	3,4	-	0/6/23/26	0/1/1/1
4	BMA	A	204	3	-	0/2/19/22	0/1/1/1
5	GOL	A	205	-	-	0/4/4/4	0/0/0/0
5	GOL	A	206	-	-	0/4/4/4	0/0/0/0
5	GOL	A	207	-	-	0/4/4/4	0/0/0/0
5	GOL	A	208	-	-	0/4/4/4	0/0/0/0
5	GOL	A	209	-	-	0/4/4/4	0/0/0/0
6	EDO	A	210	-	-	0/1/1/1	0/0/0/0
5	GOL	B	201	-	-	0/4/4/4	0/0/0/0
6	EDO	B	202	-	-	0/1/1/1	0/0/0/0
6	EDO	B	203	-	-	0/1/1/1	0/0/0/0
6	EDO	B	204	-	-	0/1/1/1	0/0/0/0
2	FUC	B	205	3	-	0/0/17/20	0/1/1/1
3	NAG	B	206	1,3,2	-	0/6/23/26	0/1/1/1
3	NAG	B	207	3,4	-	0/6/23/26	0/1/1/1
4	BMA	B	208	3,7	-	0/2/19/22	0/1/1/1
7	MAN	B	209	4	-	0/2/19/22	0/1/1/1
3	NAG	B	210	1	-	0/6/23/26	0/1/1/1
5	GOL	B	211	-	-	0/4/4/4	0/0/0/0
6	EDO	C	401	-	-	0/1/1/1	0/0/0/0
3	NAG	C	402	1,3	-	0/6/23/26	0/1/1/1
3	NAG	C	403	3,4	-	0/6/23/26	0/1/1/1
4	BMA	C	404	3,7	-	0/2/19/22	0/1/1/1
7	MAN	C	405	4	-	0/2/19/22	0/1/1/1
5	GOL	C	406	-	-	0/4/4/4	0/0/0/0
6	EDO	D	401	-	-	0/1/1/1	0/0/0/0

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	EDO	D	402	-	-	0/1/1/1	0/0/0/0
6	EDO	D	403	-	-	0/1/1/1	0/0/0/0
2	FUC	D	404	3	-	0/0/17/20	0/1/1/1
3	NAG	D	405	1,3,2	-	0/6/23/26	0/1/1/1
3	NAG	D	406	3,4	-	0/6/23/26	0/1/1/1
4	BMA	D	407	3,7	-	0/2/19/22	0/1/1/1
7	MAN	D	408	4	-	0/2/19/22	0/1/1/1
5	GOL	D	409	-	-	0/4/4/4	0/0/0/0

There are no bond length outliers.

All (28) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	405	NAG	O5-C1-C2	-4.12	105.83	111.52
3	D	406	NAG	O5-C1-C2	-2.54	108.02	111.52
3	C	403	NAG	O5-C1-C2	-2.39	108.23	111.52
3	A	202	NAG	O5-C1-C2	-2.14	108.57	111.52
3	B	207	NAG	O3-C3-C2	-2.06	104.98	109.39
4	B	208	BMA	O5-C5-C6	2.03	110.35	107.15
3	C	402	NAG	C2-N2-C7	2.05	125.94	122.94
3	D	406	NAG	C1-O5-C5	2.06	115.02	112.19
3	B	207	NAG	C1-O5-C5	2.08	115.05	112.19
7	B	209	MAN	O5-C5-C6	2.20	110.63	107.15
3	D	405	NAG	C4-C3-C2	2.24	114.30	111.02
3	A	203	NAG	C4-C3-C2	2.25	114.31	111.02
3	C	402	NAG	C3-C4-C5	2.28	114.32	110.24
4	A	204	BMA	C1-O5-C5	2.32	115.38	112.19
3	B	207	NAG	C4-C3-C2	2.33	114.43	111.02
3	A	202	NAG	C1-O5-C5	2.35	115.42	112.19
7	B	209	MAN	O5-C1-C2	2.66	114.93	110.78
2	A	201	FUC	C1-C2-C3	2.75	113.14	109.66
4	B	208	BMA	C1-O5-C5	2.90	116.17	112.19
3	B	210	NAG	O5-C5-C6	2.97	111.85	107.15
7	C	405	MAN	C1-O5-C5	3.00	116.31	112.19
7	B	209	MAN	C1-C2-C3	3.93	114.63	109.66
7	C	405	MAN	C1-C2-C3	3.94	114.65	109.66
4	C	404	BMA	C1-C2-C3	3.95	114.66	109.66
2	D	404	FUC	C1-C2-C3	4.34	115.15	109.66
3	C	402	NAG	C4-C3-C2	4.38	117.43	111.02
3	D	405	NAG	C1-O5-C5	4.58	118.49	112.19
7	B	209	MAN	C1-O5-C5	5.19	119.33	112.19

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

There are no such residues in this entry.

