



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 6, 2020 – 06:28 PM BST

PDB ID : 3ZE1  
Title : Integrin alphaIIB beta3 headpiece and RGD peptide complex  
Authors : Zhu, J.H.; Zhu, J.Q.; Springer, T.A.  
Deposited on : 2012-12-03  
Resolution : 3.00 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.13.1  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.13.1

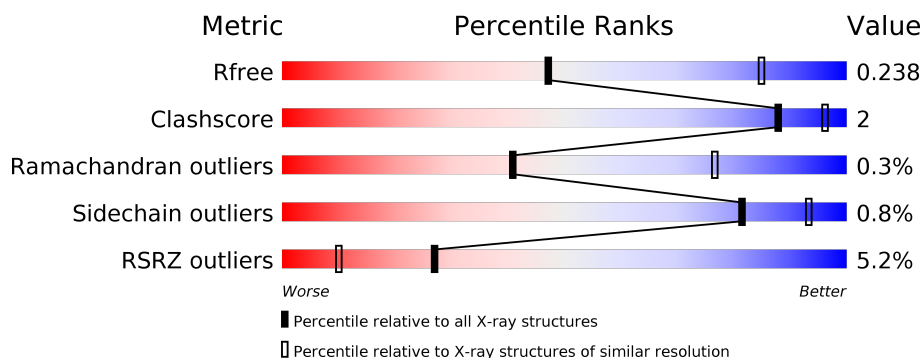
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.00 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))
$R_{free}$	130704	2092 (3.00-3.00)
Clashscore	141614	2416 (3.00-3.00)
Ramachandran outliers	138981	2333 (3.00-3.00)
Sidechain outliers	138945	2336 (3.00-3.00)
RSRZ outliers	127900	1990 (3.00-3.00)

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 respectively. 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	457	95% <span style="float: right;">•</span>
1	C	457	93% <span style="float: right;">6% •</span>
2	B	472	4% <span style="float: right;">90% 7% •</span>
2	D	472	7% <span style="float: right;">92% 7% •</span>
3	E	221	13% <span style="float: right;">93% 5% •</span>
3	H	221	4% <span style="float: right;">91% 6% •</span>

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Mol	Chain	Length	Quality of chain
4	F	214	 21% 96% 17%
4	L	214	 % 97% 17%
5	I	6	 83% 17%
5	J	6	 17% 100%
6	G	4	 75% 25%
6	M	4	 50% 50%
7	K	2	 100%
7	N	2	 100%

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
11	NAG	D	3099	-	-	-	X

## 2 Entry composition

There are 13 unique types of molecules in this entry. The entry contains 41577 atoms, of which 20215 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 INTEGRIN ALPHA-IIB.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
1	A	455	6860	2233	3350	604	665	8	1	4	0
1	C	453	6807	2218	3317	601	663	8	0	3	0

- Molecule 2 is a protein called INTEGRIN BETA-3.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
2	B	464	7083	2233	3498	612	707	33	6	1	0
2	D	469	7146	2253	3526	618	715	34	10	2	0

- Molecule 3 is a protein called 10E5 FAB HEAVY CHAIN.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
3	E	216	3239	1041	1597	266	329	6	0	0	0
3	H	216	3239	1041	1597	266	329	6	0	0	0

- Molecule 4 is a protein called 10E5 FAB LIGHT CHAIN.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
4	F	214	3187	1019	1550	268	341	9	0	0	0
4	L	214	3187	1019	1550	268	341	9	0	0	0

- Molecule 5 is a protein called RGD PEPTIDE.

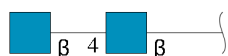
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	I	6	Total	C	H	N	O	0	0	0
			75	22	34	9	10			
5	J	6	Total	C	H	N	O	0	0	0
			75	22	34	9	10			

- Molecule 6 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-beta-D-mannopyranos e-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-gluco pyranose.



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
6	G	4	Total	C	H	N	O	0	0	0
			93	28	43	2	20			
6	M	4	Total	C	H	N	O	0	0	0
			93	28	43	2	20			

- Molecule 7 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-a cetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
7	K	2	Total	C	H	N	O	0	0	0
			53	16	25	2	10			
7	N	2	Total	C	H	N	O	0	0	0
			53	16	25	2	10			

- Molecule 8 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	1	Total O S 5 4 1	0	0
8	A	1	Total O S 5 4 1	0	0
8	L	1	Total O S 5 4 1	0	0

- Molecule 9 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	A	4	Total Ca 4 4	0	0
9	C	4	Total Ca 4 4	0	0

- Molecule 10 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
10	B	3	Total Mn 3 3	0	0
10	D	3	Total Mn 3 3	0	0

- Molecule 11 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	H	N			O
11	B	1	27	8	13	1	5	0	0
11	D	1	27	8	13	1	5	0	0

- Molecule 12 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Cl		
12	C	1	1	1	0	0

- Molecule 13 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
13	A	161	161	161	0	0
13	B	61	61	61	0	0
13	C	50	50	50	0	0
13	D	16	16	16	0	0
13	E	2	2	2	0	0
13	H	5	5	5	0	0

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<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>	<b>ZeroOcc</b>	<b>AltConf</b>
13	I	1	Total O 1 1	0	0
13	J	1	Total O 1 1	0	0
13	L	6	Total O 6 6	0	0



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

These plots are drawn for all protein, RNA, DNA and oligosaccharide 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: INTEGRIN ALPHA-IIB

