



Full wwPDB X-ray Structure Validation Report ⓘ

Jun 11, 2024 – 07:33 PM EDT

PDB ID : 8TDH
Title : Structure of trehalose bound Alistipes sp. Glucoside-3-dehydrogenase AL3
Authors : Lazarski, A.C.; Worrall, L.J.; Strynadka, N.C.J.
Deposited on : 2023-07-03
Resolution : 2.95 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 : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.36.2
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) : 2.36.2

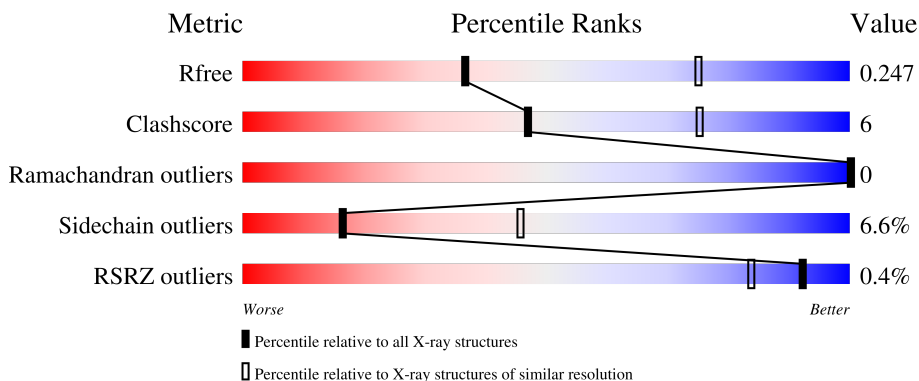
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.95 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.




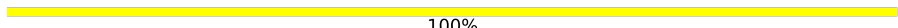
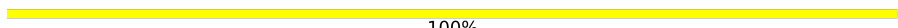


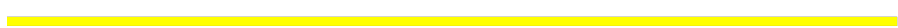






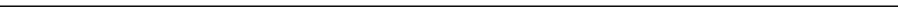
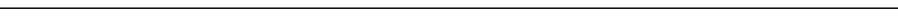


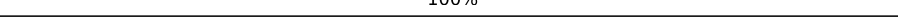




Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	3104 (3.00-2.92)
Clashscore	141614	3462 (3.00-2.92)
Ramachandran outliers	138981	3340 (3.00-2.92)
Sidechain outliers	138945	3343 (3.00-2.92)
RSRZ outliers	127900	2986 (3.00-2.92)

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	451	 78% 19% .
1	B	451	 81% 17% .
1	C	451	 82% 16% .
1	D	451	 78% 18% .
2	E	2	 100%

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Mol	Chain	Length	Quality of chain
2	G	2	 100%
2	H	2	 100%
2	L	2	 100%
2	P	2	 50% 50%
2	Q	2	 50% 50%
2	T	2	 100%
2	U	2	 100%
2	V	2	 100%
2	W	2	 100%
3	F	2	 50% 50%
3	I	2	 100%
3	J	2	 100%
3	K	2	 100%
3	M	2	 100%
3	N	2	 50% 50%
3	O	2	 100%
3	R	2	 50% 50%
3	S	2	 50% 50%
3	X	2	 50% 50%
3	Y	2	 50% 50%
3	Z	2	 100%

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
2	GLC	W	2	-	-	X	-

2 Entry composition [i](#)

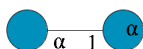
There are 5 unique types of molecules in this entry. The entry contains 15008 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Predicted dehydrogenases and related proteins.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	451	3531	2255	609	646	21	0	0	0
1	B	451	3559	2271	617	650	21	0	0	0
1	C	451	3559	2271	617	650	21	0	0	0
1	D	451	3559	2271	617	650	21	0	0	0

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



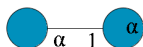
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
			Total	C	O			
2	E	2	23	12	11	0	0	0
2	G	2	23	12	11	0	0	0
2	H	2	23	12	11	0	0	0
2	L	2	23	12	11	0	0	0
2	P	2	23	12	11	0	0	0
2	Q	2	23	12	11	0	0	0
2	T	2	23	12	11	0	0	0
2	U	2	23	12	11	0	0	0

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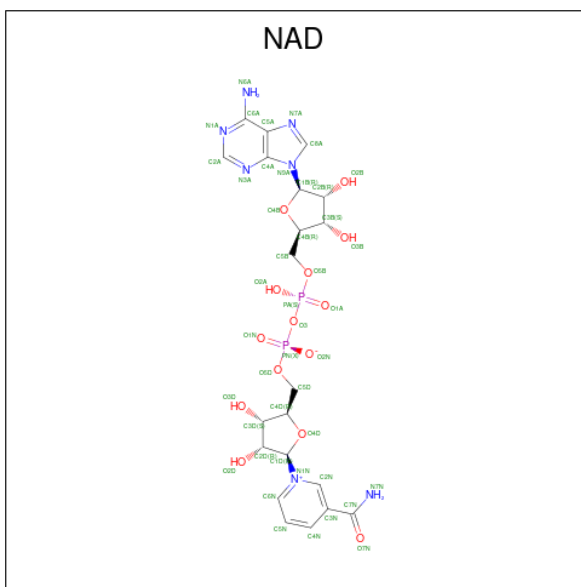
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
2	V	2	Total	C	O	0	0	0
			23	12	11			
2	W	2	Total	C	O	0	0	0
			23	12	11			

- Molecule 3 is an oligosaccharide called alpha-D-glucopyranose-(1-1)-alpha-D-glucopyranose.



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
3	F	2	Total	C	O	0	0	0
			23	12	11			
3	I	2	Total	C	O	0	0	0
			23	12	11			
3	J	2	Total	C	O	0	0	0
			23	12	11			
3	K	2	Total	C	O	0	0	0
			23	12	11			
3	M	2	Total	C	O	0	0	0
			23	12	11			
3	N	2	Total	C	O	0	0	0
			23	12	11			
3	O	2	Total	C	O	0	0	0
			23	12	11			
3	R	2	Total	C	O	0	0	0
			23	12	11			
3	S	2	Total	C	O	0	0	0
			23	12	11			
3	X	2	Total	C	O	0	0	0
			23	12	11			
3	Y	2	Total	C	O	0	0	0
			23	12	11			
3	Z	2	Total	C	O	0	0	0
			23	12	11			

- Molecule 4 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (three-letter code: NAD) (formula: C₂₁H₂₇N₇O₁₄P₂).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	N	O			P
4	A	1	Total	C	N	O	P	0	0
			44	21	7	14	2		
4	B	1	Total	C	N	O	P	0	0
			44	21	7	14	2		
4	C	1	Total	C	N	O	P	0	0
			44	21	7	14	2		
4	D	1	Total	C	N	O	P	0	0
			44	21	7	14	2		

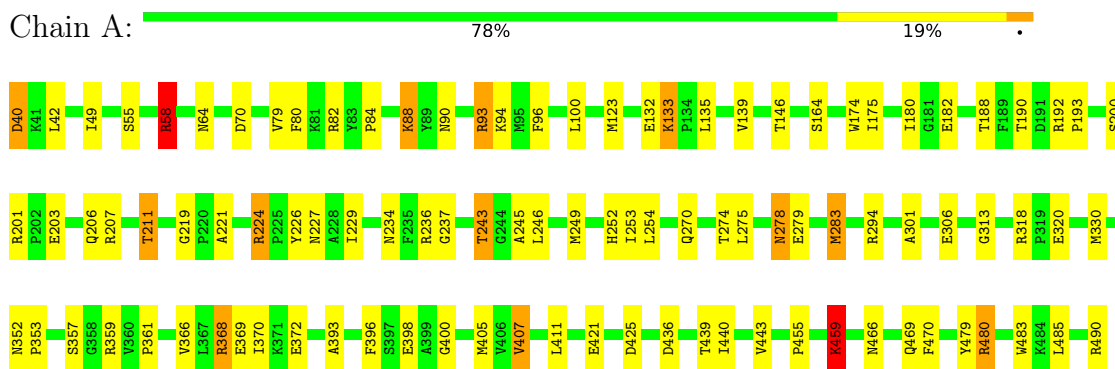
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	41	Total	O	0	0
			41	41		
5	B	30	Total	O	0	0
			30	30		
5	C	25	Total	O	0	0
			25	25		
5	D	22	Total	O	0	0
			22	22		

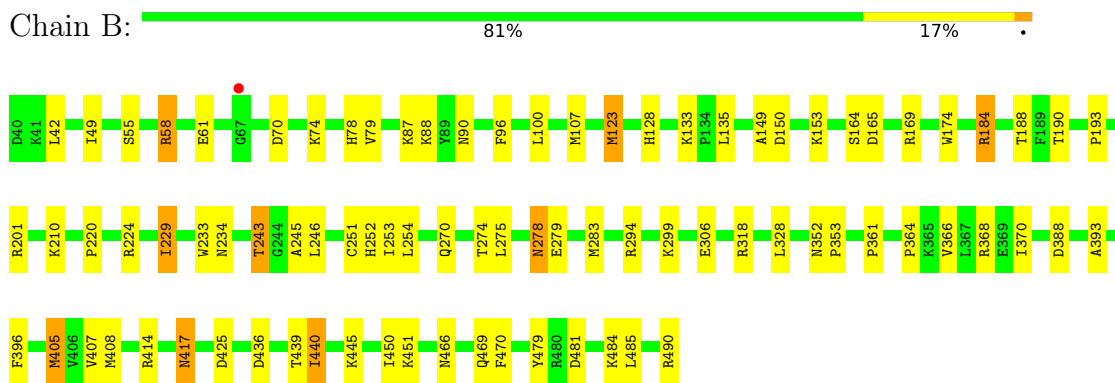
3 Residue-property plots [i](#)

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.

