



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 05:04 PM GMT

PDB ID : 4GZW  
Title : N2 neuraminidase D151G mutant of A/Tanzania/205/2010 H3N2 in complex with avian sialic acid receptor  
Authors : Zhu, X.; Wilson, I.A.  
Deposited on : 2012-09-06  
Resolution : 2.45 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  
<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

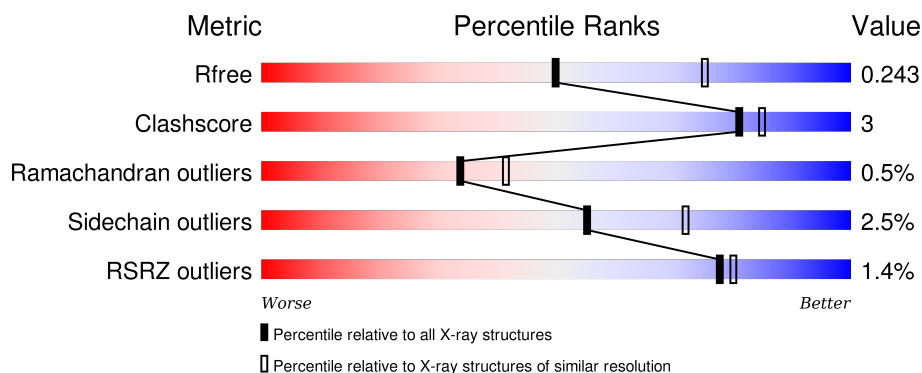
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.45 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	4776 (2.50-2.42)
Clashscore	102246	1030 (2.48-2.44)
Ramachandran outliers	100387	1024 (2.48-2.44)
Sidechain outliers	100360	1024 (2.48-2.44)
RSRZ outliers	91569	4787 (2.50-2.42)

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	393	<div> <div>%</div> <div> <div></div> <div>88%</div> <div>10% ..</div> </div> </div>
1	B	393	<div> <div>%</div> <div> <div></div> <div>90%</div> <div>8% .</div> </div> </div>
1	C	393	<div> <div>2%</div> <div> <div></div> <div>91%</div> <div>8% .</div> </div> </div>
1	D	393	<div> <div>%</div> <div> <div></div> <div>88%</div> <div>10% ..</div> </div> </div>

## 2 Entry composition [i](#)

There are 11 unique types of molecules in this entry. The entry contains 12970 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 neuraminidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	388	Total	C	N	O	S	0	0	0
			2998	1858	531	587	22			
1	B	388	Total	C	N	O	S	0	0	0
			2998	1858	531	587	22			
1	C	388	Total	C	N	O	S	0	0	0
			2998	1858	531	587	22			
1	D	388	Total	C	N	O	S	0	0	0
			2998	1858	531	587	22			

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

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	3	Total	C	N	O	0	0
			46	25	2	19		
2	B	3	Total	C	N	O	0	0
			46	25	2	19		

- Molecule 3 is a polymer of unknown type called SUGAR (5-MER).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	5	Total	C	N	O	0	0
			61	34	2	25		
3	C	5	Total	C	N	O	0	0
			61	34	2	25		
3	D	5	Total	C	N	O	0	0
			61	34	2	25		

- Molecule 4 is SUGAR (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
4	A	1	Total	C	N	O	0	0
			14	8	1	5		
4	A	1	Total	C	N	O	0	0
			14	8	1	5		
4	A	1	Total	C	N	O	0	0
			14	8	1	5		
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	B	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	C	1	Total	C	N	O	0	0
			14	8	1	5		
4	D	1	Total	C	N	O	0	0
			14	8	1	5		
4	D	1	Total	C	N	O	0	0
			14	8	1	5		

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

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	B	1	Total Ca 1 1	0	0
5	A	1	Total Ca 1 1	0	0
5	D	2	Total Ca 2 2	0	0
5	C	1	Total Ca 1 1	0	0

- Molecule 6 is a polymer of unknown type called SUGAR (4-MER).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	B	4	Total C N O 50 28 2 20	0	0

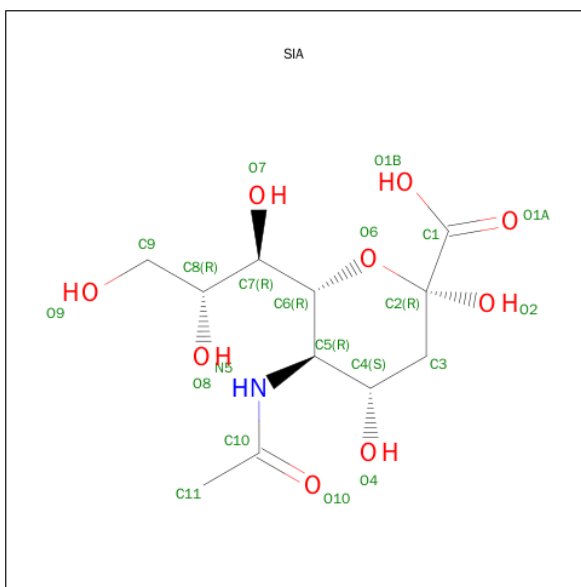
- Molecule 7 is a polymer of unknown type called SUGAR (2-MER).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	C	2	Total C N O 32 17 1 14	0	0

