Full wwPDB X-ray Structure Validation Report (i)

Jan 3, 2024 – 07:51 am GMT

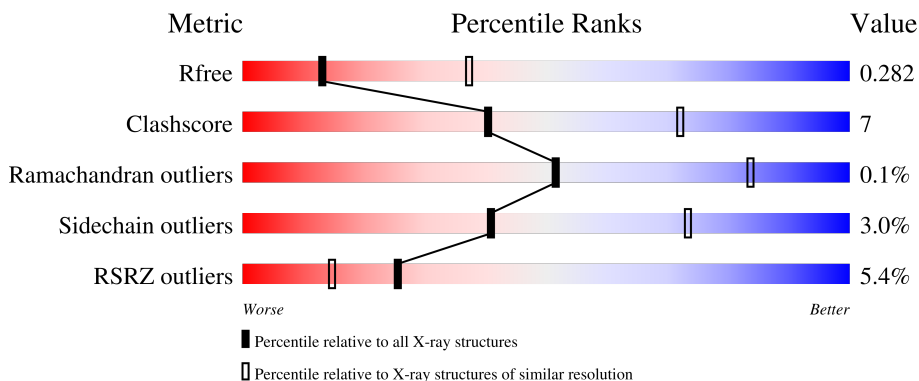|		
PDB ID	:	5HCD
Title	:	Ternary complex of human Complement C5 with Ornithodoros moubata OmCI and Rhipicephalus microplus RaCI2
Authors	:	Jore, M.M.; Johnson, S.; Lea, S.M.
Deposited on	:	2016-01-04
Resolution	:	2.98 Å(reported)

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 2.98 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	Percentile Ranks	Value
Rfree		0.282
Clashscore		7
Ramachandran outliers		0.1%
Sidechain outliers		3.0%
RSRZ outliers		5.4%

Worse *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R$_{free}$	130704	2754 (3.00-2.96)
Clashscore	141614	3103 (3.00-2.96)
Ramachandran outliers	138981	2993 (3.00-2.96)
Sidechain outliers	138945	2996 (3.00-2.96)
RSRZ outliers	127900	2644 (3.00-2.96)

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	B	656	5% / 77% / 21% / ·
2	A	998	6% / 79% / 18% / ··
3	C	165	% / 77% / 13% / 10%
4	D	80	45% / 12% / · / 39%
5	E	2	100%

2 Entry composition ⓘ

There are 6 unique types of molecules in this entry. The entry contains 14445 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	B	647	Total 5116	C 3281	N 819	O 1003	S 13	0	0	0

- Molecule 2 is a protein called Complement C5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	A	981	Total 7771	C 4970	N 1297	O 1463	S 41	0	0	0

- Molecule 3 is a protein called Complement inhibitor.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	148	Total 1160	C 715	N 195	O 239	S 11	0	0	0

There are 17 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	4	MET	-	initiating methionine	UNP Q5YD59
C	5	ALA	-	expression tag	UNP Q5YD59
C	6	SER	-	expression tag	UNP Q5YD59
C	7	HIS	-	expression tag	UNP Q5YD59
C	8	HIS	-	expression tag	UNP Q5YD59
C	9	HIS	-	expression tag	UNP Q5YD59
C	10	HIS	-	expression tag	UNP Q5YD59
C	11	HIS	-	expression tag	UNP Q5YD59
C	12	HIS	-	expression tag	UNP Q5YD59
C	13	HIS	-	expression tag	UNP Q5YD59
C	14	HIS	-	expression tag	UNP Q5YD59
C	15	HIS	-	expression tag	UNP Q5YD59
C	16	HIS	-	expression tag	UNP Q5YD59
C	17	SER	-	expression tag	UNP Q5YD59

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Chain	Residue	Modelled	Actual	Comment	Reference
C	18	GLY	-	expression tag	UNP Q5YD59
C	78	GLN	ASN	engineered mutation	UNP Q5YD59
C	102	GLN	ASN	engineered mutation	UNP Q5YD59

- Molecule 4 is a protein called Rhipicephalus microplus RaCI2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	D	49	364	217	70	71	6	0	0	0

- Molecule 5 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-a cetamido-2-deoxy-beta-D-glucopyranose.

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

- Molecule 6 is CYSTEINE (three-letter code: CYS) (formula: $C_3H_7NO_2S$).

CYS
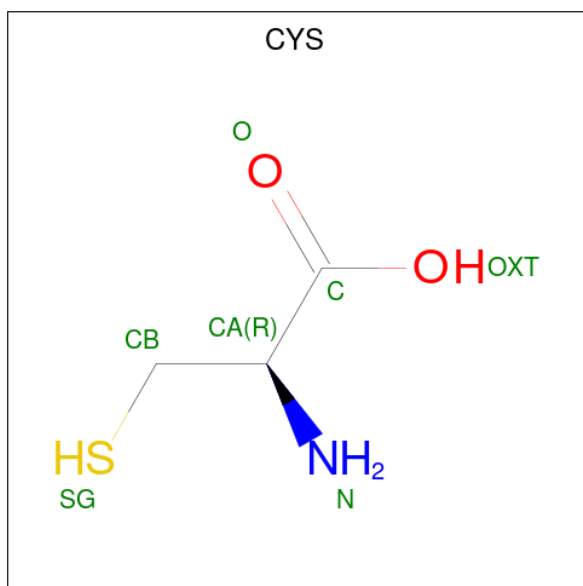
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
6	A	1	6	3	1	1	1	0	0

