



wwPDB X-ray Structure Validation Summary Report ⓘ

Oct 10, 2023 – 06:50 PM EDT

PDB ID : 6X5U
Title : Human Alpha-1,6-fucosyltransferase (FUT8) bound to GDP and NM5M2-Asn
Authors : Kadirvelraj, R.; Wood, Z.A.
Deposited on : 2020-05-26
Resolution : 3.20 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

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

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

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

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtrriage (Phenix) : 1.13
EDS : 2.35.1
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.35.1

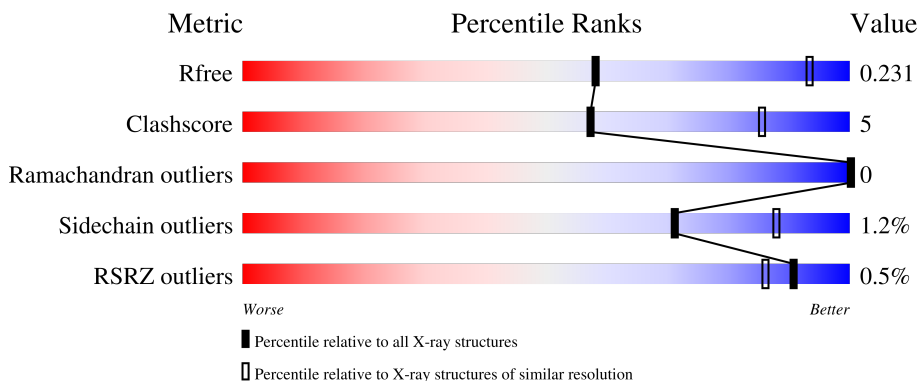
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.20 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.





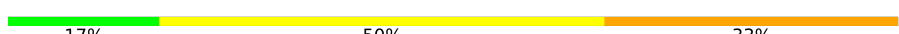
| Metric | Whole archive (#Entries) | Similar resolution (#Entries, resolution range(Å)) |
|-----------------------|-----------------------------|-------------------------------------------------------|
| R_{free} | 130704 | 1133 (3.20-3.20) |
| Clashscore | 141614 | 1253 (3.20-3.20) |
| Ramachandran outliers | 138981 | 1234 (3.20-3.20) |
| Sidechain outliers | 138945 | 1233 (3.20-3.20) |
| RSRZ outliers | 127900 | 1095 (3.20-3.20) |

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 1 | A | 535 | 79% 9% 13% |
| 1 | B | 535 | 78% 9% 13% |
| 1 | C | 535 | 76% 11% 13% |
| 1 | D | 535 | 78% 9% 13% |
| 1 | E | 535 | 76% 12% 13% |

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| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|-----------------------------------------------------------------------------------------|
| 1 | F | 535 | %  |
| 1 | G | 535 |  |
| 1 | H | 535 |  |
| 2 | I | 6 |  |
| 2 | K | 6 |  |
| 2 | P | 6 |  |
| 3 | J | 5 |  |
| 3 | L | 5 |  |
| 3 | N | 5 |  |
| 4 | M | 4 |  |
| 5 | O | 5 |  |

2 Entry composition i

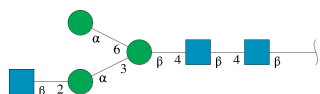
There are 8 unique types of molecules in this entry. The entry contains 31445 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Alpha-(1,6)-fucosyltransferase.

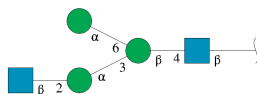
| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|---------------|-----------|----------|----------|---------|---------|---------|-------|
| | | | Total | C | N | O | S | | | |
| 1 | A | 467 | Total 3809 | C 2424 | N 672 | O 699 | S 14 | 0 | 1 | 0 |
| 1 | B | 467 | Total 3801 | C 2419 | N 669 | O 699 | S 14 | 0 | 0 | 0 |
| 1 | C | 467 | Total 3801 | C 2419 | N 669 | O 699 | S 14 | 0 | 0 | 0 |
| 1 | D | 467 | Total 3801 | C 2419 | N 669 | O 699 | S 14 | 0 | 0 | 0 |
| 1 | E | 467 | Total 3801 | C 2419 | N 669 | O 699 | S 14 | 0 | 0 | 0 |
| 1 | F | 467 | Total 3801 | C 2419 | N 669 | O 699 | S 14 | 0 | 0 | 0 |
| 1 | G | 467 | Total 3801 | C 2419 | N 669 | O 699 | S 14 | 0 | 0 | 0 |
| 1 | H | 467 | Total 3801 | C 2419 | N 669 | O 699 | S 14 | 0 | 0 | 0 |

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



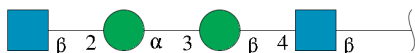
| Mol | Chain | Residues | Atoms | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------------|---------|--------|---------|---------|---------|-------|
| | | | Total | C | N | O | | | |
| 2 | I | 6 | Total 75 | C 42 | N 3 | O 30 | 0 | 0 | 0 |
| 2 | K | 6 | Total 75 | C 42 | N 3 | O 30 | 0 | 0 | 0 |
| 2 | P | 6 | Total 76 | C 42 | N 3 | O 31 | 0 | 0 | 0 |

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



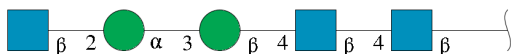
| Mol | Chain | Residues | Atoms | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|---------|-------|
| | | | Total | C | N | O | | | |
| 3 | J | 5 | 62 | 34 | 2 | 26 | 0 | 0 | 0 |
| 3 | L | 5 | 62 | 34 | 2 | 26 | 0 | 0 | 0 |
| 3 | N | 5 | 62 | 34 | 2 | 26 | 0 | 0 | 0 |

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



| Mol | Chain | Residues | Atoms | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|---------|-------|
| | | | Total | C | N | O | | | |
| 4 | M | 4 | 51 | 28 | 2 | 21 | 0 | 0 | 0 |

- Molecule 5 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(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.



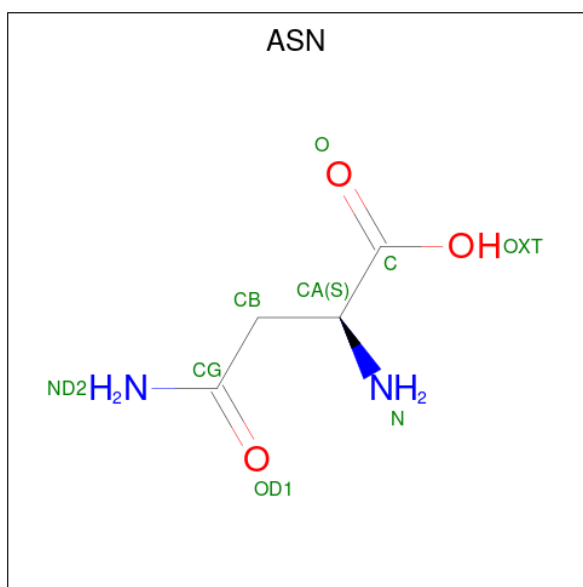
| Mol | Chain | Residues | Atoms | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|----|---|----|---------|---------|-------|
| | | | Total | C | N | O | | | |
| 5 | O | 5 | 65 | 36 | 3 | 26 | 0 | 0 | 0 |

- Molecule 6 is GUANOSINE-5'-DIPHOSPHATE (three-letter code: GDP) (formula: C₁₀H₁₅N₅O₁₁P₂) (labeled as "Ligand of Interest" by depositor).



| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf |
|-----|-------|----------|-------|----|---|----|---|---------|---------|
| | | | Total | C | N | O | P | | |
| 6 | A | 1 | Total | C | N | O | P | 0 | 0 |
| | | | 28 | 10 | 5 | 11 | 2 | | |
| 6 | B | 1 | Total | C | N | O | P | 0 | 0 |
| | | | 28 | 10 | 5 | 11 | 2 | | |
| 6 | C | 1 | Total | C | N | O | P | 0 | 0 |
| | | | 28 | 10 | 5 | 11 | 2 | | |
| 6 | D | 1 | Total | C | N | O | P | 0 | 0 |
| | | | 28 | 10 | 5 | 11 | 2 | | |
| 6 | E | 1 | Total | C | N | O | P | 0 | 0 |
| | | | 28 | 10 | 5 | 11 | 2 | | |
| 6 | F | 1 | Total | C | N | O | P | 0 | 0 |
| | | | 28 | 10 | 5 | 11 | 2 | | |
| 6 | G | 1 | Total | C | N | O | P | 0 | 0 |
| | | | 28 | 10 | 5 | 11 | 2 | | |
| 6 | H | 1 | Total | C | N | O | P | 0 | 0 |
| | | | 28 | 10 | 5 | 11 | 2 | | |

- Molecule 7 is ASPARAGINE (three-letter code: ASN) (formula: C₄H₈N₂O₃) (labeled as "Ligand of Interest" by depositor).



| Mol | Chain | Residues | Atoms | | | | ZeroOcc | AltConf |
|-----|-------|----------|-------|---|---|---|---------|---------|
| 7 | A | 1 | Total | C | N | O | 0 | 0 |
| | | | 8 | 4 | 2 | 2 | | |
| 7 | C | 1 | Total | C | N | O | 0 | 0 |
| | | | 8 | 4 | 2 | 2 | | |

- Molecule 8 is water.

| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|-----|-------|----------|-------|----|---------|---------|
| 8 | A | 34 | Total | O | 0 | 0 |
| | | | 34 | 34 | | |
| 8 | B | 34 | Total | O | 0 | 0 |
| | | | 34 | 34 | | |
| 8 | C | 33 | Total | O | 0 | 0 |
| | | | 33 | 33 | | |
| 8 | D | 31 | Total | O | 0 | 0 |
| | | | 31 | 31 | | |
| 8 | E | 28 | Total | O | 0 | 0 |
| | | | 28 | 28 | | |
| 8 | F | 40 | Total | O | 0 | 0 |
| | | | 40 | 40 | | |
| 8 | G | 25 | Total | O | 0 | 0 |
| | | | 25 | 25 | | |
| 8 | H | 36 | Total | O | 0 | 0 |
| | | | 36 | 36 | | |

Y570
P571
E572
A573
E574
LYS

- Molecule 1: Alpha-(1,6)-fucosyltransferase

Chain D: 78% 9% 13%

ARG
GLU
LEU
SER
SER
LYS
ILE
LEU
ALA
LYS
LEU
GLN
GLN
ASN
GLU
GLU
ASP
LEU
ARG
ARG
MET
ALA
GLU
SER
LEU
ARG
ILE
PRO
GLU
GLY
PRO
ILE
ASP
GLN
GLY
PRO
ALA
GLY
ARG
VAL
VAL
LEU
GLU
GLU
GLN
LEU
VAL
LYS
ALA
LYS
GLU
ILE
GLU
ASN
TYR

LYS
LYS
GLN
THR
ARG
ASN
GLY
L106
G109
K110
E120
W127
Q131
K138
E181
Q199
Q223
H226
Y229
C230
F231
T240
L241
I242
L243
E244
R249
Y250
R260
E264
R269
L291
P292
I293
L306
V317
H320
A324
K333

P338
L342
V362
M383
D400
Y421
N440
T443
S446
L447
V464
C465
T466
T481
P484
D485
A486
S487
L493
Y498
A512
P515
P522
P525
K546
E574
LYS

- Molecule 1: Alpha-(1,6)-fucosyltransferase

Chain E: 76% 12% 13%

ARG
GLU
SER
SER
LYS
ILE
LEU
ALA
LYS
LEU
GLN
GLN
ASN
GLU
GLU
ASP
LEU
ARG
ARG
MET
ALA
GLU
SER
LEU
ARG
ILE
PRO
GLU
GLY
PRO
ILE
ASP
GLN
GLY
PRO
ALA
GLY
ARG
VAL
VAL
LEU
GLU
GLU
GLN
LEU
VAL
LYS
ALA
LYS
GLU
ILE
GLU
ASN
TYR

LYS
LYS
THR
ARG
ASN
GLY
L106
G109
R118
L134
L137
N143
R147
D166
D174
E189
L190
R193
G217
Y220
H226
Y229
C230
F231
Y235
Q238
W248
R249
Y250
A251
E256
T257
V258
F259
I293
S296
L297
H298
Y303

L306
P309
L316
H320
A324
W326
S386
L342
P358
M383
F390
D400
R403
L406
Y421
S428
N440
L447
T466
Q470
V474
H483
P484
D485
A486
S487
L493
A512
P515
E520
P525
Y567

P568
T569
Y570
P571
E572
A573
E574
LYS

- Molecule 1: Alpha-(1,6)-fucosyltransferase

Chain F: 75% 12% 13%


ARG
GLU
LEU
SER
SER
LYS
ILE
LEU
ALA
LYS
LEU
GLN
GLN
ASN
GLU
GLU
ASP
LEU
ARG
ARG
MET
ALA
GLU
SER
LEU
ARG
ILE
PRO
GLU
GLY
PRO
ILE
ASP
GLN
GLY
PRO
ALA
GLY
ARG
VAL
VAL
LEU
VAL
VAL
ALA
LYS
LYS
GLU
ILE
GLU
ASN
TYR

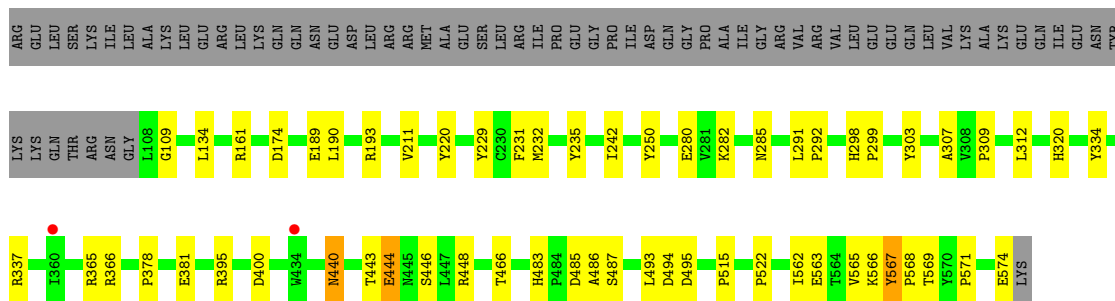
LYS
LYS
THR
ARG
ASN
GLY
L106
G109
I119
L137
L140
E144
R147
R161
S162
I163
D174
R194
G217
H226
Y229
C230
F231
Y235
R239
E244
N247
W248
R249
Y250
A251
T252
E256
F259
R269
V286
L291
P292
I293

Y294
D295
P302
Y303
A307
P309
F308
L316
V317
R318
R319
H320
W326
H363
R366
H377
F390
R395
D400
N440
E444
L447
R448
T466
Q470
V471
C472
R473
V474
A475
Y476
H483
A486
S487
L493
Y497
S501
A512


P595
P554
K557
V565
K566
Y567
P568
T569
E574
LYS

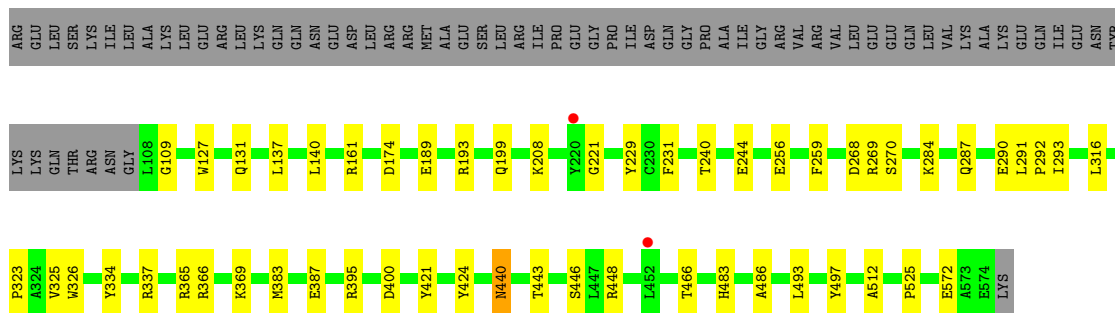
- Molecule 1: Alpha-(1,6)-fucosyltransferase

Chain G:  76% 10% 13%

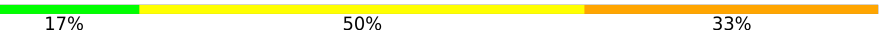


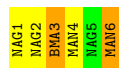
- Molecule 1: Alpha-(1,6)-fucosyltransferase

Chain H:  77% 10% 13%



- Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(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 I:  17% 50% 33%




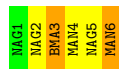
- Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain K:  100%

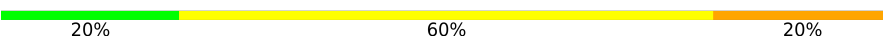


- Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain P:  17% 50% 33%

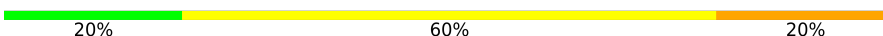


- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain J: 



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

Chain L: 



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

Chain N: 



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

Chain M: 



- Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(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 O: 



4 Data and refinement statistics i

| Property | Value | Source |
|-------------------------------------------------------------------------|-------------------------------------------------------------|------------------|
| Space group | P 65 | Depositor |
| Cell constants a, b, c, α , β , γ | 154.02Å 154.02Å 466.92Å 90.00° 90.00° 120.00° | Depositor |
| Resolution (Å) | 87.84 – 3.20 87.84 – 3.20 | Depositor EDS |
| % Data completeness (in resolution range) | 99.4 (87.84-3.20) 99.4 (87.84-3.20) | Depositor EDS |
| R_{merge} | (Not available) | Depositor |
| R_{sym} | (Not available) | Depositor |
| $\langle I/\sigma(I) \rangle$ ¹ | 1.48 (at 3.19Å) | Xtrriage |
| Refinement program | PHENIX 1.13_2998 | Depositor |
| R, R_{free} | 0.190 , 0.236 0.194 , 0.231 | Depositor DCC |
| R_{free} test set | 97028 reflections (95.05%) | wwPDB-VP |
| Wilson B-factor (Å ²) | 64.1 | Xtrriage |
| Anisotropy | 0.519 | Xtrriage |
| Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²) | 0.33 , 24.5 | EDS |
| L-test for twinning ² | $\langle L \rangle = 0.44$, $\langle L^2 \rangle = 0.26$ | Xtrriage |
| Estimated twinning fraction | 0.116 for h,-h-k,-l | Xtrriage |
| F_o, F_c correlation | 0.93 | EDS |
| Total number of atoms | 31445 | wwPDB-VP |
| Average B, all atoms (Å ²) | 61.0 | wwPDB-VP |

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 41.18 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 2.4512e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: BMA, MAN, NAG, GDP

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

| Mol | Chain | Bond lengths | | Bond angles | |
|-----|-------|--------------|---------|-------------|---------|
| | | RMSZ | # Z >5 | RMSZ | # Z >5 |
| 1 | A | 0.26 | 0/3912 | 0.41 | 0/5304 |
| 1 | B | 0.26 | 0/3901 | 0.40 | 0/5289 |
| 1 | C | 0.30 | 0/3901 | 0.41 | 0/5289 |
| 1 | D | 0.25 | 0/3901 | 0.40 | 0/5289 |
| 1 | E | 0.25 | 0/3901 | 0.40 | 0/5289 |
| 1 | F | 0.24 | 0/3901 | 0.40 | 0/5289 |
| 1 | G | 0.24 | 0/3901 | 0.40 | 0/5289 |
| 1 | H | 0.24 | 0/3901 | 0.39 | 0/5289 |
| All | All | 0.26 | 0/31219 | 0.40 | 0/42327 |

There are no bond length outliers.