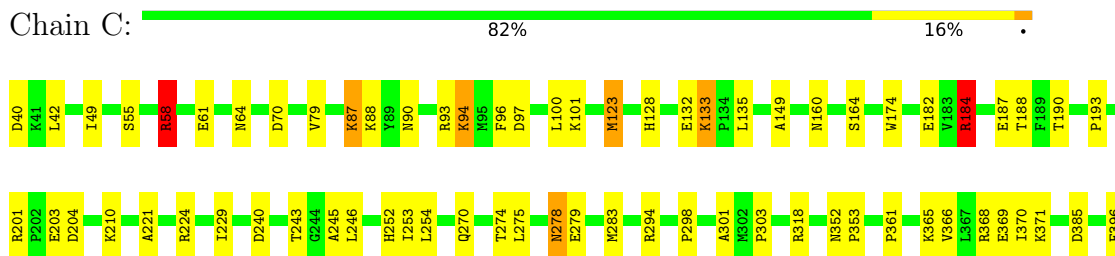
- Molecule 1: Predicted dehydrogenases and related proteins



- Molecule 1: Predicted dehydrogenases and related proteins

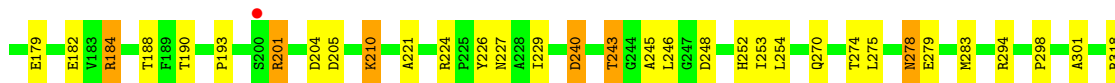
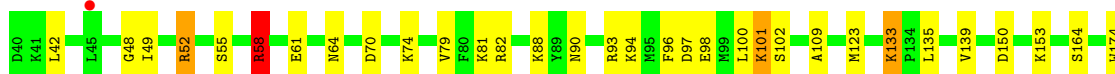
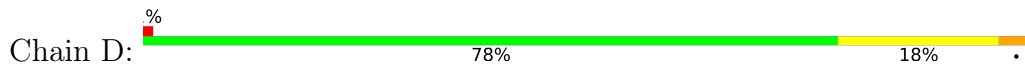


- Molecule 1: Predicted dehydrogenases and related proteins





- Molecule 1: Predicted dehydrogenases and related proteins



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



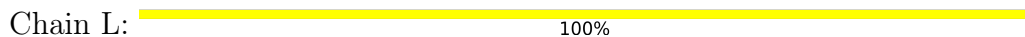
- Molecule 2: alpha-D-glucopyranose-(1-1)-alpha-D-glucopyranose




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



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



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

Chain P:  50% 50%

GLC1
GLC2

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

Chain Q:  50% 50%

GLC1
GLC2

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

Chain T:  100%

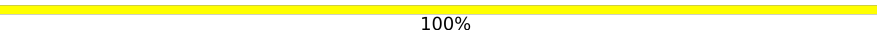
GLC1
GLC2

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

Chain U:  100%

GLC1
GLC2

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

Chain V:  100%


GLC1
GLC2

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

Chain W:  100%

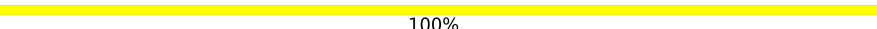
GLC1
GLC2

- Molecule 3: alpha-D-glucopyranose-(1-1)-alpha-D-glucopyranose

Chain F:  50% 50%


GLC1
GLC2

- Molecule 3: alpha-D-glucopyranose-(1-1)-alpha-D-glucopyranose

Chain I:  100%

GLC1
GLC2

- Molecule 3: alpha-D-glucopyranose-(1-1)-alpha-D-glucopyranose

Chain J:  100%GLC1
GLC2

- Molecule 3: alpha-D-glucopyranose-(1-1)-alpha-D-glucopyranose

Chain K:  100%GLC1
GLC2


- Molecule 3: alpha-D-glucopyranose-(1-1)-alpha-D-glucopyranose

Chain M:  100%GLC1
GLC2

- Molecule 3: alpha-D-glucopyranose-(1-1)-alpha-D-glucopyranose

Chain N:  50% 50%GLC1
GLC2

- Molecule 3: alpha-D-glucopyranose-(1-1)-alpha-D-glucopyranose

Chain O:  100%GLC1
GLC2

- Molecule 3: alpha-D-glucopyranose-(1-1)-alpha-D-glucopyranose

Chain R:  50% 50%GLC1
GLC2

- Molecule 3: alpha-D-glucopyranose-(1-1)-alpha-D-glucopyranose

Chain S:  50% 50%GLC1
GLC2

- Molecule 3: alpha-D-glucopyranose-(1-1)-alpha-D-glucopyranose

Chain X:  50% 50%

GLC1
GLC2

- Molecule 3: alpha-D-glucopyranose-(1-1)-alpha-D-glucopyranose

Chain Y:  50% 50%

GLC1
GLC2

- Molecule 3: alpha-D-glucopyranose-(1-1)-alpha-D-glucopyranose

Chain Z:  100%

GLC1
GLC2

4 Data and refinement statistics

Property	Value	Source
Space group	I 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	186.58Å 57.22Å 224.96Å 90.00° 106.58° 90.00°	Depositor
Resolution (Å)	162.27 – 2.95 162.27 – 2.95	Depositor EDS
% Data completeness (in resolution range)	89.7 (162.27-2.95) 85.6 (162.27-2.95)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.55 (at 2.96Å)	Xtrriage
Refinement program	REFMAC 5.8.0425	Depositor
R, R_{free}	0.195 , 0.247 0.206 , 0.247	Depositor DCC
R_{free} test set	2076 reflections (4.97%)	wwPDB-VP
Wilson B-factor (Å ²)	40.1	Xtrriage
Anisotropy	0.088	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 26.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.45$, $\langle L^2 \rangle = 0.28$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.89	EDS
Total number of atoms	15008	wwPDB-VP
Average B, all atoms (Å ²)	41.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.49% 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: GLC, NAD

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	0.70	6/3630 (0.2%)	1.17	25/4938 (0.5%)
1	B	0.61	1/3658 (0.0%)	1.07	11/4969 (0.2%)
1	C	0.58	1/3658 (0.0%)	1.10	15/4969 (0.3%)
1	D	0.54	1/3658 (0.0%)	1.06	15/4969 (0.3%)
All	All	0.61	9/14604 (0.1%)	1.10	66/19845 (0.3%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	5
1	B	0	2
1	C	0	5
1	D	0	7
All	All	0	19

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	421	GLU	CD-OE1	7.13	1.33	1.25
1	A	398	GLU	CD-OE1	7.08	1.33	1.25
1	A	306	GLU	CD-OE2	6.93	1.33	1.25
1	A	369	GLU	CD-OE2	6.29	1.32	1.25
1	A	306	GLU	CD-OE1	6.22	1.32	1.25
1	A	372	GLU	CD-OE1	5.34	1.31	1.25
1	C	369	GLU	CD-OE2	5.32	1.31	1.25
1	D	369	GLU	CD-OE2	5.11	1.31	1.25
1	B	61	GLU	CD-OE1	5.04	1.31	1.25

All (66) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	283	MET	CG-SD-CE	14.71	123.74	100.20
1	A	224	ARG	NE-CZ-NH1	-10.68	114.96	120.30
1	A	405	MET	CG-SD-CE	10.05	116.28	100.20
1	A	207	ARG	NE-CZ-NH2	-8.83	115.88	120.30
1	D	52	ARG	NE-CZ-NH1	-8.66	115.97	120.30
1	A	490	ARG	N-CA-CB	7.98	124.97	110.60
1	D	405	MET	CG-SD-CE	7.53	112.25	100.20
1	A	283	MET	CG-SD-CE	7.29	111.87	100.20
1	B	405	MET	CG-SD-CE	7.28	111.84	100.20
1	B	107	MET	CG-SD-CE	7.24	111.79	100.20
1	A	368	ARG	NE-CZ-NH2	7.18	123.89	120.30
1	B	224	ARG	NE-CZ-NH1	-7.10	116.75	120.30
1	C	87	LYS	N-CA-CB	-7.08	97.85	110.60
1	A	58	ARG	CG-CD-NE	-6.94	97.22	111.80
1	A	243	THR	OG1-CB-CG2	-6.93	94.06	110.00
1	A	192	ARG	NE-CZ-NH2	-6.74	116.93	120.30
1	C	224	ARG	NE-CZ-NH1	-6.72	116.94	120.30
1	B	169	ARG	NE-CZ-NH2	-6.71	116.95	120.30
1	D	330	MET	CG-SD-CE	6.68	110.88	100.20
1	A	64	ASN	CB-CA-C	-6.61	97.18	110.40
1	D	224	ARG	NE-CZ-NH1	-6.59	117.00	120.30
1	B	408	MET	CG-SD-CE	-6.58	89.67	100.20
1	D	88	LYS	CB-CA-C	-6.58	97.23	110.40
1	C	371	LYS	N-CA-CB	-6.57	98.78	110.60
1	C	184	ARG	NE-CZ-NH2	-6.34	117.13	120.30
1	B	58	ARG	NE-CZ-NH2	6.33	123.47	120.30
1	A	88	LYS	CB-CA-C	-6.23	97.94	110.40
1	A	203	GLU	N-CA-CB	-6.21	99.42	110.60
1	A	480	ARG	NE-CZ-NH2	6.18	123.39	120.30
1	A	123	MET	CG-SD-CE	-6.11	90.43	100.20
1	C	88	LYS	CB-CA-C	-6.08	98.23	110.40
1	A	206	GLN	N-CA-CB	6.08	121.55	110.60
1	B	123	MET	CG-SD-CE	-6.07	90.49	100.20
1	B	88	LYS	CB-CA-C	-6.06	98.27	110.40
1	C	385	ASP	CB-CA-C	6.04	122.49	110.40
1	D	123	MET	CG-SD-CE	-6.02	90.57	100.20
1	A	93	ARG	NE-CZ-NH2	-5.90	117.35	120.30
1	C	87	LYS	CA-CB-CG	5.87	126.32	113.40
1	A	224	ARG	NE-CZ-NH2	5.79	123.19	120.30
1	C	187	GLU	OE1-CD-OE2	5.75	130.20	123.30
1	D	458	ASP	CB-CA-C	5.70	121.79	110.40
1	C	123	MET	CG-SD-CE	-5.68	91.11	100.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	210	LYS	CA-CB-CG	5.63	125.79	113.40
1	A	459	LYS	CB-CA-C	-5.46	99.48	110.40
1	B	87	LYS	CB-CA-C	5.45	121.31	110.40
1	A	211	THR	CA-CB-CG2	-5.43	104.80	112.40
1	D	343	THR	OG1-CB-CG2	-5.41	97.55	110.00
1	C	458	ASP	CB-CA-C	5.38	121.16	110.40
1	D	201	ARG	CG-CD-NE	5.35	123.04	111.80
1	A	368	ARG	NE-CZ-NH1	-5.30	117.65	120.30
1	A	398	GLU	CG-CD-OE2	-5.27	107.76	118.30
1	B	243	THR	OG1-CB-CG2	-5.27	97.89	110.00
1	D	243	THR	OG1-CB-CG2	-5.24	97.95	110.00
1	C	94	LYS	CD-CE-NZ	5.20	123.67	111.70
1	A	236	ARG	NE-CZ-NH2	5.19	122.90	120.30
1	A	249	MET	CG-SD-CE	5.19	108.50	100.20
1	B	220	PRO	N-CA-CB	-5.14	96.95	102.60
1	D	42	LEU	CB-CG-CD1	-5.14	102.27	111.00
1	C	64	ASN	CB-CA-C	-5.13	100.14	110.40
1	C	58	ARG	CG-CD-NE	-5.11	101.07	111.80
1	A	93	ARG	NE-CZ-NH1	-5.10	117.75	120.30
1	D	283	MET	CG-SD-CE	5.08	108.33	100.20
1	D	371	LYS	N-CA-CB	-5.05	101.50	110.60
1	C	87	LYS	CB-CA-C	5.02	120.45	110.40
1	D	420	ARG	NE-CZ-NH2	-5.01	117.79	120.30
1	A	330	MET	CG-SD-CE	5.01	108.21	100.20