- Molecule 8 is a polymer of unknown type called SUGAR (2-MER).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	C	2	Total C N O 28 16 2 10	0	0

- Molecule 9 is SUGAR (O-SIALIC ACID) (three-letter code: SIA) (formula: C<sub>11</sub>H<sub>19</sub>NO<sub>9</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
9	D	1	Total	C	N	O	0	0
			21	11	1	9		

- Molecule 10 is a polymer of unknown type called SUGAR (3-MER).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
10	D	3	Total	C	N	O	0	0
			38	22	2	14		

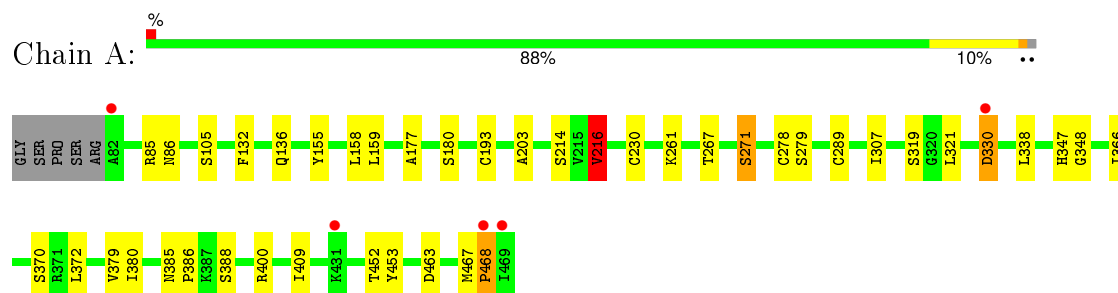
- Molecule 11 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
11	A	88	Total	O	0	0
			88	88		
11	B	90	Total	O	0	0
			90	90		
11	C	92	Total	O	0	0
			92	92		
11	D	91	Total	O	0	0
			91	91		

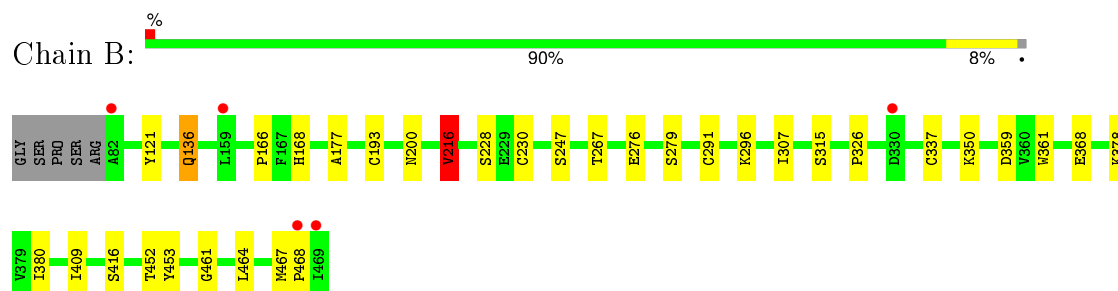
### 3 Residue-property plots [i](#)

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 ( $\text{RSRZ} > 2$ ). 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.

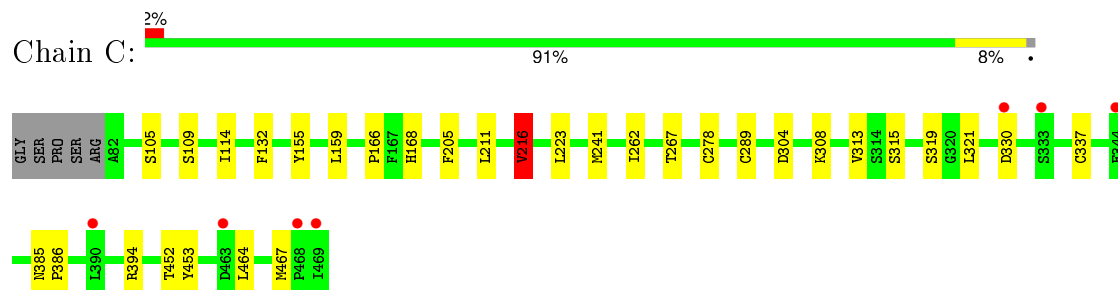
#### • Molecule 1: neuraminidase



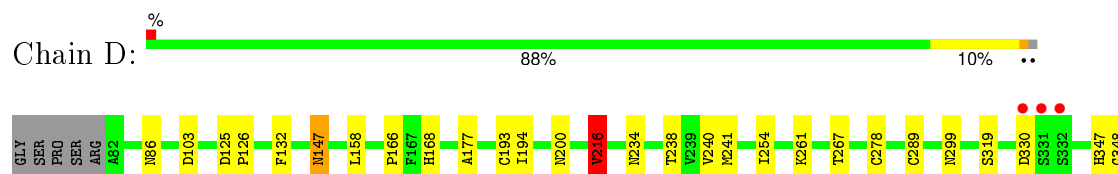
#### • Molecule 1: neuraminidase



#### • Molecule 1: neuraminidase



#### • Molecule 1: neuraminidase







## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	82.44Å 110.56Å 109.93Å 90.00° 97.79° 90.00°	Depositor
Resolution (Å)	50.00 – 2.45 48.44 – 2.44	Depositor EDS
% Data completeness (in resolution range)	93.7 (50.00-2.45) 92.6 (48.44-2.44)	Depositor EDS
$R_{merge}$	0.09	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	4.83 (at 2.45Å)	Xtriage
Refinement program	REFMAC 5.6.0117	Depositor
R, $R_{free}$	0.197 , 0.246 0.198 , 0.243	Depositor DCC
$R_{free}$ test set	3379 reflections (5.28%)	DCC
Wilson B-factor (Å <sup>2</sup> )	22.3	Xtriage
Anisotropy	1.938	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 38.3	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtriage
Outliers	1 of 67518 reflections (0.001%)	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	12970	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	28.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.55% of the height of the origin peak. No significant pseudotranslation is detected.*

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

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.375 respectively for untwinned datasets, and 0.333, 0.2 for perfectly twinned datasets.

