



# wwPDB X-ray Structure Validation Summary Report ⓘ

Nov 3, 2024 – 08:56 am GMT

PDB ID : 5FYK  
Title : Crystal Structure at 3.7 Å Resolution of Fully Glycosylated HIV-1 Clade B JR-FL SOSIP.664 Prefusion Env Trimer in Complex with Broadly Neutralizing Antibodies PGT122, 35O22 and VRC01  
Authors : Stewart-Jones, G.B.E.; Zhou, T.; Thomas, P.V.; Kwong, P.D.  
Deposited on : 2016-03-08  
Resolution : 3.11 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                          | : | 1.8.4, CSD as541be (2020)  |
| Xtriage (Phenix)               | : | 1.13   |
| EDS                            | : | 3.0  |
| Percentile statistics          | : | 20231227.v01 (using entries in the PDB archive December 27th 2023) |
| CCP4                           | : | 9.0.003 (Gargrove)   |
| Density-Fitness                | : | 1.0.11   |
| Ideal geometry (proteins)      | : | Engh & Huber (2001)  |
| Ideal geometry (DNA, RNA)      | : | Parkinson et al. (1996)  |
| Validation Pipeline (wwPDB-VP) | : | 2.39   |

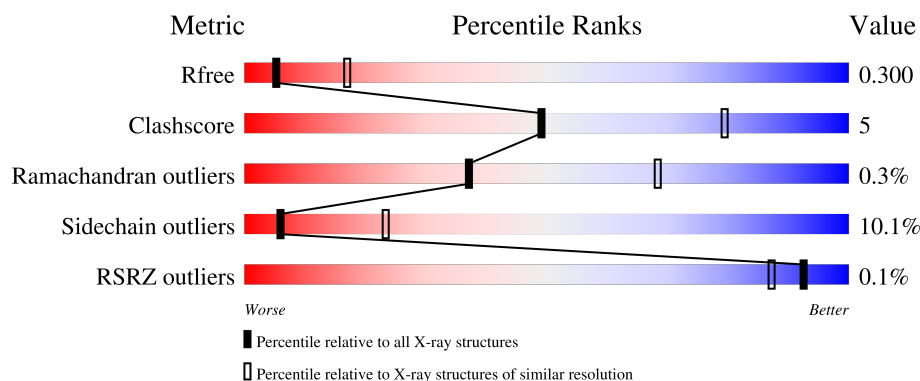
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.11 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.






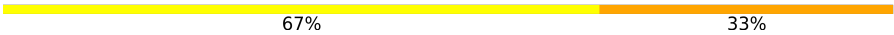
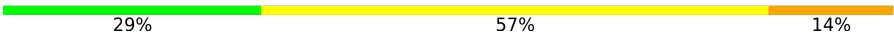
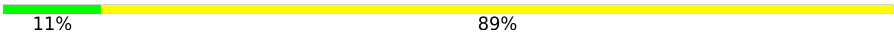
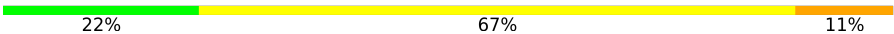
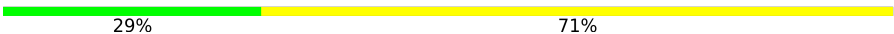
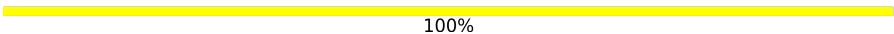
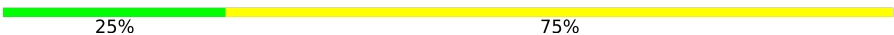
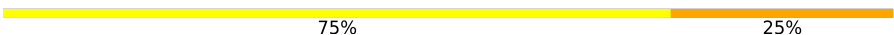
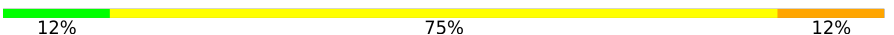
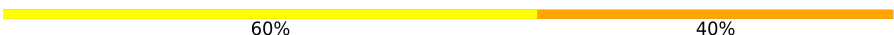
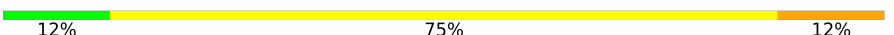





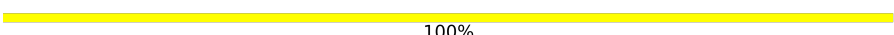



| Metric                | Whole archive<br>(#Entries) | Similar resolution<br>(#Entries, resolution range(Å)) |
|-----------------------|-----------------------------|---|
| $R_{free}$            | 164625                      | 1351 (3.10-3.10)                                      |
| Clashscore            | 180529                      | 1454 (3.10-3.10)                                      |
| Ramachandran outliers | 177936                      | 1391 (3.10-3.10)                                      |
| Sidechain outliers    | 177891                      | 1391 (3.10-3.10)                                      |
| RSRZ outliers         | 164620                      | 1351 (3.10-3.10)                                      |

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   | B     | 161    | <br>61% 27% 6% 6% |
| 2   | D     | 243    | <br>90% 10%       |
| 3   | E     | 216    | <br>81% 15% . .   |
| 4   | G     | 475    | <br>69% 23% . 5%  |
| 5   | H     | 244    | <br>82% 12% 7%    |

*Continued on next page...*

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| Mol | Chain | Length | Quality of chain   |
|-----|-------|--------|--|
| 6   | L     | 213    |    |
| 7   | U     | 240    |    |
| 7   | V     | 240    |    |
| 8   | A     | 3      |    |
| 9   | C     | 7      |    |
| 10  | F     | 9      |    |
| 10  | M     | 9      |    |
| 11  | I     | 7      |    |
| 12  | J     | 7      |    |
| 13  | K     | 4      |    |
| 13  | T     | 4      |    |
| 14  | N     | 8      |   |
| 15  | O     | 5      |  |
| 16  | P     | 8      |  |
| 17  | Q     | 10     |  |
| 18  | R     | 7      |  |
| 18  | S     | 7      |  |
| 19  | W     | 8      |  |
| 20  | X     | 6      |  |
| 21  | Y     | 2      |  |
| 21  | a     | 2      |  |
| 22  | Z     | 6      |  |
| 23  | b     | 6      |  |

## 2 Entry composition

There are 24 unique types of molecules in this entry. The entry contains 14824 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 JR-FL, GP41 ENV ECTODOMAIN.

| Mol | Chain | Residues | Atoms |     |     |     |   | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|---------|-------|
| 1   | B     | 151      | Total | C   | N   | O   | S | 0       | 0       | 0     |
|     |       |          | 1195  | 753 | 206 | 228 | 8 |         |         |       |

There are 11 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment             | Reference  |
|-------|---------|----------|--------|---------------------|------------|
| B     | 559     | PRO      | ILE    | engineered mutation | UNP Q6BC19 |
| B     | 563     | GLU      | GLN    | conflict            | UNP Q6BC19 |
| B     | 605     | CYS      | THR    | engineered mutation | UNP Q6BC19 |
| B     | 665     | GLY      | -      | expression tag      | UNP Q6BC19 |
| B     | 666     | GLY      | -      | expression tag      | UNP Q6BC19 |
| B     | 667     | LEU      | -      | expression tag      | UNP Q6BC19 |
| B     | 668     | GLU      | -      | expression tag      | UNP Q6BC19 |
| B     | 669     | VAL      | -      | expression tag      | UNP Q6BC19 |
| B     | 670     | LEU      | -      | expression tag      | UNP Q6BC19 |
| B     | 671     | PHE      | -      | expression tag      | UNP Q6BC19 |
| B     | 672     | GLN      | -      | expression tag      | UNP Q6BC19 |

- Molecule 2 is a protein called 35O22.

| Mol | Chain | Residues | Atoms |      |     |     |   | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|---------|-------|
| 2   | D     | 243      | Total | C    | N   | O   | S | 0       | 0       | 1     |
|     |       |          | 1833  | 1165 | 307 | 353 | 8 |         |         |       |

- Molecule 3 is a protein called 35O22.

| Mol | Chain | Residues | Atoms |      |     |     |   | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|---------|-------|
| 3   | E     | 213      | Total | C    | N   | O   | S | 0       | 0       | 0     |
|     |       |          | 1615  | 1012 | 267 | 328 | 8 |         |         |       |

- Molecule 4 is a protein called JR-FL, GP120 ENV ECTODOMAIN.

| Mol | Chain | Residues | Atoms |      |     |     |    | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|----|---------|---------|-------|
| 4   | G     | 451      | Total | C    | N   | O   | S  | 0       | 0       | 0     |
|     |       |          | 3571  | 2248 | 627 | 668 | 28 |         |         |       |

There are 11 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment             | Reference  |
|-------|---------|----------|--------|---------------------|------------|
| G     | 168     | LYS      | GLU    | engineered mutation | UNP Q75760 |
| G     | 430     | ILE      | VAL    | conflict            | UNP Q75760 |
| G     | 459     | CYS      | GLY    | engineered mutation | UNP Q75760 |
| G     | 501     | CYS      | ALA    | engineered mutation | UNP Q75760 |
| G     | 507     | GLY      | -      | expression tag      | UNP Q75760 |
| G     | 508     | ARG      | -      | expression tag      | UNP Q75760 |
| G     | 509     | ARG      | -      | expression tag      | UNP Q75760 |
| G     | 510     | ARG      | -      | expression tag      | UNP Q75760 |
| G     | 511     | ARG      | -      | expression tag      | UNP Q75760 |
| G     | 512     | ARG      | -      | expression tag      | UNP Q75760 |
| G     | 513     | ARG      | -      | expression tag      | UNP Q75760 |

- Molecule 5 is a protein called PGT122.

| Mol | Chain | Residues | Atoms |      |     |     |   | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|---|---------|---------|-------|
| 5   | H     | 228      | Total | C    | N   | O   | S | 0       | 0       | 0     |
|     |       |          | 1742  | 1109 | 295 | 333 | 5 |         |         |       |

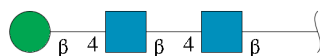
- Molecule 6 is a protein called PGT122.

| Mol | Chain | Residues | Atoms |     |     |     |   | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|---------|-------|
| 6   | L     | 210      | Total | C   | N   | O   | S | 0       | 0       | 0     |
|     |       |          | 1589  | 998 | 267 | 320 | 4 |         |         |       |

- Molecule 7 is a protein called VRC01.

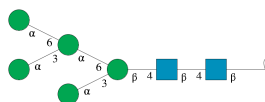
| Mol | Chain | Residues | Atoms |     |     |     |   | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|---------|-------|
| 7   | U     | 119      | Total | C   | N   | O   | S | 0       | 0       | 0     |
|     |       |          | 956   | 603 | 173 | 171 | 9 |         |         |       |
| 7   | V     | 98       | Total | C   | N   | O   | S | 0       | 0       | 0     |
|     |       |          | 758   | 479 | 130 | 147 | 2 |         |         |       |

- Molecule 8 is an oligosaccharide called beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



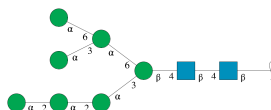
| Mol | Chain | Residues | Atoms |    |   |    | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|---------|-------|
| 8   | A     | 3        | Total | C  | N | O  | 0       | 0       | 0     |
|     |       |          | 39    | 22 | 2 | 15 |         |         |       |

- Molecule 9 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



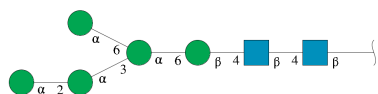
| Mol | Chain | Residues | Atoms |    |   |    | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|---------|-------|
| 9   | C     | 7        | Total | C  | N | O  | 0       | 0       | 0     |
|     |       |          | 83    | 46 | 2 | 35 |         |         |       |

- Molecule 10 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-3)]alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



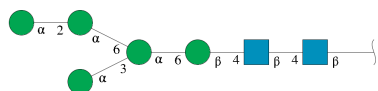
| Mol | Chain | Residues | Atoms |    |   |    | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|---------|-------|
| 10  | F     | 9        | Total | C  | N | O  | 0       | 0       | 0     |
|     |       |          | 105   | 58 | 2 | 45 |         |         |       |
| 10  | M     | 9        | Total | C  | N | O  | 0       | 0       | 0     |
|     |       |          | 105   | 58 | 2 | 45 |         |         |       |

- Molecule 11 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose-(1-6)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



| Mol | Chain | Residues | Atoms |    |   |    | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|---------|-------|
| 11  | I     | 7        | Total | C  | N | O  | 0       | 0       | 0     |
|     |       |          | 83    | 46 | 2 | 35 |         |         |       |

- Molecule 12 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]alpha-D-mannopyranose-(1-6)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



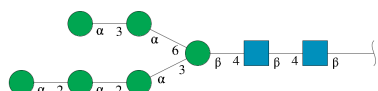
| Mol | Chain | Residues | Atoms |    |   |    | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|---------|-------|
| 12  | J     | 7        | Total | C  | N | O  | 0       | 0       | 0     |
|     |       |          | 83    | 46 | 2 | 35 |         |         |       |

- Molecule 13 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



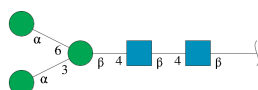
| Mol | Chain | Residues | Atoms |    |   |    | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|---------|-------|
| 13  | K     | 4        | Total | C  | N | O  | 0       | 0       | 0     |
|     |       |          | 50    | 28 | 2 | 20 |         |         |       |
| 13  | T     | 4        | Total | C  | N | O  | 0       | 0       | 0     |
|     |       |          | 50    | 28 | 2 | 20 |         |         |       |

- Molecule 14 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-3)-alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



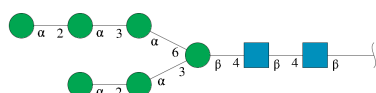
| Mol | Chain | Residues | Atoms |    |   |    | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|---------|-------|
| 14  | N     | 8        | Total | C  | N | O  | 0       | 0       | 0     |
|     |       |          | 94    | 52 | 2 | 40 |         |         |       |

- Molecule 15 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



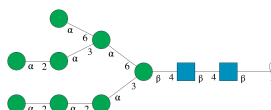
| Mol | Chain | Residues | Atoms |    |   |    | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|---------|-------|
| 15  | O     | 5        | Total | C  | N | O  | 0       | 0       | 0     |
|     |       |          | 61    | 34 | 2 | 25 |         |         |       |

- Molecule 16 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



| Mol | Chain | Residues | Atoms |    |   |    | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|---------|-------|
| 16  | P     | 8        | Total | C  | N | O  | 0       | 0       | 0     |
|     |       |          | 94    | 52 | 2 | 40 |         |         |       |

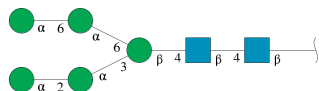
- Molecule 17 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)]alpha-D-mannopyranose-(1-6)[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



| Mol | Chain | Residues | Atoms |    |   |    | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|---------|-------|
| 17  | Q     | 10       | Total | C  | N | O  | 0       | 0       | 0     |
|     |       |          | 116   | 64 | 2 | 50 |         |         |       |

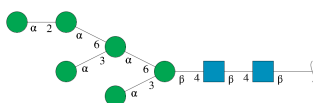


- Molecule 18 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)-alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



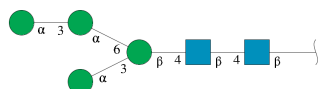
| Mol | Chain | Residues | Atoms |    |   |    | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|---------|-------|
| 18  | R     | 7        | Total | C  | N | O  | 0       | 0       | 0     |
|     |       |          | 83    | 46 | 2 | 35 |         |         |       |
| 18  | S     | 7        | Total | C  | N | O  | 0       | 0       | 0     |
|     |       |          | 83    | 46 | 2 | 35 |         |         |       |

- Molecule 19 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



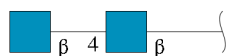
| Mol | Chain | Residues | Atoms |    |   |    | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|---------|-------|
| 19  | W     | 8        | Total | C  | N | O  | 0       | 0       | 0     |
|     |       |          | 94    | 52 | 2 | 40 |         |         |       |

- Molecule 20 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



| Mol | Chain | Residues | Atoms |    |   |    | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|---------|-------|
| 20  | X     | 6        | Total | C  | N | O  | 0       | 0       | 0     |
|     |       |          | 72    | 40 | 2 | 30 |         |         |       |

- Molecule 21 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



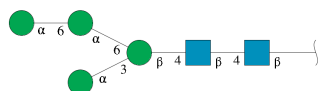
| Mol | Chain | Residues | Atoms |    |   |    | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|---------|-------|
| 21  | Y     | 2        | Total | C  | N | O  | 0       | 0       | 0     |
|     |       |          | 28    | 16 | 2 | 10 |         |         |       |
| 21  | a     | 2        | Total | C  | N | O  | 0       | 0       | 0     |
|     |       |          | 28    | 16 | 2 | 10 |         |         |       |

- Molecule 22 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-alpha-D-mannopyranose-(1-6)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



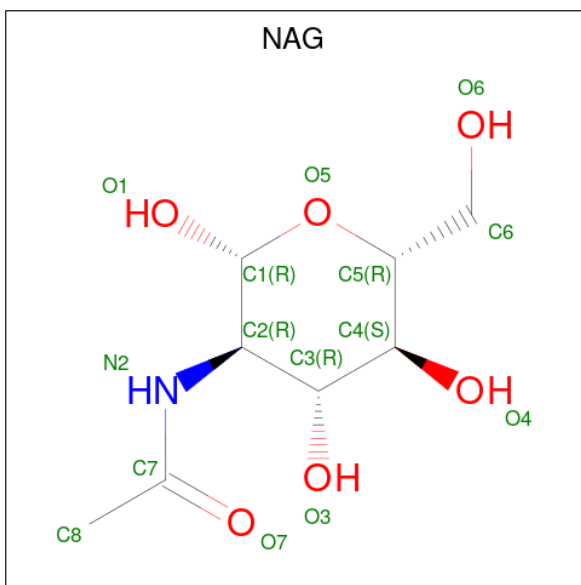
| Mol | Chain | Residues | Atoms |    |   |    | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|---------|-------|
| 22  | Z     | 6        | Total | C  | N | O  | 0       | 0       | 0     |
|     |       |          | 72    | 40 | 2 | 30 |         |         |       |

- Molecule 23 is an oligosaccharide called alpha-D-mannopyranose-(1-6)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



| Mol | Chain | Residues | Atoms |    |   |    | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|---------|-------|
| 23  | b     | 6        | Total | C  | N | O  | 0       | 0       | 0     |
|     |       |          | 72    | 40 | 2 | 30 |         |         |       |

- Molecule 24 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>).

