



Full wwPDB X-ray Structure Validation Report ⓘ

Dec 10, 2023 – 06:45 pm GMT

PDB ID : 2JBK
Title : membrane-bound glutamate carboxypeptidase II (GCPII) in complex with quisqualic acid (quisqualate, alpha-amino-3,5-dioxo-1,2,4-oxadiazolidine-2-panoic acid)
Authors : Mesters, J.R.; Henning, K.; Hilgenfeld, R.
Deposited on : 2006-12-07
Resolution : 2.99 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 types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467
Mogul : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.36
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) : 2.36

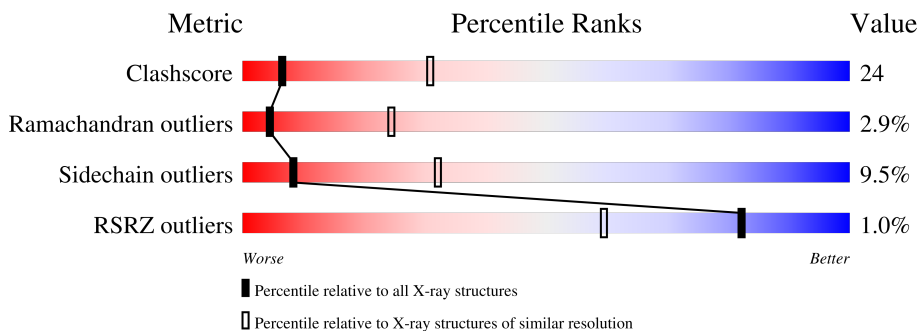
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

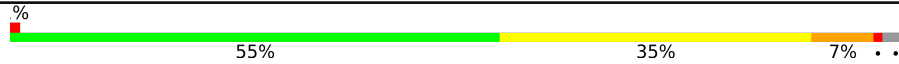
The reported resolution of this entry is 2.99 Å.

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))
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 of the lower bar indicate the fraction of residues that contain outliers for ≥ 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	707	 55% 35% 7% . .
2	B	2	 100%
2	C	2	 50% 50%
2	D	2	 100%
3	E	4	 75% 25%

2 Entry composition [i](#)

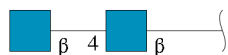
There are 9 unique types of molecules in this entry. The entry contains 5532 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 GLUTAMATE CARBOXYPEPTIDASE 2.

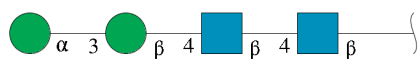
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	687	5318	3430	881	990	17	0	0	0

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



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	B	2	28	16	2	10	0	0	0
2	C	2	28	16	2	10	0	0	0
2	D	2	28	16	2	10	0	0	0

- Molecule 3 is an oligosaccharide called 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.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	E	4	50	28	2	20	0	0	0

- Molecule 4 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	2	Total	Zn	0	0
			2	2		

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

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total	Ca	0	0
			1	1		

- Molecule 6 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	1	Total	Cl	0	0
			1	1		

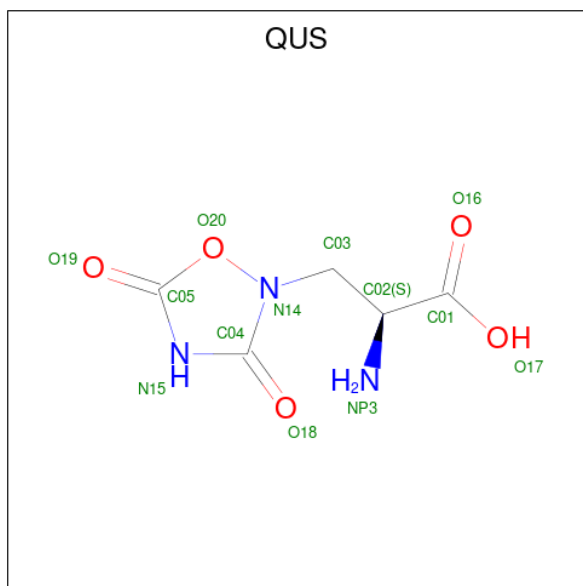
- Molecule 7 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C₈H₁₅NO₆).



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

- Molecule 8 is (S)-2-AMINO-3-(3,5-DIOXO-[1,2,4]OXADIAZOLIDIN-2-YL)-PROPIONIC

ACID (three-letter code: QUS) (formula: $C_5H_7N_3O_5$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
8	A	1	13	5	3	5	0	0

- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
9	A	21	21	21	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: GLUTAMATE CARBOXYPEPTIDASE 2



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

Chain B: 

MAG1
MAG2

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

Chain C:  50% 50%


MAG1
MAG2

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

Chain D:  100%

MAG1
MAG2

- Molecule 3: 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 E:  75% 25%

MAG1
MAG2
BMA3
MAN4

4 Data and refinement statistics

Property	Value	Source
Space group	I 2 2 2	Depositor
Cell constants a, b, c, α , β , γ	103.14Å 130.76Å 159.99Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	100.00 – 2.99 49.38 – 2.99	Depositor EDS
% Data completeness (in resolution range)	93.2 (100.00-2.99) 93.2 (49.38-2.99)	Depositor EDS
R_{merge}	0.15	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.44 (at 3.01Å)	Xtrriage
Refinement program	REFMAC 5.2.0005	Depositor
R, R_{free}	0.210 , (Not available) 0.201 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å ²)	43.3	Xtrriage
Anisotropy	0.078	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 32.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	5532	wwPDB-VP
Average B, all atoms (Å ²)	35.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.30% 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, MAN, QUS, NAG, CL, CA, ZN

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	1.13	9/5468 (0.2%)	1.05	14/7431 (0.2%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	3

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	654	ASP	CB-CG	5.52	1.63	1.51
1	A	408	GLU	CB-CG	5.44	1.62	1.52
1	A	109	GLU	CD-OE2	5.36	1.31	1.25
1	A	101	LYS	CD-CE	5.19	1.64	1.51
1	A	171	GLU	CD-OE2	5.11	1.31	1.25
1	A	272	TYR	CE2-CZ	-5.10	1.31	1.38
1	A	716	GLU	CG-CD	5.10	1.59	1.51
1	A	333	PHE	CE2-CZ	5.09	1.47	1.37
1	A	64	GLU	CD-OE1	5.03	1.31	1.25

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	664	MET	CG-SD-CE	7.21	111.74	100.20
1	A	654	ASP	CB-CG-OD1	7.18	124.76	118.30
1	A	453	ASP	CB-CG-OD2	7.12	124.70	118.30
1	A	156	ASP	CB-CG-OD2	-6.68	112.29	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	156	ASP	CB-CG-OD1	6.45	124.11	118.30
1	A	652	ASP	CB-CG-OD2	-6.05	112.85	118.30
1	A	616	MET	CG-SD-CE	5.85	109.56	100.20
1	A	173	ASP	CB-CG-OD1	-5.76	113.11	118.30
1	A	673	ARG	NE-CZ-NH1	5.61	123.11	120.30
1	A	652	ASP	N-CA-C	5.54	125.97	111.00
1	A	732	ILE	CB-CA-C	-5.49	100.62	111.60
1	A	652	ASP	CB-CA-C	-5.26	99.88	110.40
1	A	719	VAL	CB-CA-C	-5.18	101.56	111.40
1	A	156	ASP	N-CA-C	5.10	124.76	111.00

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	152	GLU	Peptide
1	A	338	SER	Peptide
1	A	506	PHE	Peptide

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	5318	0	5004	251	1
2	B	28	0	25	0	0
2	C	28	0	25	5	0
2	D	28	0	25	2	0
3	E	50	0	43	0	1
4	A	2	0	0	0	0
5	A	1	0	0	0	0
6	A	1	0	0	0	0
7	A	42	0	39	4	0
8	A	13	0	6	2	0
9	A	21	0	0	13	0
All	All	5532	0	5167	253	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 24.

