



# wwPDB X-ray Structure Validation Summary Report ⓘ

Jan 31, 2016 – 09:17 PM GMT

PDB ID : 1O7A  
Title : Human beta-Hexosaminidase B  
Authors : Maier, T.; Strater, N.; Schuette, C.; Klingenstein, R.; Sandhoff, K.; Saenger, W.  
Deposited on : 2002-10-29  
Resolution : 2.25 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

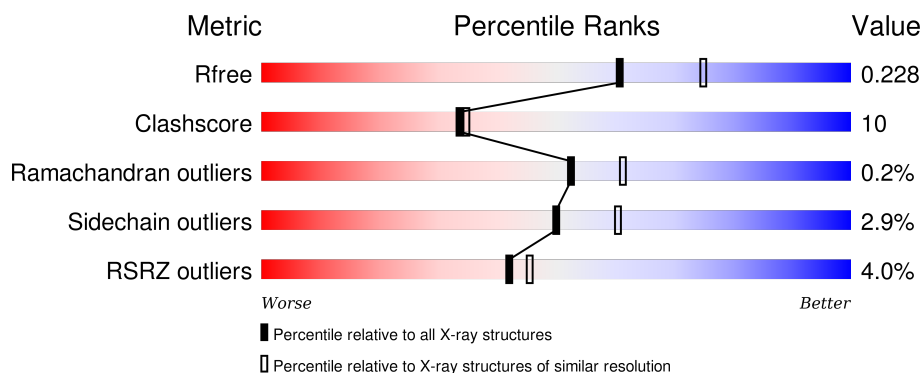
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.25 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	1640 (2.28-2.24)
Clashscore	102246	1095 (2.26-2.26)
Ramachandran outliers	100387	1063 (2.26-2.26)
Sidechain outliers	100360	1063 (2.26-2.26)
RSRZ outliers	91569	1647 (2.28-2.24)

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	515	<div> <div>3%</div> <div> <div></div> <div>72%</div> <div>20%</div> <div>6%</div> </div> </div>
1	B	515	<div> <div>2%</div> <div> <div></div> <div>77%</div> <div>16%</div> <div>6%</div> </div> </div>
1	C	515	<div> <div>4%</div> <div> <div></div> <div>77%</div> <div>16%</div> <div>6%</div> </div> </div>
1	D	515	<div> <div>4%</div> <div> <div></div> <div>74%</div> <div>18%</div> <div>6%</div> </div> </div>
1	E	515	<div> <div>4%</div> <div> <div></div> <div>74%</div> <div>18%</div> <div>6%</div> </div> </div>

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Mol	Chain	Length	Quality of chain
1	F	515	

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
3	NAG	C	700	-	-	-	X
3	NAG	E	700	-	-	-	X
4	NAG	F	702	-	-	-	X
5	EDO	A	801	-	-	-	X
5	EDO	B	801	-	-	X	X
5	EDO	B	802	-	-	-	X
5	EDO	C	801	-	-	-	X
5	EDO	E	801	-	-	-	X
5	EDO	F	801	-	-	-	X

## 2 Entry composition [i](#)

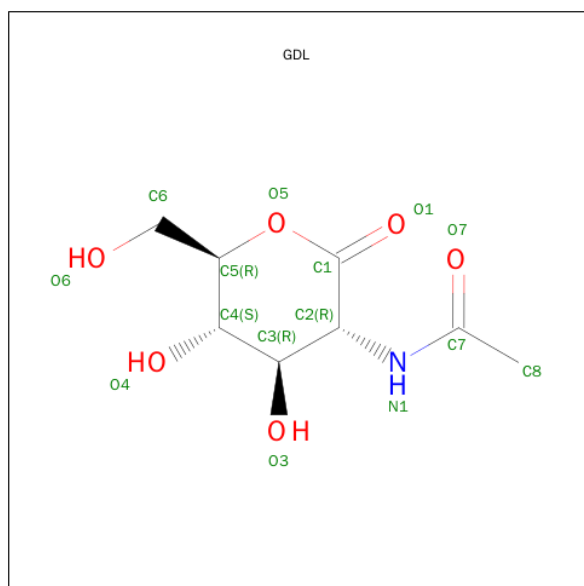
There are 6 unique types of molecules in this entry. The entry contains 26351 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 BETA-HEXOSAMINIDASE BETA CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	484	Total	C	N	O	S	0	4	1
			3933	2538	654	725	16			
1	B	484	Total	C	N	O	S	0	3	1
			3927	2535	653	724	15			
1	C	484	Total	C	N	O	S	0	4	1
			3935	2538	656	727	14			
1	D	483	Total	C	N	O	S	0	6	1
			3939	2542	655	726	16			
1	E	484	Total	C	N	O	S	0	5	1
			3941	2542	655	728	16			
1	F	484	Total	C	N	O	S	0	6	1
			3948	2546	656	730	16			