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
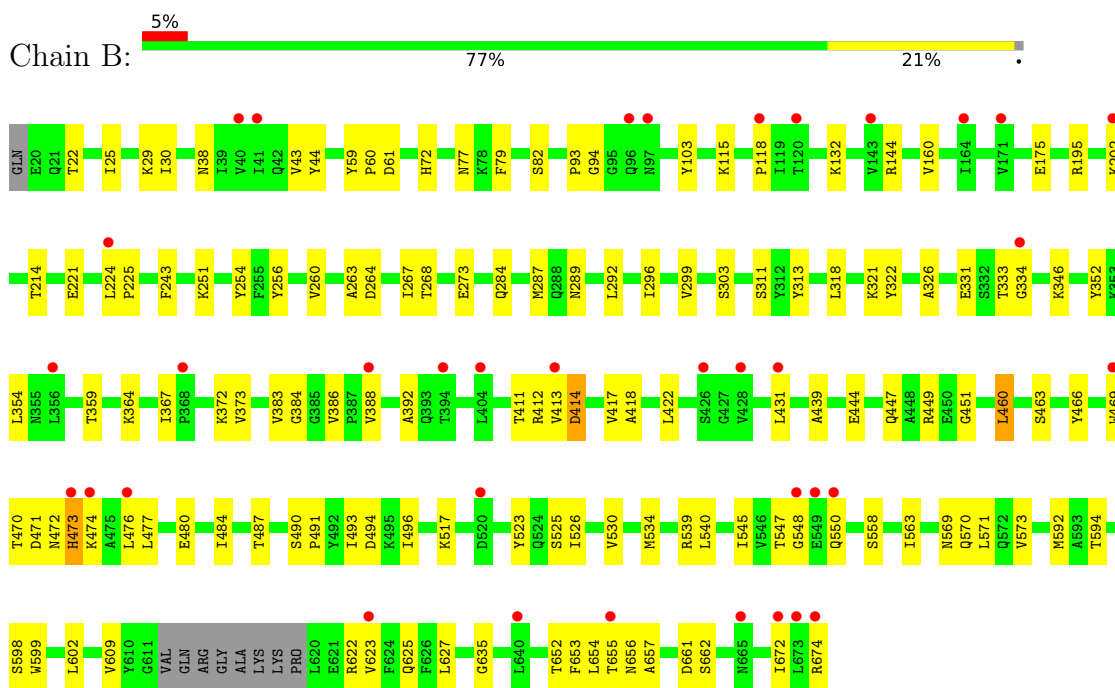
- Molecule 2: Complement C5

T1187 I1190 I1190 S1196 V1209 V1218 K1219 Y1225 R1226 K1229 D1230 N1231 K1235 D1236 T1257 I1271 R1279 T1287 T1290 I1294 Y1300 I1313 D1314 V1315 S1316 Y1317 K1318 H1319 K1320 L1323 H1324 N1325 Y1326 K1327 M1328 F1333 V1338 L1342 N1343 D1344 D1345

L1346 I1347 V1348 F1352 T1362 T1363 V1364 V1365 T1368 S1369 T1370 Q1384 D1385 I1386 E1387 ALA SER HIS TYR ARG GLY TYR GLY AS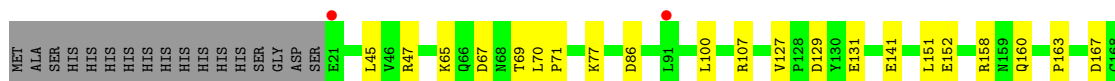N SER ASP TYR K1400 E1413 S1417 V1423 I1426 D1438 F1450 T1451 Q1463 L1464 V1475 T1492 F1493 T1494 V1495 T1506 M1507 F1508

I1514 K1515 I1516 Q1517 K1518 V1519 C1520 E1521 G1522 A1523 A1524 C1525 K1526 C1527 C1532 M1535 D1540 L1541 T1542 I1543 S1544 A1545 E1546 T1547 R1548 T1551 A1552 C1553 K1554 P1555 E1556 I1557 K1562 S1567 K1576 Y1577 K1578 L1581 Y1585 G1588 E1589 A1590 I1598 I1601 K1602 K1603 V1604 T1605

V1612 R1615 L1618 I1619 M1620 G1621 K1622 E1623 A1624 L1625 Q1626 I1627 K1628 Y1635 I1636 Y1637 P1638 L1639 D1640 S1641 L1642 T1643 W1644 I1645 E1646 Y1647 W1648 P1649 R1650 T1652 T1653 C1654 S1655 S1656 C1657 Q1658 A1659 F1660 L1661 A1662 N1663 L1664 D1665 E1666 F1667 I1671 C1676

• Molecule 3: Complement inhibitor

Chain C:

MET ALA SER HIS HIS HIS HIS HIS HIS HIS HIS HIS SER GLY ASP SER E21 L45 V46 R47 K65 Q66 D67 N68 T69 L70 P71 K77 D86 L91 L100 R107 V127 P128 D129 Y130 E131 E141 L151 E152 R158 N159 Q160 P163 D167 C168
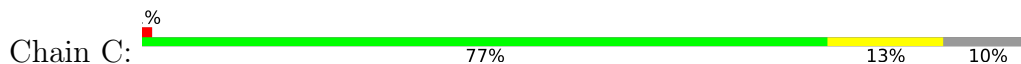
• Molecule 4: Rhipicephalus microplus RaCI2

Chain D:

GLY PRO MET GLU GLU ALA ASN THR THR PRO ILE SER VAL LYS D12 Q13 C14 C19 R20 V23 R26 D32 G33 C34 P35 D46 L51 C55 Y56 L57 T60 THR PRO LYS SER THR THR THR SER THR GLU GLN SER PHE ASN MET GLU GLU

• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain E:

NAG1 NAG2

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	105.95Å 140.21Å 209.79Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	74.54 – 2.98 116.57 – 2.98	Depositor EDS
% Data completeness (in resolution range)	99.2 (74.54-2.98) 99.3 (116.57-2.98)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	0.14	Depositor
$< I/\sigma(I) >$ [1]	1.62 (at 2.96Å)	Xtriage
Refinement program	PHENIX (1.10_2155: ???)	Depositor
R, R_{free}	0.257 , 0.282 0.259 , 0.282	Depositor DCC
R_{free} test set	3187 reflections (4.97%)	wwPDB-VP
Wilson B-factor (Å^2)	63.6	Xtriage
Anisotropy	0.412	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 23.2	EDS
L-test for twinning[2]	$< \lvert L \rvert > = 0.49, < L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.88	EDS
Total number of atoms	14445	wwPDB-VP
Average B, all atoms (Å^2)	72.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.46% 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 $< \lvert L \rvert >$, $< L^2 >$ 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: 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	B	0.54	0/5234	0.56	0/7119
2	A	0.55	1/7928 (0.0%)	0.56	0/10733
3	C	0.44	0/1183	0.51	0/1599
4	D	0.54	0/368	0.63	0/497
All	All	0.54	1/14713 (0.0%)	0.56	0/19948

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	724	CYS	CB-SG	-5.24	1.73	1.81

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

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	B	5116	0	5022	82	0
2	A	7771	0	7817	120	0
3	C	1160	0	1085	10	0
4	D	364	0	352	8	0
5	E	28	0	25	0	0
6	A	6	0	3	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	14445	0	14304	208	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 7.