There are no bond angle outliers.

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 | A | 3809 | 0 | 3724 | 32 | 0 |
| 1 | B | 3801 | 0 | 3711 | 37 | 0 |
| 1 | C | 3801 | 0 | 3711 | 46 | 0 |
| 1 | D | 3801 | 0 | 3711 | 28 | 0 |
| 1 | E | 3801 | 0 | 3711 | 50 | 0 |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 1 | F | 3801 | 0 | 3711 | 39 | 0 |
| 1 | G | 3801 | 0 | 3711 | 48 | 0 |
| 1 | H | 3801 | 0 | 3711 | 30 | 0 |
| 2 | I | 75 | 0 | 64 | 1 | 0 |
| 2 | K | 75 | 0 | 64 | 1 | 0 |
| 2 | P | 76 | 0 | 66 | 1 | 0 |
| 3 | J | 62 | 0 | 54 | 2 | 0 |
| 3 | L | 62 | 0 | 54 | 2 | 0 |
| 3 | N | 62 | 0 | 54 | 0 | 0 |
| 4 | M | 51 | 0 | 45 | 2 | 0 |
| 5 | O | 65 | 0 | 57 | 0 | 0 |
| 6 | A | 28 | 0 | 12 | 1 | 0 |
| 6 | B | 28 | 0 | 12 | 0 | 0 |
| 6 | C | 28 | 0 | 12 | 0 | 0 |
| 6 | D | 28 | 0 | 12 | 0 | 0 |
| 6 | E | 28 | 0 | 12 | 1 | 0 |
| 6 | F | 28 | 0 | 12 | 0 | 0 |
| 6 | G | 28 | 0 | 12 | 0 | 0 |
| 6 | H | 28 | 0 | 12 | 1 | 0 |
| 7 | A | 8 | 0 | 4 | 0 | 0 |
| 7 | C | 8 | 0 | 4 | 0 | 0 |
| 8 | A | 34 | 0 | 0 | 1 | 0 |
| 8 | B | 34 | 0 | 0 | 1 | 0 |
| 8 | C | 33 | 0 | 0 | 0 | 0 |
| 8 | D | 31 | 0 | 0 | 0 | 0 |
| 8 | E | 28 | 0 | 0 | 1 | 0 |
| 8 | F | 40 | 0 | 0 | 2 | 0 |
| 8 | G | 25 | 0 | 0 | 3 | 0 |
| 8 | H | 36 | 0 | 0 | 0 | 0 |
| All | All | 31445 | 0 | 30263 | 302 | 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 302 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|------------------|--------------------------|-------------------|
| 1:G:307:ALA:CB | 1:G:565:VAL:HG13 | 1.71 | 1.21 |
| 1:G:307:ALA:HB1 | 1:G:565:VAL:HG13 | 1.33 | 1.05 |
| 1:G:307:ALA:CB | 1:G:565:VAL:CG1 | 2.39 | 0.99 |
| 1:E:303:TYR:CD1 | 1:E:567:TYR:CE1 | 2.54 | 0.96 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:E:303:TYR:HD1 | 1:E:567:TYR:CE1 | 1.85 | 0.95 |

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|-----|-------|-----------------|------------|----------|----------|-------------|-----|
| 1 | A | 466/535 (87%) | 452 (97%) | 14 (3%) | 0 | 100 | 100 |
| 1 | B | 465/535 (87%) | 452 (97%) | 13 (3%) | 0 | 100 | 100 |
| 1 | C | 465/535 (87%) | 449 (97%) | 16 (3%) | 0 | 100 | 100 |
| 1 | D | 465/535 (87%) | 450 (97%) | 15 (3%) | 0 | 100 | 100 |
| 1 | E | 465/535 (87%) | 451 (97%) | 14 (3%) | 0 | 100 | 100 |
| 1 | F | 465/535 (87%) | 452 (97%) | 13 (3%) | 0 | 100 | 100 |
| 1 | G | 465/535 (87%) | 452 (97%) | 13 (3%) | 0 | 100 | 100 |
| 1 | H | 465/535 (87%) | 452 (97%) | 13 (3%) | 0 | 100 | 100 |
| All | All | 3721/4280 (87%) | 3610 (97%) | 111 (3%) | 0 | 100 | 100 |

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

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

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

| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles | |
|-----|-------|-----------------|------------|----------|-------------|----|
| 1 | A | 411/470 (87%) | 408 (99%) | 3 (1%) | 84 | 94 |
| 1 | B | 410/470 (87%) | 404 (98%) | 6 (2%) | 65 | 85 |
| 1 | C | 410/470 (87%) | 406 (99%) | 4 (1%) | 76 | 90 |
| 1 | D | 410/470 (87%) | 406 (99%) | 4 (1%) | 76 | 90 |
| 1 | E | 410/470 (87%) | 406 (99%) | 4 (1%) | 76 | 90 |
| 1 | F | 410/470 (87%) | 405 (99%) | 5 (1%) | 71 | 88 |
| 1 | G | 410/470 (87%) | 403 (98%) | 7 (2%) | 60 | 83 |
| 1 | H | 410/470 (87%) | 405 (99%) | 5 (1%) | 71 | 88 |
| All | All | 3281/3760 (87%) | 3243 (99%) | 38 (1%) | 71 | 88 |

5 of 38 residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | G | 440 | ASN |
| 1 | H | 440 | ASN |
| 1 | G | 444 | GLU |
| 1 | G | 567 | TYR |
| 1 | H | 572 | GLU |

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

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | F | 226 | HIS |
| 1 | F | 459 | GLN |

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

42 monosaccharides are modelled in this entry.

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

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|-----|------|-------|-----|------|--------------|------|-------------|-------------|------|-------------|
| | | | | | Counts | RMSZ | $\# Z > 2$ | Counts | RMSZ | $\# Z > 2$ |
| 2 | NAG | I | 1 | 7,2 | 14,14,15 | 0.34 | 0 | 17,19,21 | 1.41 | 3 (17%) |
| 2 | NAG | I | 2 | 2 | 14,14,15 | 0.34 | 0 | 17,19,21 | 0.97 | 1 (5%) |
| 2 | BMA | I | 3 | 2 | 11,11,12 | 0.34 | 0 | 15,15,17 | 0.88 | 1 (6%) |
| 2 | MAN | I | 4 | 2 | 11,11,12 | 0.77 | 0 | 15,15,17 | 0.96 | 1 (6%) |
| 2 | NAG | I | 5 | 2 | 14,14,15 | 0.30 | 0 | 17,19,21 | 0.84 | 0 |
| 2 | MAN | I | 6 | 2 | 11,11,12 | 0.66 | 0 | 15,15,17 | 1.20 | 2 (13%) |
| 3 | NAG | J | 1 | 3 | 15,15,15 | 0.43 | 0 | 21,21,21 | 0.67 | 0 |
| 3 | BMA | J | 2 | 3 | 11,11,12 | 0.27 | 0 | 15,15,17 | 0.78 | 0 |
| 3 | MAN | J | 3 | 3 | 11,11,12 | 0.62 | 0 | 15,15,17 | 1.02 | 1 (6%) |
| 3 | NAG | J | 4 | 3 | 14,14,15 | 0.33 | 0 | 17,19,21 | 1.12 | 1 (5%) |
| 3 | MAN | J | 5 | 3 | 11,11,12 | 0.68 | 0 | 15,15,17 | 1.21 | 1 (6%) |
| 2 | NAG | K | 1 | 7,2 | 14,14,15 | 0.31 | 0 | 17,19,21 | 0.98 | 1 (5%) |
| 2 | NAG | K | 2 | 2 | 14,14,15 | 0.34 | 0 | 17,19,21 | 1.03 | 1 (5%) |
| 2 | BMA | K | 3 | 2 | 11,11,12 | 0.33 | 0 | 15,15,17 | 0.71 | 0 |
| 2 | MAN | K | 4 | 2 | 11,11,12 | 0.63 | 0 | 15,15,17 | 1.19 | 1 (6%) |
| 2 | NAG | K | 5 | 2 | 14,14,15 | 0.32 | 0 | 17,19,21 | 0.88 | 1 (5%) |
| 2 | MAN | K | 6 | 2 | 11,11,12 | 0.75 | 0 | 15,15,17 | 0.74 | 0 |
| 3 | NAG | L | 1 | 3 | 15,15,15 | 0.42 | 0 | 21,21,21 | 0.67 | 0 |
| 3 | BMA | L | 2 | 3 | 11,11,12 | 0.24 | 0 | 15,15,17 | 0.86 | 1 (6%) |
| 3 | MAN | L | 3 | 3 | 11,11,12 | 0.64 | 0 | 15,15,17 | 0.95 | 1 (6%) |
| 3 | NAG | L | 4 | 3 | 14,14,15 | 0.30 | 0 | 17,19,21 | 0.76 | 1 (5%) |
| 3 | MAN | L | 5 | 3 | 11,11,12 | 0.64 | 0 | 15,15,17 | 1.27 | 1 (6%) |
| 4 | NAG | M | 1 | 4 | 15,15,15 | 0.46 | 0 | 21,21,21 | 1.28 | 2 (9%) |
| 4 | BMA | M | 2 | 4 | 11,11,12 | 0.30 | 0 | 15,15,17 | 0.75 | 0 |
| 4 | MAN | M | 3 | 4 | 11,11,12 | 0.65 | 0 | 15,15,17 | 1.00 | 1 (6%) |
| 4 | NAG | M | 4 | 4 | 14,14,15 | 0.31 | 0 | 17,19,21 | 0.76 | 0 |
| 3 | NAG | N | 1 | 3 | 15,15,15 | 0.46 | 0 | 21,21,21 | 1.33 | 3 (14%) |
| 3 | BMA | N | 2 | 3 | 11,11,12 | 0.34 | 0 | 15,15,17 | 0.80 | 1 (6%) |
| 3 | MAN | N | 3 | 3 | 11,11,12 | 0.63 | 0 | 15,15,17 | 0.87 | 0 |
| 3 | NAG | N | 4 | 3 | 14,14,15 | 0.30 | 0 | 17,19,21 | 0.80 | 1 (5%) |

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|-----|------|-------|-----|------|--------------|------|----------|-------------|------|----------|
| | | | | | Counts | RMSZ | # Z > 2 | Counts | RMSZ | # Z > 2 |
| 3 | MAN | N | 5 | 3 | 11,11,12 | 0.63 | 0 | 15,15,17 | 1.25 | 2 (13%) |
| 5 | NAG | O | 1 | 5 | 15,15,15 | 0.44 | 0 | 21,21,21 | 0.74 | 0 |
| 5 | NAG | O | 2 | 5 | 14,14,15 | 0.41 | 0 | 17,19,21 | 0.73 | 0 |
| 5 | BMA | O | 3 | 5 | 11,11,12 | 0.41 | 0 | 15,15,17 | 0.93 | 1 (6%) |
| 5 | MAN | O | 4 | 5 | 11,11,12 | 0.66 | 0 | 15,15,17 | 1.01 | 1 (6%) |
| 5 | NAG | O | 5 | 5 | 14,14,15 | 0.26 | 0 | 17,19,21 | 0.76 | 1 (5%) |
| 2 | NAG | P | 1 | 2 | 15,15,15 | 0.44 | 0 | 21,21,21 | 0.77 | 0 |
| 2 | NAG | P | 2 | 2 | 14,14,15 | 0.35 | 0 | 17,19,21 | 0.86 | 1 (5%) |
| 2 | BMA | P | 3 | 2 | 11,11,12 | 0.44 | 0 | 15,15,17 | 0.93 | 1 (6%) |
| 2 | MAN | P | 4 | 2 | 11,11,12 | 0.63 | 0 | 15,15,17 | 1.03 | 1 (6%) |
| 2 | NAG | P | 5 | 2 | 14,14,15 | 0.26 | 0 | 17,19,21 | 0.70 | 1 (5%) |
| 2 | MAN | P | 6 | 2 | 11,11,12 | 0.71 | 0 | 15,15,17 | 1.24 | 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 |
|-----|------|-------|-----|------|---------|-----------|---------|
| 2 | NAG | I | 1 | 7,2 | - | 0/6/23/26 | 0/1/1/1 |
| 2 | NAG | I | 2 | 2 | - | 0/6/23/26 | 0/1/1/1 |
| 2 | BMA | I | 3 | 2 | - | 0/2/19/22 | 0/1/1/1 |
| 2 | MAN | I | 4 | 2 | - | 0/2/19/22 | 0/1/1/1 |
| 2 | NAG | I | 5 | 2 | - | 0/6/23/26 | 0/1/1/1 |
| 2 | MAN | I | 6 | 2 | - | 2/2/19/22 | 0/1/1/1 |
| 3 | NAG | J | 1 | 3 | - | 2/6/26/26 | 0/1/1/1 |
| 3 | BMA | J | 2 | 3 | - | 0/2/19/22 | 0/1/1/1 |
| 3 | MAN | J | 3 | 3 | - | 0/2/19/22 | 0/1/1/1 |
| 3 | NAG | J | 4 | 3 | - | 0/6/23/26 | 0/1/1/1 |
| 3 | MAN | J | 5 | 3 | - | 1/2/19/22 | 0/1/1/1 |
| 2 | NAG | K | 1 | 7,2 | - | 0/6/23/26 | 0/1/1/1 |
| 2 | NAG | K | 2 | 2 | - | 0/6/23/26 | 0/1/1/1 |
| 2 | BMA | K | 3 | 2 | - | 2/2/19/22 | 0/1/1/1 |
| 2 | MAN | K | 4 | 2 | - | 0/2/19/22 | 0/1/1/1 |
| 2 | NAG | K | 5 | 2 | - | 2/6/23/26 | 0/1/1/1 |
| 2 | MAN | K | 6 | 2 | - | 2/2/19/22 | 0/1/1/1 |
| 3 | NAG | L | 1 | 3 | - | 0/6/26/26 | 0/1/1/1 |
| 3 | BMA | L | 2 | 3 | - | 0/2/19/22 | 0/1/1/1 |
| 3 | MAN | L | 3 | 3 | - | 0/2/19/22 | 0/1/1/1 |

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| Mol | Type | Chain | Res | Link | Chirals | Torsions | Rings |
|-----|------|-------|-----|------|---------|-----------|---------|
| 3 | NAG | L | 4 | 3 | - | 2/6/23/26 | 0/1/1/1 |
| 3 | MAN | L | 5 | 3 | - | 1/2/19/22 | 0/1/1/1 |
| 4 | NAG | M | 1 | 4 | - | 0/6/26/26 | 0/1/1/1 |
| 4 | BMA | M | 2 | 4 | - | 0/2/19/22 | 0/1/1/1 |
| 4 | MAN | M | 3 | 4 | - | 0/2/19/22 | 0/1/1/1 |
| 4 | NAG | M | 4 | 4 | - | 0/6/23/26 | 0/1/1/1 |
| 3 | NAG | N | 1 | 3 | - | 2/6/26/26 | 0/1/1/1 |
| 3 | BMA | N | 2 | 3 | - | 1/2/19/22 | 0/1/1/1 |
| 3 | MAN | N | 3 | 3 | - | 0/2/19/22 | 0/1/1/1 |
| 3 | NAG | N | 4 | 3 | - | 0/6/23/26 | 0/1/1/1 |
| 3 | MAN | N | 5 | 3 | - | 2/2/19/22 | 1/1/1/1 |
| 5 | NAG | O | 1 | 5 | - | 2/6/26/26 | 0/1/1/1 |
| 5 | NAG | O | 2 | 5 | - | 0/6/23/26 | 0/1/1/1 |
| 5 | BMA | O | 3 | 5 | - | 2/2/19/22 | 0/1/1/1 |
| 5 | MAN | O | 4 | 5 | - | 0/2/19/22 | 0/1/1/1 |
| 5 | NAG | O | 5 | 5 | - | 2/6/23/26 | 0/1/1/1 |
| 2 | NAG | P | 1 | 2 | - | 4/6/26/26 | 0/1/1/1 |
| 2 | NAG | P | 2 | 2 | - | 0/6/23/26 | 0/1/1/1 |
| 2 | BMA | P | 3 | 2 | - | 0/2/19/22 | 0/1/1/1 |
| 2 | MAN | P | 4 | 2 | - | 0/2/19/22 | 0/1/1/1 |
| 2 | NAG | P | 5 | 2 | - | 4/6/23/26 | 0/1/1/1 |
| 2 | MAN | P | 6 | 2 | - | 2/2/19/22 | 0/1/1/1 |

There are no bond length outliers.

