WORLDWIDE PDB
PROTEIN DATA BANK

wwPDB X-ray Structure Validation Summary Report ⓘ

Sep 6, 2023 – 02:16 AM EDT

PDB ID	:	4E0S
Title	:	Crystal Structure of C5b-6
Authors	:	Aleshin, A.E.; Stec, B.; DiScipio, R.; Liddington, R.C.
Deposited on	:	2012-03-05
Resolution	:	4.21 Å(reported)

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	:	2.35
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)	:	2.35

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 4.21 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.
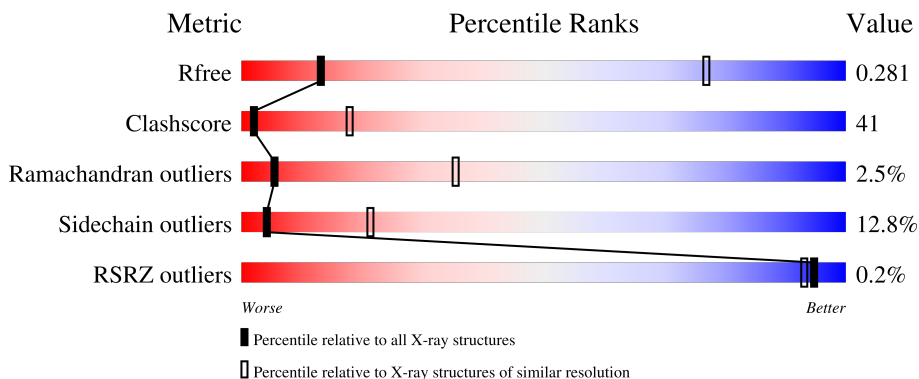
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1008 (4.66-3.78)
Clashscore	141614	1047 (4.62-3.80)
Ramachandran outliers	138981	1003 (4.62-3.80)
Sidechain outliers	138945	1010 (4.66-3.78)
RSRZ outliers	127900	1064 (4.72-3.70)

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 <=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	1676	42% 42% 8% 7%
2	B	913	54% 37% 7% ··
3	C	2	50% 50%
3	D	2	50% 50%
4	E	2	50% 50%

2 Entry composition (i)

There are 7 unique types of molecules in this entry. The entry contains 19475 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 Complement C5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	1552	Total 12306	C 7891	N 2011	O 2359	S 45	0	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	802	ILE	VAL	SEE REMARK 999	UNP P01031

- Molecule 2 is a protein called Complement component C6.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	898	Total 7046	C 4353	N 1239	O 1383	S 71	0	0	0

- Molecule 3 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
3	C	2	Total 28	C 16	N 2	O 10	0	0	0
3	D	2	Total 28	C 16	N 2	O 10	0	0	0

- Molecule 4 is an oligosaccharide called beta-D-glucopyranose-(1-3)-alpha-L-fucopyranose.
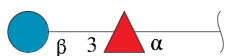
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
4	E	2	Total	C	O	0	0	0
			21	12	9			

- Molecule 5 is SODIUM ION (three-letter code: NA) (formula: Na).

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

- Molecule 6 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	B	1	Total	Ca	0	0
			1	1		

- Molecule 7 is alpha-D-mannopyranose (three-letter code: MAN) (formula: $C_6H_{12}O_6$).
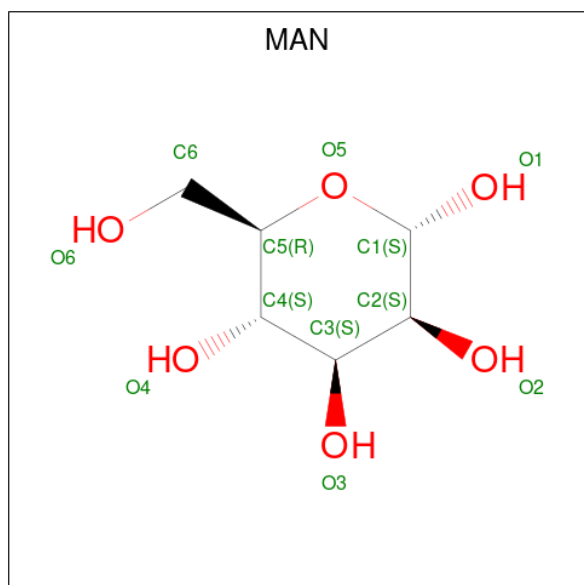
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	B	1	Total	C	O	0	0
			11	6	5		
7	B	1	Total	C	O	0	0
			11	6	5		

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

3 Residue-property plots ⓘ

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: Complement C5

PRO VAL ILE ASP HIS GLN GLY THR LYS SER SER K882 C883 Q886 K887 V888 S892 S893 H894 L895 V896 T899 V900 L901 I905 G906 L907 H908 N909 I910 N911 F912 S913 L914 E915 T916 W917 F918 E921 I922 L923 V924 K925 T926 L927 R928 V929 V930 P931 E932 G933 V934 K935 S938

Y939 S940 G941 V942 T943 L944 D945 P946 I949 Y950 G951 T952 I953 S954 R955 K957 E958 F959 P960 Y961 R962 I963 P964 L965 D966 L967 V968 T971 R975 V979 K980 G981 L982 L983 V984 G985 E986 I987 L988 V991 L992 S993 Q994 E995 G996 I997 N998 I999 L1000 T1001 H1002 L1003 P1004 K1005