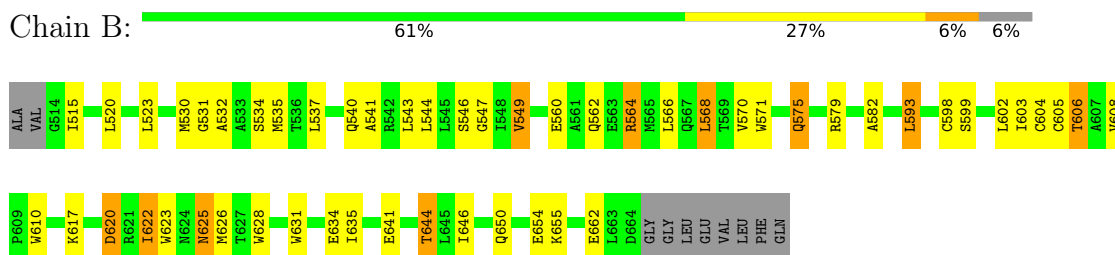


| Mol | Chain | Residues | Atoms |   |   |   | ZeroOcc | AltConf |
|-----|-------|----------|-------|---|---|---|---------|---------|
| 24  | B     | 1        | Total | C | N | O | 0       | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |         |
| 24  | B     | 1        | Total | C | N | O | 0       | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |         |
| 24  | B     | 1        | Total | C | N | O | 0       | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |         |
| 24  | G     | 1        | Total | C | N | O | 0       | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |         |
| 24  | H     | 1        | Total | C | N | O | 0       | 0       |
|     |       |          | 14    | 8 | 1 | 5 |         |         |

### 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: JR-FL, GP41 ENV ECTODOMAIN





GLU LEU ARG SER LEU THR VAL ASP THR ALA VAL TYR PHE CYS THR ARG GLY LYS ASN CYS ASP TYR ASN TRP ASP PHE GLU HIS TRP GLY ARG GLY THR PRO VAL ILE VAL GLY GLY LEU VAL PRO ARG

- Molecule 8: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain A:  67% 33%

MAG1  
MAG2  
BMA3

- Molecule 9: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain C:  29% 57% 14%

MAG1  
MAG2  
BMA3  
MAN4  
MAN5  
MAN6  
MAN7

- Molecule 10: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain F:  11% 89%

MAG1  
MAG2  
BMA3  
MAN4  
MAN5  
MAN6  
MAN7  
MAN8  
MAN9

- Molecule 10: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain M:  22% 67% 11%

MAG1  
MAG2  
BMA3  
MAN4  
MAN5  
MAN6  
MAN7  
MAN8  
MAN9

- Molecule 11: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose-(1-6)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain I:  29% 71%


MAG1  
MAG2  
BMA3  
MAN4  
MAN5  
MAN6  
MAN7

- Molecule 12: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]alpha-D-mannopyranose-(1-6)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-


## D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain J:  100%

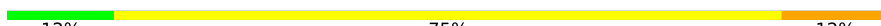
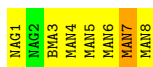
- Molecule 13: alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain K:  25%


- Molecule 13: alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain T:  75%

- Molecule 14: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-3)-alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain N:  12%


- Molecule 15: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain O:  60%

- Molecule 16: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain P:  12%

- Molecule 17:  $\alpha$ -D-mannopyranose-(1-2)- $\alpha$ -D-mannopyranose-(1-2)- $\alpha$ -D-mannopyranose-(1-3)-[ $\alpha$ -D-mannopyranose-(1-2)- $\alpha$ -D-mannopyranose-(1-3)-[ $\alpha$ -D-mannopyranose-(1-6)] $\alpha$ -D-mannopyranose-(1-6)] $\beta$ -D-mannopyranose-(1-4)-2-acetamido-2-deoxy- $\beta$ -D-glucopyranose-(1-4)-2-acetamido-2-deoxy- $\beta$ -D-glucopyranose

Chain Q: 



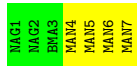
- Molecule 18:  $\alpha$ -D-mannopyranose-(1-2)- $\alpha$ -D-mannopyranose-(1-3)-[ $\alpha$ -D-mannopyranose-(1-6)- $\alpha$ -D-mannopyranose-(1-6)] $\beta$ -D-mannopyranose-(1-4)-2-acetamido-2-deoxy- $\beta$ -D-glucopyranose-(1-4)-2-acetamido-2-deoxy- $\beta$ -D-glucopyranose

Chain R: 



- Molecule 18:  $\alpha$ -D-mannopyranose-(1-2)- $\alpha$ -D-mannopyranose-(1-3)-[ $\alpha$ -D-mannopyranose-(1-6)- $\alpha$ -D-mannopyranose-(1-6)] $\beta$ -D-mannopyranose-(1-4)-2-acetamido-2-deoxy- $\beta$ -D-glucopyranose-(1-4)-2-acetamido-2-deoxy- $\beta$ -D-glucopyranose

Chain S: 

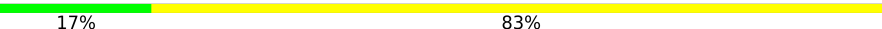


- Molecule 19:  $\alpha$ -D-mannopyranose-(1-2)- $\alpha$ -D-mannopyranose-(1-6)-[ $\alpha$ -D-mannopyranose-(1-3)] $\alpha$ -D-mannopyranose-(1-6)-[ $\alpha$ -D-mannopyranose-(1-3)] $\beta$ -D-mannopyranose-(1-4)-2-acetamido-2-deoxy- $\beta$ -D-glucopyranose-(1-4)-2-acetamido-2-deoxy- $\beta$ -D-glucopyranose

Chain W: 



- Molecule 20:  $\alpha$ -D-mannopyranose-(1-3)- $\alpha$ -D-mannopyranose-(1-6)-[ $\alpha$ -D-mannopyranose-(1-3)] $\beta$ -D-mannopyranose-(1-4)-2-acetamido-2-deoxy- $\beta$ -D-glucopyranose-(1-4)-2-acetamido-2-deoxy- $\beta$ -D-glucopyranose

Chain X: 



- Molecule 21: 2-acetamido-2-deoxy- $\beta$ -D-glucopyranose-(1-4)-2-acetamido-2-deoxy- $\beta$ -D-glucopyranose



Chain Y:  100%

MAG1  
MAG2

- Molecule 21: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain a:  50% 50%


MAG1  
MAG2

- Molecule 22: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-alpha-D-mannopyranose-(1-6)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain Z:  33% 67%

MAG1  
MAG2  
BMA3  
MAN4  
MAN5  
MAN6

- Molecule 23: alpha-D-mannopyranose-(1-6)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain b:  17% 83%

MAG1  
MAG2  
BMA3  
MAN4  
MAN5  
MAN6

## 4 Data and refinement statistics

| Property  | Value   | Source           |
|---|---|------------------|
| Space group   | P 63  | Depositor        |
| Cell constants<br>a, b, c, $\alpha$ , $\beta$ , $\gamma$                | 130.78Å 130.78Å 314.62Å<br>90.00° 90.00° 120.00°            | Depositor        |
| Resolution (Å)  | 42.81 – 3.11<br>42.81 – 3.11                                | Depositor<br>EDS |
| % Data completeness<br>(in resolution range)                            | 58.3 (42.81-3.11)<br>58.6 (42.81-3.11)                      | Depositor<br>EDS |
| $R_{merge}$   | 0.07  | Depositor        |
| $R_{sym}$   | (Not available)   | Depositor        |
| $\langle I/\sigma(I) \rangle$ <sup>1</sup>                              | 2.04 (at 3.12Å)   | Xtriage          |
| Refinement program  | PHENIX (PHENIX.REFINE: 1.9_1692)                            | Depositor        |
| R, $R_{free}$   | 0.246 , 0.303<br>0.248 , 0.300                              | Depositor<br>DCC |
| $R_{free}$ test set   | 1583 reflections (4.97%)                                    | wwPDB-VP         |
| Wilson B-factor (Å <sup>2</sup> )                                       | 93.3  | Xtriage          |
| Anisotropy  | 0.087   | Xtriage          |
| Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> ) | 0.24 , 142.5  | EDS              |
| L-test for twinning <sup>2</sup>  | $\langle  L  \rangle = 0.43$ , $\langle L^2 \rangle = 0.26$ | Xtriage          |
| Estimated twinning fraction   | 0.146 for h,-h-k,-l   | Xtriage          |
| $F_o, F_c$ correlation  | 0.92  | EDS              |
| Total number of atoms   | 14824   | wwPDB-VP         |
| Average B, all atoms (Å <sup>2</sup> )                                  | 162.0   | wwPDB-VP         |

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.31% 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, MAN, BMA

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     | 0.29         | 0/1215  | 0.50        | 0/1647         |
| 2   | D     | 0.25         | 0/1881  | 0.43        | 0/2562         |
| 3   | E     | 0.26         | 0/1658  | 0.48        | 0/2266         |
| 4   | G     | 0.29         | 0/3645  | 0.47        | 0/4946         |
| 5   | H     | 0.24         | 0/1789  | 0.47        | 0/2443         |
| 6   | L     | 0.26         | 0/1632  | 0.47        | 0/2236         |
| 7   | U     | 0.22         | 0/981   | 0.40        | 0/1328         |
| 7   | V     | 0.31         | 0/778   | 0.57        | 1/1058 (0.1%)  |
| All | All   | 0.27         | 0/13579 | 0.47        | 1/18486 (0.0%) |

There are no bond length outliers.

All (1) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms     | Z    | Observed(°) | Ideal(°) |
|-----|-------|-----|------|-----------|------|-------------|----------|
| 7   | V     | 11  | LEU  | CB-CG-CD1 | 5.30 | 120.02      | 111.00   |

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 1   | B     | 1195  | 0        | 1176     | 30      | 0            |
| 2   | D     | 1833  | 0        | 1806     | 7       | 0            |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 3   | E     | 1615  | 0        | 1541     | 21      | 0            |
| 4   | G     | 3571  | 0        | 3513     | 60      | 0            |
| 5   | H     | 1742  | 0        | 1715     | 11      | 0            |
| 6   | L     | 1589  | 0        | 1530     | 18      | 0            |
| 7   | U     | 956   | 0        | 928      | 6       | 0            |
| 7   | V     | 758   | 0        | 719      | 4       | 0            |
| 8   | A     | 39    | 0        | 34       | 1       | 0            |
| 9   | C     | 83    | 0        | 70       | 2       | 0            |
| 10  | F     | 105   | 0        | 88       | 0       | 0            |
| 10  | M     | 105   | 0        | 88       | 1       | 0            |
| 11  | I     | 83    | 0        | 70       | 0       | 0            |
| 12  | J     | 83    | 0        | 70       | 0       | 0            |
| 13  | K     | 50    | 0        | 43       | 1       | 0            |
| 13  | T     | 50    | 0        | 43       | 1       | 0            |
| 14  | N     | 94    | 0        | 79       | 1       | 0            |
| 15  | O     | 61    | 0        | 52       | 2       | 0            |
| 16  | P     | 94    | 0        | 79       | 2       | 0            |
| 17  | Q     | 116   | 0        | 97       | 1       | 0            |
| 18  | R     | 83    | 0        | 70       | 4       | 0            |
| 18  | S     | 83    | 0        | 70       | 0       | 0            |
| 19  | W     | 94    | 0        | 79       | 0       | 0            |
| 20  | X     | 72    | 0        | 61       | 0       | 0            |
| 21  | Y     | 28    | 0        | 25       | 2       | 0            |
| 21  | a     | 28    | 0        | 25       | 0       | 0            |
| 22  | Z     | 72    | 0        | 61       | 0       | 0            |
| 23  | b     | 72    | 0        | 61       | 0       | 0            |
| 24  | B     | 42    | 0        | 39       | 1       | 0            |
| 24  | G     | 14    | 0        | 13       | 0       | 0            |
| 24  | H     | 14    | 0        | 13       | 0       | 0            |
| All | All   | 14824 | 0        | 14258    | 155     | 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 5.

The worst 5 of 155 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) |
|------------------|-------------------|--------------------------|-------------------|
| 3:E:50:GLU:HB2   | 3:E:53:GLU:HB2    | 1.60                     | 0.83              |
| 6:L:106:VAL:HG13 | 6:L:109:GLN:HE21  | 1.49                     | 0.76              |
| 1:B:546:SER:HA   | 1:B:549:VAL:HG22  | 1.72                     | 0.71              |
| 1:B:617:LYS:HA   | 24:B:1668:NAG:H82 | 1.73                     | 0.71              |

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| Atom-1        | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|---------------|-----------------|--------------------------|-------------------|
| 6:L:106:VAL:O | 6:L:109:GLN:NE2 | 2.28                     | 0.66              |

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     | 149/161 (92%)   | 135 (91%)  | 14 (9%)   | 0        | 100         | 100 |
| 2   | D     | 241/243 (99%)   | 217 (90%)  | 24 (10%)  | 0        | 100         | 100 |
| 3   | E     | 209/216 (97%)   | 188 (90%)  | 19 (9%)   | 2 (1%)   | 13          | 42  |
| 4   | G     | 445/475 (94%)   | 397 (89%)  | 45 (10%)  | 3 (1%)   | 19          | 51  |
| 5   | H     | 224/244 (92%)   | 202 (90%)  | 22 (10%)  | 0        | 100         | 100 |
| 6   | L     | 208/213 (98%)   | 191 (92%)  | 17 (8%)   | 0        | 100         | 100 |
| 7   | U     | 117/240 (49%)   | 105 (90%)  | 12 (10%)  | 0        | 100         | 100 |
| 7   | V     | 96/240 (40%)    | 81 (84%)   | 15 (16%)  | 0        | 100         | 100 |
| All | All   | 1689/2032 (83%) | 1516 (90%) | 168 (10%) | 5 (0%)   | 37          | 68  |

All (5) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 3   | E     | 187 | SER  |
| 4   | G     | 313 | PRO  |
| 4   | G     | 188 | ASN  |
| 3   | E     | 208 | PRO  |
| 4   | G     | 65  | VAL  |

### 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   | B     | 127/134 (95%)   | 104 (82%)  | 23 (18%)  | 1           | 6  |
| 2   | D     | 205/206 (100%)  | 192 (94%)  | 13 (6%)   | 15          | 42 |
| 3   | E     | 186/189 (98%)   | 171 (92%)  | 15 (8%)   | 9           | 33 |
| 4   | G     | 406/427 (95%)   | 354 (87%)  | 52 (13%)  | 3           | 15 |
| 5   | H     | 198/213 (93%)   | 186 (94%)  | 12 (6%)   | 15          | 43 |
| 6   | L     | 178/181 (98%)   | 161 (90%)  | 17 (10%)  | 7           | 26 |
| 7   | U     | 102/192 (53%)   | 92 (90%)   | 10 (10%)  | 6           | 25 |
| 7   | V     | 81/192 (42%)    | 73 (90%)   | 8 (10%)   | 6           | 24 |
| All | All   | 1483/1734 (86%) | 1333 (90%) | 150 (10%) | 6           | 23 |

5 of 150 residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 6   | L     | 9   | PHE  |
| 7   | V     | 25  | THR  |
| 6   | L     | 52  | ASN  |
| 6   | L     | 203 | VAL  |
| 3   | E     | 177 | TYR  |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 4   | G     | 188 | ASN  |
| 6   | L     | 109 | GLN  |

### 5.3.3 RNA [i](#)

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 ⓘ

125 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$ |
| 8   | NAG  | A     | 1   | 8,1  | 14,14,15     | 0.39 | 0           | 17,19,21    | 0.47 | 0           |
| 8   | NAG  | A     | 2   | 8    | 14,14,15     | 0.42 | 0           | 17,19,21    | 1.16 | 3 (17%)     |
| 8   | BMA  | A     | 3   | 8    | 11,11,12     | 1.09 | 1 (9%)      | 15,15,17    | 1.33 | 3 (20%)     |
| 9   | NAG  | C     | 1   | 9,4  | 14,14,15     | 0.44 | 0           | 17,19,21    | 0.48 | 0           |
| 9   | NAG  | C     | 2   | 9    | 14,14,15     | 0.29 | 0           | 17,19,21    | 0.43 | 0           |
| 9   | BMA  | C     | 3   | 9    | 11,11,12     | 0.49 | 0           | 15,15,17    | 0.83 | 0           |
| 9   | MAN  | C     | 4   | 9    | 11,11,12     | 0.59 | 0           | 15,15,17    | 1.16 | 1 (6%)      |
| 9   | MAN  | C     | 5   | 9    | 11,11,12     | 0.79 | 0           | 15,15,17    | 0.94 | 1 (6%)      |
| 9   | MAN  | C     | 6   | 9    | 11,11,12     | 0.60 | 0           | 15,15,17    | 1.10 | 2 (13%)     |
| 9   | MAN  | C     | 7   | 9    | 11,11,12     | 0.94 | 1 (9%)      | 15,15,17    | 0.88 | 1 (6%)      |
| 10  | NAG  | F     | 1   | 4,10 | 14,14,15     | 0.44 | 0           | 17,19,21    | 0.53 | 0           |
| 10  | NAG  | F     | 2   | 10   | 14,14,15     | 0.39 | 0           | 17,19,21    | 0.81 | 1 (5%)      |
| 10  | BMA  | F     | 3   | 10   | 11,11,12     | 1.11 | 0           | 15,15,17    | 1.19 | 2 (13%)     |
| 10  | MAN  | F     | 4   | 10   | 11,11,12     | 0.63 | 0           | 15,15,17    | 1.06 | 2 (13%)     |
| 10  | MAN  | F     | 5   | 10   | 11,11,12     | 0.84 | 0           | 15,15,17    | 1.47 | 2 (13%)     |
| 10  | MAN  | F     | 6   | 10   | 11,11,12     | 0.66 | 0           | 15,15,17    | 0.96 | 2 (13%)     |
| 10  | MAN  | F     | 7   | 10   | 11,11,12     | 0.93 | 1 (9%)      | 15,15,17    | 1.31 | 3 (20%)     |
| 10  | MAN  | F     | 8   | 10   | 11,11,12     | 0.76 | 0           | 15,15,17    | 0.92 | 1 (6%)      |
| 10  | MAN  | F     | 9   | 10   | 11,11,12     | 0.61 | 0           | 15,15,17    | 0.96 | 2 (13%)     |
| 11  | NAG  | I     | 1   | 4,11 | 14,14,15     | 0.32 | 0           | 17,19,21    | 0.86 | 1 (5%)      |
| 11  | NAG  | I     | 2   | 11   | 14,14,15     | 0.27 | 0           | 17,19,21    | 0.64 | 0           |
| 11  | BMA  | I     | 3   | 11   | 11,11,12     | 0.67 | 0           | 15,15,17    | 0.81 | 0           |
| 11  | MAN  | I     | 4   | 11   | 11,11,12     | 0.90 | 0           | 15,15,17    | 1.63 | 3 (20%)     |