The worst 5 of 38 bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(°) | Ideal(°) |
|-----|-------|-----|------|----------|-------|-------------|----------|
| 4 | M | 1 | NAG | O5-C1-C2 | 3.64 | 113.17 | 109.52 |
| 3 | J | 4 | NAG | C1-O5-C5 | 3.62 | 117.10 | 112.19 |
| 3 | N | 1 | NAG | O5-C1-C2 | 3.58 | 113.11 | 109.52 |
| 3 | J | 5 | MAN | C1-O5-C5 | -3.56 | 107.38 | 112.19 |
| 2 | I | 1 | NAG | C1-O5-C5 | 3.54 | 116.99 | 112.19 |

There are no chirality outliers.

5 of 35 torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms |
|-----|-------|-----|------|-------------|
| 2 | P | 1 | NAG | C8-C7-N2-C2 |
| 2 | P | 1 | NAG | O7-C7-N2-C2 |

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| Mol | Chain | Res | Type | Atoms |
|-----|-------|-----|------|-------------|
| 2 | K | 3 | BMA | C4-C5-C6-O6 |
| 2 | P | 6 | MAN | O5-C5-C6-O6 |
| 3 | N | 1 | NAG | O5-C5-C6-O6 |

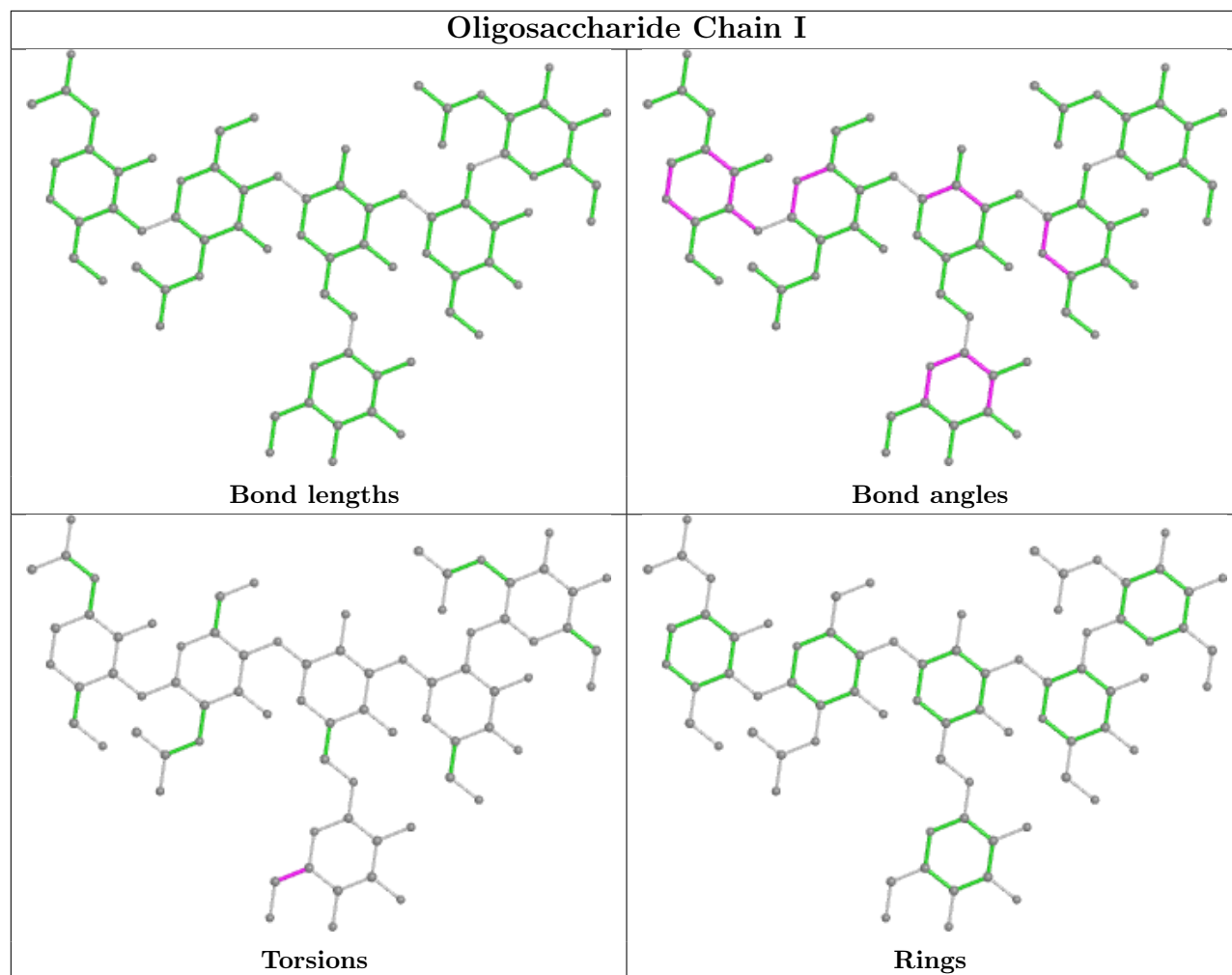
All (1) ring outliers are listed below:

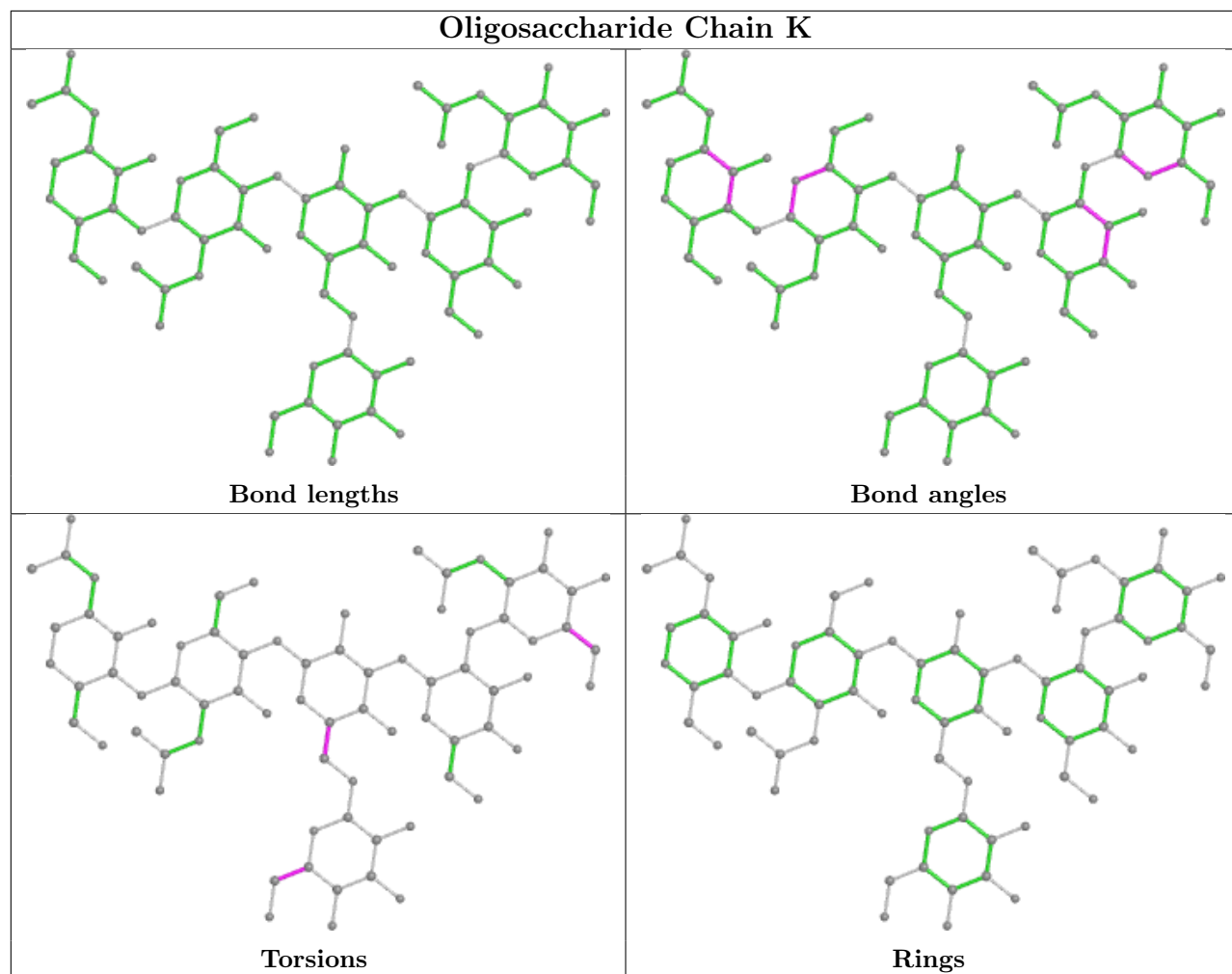
| Mol | Chain | Res | Type | Atoms |
|-----|-------|-----|------|-------------------|
| 3 | N | 5 | MAN | C1-C2-C3-C4-C5-O5 |

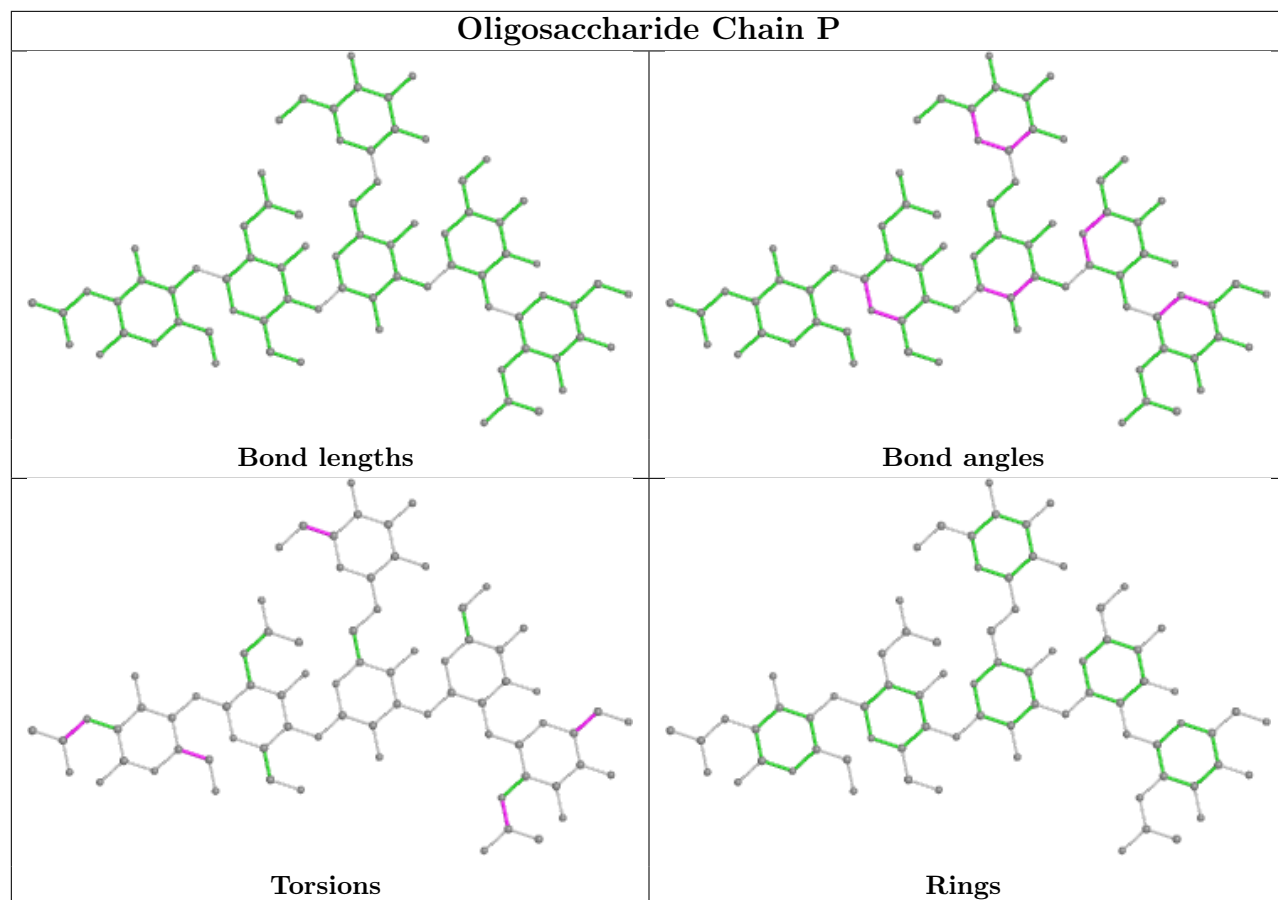
11 monomers are involved in 9 short contacts:

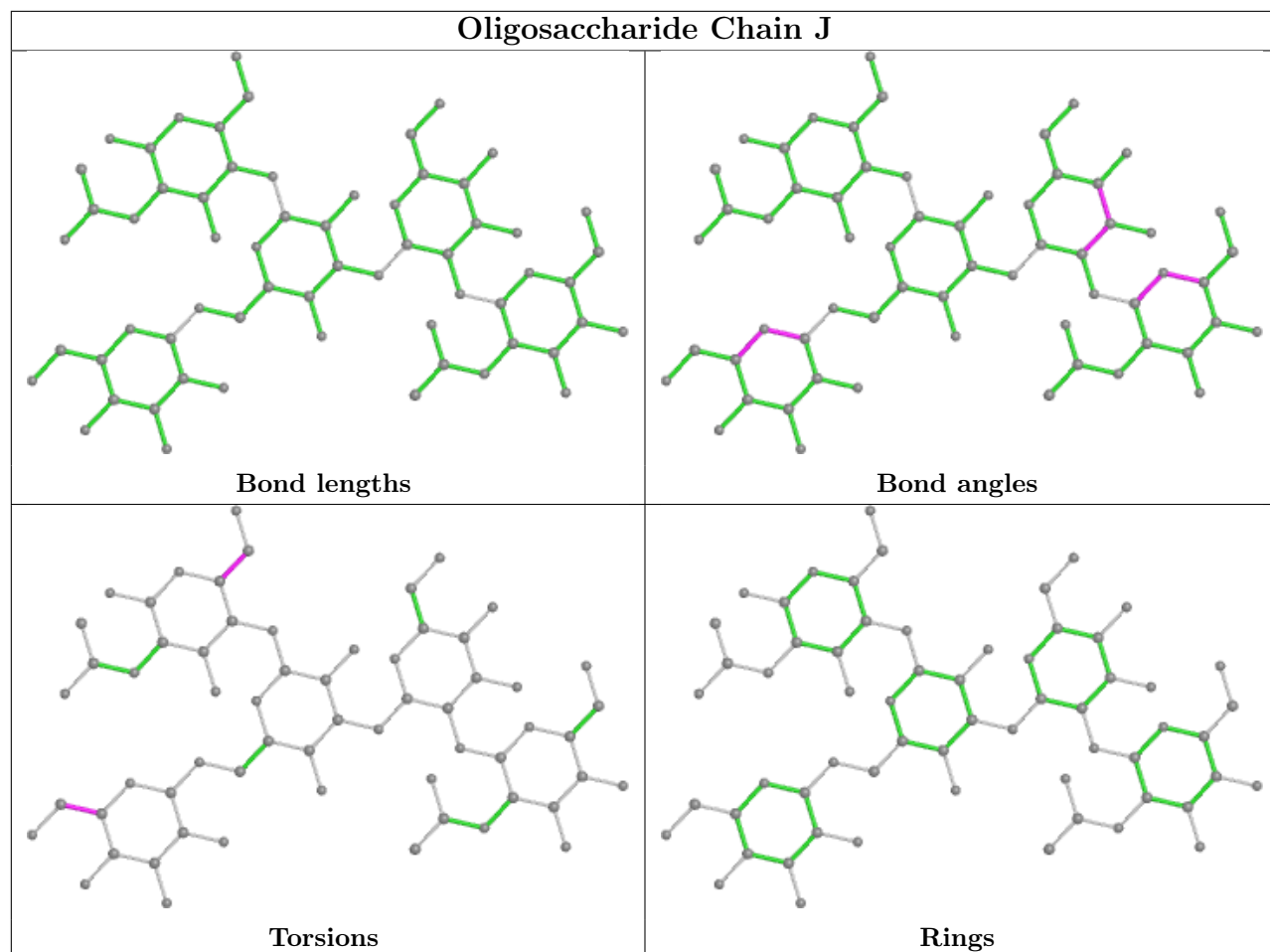
| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|-----|-------|-----|------|---------|--------------|
| 2 | P | 6 | MAN | 1 | 0 |
| 2 | I | 6 | MAN | 1 | 0 |
| 3 | L | 2 | BMA | 2 | 0 |
| 3 | J | 3 | MAN | 1 | 0 |
| 2 | I | 3 | BMA | 1 | 0 |
| 2 | K | 3 | BMA | 1 | 0 |
| 3 | J | 2 | BMA | 1 | 0 |
| 4 | M | 2 | BMA | 1 | 0 |
| 2 | K | 6 | MAN | 1 | 0 |
| 4 | M | 1 | NAG | 1 | 0 |
| 2 | P | 3 | BMA | 1 | 0 |