G1006 S1007 A1008 E1011 L1012 M1013 S1014 V1015 V1016 P1017 V1018 F1019 Y1020 V1021 F1022 H1023 Y1024 L1025 E1026 T1027 G1028 N1029 H1030 H1035 S1036 D1037 P1038 K1047 K1048 L1049 K1050 E1051 I1056 Y1059 D1063 Y1064 S1065 Y1066 S1067 V1068 W1069 K1070 G1071 G1072 S1073 W1077 L1078 T1079 A1080 F1081 A1082 L1083 R1084

V1085 Q1088 V1089 N1090 N1096 S1099 L1105 W1106 L1107 V1108 Y1111 Q1112 L1113 D1114 N1115 N1121 S1122 Q1123 Y1124 I1127 K1128 L1129 Q1130 G1131 T1132 L1133 P1134 V1135 E1136 A1137 E1139 N1140 S1141 L1142 Y1143 L1144 F1147 T1148 Y1149 I1150 R1153 K1154 I1158 L1161 V1162 K1163 I1164 D1165

T1166 I1169 K1170 A1171 D1172 L1176 Q1183 F1186 T1187 L1188 Y1193 A1194 L1195 S1196 K1200 T1201 H1202 P1203 Q1204 F1205 R1206 S1207 I1208 V1209 K1213 L1217 V1218 K1219 G1220 N1221 P1222 P1223 I1224 Y1225 R1226 F1227 W1228 N1231 L1232 Q1233 H1234 K1235 D1236 S1237 S1238 V1239 P1240 N1241 T1244 A1245

R1246 M1247 V1248 E1249 T1250 T1251 L1256 L1259 K1262 D1263 I1264 N1265 Y1266 V1267 N1268 P1269 V1270 I1271 K1272 W1273 L1274 S1275 E1276 E1277 Q1278 R1279 Y1280 G1281 G1282 G1283 F1284 Y1285 S1286 T1287 Q1288 D1289 T1290 I1291 L1297 T1298 E1299 Y1300 S1301 L1302 L1303 V1304 K1305 Q1306 L1307 R1308 L1309 S1310 M1311 D1312 I1313 D1314

V1315 S1316 Y1317 K1318 H1319 K1320 G1321 A1322 L1323 H1324 N1325 Y1326 K1327 M1328 T1329 D1330 K1331 L1334 G1335 R1336 P1337 V1338 E1339 V1340 L1341 L1342 N1343 D1344 V1348 S1349 T1350 G1351 F1352 G1353 L1356 V1359 H1360 V1361 T1362 T1363 H1366 K1367 T1370 S1371 E1373 E1373 V1374 C1375 S1376 F1377 Y1378 L1379 I1386

E1387 ALA SER HIS TYR ARG GLY TYR GLY ASN SER D1398 V1403 S1407 Y1408 K1409 P1410 S1411 R1412 E1413 E1414 S1419 S1420 H1421 A1422 V1423 S1427 L1428 P1429 F1450 T1451 D1452 Y1453 K1456 L1462 Q1463 L1464 N1465 S1466 S1469 L1473 C1474 V1475 R1476 F1480 F1483 E1484 V1485 G1486

F1487 L1488 S1489 P1490 A1491 T1492 F1493 T1494 V1495 Y1496 E1497 Y1498 H1499 R1500 P1501 D1502 K1503 Q1504 C1505 T1511 S1512 N1513 I1514 K1515 I1516 Q1517 K1518 V1519 C1520 E1521 G1522 A1523 A1524 C1525 K1526 C1527 V1528 E1529 A1530 D1531 C1532 G1533 G1534 M1535 Q1536 E1537 E1538 L1539 D1540 L1541 T1542 S1543 S1544 A1545 E1546 T1547 R1548 K1549 Q1550

T1551 A1552 C1553 K1554 P1555 E1556 I1557 A1558 Y1559 A1560 Y1561 K1562 I1565 T1566 S1567 I1568 T1569 V1570 E1571 N1572 V1573 F1574 V1575 K1578 L1581 L1582 D1583 I1584 Y1585 E1589 A1590 E1593 K1594 D1595 S1596 E1597 I1598 T1599 F1600 I1601 K1602 K1603 C1606 N1607 N1608 A1609 E1610 L1611 V1612 K1613 G1614 R1615 Q1616 Y1617

L1618 I1619 M1620 G1621 K1622 E1623 A1624 L1625 Q1626 I1627 K1628 Y1629 N1630 F1631 S1632 F1633 R1634 Y1635 I1636 L1637 P1638 L1639 D1640 S1641 L1642 T1643 W1644 I1645 E1646 Y1647 W1648 P1649 R1650 D1651 T1652 T1653 C1654 S1655 S1656 C1657 F1660 F1667 A1668 I1671 N1674 G1675 C1676

● Molecule 2: Complement component C6

Chain B: 54%   37%   7%   ●●

C1 F2 C3 D4 H5 W8 T9 Q10 W11 T17 S20 G21 T22 Q23 S24 R25 H26 I29 V30 I43 K46 Q47 E48 T49 R50 E51 C52 N53 W54 Q55 R56 F66 W69 S70 D71 C72 D73 P74 C75 K78 Q79 S80 K81 V85 P88 S89 Q90 F91

