



Full wwPDB X-ray Structure Validation Report ⓘ

May 8, 2019 – 07:38 AM EDT

PDB ID : 6MYM
Title : Crystal structure of hemagglutinin from influenza virus A/Phillipines/2/1982 (H3N2)
Authors : Dai, Y.N.; Fremont, D.H.; Center for Structural Genomics of Infectious Diseases (CSGID)
Deposited on : 2018-11-01
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

A user guide is available at

<https://www.wwpdb.org/validation/2017/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 : 1.8.0 (224370), CSD as540be (2019)
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

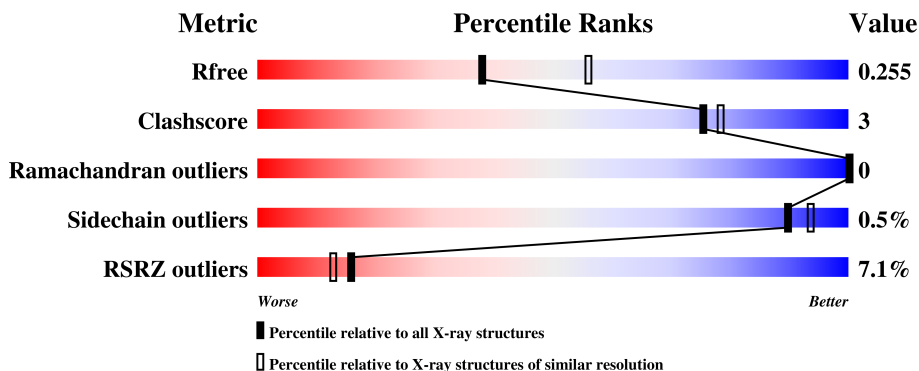
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

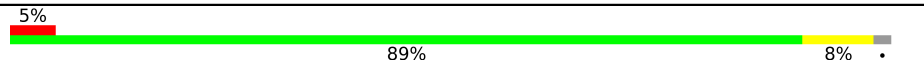
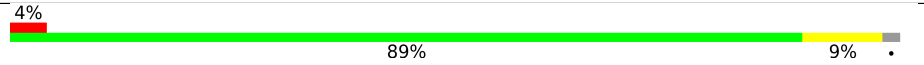
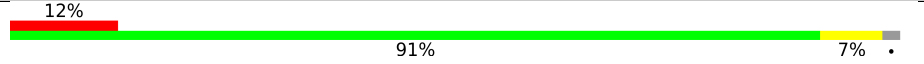
The reported resolution of this entry is 2.45 Å.

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}	111664	1259 (2.48-2.44)
Clashscore	122126	1323 (2.48-2.44)
Ramachandran outliers	120053	1314 (2.48-2.44)
Sidechain outliers	120020	1314 (2.48-2.44)
RSRZ outliers	108989	1238 (2.48-2.44)

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.

Mol	Chain	Length	Quality of chain
1	A	497	
1	B	497	
1	C	497	

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
2	NAG	A	604	-	-	-	X

2 Entry composition [i](#)

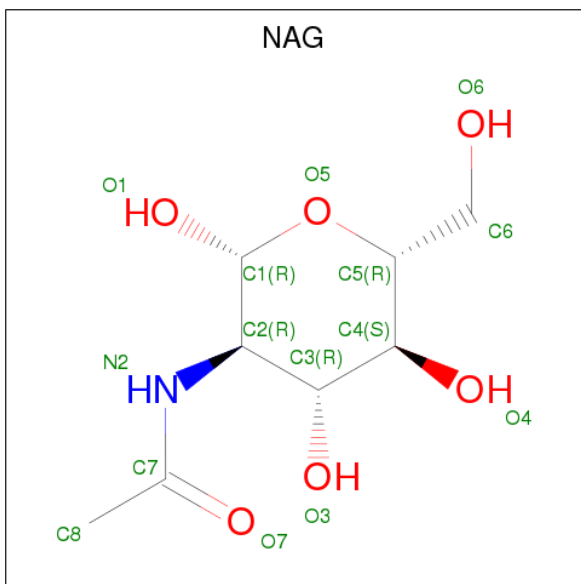
There are 4 unique types of molecules in this entry. The entry contains 12267 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Hemagglutinin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	486	Total 3837	C 2396	N 678	O 745	S 18	0	0	0
1	B	486	Total 3837	C 2396	N 678	O 745	S 18	0	0	0
1	C	487	Total 3841	C 2398	N 679	O 746	S 18	0	0	0

- Molecule 2 is N-ACETYL-D-GLUCOSAMINE (three-letter code: NAG) (formula: C₈H₁₅NO₆).