Chain A:  95%




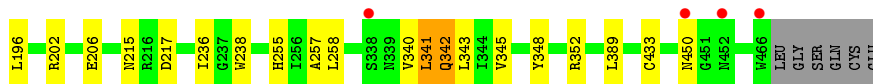
- Molecule 1: INTEGRIN ALPHA-IIB

Chain C:  93% 6%



- Molecule 2: INTEGRIN BETA-3

Chain B:  4% 90% 7%

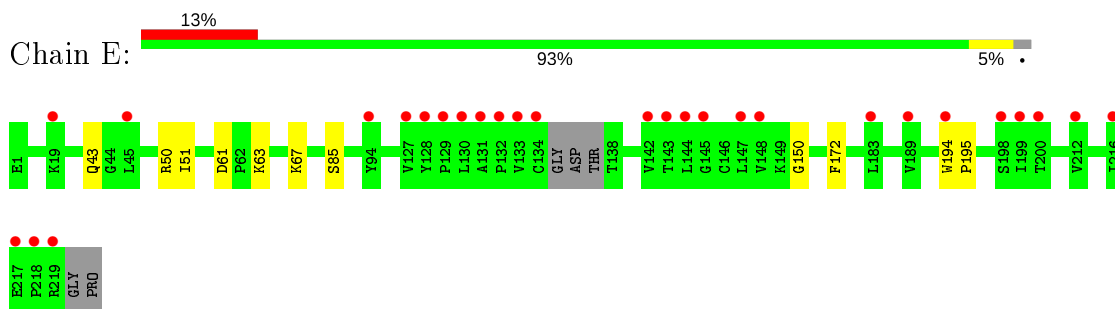


- Molecule 2: INTEGRIN BETA-3

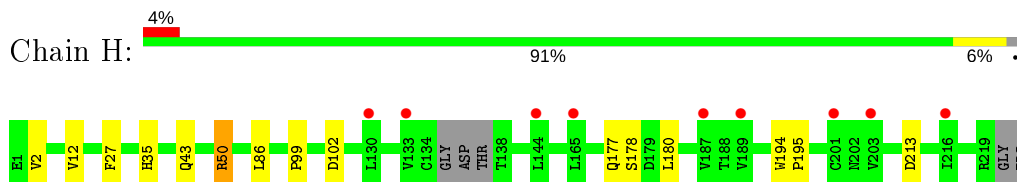
Chain D:  7% 92% 7%



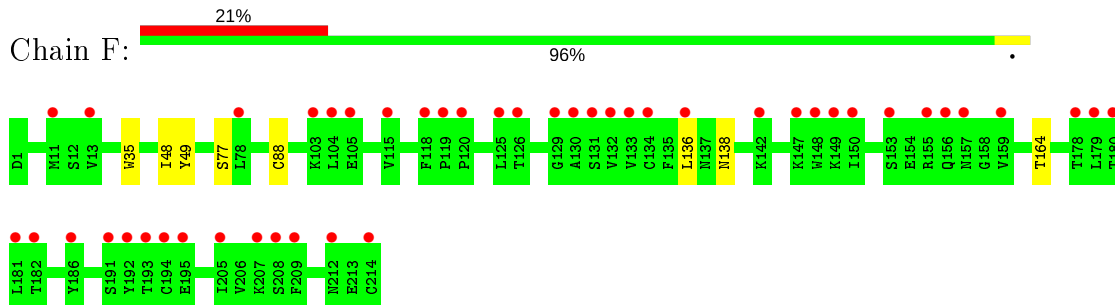
- Molecule 3: 10E5 FAB HEAVY CHAIN



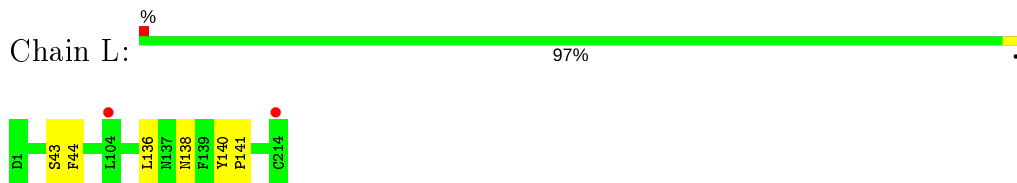
- Molecule 3: 10E5 FAB HEAVY CHAIN



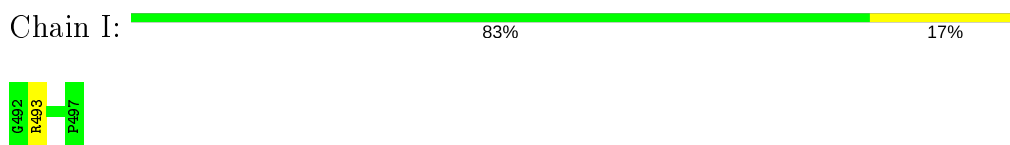
- Molecule 4: 10E5 FAB LIGHT CHAIN



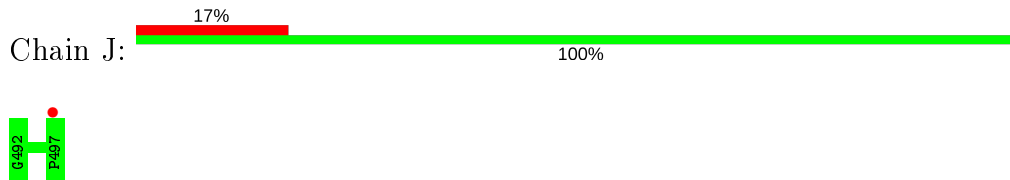
- Molecule 4: 10E5 FAB LIGHT CHAIN




- Molecule 5: RGD PEPTIDE



- Molecule 5: RGD PEPTIDE



- Molecule 6: alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain G:  75% 25%

MAG1  
MAG2  
BGA3  
MAN4

- Molecule 6: alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain M:  50% 50%

MAG1  
MAG2  
BGA3  
MAN4

- Molecule 7: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain K:  100%

MAG1  
MAG2

- Molecule 7: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain N:  100%

MAG1  
MAG2

## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	258.97Å 144.56Å 104.70Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.23 – 3.00 48.23 – 3.00	Depositor EDS
% Data completeness (in resolution range)	98.1 (48.23-3.00) 98.2 (48.23-3.00)	Depositor EDS
$R_{merge}$	0.11	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.14 (at 3.01Å)	Xtrriage
Refinement program	PHENIX (PHENIX.REFINE)	Depositor
R, $R_{free}$	0.175 , 0.233 0.186 , 0.238	Depositor DCC
$R_{free}$ test set	1053 reflections (1.35%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	64.5	Xtrriage
Anisotropy	0.000	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 85.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	41577	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	115.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.27% of the height of the origin peak. No significant pseudotranslation is detected.*

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

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

## 5 Model quality [i](#)

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

Bond lengths and bond angles in the following residue types are not validated in this section: BMA, NAG, CL, CA, MN, SO4, 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	0.23	0/3619	0.40	0/4932
1	C	0.22	0/3596	0.38	0/4900
2	B	0.22	0/3654	0.39	0/4954
2	D	0.21	0/3692	0.36	0/5005
3	E	0.21	0/1684	0.38	0/2305
3	H	0.21	0/1684	0.39	0/2305
4	F	0.21	0/1673	0.37	0/2269
4	L	0.22	0/1673	0.37	0/2269
5	I	0.19	0/41	0.33	0/52
5	J	0.18	0/41	0.34	0/52
All	All	0.22	0/21357	0.38	0/29043

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	3510	3350	3359	10	0
1	C	3490	3317	3328	14	0
2	B	3585	3498	3504	20	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	3620	3526	3537	18	0
3	E	1642	1597	1600	6	0
3	H	1642	1597	1600	8	0
4	F	1637	1550	1553	4	0
4	L	1637	1550	1553	3	0
5	I	41	34	34	1	0
5	J	41	34	34	0	0
6	G	50	43	43	0	0
6	M	50	43	43	0	0
7	K	28	25	25	0	0
7	N	28	25	25	2	0
8	A	10	0	0	0	0
8	L	5	0	0	0	0
9	A	4	0	0	0	0
9	C	4	0	0	0	0
10	B	3	0	0	0	0
10	D	3	0	0	0	0
11	B	14	13	13	0	0
11	D	14	13	13	2	0
12	C	1	0	0	0	0
13	A	161	0	0	3	1
13	B	61	0	0	1	0
13	C	50	0	0	1	1
13	D	16	0	0	0	0
13	E	2	0	0	0	0
13	H	5	0	0	0	0
13	I	1	0	0	0	0
13	J	1	0	0	0	0
13	L	6	0	0	0	0
All	All	21362	20215	20264	84	1

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 2.

