wwPDB X-ray Structure Validation Summary Report (i)

Aug 17, 2020 – 10:26 AM BST

PDB ID	:	4C3X
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 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 (i) symbol.

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

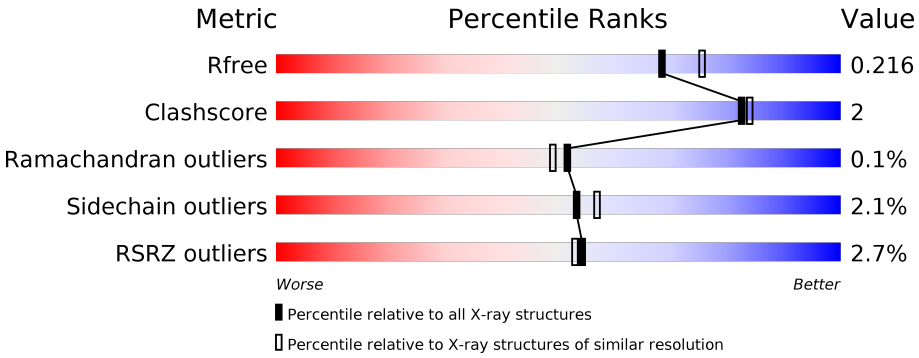
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.13.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.13.1

1 Overall quality at a glance (i)

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}	130704	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)
RSRZ outliers	127900	7900 (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 on the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	530	2% 89% 6% • •
1	B	530	2% 89% 6% • 5%
1	C	530	4% 88% 6% 5%
1	D	530	3% 89% 6% • •
1	E	530	3% 90% 5% • •
1	F	530	4% 89% 5% • 5%

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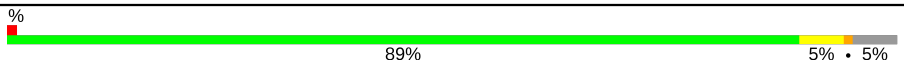
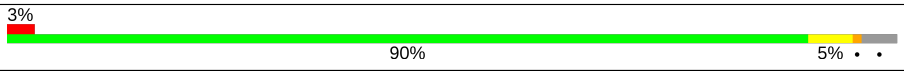
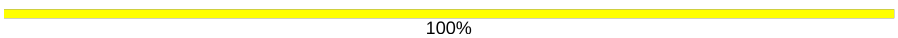
Mol	Chain	Length	Quality of chain
1	G	530	
1	H	530	
2	I	2	
2	J	2	
2	K	2	
2	L	2	
2	M	2	
2	N	2	
2	O	2	
2	P	2	
2	Q	2	
2	R	2	
2	S	2	
2	T	2	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
6	PG4	E	582	-	-	-	X
6	PG4	H	582	-	-	-	X

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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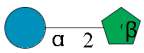
Chain	Residue	Modelled	Actual	Comment	Reference
G	0	HIS	-	expression tag	UNP Q9RA02
H	-19	MET	-	expression tag	UNP Q9RA02
H	-18	GLY	-	expression tag	UNP Q9RA02
H	-17	SER	-	expression tag	UNP Q9RA02
H	-16	SER	-	expression tag	UNP Q9RA02
H	-15	HIS	-	expression tag	UNP Q9RA02
H	-14	HIS	-	expression tag	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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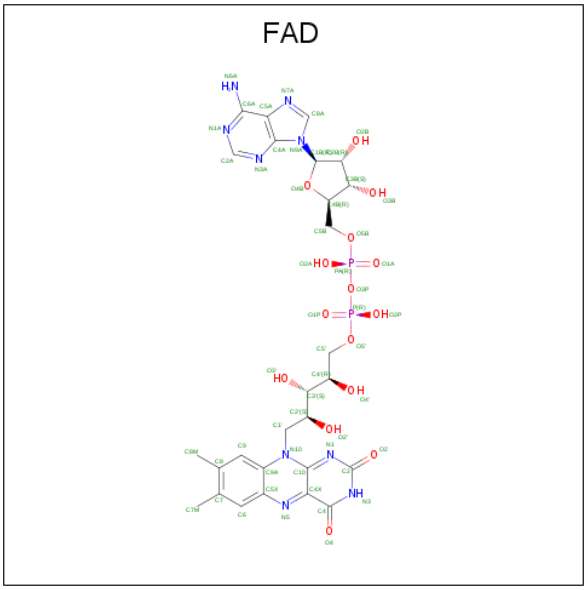
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
2	O	2	Total C O 23 12 11	0	0	0
2	P	2	Total C O 23 12 11	0	0	0
2	Q	2	Total C O 23 12 11	0	0	0
2	R	2	Total C O 23 12 11	0	0	0
2	S	2	Total C O 23 12 11	0	0	0
2	T	2	Total C O 23 12 11	0	0	0

- Molecule 3 is FLAVIN-ADENINE DINUCLEOTIDE (three-letter code: FAD) (formula: $C_{27}H_{33}N_9O_{15}P_2$).



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

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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		

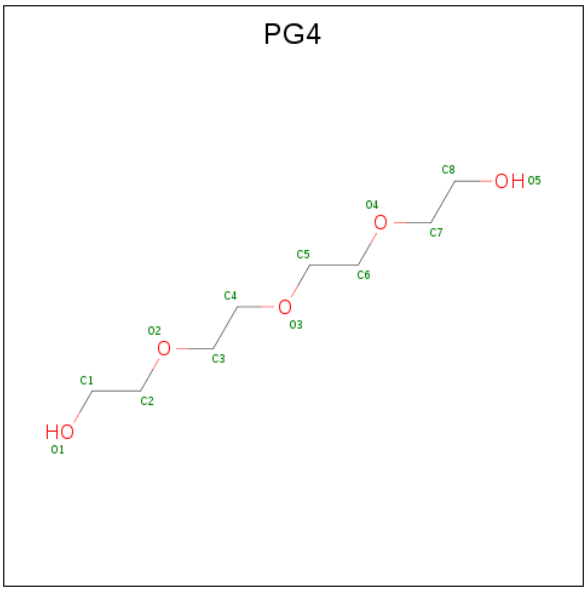
- Molecule 4 is SODIUM ION (three-letter code: NA) (formula: Na).

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

- Molecule 5 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	G	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	H	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	A	1	Total	Cl	0	0
			1	1		
5	F	1	Total	Cl	0	0
			1	1		

- Molecule 6 is TETRAETHYLENE GLYCOL (three-letter code: PG4) (formula: $C_8H_{18}O_5$).



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

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

- Molecule 7 is water.

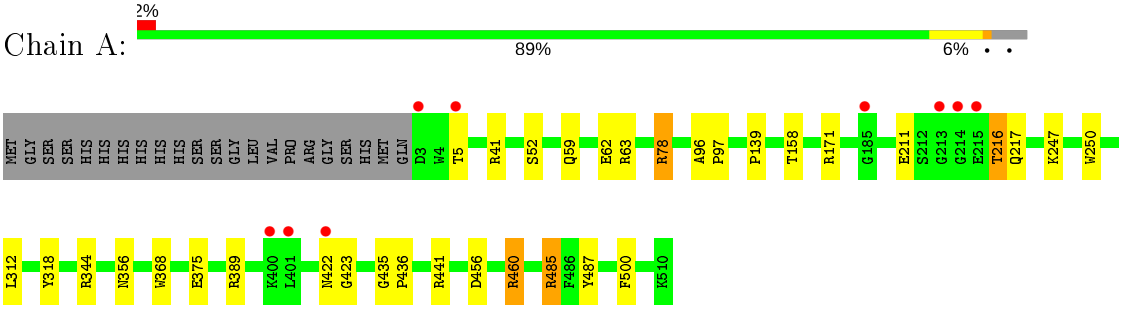
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	473	Total O 473 473	0	0
7	B	405	Total O 405 405	0	0
7	C	315	Total O 315 315	0	0
7	D	321	Total O 321 321	0	0
7	E	359	Total O 359 359	0	0
7	F	296	Total O 296 296	0	0
7	G	440	Total O 440 440	0	0
7	H	361	Total O 361 361	0	0

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.

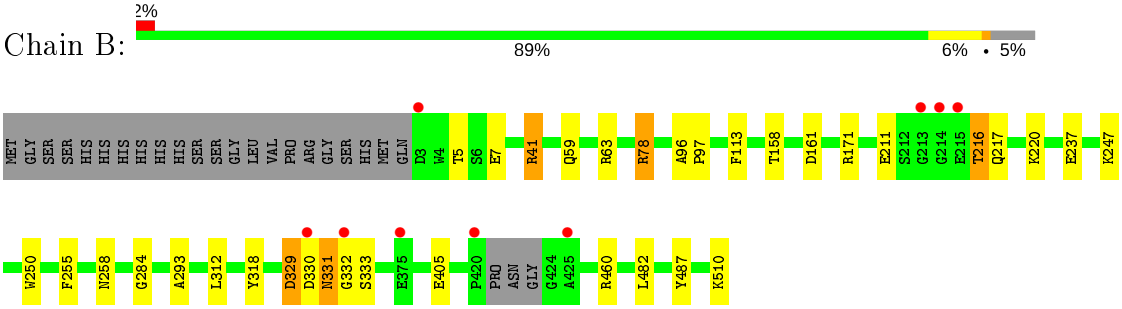
- Molecule 1: 3-KETOSTEROID DEHYDROGENASE

Chain A:



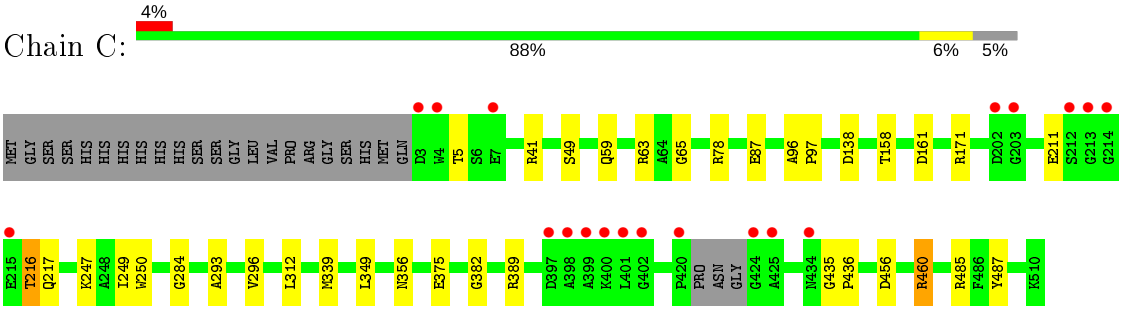
- Molecule 1: 3-KETOSTEROID DEHYDROGENASE

Chain B:



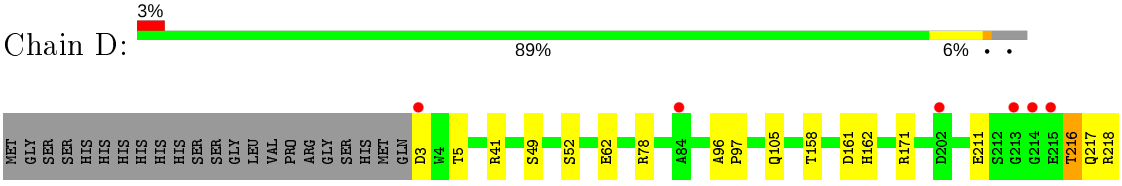
- Molecule 1: 3-KETOSTEROID DEHYDROGENASE

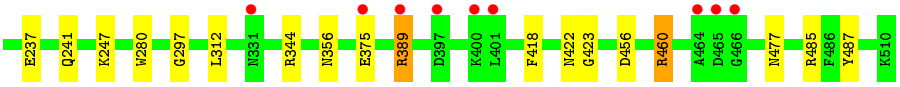
Chain C:



- Molecule 1: 3-KETOSTEROID DEHYDROGENASE

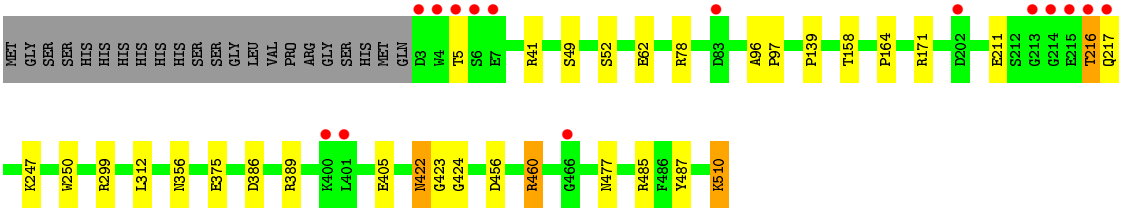
Chain D:





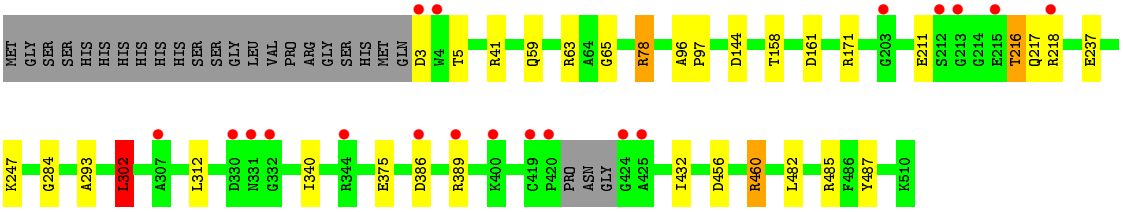
• Molecule 1: 3-KETOSTEROID DEHYDROGENASE

Chain E:



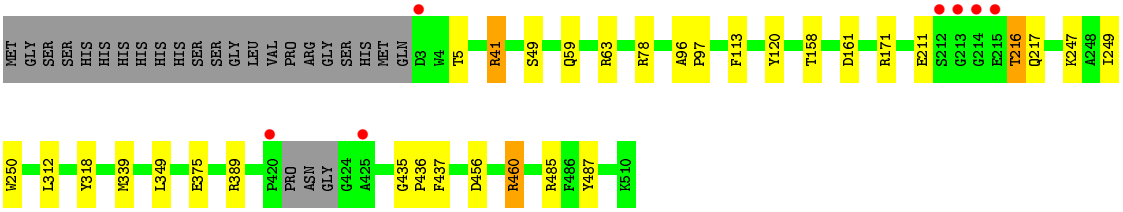
• Molecule 1: 3-KETOSTEROID DEHYDROGENASE

Chain F:



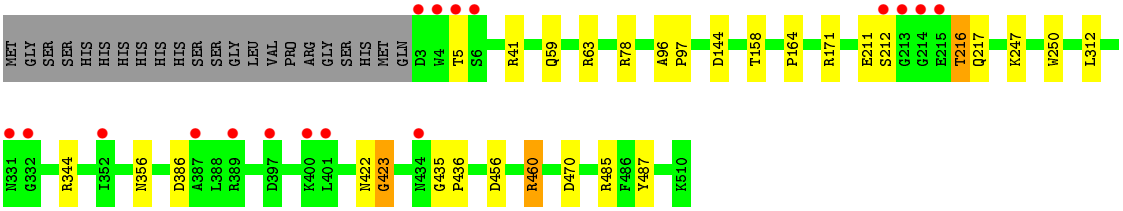
• Molecule 1: 3-KETOSTEROID DEHYDROGENASE

Chain G:



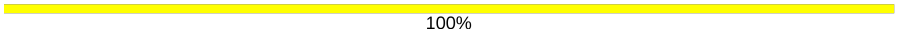
• Molecule 1: 3-KETOSTEROID DEHYDROGENASE

Chain H:



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

Chain I:

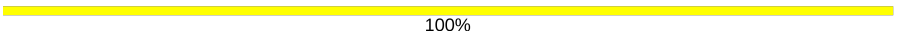


• Molecule 2: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose

Chain J:

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

Chain K:

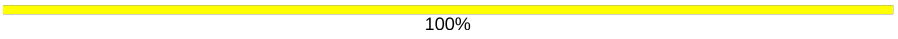


• Molecule 2: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose

Chain L:

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

Chain M:

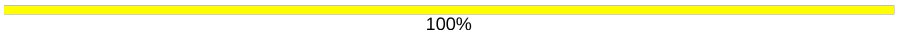


• Molecule 2: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose

Chain N:

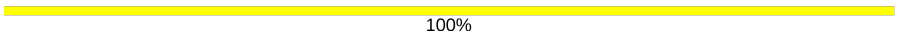
• Molecule 2: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose

Chain O:



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

Chain P:

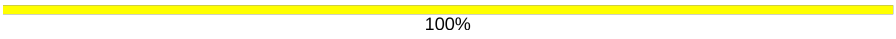


• Molecule 2: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose

Chain Q:

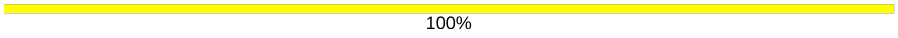
- Molecule 2: beta-D-fructofuranose-(2-1)-alpha-D-glucopyranose

Chain R:



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

Chain S:



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

Chain T:

4 Data and refinement statistics (i)

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
$< I/\sigma(I) >$ [1]	1.75 (at 2.00Å)	Xtriage
Refinement program	REFMAC 5.6.0117	Depositor
R, R_{free}	0.177 , 0.208 0.186 , 0.216	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 , 51.5	EDS
L-test for twinning[2]	$< \|L\| > = 0.47$, $< L^2 > = 0.30$	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.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

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

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	0.76	4/3782 (0.1%)	1.02	7/5138 (0.1%)
1	B	0.75	1/3761 (0.0%)	0.89	11/5107 (0.2%)
1	C	0.65	1/3761 (0.0%)	0.96	7/5107 (0.1%)
1	D	0.66	1/3782 (0.0%)	0.82	7/5138 (0.1%)
1	E	0.68	1/3782 (0.0%)	0.81	8/5138 (0.2%)
1	F	0.63	0/3761	1.01	11/5107 (0.2%)
1	G	0.76	6/3761 (0.2%)	0.82	6/5107 (0.1%)
1	H	0.72	1/3782 (0.0%)	0.99	9/5138 (0.2%)
All	All	0.70	15/30172 (0.0%)	0.92	66/40980 (0.2%)

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	G	120	TYR	CG-CD1	7.88	1.49	1.39
1	G	437	PHE	CG-CD1	6.82	1.49	1.38
1	B	405	GLU	CG-CD	6.35	1.61	1.51
1	H	41	ARG	CZ-NH1	6.28	1.41	1.33
1	G	120	TYR	CE1-CZ	6.24	1.46	1.38

The worst 5 of 66 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	78	ARG	NE-CZ-NH1	33.04	136.82	120.30
1	F	78	ARG	NE-CZ-NH1	31.73	136.17	120.30
1	C	41	ARG	NE-CZ-NH1	30.25	135.42	120.30
1	H	41	ARG	NE-CZ-NH1	30.19	135.40	120.30
1	H	41	ARG	NE-CZ-NH2	-29.71	105.45	120.30

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	3712	0	3579	16	0
1	B	3693	0	3562	19	0
1	C	3693	0	3562	26	0
1	D	3712	0	3579	17	0
1	E	3712	0	3579	18	0
1	F	3693	0	3562	15	0
1	G	3693	0	3562	21	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

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
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
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	2	0
7	H	361	0	0	3	0
All	All	33549	0	29405	148	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 2.