P95 P99 L100 F103 Q104 P105 C106 I107 L111 C112 K113 I114 E115 E116 A117 D118 C119 K120 N121 K122 F123 R124 C125 D126 S127 G128 R129 C130 L135 E136 C137 N138 G139 E140 N141 D142 C143 D148 E149 R150 G153 R154 T155 V158 C159 T160 R161 K162 Y163 S168 L171
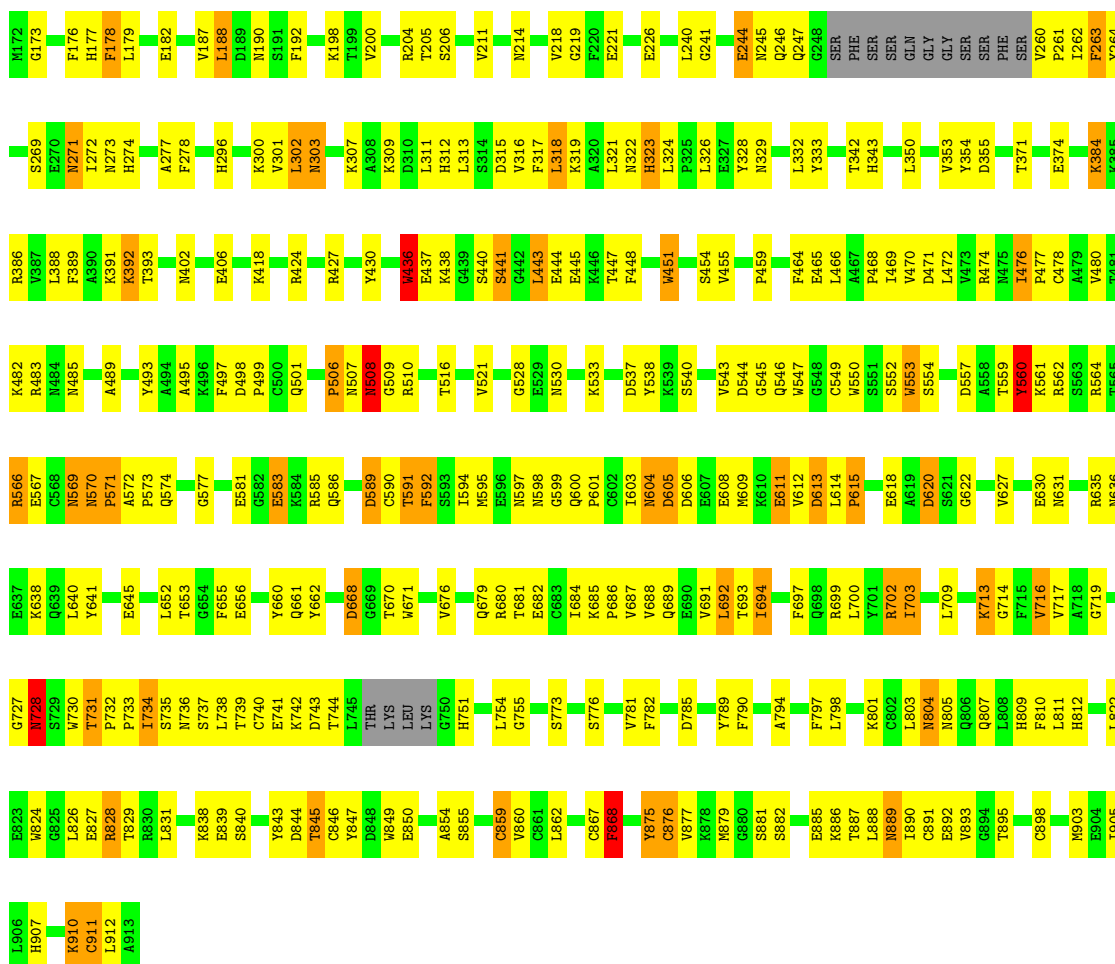
• Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-gluc opyranose

Chain C:

• Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-gluc opyranose

Chain D:

• Molecule 4: beta-D-glucopyranose-(1-3)-alpha-L-fucopyranose

Chain E:

4 Data and refinement statistics (i)

Property	Value	Source
Space group	I 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	158.95Å 227.53Å 278.16Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.93 – 4.21 29.93 – 4.21	Depositor EDS
% Data completeness (in resolution range)	81.8 (29.93-4.21) 82.1 (29.93-4.21)	Depositor EDS
R_{merge}	0.16	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.98 (at 4.26Å)	Xtriage
Refinement program	REFMAC 5.6.0117	Depositor
R, R_{free}	0.218 , 0.278 0.219 , 0.281	Depositor DCC
R_{free} test set	1529 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å^2)	113.5	Xtriage
Anisotropy	0.396	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.20 , 124.8	EDS
L-test for twinning[2]	$< |L| > = 0.46$, $< L^2 > = 0.28$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.92	EDS
Total number of atoms	19475	wwPDB-VP
Average B, all atoms (Å^2)	192.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.57% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5   Model quality ⓘ

5.1   Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: BGC, CA, MAN, FUC, NAG, NA

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	0.58	6/12576 (0.0%)	0.80	4/17068 (0.0%)
2	B	0.58	5/7193 (0.1%)	0.78	5/9708 (0.1%)
All	All	0.58	11/19769 (0.1%)	0.79	9/26776 (0.0%)

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	2
2	B	0	3
All	All	0	5

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	917	TRP	CD2-CE2	5.98	1.48	1.41
1	A	1273	TRP	CD2-CE2	5.97	1.48	1.41
1	A	797	TRP	CD2-CE2	5.75	1.48	1.41
1	A	1077	TRP	CD2-CE2	5.30	1.47	1.41
2	B	436	TRP	CD2-CE2	5.27	1.47	1.41

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	570	ASN	C-N-CD	-8.57	101.73	120.60
2	B	731	THR	C-N-CD	-7.08	105.03	120.60
1	A	794	LEU	CB-CG-CD2	-5.78	101.18	111.00
2	B	627	VAL	CB-CA-C	-5.50	100.96	111.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	560	TYR	CA-CB-CG	5.41	123.69	113.40

There are no chirality outliers.