All (84) 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)
11:D:3099:NAG:HO6	7:N:2:NAG:HO6	1.39	0.64
1:C:15:ASN:ND2	13:C:4007:HOH:O	2.33	0.62
13:A:4048:HOH:O	2:B:168:SER:O	2.17	0.58
2:B:202:ARG:NH2	2:B:206:GLU:OE2	2.38	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:76:ASP:OD1	2:D:77:SER:N	2.39	0.56
1:C:122:ALA:O	1:C:123:GLU:HB2	2.06	0.56
1:A:122:ALA:O	1:A:123:GLU:HB2	2.06	0.55
1:A:15[B]:ASN:ND2	13:A:4011:HOH:O	2.38	0.55
2:B:341:LEU:O	13:B:4058:HOH:O	2.18	0.55
2:D:123[B]:SER:OG	2:D:251:ASP:OD2	2.26	0.54
2:B:450:ASN:ND2	2:B:450:ASN:O	2.42	0.53
2:B:158:ASP:HB3	2:B:187:MET:CE	2.38	0.53
2:B:340:VAL:O	2:B:341:LEU:HB2	2.09	0.53
1:A:122:ALA:O	1:A:123:GLU:CB	2.57	0.52
1:A:262:TRP:O	1:A:263:THR:OG1	2.24	0.51
2:D:217:ASP:OD2	2:D:255:HIS:NE2	2.40	0.51
1:C:426:ASP:OD2	1:C:431:GLY:N	2.43	0.51
3:H:194:TRP:CG	3:H:195:PRO:HA	2.46	0.51
1:C:122:ALA:O	1:C:123:GLU:CB	2.59	0.51
2:B:340:VAL:O	2:B:341:LEU:CB	2.58	0.50
1:A:411:PHE:HB3	1:A:412:PRO:CD	2.41	0.50
2:B:257:ALA:O	2:B:258:LEU:HB2	2.12	0.49
2:B:130:SER:O	2:B:341:LEU:CD1	2.60	0.49
2:B:348:TYR:CZ	2:B:352:ARG:HD2	2.47	0.49
2:D:288:ASP:OD1	2:D:289:TYR:N	2.46	0.49
1:C:216:VAL:O	1:C:219:GLN:HB3	2.14	0.48
2:D:218:ALA:HB3	2:D:219:PRO:HD3	1.95	0.48
2:D:178:TYR:CG	2:D:179:ASP:N	2.82	0.48
2:B:217:ASP:OD2	2:B:255:HIS:NE2	2.48	0.47
1:C:411:PHE:HB3	1:C:412:PRO:CD	2.44	0.47
2:B:42:GLU:OE1	2:B:42:GLU:N	2.47	0.47
2:B:342:GLN:O	2:B:345:VAL:N	2.47	0.47
3:E:194:TRP:CG	3:E:195:PRO:HA	2.51	0.46
3:H:2:VAL:HG13	3:H:27:PHE:CE1	2.51	0.46
3:H:213:ASP:OD1	3:H:213:ASP:N	2.49	0.45
2:D:257:ALA:O	2:D:258:LEU:HB2	2.16	0.45
2:D:450:ASN:ND2	2:D:450:ASN:O	2.49	0.45
3:E:50:ARG:HG2	3:E:51:ILE:N	2.32	0.45
2:B:129:TRP:CE3	2:B:130:SER:HA	2.50	0.45
4:F:35:TRP:CZ3	4:F:88:CYS:HB3	2.52	0.45
3:E:61:ASP:O	3:E:63:LYS:N	2.50	0.44
2:B:93:ARG:HB2	2:B:94:PRO:HD2	1.99	0.44
2:D:249:THR:HG22	2:D:309:ALA:HB3	1.99	0.44
1:A:164:LYS:HB3	1:A:167:CYS:SG	2.57	0.44
1:C:262:TRP:CD1	2:D:253:LYS:HE2	2.53	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:340:VAL:HG13	2:D:341:LEU:N	2.32	0.44
2:D:152:GLY:N	2:D:196:LEU:HD23	2.33	0.44
3:H:43:GLN:N	3:H:43:GLN:OE1	2.50	0.44
4:F:136:LEU:N	4:F:136:LEU:HD12	2.33	0.43
3:H:12:VAL:HG21	3:H:86:LEU:CD1	2.48	0.43
3:H:177:GLN:N	3:H:180:LEU:O	2.50	0.43
2:B:152:GLY:N	2:B:196:LEU:HD23	2.34	0.43
3:E:172:PHE:CD2	4:F:164:THR:HG23	2.54	0.43
2:B:134:LEU:HA	2:B:137:LYS:CD	2.48	0.43
2:B:236:ILE:HG21	2:B:238:TRP:CE2	2.53	0.43
3:H:99:PRO:HB2	3:H:102:ASP:O	2.19	0.43
4:L:136:LEU:N	4:L:136:LEU:HD12	2.34	0.43
1:A:132:LEU:N	1:A:132:LEU:HD12	2.33	0.43
1:C:280:LEU:CD1	1:C:306:LEU:HD23	2.49	0.43
2:D:59:SER:OG	2:D:96:ASP:OD2	2.29	0.42
4:L:43:SER:OG	4:L:44:PHE:N	2.52	0.42
3:E:43:GLN:N	3:E:43:GLN:OE1	2.50	0.42
1:C:2:ASN:N	1:C:2:ASN:OD1	2.49	0.42
2:B:120:LEU:HD12	2:B:155:ALA:HB1	2.02	0.42
1:A:235:TRP:CZ2	1:A:270:LEU:HD11	2.55	0.41
1:C:278[A]:HIS:CD2	1:C:339:ALA:HB1	2.54	0.41
1:A:285:MET:HE2	1:A:285:MET:HB3	1.94	0.41
4:F:48:ILE:HG22	4:F:49:TYR:N	2.36	0.41
2:D:93:ARG:HB2	2:D:94:PRO:HD2	2.02	0.41
4:L:140:TYR:CG	4:L:141:PRO:HA	2.56	0.41
1:C:171:PHE:CG	1:C:186:PRO:HG3	2.55	0.41
11:D:3099:NAG:O6	7:N:2:NAG:O6	2.14	0.41
2:D:169:PRO:CB	2:D:170:PRO:CD	2.99	0.41
3:H:35:HIS:ND1	3:H:50:ARG:HB3	2.36	0.41
1:A:194:LEU:C	1:A:194:LEU:HD12	2.41	0.41
1:C:114:ASN:OD1	1:C:115:VAL:N	2.53	0.41
1:C:70:PHE:CD1	1:C:131:PHE:HB3	2.56	0.41
3:E:67:LYS:NZ	3:E:85:SER:O	2.54	0.41
2:D:319:GLN:HA	2:D:330:VAL:HG21	2.03	0.40
2:D:418:PRO:HB2	2:D:421:PHE:CD1	2.56	0.40
13:A:4059:HOH:O	5:I:493:ARG:NH2	2.53	0.40
2:B:389:LEU:HD12	2:B:389:LEU:N	2.37	0.40
1:C:9:THR:HB	1:C:447:VAL:HB	2.02	0.40
2:D:169:PRO:CD	2:D:178:TYR:CE1	3.05	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.



Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
13:A:4055:HOH:O	13:C:4041:HOH:O[1_554]	2.16	0.04

### 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	457/457 (100%)	438 (96%)	18 (4%)	1 (0%)	47	82
1	C	454/457 (99%)	423 (93%)	30 (7%)	1 (0%)	47	82
2	B	463/472 (98%)	433 (94%)	28 (6%)	2 (0%)	34	72
2	D	469/472 (99%)	433 (92%)	36 (8%)	0	100	100
3	E	212/221 (96%)	194 (92%)	17 (8%)	1 (0%)	29	68
3	H	212/221 (96%)	197 (93%)	14 (7%)	1 (0%)	29	68
4	F	212/214 (99%)	200 (94%)	10 (5%)	2 (1%)	17	55
4	L	212/214 (99%)	200 (94%)	11 (5%)	1 (0%)	29	68
5	I	4/6 (67%)	4 (100%)	0	0	100	100
5	J	4/6 (67%)	4 (100%)	0	0	100	100
All	All	2699/2740 (98%)	2526 (94%)	164 (6%)	9 (0%)	41	76

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	341	LEU
1	A	123	GLU
4	L	138	ASN
2	B	343	LEU
1	C	123	GLU
4	F	77	SER
4	F	138	ASN
3	H	178	SER
3	E	150	GLY

### 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	367/364 (101%)	361 (98%)	6 (2%)	62	86
1	C	364/364 (100%)	360 (99%)	4 (1%)	73	90
2	B	412/417 (99%)	405 (98%)	7 (2%)	60	85
2	D	417/417 (100%)	416 (100%)	1 (0%)	93	98
3	E	187/190 (98%)	187 (100%)	0	100	100
3	H	187/190 (98%)	186 (100%)	1 (0%)	88	96
4	F	188/188 (100%)	188 (100%)	0	100	100
4	L	188/188 (100%)	188 (100%)	0	100	100
5	I	4/4 (100%)	4 (100%)	0	100	100
5	J	4/4 (100%)	4 (100%)	0	100	100
All	All	2318/2326 (100%)	2299 (99%)	19 (1%)	81	93

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	23	LEU
1	A	166	TYR
1	A	190	TYR
1	A	267	VAL
1	A	270	LEU
1	A	288	TYR
2	B	117	LEU
2	B	118	MET
2	B	132	GLN
2	B	140	THR
2	B	215	ASN
2	B	342	GLN
2	B	433	CYS
1	C	23	LEU
1	C	166	TYR
1	C	270	LEU

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Mol	Chain	Res	Type
1	C	288	TYR
2	D	128	LEU
3	H	50	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	338	HIS
1	C	197	GLN
2	D	450	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

12 monosaccharides 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	$\# Z  > 2$
6	NAG	G	1	2,6	14,14,15	0.54	0	17,19,21	0.69	0
6	NAG	G	2	6	14,14,15	0.57	0	17,19,21	0.72	0
6	BMA	G	3	6	11,11,12	0.63	0	15,15,17	0.87	1 (6%)
6	MAN	G	4	6	11,11,12	0.63	0	15,15,17	0.70	0
7	NAG	K	1	2,7	14,14,15	0.59	0	17,19,21	0.88	0
7	NAG	K	2	7	14,14,15	0.54	0	17,19,21	0.61	0
6	NAG	M	1	2,6	14,14,15	0.54	0	17,19,21	0.78	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
6	NAG	M	2	6	14,14,15	0.57	0	17,19,21	0.70	1 (5%)
6	BMA	M	3	6	11,11,12	0.66	0	15,15,17	0.92	1 (6%)
6	MAN	M	4	6	11,11,12	0.67	0	15,15,17	0.72	0
7	NAG	N	1	2,7	14,14,15	0.62	0	17,19,21	1.04	1 (5%)
7	NAG	N	2	7	14,14,15	0.53	0	17,19,21	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
6	NAG	G	1	2,6	-	2/6/23/26	0/1/1/1
6	NAG	G	2	6	-	0/6/23/26	0/1/1/1
6	BMA	G	3	6	-	0/2/19/22	0/1/1/1
6	MAN	G	4	6	-	0/2/19/22	0/1/1/1
7	NAG	K	1	2,7	-	2/6/23/26	0/1/1/1
7	NAG	K	2	7	-	1/6/23/26	0/1/1/1
6	NAG	M	1	2,6	-	0/6/23/26	0/1/1/1
6	NAG	M	2	6	-	2/6/23/26	0/1/1/1
6	BMA	M	3	6	-	0/2/19/22	0/1/1/1
6	MAN	M	4	6	-	0/2/19/22	0/1/1/1
7	NAG	N	1	2,7	-	0/6/23/26	0/1/1/1
7	NAG	N	2	7	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	M	3	BMA	C1-C2-C3	2.55	112.80	109.67
7	N	1	NAG	C4-C3-C2	2.43	114.58	111.02
6	M	2	NAG	O5-C5-C6	2.23	110.70	107.20
6	G	3	BMA	C1-C2-C3	2.19	112.36	109.67

There are no chirality outliers.