All (208) 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)
2:A:1515:LYS:HG2	2:A:1516:ILE:HA	1.64	0.79
2:A:942:VAL:HG21	2:A:957:LYS:HG2	1.65	0.77
2:A:1515:LYS:HE3	2:A:1516:ILE:HG23	1.67	0.76
1:B:93:PRO:O	4:D:26:ARG:NH2	2.20	0.75
1:B:487:THR:HG22	1:B:523:TYR:HB3	1.68	0.75
2:A:1625:LEU:HB2	2:A:1636:ILE:HG23	1.68	0.74
1:B:373:VAL:HG21	1:B:388:VAL:HG11	1.70	0.73
1:B:384:GLY:HA3	1:B:413:VAL:HG23	1.70	0.73
2:A:1548:ARG:NH1	2:A:1646:GLU:OE1	2.22	0.71
1:B:359:THR:HG21	1:B:372:LYS:H	1.56	0.71
1:B:490:SER:OG	1:B:491:PRO:O	2.07	0.70
1:B:469:TRP:HA	1:B:484:ILE:HA	1.74	0.70
4:D:13:GLN:HG3	4:D:14:CYS:H	1.56	0.68
2:A:751:ARG:O	2:A:755:LYS:HB2	1.95	0.67
3:C:77:LYS:NZ	3:C:167:ASP:O	2.27	0.66
1:B:72:HIS:O	1:B:77:ASN:ND2	2.28	0.66
3:C:107:ARG:NH1	3:C:131:GLU:OE1	2.28	0.65
1:B:221:GLU:OE1	2:A:762:LYS:NZ	2.31	0.64
2:A:934:VAL:HG23	2:A:1508:PHE:CZ	2.32	0.64
1:B:655:THR:HG22	1:B:657:ALA:H	1.62	0.63
1:B:268:THR:HG22	1:B:287:MET:HG2	1.79	0.63
1:B:569:ASN:ND2	1:B:598:SER:HB2	2.14	0.63
4:D:20:ARG:NH1	4:D:32:ASP:OD2	2.31	0.62
2:A:1532:CYS:HA	2:A:1640:ASP:HA	1.81	0.62
4:D:14:CYS:SG	4:D:35:PRO:HG2	2.40	0.62
1:B:273:GLU:OE2	1:B:321:LYS:NZ	2.32	0.61
2:A:1535:MET:HG3	2:A:1645:ILE:HD11	1.81	0.61
2:A:1450:PHE:CZ	2:A:1475:VAL:HB	2.35	0.60
2:A:1576:LYS:HE2	2:A:1601:ILE:HD11	1.83	0.60
2:A:1556:GLU:HB3	2:A:1622:LYS:HE2	1.82	0.60
1:B:195:ARG:NH2	2:A:1060:ARG:O	2.35	0.59
1:B:386:VAL:H	1:B:411:THR:HB	1.68	0.59
2:A:1544:SER:O	2:A:1546:GLU:N	2.32	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:25:ILE:O	1:B:653:PHE:HA	2.03	0.58
1:B:364:LYS:HB3	1:B:367:ILE:HD13	1.84	0.58
1:B:251:LYS:HG2	1:B:296:ILE:HG12	1.84	0.58
1:B:224:LEU:HD12	1:B:225:PRO:HD2	1.85	0.58
2:A:1032:ASN:OD1	2:A:1032:ASN:N	2.37	0.58
2:A:687:ALA:O	2:A:691:LYS:HG3	2.04	0.57
1:B:144:ARG:NH2	1:B:602:LEU:O	2.37	0.57
2:A:743:SER:OG	2:A:746:ASP:OD1	2.20	0.57
1:B:573:VAL:HG12	1:B:592:MET:HG2	1.87	0.57
1:B:160:VAL:HG22	1:B:175:GLU:HB3	1.87	0.57
1:B:414:ASP:OD1	1:B:414:ASP:N	2.35	0.57
2:A:747:MET:O	2:A:751:ARG:HG3	2.05	0.56
2:A:1226:ARG:NH1	3:C:141:GLU:OE1	2.38	0.56
1:B:484:ILE:O	1:B:525:SER:HA	2.05	0.56
2:A:1622:LYS:HE3	2:A:1642:LEU:HD23	1.87	0.56
1:B:22:THR:HG21	1:B:545:ILE:HD13	1.87	0.56
2:A:1548:ARG:HH11	2:A:1644:TRP:HH2	1.53	0.55
2:A:915:GLU:OE2	2:A:920:LYS:NZ	2.39	0.55
2:A:915:GLU:HG2	2:A:920:LYS:HG3	1.88	0.54
1:B:115:LYS:HB2	1:B:654:LEU:HD21	1.89	0.54
2:A:1219:LYS:HB2	2:A:1225:TYR:HB2	1.88	0.54
2:A:1370:THR:HG21	2:A:1506:THR:HB	1.90	0.54
2:A:696:LYS:HE2	2:A:758:LEU:O	2.07	0.53
2:A:826:GLU:HG2	2:A:846:TYR:HE1	1.74	0.53
1:B:539:ARG:NH2	1:B:635:GLY:O	2.41	0.53
2:A:937:GLU:HG3	2:A:1364:VAL:HG22	1.91	0.53
1:B:439:ALA:H	1:B:447:GLN:HE22	1.57	0.53
2:A:1598:ILE:HD12	2:A:1637:TYR:HE1	1.74	0.53
2:A:719:SER:O	2:A:721:GLY:N	2.42	0.53
2:A:1235:LYS:NZ	2:A:1413:GLU:OE1	2.41	0.53
1:B:412:ARG:N	1:B:417:VAL:O	2.33	0.52
1:B:547:THR:OG1	1:B:548:GLY:N	2.42	0.52
2:A:958:GLU:OE2	2:A:1318:LYS:NZ	2.28	0.52
2:A:1652:THR:HG22	2:A:1658:GLN:HB2	1.92	0.52
2:A:1517:GLN:NE2	2:A:1604:VAL:O	2.41	0.52
2:A:1516:ILE:HG22	2:A:1517:GLN:H	1.76	0.52
2:A:1290:THR:O	2:A:1294:ILE:HG12	2.10	0.51
1:B:22:THR:HG22	1:B:44:TYR:HB2	1.92	0.51
2:A:749:LEU:HD23	2:A:752:LEU:HD12	1.92	0.51
2:A:999:ILE:HD13	2:A:1017:PRO:HG3	1.91	0.51
1:B:469:TRP:O	1:B:469:TRP:CD1	2.64	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1612:VAL:HB	2:A:1615:ARG:HD2	1.92	0.51
2:A:1567:SER:HB2	2:A:1578:LYS:HD2	1.92	0.51
1:B:484:ILE:HG22	1:B:526:ILE:O	2.09	0.51
2:A:751:ARG:O	2:A:755:LYS:CB	2.59	0.50
2:A:977:LEU:HD21	2:A:1315:VAL:HG11	1.92	0.50
1:B:622:ARG:HB3	1:B:625:GLN:NE2	2.27	0.50
1:B:383:VAL:O	1:B:411:THR:HG21	2.11	0.50
2:A:942:VAL:CG2	2:A:957:LYS:HG2	2.40	0.50
2:A:969:PRO:HG3	2:A:1601:ILE:HG21	1.93	0.50
1:B:284:GLN:NE2	2:A:757:LEU:HD11	2.27	0.50
2:A:857:VAL:HA	2:A:913:SER:O	2.11	0.50
3:C:65:LYS:HE2	3:C:67:ASP:O	2.12	0.49
1:B:451:GLY:O	1:B:674:ARG:NH2	2.46	0.49
2:A:1618:LEU:O	2:A:1645:ILE:HA	2.13	0.49
2:A:905:ILE:HD13	2:A:931:PRO:HG3	1.94	0.49
1:B:444:GLU:O	1:B:449:ARG:NH2	2.46	0.49
2:A:822:ASP:HB2	2:A:849:ARG:HG3	1.93	0.49
2:A:1316:SER:HA	2:A:1323:LEU:H	1.77	0.49
1:B:94:GLY:HA2	4:D:26:ARG:HH21	1.78	0.49
2:A:1384:GLN:O	2:A:1400:LYS:HA	2.12	0.49
2:A:1647:TYR:CE2	2:A:1649:PRO:HG3	2.47	0.49
2:A:1229:LYS:HD2	2:A:1231:ASN:O	2.13	0.49
2:A:1315:VAL:HG23	2:A:1323:LEU:HB3	1.95	0.49
1:B:392:ALA:HB1	1:B:431:LEU:HD11	1.95	0.48
1:B:322:TYR:CE2	1:B:346:LYS:HB2	2.48	0.48
2:A:689:LYS:HD3	2:A:690:TYR:CE1	2.47	0.48
2:A:1196:SER:HB3	2:A:1257:THR:HG23	1.95	0.48
2:A:1313:ILE:HD12	2:A:1328:MET:HE3	1.96	0.47
1:B:22:THR:HA	1:B:656:ASN:HD21	1.78	0.47
2:A:1320:LYS:HG2	2:A:1342:LEU:HD13	1.95	0.47