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: BMA, NAG, CA, SIA, GAL, 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	0/3065	0.62	1/4156 (0.0%)
1	B	0.48	0/3065	0.61	1/4156 (0.0%)
1	C	0.49	0/3065	0.61	1/4156 (0.0%)
1	D	0.49	0/3065	0.62	1/4156 (0.0%)
All	All	0.49	0/12260	0.62	4/16624 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	216	VAL	CB-CA-C	-6.53	98.99	111.40
1	D	216	VAL	CB-CA-C	-5.63	100.70	111.40
1	B	216	VAL	CB-CA-C	-5.61	100.73	111.40
1	A	216	VAL	CB-CA-C	-5.08	101.76	111.40

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	2998	0	2854	23	0
1	B	2998	0	2854	21	0
1	C	2998	0	2855	21	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	D	2998	0	2855	28	0
2	A	46	0	40	0	0
2	B	46	0	40	1	0
3	A	61	0	52	0	0
3	C	61	0	52	0	0
3	D	61	0	52	0	0
4	A	56	0	52	0	0
4	B	56	0	52	0	0
4	C	28	0	26	0	0
4	D	28	0	26	0	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
5	C	1	0	0	0	0
5	D	2	0	0	0	0
6	B	50	0	43	0	0
7	C	32	0	28	1	0
8	C	28	0	25	0	0
9	D	21	0	18	0	0
10	D	38	0	34	1	0
11	A	88	0	0	2	0
11	B	90	0	0	3	0
11	C	92	0	0	1	0
11	D	91	0	0	0	0
All	All	12970	0	11958	80	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 3.