All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	M	2	NAG	O7-C7-N2-C2

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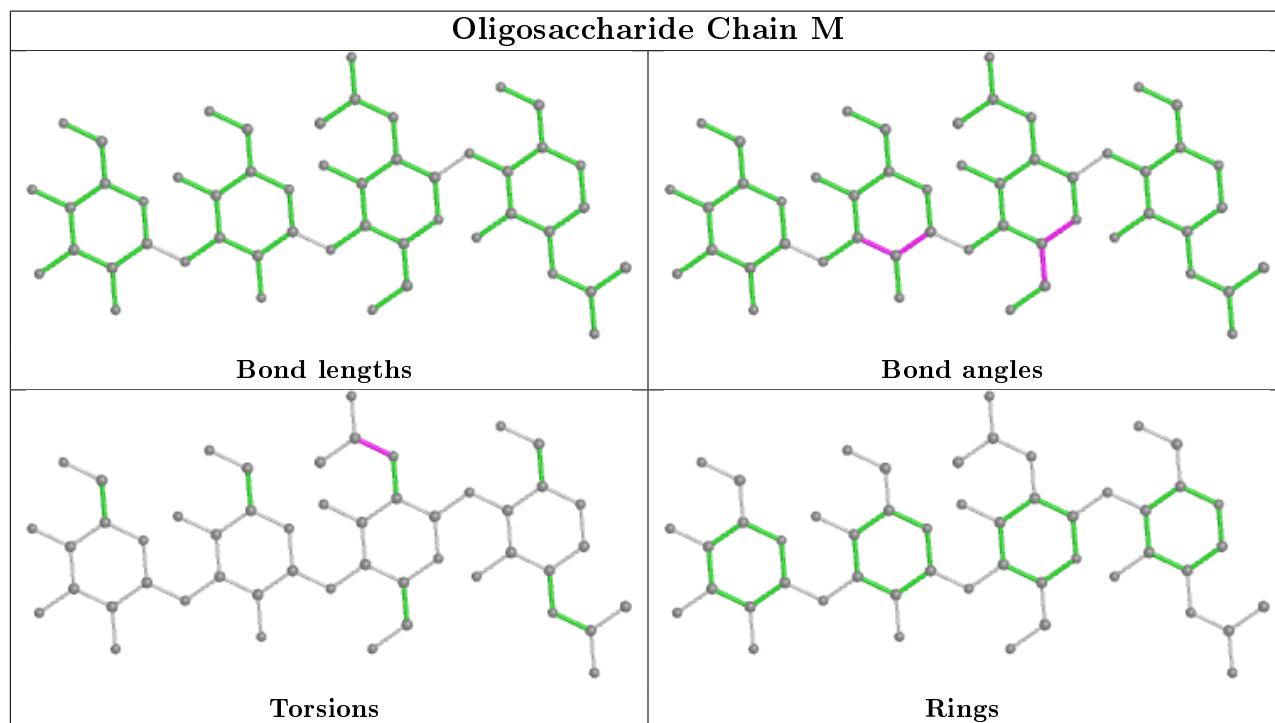
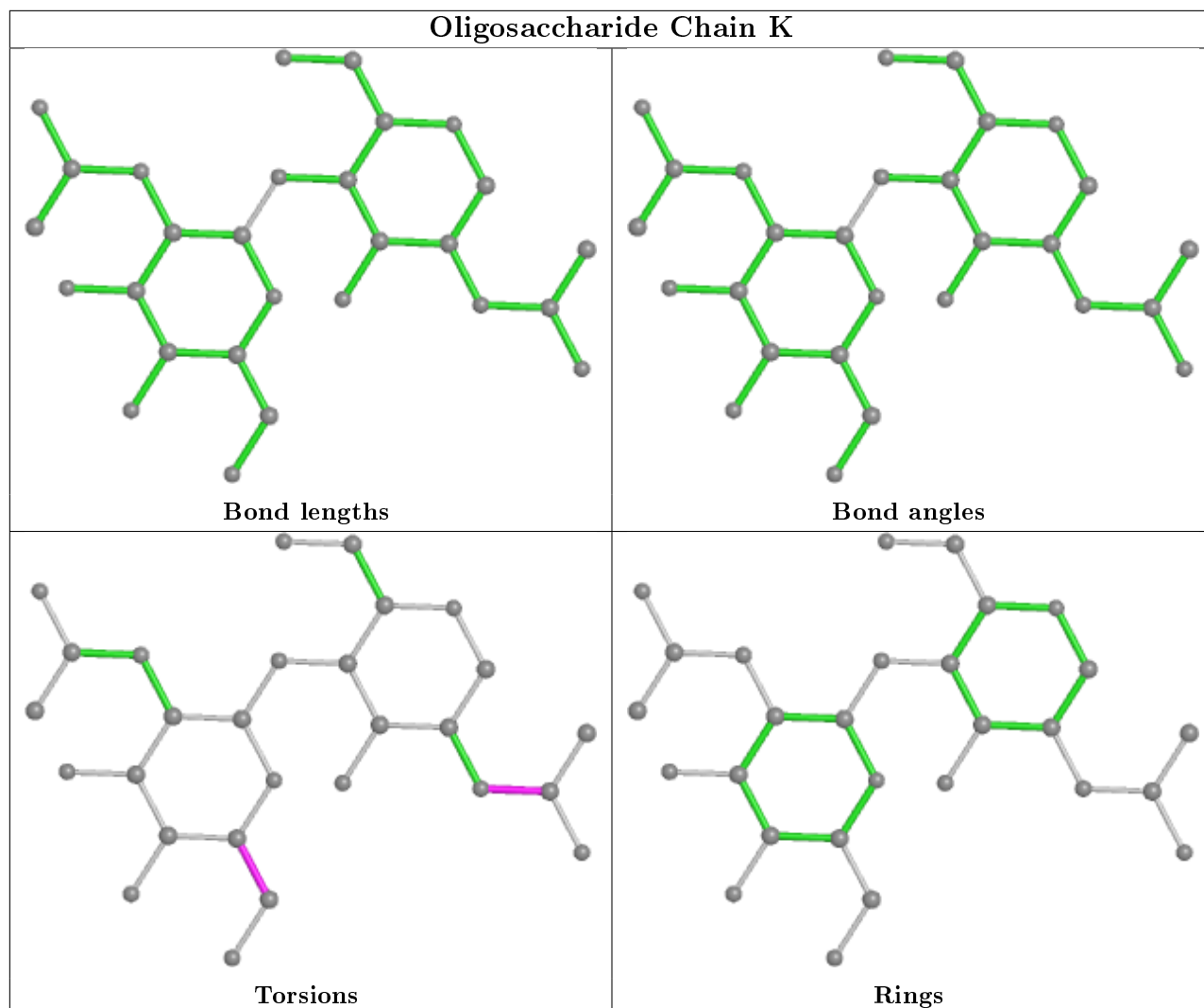
Mol	Chain	Res	Type	Atoms
6	M	2	NAG	C8-C7-N2-C2
7	N	2	NAG	C8-C7-N2-C2
7	N	2	NAG	O7-C7-N2-C2
7	K	1	NAG	C8-C7-N2-C2
7	K	1	NAG	O7-C7-N2-C2
7	K	2	NAG	O5-C5-C6-O6
6	G	1	NAG	C8-C7-N2-C2
6	G	1	NAG	O7-C7-N2-C2

