



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 1, 2026 – 06:56 PM UTC

PDB ID : 4C3X / pdb_00004c3x
Title : Crystal structure of 3-ketosteroid delta1-dehydrogenase from Rhodococcus erythropolis SQ1
Authors : Rohman, A.; van Oosterwijk, N.; Thunnissen, A.M.W.H.; Dijkstra, B.W.
Deposited on : 2013-08-28
Resolution : 2.00 Å(reported)

This is a Full wwPDB X-ray Structure Validation 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

<http://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	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

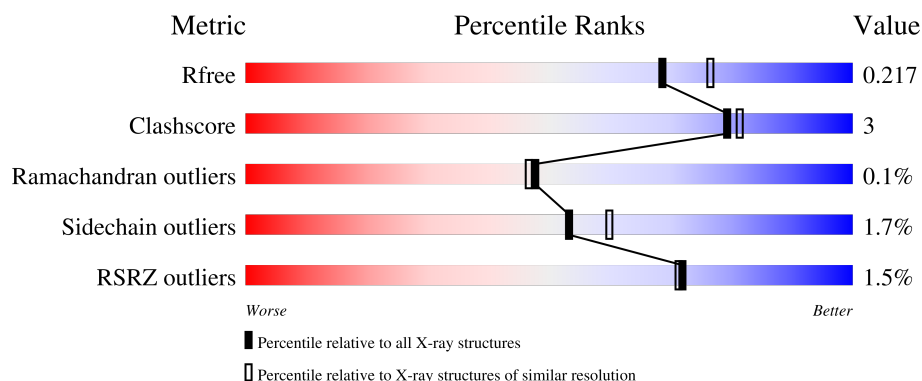
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.00 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}	180053	10052 (2.00-2.00)
Clashscore	190562	11152 (2.00-2.00)
Ramachandran outliers	187476	11031 (2.00-2.00)
Sidechain outliers	187428	11029 (2.00-2.00)
RSRZ outliers	180081	10067 (2.00-2.00)

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	530	% 90% 5% . .
1	B	530	3% 88% 6% . 5%
1	C	530	% 88% 7% 5%
1	D	530	% 89% 6% .
1	E	530	% 90% 5% . .

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Mol	Chain	Length	Quality of chain
1	F	530	2% 89% 6% 5%
1	G	530	% 89% 6% 5%
1	H	530	2% 91% 5% . .
2	I	2	100%
2	J	2	100%
2	K	2	100%
2	L	2	50% 50%
2	M	2	100%
2	N	2	100%
2	O	2	100%
2	P	2	100%
2	Q	2	100%
2	R	2	100%
2	S	2	100%
2	T	2	100%

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 33549 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 3-KETOSTEROID DEHYDROGENASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	508	Total	C	N	O	S	0	0	0
			3712	2305	647	746	14			
1	B	505	Total	C	N	O	S	0	0	0
			3693	2294	643	742	14			
1	C	505	Total	C	N	O	S	0	0	0
			3693	2294	643	742	14			
1	D	508	Total	C	N	O	S	0	0	0
			3712	2305	647	746	14			
1	E	508	Total	C	N	O	S	0	0	0
			3712	2305	647	746	14			
1	F	505	Total	C	N	O	S	0	0	0
			3693	2294	643	742	14			
1	G	505	Total	C	N	O	S	0	0	0
			3693	2294	643	742	14			
1	H	508	Total	C	N	O	S	0	0	0
			3712	2305	647	746	14			

There are 160 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	expression tag	UNP Q9RA02
A	-18	GLY	-	expression tag	UNP Q9RA02
A	-17	SER	-	expression tag	UNP Q9RA02
A	-16	SER	-	expression tag	UNP Q9RA02
A	-15	HIS	-	expression tag	UNP Q9RA02
A	-14	HIS	-	expression tag	UNP Q9RA02
A	-13	HIS	-	expression tag	UNP Q9RA02
A	-12	HIS	-	expression tag	UNP Q9RA02
A	-11	HIS	-	expression tag	UNP Q9RA02
A	-10	HIS	-	expression tag	UNP Q9RA02
A	-9	SER	-	expression tag	UNP Q9RA02
A	-8	SER	-	expression tag	UNP Q9RA02
A	-7	GLY	-	expression tag	UNP Q9RA02

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-6	LEU	-	expression tag	UNP Q9RA02
A	-5	VAL	-	expression tag	UNP Q9RA02
A	-4	PRO	-	expression tag	UNP Q9RA02
A	-3	ARG	-	expression tag	UNP Q9RA02
A	-2	GLY	-	expression tag	UNP Q9RA02
A	-1	SER	-	expression tag	UNP Q9RA02
A	0	HIS	-	expression tag	UNP Q9RA02
B	-19	MET	-	expression tag	UNP Q9RA02
B	-18	GLY	-	expression tag	UNP Q9RA02
B	-17	SER	-	expression tag	UNP Q9RA02
B	-16	SER	-	expression tag	UNP Q9RA02
B	-15	HIS	-	expression tag	UNP Q9RA02
B	-14	HIS	-	expression tag	UNP Q9RA02
B	-13	HIS	-	expression tag	UNP Q9RA02
B	-12	HIS	-	expression tag	UNP Q9RA02
B	-11	HIS	-	expression tag	UNP Q9RA02
B	-10	HIS	-	expression tag	UNP Q9RA02
B	-9	SER	-	expression tag	UNP Q9RA02
B	-8	SER	-	expression tag	UNP Q9RA02
B	-7	GLY	-	expression tag	UNP Q9RA02
B	-6	LEU	-	expression tag	UNP Q9RA02
B	-5	VAL	-	expression tag	UNP Q9RA02
B	-4	PRO	-	expression tag	UNP Q9RA02
B	-3	ARG	-	expression tag	UNP Q9RA02
B	-2	GLY	-	expression tag	UNP Q9RA02
B	-1	SER	-	expression tag	UNP Q9RA02
B	0	HIS	-	expression tag	UNP Q9RA02
C	-19	MET	-	expression tag	UNP Q9RA02
C	-18	GLY	-	expression tag	UNP Q9RA02
C	-17	SER	-	expression tag	UNP Q9RA02
C	-16	SER	-	expression tag	UNP Q9RA02
C	-15	HIS	-	expression tag	UNP Q9RA02
C	-14	HIS	-	expression tag	UNP Q9RA02
C	-13	HIS	-	expression tag	UNP Q9RA02
C	-12	HIS	-	expression tag	UNP Q9RA02
C	-11	HIS	-	expression tag	UNP Q9RA02
C	-10	HIS	-	expression tag	UNP Q9RA02
C	-9	SER	-	expression tag	UNP Q9RA02
C	-8	SER	-	expression tag	UNP Q9RA02
C	-7	GLY	-	expression tag	UNP Q9RA02
C	-6	LEU	-	expression tag	UNP Q9RA02
C	-5	VAL	-	expression tag	UNP Q9RA02

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-4	PRO	-	expression tag	UNP Q9RA02
C	-3	ARG	-	expression tag	UNP Q9RA02
C	-2	GLY	-	expression tag	UNP Q9RA02
C	-1	SER	-	expression tag	UNP Q9RA02
C	0	HIS	-	expression tag	UNP Q9RA02
D	-19	MET	-	expression tag	UNP Q9RA02
D	-18	GLY	-	expression tag	UNP Q9RA02
D	-17	SER	-	expression tag	UNP Q9RA02
D	-16	SER	-	expression tag	UNP Q9RA02
D	-15	HIS	-	expression tag	UNP Q9RA02
D	-14	HIS	-	expression tag	UNP Q9RA02
D	-13	HIS	-	expression tag	UNP Q9RA02
D	-12	HIS	-	expression tag	UNP Q9RA02
D	-11	HIS	-	expression tag	UNP Q9RA02
D	-10	HIS	-	expression tag	UNP Q9RA02
D	-9	SER	-	expression tag	UNP Q9RA02
D	-8	SER	-	expression tag	UNP Q9RA02
D	-7	GLY	-	expression tag	UNP Q9RA02
D	-6	LEU	-	expression tag	UNP Q9RA02
D	-5	VAL	-	expression tag	UNP Q9RA02
D	-4	PRO	-	expression tag	UNP Q9RA02
D	-3	ARG	-	expression tag	UNP Q9RA02
D	-2	GLY	-	expression tag	UNP Q9RA02
D	-1	SER	-	expression tag	UNP Q9RA02
D	0	HIS	-	expression tag	UNP Q9RA02
E	-19	MET	-	expression tag	UNP Q9RA02
E	-18	GLY	-	expression tag	UNP Q9RA02
E	-17	SER	-	expression tag	UNP Q9RA02
E	-16	SER	-	expression tag	UNP Q9RA02
E	-15	HIS	-	expression tag	UNP Q9RA02
E	-14	HIS	-	expression tag	UNP Q9RA02
E	-13	HIS	-	expression tag	UNP Q9RA02
E	-12	HIS	-	expression tag	UNP Q9RA02
E	-11	HIS	-	expression tag	UNP Q9RA02
E	-10	HIS	-	expression tag	UNP Q9RA02
E	-9	SER	-	expression tag	UNP Q9RA02
E	-8	SER	-	expression tag	UNP Q9RA02
E	-7	GLY	-	expression tag	UNP Q9RA02
E	-6	LEU	-	expression tag	UNP Q9RA02
E	-5	VAL	-	expression tag	UNP Q9RA02
E	-4	PRO	-	expression tag	UNP Q9RA02
E	-3	ARG	-	expression tag	UNP Q9RA02

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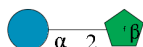
Chain	Residue	Modelled	Actual	Comment	Reference
E	-2	GLY	-	expression tag	UNP Q9RA02
E	-1	SER	-	expression tag	UNP Q9RA02
E	0	HIS	-	expression tag	UNP Q9RA02
F	-19	MET	-	expression tag	UNP Q9RA02
F	-18	GLY	-	expression tag	UNP Q9RA02
F	-17	SER	-	expression tag	UNP Q9RA02
F	-16	SER	-	expression tag	UNP Q9RA02
F	-15	HIS	-	expression tag	UNP Q9RA02
F	-14	HIS	-	expression tag	UNP Q9RA02
F	-13	HIS	-	expression tag	UNP Q9RA02
F	-12	HIS	-	expression tag	UNP Q9RA02
F	-11	HIS	-	expression tag	UNP Q9RA02
F	-10	HIS	-	expression tag	UNP Q9RA02
F	-9	SER	-	expression tag	UNP Q9RA02
F	-8	SER	-	expression tag	UNP Q9RA02
F	-7	GLY	-	expression tag	UNP Q9RA02
F	-6	LEU	-	expression tag	UNP Q9RA02
F	-5	VAL	-	expression tag	UNP Q9RA02
F	-4	PRO	-	expression tag	UNP Q9RA02
F	-3	ARG	-	expression tag	UNP Q9RA02
F	-2	GLY	-	expression tag	UNP Q9RA02
F	-1	SER	-	expression tag	UNP Q9RA02
F	0	HIS	-	expression tag	UNP Q9RA02
G	-19	MET	-	expression tag	UNP Q9RA02
G	-18	GLY	-	expression tag	UNP Q9RA02
G	-17	SER	-	expression tag	UNP Q9RA02
G	-16	SER	-	expression tag	UNP Q9RA02
G	-15	HIS	-	expression tag	UNP Q9RA02
G	-14	HIS	-	expression tag	UNP Q9RA02
G	-13	HIS	-	expression tag	UNP Q9RA02
G	-12	HIS	-	expression tag	UNP Q9RA02
G	-11	HIS	-	expression tag	UNP Q9RA02
G	-10	HIS	-	expression tag	UNP Q9RA02
G	-9	SER	-	expression tag	UNP Q9RA02
G	-8	SER	-	expression tag	UNP Q9RA02
G	-7	GLY	-	expression tag	UNP Q9RA02
G	-6	LEU	-	expression tag	UNP Q9RA02
G	-5	VAL	-	expression tag	UNP Q9RA02
G	-4	PRO	-	expression tag	UNP Q9RA02
G	-3	ARG	-	expression tag	UNP Q9RA02
G	-2	GLY	-	expression tag	UNP Q9RA02
G	-1	SER	-	expression tag	UNP Q9RA02

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Chain	Residue	Modelled	Actual	Comment	Reference
G	0	HIS	-	expression tag	UNP Q9RA02
H	-19	MET	-	expression tag	UNP Q9RA02
H	-18	GLY	-	expression tag	UNP Q9RA02
H	-17	SER	-	expression tag	UNP Q9RA02
H	-16	SER	-	expression tag	UNP Q9RA02
H	-15	HIS	-	expression tag	UNP Q9RA02
H	-14	HIS	-	expression tag	UNP Q9RA02
H	-13	HIS	-	expression tag	UNP Q9RA02
H	-12	HIS	-	expression tag	UNP Q9RA02
H	-11	HIS	-	expression tag	UNP Q9RA02
H	-10	HIS	-	expression tag	UNP Q9RA02
H	-9	SER	-	expression tag	UNP Q9RA02
H	-8	SER	-	expression tag	UNP Q9RA02
H	-7	GLY	-	expression tag	UNP Q9RA02
H	-6	LEU	-	expression tag	UNP Q9RA02
H	-5	VAL	-	expression tag	UNP Q9RA02
H	-4	PRO	-	expression tag	UNP Q9RA02
H	-3	ARG	-	expression tag	UNP Q9RA02
H	-2	GLY	-	expression tag	UNP Q9RA02
H	-1	SER	-	expression tag	UNP Q9RA02
H	0	HIS	-	expression tag	UNP Q9RA02

- Molecule 2 is an oligosaccharide called beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose.



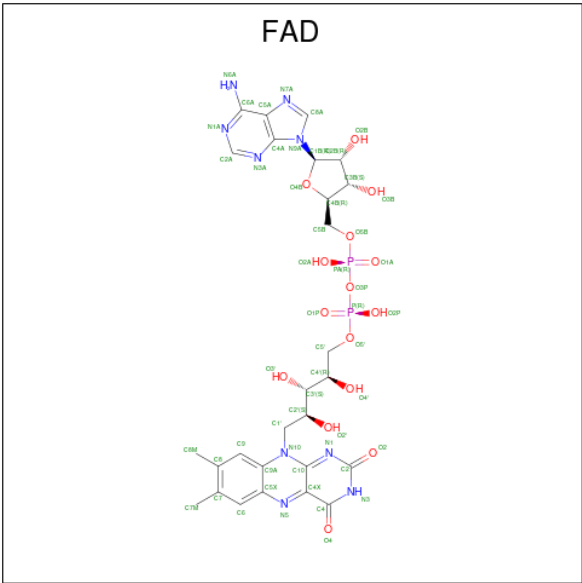
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
2	I	2	Total	C	O	0	0	0
			23	12	11			
2	J	2	Total	C	O	0	0	0
			23	12	11			
2	K	2	Total	C	O	0	0	0
			23	12	11			
2	L	2	Total	C	O	0	0	0
			23	12	11			
2	M	2	Total	C	O	0	0	0
			23	12	11			
2	N	2	Total	C	O	0	0	0
			23	12	11			

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
2	O	2	Total	C	O	0	0	0
			23	12	11			
2	P	2	Total	C	O	0	0	0
			23	12	11			
2	Q	2	Total	C	O	0	0	0
			23	12	11			
2	R	2	Total	C	O	0	0	0
			23	12	11			
2	S	2	Total	C	O	0	0	0
			23	12	11			
2	T	2	Total	C	O	0	0	0
			23	12	11			

- Molecule 3 is FLAVIN-ADENINE DINUCLEOTIDE (CCD ID: FAD) (formula: C₂₇H₃₃N₉O₁₅P₂).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0
			53	27	9	15	2	
3	B	1	Total	C	N	O	P	0
			53	27	9	15	2	
3	C	1	Total	C	N	O	P	0
			53	27	9	15	2	
3	D	1	Total	C	N	O	P	0
			53	27	9	15	2	
3	E	1	Total	C	N	O	P	0
			53	27	9	15	2	

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	F	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
3	G	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
3	H	1	Total	C	N	O	P	0	0
			53	27	9	15	2		

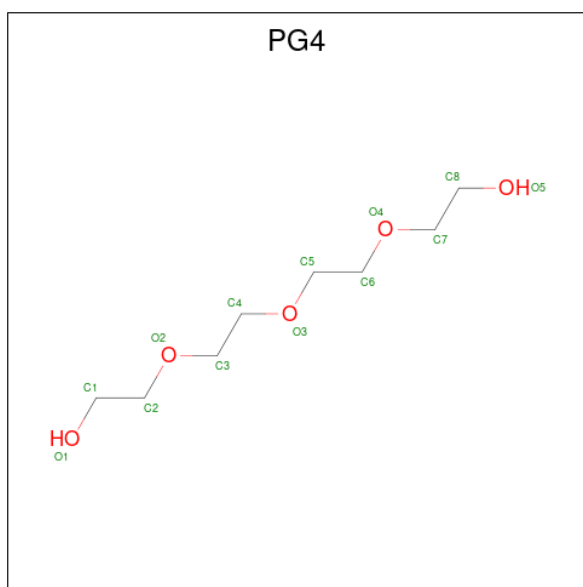
- Molecule 4 is SODIUM ION (CCD ID: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total	Na	0	0
			1	1		
4	C	1	Total	Na	0	0
			1	1		
4	E	1	Total	Na	0	0
			1	1		
4	G	1	Total	Na	0	0
			1	1		

- Molecule 5 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total	Cl	0	0
			1	1		
5	B	1	Total	Cl	0	0
			1	1		
5	C	1	Total	Cl	0	0
			1	1		
5	D	1	Total	Cl	0	0
			1	1		
5	E	1	Total	Cl	0	0
			1	1		
5	F	1	Total	Cl	0	0
			1	1		
5	G	1	Total	Cl	0	0
			1	1		
5	H	1	Total	Cl	0	0
			1	1		

- Molecule 6 is TETRAETHYLENE GLYCOL (CCD ID: PG4) (formula: C₈H₁₈O₅).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total 13	C 8	O 5	0	0
6	A	1	Total 13	C 8	O 5	0	0
6	A	1	Total 13	C 8	O 5	0	0
6	B	1	Total 13	C 8	O 5	0	0
6	B	1	Total 13	C 8	O 5	0	0
6	B	1	Total 13	C 8	O 5	0	0
6	C	1	Total 13	C 8	O 5	0	0
6	C	1	Total 13	C 8	O 5	0	0
6	D	1	Total 13	C 8	O 5	0	0
6	D	1	Total 13	C 8	O 5	0	0
6	E	1	Total 13	C 8	O 5	0	0
6	E	1	Total 13	C 8	O 5	0	0
6	E	1	Total 13	C 8	O 5	0	0
6	F	1	Total 13	C 8	O 5	0	0

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	F	1	Total	C	O	0	0
			13	8	5		
6	G	1	Total	C	O	0	0
			13	8	5		
6	G	1	Total	C	O	0	0
			13	8	5		
6	H	1	Total	C	O	0	0
			13	8	5		
6	H	1	Total	C	O	0	0
			13	8	5		

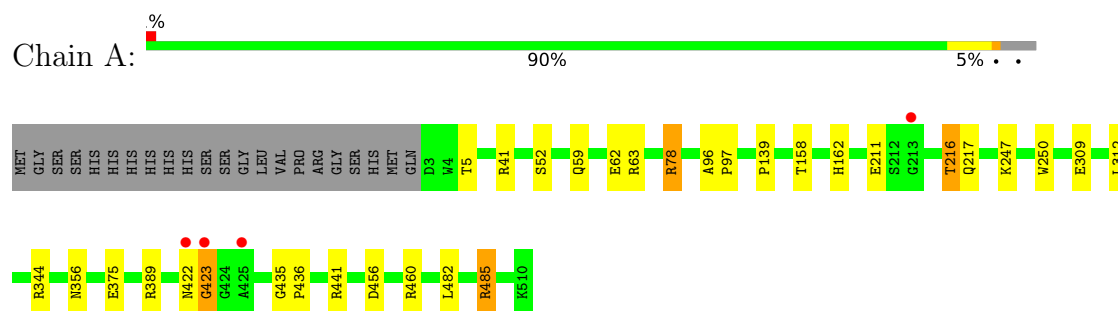
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	473	Total	O	0	0
			473	473		
7	B	405	Total	O	0	0
			405	405		
7	C	315	Total	O	0	0
			315	315		
7	D	321	Total	O	0	0
			321	321		
7	E	359	Total	O	0	0
			359	359		
7	F	296	Total	O	0	0
			296	296		
7	G	440	Total	O	0	0
			440	440		
7	H	361	Total	O	0	0
			361	361		

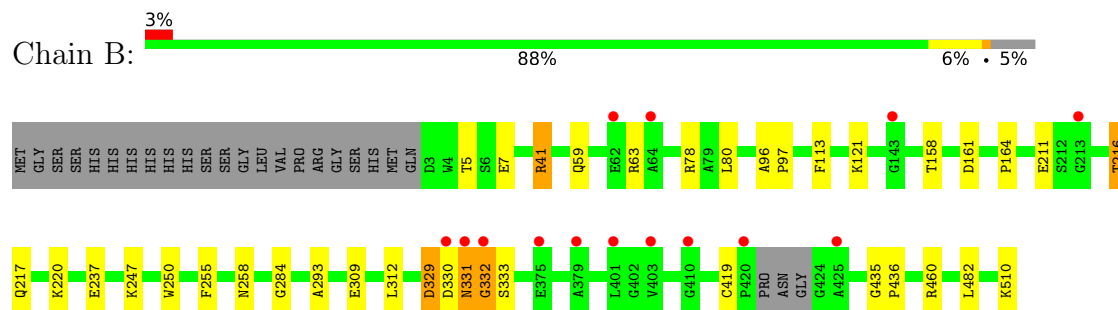
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

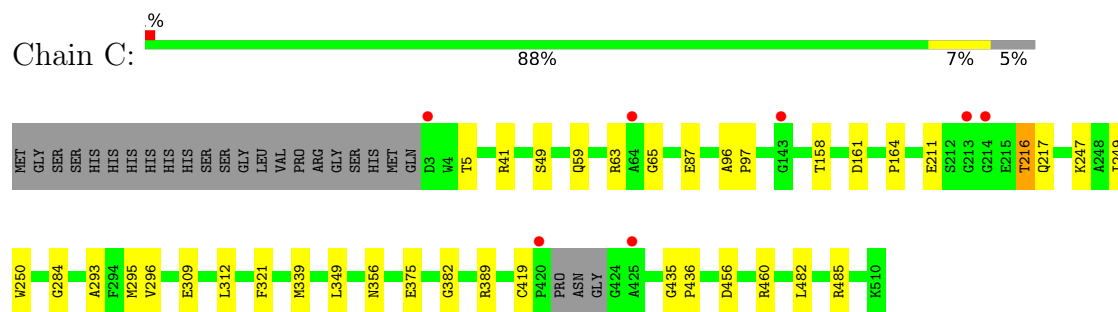
• Molecule 1: 3-KETOSTEROID DEHYDROGENASE



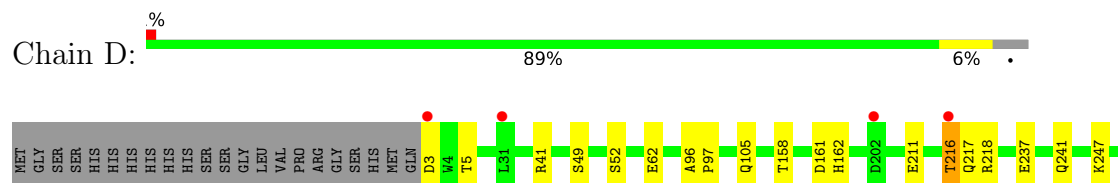
• Molecule 1: 3-KETOSTEROID DEHYDROGENASE

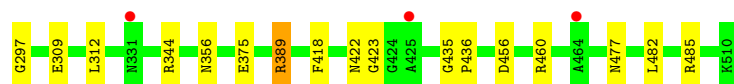


• Molecule 1: 3-KETOSTEROID DEHYDROGENASE

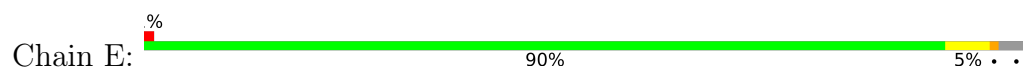


• Molecule 1: 3-KETOSTEROID DEHYDROGENASE

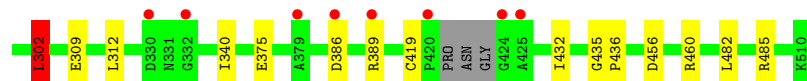
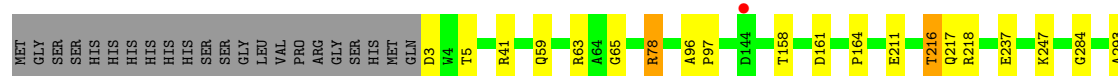
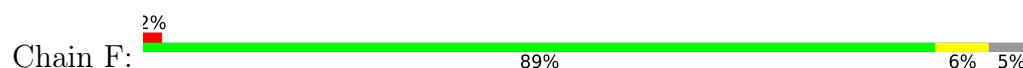




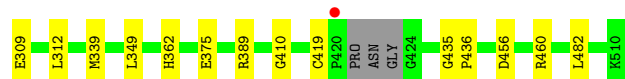
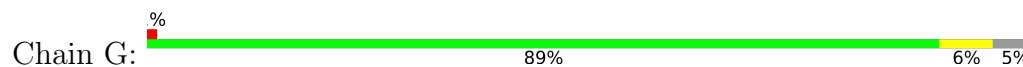
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• Molecule 2: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose



GLC1
FRU2

- Molecule 2: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose

Chain J:  100%GLC1
FRU2

- Molecule 2: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose

Chain K:  100%GLC1
FRU2

- Molecule 2: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose

Chain L:  50%  50%GLC1
FRU2

- Molecule 2: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose

Chain M:  100%GLC1
FRU2

- Molecule 2: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose

Chain N:  100%GLC1
FRU2

- Molecule 2: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose

Chain O:  100%GLC1
FRU2

- Molecule 2: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose

Chain P:  100%GLC1
FRU2

- Molecule 2: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose

Chain Q:  100%

GLC1
FRU2

- Molecule 2: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose

Chain R:  100%

GLC1
FRU2

- Molecule 2: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose

Chain S:  100%

GLC1
FRU2

- Molecule 2: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose

Chain T:  100%

GLC1
FRU2

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	107.39Å 131.62Å 363.16Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.26 – 2.00 49.26 – 2.00	Depositor EDS
% Data completeness (in resolution range)	99.7 (49.26-2.00) 99.8 (49.26-2.00)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.75 (at 2.00Å)	Xtriage
Refinement program	REFMAC 5.6.0117	Depositor
R, R_{free}	0.177 , 0.208 0.186 , 0.217	Depositor DCC
R_{free} test set	17446 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å ²)	30.0	Xtriage
Anisotropy	0.073	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 44.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	33549	wwPDB-VP
Average B, all atoms (Å ²)	32.0	wwPDB-VP

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

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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: FRU, NA, GLC, PG4, FAD, CL