2:A:1602:LYS:HB3	2:A:1639:LEU:HD12	1.97	0.47
3:C:86:ASP:O	3:C:100:LEU:HD13	2.14	0.47
1:B:29:LYS:HD2	1:B:652:THR:HG23	1.96	0.47
1:B:623:VAL:HG12	1:B:627:LEU:HD22	1.96	0.47
2:A:719:SER:C	2:A:721:GLY:H	2.17	0.47
2:A:1645:ILE:O	2:A:1645:ILE:HG13	2.14	0.47
1:B:417:VAL:HG21	1:B:473:HIS:NE2	2.29	0.47
1:B:463:SER:HA	1:B:490:SER:HB2	1.97	0.47
1:B:256:TYR:HA	2:A:846:TYR:HE2	1.79	0.47
2:A:1451:THR:HG22	2:A:1463:GLN:O	2.14	0.47
1:B:318:LEU:HA	1:B:321:LYS:HG3	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1589:GLU:OE1	2:A:1590:ALA:N	2.48	0.47
1:B:490:SER:O	1:B:493:ILE:HG13	2.15	0.46
1:B:38:ASN:ND2	1:B:82:SER:OG	2.38	0.46
2:A:695:VAL:HG23	2:A:698:CYS:SG	2.55	0.46
2:A:1086:LEU:HD22	2:A:1095:GLN:OE1	2.16	0.46
2:A:1315:VAL:HG12	2:A:1348:VAL:HG22	1.97	0.46
1:B:571:LEU:HG	2:A:812:ALA:HB2	1.97	0.46
3:C:129:ASP:OD1	3:C:158:ARG:NH2	2.45	0.46
1:B:373:VAL:HG22	1:B:418:ALA:HB3	1.98	0.46
2:A:1450:PHE:HA	2:A:1464:LEU:HD13	1.98	0.46
1:B:352:TYR:HE1	1:B:383:VAL:HG11	1.80	0.46
2:A:829:ILE:HG13	2:A:925:LYS:HG2	1.98	0.46
2:A:999:ILE:HG13	2:A:1000:LEU:HG	1.97	0.46
2:A:1218:VAL:HG12	2:A:1226:ARG:HG3	1.96	0.46
2:A:1554:LYS:HG3	2:A:1556:GLU:H	1.81	0.46
1:B:477:LEU:HB2	1:B:480:GLU:HG3	1.98	0.45
2:A:975:ARG:HA	2:A:1362:THR:O	2.16	0.45
3:C:152:GLU:HG2	3:C:160:GLN:HE22	1.81	0.45
1:B:599:TRP:CZ3	2:A:779:LEU:HB2	2.51	0.45
1:B:570:GLN:O	1:B:594:THR:HA	2.17	0.45
2:A:934:VAL:HG22	2:A:1492:THR:HG21	1.99	0.45
2:A:981:GLY:HA3	2:A:1333:PHE:CD2	2.51	0.45
2:A:1386:ILE:HD12	2:A:1386:ILE:HA	1.83	0.45
2:A:968:VAL:HG22	2:A:1368:THR:HG22	1.97	0.45
1:B:331:GLU:OE2	1:B:333:THR:OG1	2.22	0.45
2:A:1012:LEU:O	2:A:1015:VAL:HG12	2.17	0.45
2:A:1128:LYS:NZ	2:A:1417:SER:OG	2.49	0.45
2:A:1324:HIS:HE1	2:A:1338:VAL:HG11	1.82	0.44
2:A:939:TYR:CZ	2:A:1279:ARG:HD3	2.52	0.44
1:B:540:LEU:O	1:B:558:SER:HA	2.18	0.44
1:B:422:LEU:HD12	1:B:422:LEU:HA	1.83	0.44
1:B:460:LEU:HA	1:B:460:LEU:HD12	1.70	0.44
2:A:1426:ILE:HG12	2:A:1493:PHE:CD1	2.53	0.44
2:A:1517:GLN:NE2	2:A:1605:THR:HA	2.32	0.44
2:A:691:LYS:HE2	2:A:757:LEU:HD13	1.99	0.44
1:B:333:THR:OG1	1:B:334:GLY:N	2.51	0.44
1:B:609:VAL:HG12	2:A:769:PHE:CG	2.53	0.44
1:B:254:TYR:CE2	1:B:260:VAL:HA	2.52	0.44
2:A:822:ASP:OD1	2:A:822:ASP:N	2.46	0.44
2:A:823:VAL:HG21	2:A:853:MET:SD	2.58	0.43
2:A:1129:LEU:HD23	2:A:1129:LEU:HA	1.84	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:43:VAL:HG23	1:B:79:PHE:HB3	2.00	0.43
1:B:311:SER:O	1:B:313:TYR:N	2.51	0.43
2:A:1037:ASP:OD2	2:A:1040:ILE:HG13	2.17	0.43
1:B:132:LYS:HD2	1:B:609:VAL:HG11	1.99	0.43
1:B:496:ILE:O	1:B:517:LYS:HD3	2.18	0.43
2:A:1015:VAL:HG22	2:A:1049:LEU:HD12	2.00	0.43
1:B:268:THR:OG1	1:B:326:ALA:HB3	2.17	0.43
2:A:1319:HIS:N	2:A:1344:ASP:OD2	2.49	0.43
3:C:47:ARG:NH1	3:C:160:GLN:OE1	2.48	0.43
4:D:46:ASP:OD1	4:D:46:ASP:N	2.50	0.43
1:B:144:ARG:HG2	2:A:775:TRP:CZ2	2.53	0.43
2:A:765:ILE:HG13	2:A:767:SER:H	1.84	0.43
2:A:988:LEU:HD23	2:A:1021:VAL:HG22	2.00	0.43
1:B:627:LEU:HD12	1:B:627:LEU:HA	1.82	0.43
1:B:661:ASP:OD1	1:B:662:SER:N	2.45	0.43
4:D:19:CYS:HB3	4:D:55:CYS:SG	2.58	0.43
2:A:973:ILE:HG23	2:A:1365:VAL:HG12	2.01	0.42
2:A:1187:THR:HA	2:A:1190:ILE:HG22	2.01	0.42
2:A:1576:LYS:HG2	2:A:1601:ILE:HG12	2.01	0.42
2:A:987:ILE:HD13	2:A:1294:ILE:HG23	2.02	0.42
1:B:94:GLY:HA2	4:D:26:ARG:NH2	2.34	0.42
2:A:1654:CYS:HB2	2:A:1657:CYS:HB3	1.95	0.42
1:B:59:TYR:HA	1:B:60:PRO:HA	1.79	0.42
2:A:881:SER:OG	2:A:882:LYS:N	2.52	0.42
2:A:1031:TRP:HB3	2:A:1038:PRO:HB3	2.01	0.42
1:B:263:ALA:HB3	1:B:292:LEU:HB3	2.01	0.42
2:A:688:ALA:HA	2:A:691:LYS:HD2	2.02	0.42
2:A:781:PRO:C	2:A:783:ARG:H	2.23	0.42
2:A:860:SER:HB3	2:A:911:ASN:H	1.85	0.42
2:A:701:ASP:HA	2:A:704:CYS:SG	2.60	0.41
2:A:1554:LYS:HB3	2:A:1557:ILE:HG12	2.01	0.41
1:B:267:ILE:HD13	1:B:299:VAL:HG21	2.01	0.41
2:A:1009:GLU:OE2	2:A:1287:THR:OG1	2.30	0.41
2:A:1540:ASP:HB3	2:A:1543:ILE:HD13	2.01	0.41
2:A:1516:ILE:HG22	2:A:1517:GLN:N	2.35	0.41
1:B:202:LYS:HE3	1:B:214:THR:OG1	2.21	0.41
2:A:872:VAL:HG22	2:A:881:SER:O	2.21	0.41
2:A:1423:VAL:O	2:A:1495:VAL:HA	2.20	0.41
1:B:243:PHE:O	1:B:303:SER:HB2	2.21	0.41
3:C:45:LEU:HG	3:C:163:PRO:HG2	2.01	0.41
2:A:1044:LYS:HE2	2:A:1044:LYS:HB3	1.86	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:1229:LYS:NZ	2:A:1236:ASP:O	2.54	0.40
2:A:1451:THR:HG22	2:A:1463:GLN:C	2.42	0.40
1:B:466:TYR:HD2	1:B:487:THR:OG1	2.04	0.40
1:B:476:LEU:HB2	1:B:563:ILE:HG12	2.03	0.40
2:A:987:ILE:H	2:A:987:ILE:HG13	1.53	0.40
2:A:1663:ASN:O	2:A:1666:GLU:HB2	2.22	0.40
1:B:30:ILE:HD12	1:B:118:PRO:HB2	2.02	0.40
1:B:311:SER:HA	1:B:313:TYR:CE2	2.56	0.40
2:A:1438:ASP:OD1	2:A:1438:ASP:N	2.55	0.40
1:B:530:VAL:HA	1:B:534:MET:SD	2.61	0.40
3:C:70:LEU:HA	3:C:71:PRO:HD3	1.97	0.40