The worst 5 of 148 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	1.25	1.17
1:G:339:MET:HE1	1:G:349:LEU:HD21	1.27	1.15
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:F:302:LEU:HD22	1:F:340:ILE:HB	1.68	0.76

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	506/530 (96%)	493 (97%)	12 (2%)	1 (0%)	47	44
1	B	501/530 (94%)	487 (97%)	14 (3%)	0	100	100
1	C	501/530 (94%)	489 (98%)	12 (2%)	0	100	100
1	D	506/530 (96%)	493 (97%)	12 (2%)	1 (0%)	47	44
1	E	506/530 (96%)	494 (98%)	11 (2%)	1 (0%)	47	44
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%)	47	44
All	All	4028/4240 (95%)	3930 (98%)	94 (2%)	4 (0%)	51	49

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 (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	369/388 (95%)	361 (98%)	8 (2%)	52	55

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	B	367/388 (95%)	359 (98%)	8 (2%)	52 55
1	C	367/388 (95%)	361 (98%)	6 (2%)	62 67
1	D	369/388 (95%)	359 (97%)	10 (3%)	44 46
1	E	369/388 (95%)	361 (98%)	8 (2%)	52 55
1	F	367/388 (95%)	358 (98%)	9 (2%)	47 49
1	G	367/388 (95%)	360 (98%)	7 (2%)	57 61
1	H	369/388 (95%)	362 (98%)	7 (2%)	57 61
All	All	2944/3104 (95%)	2881 (98%)	63 (2%)	53 57

5 of 63 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	312	LEU
1	E	312	LEU
1	H	216	THR
1	D	389	ARG
1	D	487	TYR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 6 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	217	GLN
1	H	241	GLN
1	E	422	ASN
1	D	422	ASN
1	H	217	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)

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	1.38	2 (18%)	15,15,17	0.93	1 (6%)
2	FRU	I	2	2	11,12,12	1.17	1 (9%)	10,18,18	0.84	0
2	GLC	J	1	2	11,11,12	1.26	2 (18%)	15,15,17	1.86	4 (26%)
2	FRU	J	2	2	11,12,12	2.26	3 (27%)	10,18,18	2.12	3 (30%)
2	GLC	K	1	2	11,11,12	2.27	7 (63%)	15,15,17	1.38	1 (6%)
2	FRU	K	2	2	11,12,12	2.82	3 (27%)	10,18,18	1.10	1 (10%)
2	GLC	L	1	2	11,11,12	0.89	0	15,15,17	0.93	0
2	FRU	L	2	2	11,12,12	2.12	3 (27%)	10,18,18	1.64	2 (20%)
2	GLC	M	1	2	11,11,12	1.54	2 (18%)	15,15,17	0.83	0
2	FRU	M	2	2	11,12,12	1.82	3 (27%)	10,18,18	1.46	3 (30%)
2	GLC	N	1	2	11,11,12	2.00	5 (45%)	15,15,17	2.13	2 (13%)
2	FRU	N	2	2	11,12,12	1.49	3 (27%)	10,18,18	1.42	3 (30%)
2	GLC	O	1	2	11,11,12	1.68	3 (27%)	15,15,17	0.96	0
2	FRU	O	2	2	11,12,12	1.26	2 (18%)	10,18,18	1.44	2 (20%)
2	GLC	P	1	2	11,11,12	1.62	3 (27%)	15,15,17	1.66	3 (20%)
2	FRU	P	2	2	11,12,12	2.58	4 (36%)	10,18,18	1.44	2 (20%)
2	GLC	Q	1	2	11,11,12	2.15	4 (36%)	15,15,17	1.33	1 (6%)
2	FRU	Q	2	2	11,12,12	1.64	2 (18%)	10,18,18	1.56	2 (20%)
2	GLC	R	1	2	11,11,12	1.17	1 (9%)	15,15,17	1.23	1 (6%)
2	FRU	R	2	2	11,12,12	1.46	2 (18%)	10,18,18	0.79	0
2	GLC	S	1	2	11,11,12	0.95	1 (9%)	15,15,17	1.34	2 (13%)
2	FRU	S	2	2	11,12,12	2.00	3 (27%)	10,18,18	1.52	3 (30%)
2	GLC	T	1	2	11,11,12	2.11	5 (45%)	15,15,17	1.07	2 (13%)
2	FRU	T	2	2	11,12,12	1.80	3 (27%)	10,18,18	1.65	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	-	1/5/24/24	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

The worst 5 of 67 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	K	2	FRU	O2-C2	6.91	1.52	1.40
2	P	2	FRU	O5-C2	5.88	1.52	1.43
2	K	2	FRU	O5-C2	4.86	1.50	1.43
2	J	2	FRU	O2-C2	4.83	1.49	1.40
2	L	2	FRU	O2-C2	4.52	1.48	1.40

The worst 5 of 39 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	N	1	GLC	O5-C5-C6	7.22	118.53	107.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	J	1	GLC	C1-O5-C5	4.55	118.36	112.19
2	K	1	GLC	O5-C5-C6	4.47	114.22	107.20
2	T	2	FRU	O2-C2-O5	4.40	117.99	109.50
2	P	1	GLC	C1-O5-C5	4.34	118.07	112.19

There are no chirality outliers.

5 of 14 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

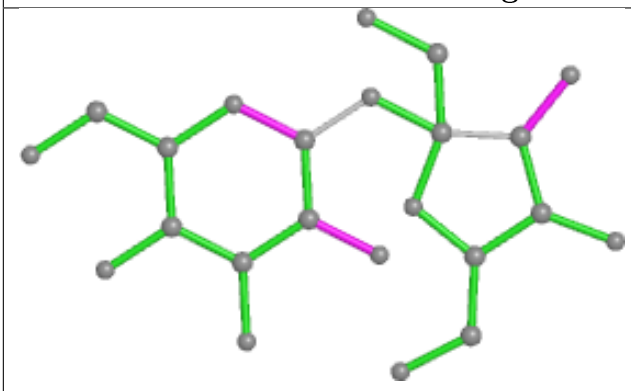
There are no ring outliers.

2 monomers are involved in 1 short contact:

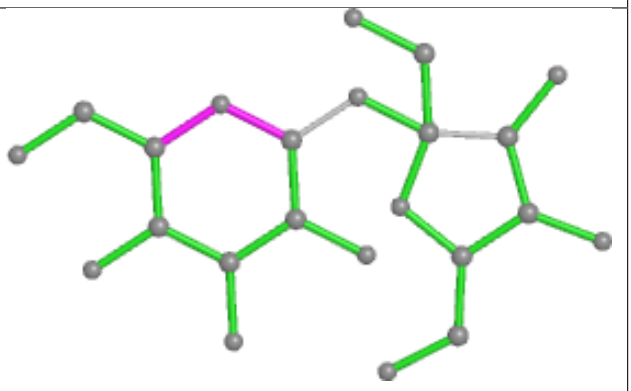
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	N	2	FRU	1	0
2	N	1	GLC	1	0