There are no chirality outliers.

All (19) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	224	ARG	Sidechain
1	A	368	ARG	Sidechain
1	A	40	ASP	Peptide
1	A	58	ARG	Sidechain
1	A	93	ARG	Sidechain
1	B	184	ARG	Sidechain
1	B	368	ARG	Sidechain
1	C	184	ARG	Sidechain
1	C	368	ARG	Sidechain
1	C	40	ASP	Peptide
1	C	58	ARG	Sidechain
1	C	93	ARG	Sidechain
1	D	184	ARG	Sidechain

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Mol	Chain	Res	Type	Group
1	D	359	ARG	Sidechain
1	D	368	ARG	Sidechain
1	D	52	ARG	Sidechain
1	D	58	ARG	Sidechain
1	D	82	ARG	Sidechain
1	D	93	ARG	Sidechain

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	3531	0	3426	47	0
1	B	3559	0	3488	50	0
1	C	3559	0	3488	34	0
1	D	3559	0	3488	54	0
2	E	23	0	21	1	0
2	G	23	0	21	2	0
2	H	23	0	21	0	0
2	L	23	0	21	0	0
2	P	23	0	21	1	0
2	Q	23	0	21	1	0
2	T	23	0	21	0	0
2	U	23	0	21	4	0
2	V	23	0	21	0	0
2	W	23	0	21	7	0
3	F	23	0	21	3	0
3	I	23	0	21	0	0
3	J	23	0	21	0	0
3	K	23	0	21	0	0
3	M	23	0	21	0	0
3	N	23	0	21	1	0
3	O	23	0	21	0	0
3	R	23	0	21	1	0
3	S	23	0	21	2	0
3	X	23	0	21	0	0
3	Y	23	0	21	3	0
3	Z	23	0	21	0	0
4	A	44	0	26	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	B	44	0	26	3	0
4	C	44	0	26	2	0
4	D	44	0	26	2	0
5	A	41	0	0	5	0
5	B	30	0	0	4	0
5	C	25	0	0	1	0
5	D	22	0	0	2	0
All	All	15008	0	14456	183	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 6.