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	0.97	1/3782 (0.0%)	0.93	4/5138 (0.1%)
1	B	1.00	3/3761 (0.1%)	0.93	9/5107 (0.2%)
1	C	0.86	2/3761 (0.1%)	0.89	5/5107 (0.1%)
1	D	0.87	0/3782	0.87	2/5138 (0.0%)
1	E	0.90	0/3782	0.86	1/5138 (0.0%)
1	F	0.84	1/3761 (0.0%)	0.91	7/5107 (0.1%)
1	G	0.95	2/3761 (0.1%)	0.85	2/5107 (0.0%)
1	H	0.94	2/3782 (0.1%)	0.90	6/5138 (0.1%)
All	All	0.92	11/30172 (0.0%)	0.89	36/40980 (0.1%)

All (11) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	331	ASN	CA-C	7.71	1.62	1.52
1	B	419	CYS	CA-C	6.76	1.61	1.52
1	G	419	CYS	CA-C	6.24	1.60	1.52
1	C	419	CYS	CA-C	6.22	1.60	1.52
1	B	331	ASN	N-CA	6.20	1.53	1.46
1	F	419	CYS	CA-C	6.09	1.60	1.52
1	H	41	ARG	CZ-NH1	6.05	1.41	1.32
1	G	362	HIS	CG-CD2	5.74	1.42	1.35
1	H	328	HIS	CG-CD2	5.22	1.41	1.35
1	A	162	HIS	CG-ND1	-5.10	1.32	1.38
1	C	41	ARG	CZ-NH1	5.01	1.39	1.32

All (36) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	78	ARG	NE-CZ-NH1	15.32	136.82	121.50
1	H	41	ARG	NE-CZ-NH2	-15.28	105.45	119.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	F	78	ARG	NE-CZ-NH1	14.67	136.17	121.50
1	C	41	ARG	NE-CZ-NH2	-14.64	106.03	119.20
1	A	78	ARG	NE-CZ-NH2	-14.41	106.23	119.20
1	F	78	ARG	NE-CZ-NH2	-13.95	106.65	119.20
1	C	41	ARG	NE-CZ-NH1	13.92	135.42	121.50
1	H	41	ARG	NE-CZ-NH1	13.90	135.40	121.50
1	F	78	ARG	CD-NE-CZ	10.95	139.72	124.40
1	A	78	ARG	CD-NE-CZ	10.66	139.32	124.40
1	B	329	ASP	CB-CA-C	-10.51	97.95	111.50
1	B	331	ASN	N-CA-C	8.01	126.51	114.09
1	F	247	LYS	CG-CD-CE	7.96	129.62	111.30
1	D	247	LYS	CG-CD-CE	7.76	129.16	111.30
1	B	510	LYS	CG-CD-CE	7.05	127.51	111.30
1	G	41	ARG	NE-CZ-NH2	-6.23	113.60	119.20
1	B	164	PRO	N-CA-C	6.16	121.56	113.86
1	B	41	ARG	NE-CZ-NH2	-6.15	113.67	119.20
1	B	332	GLY	N-CA-C	-6.08	107.51	115.47
1	F	41	ARG	NE-CZ-NH2	-6.02	113.78	119.20
1	B	460	ARG	NE-CZ-NH2	-5.99	113.81	119.20
1	D	41	ARG	NE-CZ-NH2	-5.88	113.91	119.20
1	H	144	ASP	CB-CA-C	-5.73	98.49	110.17
1	E	41	ARG	NE-CZ-NH2	-5.62	114.14	119.20
1	C	41	ARG	CD-NE-CZ	5.41	131.97	124.40
1	G	164	PRO	N-CA-C	5.39	120.59	113.86
1	B	80	LEU	CB-CA-C	-5.16	102.13	110.79
1	B	121	LYS	CB-CA-C	-5.15	102.54	110.26
1	A	41	ARG	NE-CZ-NH2	-5.12	114.59	119.20
1	C	321	PHE	N-CA-C	-5.11	105.60	111.07
1	H	164	PRO	N-CA-C	5.11	120.24	113.86
1	C	164	PRO	N-CA-C	5.08	120.21	113.86
1	F	164	PRO	N-CA-C	5.08	120.21	113.86
1	F	302	LEU	CA-CB-CG	5.04	133.94	116.30
1	H	164	PRO	CA-C-N	-5.02	113.99	121.87
1	H	164	PRO	C-N-CA	-5.02	113.99	121.87

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen

atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3712	0	3579	18	0
1	B	3693	0	3562	21	0
1	C	3693	0	3562	27	0
1	D	3712	0	3579	19	0
1	E	3712	0	3579	20	0
1	F	3693	0	3562	16	0
1	G	3693	0	3562	26	0
1	H	3712	0	3579	17	0
2	I	23	0	21	0	0
2	J	23	0	21	0	0
2	K	23	0	21	0	0
2	L	23	0	21	0	0
2	M	23	0	20	0	0
2	N	23	0	21	1	0
2	O	23	0	21	0	0
2	P	23	0	21	0	0
2	Q	23	0	21	0	0
2	R	23	0	21	0	0
2	S	23	0	21	0	0
2	T	23	0	21	0	0
3	A	53	0	31	0	0
3	B	53	0	31	1	0
3	C	53	0	31	1	0
3	D	53	0	31	3	0
3	E	53	0	31	2	0
3	F	53	0	31	0	0
3	G	53	0	31	2	0
3	H	53	0	31	0	0
4	A	1	0	0	0	0
4	C	1	0	0	0	0
4	E	1	0	0	0	0
4	G	1	0	0	0	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
5	C	1	0	0	0	0
5	D	1	0	0	0	0
5	E	1	0	0	0	0
5	F	1	0	0	0	0
5	G	1	0	0	0	0
5	H	1	0	0	0	0
6	A	39	0	54	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	B	39	0	54	2	0
6	C	26	0	36	3	0
6	D	26	0	36	4	0
6	E	39	0	54	4	0
6	F	26	0	36	3	0
6	G	26	0	36	2	0
6	H	26	0	36	0	0
7	A	473	0	0	3	0
7	B	405	0	0	4	0
7	C	315	0	0	3	0
7	D	321	0	0	1	0
7	E	359	0	0	1	0
7	F	296	0	0	2	0
7	G	440	0	0	3	0
7	H	361	0	0	3	0
All	All	33549	0	29405	163	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 3.

All (163) 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:C:339:MET:HE1	1:C:349:LEU:HD21	1.42	1.00
1:G:339:MET:HE1	1:G:349:LEU:HD21	1.46	0.97
1:G:339:MET:CE	1:G:349:LEU:HD21	2.04	0.88
1:F:302:LEU:HD13	1:F:432:ILE:HD12	1.62	0.82
1:C:339:MET:CE	1:C:349:LEU:HD21	2.12	0.79
1:F:302:LEU:HD22	1:F:340:ILE:HB	1.68	0.76
1:F:302:LEU:HD13	1:F:432:ILE:CD1	2.16	0.76
1:C:249:ILE:HB	7:C:2178:HOH:O	1.89	0.71
1:C:339:MET:CE	1:C:349:LEU:HD11	2.24	0.67
1:B:41:ARG:HD3	7:B:2034:HOH:O	1.96	0.65
6:D:581:PG4:O1	6:D:581:PG4:C5	2.46	0.64
1:G:295:MET:SD	1:G:339:MET:HE1	2.38	0.63
1:A:139:PRO:HG3	6:B:582:PG4:H42	1.80	0.63
1:E:456:ASP:OD2	1:E:460:ARG:HD3	1.99	0.62
1:C:456:ASP:OD2	1:C:460:ARG:HD3	1.99	0.62
1:F:456:ASP:OD2	1:F:460:ARG:HD3	2.00	0.62
1:G:456:ASP:OD2	1:G:460:ARG:HD3	1.99	0.62
1:D:456:ASP:OD2	1:D:460:ARG:HD3	2.00	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:344:ARG:NH1	7:H:2281:HOH:O	2.27	0.61
1:C:339:MET:HE3	1:C:349:LEU:CG	2.31	0.61
1:H:456:ASP:OD2	1:H:460:ARG:HD3	2.00	0.61
1:A:456:ASP:OD2	1:A:460:ARG:HD3	2.00	0.61
1:C:339:MET:HE3	1:C:349:LEU:HG	1.83	0.61
1:E:139:PRO:HB3	6:F:582:PG4:H42	1.83	0.60
1:A:62:GLU:OE2	1:D:422:ASN:OD1	2.18	0.60
1:G:339:MET:HE3	1:G:349:LEU:CG	2.32	0.59
1:E:5:THR:HG21	1:E:217:GLN:HG2	1.85	0.59
1:B:113:PHE:HE2	1:C:65:GLY:HA3	1.67	0.58
1:D:375:GLU:OE2	1:D:389:ARG:NE	2.32	0.58
1:D:344:ARG:NH1	7:D:2238:HOH:O	2.35	0.57
1:B:5:THR:HG21	1:B:217:GLN:HG2	1.86	0.56
1:H:212:SER:OG	1:H:217:GLN:NE2	2.36	0.56
1:B:330:ASP:C	1:B:331:ASN:OD1	2.48	0.55
6:B:582:PG4:H51	7:B:2405:HOH:O	2.05	0.55
1:A:485:ARG:HD3	7:A:2295:HOH:O	2.06	0.55
1:G:339:MET:HE3	1:G:349:LEU:HG	1.88	0.55
1:H:212:SER:HG	1:H:217:GLN:HE22	1.55	0.54
6:D:581:PG4:O1	6:D:581:PG4:H51	2.07	0.53
1:D:5:THR:HG21	1:D:217:GLN:HG2	1.90	0.53
1:E:422:ASN:ND2	1:E:424:GLY:H	2.06	0.53
1:A:441:ARG:NH1	7:A:2421:HOH:O	2.41	0.53
1:G:5:THR:HG21	1:G:217:GLN:HG2	1.90	0.53
1:E:386:ASP:HB3	7:E:2302:HOH:O	2.08	0.53
1:B:329:ASP:CG	1:B:329:ASP:O	2.51	0.53
1:A:5:THR:HG21	1:A:217:GLN:HG2	1.91	0.53
1:F:5:THR:HG21	1:F:217:GLN:HG2	1.91	0.52
1:A:344:ARG:NH1	7:A:2358:HOH:O	2.36	0.51
1:C:5:THR:HG21	1:C:217:GLN:HG2	1.91	0.51
1:H:423:GLY:HA3	7:H:2320:HOH:O	2.10	0.51
1:C:339:MET:CE	1:C:349:LEU:CD2	2.88	0.51
1:G:339:MET:CE	1:G:349:LEU:HD11	2.40	0.51
1:A:375:GLU:OE2	1:A:389:ARG:NE	2.39	0.51
1:A:356:ASN:ND2	1:B:161:ASP:HB3	2.26	0.50
1:G:49:SER:HA	3:G:551:FAD:C6	2.40	0.50
1:D:3:ASP:OD1	1:D:218:ARG:NH1	2.45	0.50
1:F:375:GLU:OE2	1:F:389:ARG:NE	2.36	0.50
1:B:332:GLY:HA2	7:B:2304:HOH:O	2.11	0.50
1:G:339:MET:CE	1:G:349:LEU:CD2	2.84	0.50
1:E:139:PRO:HG3	6:F:582:PG4:H32	1.94	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:386:ASP:HB2	7:F:2256:HOH:O	2.11	0.49
1:G:41:ARG:HD3	7:G:2034:HOH:O	2.12	0.49
1:H:5:THR:HG21	1:H:217:GLN:HG2	1.93	0.49
1:A:422:ASN:ND2	1:D:62:GLU:OE2	2.44	0.49
6:C:582:PG4:H32	1:D:162:HIS:HB2	1.94	0.49
1:C:296:VAL:HG21	6:C:581:PG4:H51	1.94	0.49
1:C:435:GLY:HA2	1:C:436:PRO:C	2.38	0.49
1:F:65:GLY:HA3	1:G:113:PHE:HE2	1.78	0.49
1:A:435:GLY:HA2	1:A:436:PRO:C	2.38	0.49
1:F:3:ASP:OD1	1:F:218:ARG:NH1	2.45	0.49
1:B:255:PHE:HB2	7:B:2241:HOH:O	2.13	0.49
1:C:87:GLU:HG3	7:C:2060:HOH:O	2.13	0.48
1:B:258:ASN:OD1	3:B:551:FAD:H2B	2.14	0.48
1:B:247:LYS:HE2	1:B:250:TRP:CH2	2.49	0.48
1:C:375:GLU:OE2	1:C:389:ARG:NE	2.40	0.48
1:H:247:LYS:HE2	1:H:250:TRP:CH2	2.48	0.48
1:B:482:LEU:C	1:B:482:LEU:HD12	2.39	0.48
1:A:52:SER:HB2	6:A:581:PG4:H82	1.95	0.48
1:C:295:MET:SD	1:C:339:MET:HE1	2.54	0.47
1:G:49:SER:HB2	3:G:551:FAD:C4X	2.44	0.47
6:D:581:PG4:O1	6:D:581:PG4:H52	2.15	0.47
1:H:435:GLY:HA2	1:H:436:PRO:C	2.40	0.47
1:C:382:GLY:HA2	7:C:2264:HOH:O	2.15	0.47
6:E:581:PG4:O1	6:E:581:PG4:C5	2.64	0.46
1:E:96:ALA:HB3	1:E:97:PRO:HD3	1.98	0.46
1:E:247:LYS:HE2	1:E:250:TRP:CH2	2.51	0.46
1:D:96:ALA:HB3	1:D:97:PRO:HD3	1.98	0.46
1:G:339:MET:HE3	1:G:349:LEU:CD2	2.45	0.46
1:E:62:GLU:OE2	1:H:422:ASN:OD1	2.34	0.45
1:E:356:ASN:ND2	1:F:161:ASP:HB3	2.32	0.45
1:F:482:LEU:C	1:F:482:LEU:HD12	2.41	0.45
1:G:96:ALA:HB3	1:G:97:PRO:HD3	1.98	0.45
1:H:422:ASN:C	1:H:423:GLY:O	2.58	0.45
1:E:510:LYS:HB2	1:E:510:LYS:HE3	1.62	0.45
1:G:339:MET:HE3	1:G:349:LEU:HD21	1.92	0.45
1:B:7:GLU:HG2	1:B:220:LYS:HD3	1.99	0.45
1:B:7:GLU:HG2	1:B:220:LYS:HB3	1.98	0.45
6:C:581:PG4:O3	6:C:581:PG4:O1	2.35	0.45
1:G:247:LYS:HE2	1:G:250:TRP:CH2	2.51	0.45
1:B:96:ALA:HB3	1:B:97:PRO:HD3	1.99	0.45
1:D:49:SER:HA	3:D:551:FAD:C6	2.47	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:477:ASN:ND2	3:E:551:FAD:H5'2	2.31	0.44
6:G:582:PG4:H11	1:H:164:PRO:HA	1.98	0.44
1:G:375:GLU:OE2	1:G:389:ARG:NE	2.39	0.44
1:E:435:GLY:HA2	1:E:436:PRO:C	2.42	0.44
1:H:96:ALA:HB3	1:H:97:PRO:HD3	1.99	0.44
1:C:161:ASP:HB3	1:D:356:ASN:ND2	2.32	0.44
1:C:247:LYS:HE2	1:C:250:TRP:CH2	2.52	0.44
1:F:96:ALA:HB3	1:F:97:PRO:HD3	1.99	0.44
1:A:96:ALA:HB3	1:A:97:PRO:HD3	1.98	0.44
1:E:164:PRO:HG3	7:F:2120:HOH:O	2.16	0.44
1:G:435:GLY:HA2	1:G:436:PRO:C	2.42	0.44
1:G:161:ASP:HB3	1:H:356:ASN:ND2	2.32	0.43
1:C:339:MET:HE2	1:C:349:LEU:HD11	1.97	0.43
1:D:52:SER:HB2	6:D:581:PG4:H82	2.00	0.43
1:G:482:LEU:HD12	1:G:482:LEU:C	2.43	0.43
1:C:339:MET:CE	1:C:349:LEU:CG	2.97	0.43
1:H:211:GLU:OE2	1:H:216:THR:HB	2.19	0.43
1:A:422:ASN:C	1:A:423:GLY:O	2.61	0.43
1:D:482:LEU:C	1:D:482:LEU:HD12	2.44	0.43
1:E:211:GLU:OE2	1:E:216:THR:HB	2.19	0.43
1:F:211:GLU:OE2	1:F:216:THR:HB	2.19	0.42
1:F:435:GLY:HA2	1:F:436:PRO:C	2.44	0.42
1:D:211:GLU:OE2	1:D:216:THR:HB	2.20	0.42
1:B:211:GLU:OE2	1:B:216:THR:HB	2.19	0.42
1:C:49:SER:HA	3:C:551:FAD:C6	2.49	0.42
1:E:49:SER:HB2	3:E:551:FAD:C4X	2.49	0.42
2:N:1:GLC:O5	2:N:2:FRU:H61	2.19	0.42
1:A:211:GLU:OE2	1:A:216:THR:HB	2.19	0.42
1:C:96:ALA:HB3	1:C:97:PRO:HD3	2.01	0.42
1:D:49:SER:HB2	3:D:551:FAD:C4X	2.49	0.42
1:G:211:GLU:OE2	1:G:216:THR:HB	2.20	0.42
1:C:482:LEU:HD12	1:C:482:LEU:C	2.45	0.42
1:D:435:GLY:HA2	1:D:436:PRO:C	2.44	0.42
1:G:339:MET:HE2	1:G:349:LEU:HD11	2.00	0.42
6:G:582:PG4:C1	1:H:164:PRO:HA	2.50	0.42
1:B:435:GLY:HA2	1:B:436:PRO:C	2.45	0.42
1:A:247:LYS:HE2	1:A:250:TRP:CH2	2.54	0.42
1:C:211:GLU:OE2	1:C:216:THR:HB	2.20	0.42
1:C:59:GLN:O	1:C:63:ARG:HG3	2.20	0.41
1:C:356:ASN:ND2	1:D:161:ASP:HB3	2.35	0.41
1:F:59:GLN:O	1:F:63:ARG:HG3	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:249:ILE:HB	7:G:2245:HOH:O	2.20	0.41
1:A:59:GLN:O	1:A:63:ARG:HG3	2.21	0.41
1:G:59:GLN:O	1:G:63:ARG:HG3	2.20	0.41
1:H:456:ASP:HB2	7:H:2329:HOH:O	2.20	0.41
1:H:59:GLN:O	1:H:63:ARG:HG3	2.20	0.41
1:B:331:ASN:C	1:B:333:SER:H	2.28	0.41
1:D:477:ASN:ND2	3:D:551:FAD:H5'2	2.36	0.41
1:G:410:GLY:C	7:G:2380:HOH:O	2.63	0.41
1:B:331:ASN:HB2	1:B:333:SER:HB3	2.03	0.41
1:E:52:SER:HB2	6:E:581:PG4:H81	2.01	0.41
1:B:284:GLY:HA2	1:B:293:ALA:O	2.22	0.40
1:E:139:PRO:CB	6:F:582:PG4:H42	2.51	0.40
1:E:375:GLU:OE2	1:E:389:ARG:NE	2.40	0.40
6:E:581:PG4:O1	6:E:581:PG4:H51	2.21	0.40
1:B:59:GLN:O	1:B:63:ARG:HG3	2.20	0.40
1:E:482:LEU:HD12	1:E:482:LEU:C	2.45	0.40
1:A:482:LEU:C	1:A:482:LEU:HD12	2.45	0.40
6:E:581:PG4:O1	6:E:581:PG4:H52	2.21	0.40
1:D:297:GLY:HA2	1:D:418:PHE:CG	2.57	0.40
1:B:330:ASP:O	1:B:331:ASN:OD1	2.39	0.40
1:C:284:GLY:HA2	1:C:293:ALA:O	2.21	0.40
1:F:284:GLY:HA2	1:F:293:ALA:O	2.21	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	506/530 (96%)	493 (97%)	12 (2%)	1 (0%)	43	42
1	B	501/530 (94%)	487 (97%)	14 (3%)	0	100	100
1	C	501/530 (94%)	489 (98%)	12 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	D	506/530 (96%)	493 (97%)	12 (2%)	1 (0%)	43	42
1	E	506/530 (96%)	494 (98%)	11 (2%)	1 (0%)	43	42
1	F	501/530 (94%)	489 (98%)	12 (2%)	0	100	100
1	G	501/530 (94%)	490 (98%)	11 (2%)	0	100	100
1	H	506/530 (96%)	495 (98%)	10 (2%)	1 (0%)	43	42
All	All	4028/4240 (95%)	3930 (98%)	94 (2%)	4 (0%)	48	46

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	423	GLY
1	H	423	GLY
1	D	423	GLY
1	E	423	GLY

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	369/388 (95%)	363 (98%)	6 (2%)	55	62
1	B	367/388 (95%)	361 (98%)	6 (2%)	55	62
1	C	367/388 (95%)	362 (99%)	5 (1%)	59	66
1	D	369/388 (95%)	360 (98%)	9 (2%)	43	47
1	E	369/388 (95%)	363 (98%)	6 (2%)	55	62
1	F	367/388 (95%)	359 (98%)	8 (2%)	45	50
1	G	367/388 (95%)	363 (99%)	4 (1%)	65	73
1	H	369/388 (95%)	363 (98%)	6 (2%)	55	62
All	All	2944/3104 (95%)	2894 (98%)	50 (2%)	53	60

All (50) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	78	ARG
1	A	158	THR
1	A	216	THR
1	A	309	GLU
1	A	312	LEU
1	A	485	ARG
1	B	78	ARG
1	B	158	THR
1	B	216	THR
1	B	237	GLU
1	B	309	GLU
1	B	312	LEU
1	C	158	THR
1	C	216	THR
1	C	309	GLU
1	C	312	LEU
1	C	485	ARG
1	D	105	GLN
1	D	158	THR
1	D	216	THR
1	D	237	GLU
1	D	241	GLN
1	D	309	GLU
1	D	312	LEU
1	D	389	ARG
1	D	485	ARG
1	E	158	THR
1	E	216	THR
1	E	312	LEU
1	E	422	ASN
1	E	485	ARG
1	E	510	LYS
1	F	78	ARG
1	F	158	THR
1	F	216	THR
1	F	237	GLU
1	F	302	LEU
1	F	309	GLU
1	F	312	LEU
1	F	485	ARG
1	G	158	THR
1	G	216	THR
1	G	309	GLU

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Mol	Chain	Res	Type
1	G	312	LEU
1	H	158	THR
1	H	216	THR
1	H	309	GLU
1	H	312	LEU
1	H	386	ASP
1	H	485	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (21) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	29	GLN
1	A	356	ASN
1	B	29	GLN
1	B	108	ASN
1	B	241	GLN
1	B	320	GLN
1	C	29	GLN
1	C	108	ASN
1	D	29	GLN
1	D	422	ASN
1	E	29	GLN
1	E	108	ASN
1	E	422	ASN
1	F	29	GLN
1	F	108	ASN
1	G	29	GLN
1	G	108	ASN
1	H	29	GLN
1	H	217	GLN
1	H	241	GLN
1	H	422	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

24 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	GLC	I	1	2	11,11,12	1.35	2 (18%)	15,15,17	0.91	1 (6%)
2	FRU	I	2	2	11,12,12	1.11	1 (9%)	10,18,18	0.84	0
2	GLC	J	1	2	11,11,12	1.24	2 (18%)	15,15,17	1.81	4 (26%)
2	FRU	J	2	2	11,12,12	2.19	3 (27%)	10,18,18	2.15	3 (30%)
2	GLC	K	1	2	11,11,12	2.23	7 (63%)	15,15,17	1.08	1 (6%)
2	FRU	K	2	2	11,12,12	2.67	3 (27%)	10,18,18	1.12	1 (10%)
2	GLC	L	1	2	11,11,12	0.89	0	15,15,17	0.85	0
2	FRU	L	2	2	11,12,12	2.06	3 (27%)	10,18,18	1.66	2 (20%)
2	GLC	M	1	2	11,11,12	1.55	2 (18%)	15,15,17	0.79	0
2	FRU	M	2	2	11,12,12	1.75	3 (27%)	10,18,18	1.48	3 (30%)
2	GLC	N	1	2	11,11,12	2.01	4 (36%)	15,15,17	1.73	1 (6%)
2	FRU	N	2	2	11,12,12	1.37	2 (18%)	10,18,18	1.41	3 (30%)
2	GLC	O	1	2	11,11,12	1.67	3 (27%)	15,15,17	0.87	0
2	FRU	O	2	2	11,12,12	1.23	1 (9%)	10,18,18	1.43	2 (20%)
2	GLC	P	1	2	11,11,12	1.57	2 (18%)	15,15,17	1.63	3 (20%)
2	FRU	P	2	2	11,12,12	2.46	3 (27%)	10,18,18	1.47	2 (20%)
2	GLC	Q	1	2	11,11,12	2.17	4 (36%)	15,15,17	1.11	1 (6%)
2	FRU	Q	2	2	11,12,12	1.58	2 (18%)	10,18,18	1.55	2 (20%)
2	GLC	R	1	2	11,11,12	1.15	0	15,15,17	1.18	1 (6%)
2	FRU	R	2	2	11,12,12	1.40	1 (9%)	10,18,18	0.77	0
2	GLC	S	1	2	11,11,12	0.92	1 (9%)	15,15,17	1.27	1 (6%)
2	FRU	S	2	2	11,12,12	1.92	3 (27%)	10,18,18	1.54	3 (30%)
2	GLC	T	1	2	11,11,12	2.05	5 (45%)	15,15,17	0.91	1 (6%)
2	FRU	T	2	2	11,12,12	1.68	2 (18%)	10,18,18	1.68	1 (10%)

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	GLC	I	1	2	-	0/2/19/22	0/1/1/1
2	FRU	I	2	2	-	0/5/24/24	0/1/1/1
2	GLC	J	1	2	-	0/2/19/22	0/1/1/1
2	FRU	J	2	2	-	0/5/24/24	0/1/1/1
2	GLC	K	1	2	-	2/2/19/22	0/1/1/1
2	FRU	K	2	2	-	0/5/24/24	0/1/1/1
2	GLC	L	1	2	-	0/2/19/22	0/1/1/1
2	FRU	L	2	2	-	2/5/24/24	0/1/1/1
2	GLC	M	1	2	-	0/2/19/22	0/1/1/1
2	FRU	M	2	2	-	2/5/24/24	0/1/1/1
2	GLC	N	1	2	-	2/2/19/22	0/1/1/1
2	FRU	N	2	2	-	2/5/24/24	0/1/1/1
2	GLC	O	1	2	-	0/2/19/22	0/1/1/1
2	FRU	O	2	2	-	0/5/24/24	0/1/1/1
2	GLC	P	1	2	-	0/2/19/22	0/1/1/1
2	FRU	P	2	2	-	2/5/24/24	0/1/1/1
2	GLC	Q	1	2	-	1/2/19/22	0/1/1/1
2	FRU	Q	2	2	-	0/5/24/24	0/1/1/1
2	GLC	R	1	2	-	0/2/19/22	0/1/1/1
2	FRU	R	2	2	-	0/5/24/24	0/1/1/1
2	GLC	S	1	2	-	0/2/19/22	0/1/1/1
2	FRU	S	2	2	-	0/5/24/24	0/1/1/1
2	GLC	T	1	2	-	2/2/19/22	0/1/1/1
2	FRU	T	2	2	-	0/5/24/24	0/1/1/1