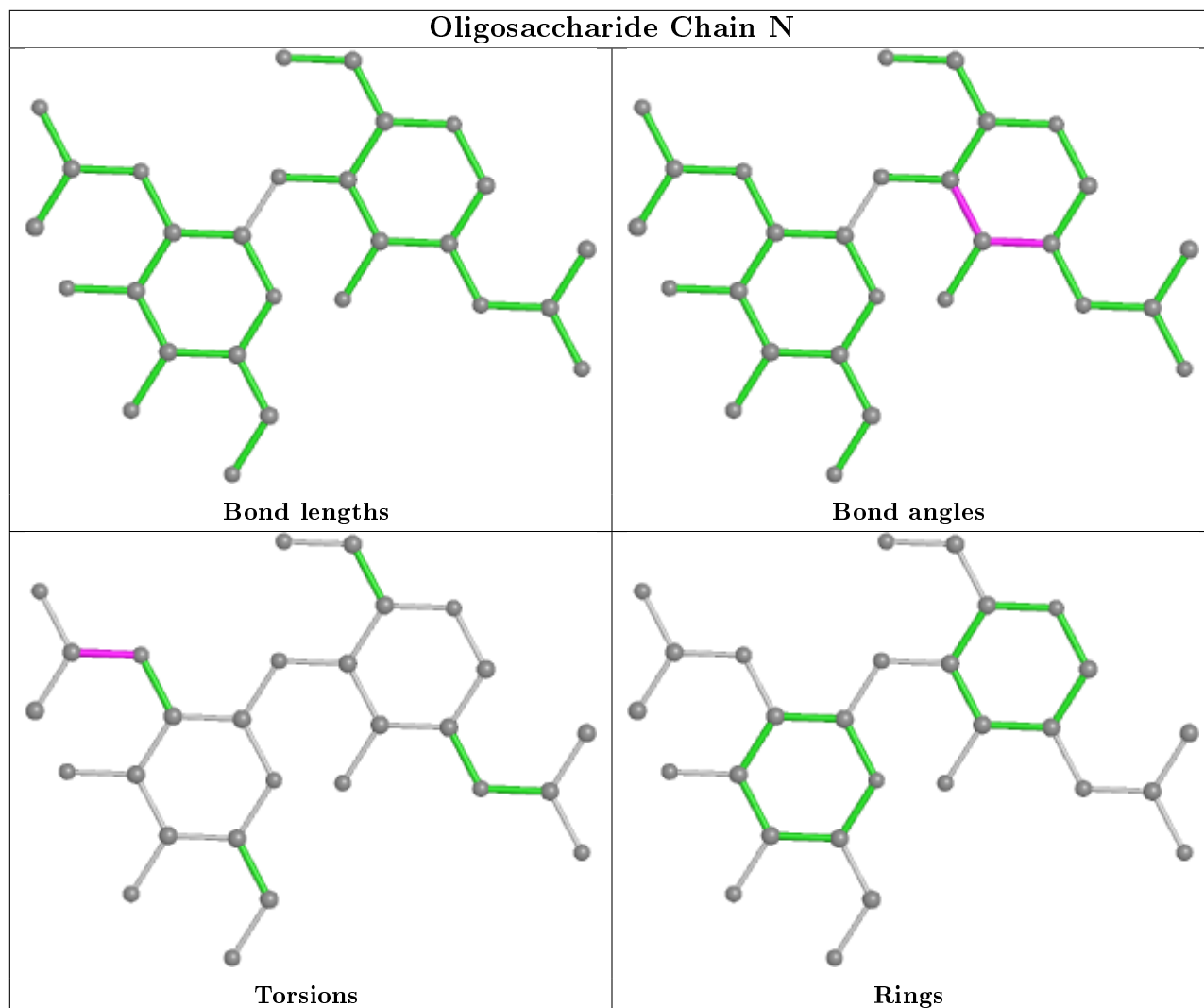
There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	N	2	NAG	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.





## 5.6 Ligand geometry [i](#)

Of 20 ligands modelled in this entry, 15 are monoatomic - leaving 5 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	$\# Z  > 2$
8	SO4	L	1215	-	4,4,4	0.13	0	6,6,6	0.05	0
8	SO4	A	1456	-	4,4,4	0.14	0	6,6,6	0.07	0
8	SO4	A	1457	-	4,4,4	0.15	0	6,6,6	0.04	0
11	NAG	D	3099	2	14,14,15	0.52	0	17,19,21	0.58	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
11	NAG	B	3099	2	14,14,15	0.53	0	17,19,21	0.66	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
11	NAG	D	3099	2	-	0/6/23/26	0/1/1/1
11	NAG	B	3099	2	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
11	D	3099	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, 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	455/457 (99%)	-0.04	1 (0%) 95 87	29, 51, 91, 147	1 (0%)
1	C	453/457 (99%)	-0.00	1 (0%) 95 87	45, 84, 129, 195	0
2	B	464/472 (98%)	0.30	20 (4%) 35 13	32, 90, 183, 217	2 (0%)
2	D	469/472 (99%)	0.47	32 (6%) 17 5	57, 125, 192, 221	1 (0%)
3	E	216/221 (97%)	0.73	28 (12%) 3 1	86, 151, 204, 230	0
3	H	216/221 (97%)	0.09	9 (4%) 36 14	58, 118, 184, 219	0
4	F	214/214 (100%)	1.04	46 (21%) 0 0	89, 153, 226, 284	0
4	L	214/214 (100%)	0.07	2 (0%) 84 63	65, 106, 147, 242	0
5	I	6/6 (100%)	0.23	0 100 100	48, 57, 97, 118	0
5	J	6/6 (100%)	0.86	1 (16%) 1 0	108, 121, 149, 165	2 (33%)
All	All	2713/2740 (99%)	0.28	140 (5%) 27 10	29, 103, 190, 284	6 (0%)

All (140) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
4	F	181	LEU	8.1
4	F	193	THR	7.9
2	B	36	PRO	7.7
3	E	194	TRP	5.7
4	F	214	CYS	5.3
3	E	130	LEU	5.1
3	E	134	CYS	5.1
4	F	180	THR	5.0
3	E	144	LEU	4.5
3	E	133	VAL	4.4
4	F	130	ALA	4.3
3	E	131	ALA	4.2
3	E	219	ARG	4.0

