



# wwPDB X-ray Structure Validation Summary Report ⓘ

Aug 30, 2023 – 03:01 AM EDT

PDB ID : 3PRX  
Title : Structure of Complement C5 in Complex with CVF and SSL7  
Authors : Laursen, N.S.; Andersen, G.R.; Sottrup-Jensen, L.; Andersen, K.R.; Spillner, E.; Braren, I.  
Deposited on : 2010-11-30  
Resolution : 4.30 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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.

The types of validation reports are described at

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

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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 : 2.35  
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

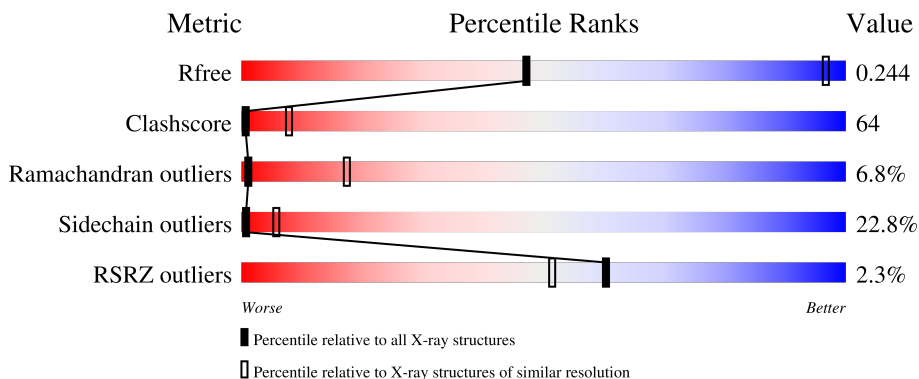
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 4.30 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	1014 (4.80-3.80)
Clashscore	141614	1077 (4.80-3.80)
Ramachandran outliers	138981	1029 (4.80-3.80)
Sidechain outliers	138945	1012 (4.80-3.80)
RSRZ outliers	127900	1075 (4.90-3.70)

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  $\geq 3$ , 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	1676	 11% 24% 50% 21% ..
1	C	1676	 3% 23% 51% 21% ..
2	B	1642	 23% 38% 13% 26%
2	D	1642	 22% 39% 12% 26%
3	X	231	 11% 26% 44% 11% 17%

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Mol	Chain	Length	Quality of chain
3	Y	231	
4	E	2	
4	F	2	
4	G	2	
4	H	2	

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
4	NAG	E	1	-	-	-	X
4	NAG	E	2	-	-	-	X
4	NAG	F	1	-	-	-	X
4	NAG	F	2	-	-	-	X
4	NAG	G	2	-	-	-	X
4	NAG	H	1	-	-	-	X
4	NAG	H	2	-	-	-	X

## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 48236 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
			Total	C	N	O	S			
1	A	1626	Total	C	N	O	S	0	0	0
			12874	8242	2113	2467	52			
1	C	1626	Total	C	N	O	S	0	0	0
			12874	8242	2113	2467	52			

- Molecule 2 is a protein called Cobra venom factor.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	1215	Total	C	N	O	S	0	0	0
			9635	6143	1617	1836	39			
2	D	1215	Total	C	N	O	S	0	0	0
			9635	6143	1617	1836	39			

- Molecule 3 is a protein called Superantigen-like protein 7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	X	191	Total	C	N	O	S	0	0	0
			1539	965	267	306	1			
3	Y	191	Total	C	N	O	S	0	0	0
			1539	965	267	306	1			

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



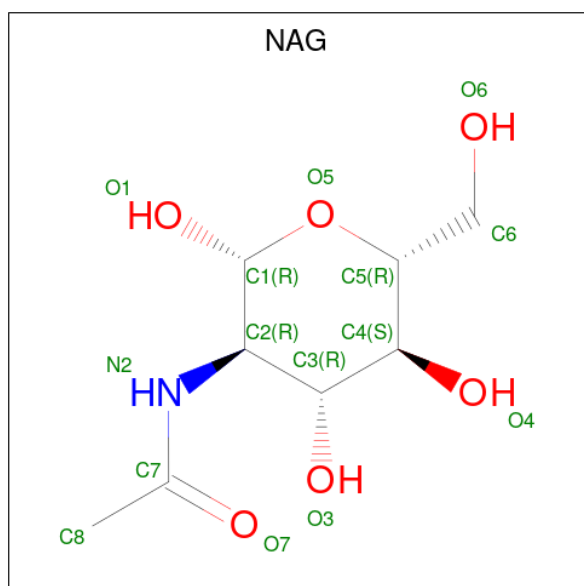
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
4	E	2	Total	C	N	O	0	0	0
			28	16	2	10			

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
4	F	2	Total	C	N	O	0	0	0
			28	16	2	10			
4	G	2	Total	C	N	O	0	0	0
			28	16	2	10			
4	H	2	Total	C	N	O	0	0	0
			28	16	2	10			

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).

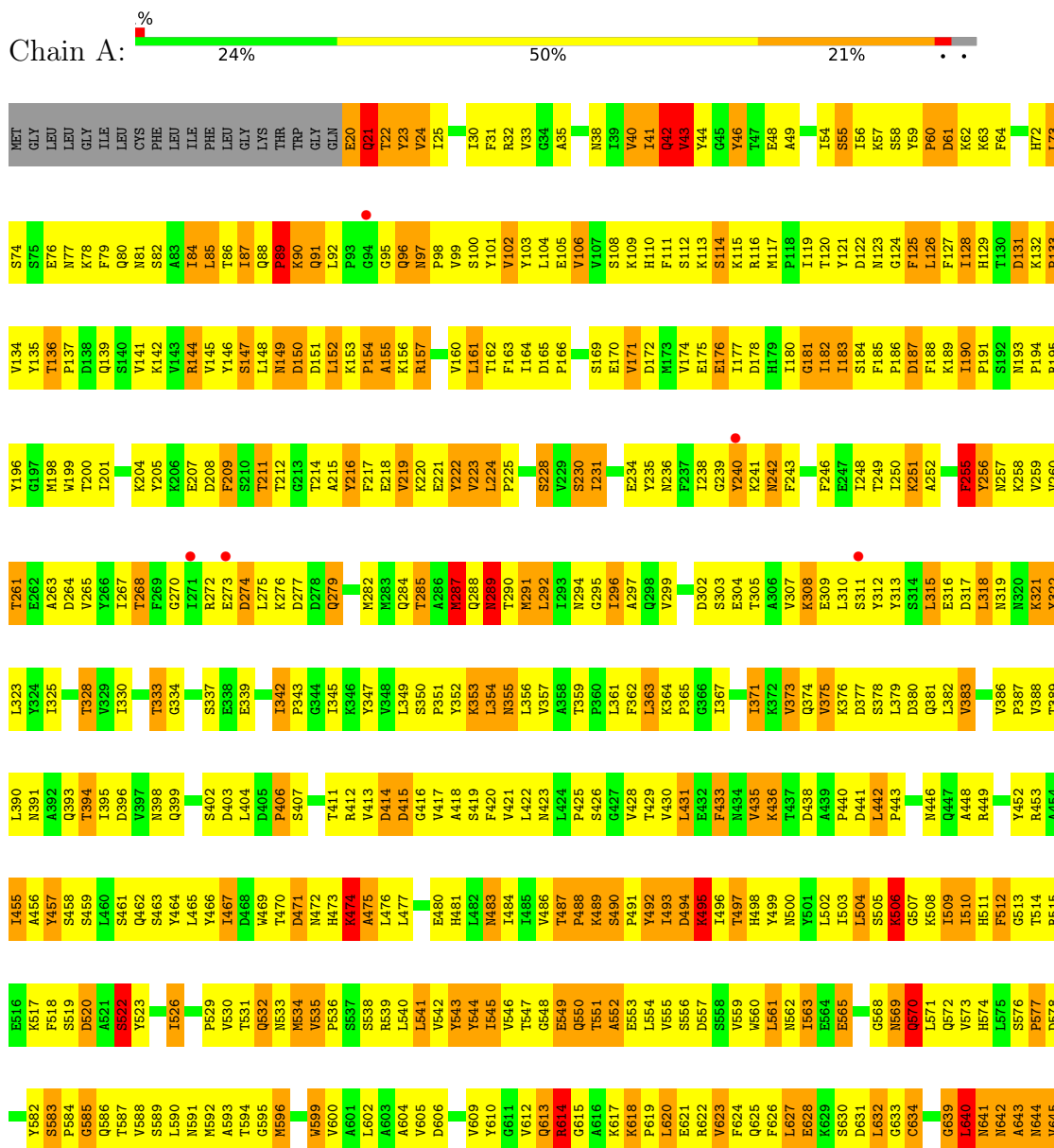


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
5	A	1	Total	C	N	O	0	0
			14	8	1	5		
5	C	1	Total	C	N	O	0	0
			14	8	1	5		