All (253) 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)
9:A:2019:HOH:O	2:C:1:NAG:H3	1.46	1.12
1:A:337:PHE:HB3	1:A:340:GLN:NE2	1.70	1.07
1:A:657:ASN:HD21	1:A:660:VAL:HG23	1.18	1.06
1:A:657:ASN:ND2	1:A:660:VAL:CG2	2.19	1.04
1:A:620:GLN:HA	1:A:620:GLN:NE2	1.71	1.02
1:A:337:PHE:C	1:A:339:THR:HB	1.80	1.01
1:A:337:PHE:HB3	1:A:340:GLN:HE21	0.85	1.01
1:A:315:PRO:O	1:A:316:ASP:HB3	1.56	1.00
1:A:337:PHE:CB	1:A:340:GLN:HE21	1.74	0.99
1:A:509:MET:HA	1:A:509:MET:CE	1.92	0.99
1:A:620:GLN:HA	1:A:620:GLN:HE21	1.27	0.97
1:A:657:ASN:ND2	1:A:660:VAL:HG23	1.79	0.97
1:A:509:MET:HE2	1:A:510:PRO:HD2	1.46	0.96
1:A:257:ASN:ND2	8:A:1764:QUS:O18	2.01	0.92
1:A:197:SER:O	1:A:199:LYS:HD2	1.71	0.91
1:A:494:TYR:OH	1:A:509:MET:CE	2.19	0.91
1:A:509:MET:HA	1:A:509:MET:HE3	1.49	0.91
1:A:638:ASN:O	1:A:642:ILE:HG13	1.71	0.90
1:A:456:ILE:HD13	1:A:573:HIS:CE1	2.07	0.90
1:A:494:TYR:OH	1:A:509:MET:HE1	1.71	0.89
1:A:138:ILE:O	2:C:1:NAG:C8	2.21	0.89
1:A:175:VAL:CG2	1:A:331:PRO:HB3	2.05	0.86
1:A:138:ILE:O	2:C:1:NAG:H83	1.74	0.86
1:A:645:LYS:O	1:A:649:ARG:HG3	1.78	0.83
1:A:349:THR:HG21	7:A:1753:NAG:H81	1.61	0.82
1:A:180:ALA:HB3	1:A:213:LYS:HB3	1.62	0.82
1:A:657:ASN:HD21	1:A:660:VAL:CG2	1.81	0.81
1:A:109:GLU:OE2	1:A:109:GLU:HA	1.81	0.80
1:A:618:HIS:HB3	1:A:621:GLU:OE1	1.81	0.80
1:A:654:ASP:OD1	1:A:656:SER:CB	2.30	0.79
1:A:370:ARG:NH2	1:A:666:ASP:OD1	2.17	0.78
1:A:654:ASP:OD1	1:A:656:SER:HB2	1.85	0.77
1:A:339:THR:HA	9:A:2006:HOH:O	1.85	0.76
1:A:337:PHE:HA	9:A:2005:HOH:O	1.86	0.75
1:A:337:PHE:N	9:A:2005:HOH:O	2.19	0.75
1:A:325:VAL:HB	1:A:326:PRO:CD	2.18	0.73
1:A:509:MET:HA	1:A:509:MET:HE2	1.71	0.73
1:A:456:ILE:CD1	1:A:573:HIS:CE1	2.71	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:175:VAL:HG22	1:A:331:PRO:HB3	1.70	0.72
1:A:334:THR:HG23	1:A:334:THR:O	1.90	0.72
1:A:439:SER:O	1:A:443:GLN:HG2	1.89	0.72
1:A:460:TYR:CE1	1:A:500:LYS:HE2	2.24	0.72
1:A:337:PHE:O	1:A:339:THR:HB	1.89	0.71
1:A:422:ASP:O	1:A:430:GLY:HA3	1.90	0.70
1:A:235:PHE:HA	1:A:247:ASN:OD1	1.91	0.70
1:A:205:TYR:CE1	1:A:254:GLN:HB3	2.26	0.70
1:A:602:VAL:HG12	1:A:603:VAL:N	2.06	0.69
1:A:616:MET:O	1:A:619:PRO:HD3	1.93	0.68
1:A:166:PRO:HD3	1:A:290:PRO:HG2	1.74	0.68
1:A:657:ASN:ND2	1:A:660:VAL:HG21	2.05	0.68
1:A:138:ILE:O	2:C:1:NAG:H82	1.93	0.68
1:A:228:TYR:CE1	1:A:230:ASP:HB2	2.29	0.68
1:A:456:ILE:CD1	1:A:573:HIS:HE1	2.05	0.67
1:A:171:GLU:HA	1:A:342:VAL:O	1.95	0.67
1:A:334:THR:O	1:A:334:THR:CG2	2.43	0.66
1:A:719:VAL:O	1:A:721:PRO:HD3	1.96	0.66
1:A:716:GLU:CD	1:A:716:GLU:H	1.97	0.66
1:A:366:VAL:HB	1:A:413:ARG:HG2	1.77	0.65
1:A:180:ALA:CB	1:A:213:LYS:HB3	2.26	0.65
1:A:461:THR:HG23	1:A:462:LEU:O	1.96	0.65
1:A:509:MET:CE	1:A:509:MET:CA	2.72	0.65
1:A:337:PHE:CA	9:A:2005:HOH:O	2.40	0.64
1:A:551:LEU:HD12	1:A:561:LEU:HD22	1.79	0.64
1:A:259:LEU:HD13	1:A:261:LEU:HD21	1.80	0.64
1:A:315:PRO:O	1:A:316:ASP:CB	2.34	0.63
1:A:556:TYR:O	1:A:558:THR:HG23	1.97	0.63
1:A:377:HIS:CE1	1:A:388:PRO:HB3	2.32	0.63
1:A:337:PHE:CD2	1:A:340:GLN:NE2	2.67	0.63
1:A:509:MET:CE	1:A:510:PRO:HD2	2.27	0.63
1:A:538:THR:HG23	1:A:539:LYS:O	1.99	0.62
1:A:448:ALA:HB3	1:A:587:LEU:HD13	1.80	0.62
1:A:137:GLU:OE2	2:C:1:NAG:H5	1.99	0.62
1:A:232:ALA:HB2	1:A:321:GLY:HA2	1.82	0.62
1:A:460:TYR:CD1	1:A:500:LYS:HE2	2.34	0.62
1:A:337:PHE:O	1:A:340:GLN:N	2.23	0.62
1:A:225:VAL:HB	1:A:294:VAL:HG22	1.82	0.61
1:A:459:ASN:OD1	7:A:1757:NAG:H2	1.99	0.61
1:A:707:GLY:O	1:A:731:GLN:HG3	1.99	0.61
1:A:177:VAL:CG2	1:A:203:ALA:HB2	2.29	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:339:THR:HG23	9:A:2006:HOH:O	2.00	0.61
1:A:394:VAL:O	1:A:398:ILE:HG13	2.00	0.61
1:A:195:ASN:OD1	1:A:197:SER:HB3	2.00	0.61
1:A:620:GLN:HE21	1:A:620:GLN:CA	2.06	0.60
1:A:173:ASP:O	1:A:174:LEU:C	2.39	0.60
1:A:358:VAL:O	1:A:419:ALA:HA	2.01	0.60
1:A:192:MET:HE1	1:A:329:VAL:HG21	1.82	0.60
1:A:325:VAL:HB	1:A:326:PRO:HD2	1.84	0.60
1:A:476:ASN:HD22	2:D:1:NAG:H83	1.66	0.60
1:A:195:ASN:ND2	7:A:1756:NAG:C7	2.65	0.60
1:A:338:SER:N	1:A:339:THR:HB	2.16	0.60
1:A:484:PRO:HD2	1:A:485:ASP:OD1	2.02	0.59
1:A:460:TYR:CD2	1:A:540:ASN:HA	2.38	0.59
1:A:174:LEU:HD13	1:A:342:VAL:HG21	1.85	0.58
1:A:232:ALA:HB2	1:A:321:GLY:CA	2.33	0.58
1:A:657:ASN:HD22	1:A:660:VAL:CG2	2.14	0.57
1:A:88:GLN:N	1:A:88:GLN:OE1	2.37	0.57
1:A:155:SER:O	1:A:156:ASP:CG	2.42	0.57
1:A:165:SER:OG	1:A:293:PRO:HA	2.05	0.57
1:A:127:TYR:HE1	1:A:129:SER:OG	1.88	0.57
1:A:703:GLU:HG3	1:A:704:SER:N	2.19	0.57
1:A:175:VAL:HG23	1:A:331:PRO:HB3	1.86	0.57
1:A:349:THR:HG21	7:A:1753:NAG:C8	2.32	0.57
1:A:689:HIS:CE1	1:A:691:ILE:HB	2.40	0.57
1:A:381:TRP:CH2	9:A:2003:HOH:O	2.52	0.56
1:A:382:VAL:HB	9:A:2008:HOH:O	2.06	0.56
1:A:412:PRO:HA	1:A:589:ASN:OD1	2.05	0.56
1:A:494:TYR:OH	1:A:509:MET:HE3	2.04	0.56
1:A:657:ASN:ND2	1:A:660:VAL:CB	2.68	0.56
1:A:656:SER:O	1:A:658:PRO:HD3	2.05	0.56
1:A:258:ILE:HD12	1:A:290:PRO:HG3	1.86	0.55
1:A:483:SER:HB2	1:A:496:SER:OG	2.07	0.55
1:A:82:HIS:HB2	1:A:380:SER:OG	2.06	0.55
1:A:509:MET:HE3	1:A:509:MET:CA	2.30	0.55
1:A:699:LYS:HE2	8:A:1764:QUS:O19	2.07	0.55
1:A:619:PRO:HA	1:A:622:MET:HB2	1.89	0.55
1:A:103:PHE:O	1:A:403:GLY:HA3	2.07	0.54
1:A:129:SER:HA	1:A:139:PHE:O	2.07	0.54
1:A:618:HIS:N	1:A:618:HIS:CD2	2.75	0.54
1:A:484:PRO:HG3	1:A:575:THR:OG1	2.07	0.54
1:A:109:GLU:OE2	1:A:109:GLU:CA	2.53	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:181:ARG:HH11	1:A:207:LYS:HG2	1.74	0.53
1:A:460:TYR:HD2	1:A:540:ASN:HA	1.72	0.53
2:D:1:NAG:H61	2:D:2:NAG:C1	2.37	0.53
1:A:236:ALA:N	1:A:247:ASN:OD1	2.41	0.53
1:A:311:GLY:HA3	1:A:330:GLY:O	2.08	0.52
1:A:334:THR:HG22	1:A:337:PHE:HD1	1.73	0.52