All (80) 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:452:THR:HB	1:D:216:VAL:HG22	1.69	0.72
1:C:216:VAL:HG13	1:D:453:TYR:C	2.10	0.71
1:C:216:VAL:HG13	1:D:453:TYR:O	1.91	0.70
1:A:321:LEU:HD22	11:A:951:HOH:O	1.94	0.66
1:B:216:VAL:CG2	1:C:452:THR:HB	2.27	0.64
1:A:453:TYR:C	1:D:216:VAL:HG13	2.19	0.61
1:A:467:MET:HB3	1:A:468:PRO:HD2	1.82	0.61
1:A:279:SER:HB3	1:A:409:ILE:HG22	1.82	0.61
1:B:216:VAL:HG22	1:C:452:THR:HB	1.81	0.61
7:C:801:SIA:H92	11:C:912:HOH:O	2.01	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:359:ASP:OD1	1:B:380:ILE:HA	2.03	0.57
1:D:194:ILE:HD11	1:D:241:MET:CE	2.35	0.56
1:D:194:ILE:HD11	1:D:241:MET:HE3	1.87	0.55
1:A:380:ILE:O	1:A:388:SER:OG	2.21	0.55
1:B:216:VAL:HG13	1:C:453:TYR:C	2.28	0.54
1:B:136:GLN:HE21	1:B:136:GLN:HA	1.73	0.53
1:A:385:ASN:HD22	1:A:386:PRO:HD2	1.73	0.52
1:A:453:TYR:O	1:D:216:VAL:HG13	2.10	0.51
1:A:132:PHE:HB3	1:A:158:LEU:HD11	1.93	0.51
1:C:385:ASN:HD22	1:C:386:PRO:HD2	1.77	0.50
1:B:464:LEU:HA	1:B:467:MET:HG2	1.92	0.50
1:A:452:THR:CB	1:D:216:VAL:HG22	2.40	0.50
1:C:321:LEU:HD22	1:C:330:ASP:OD1	2.12	0.49
1:D:347:HIS:CG	1:D:348:GLY:H	2.30	0.49
1:A:216:VAL:HG22	1:B:453:TYR:N	2.28	0.49
1:D:240:VAL:HG22	1:D:254:ILE:HG13	1.94	0.49
1:C:155:TYR:CE1	1:D:461:GLY:HA3	2.49	0.48
1:C:223:LEU:HD11	1:C:241:MET:HE1	1.94	0.48
1:C:278:CYS:HB3	1:C:289:CYS:HB3	1.96	0.48
1:B:279:SER:HB3	1:B:409:ILE:HG22	1.96	0.48
1:A:177:ALA:HB2	1:A:193:CYS:HB3	1.95	0.47
1:D:428:ARG:NH2	1:D:464:LEU:HG	2.30	0.47
1:C:216:VAL:HG22	1:D:452:THR:HB	1.98	0.46
1:C:464:LEU:HA	1:C:467:MET:HG3	1.97	0.46
1:A:216:VAL:CG2	1:B:452:THR:HB	2.46	0.46
1:B:228:SER:HB3	1:B:350:LYS:HE2	1.97	0.46
1:A:155:TYR:CE1	1:B:461:GLY:HA3	2.51	0.46
1:D:465:ASN:H	1:D:465:ASN:HD22	1.62	0.46
1:B:296:LYS:HB2	11:B:902:HOH:O	2.15	0.46
11:B:960:HOH:O	1:C:394:ARG:HD3	2.15	0.46
1:D:125:ASP:HB2	1:D:126:PRO:HD2	1.98	0.45
1:B:315:SER:HB2	1:B:337:CYS:O	2.17	0.45
1:B:276:GLU:O	1:B:291:CYS:HB3	2.17	0.45
1:C:216:VAL:CG1	1:D:453:TYR:O	2.61	0.45
1:C:304:ASP:HB2	1:C:313:VAL:CG2	2.47	0.45
1:A:347:HIS:CG	1:A:348:GLY:H	2.35	0.45
1:B:464:LEU:HA	1:B:467:MET:CG	2.47	0.45
1:D:465:ASN:H	1:D:465:ASN:ND2	2.14	0.45
1:D:86:ASN:OD1	1:D:234:ASN:OD1	2.35	0.45
1:A:132:PHE:HA	1:A:159:LEU:O	2.17	0.44
1:D:177:ALA:HB2	1:D:193:CYS:HB3	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:177:ALA:HB2	1:B:193:CYS:HB3	1.99	0.44
1:D:278:CYS:HB3	1:D:289:CYS:HB3	2.00	0.43
1:D:147:ASN:ND2	10:D:509:NAG:H62	2.32	0.43
1:C:205:PHE:CE1	1:C:262:ILE:HD11	2.52	0.43
1:C:109:SER:HB3	1:C:114:ILE:HB	2.01	0.43
1:D:166:PRO:O	1:D:168:HIS:HD2	2.02	0.43
1:B:326:PRO:HA	1:B:368:GLU:O	2.19	0.42
1:C:304:ASP:HB2	1:C:313:VAL:HG23	2.00	0.42
1:A:278:CYS:HB3	1:A:289:CYS:HB3	2.01	0.42
1:A:330:ASP:N	1:A:330:ASP:OD1	2.51	0.42
1:C:132:PHE:HA	1:C:159:LEU:O	2.19	0.42
1:B:361:TRP:CE2	1:B:378:LYS:HD3	2.55	0.42
1:B:296:LYS:HB2	1:B:296:LYS:HE3	1.84	0.41
1:D:359:ASP:OD1	1:D:380:ILE:HA	2.20	0.41
1:C:166:PRO:O	1:C:168:HIS:HD2	2.03	0.41
1:D:299:ASN:N	1:D:299:ASN:OD1	2.53	0.41
1:D:125:ASP:HB2	1:D:126:PRO:CD	2.51	0.41
1:D:103:ASP:OD1	1:D:442:SER:HB2	2.20	0.41
1:A:203:ALA:O	1:A:214:SER:HA	2.20	0.41
1:C:315:SER:HB2	1:C:337:CYS:O	2.20	0.41
1:B:166:PRO:O	1:B:168:HIS:HD2	2.04	0.41
1:D:385:ASN:HA	1:D:386:PRO:HD2	2.00	0.41
1:A:271:SER:HB3	1:A:338:LEU:O	2.21	0.41
1:A:85:ARG:HD3	11:A:969:HOH:O	2.20	0.41
1:B:121:TYR:CG	1:B:228:SER:HA	2.56	0.40
1:D:132:PHE:HB3	1:D:158:LEU:HD11	2.02	0.40
1:A:321:LEU:HD12	1:A:379:VAL:HG22	2.02	0.40
2:B:501:SIA:H92	11:B:990:HOH:O	2.22	0.40
1:A:366:ILE:HG21	1:A:400:ARG:HB3	2.04	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles ⓘ

### 5.3.1 Protein backbone ⓘ

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	386/393 (98%)	364 (94%)	20 (5%)	2 (0%)	34	41
1	B	386/393 (98%)	368 (95%)	16 (4%)	2 (0%)	34	41
1	C	386/393 (98%)	365 (95%)	20 (5%)	1 (0%)	46	57
1	D	386/393 (98%)	366 (95%)	17 (4%)	3 (1%)	24	28
All	All	1544/1572 (98%)	1463 (95%)	73 (5%)	8 (0%)	34	41

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	468	PRO
1	D	319	SER
1	B	200	ASN
1	D	468	PRO
1	A	319	SER
1	B	468	PRO
1	C	319	SER
1	D	200	ASN

### 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	337/341 (99%)	323 (96%)	14 (4%)	36	51
1	B	337/341 (99%)	330 (98%)	7 (2%)	61	77
1	C	337/341 (99%)	332 (98%)	5 (2%)	72	84
1	D	337/341 (99%)	329 (98%)	8 (2%)	57	73
All	All	1348/1364 (99%)	1314 (98%)	34 (2%)	55	72

All (34) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	86	ASN
1	A	105	SER
1	A	136	GLN