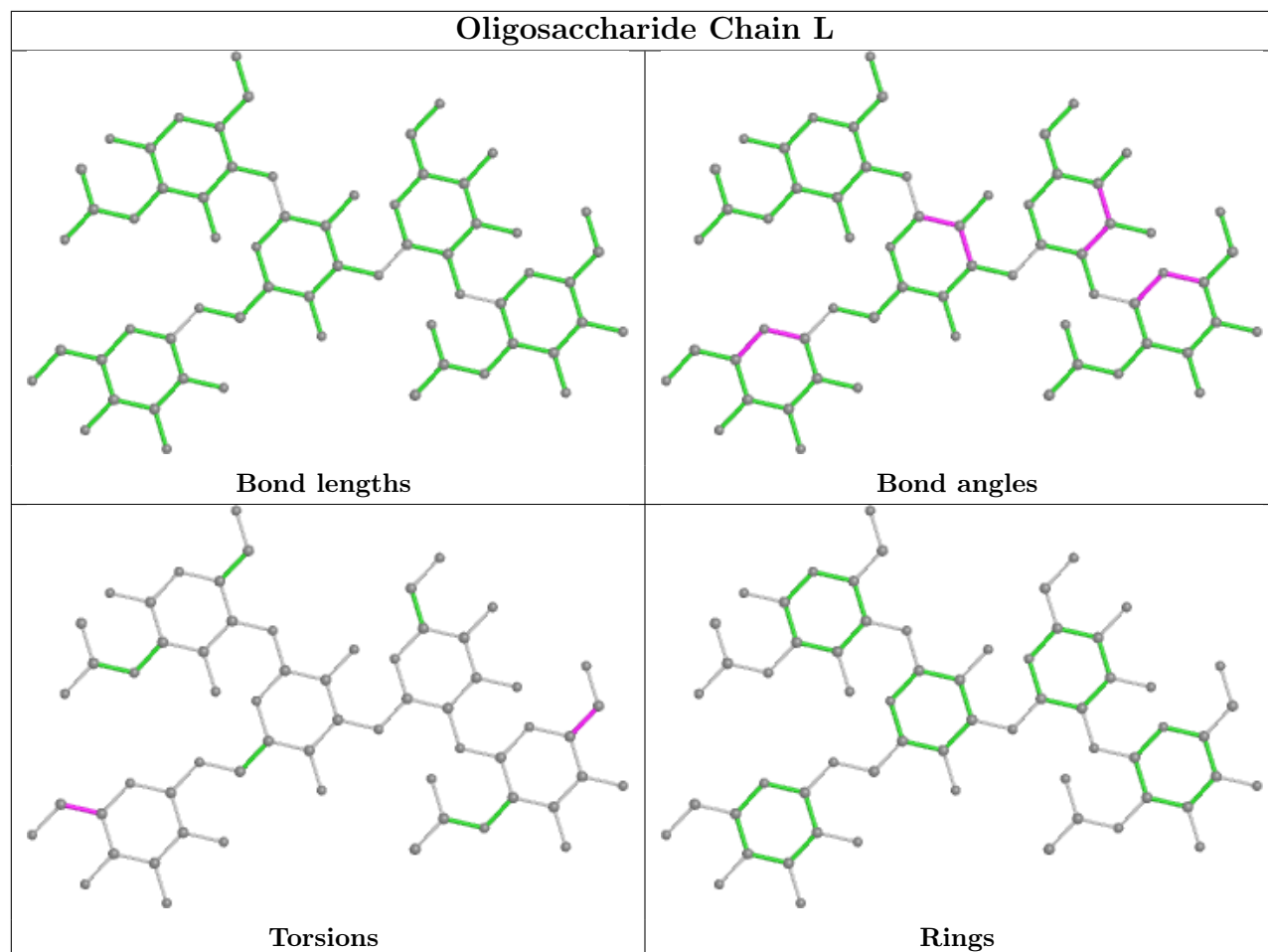
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

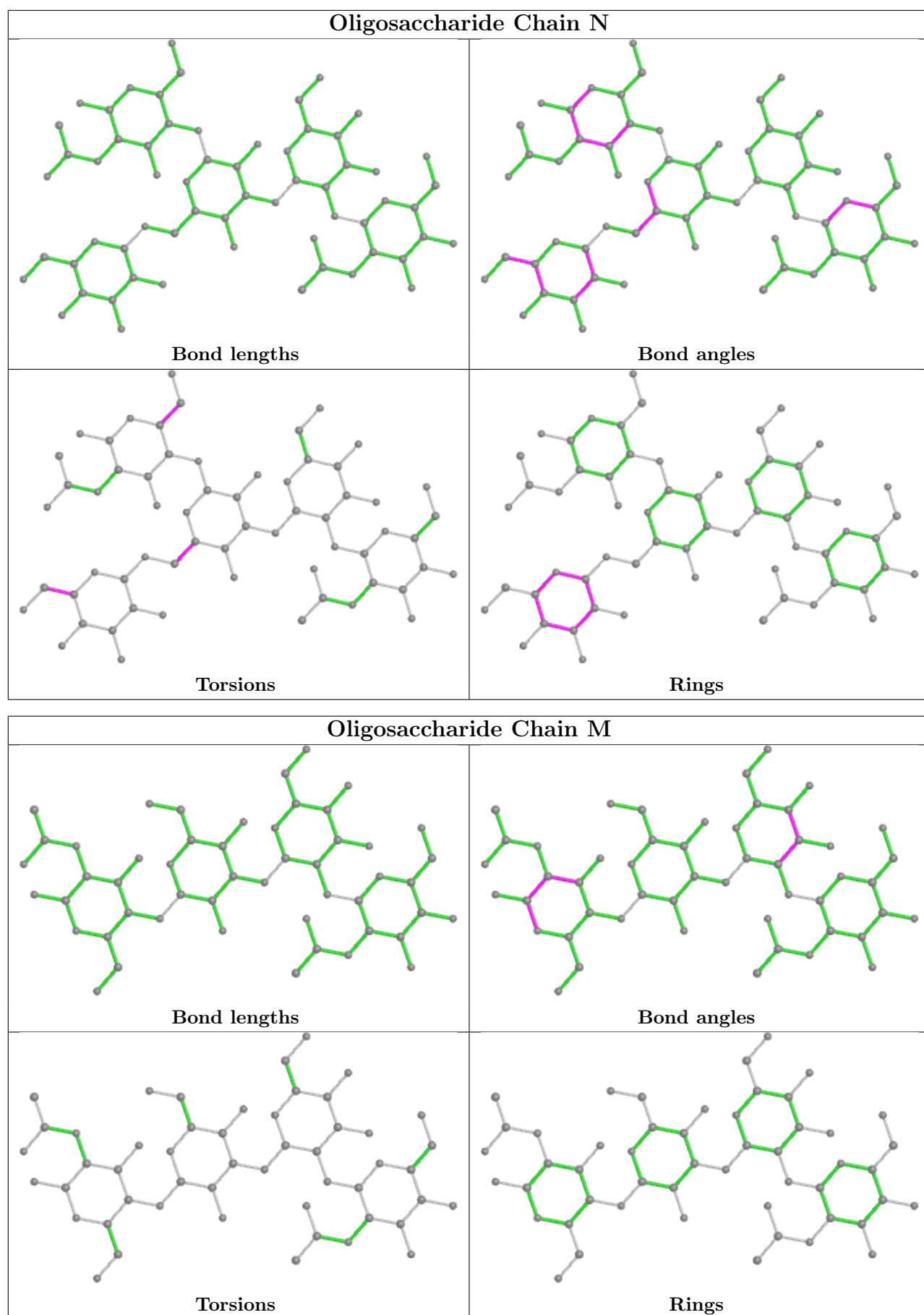


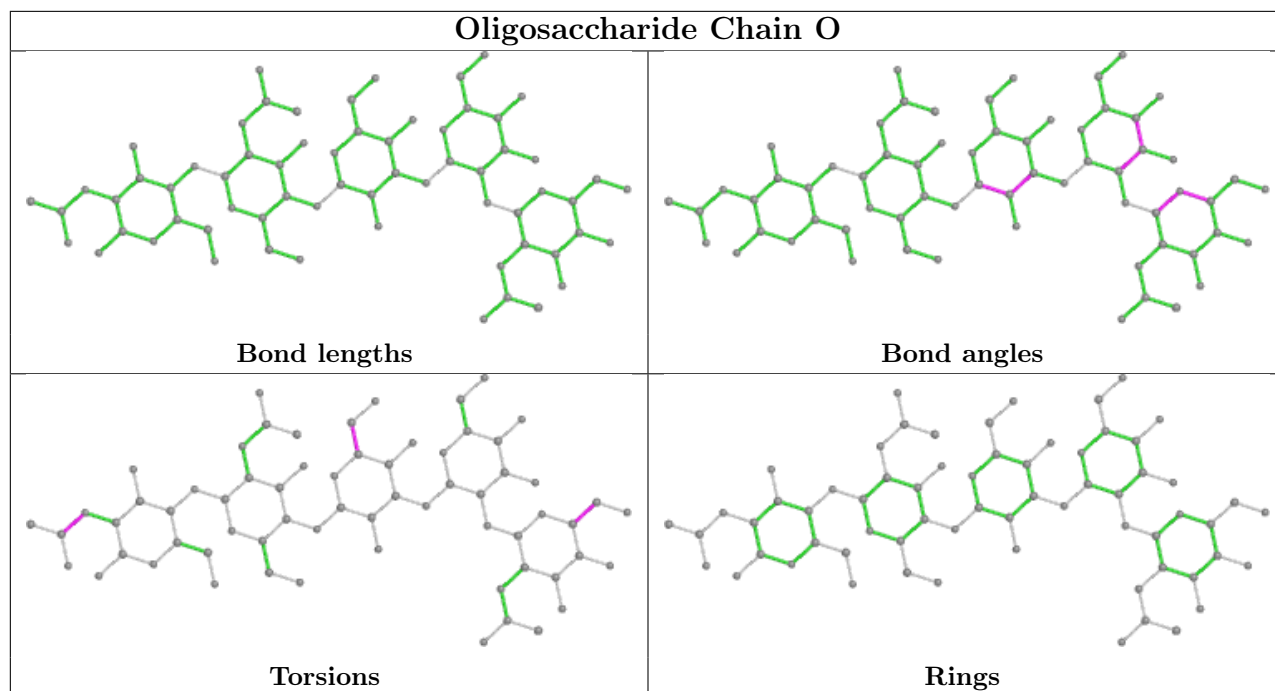












5.6 Ligand geometry [i](#)

10 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 |
| 7 | ASN | C | 700 | 2 | 6,7,8 | 0.46 | 0 | 5,8,10 | 0.28 | 0 |
| 6 | GDP | B | 600 | - | 24,30,30 | 1.49 | 4 (16%) | 30,47,47 | 1.15 | 3 (10%) |
| 6 | GDP | E | 600 | - | 24,30,30 | 1.50 | 4 (16%) | 30,47,47 | 1.18 | 4 (13%) |
| 6 | GDP | F | 600 | - | 24,30,30 | 1.50 | 4 (16%) | 30,47,47 | 1.20 | 3 (10%) |
| 6 | GDP | A | 600 | - | 24,30,30 | 1.47 | 4 (16%) | 30,47,47 | 1.16 | 3 (10%) |
| 6 | GDP | C | 600 | - | 24,30,30 | 1.49 | 4 (16%) | 30,47,47 | 1.15 | 3 (10%) |
| 6 | GDP | G | 600 | - | 24,30,30 | 1.47 | 4 (16%) | 30,47,47 | 1.15 | 3 (10%) |
| 6 | GDP | D | 600 | - | 24,30,30 | 1.49 | 4 (16%) | 30,47,47 | 1.18 | 3 (10%) |
| 6 | GDP | H | 600 | - | 24,30,30 | 1.49 | 4 (16%) | 30,47,47 | 1.16 | 4 (13%) |
| 7 | ASN | A | 700 | 2 | 6,7,8 | 0.47 | 0 | 5,8,10 | 0.30 | 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 |
|-----|------|-------|-----|------|---------|------------|---------|
| 7 | ASN | C | 700 | 2 | - | 0/5/6/8 | - |
| 6 | GDP | B | 600 | - | - | 7/12/32/32 | 0/3/3/3 |
| 6 | GDP | E | 600 | - | - | 4/12/32/32 | 0/3/3/3 |
| 6 | GDP | F | 600 | - | - | 4/12/32/32 | 0/3/3/3 |
| 6 | GDP | A | 600 | - | - | 6/12/32/32 | 0/3/3/3 |
| 6 | GDP | C | 600 | - | - | 5/12/32/32 | 0/3/3/3 |
| 6 | GDP | G | 600 | - | - | 7/12/32/32 | 0/3/3/3 |
| 6 | GDP | D | 600 | - | - | 7/12/32/32 | 0/3/3/3 |
| 6 | GDP | H | 600 | - | - | 8/12/32/32 | 0/3/3/3 |
| 7 | ASN | A | 700 | 2 | - | 3/5/6/8 | - |

The worst 5 of 32 bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|--------|-------|-------------|----------|
| 6 | E | 600 | GDP | PB-O1B | 3.40 | 1.61 | 1.50 |
| 6 | F | 600 | GDP | PB-O1B | 3.40 | 1.61 | 1.50 |
| 6 | B | 600 | GDP | PB-O1B | 3.39 | 1.61 | 1.50 |
| 6 | D | 600 | GDP | PB-O1B | 3.35 | 1.61 | 1.50 |
| 6 | E | 600 | GDP | C5-C6 | -3.21 | 1.40 | 1.47 |

The worst 5 of 26 bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(°) | Ideal(°) |
|-----|-------|-----|------|----------|------|-------------|----------|
| 6 | F | 600 | GDP | C8-N7-C5 | 3.23 | 109.14 | 102.99 |
| 6 | A | 600 | GDP | C8-N7-C5 | 3.21 | 109.11 | 102.99 |
| 6 | D | 600 | GDP | C8-N7-C5 | 3.21 | 109.10 | 102.99 |
| 6 | C | 600 | GDP | C8-N7-C5 | 3.20 | 109.08 | 102.99 |
| 6 | B | 600 | GDP | C8-N7-C5 | 3.18 | 109.04 | 102.99 |

There are no chirality outliers.