All (59) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	K	2	FRU	O2-C2	6.81	1.52	1.40
2	P	2	FRU	O5-C2	5.59	1.52	1.43
2	J	2	FRU	O2-C2	4.77	1.49	1.40
2	K	2	FRU	O5-C2	4.60	1.50	1.43
2	L	2	FRU	O2-C2	4.46	1.48	1.40
2	Q	1	GLC	O5-C5	4.43	1.52	1.43
2	P	2	FRU	O2-C2	3.88	1.47	1.40
2	Q	1	GLC	O2-C2	3.86	1.51	1.43
2	Q	2	FRU	O5-C2	3.85	1.49	1.43
2	N	1	GLC	O5-C5	3.72	1.50	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	S	2	FRU	O2-C2	3.68	1.47	1.40
2	T	1	GLC	O5-C1	3.67	1.49	1.43
2	T	2	FRU	O5-C2	3.65	1.49	1.43
2	J	2	FRU	O5-C2	3.56	1.49	1.43
2	S	2	FRU	O5-C2	3.54	1.49	1.43
2	O	1	GLC	O5-C5	3.46	1.50	1.43
2	J	2	FRU	O5-C5	3.46	1.51	1.43
2	L	2	FRU	O5-C2	3.39	1.48	1.43
2	K	1	GLC	C2-C3	3.27	1.57	1.52
2	T	1	GLC	O2-C2	3.18	1.50	1.43
2	N	2	FRU	O2-C2	3.13	1.46	1.40
2	M	1	GLC	O2-C2	-3.12	1.36	1.43
2	K	1	GLC	O2-C2	3.06	1.49	1.43
2	P	2	FRU	O5-C5	3.05	1.50	1.43
2	M	1	GLC	O5-C5	3.03	1.49	1.43
2	M	2	FRU	O2-C2	2.98	1.45	1.40
2	P	1	GLC	O5-C1	2.96	1.48	1.43
2	M	2	FRU	O5-C2	2.87	1.48	1.43
2	R	2	FRU	O2-C2	2.80	1.45	1.40
2	L	2	FRU	C4-C5	2.79	1.60	1.53
2	N	1	GLC	C2-C3	2.75	1.56	1.52
2	Q	1	GLC	C4-C3	2.73	1.59	1.52
2	T	2	FRU	O2-C2	2.72	1.45	1.40
2	N	1	GLC	O2-C2	2.65	1.48	1.43
2	Q	2	FRU	O2-C2	2.61	1.45	1.40
2	M	2	FRU	O5-C5	2.60	1.49	1.43
2	T	1	GLC	O3-C3	2.59	1.49	1.43
2	Q	1	GLC	C2-C3	2.56	1.56	1.52
2	O	1	GLC	O4-C4	2.55	1.49	1.43
2	I	1	GLC	O2-C2	-2.53	1.38	1.43
2	O	2	FRU	O5-C5	2.51	1.49	1.43
2	K	1	GLC	O3-C3	2.48	1.49	1.43
2	O	1	GLC	C2-C3	2.46	1.56	1.52
2	K	1	GLC	O5-C1	2.44	1.47	1.43
2	K	1	GLC	C4-C5	2.43	1.58	1.53
2	K	1	GLC	O5-C5	2.42	1.48	1.43
2	T	1	GLC	C2-C3	2.41	1.56	1.52
2	T	1	GLC	C4-C3	2.36	1.58	1.52
2	P	1	GLC	C4-C3	2.35	1.58	1.52
2	S	2	FRU	O5-C5	2.34	1.49	1.43
2	I	1	GLC	O5-C1	2.34	1.47	1.43
2	I	2	FRU	O3-C3	-2.33	1.38	1.42

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	N	1	GLC	C4-C5	2.30	1.57	1.53
2	S	1	GLC	C2-C3	-2.27	1.49	1.52
2	J	1	GLC	C4-C3	2.27	1.58	1.52
2	K	2	FRU	C1-C2	2.19	1.57	1.52
2	K	1	GLC	O4-C4	2.18	1.48	1.43
2	N	2	FRU	O5-C2	2.17	1.47	1.43
2	J	1	GLC	C2-C3	2.03	1.55	1.52

All (36) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	N	1	GLC	O5-C5-C6	5.58	118.53	107.66
2	J	1	GLC	C1-O5-C5	4.61	118.36	112.19
2	T	2	FRU	O2-C2-O5	4.52	117.99	109.33
2	J	2	FRU	C6-C5-C4	-4.40	104.71	115.10
2	P	1	GLC	C1-O5-C5	4.39	118.07	112.19
2	J	2	FRU	O2-C2-O5	3.89	116.79	109.33
2	Q	2	FRU	O2-C2-O5	3.70	116.43	109.33
2	L	2	FRU	O2-C2-O5	3.43	115.91	109.33
2	K	1	GLC	O5-C5-C6	3.37	114.22	107.66
2	O	2	FRU	O2-C2-O5	3.32	115.70	109.33
2	K	2	FRU	O2-C2-O5	3.21	115.48	109.33
2	S	1	GLC	C1-O5-C5	3.21	116.48	112.19
2	S	2	FRU	O2-C2-O5	3.08	115.23	109.33
2	P	2	FRU	O2-C2-O5	2.98	115.05	109.33
2	P	2	FRU	O5-C5-C6	2.74	116.36	108.89
2	J	2	FRU	O5-C5-C6	2.56	115.86	108.89
2	O	2	FRU	O1-C1-C2	-2.52	106.09	111.67
2	Q	1	GLC	O5-C5-C6	2.49	112.51	107.66
2	J	1	GLC	C6-C5-C4	-2.48	106.94	113.02
2	I	1	GLC	C1-O5-C5	2.44	115.46	112.19
2	N	2	FRU	O1-C1-C2	-2.41	106.33	111.67
2	L	2	FRU	O5-C5-C6	-2.39	102.38	108.89
2	M	2	FRU	O5-C5-C6	2.38	115.38	108.89
2	P	1	GLC	O4-C4-C3	2.38	115.98	110.38
2	Q	2	FRU	O1-C1-C2	-2.36	106.44	111.67
2	M	2	FRU	O6-C6-C5	-2.33	103.41	111.33
2	J	1	GLC	C1-C2-C3	2.24	112.91	109.64
2	P	1	GLC	C6-C5-C4	-2.21	107.60	113.02
2	J	1	GLC	O4-C4-C3	2.21	115.58	110.38
2	M	2	FRU	O2-C2-O5	2.20	113.56	109.33
2	S	2	FRU	C6-C5-C4	-2.19	109.94	115.10

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	T	1	GLC	O2-C2-C3	2.17	114.64	110.15
2	R	1	GLC	O2-C2-C1	-2.15	104.31	109.22
2	N	2	FRU	O2-C2-O5	2.15	113.45	109.33
2	N	2	FRU	C6-C5-C4	-2.05	110.26	115.10
2	S	2	FRU	O6-C6-C5	-2.03	104.43	111.33

There are no chirality outliers.

All (15) torsion outliers are listed below:

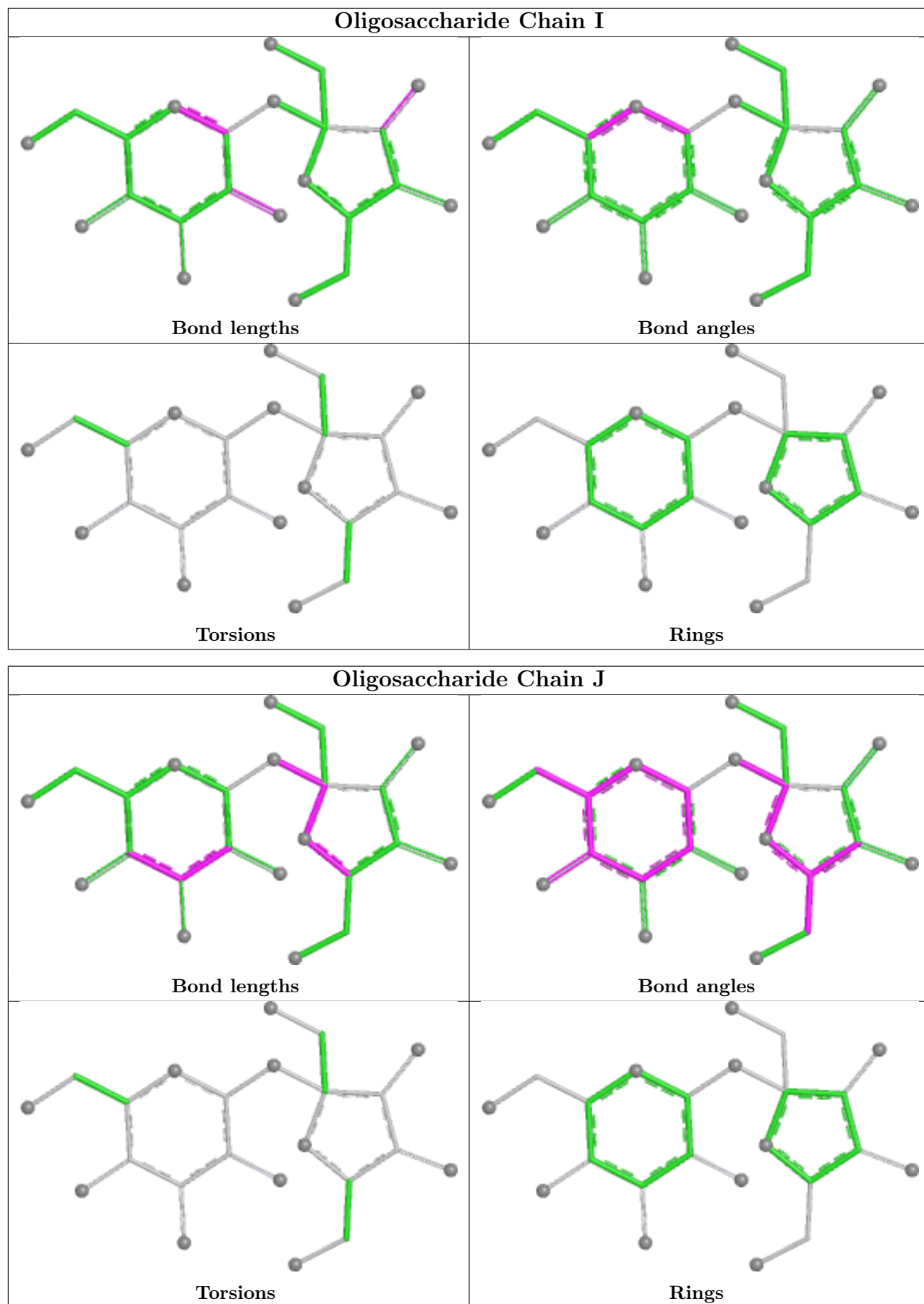
Mol	Chain	Res	Type	Atoms
2	N	2	FRU	O5-C5-C6-O6
2	N	2	FRU	C4-C5-C6-O6
2	L	2	FRU	C4-C5-C6-O6
2	L	2	FRU	O5-C5-C6-O6
2	N	1	GLC	O5-C5-C6-O6
2	K	1	GLC	C4-C5-C6-O6
2	K	1	GLC	O5-C5-C6-O6
2	N	1	GLC	C4-C5-C6-O6
2	T	1	GLC	C4-C5-C6-O6
2	T	1	GLC	O5-C5-C6-O6
2	P	2	FRU	O5-C5-C6-O6
2	Q	1	GLC	C4-C5-C6-O6
2	M	2	FRU	O1-C1-C2-O2
2	M	2	FRU	O1-C1-C2-O5
2	P	2	FRU	C4-C5-C6-O6

There are no ring outliers.

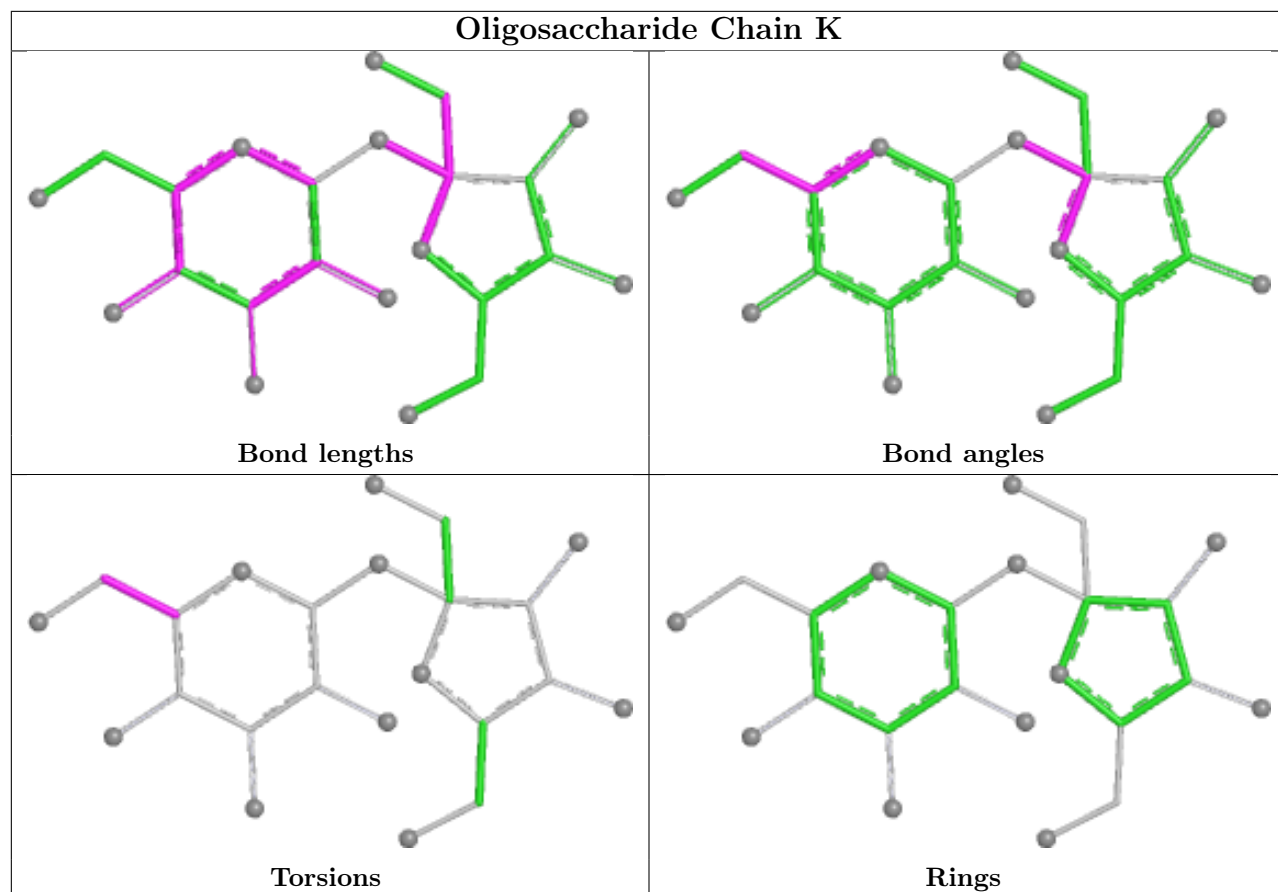
2 monomers are involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	N	1	GLC	1	0
2	N	2	FRU	1	0

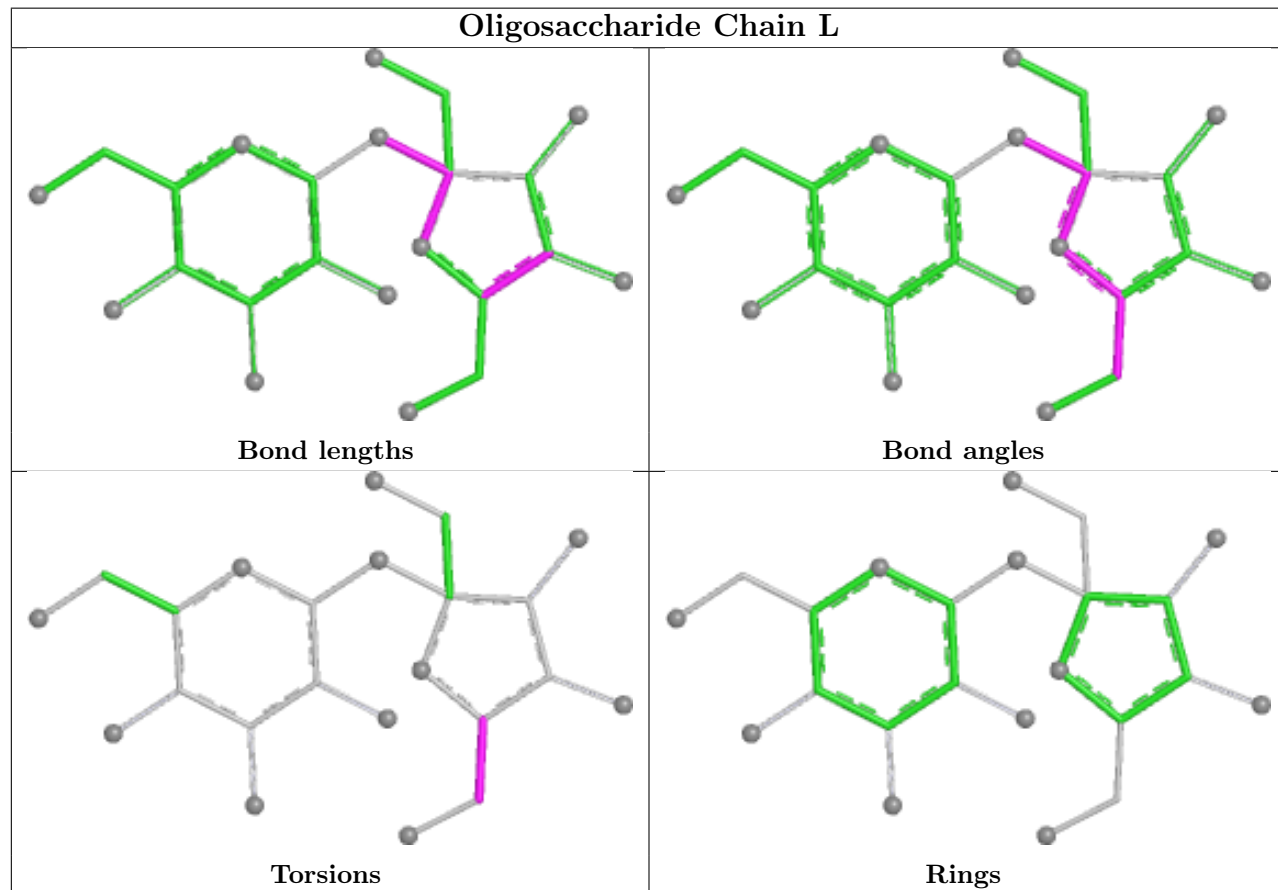
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.