All (5) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	90	LYS	Peptide
1	A	985	GLY	Peptide
2	B	391	LYS	Peptide
2	B	599	GLY	Peptide
2	B	731	THR	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	12306	0	12238	1116	0
2	B	7046	0	6708	482	0
3	C	28	0	25	1	0
3	D	28	0	25	3	0
4	E	21	0	19	0	0
5	A	1	0	0	0	0
6	B	1	0	0	0	0
7	B	44	0	40	7	0
All	All	19475	0	19055	1562	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 41.

The worst 5 of 1562 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:1598:ILE:HG21	1:A:1637:TYR:CE2	1.45	1.52
1:A:21:GLN:NE2	1:A:45:GLY:HA2	1.32	1.45
1:A:1013:MET:SD	1:A:1129:LEU:HG	1.65	1.35

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1127:ILE:HD12	1:A:1130:GLN:NE2	1.36	1.35
1:A:1539:LEU:HD22	1:A:1540:ASP:N	1.48	1.27

There are no symmetry-related clashes.

5.3   Torsion angles ⓘ

5.3.1   Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	1544/1676 (92%)	1339 (87%)	170 (11%)	35 (2%)	6	37
2	B	892/913 (98%)	770 (86%)	96 (11%)	26 (3%)	4	33
All	All	2436/2589 (94%)	2109 (87%)	266 (11%)	61 (2%)	5	35

5 of 61 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	60	PRO
1	A	89	PRO
1	A	191	PRO
1	A	335	GLY
1	A	490	SER

5.3.2   Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	1379/1484 (93%)	1183 (86%)	196 (14%)	3	19
2	B	797/810 (98%)	715 (90%)	82 (10%)	7	28
All	All	2176/2294 (95%)	1898 (87%)	278 (13%)	4	21

5 of 278 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	441	SER
2	B	581	GLU
2	B	741	GLU
1	A	963	ILE
1	A	952	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 71 such sidechains are listed below:

Mol	Chain	Res	Type
2	B	312	HIS
2	B	491	GLN
2	B	636	ASN
1	A	1096	ASN
1	A	1090	ASN

5.3.3   RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5   Carbohydrates ⓘ

6 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	$\#\|Z\| > 2$
3	NAG	C	1	3,1	14,14,15	0.58	0	17,19,21	1.52	5 (29%)
3	NAG	C	2	3	14,14,15	0.54	0	17,19,21	1.08	1 (5%)
3	NAG	D	1	2,3	14,14,15	0.43	0	17,19,21	1.95	2 (11%)
3	NAG	D	2	3	14,14,15	0.58	0	17,19,21	1.01	2 (11%)
4	FUC	E	1	2,4	10,10,11	0.67	0	14,14,16	1.50	3 (21%)
4	BGC	E	2	4	11,11,12	0.75	0	15,15,17	1.02	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	C	1	3,1	-	1/6/23/26	0/1/1/1
3	NAG	C	2	3	-	0/6/23/26	0/1/1/1
3	NAG	D	1	2,3	-	0/6/23/26	0/1/1/1
3	NAG	D	2	3	-	2/6/23/26	0/1/1/1
4	FUC	E	1	2,4	-	-	0/1/1/1
4	BGC	E	2	4	-	2/2/19/22	0/1/1/1

There are no bond length outliers.

The worst 5 of 13 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	D	1	NAG	C1-O5-C5	6.69	121.25	112.19
4	E	1	FUC	C3-C4-C5	3.40	115.07	109.77
3	C	1	NAG	O5-C1-C2	-3.30	106.07	111.29
3	C	1	NAG	C1-C2-N2	2.58	114.90	110.49
4	E	1	FUC	C1-O5-C5	2.55	118.56	112.78

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	E	2	BGC	O5-C5-C6-O6
3	D	2	NAG	O5-C5-C6-O6
4	E	2	BGC	C4-C5-C6-O6

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Mol	Chain	Res	Type	Atoms
3	C	1	NAG	O5-C5-C6-O6
3	D	2	NAG	C4-C5-C6-O6

There are no ring outliers.

2 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	1	NAG	3	0
3	C	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.