| Mol | Type | Chain | Res | Link | Bond lengths |      |          | Bond angles |      |          |
|-----|------|-------|-----|------|--------------|------|----------|-------------|------|----------|
|     |      |       |     |      | Counts       | RMSZ | # Z  > 2 | Counts      | RMSZ | # Z  > 2 |
| 11  | MAN  | I     | 5   | 11   | 11,11,12     | 0.83 | 0        | 15,15,17    | 0.93 | 1 (6%)   |
| 11  | MAN  | I     | 6   | 11   | 11,11,12     | 0.97 | 1 (9%)   | 15,15,17    | 1.58 | 2 (13%)  |
| 11  | MAN  | I     | 7   | 11   | 11,11,12     | 0.72 | 0        | 15,15,17    | 0.93 | 1 (6%)   |
| 12  | NAG  | J     | 1   | 12,4 | 14,14,15     | 0.88 | 1 (7%)   | 17,19,21    | 0.71 | 0        |
| 12  | NAG  | J     | 2   | 12   | 14,14,15     | 0.39 | 0        | 17,19,21    | 0.95 | 2 (11%)  |
| 12  | BMA  | J     | 3   | 12   | 11,11,12     | 0.50 | 0        | 15,15,17    | 0.98 | 1 (6%)   |
| 12  | MAN  | J     | 4   | 12   | 11,11,12     | 0.81 | 0        | 15,15,17    | 1.03 | 2 (13%)  |
| 12  | MAN  | J     | 5   | 12   | 11,11,12     | 0.60 | 0        | 15,15,17    | 1.05 | 2 (13%)  |
| 12  | MAN  | J     | 6   | 12   | 11,11,12     | 0.67 | 0        | 15,15,17    | 1.02 | 2 (13%)  |
| 12  | MAN  | J     | 7   | 12   | 11,11,12     | 0.70 | 0        | 15,15,17    | 1.18 | 2 (13%)  |
| 13  | NAG  | K     | 1   | 13,4 | 14,14,15     | 0.36 | 0        | 17,19,21    | 0.39 | 0        |
| 13  | NAG  | K     | 2   | 13   | 14,14,15     | 0.19 | 0        | 17,19,21    | 0.47 | 0        |
| 13  | BMA  | K     | 3   | 13   | 11,11,12     | 0.62 | 0        | 15,15,17    | 0.71 | 0        |
| 13  | MAN  | K     | 4   | 13   | 11,11,12     | 0.66 | 0        | 15,15,17    | 0.91 | 2 (13%)  |
| 10  | NAG  | M     | 1   | 4,10 | 14,14,15     | 0.23 | 0        | 17,19,21    | 0.59 | 0        |
| 10  | NAG  | M     | 2   | 10   | 14,14,15     | 0.34 | 0        | 17,19,21    | 0.52 | 0        |
| 10  | BMA  | M     | 3   | 10   | 11,11,12     | 0.63 | 0        | 15,15,17    | 0.73 | 0        |
| 10  | MAN  | M     | 4   | 10   | 11,11,12     | 0.63 | 0        | 15,15,17    | 1.19 | 1 (6%)   |
| 10  | MAN  | M     | 5   | 10   | 11,11,12     | 0.81 | 1 (9%)   | 15,15,17    | 1.42 | 1 (6%)   |
| 10  | MAN  | M     | 6   | 10   | 11,11,12     | 0.90 | 1 (9%)   | 15,15,17    | 0.99 | 1 (6%)   |
| 10  | MAN  | M     | 7   | 10   | 11,11,12     | 1.04 | 0        | 15,15,17    | 1.43 | 2 (13%)  |
| 10  | MAN  | M     | 8   | 10   | 11,11,12     | 0.72 | 0        | 15,15,17    | 1.02 | 2 (13%)  |
| 10  | MAN  | M     | 9   | 10   | 11,11,12     | 0.71 | 0        | 15,15,17    | 1.03 | 2 (13%)  |
| 14  | NAG  | N     | 1   | 4,14 | 14,14,15     | 0.60 | 1 (7%)   | 17,19,21    | 0.69 | 0        |
| 14  | NAG  | N     | 2   | 14   | 14,14,15     | 0.20 | 0        | 17,19,21    | 0.83 | 0        |
| 14  | BMA  | N     | 3   | 14   | 11,11,12     | 1.25 | 1 (9%)   | 15,15,17    | 1.83 | 3 (20%)  |
| 14  | MAN  | N     | 4   | 14   | 11,11,12     | 0.72 | 0        | 15,15,17    | 0.96 | 1 (6%)   |
| 14  | MAN  | N     | 5   | 14   | 11,11,12     | 0.90 | 1 (9%)   | 15,15,17    | 1.14 | 1 (6%)   |
| 14  | MAN  | N     | 6   | 14   | 11,11,12     | 0.72 | 0        | 15,15,17    | 0.93 | 2 (13%)  |
| 14  | MAN  | N     | 7   | 14   | 11,11,12     | 1.27 | 2 (18%)  | 15,15,17    | 1.19 | 2 (13%)  |
| 14  | MAN  | N     | 8   | 14   | 11,11,12     | 0.66 | 0        | 15,15,17    | 1.31 | 2 (13%)  |
| 15  | NAG  | O     | 1   | 15,4 | 14,14,15     | 0.40 | 0        | 17,19,21    | 0.50 | 0        |
| 15  | NAG  | O     | 2   | 15   | 14,14,15     | 0.23 | 0        | 17,19,21    | 0.53 | 0        |
| 15  | BMA  | O     | 3   | 15   | 11,11,12     | 1.44 | 1 (9%)   | 15,15,17    | 1.02 | 1 (6%)   |
| 15  | MAN  | O     | 4   | 15   | 11,11,12     | 0.77 | 1 (9%)   | 15,15,17    | 1.06 | 2 (13%)  |
| 15  | MAN  | O     | 5   | 15   | 11,11,12     | 0.83 | 1 (9%)   | 15,15,17    | 1.13 | 2 (13%)  |



| Mol | Type | Chain | Res | Link | Bond lengths |      |          | Bond angles |      |          |
|-----|------|-------|-----|------|--------------|------|----------|-------------|------|----------|
|     |      |       |     |      | Counts       | RMSZ | # Z  > 2 | Counts      | RMSZ | # Z  > 2 |
| 16  | NAG  | P     | 1   | 16,4 | 14,14,15     | 0.65 | 1 (7%)   | 17,19,21    | 0.84 | 1 (5%)   |
| 16  | NAG  | P     | 2   | 16   | 14,14,15     | 0.29 | 0        | 17,19,21    | 0.64 | 0        |
| 16  | BMA  | P     | 3   | 16   | 11,11,12     | 0.92 | 1 (9%)   | 15,15,17    | 1.11 | 1 (6%)   |
| 16  | MAN  | P     | 4   | 16   | 11,11,12     | 1.22 | 1 (9%)   | 15,15,17    | 1.12 | 0        |
| 16  | MAN  | P     | 5   | 16   | 11,11,12     | 1.77 | 4 (36%)  | 15,15,17    | 1.20 | 2 (13%)  |
| 16  | MAN  | P     | 6   | 16   | 11,11,12     | 0.76 | 0        | 15,15,17    | 1.01 | 1 (6%)   |
| 16  | MAN  | P     | 7   | 16   | 11,11,12     | 0.72 | 0        | 15,15,17    | 1.32 | 2 (13%)  |
| 16  | MAN  | P     | 8   | 16   | 11,11,12     | 0.89 | 0        | 15,15,17    | 1.01 | 1 (6%)   |
| 17  | NAG  | Q     | 1   | 4,17 | 14,14,15     | 0.32 | 0        | 17,19,21    | 0.48 | 0        |
| 17  | MAN  | Q     | 10  | 17   | 11,11,12     | 0.68 | 0        | 15,15,17    | 1.05 | 2 (13%)  |
| 17  | NAG  | Q     | 2   | 17   | 14,14,15     | 0.21 | 0        | 17,19,21    | 0.71 | 0        |
| 17  | BMA  | Q     | 3   | 17   | 11,11,12     | 0.93 | 1 (9%)   | 15,15,17    | 0.88 | 0        |
| 17  | MAN  | Q     | 4   | 17   | 11,11,12     | 0.73 | 1 (9%)   | 15,15,17    | 1.38 | 2 (13%)  |
| 17  | MAN  | Q     | 5   | 17   | 11,11,12     | 0.67 | 0        | 15,15,17    | 0.93 | 2 (13%)  |
| 17  | MAN  | Q     | 6   | 17   | 11,11,12     | 0.73 | 0        | 15,15,17    | 1.04 | 2 (13%)  |
| 17  | MAN  | Q     | 7   | 17   | 11,11,12     | 0.68 | 0        | 15,15,17    | 1.08 | 2 (13%)  |
| 17  | MAN  | Q     | 8   | 17   | 11,11,12     | 0.68 | 0        | 15,15,17    | 1.10 | 2 (13%)  |
| 17  | MAN  | Q     | 9   | 17   | 11,11,12     | 0.66 | 0        | 15,15,17    | 0.92 | 2 (13%)  |
| 18  | NAG  | R     | 1   | 18,4 | 14,14,15     | 0.75 | 1 (7%)   | 17,19,21    | 0.78 | 0        |
| 18  | NAG  | R     | 2   | 18   | 14,14,15     | 0.19 | 0        | 17,19,21    | 0.37 | 0        |
| 18  | BMA  | R     | 3   | 18   | 11,11,12     | 0.94 | 1 (9%)   | 15,15,17    | 1.19 | 1 (6%)   |
| 18  | MAN  | R     | 4   | 18   | 11,11,12     | 1.38 | 2 (18%)  | 15,15,17    | 1.88 | 2 (13%)  |
| 18  | MAN  | R     | 5   | 18   | 11,11,12     | 0.88 | 1 (9%)   | 15,15,17    | 1.08 | 2 (13%)  |
| 18  | MAN  | R     | 6   | 18   | 11,11,12     | 0.60 | 0        | 15,15,17    | 1.23 | 2 (13%)  |
| 18  | MAN  | R     | 7   | 18   | 11,11,12     | 0.72 | 0        | 15,15,17    | 1.13 | 2 (13%)  |
| 18  | NAG  | S     | 1   | 18,4 | 14,14,15     | 0.24 | 0        | 17,19,21    | 0.39 | 0        |
| 18  | NAG  | S     | 2   | 18   | 14,14,15     | 0.28 | 0        | 17,19,21    | 0.74 | 0        |
| 18  | BMA  | S     | 3   | 18   | 11,11,12     | 0.82 | 0        | 15,15,17    | 0.97 | 0        |
| 18  | MAN  | S     | 4   | 18   | 11,11,12     | 0.64 | 0        | 15,15,17    | 1.08 | 2 (13%)  |
| 18  | MAN  | S     | 5   | 18   | 11,11,12     | 0.75 | 0        | 15,15,17    | 1.06 | 2 (13%)  |
| 18  | MAN  | S     | 6   | 18   | 11,11,12     | 0.51 | 0        | 15,15,17    | 1.03 | 2 (13%)  |
| 18  | MAN  | S     | 7   | 18   | 11,11,12     | 0.69 | 0        | 15,15,17    | 1.00 | 2 (13%)  |
| 13  | NAG  | T     | 1   | 13,4 | 14,14,15     | 0.38 | 0        | 17,19,21    | 0.84 | 2 (11%)  |
| 13  | NAG  | T     | 2   | 13   | 14,14,15     | 0.47 | 0        | 17,19,21    | 0.79 | 1 (5%)   |
| 13  | BMA  | T     | 3   | 13   | 11,11,12     | 1.04 | 1 (9%)   | 15,15,17    | 1.03 | 1 (6%)   |
| 13  | MAN  | T     | 4   | 13   | 11,11,12     | 0.74 | 0        | 15,15,17    | 1.29 | 2 (13%)  |

| Mol | Type | Chain | Res | Link | Bond lengths |      |          | Bond angles |      |          |
|-----|------|-------|-----|------|--------------|------|----------|-------------|------|----------|
|     |      |       |     |      | Counts       | RMSZ | # Z  > 2 | Counts      | RMSZ | # Z  > 2 |
| 19  | NAG  | W     | 1   | 4,19 | 14,14,15     | 0.34 | 0        | 17,19,21    | 0.67 | 0        |
| 19  | NAG  | W     | 2   | 19   | 14,14,15     | 0.57 | 0        | 17,19,21    | 0.73 | 1 (5%)   |
| 19  | BMA  | W     | 3   | 19   | 11,11,12     | 0.68 | 0        | 15,15,17    | 0.85 | 0        |
| 19  | MAN  | W     | 4   | 19   | 11,11,12     | 0.89 | 0        | 15,15,17    | 1.20 | 2 (13%)  |
| 19  | MAN  | W     | 5   | 19   | 11,11,12     | 0.71 | 0        | 15,15,17    | 1.18 | 2 (13%)  |
| 19  | MAN  | W     | 6   | 19   | 11,11,12     | 0.73 | 0        | 15,15,17    | 0.96 | 2 (13%)  |
| 19  | MAN  | W     | 7   | 19   | 11,11,12     | 0.67 | 0        | 15,15,17    | 0.91 | 1 (6%)   |
| 19  | MAN  | W     | 8   | 19   | 11,11,12     | 0.78 | 1 (9%)   | 15,15,17    | 1.23 | 2 (13%)  |
| 20  | NAG  | X     | 1   | 20,4 | 14,14,15     | 0.39 | 0        | 17,19,21    | 0.53 | 0        |
| 20  | NAG  | X     | 2   | 20   | 14,14,15     | 0.43 | 0        | 17,19,21    | 1.41 | 2 (11%)  |
| 20  | BMA  | X     | 3   | 20   | 11,11,12     | 0.95 | 0        | 15,15,17    | 1.46 | 1 (6%)   |
| 20  | MAN  | X     | 4   | 20   | 11,11,12     | 0.66 | 0        | 15,15,17    | 1.17 | 2 (13%)  |
| 20  | MAN  | X     | 5   | 20   | 11,11,12     | 0.70 | 0        | 15,15,17    | 0.93 | 2 (13%)  |
| 20  | MAN  | X     | 6   | 20   | 11,11,12     | 0.84 | 0        | 15,15,17    | 0.94 | 1 (6%)   |
| 21  | NAG  | Y     | 1   | 4,21 | 14,14,15     | 0.26 | 0        | 17,19,21    | 0.44 | 0        |
| 21  | NAG  | Y     | 2   | 21   | 14,14,15     | 0.27 | 0        | 17,19,21    | 0.40 | 0        |
| 22  | NAG  | Z     | 1   | 22,4 | 14,14,15     | 0.29 | 0        | 17,19,21    | 0.43 | 0        |
| 22  | NAG  | Z     | 2   | 22   | 14,14,15     | 0.26 | 0        | 17,19,21    | 0.46 | 0        |
| 22  | BMA  | Z     | 3   | 22   | 11,11,12     | 0.97 | 1 (9%)   | 15,15,17    | 1.22 | 2 (13%)  |
| 22  | MAN  | Z     | 4   | 22   | 11,11,12     | 0.73 | 0        | 15,15,17    | 1.45 | 2 (13%)  |
| 22  | MAN  | Z     | 5   | 22   | 11,11,12     | 1.91 | 4 (36%)  | 15,15,17    | 1.17 | 2 (13%)  |
| 22  | MAN  | Z     | 6   | 22   | 11,11,12     | 0.70 | 0        | 15,15,17    | 1.10 | 2 (13%)  |
| 21  | NAG  | a     | 1   | 4,21 | 14,14,15     | 0.73 | 1 (7%)   | 17,19,21    | 0.71 | 0        |
| 21  | NAG  | a     | 2   | 21   | 14,14,15     | 0.38 | 0        | 17,19,21    | 0.60 | 0        |
| 23  | NAG  | b     | 1   | 23,7 | 14,14,15     | 0.44 | 0        | 17,19,21    | 0.59 | 0        |
| 23  | NAG  | b     | 2   | 23   | 14,14,15     | 0.53 | 0        | 17,19,21    | 1.29 | 2 (11%)  |
| 23  | BMA  | b     | 3   | 23   | 11,11,12     | 0.55 | 0        | 15,15,17    | 1.34 | 2 (13%)  |
| 23  | MAN  | b     | 4   | 23   | 11,11,12     | 0.97 | 1 (9%)   | 15,15,17    | 1.39 | 3 (20%)  |
| 23  | MAN  | b     | 5   | 23   | 11,11,12     | 1.00 | 1 (9%)   | 15,15,17    | 0.84 | 1 (6%)   |
| 23  | MAN  | b     | 6   | 23   | 11,11,12     | 0.90 | 1 (9%)   | 15,15,17    | 1.60 | 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   |
|-----|------|-------|-----|------|---------|-----------|---------|
| 8   | NAG  | A     | 1   | 8,1  | -       | 0/6/23/26 | 0/1/1/1 |