All (183) 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:B:184:ARG:HB2	3:Y:1:GLC:H61	1.41	1.02
1:D:462:THR:HG21	2:W:2:GLC:O6	1.67	0.94
2:G:1:GLC:H5	2:G:2:GLC:H1	1.49	0.93
1:D:184:ARG:HB2	3:S:1:GLC:H61	1.58	0.83
1:B:201:ARG:NH1	1:B:279:GLU:OE2	2.14	0.80
1:A:201:ARG:NH1	1:A:279:GLU:OE2	2.15	0.80
1:D:450:ILE:HG23	1:D:453:GLY:O	1.85	0.76
1:D:462:THR:OG1	2:W:2:GLC:H62	1.88	0.74
1:B:184:ARG:HB2	3:Y:1:GLC:C6	2.18	0.73
1:D:436:ASP:N	1:D:436:ASP:OD1	2.22	0.72
1:C:70:ASP:OD2	4:C:501:NAD:O3B	2.07	0.71
2:G:1:GLC:C5	2:G:2:GLC:H1	2.20	0.71
1:A:132:GLU:OE2	4:A:501:NAD:H2N	1.92	0.69
1:A:318:ARG:H	1:B:270:GLN:HE22	1.38	0.69
1:B:174:TRP:CE2	1:B:361:PRO:HG2	2.28	0.69
1:B:251:CYS:O	5:B:601:HOH:O	2.10	0.69
1:B:414:ARG:HH22	3:N:2:GLC:H61	1.57	0.68
1:A:174:TRP:CE2	1:A:361:PRO:HG2	2.29	0.67
1:A:283:MET:SD	1:B:283:MET:CE	2.84	0.66
1:C:174:TRP:CE2	1:C:361:PRO:HG2	2.32	0.64
1:D:442:ALA:H	1:D:462:THR:HG22	1.63	0.64
1:A:283:MET:SD	1:B:283:MET:HE3	2.38	0.64
1:A:237:GLY:HA3	5:A:635:HOH:O	1.98	0.64
1:D:150:ASP:O	1:D:153:LYS:HD3	1.98	0.63
1:D:405:MET:N	1:D:405:MET:SD	2.71	0.63
1:D:470:PHE:CE1	1:D:474:LEU:HD21	2.34	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:450:ILE:CG2	1:D:453:GLY:O	2.47	0.62
1:D:179:GLU:OE2	1:D:359:ARG:NH1	2.32	0.62
1:C:184:ARG:HD2	1:C:303:PRO:HG3	1.80	0.62
1:D:188:THR:HG21	1:D:254:LEU:CD2	2.33	0.59
1:D:462:THR:OG1	2:W:2:GLC:C6	2.51	0.58
1:C:270:GLN:HE22	1:D:318:ARG:H	1.49	0.58
1:B:70:ASP:OD2	4:B:501:NAD:O3B	2.21	0.58
1:C:184:ARG:HD2	1:C:303:PRO:CG	2.34	0.57
1:D:184:ARG:HB2	3:S:1:GLC:C6	2.34	0.56
1:A:270:GLN:HE22	1:B:318:ARG:H	1.53	0.56
1:D:174:TRP:CE2	1:D:361:PRO:HG2	2.40	0.56
1:B:128:HIS:HE2	3:F:2:GLC:C4	2.19	0.56
1:B:123:MET:HE1	1:B:149:ALA:HB2	1.87	0.55
1:A:443:VAL:HG21	1:A:459:LYS:HE3	1.88	0.55
1:B:229:ILE:HD12	1:B:234:ASN:ND2	2.21	0.55
1:B:49:ILE:O	1:B:79:VAL:HG21	2.08	0.54
1:C:133:LYS:HD3	1:C:252:HIS:CE1	2.42	0.54
1:D:96:PHE:O	1:D:100:LEU:HB2	2.08	0.54
1:C:201:ARG:NH1	1:C:279:GLU:OE1	2.40	0.54
1:D:201:ARG:NH1	1:D:279:GLU:OE1	2.41	0.54
1:A:133:LYS:HD3	1:A:252:HIS:CE1	2.43	0.53
1:C:188:THR:HG21	1:C:254:LEU:CD2	2.37	0.53
1:A:283:MET:SD	1:B:283:MET:HE2	2.47	0.53
1:B:188:THR:HG21	1:B:254:LEU:CD2	2.38	0.53
1:A:466:ASN:OD1	1:A:469:GLN:HG3	2.08	0.53
1:A:96:PHE:O	1:A:100:LEU:HB2	2.08	0.53
1:A:175:ILE:HG12	1:A:180:ILE:HD11	1.89	0.53
1:D:425:ASP:OD1	1:D:425:ASP:C	2.47	0.53
1:D:440:ILE:HG21	1:D:470:PHE:CD2	2.44	0.53
4:B:501:NAD:H8A	5:B:612:HOH:O	2.08	0.53
2:U:1:GLC:H5	2:U:2:GLC:H1	1.91	0.53
1:B:96:PHE:O	1:B:100:LEU:HB2	2.08	0.52
1:D:438:ALA:O	5:D:601:HOH:O	2.19	0.52
1:A:164:SER:HA	1:A:370:ILE:HD12	1.91	0.52
1:C:425:ASP:OD1	1:C:425:ASP:C	2.48	0.52
1:A:425:ASP:OD1	1:A:425:ASP:C	2.48	0.52
1:B:133:LYS:HD3	1:B:252:HIS:CE1	2.45	0.52
1:A:274:THR:O	1:A:275:LEU:C	2.49	0.51
1:C:49:ILE:O	1:C:79:VAL:HG21	2.10	0.51
1:C:96:PHE:O	1:C:100:LEU:HB2	2.10	0.51
1:D:442:ALA:H	1:D:462:THR:CG2	2.23	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:188:THR:HG21	1:A:254:LEU:CD2	2.40	0.51
1:B:165:ASP:OD2	5:B:602:HOH:O	2.19	0.51
1:C:489:PRO:O	1:C:490:ARG:HG2	2.11	0.51
1:B:164:SER:HA	1:B:370:ILE:HD12	1.93	0.51
1:A:234:ASN:HB2	1:B:450:ILE:CD1	2.41	0.51
1:C:128:HIS:NE2	2:Q:2:GLC:O3	2.44	0.51
1:B:150:ASP:O	1:B:153:LYS:HD3	2.11	0.50
1:C:135:LEU:HD11	1:C:396:PHE:CE1	2.47	0.50
1:B:306:GLU:OE1	2:U:1:GLC:H2	2.12	0.50
1:A:283:MET:HB2	1:B:283:MET:HE1	1.94	0.50
1:B:190:THR:HB	1:B:253:ILE:CD1	2.42	0.50
1:B:135:LEU:HD11	1:B:396:PHE:CE1	2.47	0.49
1:D:417:ASN:N	1:D:417:ASN:OD1	2.45	0.49
1:B:184:ARG:HD2	3:Y:1:GLC:H61	1.94	0.49
1:D:443:VAL:HG21	1:D:459:LYS:HE3	1.94	0.49
1:B:466:ASN:OD1	1:B:469:GLN:HG3	2.12	0.49
1:C:70:ASP:O	1:C:90:ASN:HA	2.13	0.49
1:D:98:GLU:O	1:D:101:LYS:NZ	2.42	0.49
1:A:135:LEU:HD11	1:A:396:PHE:CE1	2.48	0.49
1:C:274:THR:O	1:C:275:LEU:C	2.51	0.48
1:B:425:ASP:C	1:B:425:ASP:OD1	2.50	0.48
1:C:278:ASN:H	1:C:278:ASN:HD22	1.61	0.48
1:D:221:ALA:O	1:D:480:ARG:HD3	2.14	0.48
1:A:49:ILE:O	1:A:79:VAL:HG21	2.14	0.48
1:D:133:LYS:HD3	1:D:252:HIS:CE1	2.49	0.48
1:A:190:THR:HB	1:A:253:ILE:CD1	2.43	0.47
1:A:132:GLU:OE2	4:A:501:NAD:C2N	2.62	0.47
1:D:70:ASP:O	1:D:90:ASN:HA	2.14	0.47
1:D:278:ASN:HD22	1:D:278:ASN:H	1.62	0.47
1:A:94:LYS:HB3	1:A:94:LYS:HE3	1.51	0.47
1:A:370:ILE:HD11	1:A:393:ALA:HB2	1.97	0.47
1:D:190:THR:HB	1:D:253:ILE:CD1	2.45	0.47
1:B:352:ASN:N	1:B:353:PRO:CD	2.77	0.47
1:B:370:ILE:HD11	1:B:393:ALA:HB2	1.96	0.47
1:C:123:MET:HE1	1:C:149:ALA:HB2	1.97	0.47
2:E:1:GLC:O2	2:E:2:GLC:H3	2.14	0.47
1:A:278:ASN:HD22	1:A:278:ASN:H	1.62	0.47
1:A:283:MET:HB2	1:B:283:MET:CE	2.45	0.47
1:B:70:ASP:O	1:B:90:ASN:HA	2.15	0.47
1:B:274:THR:O	1:B:275:LEU:C	2.53	0.47
1:C:254:LEU:HD13	1:C:405:MET:CE	2.45	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:128:HIS:NE2	3:F:2:GLC:O4	2.48	0.46
1:C:160:ASN:HB2	5:C:603:HOH:O	2.15	0.46
1:C:164:SER:HA	1:C:370:ILE:HD12	1.97	0.46
1:C:352:ASN:N	1:C:353:PRO:CD	2.78	0.46
1:A:70:ASP:O	1:A:90:ASN:HA	2.14	0.46
1:B:128:HIS:HE2	3:F:2:GLC:HO4	1.62	0.46
1:C:132:GLU:OE2	4:C:501:NAD:H2N	2.15	0.46
1:D:49:ILE:O	1:D:79:VAL:HG21	2.15	0.46
1:D:240:ASP:OD2	2:W:1:GLC:H4	2.16	0.46
1:D:462:THR:HG21	2:W:2:GLC:C6	2.45	0.46
1:D:387:ASP:OD1	1:D:387:ASP:N	2.38	0.45
1:A:352:ASN:N	1:A:353:PRO:CD	2.78	0.45
1:B:440:ILE:HG21	1:B:470:PHE:CD2	2.51	0.45
1:A:193:PRO:HD3	1:A:245:ALA:HB2	1.99	0.45
1:C:182:GLU:CG	1:C:301:ALA:HB3	2.47	0.45
1:B:417:ASN:N	1:B:417:ASN:OD1	2.49	0.45
1:C:193:PRO:HD3	1:C:245:ALA:HB2	1.98	0.45
1:D:274:THR:O	1:D:275:LEU:C	2.54	0.45
1:C:184:ARG:N	2:P:1:GLC:O6	2.45	0.45
1:D:58:ARG:HA	1:D:61:GLU:HG3	1.98	0.44
1:C:190:THR:HB	1:C:253:ILE:CD1	2.47	0.44
1:D:164:SER:HA	1:D:370:ILE:HD12	1.99	0.44
1:B:370:ILE:CD1	1:B:393:ALA:HB2	2.47	0.44
1:B:490:ARG:HG3	1:B:490:ARG:HH11	1.82	0.44
1:C:182:GLU:HG3	1:C:301:ALA:HB3	1.99	0.44
1:A:219:GLY:HA2	1:A:483:TRP:CH2	2.52	0.44
1:B:479:TYR:CE2	1:B:485:LEU:HG	2.53	0.44
4:A:501:NAD:H8A	5:A:625:HOH:O	2.17	0.44
1:D:135:LEU:HD11	1:D:396:PHE:CE1	2.52	0.44
1:A:440:ILE:HG21	1:A:470:PHE:CD2	2.52	0.43
1:D:462:THR:CG2	2:W:2:GLC:O6	2.53	0.43
1:C:254:LEU:HD13	1:C:405:MET:HE2	1.99	0.43
1:A:479:TYR:CE2	1:A:485:LEU:HG	2.54	0.43
1:D:248:ASP:OD1	3:R:1:GLC:O4	2.29	0.43
1:A:80:PHE:CD1	1:A:88:LYS:HG2	2.54	0.43
1:A:357:SER:OG	1:A:359:ARG:HG3	2.17	0.43
1:A:411:LEU:HG	5:A:610:HOH:O	2.19	0.43
1:B:328:LEU:HD12	5:B:626:HOH:O	2.17	0.43
1:A:146:THR:OG1	1:A:400:GLY:HA3	2.19	0.43
1:A:313:GLY:C	5:A:616:HOH:O	2.57	0.43
1:C:221:ALA:O	1:C:480:ARG:HD3	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:193:PRO:HD3	1:D:245:ALA:HB2	2.00	0.43
1:D:370:ILE:HD11	1:D:393:ALA:HB2	2.01	0.43
1:B:278:ASN:H	1:B:278:ASN:HD22	1.66	0.43
4:D:501:NAD:H2B	5:D:609:HOH:O	2.18	0.43
1:B:193:PRO:HD3	1:B:245:ALA:HB2	2.01	0.42
1:B:229:ILE:HD12	1:B:234:ASN:HD22	1.83	0.42
1:D:352:ASN:N	1:D:353:PRO:CD	2.82	0.42
1:C:440:ILE:HG21	1:C:470:PHE:CD2	2.55	0.42
1:A:455:PRO:HG3	1:B:233:TRP:CE2	2.55	0.42
1:A:370:ILE:CD1	1:A:393:ALA:HB2	2.49	0.42
1:D:139:VAL:HG23	1:D:407:VAL:HG12	2.01	0.42
1:D:48:GLY:O	1:D:109:ALA:HB3	2.20	0.41
1:D:462:THR:CG2	2:W:2:GLC:C6	2.98	0.41
1:C:58:ARG:HA	1:C:61:GLU:HG3	2.02	0.41
1:D:188:THR:HG21	1:D:254:LEU:HD23	2.02	0.41
1:A:221:ALA:O	1:A:480:ARG:HD3	2.19	0.41
1:B:133:LYS:O	4:B:501:NAD:H1D	2.20	0.41
2:U:1:GLC:H5	2:U:2:GLC:C1	2.49	0.41
1:B:364:PRO:O	1:B:366:VAL:HG23	2.20	0.41
1:A:139:VAL:HG23	1:A:407:VAL:HG12	2.02	0.41
1:A:182:GLU:CG	1:A:301:ALA:HB3	2.50	0.41
1:A:82:ARG:C	1:A:84:PRO:HD3	2.41	0.41
2:U:1:GLC:C5	2:U:2:GLC:H1	2.50	0.41
1:A:226:TYR:CG	1:A:227:ASN:N	2.89	0.41
1:C:188:THR:HG21	1:C:254:LEU:HD23	2.02	0.41
1:C:318:ARG:HG3	1:D:270:GLN:HE22	1.85	0.41
1:D:449:HIS:NE2	1:D:451:LYS:HD2	2.36	0.41
1:A:411:LEU:CD2	5:A:610:HOH:O	2.69	0.40
1:B:490:ARG:HH11	1:B:490:ARG:CG	2.34	0.40
1:D:133:LYS:O	4:D:501:NAD:H1D	2.21	0.40
1:D:442:ALA:N	1:D:462:THR:HG22	2.33	0.40
1:D:318:ARG:HG2	1:D:318:ARG:HH11	1.86	0.40
1:D:182:GLU:CG	1:D:301:ALA:HB3	2.51	0.40
1:D:226:TYR:CG	1:D:227:ASN:N	2.90	0.40