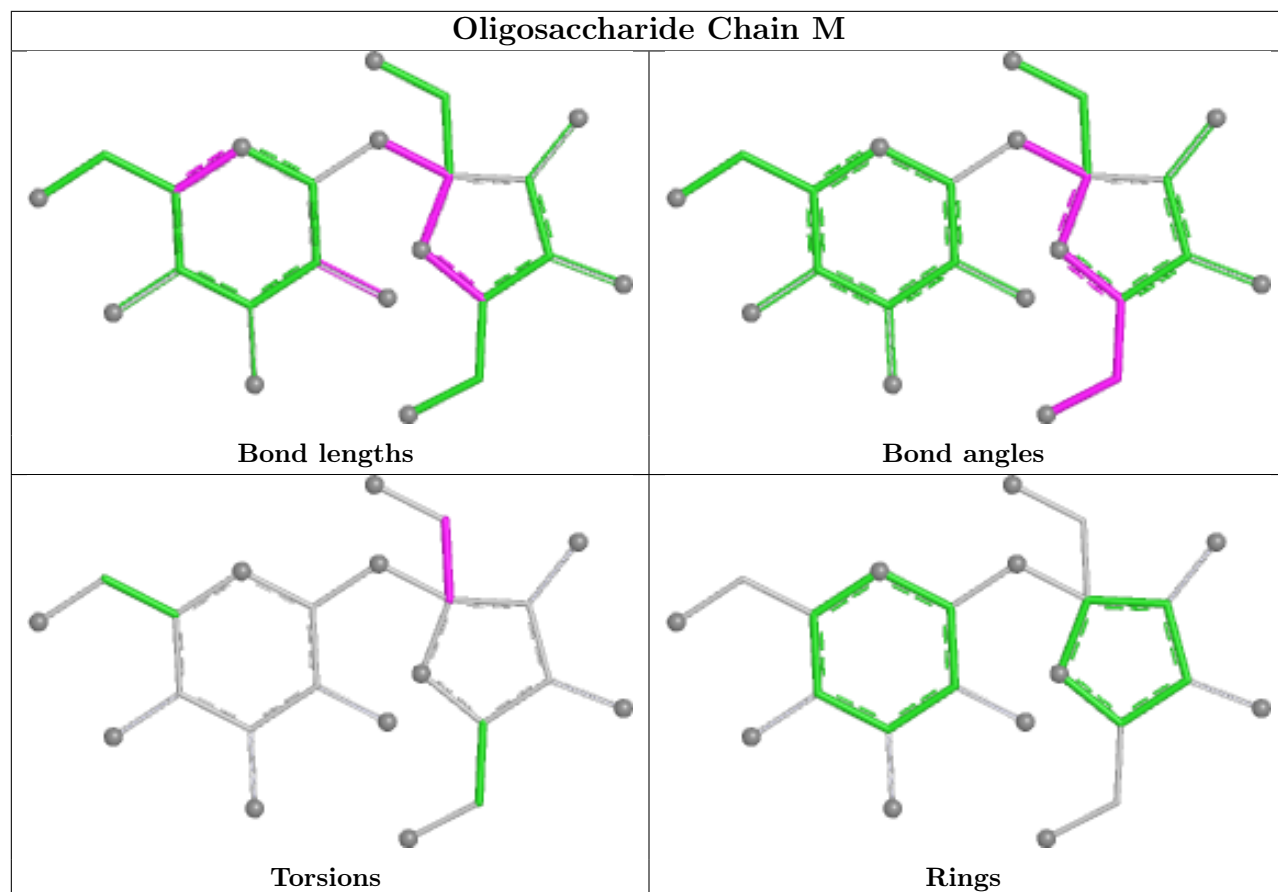
Oligosaccharide Chain K



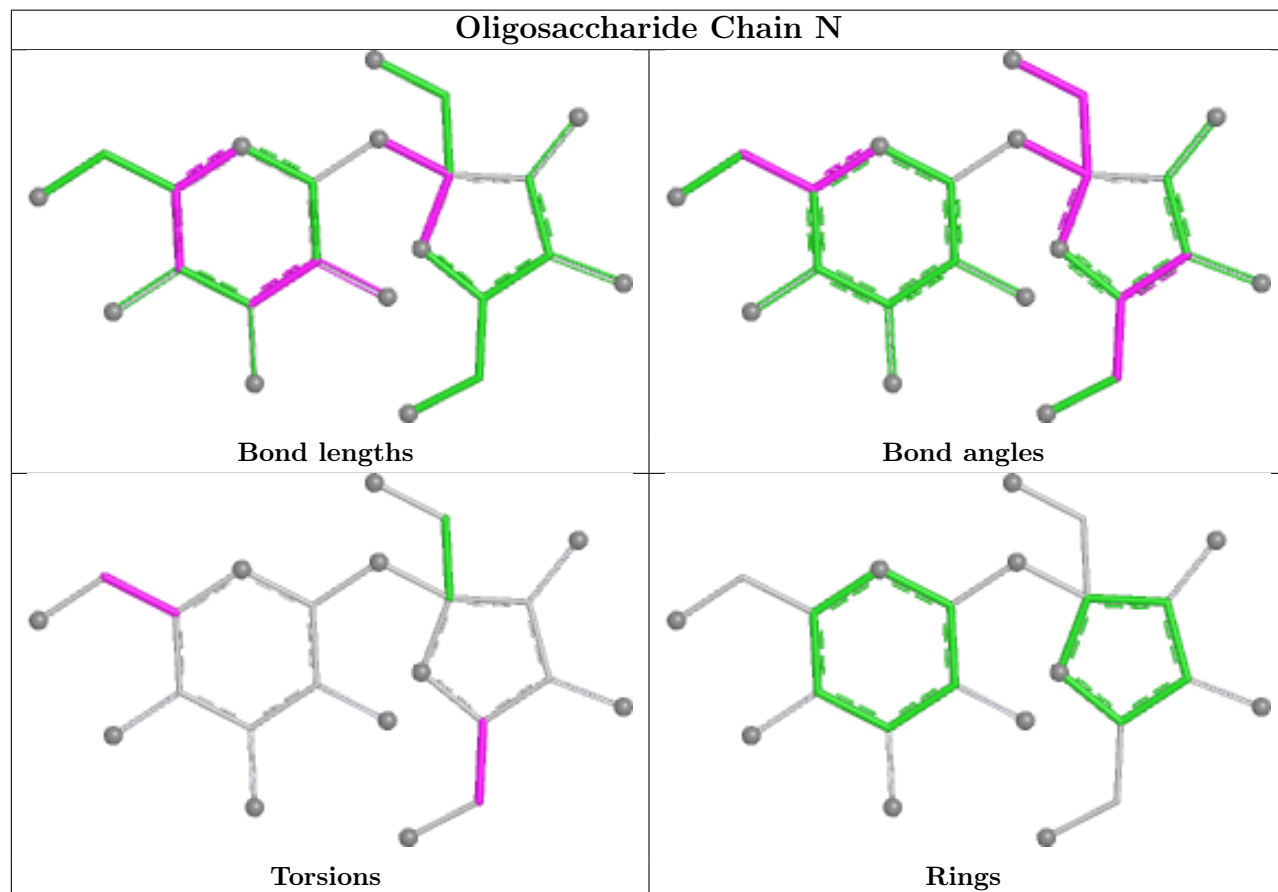
Oligosaccharide Chain L



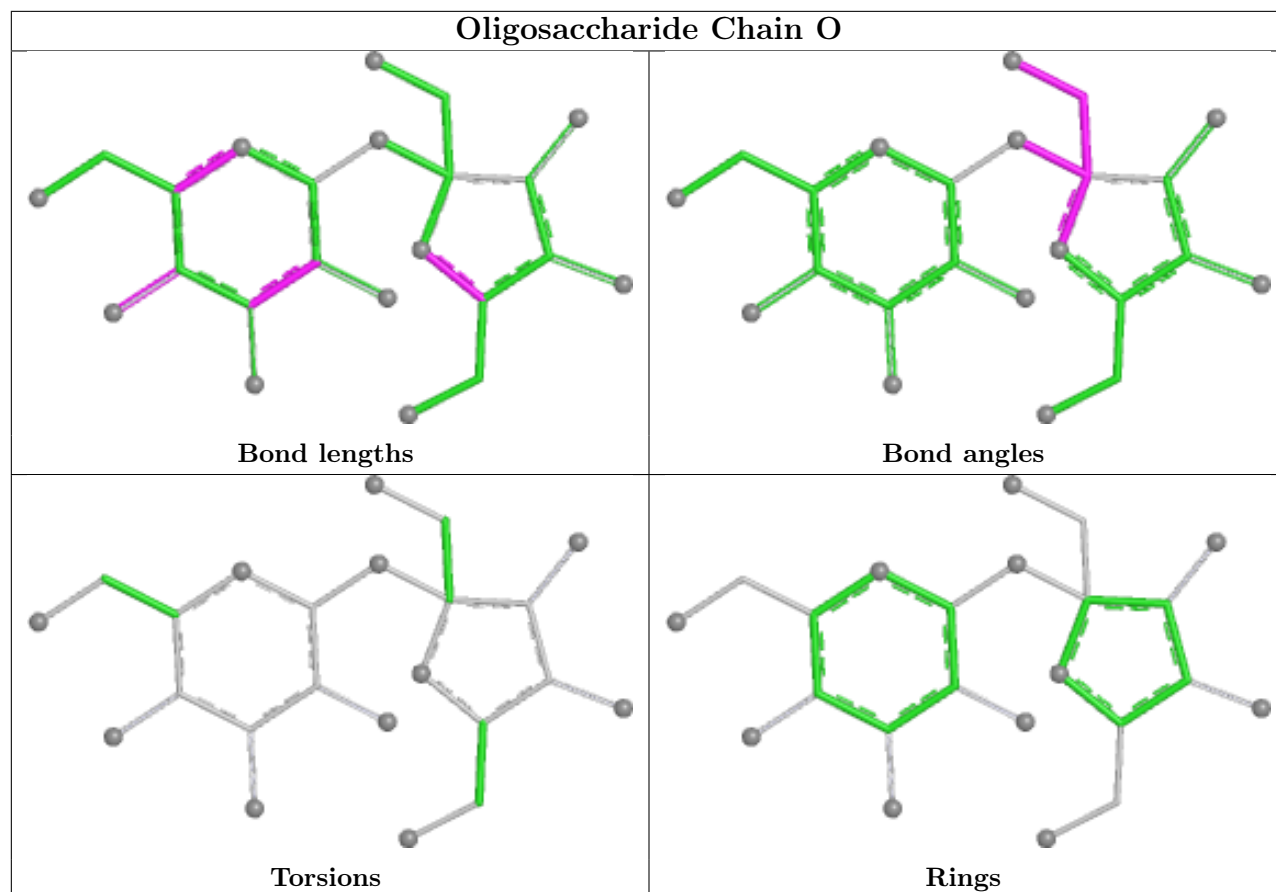
Oligosaccharide Chain M



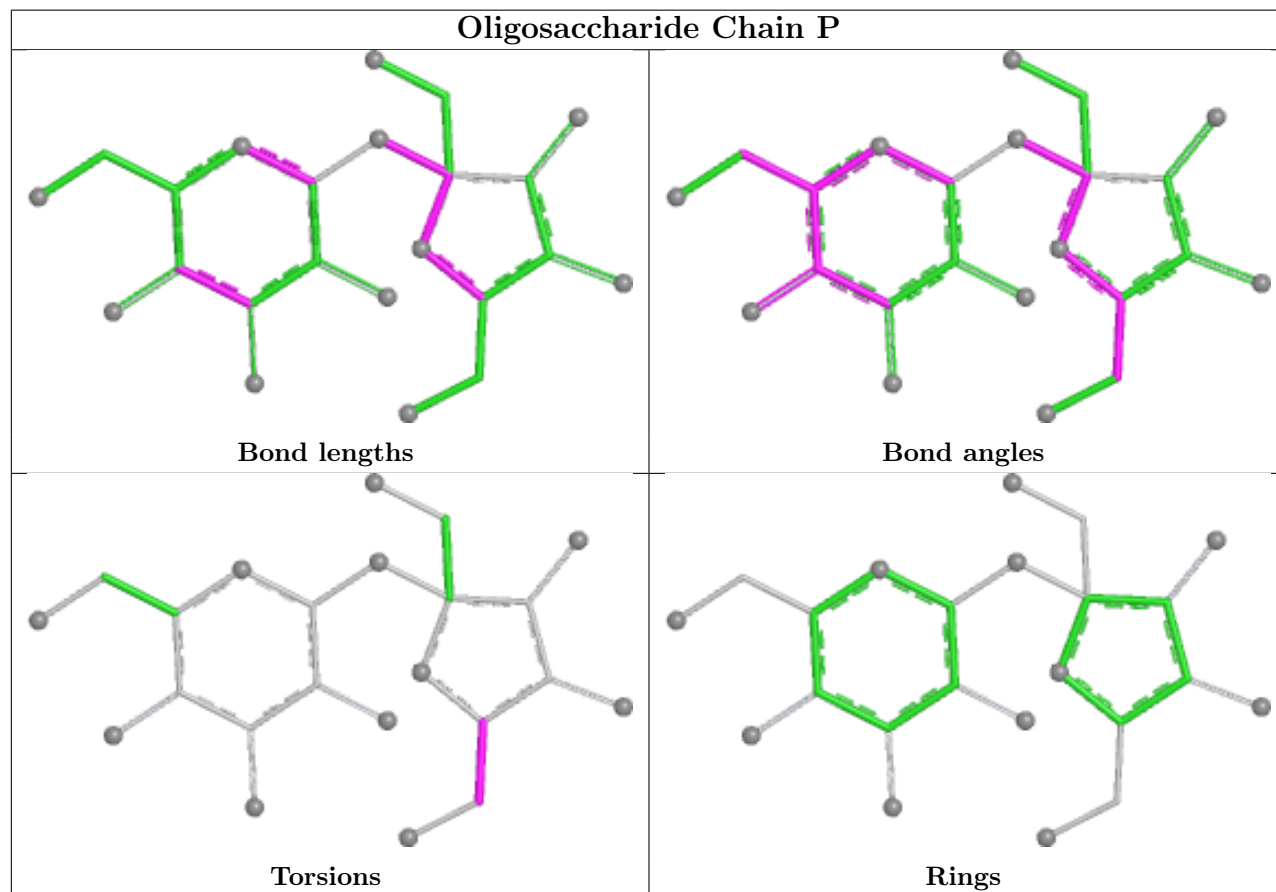
Oligosaccharide Chain N



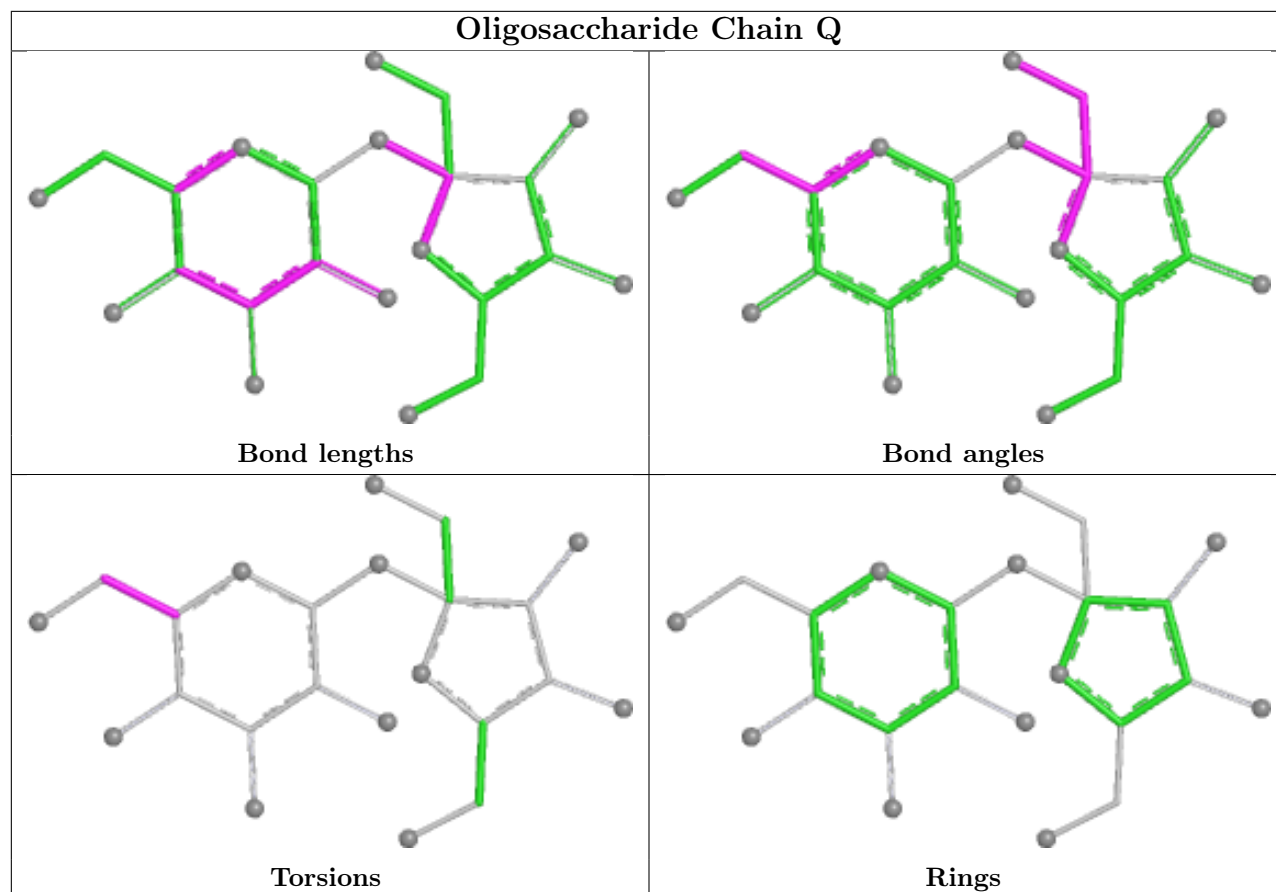
Oligosaccharide Chain O



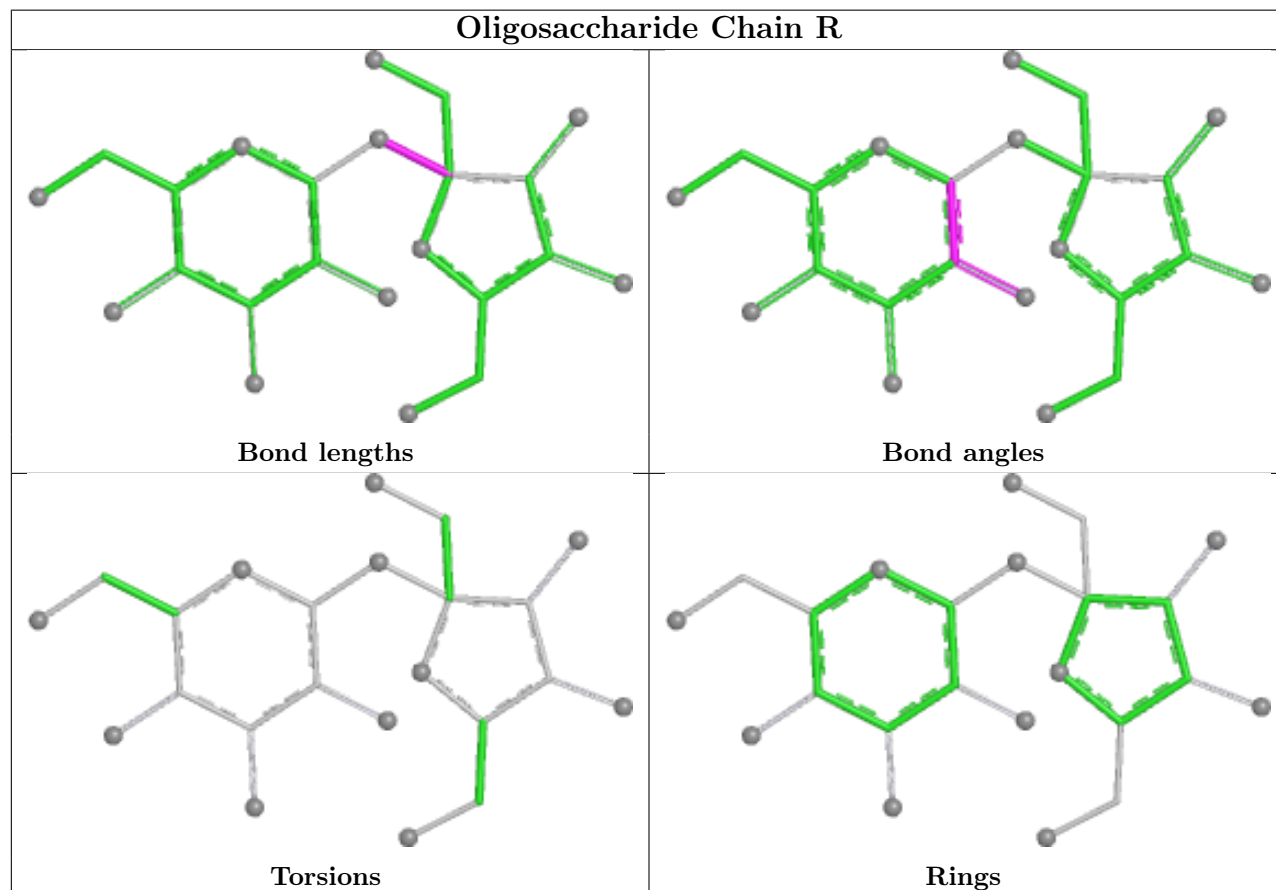
Oligosaccharide Chain P



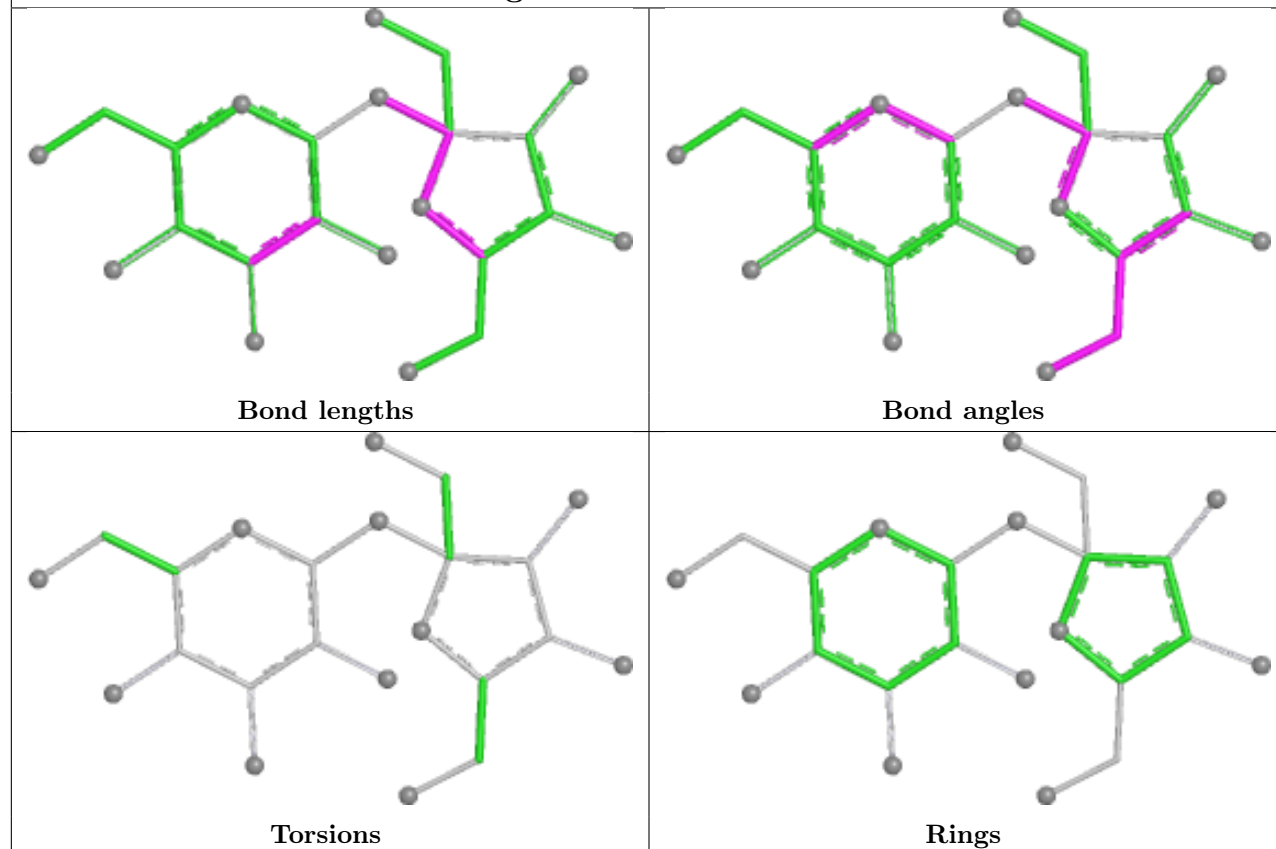
Oligosaccharide Chain Q



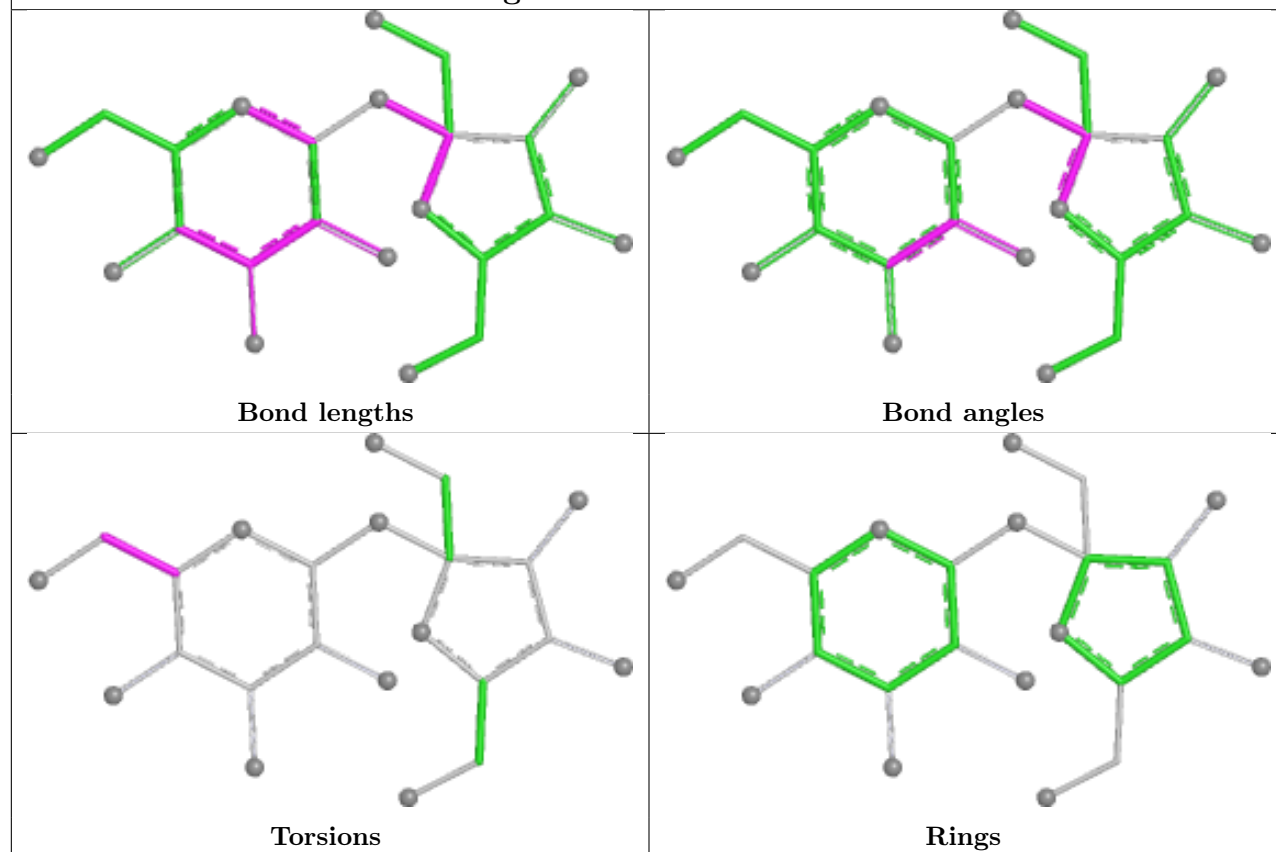
Oligosaccharide Chain R



Oligosaccharide Chain S



Oligosaccharide Chain T



5.6 Ligand geometry

Of 39 ligands modelled in this entry, 12 are monoatomic - leaving 27 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z > 2$	Counts	RMSZ	# $ Z > 2$
6	PG4	A	582	-	12,12,12	0.91	0	11,11,11	0.64	0
3	FAD	A	551	-	58,58,58	2.20	14 (24%)	85,89,89	1.96	25 (29%)
6	PG4	F	581	-	12,12,12	0.99	1 (8%)	11,11,11	0.51	0
6	PG4	H	582	-	12,12,12	0.77	0	11,11,11	0.81	0
6	PG4	B	584	-	12,12,12	0.80	0	11,11,11	1.16	1 (9%)
6	PG4	B	581	-	12,12,12	0.68	0	11,11,11	0.58	0
3	FAD	G	551	-	58,58,58	1.85	15 (25%)	85,89,89	1.90	21 (24%)
3	FAD	D	551	-	58,58,58	2.20	13 (22%)	85,89,89	1.91	24 (28%)
6	PG4	E	581	-	12,12,12	0.87	0	11,11,11	0.53	0
3	FAD	C	551	-	58,58,58	2.08	13 (22%)	85,89,89	1.79	21 (24%)
3	FAD	B	551	-	58,58,58	1.82	13 (22%)	85,89,89	1.96	24 (28%)
6	PG4	D	582	-	12,12,12	0.93	0	11,11,11	0.63	0
6	PG4	D	581	-	12,12,12	0.96	0	11,11,11	0.65	0
6	PG4	F	582	-	12,12,12	0.92	1 (8%)	11,11,11	1.08	1 (9%)
6	PG4	G	582	-	12,12,12	0.87	0	11,11,11	0.63	0
6	PG4	E	583	-	12,12,12	0.99	0	11,11,11	1.19	1 (9%)
6	PG4	G	581	-	12,12,12	0.75	0	11,11,11	0.59	0
6	PG4	A	581	-	12,12,12	0.99	0	11,11,11	0.77	0
3	FAD	H	551	-	58,58,58	1.54	8 (13%)	85,89,89	1.95	25 (29%)
3	FAD	F	551	-	58,58,58	1.65	11 (18%)	85,89,89	1.81	26 (30%)
6	PG4	A	583	-	12,12,12	0.99	0	11,11,11	1.31	1 (9%)
6	PG4	B	582	-	12,12,12	0.92	0	11,11,11	0.79	0
6	PG4	C	581	-	12,12,12	0.93	0	11,11,11	1.24	2 (18%)
6	PG4	C	582	-	12,12,12	0.88	0	11,11,11	0.89	0
6	PG4	H	581	-	12,12,12	0.84	0	11,11,11	0.69	0
3	FAD	E	551	-	58,58,58	1.86	12 (20%)	85,89,89	1.91	27 (31%)
6	PG4	E	582	-	12,12,12	1.03	0	11,11,11	0.95	0

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

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	PG4	A	582	-	-	8/10/10/10	-
3	FAD	A	551	-	-	5/34/50/50	0/6/6/6
6	PG4	F	581	-	-	5/10/10/10	-
6	PG4	H	582	-	-	4/10/10/10	-
6	PG4	B	584	-	-	6/10/10/10	-
6	PG4	B	581	-	-	5/10/10/10	-
3	FAD	G	551	-	-	9/34/50/50	0/6/6/6
3	FAD	D	551	-	-	4/34/50/50	0/6/6/6
6	PG4	E	581	-	-	6/10/10/10	-
3	FAD	C	551	-	-	10/34/50/50	0/6/6/6
3	FAD	B	551	-	-	7/34/50/50	0/6/6/6
6	PG4	D	582	-	-	5/10/10/10	-
6	PG4	D	581	-	-	7/10/10/10	-
6	PG4	F	582	-	-	7/10/10/10	-
6	PG4	G	582	-	-	5/10/10/10	-
6	PG4	E	583	-	-	4/10/10/10	-
6	PG4	G	581	-	-	5/10/10/10	-
6	PG4	A	581	-	-	7/10/10/10	-
3	FAD	H	551	-	-	7/34/50/50	0/6/6/6
3	FAD	F	551	-	-	1/34/50/50	0/6/6/6
6	PG4	A	583	-	-	3/10/10/10	-
6	PG4	B	582	-	-	6/10/10/10	-
6	PG4	C	581	-	-	7/10/10/10	-
6	PG4	C	582	-	-	8/10/10/10	-
6	PG4	H	581	-	-	6/10/10/10	-
3	FAD	E	551	-	-	4/34/50/50	0/6/6/6
6	PG4	E	582	-	-	5/10/10/10	-

All (101) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	551	FAD	P-O3P	9.27	1.69	1.59
3	C	551	FAD	P-O3P	-7.77	1.51	1.59
3	A	551	FAD	P-O3P	7.66	1.67	1.59