### 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.

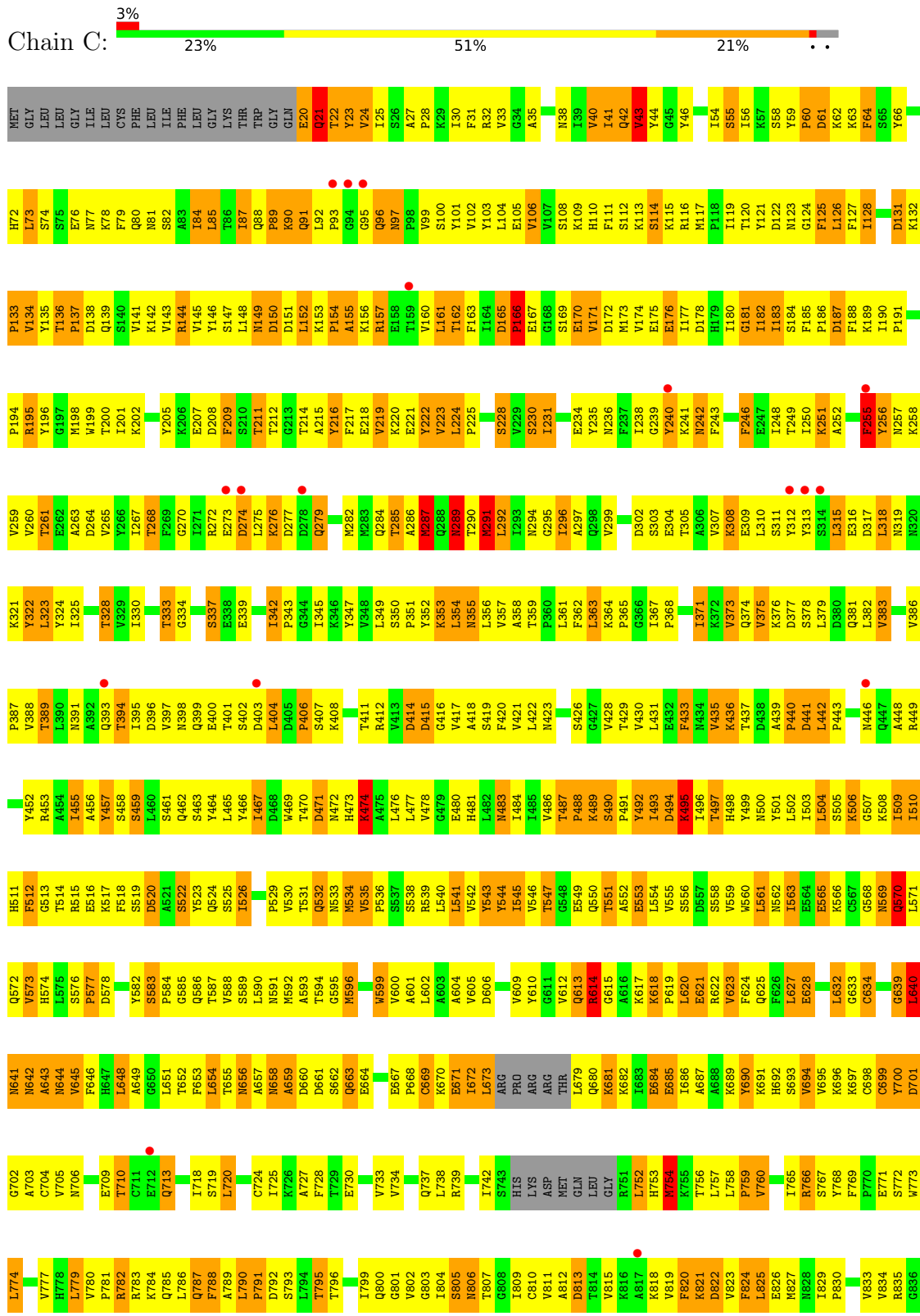
#### • Molecule 1: Complement C5



F646	E709	W780	T844	L907	T971	F1034	C101	I1164	M1231	I1294	V1359	I1426	S1489	T1551
H647	T710	F781	V845	H908	E972	H1035	M102	D1165	L1232	E1295	H1360	S1427	P1490	A1552
L648	C711	R782	Y846	N909	E973	S1036	S103	T1166	Q1233	G1296	A1491	T1428	T1492	C1553
A649	E712	R783	N847	N910	K974	D1037	L1103	A1167	L1234	L1297	T1362	P1429	F1493	P1555
G650	Q713	K784	Y848	N911	R975	P1038	L1045	L1168	D1235	T1298	V1364	P1430	F1494	P1556
L651	W718	Q785	R849	F912	Y976	E1041	W106	A1171	K1236	E1299	V1365	G1431	V1495	T1557
T652	S719	L786	T850	S913	L977	K1042	L1107	D1172	S1237	Y1300	H1366	I1432	Y1496	I1558
F653	L720	Q787	S851	E914	S978	Q1043	V1108	L1184	T1238	S1301	H1367	S1433	Y1497	Y1559
L654		F788	G852	E915	Y979	K1044	E1109	L1175	V1239	L1302	K1368	A1434	Y1498	T1560
T655		A789	M853	K980	T916	K1044	M110	L1180	M1241	V1303	S1369	W1435	H1499	Y1561
M656	C724	L790	Q854	W917	G981	K1047	Y1111	T1179	N1242	V1304	S1370	A1436	R1500	Y1562
A657	L725	F791	F855	F918	L982	K1048	O1112	P1181	G1243	K1305	T1370	E1436	R1501	V1563
M658	K726	D792	C856	G919	L983	L1049	L1113	P1182	G1244	Q1306	S1371	L1439	R1502	S1564
A659	A727	S793	V857	K920	Y984	L1049	L1113	P1183	T1244	L1307	E1372	L1440	D1502	T1565
D660	F728	L794	K858	L923	G985	K1050	D1114	A1182	A1245	R1308	E1373	V1443	K1503	T1566
L661	T729	L795	M859	L923	E986	E1051	Q1183	L1183	A1246	R1309	E1373	V1444	K1504	T1567
Q662	E730	T796	T796	K925	E987	G1052	S1117	S1184	V1247	I1313	S1376	E1443	C1505	S1568
E664	C731	W799	V862	N925	L988	M1053	F1118	T1185	W1248	I1314	L1379	E1444	T1506	T1569
C669	C732	Q800	E863	T926	S989	L1054	K1119	F1186	E1249	V1314	L1380	G1445	M1507	V1570
K670	W733	L800	G864	L927	A990	S1055	E1120	T1187	T1250	V1315	V1316	V1446		
E671	F737	G802	I865	R928	S993	I1056	W1221	L1188	L1251	S1316	D1447	D1447	S1510	S1510
L672	Q737	H803	C966	V929	Q994	M1057	S1122	A1189	A1252	K1317	Q1448	Q1448	T1511	T1511
L673	L738	T804	T867	V930	L994		Q1123	I1190	Y1253	K1318	L1449	L1449	S1512	S1512
L673	E739	S805	S868	P931	F995	M1061	Y1124	I1191	A1254	H1319	Q1384	F1450	N1513	F1574
ARG		R806	E869	V934	G996		Q1125	A1192	L1255	K1320	D1385	T1451	I1514	V1575
PRO	I742	R807	S870	K936	I997	Y1064	F1126	Y1193	L1256	G1321	T1386	D1452	LYS	K1576
ARG	S743	L807	P871	K935	N998	S1065	I1127	A1194	T1257	A1322	I1387	F1453	ILE	I1577
ARG	R743	G808	R872	R936	N999	I1066	K1128	L1195	S1258	L1323	ALA	Q1454	GLN	K1578
THR	LYS	R109	I873	E937	L1000	S1067	L1129	S1196	L1259	H1324	SER	L1455	LYS	A1579
L679	ASP	C810	D874	S938	T1001	V1068	Q1130	H1197	M1260	K1325	HIS	K1456	VAL	T1580
Q680	MET	W811	H875	V939	L1002	V1069	G1131	G1198	L1261	Y1326	TYR	D1457	CYS	L1581
K681	GLN	A812	Q876	S940	H1003	K1070	T1132	D1199	K1262	K1327	ARG	G1458	GLU	L1582
L682	LEU	D813	G877	G941	P1004	G1071	L1133	K1200	D1263	M1328	GLY	H1459	GLY	L1583
E684	GLY	W814	R879	V942	T878	S1073	P1134	H1201	N1264	T1329	TYR	V1460	ALA	Y1584
E685	L751	L815	K816	L944	T943	G1072	V1135	H1202	L1265	D1330	GLY	L1461	ALA	Y1585
L686	R755	W818	A817	D945	R879	A1074	S1140	H1203	Y1266	K1331	ASN	L1462	C1525	K1526
A687	K755	L818	K818	P946	A1008	T1075	S1141	Q1204	V1267	M1268	S1397	L1463	C1526	C1527
K688	R755	W819	Q886	R947	E1011	W1077	S1142	S1207	M1268	P1269	Y1399	M1465	V1528	V1529
K689	T756	F820	Q886	G948	L1012	L1078	L1142	I1208	V1270	G1335	K1400	P1468	C1532	C1532
Y690	L757	D822	V888	I949	S1013	T1079	Y1143	I1208	L1271	L1341	R1401	S1469	G1533	G1533
K691	L758	D822	V888	Y950	S1014	A1080	L1144	I1208	K1272	L1341	I1402	S1470	Q1534	Q1534
H692	L758	D822	V888	G951	Y1015	F1081	T1145	A1211	L1273	V1340	V1403	D1471	M1535	M1535
H692	W759	F824	E889	T952	V1016	F1081	T1146	K1212	W1274	L1341	V1404	F1472	C1536	C1536
S693	W760	L825	G890	L953	P1017	L1082	F1147	K1214	S1275	L1342	C1405	L1473	E1537	E1537
V694	I765	E826	S891	L953	W1018	L1083	T1148	R1214	L1275	L1342	A1406	L1473	E1538	E1538
K696	T765	E826	S892	L955	F1019	R1084	V1149	A1216	E1276	M1343	A1407	C1474	Y1475	Y1475
K697	S767	W828	H894	R955	Y1020	V1085	G1150	A1216	Q1277	D1344	S1407	L1475	R1476	R1476
C698	W768	P830	L895	E958	F1022	L1086	L1151	V1218	R1279	D1345	K1409	R1476	D1540	D1540
C699	F769	F830	V896	F959	H1023	Q1088	R1153	K1219	Y1280	L1347	P1410	L1479	L1541	L1541
Y700	P770	W833	T897	P960	Y1024	V1089	K1154	G1220	G1283	V1348	S1411	L1479	L1541	L1541
D701	E771	F834	F898	Y961	L1025	M1090	A1195	M1221	L1283	S1349	E1414	F1480	T1542	T1542
G702	S772	W834	T899	R962	E1026	K1091	F1156	P1222	F1284	T1350	E1414	E1481	K1602	K1602
C703	E773	W900	T899	I963	Y1092	Y1092	D1157	P1223	Y1285	G1351	S1415	L1482	S1544	S1544
A704	W773	E837	V900	G964	G1028	V1093	L1158	P1223	S1286	F1352	S1416	F1483	G1605	G1605
C704	L774	Q838	L901	P964	M1029	E1094	C1159	R1226	L1287	F1352	S1416	F1484	E1546	E1546
V705	L839	T839	P902	L965	H1030	Q1095	P1160	F1227	Q1288	G1355	S1420	V1485	T1547	T1547
W706	Q840	Q840	E904	L967	H1031	M1096	L1161	W1228	D1289	L1356	H1421	V1486	R1548	R1548
H707	W777	E904	E904	L967	M1032	Q1097	L1162	W1228	D1289	L1357	H1421	F1487	A1609	A1609
D708	L779	G843	G906	V968	I1033	M1098	K1163	D1230	A1293	T1358	V1423	L1488	E1610	E1610