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

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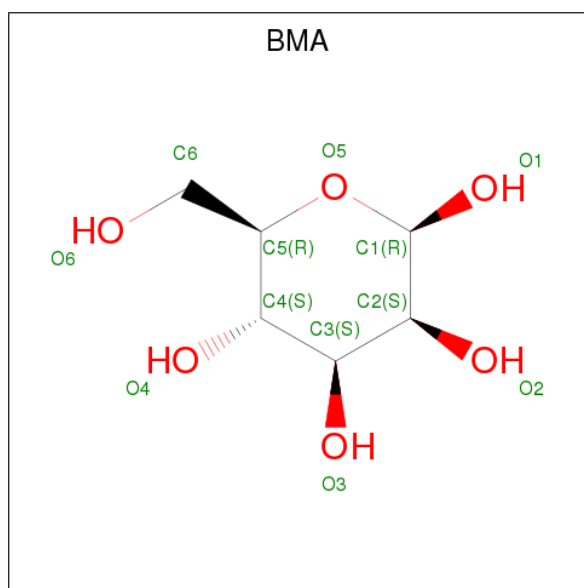
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	B	1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

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

- Molecule 3 is BETA-D-MANNOSE (three-letter code: BMA) (formula: C₆H₁₂O₆).



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

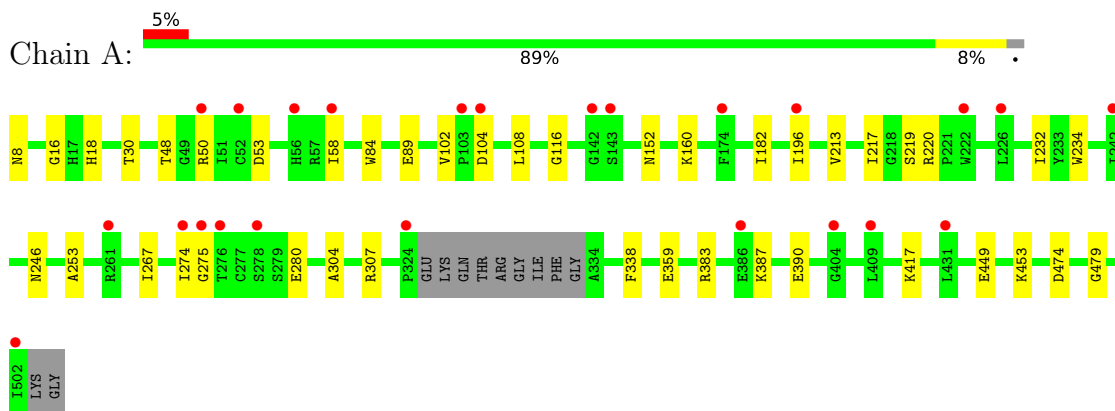
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	60	Total	O	0	0
			60	60		
4	B	71	Total	O	0	0
			71	71		
4	C	40	Total	O	0	0
			40	40		

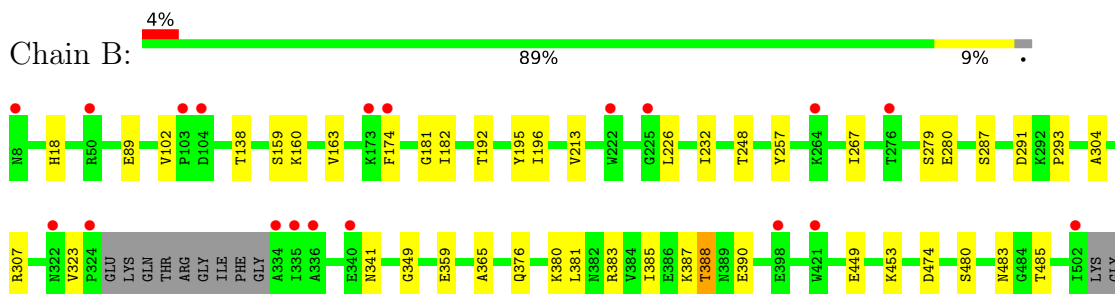
3 Residue-property plots [i](#)

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.