- Molecule 2 is 2-ACETAMIDO-2-DEOXY-D-GLUCONO-1,5-LACTONE (three-letter code: GDL) (formula: C<sub>8</sub>H<sub>13</sub>NO<sub>6</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			15	8	1	6		
2	B	1	Total	C	N	O	0	0
			15	8	1	6		
2	C	1	Total	C	N	O	0	0
			15	8	1	6		
2	D	1	Total	C	N	O	0	0
			15	8	1	6		
2	E	1	Total	C	N	O	0	0
			15	8	1	6		
2	F	1	Total	C	N	O	0	0
			15	8	1	6		

- Molecule 3 is a polymer of unknown type called SUGAR (2-MER).

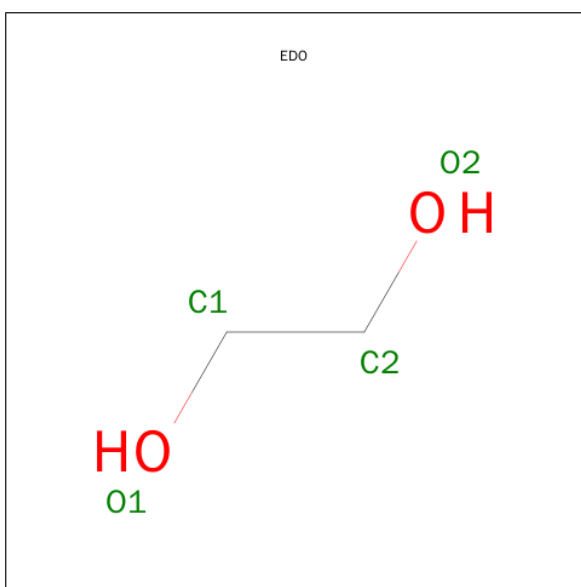
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	2	Total	C	N	O	0	0
			28	16	2	10		
3	B	2	Total	C	N	O	0	0
			28	16	2	10		
3	C	2	Total	C	N	O	0	0
			28	16	2	10		
3	D	2	Total	C	N	O	0	0
			28	16	2	10		
3	E	2	Total	C	N	O	0	0
			28	16	2	10		
3	F	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 4 is SUGAR (N-ACETYL-D-GLUCOSAMINE) (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			14	8	1	5		
4	B	1	Total	C	N	O	0	0
			14	8	1	5		
4	C	1	Total	C	N	O	0	0
			14	8	1	5		
4	E	1	Total	C	N	O	0	0
			14	8	1	5		
4	F	1	Total	C	N	O	0	0
			14	8	1	5		
4	F	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 5 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
5	A	1	Total	C	O	0	0
			4	2	2		
5	A	1	Total	C	O	0	0
			4	2	2		
5	A	1	Total	C	O	0	0
			4	2	2		
5	B	1	Total	C	O	0	0
			4	2	2		
5	B	1	Total	C	O	0	0
			4	2	2		
5	B	1	Total	C	O	0	0
			4	2	2		
5	C	1	Total	C	O	0	0
			4	2	2		
5	C	1	Total	C	O	0	0
			4	2	2		
5	C	1	Total	C	O	0	0
			4	2	2		
5	E	1	Total	C	O	0	0
			4	2	2		
5	E	1	Total	C	O	0	0
			4	2	2		
5	E	1	Total	C	O	0	0
			4	2	2		
5	F	1	Total	C	O	0	0
			4	2	2		
5	F	1	Total	C	O	0	0
			4	2	2		