● Molecule 1: Complement C5

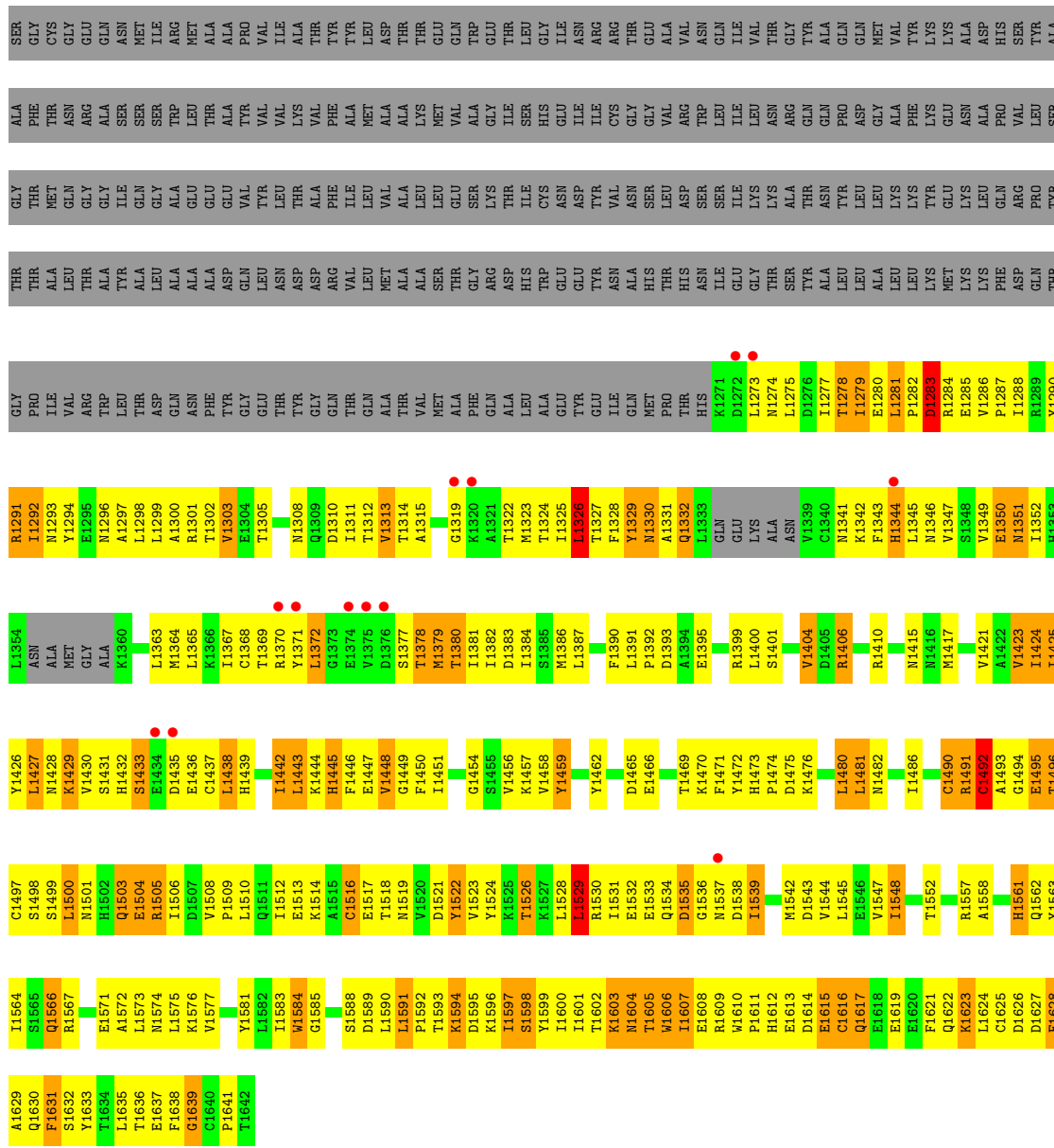




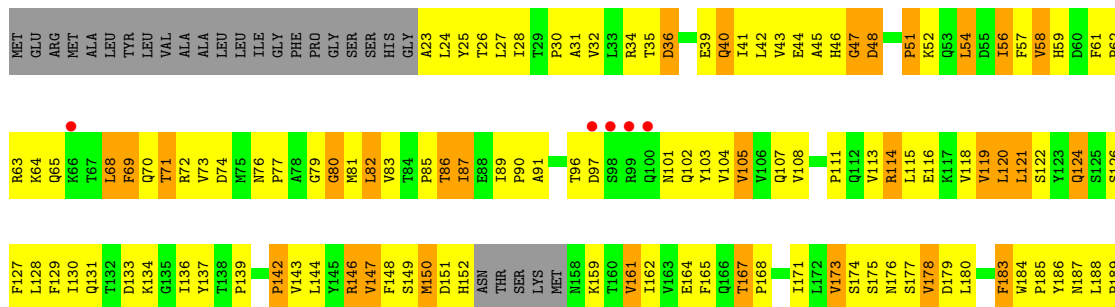
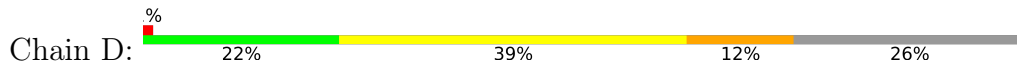
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M1674	A1609	F1487	R1548	G1486	A1422	A1357	A1294	M1231	K1163	S1099	H1030	V968	Q888
G1675	L1488	L1488	Q1550	F1487	V1423	T1358	E1295	L1232	D1166	I1100	M1031	P969	R889
C1676	L1488	L1488	Q1550	F1487	V1423	T1358	E1295	L1232	D1166	C1101	H1032	K970	Q840
	L1610	L1611	L1551	S1489	S1426	H1360	G1296	H1234	T1166	M1102	I1033	T971	G843
	L1612	L1612	A1552	P1490	S1427	V1361	L1297	A1167	F1034	S1103	F1034	E972	T844
	K1613	K1613	C1553	A1491	L1428	T1362	T1298	L1168	H1035	L1104	H1035	R973	V844
	G1614	G1614	C1553	A1491	P1429	T1363	T1299	S1237	L1106	L1106	K974	K974	V845
	R1615	R1615	P1555	F1493	T1430	V1364	E1300	A1171	M1106	M1106	E1041	R975	V846
	E1616	E1616	F1494	F1493	G1431	S1301	S1301	L1175	L1107	L1107	K1042	R976	N847
	E1617	E1617	F1494	F1494	I432	H1366	L1302	L1175	L1107	L1107	K1042	R976	N847
	L1618	L1618	A1558	Y1496	S1433	K1367	L1303	L1476	E1109	E1109	K1047	S978	R849
	L1619	L1619	A1558	Y1496	S1433	K1367	L1303	L1476	E1109	E1109	K1047	S978	R849
	M1620	M1620	A1560	Y1498	A1434	T1368	V1304	T1242	M1110	M1110	L1049	R979	T850
	G1621	G1621	H1499	H1499	H1485	S1369	K1305	G1243	Y1111	Y1111	K980	E915	S851
	K1622	K1622	R1500	R1500	E1436	T1370	Q1306	T1244	Q1112	Q1112	E1050	R916	G852
	E1623	E1623	S1371	S1371	G1439	I1307	L1307	A1245	L1113	L1113	E1051	R917	M853
	A1624	A1624	P1501	P1501	L1439	E1372	R1308	R1246	G1052	G1052	F918	F918	Q854
	L1625	L1625	K1503	K1503	K1440	E1373	L1309	M1247	M1053	M1053	V884	V884	F855
	Q1626	Q1626	Q1504	Q1504	V1443	S1376	I1313	V1248	L1054	L1054	G985	G985	C856
	K1628	K1628	C1505	C1505	E1444	F1377	D1314	E1249	S1055	S1055	E986	E986	V887
	Y1629	Y1629	T1506	T1506	G1445	L1378	V1315	T1250	L1056	L1056	R987	R987	M859
	M1630	M1630	M1507	M1507	V1446	L1379	S1316	A1252	L1057	L1057	R988	R988	V862
	F1631	F1631	V1570	V1570	D1447	K1380	L1380	L1188	S1058	S1058	S989	S989	V863
	Y1635	Y1635	E1571	E1571	Q1448	I1381	K1318	A1254	M1061	M1061	K1123	K1123	V863
	F1636	F1636	M1572	M1572	L1449	D1382	H1319	L1255	Y1124	Y1124	V930	V930	G864
	K1637	K1637	V1573	V1573	F1450	I1383	H1319	L1256	Q994	Q994	P931	P931	I865
	P1638	P1638	F1574	F1574	T1451	Q1384	G1321	T1257	S1064	S1064	V934	V934	E869
	L1639	L1639	L1574	L1574	A1452	D1385	A1322	S1258	E995	E995	V934	V934	S870
	D1640	D1640	L1575	L1575	V1453	I1386	L1323	L1259	G996	G996	V934	V934	R871
	S1641	S1641	T1577	T1577	Q1454	E1387	H1324	M1260	N998	N998	R936	R936	V872
	L1642	L1642	K1578	K1578	I1455	ALA	M1325	L1261	I999	I999	E937	E937	V873
	Y1643	Y1643	A1579	A1579	K1456	SER	Y1326	G1198	S938	S938	S938	S938	H874
	L1644	L1644	T1580	T1580	D1457	TYR	K1327	D1263	T1001	T1001	Y939	Y939	H875
	I1645	I1645	L1582	L1582	H1459	ARG	T1329	M1265	H002	H002	S940	S940	D876
	E1646	E1646	D1583	D1583	V1460	GLY	D1330	Y1266	L1003	L1003	G941	G941	G877
	Y1647	Y1647	L1584	L1584	I1461	TYR	K1331	V1267	P1004	P1004	V942	V942	G877
	M1648	M1648	Y1585	Y1585	L1462	GLY	M1332	M1268	K1005	K1005	T943	T943	T878
	P1649	P1649	K1586	K1586	Q1463	ASN	F1333	P1269	G1006	G1006	L944	L944	R879
	G1650	G1650	T1587	T1587	L1464	S1397	L1334	V1270	A1008	A1008	D945	D945	F882
	D1651	D1651	G1588	G1588	N1465	D1398	G1335	I1271	T1078	T1078	P946	P946	C883
	T1652	T1652	E1589	E1589	S1466	K1400	R1337	K1272	T1079	T1079	R947	R947	V884
	T1653	T1653	A1590	A1590	P1467	R1401	V1338	L1274	F1081	F1081	I949	I949	R885
	C1654	C1654	V1591	V1591	P1468	L1402	E1339	L1212	M1011	M1011	L1012	L1012	Q886
	F1660	F1660	A1592	A1592	S1469	V1403	L1340	S1275	L1083	L1083	M1013	M1013	K887
	L1661	L1661	K1594	K1594	D1471	A1404	L1341	E1276	R1084	R1084	S1014	S1014	V888
	A1662	A1662	D1595	D1595	F1472	C1405	L1342	I1215	V1085	V1085	T952	T952	E889