5 of 51 torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms |
|-----|-------|-----|------|----------------|
| 6 | A | 600 | GDP | PA-O3A-PB-O3B |
| 6 | A | 600 | GDP | C5'-O5'-PA-O3A |
| 6 | B | 600 | GDP | C5'-O5'-PA-O1A |

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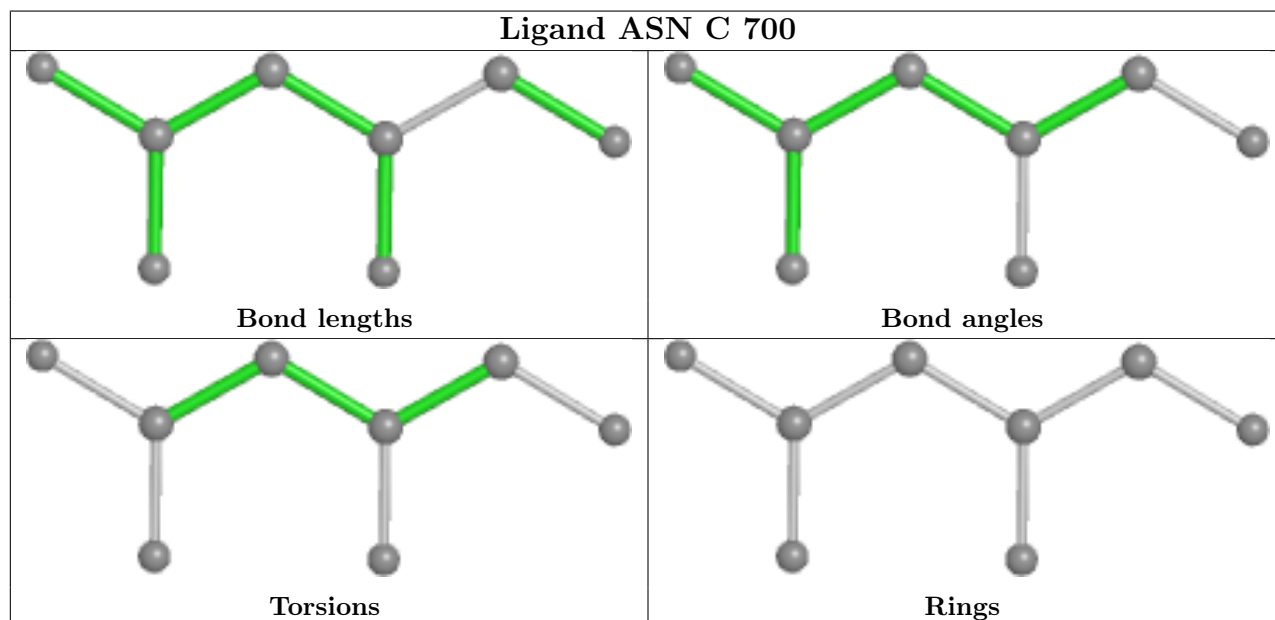
| Mol | Chain | Res | Type | Atoms |
|-----|-------|-----|------|---------------|
| 6 | C | 600 | GDP | PA-O3A-PB-O3B |
| 6 | D | 600 | GDP | PA-O3A-PB-O3B |

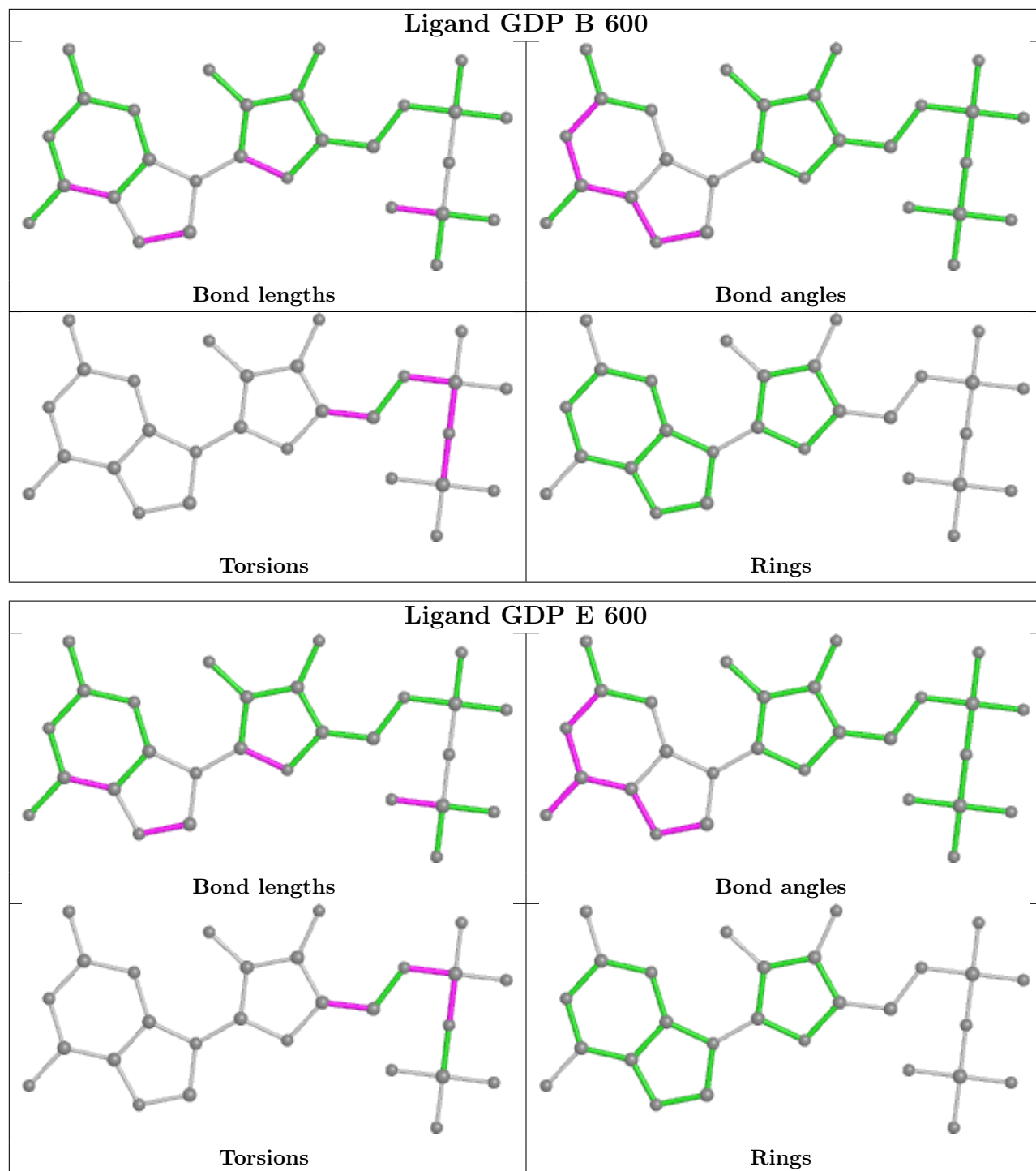
There are no ring outliers.

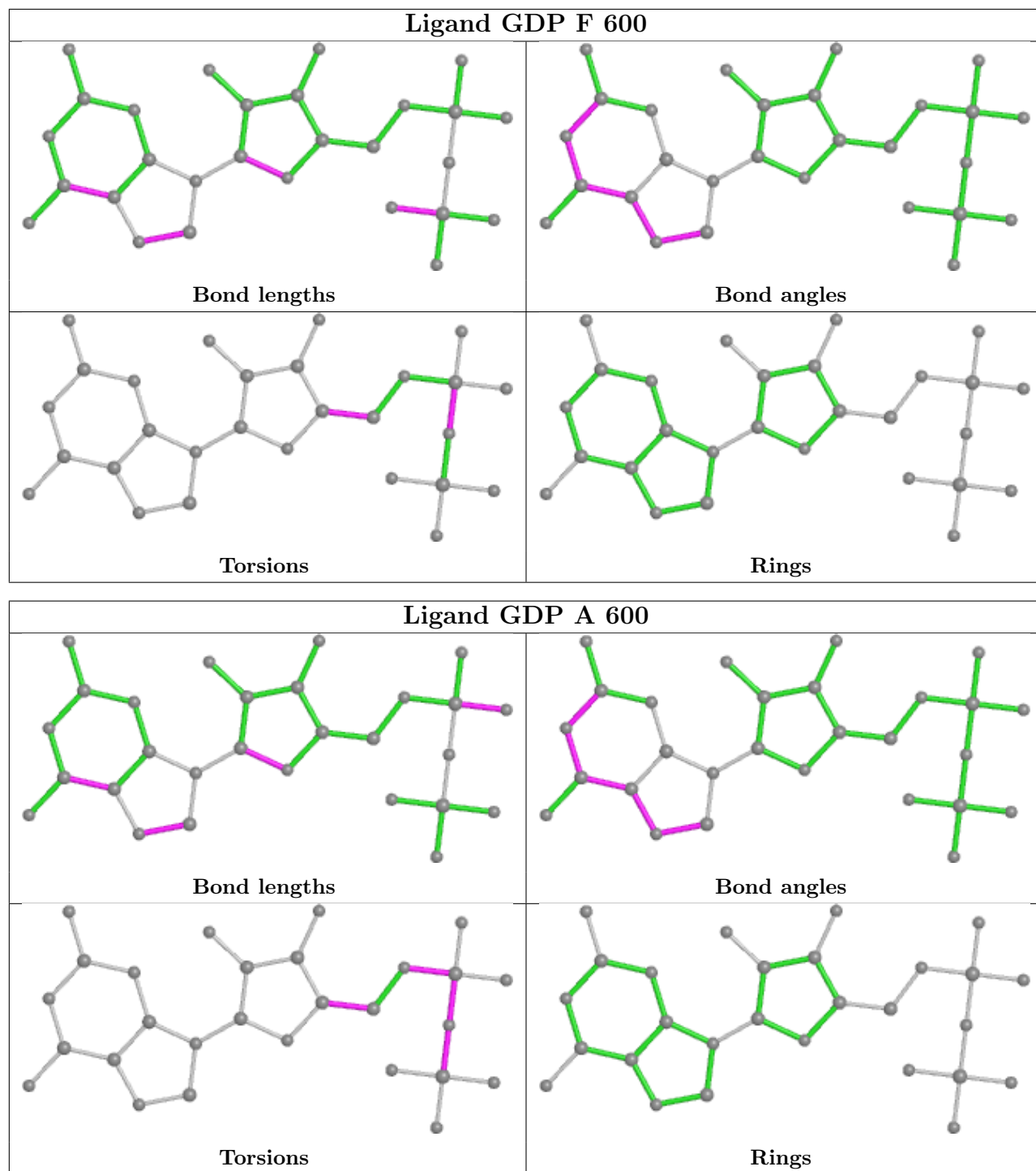
3 monomers are involved in 3 short contacts:

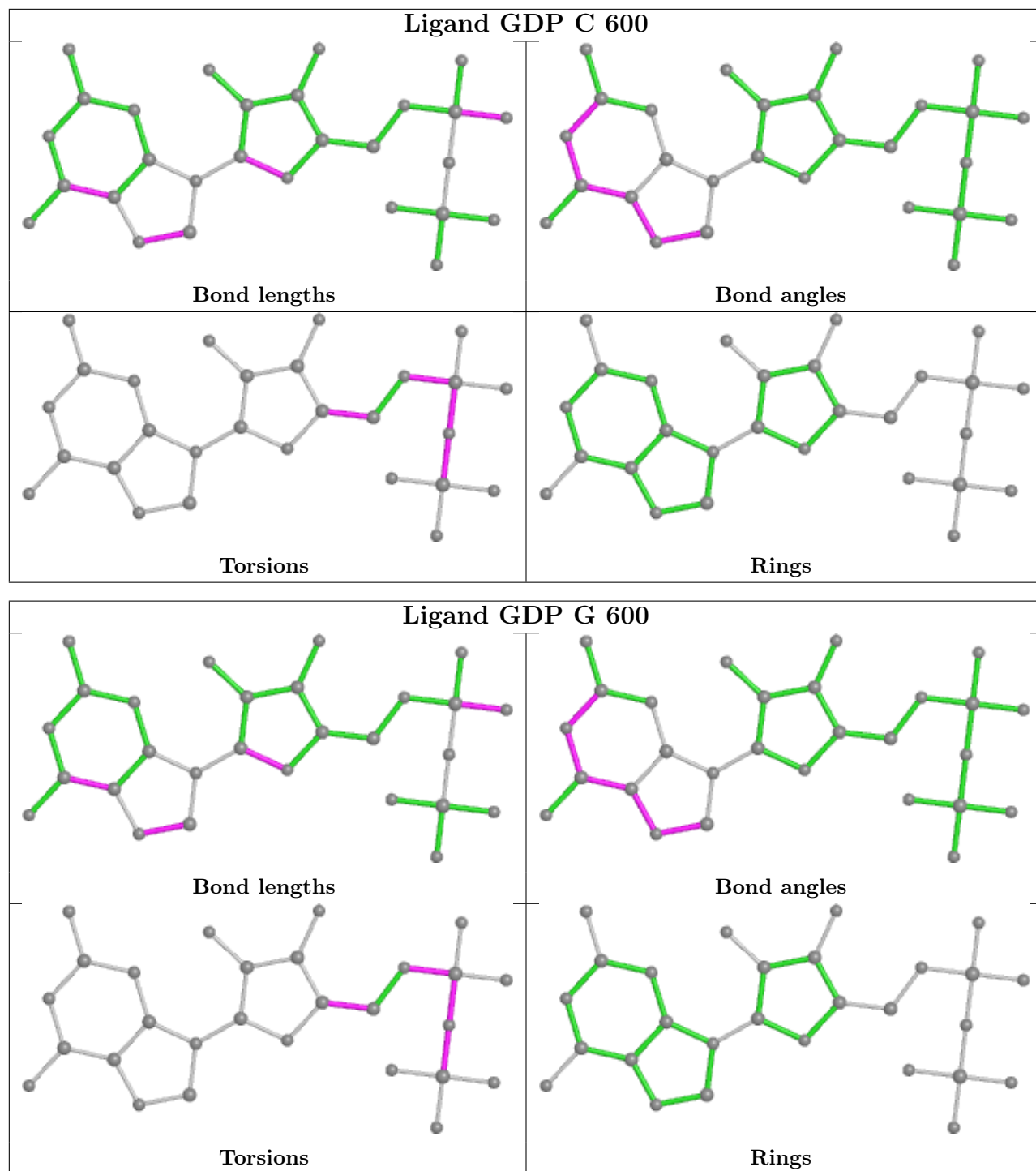
| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|-----|-------|-----|------|---------|--------------|
| 6 | E | 600 | GDP | 1 | 0 |
| 6 | A | 600 | GDP | 1 | 0 |
| 6 | H | 600 | GDP | 1 | 0 |

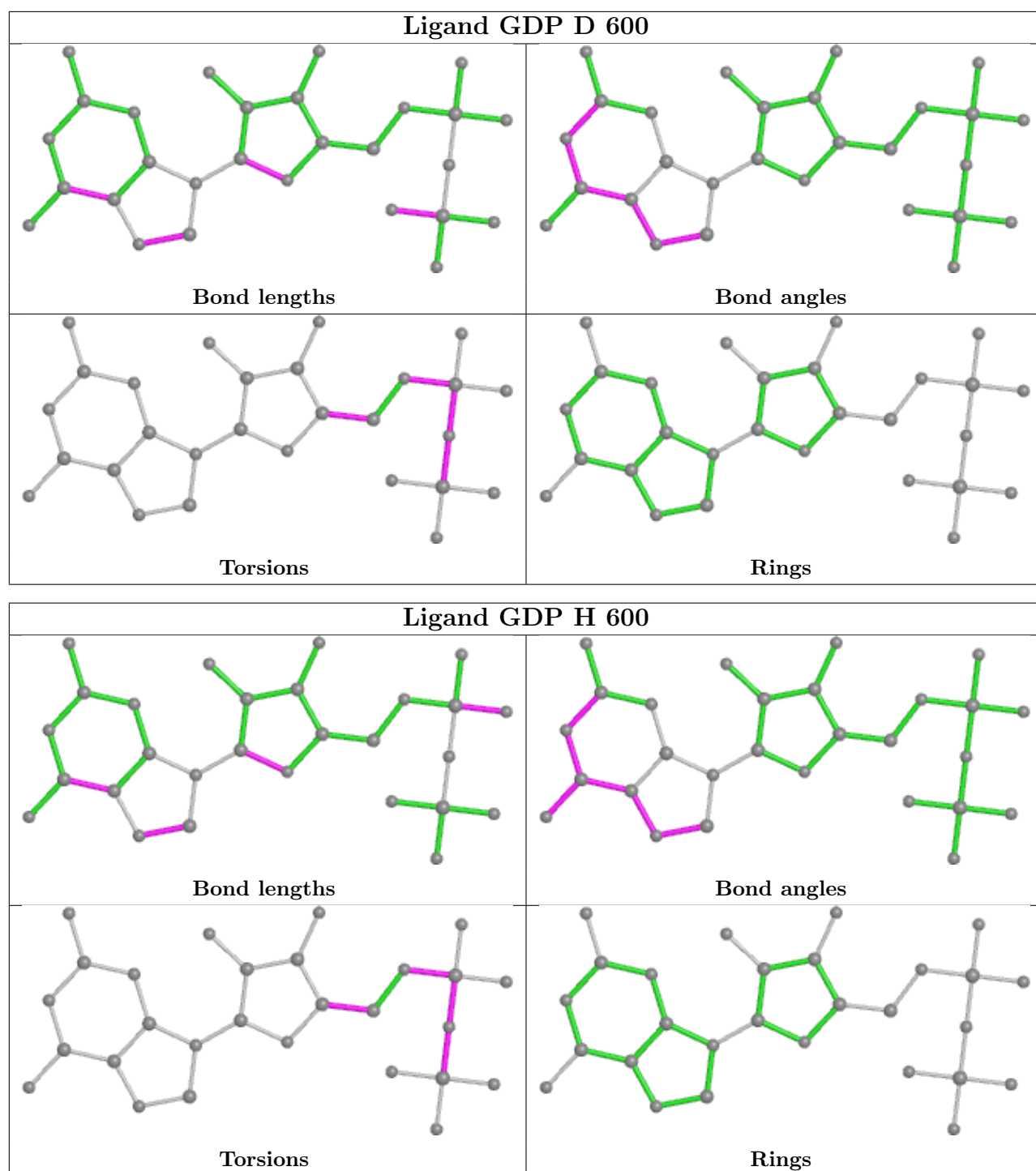
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