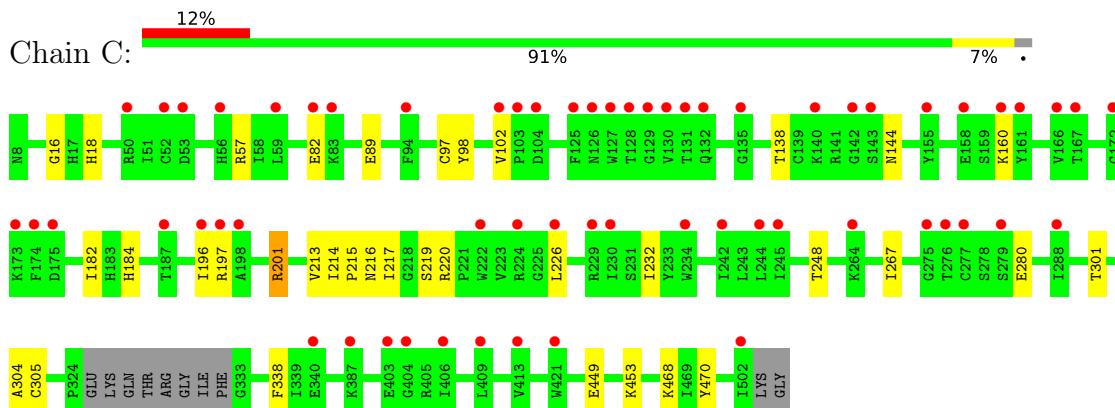
- Molecule 1: Hemagglutinin



- Molecule 1: Hemagglutinin



- Molecule 1: Hemagglutinin



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	195.78Å 187.58Å 107.73Å 90.00° 109.82° 90.00°	Depositor
Resolution (Å)	48.58 – 2.45 48.58 – 2.45	Depositor EDS
% Data completeness (in resolution range)	99.3 (48.58-2.45) 99.5 (48.58-2.45)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.63 (at 2.45Å)	Xtrriage
Refinement program	PHENIX 1.11.1_2575	Depositor
R, R_{free}	0.227 , 0.254 0.228 , 0.255	Depositor DCC
R_{free} test set	6562 reflections (4.93%)	wwPDB-VP
Wilson B-factor (Å ²)	59.7	Xtrriage
Anisotropy	0.327	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 57.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.52$, $\langle L^2 \rangle = 0.35$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	12267	wwPDB-VP
Average B, all atoms (Å ²)	84.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.36% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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: BMA, NAG

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	0.34	0/3917	0.55	0/5304
1	B	0.33	0/3917	0.52	0/5304
1	C	0.32	0/3921	0.52	0/5309
All	All	0.33	0/11755	0.53	0/15917

There are no bond length outliers.

There are no bond angle outliers.