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	449/451 (100%)	427 (95%)	22 (5%)	0	100	100
1	B	449/451 (100%)	430 (96%)	19 (4%)	0	100	100
1	C	449/451 (100%)	429 (96%)	20 (4%)	0	100	100
1	D	449/451 (100%)	433 (96%)	16 (4%)	0	100	100
All	All	1796/1804 (100%)	1719 (96%)	77 (4%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	367/375 (98%)	349 (95%)	18 (5%)	25	58
1	B	375/375 (100%)	352 (94%)	23 (6%)	18	49
1	C	375/375 (100%)	347 (92%)	28 (8%)	13	40
1	D	375/375 (100%)	345 (92%)	30 (8%)	12	37
All	All	1492/1500 (100%)	1393 (93%)	99 (7%)	16	46

All (99) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	40	ASP
1	A	42	LEU

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Mol	Chain	Res	Type
1	A	55	SER
1	A	58	ARG
1	A	133	LYS
1	A	200	SER
1	A	211	THR
1	A	229	ILE
1	A	243	THR
1	A	246	LEU
1	A	278	ASN
1	A	294	ARG
1	A	320	GLU
1	A	366	VAL
1	A	407	VAL
1	A	436	ASP
1	A	439	THR
1	A	459	LYS
1	B	42	LEU
1	B	55	SER
1	B	58	ARG
1	B	74	LYS
1	B	78	HIS
1	B	210	LYS
1	B	229	ILE
1	B	243	THR
1	B	246	LEU
1	B	278	ASN
1	B	294	ARG
1	B	299	LYS
1	B	388	ASP
1	B	405	MET
1	B	407	VAL
1	B	417	ASN
1	B	436	ASP
1	B	439	THR
1	B	440	ILE
1	B	445	LYS
1	B	451	LYS
1	B	481	ASP
1	B	484	LYS
1	C	42	LEU
1	C	55	SER
1	C	58	ARG

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Mol	Chain	Res	Type
1	C	87	LYS
1	C	94	LYS
1	C	97	ASP
1	C	101	LYS
1	C	133	LYS
1	C	184	ARG
1	C	203	GLU
1	C	204	ASP
1	C	210	LYS
1	C	229	ILE
1	C	240	ASP
1	C	243	THR
1	C	246	LEU
1	C	278	ASN
1	C	294	ARG
1	C	298	PRO
1	C	365	LYS
1	C	366	VAL
1	C	407	VAL
1	C	436	ASP
1	C	440	ILE
1	C	459	LYS
1	C	481	ASP
1	C	484	LYS
1	C	490	ARG
1	D	55	SER
1	D	58	ARG
1	D	64	ASN
1	D	74	LYS
1	D	81	LYS
1	D	94	LYS
1	D	97	ASP
1	D	101	LYS
1	D	102	SER
1	D	133	LYS
1	D	204	ASP
1	D	205	ASP
1	D	210	LYS
1	D	229	ILE
1	D	240	ASP
1	D	243	THR
1	D	246	LEU

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Mol	Chain	Res	Type
1	D	278	ASN
1	D	294	ARG
1	D	298	PRO
1	D	365	LYS
1	D	371	LYS
1	D	387	ASP
1	D	407	VAL
1	D	417	ASN
1	D	436	ASP
1	D	440	ILE
1	D	459	LYS
1	D	481	ASP
1	D	490	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (20) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	270	GLN
1	A	278	ASN
1	A	469	GLN
1	A	477	HIS
1	B	78	HIS
1	B	234	ASN
1	B	252	HIS
1	B	270	GLN
1	B	278	ASN
1	B	469	GLN
1	B	477	HIS
1	C	270	GLN
1	C	278	ASN
1	C	469	GLN
1	C	477	HIS
1	D	64	ASN
1	D	270	GLN
1	D	278	ASN
1	D	469	GLN
1	D	477	HIS

5.3.3 RNA

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](#)

44 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	E	1	2	11,11,12	1.24	1 (9%)	15,15,17	3.23	3 (20%)
2	GLC	E	2	2	12,12,12	0.78	0	17,17,17	1.25	2 (11%)
3	GLC	F	1	3	12,12,12	0.59	0	17,17,17	1.35	3 (17%)
3	GLC	F	2	3	11,11,12	1.31	1 (9%)	15,15,17	2.38	7 (46%)
2	GLC	G	1	2	11,11,12	1.11	1 (9%)	15,15,17	1.72	2 (13%)
2	GLC	G	2	2	12,12,12	1.03	1 (8%)	17,17,17	1.88	4 (23%)
2	GLC	H	1	2	11,11,12	0.95	0	15,15,17	2.59	2 (13%)
2	GLC	H	2	2	12,12,12	0.98	1 (8%)	17,17,17	2.06	5 (29%)
3	GLC	I	1	3	12,12,12	0.61	0	17,17,17	1.26	2 (11%)
3	GLC	I	2	3	11,11,12	0.82	0	15,15,17	2.31	5 (33%)
3	GLC	J	1	3	12,12,12	0.76	0	17,17,17	1.74	3 (17%)
3	GLC	J	2	3	11,11,12	0.62	0	15,15,17	2.03	4 (26%)
3	GLC	K	1	3	12,12,12	0.75	0	17,17,17	1.62	5 (29%)
3	GLC	K	2	3	11,11,12	1.04	1 (9%)	15,15,17	1.59	2 (13%)
2	GLC	L	1	2	11,11,12	0.86	0	15,15,17	1.90	5 (33%)
2	GLC	L	2	2	12,12,12	0.53	0	17,17,17	1.81	3 (17%)
3	GLC	M	1	3	12,12,12	0.99	1 (8%)	17,17,17	1.55	4 (23%)
3	GLC	M	2	3	11,11,12	0.59	0	15,15,17	1.68	1 (6%)
3	GLC	N	1	3	12,12,12	0.89	0	17,17,17	1.66	6 (35%)
3	GLC	N	2	3	11,11,12	0.98	1 (9%)	15,15,17	3.75	8 (53%)
3	GLC	O	1	3	12,12,12	0.48	0	17,17,17	1.77	4 (23%)
3	GLC	O	2	3	11,11,12	0.66	0	15,15,17	3.33	4 (26%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	GLC	P	1	2	11,11,12	0.74	0	15,15,17	2.09	5 (33%)
2	GLC	P	2	2	12,12,12	0.75	0	17,17,17	1.12	1 (5%)
2	GLC	Q	1	2	11,11,12	1.00	1 (9%)	15,15,17	1.95	5 (33%)
2	GLC	Q	2	2	12,12,12	0.45	0	17,17,17	1.25	2 (11%)
3	GLC	R	1	3	12,12,12	0.46	0	17,17,17	1.52	4 (23%)
3	GLC	R	2	3	11,11,12	0.60	0	15,15,17	2.74	7 (46%)
3	GLC	S	1	3	12,12,12	0.54	0	17,17,17	1.44	5 (29%)
3	GLC	S	2	3	11,11,12	0.56	0	15,15,17	1.49	3 (20%)
2	GLC	T	1	2	11,11,12	0.78	0	15,15,17	2.18	4 (26%)
2	GLC	T	2	2	12,12,12	1.47	1 (8%)	17,17,17	2.03	4 (23%)
2	GLC	U	1	2	11,11,12	1.43	2 (18%)	15,15,17	2.21	4 (26%)
2	GLC	U	2	2	12,12,12	0.95	1 (8%)	17,17,17	1.39	1 (5%)
2	GLC	V	1	2	11,11,12	0.92	1 (9%)	15,15,17	1.60	3 (20%)
2	GLC	V	2	2	12,12,12	0.47	0	17,17,17	1.89	5 (29%)
2	GLC	W	1	2	11,11,12	1.45	2 (18%)	15,15,17	3.02	5 (33%)
2	GLC	W	2	2	12,12,12	0.81	0	17,17,17	1.55	4 (23%)
3	GLC	X	1	3	12,12,12	0.38	0	17,17,17	0.90	0
3	GLC	X	2	3	11,11,12	1.11	1 (9%)	15,15,17	2.00	3 (20%)
3	GLC	Y	1	3	12,12,12	0.33	0	17,17,17	1.24	1 (5%)
3	GLC	Y	2	3	11,11,12	0.56	0	15,15,17	2.15	6 (40%)
3	GLC	Z	1	3	12,12,12	0.67	0	17,17,17	1.40	2 (11%)
3	GLC	Z	2	3	11,11,12	0.74	0	15,15,17	2.09	5 (33%)