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	B	643/656 (98%)	615 (96%)	28 (4%)	0	100	100
2	A	975/998 (98%)	924 (95%)	50 (5%)	1 (0%)	51	83
3	C	146/165 (88%)	138 (94%)	8 (6%)	0	100	100
4	D	47/80 (59%)	43 (92%)	3 (6%)	1 (2%)	7	30
All	All	1811/1899 (95%)	1720 (95%)	89 (5%)	2 (0%)	51	83

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	A	720	LEU
4	D	13	GLN

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	B	574/581 (99%)	559 (97%)	15 (3%)	46	76
2	A	872/885 (98%)	848 (97%)	24 (3%)	43	75
3	C	128/143 (90%)	125 (98%)	3 (2%)	50	79
4	D	42/71 (59%)	36 (86%)	6 (14%)	3	14
All	All	1616/1680 (96%)	1568 (97%)	48 (3%)	41	73

All (48) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	61	ASP
1	B	103	TYR
1	B	264	ASP
1	B	289	ASN
1	B	354	LEU
1	B	414	ASP
1	B	460	LEU
1	B	470	THR
1	B	471	ASP
1	B	472	ASN
1	B	473	HIS
1	B	474	LYS
1	B	494	ASP
1	B	550	GLN
1	B	672	ILE
2	A	807	THR
2	A	814	THR
2	A	862	VAL
2	A	916	THR
2	A	987	ILE
2	A	1326	TYR
2	A	1370	THR
2	A	1515	LYS
2	A	1516	ILE

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Mol	Chain	Res	Type
2	A	1519	VAL
2	A	1526	LYS
2	A	1546	GLU
2	A	1562	LYS
2	A	1581	LEU
2	A	1589	GLU
2	A	1601	ILE
2	A	1636	ILE
2	A	1645	ILE
2	A	1650	ARG
2	A	1651	ASP
2	A	1654	CYS
2	A	1657	CYS
2	A	1658	GLN
2	A	1664	LEU
3	C	69	THR
3	C	127	VAL
3	C	151	LEU
4	D	23	VAL
4	D	26	ARG
4	D	34	CYS
4	D	46	ASP
4	D	51	LEU
4	D	57	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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 ⓘ

2 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	$\#|Z| > 2$
5	NAG	E	1	2,5	14,14,15	0.28	0	17,19,21	0.54	0
5	NAG	E	2	5	14,14,15	0.30	0	17,19,21	0.48	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
5	NAG	E	1	2,5	-	0/6/23/26	0/1/1/1
5	NAG	E	2	5	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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 E