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	551	FAD	C7M-C7	-6.14	1.39	1.51
3	E	551	FAD	PA-O3P	6.07	1.66	1.59
3	E	551	FAD	C7M-C7	-5.90	1.40	1.51
3	G	551	FAD	C8M-C8	-5.80	1.40	1.51
3	F	551	FAD	C8M-C8	-5.78	1.40	1.51
3	D	551	FAD	C7M-C7	-5.76	1.40	1.51
3	D	551	FAD	C2A-N3A	5.41	1.43	1.33
3	A	551	FAD	C8M-C8	-5.34	1.41	1.51
3	C	551	FAD	C8M-C8	-5.23	1.41	1.51
3	H	551	FAD	C7M-C7	-5.16	1.41	1.51
3	C	551	FAD	C2A-N3A	4.80	1.42	1.33
3	A	551	FAD	C7M-C7	-4.75	1.42	1.51
3	E	551	FAD	C8M-C8	-4.74	1.42	1.51
3	G	551	FAD	C7M-C7	-4.72	1.42	1.51
3	B	551	FAD	C2A-N1A	4.71	1.42	1.33
3	F	551	FAD	C7M-C7	-4.70	1.42	1.51
3	A	551	FAD	C2A-N3A	4.63	1.42	1.33
3	B	551	FAD	C7M-C7	-4.61	1.42	1.51
3	D	551	FAD	C8M-C8	-4.56	1.42	1.51
3	B	551	FAD	C8M-C8	-4.37	1.42	1.51
3	C	551	FAD	C2A-N1A	4.16	1.41	1.33
3	H	551	FAD	C5A-C4A	-3.86	1.32	1.39
3	G	551	FAD	C5A-N7A	-3.82	1.32	1.39
3	H	551	FAD	C8M-C8	-3.69	1.44	1.51
3	A	551	FAD	C2A-N1A	3.67	1.40	1.33
3	B	551	FAD	C5'-C4'	3.65	1.56	1.51
3	G	551	FAD	C2A-N1A	3.65	1.40	1.33
3	B	551	FAD	P-O3P	3.63	1.63	1.59
3	A	551	FAD	C1'-N10	3.57	1.56	1.47
3	E	551	FAD	C2A-N1A	3.52	1.40	1.33
3	E	551	FAD	C2A-N3A	3.51	1.40	1.33
3	A	551	FAD	C5A-C4A	-3.40	1.33	1.39
3	G	551	FAD	C9A-N10	-3.36	1.35	1.41
3	A	551	FAD	C4X-N5	3.34	1.38	1.30
3	B	551	FAD	C5A-N7A	-3.34	1.33	1.39
3	D	551	FAD	C2A-N1A	3.29	1.39	1.33
3	G	551	FAD	PA-O3P	3.27	1.63	1.59
3	F	551	FAD	C10-N1	3.25	1.39	1.33
3	A	551	FAD	C1B-N9A	3.22	1.55	1.46
3	F	551	FAD	C8A-N9A	-3.19	1.32	1.37
3	A	551	FAD	C5A-N7A	-3.11	1.33	1.39
3	H	551	FAD	C2A-N3A	3.07	1.39	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	551	FAD	C8A-N9A	-3.00	1.32	1.37
3	D	551	FAD	O4B-C4B	2.89	1.51	1.45
3	F	551	FAD	C5A-C4A	-2.73	1.34	1.39
3	D	551	FAD	C8A-N9A	-2.69	1.33	1.37
3	D	551	FAD	C9A-N10	-2.65	1.36	1.41
3	G	551	FAD	C2-N1	2.64	1.42	1.36
3	D	551	FAD	C10-N1	2.64	1.38	1.33
3	B	551	FAD	C2A-N3A	2.61	1.38	1.33
3	G	551	FAD	C1'-N10	2.61	1.54	1.47
3	F	551	FAD	C5A-N7A	-2.61	1.34	1.39
3	B	551	FAD	C4'-C3'	-2.60	1.48	1.53
3	G	551	FAD	C4X-N5	2.56	1.36	1.30
3	D	551	FAD	C9-C9A	2.56	1.43	1.39
3	E	551	FAD	C5X-N5	-2.54	1.34	1.39
3	C	551	FAD	C5A-N7A	-2.53	1.34	1.39
3	F	551	FAD	P-O2P	-2.52	1.43	1.55
3	D	551	FAD	C5A-C4A	-2.49	1.34	1.39
3	C	551	FAD	C1'-C2'	2.47	1.56	1.52
3	F	551	FAD	C2A-N3A	2.46	1.38	1.33
3	A	551	FAD	C4'-C3'	-2.45	1.49	1.53
3	C	551	FAD	O4B-C4B	2.38	1.50	1.45
3	E	551	FAD	C5A-C4A	-2.36	1.34	1.39
3	G	551	FAD	C2'-C3'	2.34	1.57	1.53
3	E	551	FAD	C4'-C3'	-2.33	1.49	1.53
3	G	551	FAD	C2A-N3A	2.33	1.38	1.33
3	F	551	FAD	C9A-N10	-2.31	1.37	1.41
3	G	551	FAD	C5X-N5	-2.27	1.35	1.39
3	A	551	FAD	C6-C7	2.26	1.42	1.39
3	C	551	FAD	C8A-N9A	-2.26	1.33	1.37
3	H	551	FAD	C1'-N10	2.25	1.53	1.47
3	B	551	FAD	C4X-N5	2.21	1.35	1.30
3	E	551	FAD	C8A-N9A	-2.19	1.33	1.37
3	C	551	FAD	O3B-C3B	2.19	1.48	1.43
3	D	551	FAD	C4X-N5	2.18	1.35	1.30
3	B	551	FAD	C5A-C6A	-2.17	1.34	1.41
3	G	551	FAD	C4A-N9A	-2.17	1.33	1.37
3	D	551	FAD	C5A-N7A	-2.16	1.35	1.39
3	B	551	FAD	PA-O5B	-2.16	1.50	1.59
3	H	551	FAD	C4A-N9A	-2.16	1.33	1.37
3	B	551	FAD	P-O2P	-2.15	1.45	1.55
3	F	551	FAD	C1'-C2'	2.14	1.55	1.52
3	C	551	FAD	C1B-N9A	2.14	1.52	1.46

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	H	551	FAD	C5A-C6A	-2.13	1.35	1.41
3	F	551	FAD	C5A-C6A	-2.13	1.35	1.41
3	C	551	FAD	C10-N1	2.10	1.37	1.33
3	C	551	FAD	C9A-N10	-2.09	1.37	1.41
3	B	551	FAD	PA-O1A	-2.09	1.43	1.50
3	A	551	FAD	C10-N1	2.08	1.37	1.33
3	G	551	FAD	C10-N1	2.08	1.37	1.33
3	G	551	FAD	C5A-C6A	-2.04	1.35	1.41
6	F	581	PG4	O2-C2	2.04	1.50	1.42
3	E	551	FAD	C5A-N7A	-2.03	1.35	1.39
3	H	551	FAD	C8A-N7A	2.03	1.35	1.31
3	E	551	FAD	C1'-C2'	2.03	1.55	1.52
3	E	551	FAD	C4X-N5	2.01	1.35	1.30
6	F	582	PG4	C4-C3	2.00	1.59	1.49

All (199) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	H	551	FAD	N3A-C2A-N1A	-7.33	117.48	128.58
3	E	551	FAD	N3A-C2A-N1A	-7.13	117.79	128.58
3	B	551	FAD	N3A-C2A-N1A	-6.98	118.01	128.58
3	D	551	FAD	N3A-C2A-N1A	-6.82	118.26	128.58
3	A	551	FAD	N3A-C2A-N1A	-6.72	118.41	128.58
3	G	551	FAD	C4'-C3'-C2'	-6.00	103.58	113.57
3	F	551	FAD	N3A-C2A-N1A	-5.75	119.87	128.58
3	G	551	FAD	N3A-C2A-N1A	-5.52	120.23	128.58
3	C	551	FAD	N3A-C2A-N1A	-5.40	120.41	128.58
3	C	551	FAD	C4'-C3'-C2'	-5.16	104.98	113.57
3	D	551	FAD	O2A-PA-O3P	4.98	120.74	107.27
3	B	551	FAD	C4'-C3'-C2'	-4.85	105.50	113.57
3	A	551	FAD	C5A-C4A-N3A	-4.85	120.04	126.72
3	B	551	FAD	C5A-C4A-N3A	-4.80	120.11	126.72
3	B	551	FAD	O2P-P-O3P	4.78	120.19	107.27
3	H	551	FAD	C5A-C4A-N3A	-4.76	120.16	126.72
3	F	551	FAD	C4'-C3'-C2'	-4.71	105.72	113.57
3	F	551	FAD	C5A-C4A-N3A	-4.52	120.50	126.72
3	H	551	FAD	C2A-N3A-C4A	4.28	122.27	111.83
3	E	551	FAD	C4'-C3'-C2'	-4.21	106.56	113.57
3	G	551	FAD	C4X-C10-N10	4.21	122.50	116.48
3	D	551	FAD	C4X-C10-N10	4.19	122.48	116.48
3	E	551	FAD	N9A-C8A-N7A	-4.17	108.02	113.94
3	D	551	FAD	C4'-C3'-C2'	-4.05	106.83	113.57

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	551	FAD	C5A-C4A-N3A	-4.05	121.14	126.72
3	A	551	FAD	C4'-C3'-C2'	-4.02	106.88	113.57
3	G	551	FAD	C10-C4X-N5	-4.01	116.62	124.81
3	H	551	FAD	N9A-C8A-N7A	-4.00	108.27	113.94
3	D	551	FAD	N9A-C8A-N7A	-3.96	108.32	113.94
3	D	551	FAD	C5A-C4A-N3A	-3.95	121.28	126.72
3	G	551	FAD	C5A-C4A-N3A	-3.84	121.42	126.72
3	H	551	FAD	C4'-C3'-C2'	-3.83	107.20	113.57
3	H	551	FAD	C4X-C10-N10	3.76	121.87	116.48
3	A	551	FAD	N9A-C8A-N7A	-3.75	108.62	113.94
3	G	551	FAD	N9A-C8A-N7A	-3.74	108.64	113.94
3	B	551	FAD	C2A-N3A-C4A	3.69	120.84	111.83
3	G	551	FAD	C4-C4X-N5	3.60	123.19	118.21
3	G	551	FAD	C4-N3-C2	-3.59	119.27	125.64
3	A	551	FAD	C2A-N3A-C4A	3.57	120.54	111.83
3	E	551	FAD	C5A-C4A-N3A	-3.55	121.83	126.72
3	C	551	FAD	C4X-C10-N10	3.54	121.55	116.48
3	B	551	FAD	N9A-C8A-N7A	-3.51	108.95	113.94
3	B	551	FAD	C4X-C10-N10	3.50	121.50	116.48
3	F	551	FAD	N9A-C8A-N7A	-3.48	109.00	113.94
3	F	551	FAD	C4X-C10-N10	3.46	121.43	116.48
3	A	551	FAD	C4-C4X-N5	3.32	122.79	118.21
3	C	551	FAD	C4-N3-C2	-3.30	119.79	125.64
3	H	551	FAD	C5A-C4A-N9A	3.29	109.40	105.81
3	E	551	FAD	C4X-C10-N10	3.20	121.07	116.48
3	B	551	FAD	C5A-C4A-N9A	3.19	109.29	105.81
3	G	551	FAD	C6A-C5A-C4A	3.19	121.53	117.18
3	E	551	FAD	C5A-N7A-C8A	3.17	108.43	103.45
3	E	551	FAD	C4A-N9A-C1B	-3.11	119.36	126.63
3	C	551	FAD	C4A-C5A-N7A	-3.08	107.06	110.58
3	E	551	FAD	C2A-N3A-C4A	3.07	119.32	111.83
3	H	551	FAD	C4A-N9A-C1B	-3.06	119.47	126.63
3	C	551	FAD	C10-C4X-N5	-3.03	118.61	124.81
3	C	551	FAD	C5A-N7A-C8A	3.03	108.22	103.45
3	A	551	FAD	C9A-C5X-N5	-3.03	119.24	122.45
3	B	551	FAD	C5A-N7A-C8A	3.02	108.20	103.45
3	C	551	FAD	N9A-C8A-N7A	-3.02	109.65	113.94
3	H	551	FAD	O2P-P-O3P	3.01	115.42	107.27
3	B	551	FAD	C10-C4X-N5	-3.00	118.69	124.81
3	A	551	FAD	C4X-C10-N10	2.96	120.71	116.48
6	A	583	PG4	C3-O2-C2	2.95	126.16	113.26
3	G	551	FAD	O4-C4-N3	-2.95	114.57	120.11

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	551	FAD	C6A-C5A-C4A	2.94	121.19	117.18
3	A	551	FAD	C5A-C6A-N6A	-2.93	116.02	123.29
3	E	551	FAD	C4A-C5A-N7A	-2.93	107.23	110.58
3	A	551	FAD	C5A-C4A-N9A	2.90	108.97	105.81
3	D	551	FAD	C5A-N7A-C8A	2.89	107.99	103.45
3	D	551	FAD	O3P-PA-O1A	-2.88	102.05	110.70
3	A	551	FAD	C4A-C5A-N7A	-2.87	107.30	110.58
3	H	551	FAD	O3P-PA-O1A	-2.87	102.08	110.70
3	H	551	FAD	C4-N3-C2	-2.85	120.58	125.64
3	G	551	FAD	O4B-C1B-N9A	2.85	113.56	108.09
3	G	551	FAD	C5A-N7A-C8A	2.84	107.92	103.45
3	F	551	FAD	C2A-N3A-C4A	2.84	118.77	111.83
3	E	551	FAD	C10-C4X-N5	-2.84	119.02	124.81
3	A	551	FAD	C5A-N7A-C8A	2.83	107.89	103.45
3	D	551	FAD	O2P-P-O1P	2.82	125.57	112.44
3	B	551	FAD	C4A-C5A-N7A	-2.82	107.36	110.58
3	F	551	FAD	C4A-C5A-N7A	-2.81	107.36	110.58
3	E	551	FAD	C9A-C5X-N5	-2.80	119.48	122.45
3	B	551	FAD	C6A-C5A-C4A	2.80	121.00	117.18
3	F	551	FAD	O3'-C3'-C2'	2.80	115.28	108.93
3	D	551	FAD	C10-C4X-N5	-2.79	119.11	124.81
3	G	551	FAD	O4B-C1B-C2B	-2.77	100.68	106.62
3	A	551	FAD	C10-C4X-N5	-2.76	119.17	124.81
3	A	551	FAD	O4B-C1B-N9A	2.75	113.37	108.09
3	H	551	FAD	C5A-C6A-N1A	2.74	124.47	117.51
3	D	551	FAD	C6A-C5A-C4A	2.73	120.91	117.18
3	G	551	FAD	C4X-C4-N3	2.73	120.20	113.25
3	A	551	FAD	C5A-C6A-N1A	2.72	124.42	117.51
6	B	584	PG4	C5-O3-C4	2.71	125.14	113.26
3	E	551	FAD	C4-N3-C2	-2.71	120.83	125.64
3	H	551	FAD	C9A-N10-C10	-2.71	116.62	120.75
3	A	551	FAD	C4X-C4-N3	2.69	120.09	113.25
3	F	551	FAD	C10-C4X-N5	-2.67	119.35	124.81
3	C	551	FAD	C4X-C4-N3	2.66	120.02	113.25
3	A	551	FAD	C4A-N9A-C1B	-2.65	120.43	126.63
3	H	551	FAD	C5A-C6A-N6A	-2.64	116.74	123.29
3	C	551	FAD	O2-C2-N1	-2.63	117.43	121.80
3	B	551	FAD	O3P-PA-O1A	-2.62	102.81	110.70
3	E	551	FAD	C4A-N9A-C8A	2.62	108.49	105.74
3	F	551	FAD	C4A-N9A-C1B	-2.61	120.52	126.63
3	D	551	FAD	C5A-C6A-N6A	-2.61	116.83	123.29
3	E	551	FAD	C5X-C9A-N10	2.60	120.32	117.97

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	551	FAD	C1B-N9A-C8A	2.59	132.84	127.09
3	H	551	FAD	C1B-N9A-C8A	2.58	132.82	127.09
3	H	551	FAD	C10-N1-C2	2.57	122.42	116.85
3	F	551	FAD	C5A-C4A-N9A	2.57	108.61	105.81
3	D	551	FAD	O2-C2-N1	-2.56	117.54	121.80
3	C	551	FAD	C4-C4X-N5	2.53	121.70	118.21
3	D	551	FAD	C2A-N3A-C4A	2.53	118.00	111.83
3	D	551	FAD	C4A-C5A-N7A	-2.51	107.71	110.58
3	F	551	FAD	C5A-N7A-C8A	2.51	107.40	103.45
3	H	551	FAD	O3P-P-O1P	-2.51	103.15	110.70
3	A	551	FAD	O4B-C4B-C5B	-2.51	101.31	109.33
3	D	551	FAD	C4A-N9A-C1B	-2.50	120.78	126.63
3	A	551	FAD	O2P-P-O1P	2.49	124.04	112.44
3	H	551	FAD	O2-C2-N3	2.49	123.36	118.58
3	H	551	FAD	O2-C2-N1	-2.47	117.69	121.80
3	E	551	FAD	C6-C5X-C9A	2.47	122.44	119.05
3	B	551	FAD	C4-C4X-N5	2.47	121.61	118.21
3	D	551	FAD	O2-C2-N3	2.45	123.28	118.58
3	B	551	FAD	C4A-N9A-C1B	-2.44	120.92	126.63
3	A	551	FAD	C1B-N9A-C8A	2.44	132.50	127.09
3	H	551	FAD	C4X-C4-N3	2.43	119.43	113.25
3	H	551	FAD	O2P-P-O1P	2.40	123.62	112.44
3	F	551	FAD	C4-N3-C2	-2.40	121.38	125.64
3	F	551	FAD	C4X-C4-N3	2.40	119.36	113.25
3	C	551	FAD	O2-C2-N3	2.39	123.17	118.58
3	B	551	FAD	C5A-C6A-N6A	-2.38	117.39	123.29
3	G	551	FAD	C2A-N3A-C4A	2.35	117.58	111.83
3	F	551	FAD	C9A-C9-C8	2.34	123.92	119.22
3	D	551	FAD	C4A-N9A-C8A	2.33	108.18	105.74
3	A	551	FAD	C10-N1-C2	2.32	121.86	116.85
3	C	551	FAD	C2A-N3A-C4A	2.30	117.46	111.83
3	G	551	FAD	C5A-C4A-N9A	2.30	108.32	105.81
3	B	551	FAD	O3P-P-O1P	-2.29	103.82	110.70
6	E	583	PG4	C3-O2-C2	2.29	123.27	113.26
3	H	551	FAD	C10-C4X-N5	-2.29	120.14	124.81
3	C	551	FAD	C9A-C5X-N5	-2.28	120.03	122.45
3	D	551	FAD	C4-N3-C2	-2.28	121.59	125.64
3	E	551	FAD	C1B-N9A-C8A	2.27	132.14	127.09
3	E	551	FAD	C1'-C2'-C3'	2.26	115.78	109.66
3	E	551	FAD	C4X-C4-N3	2.25	118.97	113.25
3	A	551	FAD	N3A-C4A-N9A	2.24	130.98	127.17
3	B	551	FAD	O4B-C1B-N9A	2.24	112.39	108.09

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	F	551	FAD	C5X-C9A-N10	2.24	119.99	117.97
3	E	551	FAD	C9A-N10-C10	-2.23	117.35	120.75
3	E	551	FAD	C10-N1-C2	2.23	121.67	116.85
6	C	581	PG4	C3-O2-C2	2.23	123.00	113.26
3	G	551	FAD	C4A-C5A-N7A	-2.22	108.04	110.58
3	E	551	FAD	O3'-C3'-C2'	2.22	113.96	108.93
3	D	551	FAD	C4X-C10-N1	-2.21	119.17	124.59
3	H	551	FAD	C4-C4X-N5	2.21	121.26	118.21
3	G	551	FAD	O2-C2-N1	-2.20	118.14	121.80
3	B	551	FAD	C4-N3-C2	-2.20	121.73	125.64
3	D	551	FAD	N3A-C4A-N9A	2.20	130.91	127.17
3	F	551	FAD	C6A-C5A-C4A	2.19	120.17	117.18
3	G	551	FAD	C4X-C10-N1	-2.19	119.22	124.59
3	B	551	FAD	C4X-C10-N1	-2.19	119.23	124.59
3	C	551	FAD	C10-N1-C2	2.18	121.56	116.85
3	F	551	FAD	N3A-C4A-N9A	2.18	130.87	127.17
3	A	551	FAD	C4-N3-C2	-2.17	121.80	125.64
3	F	551	FAD	C1B-N9A-C8A	2.16	131.90	127.09
3	G	551	FAD	O2A-PA-O1A	2.16	122.50	112.44
3	E	551	FAD	C4X-C10-N1	-2.16	119.30	124.59
3	F	551	FAD	C9A-N10-C10	-2.15	117.47	120.75
6	F	582	PG4	C3-O2-C2	2.15	122.68	113.26
3	D	551	FAD	C4X-C4-N3	2.15	118.72	113.25
3	E	551	FAD	O2-C2-N1	-2.14	118.25	121.80
3	F	551	FAD	O3P-PA-O1A	-2.13	104.31	110.70
3	H	551	FAD	O3B-C3B-C4B	-2.12	104.98	111.08
3	C	551	FAD	N3A-C4A-N9A	2.12	130.77	127.17
3	E	551	FAD	O2A-PA-O3P	2.11	112.99	107.27
3	G	551	FAD	O2P-P-O3P	2.11	112.98	107.27
3	B	551	FAD	C10-N1-C2	2.10	121.40	116.85
3	C	551	FAD	C5A-C6A-N6A	-2.10	118.08	123.29
3	C	551	FAD	C5A-C4A-N9A	2.09	108.09	105.81
3	A	551	FAD	O2'-C2'-C3'	-2.08	104.38	109.25
3	F	551	FAD	C4X-C10-N1	-2.08	119.49	124.59
3	F	551	FAD	C5A-C6A-N6A	-2.06	118.18	123.29
3	F	551	FAD	C4-C4X-N5	2.06	121.05	118.21
3	B	551	FAD	C4X-C4-N3	2.05	118.48	113.25
3	H	551	FAD	C4A-C5A-N7A	-2.05	108.24	110.58
3	F	551	FAD	O2-C2-N3	2.04	122.50	118.58
3	D	551	FAD	C10-N1-C2	2.04	121.27	116.85
3	D	551	FAD	C9A-N10-C10	-2.03	117.65	120.75
3	E	551	FAD	C4-C4X-N5	2.03	121.02	118.21

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	551	FAD	C4X-C10-N1	-2.03	119.61	124.59
6	C	581	PG4	O2-C2-C1	2.03	119.06	110.11
3	E	551	FAD	C4B-O4B-C1B	-2.02	105.00	109.47
3	B	551	FAD	N3A-C4A-N9A	2.02	130.60	127.17
3	E	551	FAD	O2-C2-N3	2.02	122.45	118.58
3	A	551	FAD	C6A-C5A-C4A	2.01	119.92	117.18
3	F	551	FAD	C10-N1-C2	2.00	121.18	116.85

There are no chirality outliers.

All (156) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	551	FAD	C1'-C2'-C3'-C4'
3	C	551	FAD	C1'-C2'-C3'-C4'
3	G	551	FAD	C1'-C2'-C3'-C4'
6	A	582	PG4	C3-C4-O3-C5
6	B	582	PG4	C3-C4-O3-C5
6	B	584	PG4	C6-C5-O3-C4
6	C	581	PG4	C1-C2-O2-C3
6	E	581	PG4	O2-C3-C4-O3
6	F	581	PG4	O2-C3-C4-O3
6	E	582	PG4	O3-C5-C6-O4
6	D	582	PG4	O3-C5-C6-O4
6	A	582	PG4	O3-C5-C6-O4
6	D	582	PG4	O2-C3-C4-O3
6	H	581	PG4	O3-C5-C6-O4
6	A	581	PG4	O3-C5-C6-O4
6	E	583	PG4	O2-C3-C4-O3
6	H	581	PG4	O2-C3-C4-O3
6	B	581	PG4	O3-C5-C6-O4
6	G	581	PG4	O3-C5-C6-O4
6	F	582	PG4	O3-C5-C6-O4
6	G	582	PG4	O2-C3-C4-O3
6	B	582	PG4	O1-C1-C2-O2
6	B	582	PG4	O4-C7-C8-O5
6	D	581	PG4	O4-C7-C8-O5
6	F	581	PG4	O1-C1-C2-O2
6	C	581	PG4	C8-C7-O4-C6
6	D	581	PG4	O3-C5-C6-O4
6	E	581	PG4	O3-C5-C6-O4
6	A	581	PG4	O1-C1-C2-O2
6	A	581	PG4	O4-C7-C8-O5

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Mol	Chain	Res	Type	Atoms
6	A	582	PG4	O4-C7-C8-O5
6	C	582	PG4	O4-C7-C8-O5
6	E	582	PG4	O4-C7-C8-O5
6	B	581	PG4	O2-C3-C4-O3
6	C	582	PG4	O2-C3-C4-O3
6	D	581	PG4	O1-C1-C2-O2
6	F	582	PG4	O1-C1-C2-O2
6	H	582	PG4	O1-C1-C2-O2
6	B	582	PG4	O3-C5-C6-O4
6	C	582	PG4	O1-C1-C2-O2
6	G	582	PG4	O1-C1-C2-O2
6	G	582	PG4	O3-C5-C6-O4
3	G	551	FAD	O2'-C2'-C3'-C4'
6	F	582	PG4	O2-C3-C4-O3
6	B	581	PG4	O1-C1-C2-O2
6	B	584	PG4	O1-C1-C2-O2
6	D	582	PG4	O4-C7-C8-O5
6	C	582	PG4	C1-C2-O2-C3
6	F	582	PG4	C4-C3-O2-C2
3	A	551	FAD	P-O3P-PA-O1A
3	G	551	FAD	P-O3P-PA-O1A
6	C	581	PG4	O1-C1-C2-O2
6	D	582	PG4	O1-C1-C2-O2
6	G	581	PG4	O2-C3-C4-O3
3	A	551	FAD	C3B-C4B-C5B-O5B
3	D	551	FAD	PA-O3P-P-O5'
3	G	551	FAD	PA-O3P-P-O5'
6	B	582	PG4	C5-C6-O4-C7
6	G	582	PG4	C4-C3-O2-C2
6	H	581	PG4	C8-C7-O4-C6
6	B	581	PG4	C3-C4-O3-C5
6	E	582	PG4	C4-C3-O2-C2
6	C	581	PG4	C4-C3-O2-C2
6	A	582	PG4	C1-C2-O2-C3
6	G	581	PG4	C3-C4-O3-C5
6	A	583	PG4	C5-C6-O4-C7
6	A	582	PG4	O2-C3-C4-O3
6	B	581	PG4	C1-C2-O2-C3
6	A	581	PG4	C1-C2-O2-C3
6	F	582	PG4	C8-C7-O4-C6
6	H	581	PG4	C6-C5-O3-C4
6	E	581	PG4	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
6	D	581	PG4	C3-C4-O3-C5
6	G	581	PG4	C4-C3-O2-C2
6	A	582	PG4	C5-C6-O4-C7
6	C	582	PG4	O3-C5-C6-O4
6	F	581	PG4	C1-C2-O2-C3
6	C	582	PG4	C3-C4-O3-C5
3	B	551	FAD	O2'-C2'-C3'-C4'
6	C	581	PG4	C5-C6-O4-C7
6	H	581	PG4	C3-C4-O3-C5
6	E	583	PG4	C6-C5-O3-C4
3	H	551	FAD	O4'-C4'-C5'-O5'
6	E	581	PG4	C6-C5-O3-C4
6	C	581	PG4	O4-C7-C8-O5
3	A	551	FAD	O4B-C4B-C5B-O5B
6	G	582	PG4	C6-C5-O3-C4
6	B	584	PG4	C3-C4-O3-C5
6	F	581	PG4	C8-C7-O4-C6
6	H	581	PG4	C4-C3-O2-C2
6	D	581	PG4	O2-C3-C4-O3
6	B	584	PG4	C5-C6-O4-C7
6	C	581	PG4	O3-C5-C6-O4
3	H	551	FAD	O4B-C4B-C5B-O5B
3	C	551	FAD	C5'-O5'-P-O1P
3	E	551	FAD	C5'-O5'-P-O1P
6	E	581	PG4	C4-C3-O2-C2
6	A	583	PG4	O1-C1-C2-O2
6	E	582	PG4	O1-C1-C2-O2
6	F	582	PG4	O4-C7-C8-O5
6	H	582	PG4	O4-C7-C8-O5
6	F	582	PG4	C5-C6-O4-C7
6	A	582	PG4	C4-C3-O2-C2
6	A	582	PG4	C6-C5-O3-C4
3	B	551	FAD	O4B-C4B-C5B-O5B
3	C	551	FAD	O4B-C4B-C5B-O5B
6	E	582	PG4	C8-C7-O4-C6
6	D	581	PG4	C1-C2-O2-C3
6	E	583	PG4	C5-C6-O4-C7
6	A	581	PG4	C3-C4-O3-C5
6	B	582	PG4	C1-C2-O2-C3
6	A	581	PG4	C6-C5-O3-C4
3	F	551	FAD	O4B-C4B-C5B-O5B
6	D	582	PG4	C1-C2-O2-C3