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
4	F	192	TYR	4.0
3	E	145	GLY	3.9
4	L	214	CYS	3.9
3	E	128	TYR	3.8
4	F	179	LEU	3.8
3	E	132	PRO	3.7
2	D	36	PRO	3.6
2	B	8	ARG	3.6
4	F	150	ILE	3.6
2	D	22	MET	3.5
4	F	148	TRP	3.5
3	E	129	PRO	3.4
2	B	44	LEU	3.4
4	F	125	LEU	3.4
3	E	189	VAL	3.4
5	J	497	PRO	3.4
3	E	127	VAL	3.4
2	D	355	VAL	3.3
3	E	148	VAL	3.3
2	B	10	VAL	3.3
2	D	44	LEU	3.3
4	F	205	ILE	3.3
1	A	455	LYS	3.2
4	F	186	TYR	3.2
3	E	142	VAL	3.2
2	D	376	ASN	3.2
4	F	155	ARG	3.1
4	F	133	VAL	3.1
3	E	45	LEU	3.1
2	D	51	PRO	3.1
4	F	132	VAL	3.0
2	D	48	ASN	3.0
2	D	90	LEU	3.0
4	F	212	ASN	3.0
2	B	11	SER	2.9
2	B	338	SER	2.9
2	B	24	ALA	2.9
4	F	147	LYS	2.9
2	B	48	ASN	2.9
4	F	11	MET	2.9
3	E	200	THR	2.8
3	E	147	LEU	2.8

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
2	B	26	CYS	2.8
4	F	115	VAL	2.8
2	B	33	LEU	2.8
4	F	119	PRO	2.8
2	D	49	CYS	2.8
3	E	199	ILE	2.8
2	B	28	ASP	2.7
4	F	105	GLU	2.7
2	D	375	LEU	2.7
4	F	104	LEU	2.7
4	F	120	PRO	2.7
2	B	7	THR	2.7
3	H	133	VAL	2.6
3	E	183	LEU	2.6
3	E	218	PRO	2.6
4	F	209	PHE	2.6
4	F	157	ASN	2.6
2	D	374	CYS	2.6
4	F	182	THR	2.6
2	D	122	TYR	2.6
4	F	126	THR	2.5
2	D	432	ASP	2.5
4	F	159	VAL	2.5
3	E	198	SER	2.5
3	H	144	LEU	2.5
3	H	189	VAL	2.5
4	F	136	LEU	2.5
2	B	39	ASP	2.4
2	D	31	LEU	2.4
2	D	59	SER	2.4
4	F	149	LYS	2.4
4	F	208	SER	2.4
4	F	195	GLU	2.4
2	D	369	SER	2.4
3	E	212	VAL	2.4
2	D	35	SER	2.4
2	B	450	ASN	2.4
2	D	21	PRO	2.4
2	B	5	CYS	2.3
3	E	217	GLU	2.3
2	D	368	LEU	2.3
3	H	201	CYS	2.3

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
2	D	94	PRO	2.3
4	F	134	CYS	2.3
2	D	454	THR	2.3
4	F	103	LYS	2.3
3	E	216	ILE	2.3
4	F	131	SER	2.3
2	B	452	ASN	2.2
4	F	191	SER	2.2
2	D	340	VAL	2.2
4	F	178	THR	2.2
3	E	19	LYS	2.2
4	F	142	LYS	2.2
3	H	130	LEU	2.2
3	H	216	ILE	2.2
2	D	95	ASP	2.2
3	E	143	THR	2.2
3	H	203	VAL	2.2
2	D	433	CYS	2.2
4	F	194	CYS	2.2
4	L	104	LEU	2.2
2	B	27	SER	2.2
4	F	13	VAL	2.2
2	D	27	SER	2.1
3	E	94	TYR	2.1
1	C	340	LEU	2.1
2	D	54	ILE	2.1
2	B	40	LEU	2.1
4	F	78	LEU	2.1
2	B	4	ILE	2.1
4	F	118	PHE	2.1
2	D	92	LEU	2.1
4	F	153	SER	2.1
3	H	187	VAL	2.1
3	H	165	LEU	2.1
2	D	469	SER	2.1
2	B	466	TRP	2.0
4	F	129	GLY	2.0
2	D	72	LYS	2.0
2	D	26	CYS	2.0
2	D	34	GLY	2.0
4	F	156	GLN	2.0
2	D	58	VAL	2.0

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Mol	Chain	Res	Type	RSRZ
4	F	207	LYS	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](#)

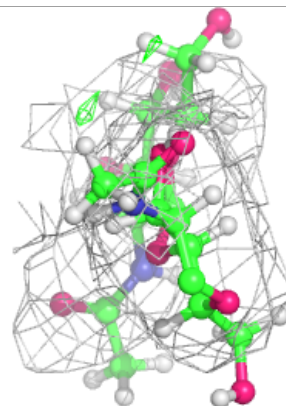
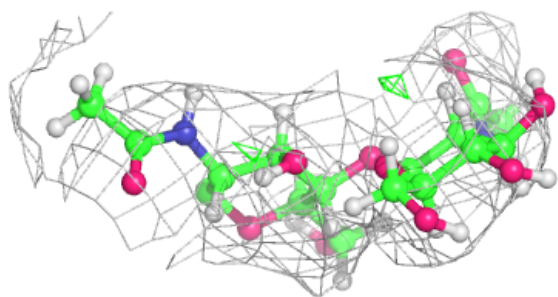
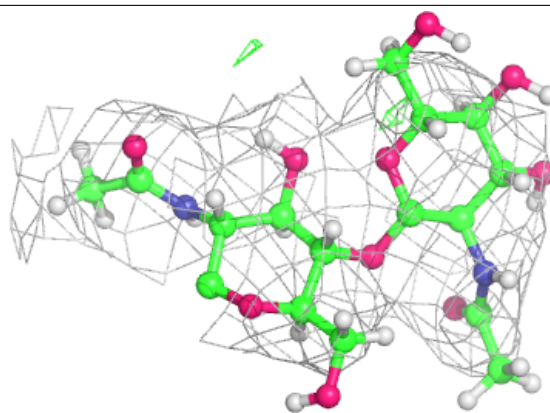
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q<0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
6	BMA	M	3	11/12	0.76	0.28	176,197,235,237	0
7	NAG	N	1	14/15	0.81	0.39	137,170,200,210	0
6	MAN	M	4	11/12	0.85	0.31	205,211,252,253	0
6	BMA	G	3	11/12	0.87	0.14	143,167,200,201	0
7	NAG	N	2	14/15	0.87	0.43	163,190,227,228	0
6	MAN	G	4	11/12	0.88	0.30	143,163,188,191	0
7	NAG	K	2	14/15	0.89	0.34	138,171,206,212	0
7	NAG	K	1	14/15	0.90	0.24	116,142,165,172	0
6	NAG	M	2	14/15	0.90	0.20	108,146,181,185	0
6	NAG	G	2	14/15	0.94	0.16	88,112,146,150	0
6	NAG	M	1	14/15	0.95	0.16	74,107,135,142	0
6	NAG	G	1	14/15	0.97	0.18	19,59,87,104	0