1:A:338:SER:HB3	1:A:339:THR:OG1	2.09	0.52
1:A:191:ASP:OD1	1:A:191:ASP:N	2.41	0.51
1:A:373:ILE:HG12	1:A:417:LEU:HB2	1.92	0.51
1:A:688:ARG:HD3	9:A:2016:HOH:O	2.10	0.51
1:A:382:VAL:HG12	1:A:383:PHE:N	2.25	0.51
1:A:71:LYS:HE2	1:A:570:PHE:CE2	2.46	0.51
1:A:103:PHE:HB3	1:A:400:ARG:HA	1.93	0.51
1:A:225:VAL:O	1:A:294:VAL:HA	2.11	0.51
1:A:239:VAL:HB	1:A:247:ASN:ND2	2.26	0.51
1:A:608:ALA:O	1:A:611:ILE:HG22	2.11	0.51
1:A:153:ASN:O	1:A:154:VAL:C	2.49	0.51
1:A:242:TYR:CG	1:A:243:PRO:HA	2.46	0.51
1:A:71:LYS:HG3	1:A:570:PHE:CZ	2.46	0.50
1:A:137:GLU:HB2	9:A:2019:HOH:O	2.11	0.50
1:A:231:PRO:HD2	1:A:323:LEU:HD13	1.93	0.50
1:A:695:SER:HB3	1:A:698:ASN:O	2.11	0.50
1:A:330:GLY:HA2	1:A:331:PRO:O	2.11	0.50
1:A:455:SER:O	1:A:536:ARG:HB2	2.12	0.50
1:A:534:ARG:HB2	9:A:2011:HOH:O	2.12	0.50
1:A:148:PRO:HG2	1:A:151:TYR:CD2	2.47	0.49
1:A:302:ALA:O	1:A:305:LEU:N	2.41	0.49
1:A:629:PHE:O	1:A:633:PHE:HD2	1.96	0.49
1:A:130:ILE:HG22	1:A:131:ILE:N	2.28	0.49
1:A:653:PHE:O	1:A:653:PHE:CD1	2.65	0.49
1:A:128:ILE:CD1	1:A:226:ILE:HG12	2.43	0.49
1:A:325:VAL:CB	1:A:326:PRO:CD	2.87	0.49
1:A:551:LEU:HD12	1:A:561:LEU:CD2	2.42	0.49
1:A:494:TYR:HH	1:A:509:MET:HE1	1.72	0.48
1:A:621:GLU:O	1:A:622:MET:C	2.52	0.48
1:A:657:ASN:HD22	1:A:660:VAL:HG21	1.74	0.48
1:A:413:ARG:HG3	1:A:413:ARG:HH11	1.79	0.48
1:A:114:ASP:OD1	1:A:354:ARG:HB2	2.13	0.48
1:A:301:ASP:O	1:A:302:ALA:C	2.52	0.48
1:A:273:PRO:HG3	1:A:437:GLU:HA	1.96	0.48
1:A:356:TYR:O	1:A:378:ARG:NH2	2.30	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:682:PRO:O	1:A:683:ASP:HB2	2.12	0.48
1:A:175:VAL:HG22	1:A:331:PRO:CB	2.41	0.48
1:A:333:PHE:HD1	1:A:340:GLN:O	1.96	0.48
1:A:142:SER:N	1:A:301:ASP:OD2	2.40	0.47
1:A:657:ASN:ND2	1:A:660:VAL:HB	2.29	0.47
1:A:240:LYS:O	1:A:245:GLY:HA3	2.14	0.47
1:A:602:VAL:CG1	1:A:603:VAL:N	2.77	0.47
1:A:620:GLN:NE2	1:A:620:GLN:CA	2.53	0.47
1:A:209:PHE:CE2	1:A:211:GLY:HA3	2.49	0.47
1:A:456:ILE:HD11	1:A:573:HIS:HE1	1.79	0.47
1:A:463:ARG:HD3	1:A:536:ARG:CZ	2.44	0.47
1:A:652:ASP:N	1:A:652:ASP:OD2	2.48	0.47
1:A:337:PHE:HD2	1:A:340:GLN:NE2	2.13	0.47
1:A:330:GLY:CA	1:A:331:PRO:O	2.63	0.47
1:A:353:THR:HG22	1:A:354:ARG:N	2.30	0.46
1:A:231:PRO:HG2	1:A:323:LEU:CD1	2.45	0.46
1:A:449:TYR:CE2	1:A:521:PHE:HA	2.50	0.46
1:A:112:HIS:HA	1:A:355:ILE:O	2.15	0.46
1:A:250:GLY:CA	1:A:299:TYR:CE2	2.98	0.46
1:A:406:LYS:HA	1:A:410:TRP:O	2.16	0.45
1:A:126:ASN:HA	1:A:345:HIS:O	2.16	0.45
1:A:57:ASN:ND2	1:A:60:ALA:H	2.14	0.45
1:A:518:GLY:O	1:A:519:ASN:HB2	2.16	0.45
1:A:616:MET:CE	1:A:619:PRO:HB3	2.47	0.45
1:A:720:ASP:C	1:A:720:ASP:OD1	2.55	0.45
1:A:715:ILE:HD13	1:A:725:TRP:CE2	2.52	0.45
1:A:188:LEU:HD23	1:A:196:CYS:SG	2.57	0.45
1:A:469:LEU:O	1:A:595:PHE:HA	2.17	0.45
1:A:551:LEU:O	1:A:557:GLU:HG3	2.17	0.45
1:A:488:PHE:O	1:A:489:GLU:C	2.54	0.44
1:A:234:TYR:HD2	1:A:550:PRO:HA	1.82	0.44
1:A:106:ASP:OD1	1:A:411:ARG:NH2	2.45	0.44
1:A:658:PRO:O	1:A:661:LEU:HB3	2.17	0.44
1:A:119:TYR:O	1:A:348:SER:HB3	2.17	0.44
1:A:145:GLU:OE1	1:A:555:VAL:HB	2.18	0.44
1:A:382:VAL:HG11	1:A:555:VAL:HG23	1.99	0.44
1:A:561:LEU:HD12	1:A:565:PHE:HD2	1.82	0.44
1:A:170:PRO:O	1:A:343:LYS:HA	2.17	0.43
1:A:231:PRO:HD3	1:A:299:TYR:CD1	2.53	0.43
1:A:167:GLN:HG2	1:A:347:HIS:HA	2.00	0.43
1:A:654:ASP:C	1:A:656:SER:N	2.71	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:239:VAL:HB	1:A:247:ASN:HD21	1.82	0.43
1:A:611:ILE:HD11	1:A:708:ILE:HG22	1.99	0.43
1:A:663:MET:HG3	1:A:663:MET:O	2.16	0.43
1:A:132:ASN:HB3	1:A:138:ILE:HD11	2.01	0.43
1:A:266:ASP:HA	1:A:429:LEU:HD22	2.00	0.43
1:A:186:PHE:HD1	1:A:186:PHE:HA	1.70	0.43
1:A:427:GLY:O	1:A:428:LEU:HB2	2.19	0.43
1:A:333:PHE:CD1	1:A:340:GLN:O	2.72	0.43
1:A:80:ILE:HD12	1:A:88:GLN:HG2	2.01	0.42
1:A:131:ILE:HB	1:A:135:GLY:HA2	2.00	0.42
1:A:621:GLU:CD	1:A:621:GLU:H	2.21	0.42
1:A:362:LEU:HD23	1:A:416:ILE:HD12	2.00	0.42
1:A:307:GLU:HA	1:A:325:VAL:HG12	2.02	0.42
1:A:517:SER:OG	1:A:518:GLY:N	2.53	0.42
1:A:603:VAL:HG23	1:A:607:TYR:CE2	2.53	0.42
1:A:127:TYR:CD1	1:A:127:TYR:C	2.93	0.42
1:A:160:PRO:O	1:A:161:PHE:HB3	2.20	0.42
1:A:339:THR:CA	9:A:2006:HOH:O	2.56	0.42
1:A:181:ARG:HE	1:A:181:ARG:HB2	1.39	0.41
1:A:256:GLY:HA2	9:A:2021:HOH:O	2.19	0.41
1:A:732:ILE:O	1:A:732:ILE:HG22	2.18	0.41
1:A:407:LYS:C	1:A:409:GLY:H	2.24	0.41
1:A:504:PRO:O	1:A:506:PHE:N	2.53	0.41
1:A:689:HIS:HB3	1:A:692:TYR:O	2.21	0.41
1:A:442:LEU:HD23	1:A:442:LEU:HA	1.76	0.41
1:A:654:ASP:C	1:A:656:SER:H	2.24	0.41
1:A:272:TYR:CD2	1:A:272:TYR:N	2.89	0.41
1:A:215:LYS:HE2	1:A:219:LEU:HD11	2.01	0.41
1:A:538:THR:HG23	1:A:539:LYS:N	2.36	0.41
1:A:583:MET:O	1:A:584:VAL:C	2.57	0.41
1:A:664:MET:HE3	1:A:664:MET:HB3	1.90	0.41
1:A:691:ILE:O	1:A:704:SER:HA	2.21	0.41
1:A:149:PRO:HG2	1:A:243:PRO:HG3	2.02	0.41
1:A:227:LEU:O	1:A:296:PRO:HA	2.20	0.41
1:A:334:THR:CG2	1:A:337:PHE:HD1	2.34	0.41
1:A:382:VAL:HG12	1:A:383:PHE:CD2	2.56	0.41
1:A:485:ASP:OD1	1:A:485:ASP:N	2.54	0.41
1:A:124:HIS:N	1:A:125:PRO:CD	2.82	0.40
1:A:266:ASP:OD2	1:A:269:THR:OG1	2.39	0.40
1:A:676:ILE:HG23	1:A:688:ARG:HB2	2.02	0.40
1:A:155:SER:O	1:A:156:ASP:CB	2.69	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:261:LEU:O	1:A:262:ASN:HB2	2.21	0.40
1:A:286:ALA:HB3	1:A:289:LEU:HG	2.03	0.40
1:A:378:ARG:HB2	1:A:420:SER:OG	2.22	0.40
1:A:103:PHE:CD2	1:A:400:ARG:HB2	2.57	0.40
1:A:616:MET:C	1:A:618:HIS:N	2.75	0.40
1:A:653:PHE:CD1	1:A:653:PHE:C	2.94	0.40
1:A:145:GLU:OE2	1:A:554:SER:HB2	2.20	0.40
1:A:191:ASP:O	1:A:192:MET:C	2.60	0.40
1:A:250:GLY:HA2	1:A:299:TYR:CE2	2.56	0.40
1:A:729:LYS:O	1:A:730:ARG:C	2.58	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)
1:A:276:GLU:OE2	3:E:3:BMA:O2[2_565]	2.19	0.01