Bond lengths   Bond angles

Torsions   Rings
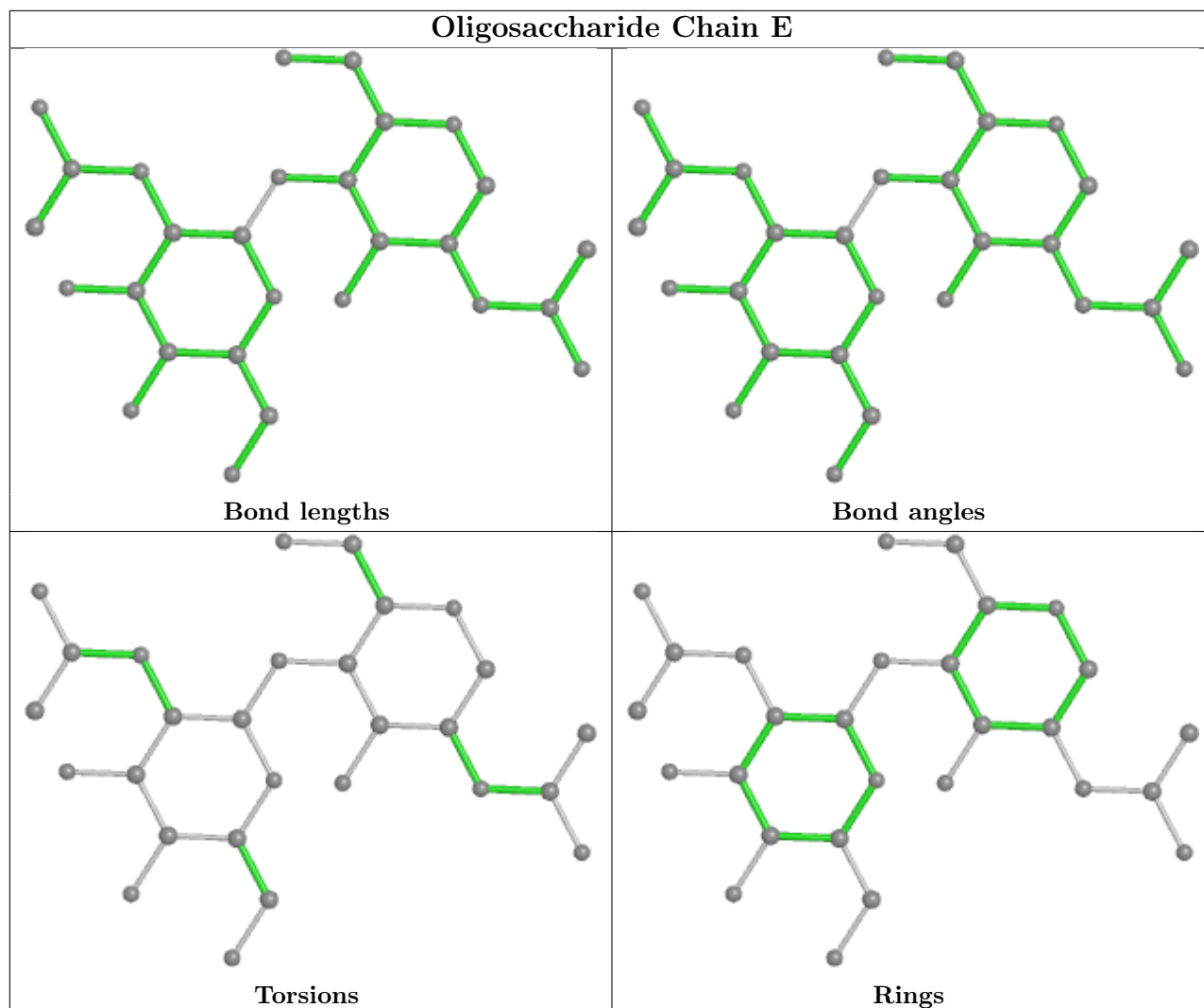
5.6 Ligand geometry ⓘ

1 ligand is modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#|Z| > 2$	Counts	RMSZ	$\#|Z| > 2$
6	CYS	A	2003	2	4,5,6	0.80	0	1,5,7	0.52	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	CYS	A	2003	2	-	1/1/4/6	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	A	2003	CYS	N-CA-CB-SG

There are no ring outliers.

No monomer is involved in short contacts.

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 ⓘ

6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	B	647/656 (98%)	0.69	36 (5%)	24	13	43, 68, 106, 155	0
2	A	981/998 (98%)	0.69	60 (6%)	21	11	39, 59, 148, 208	0
3	C	148/165 (89%)	0.32	2 (1%)	75	57	56, 78, 116, 178	0
4	D	49/80 (61%)	0.51	0	100	100	49, 69, 92, 173	0
All	All	1825/1899 (96%)	0.65	98 (5%)	25	15	39, 64, 134, 208	0

All (98) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	A	1518	LYS	14.8
2	A	1517	GLN	11.8
2	A	1588	GLY	9.4
2	A	1656	SER	5.4
1	B	96	GLN	5.3
2	A	758	LEU	5.2
2	A	1671	ILE	5.0
2	A	995	GLU	4.4
2	A	1521	GLU	4.4
2	A	1516	ILE	4.3
2	A	1623	GLU	4.3
3	C	21	GLU	4.2
2	A	1622	LYS	4.2
2	A	1621	GLY	4.1
1	B	474	LYS	4.1
2	A	1520	CYS	4.0
2	A	1541	LEU	4.0
1	B	469	TRP	3.9
2	A	1662	ALA	3.8
1	B	674	ARG	3.7
1	B	394	THR	3.7

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Mol	Chain	Res	Type	RSRZ
1	B	673	LEU	3.7
2	A	1655	SER	3.6
2	A	1514	ILE	3.4
1	B	623	VAL	3.4
1	B	97	ASN	3.3
1	B	548	GLY	3.3
2	A	996	GLY	3.1
2	A	1635	TYR	3.1
2	A	1519	VAL	3.0
1	B	413	VAL	3.0
2	A	1676	CYS	3.0
1	B	428	VAL	3.0
2	A	1515	LYS	2.9
2	A	880	SER	2.9
1	B	334	GLY	2.9
1	B	549	GLU	2.9
1	B	431	LEU	2.8
1	B	520	ASP	2.8
2	A	1271	ILE	2.8
1	B	473	HIS	2.7
2	A	1585	TYR	2.6
2	A	1164	ILE	2.6
2	A	1557	ILE	2.6
2	A	1642	LEU	2.6
2	A	1619	ILE	2.6
1	B	224	LEU	2.5
2	A	1352	PHE	2.5
1	B	368	PRO	2.5
2	A	1551	THR	2.5
2	A	1667	PHE	2.5
2	A	1524	ALA	2.5
2	A	729	THR	2.5
2	A	686	ILE	2.4
2	A	1625	LEU	2.4
2	A	741	ASN	2.4
2	A	1660	PHE	2.4
1	B	672	ILE	2.4
2	A	1627	ILE	2.3
2	A	1553	CYS	2.3
2	A	1589	GLU	2.3
2	A	1346	LEU	2.3
2	A	750	GLY	2.2