	M1663	M1663	S1596	S1596	L1473	A1406	M1343	Q1278	L1086	L1086	P1017	P1017	G890
	L1664	L1664	E1597	E1597	C1474	S1407	D1344	L1217	G1087	G1087	R955	R955	S891
	E1665	E1665	T1598	T1598	V1475	Y1408	L1345	V1218	Q1088	Q1088	F1019	F1019	S892
	F1666	F1666	L1599	L1599	R1476	L1409	L1346	K1219	Y1020	Y1020	E988	E988	S893
	A1667	A1667	F1600	F1600	P1410	K1409	L1347	G1280	V1021	V1021	F959	F959	H894
	K1602	K1602	L1541	L1541	S1411	S1411	V1348	A1155	F1022	F1022	P960	P960	L895
	E1668	E1668	T1542	T1542	E1414	E1414	T1350	D1286	H023	H023	Y961	Y961	V896
	D1670	D1670	I1543	I1543	S1415	S1415	G1351	S1287	V1092	V1092	K962	K962	T897
	L1671	L1671	S1544	S1544	F1483	F1483	V1352	T1287	E1094	E1094	L1025	L1025	F898
	F1672	F1672	C1606	C1606	E1484	E1484	G1352	D1288	Q1095	Q1095	P964	P964	T899
								T1290	M1096	M1096	T1027	T1027	V900
									G1028	G1028	D966	D966	L901

● Molecule 2: Cobra venom factor



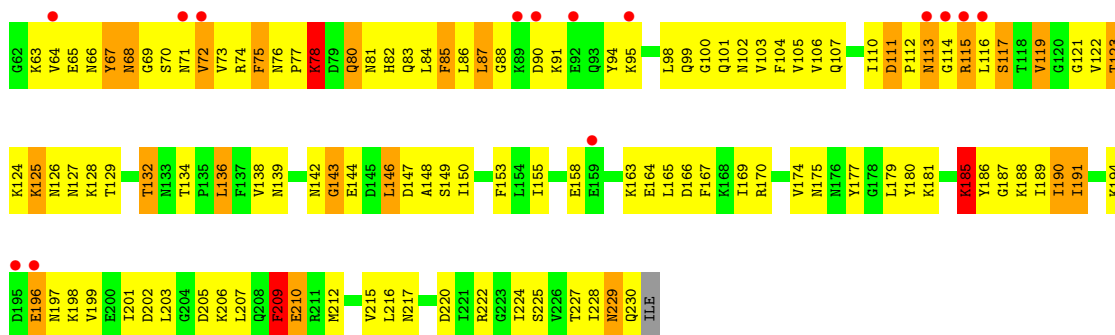


● Molecule 2: Cobra venom factor









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

Chain E: 100%

MAG1  
MAG2

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

Chain F: 50%

MAG1  
MAG2

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

Chain G: 100%

MAG1  
MAG2

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

Chain H: 50%

MAG1  
MAG2

## 4 Data and refinement statistics

Property	Value	Source
Space group	P 2 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	163.65Å 181.96Å 392.78Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.21 – 4.30 49.21 – 4.30	Depositor EDS
% Data completeness (in resolution range)	96.9 (49.21-4.30) 96.9 (49.21-4.30)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.14	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.83 (at 4.29Å)	Xtrriage
Refinement program	PHENIX (phenix.refine: 1.6.4_486)	Depositor
R, $R_{free}$	0.208 , 0.261 0.193 , 0.244	Depositor DCC
$R_{free}$ test set	1818 reflections (2.33%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	116.2	Xtrriage
Anisotropy	0.456	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 160.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.29$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.90	EDS
Total number of atoms	48236	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	167.0	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: NAG

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	A	0.60	1/13151 (0.0%)	0.80	3/17841 (0.0%)
1	C	0.60	0/13151	0.80	5/17841 (0.0%)
2	B	0.53	1/9833 (0.0%)	0.73	2/13345 (0.0%)
2	D	0.54	0/9833	0.74	3/13345 (0.0%)
3	X	0.47	1/1560 (0.1%)	0.67	1/2096 (0.0%)
3	Y	0.49	0/1560	0.69	1/2096 (0.0%)
All	All	0.57	3/49088 (0.0%)	0.77	15/66564 (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
1	C	0	1
All	All	0	3

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	X	210	GLU	C-N	5.35	1.46	1.34
2	B	347	PHE	CB-CG	-5.29	1.42	1.51
1	A	42	GLN	CB-CG	5.16	1.66	1.52

The worst 5 of 15 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	347	PHE	CB-CA-C	-7.26	95.88	110.40
2	D	347	PHE	CB-CA-C	-6.90	96.60	110.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	640	LEU	CA-CB-CG	6.49	130.23	115.30
1	C	640	LEU	CA-CB-CG	6.30	129.80	115.30
1	A	871	PRO	CA-N-CD	-6.16	102.87	111.50

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1504	GLN	Peptide
1	A	98	PRO	Peptide
1	C	1504	GLN	Peptide

## 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	12874	0	12814	1855	0
1	C	12874	0	12814	1901	0
2	B	9635	0	9630	1082	0
2	D	9635	0	9630	1079	0
3	X	1539	0	1530	166	0
3	Y	1539	0	1530	194	0
4	E	28	0	25	3	0
4	F	28	0	25	3	0
4	G	28	0	25	4	0
4	H	28	0	25	3	0
5	A	14	0	13	1	0
5	C	14	0	13	2	0
All	All	48236	0	48074	6152	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 64.