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| Mol | Type | Chain | Res | Link | Chirals | Torsions  | Rings   |
|-----|------|-------|-----|------|---------|-----------|---------|
| 8   | NAG  | A     | 2   | 8    | -       | 0/6/23/26 | 0/1/1/1 |
| 8   | BMA  | A     | 3   | 8    | -       | 2/2/19/22 | 0/1/1/1 |
| 9   | NAG  | C     | 1   | 9,4  | -       | 2/6/23/26 | 0/1/1/1 |
| 9   | NAG  | C     | 2   | 9    | -       | 0/6/23/26 | 0/1/1/1 |
| 9   | BMA  | C     | 3   | 9    | -       | 2/2/19/22 | 0/1/1/1 |
| 9   | MAN  | C     | 4   | 9    | -       | 2/2/19/22 | 0/1/1/1 |
| 9   | MAN  | C     | 5   | 9    | -       | 0/2/19/22 | 0/1/1/1 |
| 9   | MAN  | C     | 6   | 9    | -       | 2/2/19/22 | 0/1/1/1 |
| 9   | MAN  | C     | 7   | 9    | -       | 2/2/19/22 | 0/1/1/1 |
| 10  | NAG  | F     | 1   | 4,10 | -       | 2/6/23/26 | 0/1/1/1 |
| 10  | NAG  | F     | 2   | 10   | -       | 2/6/23/26 | 0/1/1/1 |
| 10  | BMA  | F     | 3   | 10   | -       | 1/2/19/22 | 0/1/1/1 |
| 10  | MAN  | F     | 4   | 10   | -       | 0/2/19/22 | 0/1/1/1 |
| 10  | MAN  | F     | 5   | 10   | -       | 0/2/19/22 | 0/1/1/1 |
| 10  | MAN  | F     | 6   | 10   | -       | 0/2/19/22 | 0/1/1/1 |
| 10  | MAN  | F     | 7   | 10   | -       | 2/2/19/22 | 0/1/1/1 |
| 10  | MAN  | F     | 8   | 10   | -       | 0/2/19/22 | 0/1/1/1 |
| 10  | MAN  | F     | 9   | 10   | -       | 0/2/19/22 | 0/1/1/1 |
| 11  | NAG  | I     | 1   | 4,11 | -       | 2/6/23/26 | 0/1/1/1 |
| 11  | NAG  | I     | 2   | 11   | -       | 1/6/23/26 | 0/1/1/1 |
| 11  | BMA  | I     | 3   | 11   | -       | 2/2/19/22 | 0/1/1/1 |
| 11  | MAN  | I     | 4   | 11   | -       | 2/2/19/22 | 0/1/1/1 |
| 11  | MAN  | I     | 5   | 11   | -       | 0/2/19/22 | 0/1/1/1 |
| 11  | MAN  | I     | 6   | 11   | -       | 1/2/19/22 | 0/1/1/1 |
| 11  | MAN  | I     | 7   | 11   | -       | 1/2/19/22 | 0/1/1/1 |
| 12  | NAG  | J     | 1   | 12,4 | -       | 2/6/23/26 | 0/1/1/1 |
| 12  | NAG  | J     | 2   | 12   | -       | 1/6/23/26 | 0/1/1/1 |
| 12  | BMA  | J     | 3   | 12   | -       | 0/2/19/22 | 0/1/1/1 |
| 12  | MAN  | J     | 4   | 12   | -       | 2/2/19/22 | 0/1/1/1 |
| 12  | MAN  | J     | 5   | 12   | -       | 1/2/19/22 | 0/1/1/1 |
| 12  | MAN  | J     | 6   | 12   | -       | 0/2/19/22 | 0/1/1/1 |
| 12  | MAN  | J     | 7   | 12   | -       | 0/2/19/22 | 0/1/1/1 |
| 13  | NAG  | K     | 1   | 13,4 | -       | 0/6/23/26 | 0/1/1/1 |
| 13  | NAG  | K     | 2   | 13   | -       | 1/6/23/26 | 0/1/1/1 |
| 13  | BMA  | K     | 3   | 13   | -       | 0/2/19/22 | 0/1/1/1 |
| 13  | MAN  | K     | 4   | 13   | -       | 2/2/19/22 | 0/1/1/1 |
| 10  | NAG  | M     | 1   | 4,10 | -       | 0/6/23/26 | 0/1/1/1 |
| 10  | NAG  | M     | 2   | 10   | -       | 2/6/23/26 | 0/1/1/1 |

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| Mol | Type | Chain | Res | Link | Chirals | Torsions  | Rings   |
|-----|------|-------|-----|------|---------|-----------|---------|
| 10  | BMA  | M     | 3   | 10   | -       | 0/2/19/22 | 0/1/1/1 |
| 10  | MAN  | M     | 4   | 10   | -       | 0/2/19/22 | 0/1/1/1 |
| 10  | MAN  | M     | 5   | 10   | -       | 0/2/19/22 | 0/1/1/1 |
| 10  | MAN  | M     | 6   | 10   | -       | 0/2/19/22 | 0/1/1/1 |
| 10  | MAN  | M     | 7   | 10   | -       | 1/2/19/22 | 0/1/1/1 |
| 10  | MAN  | M     | 8   | 10   | -       | 0/2/19/22 | 0/1/1/1 |
| 10  | MAN  | M     | 9   | 10   | -       | 0/2/19/22 | 0/1/1/1 |
| 14  | NAG  | N     | 1   | 4,14 | -       | 1/6/23/26 | 0/1/1/1 |
| 14  | NAG  | N     | 2   | 14   | -       | 3/6/23/26 | 0/1/1/1 |
| 14  | BMA  | N     | 3   | 14   | -       | 1/2/19/22 | 0/1/1/1 |
| 14  | MAN  | N     | 4   | 14   | -       | 0/2/19/22 | 0/1/1/1 |
| 14  | MAN  | N     | 5   | 14   | -       | 0/2/19/22 | 0/1/1/1 |
| 14  | MAN  | N     | 6   | 14   | -       | 1/2/19/22 | 0/1/1/1 |
| 14  | MAN  | N     | 7   | 14   | -       | 2/2/19/22 | 0/1/1/1 |
| 14  | MAN  | N     | 8   | 14   | -       | 1/2/19/22 | 0/1/1/1 |
| 15  | NAG  | O     | 1   | 15,4 | -       | 0/6/23/26 | 0/1/1/1 |
| 15  | NAG  | O     | 2   | 15   | -       | 2/6/23/26 | 0/1/1/1 |
| 15  | BMA  | O     | 3   | 15   | -       | 1/2/19/22 | 0/1/1/1 |
| 15  | MAN  | O     | 4   | 15   | -       | 0/2/19/22 | 0/1/1/1 |
| 15  | MAN  | O     | 5   | 15   | -       | 0/2/19/22 | 0/1/1/1 |
| 16  | NAG  | P     | 1   | 16,4 | -       | 2/6/23/26 | 0/1/1/1 |
| 16  | NAG  | P     | 2   | 16   | -       | 2/6/23/26 | 0/1/1/1 |
| 16  | BMA  | P     | 3   | 16   | -       | 1/2/19/22 | 0/1/1/1 |
| 16  | MAN  | P     | 4   | 16   | -       | 0/2/19/22 | 0/1/1/1 |
| 16  | MAN  | P     | 5   | 16   | -       | 1/2/19/22 | 0/1/1/1 |
| 16  | MAN  | P     | 6   | 16   | -       | 0/2/19/22 | 0/1/1/1 |
| 16  | MAN  | P     | 7   | 16   | -       | 1/2/19/22 | 0/1/1/1 |
| 16  | MAN  | P     | 8   | 16   | -       | 0/2/19/22 | 0/1/1/1 |
| 17  | NAG  | Q     | 1   | 4,17 | -       | 2/6/23/26 | 0/1/1/1 |
| 17  | MAN  | Q     | 10  | 17   | -       | 2/2/19/22 | 0/1/1/1 |
| 17  | NAG  | Q     | 2   | 17   | -       | 3/6/23/26 | 0/1/1/1 |
| 17  | BMA  | Q     | 3   | 17   | -       | 0/2/19/22 | 0/1/1/1 |
| 17  | MAN  | Q     | 4   | 17   | -       | 2/2/19/22 | 0/1/1/1 |
| 17  | MAN  | Q     | 5   | 17   | -       | 2/2/19/22 | 0/1/1/1 |
| 17  | MAN  | Q     | 6   | 17   | -       | 0/2/19/22 | 0/1/1/1 |
| 17  | MAN  | Q     | 7   | 17   | -       | 0/2/19/22 | 0/1/1/1 |
| 17  | MAN  | Q     | 8   | 17   | -       | 0/2/19/22 | 0/1/1/1 |
| 17  | MAN  | Q     | 9   | 17   | -       | 0/2/19/22 | 0/1/1/1 |
| 18  | NAG  | R     | 1   | 18,4 | -       | 0/6/23/26 | 0/1/1/1 |
| 18  | NAG  | R     | 2   | 18   | -       | 0/6/23/26 | 0/1/1/1 |

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| Mol | Type | Chain | Res | Link | Chirals | Torsions  | Rings   |
|-----|------|-------|-----|------|---------|-----------|---------|
| 18  | BMA  | R     | 3   | 18   | -       | 2/2/19/22 | 0/1/1/1 |
| 18  | MAN  | R     | 4   | 18   | -       | 0/2/19/22 | 0/1/1/1 |
| 18  | MAN  | R     | 5   | 18   | -       | 0/2/19/22 | 0/1/1/1 |
| 18  | MAN  | R     | 6   | 18   | -       | 0/2/19/22 | 0/1/1/1 |
| 18  | MAN  | R     | 7   | 18   | -       | 0/2/19/22 | 0/1/1/1 |
| 18  | NAG  | S     | 1   | 18,4 | -       | 0/6/23/26 | 0/1/1/1 |
| 18  | NAG  | S     | 2   | 18   | -       | 2/6/23/26 | 0/1/1/1 |
| 18  | BMA  | S     | 3   | 18   | -       | 0/2/19/22 | 0/1/1/1 |
| 18  | MAN  | S     | 4   | 18   | -       | 0/2/19/22 | 0/1/1/1 |
| 18  | MAN  | S     | 5   | 18   | -       | 0/2/19/22 | 0/1/1/1 |
| 18  | MAN  | S     | 6   | 18   | -       | 1/2/19/22 | 0/1/1/1 |
| 18  | MAN  | S     | 7   | 18   | -       | 0/2/19/22 | 0/1/1/1 |
| 13  | NAG  | T     | 1   | 13,4 | -       | 0/6/23/26 | 0/1/1/1 |
| 13  | NAG  | T     | 2   | 13   | -       | 2/6/23/26 | 0/1/1/1 |
| 13  | BMA  | T     | 3   | 13   | -       | 0/2/19/22 | 0/1/1/1 |
| 13  | MAN  | T     | 4   | 13   | -       | 0/2/19/22 | 0/1/1/1 |
| 19  | NAG  | W     | 1   | 4,19 | -       | 3/6/23/26 | 0/1/1/1 |
| 19  | NAG  | W     | 2   | 19   | -       | 2/6/23/26 | 0/1/1/1 |
| 19  | BMA  | W     | 3   | 19   | -       | 2/2/19/22 | 0/1/1/1 |
| 19  | MAN  | W     | 4   | 19   | -       | 1/2/19/22 | 0/1/1/1 |
| 19  | MAN  | W     | 5   | 19   | -       | 0/2/19/22 | 0/1/1/1 |
| 19  | MAN  | W     | 6   | 19   | -       | 0/2/19/22 | 0/1/1/1 |
| 19  | MAN  | W     | 7   | 19   | -       | 0/2/19/22 | 0/1/1/1 |
| 19  | MAN  | W     | 8   | 19   | -       | 0/2/19/22 | 0/1/1/1 |
| 20  | NAG  | X     | 1   | 20,4 | -       | 2/6/23/26 | 0/1/1/1 |
| 20  | NAG  | X     | 2   | 20   | -       | 1/6/23/26 | 0/1/1/1 |
| 20  | BMA  | X     | 3   | 20   | -       | 1/2/19/22 | 0/1/1/1 |
| 20  | MAN  | X     | 4   | 20   | -       | 0/2/19/22 | 0/1/1/1 |
| 20  | MAN  | X     | 5   | 20   | -       | 0/2/19/22 | 0/1/1/1 |
| 20  | MAN  | X     | 6   | 20   | -       | 0/2/19/22 | 0/1/1/1 |
| 21  | NAG  | Y     | 1   | 4,21 | -       | 0/6/23/26 | 0/1/1/1 |
| 21  | NAG  | Y     | 2   | 21   | -       | 0/6/23/26 | 0/1/1/1 |
| 22  | NAG  | Z     | 1   | 22,4 | -       | 2/6/23/26 | 0/1/1/1 |
| 22  | NAG  | Z     | 2   | 22   | -       | 2/6/23/26 | 0/1/1/1 |
| 22  | BMA  | Z     | 3   | 22   | -       | 2/2/19/22 | 0/1/1/1 |
| 22  | MAN  | Z     | 4   | 22   | -       | 0/2/19/22 | 0/1/1/1 |
| 22  | MAN  | Z     | 5   | 22   | -       | 0/2/19/22 | 0/1/1/1 |
| 22  | MAN  | Z     | 6   | 22   | -       | 0/2/19/22 | 0/1/1/1 |
| 21  | NAG  | a     | 1   | 4,21 | -       | 0/6/23/26 | 0/1/1/1 |
| 21  | NAG  | a     | 2   | 21   | -       | 0/6/23/26 | 0/1/1/1 |

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| Mol | Type | Chain | Res | Link | Chirals | Torsions  | Rings   |
|-----|------|-------|-----|------|---------|-----------|---------|
| 23  | NAG  | b     | 1   | 23,7 | -       | 0/6/23/26 | 0/1/1/1 |
| 23  | NAG  | b     | 2   | 23   | -       | 0/6/23/26 | 0/1/1/1 |
| 23  | BMA  | b     | 3   | 23   | -       | 0/2/19/22 | 0/1/1/1 |
| 23  | MAN  | b     | 4   | 23   | -       | 2/2/19/22 | 0/1/1/1 |
| 23  | MAN  | b     | 5   | 23   | -       | 0/2/19/22 | 0/1/1/1 |
| 23  | MAN  | b     | 6   | 23   | -       | 0/2/19/22 | 0/1/1/1 |

The worst 5 of 40 bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z    | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|-------|------|-------------|----------|
| 16  | P     | 5   | MAN  | C2-C3 | 3.84 | 1.58        | 1.52     |
| 22  | Z     | 5   | MAN  | C2-C3 | 3.71 | 1.58        | 1.52     |
| 15  | O     | 3   | BMA  | C1-C2 | 3.55 | 1.60        | 1.52     |
| 18  | R     | 4   | MAN  | C1-C2 | 3.36 | 1.59        | 1.52     |
| 14  | N     | 3   | BMA  | O5-C5 | 3.25 | 1.50        | 1.43     |

The worst 5 of 153 bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms    | Z    | Observed(°) | Ideal(°) |
|-----|-------|-----|------|----------|------|-------------|----------|
| 18  | R     | 4   | MAN  | C1-O5-C5 | 5.94 | 120.25      | 112.19   |
| 23  | b     | 6   | MAN  | C1-O5-C5 | 5.29 | 119.36      | 112.19   |
| 11  | I     | 6   | MAN  | C1-O5-C5 | 5.07 | 119.06      | 112.19   |
| 10  | F     | 5   | MAN  | C1-O5-C5 | 4.91 | 118.84      | 112.19   |
| 14  | N     | 3   | BMA  | C1-O5-C5 | 4.53 | 118.33      | 112.19   |

There are no chirality outliers.

5 of 97 torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms       |
|-----|-------|-----|------|-------------|
| 11  | I     | 1   | NAG  | C8-C7-N2-C2 |
| 11  | I     | 1   | NAG  | O7-C7-N2-C2 |
| 16  | P     | 2   | NAG  | O5-C5-C6-O6 |
| 10  | M     | 2   | NAG  | O5-C5-C6-O6 |
| 9   | C     | 3   | BMA  | O5-C5-C6-O6 |

There are no ring outliers.

23 monomers are involved in 18 short contacts:

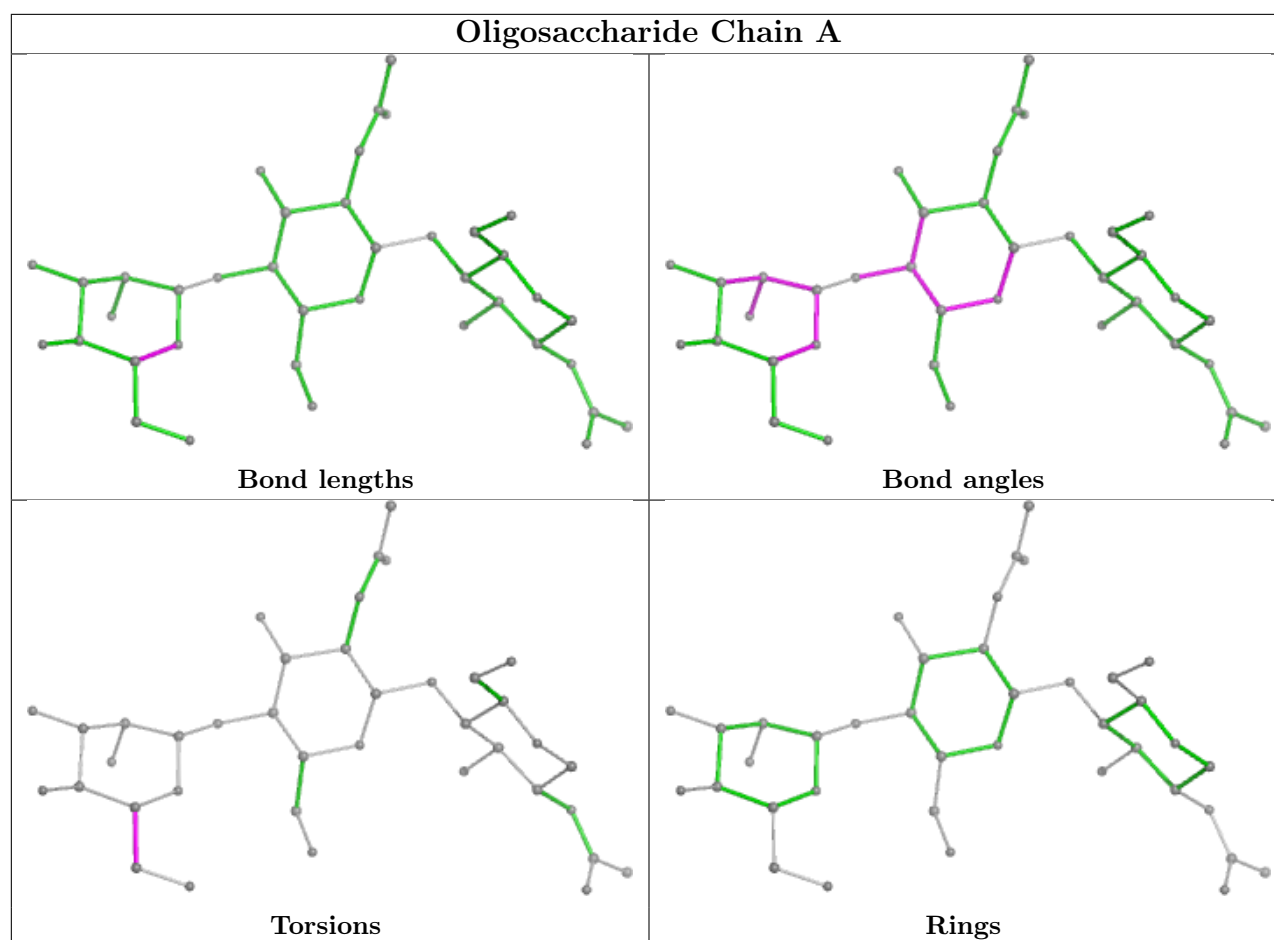
| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|-----|-------|-----|------|---------|--------------|
| 10  | M     | 7   | MAN  | 1       | 0            |
| 18  | R     | 3   | BMA  | 2       | 0            |