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	3837	0	3714	27	0
1	B	3837	0	3713	30	0
1	C	3841	0	3717	20	0
2	A	182	0	160	4	0
2	B	168	0	150	4	0
2	C	154	0	137	0	0
3	A	33	0	30	0	0
3	B	22	0	20	0	0
3	C	22	0	20	0	0
4	A	60	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	B	71	0	0	0	0
4	C	40	0	0	0	0
All	All	12267	0	11661	81	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 (81) 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:160:LYS:HA	1:A:196:ILE:HD11	1.29	1.14
1:C:57:ARG:NH2	1:C:82:GLU:OE2	2.02	0.90
1:C:160:LYS:HA	1:C:196:ILE:HD11	1.58	0.84
1:C:280:GLU:HG2	1:C:304:ALA:HB3	1.61	0.80
1:B:280:GLU:HG2	1:B:304:ALA:HB3	1.65	0.78
1:B:160:LYS:HA	1:B:196:ILE:HD11	1.68	0.76
1:A:280:GLU:HG2	1:A:304:ALA:HB3	1.68	0.75
1:B:359:GLU:OE2	1:B:474:ASP:HB2	1.92	0.70
1:B:163:VAL:HG12	1:B:248:THR:HG22	1.75	0.68
1:A:160:LYS:HA	1:A:196:ILE:CD1	2.19	0.67
1:B:182:ILE:CD1	1:B:213:VAL:HB	2.23	0.67
1:C:160:LYS:HA	1:C:196:ILE:CD1	2.27	0.65
1:C:160:LYS:CA	1:C:196:ILE:HD11	2.25	0.65
1:C:217:ILE:H	1:C:217:ILE:HD12	1.63	0.64
1:A:48:THR:HG21	1:A:50:ARG:NH2	2.13	0.64
1:A:182:ILE:CD1	1:A:213:VAL:HB	2.28	0.63
1:C:216:ASN:HB2	1:C:220:ARG:HH12	1.64	0.63
2:B:710:NAG:H83	2:B:710:NAG:H3	1.81	0.62
1:A:359:GLU:OE2	1:A:474:ASP:HB2	2.00	0.61
1:B:160:LYS:CA	1:B:196:ILE:HD11	2.30	0.60
2:B:702:NAG:H83	2:B:702:NAG:H3	1.84	0.59
1:B:160:LYS:HA	1:B:196:ILE:CD1	2.32	0.58
1:B:182:ILE:HD13	1:B:213:VAL:HB	1.86	0.56
1:C:138:THR:HG21	1:C:226:LEU:HG	1.86	0.56
2:A:614:NAG:C8	1:C:219:SER:H	2.19	0.56
1:C:449:GLU:O	1:C:453:LYS:HG2	2.05	0.56
2:A:604:NAG:H83	2:A:604:NAG:H3	1.87	0.55
1:A:219:SER:O	1:A:220:ARG:NH1	2.40	0.55
1:B:383:ARG:O	1:B:387:LYS:HG2	2.08	0.53
1:A:479:GLY:HA3	2:A:611:NAG:H61	1.91	0.53
1:B:307:ARG:NH1	1:B:390:GLU:OE1	2.41	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:217:ILE:HD12	1:A:217:ILE:H	1.74	0.52
1:C:102:VAL:HG22	1:C:232:ILE:HB	1.92	0.52
1:C:182:ILE:CD1	1:C:213:VAL:HB	2.39	0.52
1:A:449:GLU:O	1:A:453:LYS:HG2	2.10	0.52
1:A:102:VAL:HG22	1:A:232:ILE:HB	1.92	0.51
1:B:449:GLU:O	1:B:453:LYS:HG2	2.10	0.51
1:B:483:ASN:HB3	1:B:485:THR:HG23	1.92	0.51
1:A:48:THR:HG22	1:A:50:ARG:NH1	2.25	0.51
1:A:89:GLU:HG3	1:A:267:ILE:HD11	1.93	0.49
1:A:307:ARG:NH1	1:A:390:GLU:HG3	2.27	0.49
1:C:201:ARG:NH1	1:C:214:ILE:HD11	2.27	0.49
1:A:246:ASN:HD22	2:A:614:NAG:H83	1.78	0.49
1:B:192:THR:HA	1:B:195:TYR:O	2.12	0.48
2:B:708:NAG:H3	2:B:708:NAG:H83	1.95	0.48
1:B:480:SER:HA	1:B:483:ASN:HB2	1.95	0.48
1:C:97:CYS:SG	1:C:98:TYR:N	2.86	0.47
1:B:89:GLU:HG3	1:B:267:ILE:HD11	1.97	0.47
1:B:174:PHE:HZ	1:B:257:TYR:HH	1.63	0.46
1:B:279:SER:OG	1:B:287:SER:HB3	2.16	0.46
1:A:30:THR:HG21	1:B:376:GLN:HG2	1.98	0.46
1:B:159:SER:C	1:B:196:ILE:HD11	2.36	0.46
1:B:381:LEU:O	1:B:385:ILE:HG12	2.16	0.45
1:A:58:ILE:HG21	1:A:274:ILE:HD12	1.99	0.45
1:B:102:VAL:HG22	1:B:232:ILE:HB	1.99	0.44
1:C:89:GLU:HG3	1:C:267:ILE:HD11	2.00	0.44
1:C:468:LYS:HG2	1:C:470:TYR:CE1	2.53	0.44
1:A:383:ARG:O	1:A:387:LYS:HG2	2.18	0.43
1:A:53:ASP:N	1:A:275:GLY:O	2.44	0.43
1:A:217:ILE:HD12	1:A:217:ILE:N	2.34	0.42
1:A:108:LEU:HB2	1:A:234:TRP:CZ3	2.54	0.42
1:A:152:ASN:HB3	1:A:253:ALA:HB3	2.01	0.42
2:B:709:NAG:O3	2:B:710:NAG:O7	2.26	0.42
1:A:104:ASP:HB3	1:A:234:TRP:CH2	2.54	0.42
1:B:293:PRO:HA	1:B:388:THR:HG22	2.02	0.42
1:A:390:GLU:OE2	1:A:417:LYS:NZ	2.53	0.41
1:B:181:GLY:O	1:B:182:ILE:HG13	2.20	0.41
1:B:291:ASP:N	1:B:291:ASP:OD1	2.53	0.41
1:B:138:THR:HG21	1:B:226:LEU:HG	2.02	0.41
1:A:16:GLY:HA2	1:A:338:PHE:HB3	2.02	0.41
1:C:301:THR:HB	1:C:305:CYS:SG	2.61	0.41
1:A:220:ARG:HD3	1:A:220:ARG:HA	1.95	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:159:SER:O	1:B:196:ILE:HD11	2.21	0.41
1:A:84:TRP:CE2	1:A:116:GLY:HA2	2.56	0.41
1:B:380:LYS:HB3	1:B:380:LYS:HE2	1.88	0.41
1:C:184:HIS:CE1	1:C:215:PRO:HA	2.56	0.41
1:C:16:GLY:HA2	1:C:338:PHE:HB3	2.03	0.41
1:C:197:ARG:NH2	1:C:248:THR:O	2.52	0.41
1:B:323:VAL:HG12	1:B:341:ASN:OD1	2.20	0.41
1:B:349:GLY:HA3	1:B:365:ALA:HB1	2.03	0.41
1:B:196:ILE:HD13	1:B:196:ILE:HG21	1.83	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	482/497 (97%)	465 (96%)	17 (4%)	0	100	100
1	B	482/497 (97%)	465 (96%)	17 (4%)	0	100	100
1	C	483/497 (97%)	465 (96%)	18 (4%)	0	100	100
All	All	1447/1491 (97%)	1395 (96%)	52 (4%)	0	100	100

There are no Ramachandran outliers to report.