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	681/707 (96%)	587 (86%)	74 (11%)	20 (3%)	4 24

All (20) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	153	ASN
1	A	154	VAL
1	A	338	SER
1	A	505	GLU
1	A	192	MET
1	A	332	GLY

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Mol	Chain	Res	Type
1	A	339	THR
1	A	602	VAL
1	A	178	ASN
1	A	617	LYS
1	A	125	PRO
1	A	382	VAL
1	A	557	GLU
1	A	594	PRO
1	A	316	ASP
1	A	484	PRO
1	A	657	ASN
1	A	311	GLY
1	A	198	GLY
1	A	331	PRO

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	536/603 (89%)	485 (90%)	51 (10%)	8 32

All (51) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	57	ASN
1	A	107	SER
1	A	123	THR
1	A	128	ILE
1	A	155	SER
1	A	158	VAL
1	A	174	LEU
1	A	192	MET
1	A	197	SER
1	A	200	ILE
1	A	218	GLN
1	A	257	ASN

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Mol	Chain	Res	Type
1	A	258	ILE
1	A	266	ASP
1	A	316	ASP
1	A	323	LEU
1	A	325	VAL
1	A	334	THR
1	A	359	ILE
1	A	380	SER
1	A	396	HIS
1	A	455	SER
1	A	456	ILE
1	A	465	ASP
1	A	473	LEU
1	A	489	GLU
1	A	496	SER
1	A	503	SER
1	A	509	MET
1	A	534	ARG
1	A	536	ARG
1	A	537	TYR
1	A	538	THR
1	A	569	MET
1	A	571	LYS
1	A	590	SER
1	A	600	TYR
1	A	603	VAL
1	A	605	ARG
1	A	618	HIS
1	A	626	SER
1	A	644	SER
1	A	654	ASP
1	A	656	SER
1	A	663	MET
1	A	664	MET
1	A	668	LEU
1	A	673	ARG
1	A	716	GLU
1	A	722	SER
1	A	733	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	57	ASN
1	A	340	GLN
1	A	345	HIS
1	A	443	GLN
1	A	618	HIS
1	A	620	GLN
1	A	657	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](#)

10 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$
2	NAG	B	1	1,2	14,14,15	1.03	1 (7%)	17,19,21	2.01	6 (35%)
2	NAG	B	2	2	14,14,15	0.97	1 (7%)	17,19,21	2.82	7 (41%)
2	NAG	C	1	1,2	14,14,15	1.48	3 (21%)	17,19,21	2.95	9 (52%)
2	NAG	C	2	2	14,14,15	1.10	1 (7%)	17,19,21	2.94	7 (41%)
2	NAG	D	1	1,2	14,14,15	0.89	0	17,19,21	2.80	6 (35%)
2	NAG	D	2	2	14,14,15	0.78	0	17,19,21	3.21	6 (35%)
3	NAG	E	1	3,1	14,14,15	0.58	0	17,19,21	2.37	6 (35%)
3	NAG	E	2	3	14,14,15	1.30	3 (21%)	17,19,21	3.56	7 (41%)
3	BMA	E	3	3	11,11,12	1.07	1 (9%)	15,15,17	1.50	2 (13%)
3	MAN	E	4	3	11,11,12	0.88	0	15,15,17	2.65	8 (53%)

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	B	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	B	2	2	-	4/6/23/26	0/1/1/1
2	NAG	C	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	C	2	2	-	0/6/23/26	0/1/1/1
2	NAG	D	1	1,2	-	4/6/23/26	0/1/1/1
2	NAG	D	2	2	-	1/6/23/26	0/1/1/1
3	NAG	E	1	3,1	-	2/6/23/26	0/1/1/1
3	NAG	E	2	3	-	4/6/23/26	0/1/1/1
3	BMA	E	3	3	-	0/2/19/22	0/1/1/1
3	MAN	E	4	3	-	0/2/19/22	0/1/1/1

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	1	NAG	C1-C2	3.51	1.57	1.52
3	E	2	NAG	C8-C7	2.67	1.56	1.50
2	C	1	NAG	O7-C7	2.53	1.29	1.23
3	E	2	NAG	O5-C1	-2.50	1.39	1.43
2	B	1	NAG	O7-C7	2.47	1.28	1.23
2	C	1	NAG	C2-N2	2.26	1.50	1.46
3	E	2	NAG	O5-C5	-2.21	1.39	1.43
2	C	2	NAG	C1-C2	2.08	1.55	1.52
2	B	2	NAG	O5-C5	2.07	1.47	1.43
3	E	3	BMA	C2-C3	2.06	1.55	1.52