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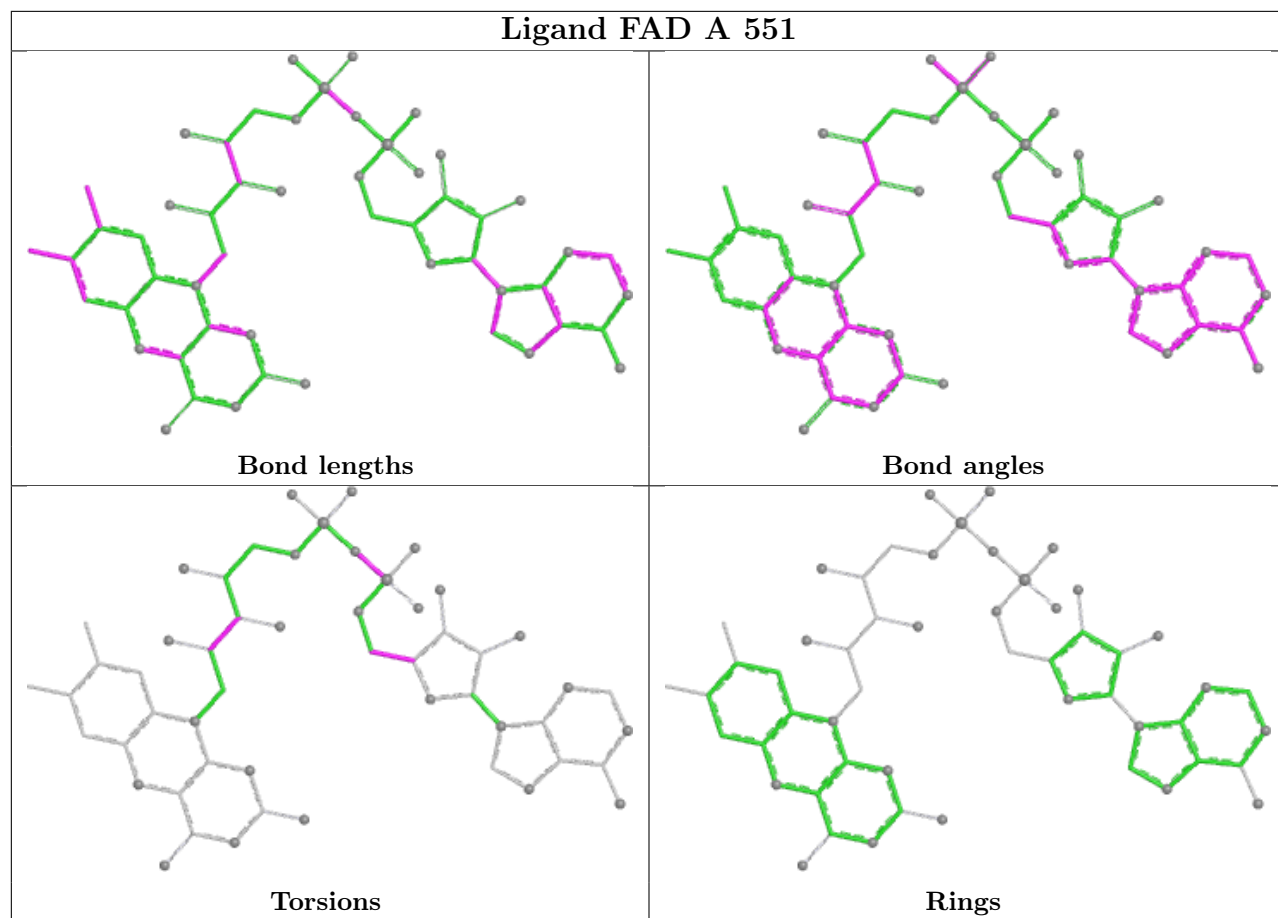
Mol	Chain	Res	Type	Atoms
6	A	581	PG4	C8-C7-O4-C6
6	H	582	PG4	C5-C6-O4-C7
6	F	581	PG4	C4-C3-O2-C2
6	G	581	PG4	C8-C7-O4-C6
3	B	551	FAD	C3B-C4B-C5B-O5B
3	H	551	FAD	C3B-C4B-C5B-O5B
6	E	583	PG4	C4-C3-O2-C2
3	A	551	FAD	P-O3P-PA-O2A
3	C	551	FAD	P-O3P-PA-O1A
3	H	551	FAD	P-O3P-PA-O1A
3	B	551	FAD	O2'-C2'-C3'-O3'
3	G	551	FAD	O2'-C2'-C3'-O3'
3	C	551	FAD	PA-O3P-P-O5'
3	E	551	FAD	O4B-C4B-C5B-O5B
3	G	551	FAD	O4B-C4B-C5B-O5B
3	C	551	FAD	O2'-C2'-C3'-C4'
6	A	583	PG4	C1-C2-O2-C3
3	A	551	FAD	C1'-C2'-C3'-O3'
3	B	551	FAD	C1'-C2'-C3'-O3'
3	C	551	FAD	C1'-C2'-C3'-O3'
3	E	551	FAD	C1'-C2'-C3'-O3'
3	G	551	FAD	C1'-C2'-C3'-O3'
3	H	551	FAD	C1'-C2'-C3'-O3'
3	E	551	FAD	C1'-C2'-C3'-C4'
6	E	581	PG4	C8-C7-O4-C6
3	C	551	FAD	C3B-C4B-C5B-O5B
6	H	582	PG4	C8-C7-O4-C6
3	D	551	FAD	O4B-C4B-C5B-O5B
3	B	551	FAD	C2B-C1B-N9A-C8A
3	D	551	FAD	P-O3P-PA-O2A
3	G	551	FAD	P-O3P-PA-O2A
3	H	551	FAD	P-O3P-PA-O2A
6	D	581	PG4	C8-C7-O4-C6
3	H	551	FAD	C2B-C1B-N9A-C8A
3	C	551	FAD	O2'-C2'-C3'-O3'
6	C	582	PG4	C5-C6-O4-C7
3	D	551	FAD	C3B-C4B-C5B-O5B
6	B	584	PG4	O2-C3-C4-O3
6	B	584	PG4	C8-C7-O4-C6
6	C	582	PG4	C6-C5-O3-C4
3	C	551	FAD	P-O3P-PA-O2A
3	G	551	FAD	C3B-C4B-C5B-O5B

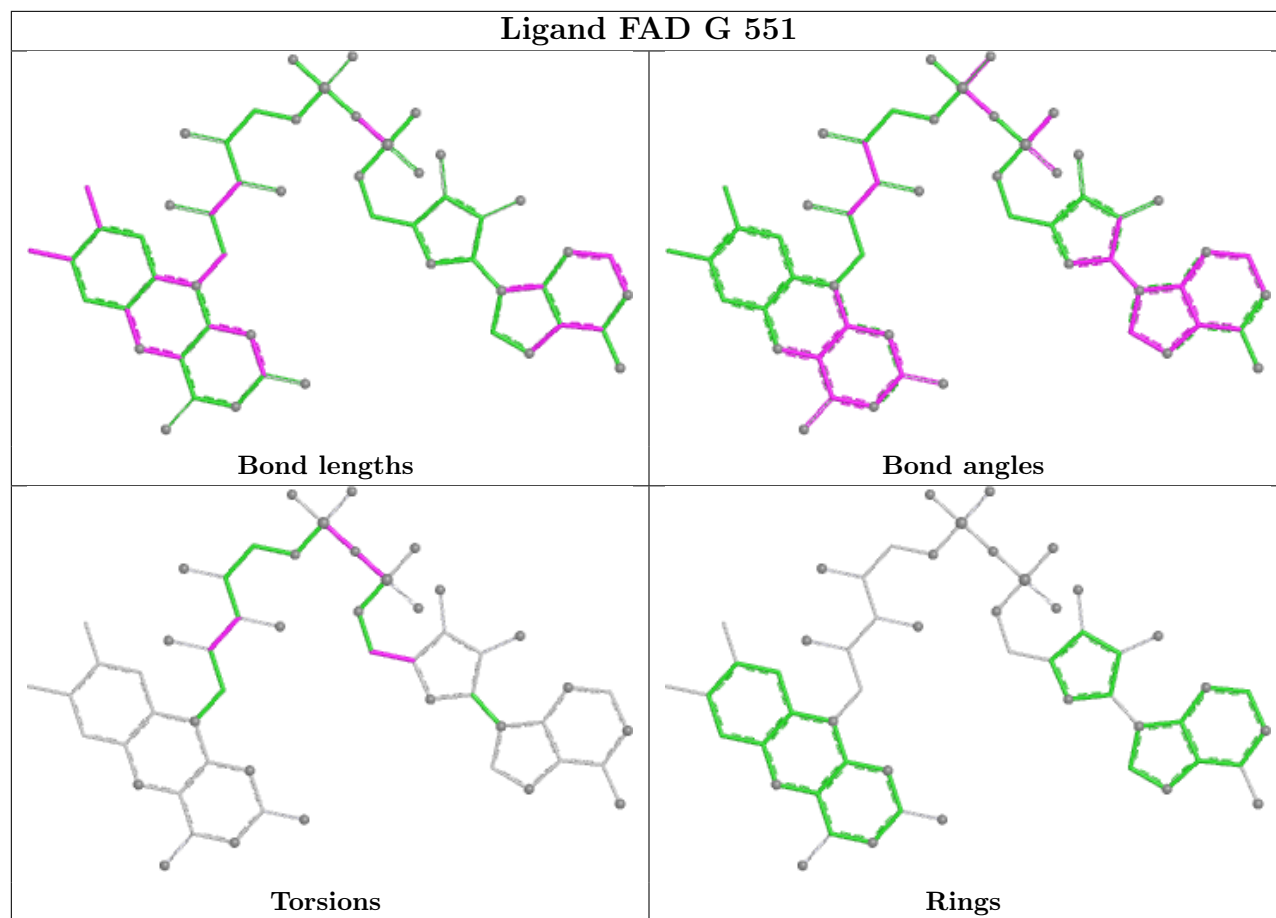
There are no ring outliers.

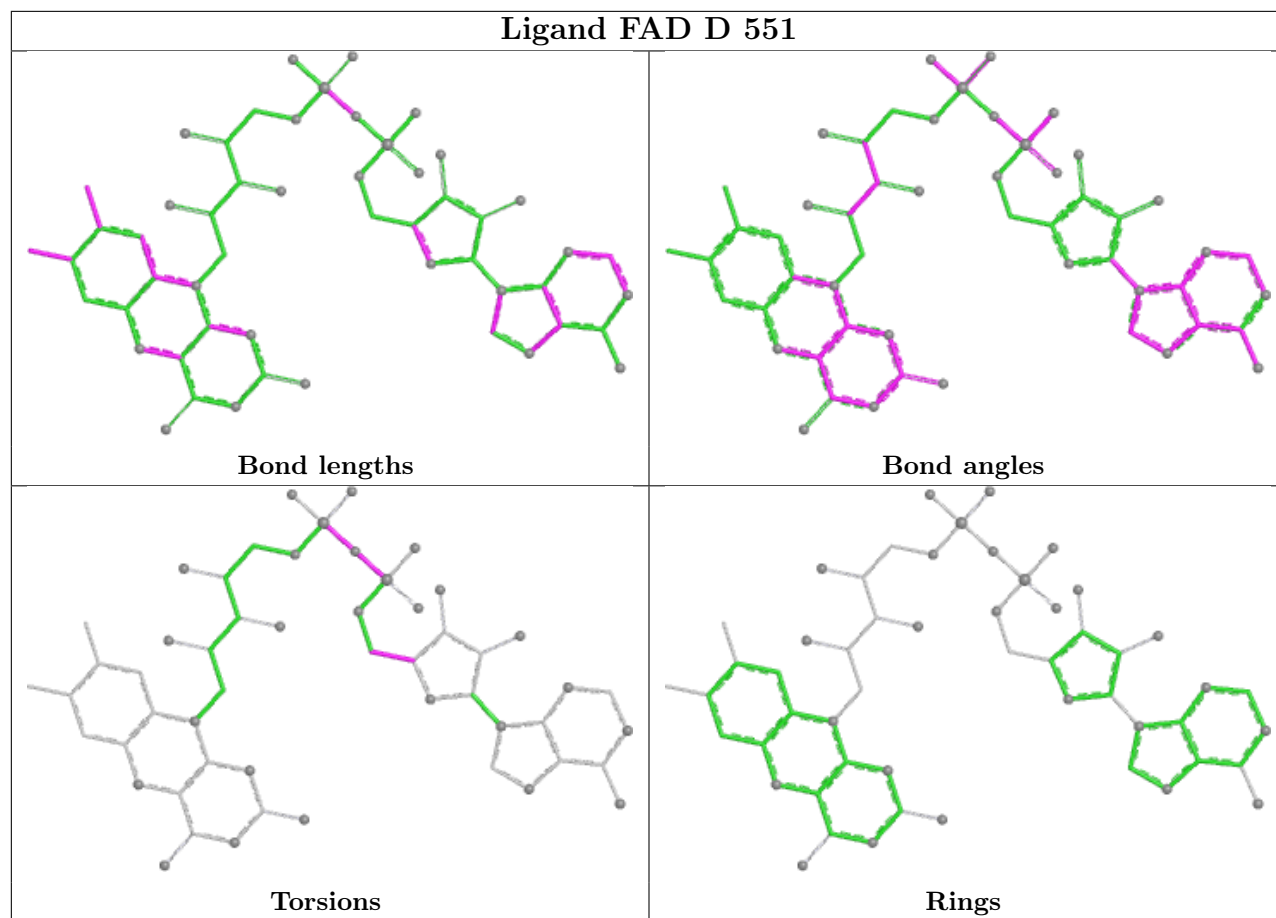
13 monomers are involved in 28 short contacts:

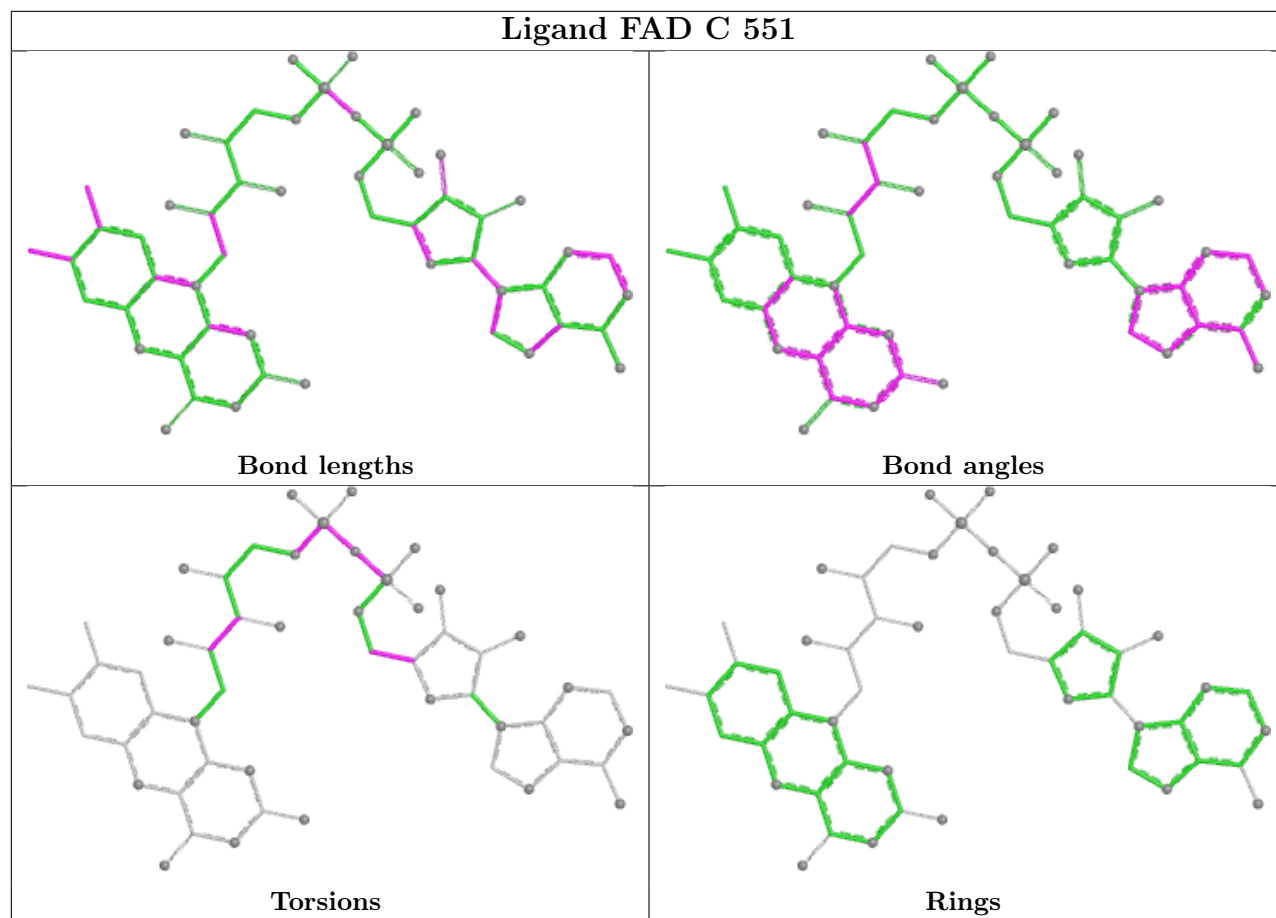
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	G	551	FAD	2	0
3	D	551	FAD	3	0
6	E	581	PG4	4	0
3	C	551	FAD	1	0
3	B	551	FAD	1	0
6	D	581	PG4	4	0
6	F	582	PG4	3	0
6	G	582	PG4	2	0
6	A	581	PG4	1	0
6	B	582	PG4	2	0
6	C	581	PG4	2	0
6	C	582	PG4	1	0
3	E	551	FAD	2	0

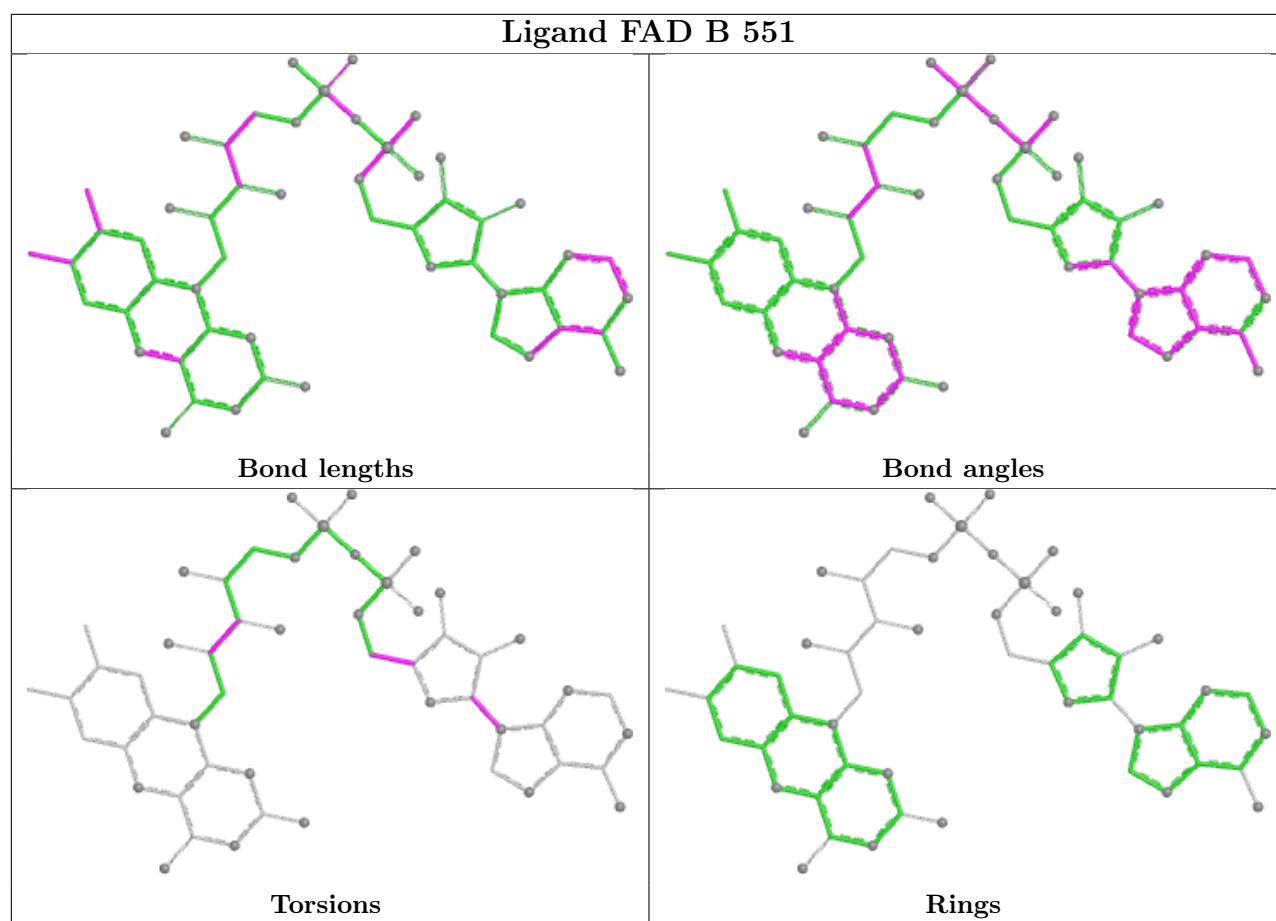
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.