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	425/433 (98%)	423 (100%)	2 (0%)	90	93
1	B	425/433 (98%)	423 (100%)	2 (0%)	90	93
1	C	425/433 (98%)	422 (99%)	3 (1%)	85	91
All	All	1275/1299 (98%)	1268 (100%)	7 (0%)	90	93

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	8	ASN
1	A	18	HIS
1	B	18	HIS
1	B	388	THR
1	C	18	HIS
1	C	144	ASN
1	C	201	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	407	GLN
1	C	355	HIS

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](#)

43 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	NAG	A	601	1,2	14,14,15	0.24	0	17,19,21	0.57	0
2	NAG	A	602	2	14,14,15	0.37	0	17,19,21	0.45	0
2	NAG	A	603	1,2	14,14,15	0.31	0	17,19,21	0.68	1 (5%)
2	NAG	A	604	2	14,14,15	0.33	0	17,19,21	1.84	4 (23%)
2	NAG	A	605	1,2	14,14,15	0.19	0	17,19,21	0.46	0
2	NAG	A	606	3,2	14,14,15	0.20	0	17,19,21	0.63	0
3	BMA	A	607	2	11,11,12	0.64	0	15,15,17	0.80	0
2	NAG	A	608	1,2	14,14,15	0.36	0	17,19,21	0.46	0
2	NAG	A	609	3,2	14,14,15	0.26	0	17,19,21	0.51	0
3	BMA	A	610	2	11,11,12	0.69	0	15,15,17	0.76	0
2	NAG	A	611	1	14,14,15	0.17	0	17,19,21	0.54	0
2	NAG	A	612	1,2	14,14,15	0.26	0	17,19,21	0.46	0
2	NAG	A	613	2	14,14,15	0.24	0	17,19,21	0.41	0
2	NAG	A	614	1,2	14,14,15	0.93	1 (7%)	17,19,21	0.77	1 (5%)
2	NAG	A	615	3,2	14,14,15	0.47	0	17,19,21	0.55	0
3	BMA	A	616	2	11,11,12	0.60	0	15,15,17	0.84	0
2	NAG	B	701	1	14,14,15	0.34	0	17,19,21	0.56	0
2	NAG	B	702	1	14,14,15	0.66	1 (7%)	17,19,21	1.30	2 (11%)
2	NAG	B	703	1,2	14,14,15	0.39	0	17,19,21	0.63	0
2	NAG	B	704	3,2	14,14,15	0.33	0	17,19,21	0.54	0
3	BMA	B	705	2	11,11,12	0.67	0	15,15,17	0.91	0
2	NAG	B	706	1,2	14,14,15	0.27	0	17,19,21	0.42	0
2	NAG	B	707	2	14,14,15	0.33	0	17,19,21	0.38	0
2	NAG	B	708	1	14,14,15	0.72	0	17,19,21	1.39	3 (17%)
2	NAG	B	709	1	14,14,15	0.26	0	17,19,21	0.43	0
2	NAG	B	710	1,2	14,14,15	0.55	0	17,19,21	1.31	1 (5%)
2	NAG	B	711	2	14,14,15	0.25	0	17,19,21	0.44	0
2	NAG	B	712	1,2	14,14,15	0.43	0	17,19,21	0.84	0
2	NAG	B	713	3,2	14,14,15	0.72	1 (7%)	17,19,21	0.58	0
3	BMA	B	714	2	11,11,12	0.67	0	15,15,17	0.98	0
2	NAG	C	601	1	14,14,15	0.43	0	17,19,21	0.65	1 (5%)
2	NAG	C	602	1,2	14,14,15	0.28	0	17,19,21	0.79	1 (5%)
2	NAG	C	603	2	14,14,15	0.35	0	17,19,21	0.53	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	NAG	C	604	1	14,14,15	0.50	0	17,19,21	0.45	0
2	NAG	C	605	1,2	14,14,15	1.96	1 (7%)	17,19,21	1.53	3 (17%)
2	NAG	C	606	3,2	14,14,15	1.08	1 (7%)	17,19,21	0.61	0
3	BMA	C	607	2	11,11,12	0.93	1 (9%)	15,15,17	1.02	1 (6%)
2	NAG	C	608	1,2	14,14,15	0.58	0	17,19,21	0.62	0
2	NAG	C	609	2	14,14,15	0.23	0	17,19,21	0.77	1 (5%)
2	NAG	C	610	1	14,14,15	0.64	0	17,19,21	2.23	5 (29%)
2	NAG	C	611	1,2	14,14,15	0.19	0	17,19,21	0.66	0
2	NAG	C	612	3,2	14,14,15	0.55	0	17,19,21	0.57	0
3	BMA	C	613	2	11,11,12	0.73	0	15,15,17	1.07	2 (13%)