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Mol	Chain	Res	Type
1	A	180	SER
1	A	216	VAL
1	A	230	CYS
1	A	261	LYS
1	A	267	THR
1	A	271	SER
1	A	307	ILE
1	A	330	ASP
1	A	370	SER
1	A	372	LEU
1	A	463	ASP
1	B	136	GLN
1	B	216	VAL
1	B	230	CYS
1	B	247	SER
1	B	267	THR
1	B	307	ILE
1	B	416	SER
1	C	105	SER
1	C	211	LEU
1	C	216	VAL
1	C	267	THR
1	C	308	LYS
1	D	147	ASN
1	D	216	VAL
1	D	238	THR
1	D	261	LYS
1	D	267	THR
1	D	330	ASP
1	D	369	THR
1	D	385	ASN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (24) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	136	GLN
1	A	168	HIS
1	A	358	ASN
1	A	385	ASN
1	A	393	ASN
1	B	136	GLN
1	B	168	HIS

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Mol	Chain	Res	Type
1	B	173	GLN
1	B	385	ASN
1	B	402	ASN
1	C	86	ASN
1	C	136	GLN
1	C	147	ASN
1	C	168	HIS
1	C	385	ASN
1	C	393	ASN
1	D	136	GLN
1	D	147	ASN
1	D	168	HIS
1	D	234	ASN
1	D	358	ASN
1	D	385	ASN
1	D	393	ASN
1	D	465	ASN

### 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 ⓘ

32 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	$\# Z  > 2$
2	SIA	A	501	2	16,20,21	0.46	0	18,28,31	1.16	1 (5%)



Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	NAG	A	502	2	15,15,15	0.49	0	17,21,21	1.17	2 (11%)
2	GAL	A	503	2	11,11,12	0.60	0	14,15,17	1.14	1 (7%)
3	NAG	A	504	1,3	14,14,15	0.65	0	15,19,21	1.20	1 (6%)
3	NAG	A	505	3	14,14,15	0.50	0	15,19,21	1.42	3 (20%)
3	BMA	A	506	3	11,11,12	0.78	0	14,15,17	0.95	1 (7%)
3	MAN	A	507	3	11,11,12	0.66	0	14,15,17	1.17	1 (7%)
3	MAN	A	508	3	11,11,12	0.61	0	14,15,17	1.09	1 (7%)
2	SIA	B	501	2	16,20,21	0.45	0	18,28,31	1.66	4 (22%)
2	NAG	B	502	2	15,15,15	0.82	1 (6%)	17,21,21	1.46	2 (11%)
2	GAL	B	503	2	11,11,12	0.73	0	14,15,17	1.53	2 (14%)
6	NAG	B	504	1,6	14,14,15	0.63	0	15,19,21	1.13	1 (6%)
6	NAG	B	505	6	14,14,15	0.46	0	15,19,21	1.46	3 (20%)
6	BMA	B	506	6	11,11,12	0.67	0	14,15,17	0.68	0
6	MAN	B	507	6	11,11,12	0.68	0	14,15,17	0.94	1 (7%)
7	SIA	C	801	7	16,20,21	0.51	0	18,28,31	1.53	3 (16%)
7	GAL	C	802	7	12,12,12	0.78	0	17,17,17	0.79	0
3	NAG	C	803	1,3	14,14,15	0.60	0	15,19,21	1.07	1 (6%)
3	NAG	C	804	3	14,14,15	0.38	0	15,19,21	1.40	2 (13%)
3	BMA	C	805	3	11,11,12	0.83	0	14,15,17	0.96	1 (7%)
3	MAN	C	806	3	11,11,12	0.63	0	14,15,17	1.65	1 (7%)
3	MAN	C	807	3	11,11,12	0.52	0	14,15,17	1.54	2 (14%)
8	NAG	C	808	1,8	14,14,15	0.59	0	15,19,21	1.32	3 (20%)
8	NAG	C	809	8	14,14,15	0.61	0	15,19,21	1.15	2 (13%)
3	NAG	D	503	1,3	14,14,15	0.59	0	15,19,21	0.94	1 (6%)
3	NAG	D	504	3	14,14,15	0.50	0	15,19,21	1.46	2 (13%)
3	BMA	D	505	3	11,11,12	0.68	0	14,15,17	1.02	0
3	MAN	D	506	3	11,11,12	0.54	0	14,15,17	1.63	1 (7%)
3	MAN	D	507	3	11,11,12	0.58	0	14,15,17	2.16	3 (21%)
10	NAG	D	509	1,10	14,14,15	0.54	0	15,19,21	1.60	5 (33%)
10	NAG	D	510	10	14,14,15	0.55	0	15,19,21	1.14	2 (13%)
10	FUC	D	511	10	10,10,11	0.72	0	14,14,16	2.07	3 (21%)