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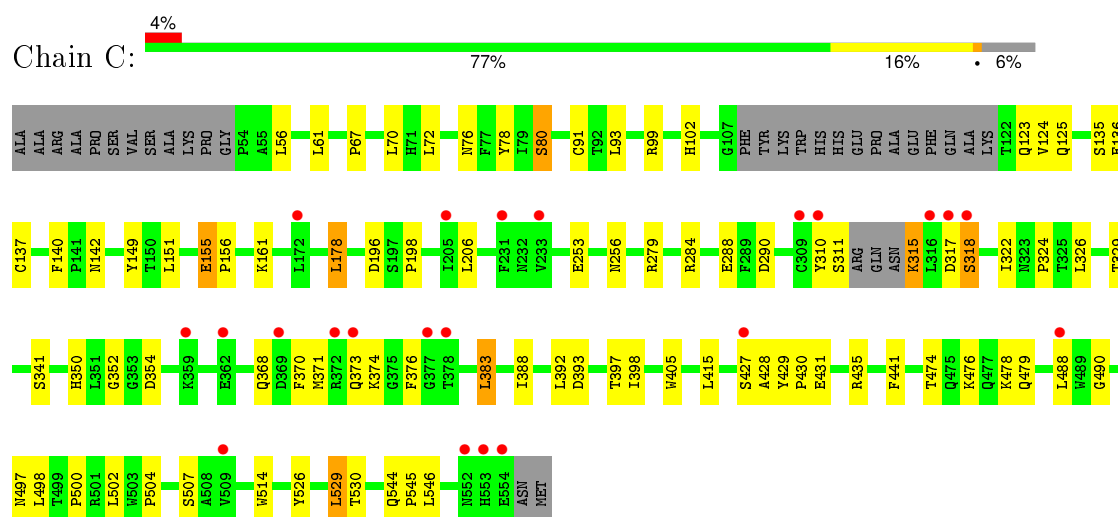
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	F	1	Total	C	O	0	0
			4	2	2		

- Molecule 6 is water.

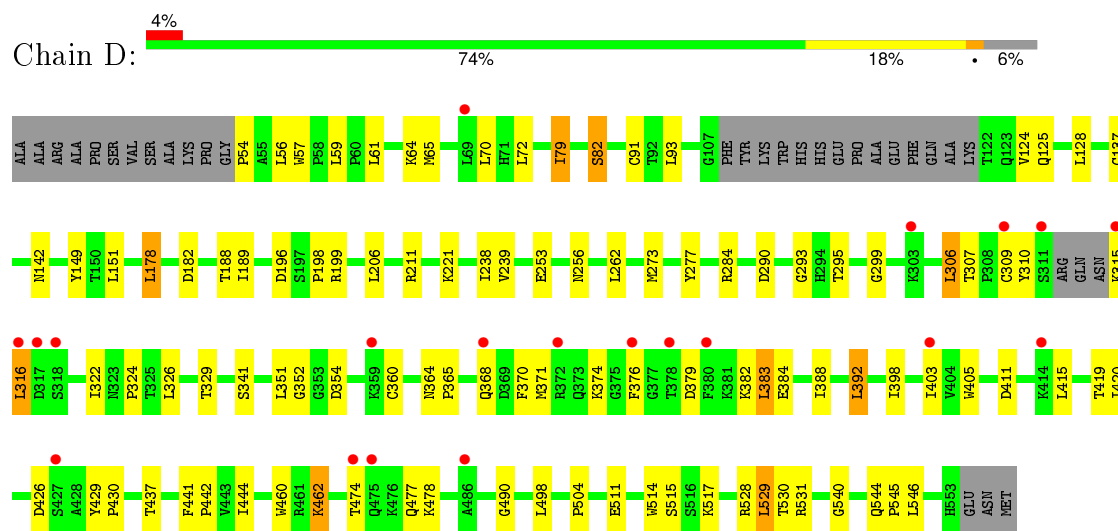
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	385	Total	O	0	0
			385	385		
6	B	399	Total	O	0	0
			399	399		
6	C	385	Total	O	0	0
			385	385		
6	D	346	Total	O	0	0
			346	346		
6	E	448	Total	O	0	0
			448	448		
6	F	363	Total	O	0	0
			363	363		