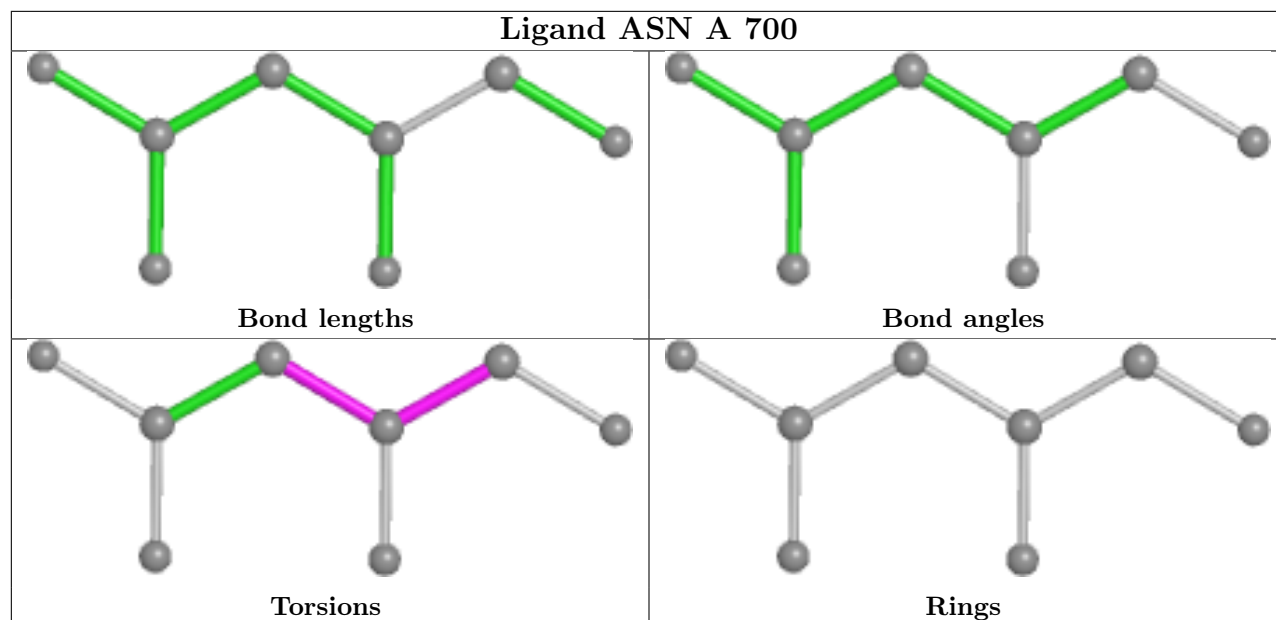












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

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

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

| Mol | Chain | Analysed | <RSRZ> | #RSRZ>2 | OWAB(Å ²) | Q<0.9 |
|-----|-------|-----------------|--------|---------------|-----------------------|-------|
| 1 | A | 467/535 (87%) | 0.06 | 4 (0%) 84 75 | 36, 58, 84, 112 | 0 |
| 1 | B | 467/535 (87%) | 0.03 | 0 100 100 | 35, 58, 84, 125 | 0 |
| 1 | C | 467/535 (87%) | 0.06 | 4 (0%) 84 75 | 34, 61, 88, 131 | 0 |
| 1 | D | 467/535 (87%) | 0.00 | 1 (0%) 95 94 | 35, 58, 80, 116 | 0 |
| 1 | E | 467/535 (87%) | 0.07 | 3 (0%) 89 83 | 37, 60, 87, 113 | 0 |
| 1 | F | 467/535 (87%) | 0.11 | 3 (0%) 89 83 | 36, 57, 85, 124 | 0 |
| 1 | G | 467/535 (87%) | 0.01 | 2 (0%) 92 89 | 34, 60, 88, 127 | 0 |
| 1 | H | 467/535 (87%) | 0.04 | 2 (0%) 92 89 | 36, 65, 98, 138 | 0 |
| All | All | 3736/4280 (87%) | 0.05 | 19 (0%) 91 86 | 34, 60, 87, 138 | 0 |

The worst 5 of 19 RSRZ outliers are listed below:

| Mol | Chain | Res | Type | RSRZ |
|-----|-------|-----|------|------|
| 1 | A | 255 | TRP | 3.6 |
| 1 | C | 439 | HIS | 3.6 |
| 1 | A | 440 | ASN | 3.3 |
| 1 | H | 452 | LEU | 2.9 |
| 1 | E | 250 | TYR | 2.6 |

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

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

6.3 Carbohydrates [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum,

median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

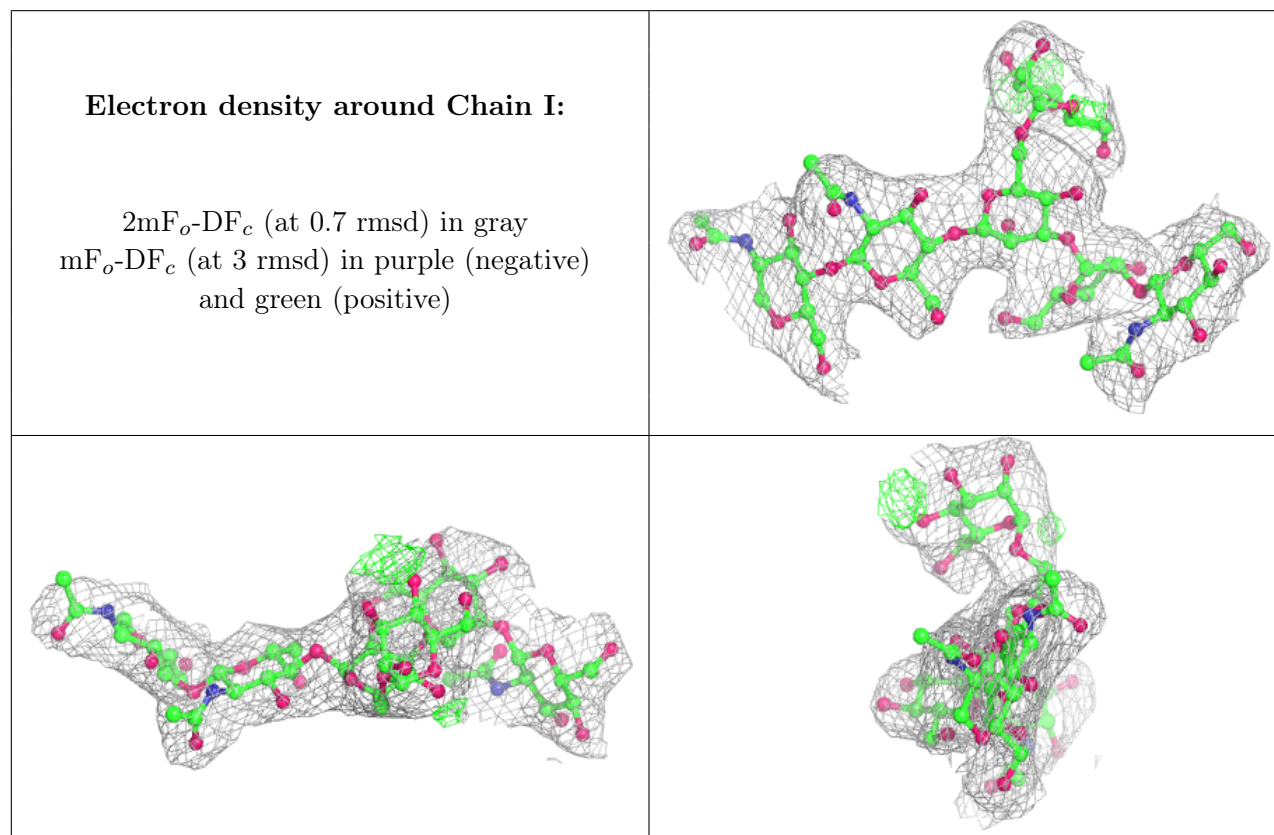
| Mol | Type | Chain | Res | Atoms | RSCC | RSR | B-factors(Å ²) | Q<0.9 |
|-----|------|-------|-----|-------|------|------|----------------------------|-------|
| 2 | MAN | K | 6 | 11/12 | 0.85 | 0.19 | 68,73,75,75 | 0 |
| 5 | NAG | O | 1 | 15/15 | 0.87 | 0.30 | 88,101,107,108 | 0 |
| 2 | MAN | I | 6 | 11/12 | 0.90 | 0.15 | 78,82,83,84 | 0 |
| 2 | MAN | P | 6 | 11/12 | 0.91 | 0.15 | 74,80,81,81 | 0 |
| 2 | NAG | P | 1 | 15/15 | 0.92 | 0.24 | 61,67,74,77 | 0 |
| 3 | NAG | J | 1 | 15/15 | 0.92 | 0.33 | 80,94,97,97 | 0 |
| 3 | MAN | J | 3 | 11/12 | 0.92 | 0.23 | 61,67,73,75 | 0 |
| 3 | MAN | L | 5 | 11/12 | 0.92 | 0.37 | 81,83,88,92 | 0 |
| 3 | MAN | N | 5 | 11/12 | 0.92 | 0.24 | 62,68,75,76 | 0 |
| 4 | NAG | M | 1 | 15/15 | 0.92 | 0.21 | 74,83,88,91 | 0 |
| 4 | NAG | M | 4 | 14/15 | 0.92 | 0.26 | 63,69,72,74 | 0 |
| 2 | NAG | P | 5 | 14/15 | 0.92 | 0.19 | 70,73,75,76 | 0 |
| 3 | NAG | N | 1 | 15/15 | 0.93 | 0.31 | 78,88,91,92 | 0 |
| 4 | MAN | M | 3 | 11/12 | 0.93 | 0.20 | 66,70,84,87 | 0 |
| 4 | BMA | M | 2 | 11/12 | 0.94 | 0.22 | 53,59,67,67 | 0 |
| 3 | NAG | L | 1 | 15/15 | 0.94 | 0.38 | 80,88,89,89 | 0 |
| 2 | BMA | K | 3 | 11/12 | 0.95 | 0.17 | 61,62,69,75 | 0 |
| 2 | MAN | K | 4 | 11/12 | 0.95 | 0.20 | 59,62,65,66 | 0 |
| 3 | BMA | N | 2 | 11/12 | 0.95 | 0.24 | 56,65,69,70 | 0 |
| 2 | NAG | I | 5 | 14/15 | 0.95 | 0.19 | 60,64,69,71 | 0 |
| 2 | NAG | K | 1 | 14/15 | 0.95 | 0.25 | 45,52,56,58 | 0 |
| 3 | NAG | J | 4 | 14/15 | 0.95 | 0.17 | 50,59,63,63 | 0 |
| 3 | MAN | J | 5 | 11/12 | 0.95 | 0.21 | 66,70,72,73 | 0 |
| 2 | BMA | P | 3 | 11/12 | 0.95 | 0.16 | 67,70,72,75 | 0 |
| 3 | MAN | L | 3 | 11/12 | 0.95 | 0.20 | 58,63,75,77 | 0 |
| 5 | BMA | O | 3 | 11/12 | 0.95 | 0.19 | 70,79,80,82 | 0 |
| 5 | MAN | O | 4 | 11/12 | 0.95 | 0.16 | 66,69,72,72 | 0 |
| 3 | NAG | N | 4 | 14/15 | 0.96 | 0.24 | 63,66,69,71 | 0 |
| 2 | NAG | K | 5 | 14/15 | 0.96 | 0.23 | 59,67,69,69 | 0 |
| 2 | MAN | I | 4 | 11/12 | 0.96 | 0.18 | 68,73,75,76 | 0 |
| 3 | BMA | L | 2 | 11/12 | 0.96 | 0.21 | 66,69,74,78 | 0 |
| 2 | NAG | I | 1 | 14/15 | 0.96 | 0.20 | 54,60,62,63 | 0 |
| 3 | NAG | L | 4 | 14/15 | 0.96 | 0.19 | 44,54,56,57 | 0 |
| 3 | BMA | J | 2 | 11/12 | 0.96 | 0.17 | 61,66,70,72 | 0 |
| 5 | NAG | O | 2 | 14/15 | 0.96 | 0.20 | 73,85,89,92 | 0 |
| 2 | NAG | P | 2 | 14/15 | 0.96 | 0.21 | 71,76,82,84 | 0 |
| 2 | BMA | I | 3 | 11/12 | 0.96 | 0.16 | 60,64,71,77 | 0 |
| 5 | NAG | O | 5 | 14/15 | 0.96 | 0.19 | 48,58,64,67 | 0 |
| 3 | MAN | N | 3 | 11/12 | 0.97 | 0.23 | 67,71,74,75 | 0 |
| 2 | MAN | P | 4 | 11/12 | 0.97 | 0.15 | 70,74,75,76 | 0 |
| 2 | NAG | K | 2 | 14/15 | 0.97 | 0.19 | 46,49,57,58 | 0 |

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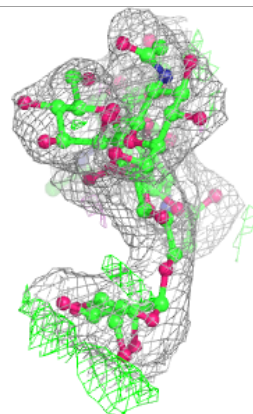
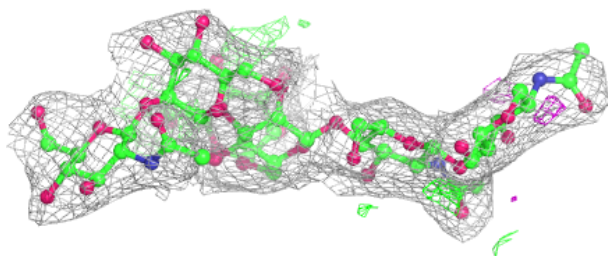
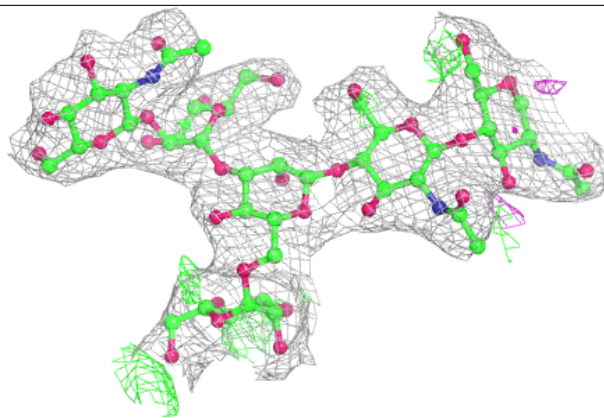
| Mol | Type | Chain | Res | Atoms | RSCC | RSR | B-factors(\AA^2) | Q<0.9 |
|-----|------|-------|-----|-------|------|------|-----------------------------|-------|
| 2 | NAG | I | 2 | 14/15 | 0.97 | 0.22 | 49,59,70,72 | 0 |

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.

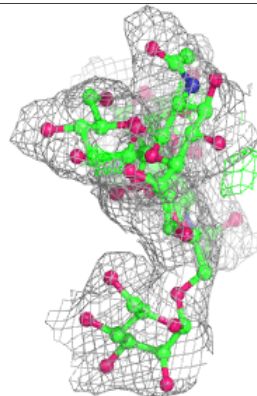
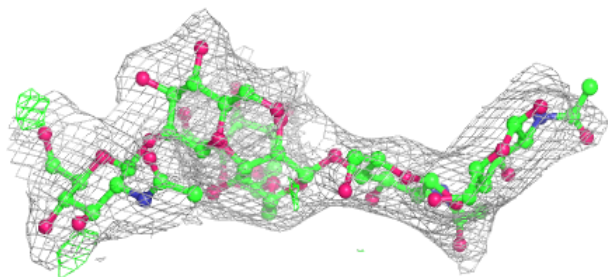
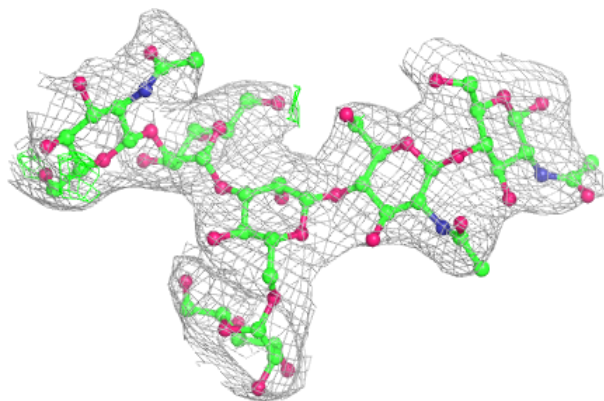


Electron density around Chain K:

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

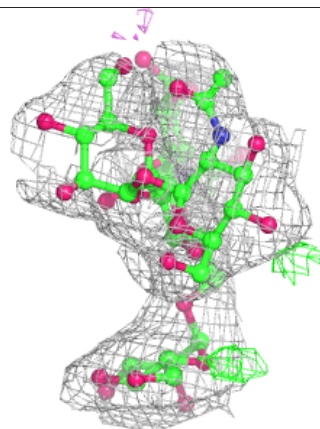
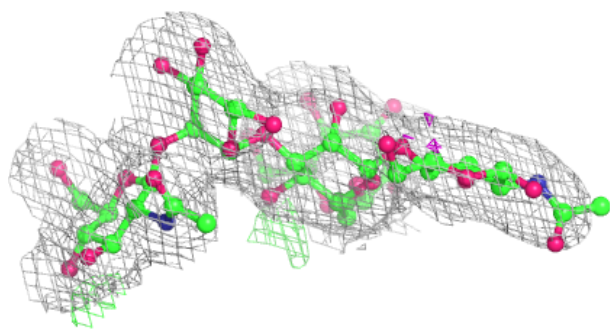
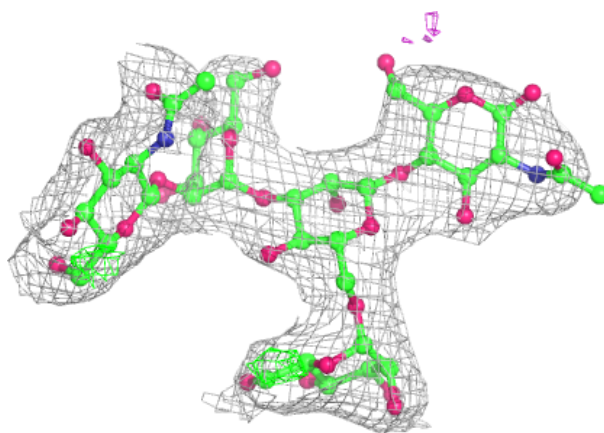
**Electron density around Chain P:**