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	NAG	A	601	1,2	-	0/6/23/26	0/1/1/1
2	NAG	A	602	2	-	0/6/23/26	0/1/1/1
2	NAG	A	603	1,2	-	0/6/23/26	0/1/1/1
2	NAG	A	604	2	-	0/6/23/26	0/1/1/1
2	NAG	A	605	1,2	-	0/6/23/26	0/1/1/1
2	NAG	A	606	3,2	-	0/6/23/26	0/1/1/1
3	BMA	A	607	2	-	0/2/19/22	0/1/1/1
2	NAG	A	608	1,2	-	0/6/23/26	0/1/1/1
2	NAG	A	609	3,2	-	0/6/23/26	0/1/1/1
3	BMA	A	610	2	-	0/2/19/22	0/1/1/1
2	NAG	A	611	1	-	0/6/23/26	0/1/1/1
2	NAG	A	612	1,2	-	0/6/23/26	0/1/1/1
2	NAG	A	613	2	-	0/6/23/26	0/1/1/1
2	NAG	A	614	1,2	-	0/6/23/26	0/1/1/1
2	NAG	A	615	3,2	-	0/6/23/26	0/1/1/1
3	BMA	A	616	2	-	0/2/19/22	0/1/1/1
2	NAG	B	701	1	-	0/6/23/26	0/1/1/1
2	NAG	B	702	1	-	0/6/23/26	0/1/1/1
2	NAG	B	703	1,2	-	0/6/23/26	0/1/1/1
2	NAG	B	704	3,2	-	0/6/23/26	0/1/1/1
3	BMA	B	705	2	-	0/2/19/22	0/1/1/1
2	NAG	B	706	1,2	-	0/6/23/26	0/1/1/1
2	NAG	B	707	2	-	0/6/23/26	0/1/1/1
2	NAG	B	708	1	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	B	709	1	-	0/6/23/26	0/1/1/1
2	NAG	B	710	1,2	-	0/6/23/26	0/1/1/1
2	NAG	B	711	2	-	0/6/23/26	0/1/1/1
2	NAG	B	712	1,2	-	0/6/23/26	0/1/1/1
2	NAG	B	713	3,2	-	0/6/23/26	0/1/1/1
3	BMA	B	714	2	-	0/2/19/22	0/1/1/1
2	NAG	C	601	1	-	0/6/23/26	0/1/1/1
2	NAG	C	602	1,2	-	0/6/23/26	0/1/1/1
2	NAG	C	603	2	-	0/6/23/26	0/1/1/1
2	NAG	C	604	1	-	0/6/23/26	0/1/1/1
2	NAG	C	605	1,2	-	0/6/23/26	0/1/1/1
2	NAG	C	606	3,2	-	0/6/23/26	0/1/1/1
3	BMA	C	607	2	-	0/2/19/22	0/1/1/1
2	NAG	C	608	1,2	-	0/6/23/26	0/1/1/1
2	NAG	C	609	2	-	0/6/23/26	0/1/1/1
2	NAG	C	610	1	-	0/6/23/26	0/1/1/1
2	NAG	C	611	1,2	-	0/6/23/26	0/1/1/1
2	NAG	C	612	3,2	-	0/6/23/26	0/1/1/1
3	BMA	C	613	2	-	0/2/19/22	0/1/1/1

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	614	NAG	O5-C1	-3.32	1.38	1.43
2	B	713	NAG	O5-C1	-2.60	1.39	1.43
3	C	607	BMA	C2-C3	-2.02	1.49	1.52
2	B	702	NAG	C1-C2	2.25	1.55	1.52
2	C	606	NAG	O5-C1	3.34	1.49	1.43
2	C	605	NAG	O5-C1	6.85	1.54	1.43

All (26) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	613	BMA	O2-C2-C3	-2.32	105.62	110.16
2	A	614	NAG	O4-C4-C5	-2.02	104.23	109.29
2	B	702	NAG	C1-C2-N2	2.05	114.00	110.49
2	C	605	NAG	O3-C3-C2	2.06	113.74	109.38
2	A	603	NAG	C1-O5-C5	2.08	115.03	112.20
2	B	708	NAG	C1-C2-N2	2.08	114.05	110.49
2	C	605	NAG	C2-N2-C7	2.09	125.92	122.92
2	B	708	NAG	C1-O5-C5	2.15	115.13	112.20
2	C	610	NAG	C1-C2-N2	2.21	114.27	110.49