The worst 5 of 6152 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:1525:CYS:O	1:A:1528:VAL:HG22	1.34	1.25
3:X:207:LEU:HD12	3:X:207:LEU:O	1.32	1.24
3:Y:207:LEU:HD12	3:Y:207:LEU:O	1.32	1.23
1:C:386:VAL:H	1:C:411:THR:HG22	1.03	1.17
1:A:500:ASN:HB2	1:A:543:TYR:CE1	1.79	1.17

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	1616/1676 (96%)	1165 (72%)	300 (19%)	151 (9%)	0	12
1	C	1616/1676 (96%)	1179 (73%)	290 (18%)	147 (9%)	1	12
2	B	1203/1642 (73%)	981 (82%)	176 (15%)	46 (4%)	3	27
2	D	1203/1642 (73%)	982 (82%)	177 (15%)	44 (4%)	3	28
3	X	189/231 (82%)	148 (78%)	31 (16%)	10 (5%)	2	22
3	Y	189/231 (82%)	150 (79%)	28 (15%)	11 (6%)	1	20
All	All	6016/7098 (85%)	4605 (76%)	1002 (17%)	409 (7%)	1	17

5 of 409 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	21	GLN
1	A	60	PRO
1	A	89	PRO
1	A	96	GLN
1	A	150	ASP

### 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	1445/1484 (97%)	1090 (75%)	355 (25%)	0	4
1	C	1445/1484 (97%)	1098 (76%)	347 (24%)	0	5
2	B	1084/1435 (76%)	849 (78%)	235 (22%)	1	6
2	D	1084/1435 (76%)	855 (79%)	229 (21%)	1	7
3	X	175/205 (85%)	143 (82%)	32 (18%)	1	11
3	Y	175/205 (85%)	142 (81%)	33 (19%)	1	10
All	All	5408/6248 (87%)	4177 (77%)	1231 (23%)	1	6

5 of 1231 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	1618	LEU
2	D	1522	TYR
2	D	121	LEU
1	C	1606	CYS
2	D	594	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 162 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	1550	GLN
2	D	1511	GLN
2	D	65	GLN
2	D	507	ASN
3	X	139	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](#)

8 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
4	NAG	E	1	2,4	14,14,15	0.96	1 (7%)	17,19,21	2.06	6 (35%)
4	NAG	E	2	4	14,14,15	1.04	1 (7%)	17,19,21	2.50	6 (35%)
4	NAG	F	1	2,4	14,14,15	2.05	7 (50%)	17,19,21	3.28	8 (47%)
4	NAG	F	2	4	14,14,15	1.64	1 (7%)	17,19,21	2.34	6 (35%)
4	NAG	G	1	2,4	14,14,15	0.88	1 (7%)	17,19,21	1.97	6 (35%)
4	NAG	G	2	4	14,14,15	1.07	1 (7%)	17,19,21	1.74	4 (23%)
4	NAG	H	1	2,4	14,14,15	1.99	6 (42%)	17,19,21	3.46	9 (52%)
4	NAG	H	2	4	14,14,15	1.52	1 (7%)	17,19,21	2.32	6 (35%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	E	1	2,4	-	4/6/23/26	0/1/1/1
4	NAG	E	2	4	-	5/6/23/26	0/1/1/1
4	NAG	F	1	2,4	-	2/6/23/26	0/1/1/1
4	NAG	F	2	4	-	6/6/23/26	0/1/1/1
4	NAG	G	1	2,4	-	3/6/23/26	0/1/1/1
4	NAG	G	2	4	-	5/6/23/26	0/1/1/1
4	NAG	H	1	2,4	-	2/6/23/26	0/1/1/1
4	NAG	H	2	4	-	6/6/23/26	0/1/1/1

The worst 5 of 19 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	F	2	NAG	C1-C2	5.13	1.60	1.52
4	H	2	NAG	C1-C2	4.97	1.59	1.52
4	F	1	NAG	C1-C2	3.85	1.58	1.52
4	H	1	NAG	C1-C2	3.38	1.57	1.52
4	F	1	NAG	O5-C1	3.13	1.48	1.43

The worst 5 of 51 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	H	1	NAG	C1-O5-C5	10.09	125.86	112.19
4	F	1	NAG	C1-O5-C5	9.29	124.78	112.19
4	E	2	NAG	C4-C3-C2	6.58	120.66	111.02
4	H	2	NAG	C1-C2-N2	5.47	119.84	110.49
4	F	2	NAG	C1-C2-N2	5.45	119.79	110.49

There are no chirality outliers.

5 of 33 torsion outliers are listed below:

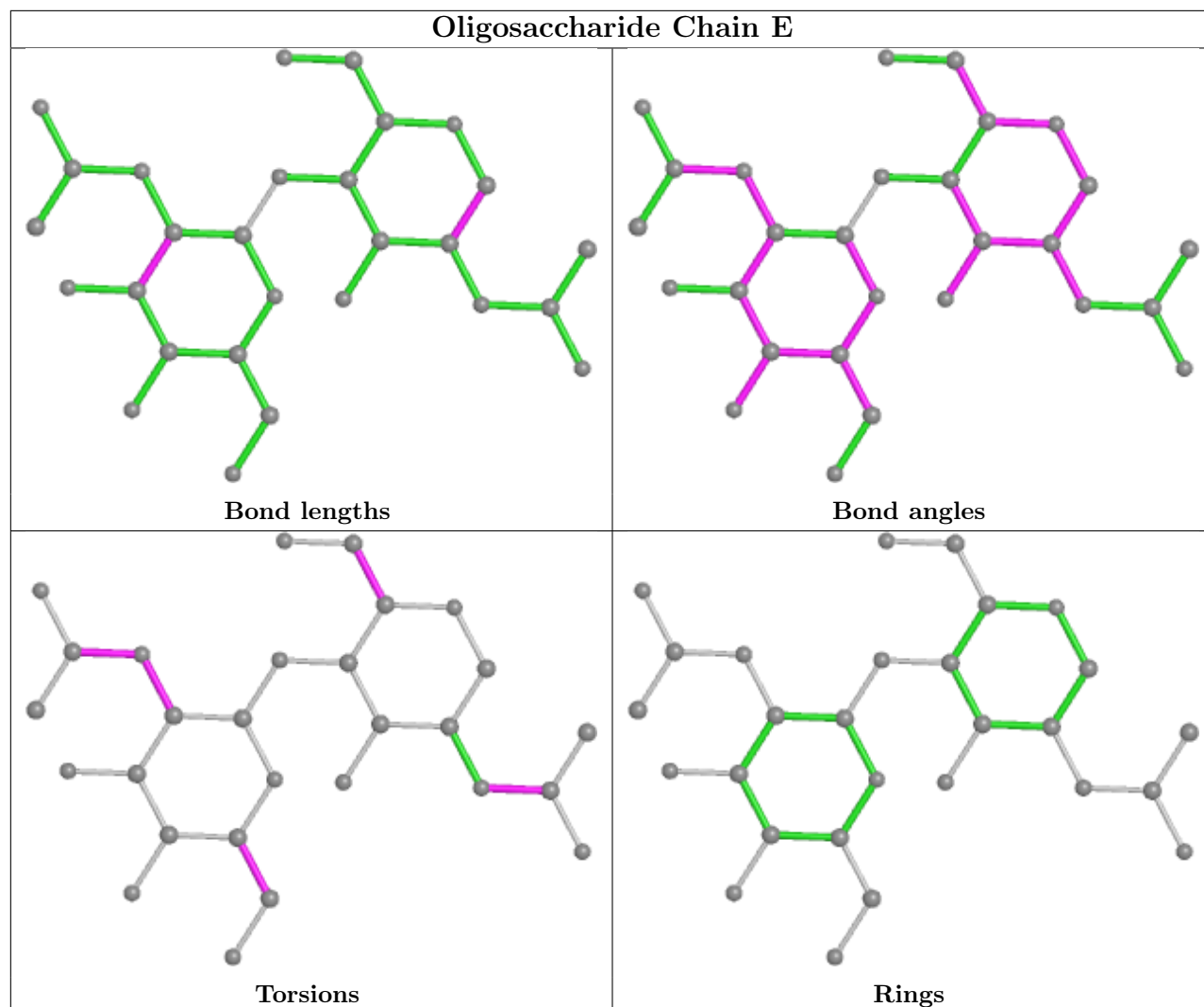
Mol	Chain	Res	Type	Atoms
4	E	1	NAG	C8-C7-N2-C2
4	E	1	NAG	O7-C7-N2-C2
4	E	2	NAG	C1-C2-N2-C7
4	E	2	NAG	O7-C7-N2-C2
4	F	2	NAG	C1-C2-N2-C7