All (64) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	2	NAG	C2-N2-C7	-10.83	107.48	122.90
3	E	2	NAG	C2-N2-C7	-9.82	108.92	122.90
2	D	1	NAG	C2-N2-C7	-7.45	112.29	122.90
3	E	2	NAG	C1-O5-C5	-6.75	103.04	112.19
2	C	1	NAG	C2-N2-C7	-6.69	113.38	122.90
2	B	2	NAG	C1-O5-C5	6.67	121.23	112.19
2	C	2	NAG	C2-N2-C7	-6.52	113.62	122.90
2	B	2	NAG	O3-C3-C2	-6.25	96.53	109.47
3	E	2	NAG	C3-C4-C5	-5.91	99.69	110.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	2	NAG	O3-C3-C2	-5.34	98.41	109.47
3	E	1	NAG	C2-N2-C7	5.25	130.38	122.90
3	E	4	MAN	C1-O5-C5	-5.07	105.32	112.19
2	C	1	NAG	O5-C5-C6	4.97	115.00	107.20
2	C	1	NAG	C1-O5-C5	-4.73	105.79	112.19
2	C	2	NAG	O5-C5-C4	-4.61	99.60	110.83
2	D	1	NAG	O5-C5-C6	-4.51	100.14	107.20
2	B	2	NAG	O5-C5-C4	4.43	121.59	110.83
2	D	2	NAG	O4-C4-C5	4.28	119.94	109.30
3	E	4	MAN	O5-C5-C6	4.21	113.81	107.20
2	B	1	NAG	O5-C5-C6	4.12	113.67	107.20
2	C	1	NAG	C1-C2-N2	4.06	117.43	110.49
2	B	1	NAG	O4-C4-C3	-3.91	101.30	110.35
3	E	1	NAG	C6-C5-C4	-3.84	104.02	113.00
2	D	1	NAG	O3-C3-C2	-3.83	101.53	109.47
3	E	4	MAN	O5-C5-C4	-3.72	101.78	110.83
3	E	3	BMA	O4-C4-C5	3.59	118.20	109.30
2	C	2	NAG	C1-C2-N2	3.57	116.59	110.49
2	B	1	NAG	C1-O5-C5	3.49	116.93	112.19
2	C	1	NAG	C3-C4-C5	3.39	116.29	110.24
3	E	2	NAG	O5-C1-C2	-3.34	106.01	111.29
3	E	1	NAG	O4-C4-C3	3.22	117.78	110.35
3	E	1	NAG	O7-C7-C8	-3.21	116.09	122.06
3	E	4	MAN	C3-C4-C5	-3.20	104.52	110.24
2	D	1	NAG	O3-C3-C4	-3.20	102.94	110.35
2	C	2	NAG	C8-C7-N2	3.10	121.34	116.10
2	C	1	NAG	O7-C7-C8	-3.03	116.44	122.06
3	E	4	MAN	O4-C4-C3	-2.98	103.47	110.35
2	D	2	NAG	O5-C1-C2	2.97	115.98	111.29
3	E	1	NAG	O7-C7-N2	2.96	127.40	121.95
3	E	4	MAN	C6-C5-C4	2.92	119.85	113.00
2	C	2	NAG	O7-C7-C8	-2.90	116.66	122.06
3	E	4	MAN	O2-C2-C1	2.90	115.08	109.15
3	E	3	BMA	C1-C2-C3	2.87	113.20	109.67
2	D	1	NAG	O4-C4-C5	2.80	116.26	109.30
3	E	1	NAG	O5-C5-C6	2.77	111.55	107.20
2	C	1	NAG	C8-C7-N2	2.76	120.77	116.10
2	D	1	NAG	O6-C6-C5	-2.74	101.87	111.29
2	B	1	NAG	C4-C3-C2	-2.68	107.09	111.02
2	B	2	NAG	C6-C5-C4	-2.68	106.73	113.00
3	E	2	NAG	O4-C4-C3	2.66	116.49	110.35
2	B	1	NAG	C3-C4-C5	-2.65	105.52	110.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	2	NAG	O6-C6-C5	-2.58	102.43	111.29
3	E	2	NAG	O5-C5-C6	-2.39	103.47	107.20
2	C	2	NAG	O4-C4-C5	2.38	115.21	109.30
2	B	2	NAG	C8-C7-N2	2.37	120.11	116.10
2	C	1	NAG	C4-C3-C2	2.35	114.46	111.02
2	D	2	NAG	C1-C2-N2	-2.28	106.59	110.49
3	E	4	MAN	C2-C3-C4	2.21	114.72	110.89
2	B	2	NAG	O4-C4-C5	2.17	114.68	109.30
2	C	1	NAG	O4-C4-C3	-2.12	105.46	110.35
3	E	2	NAG	C6-C5-C4	2.10	117.93	113.00
2	D	2	NAG	C3-C4-C5	-2.10	106.48	110.24
2	B	1	NAG	C8-C7-N2	-2.02	112.68	116.10
2	B	2	NAG	O3-C3-C4	-2.01	105.70	110.35

There are no chirality outliers.

All (17) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	2	NAG	C8-C7-N2-C2
2	D	1	NAG	C8-C7-N2-C2
2	D	1	NAG	O7-C7-N2-C2
2	B	2	NAG	O7-C7-N2-C2
2	B	2	NAG	C4-C5-C6-O6
3	E	2	NAG	C4-C5-C6-O6
3	E	2	NAG	C8-C7-N2-C2
3	E	2	NAG	O7-C7-N2-C2
2	D	1	NAG	O5-C5-C6-O6
2	D	1	NAG	C4-C5-C6-O6
2	B	2	NAG	O5-C5-C6-O6
3	E	1	NAG	C4-C5-C6-O6
3	E	2	NAG	O5-C5-C6-O6
2	C	1	NAG	C8-C7-N2-C2
2	D	2	NAG	C4-C5-C6-O6
3	E	1	NAG	O5-C5-C6-O6
2	C	1	NAG	O7-C7-N2-C2

There are no ring outliers.

4 monomers are involved in 8 short contacts:

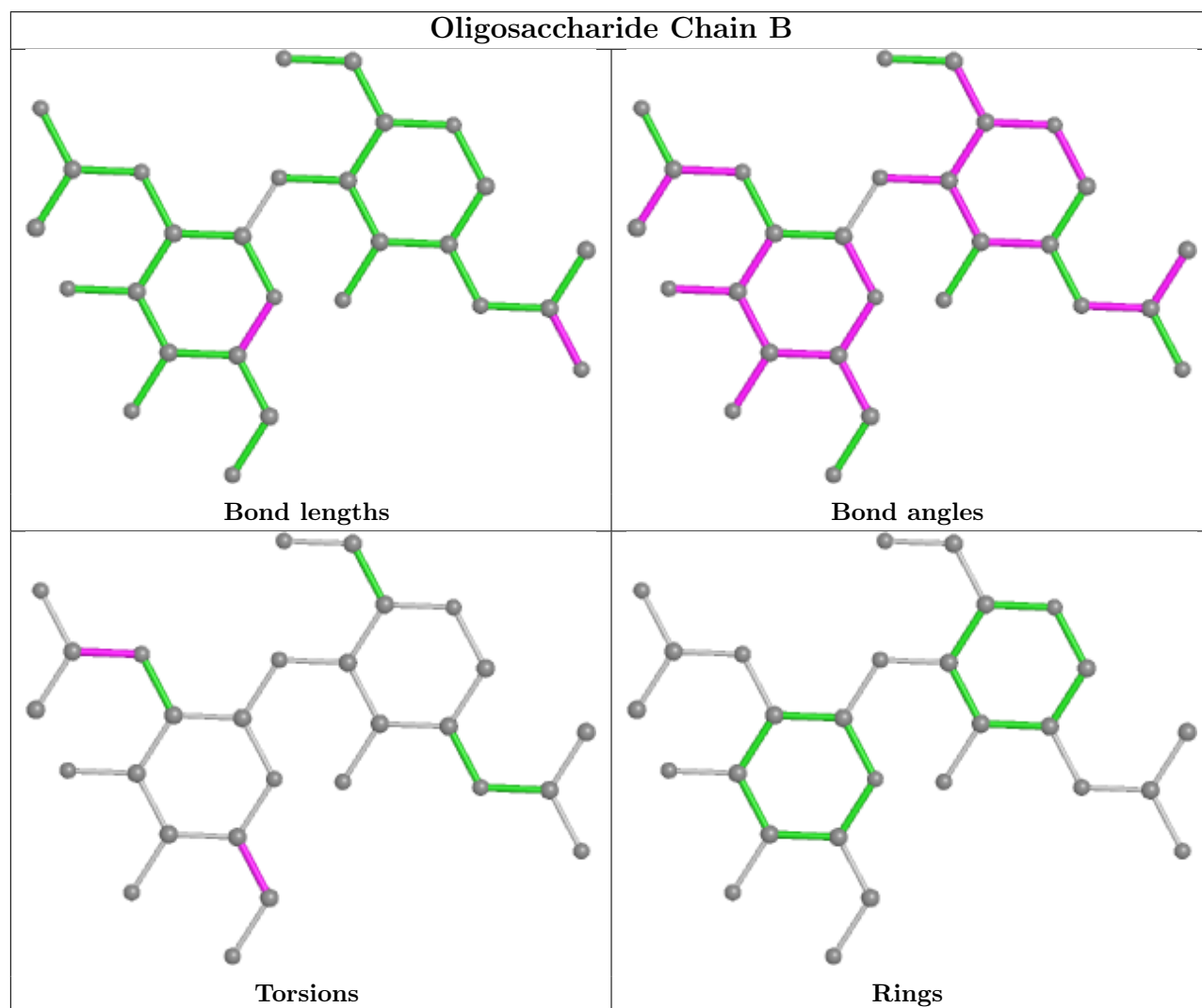
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	1	NAG	5	0