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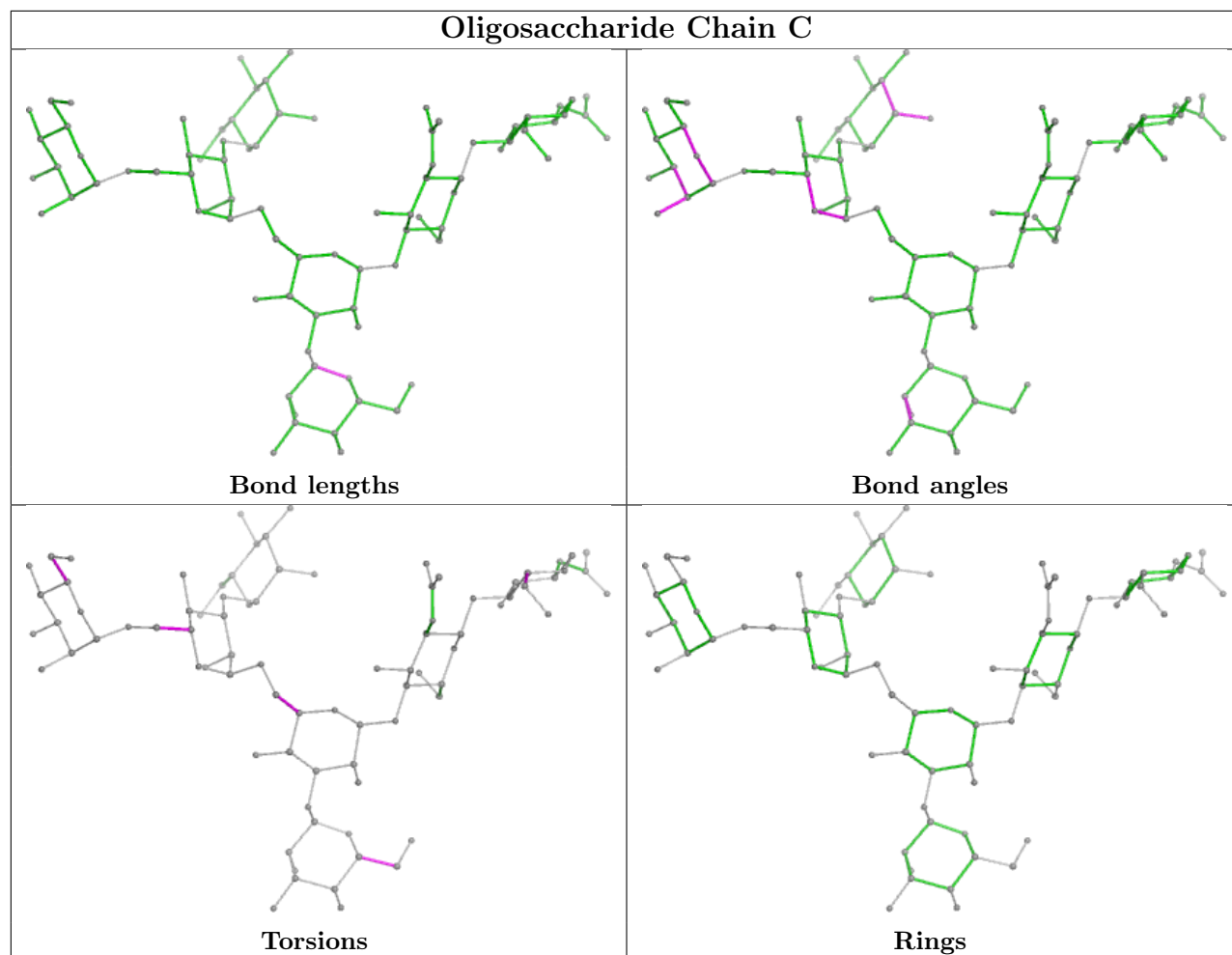
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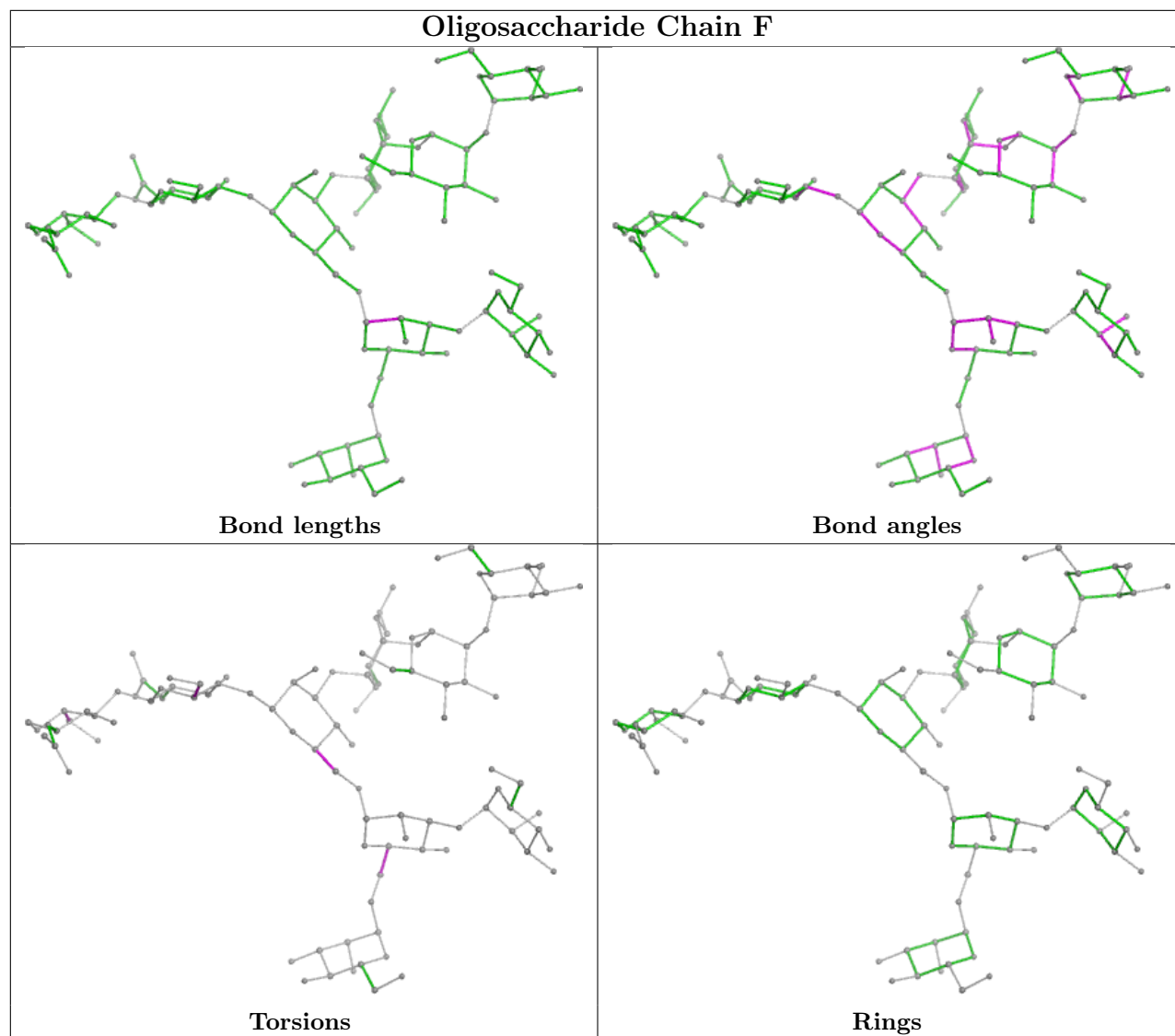
| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|-----|-------|-----|------|---------|--------------|
| 14  | N     | 7   | MAN  | 1       | 0            |
| 13  | K     | 2   | NAG  | 1       | 0            |
| 17  | Q     | 5   | MAN  | 1       | 0            |
| 18  | R     | 4   | MAN  | 3       | 0            |
| 9   | C     | 1   | NAG  | 1       | 0            |
| 8   | A     | 2   | NAG  | 1       | 0            |
| 15  | O     | 1   | NAG  | 1       | 0            |
| 13  | T     | 4   | MAN  | 1       | 0            |
| 10  | M     | 3   | BMA  | 1       | 0            |
| 21  | Y     | 2   | NAG  | 2       | 0            |
| 18  | R     | 5   | MAN  | 1       | 0            |
| 15  | O     | 4   | MAN  | 1       | 0            |
| 15  | O     | 3   | BMA  | 1       | 0            |
| 15  | O     | 2   | NAG  | 1       | 0            |
| 18  | R     | 2   | NAG  | 1       | 0            |
| 18  | R     | 1   | NAG  | 1       | 0            |
| 9   | C     | 7   | MAN  | 1       | 0            |
| 21  | Y     | 1   | NAG  | 1       | 0            |
| 8   | A     | 1   | NAG  | 1       | 0            |
| 16  | P     | 1   | NAG  | 2       | 0            |
| 13  | K     | 1   | NAG  | 1       | 0            |

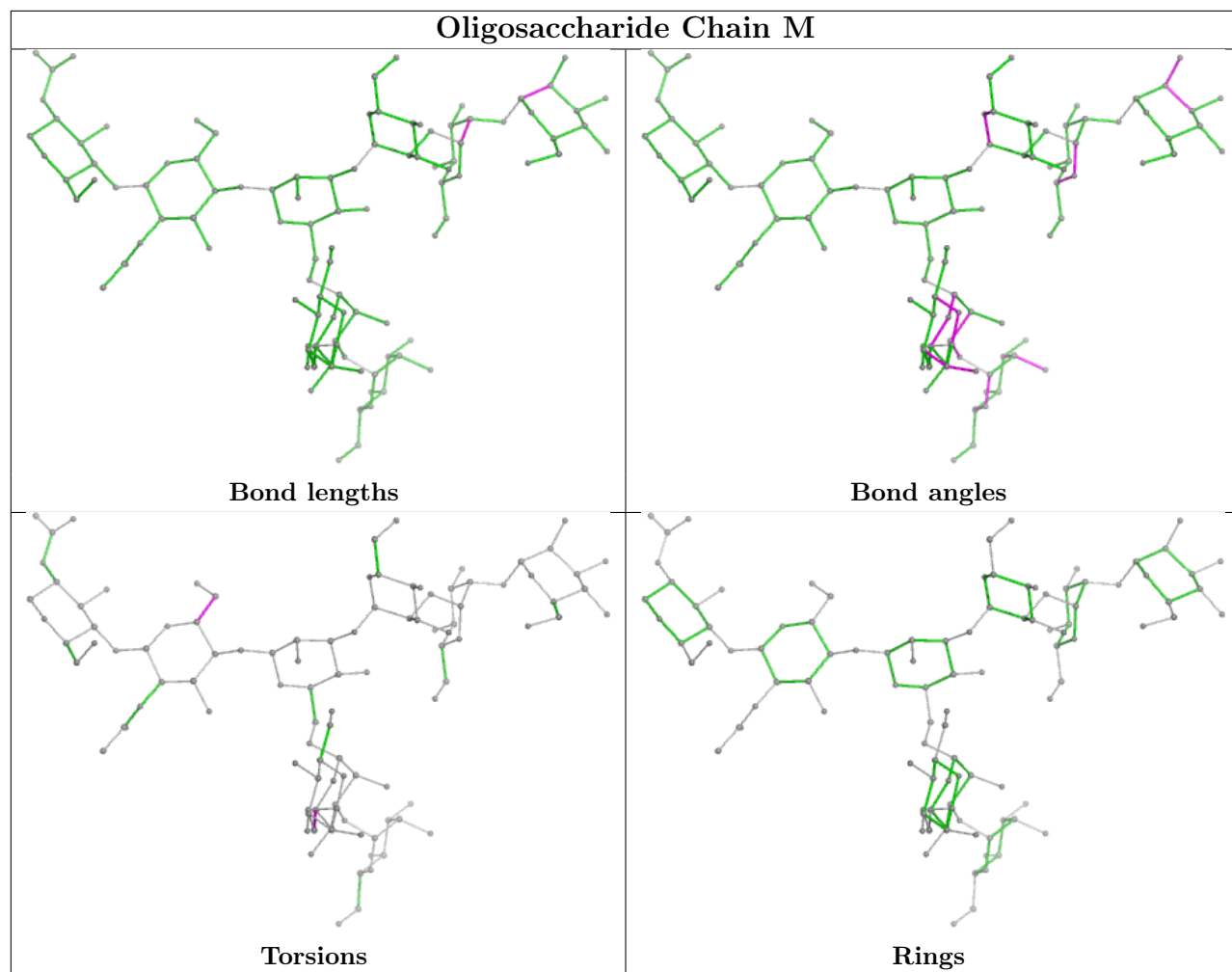
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

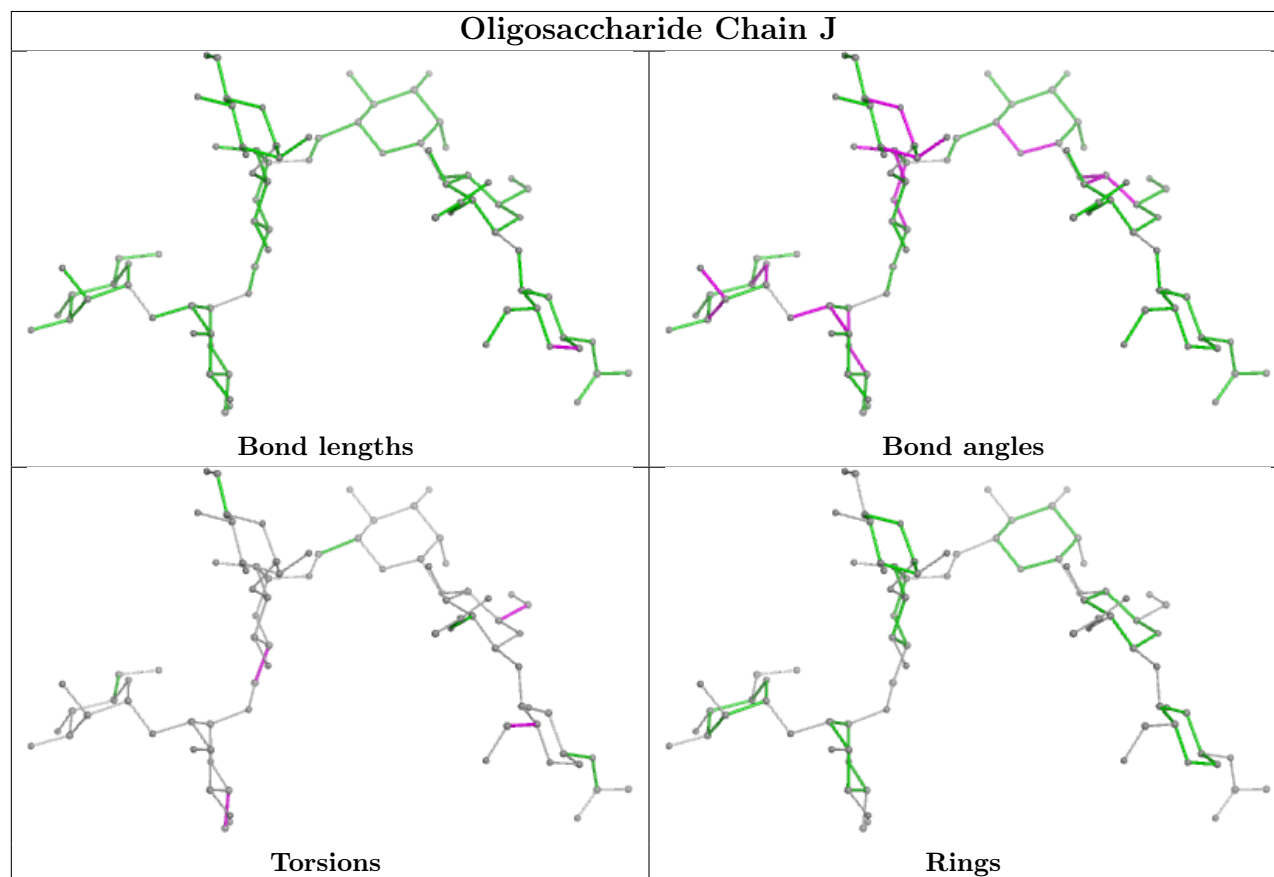
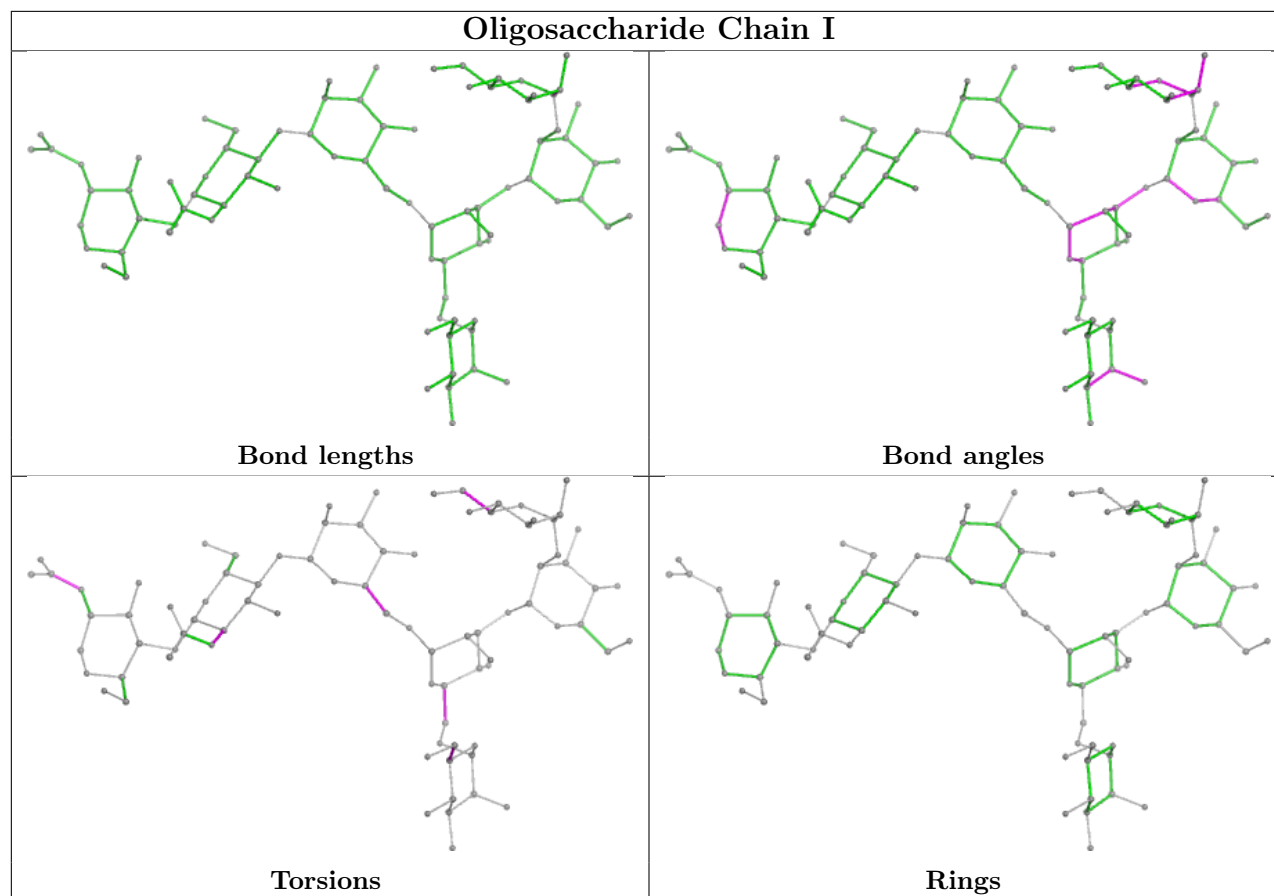