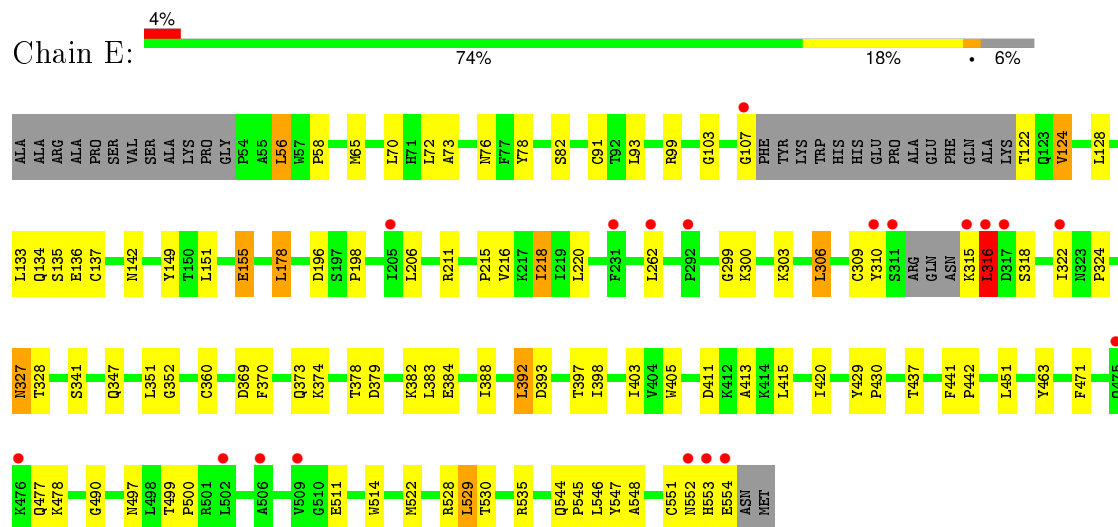




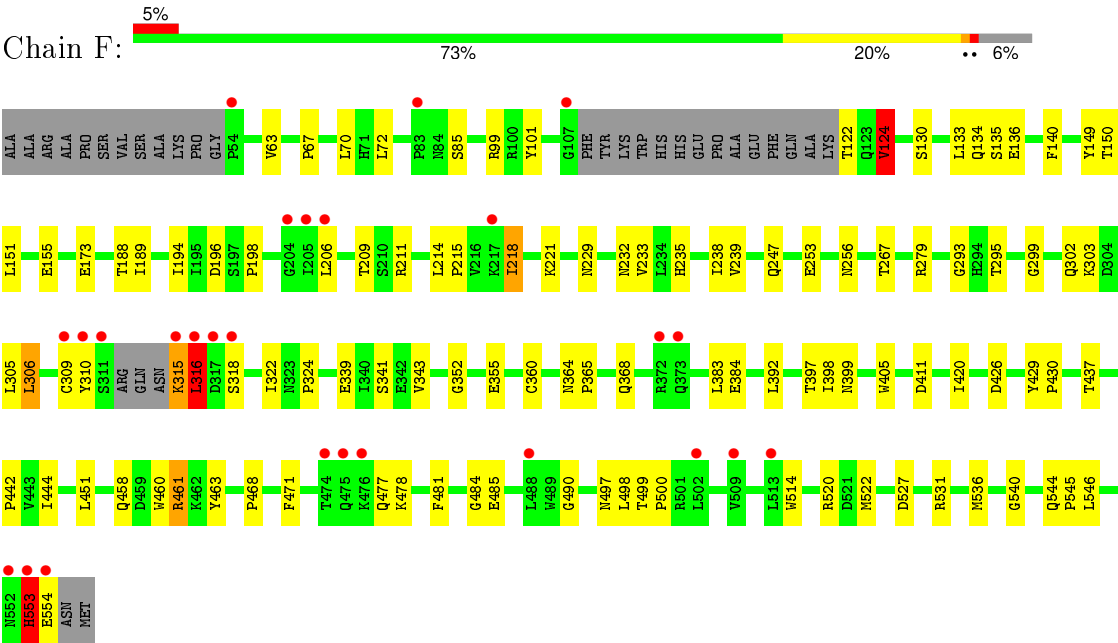
• Molecule 1: BETA-HEXOSAMINIDASE BETA CHAIN



• Molecule 1: BETA-HEXOSAMINIDASE BETA CHAIN



• Molecule 1: BETA-HEXOSAMINIDASE BETA CHAIN



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	163.93Å 163.93Å 244.72Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	28.12 – 2.25 28.12 – 2.25	Depositor EDS
% Data completeness (in resolution range)	97.4 (28.12-2.25) 97.4 (28.12-2.25)	Depositor EDS
$R_{merge}$	0.07	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	4.84 (at 2.24Å)	Xtriage
Refinement program	CNS 1.0	Depositor
R, $R_{free}$	0.196 , 0.236 0.191 , 0.228	Depositor DCC
$R_{free}$ test set	1708 reflections (0.99%)	DCC
Wilson B-factor (Å <sup>2</sup> )	35.3	Xtriage
Anisotropy	0.622	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 47.2	EDS
Estimated twinning fraction	0.004 for -h,-k,l	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.53$ , $\langle L^2 \rangle = 0.37$	Xtriage
Outliers	4 of 175667 reflections (0.002%)	Xtriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	26351	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	41.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.00% 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 [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: GDL, NAG, EDO