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	SIA	A	501	2	-	0/14/34/38	0/1/1/1
2	NAG	A	502	2	-	0/6/26/26	0/1/1/1
2	GAL	A	503	2	-	0/2/19/22	0/1/1/1
3	NAG	A	504	1,3	-	0/6/23/26	0/1/1/1
3	NAG	A	505	3	-	0/6/23/26	0/1/1/1
3	BMA	A	506	3	-	0/2/19/22	0/1/1/1
3	MAN	A	507	3	-	0/2/19/22	0/1/1/1
3	MAN	A	508	3	-	0/2/19/22	0/1/1/1
2	SIA	B	501	2	-	0/14/34/38	0/1/1/1
2	NAG	B	502	2	-	0/6/26/26	0/1/1/1
2	GAL	B	503	2	-	0/2/19/22	0/1/1/1
6	NAG	B	504	1,6	-	0/6/23/26	0/1/1/1
6	NAG	B	505	6	-	0/6/23/26	0/1/1/1
6	BMA	B	506	6	-	0/2/19/22	0/1/1/1
6	MAN	B	507	6	-	0/2/19/22	0/1/1/1
7	SIA	C	801	7	-	0/14/34/38	0/1/1/1
7	GAL	C	802	7	-	0/2/22/22	0/1/1/1
3	NAG	C	803	1,3	-	0/6/23/26	0/1/1/1
3	NAG	C	804	3	-	0/6/23/26	0/1/1/1
3	BMA	C	805	3	-	0/2/19/22	0/1/1/1
3	MAN	C	806	3	-	0/2/19/22	0/1/1/1
3	MAN	C	807	3	-	0/2/19/22	0/1/1/1
8	NAG	C	808	1,8	-	0/6/23/26	0/1/1/1
8	NAG	C	809	8	-	0/6/23/26	0/1/1/1
3	NAG	D	503	1,3	-	0/6/23/26	0/1/1/1
3	NAG	D	504	3	-	0/6/23/26	0/1/1/1
3	BMA	D	505	3	-	0/2/19/22	0/1/1/1
3	MAN	D	506	3	-	0/2/19/22	0/1/1/1
3	MAN	D	507	3	-	0/2/19/22	0/1/1/1
10	NAG	D	509	1,10	-	0/6/23/26	0/1/1/1
10	NAG	D	510	10	-	0/6/23/26	0/1/1/1
10	FUC	D	511	10	-	0/0/17/20	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	502	NAG	O3-C3	2.27	1.48	1.43

All (56) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	C	801	SIA	C7-C6-C5	-3.64	108.81	114.32
3	D	504	NAG	C3-C4-C5	-3.02	104.93	110.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	501	SIA	C7-C6-C5	-2.97	109.83	114.32
10	D	509	NAG	O3-C3-C2	-2.92	103.33	109.11
7	C	801	SIA	C9-C8-C7	-2.89	105.70	112.48
6	B	504	NAG	C2-N2-C7	-2.87	119.35	123.04
6	B	505	NAG	O4-C4-C3	-2.74	104.17	110.34
2	B	501	SIA	C9-C8-C7	-2.66	106.23	112.48
3	A	505	NAG	C3-C4-C5	-2.55	105.75	110.20
10	D	509	NAG	C2-N2-C7	-2.46	119.87	123.04
8	C	808	NAG	O3-C3-C2	-2.41	104.34	109.11
6	B	505	NAG	C3-C2-N2	-2.32	105.00	110.56
3	A	505	NAG	O4-C4-C3	-2.21	105.37	110.34
8	C	808	NAG	O6-C6-C5	-2.04	104.59	111.33
10	D	509	NAG	O3-C3-C4	2.08	115.02	110.34
2	A	502	NAG	C4-C3-C2	2.20	113.47	110.43
8	C	808	NAG	C4-C3-C2	2.21	114.67	111.23
10	D	510	NAG	C4-C3-C2	2.24	114.72	111.23
3	D	507	MAN	O5-C5-C6	2.25	112.23	107.35
6	B	507	MAN	C1-O5-C5	2.28	115.14	112.25
10	D	509	NAG	C4-C3-C2	2.30	114.81	111.23
3	C	805	BMA	C1-O5-C5	2.31	115.18	112.25
8	C	809	NAG	O5-C5-C6	2.33	112.39	107.35
3	C	804	NAG	C2-N2-C7	2.38	126.10	123.04
3	D	503	NAG	C1-O5-C5	2.41	115.31	112.25
3	D	504	NAG	C2-N2-C7	2.45	126.19	123.04
2	A	502	NAG	C3-C4-C5	2.47	114.50	110.20
3	C	804	NAG	C1-O5-C5	2.52	115.45	112.25
10	D	509	NAG	C1-O5-C5	2.55	115.49	112.25
3	A	508	MAN	C1-O5-C5	2.67	115.63	112.25
3	A	506	BMA	C1-C2-C3	2.69	112.72	109.54
2	B	502	NAG	C4-C3-C2	2.77	114.27	110.43
10	D	510	NAG	C1-O5-C5	2.91	115.95	112.25
3	A	505	NAG	C1-O5-C5	3.02	116.08	112.25
8	C	809	NAG	C4-C3-C2	3.02	115.92	111.23
3	C	803	NAG	C1-O5-C5	3.23	116.34	112.25
2	B	501	SIA	O6-C6-C5	3.24	113.78	108.48
2	B	503	GAL	C1-C2-C3	3.30	113.45	109.54
2	B	501	SIA	O6-C2-C3	3.32	116.25	109.86
7	C	801	SIA	O6-C6-C5	3.33	113.94	108.48
2	A	503	GAL	C1-C2-C3	3.35	113.51	109.54
3	D	507	MAN	C1-C2-C3	3.37	113.53	109.54
3	A	504	NAG	C1-O5-C5	3.41	116.57	112.25
10	D	511	FUC	C3-C4-C5	3.43	115.50	109.72