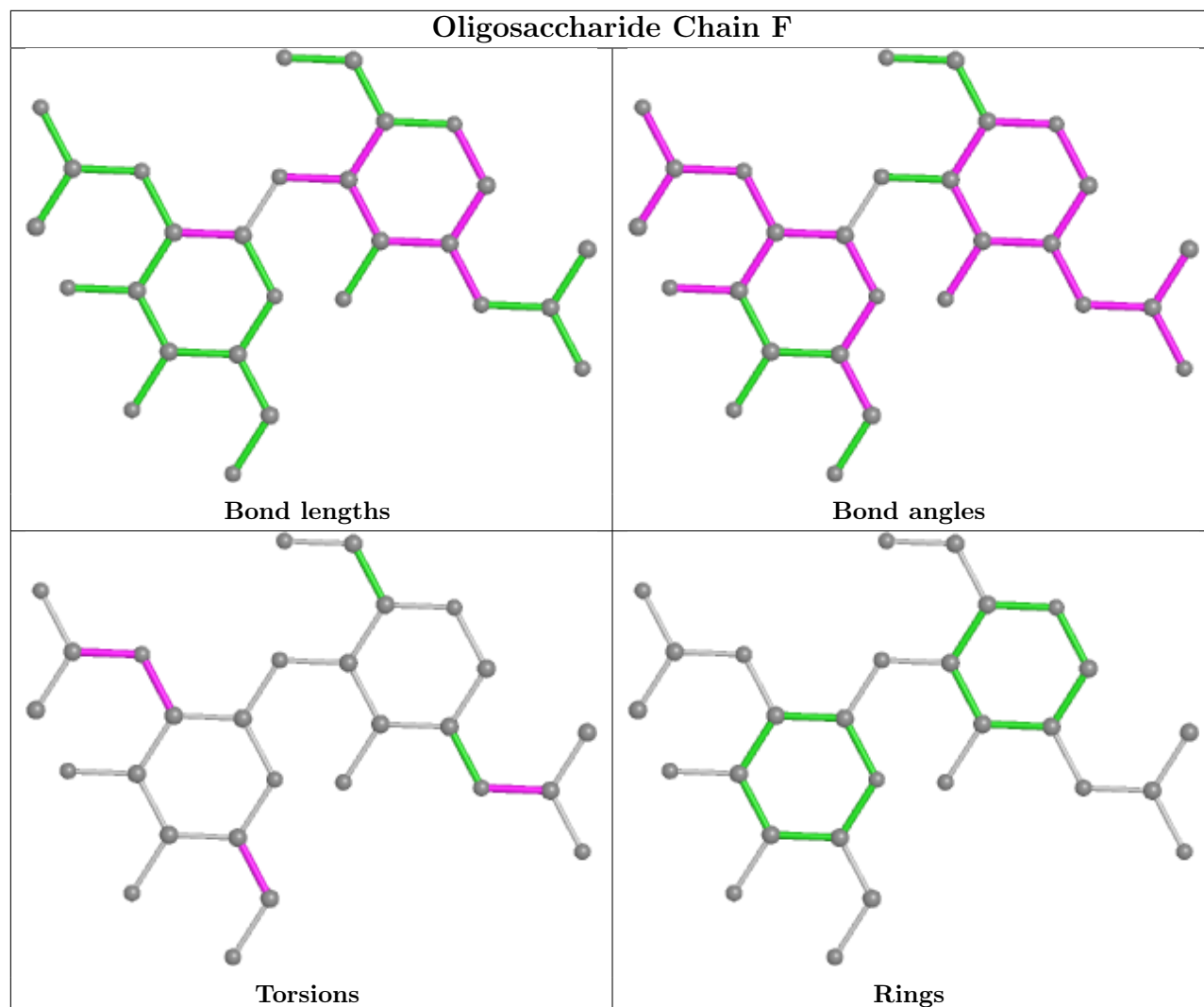
There are no ring outliers.

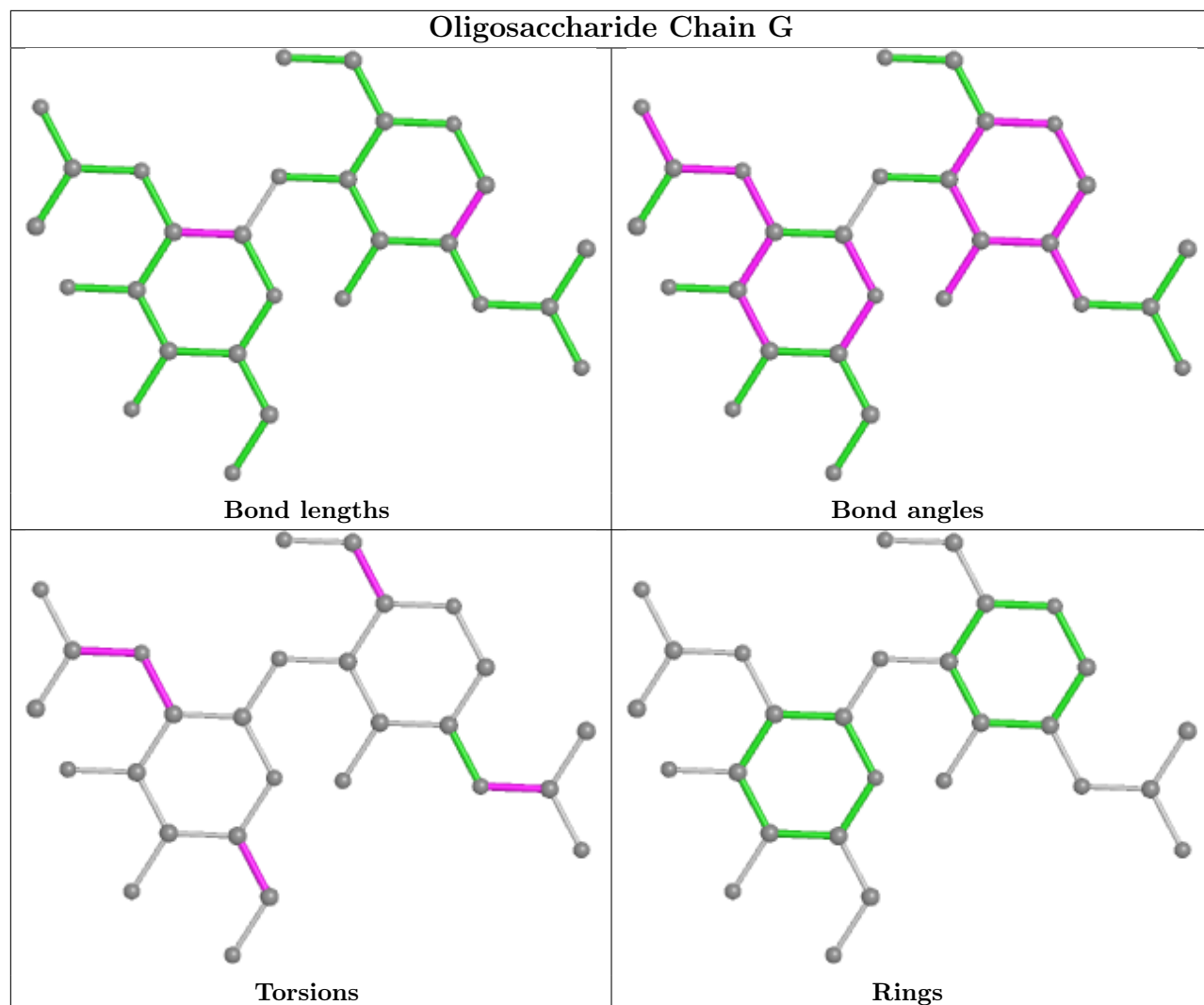
6 monomers are involved in 13 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	E	2	NAG	3	0
4	E	1	NAG	3	0
4	G	2	NAG	4	0
4	G	1	NAG	4	0
4	F	1	NAG	3	0
4	H	1	NAG	3	0