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

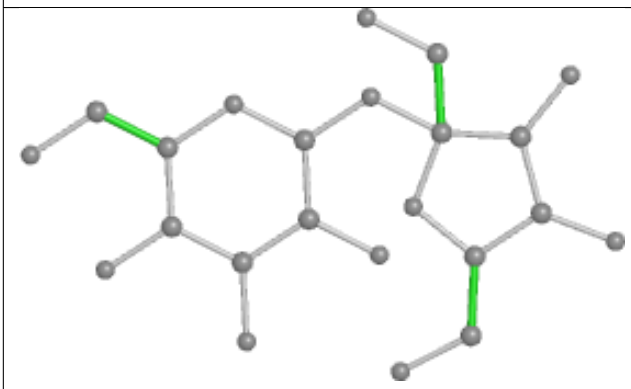
Oligosaccharide Chain I



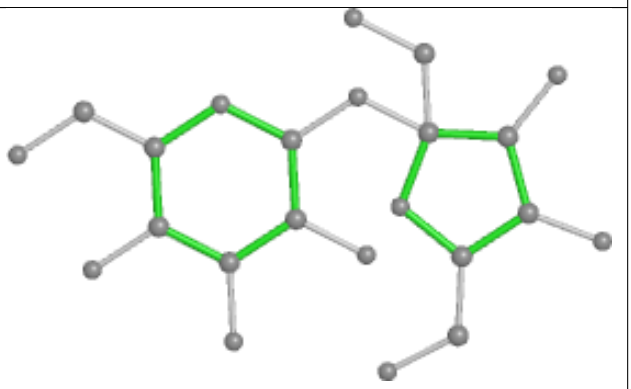
Bond lengths



Bond angles

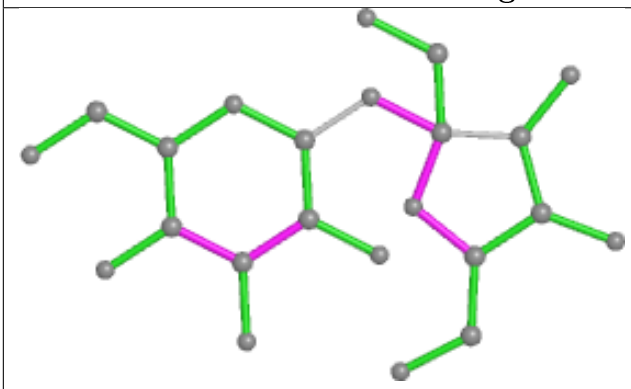


Torsions

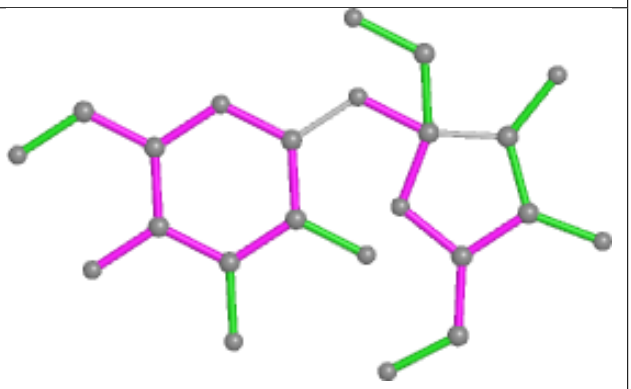


Rings

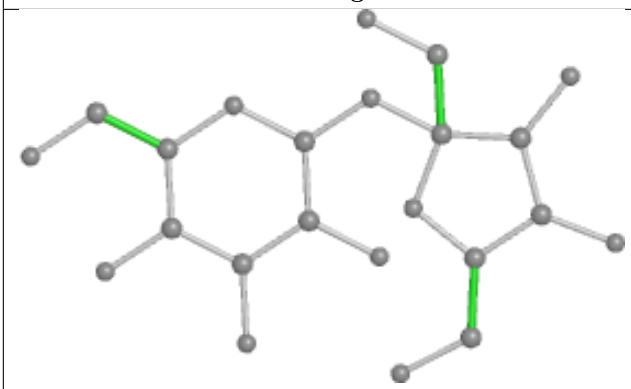
Oligosaccharide Chain J



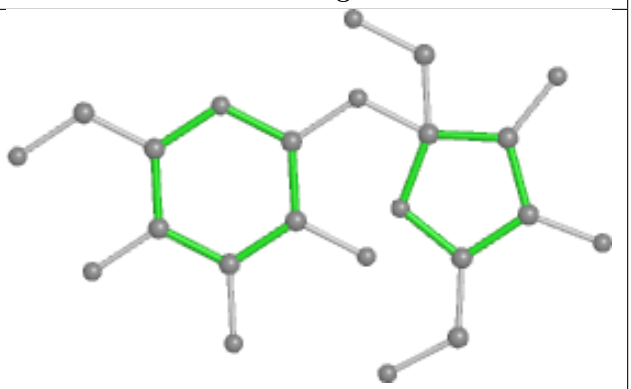
Bond lengths



Bond angles

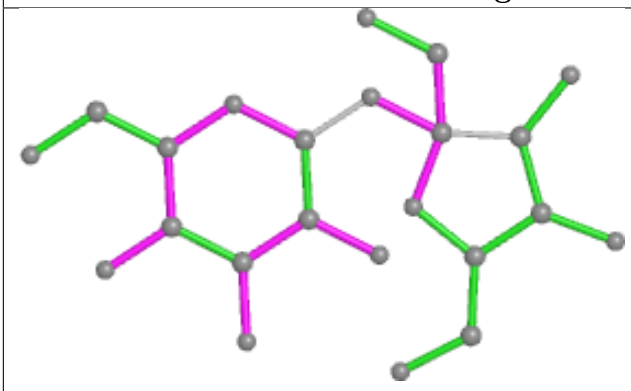


Torsions

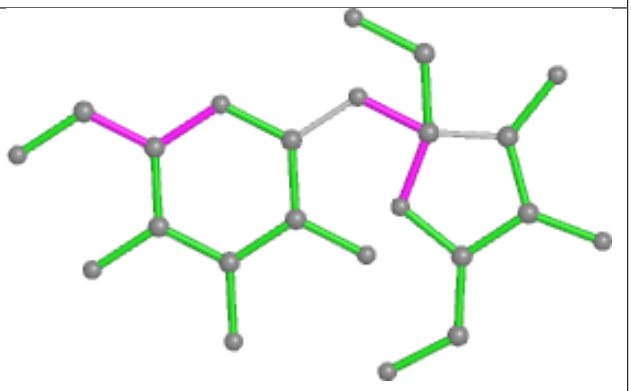


Rings

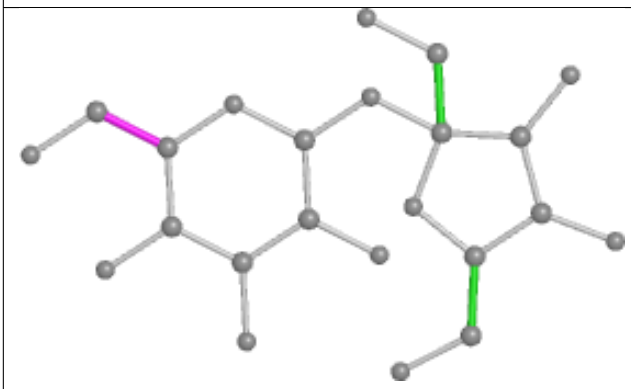
Oligosaccharide Chain K



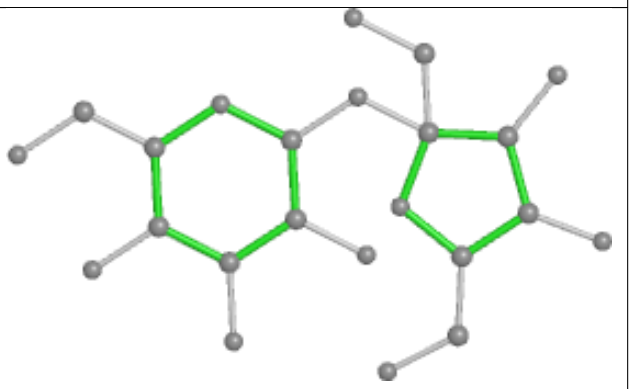
Bond lengths



Bond angles

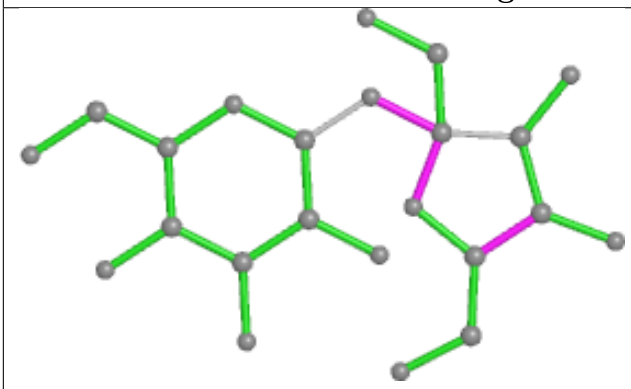


Torsions

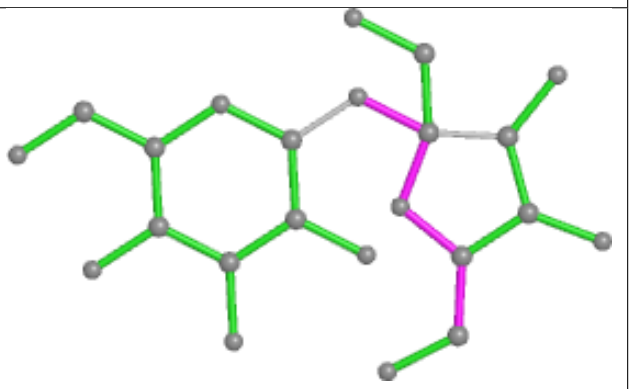


Rings

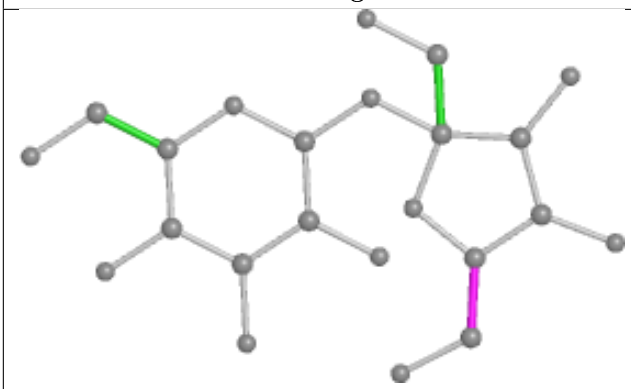
Oligosaccharide Chain L



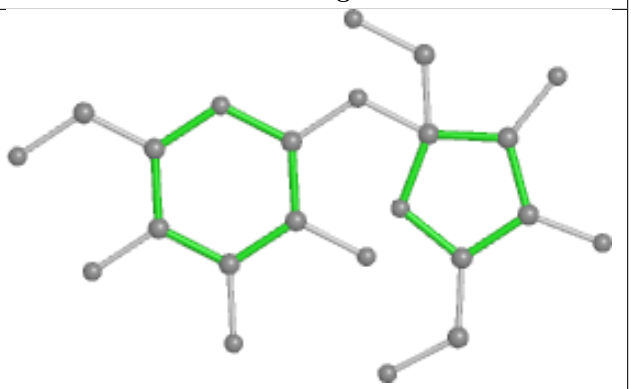
Bond lengths



Bond angles

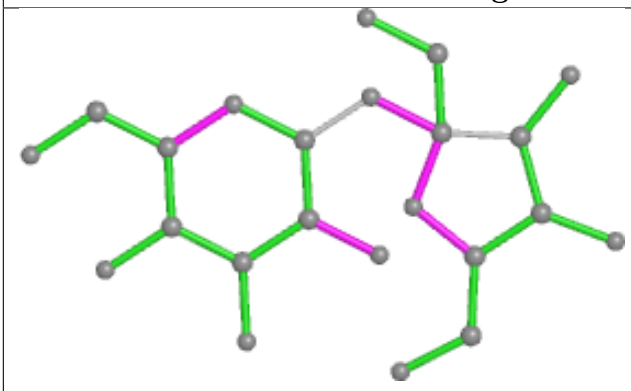


Torsions

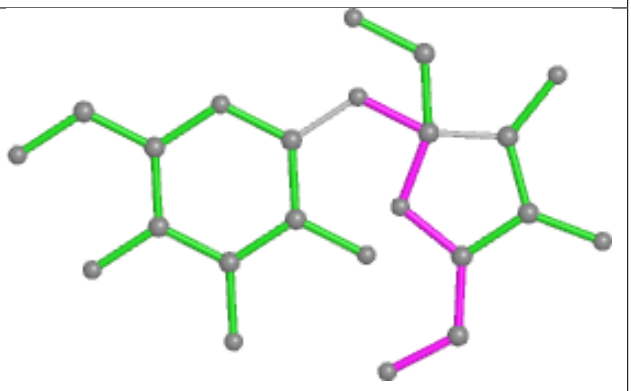


Rings

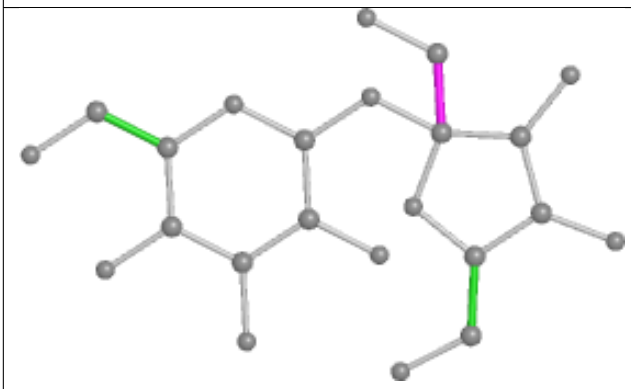
Oligosaccharide Chain M



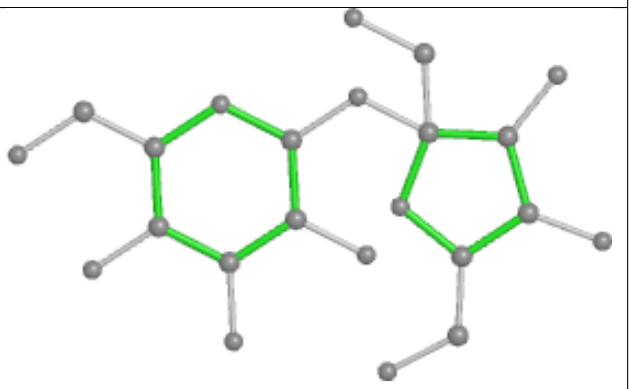
Bond lengths



Bond angles

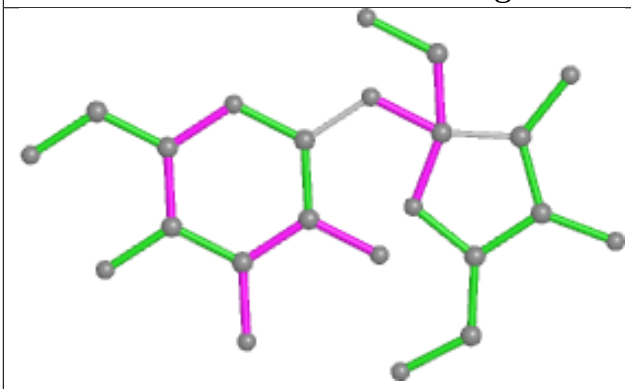


Torsions

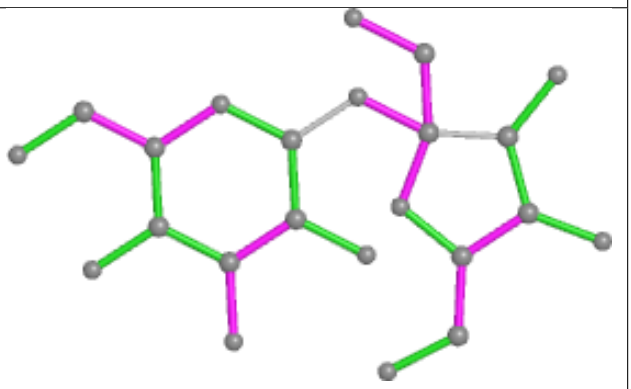


Rings

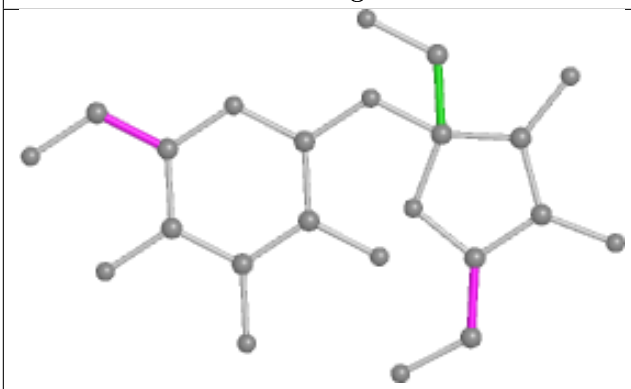
Oligosaccharide Chain N



Bond lengths



Bond angles



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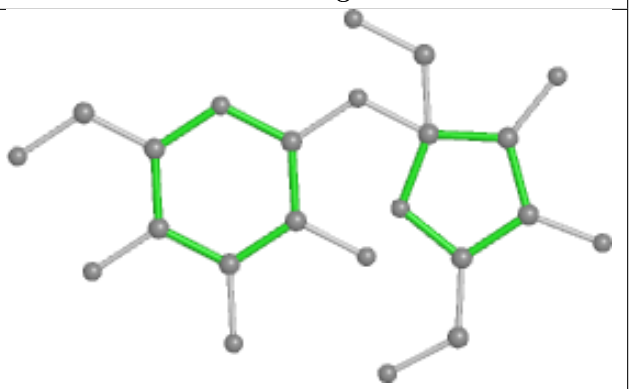
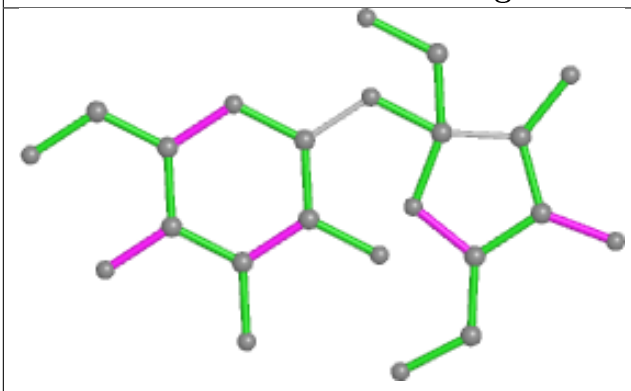
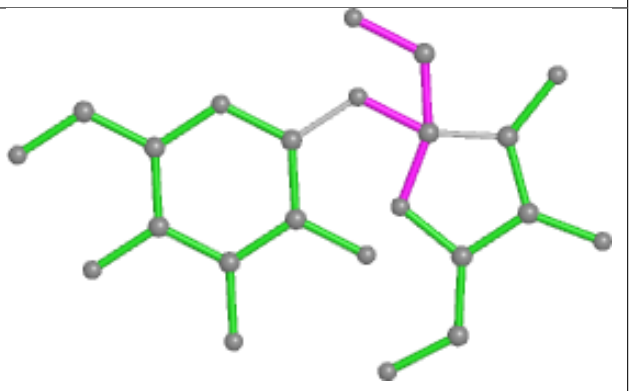