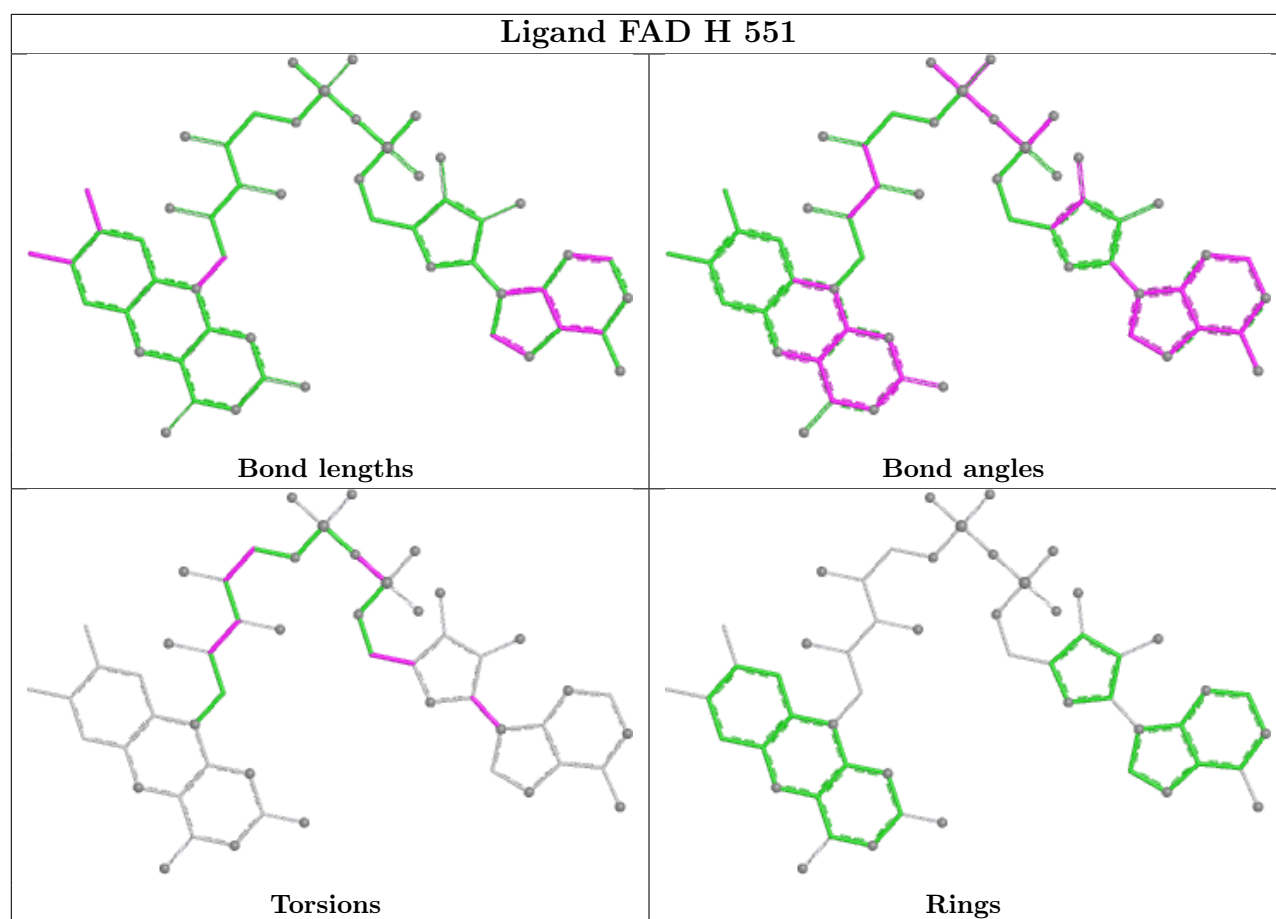


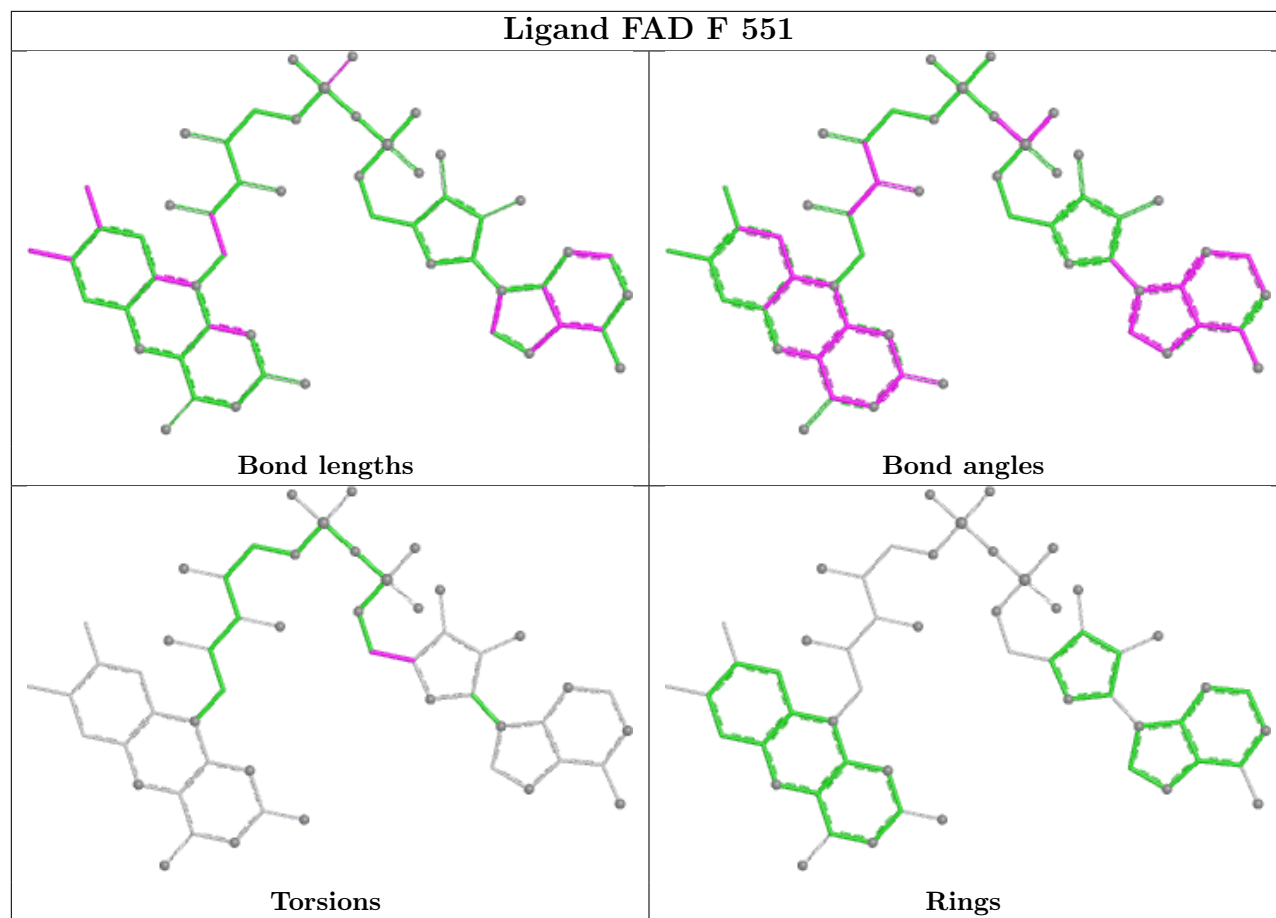


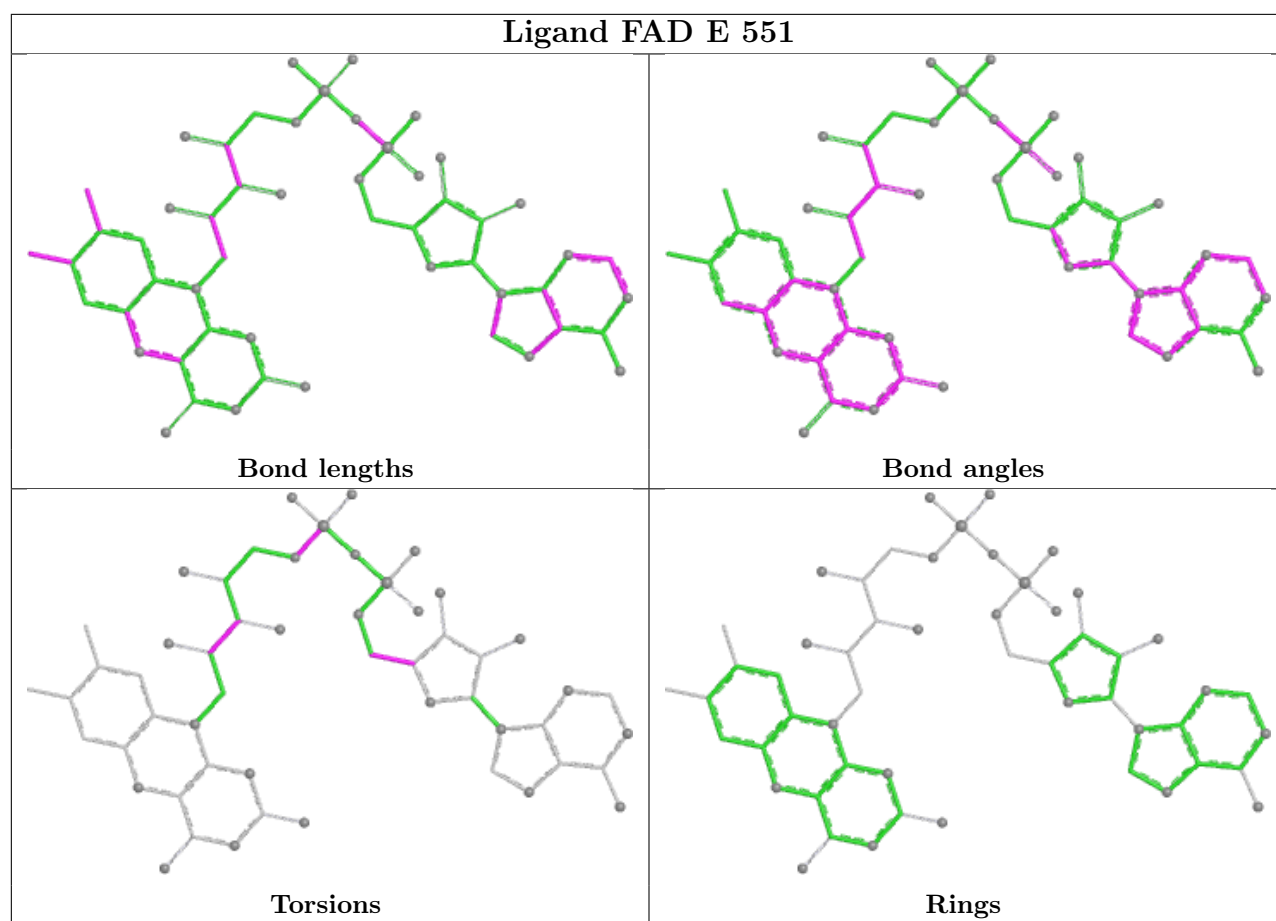












5.7 Other polymers [i](#)

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 ⓘ

6.1 Protein, DNA and RNA chains ⓘ

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	508/530 (95%)	-0.20	4 (0%) 82 82	19, 26, 43, 74	0
1	B	505/530 (95%)	-0.04	14 (2%) 55 54	19, 28, 47, 67	0
1	C	505/530 (95%)	0.14	7 (1%) 73 73	21, 33, 52, 81	0
1	D	508/530 (95%)	0.15	7 (1%) 73 73	21, 32, 52, 77	0
1	E	508/530 (95%)	-0.07	5 (0%) 79 79	19, 30, 51, 77	0
1	F	505/530 (95%)	0.08	9 (1%) 67 67	18, 33, 53, 84	0
1	G	505/530 (95%)	-0.20	3 (0%) 85 85	18, 27, 44, 68	0
1	H	508/530 (95%)	-0.11	10 (1%) 65 64	20, 28, 49, 96	0
All	All	4052/4240 (95%)	-0.03	59 (1%) 72 71	18, 30, 50, 96	0

All (59) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	375	GLU	4.5
1	C	420	PRO	4.0
1	G	213	GLY	4.0
1	H	331	ASN	3.8
1	D	331	ASN	3.7
1	H	332	GLY	3.7
1	A	423	GLY	3.6
1	H	213	GLY	3.6
1	A	213	GLY	3.5
1	A	422	ASN	3.3
1	C	213	GLY	3.2
1	B	330	ASP	3.2
1	B	213	GLY	3.0
1	G	214	GLY	3.0
1	B	420	PRO	2.9
1	F	420	PRO	2.9

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Mol	Chain	Res	Type	RSRZ
1	E	216	THR	2.9
1	B	425	ALA	2.8
1	H	423	GLY	2.7
1	C	214	GLY	2.7
1	E	213	GLY	2.6
1	H	422	ASN	2.6
1	B	379	ALA	2.6
1	B	331	ASN	2.5
1	D	425	ALA	2.5
1	F	379	ALA	2.5
1	G	420	PRO	2.5
1	F	332	GLY	2.5
1	C	3	ASP	2.4
1	F	425	ALA	2.4
1	H	379	ALA	2.4
1	F	389	ARG	2.4
1	A	425	ALA	2.3
1	C	425	ALA	2.3
1	B	401	LEU	2.3
1	E	202	ASP	2.3
1	F	386	ASP	2.3
1	B	332	GLY	2.3
1	C	143	GLY	2.3
1	D	216	THR	2.3
1	D	202	ASP	2.3
1	F	330	ASP	2.2
1	H	389	ARG	2.2
1	D	3	ASP	2.2
1	B	143	GLY	2.2
1	B	64	ALA	2.2
1	H	330	ASP	2.2
1	B	403	VAL	2.1
1	F	424	GLY	2.1
1	B	62	GLU	2.1
1	D	464	ALA	2.1
1	H	212	SER	2.1
1	H	333	SER	2.1
1	E	421	PRO	2.1
1	E	83	ASP	2.0
1	F	144	ASP	2.0
1	B	410	GLY	2.0
1	C	64	ALA	2.0

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Mol	Chain	Res	Type	RSRZ
1	D	31	LEU	2.0

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

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

6.3 Carbohydrates [i](#)

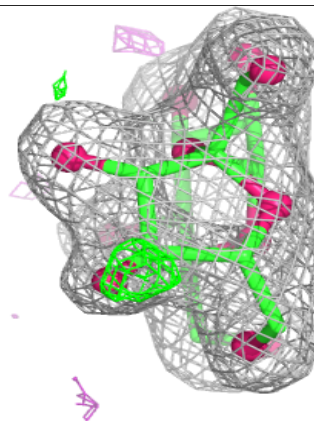
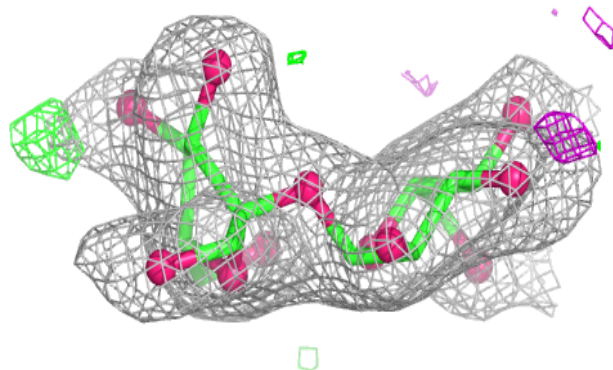
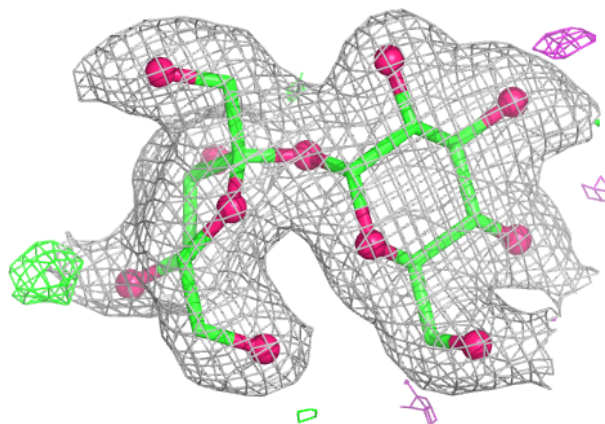
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	GLC	P	1	11/12	0.79	0.15	44,60,64,68	0
2	GLC	J	1	11/12	0.80	0.14	52,62,66,68	0
2	FRU	P	2	12/12	0.80	0.16	64,73,76,82	0
2	GLC	K	1	11/12	0.81	0.14	49,58,63,67	0
2	FRU	J	2	12/12	0.83	0.14	63,73,76,77	0
2	FRU	K	2	12/12	0.84	0.14	52,56,61,62	0
2	FRU	N	2	12/12	0.85	0.12	46,52,57,57	0
2	GLC	L	1	11/12	0.85	0.13	45,61,66,70	0
2	FRU	L	2	12/12	0.85	0.13	56,68,71,71	0
2	FRU	S	2	12/12	0.86	0.12	46,51,56,56	0
2	GLC	N	1	11/12	0.87	0.13	47,54,60,61	0
2	FRU	M	2	12/12	0.88	0.12	43,56,65,65	0
2	GLC	T	1	11/12	0.89	0.11	43,47,54,56	0
2	FRU	R	2	12/12	0.90	0.11	45,56,61,62	0
2	GLC	M	1	11/12	0.91	0.08	31,35,42,43	0
2	GLC	Q	1	11/12	0.91	0.10	35,44,48,49	0
2	FRU	Q	2	12/12	0.91	0.09	41,44,46,50	0
2	FRU	I	2	12/12	0.92	0.09	39,44,47,48	0
2	GLC	R	1	11/12	0.93	0.07	35,41,44,44	0
2	GLC	S	1	11/12	0.93	0.08	37,43,49,49	0
2	FRU	O	2	12/12	0.94	0.08	36,42,47,50	0
2	FRU	T	2	12/12	0.94	0.08	37,44,46,48	0
2	GLC	O	1	11/12	0.96	0.06	26,31,35,38	0
2	GLC	I	1	11/12	0.96	0.06	33,34,39,39	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.

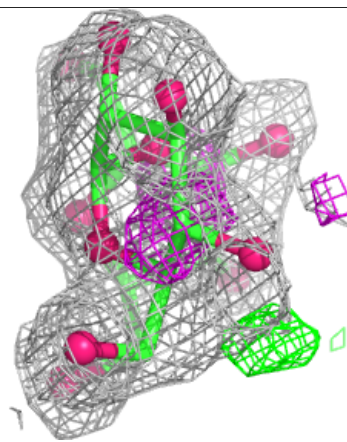
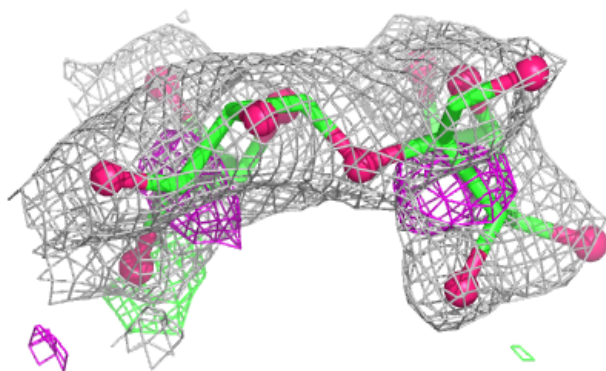
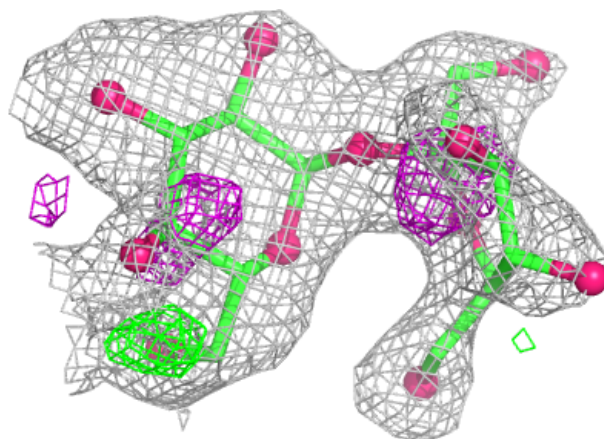
Electron density around Chain I:

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



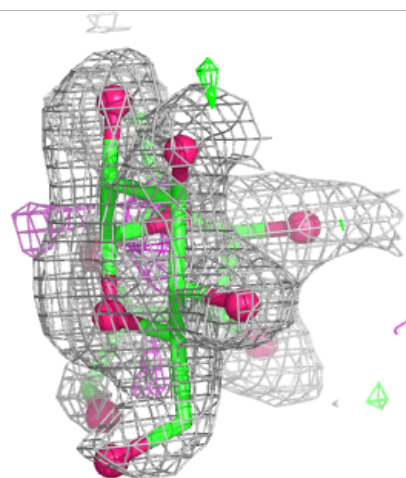
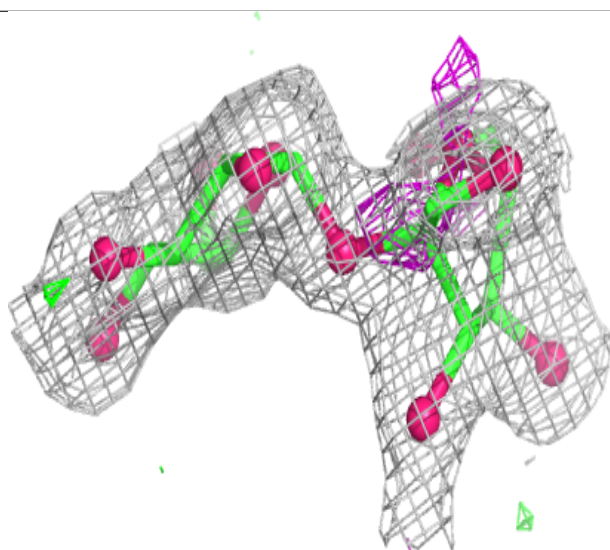
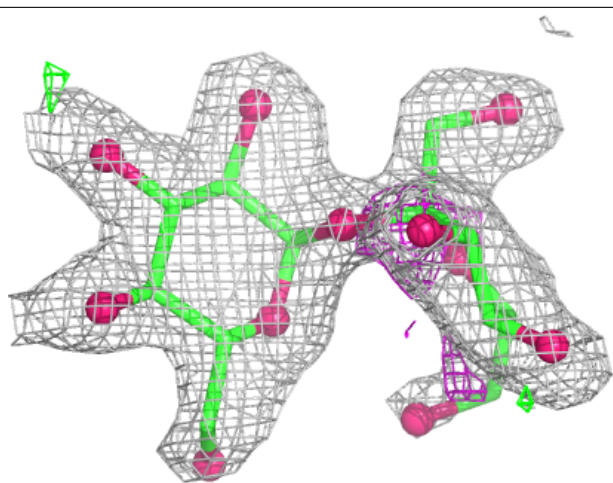
Electron density around Chain J:

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



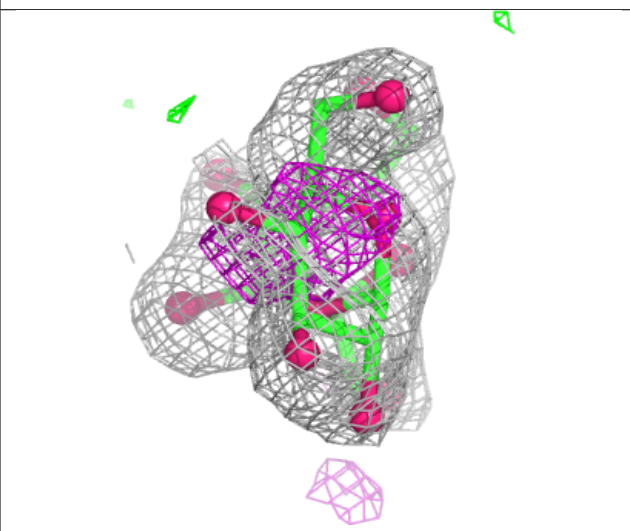
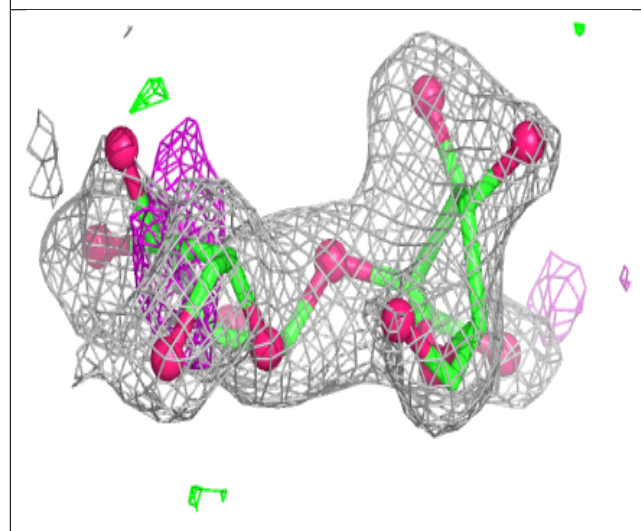
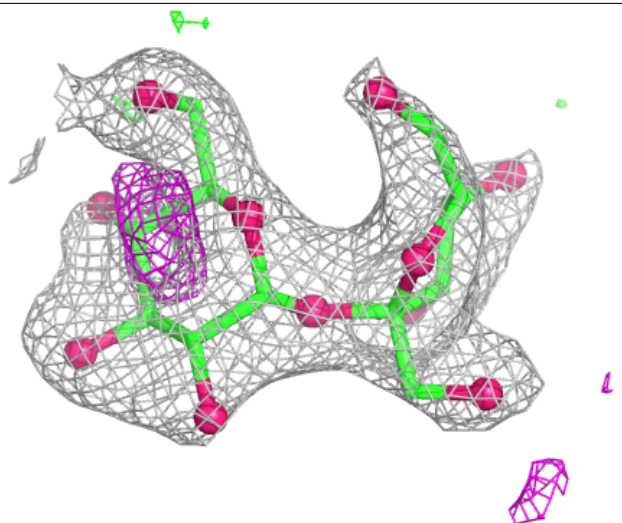
Electron density around Chain K:

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



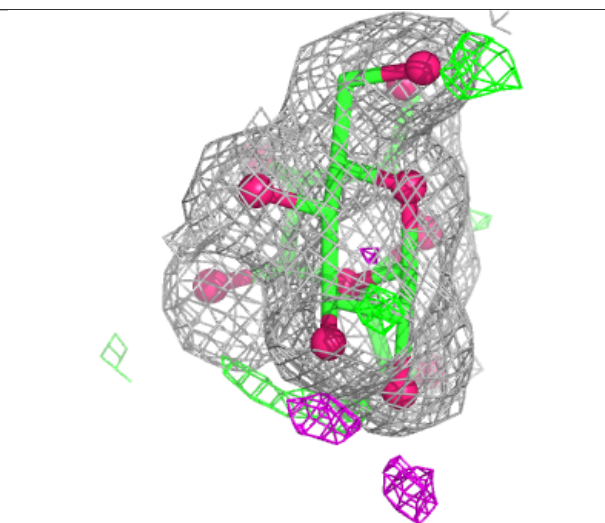
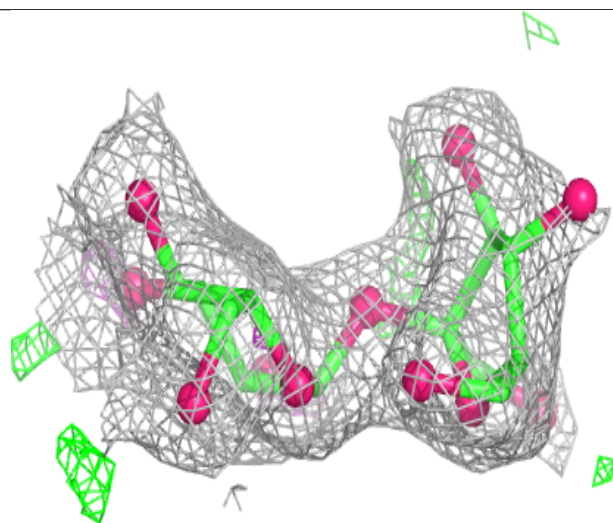
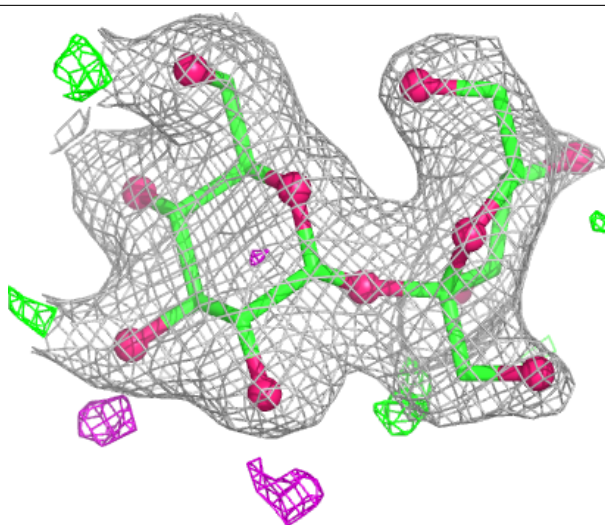
Electron density around Chain L:

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



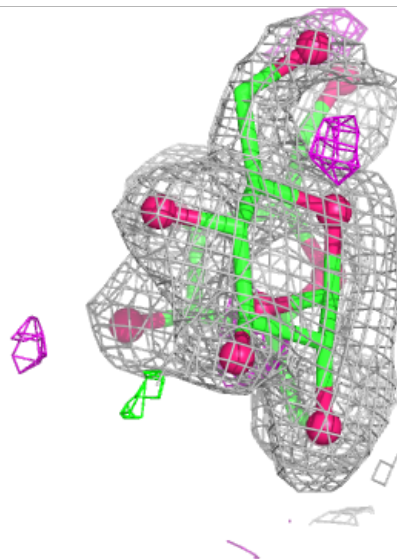
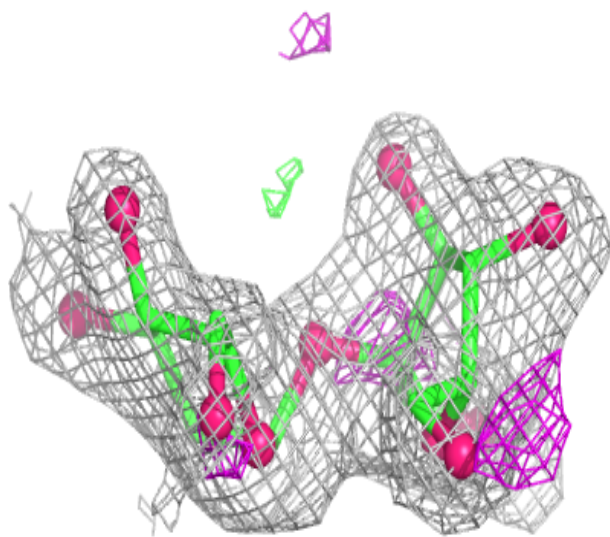
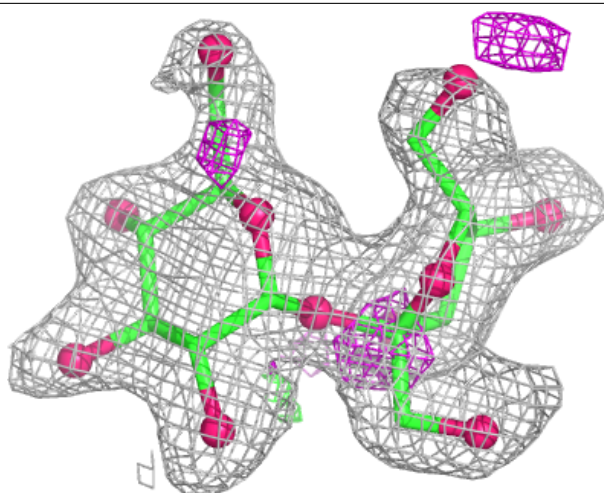
Electron density around Chain M:

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 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



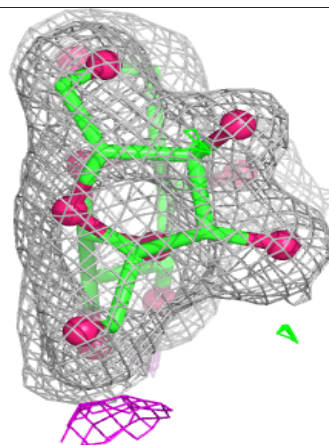
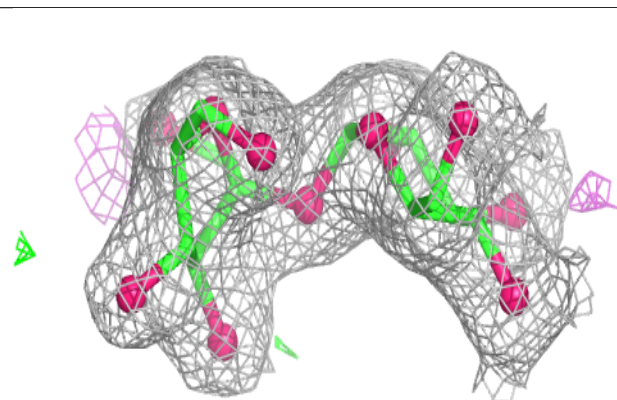
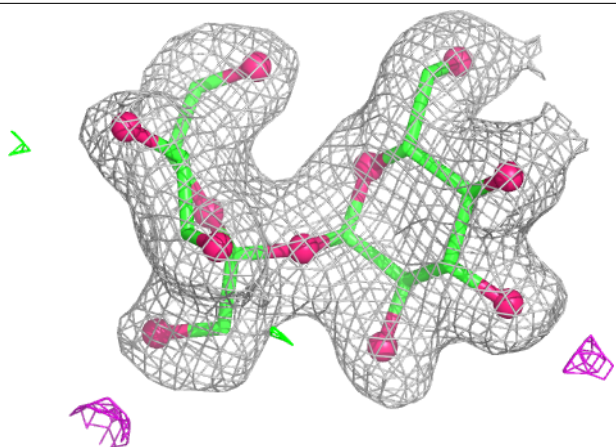
Electron density around Chain N:

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



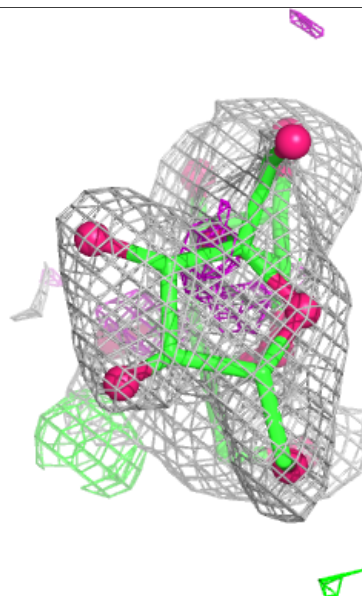
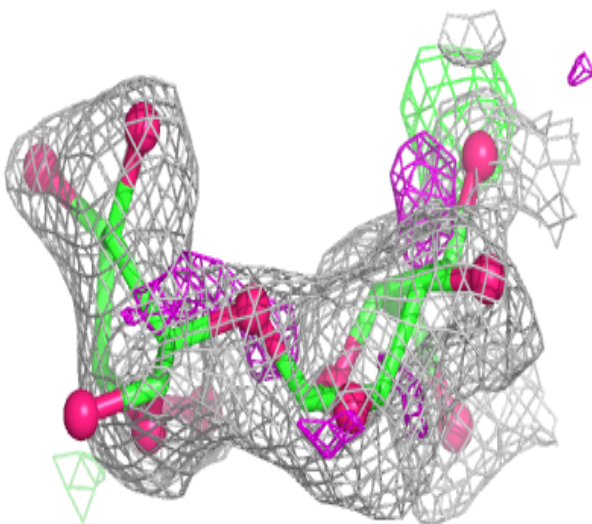
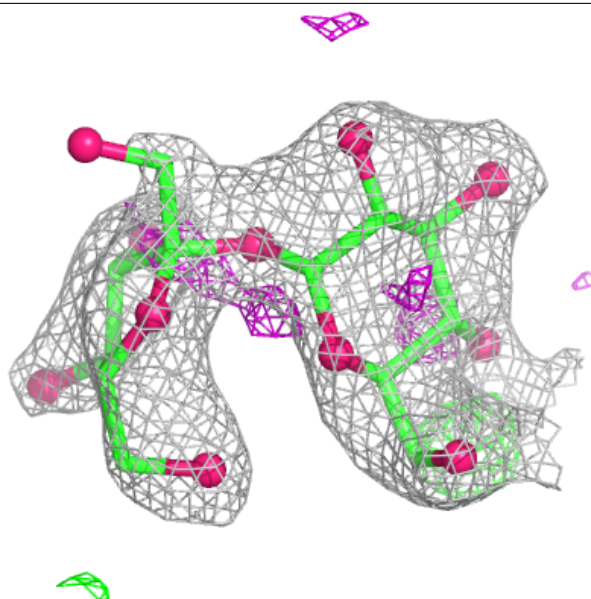
Electron density around Chain O:

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



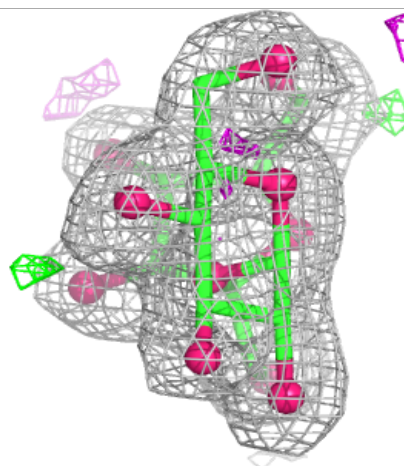
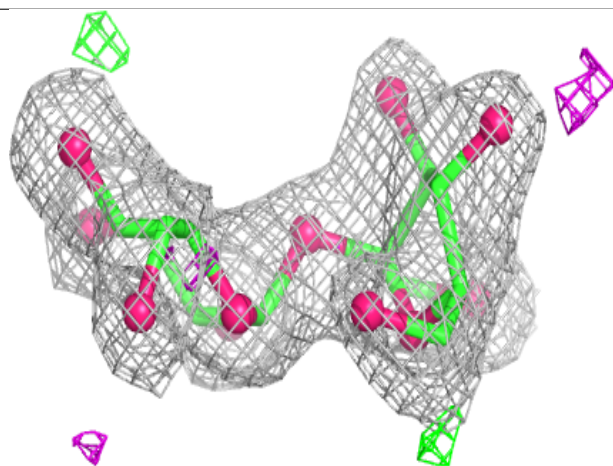
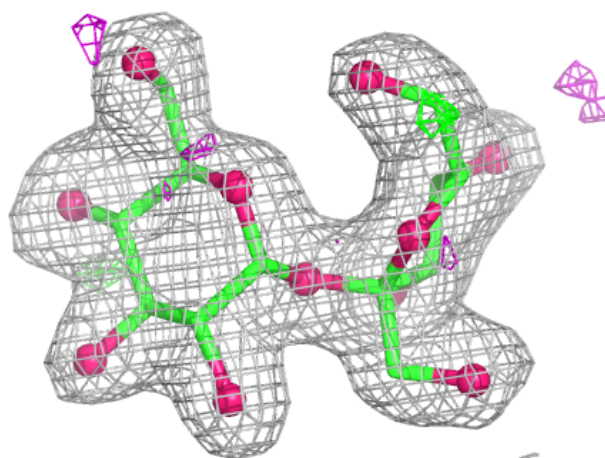
Electron density around Chain P:

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



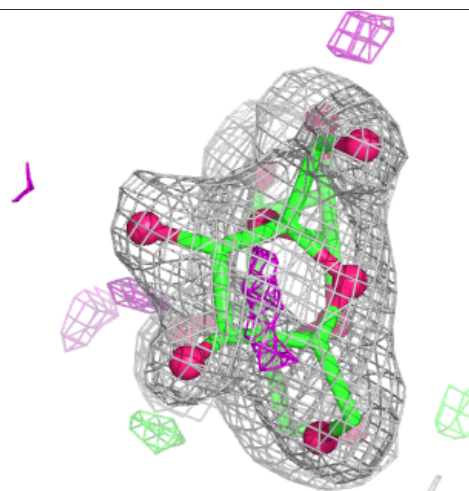
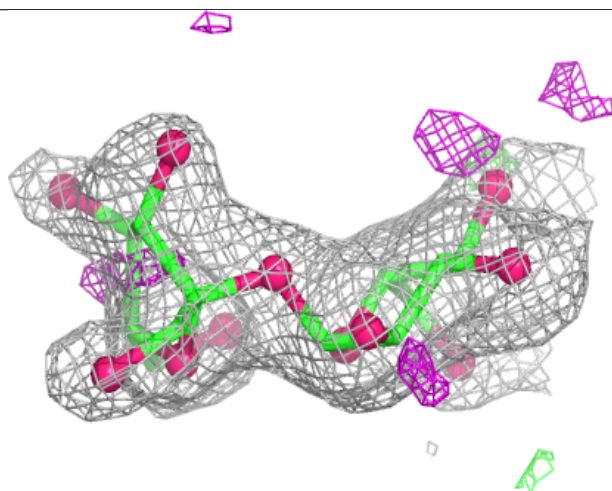
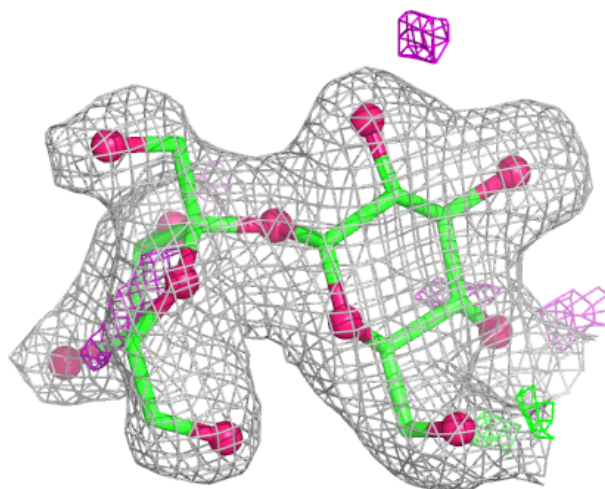
Electron density around Chain Q:

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



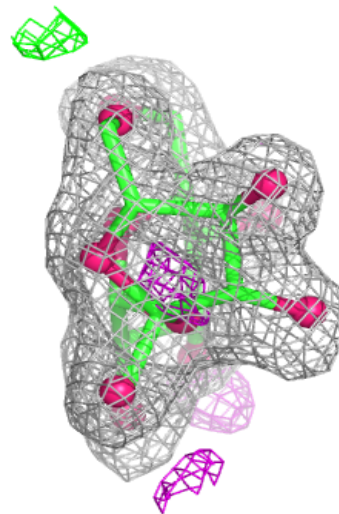
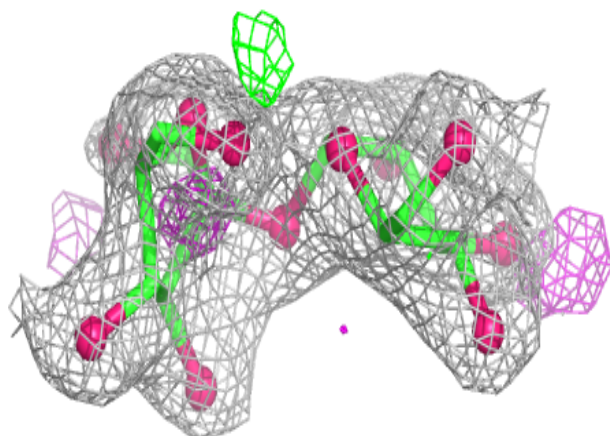
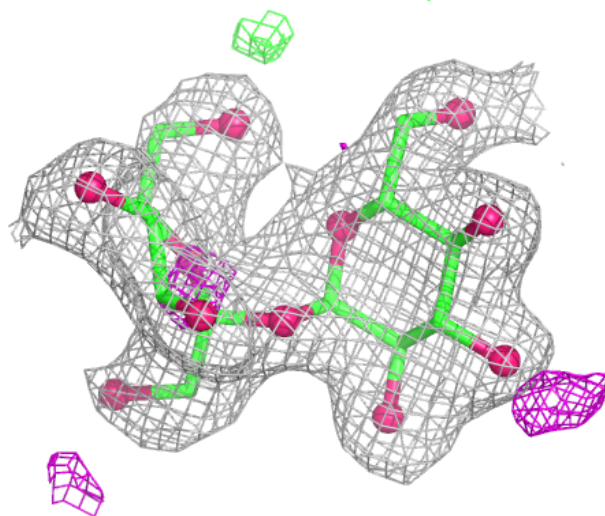
Electron density around Chain R:

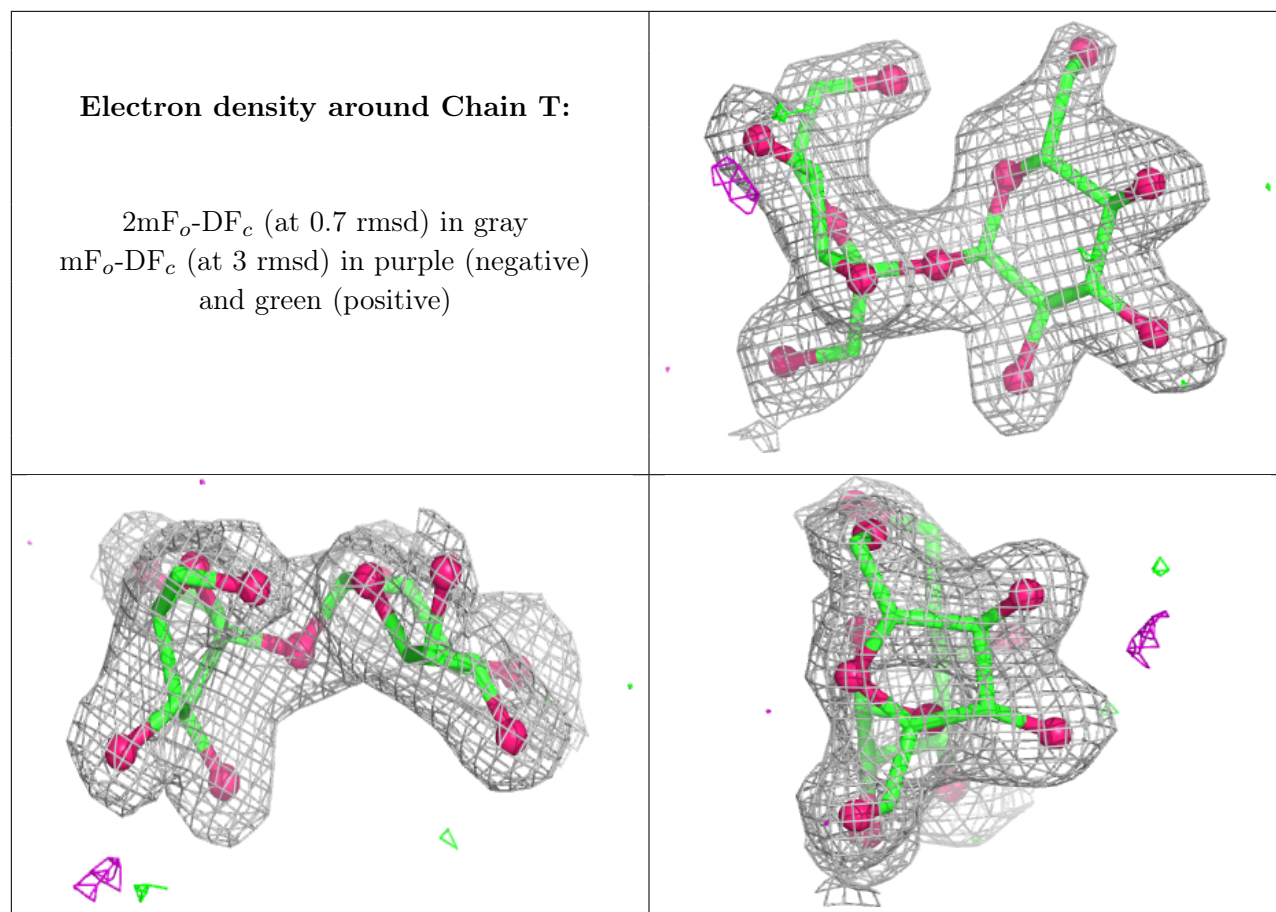
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around Chain S:

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





6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
6	PG4	B	584	13/13	0.66	0.26	72,85,90,91	0
6	PG4	E	582	13/13	0.77	0.25	60,68,80,81	0
6	PG4	C	581	13/13	0.79	0.23	47,61,77,79	0
6	PG4	C	582	13/13	0.80	0.21	56,66,78,79	0
6	PG4	B	582	13/13	0.80	0.20	58,61,64,65	0
6	PG4	G	581	13/13	0.80	0.22	67,69,77,78	0
6	PG4	H	582	13/13	0.80	0.23	64,67,76,78	0
6	PG4	G	582	13/13	0.82	0.21	63,69,78,80	0
6	PG4	B	581	13/13	0.82	0.21	52,68,88,90	0
6	PG4	F	582	13/13	0.83	0.19	55,60,77,78	0
6	PG4	F	581	13/13	0.83	0.20	51,60,68,70	0
6	PG4	E	583	13/13	0.84	0.20	53,67,69,71	0

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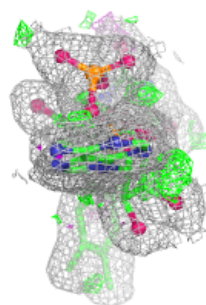
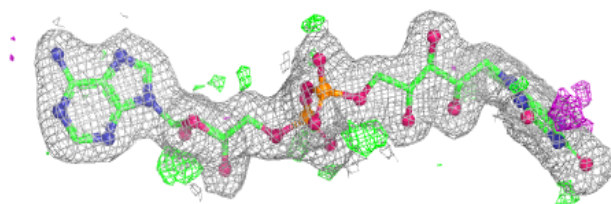
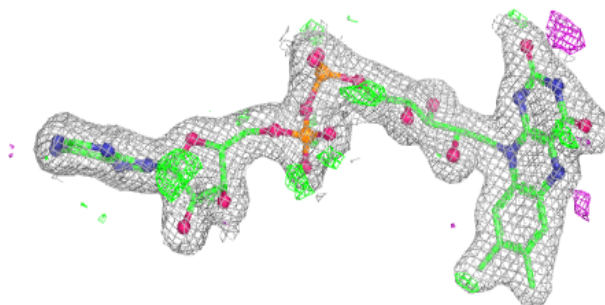
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
6	PG4	A	581	13/13	0.84	0.22	55,65,71,74	0
6	PG4	A	583	13/13	0.84	0.18	48,56,65,67	0
6	PG4	H	581	13/13	0.85	0.19	55,62,69,72	0
6	PG4	D	581	13/13	0.85	0.16	48,56,65,65	0
6	PG4	D	582	13/13	0.86	0.20	62,68,78,81	0
6	PG4	A	582	13/13	0.87	0.18	64,70,76,76	0
6	PG4	E	581	13/13	0.87	0.17	50,59,69,70	0
4	NA	G	561	1/1	0.96	0.04	26,26,26,26	0
4	NA	C	561	1/1	0.97	0.04	22,22,22,22	0
3	FAD	D	551	53/53	0.97	0.06	22,26,32,35	0
3	FAD	H	551	53/53	0.97	0.06	21,23,25,26	0
5	CL	D	571	1/1	0.98	0.05	33,33,33,33	0
3	FAD	E	551	53/53	0.98	0.05	19,24,33,34	0
3	FAD	F	551	53/53	0.98	0.05	20,24,28,29	0
3	FAD	G	551	53/53	0.98	0.05	19,22,25,27	0
3	FAD	B	551	53/53	0.98	0.05	19,23,25,29	0
3	FAD	C	551	53/53	0.98	0.05	23,26,33,38	0
3	FAD	A	551	53/53	0.98	0.05	20,22,24,28	0
5	CL	A	571	1/1	0.98	0.07	30,30,30,30	0
5	CL	B	571	1/1	0.98	0.05	33,33,33,33	0
5	CL	C	571	1/1	0.98	0.05	34,34,34,34	0
4	NA	A	561	1/1	0.99	0.04	23,23,23,23	0
5	CL	E	571	1/1	0.99	0.04	28,28,28,28	0
5	CL	F	571	1/1	0.99	0.05	33,33,33,33	0
5	CL	G	571	1/1	0.99	0.04	27,27,27,27	0
5	CL	H	571	1/1	0.99	0.06	34,34,34,34	0
4	NA	E	561	1/1	0.99	0.02	23,23,23,23	0

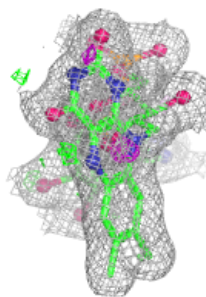
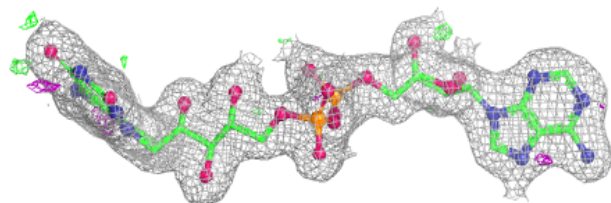
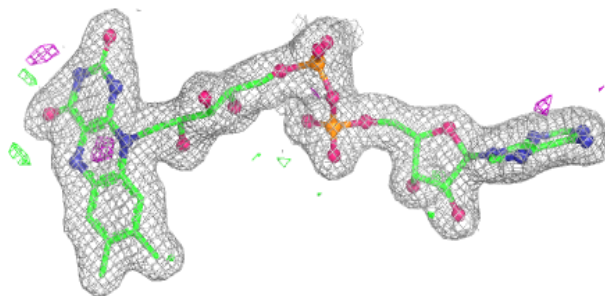
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around FAD D 551:

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

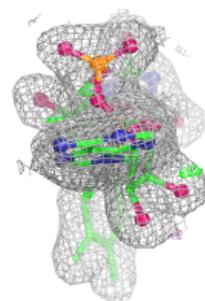
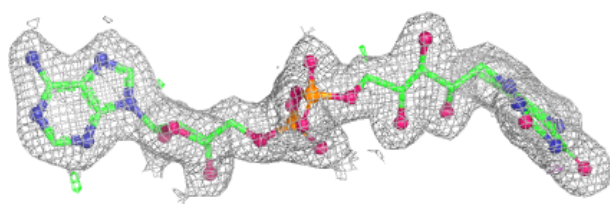
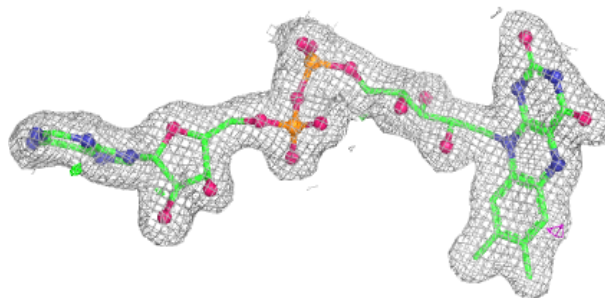
**Electron density around FAD H 551:**

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

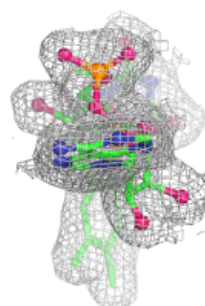
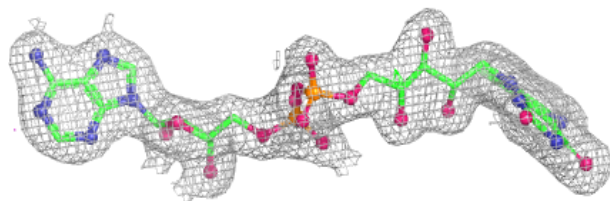


Electron density around FAD E 551:

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

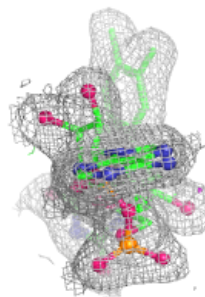
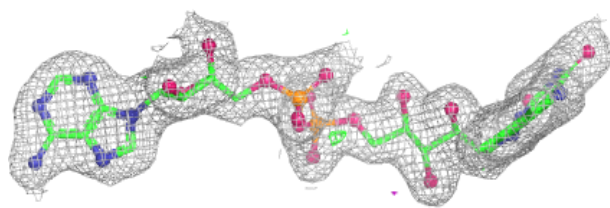
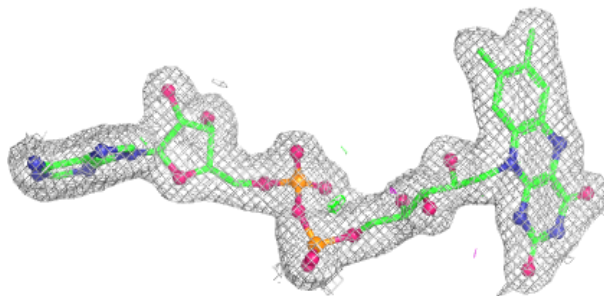
**Electron density around FAD F 551:**

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

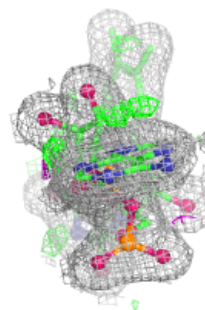
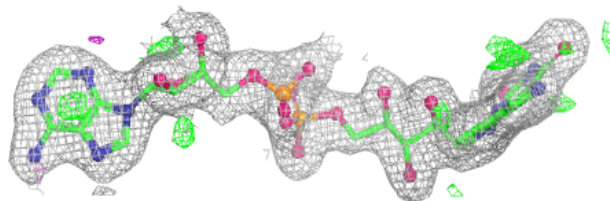
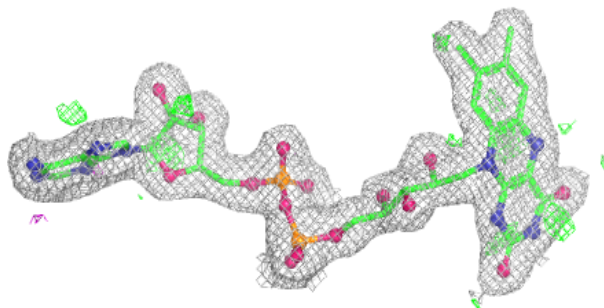


Electron density around FAD G 551:

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

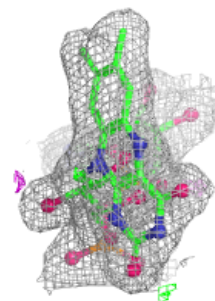
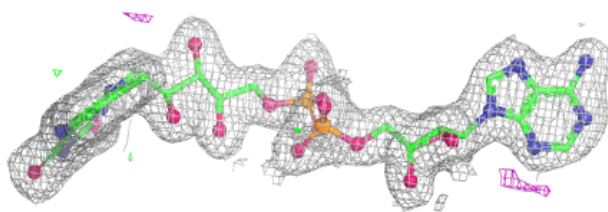
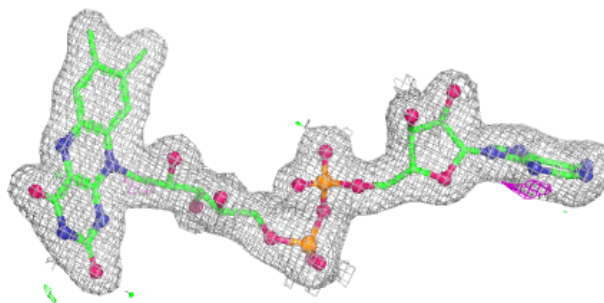
**Electron density around FAD B 551:**

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

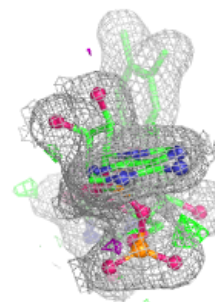
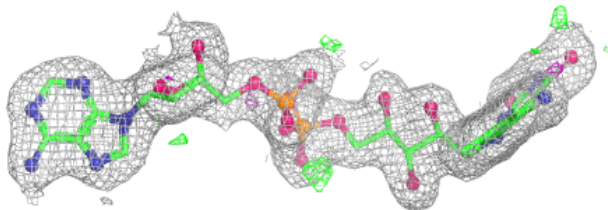
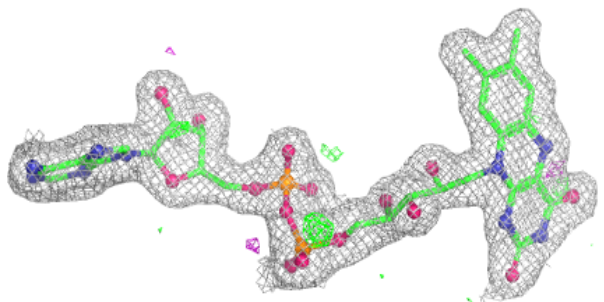


Electron density around FAD C 551:

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

**Electron density around FAD A 551:**

$2mF_o-DF_c$ (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.