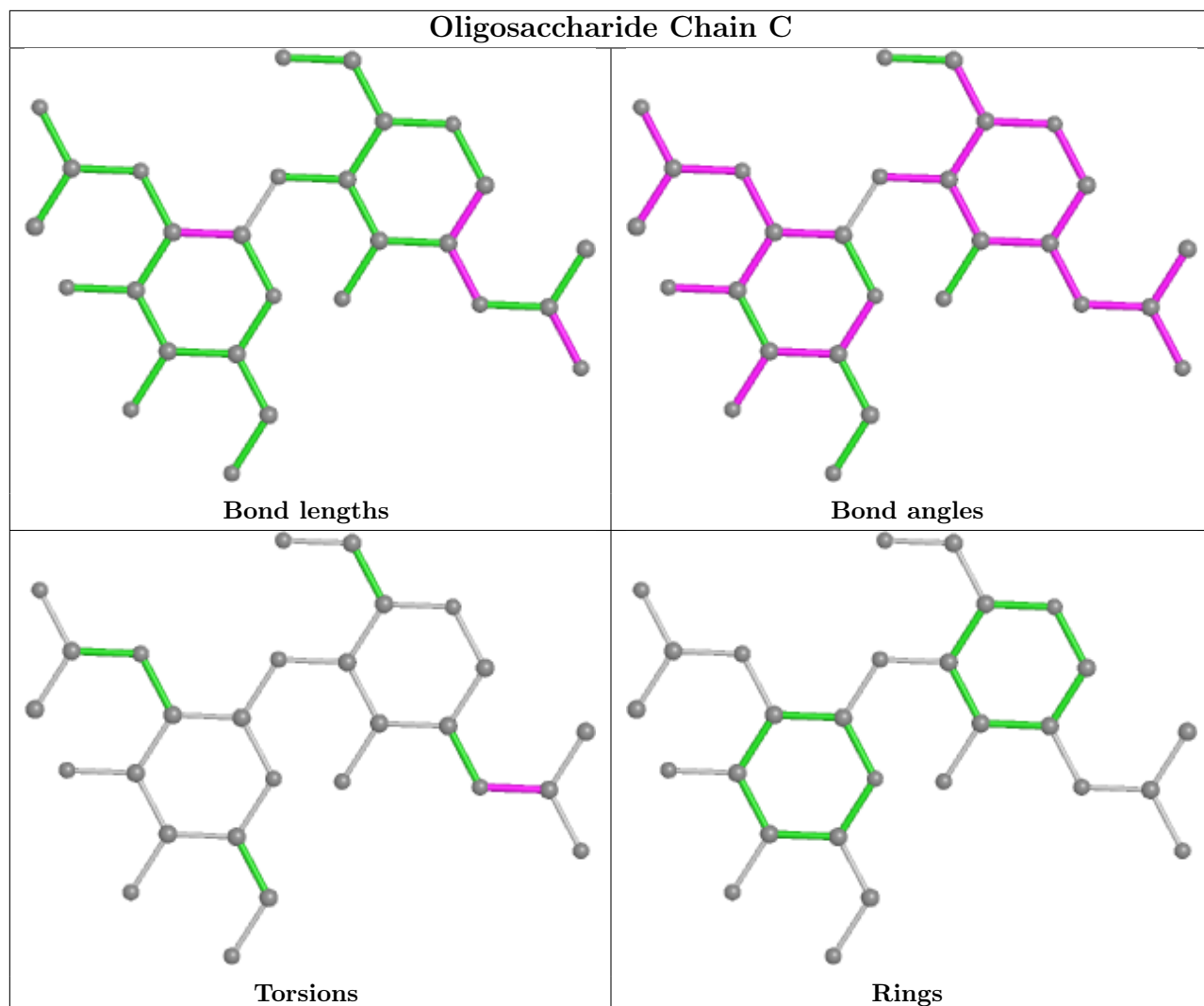
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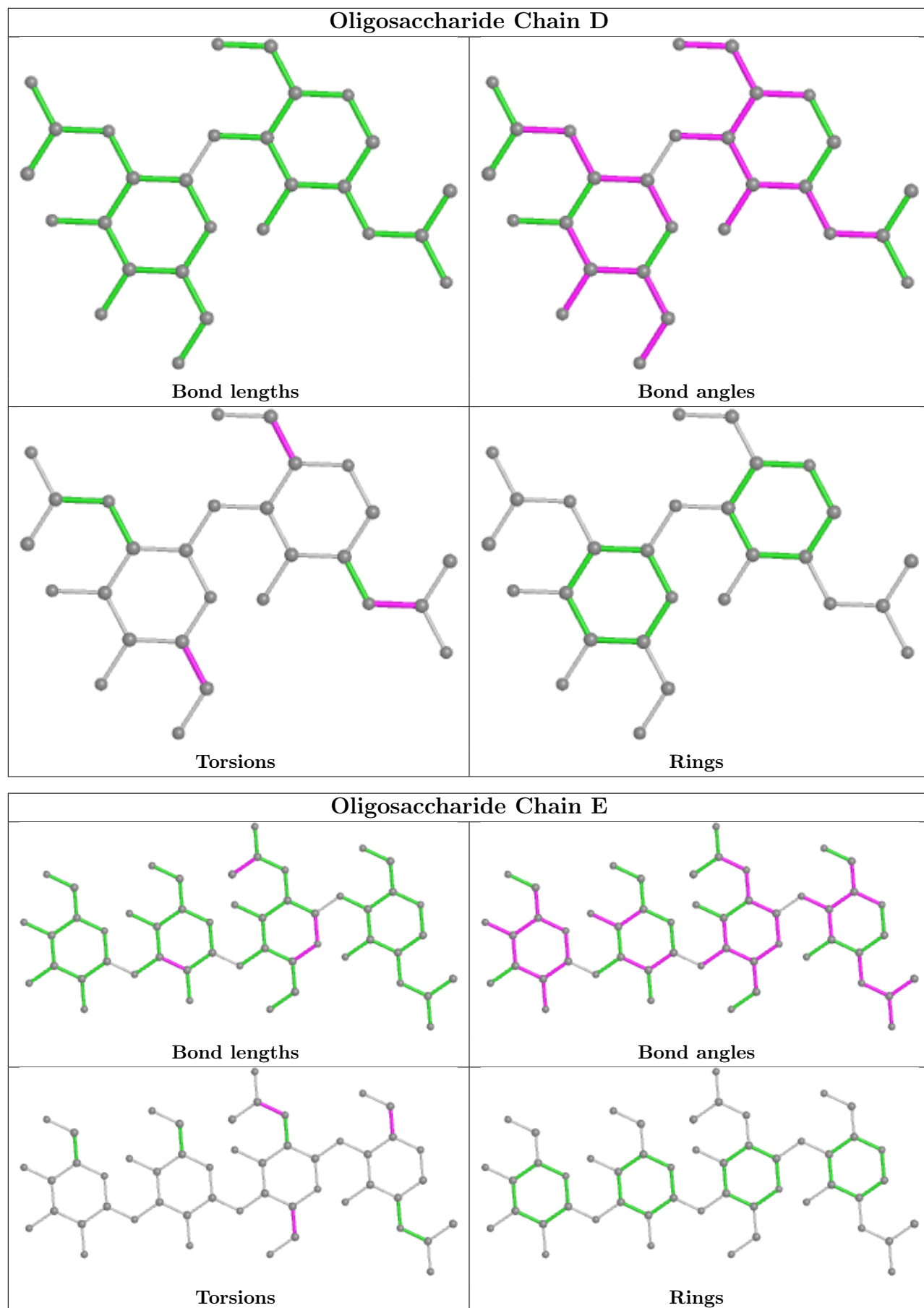
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Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	1	NAG	2	0
3	E	3	BMA	0	1
2	D	2	NAG	1	0

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

Of 8 ligands modelled in this entry, 4 are monoatomic - leaving 4 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
7	NAG	A	1757	1	14,14,15	1.10	1 (7%)	17,19,21	2.71	7 (41%)
7	NAG	A	1756	1	14,14,15	1.88	5 (35%)	17,19,21	2.74	8 (47%)
8	QUS	A	1764	-	6,13,13	1.55	2 (33%)	4,18,18	2.24	1 (25%)
7	NAG	A	1753	1	14,14,15	1.37	3 (21%)	17,19,21	3.21	7 (41%)