Rings

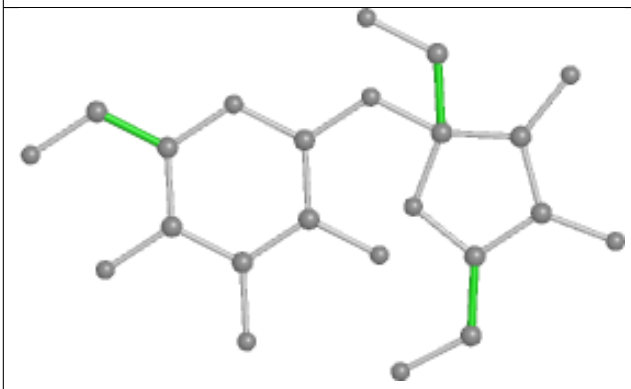
Oligosaccharide Chain O



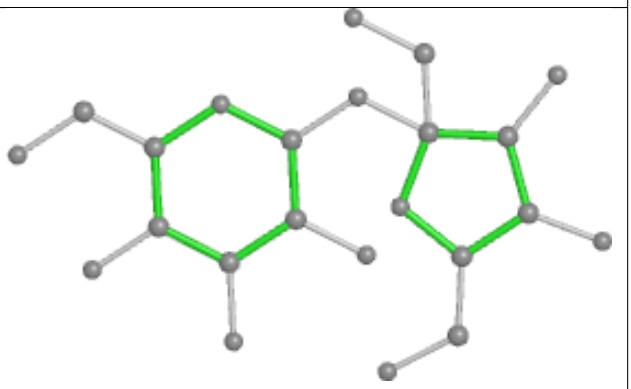
Bond lengths



Bond angles

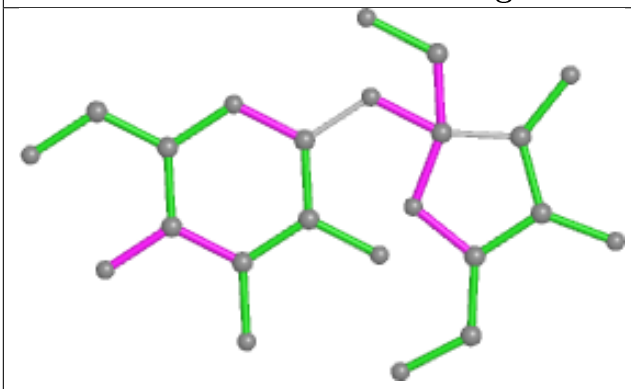


Torsions

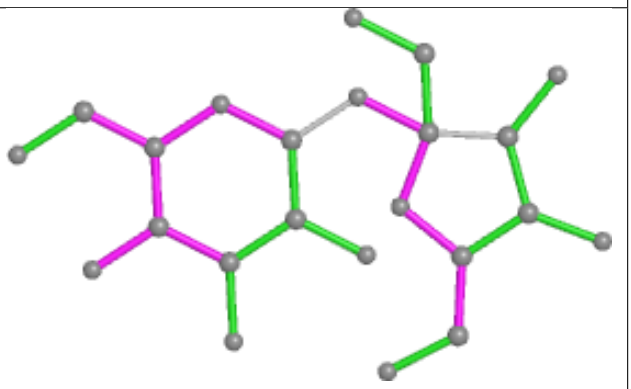


Rings

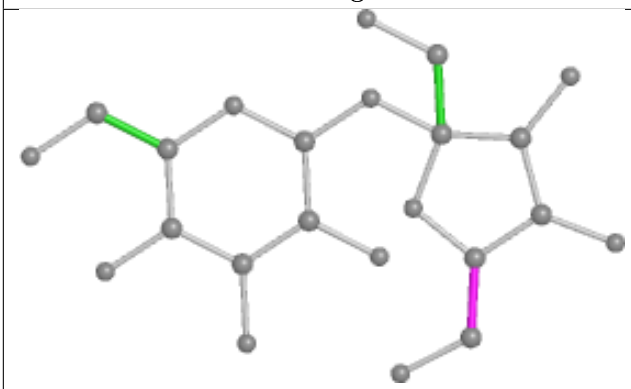
Oligosaccharide Chain P



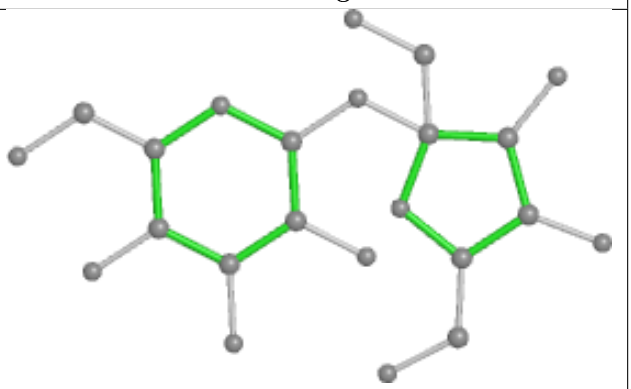
Bond lengths



Bond angles

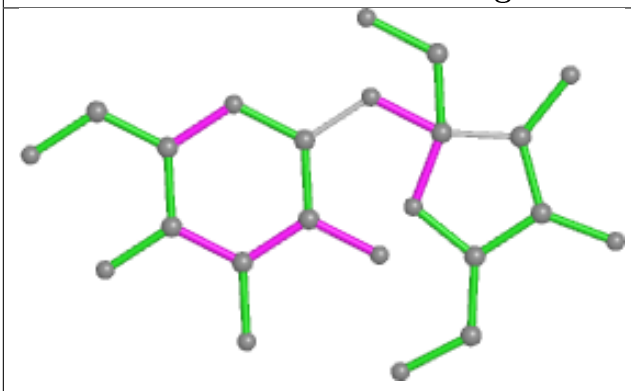


Torsions

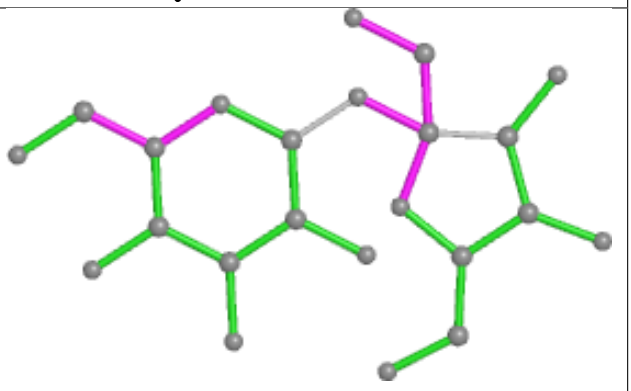


Rings

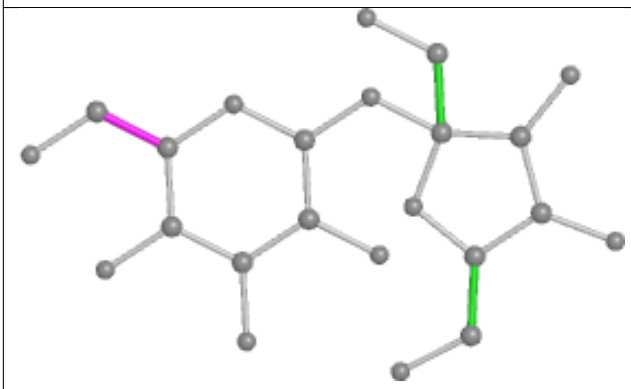
Oligosaccharide Chain Q



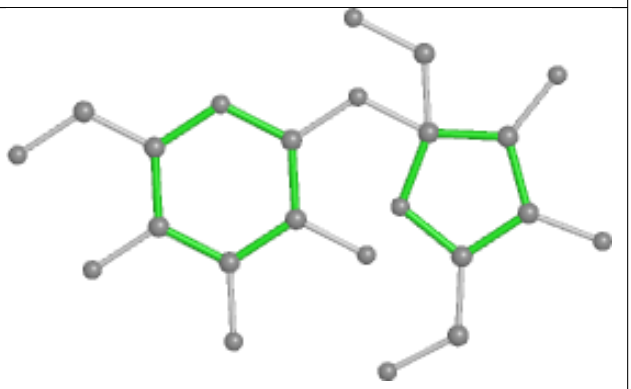
Bond lengths



Bond angles

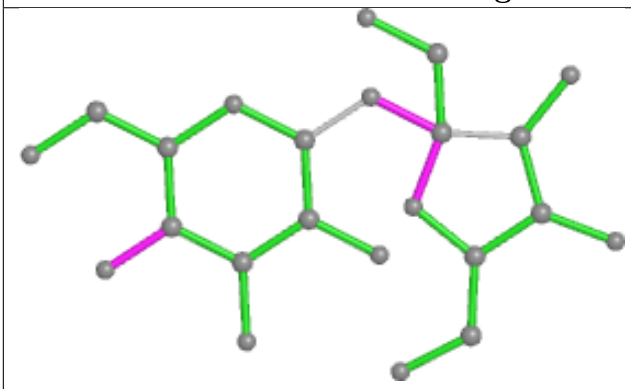


Torsions

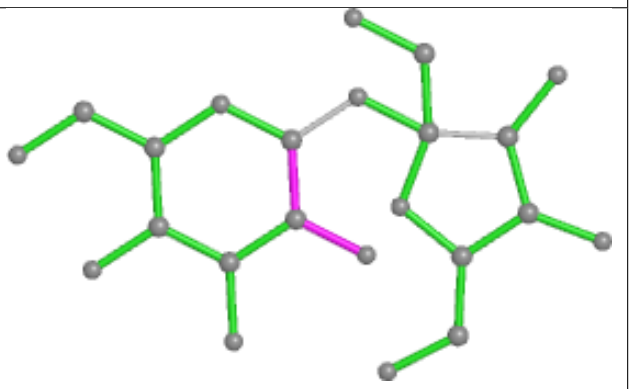


Rings

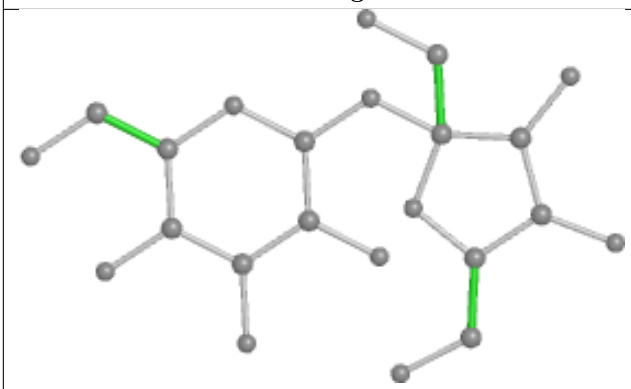
Oligosaccharide Chain R



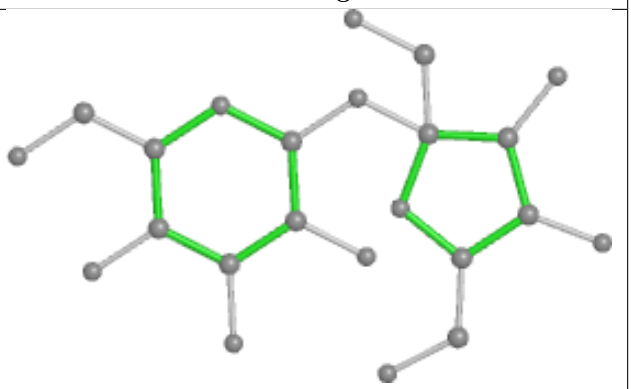
Bond lengths



Bond angles

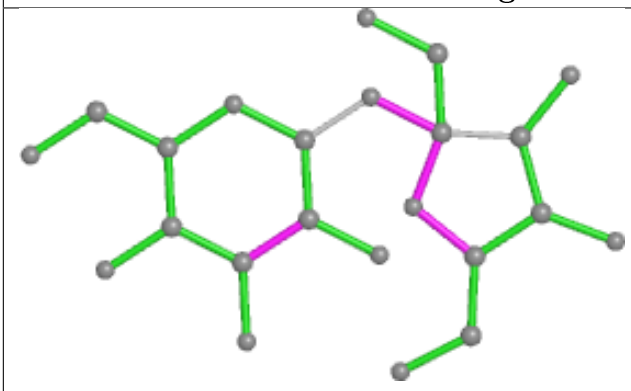


Torsions

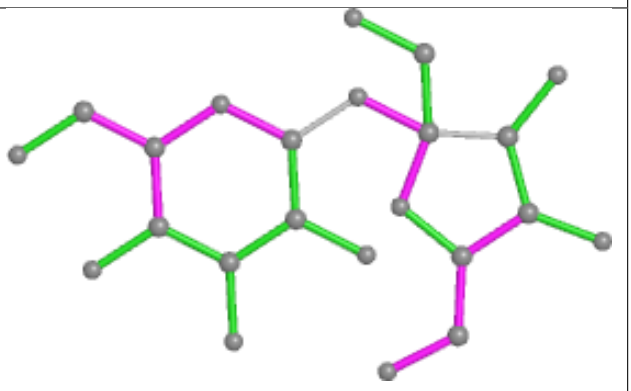


Rings

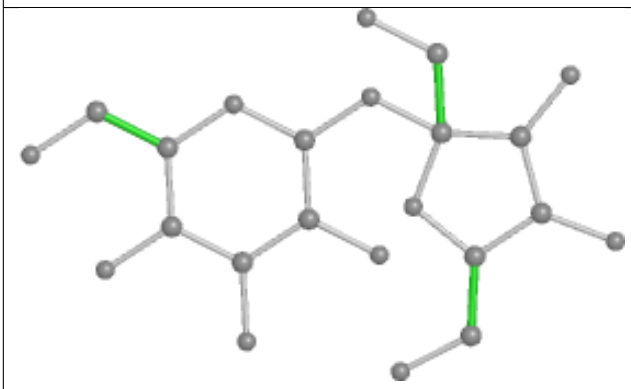
Oligosaccharide Chain S



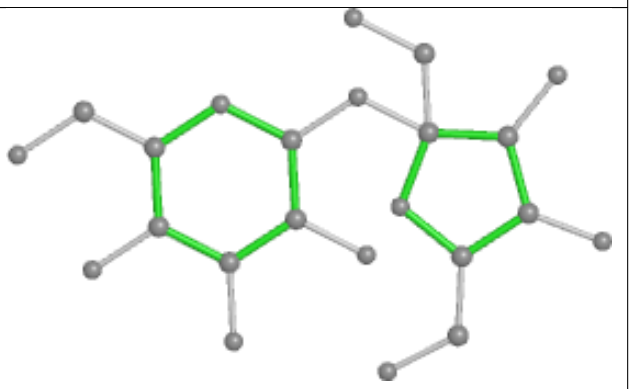
Bond lengths



Bond angles

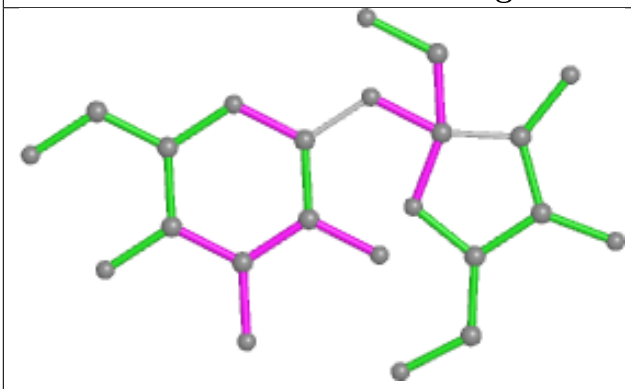


Torsions

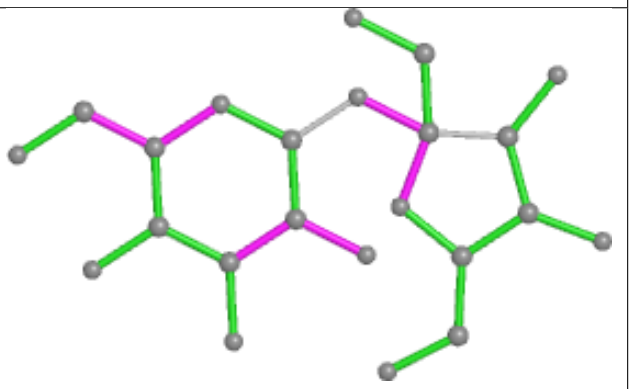


Rings

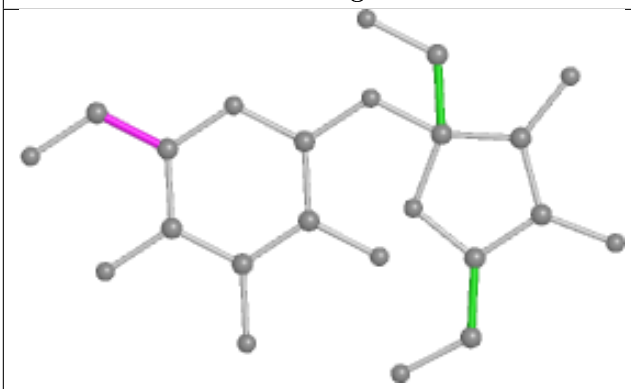
Oligosaccharide Chain T



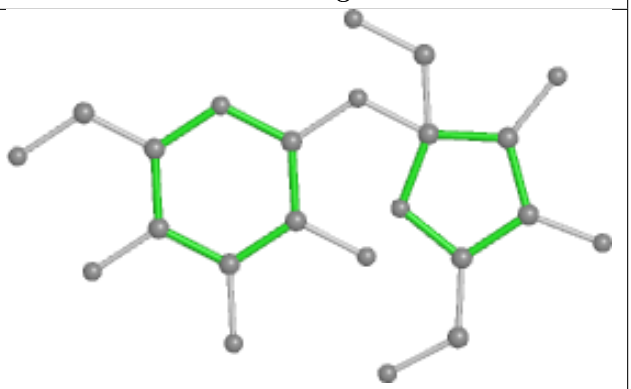
Bond lengths



Bond angles



Torsions



Rings

5.6 Ligand geometry (i)

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	$\#\|Z\| > 2$
3	FAD	A	551	-	51,58,58	2.26	12 (23%)	60,89,89	2.17	18 (30%)
6	PG4	F	581	-	12,12,12	0.98	1 (8%)	11,11,11	0.52	0
6	PG4	B	584	-	12,12,12	0.80	0	11,11,11	1.16	1 (9%)
6	PG4	G	582	-	12,12,12	0.87	0	11,11,11	0.64	0
3	FAD	D	551	-	51,58,58	2.16	12 (23%)	60,89,89	2.08	12 (20%)
6	PG4	C	581	-	12,12,12	0.93	0	11,11,11	1.26	2 (18%)
6	PG4	G	581	-	12,12,12	0.74	0	11,11,11	0.59	0
3	FAD	E	551	-	51,58,58	1.80	9 (17%)	60,89,89	2.09	16 (26%)
6	PG4	H	581	-	12,12,12	0.84	0	11,11,11	0.70	0
3	FAD	F	551	-	51,58,58	1.78	9 (17%)	60,89,89	1.99	11 (18%)
6	PG4	D	582	-	12,12,12	0.93	0	11,11,11	0.64	0
3	FAD	B	551	-	51,58,58	1.92	16 (31%)	60,89,89	2.10	12 (20%)
6	PG4	B	581	-	12,12,12	0.67	0	11,11,11	0.59	0
3	FAD	G	551	-	51,58,58	2.01	15 (29%)	60,89,89	2.07	12 (20%)
6	PG4	F	582	-	12,12,12	0.91	0	11,11,11	1.09	1 (9%)
3	FAD	C	551	-	51,58,58	2.01	11 (21%)	60,89,89	1.89	11 (18%)
6	PG4	D	581	-	12,12,12	0.96	0	11,11,11	0.66	0
6	PG4	E	581	-	12,12,12	0.86	0	11,11,11	0.54	0
6	PG4	A	582	-	12,12,12	0.91	0	11,11,11	0.64	0
6	PG4	A	583	-	12,12,12	0.98	0	11,11,11	1.32	1 (9%)
6	PG4	E	582	-	12,12,12	1.02	0	11,11,11	0.96	0
6	PG4	E	583	-	12,12,12	0.99	0	11,11,11	1.21	1 (9%)
6	PG4	B	582	-	12,12,12	0.91	0	11,11,11	0.80	0
6	PG4	C	582	-	12,12,12	0.87	0	11,11,11	0.90	0
6	PG4	H	582	-	12,12,12	0.77	0	11,11,11	0.82	0
6	PG4	A	581	-	12,12,12	0.98	0	11,11,11	0.77	0
3	FAD	H	551	-	51,58,58	1.90	11 (21%)	60,89,89	2.00	14 (23%)

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
3	FAD	A	551	-	-	5/30/50/50	0/6/6/6
6	PG4	F	581	-	-	5/10/10/10	-
6	PG4	B	584	-	-	6/10/10/10	-
6	PG4	G	582	-	-	5/10/10/10	-
3	FAD	D	551	-	-	4/30/50/50	0/6/6/6
6	PG4	C	581	-	-	7/10/10/10	-
6	PG4	G	581	-	-	5/10/10/10	-
3	FAD	E	551	-	-	3/30/50/50	0/6/6/6
6	PG4	H	581	-	-	6/10/10/10	-
3	FAD	F	551	-	-	2/30/50/50	0/6/6/6
6	PG4	D	582	-	-	5/10/10/10	-
3	FAD	B	551	-	-	6/30/50/50	0/6/6/6
6	PG4	B	581	-	-	5/10/10/10	-
3	FAD	G	551	-	-	10/30/50/50	0/6/6/6
6	PG4	F	582	-	-	7/10/10/10	-
3	FAD	C	551	-	-	8/30/50/50	0/6/6/6
6	PG4	D	581	-	-	7/10/10/10	-
6	PG4	E	581	-	-	6/10/10/10	-
6	PG4	A	582	-	-	8/10/10/10	-
6	PG4	A	583	-	-	3/10/10/10	-
6	PG4	E	582	-	-	5/10/10/10	-
6	PG4	E	583	-	-	4/10/10/10	-
6	PG4	B	582	-	-	6/10/10/10	-
6	PG4	C	582	-	-	7/10/10/10	-
6	PG4	H	582	-	-	4/10/10/10	-
6	PG4	A	581	-	-	7/10/10/10	-
3	FAD	H	551	-	-	6/30/50/50	0/6/6/6

The worst 5 of 96 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	551	FAD	C1'-N10	8.04	1.56	1.48
3	D	551	FAD	C2A-N3A	7.10	1.43	1.32

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	551	FAD	C2A-N3A	6.43	1.42	1.32
3	A	551	FAD	C2A-N3A	6.24	1.42	1.32
3	G	551	FAD	C1'-N10	5.79	1.54	1.48

The worst 5 of 112 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	551	FAD	C4-N3-C2	7.88	121.80	115.14
3	B	551	FAD	C4-N3-C2	7.80	121.73	115.14
3	D	551	FAD	C4-N3-C2	7.64	121.59	115.14
3	F	551	FAD	C4-N3-C2	7.39	121.38	115.14
3	H	551	FAD	N3A-C2A-N1A	-7.16	117.48	128.68

There are no chirality outliers.

5 of 152 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	551	FAD	C1'-C2'-C3'-C4'
3	G	551	FAD	C1'-C2'-C3'-C4'
3	C	551	FAD	C1'-C2'-C3'-C4'
6	A	582	PG4	C3-C4-O3-C5
6	B	584	PG4	C6-C5-O3-C4

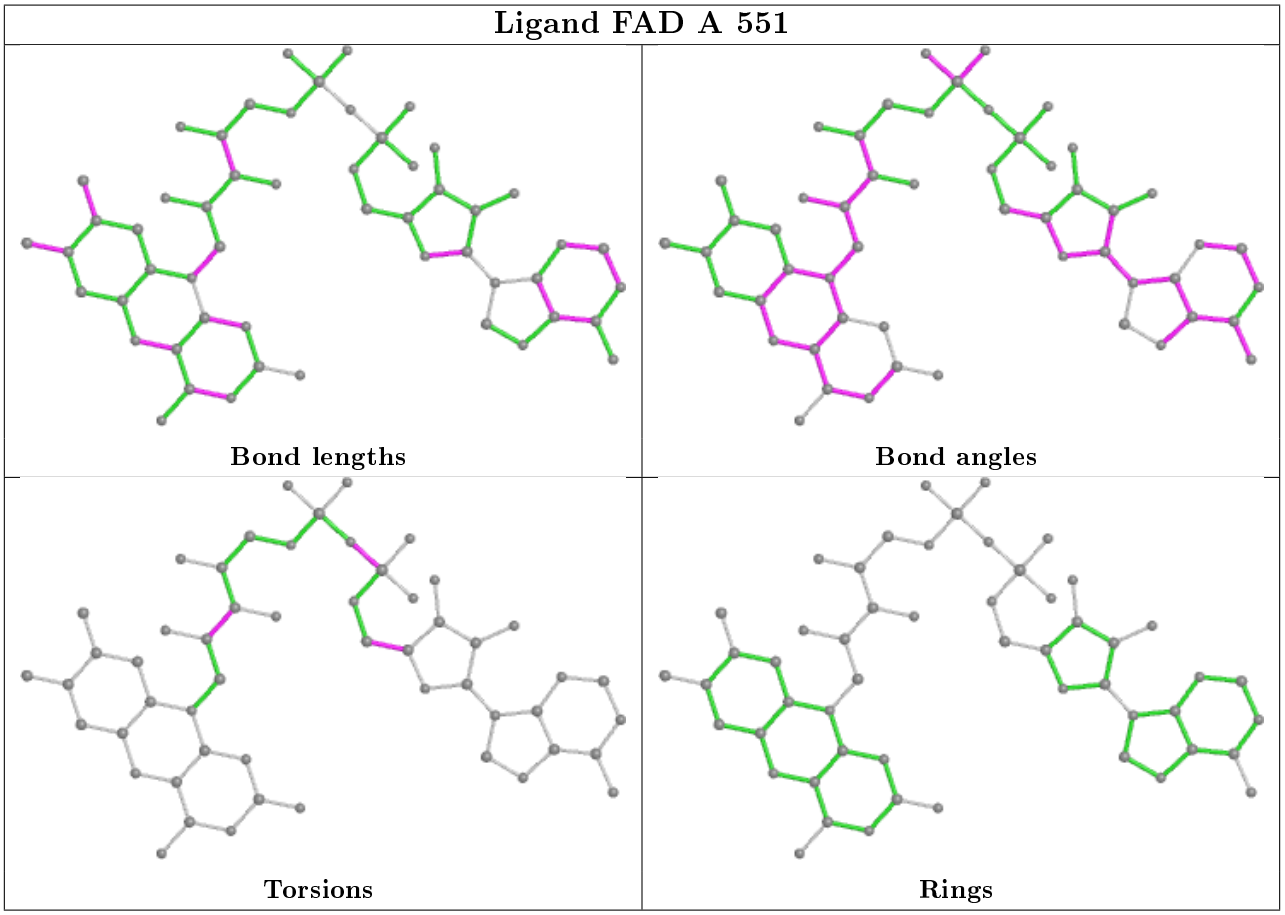
There are no ring outliers.

13 monomers are involved in 28 short contacts:

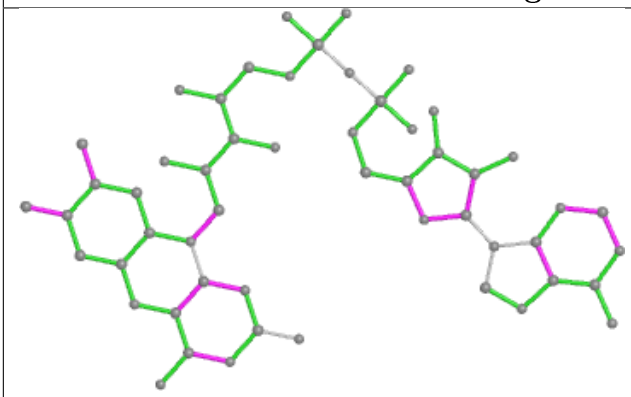
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	G	582	PG4	2	0
3	D	551	FAD	3	0
6	C	581	PG4	2	0
3	E	551	FAD	2	0
3	B	551	FAD	1	0
3	G	551	FAD	2	0
6	F	582	PG4	3	0
3	C	551	FAD	1	0
6	D	581	PG4	4	0
6	E	581	PG4	4	0
6	B	582	PG4	2	0
6	C	582	PG4	1	0
6	A	581	PG4	1	0

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 then 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.