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	0.54	1/4045 (0.0%)	0.73	6/5499 (0.1%)
1	B	0.50	0/4039	0.71	1/5491 (0.0%)
1	C	0.49	0/4047	0.68	2/5503 (0.0%)
1	D	0.46	0/4050	0.69	2/5506 (0.0%)
1	E	0.51	0/4053	0.72	3/5510 (0.1%)
1	F	0.47	0/4060	0.70	3/5520 (0.1%)
All	All	0.50	1/24294 (0.0%)	0.70	17/33029 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	142	ASN	CG-ND2	12.73	1.64	1.32

The worst 5 of 17 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	142	ASN	OD1-CG-ND2	-11.23	96.07	121.90
1	E	155	GLU	C-N-CD	-7.06	105.07	120.60
1	A	142	ASN	CB-CG-ND2	6.98	133.45	116.70
1	F	316	LEU	CA-CB-CG	-6.56	100.20	115.30
1	E	490	GLY	N-CA-C	5.88	127.81	113.10

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	142	ASN	Sidechain

## 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	3933	0	3832	91	0
1	B	3927	0	3828	70	0
1	C	3935	0	3830	72	0
1	D	3939	0	3843	86	0
1	E	3941	0	3835	79	0
1	F	3948	0	3840	76	0
2	A	15	0	13	0	0
2	B	15	0	13	0	0
2	C	15	0	13	0	0
2	D	15	0	13	0	0
2	E	15	0	13	0	0
2	F	15	0	13	1	0
3	A	28	0	25	2	0
3	B	28	0	25	4	0
3	C	28	0	25	4	0
3	D	28	0	25	2	0
3	E	28	0	25	2	0
3	F	28	0	25	2	0
4	A	14	0	13	1	0
4	B	14	0	13	0	0
4	C	14	0	13	0	0
4	E	14	0	13	0	0
4	F	28	0	26	0	0
5	A	12	0	18	4	0
5	B	12	0	18	4	0
5	C	12	0	18	2	0
5	E	12	0	18	1	0
5	F	12	0	18	1	0
6	A	385	0	0	17	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	B	399	0	0	11	0
6	C	385	0	0	11	0
6	D	346	0	0	8	0
6	E	448	0	0	14	0
6	F	363	0	0	11	0
All	All	26351	0	23404	480	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 10.

The worst 5 of 480 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:56:LEU:HD21	1:D:178:LEU:HD13	1.51	0.93
1:C:488:LEU:HD23	1:C:502:LEU:HD13	1.51	0.92
1:C:393:ASP:O	1:C:397:THR:HG23	1.70	0.92
1:C:488:LEU:HD12	1:C:488:LEU:O	1.74	0.87
1:F:553:HIS:ND1	1:F:554:GLU:N	2.22	0.86

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	482/515 (94%)	466 (97%)	16 (3%)	0	100	100
1	B	481/515 (93%)	462 (96%)	18 (4%)	1 (0%)	52	61
1	C	482/515 (94%)	467 (97%)	14 (3%)	1 (0%)	52	61
1	D	483/515 (94%)	462 (96%)	20 (4%)	1 (0%)	52	61
1	E	483/515 (94%)	463 (96%)	18 (4%)	2 (0%)	39	43

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	F	484/515 (94%)	463 (96%)	19 (4%)	2 (0%)	39	43
All	All	2895/3090 (94%)	2783 (96%)	105 (4%)	7 (0%)	52	61

5 of 7 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	316	LEU
1	C	318	SER
1	D	316	LEU
1	E	552	ASN
1	F	316	LEU

### 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	433/454 (95%)	418 (96%)	15 (4%)	43	53
1	B	432/454 (95%)	422 (98%)	10 (2%)	58	69
1	C	433/454 (95%)	420 (97%)	13 (3%)	48	59
1	D	434/454 (96%)	422 (97%)	12 (3%)	51	62
1	E	434/454 (96%)	421 (97%)	13 (3%)	48	59
1	F	435/454 (96%)	423 (97%)	12 (3%)	51	62
All	All	2601/2724 (96%)	2526 (97%)	75 (3%)	50	60

5 of 75 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	373	GLN
1	D	211	ARG
1	F	315	LYS
1	C	383	LEU
1	D	82	SER



Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 21 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	76	ASN
1	D	126	GLN
1	E	327	ASN
1	D	68	ASN
1	F	102	HIS