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
7	NAG	A	1757	1	-	6/6/23/26	0/1/1/1
7	NAG	A	1756	1	-	6/6/23/26	0/1/1/1
8	QUS	A	1764	-	-	1/6/8/8	0/1/1/1
7	NAG	A	1753	1	-	4/6/23/26	0/1/1/1

All (11) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	A	1756	NAG	O5-C1	3.06	1.48	1.43
7	A	1756	NAG	O5-C5	3.02	1.49	1.43
7	A	1757	NAG	O5-C1	2.72	1.48	1.43
7	A	1756	NAG	C8-C7	2.63	1.56	1.50
8	A	1764	QUS	O19-C05	2.62	1.22	1.19
7	A	1756	NAG	O7-C7	2.45	1.28	1.23
7	A	1753	NAG	O5-C5	2.38	1.48	1.43
7	A	1753	NAG	O5-C1	2.36	1.47	1.43
7	A	1753	NAG	C6-C5	2.16	1.59	1.51
7	A	1756	NAG	C4-C3	2.07	1.57	1.52
8	A	1764	QUS	C04-N15	-2.01	1.32	1.34

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	A	1753	NAG	O5-C5-C6	7.49	118.94	107.20
7	A	1757	NAG	C4-C3-C2	-6.26	101.85	111.02
7	A	1756	NAG	C1-O5-C5	6.18	120.56	112.19
7	A	1757	NAG	C1-O5-C5	5.53	119.69	112.19
7	A	1753	NAG	C3-C4-C5	-5.53	100.38	110.24
7	A	1756	NAG	O5-C5-C6	5.34	115.58	107.20
7	A	1753	NAG	C1-O5-C5	5.03	119.01	112.19
7	A	1753	NAG	C4-C3-C2	-4.94	103.78	111.02
8	A	1764	QUS	C03-C02-C01	4.22	117.42	108.94
7	A	1757	NAG	O5-C5-C6	3.85	113.24	107.20
7	A	1756	NAG	O4-C4-C3	3.64	118.77	110.35
7	A	1753	NAG	C2-N2-C7	-3.63	117.74	122.90
7	A	1757	NAG	C2-N2-C7	-3.43	118.02	122.90
7	A	1756	NAG	C6-C5-C4	-3.30	105.28	113.00
7	A	1753	NAG	O4-C4-C5	3.00	116.76	109.30
7	A	1756	NAG	C1-C2-N2	3.00	115.61	110.49
7	A	1757	NAG	O7-C7-N2	2.86	127.21	121.95
7	A	1756	NAG	O5-C1-C2	-2.84	106.80	111.29
7	A	1757	NAG	C8-C7-N2	-2.32	112.17	116.10
7	A	1757	NAG	O5-C1-C2	2.24	114.83	111.29
7	A	1756	NAG	C2-N2-C7	2.19	126.03	122.90
7	A	1756	NAG	C3-C4-C5	2.17	114.12	110.24
7	A	1753	NAG	O6-C6-C5	2.04	118.29	111.29

There are no chirality outliers.

All (17) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	A	1753	NAG	C8-C7-N2-C2
7	A	1753	NAG	O7-C7-N2-C2
7	A	1756	NAG	C8-C7-N2-C2
7	A	1756	NAG	O7-C7-N2-C2
8	A	1764	QUS	C01-C02-C03-N14
7	A	1753	NAG	O5-C5-C6-O6
7	A	1757	NAG	C4-C5-C6-O6
7	A	1756	NAG	O5-C5-C6-O6
7	A	1757	NAG	C8-C7-N2-C2
7	A	1757	NAG	O5-C5-C6-O6
7	A	1756	NAG	C4-C5-C6-O6
7	A	1753	NAG	C4-C5-C6-O6
7	A	1757	NAG	O7-C7-N2-C2

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Mol	Chain	Res	Type	Atoms
7	A	1756	NAG	C1-C2-N2-C7
7	A	1757	NAG	C1-C2-N2-C7
7	A	1756	NAG	C3-C2-N2-C7
7	A	1757	NAG	C3-C2-N2-C7

There are no ring outliers.

4 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	A	1757	NAG	1	0
7	A	1756	NAG	1	0
8	A	1764	QUS	2	0
7	A	1753	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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	687/707 (97%)	-0.22	7 (1%) 82 59	35, 35, 35, 35	0

All (7) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	340	GLN	2.8
1	A	719	VAL	2.7
1	A	310	GLY	2.3
1	A	155	SER	2.2
1	A	153	ASN	2.0
1	A	315	PRO	2.0
1	A	488	PHE	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, 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.

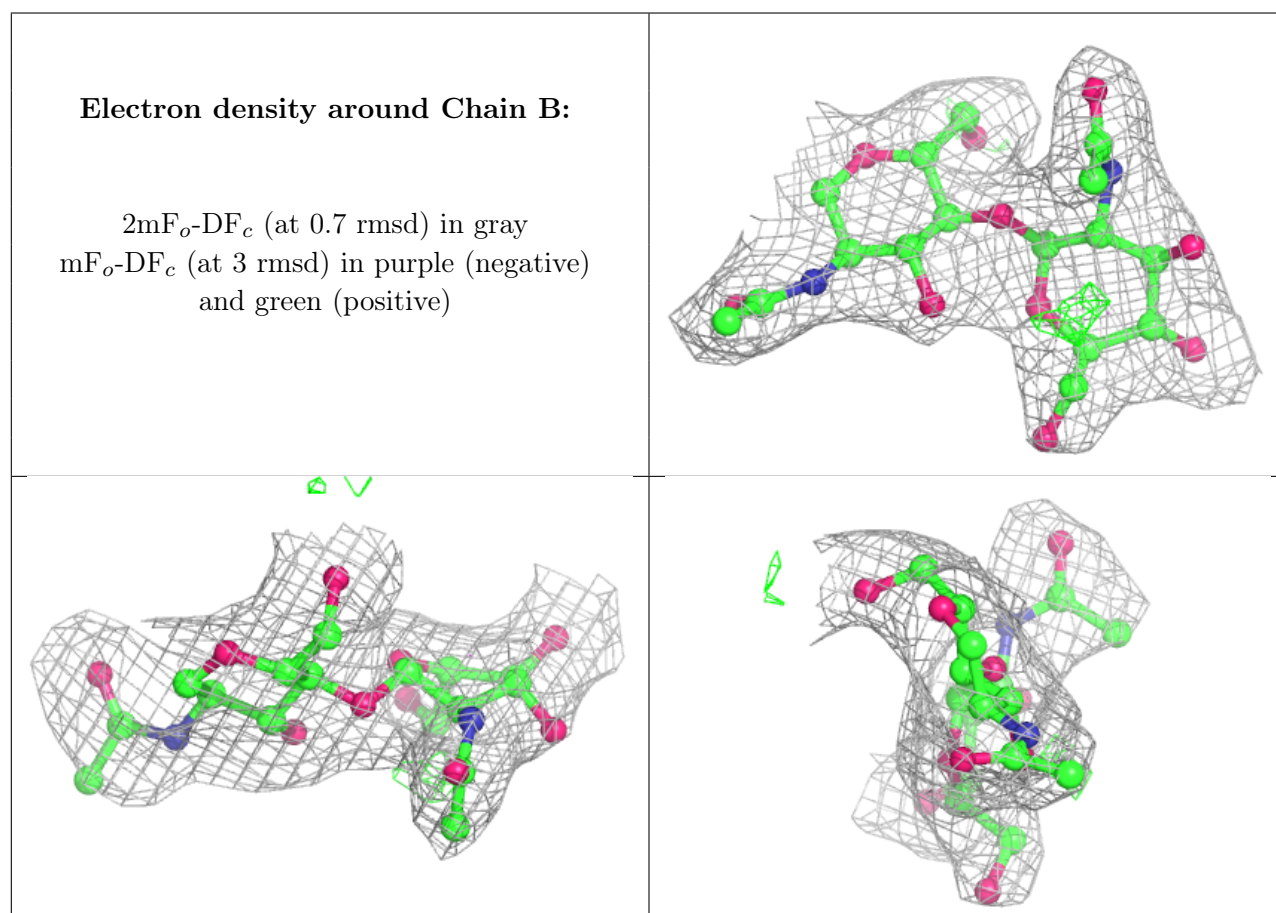
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	NAG	C	2	14/15	0.89	0.42	35,35,35,35	0
3	NAG	E	2	14/15	0.91	0.19	35,35,35,35	0
2	NAG	C	1	14/15	0.92	0.28	35,35,35,35	0
2	NAG	D	2	14/15	0.93	0.22	35,35,35,35	0
3	BMA	E	3	11/12	0.93	0.15	35,35,35,35	0