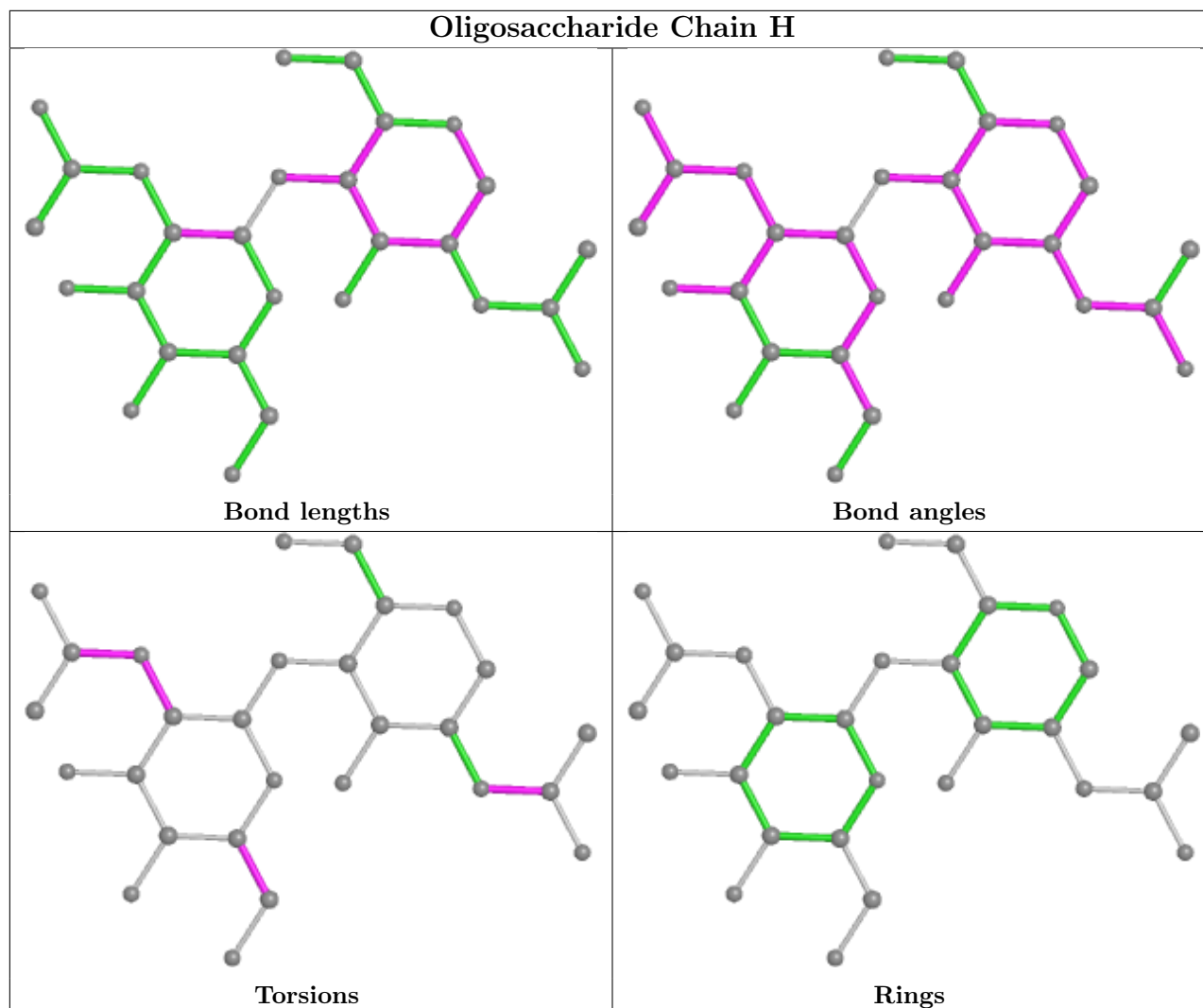
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.











## 5.6 Ligand geometry [i](#)

2 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z  > 2$	Counts	RMSZ	# $ Z  > 2$
5	NAG	A	2003	1	14,14,15	1.89	5 (35%)	17,19,21	3.34	13 (76%)
5	NAG	C	2003	1	14,14,15	2.04	4 (28%)	17,19,21	2.60	10 (58%)

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
5	NAG	A	2003	1	-	2/6/23/26	0/1/1/1
5	NAG	C	2003	1	-	4/6/23/26	0/1/1/1

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	C	2003	NAG	C1-C2	4.43	1.59	1.52
5	A	2003	NAG	C3-C2	4.37	1.61	1.52
5	C	2003	NAG	C3-C2	3.97	1.60	1.52
5	C	2003	NAG	C4-C5	3.10	1.59	1.53
5	A	2003	NAG	O4-C4	2.43	1.48	1.43

The worst 5 of 23 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	2003	NAG	C2-N2-C7	5.28	130.43	122.90
5	A	2003	NAG	O7-C7-C8	-5.11	112.57	122.06
5	A	2003	NAG	C4-C3-C2	4.83	118.10	111.02
5	C	2003	NAG	O3-C3-C2	4.38	118.53	109.47
5	A	2003	NAG	O4-C4-C3	4.22	120.10	110.35

There are no chirality outliers.

5 of 6 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	C	2003	NAG	O5-C5-C6-O6
5	A	2003	NAG	O5-C5-C6-O6
5	C	2003	NAG	C4-C5-C6-O6
5	A	2003	NAG	C4-C5-C6-O6
5	C	2003	NAG	C8-C7-N2-C2

There are no ring outliers.

2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	2003	NAG	1	0
5	C	2003	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, 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	1626/1676 (97%)	-0.04	19 (1%) 79 70	72, 150, 260, 469	0
1	C	1626/1676 (97%)	0.03	42 (2%) 56 46	60, 153, 277, 515	0
2	B	1215/1642 (73%)	0.02	21 (1%) 70 61	73, 160, 235, 335	0
2	D	1215/1642 (73%)	-0.03	16 (1%) 77 68	85, 155, 241, 362	0
3	X	191/231 (82%)	0.68	26 (13%) 3 3	99, 230, 333, 437	0
3	Y	191/231 (82%)	0.41	15 (7%) 12 11	95, 195, 300, 385	0
All	All	6064/7098 (85%)	0.03	139 (2%) 60 51	60, 157, 264, 515	0

The worst 5 of 139 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	X	112	PRO	11.8
3	Y	114	GLY	6.8
3	X	113	ASN	5.6
1	C	1651	ASP	5.6
3	X	114	GLY	5.6

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

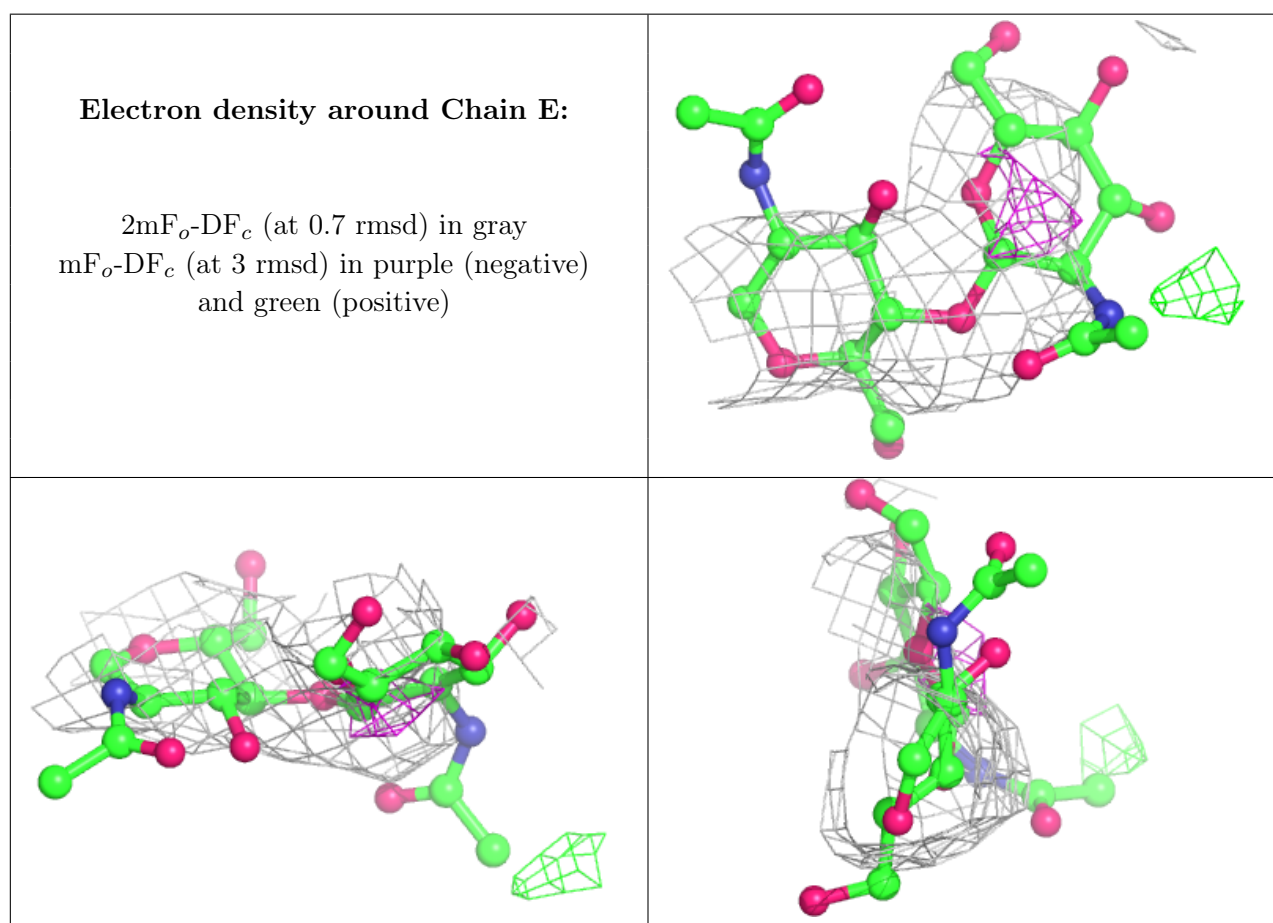
There are no non-standard protein/DNA/RNA residues in this entry.