Oligosaccharide Chain C

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain D

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain E

Bond lengths

Bond angles

Torsions

Rings
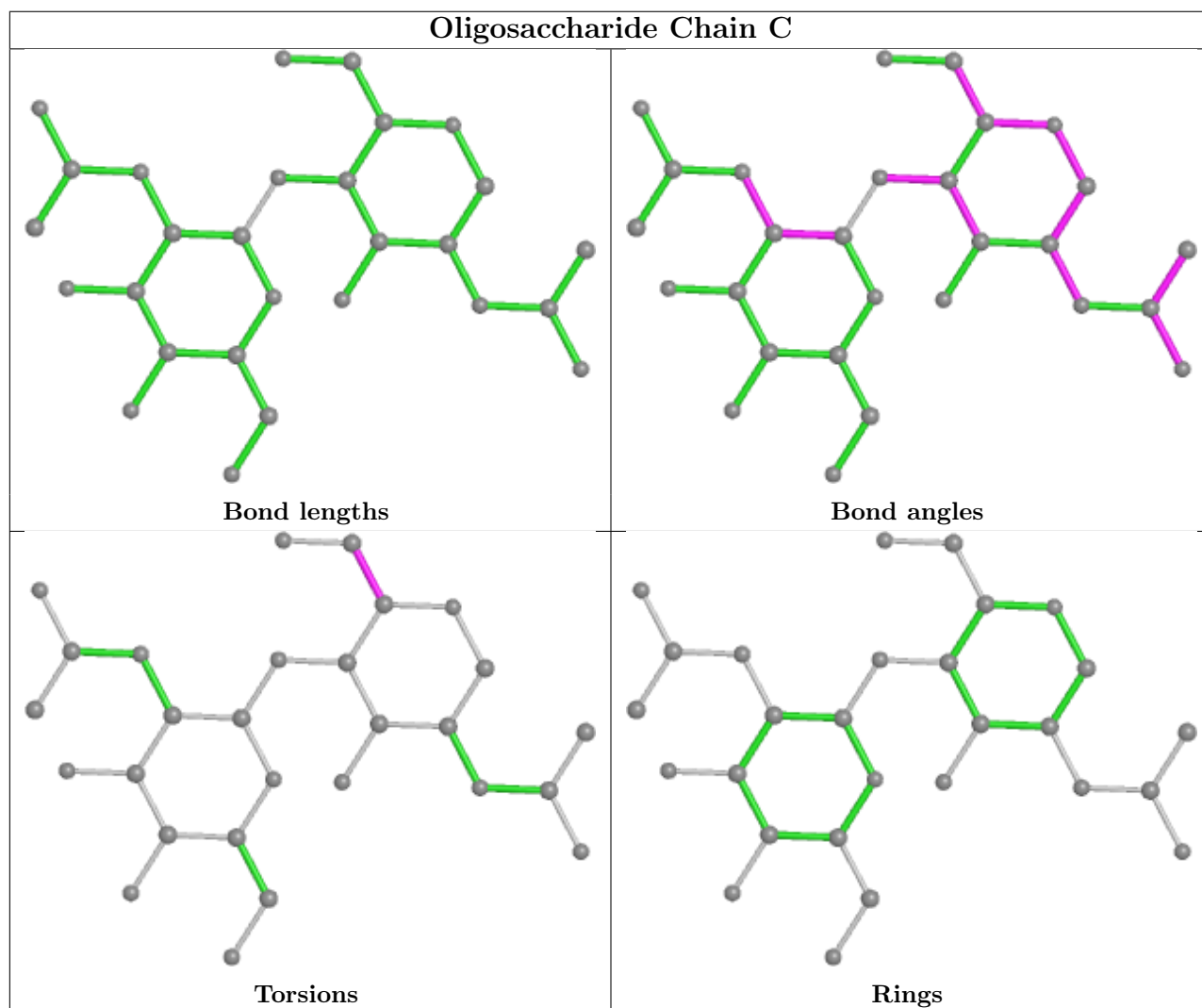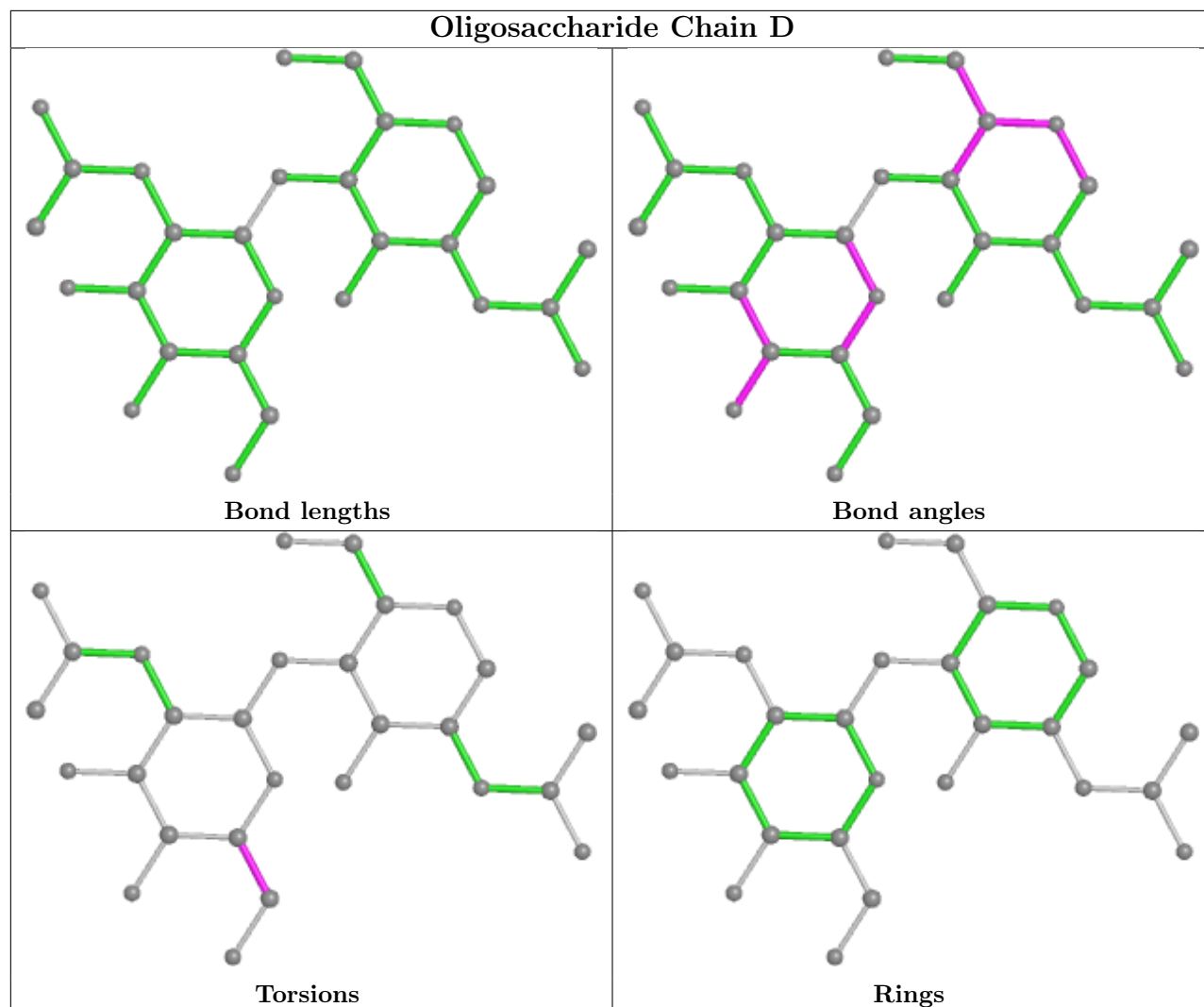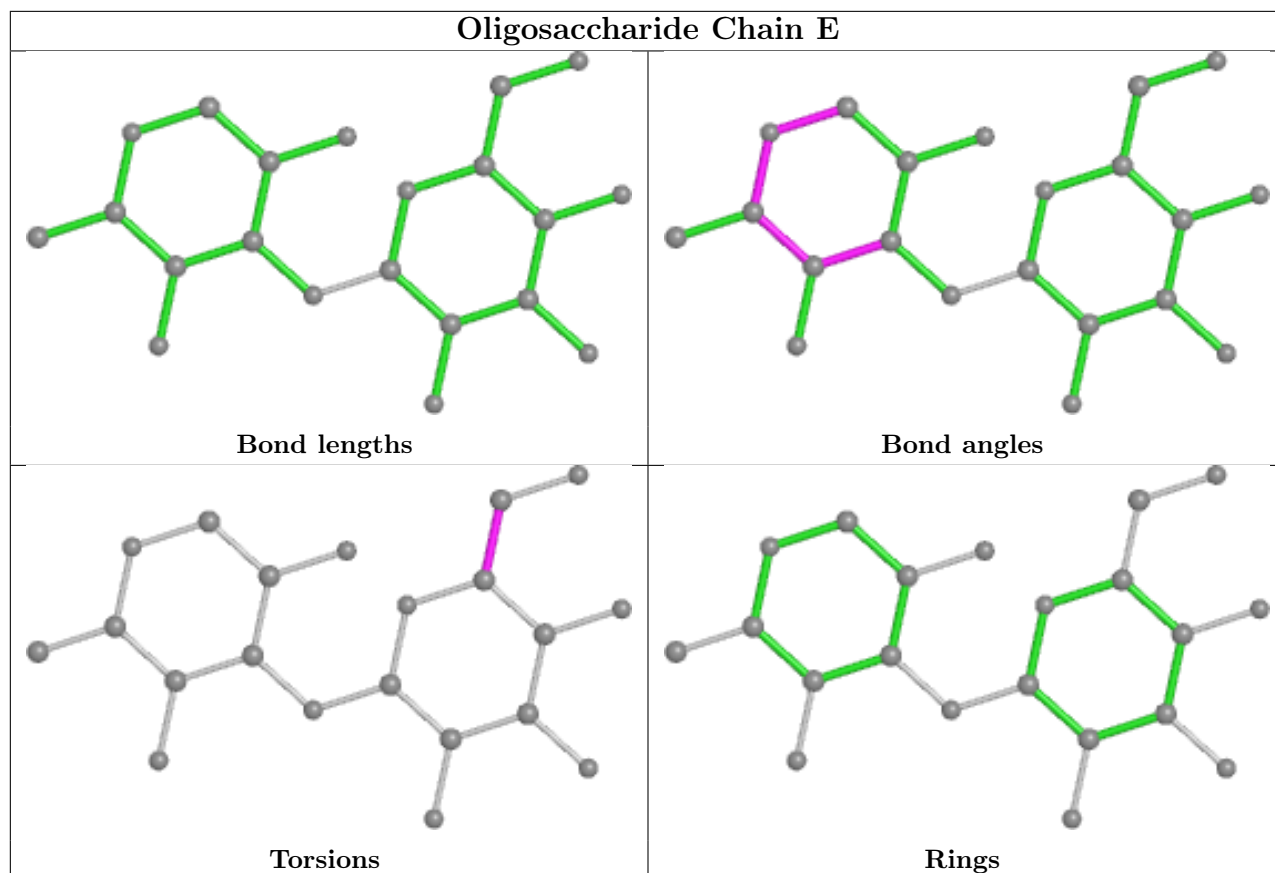
5.6 Ligand geometry (i)