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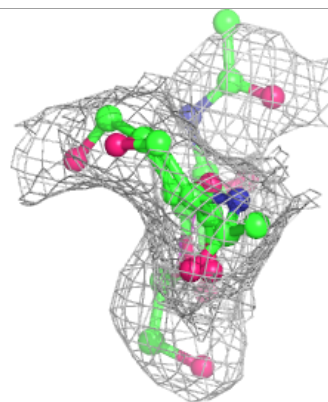
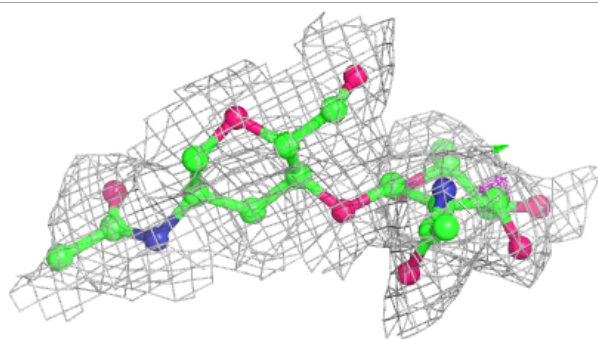
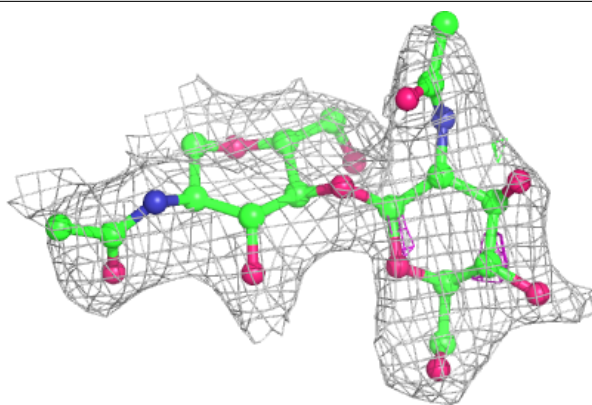
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	MAN	E	4	11/12	0.93	0.15	35,35,35,35	0
2	NAG	B	2	14/15	0.94	0.37	35,35,35,35	0
3	NAG	E	1	14/15	0.95	0.14	35,35,35,35	0
2	NAG	B	1	14/15	0.96	0.23	35,35,35,35	0
2	NAG	D	1	14/15	0.97	0.18	35,35,35,35	0

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.

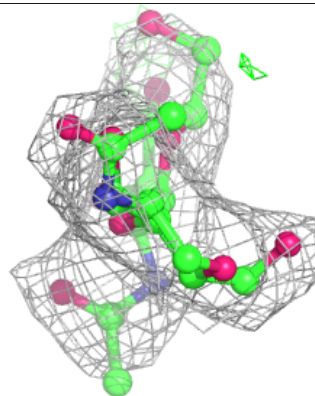
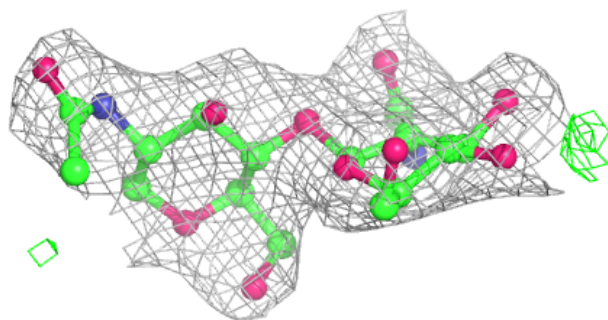
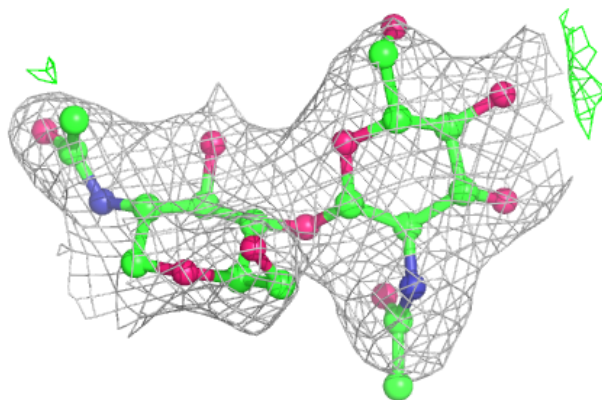


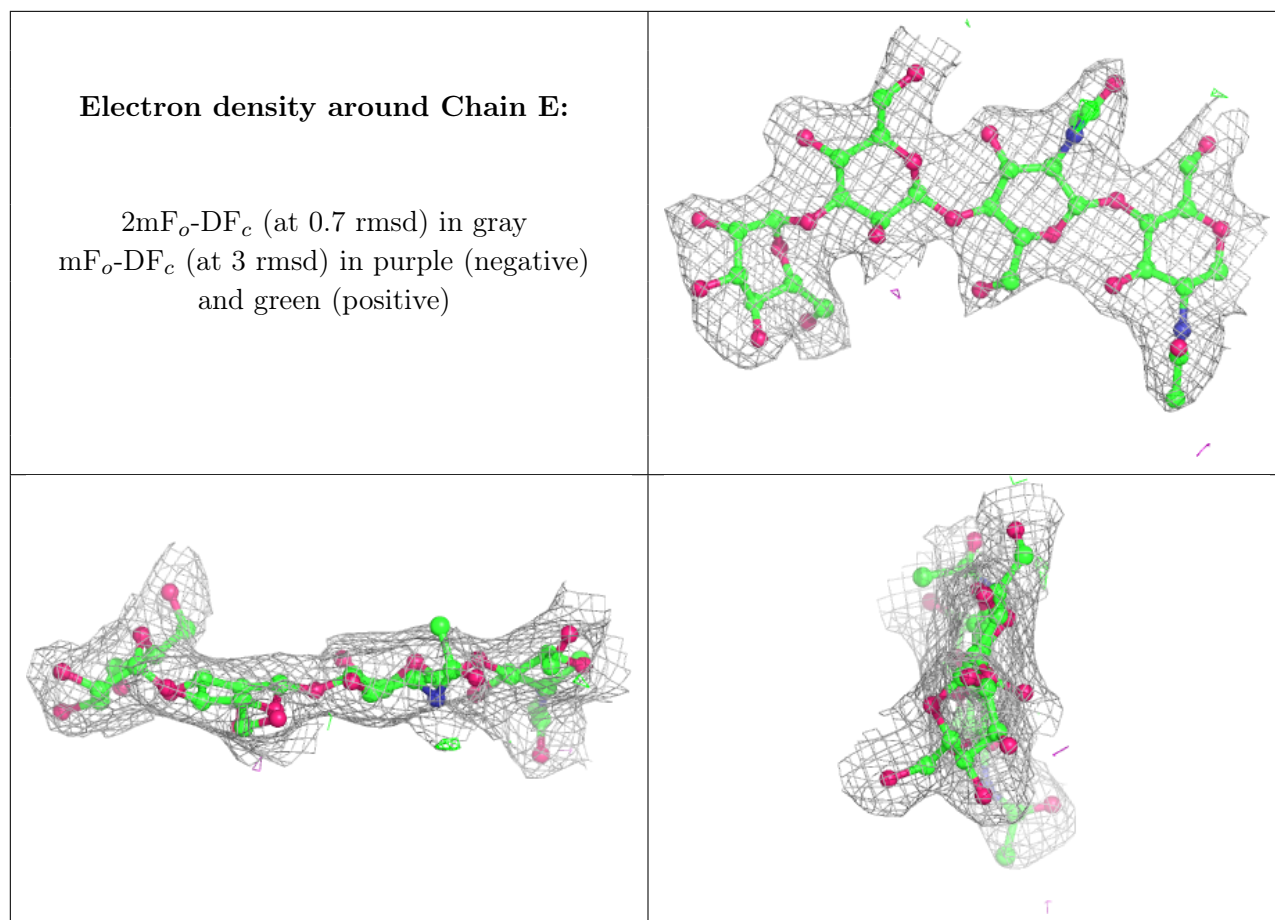
Electron density around Chain C:

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

**Electron density around Chain D:**

$2mF_o-DF_c$ (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, 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
7	NAG	A	1756	14/15	0.85	0.30	35,35,35,35	0
7	NAG	A	1753	14/15	0.91	0.36	35,35,35,35	0
7	NAG	A	1757	14/15	0.93	0.21	35,35,35,35	0
6	CL	A	804	1/1	0.97	0.16	35,35,35,35	0
8	QUS	A	1764	13/13	0.97	0.19	35,35,35,35	0
4	ZN	A	802	1/1	0.98	0.11	35,35,35,35	0
4	ZN	A	801	1/1	0.98	0.12	35,35,35,35	0
5	CA	A	803	1/1	1.00	0.13	35,35,35,35	0

6.5 Other polymers [i](#)

There are no such residues in this entry.