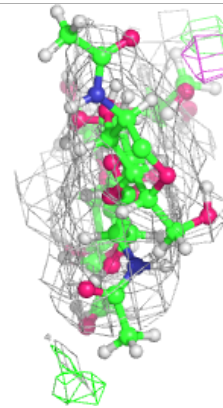
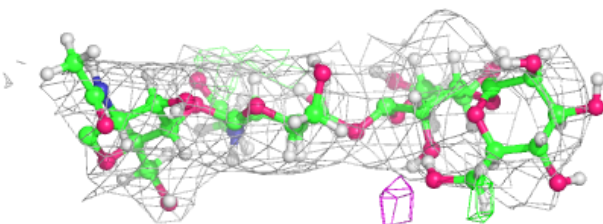
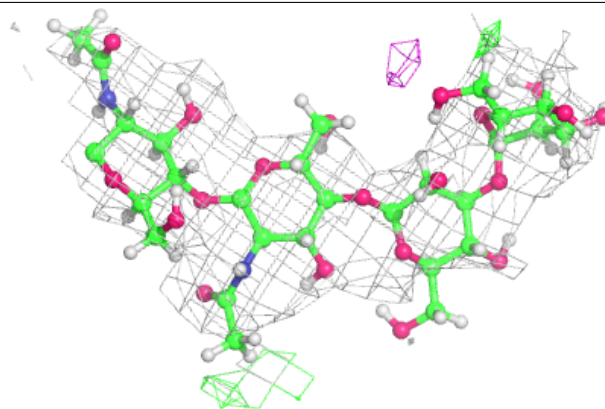
The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.

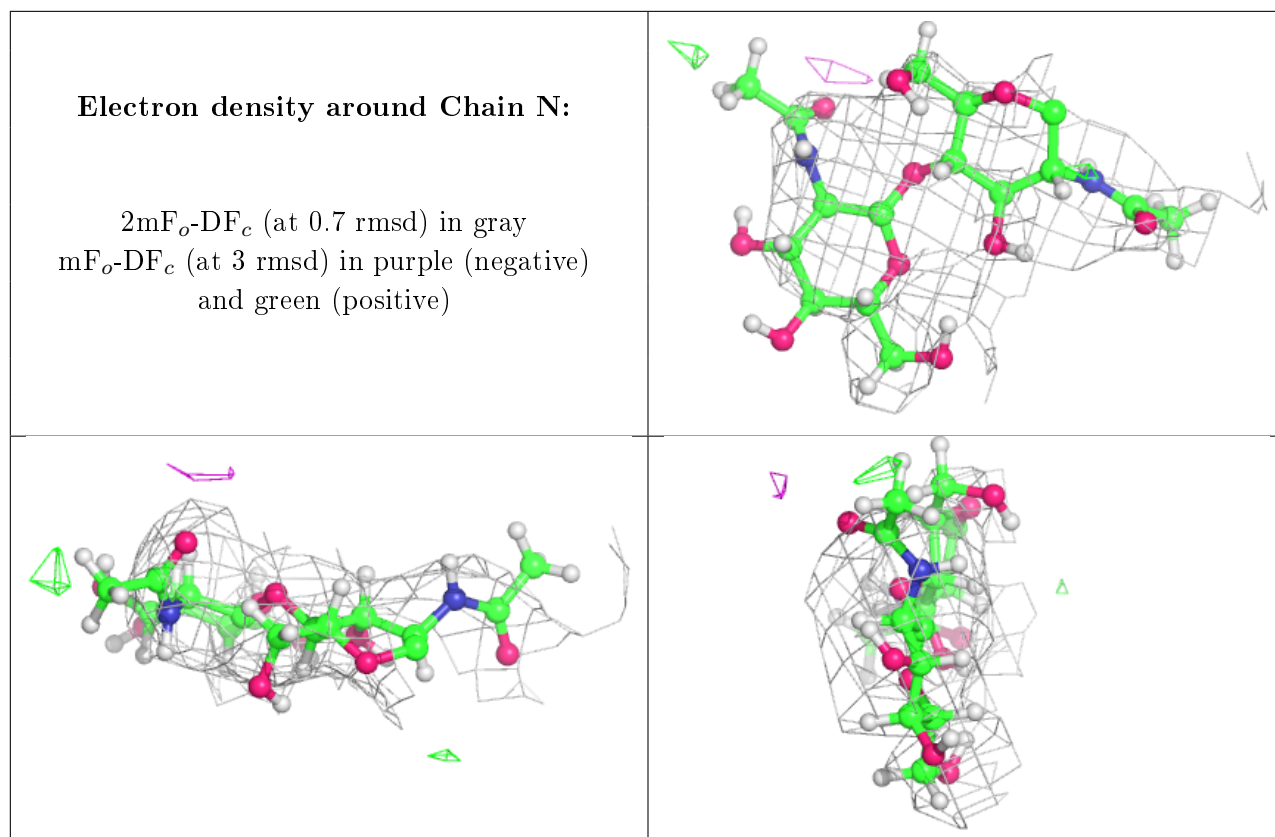
**Electron density around Chain K:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

**Electron density around Chain M:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





## 6.4 Ligands [\(i\)](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
11	NAG	D	3099	14/15	0.67	0.44	144,168,198,202	0
8	SO4	L	1215	5/5	0.86	0.21	152,153,156,164	0
11	NAG	B	3099	14/15	0.87	0.40	123,153,182,187	0
12	CL	C	2001	1/1	0.91	0.27	81,81,81,81	0
8	SO4	A	1456	5/5	0.91	0.23	83,99,114,131	0
10	MN	D	2002	1/1	0.91	0.14	174,174,174,174	0
8	SO4	A	1457	5/5	0.93	0.33	109,126,139,157	0
9	CA	C	2007	1/1	0.95	0.14	71,71,71,71	0
9	CA	C	2004	1/1	0.95	0.09	113,113,113,113	0
9	CA	C	2006	1/1	0.97	0.12	78,78,78,78	0
9	CA	C	2005	1/1	0.97	0.07	107,107,107,107	0
10	MN	D	2003	1/1	0.97	0.18	120,120,120,120	0
10	MN	D	2001	1/1	0.98	0.24	119,119,119,119	0
10	MN	B	2002	1/1	0.99	0.19	63,63,63,63	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
9	CA	A	2007	1/1	0.99	0.19	49,49,49,49	0
9	CA	A	2005	1/1	0.99	0.16	41,41,41,41	0
10	MN	B	2003	1/1	0.99	0.26	61,61,61,61	0
9	CA	A	2004	1/1	0.99	0.12	47,47,47,47	0
10	MN	B	2001	1/1	1.00	0.27	48,48,48,48	0
9	CA	A	2006	1/1	1.00	0.18	40,40,40,40	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.