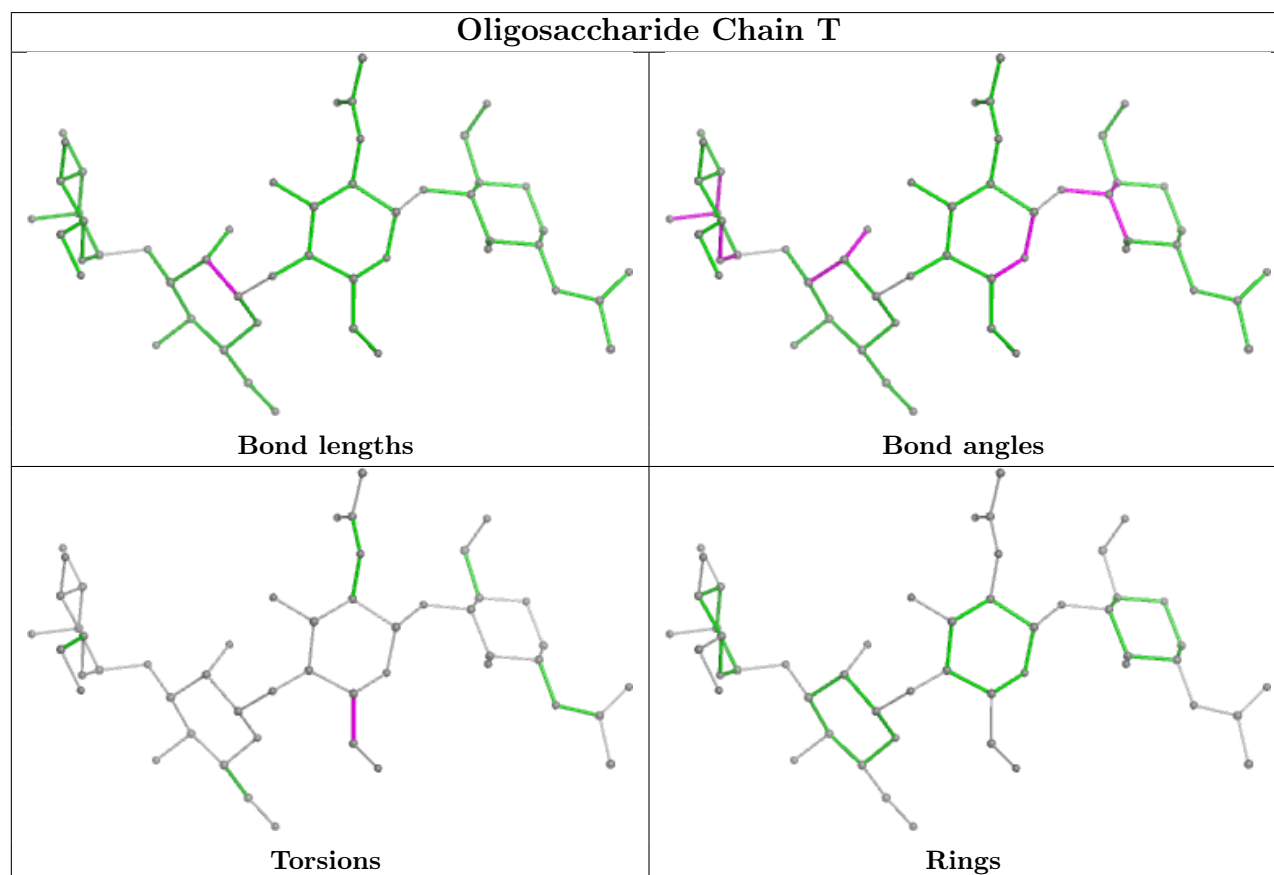
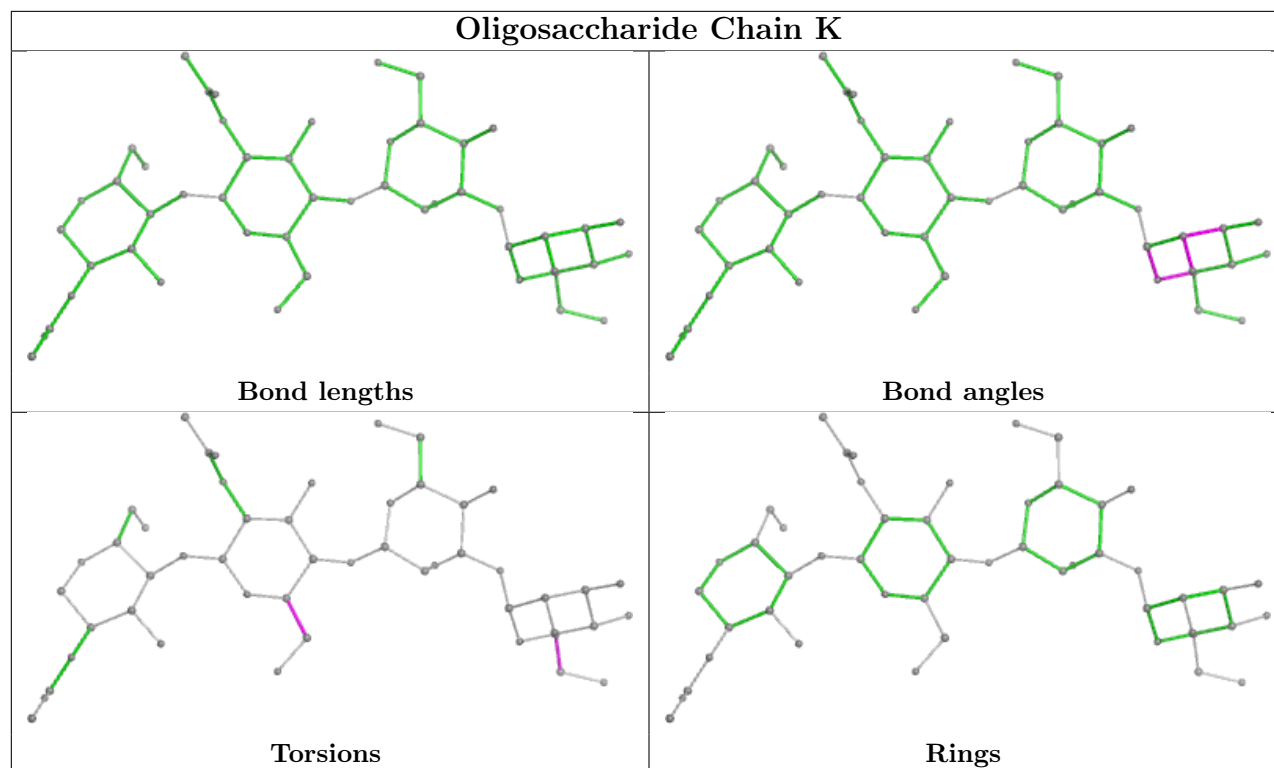


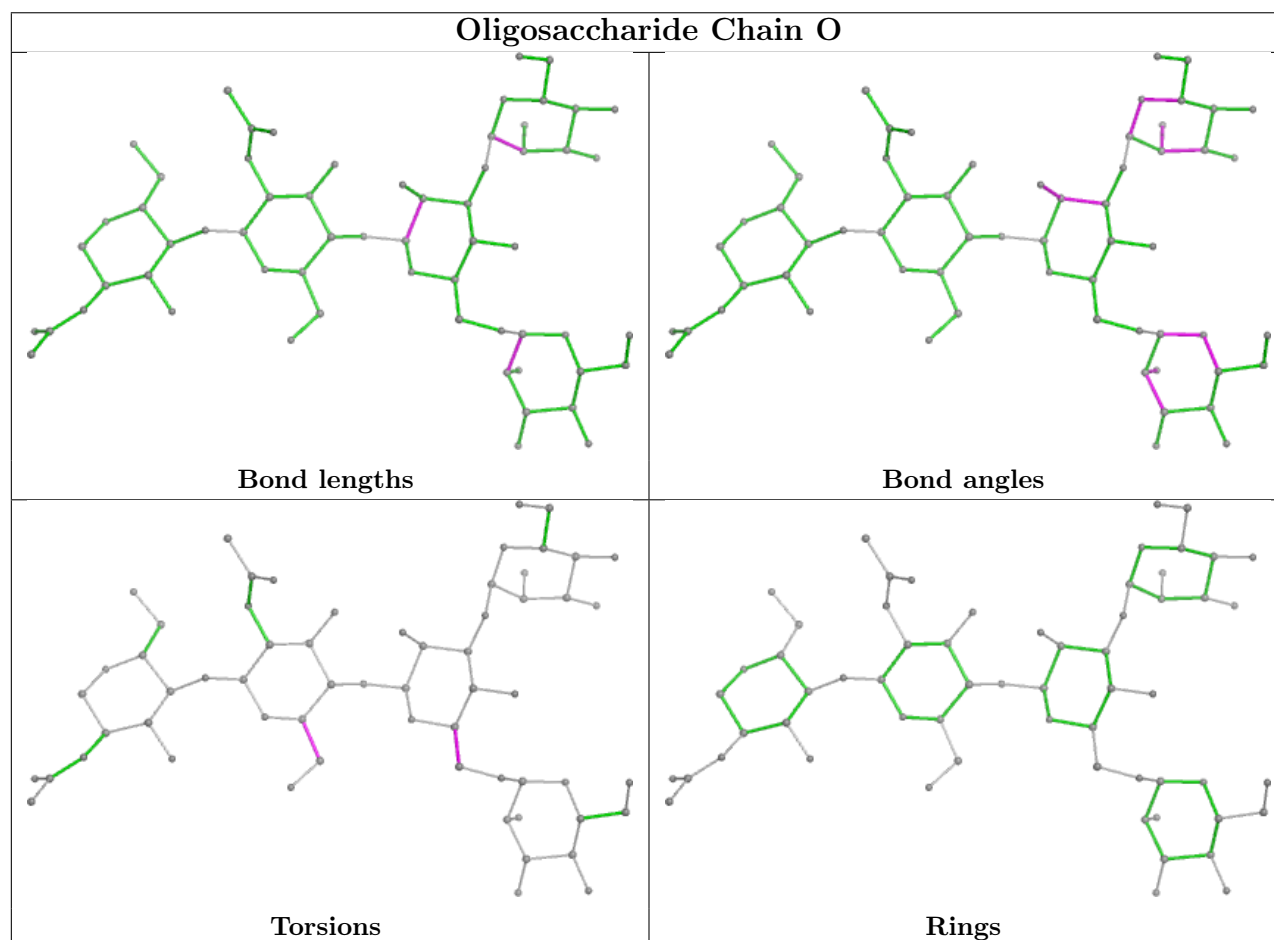
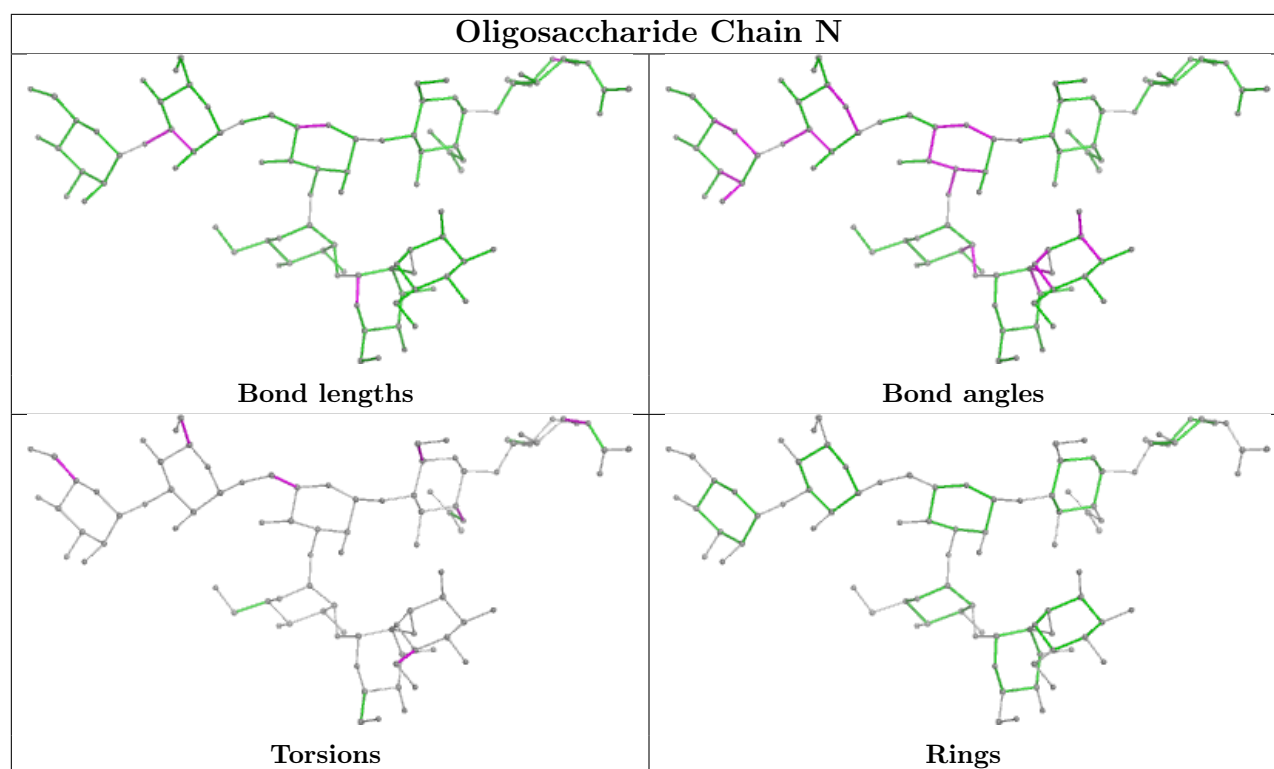