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	807	MAN	C1-O5-C5	3.46	116.64	112.25
2	B	503	GAL	C1-O5-C5	3.46	116.64	112.25
3	A	507	MAN	C1-O5-C5	3.50	116.69	112.25
6	B	505	NAG	C1-O5-C5	3.58	116.79	112.25
2	A	501	SIA	O6-C2-C3	3.63	116.84	109.86
3	C	807	MAN	C1-C2-C3	3.67	113.88	109.54
2	B	502	NAG	C3-C4-C5	3.85	116.91	110.20
10	D	511	FUC	O5-C5-C4	4.23	116.87	109.53
10	D	511	FUC	C1-O5-C5	4.68	119.60	112.38
3	D	506	MAN	C1-O5-C5	4.99	118.58	112.25
3	C	806	MAN	C1-O5-C5	5.33	119.01	112.25
3	D	507	MAN	C1-O5-C5	6.27	120.20	112.25

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	501	SIA	1	0
7	C	801	SIA	1	0
10	D	509	NAG	1	0

## 5.6 Ligand geometry ⓘ

Of 18 ligands modelled in this entry, 5 are monoatomic - leaving 13 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	$\# Z  > 2$
4	NAG	A	509	1	14,14,15	0.57	0	15,19,21	1.56	3 (20%)
4	NAG	A	510	1	14,14,15	0.53	0	15,19,21	1.23	2 (13%)
4	NAG	A	511	1	14,14,15	0.49	0	15,19,21	1.20	1 (6%)
4	NAG	A	512	1	14,14,15	0.50	0	15,19,21	1.80	2 (13%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	NAG	B	508	1	14,14,15	0.48	0	15,19,21	1.43	1 (6%)
4	NAG	B	509	1	14,14,15	0.51	0	15,19,21	1.36	3 (20%)
4	NAG	B	510	1	14,14,15	0.60	0	15,19,21	1.02	1 (6%)
4	NAG	B	511	1	14,14,15	0.45	0	15,19,21	1.34	1 (6%)
4	NAG	C	810	1	14,14,15	0.59	0	15,19,21	0.82	0
4	NAG	C	811	1	14,14,15	0.47	0	15,19,21	0.89	0
9	SIA	D	502	-	17,21,21	1.73	2 (11%)	19,31,31	4.91	3 (15%)
4	NAG	D	508	1	14,14,15	0.48	0	15,19,21	1.42	2 (13%)
4	NAG	D	512	1	14,14,15	0.51	0	15,19,21	1.28	1 (6%)

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
4	NAG	A	509	1	-	0/6/23/26	0/1/1/1
4	NAG	A	510	1	-	0/6/23/26	0/1/1/1
4	NAG	A	511	1	-	0/6/23/26	0/1/1/1
4	NAG	A	512	1	-	0/6/23/26	0/1/1/1
4	NAG	B	508	1	-	0/6/23/26	0/1/1/1
4	NAG	B	509	1	-	0/6/23/26	0/1/1/1
4	NAG	B	510	1	-	0/6/23/26	0/1/1/1
4	NAG	B	511	1	-	0/6/23/26	0/1/1/1
4	NAG	C	810	1	-	0/6/23/26	0/1/1/1
4	NAG	C	811	1	-	0/6/23/26	0/1/1/1
9	SIA	D	502	-	-	0/14/38/38	0/1/1/1
4	NAG	D	508	1	-	0/6/23/26	0/1/1/1
4	NAG	D	512	1	-	0/6/23/26	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	D	502	SIA	C3-C2	2.57	1.55	1.51
9	D	502	SIA	O2-C2	6.27	1.46	1.40

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	D	502	SIA	O2-C2-C3	-17.76	87.23	109.41

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	D	512	NAG	C4-C3-C2	-2.79	106.88	111.23
4	A	512	NAG	C3-C4-C5	-2.51	105.83	110.20
4	B	509	NAG	C2-N2-C7	-2.36	120.01	123.04
4	B	509	NAG	O3-C3-C2	-2.14	104.88	109.11
4	A	510	NAG	C1-O5-C5	2.11	114.92	112.25
4	D	508	NAG	C3-C4-C5	2.43	114.43	110.20
4	B	509	NAG	C4-C3-C2	2.44	115.03	111.23
4	B	510	NAG	C1-O5-C5	2.62	115.57	112.25
4	A	509	NAG	C4-C3-C2	2.62	115.31	111.23
4	A	509	NAG	C1-O5-C5	2.76	115.76	112.25
4	A	510	NAG	C4-C3-C2	3.02	115.92	111.23
9	D	502	SIA	C2-C3-C4	3.39	117.99	110.69
4	A	509	NAG	C3-C4-C5	4.04	117.25	110.20
4	A	511	NAG	C1-O5-C5	4.11	117.46	112.25
4	D	508	NAG	C1-O5-C5	4.26	117.66	112.25
4	B	508	NAG	C1-O5-C5	4.62	118.11	112.25
4	B	511	NAG	C1-O5-C5	4.64	118.13	112.25
4	A	512	NAG	C1-O5-C5	5.37	119.06	112.25
9	D	502	SIA	O2-C2-O6	11.01	128.18	110.22

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 ⓘ

### 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	388/393 (98%)	-0.17	5 (1%) 79 81	11, 26, 42, 58	0
1	B	388/393 (98%)	-0.10	5 (1%) 79 81	12, 26, 41, 59	0
1	C	388/393 (98%)	-0.17	7 (1%) 71 74	14, 26, 42, 59	0
1	D	388/393 (98%)	-0.19	5 (1%) 79 81	15, 26, 40, 56	0
All	All	1552/1572 (98%)	-0.16	22 (1%) 78 80	11, 26, 42, 59	0