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	601	NAG	C1-O5-C5	2.32	115.36	112.20
3	C	613	BMA	C1-O5-C5	2.47	115.56	112.20
2	A	604	NAG	C1-O5-C5	2.62	115.76	112.20
2	C	610	NAG	O3-C3-C2	2.69	115.05	109.38
2	A	604	NAG	C3-C4-C5	2.71	115.09	110.23
3	C	607	BMA	C1-O5-C5	2.73	115.91	112.20
2	C	610	NAG	C3-C4-C5	2.76	115.19	110.23
2	C	602	NAG	C1-O5-C5	2.80	116.01	112.20
2	C	610	NAG	C2-N2-C7	2.87	127.03	122.92
2	C	609	NAG	C1-O5-C5	2.92	116.17	112.20
2	A	604	NAG	C1-C2-N2	3.11	115.80	110.49
2	B	710	NAG	C2-N2-C7	4.24	129.00	122.92
2	B	702	NAG	C2-N2-C7	4.32	129.12	122.92
2	B	708	NAG	C2-N2-C7	4.39	129.21	122.92
2	C	605	NAG	C1-O5-C5	4.85	118.80	112.20
2	A	604	NAG	C2-N2-C7	4.93	129.98	122.92
2	C	610	NAG	C1-O5-C5	6.55	121.11	112.20

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

7 monomers are involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	604	NAG	1	0
2	A	611	NAG	1	0
2	A	614	NAG	2	0
2	B	702	NAG	1	0
2	B	708	NAG	1	0
2	B	709	NAG	1	0
2	B	710	NAG	2	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

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, 95th 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 ²)	Q<0.9
1	A	486/497 (97%)	0.47	24 (4%) 29 27	47, 74, 107, 124	0
1	B	486/497 (97%)	0.51	19 (3%) 39 36	47, 74, 107, 131	0
1	C	487/497 (97%)	0.82	61 (12%) 4 2	51, 94, 125, 155	0
All	All	1459/1491 (97%)	0.60	104 (7%) 16 13	47, 78, 118, 155	0

All (104) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	502	ILE	6.7
1	C	277	CYS	5.6
1	C	161	TYR	4.9
1	C	174	PHE	4.9
1	B	334	ALA	4.7
1	C	155	TYR	4.7
1	B	502	ILE	4.2
1	B	324	PRO	4.2
1	A	103	PRO	3.9
1	B	222	TRP	3.9
1	C	142	GLY	3.9
1	C	127	TRP	3.9
1	A	196	ILE	3.8
1	C	196	ILE	3.8
1	C	129	GLY	3.7
1	C	173	LYS	3.6
1	B	336	ALA	3.5
1	C	158	GLU	3.5
1	C	276	THR	3.5
1	A	50	ARG	3.4
1	C	222	TRP	3.4
1	B	174	PHE	3.4
1	A	142	GLY	3.4

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Mol	Chain	Res	Type	RSRZ
1	C	128	THR	3.3
1	B	225	GLY	3.3
1	B	50	ARG	3.2
1	C	143	SER	3.2
1	A	104	ASP	3.1
1	B	173	LYS	3.1
1	A	502	ILE	3.1
1	B	335	ILE	3.0
1	C	130	VAL	3.0
1	C	82	GLU	3.0
1	C	406	ILE	3.0
1	C	167	THR	2.9
1	C	160	LYS	2.9
1	C	413	VAL	2.8
1	B	8	ASN	2.8
1	B	104	ASP	2.8
1	C	244	LEU	2.8
1	A	261	ARG	2.8
1	C	52	CYS	2.7
1	C	125	PHE	2.7
1	A	143	SER	2.7
1	C	175	ASP	2.7
1	A	274	ILE	2.7
1	C	421	TRP	2.7
1	C	224	ARG	2.6
1	C	288	ILE	2.6
1	B	340	GLU	2.6
1	A	222	TRP	2.6
1	C	131	THR	2.6
1	C	132	GLN	2.6
1	A	276	THR	2.6
1	C	187	THR	2.5
1	C	103	PRO	2.5
1	A	242	ILE	2.5
1	C	140	LYS	2.5
1	A	324	PRO	2.5
1	C	264	LYS	2.4
1	B	264	LYS	2.4
1	C	83	LYS	2.4
1	C	387	LYS	2.4
1	C	404	GLY	2.4
1	C	242	ILE	2.4