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

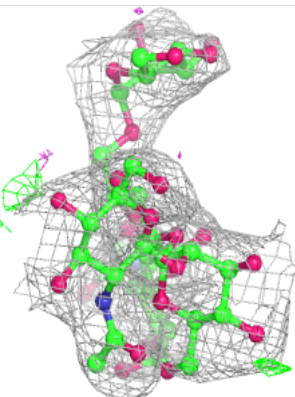
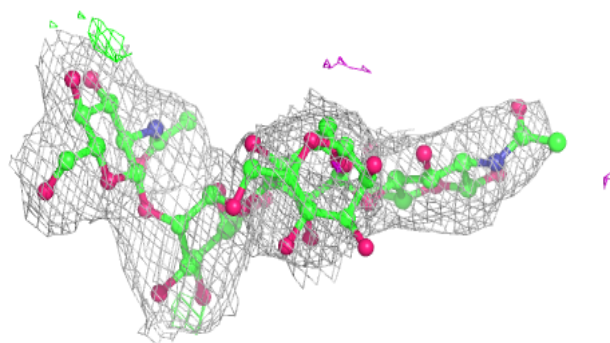
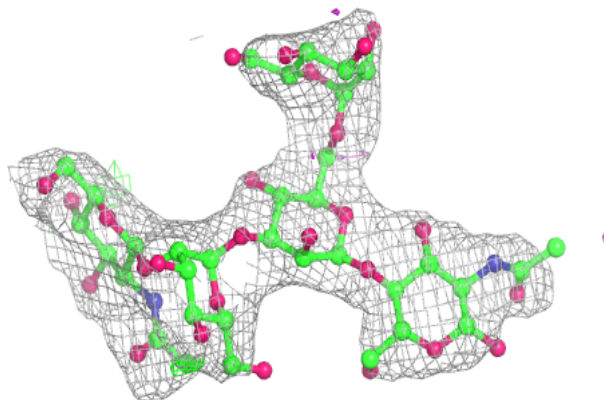


Electron density around Chain J:

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

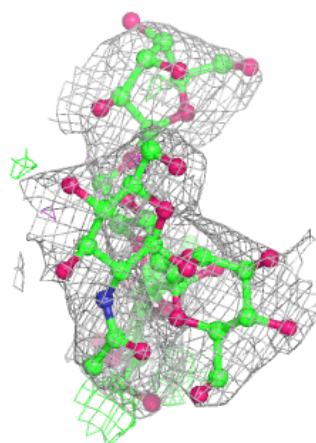
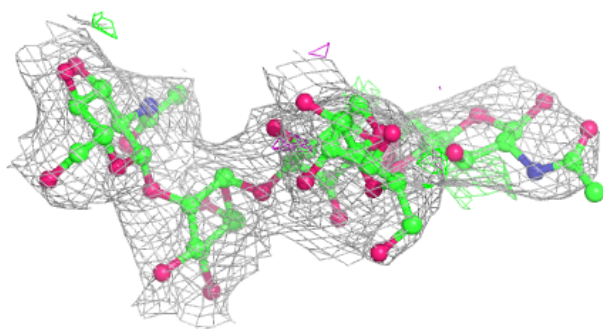
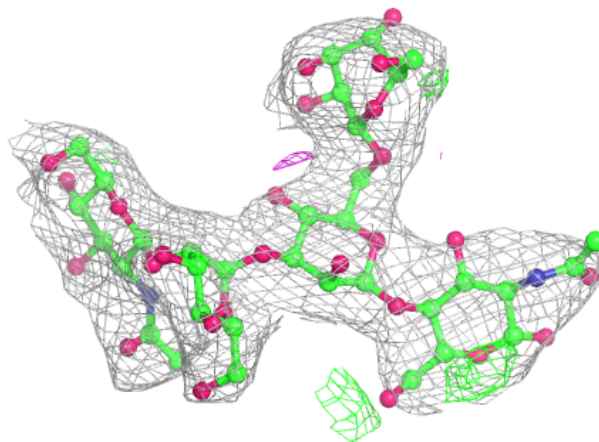
**Electron density around Chain L:**

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



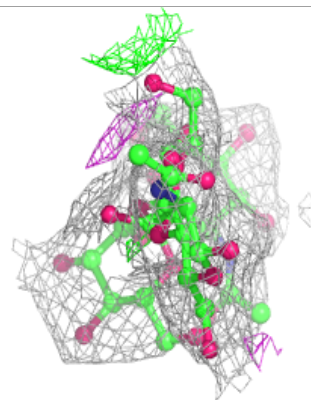
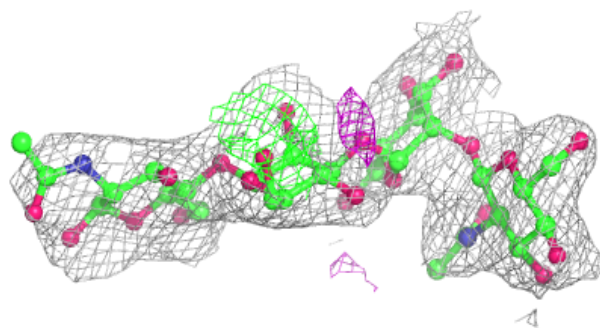
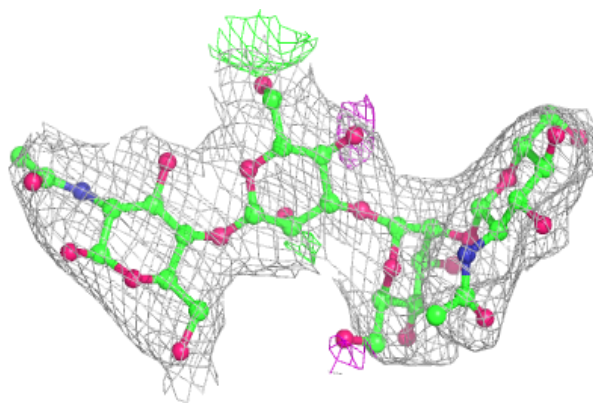
Electron density around Chain N:

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

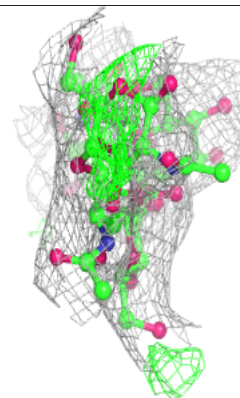
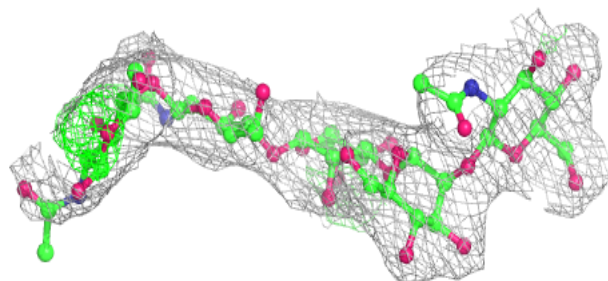
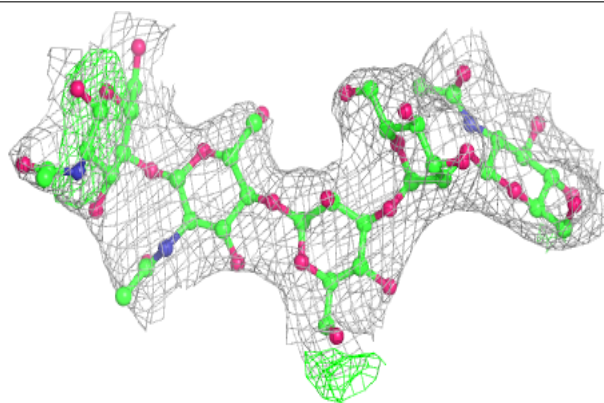


Electron density around Chain M:

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

**Electron density around Chain O:**

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



6.4 Ligands

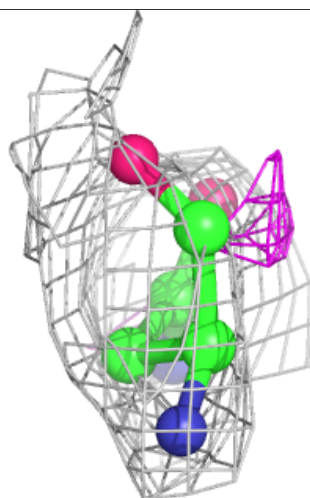
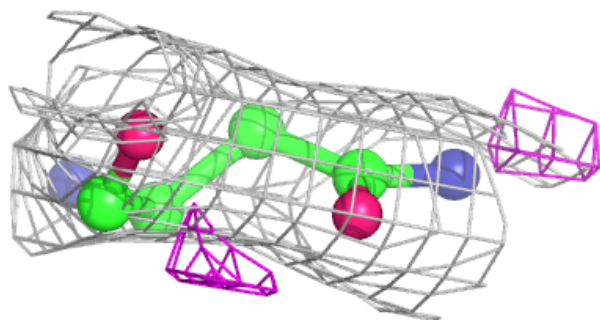
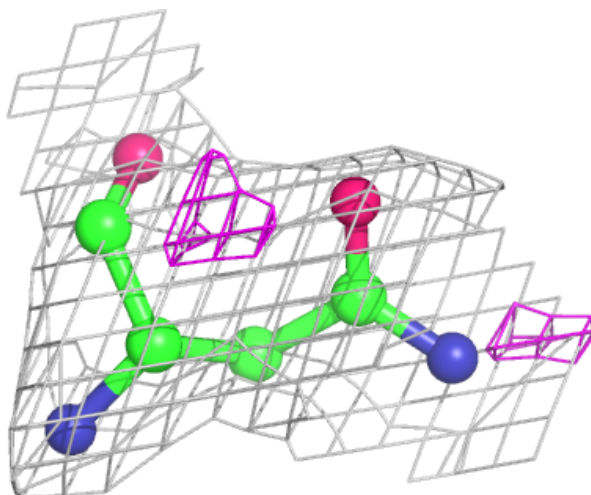
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

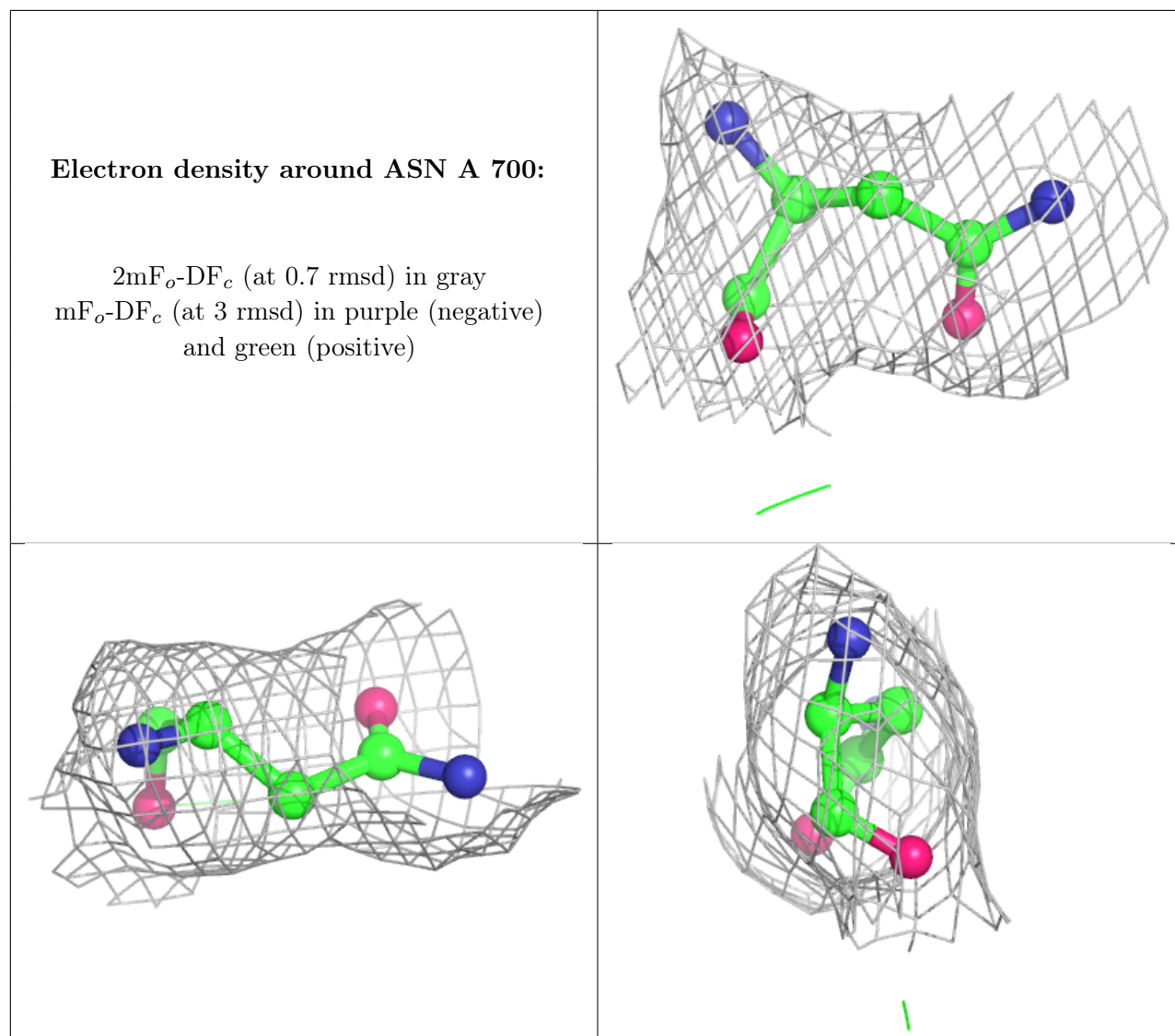
| Mol | Type | Chain | Res | Atoms | RSCC | RSR | B-factors(Å ²) | Q<0.9 |
|-----|------|-------|-----|-------|------|------|----------------------------|-------|
| 7 | ASN | C | 700 | 8/9 | 0.91 | 0.39 | 59,66,75,77 | 0 |
| 7 | ASN | A | 700 | 8/9 | 0.93 | 0.18 | 64,68,78,81 | 0 |
| 6 | GDP | G | 600 | 28/28 | 0.97 | 0.20 | 57,64,67,69 | 0 |
| 6 | GDP | H | 600 | 28/28 | 0.97 | 0.24 | 68,74,79,80 | 0 |
| 6 | GDP | A | 600 | 28/28 | 0.97 | 0.22 | 54,61,64,66 | 0 |
| 6 | GDP | D | 600 | 28/28 | 0.97 | 0.22 | 51,57,61,64 | 0 |
| 6 | GDP | C | 600 | 28/28 | 0.98 | 0.23 | 50,61,67,69 | 0 |
| 6 | GDP | B | 600 | 28/28 | 0.98 | 0.23 | 48,58,63,64 | 0 |
| 6 | GDP | E | 600 | 28/28 | 0.98 | 0.23 | 53,65,68,69 | 0 |
| 6 | GDP | F | 600 | 28/28 | 0.98 | 0.23 | 40,62,71,72 | 0 |

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around ASN C 700:

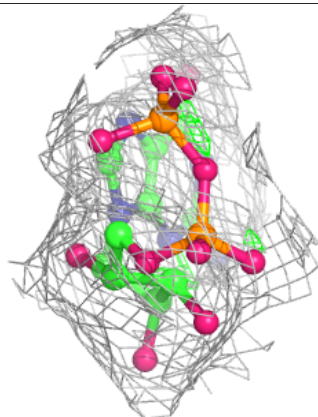
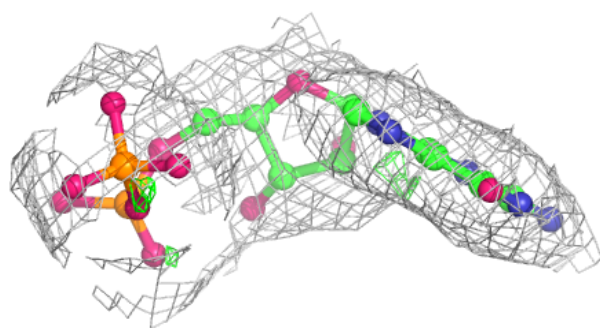
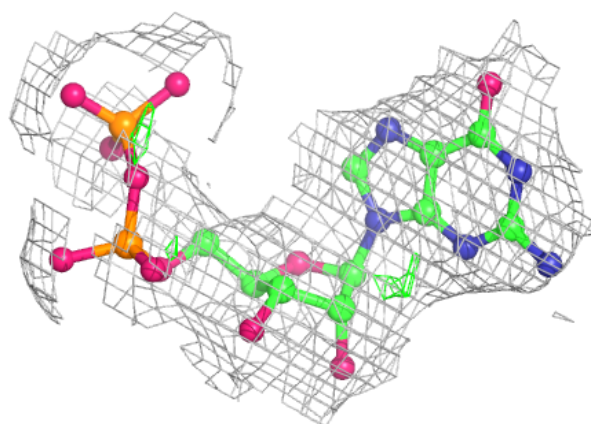
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)