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Mol	Chain	Res	Type	RSRZ
2	A	695	VAL	2.2
2	A	1650	ARG	2.2
1	B	388	VAL	2.2
2	A	981	GLY	2.2
2	A	1653	THR	2.2
1	B	665	ASN	2.2
1	B	426	SER	2.2
2	A	1527	CYS	2.2
1	B	120	THR	2.2
1	B	164	ILE	2.2
1	B	202	LYS	2.2
1	B	118	PRO	2.2
1	B	40	VAL	2.1
2	A	1628	LYS	2.1
2	A	1300	TYR	2.1
2	A	1522	GLY	2.1
1	B	356	LEU	2.1
1	B	640	LEU	2.1
2	A	1323	LEU	2.1
1	B	171	VAL	2.1
2	A	819	VAL	2.1
2	A	728	PHE	2.1
1	B	550	GLN	2.1
2	A	888	VAL	2.1
1	B	404	LEU	2.1
1	B	476	LEU	2.1
2	A	914	LEU	2.1
2	A	997	ILE	2.0
2	A	1598	ILE	2.0
2	A	1601	ILE	2.0
1	B	655	THR	2.0
1	B	143	VAL	2.0
2	A	1209	VAL	2.0
1	B	41	ILE	2.0
3	C	91	LEU	2.0

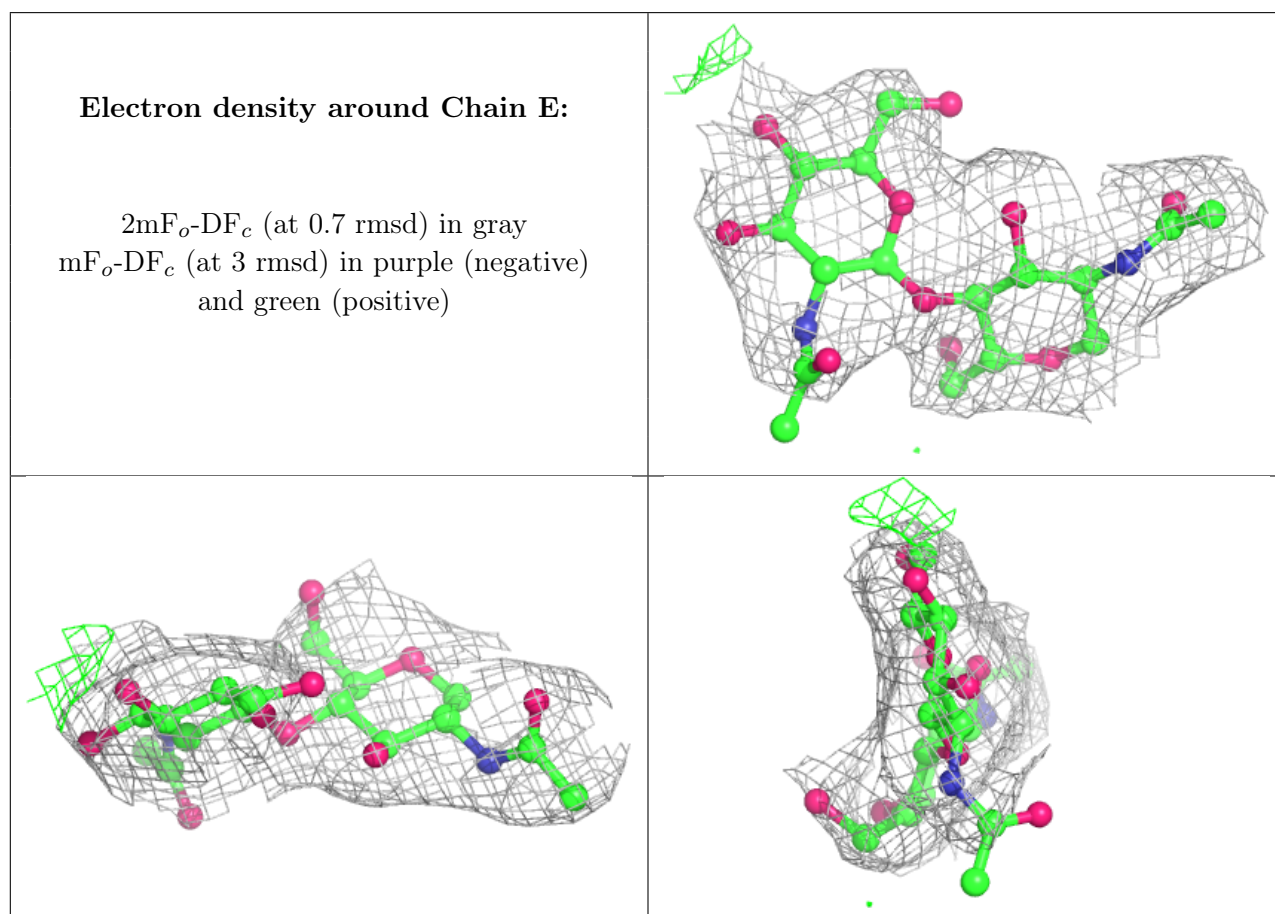## 6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

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
5	NAG	E	2	14/15	0.87	0.23	76,91,102,112	0
5	NAG	E	1	14/15	0.92	0.16	36,54,78,81	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 E:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (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
6	CYS	A	2003	6/7	0.87	0.21	85,92,98,99	0

6.5 Other polymers ⓘ

There are no such residues in this entry.