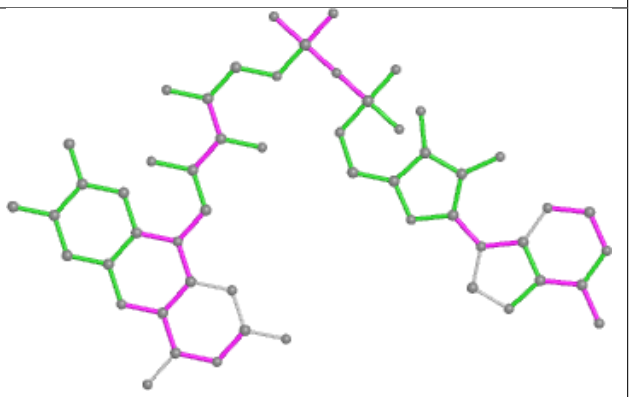
Ligand FAD A 551



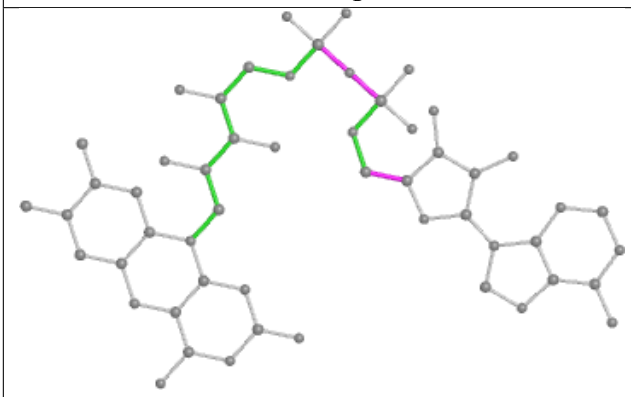
Ligand FAD D 551



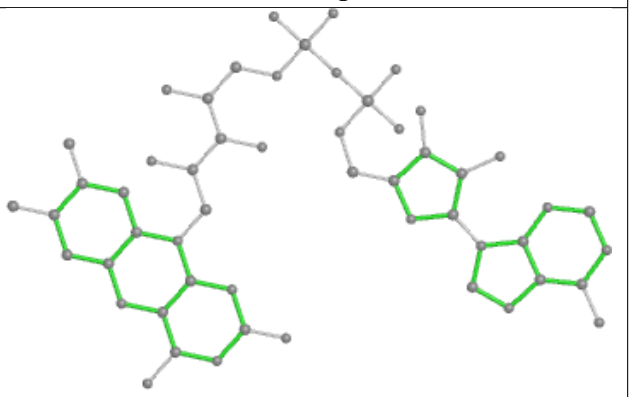
Bond lengths



Bond angles

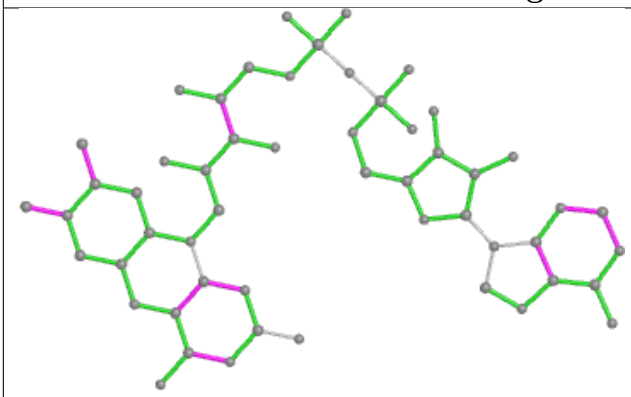


Torsions

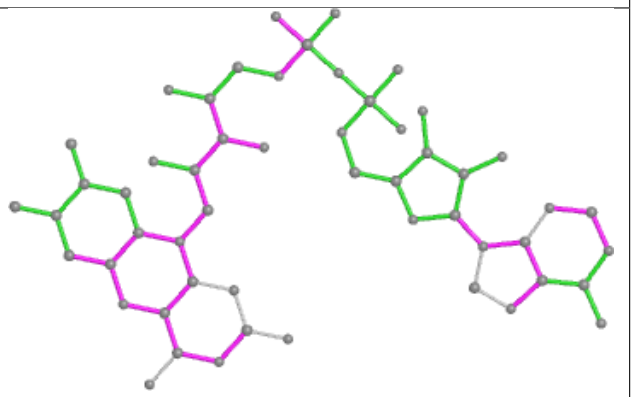


Rings

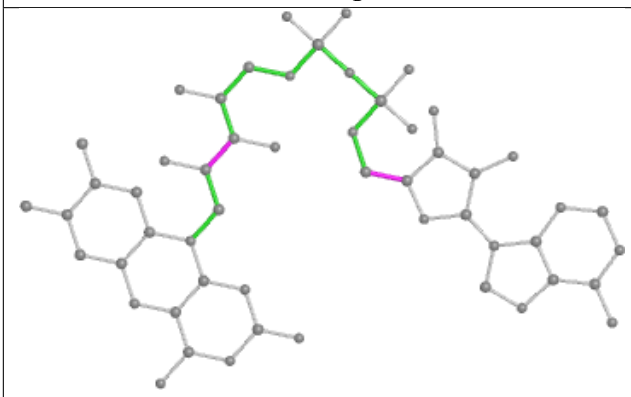
Ligand FAD E 551



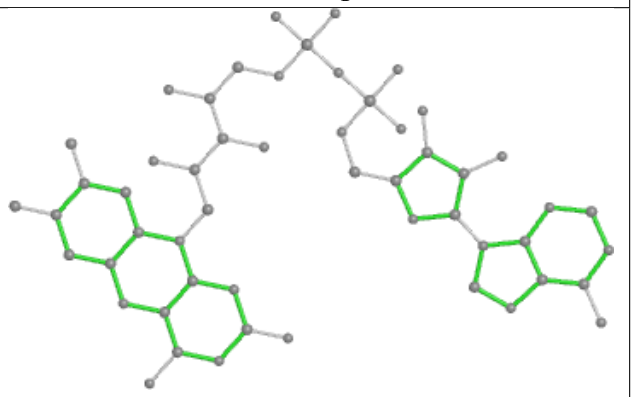
Bond lengths



Bond angles

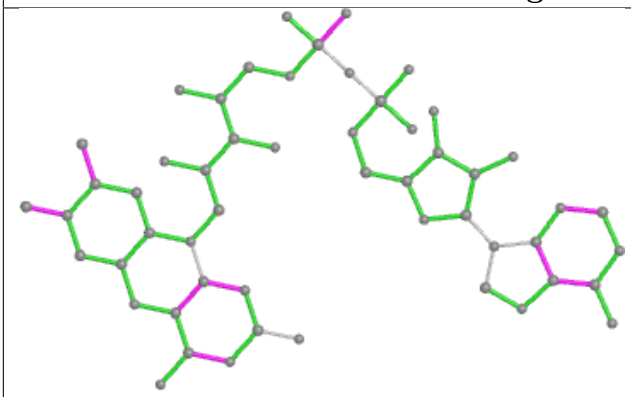


Torsions

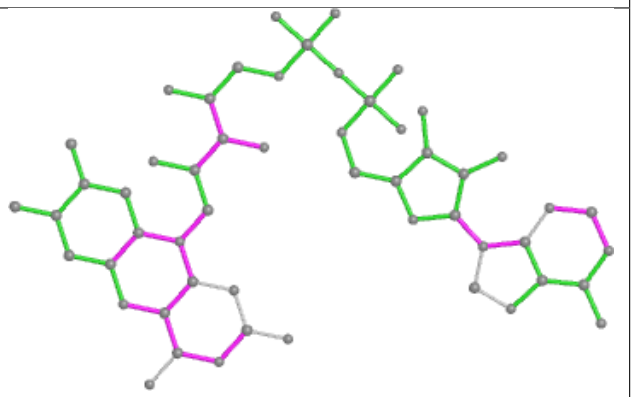


Rings

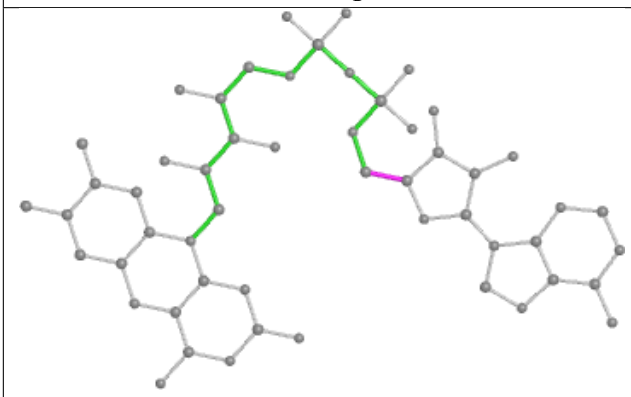
Ligand FAD F 551



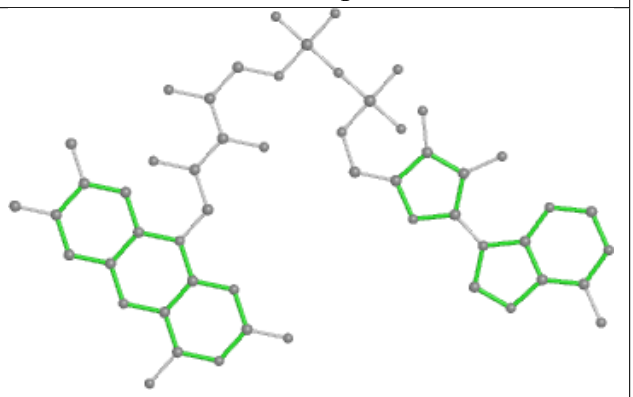
Bond lengths



Bond angles

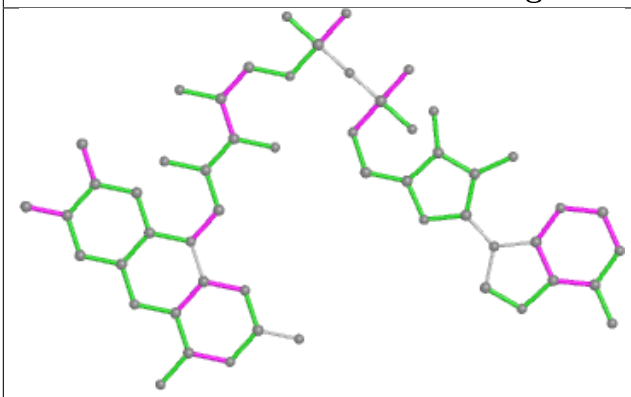


Torsions

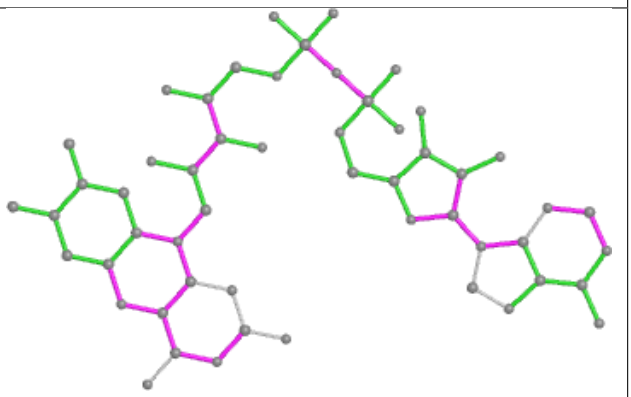


Rings

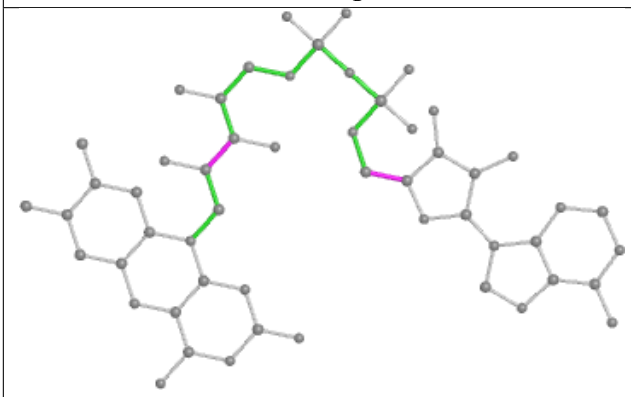
Ligand FAD B 551



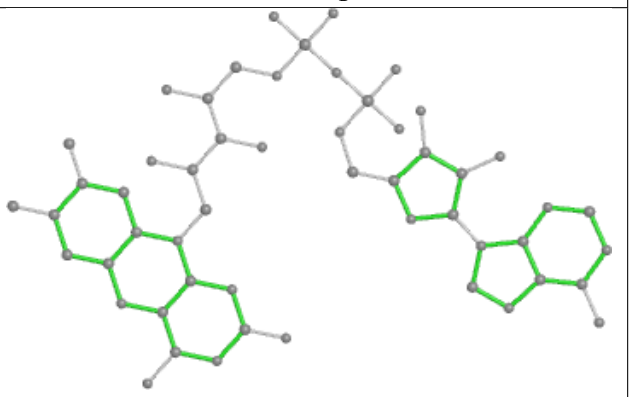
Bond lengths



Bond angles

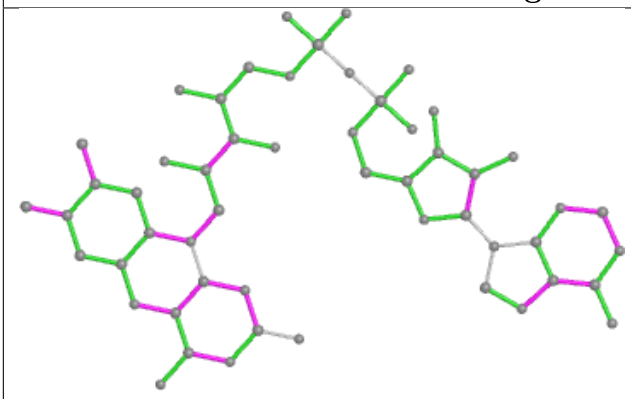


Torsions

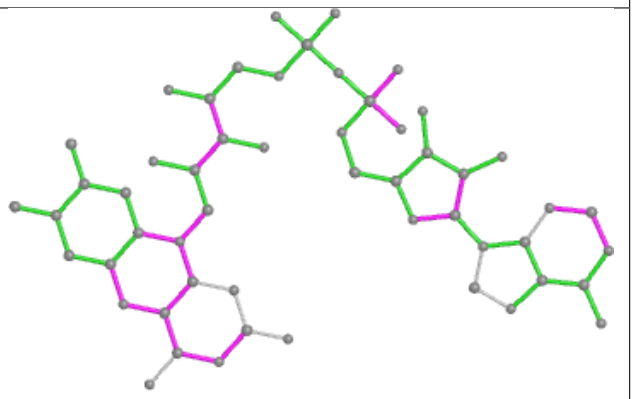


Rings

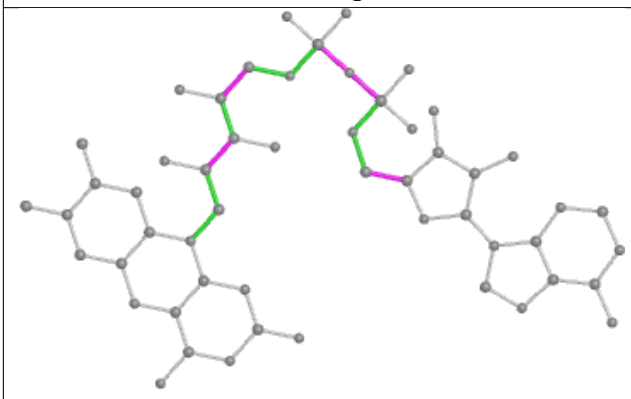
Ligand FAD G 551



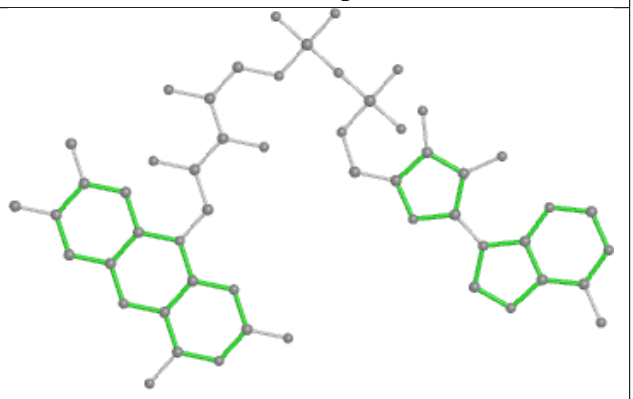
Bond lengths



Bond angles

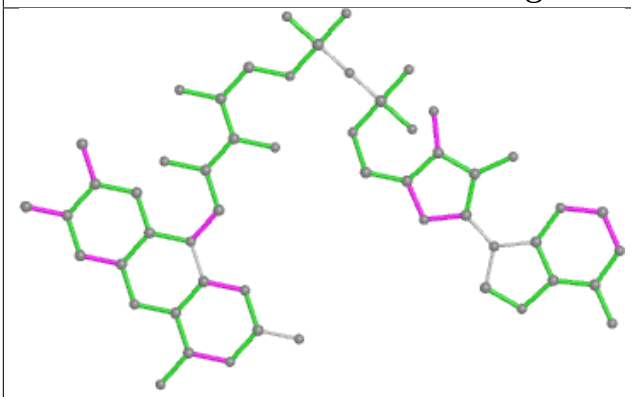


Torsions

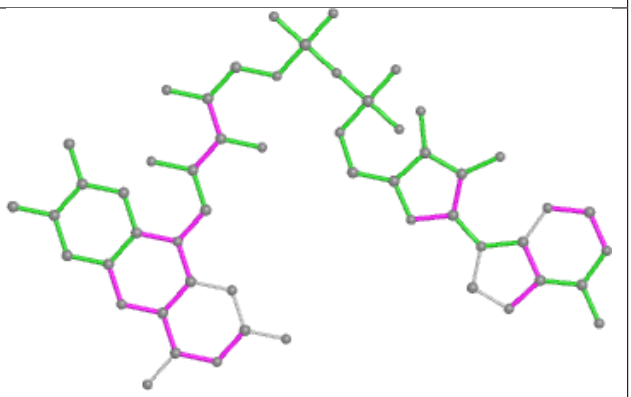


Rings

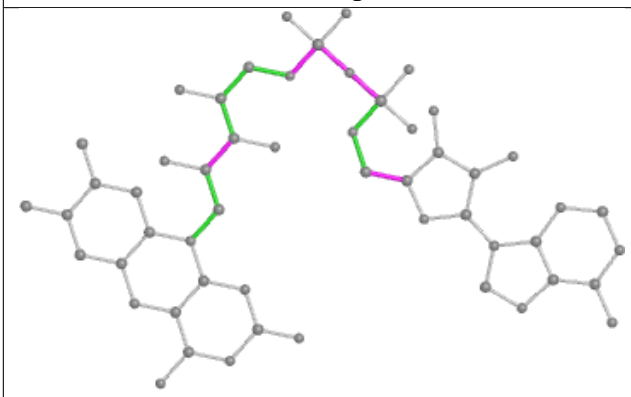
Ligand FAD C 551



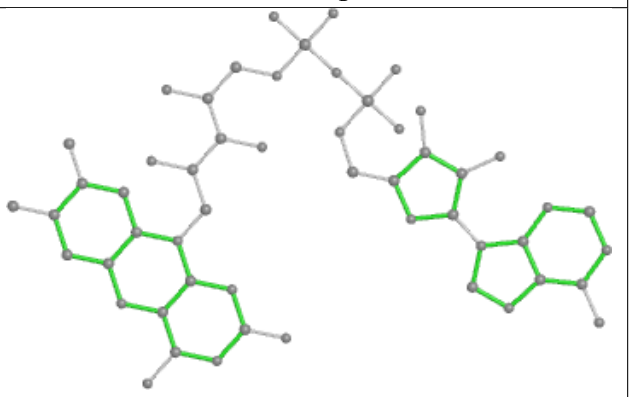
Bond lengths



Bond angles

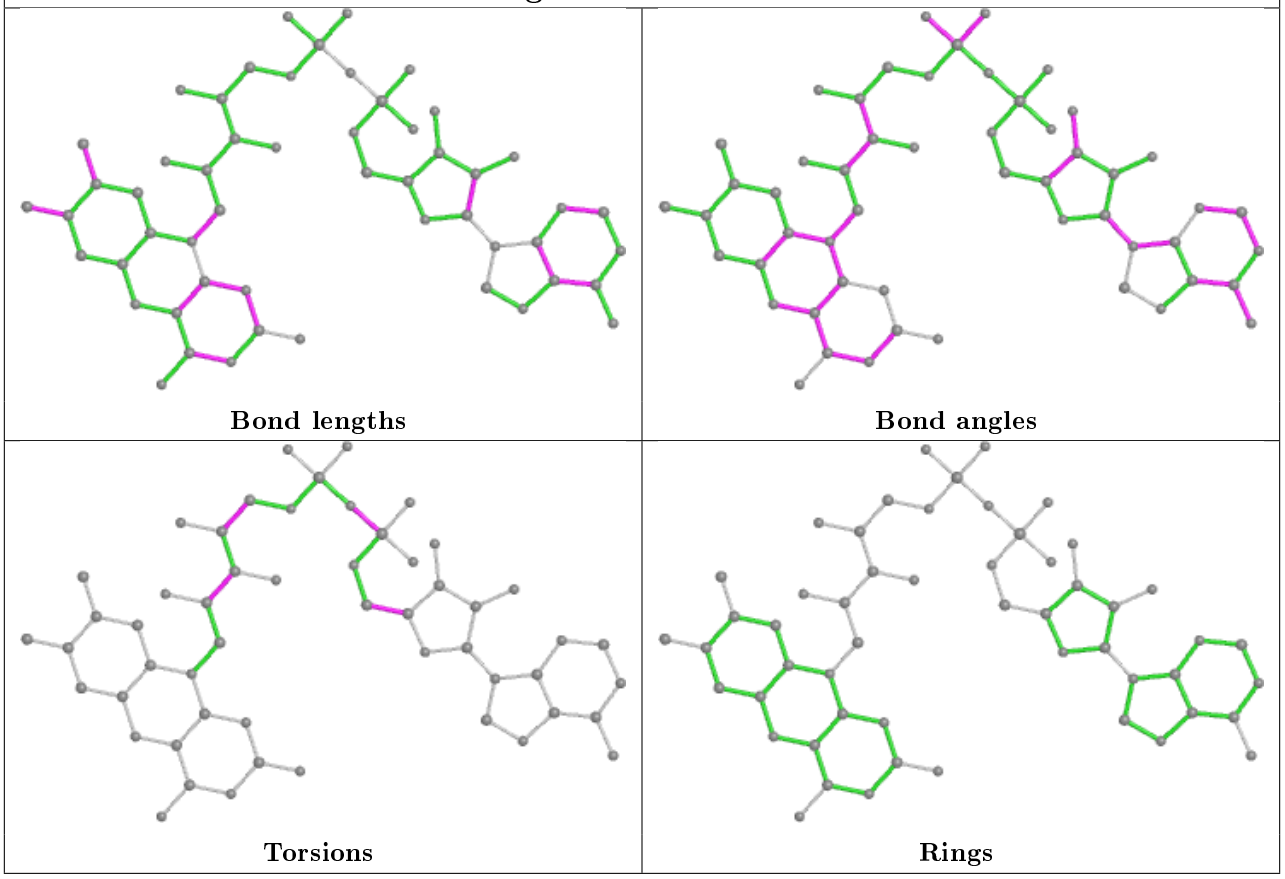


Torsions



Rings

Ligand FAD H 551



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, 95^{th} 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%)	-0.07	9 (1%) 68 66	19, 26, 43, 74	0
1	B	505/530 (95%)	-0.15	9 (1%) 68 66	19, 28, 47, 67	0
1	C	505/530 (95%)	0.07	19 (3%) 40 39	21, 33, 52, 81	0
1	D	508/530 (95%)	0.09	15 (2%) 50 49	21, 32, 52, 77	0
1	E	508/530 (95%)	-0.01	15 (2%) 50 49	19, 30, 51, 77	0
1	F	505/530 (95%)	0.04	19 (3%) 40 39	18, 33, 53, 84	0
1	G	505/530 (95%)	-0.16	7 (1%) 75 74	18, 27, 44, 68	0
1	H	508/530 (95%)	0.02	17 (3%) 46 45	20, 28, 49, 96	0
All	All	4052/4240 (95%)	-0.02	110 (2%) 54 53	18, 30, 50, 96	0

The worst 5 of 110 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	214	GLY	7.2
1	H	331	ASN	5.7
1	C	420	PRO	5.3
1	A	213	GLY	5.0
1	G	213	GLY	4.7

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

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

6.3 Carbohydrates

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

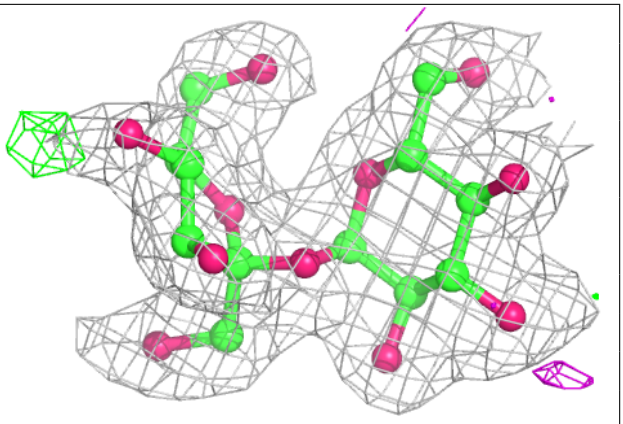
median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