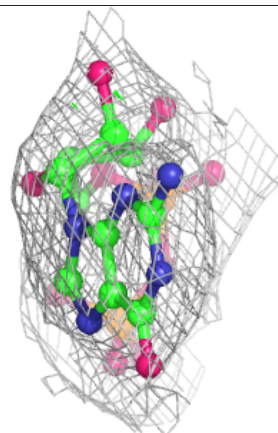
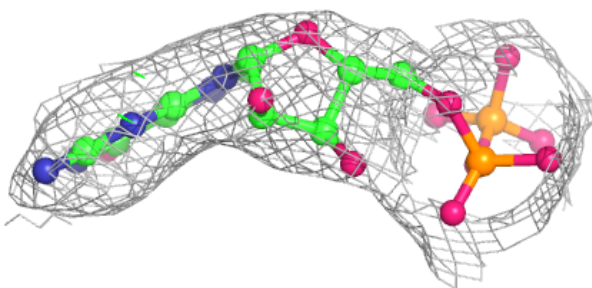
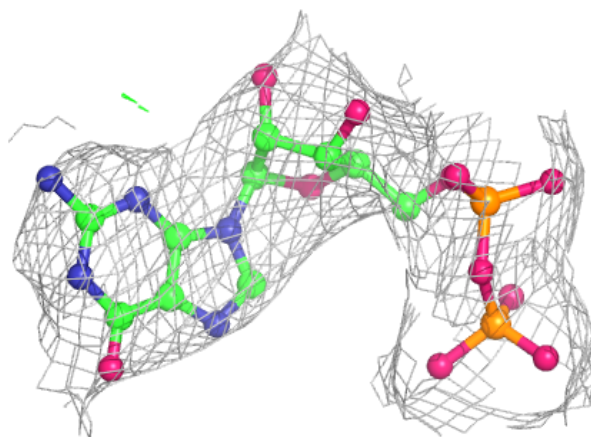
Electron density around GDP G 600:

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

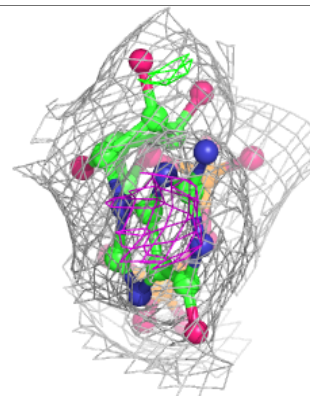
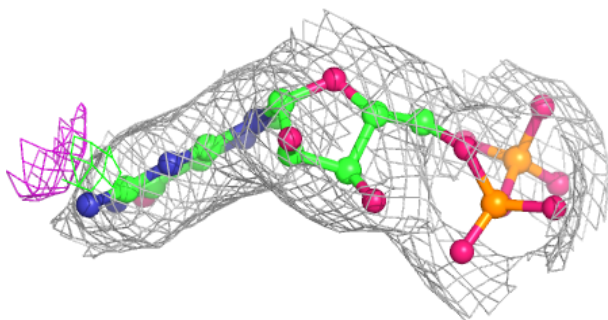
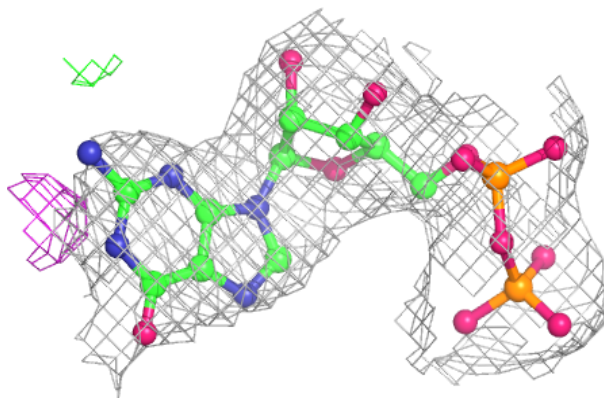


Electron density around GDP H 600:

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

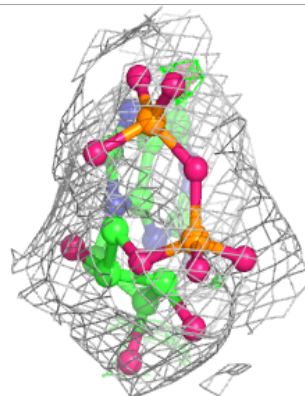
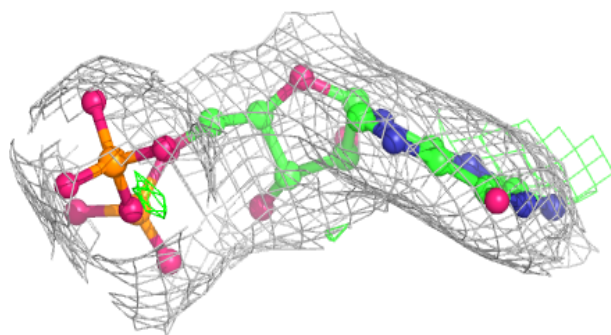
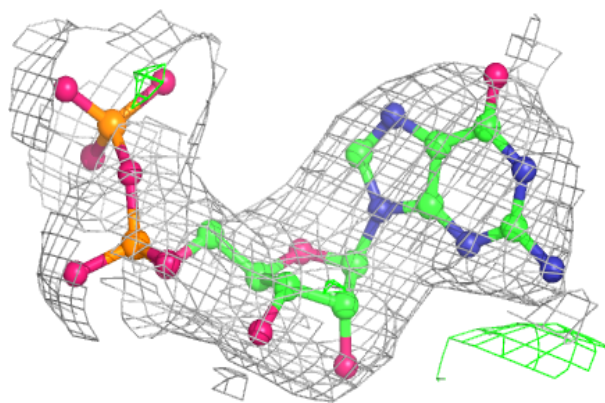
**Electron density around GDP A 600:**

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

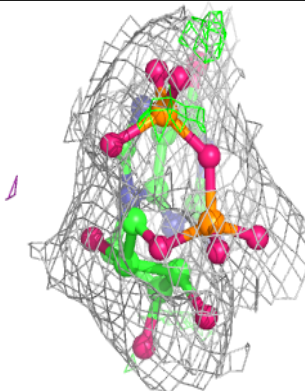
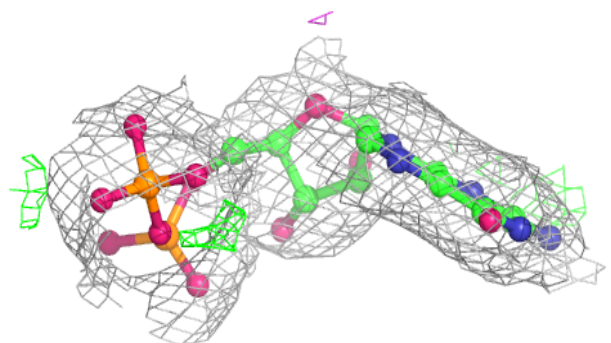
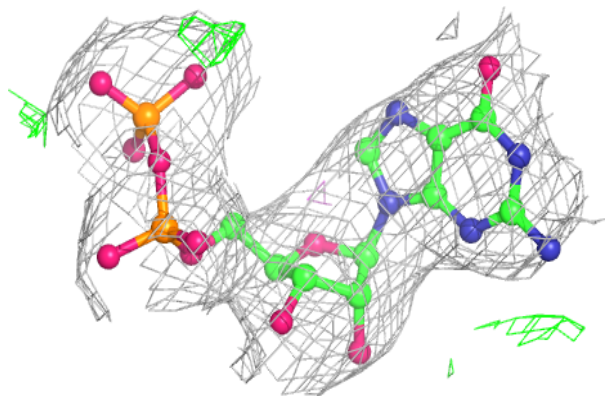


Electron density around GDP D 600:

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

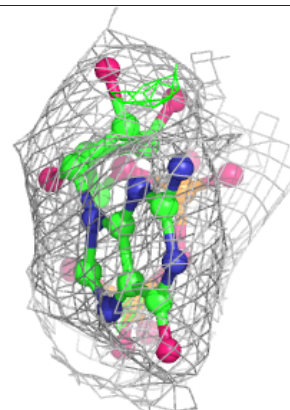
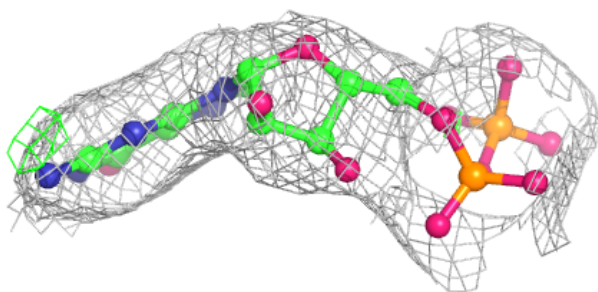
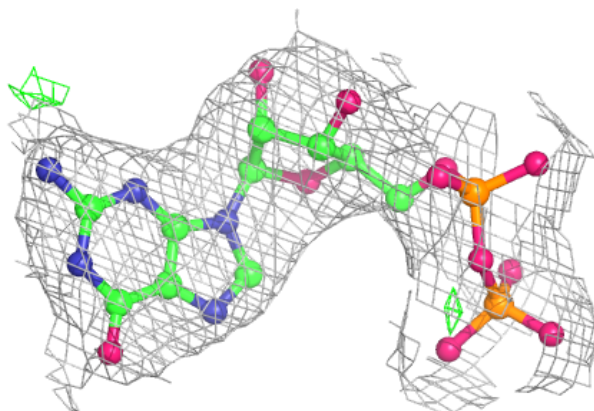
**Electron density around GDP C 600:**

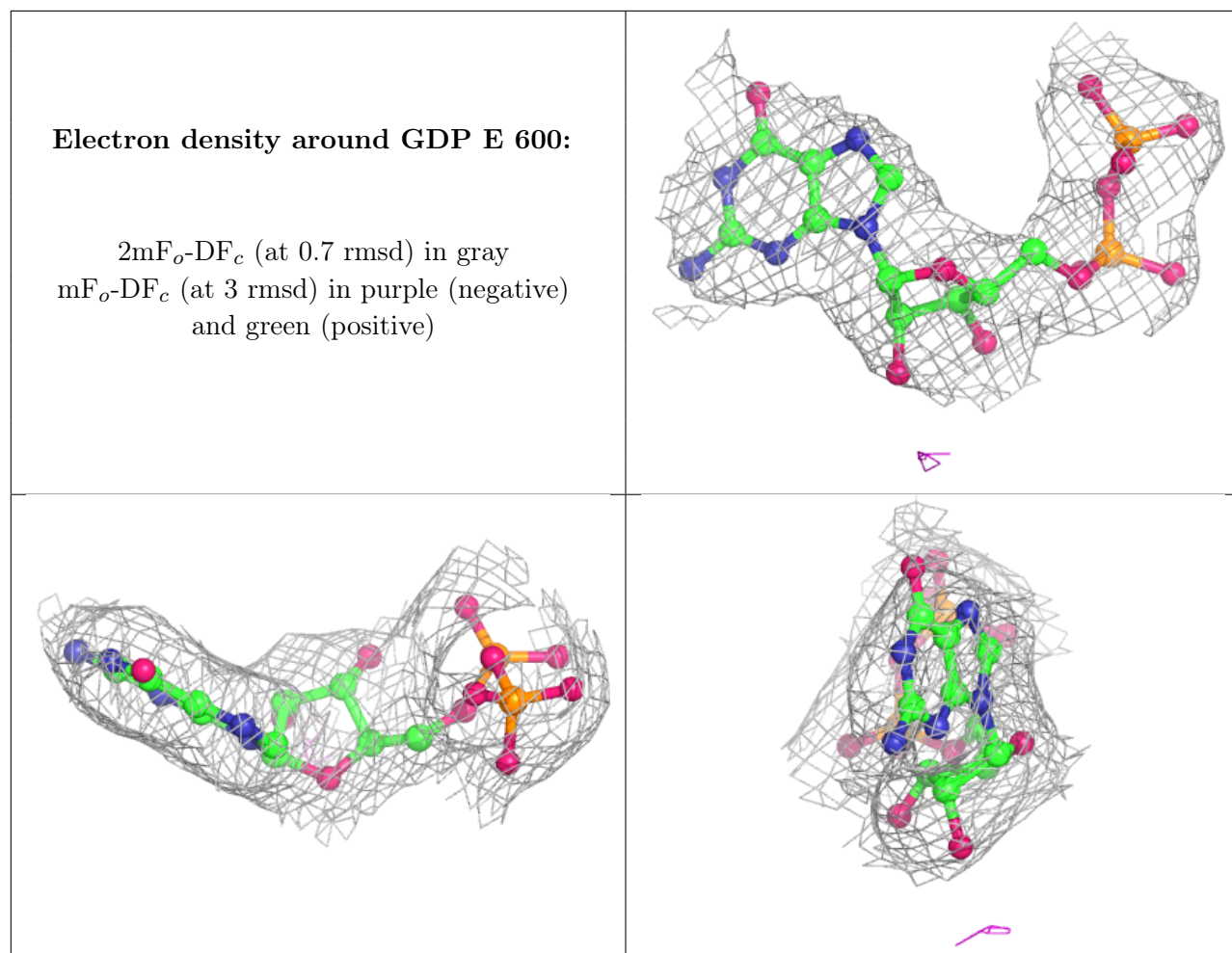
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

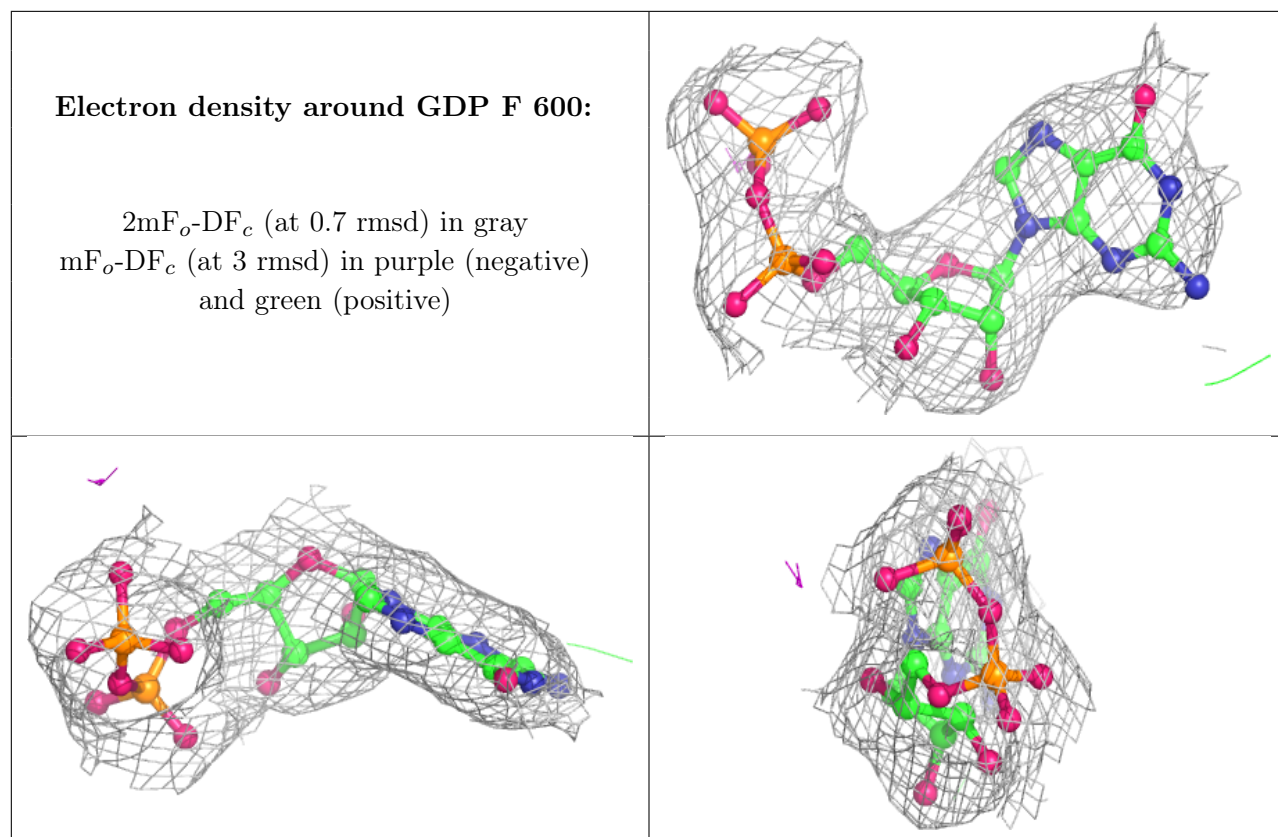


Electron density around GDP B 600:

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







6.5 Other polymers [i](#)

There are no such residues in this entry.