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates ⓘ

12 carbohydrates 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	$\# Z  > 2$
3	NAG	A	700	1,3	14,14,15	0.49	0	15,19,21	0.98	1 (6%)
3	NAG	A	701	3	14,14,15	0.52	0	15,19,21	0.66	0
3	NAG	B	700	1,3	14,14,15	0.41	0	15,19,21	0.70	1 (6%)
3	NAG	B	701	3	14,14,15	0.50	0	15,19,21	0.68	1 (6%)
3	NAG	C	700	1,3	14,14,15	0.41	0	15,19,21	0.96	1 (6%)
3	NAG	C	701	3	14,14,15	0.55	0	15,19,21	0.57	0
3	NAG	D	700	1,3	14,14,15	0.48	0	15,19,21	0.98	1 (6%)
3	NAG	D	701	3	14,14,15	0.53	0	15,19,21	0.87	1 (6%)
3	NAG	E	700	1,3	14,14,15	0.46	0	15,19,21	1.17	2 (13%)
3	NAG	E	701	3	14,14,15	0.51	0	15,19,21	0.69	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	NAG	F	700	1,3	14,14,15	0.51	0	15,19,21	0.85	1 (6%)
3	NAG	F	701	3	14,14,15	0.63	0	15,19,21	0.65	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
3	NAG	A	700	1,3	-	0/6/23/26	0/1/1/1
3	NAG	A	701	3	-	0/6/23/26	0/1/1/1
3	NAG	B	700	1,3	-	0/6/23/26	0/1/1/1
3	NAG	B	701	3	-	0/6/23/26	0/1/1/1
3	NAG	C	700	1,3	-	0/6/23/26	0/1/1/1
3	NAG	C	701	3	-	0/6/23/26	0/1/1/1
3	NAG	D	700	1,3	-	0/6/23/26	0/1/1/1
3	NAG	D	701	3	-	1/6/23/26	0/1/1/1
3	NAG	E	700	1,3	-	0/6/23/26	0/1/1/1
3	NAG	E	701	3	-	1/6/23/26	0/1/1/1
3	NAG	F	700	1,3	-	0/6/23/26	0/1/1/1
3	NAG	F	701	3	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

The worst 5 of 9 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	700	NAG	C2-N2-C7	-2.97	119.23	123.04
3	F	700	NAG	C2-N2-C7	-2.58	119.72	123.04
3	D	701	NAG	C2-N2-C7	-2.54	119.78	123.04
3	E	700	NAG	C2-N2-C7	-2.44	119.91	123.04
3	C	700	NAG	C2-N2-C7	-2.34	120.03	123.04

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	E	701	NAG	O7-C7-N2-C2
3	D	701	NAG	O7-C7-N2-C2

There are no ring outliers.

11 monomers are involved in 16 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	700	NAG	2	0
3	A	701	NAG	1	0
3	B	700	NAG	4	0
3	B	701	NAG	2	0
3	C	700	NAG	4	0
3	C	701	NAG	3	0
3	D	700	NAG	2	0
3	E	700	NAG	2	0
3	E	701	NAG	1	0
3	F	700	NAG	1	0
3	F	701	NAG	1	0