Of 6 ligands modelled in this entry, 2 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	MAN	B	1009	2	11,11,12	0.62	0	15,15,17	1.24	3 (20%)
7	MAN	B	1007	2	11,11,12	0.70	0	15,15,17	0.89	0
7	MAN	B	1006	2	11,11,12	0.58	0	15,15,17	1.08	1 (6%)
7	MAN	B	1008	2	11,11,12	0.68	0	15,15,17	1.58	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
7	MAN	B	1009	2	-	0/2/19/22	0/1/1/1
7	MAN	B	1007	2	-	1/2/19/22	0/1/1/1
7	MAN	B	1006	2	-	2/2/19/22	0/1/1/1
7	MAN	B	1008	2	-	0/2/19/22	0/1/1/1

There are no bond length outliers.

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($°$)	Ideal($°$)
7	B	1008	MAN	C3-C4-C5	3.76	116.94	110.24
7	B	1009	MAN	O5-C1-C2	-2.83	106.41	110.77
7	B	1008	MAN	O5-C1-C2	-2.44	107.00	110.77
7	B	1009	MAN	C3-C4-C5	2.30	114.34	110.24
7	B	1006	MAN	C1-O5-C5	2.24	115.22	112.19

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	B	1006	MAN	O5-C5-C6-O6
7	B	1006	MAN	C4-C5-C6-O6
7	B	1007	MAN	C4-C5-C6-O6

There are no ring outliers.

3 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	B	1009	MAN	1	0
7	B	1007	MAN	2	0
7	B	1008	MAN	4	0

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6   Fit of model and data (i)

6.1   Protein, DNA and RNA chains (i)

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	1552/1676 (92%)	-0.63	4 (0%)	94	90	110, 177, 258, 386	0
2	B	898/913 (98%)	-0.54	0	100	100	121, 201, 282, 389	0
All	All	2450/2589 (94%)	-0.60	4 (0%)	95	93	110, 187, 269, 389	0

All (4) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1238	SER	5.1
1	A	1006	GLY	2.7
1	A	1237	SER	2.4
1	A	1005	LYS	2.0

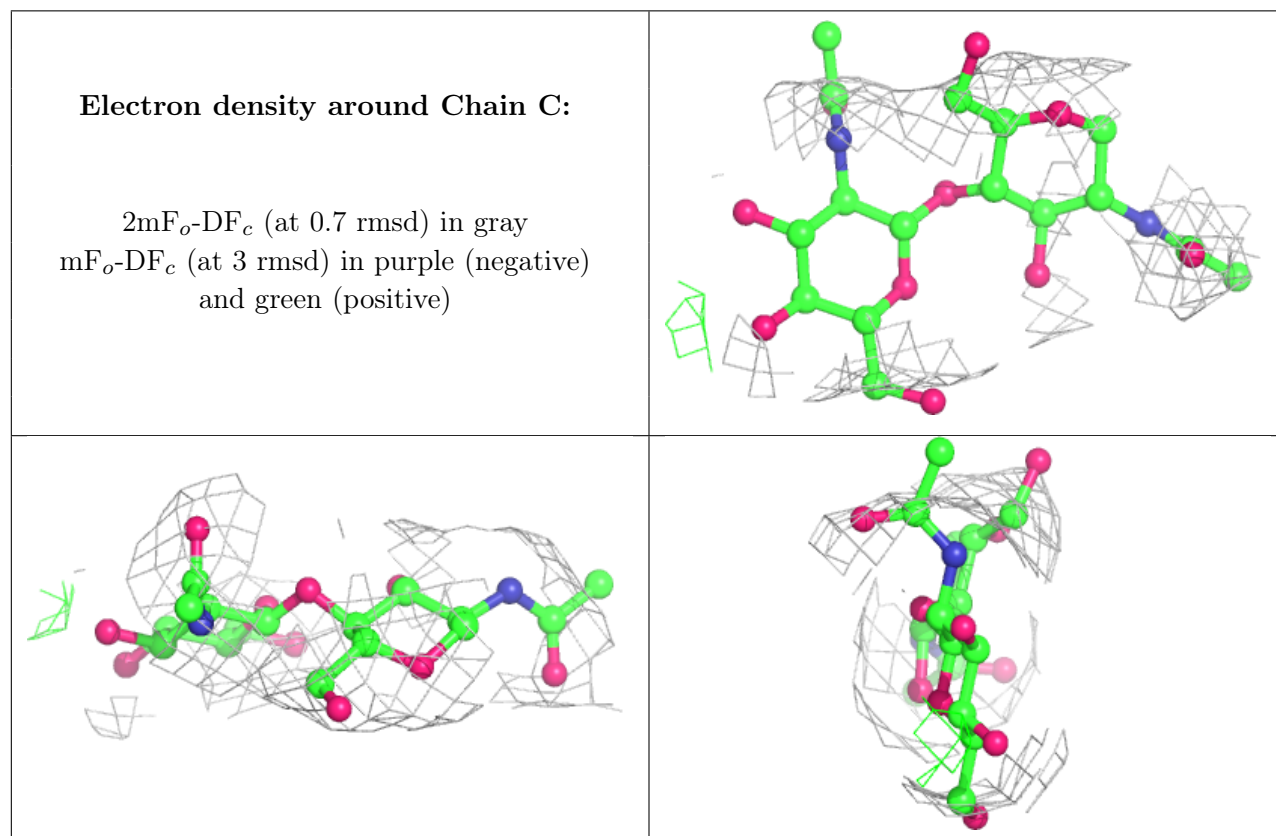## 6.2   Non-standard residues in protein, DNA, RNA chains (i)