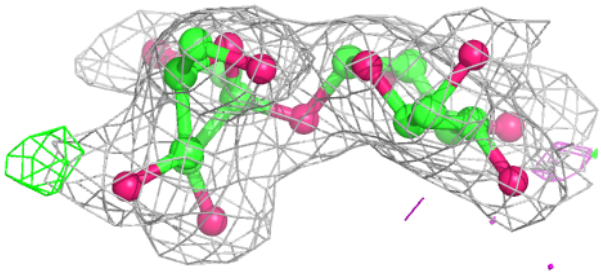
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	FRU	J	2	12/12	0.70	0.21	63,73,76,77	0
2	GLC	J	1	11/12	0.74	0.21	52,62,66,68	0
2	FRU	P	2	12/12	0.77	0.23	64,73,76,82	0
2	GLC	L	1	11/12	0.81	0.20	45,61,66,70	0
2	GLC	P	1	11/12	0.81	0.19	44,60,64,68	0
2	FRU	N	2	12/12	0.82	0.23	46,52,57,57	0
2	GLC	K	1	11/12	0.82	0.25	49,58,63,67	0
2	FRU	K	2	12/12	0.82	0.29	52,56,61,62	0
2	FRU	S	2	12/12	0.84	0.20	46,51,56,56	0
2	GLC	T	1	11/12	0.87	0.26	43,47,54,56	0
2	FRU	L	2	12/12	0.87	0.16	56,68,71,71	0
2	GLC	Q	1	11/12	0.88	0.21	35,44,48,49	0
2	FRU	R	2	12/12	0.89	0.17	45,56,61,62	0
2	GLC	S	1	11/12	0.90	0.16	37,43,49,49	0
2	GLC	N	1	11/12	0.90	0.22	47,54,60,61	0
2	GLC	R	1	11/12	0.91	0.11	35,41,44,44	0
2	FRU	M	2	12/12	0.91	0.21	43,56,65,65	0
2	FRU	Q	2	12/12	0.92	0.17	41,44,46,50	0
2	GLC	M	1	11/12	0.92	0.16	31,35,42,43	0
2	FRU	T	2	12/12	0.94	0.25	37,44,46,48	0
2	FRU	I	2	12/12	0.94	0.15	39,44,47,48	0
2	GLC	I	1	11/12	0.95	0.16	33,34,39,39	0
2	GLC	O	1	11/12	0.96	0.11	26,31,35,38	0
2	FRU	O	2	12/12	0.97	0.12	36,42,47,50	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:

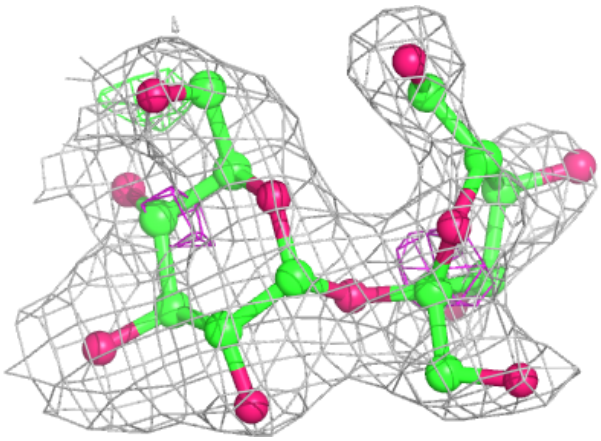
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

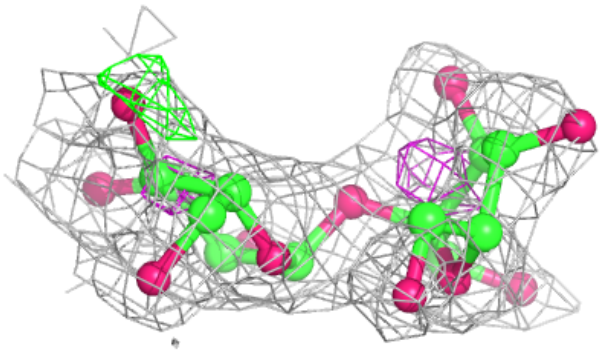


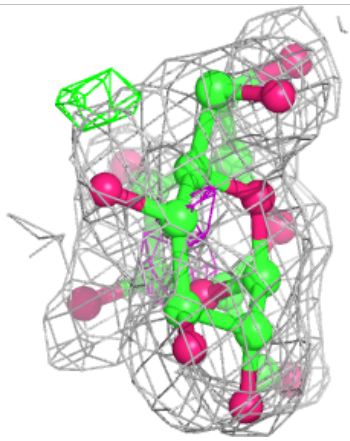


Electron density around Chain J:

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

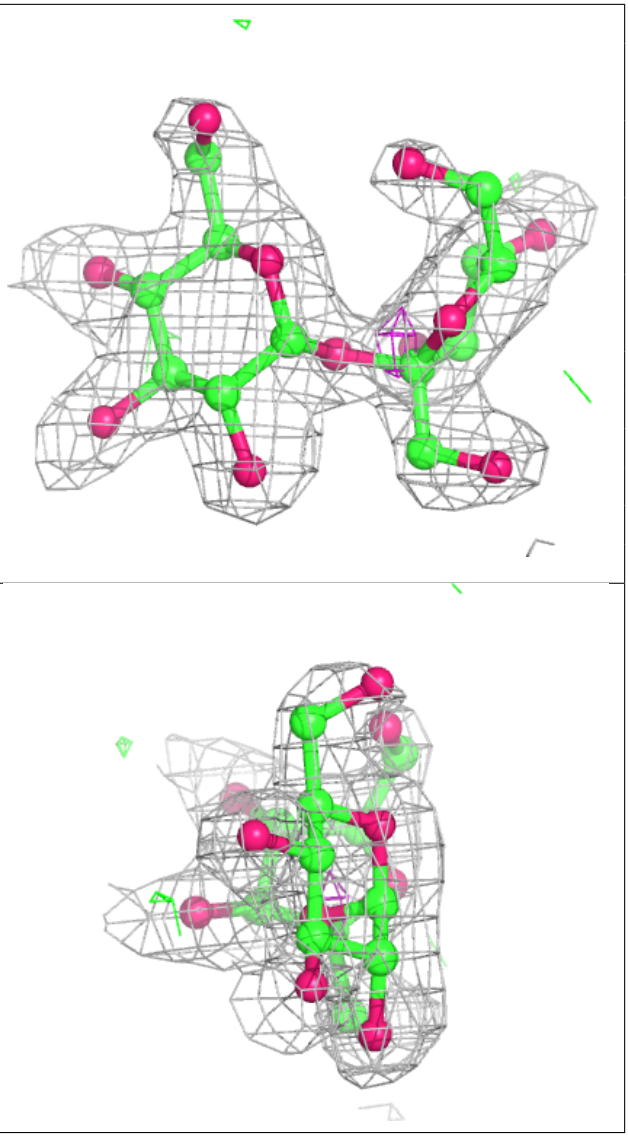






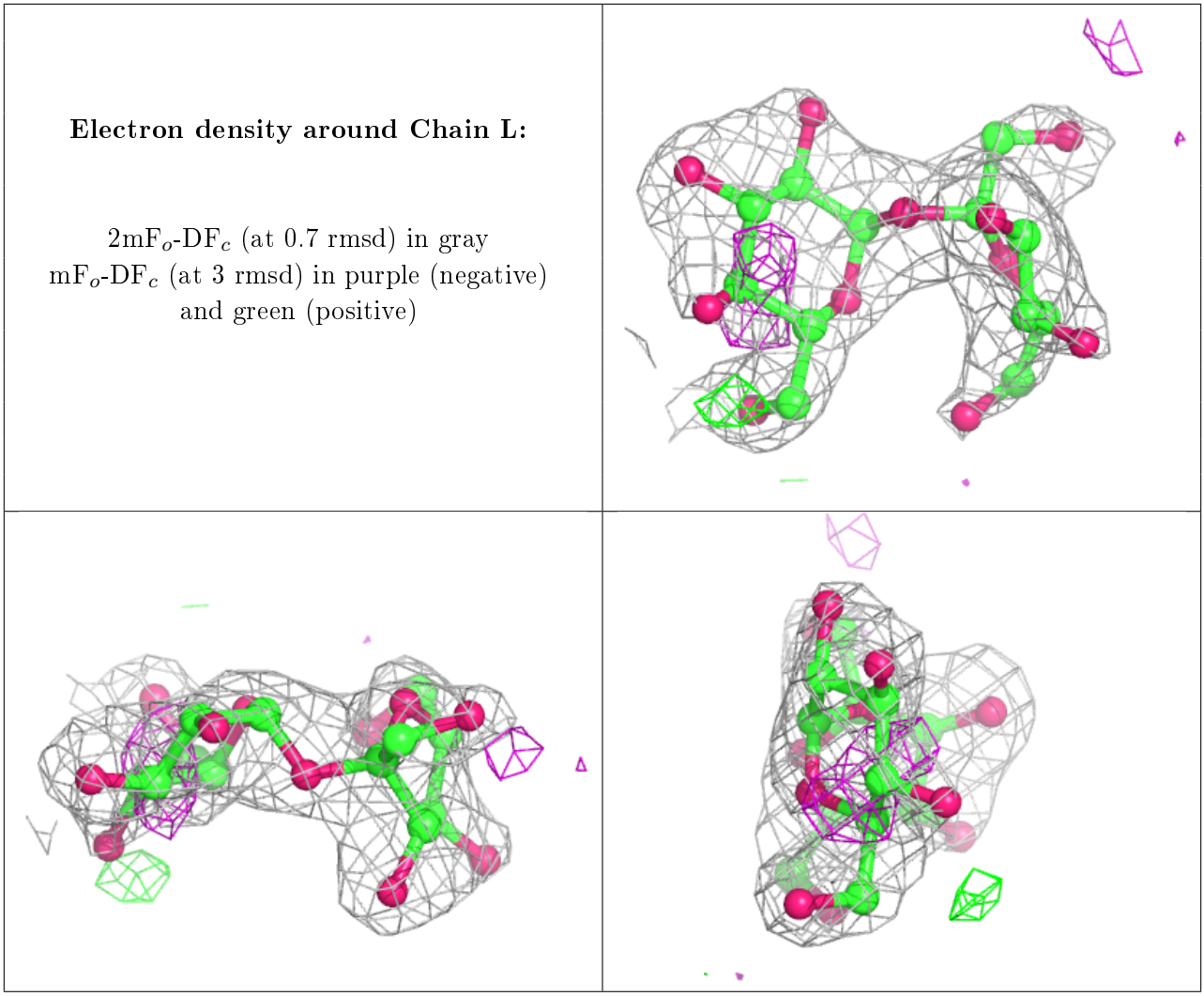
Electron density around Chain K:

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



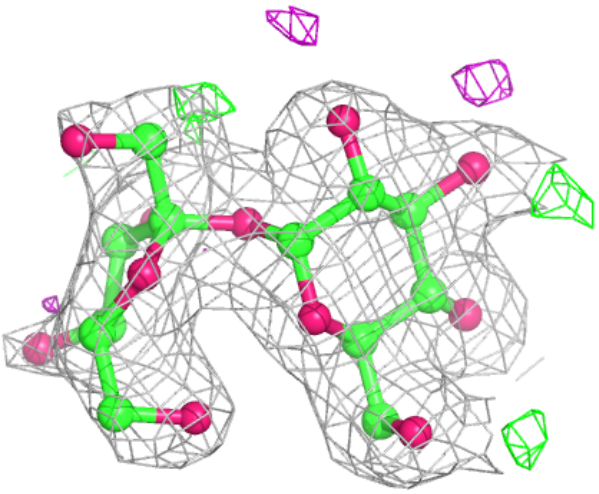
Electron density around Chain L:

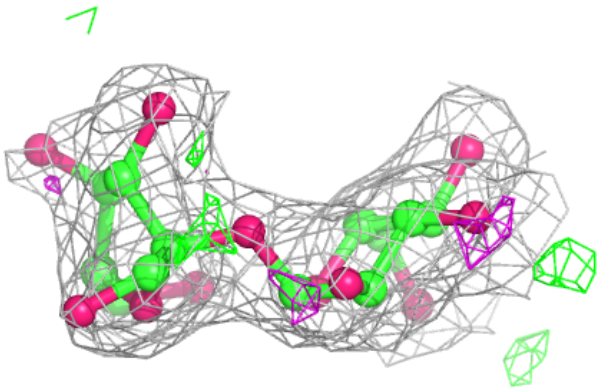
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

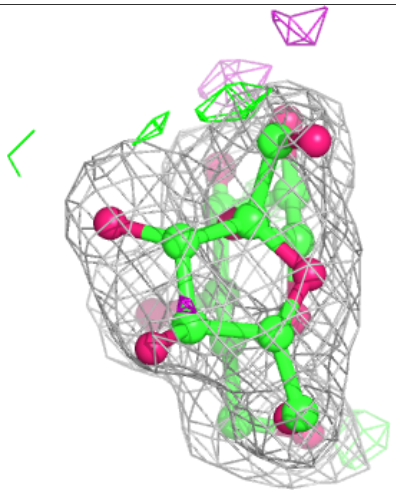


Electron density around Chain M:

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

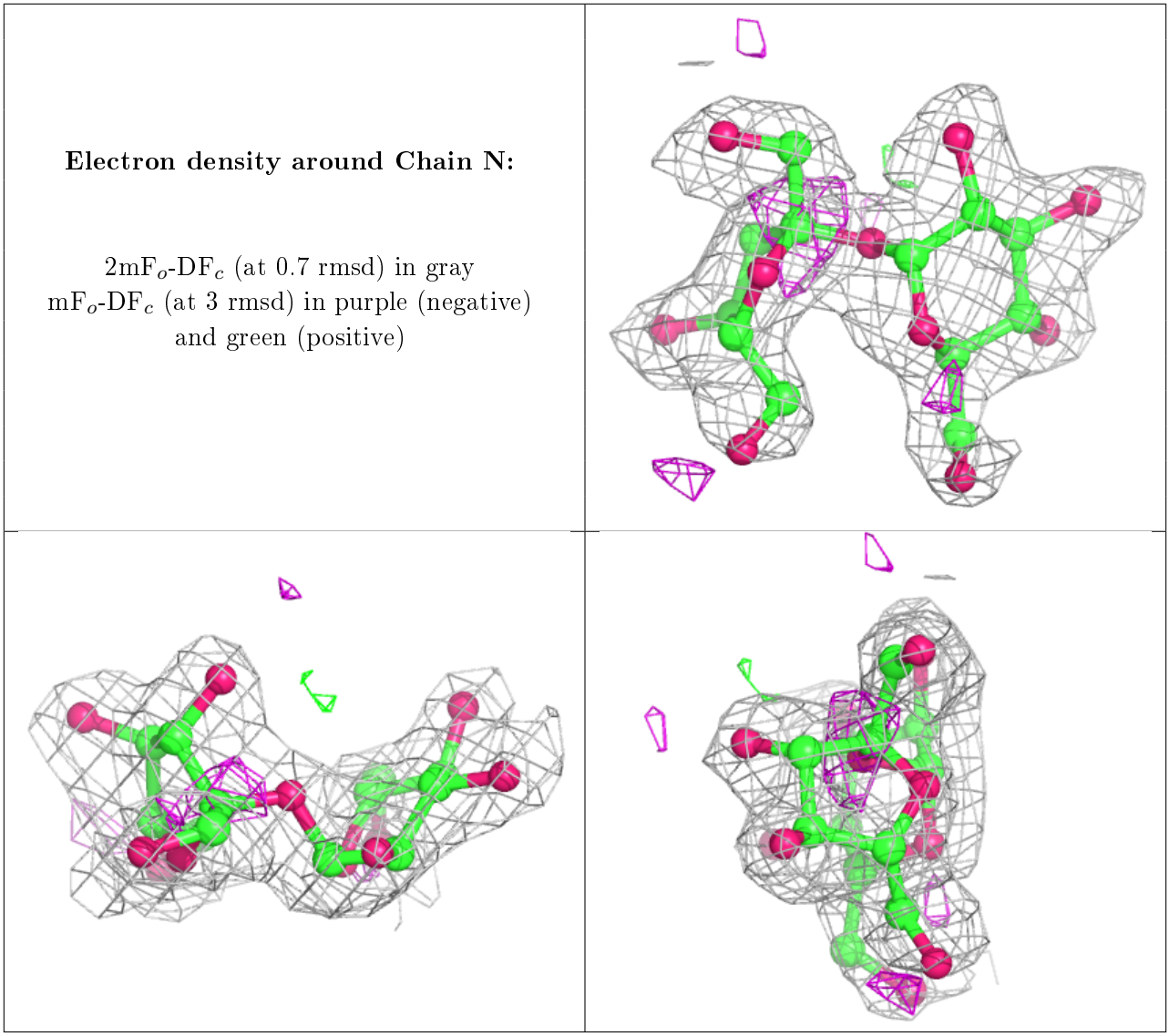






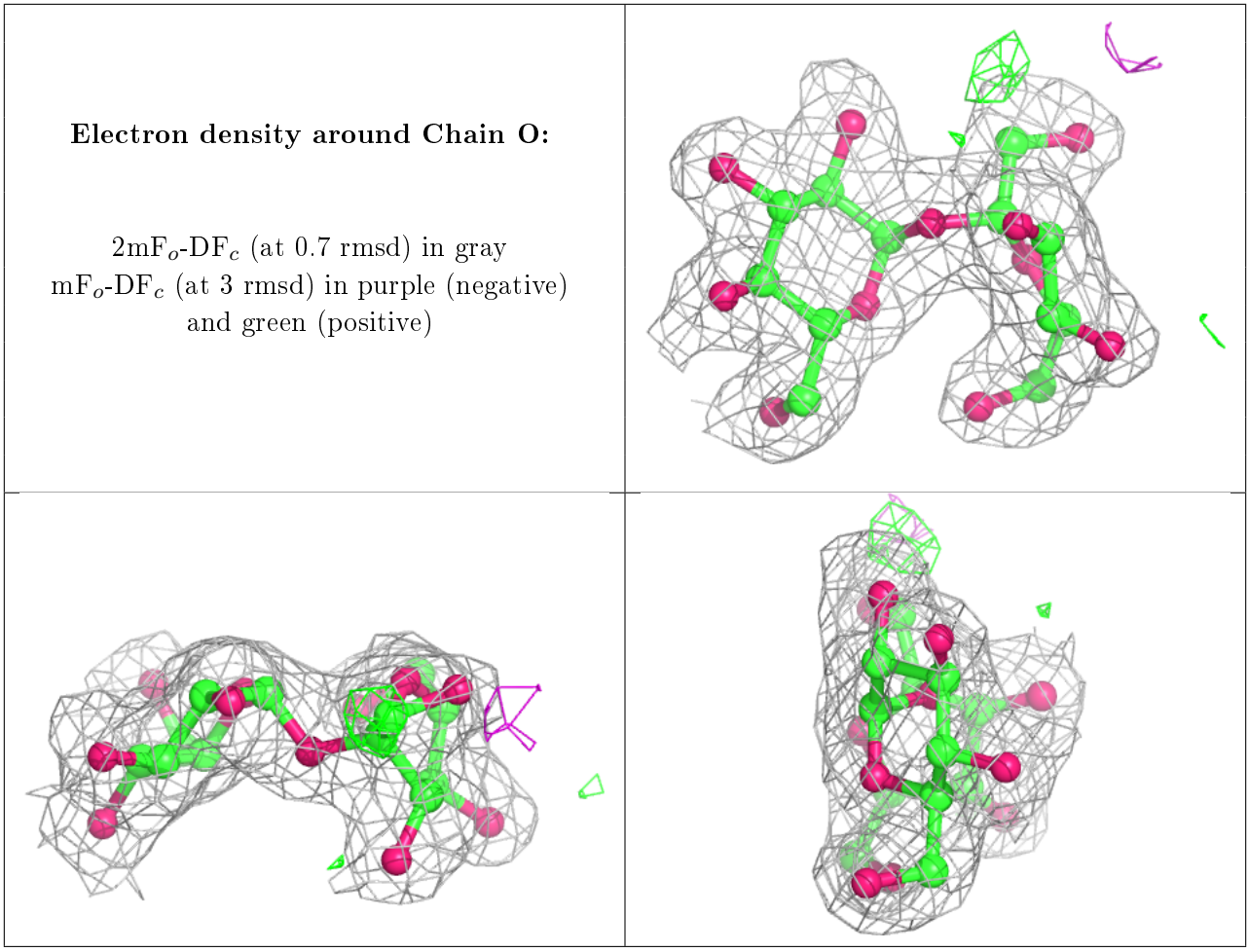
Electron density around Chain N:

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



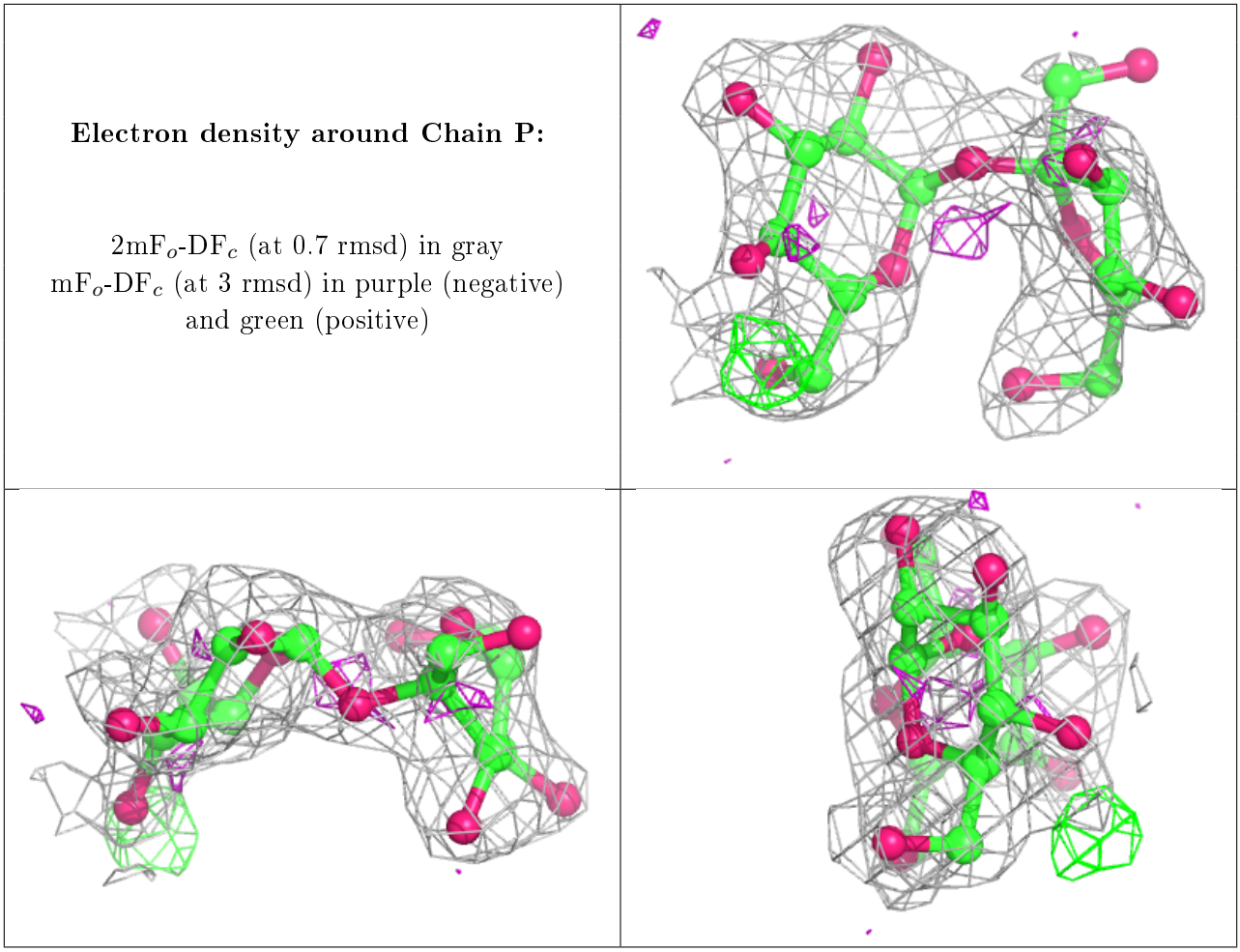
Electron density around Chain O:

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



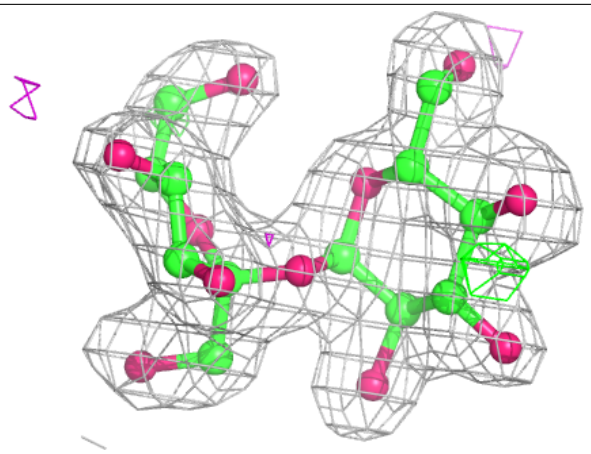
Electron density around Chain P:

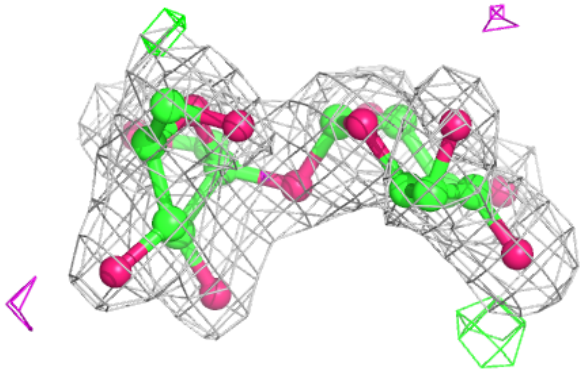
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

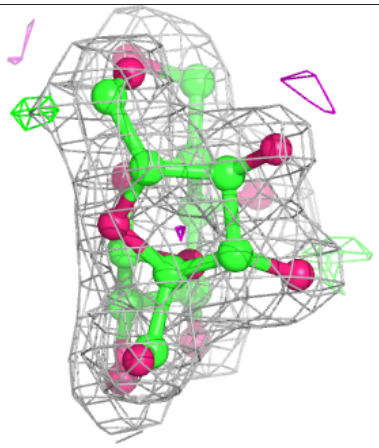


Electron density around Chain Q:

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

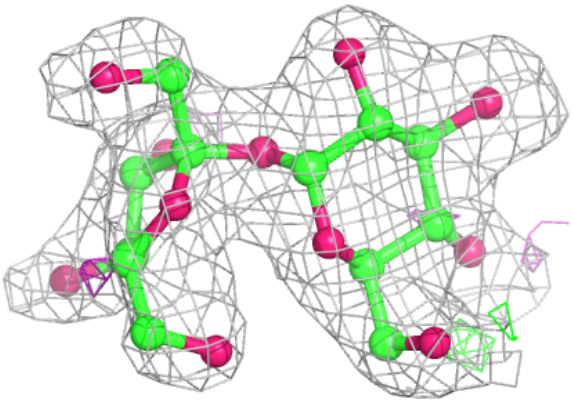


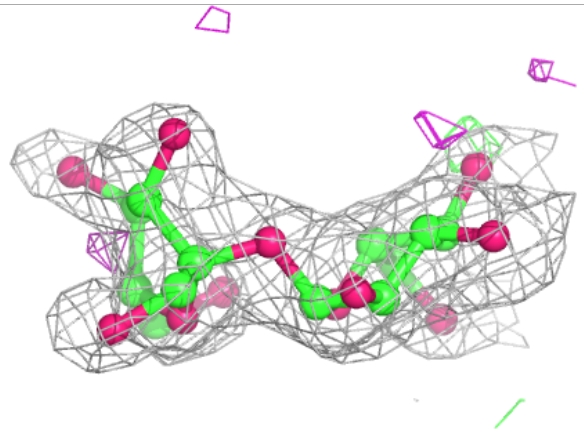


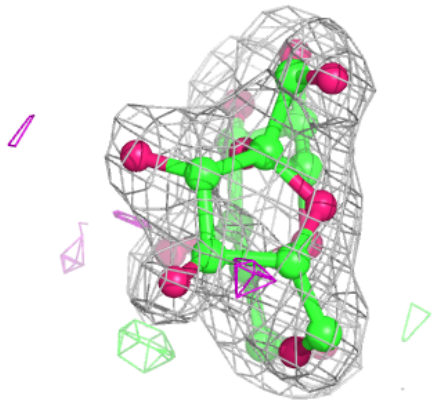


Electron density around Chain R:

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

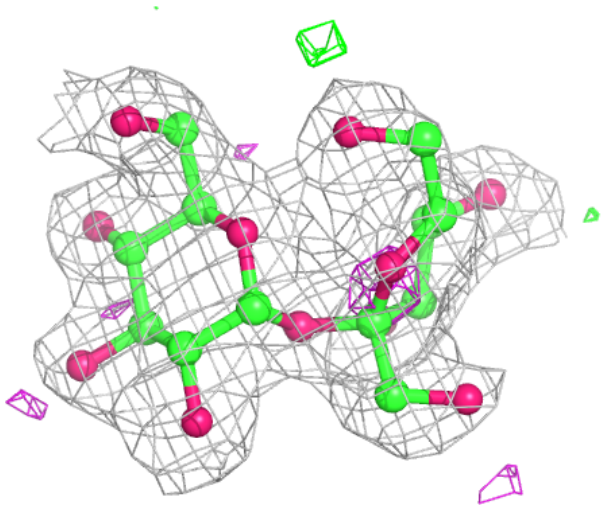


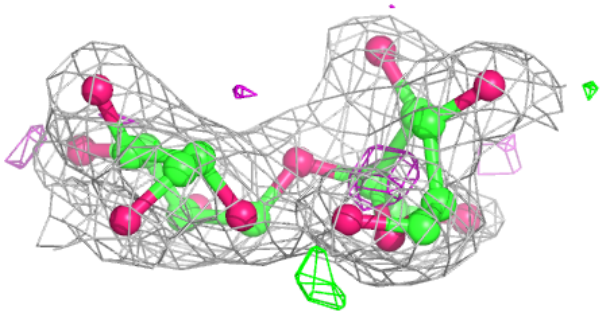


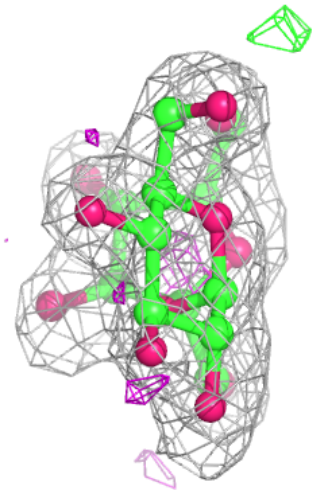


Electron density around Chain S:

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

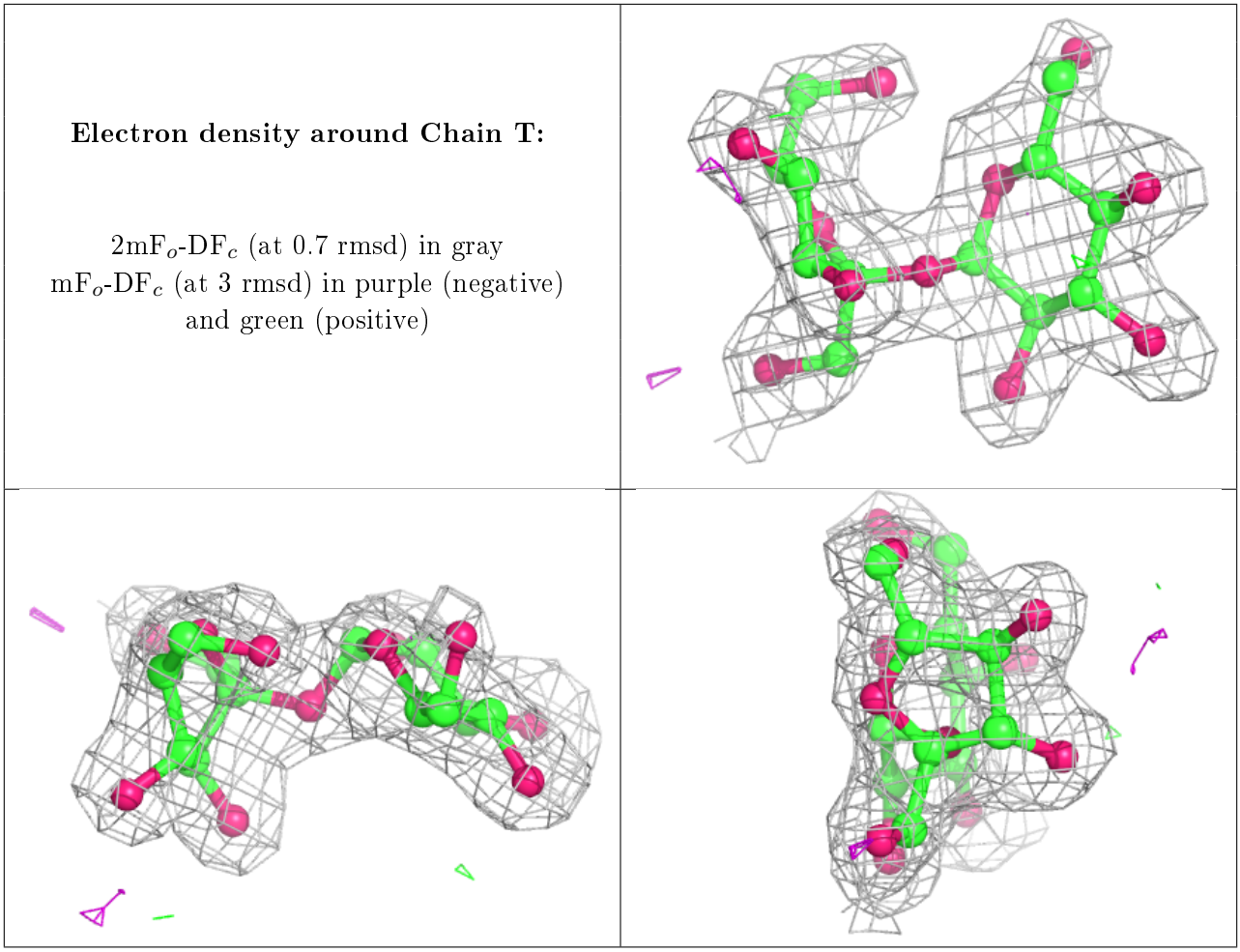






Electron density around Chain T:

$2mF_o$-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, 95^{th} 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	H	582	13/13	0.64	0.47	64,67,76,78	0
6	PG4	E	582	13/13	0.65	0.41	60,68,80,81	0
6	PG4	E	583	13/13	0.69	0.24	53,67,69,71	0
6	PG4	B	584	13/13	0.69	0.28	72,85,90,91	0
6	PG4	G	582	13/13	0.70	0.23	63,69,78,80	0
6	PG4	G	581	13/13	0.75	0.24	67,69,77,78	0
6	PG4	A	582	13/13	0.77	0.34	64,70,76,76	0
6	PG4	C	582	13/13	0.78	0.28	56,66,78,79	0
6	PG4	F	582	13/13	0.78	0.20	55,60,77,78	0
6	PG4	D	581	13/13	0.79	0.29	48,56,65,65	0
6	PG4	B	582	13/13	0.79	0.24	58,61,64,65	0

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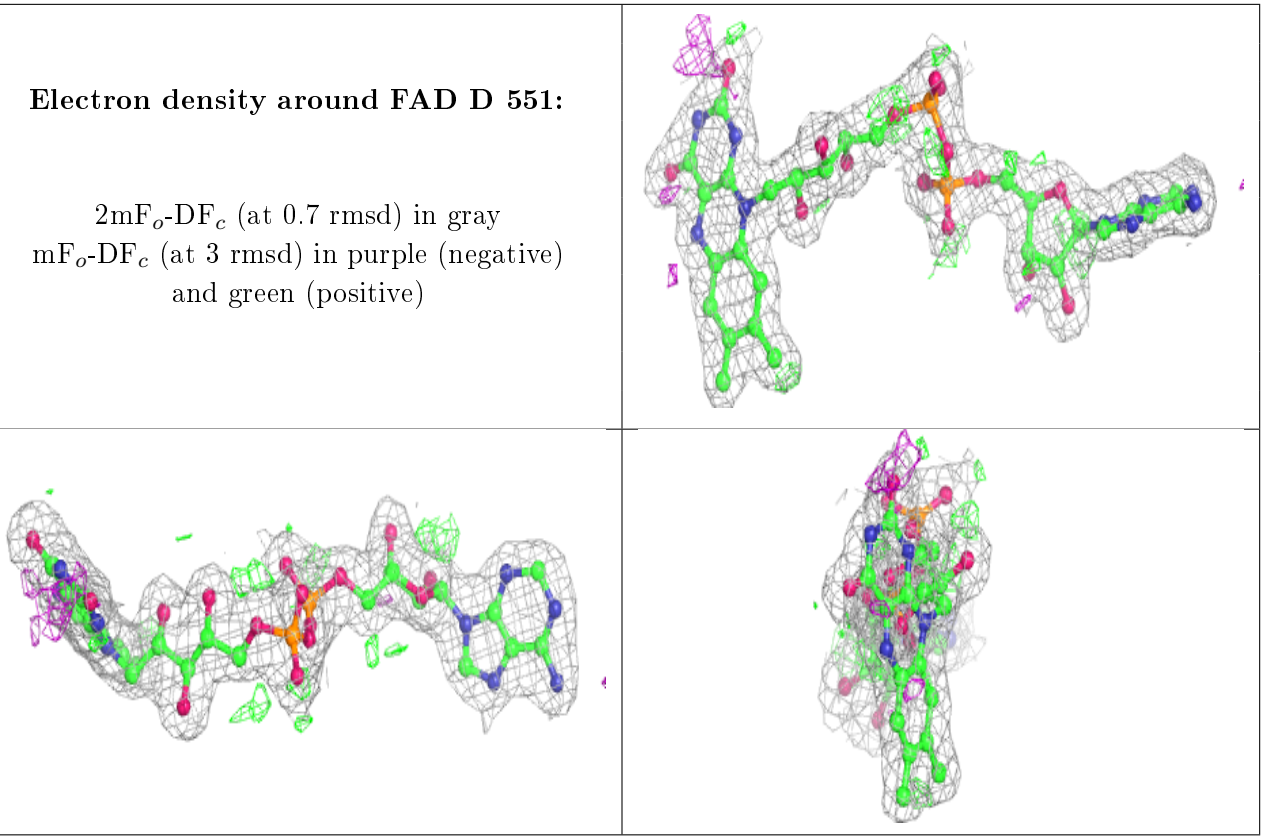
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
6	PG4	D	582	13/13	0.80	0.33	62,68,78,81	0
6	PG4	E	581	13/13	0.80	0.28	50,59,69,70	0
6	PG4	F	581	13/13	0.80	0.24	51,60,68,70	0
6	PG4	A	583	13/13	0.80	0.22	48,56,65,67	0
6	PG4	C	581	13/13	0.81	0.24	47,61,77,79	0
6	PG4	B	581	13/13	0.82	0.27	52,68,88,90	0
6	PG4	A	581	13/13	0.82	0.36	55,65,71,74	0
6	PG4	H	581	13/13	0.83	0.35	55,62,69,72	0
4	NA	G	561	1/1	0.94	0.09	26,26,26,26	0
3	FAD	D	551	53/53	0.97	0.10	22,26,32,35	0
3	FAD	C	551	53/53	0.97	0.08	23,26,33,38	0
3	FAD	E	551	53/53	0.97	0.10	19,24,33,34	0
3	FAD	H	551	53/53	0.97	0.11	21,23,25,26	0
5	CL	C	571	1/1	0.97	0.09	34,34,34,34	0
3	FAD	A	551	53/53	0.97	0.10	20,22,24,28	0
3	FAD	B	551	53/53	0.98	0.10	19,23,25,29	0
5	CL	B	571	1/1	0.98	0.13	33,33,33,33	0
5	CL	D	571	1/1	0.98	0.13	33,33,33,33	0
3	FAD	F	551	53/53	0.98	0.10	20,24,28,29	0
3	FAD	G	551	53/53	0.98	0.09	19,22,25,27	0
4	NA	C	561	1/1	0.99	0.06	22,22,22,22	0
5	CL	G	571	1/1	0.99	0.09	27,27,27,27	0
5	CL	A	571	1/1	0.99	0.10	30,30,30,30	0
4	NA	A	561	1/1	0.99	0.06	23,23,23,23	0
4	NA	E	561	1/1	0.99	0.07	23,23,23,23	0
5	CL	H	571	1/1	0.99	0.11	34,34,34,34	0
5	CL	E	571	1/1	0.99	0.12	28,28,28,28	0
5	CL	F	571	1/1	0.99	0.10	33,33,33,33	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.