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	468	PRO	6.3
1	A	469	ILE	6.2
1	C	469	ILE	6.2
1	C	468	PRO	4.6
1	D	469	ILE	4.2
1	B	468	PRO	4.1
1	B	469	ILE	3.8
1	A	330	ASP	3.7
1	D	332	SER	3.2
1	A	468	PRO	3.1
1	C	390	LEU	2.5
1	B	82	ALA	2.5
1	A	431	LYS	2.4
1	C	333	SER	2.4
1	C	463	ASP	2.3
1	D	330	ASP	2.3
1	C	330	ASP	2.2
1	B	330	ASP	2.2
1	C	344	GLU	2.0
1	D	331	SER	2.0
1	A	82	ALA	2.0
1	B	159	LEU	2.0

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

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

## 6.3 Carbohydrates ⓘ

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
6	NAG	B	504	14/15	0.95	0.14	0.95	26,27,36,36	0
3	NAG	A	504	14/15	0.94	0.14	0.59	26,31,37,38	0
3	NAG	D	503	14/15	0.93	0.15	0.54	25,31,35,36	0
2	SIA	B	501	20/21	0.90	0.15	0.47	33,41,46,48	0
7	SIA	C	801	20/21	0.93	0.14	0.36	33,37,39,40	0
3	NAG	C	803	14/15	0.93	0.14	0.25	25,32,35,35	0
2	SIA	A	501	20/21	0.94	0.14	0.05	45,47,52,52	0
2	NAG	A	502	15/15	0.79	0.37	-	71,76,78,78	0
3	NAG	D	504	14/15	0.94	0.19	-	29,32,37,37	0
3	MAN	C	806	11/12	0.84	0.17	-	36,39,42,45	0
3	MAN	A	507	11/12	0.82	0.20	-	45,46,47,50	0
2	GAL	A	503	11/12	0.87	0.28	-	60,65,68,68	0
3	BMA	D	505	11/12	0.95	0.12	-	40,43,47,51	0
8	NAG	C	808	14/15	0.79	0.16	-	52,57,63,63	0
10	NAG	D	509	14/15	0.90	0.17	-	46,49,55,55	0
8	NAG	C	809	14/15	0.82	0.24	-	65,67,68,69	0
10	FUC	D	511	10/11	0.83	0.25	-	57,58,59,59	0
10	NAG	D	510	14/15	0.80	0.27	-	58,59,60,61	0
3	MAN	D	506	11/12	0.85	0.18	-	46,47,49,51	0
3	MAN	C	807	11/12	0.88	0.23	-	54,56,58,59	0
7	GAL	C	802	12/12	0.74	0.27	-	47,51,54,54	0
6	BMA	B	506	11/12	0.85	0.15	-	38,41,46,53	0
3	NAG	C	804	14/15	0.96	0.12	-	32,33,34,36	0
2	NAG	B	502	15/15	0.67	0.47	-	74,78,81,82	0
3	MAN	A	508	11/12	0.89	0.15	-	43,45,47,47	0
3	BMA	A	506	11/12	0.94	0.17	-	36,39,41,42	0
3	BMA	C	805	11/12	0.92	0.12	-	38,40,45,51	0
2	GAL	B	503	11/12	0.75	0.32	-	57,66,69,70	0
3	MAN	D	507	11/12	0.86	0.16	-	53,55,57,58	0
6	MAN	B	507	11/12	0.92	0.18	-	38,43,45,48	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
3	NAG	A	505	14/15	0.96	0.14	-	29,30,31,34	0
6	NAG	B	505	14/15	0.98	0.12	-	28,30,31,34	0

## 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
9	SIA	D	502	21/21	0.91	0.16	1.38	39,41,45,53	0
4	NAG	C	811	14/15	0.90	0.20	0.13	47,51,52,52	0
5	CA	A	513	1/1	0.99	0.07	-1.35	27,27,27,27	0
5	CA	C	812	1/1	0.99	0.05	-1.55	29,29,29,29	0
5	CA	D	513	1/1	0.99	0.06	-1.92	26,26,26,26	0
5	CA	B	512	1/1	0.99	0.05	-2.42	30,30,30,30	0
4	NAG	B	509	14/15	0.81	0.19	-	54,59,66,66	0
4	NAG	A	510	14/15	0.77	0.17	-	53,58,65,67	0
4	NAG	B	510	14/15	0.89	0.33	-	45,49,50,51	0
4	NAG	A	509	14/15	0.69	0.26	-	58,61,64,64	0
4	NAG	A	511	14/15	0.80	0.31	-	48,52,54,54	0
4	NAG	C	810	14/15	0.84	0.31	-	49,53,54,54	0
4	NAG	B	508	14/15	0.81	0.31	-	56,59,60,60	0
4	NAG	D	512	14/15	0.84	0.24	-	48,52,52,53	0
4	NAG	A	512	14/15	0.86	0.29	-	48,52,56,56	0
4	NAG	D	508	14/15	0.85	0.33	-	56,60,62,62	0
5	CA	D	501	1/1	0.89	0.07	-	69,69,69,69	0
4	NAG	B	511	14/15	0.83	0.31	-	50,54,54,55	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.