## 5.6 Ligand geometry [i](#)

27 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	GDL	A	600	-	13,15,15	1.70	2 (15%)	14,21,21	1.84	3 (21%)
4	NAG	A	702	1	14,14,15	0.68	0	15,19,21	0.74	1 (6%)
5	EDO	A	800	-	3,3,3	0.56	0	2,2,2	0.50	0
5	EDO	A	801	-	3,3,3	0.59	0	2,2,2	0.42	0
5	EDO	A	802	-	3,3,3	0.48	0	2,2,2	0.42	0
2	GDL	B	600	-	13,15,15	1.87	1 (7%)	14,21,21	1.81	4 (28%)
4	NAG	B	702	1	14,14,15	0.60	0	15,19,21	0.68	1 (6%)
5	EDO	B	800	-	3,3,3	0.57	0	2,2,2	0.47	0
5	EDO	B	801	-	3,3,3	0.52	0	2,2,2	0.37	0
5	EDO	B	802	-	3,3,3	0.56	0	2,2,2	0.45	0
2	GDL	C	600	-	13,15,15	1.83	2 (15%)	14,21,21	1.74	3 (21%)
4	NAG	C	703	1	14,14,15	0.60	0	15,19,21	0.78	0
5	EDO	C	800	-	3,3,3	0.55	0	2,2,2	0.46	0
5	EDO	C	801	-	3,3,3	0.58	0	2,2,2	0.42	0
5	EDO	C	802	-	3,3,3	0.57	0	2,2,2	0.44	0
2	GDL	D	600	-	13,15,15	1.82	3 (23%)	14,21,21	1.74	3 (21%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	GDL	E	600	-	13,15,15	1.79	2 (15%)	14,21,21	1.71	3 (21%)
4	NAG	E	702	1	14,14,15	0.57	0	15,19,21	0.64	0
5	EDO	E	800	-	3,3,3	0.59	0	2,2,2	0.45	0
5	EDO	E	801	-	3,3,3	0.57	0	2,2,2	0.38	0
5	EDO	E	802	-	3,3,3	0.68	0	2,2,2	0.40	0
2	GDL	F	600	-	13,15,15	1.80	1 (7%)	14,21,21	1.72	2 (14%)
4	NAG	F	702	1	14,14,15	0.59	0	15,19,21	0.84	1 (6%)
4	NAG	F	703	1	14,14,15	0.58	0	15,19,21	0.66	0
5	EDO	F	800	-	3,3,3	0.51	0	2,2,2	0.42	0
5	EDO	F	801	-	3,3,3	0.58	0	2,2,2	0.42	0
5	EDO	F	802	-	3,3,3	0.50	0	2,2,2	0.41	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	GDL	A	600	-	-	0/6/26/26	0/1/1/1
4	NAG	A	702	1	-	0/6/23/26	0/1/1/1
5	EDO	A	800	-	-	0/1/1/1	0/0/0/0
5	EDO	A	801	-	-	0/1/1/1	0/0/0/0
5	EDO	A	802	-	-	0/1/1/1	0/0/0/0
2	GDL	B	600	-	-	0/6/26/26	0/1/1/1
4	NAG	B	702	1	-	0/6/23/26	0/1/1/1
5	EDO	B	800	-	-	0/1/1/1	0/0/0/0
5	EDO	B	801	-	-	0/1/1/1	0/0/0/0
5	EDO	B	802	-	-	0/1/1/1	0/0/0/0
2	GDL	C	600	-	-	0/6/26/26	0/1/1/1
4	NAG	C	703	1	-	0/6/23/26	0/1/1/1
5	EDO	C	800	-	-	0/1/1/1	0/0/0/0
5	EDO	C	801	-	-	0/1/1/1	0/0/0/0
5	EDO	C	802	-	-	0/1/1/1	0/0/0/0
2	GDL	D	600	-	-	0/6/26/26	0/1/1/1
2	GDL	E	600	-	-	0/6/26/26	0/1/1/1
4	NAG	E	702	1	-	0/6/23/26	0/1/1/1
5	EDO	E	800	-	-	0/1/1/1	0/0/0/0
5	EDO	E	801	-	-	0/1/1/1	0/0/0/0
5	EDO	E	802	-	-	0/1/1/1	0/0/0/0
2	GDL	F	600	-	-	0/6/26/26	0/1/1/1
4	NAG	F	702	1	-	0/6/23/26	0/1/1/1
4	NAG	F	703	1	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	EDO	F	800	-	-	0/1/1/1	0/0/0/0
5	EDO	F	801	-	-	0/1/1/1	0/0/0/0
5	EDO	F	802	-	-	0/1/1/1	0/0/0/0

The worst 5 of 11 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	600	GDL	O5-C1	-5.23	1.27	1.34
2	E	600	GDL	O5-C1	-5.20	1.27	1.34
2	F	600	GDL	O5-C1	-4.90	1.27	1.34
2	C	600	GDL	O5-C1	-4.90	1.27	1.34
2	D	600	GDL	O5-C1	-4.60	1.28	1.34

The worst 5 of 21 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	600	GDL	O1-C1-C2	-4.02	113.78	123.18
2	D	600	GDL	O1-C1-C2	-3.98	113.89	123.18
2	C	600	GDL	O1-C1-C2	-3.89	114.10	123.18
2	F	600	GDL	O1-C1-C2	-3.69	114.56	123.18
2	B	600	GDL	O1-C1-C2	-3.64	114.68	123.18

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

8 monomers are involved in 14 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	702	NAG	1	0
5	A	800	EDO	2	0
5	A	801	EDO	2	0
5	B	801	EDO	4	0
5	C	801	EDO	2	0
5	E	801	EDO	1	0
2	F	600	GDL	1	0
5	F	800	EDO	1	0