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	E	1	2	-	2/2/19/22	0/1/1/1
2	GLC	E	2	2	-	2/2/22/22	0/1/1/1
3	GLC	F	1	3	-	2/2/22/22	0/1/1/1
3	GLC	F	2	3	-	2/2/19/22	0/1/1/1
2	GLC	G	1	2	-	2/2/19/22	0/1/1/1
2	GLC	G	2	2	-	0/2/22/22	0/1/1/1
2	GLC	H	1	2	-	2/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GLC	H	2	2	-	2/2/22/22	0/1/1/1
3	GLC	I	1	3	-	2/2/22/22	0/1/1/1
3	GLC	I	2	3	-	0/2/19/22	0/1/1/1
3	GLC	J	1	3	-	0/2/22/22	0/1/1/1
3	GLC	J	2	3	-	0/2/19/22	0/1/1/1
3	GLC	K	1	3	-	2/2/22/22	0/1/1/1
3	GLC	K	2	3	-	0/2/19/22	0/1/1/1
2	GLC	L	1	2	-	2/2/19/22	0/1/1/1
2	GLC	L	2	2	-	0/2/22/22	0/1/1/1
3	GLC	M	1	3	-	0/2/22/22	0/1/1/1
3	GLC	M	2	3	-	2/2/19/22	0/1/1/1
3	GLC	N	1	3	-	0/2/22/22	0/1/1/1
3	GLC	N	2	3	-	2/2/19/22	0/1/1/1
3	GLC	O	1	3	-	2/2/22/22	0/1/1/1
3	GLC	O	2	3	-	1/2/19/22	0/1/1/1
2	GLC	P	1	2	-	2/2/19/22	0/1/1/1
2	GLC	P	2	2	-	2/2/22/22	0/1/1/1
2	GLC	Q	1	2	-	2/2/19/22	0/1/1/1
2	GLC	Q	2	2	-	0/2/22/22	0/1/1/1
3	GLC	R	1	3	-	0/2/22/22	0/1/1/1
3	GLC	R	2	3	-	2/2/19/22	0/1/1/1
3	GLC	S	1	3	-	2/2/22/22	0/1/1/1
3	GLC	S	2	3	-	2/2/19/22	0/1/1/1
2	GLC	T	1	2	-	0/2/19/22	0/1/1/1
2	GLC	T	2	2	-	2/2/22/22	0/1/1/1
2	GLC	U	1	2	-	2/2/19/22	0/1/1/1
2	GLC	U	2	2	-	2/2/22/22	0/1/1/1
2	GLC	V	1	2	-	2/2/19/22	0/1/1/1
2	GLC	V	2	2	-	0/2/22/22	0/1/1/1
2	GLC	W	1	2	-	2/2/19/22	0/1/1/1
2	GLC	W	2	2	-	2/2/22/22	0/1/1/1
3	GLC	X	1	3	-	0/2/22/22	0/1/1/1
3	GLC	X	2	3	-	2/2/19/22	0/1/1/1
3	GLC	Y	1	3	-	2/2/22/22	0/1/1/1
3	GLC	Y	2	3	-	1/2/19/22	0/1/1/1
3	GLC	Z	1	3	-	0/2/22/22	0/1/1/1
3	GLC	Z	2	3	-	2/2/19/22	0/1/1/1

All (17) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	T	2	GLC	C4-C5	4.39	1.62	1.53
3	F	2	GLC	C4-C5	3.88	1.61	1.53
2	Q	1	GLC	C1-C2	2.98	1.59	1.52
2	U	1	GLC	C4-C5	2.85	1.59	1.53
3	X	2	GLC	C4-C5	2.72	1.58	1.53
2	W	1	GLC	C4-C5	2.65	1.58	1.53
2	E	1	GLC	C1-C2	2.63	1.58	1.52
2	G	2	GLC	O1-C1	2.61	1.47	1.39
2	U	2	GLC	C4-C5	2.56	1.58	1.53
2	G	1	GLC	O5-C1	2.49	1.47	1.43
2	U	1	GLC	C1-C2	2.43	1.57	1.52
2	V	1	GLC	C4-C5	2.35	1.58	1.53
3	M	1	GLC	O4-C4	-2.35	1.37	1.43
2	H	2	GLC	O1-C1	2.27	1.46	1.39
2	W	1	GLC	C4-C3	2.16	1.57	1.52
3	K	2	GLC	C1-C2	2.16	1.57	1.52
3	N	2	GLC	O4-C4	2.09	1.47	1.43

All (163) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	O	2	GLC	C1-O5-C5	10.90	126.96	112.19
3	N	2	GLC	C1-O5-C5	9.68	125.31	112.19
2	E	1	GLC	C1-C2-C3	9.06	120.81	109.67
2	H	1	GLC	C1-O5-C5	8.37	123.53	112.19
3	N	2	GLC	C1-C2-C3	7.03	118.30	109.67
2	E	1	GLC	C1-O5-C5	-7.02	102.69	112.19
2	W	1	GLC	O2-C2-C3	6.21	122.59	110.14
2	U	1	GLC	C1-C2-C3	6.18	117.26	109.67
2	T	1	GLC	O5-C1-C2	-6.10	101.36	110.77
2	W	1	GLC	C2-C3-C4	5.98	121.24	110.89
3	R	2	GLC	C1-C2-C3	-5.83	102.50	109.67
3	Z	2	GLC	C1-O5-C5	5.79	120.04	112.19
3	R	2	GLC	O5-C1-C2	-5.29	102.60	110.77
3	I	2	GLC	O2-C2-C3	5.28	120.72	110.14
2	L	2	GLC	O2-C2-C3	-5.25	98.21	110.35
3	M	2	GLC	O5-C1-C2	-5.19	102.77	110.77
2	W	1	GLC	O5-C1-C2	-5.09	102.91	110.77
2	P	1	GLC	O3-C3-C2	-5.08	100.26	109.99
3	X	2	GLC	O5-C1-C2	5.00	118.49	110.77
2	G	1	GLC	O5-C5-C6	4.84	114.79	107.20
3	I	2	GLC	O3-C3-C2	4.84	119.25	109.99

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	V	2	GLC	O3-C3-C2	-4.68	99.53	110.35
3	R	2	GLC	O2-C2-C3	4.67	119.50	110.14
2	L	1	GLC	O5-C1-C2	-4.54	103.76	110.77
3	F	2	GLC	C1-O5-C5	4.51	118.30	112.19
2	H	2	GLC	C4-C3-C2	-4.49	102.98	110.82
3	J	2	GLC	C1-C2-C3	4.41	115.09	109.67
3	J	1	GLC	C1-C2-C3	4.33	119.31	110.31
3	X	2	GLC	C1-O5-C5	4.30	118.02	112.19
3	O	1	GLC	O5-C1-C2	4.26	117.89	110.28
3	J	2	GLC	O5-C1-C2	-4.23	104.25	110.77
3	F	2	GLC	C3-C4-C5	4.21	117.74	110.24
3	O	2	GLC	C1-C2-C3	-4.17	104.54	109.67
2	V	2	GLC	C1-O5-C5	4.08	121.37	113.66
2	T	2	GLC	C1-O5-C5	4.06	121.33	113.66
2	H	2	GLC	O2-C2-C3	4.00	119.59	110.35
2	T	1	GLC	O2-C2-C3	3.99	118.13	110.14
2	H	2	GLC	O3-C3-C2	3.96	119.52	110.35
2	V	1	GLC	C1-O5-C5	3.93	117.51	112.19
3	N	2	GLC	O5-C5-C6	-3.89	101.10	107.20
2	G	2	GLC	C1-O5-C5	-3.87	106.36	113.66
2	T	2	GLC	C1-C2-C3	3.86	118.31	110.31
3	Y	1	GLC	O3-C3-C2	-3.83	101.48	110.35
2	H	1	GLC	O2-C2-C3	3.81	117.77	110.14
2	Q	1	GLC	O3-C3-C2	3.79	117.25	109.99
3	Y	2	GLC	C1-O5-C5	3.78	117.32	112.19
3	K	2	GLC	C1-O5-C5	3.78	117.31	112.19
3	Y	2	GLC	O5-C5-C6	3.77	113.11	107.20
2	E	1	GLC	O2-C2-C3	-3.73	102.67	110.14
2	P	1	GLC	O5-C1-C2	3.72	116.52	110.77
2	Q	1	GLC	C1-C2-C3	3.69	114.21	109.67
3	F	2	GLC	O4-C4-C3	-3.65	101.92	110.35
2	W	1	GLC	O2-C2-C1	-3.64	101.70	109.15
2	W	1	GLC	O3-C3-C2	-3.61	103.08	109.99
3	Y	2	GLC	C2-C3-C4	-3.58	104.71	110.89
3	O	1	GLC	C1-C2-C3	3.52	117.61	110.31
2	W	2	GLC	C1-O5-C5	-3.51	107.03	113.66
2	U	2	GLC	O5-C1-C2	-3.49	104.06	110.28
3	O	2	GLC	O2-C2-C3	3.49	117.13	110.14
2	G	2	GLC	O5-C1-C2	-3.46	104.12	110.28
3	N	2	GLC	O2-C2-C1	-3.44	102.11	109.15
3	Z	1	GLC	C4-C3-C2	3.42	116.79	110.82
3	J	1	GLC	O5-C1-C2	3.41	116.36	110.28

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	N	2	GLC	O5-C5-C4	3.40	119.10	110.83
2	T	2	GLC	O5-C1-C2	3.34	116.24	110.28
3	K	1	GLC	O3-C3-C2	-3.24	102.87	110.35
3	F	2	GLC	O2-C2-C3	-3.20	103.72	110.14
2	L	2	GLC	O5-C1-C2	3.19	115.97	110.28
3	O	2	GLC	C2-C3-C4	-3.12	105.50	110.89
2	V	1	GLC	O5-C1-C2	-3.10	105.98	110.77
2	U	1	GLC	C2-C3-C4	3.08	116.23	110.89
3	Y	2	GLC	O5-C1-C2	3.03	115.45	110.77
3	I	2	GLC	O3-C3-C4	-3.03	103.33	110.35
2	T	2	GLC	O5-C5-C4	3.01	115.17	109.69
3	M	1	GLC	O4-C4-C3	-3.00	103.42	110.35
2	Q	2	GLC	C1-O5-C5	2.98	119.29	113.66
3	F	1	GLC	C4-C3-C2	2.98	116.02	110.82
2	T	1	GLC	O2-C2-C1	-2.97	103.07	109.15
3	J	2	GLC	O4-C4-C3	-2.96	103.51	110.35
2	G	2	GLC	C4-C3-C2	2.95	115.98	110.82
3	S	1	GLC	C1-C2-C3	2.94	116.42	110.31
3	O	1	GLC	O2-C2-C3	-2.93	103.57	110.35
2	G	2	GLC	O2-C2-C3	2.92	117.11	110.35
3	S	2	GLC	O5-C1-C2	2.92	115.28	110.77
3	F	1	GLC	O2-C2-C1	-2.90	102.44	109.16
3	I	1	GLC	C4-C3-C2	-2.88	105.79	110.82
3	N	1	GLC	C1-O5-C5	-2.87	108.25	113.66
3	N	2	GLC	C2-C3-C4	2.85	115.83	110.89
2	G	1	GLC	C1-O5-C5	2.83	116.03	112.19
3	O	1	GLC	O1-C1-O5	-2.79	102.00	110.38
2	U	1	GLC	C3-C4-C5	2.73	115.11	110.24
3	R	2	GLC	C1-O5-C5	-2.72	108.51	112.19
2	V	1	GLC	O2-C2-C3	2.71	115.56	110.14
2	W	2	GLC	C1-C2-C3	2.66	115.83	110.31
2	L	1	GLC	C1-O5-C5	2.65	115.78	112.19
3	K	1	GLC	O2-C2-C1	2.65	115.30	109.16
3	K	1	GLC	O5-C1-C2	2.64	115.00	110.28
3	Y	2	GLC	O3-C3-C2	2.64	115.06	109.99
3	N	2	GLC	O5-C1-C2	2.64	114.85	110.77
3	X	2	GLC	C3-C4-C5	2.63	114.94	110.24
3	R	1	GLC	O5-C1-C2	2.63	114.97	110.28
2	E	2	GLC	C1-O5-C5	2.62	118.61	113.66
3	F	2	GLC	C1-C2-C3	2.59	112.86	109.67
2	L	1	GLC	C1-C2-C3	2.59	112.85	109.67
3	S	2	GLC	C2-C3-C4	-2.57	106.45	110.89