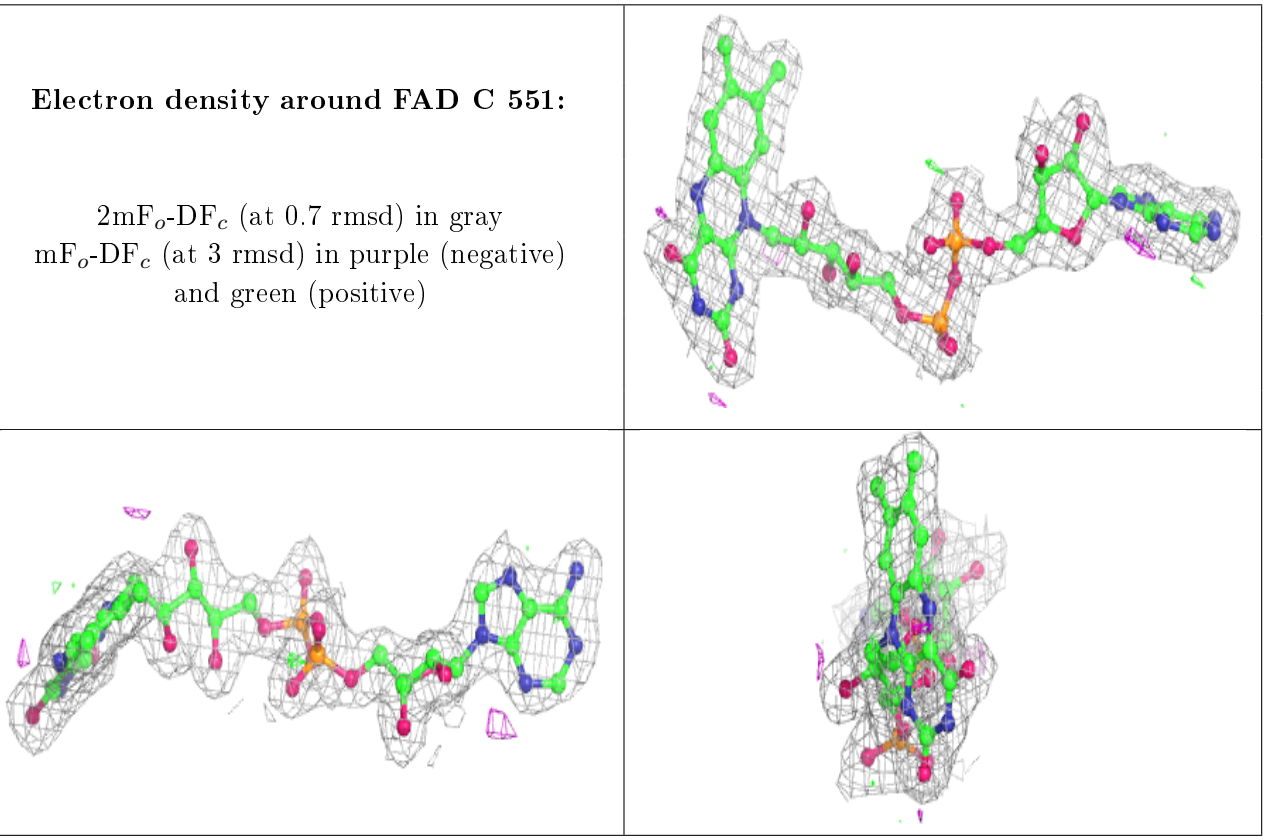
Electron density around FAD D 551:

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



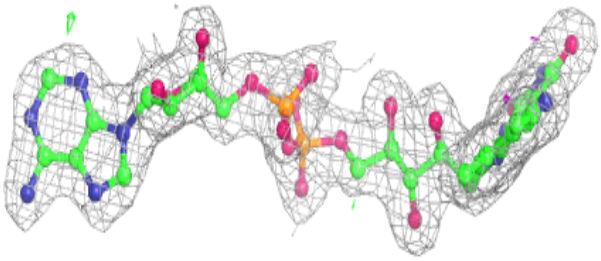
Electron density around FAD C 551:

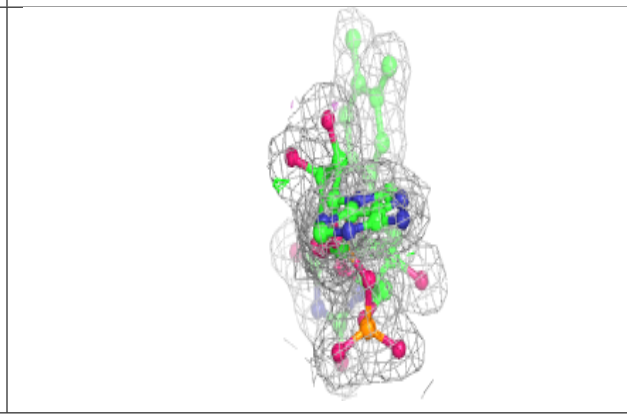
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



Electron density around FAD E 551:

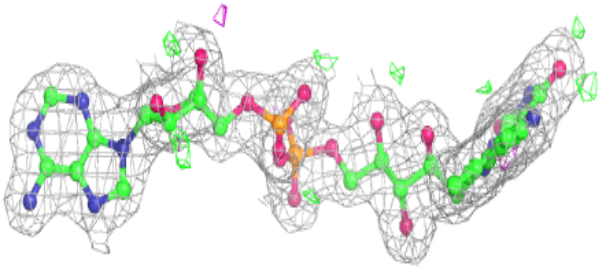
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

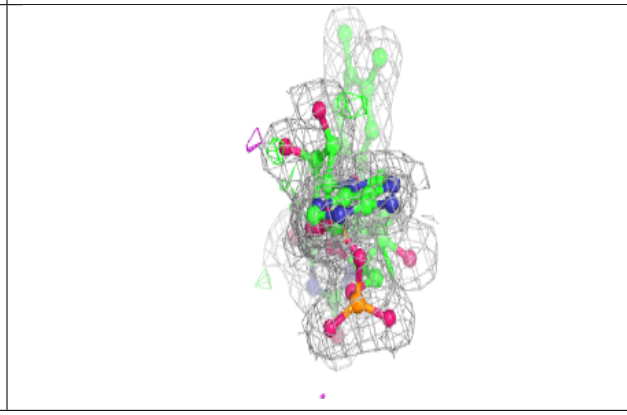




Electron density around FAD H 551:

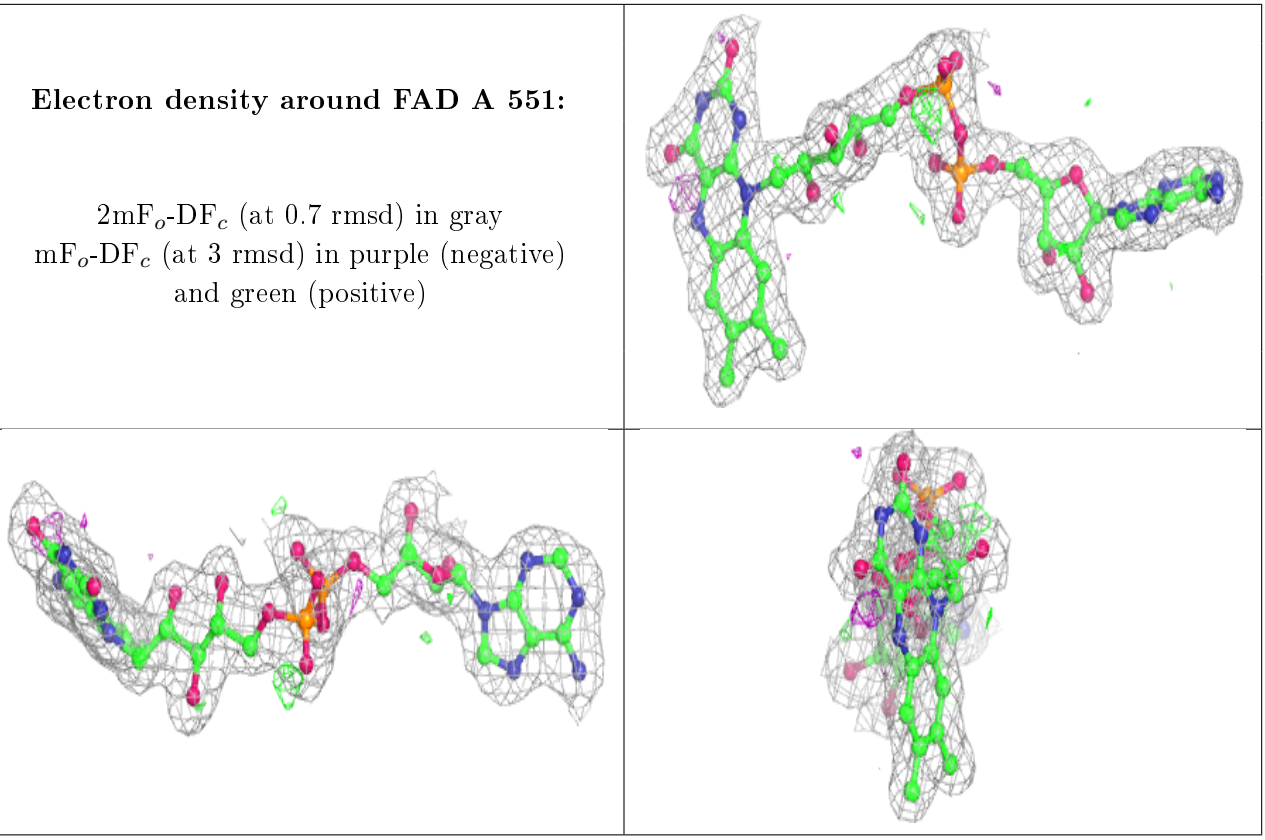
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)





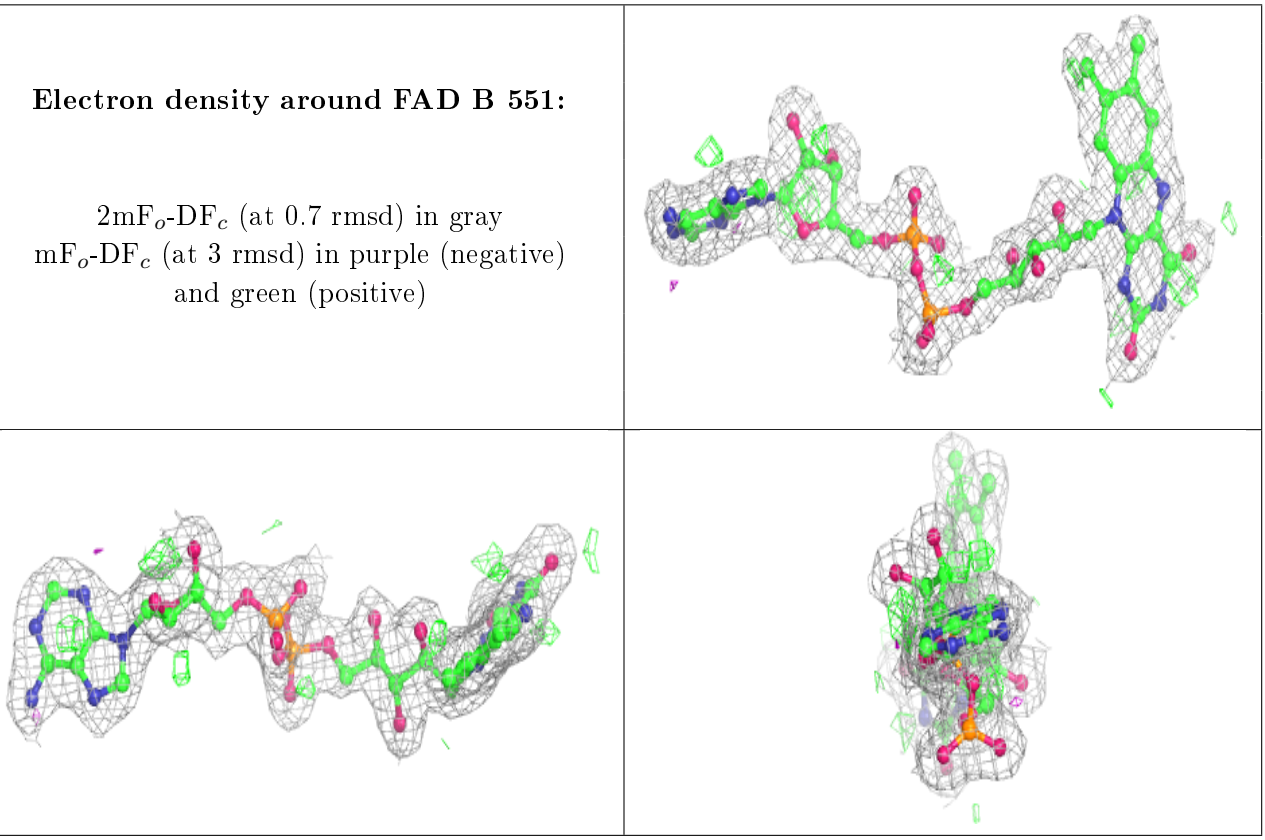
Electron density around FAD A 551:

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



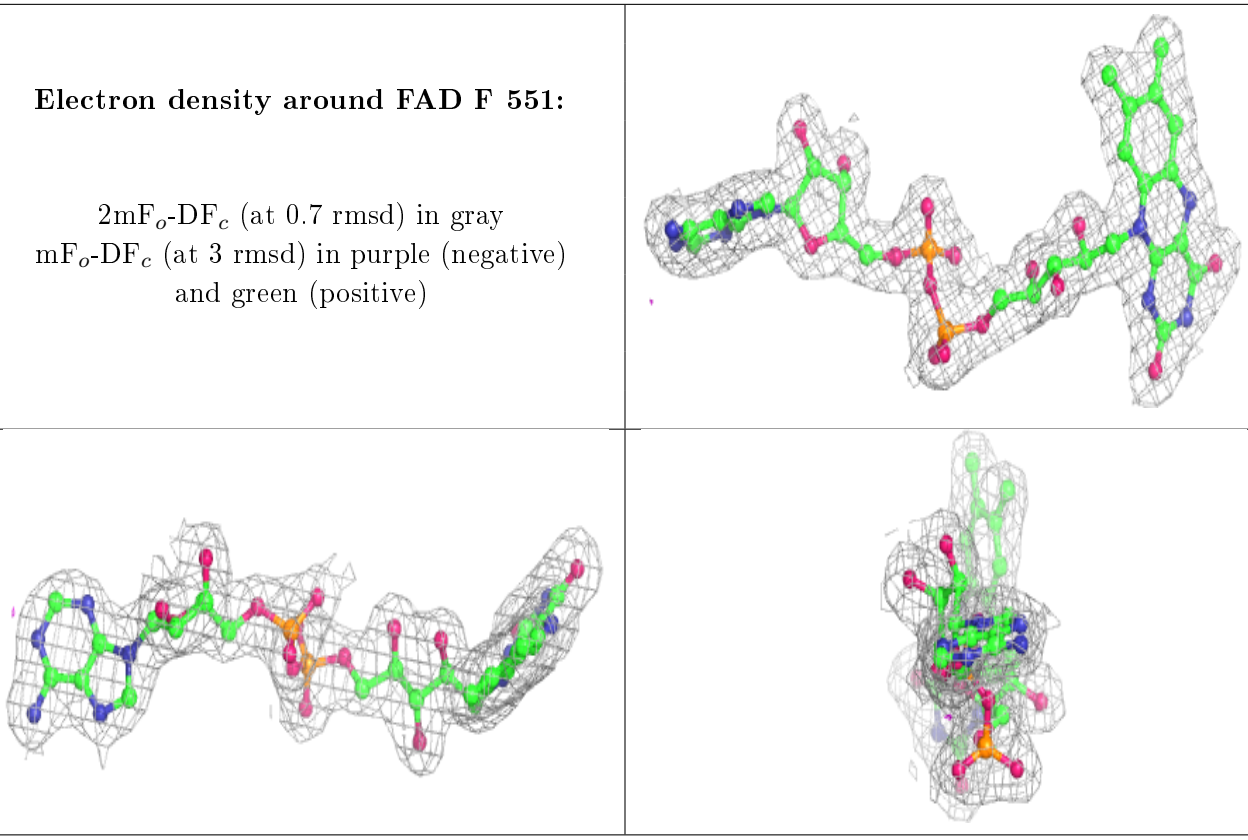
Electron density around FAD B 551:

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



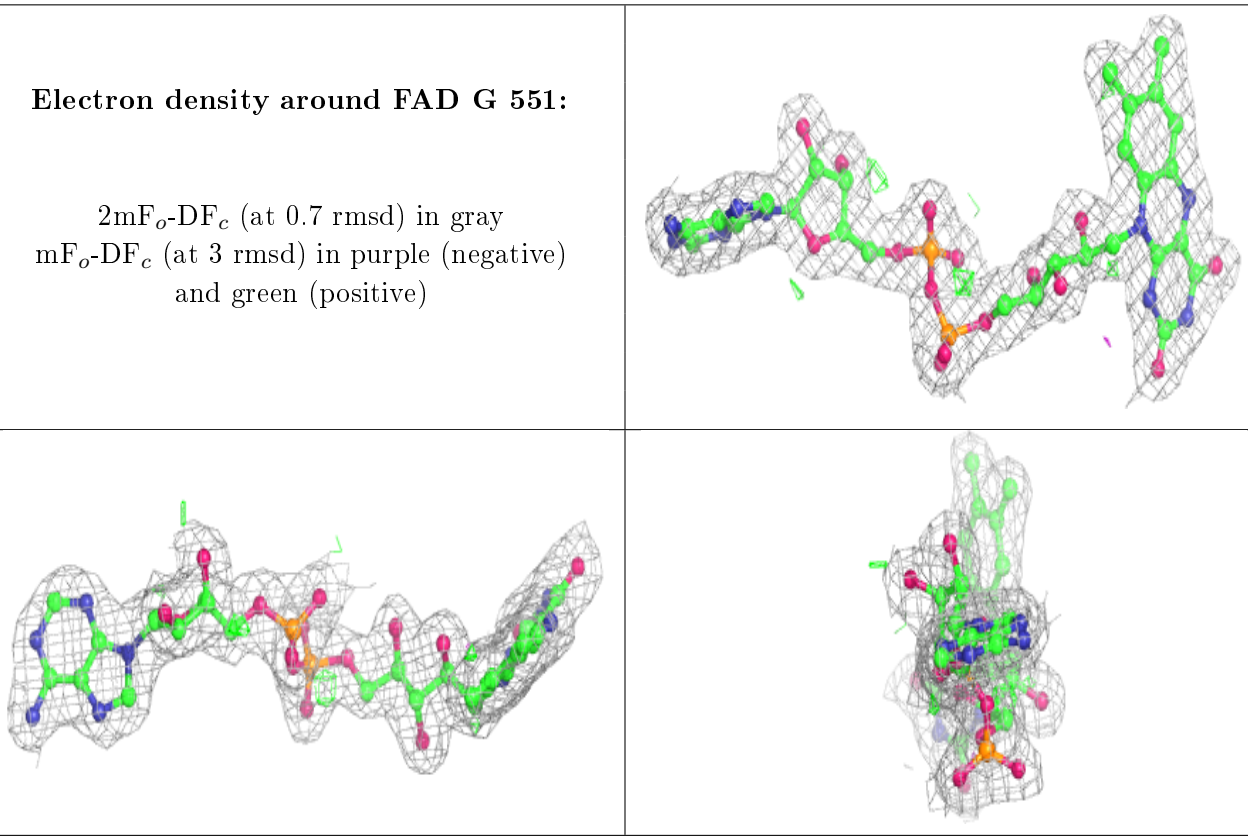
Electron density around FAD F 551:

$2mF_o$-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)



6.5 Other polymers (i)

There are no such residues in this entry.