## 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 [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	484/515 (93%)	0.02	18 (3%)	45	49	27, 38, 58, 85	0
1	B	484/515 (93%)	-0.10	11 (2%)	64	68	24, 37, 57, 85	0
1	C	484/515 (93%)	0.01	22 (4%)	37	41	27, 38, 67, 88	0
1	D	483/515 (93%)	0.03	20 (4%)	41	44	27, 39, 64, 93	0
1	E	484/515 (93%)	-0.06	19 (3%)	43	47	25, 36, 54, 86	0
1	F	484/515 (93%)	0.01	26 (5%)	29	33	28, 39, 66, 90	0
All	All	2903/3090 (93%)	-0.02	116 (3%)	42	45	24, 38, 62, 93	0

The worst 5 of 116 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	554	GLU	14.1
1	C	554	GLU	10.2
1	B	554	GLU	9.2
1	D	317	ASP	8.1
1	E	315	LYS	7.7

### 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](#)

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
3	NAG	C	700	14/15	0.89	0.24	4.14	66,69,74,80	0
3	NAG	E	700	14/15	0.85	0.26	2.22	64,67,70,76	0
3	NAG	F	700	14/15	0.84	0.25	1.85	57,60,66,74	0
3	NAG	A	700	14/15	0.88	0.17	1.73	66,70,74,82	0
3	NAG	D	700	14/15	0.85	0.21	0.76	64,68,72,77	0
3	NAG	B	700	14/15	0.86	0.17	0.72	62,65,69,75	0
3	NAG	C	701	14/15	0.72	0.56	-	85,88,90,91	0
3	NAG	E	701	14/15	0.78	0.47	-	81,84,86,87	0
3	NAG	B	701	14/15	0.61	0.46	-	80,84,87,90	0
3	NAG	F	701	14/15	0.82	0.54	-	80,85,88,90	0
3	NAG	D	701	14/15	0.76	0.42	-	81,83,86,88	0
3	NAG	A	701	14/15	0.71	0.56	-	89,93,95,96	0

## 6.4 Ligands ⓘ

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
4	NAG	F	702	14/15	0.70	0.52	7.52	83,88,90,91	0
5	EDO	C	801	4/4	0.77	0.30	7.01	65,66,67,67	0
5	EDO	A	801	4/4	0.84	0.36	6.84	76,76,76,77	0
5	EDO	B	801	4/4	0.83	0.31	4.25	61,62,63,65	0
5	EDO	F	801	4/4	0.91	0.31	3.03	66,67,67,69	0
5	EDO	E	801	4/4	0.89	0.27	2.97	65,66,66,67	0
5	EDO	B	802	4/4	0.93	0.17	2.56	30,35,36,38	0
5	EDO	A	802	4/4	0.95	0.17	1.93	31,38,40,40	0
5	EDO	C	800	4/4	0.91	0.19	1.88	59,59,59,61	0
5	EDO	F	800	4/4	0.91	0.17	1.69	48,51,52,56	0
5	EDO	E	802	4/4	0.91	0.16	1.26	30,31,34,38	0
2	GDL	E	600	15/15	0.93	0.12	1.13	29,33,34,36	0
5	EDO	F	802	4/4	0.95	0.17	1.09	37,38,39,39	0
5	EDO	B	800	4/4	0.97	0.12	0.41	38,38,38,41	0
5	EDO	E	800	4/4	0.92	0.13	0.35	49,49,49,51	0
2	GDL	F	600	15/15	0.90	0.10	0.31	33,38,40,41	0
2	GDL	D	600	15/15	0.94	0.11	-0.03	32,34,37,40	0
5	EDO	A	800	4/4	0.97	0.11	-0.15	56,57,57,61	0
2	GDL	A	600	15/15	0.94	0.10	-0.22	30,32,34,35	0
2	GDL	C	600	15/15	0.93	0.10	-0.36	30,34,38,38	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
2	GDL	B	600	15/15	0.95	0.10	-0.59	30,33,34,35	0
5	EDO	C	802	4/4	0.98	0.08	-1.07	35,36,37,38	0
4	NAG	E	702	14/15	0.68	0.48	-	77,81,82,83	0
4	NAG	A	702	14/15	0.71	0.34	-	64,71,75,78	0
4	NAG	C	703	14/15	0.68	0.54	-	84,88,90,90	0
4	NAG	B	702	14/15	0.67	0.40	-	70,72,75,76	0
4	NAG	F	703	14/15	0.80	0.45	-	79,82,84,84	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.