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	P	2	GLC	O2-C2-C3	2.57	116.29	110.35
3	N	1	GLC	O1-C1-C2	2.56	116.23	109.03
3	N	1	GLC	O3-C3-C2	-2.56	104.44	110.35
2	P	1	GLC	C2-C3-C4	2.53	115.27	110.89
3	N	1	GLC	O5-C5-C4	-2.51	105.14	109.69
2	V	2	GLC	C4-C3-C2	2.48	115.16	110.82
3	R	1	GLC	C1-C2-C3	2.48	115.46	110.31
2	H	2	GLC	C1-O5-C5	2.47	118.33	113.66
2	H	2	GLC	O1-C1-C2	2.47	115.99	109.03
3	R	2	GLC	O2-C2-C1	2.45	114.17	109.15
2	U	1	GLC	O5-C1-C2	2.44	114.54	110.77
2	Q	1	GLC	C1-O5-C5	-2.43	108.90	112.19
3	Z	1	GLC	O3-C3-C2	-2.42	104.76	110.35
3	M	1	GLC	O3-C3-C2	2.42	115.93	110.35
2	W	2	GLC	O1-C1-C2	2.40	115.80	109.03
2	P	1	GLC	C1-C2-C3	2.40	112.62	109.67
3	Z	2	GLC	O3-C3-C2	-2.39	105.42	109.99
3	F	2	GLC	O5-C5-C4	2.38	116.61	110.83
3	N	1	GLC	O1-C1-O5	-2.35	103.32	110.38
3	Z	2	GLC	O4-C4-C5	-2.35	103.47	109.30
3	K	1	GLC	C1-O5-C5	2.33	118.07	113.66
3	I	2	GLC	O5-C5-C6	-2.33	103.55	107.20
3	S	1	GLC	O1-C1-O5	2.33	117.37	110.38
3	S	1	GLC	O1-C1-C2	-2.33	102.48	109.03
3	M	1	GLC	O2-C2-C3	-2.32	104.98	110.35
3	R	1	GLC	O3-C3-C2	2.32	115.71	110.35
2	L	2	GLC	C1-C2-C3	2.32	115.12	110.31
2	P	1	GLC	O2-C2-C3	-2.31	105.51	110.14
3	M	1	GLC	O2-C2-C1	2.30	114.50	109.16
2	L	1	GLC	C6-C5-C4	-2.26	107.70	113.00
3	I	1	GLC	O2-C2-C1	2.26	114.41	109.16
2	Q	1	GLC	O5-C1-C2	2.24	114.23	110.77
3	K	2	GLC	O2-C2-C3	2.24	114.62	110.14
2	E	2	GLC	O2-C2-C3	2.24	115.52	110.35
2	Q	1	GLC	O3-C3-C4	-2.22	105.22	110.35
3	F	2	GLC	O5-C5-C6	-2.21	103.73	107.20
3	S	1	GLC	O2-C2-C3	-2.21	105.25	110.35
3	J	1	GLC	O2-C2-C1	-2.20	104.06	109.16
3	J	2	GLC	C2-C3-C4	2.19	114.69	110.89
3	N	2	GLC	O3-C3-C4	-2.17	105.32	110.35
3	R	2	GLC	O5-C5-C6	2.17	110.60	107.20
2	Q	2	GLC	O1-C1-C2	-2.15	102.99	109.03

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	R	2	GLC	C2-C3-C4	-2.12	107.23	110.89
2	W	2	GLC	C3-C4-C5	-2.11	106.47	110.24
2	V	2	GLC	O5-C1-C2	2.10	114.04	110.28
3	Z	2	GLC	O5-C1-C2	2.10	114.01	110.77
3	S	1	GLC	O3-C3-C2	-2.09	105.51	110.35
2	T	1	GLC	C1-O5-C5	2.09	115.02	112.19
3	K	1	GLC	C3-C4-C5	2.07	113.93	110.24
3	Z	2	GLC	O3-C3-C4	2.07	115.13	110.35
3	S	2	GLC	C1-O5-C5	2.07	114.99	112.19
2	V	2	GLC	C3-C4-C5	2.07	113.92	110.24
3	N	1	GLC	O2-C2-C1	2.06	113.94	109.16
2	L	1	GLC	O3-C3-C4	-2.06	105.59	110.35
3	F	1	GLC	O2-C2-C3	2.06	115.11	110.35
3	Y	2	GLC	C3-C4-C5	-2.04	106.59	110.24
3	R	1	GLC	O6-C6-C5	2.02	118.21	111.29
3	I	2	GLC	O2-C2-C1	-2.02	105.03	109.15

There are no chirality outliers.

All (58) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	E	2	GLC	O5-C5-C6-O6
2	W	2	GLC	O5-C5-C6-O6
3	O	1	GLC	O5-C5-C6-O6
2	G	1	GLC	O5-C5-C6-O6
3	N	2	GLC	O5-C5-C6-O6
2	Q	1	GLC	C4-C5-C6-O6
3	M	2	GLC	O5-C5-C6-O6
2	L	1	GLC	C4-C5-C6-O6
3	F	2	GLC	C4-C5-C6-O6
2	H	2	GLC	O5-C5-C6-O6
3	F	1	GLC	O5-C5-C6-O6
3	S	1	GLC	O5-C5-C6-O6
3	Y	1	GLC	O5-C5-C6-O6
2	E	1	GLC	C4-C5-C6-O6
2	U	1	GLC	C4-C5-C6-O6
3	M	2	GLC	C4-C5-C6-O6
2	U	1	GLC	O5-C5-C6-O6
2	G	1	GLC	C4-C5-C6-O6
2	H	2	GLC	C4-C5-C6-O6
2	Q	1	GLC	O5-C5-C6-O6
3	F	2	GLC	O5-C5-C6-O6

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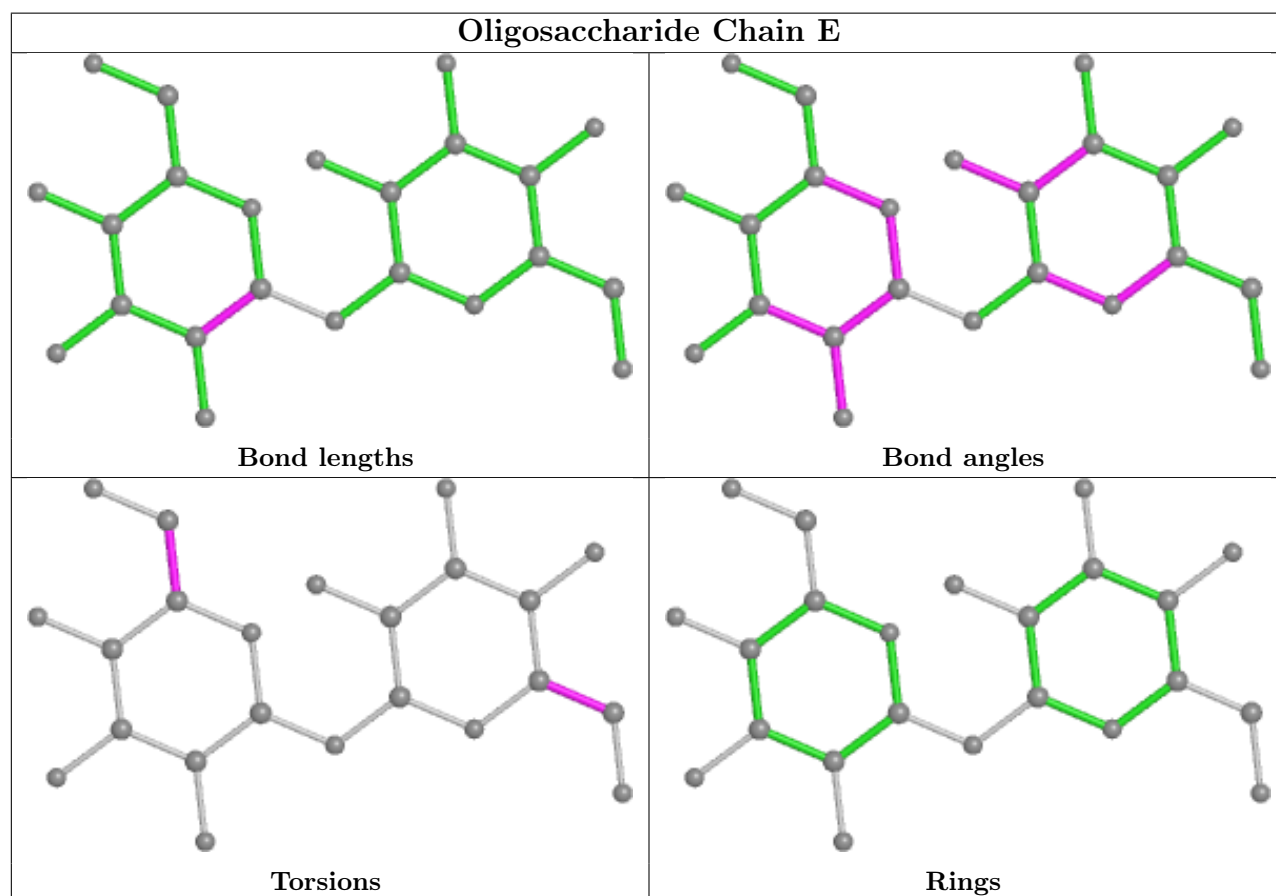
Mol	Chain	Res	Type	Atoms
2	E	2	GLC	C4-C5-C6-O6
2	W	2	GLC	C4-C5-C6-O6
3	O	1	GLC	C4-C5-C6-O6
2	W	1	GLC	C4-C5-C6-O6
3	S	2	GLC	O5-C5-C6-O6
3	N	2	GLC	C4-C5-C6-O6
3	Y	1	GLC	C4-C5-C6-O6
2	P	2	GLC	O5-C5-C6-O6
3	R	2	GLC	O5-C5-C6-O6
3	R	2	GLC	C4-C5-C6-O6
2	E	1	GLC	O5-C5-C6-O6
3	I	1	GLC	O5-C5-C6-O6
2	T	2	GLC	O5-C5-C6-O6
3	F	1	GLC	C4-C5-C6-O6
3	S	1	GLC	C4-C5-C6-O6
2	H	1	GLC	O5-C5-C6-O6
2	L	1	GLC	O5-C5-C6-O6
2	W	1	GLC	O5-C5-C6-O6
3	X	2	GLC	O5-C5-C6-O6
2	V	1	GLC	C4-C5-C6-O6
3	I	1	GLC	C4-C5-C6-O6
2	U	2	GLC	C4-C5-C6-O6
3	S	2	GLC	C4-C5-C6-O6
2	V	1	GLC	O5-C5-C6-O6
2	P	2	GLC	C4-C5-C6-O6
3	Z	2	GLC	C4-C5-C6-O6
3	K	1	GLC	O5-C5-C6-O6
3	O	2	GLC	C4-C5-C6-O6
3	Z	2	GLC	O5-C5-C6-O6
2	P	1	GLC	C4-C5-C6-O6
2	U	2	GLC	O5-C5-C6-O6
2	H	1	GLC	C4-C5-C6-O6
3	Y	2	GLC	O5-C5-C6-O6
3	X	2	GLC	C4-C5-C6-O6
2	T	2	GLC	C4-C5-C6-O6
2	P	1	GLC	O5-C5-C6-O6
3	K	1	GLC	C4-C5-C6-O6