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, 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	NAG	D	2	14/15	0.80	0.52	269,286,304,315	0
3	NAG	D	1	14/15	0.81	0.38	205,240,279,295	0
3	NAG	C	2	14/15	0.83	0.28	207,226,257,262	0
4	BGC	E	2	11/12	0.90	0.29	187,198,214,224	0
3	NAG	C	1	14/15	0.93	0.21	152,160,185,186	0
4	FUC	E	1	10/11	0.97	0.20	174,188,192,196	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.
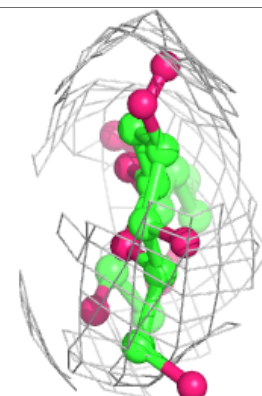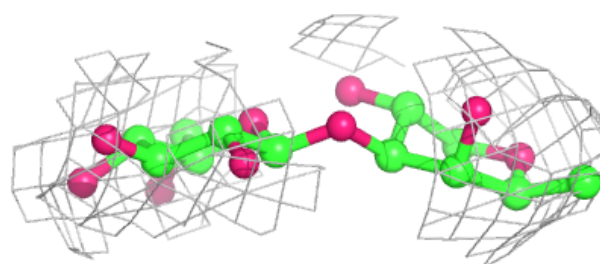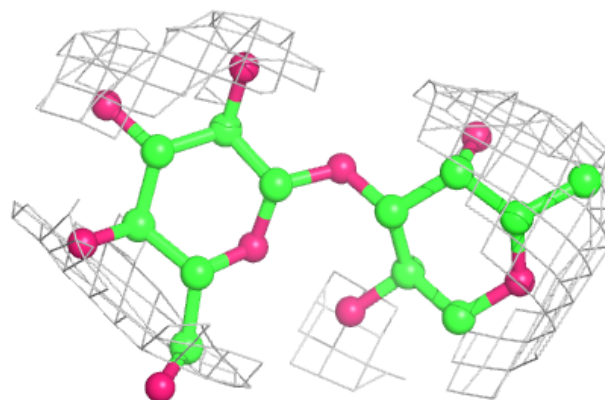
Electron density around Chain C:

$2mF_o$-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)
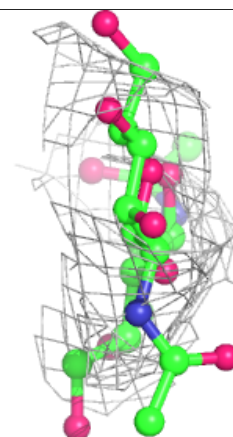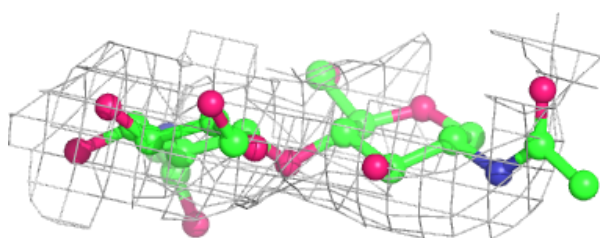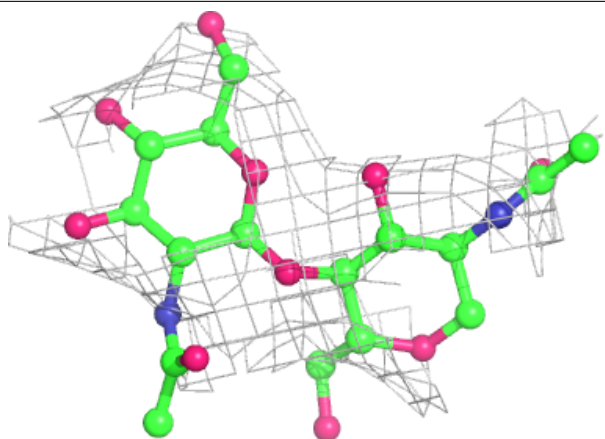
Electron density around Chain E:

$2mF_o$-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
5	NA	A	2003	1/1	0.81	0.33	111,111,111,111	0
7	MAN	B	1006	11/12	0.88	0.25	245,260,277,281	0
7	MAN	B	1007	11/12	0.89	0.22	205,212,234,240	0
6	CA	B	1001	1/1	0.90	0.06	167,167,167,167	1
7	MAN	B	1009	11/12	0.94	0.25	178,190,201,215	0
7	MAN	B	1008	11/12	0.96	0.23	147,167,176,188	0

6.5 Other polymers (i)

There are no such residues in this entry.