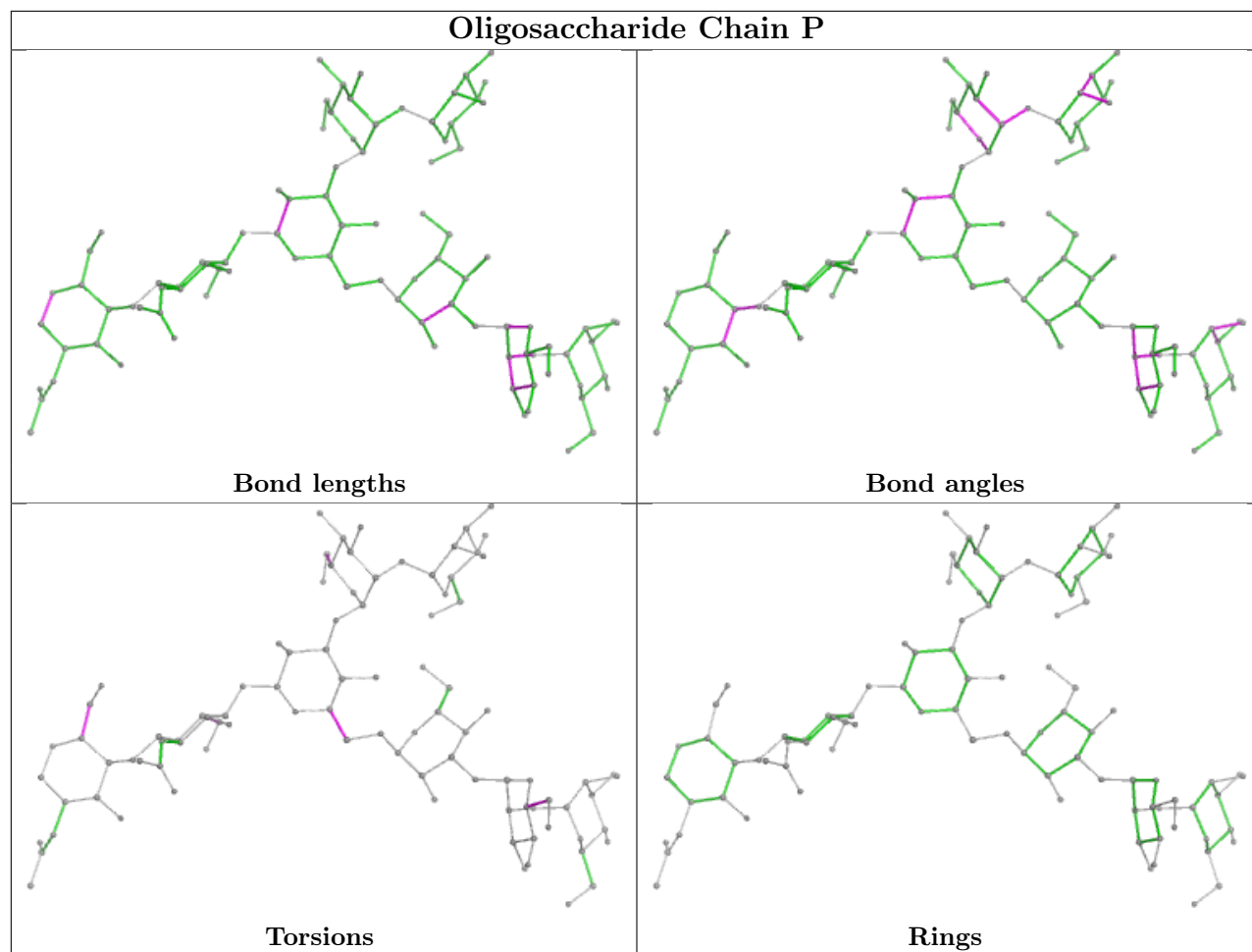


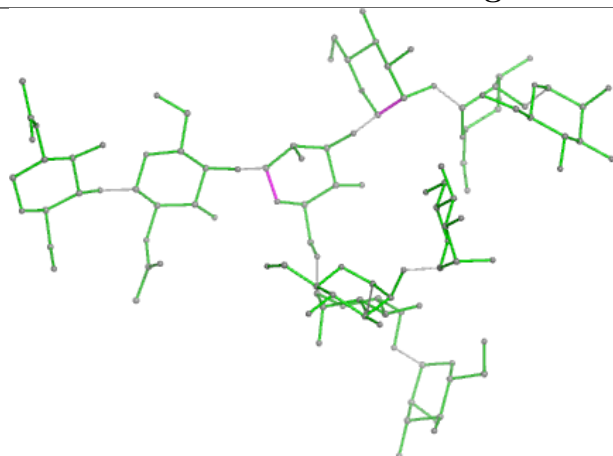
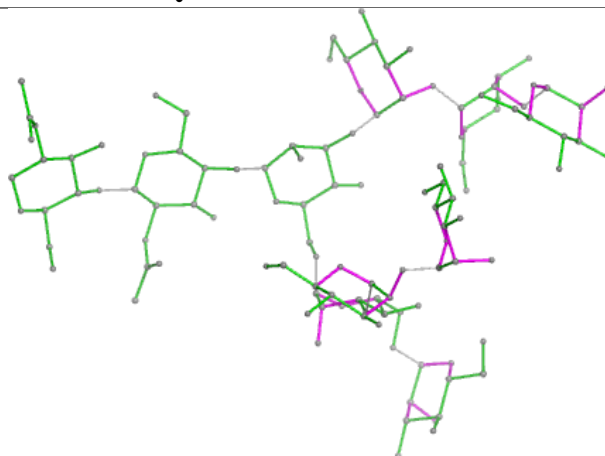
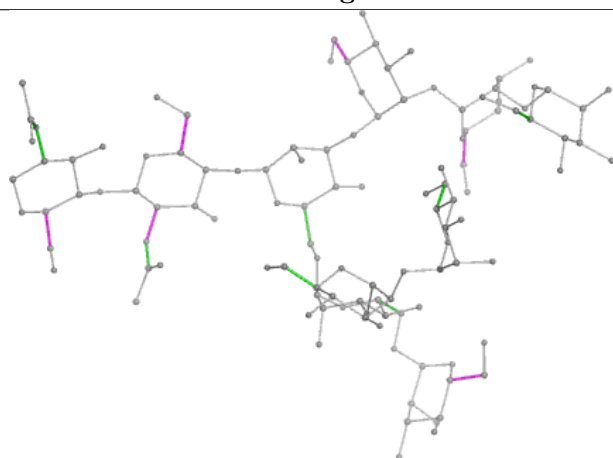
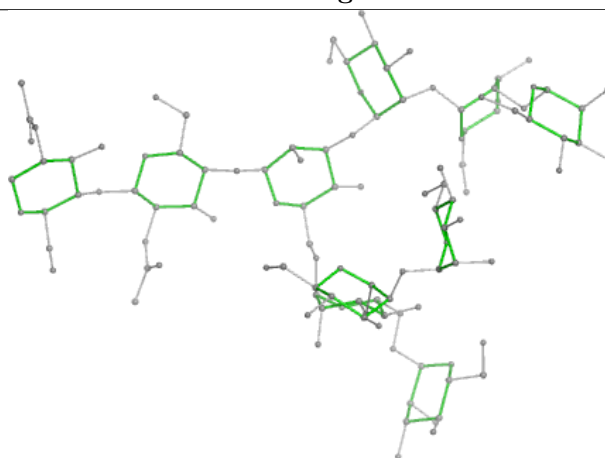




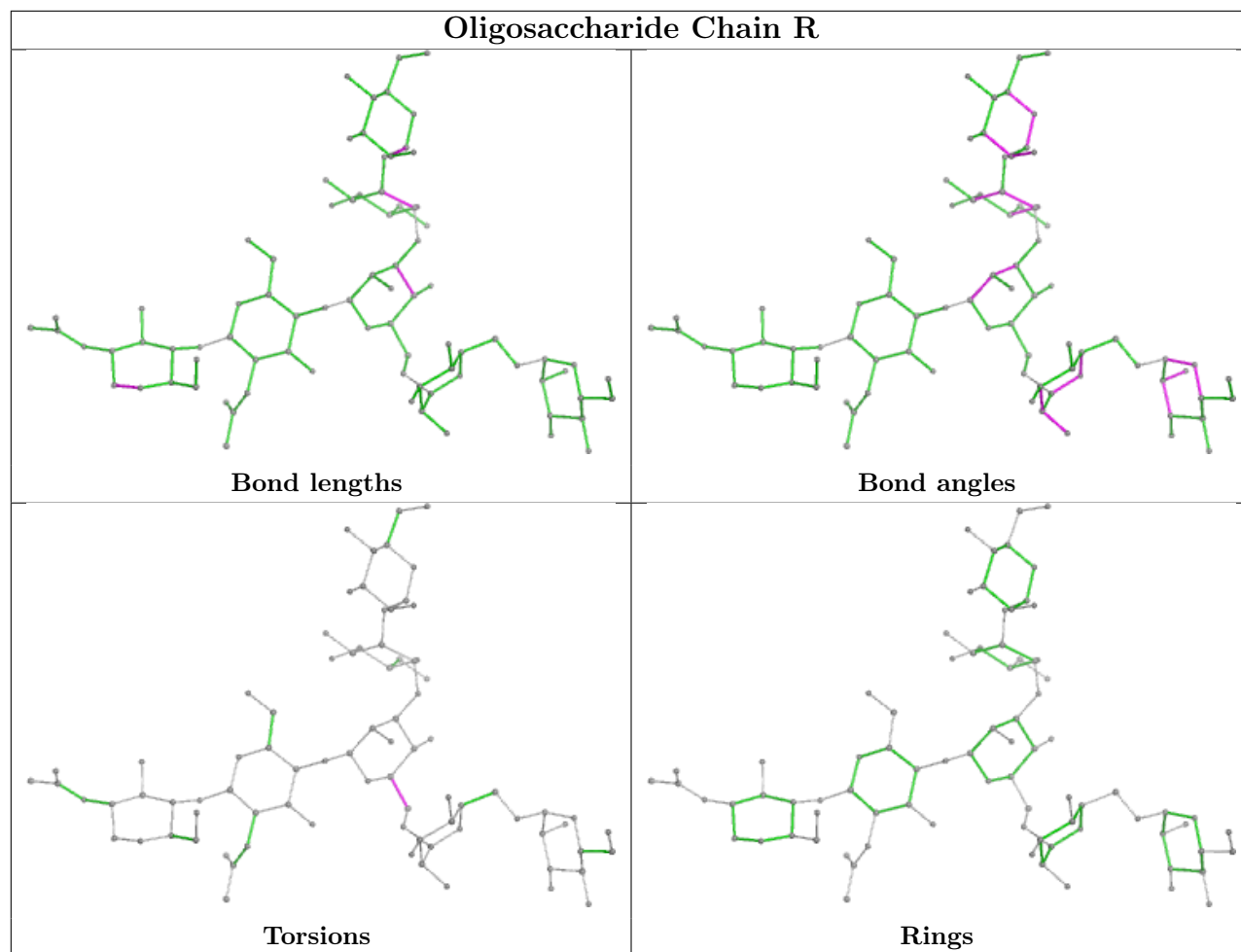


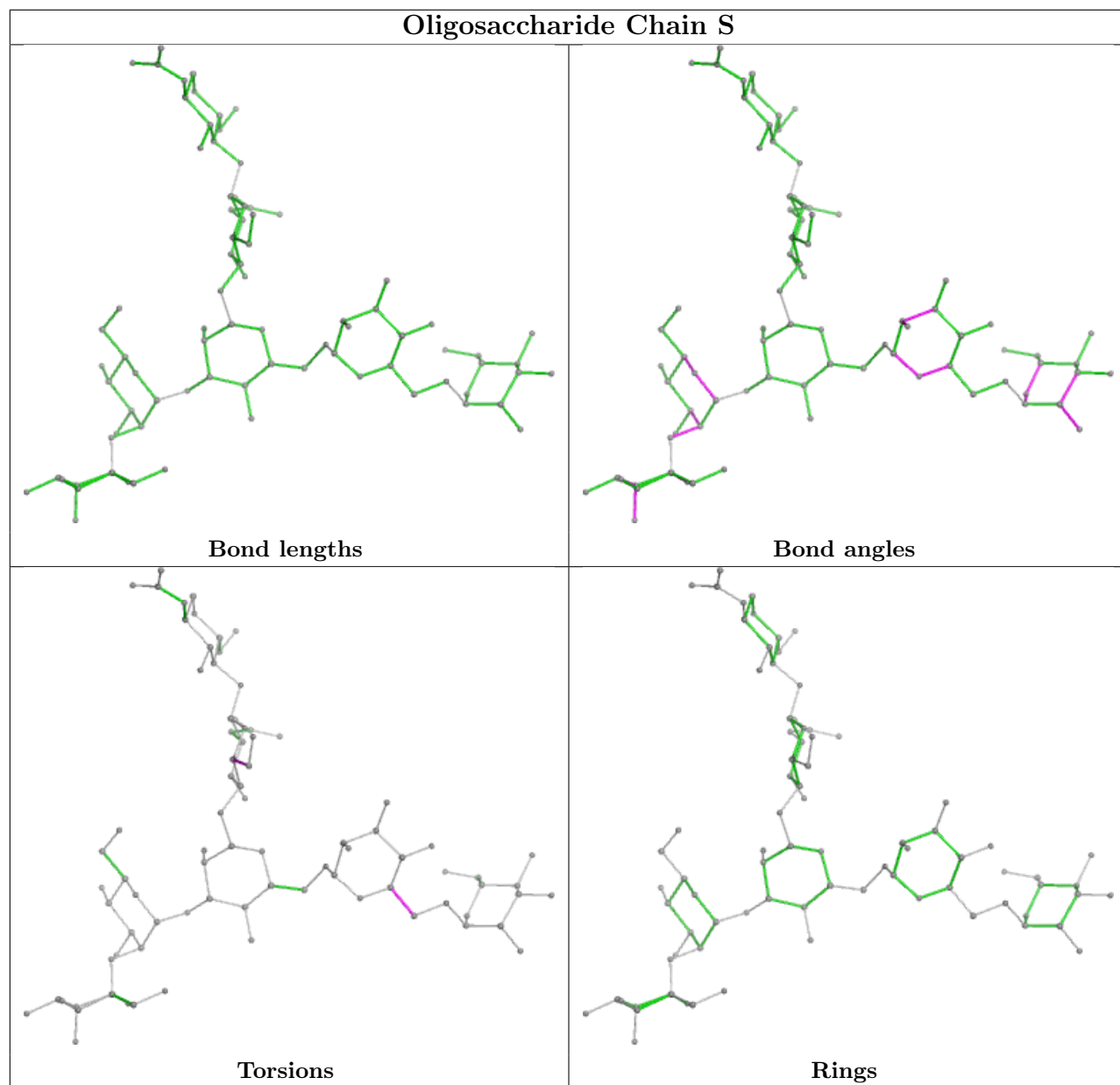


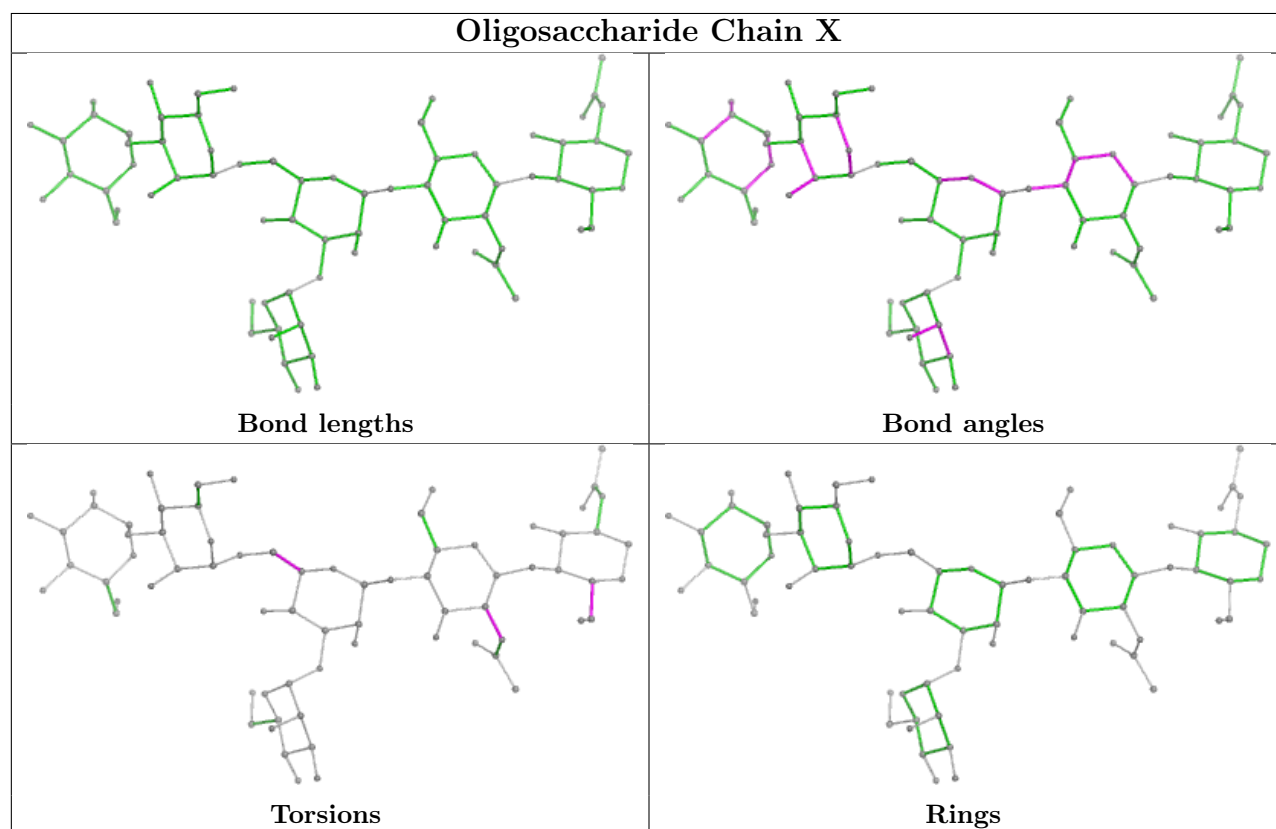
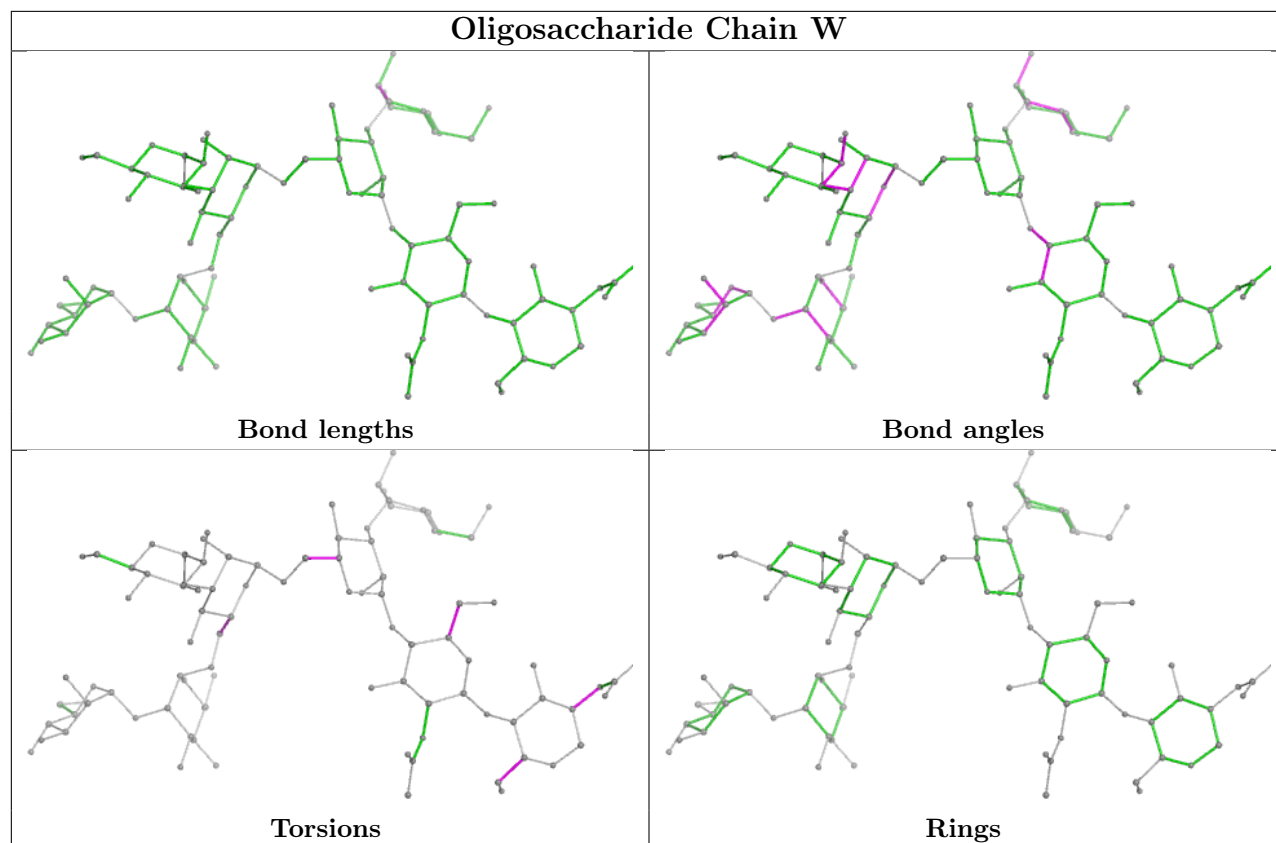