### 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.

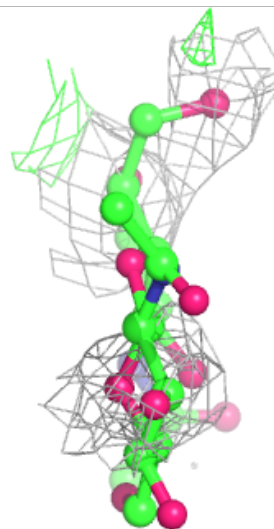
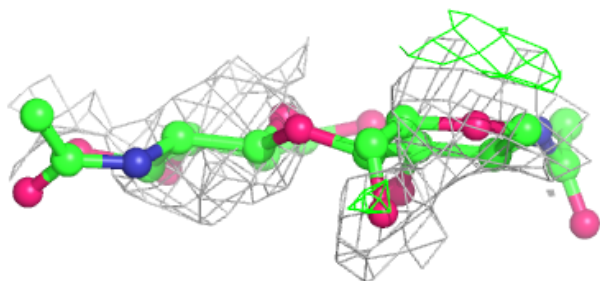
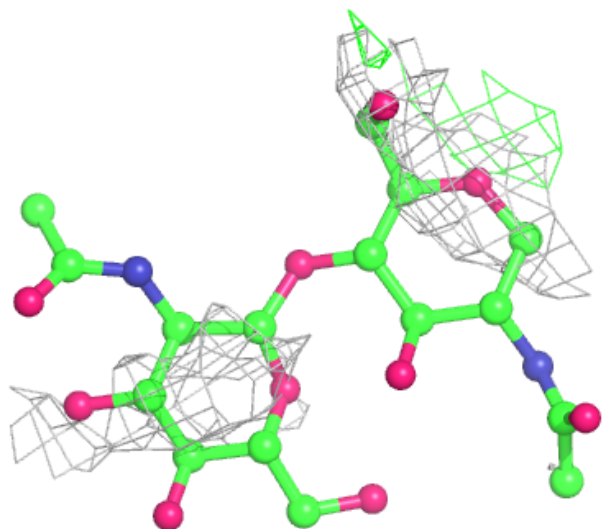
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
4	NAG	F	1	14/15	0.24	0.78	225,233,240,245	0
4	NAG	H	1	14/15	0.54	0.54	246,253,258,265	0
4	NAG	F	2	14/15	0.55	0.79	297,301,307,310	0
4	NAG	G	2	14/15	0.66	0.60	228,239,251,252	0
4	NAG	E	2	14/15	0.72	0.69	228,239,253,257	0
4	NAG	H	2	14/15	0.72	0.85	271,274,277,278	0
4	NAG	E	1	14/15	0.73	0.55	278,305,319,322	0
4	NAG	G	1	14/15	0.89	0.41	228,253,282,288	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.



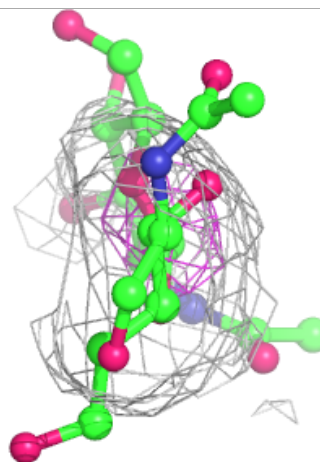
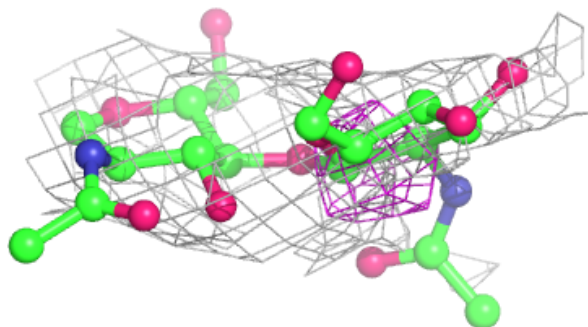
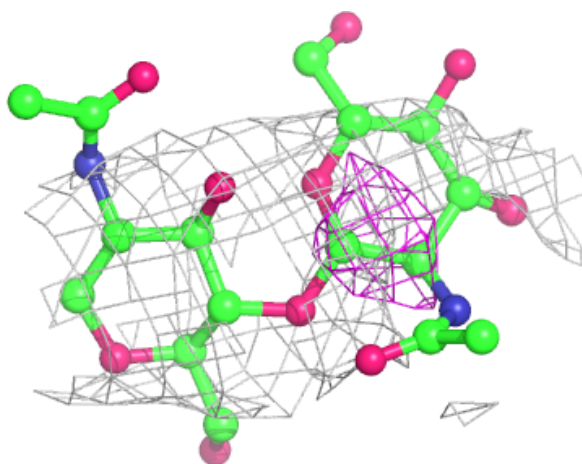
**Electron density around Chain F:**

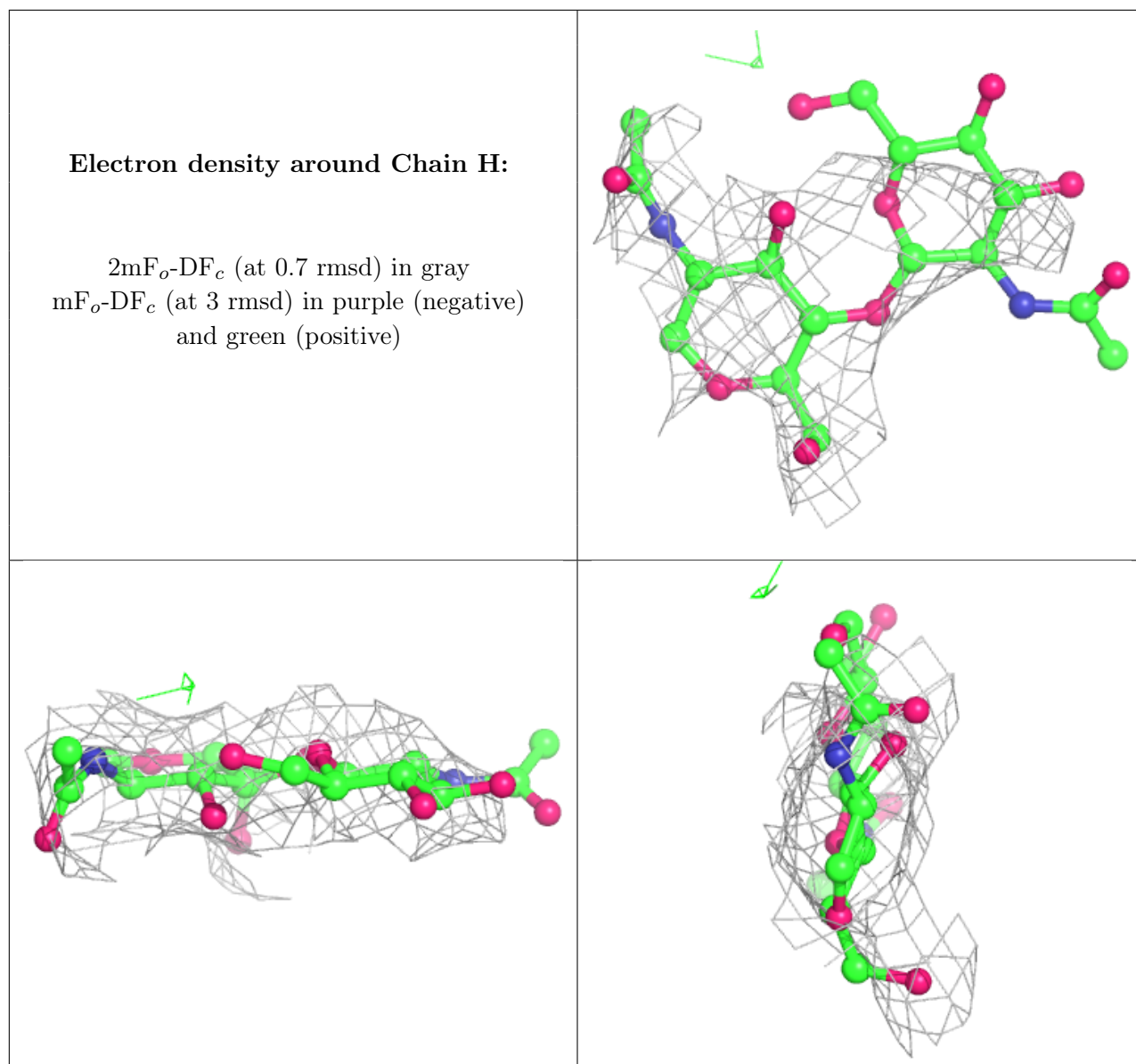
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around Chain G:**

$2mF_o-DF_c$  (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( $\text{\AA}^2$ )	Q<0.9
5	NAG	C	2003	14/15	0.73	0.39	177,180,183,183	0
5	NAG	A	2003	14/15	0.78	0.29	166,169,171,172	0



## 6.5 Other polymers [i](#)

There are no such residues in this entry.