## 5.8 Polymer linkage issues

There are no chain breaks in this entry.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

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	136/143 (95%)	0.52	4 (2%) 51 34	44, 62, 112, 132	0
1	B	135/143 (94%)	0.56	7 (5%) 27 16	44, 67, 106, 119	0
1	C	134/143 (93%)	0.50	4 (2%) 50 32	54, 75, 105, 119	0
1	D	134/143 (93%)	0.66	7 (5%) 27 16	56, 75, 102, 111	0
All	All	539/572 (94%)	0.56	22 (4%) 37 23	44, 71, 108, 132	0

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	106	ARG	3.4
1	C	40	TYR	3.2
1	C	160	PRO	3.2
1	C	96	PRO	3.1
1	A	43	VAL	2.9
1	B	40	TYR	2.9
1	D	95	GLY	2.8
1	B	142	ASP	2.8
1	B	57	GLY	2.8
1	A	57	GLY	2.7
1	C	146	VAL	2.7
1	B	160	PRO	2.6
1	D	96	PRO	2.5
1	D	115	GLY	2.5
1	B	94	LEU	2.4
1	B	141	LEU	2.3
1	A	31	CYS	2.2
1	A	30	ASN	2.2
1	D	132	VAL	2.2
1	D	79	SER	2.1
1	D	28	CYS	2.0
1	B	126	ASP	2.0

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

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

## 6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

## 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 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	B-factors(Å <sup>2</sup> )	Q<0.9
5	GOL	A	206	6/6	0.50	0.31	111,115,117,118	0
5	GOL	C	406	6/6	0.67	0.19	112,115,116,117	0
6	EDO	D	403	4/4	0.74	0.32	93,95,95,96	0
3	NAG	B	210	14/15	0.74	0.34	102,109,113,113	0
7	MAN	C	405	11/12	0.77	0.16	123,134,137,139	0
4	BMA	D	407	11/12	0.78	0.21	100,106,116,118	0
5	GOL	D	409	6/6	0.78	0.29	80,87,89,90	0
4	BMA	C	404	11/12	0.79	0.42	136,138,142,143	0
7	MAN	D	408	11/12	0.80	0.22	115,123,124,124	0
6	EDO	B	204	4/4	0.81	0.26	73,77,80,83	0
7	MAN	B	209	11/12	0.81	0.21	99,110,115,118	0
6	EDO	D	401	4/4	0.83	0.20	69,71,72,75	0
5	GOL	B	201	6/6	0.84	0.29	90,98,99,100	0
3	NAG	A	203	14/15	0.85	0.22	85,95,105,113	0
2	FUC	D	404	10/11	0.85	0.18	92,99,101,103	0
4	BMA	A	204	11/12	0.85	0.26	110,115,117,118	0
3	NAG	C	403	14/15	0.85	0.28	106,120,122,131	0
5	GOL	A	207	6/6	0.85	0.29	74,78,79,79	0
5	GOL	A	209	6/6	0.86	0.17	90,92,93,93	0
5	GOL	A	208	6/6	0.86	0.25	85,88,88,90	0
4	BMA	B	208	11/12	0.88	0.19	82,91,100,102	0
5	GOL	B	211	6/6	0.88	0.26	93,95,96,96	0
3	NAG	C	402	14/15	0.89	0.23	103,109,111,114	0
6	EDO	B	203	4/4	0.89	0.33	57,58,58,60	0
5	GOL	A	205	6/6	0.91	0.16	57,59,61,62	0
6	EDO	D	402	4/4	0.92	0.33	81,81,81,83	0
3	NAG	A	202	14/15	0.93	0.15	66,73,77,86	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
6	EDO	A	210	4/4	0.94	0.22	54,55,56,56	0
3	NAG	D	405	14/15	0.94	0.17	80,83,89,97	0
3	NAG	B	206	14/15	0.94	0.22	52,55,61,62	0
2	FUC	A	201	10/11	0.94	0.35	76,77,80,82	0
3	NAG	D	406	14/15	0.94	0.21	88,90,94,99	0
2	FUC	B	205	10/11	0.95	0.22	61,64,65,65	0
6	EDO	C	401	4/4	0.95	0.14	66,66,68,69	0
6	EDO	B	202	4/4	0.96	0.23	66,69,71,74	0
3	NAG	B	207	14/15	0.96	0.20	54,58,61,72	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.