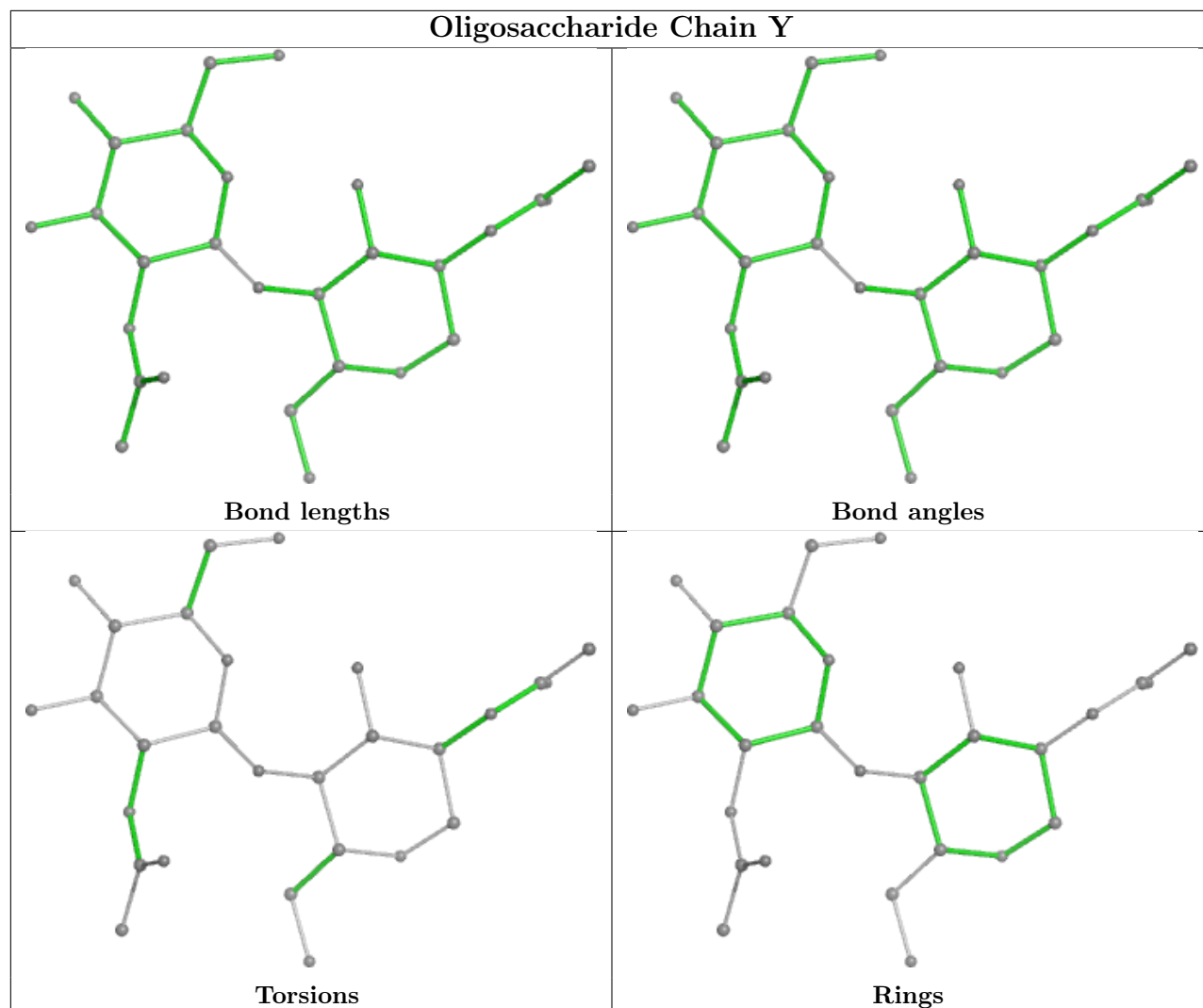
**Oligosaccharide Chain Q****Bond lengths****Bond angles****Torsions****Rings**

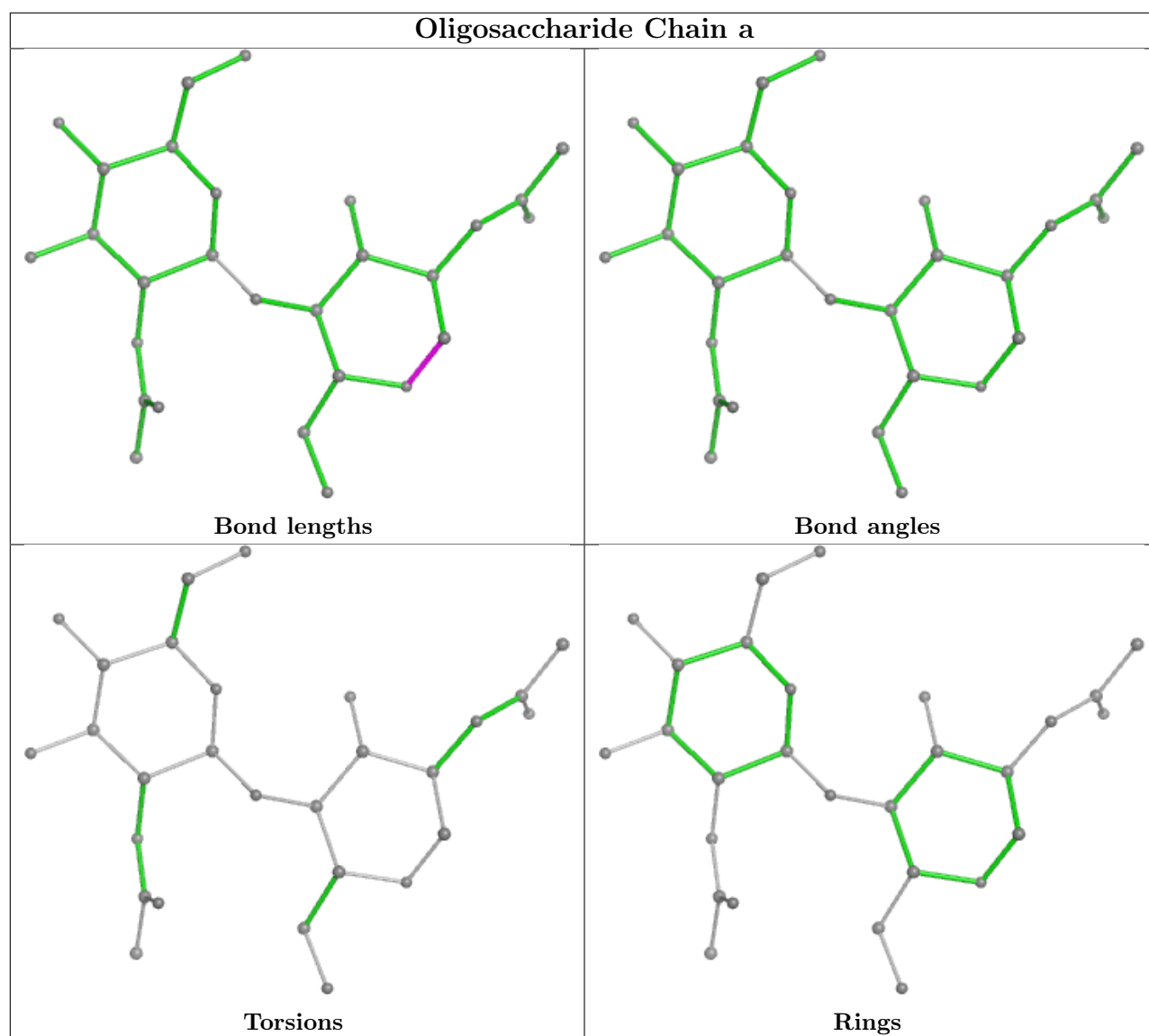


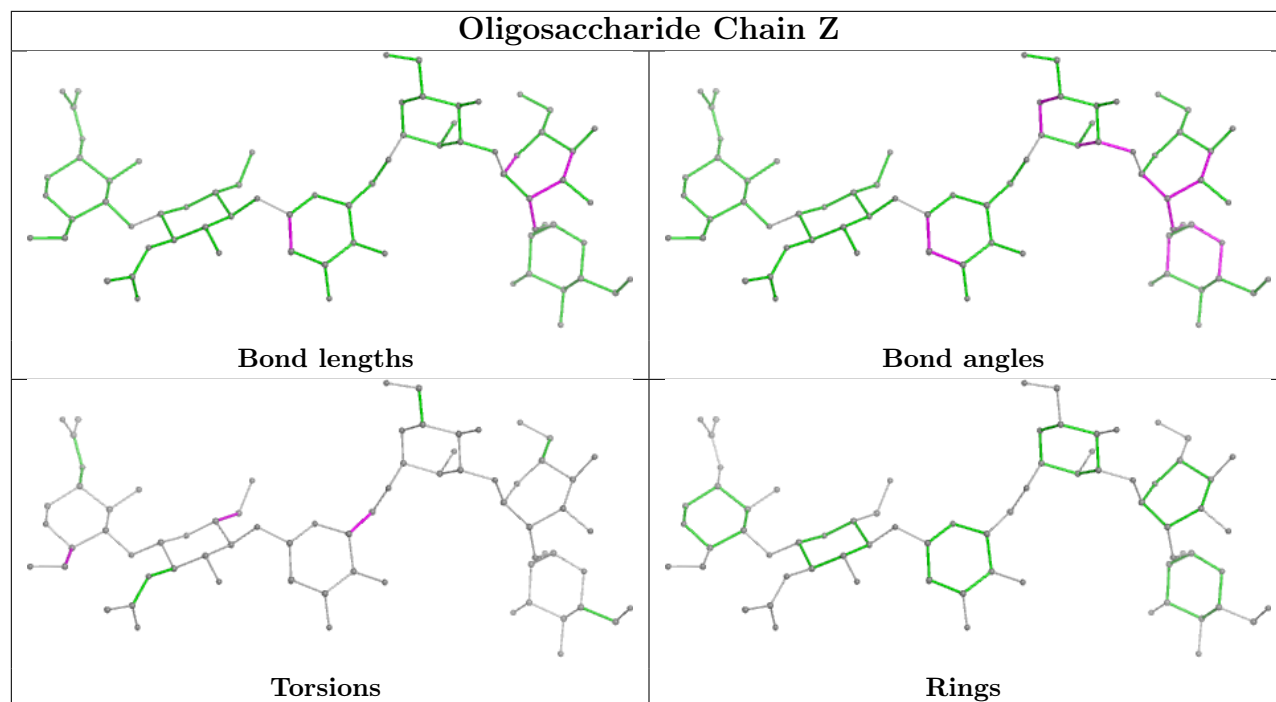


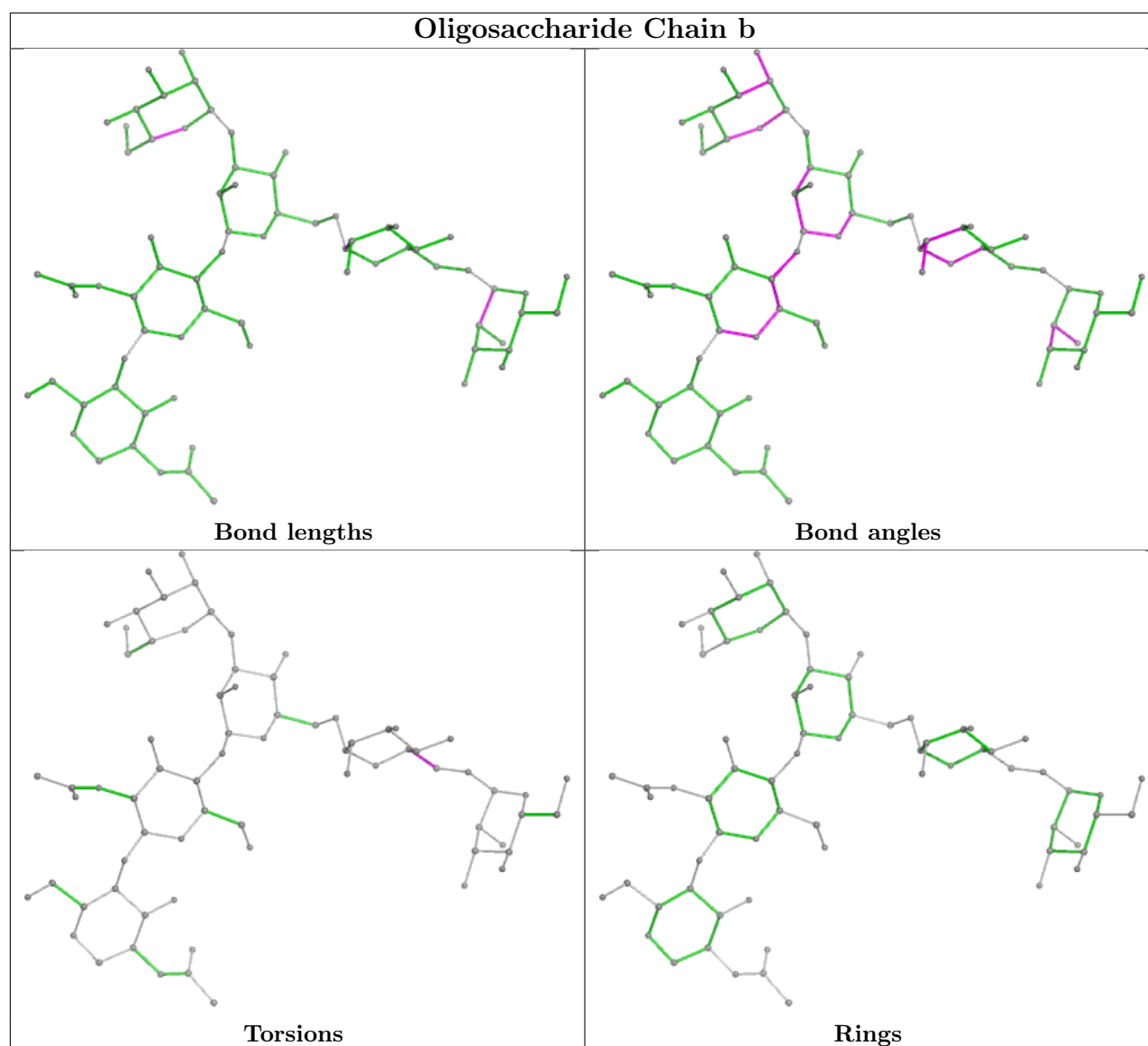












## 5.6 Ligand geometry [i](#)

5 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 | $\# Z  > 2$ |
| 24  | NAG  | H     | 1212 | 5    | 14,14,15     | 0.27 | 0           | 17,19,21    | 0.43 | 0           |

| Mol | Type | Chain | Res  | Link | Bond lengths |      |          | Bond angles |      |          |
|-----|------|-------|------|------|--------------|------|----------|-------------|------|----------|
|     |      |       |      |      | Counts       | RMSZ | # Z  > 2 | Counts      | RMSZ | # Z  > 2 |
| 24  | NAG  | B     | 1670 | 1    | 14,14,15     | 0.40 | 0        | 17,19,21    | 0.43 | 0        |
| 24  | NAG  | B     | 1669 | 1    | 14,14,15     | 0.35 | 0        | 17,19,21    | 0.49 | 0        |
| 24  | NAG  | G     | 1509 | 4    | 14,14,15     | 0.39 | 0        | 17,19,21    | 0.43 | 0        |
| 24  | NAG  | B     | 1668 | 1    | 14,14,15     | 0.43 | 0        | 17,19,21    | 0.63 | 1 (5%)   |

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   |
|-----|------|-------|------|------|---------|-----------|---------|
| 24  | NAG  | H     | 1212 | 5    | -       | 0/6/23/26 | 0/1/1/1 |
| 24  | NAG  | B     | 1670 | 1    | -       | 1/6/23/26 | 0/1/1/1 |
| 24  | NAG  | B     | 1669 | 1    | -       | 2/6/23/26 | 0/1/1/1 |
| 24  | NAG  | G     | 1509 | 4    | -       | 1/6/23/26 | 0/1/1/1 |
| 24  | NAG  | B     | 1668 | 1    | -       | 0/6/23/26 | 0/1/1/1 |

There are no bond length outliers.

All (1) bond angle outliers are listed below:

| Mol | Chain | Res  | Type | Atoms    | Z    | Observed(°) | Ideal(°) |
|-----|-------|------|------|----------|------|-------------|----------|
| 24  | B     | 1668 | NAG  | C1-O5-C5 | 2.02 | 114.93      | 112.19   |

There are no chirality outliers.

All (4) torsion outliers are listed below:

| Mol | Chain | Res  | Type | Atoms       |
|-----|-------|------|------|-------------|
| 24  | B     | 1669 | NAG  | O5-C5-C6-O6 |
| 24  | B     | 1669 | NAG  | C4-C5-C6-O6 |
| 24  | G     | 1509 | NAG  | O5-C5-C6-O6 |
| 24  | B     | 1670 | NAG  | C4-C5-C6-O6 |

There are no ring outliers.

1 monomer is involved in 1 short contact:

| Mol | Chain | Res  | Type | Clashes | Symm-Clashes |
|-----|-------|------|------|---------|--------------|
| 24  | B     | 1668 | NAG  | 1       | 0            |



## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

| Mol | Chain | Number of breaks |
|-----|-------|------------------|
| 3   | E     | 1                |

All chain breaks are listed below:

| Model | Chain | Residue-1 | Atom-1 | Residue-2 | Atom-2 | Distance (Å) |
|-------|-------|-----------|--------|-----------|--------|--------------|
| 1     | E     | 95:SER    | C      | 95(A):GLY | N      | 3.44         |

## 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   | B     | 151/161 (93%)   | -1.33  | 0 100 100    | 39, 104, 220, 254     | 0     |
| 2   | D     | 243/243 (100%)  | -0.88  | 0 100 100    | 133, 213, 281, 315    | 0     |
| 3   | E     | 213/216 (98%)   | -0.90  | 0 100 100    | 131, 210, 284, 309    | 0     |
| 4   | G     | 451/475 (94%)   | -1.38  | 0 100 100    | 43, 110, 187, 295     | 0     |
| 5   | H     | 228/244 (93%)   | -1.03  | 0 100 100    | 105, 156, 197, 247    | 0     |
| 6   | L     | 210/213 (98%)   | -1.07  | 1 (0%) 87 75 | 85, 136, 179, 212     | 0     |
| 7   | U     | 119/240 (49%)   | -1.18  | 0 100 100    | 130, 167, 232, 248    | 0     |
| 7   | V     | 98/240 (40%)    | -1.15  | 0 100 100    | 136, 204, 240, 342    | 0     |
| All | All   | 1713/2032 (84%) | -1.13  | 1 (0%) 92 87 | 39, 154, 264, 342     | 0     |

All (1) RSRZ outliers are listed below:

| Mol | Chain | Res | Type | RSRZ |
|-----|-------|-----|------|------|
| 6   | L     | 80  | ALA  | 2.1  |

### 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](#)

SUGAR-RSR INFOmissingINFO

### 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 |
|-----|------|-------|------|-------|------|------|-----------------------------|-------|
| 24  | NAG  | B     | 1670 | 14/15 | 0.94 | 0.06 | 170,182,187,189             | 0     |
| 24  | NAG  | H     | 1212 | 14/15 | 0.96 | 0.04 | 121,132,140,149             | 0     |
| 24  | NAG  | G     | 1509 | 14/15 | 0.97 | 0.04 | 135,144,144,146             | 0     |
| 24  | NAG  | B     | 1668 | 14/15 | 0.97 | 0.04 | 147,156,161,162             | 0     |
| 24  | NAG  | B     | 1669 | 14/15 | 0.99 | 0.07 | 123,136,154,157             | 0     |

## 6.5 Other polymers [i](#)

There are no such residues in this entry.