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Mol	Chain	Res	Type	RSRZ
1	C	279	SER	2.4
1	A	58	ILE	2.4
1	C	234	TRP	2.3
1	C	197	ARG	2.3
1	C	126	ASN	2.3
1	A	226	LEU	2.3
1	C	53	ASP	2.3
1	A	386	GLU	2.3
1	A	52	CYS	2.3
1	B	398	GLU	2.3
1	C	104	ASP	2.3
1	A	278	SER	2.3
1	C	94	PHE	2.2
1	C	226	LEU	2.2
1	A	275	GLY	2.2
1	A	409	LEU	2.2
1	C	59	LEU	2.2
1	C	166	VAL	2.2
1	C	172	GLY	2.2
1	B	103	PRO	2.2
1	B	421	TRP	2.1
1	A	174	PHE	2.1
1	A	56	HIS	2.1
1	C	135	GLY	2.1
1	B	276	THR	2.1
1	C	275	GLY	2.1
1	C	56	HIS	2.1
1	A	404	GLY	2.1
1	C	50	ARG	2.1
1	B	322	ASN	2.1
1	C	229	ARG	2.1
1	C	102	VAL	2.0
1	C	245	ILE	2.0
1	C	198	ALA	2.0
1	C	403	GLU	2.0
1	C	230	ILE	2.0
1	A	431	LEU	2.0
1	C	409	LEU	2.0
1	C	340	GLU	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, 95th 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 ²)	Q<0.9
3	BMA	A	610	11/12	0.49	0.26	130,165,172,176	0
3	BMA	C	613	11/12	0.51	0.27	137,168,177,180	0
2	NAG	B	709	14/15	0.68	0.29	103,136,142,143	0
2	NAG	B	708	14/15	0.70	0.32	116,134,153,157	0
3	BMA	A	607	11/12	0.72	0.32	127,161,164,166	0
3	BMA	B	714	11/12	0.75	0.21	110,121,132,138	0
2	NAG	A	604	14/15	0.75	0.48	164,180,185,186	0
2	NAG	C	604	14/15	0.75	0.37	154,165,176,179	0
2	NAG	B	710	14/15	0.76	0.20	92,119,136,143	0
2	NAG	B	702	14/15	0.77	0.23	104,139,156,158	0
3	BMA	A	616	11/12	0.77	0.21	143,166,169,172	0
2	NAG	A	611	14/15	0.80	0.27	106,120,130,132	0
2	NAG	A	615	14/15	0.82	0.21	121,142,156,165	0
2	NAG	C	610	14/15	0.82	0.26	138,169,174,180	0
2	NAG	C	603	14/15	0.84	0.30	129,163,174,177	0
2	NAG	B	707	14/15	0.84	0.26	163,176,185,192	0
3	BMA	C	607	11/12	0.85	0.22	156,186,215,239	0
2	NAG	B	711	14/15	0.85	0.33	97,144,153,154	0
2	NAG	B	713	14/15	0.86	0.16	79,104,122,123	0
2	NAG	A	613	14/15	0.86	0.32	124,158,169,175	0
2	NAG	C	601	14/15	0.87	0.19	97,125,133,134	0
2	NAG	C	606	14/15	0.87	0.30	146,157,184,249	0
2	NAG	C	608	14/15	0.87	0.23	95,111,130,154	0
3	BMA	B	705	11/12	0.87	0.28	130,144,150,155	0
2	NAG	A	602	14/15	0.88	0.36	107,154,167,169	0
2	NAG	A	605	14/15	0.88	0.27	74,84,95,110	0
2	NAG	C	602	14/15	0.89	0.24	109,126,144,159	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	NAG	A	614	14/15	0.89	0.25	91,111,123,124	0
2	NAG	B	706	14/15	0.89	0.21	91,128,144,158	0
2	NAG	C	609	14/15	0.89	0.28	172,181,195,199	0
2	NAG	C	611	14/15	0.90	0.14	103,122,135,136	0
2	NAG	A	612	14/15	0.90	0.27	72,99,121,138	0
2	NAG	C	612	14/15	0.91	0.15	134,144,150,155	0
2	NAG	A	606	14/15	0.91	0.30	71,128,147,161	0
2	NAG	A	609	14/15	0.92	0.31	96,120,147,156	0
2	NAG	A	601	14/15	0.92	0.17	92,113,128,145	0
2	NAG	A	603	14/15	0.93	0.25	91,113,132,153	0
2	NAG	C	605	14/15	0.93	0.16	105,120,137,140	0
2	NAG	B	712	14/15	0.93	0.18	48,73,99,134	0
2	NAG	B	701	14/15	0.94	0.16	66,93,103,106	0
2	NAG	B	703	14/15	0.96	0.17	57,70,89,96	0
2	NAG	A	608	14/15	0.96	0.11	63,85,94,99	0
2	NAG	B	704	14/15	0.96	0.21	77,88,101,109	0

6.5 Other polymers [i](#)

There are no such residues in this entry.