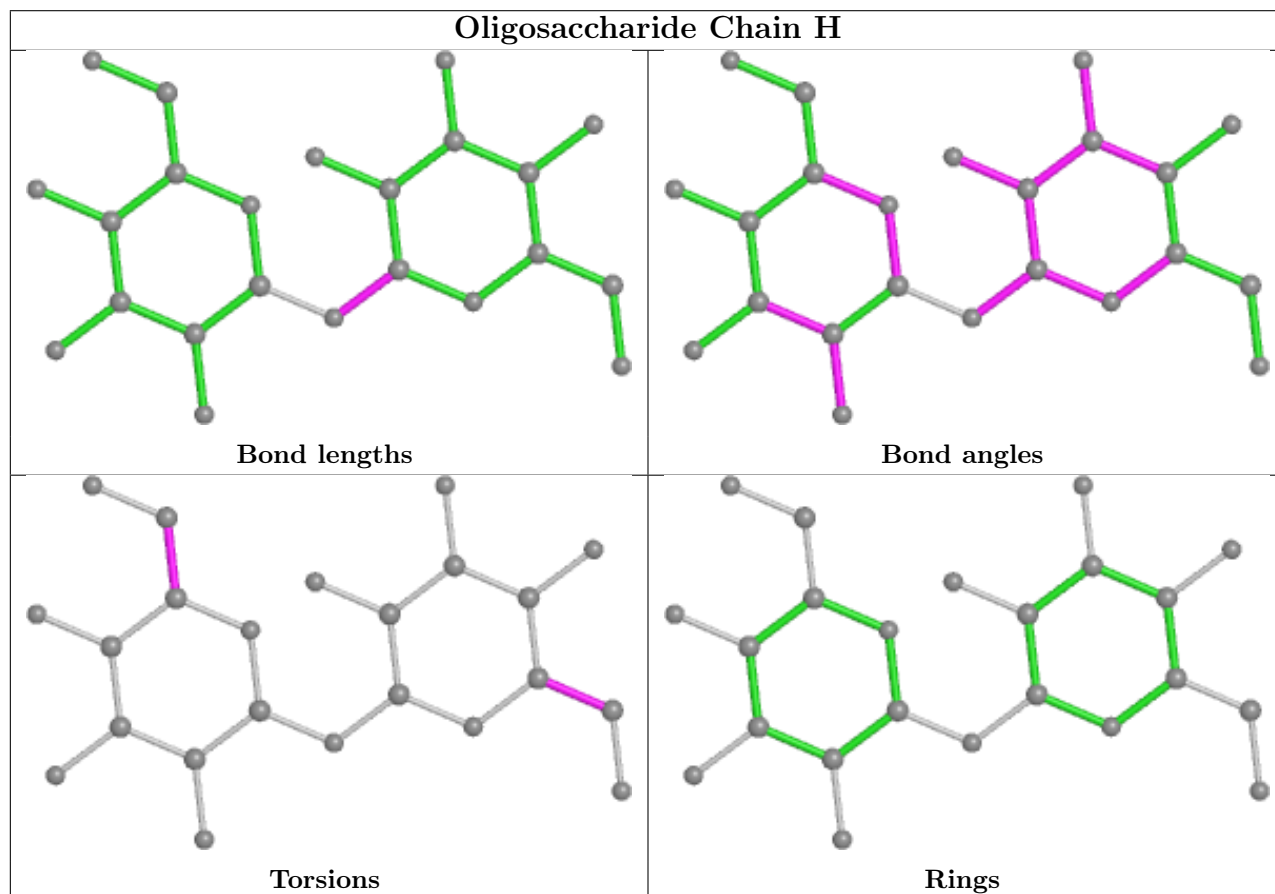
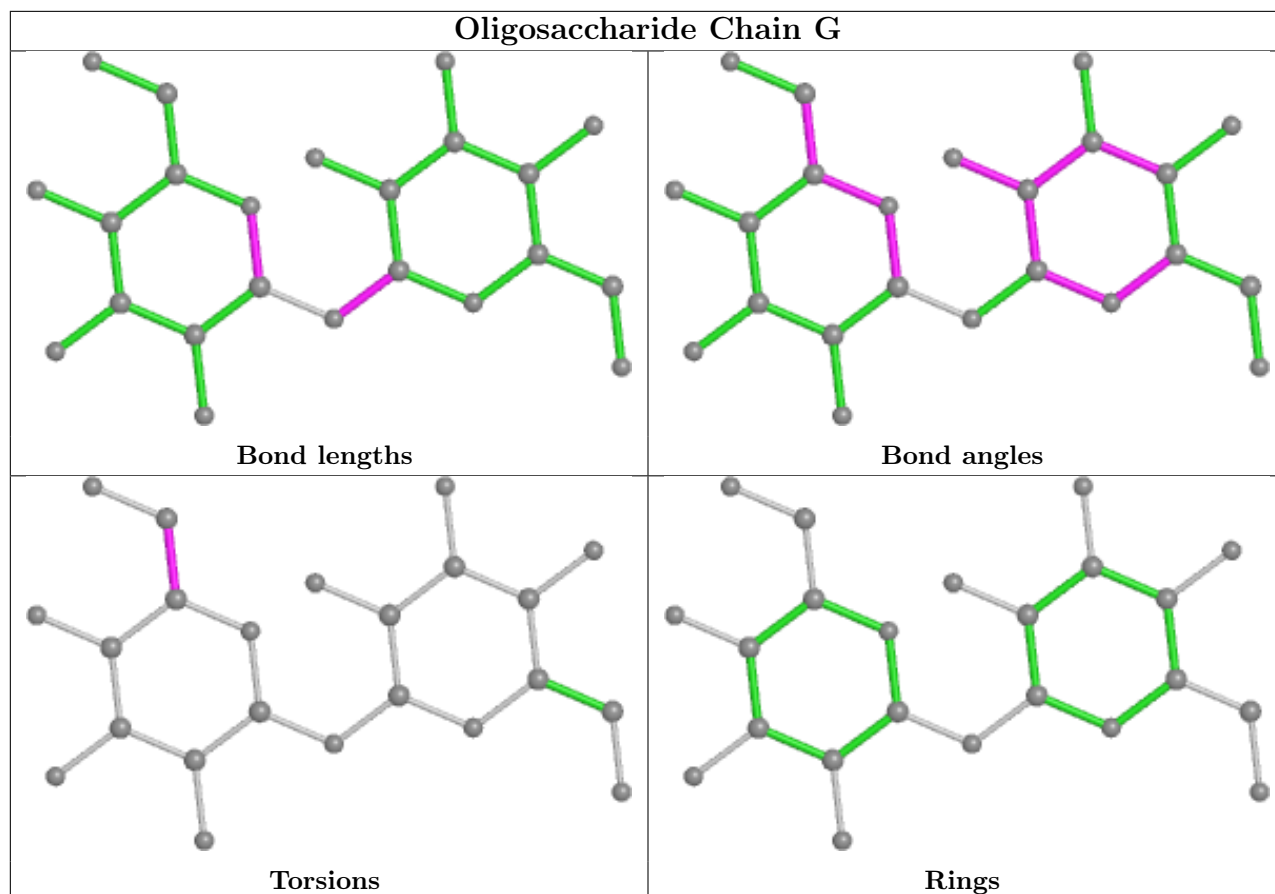
There are no ring outliers.

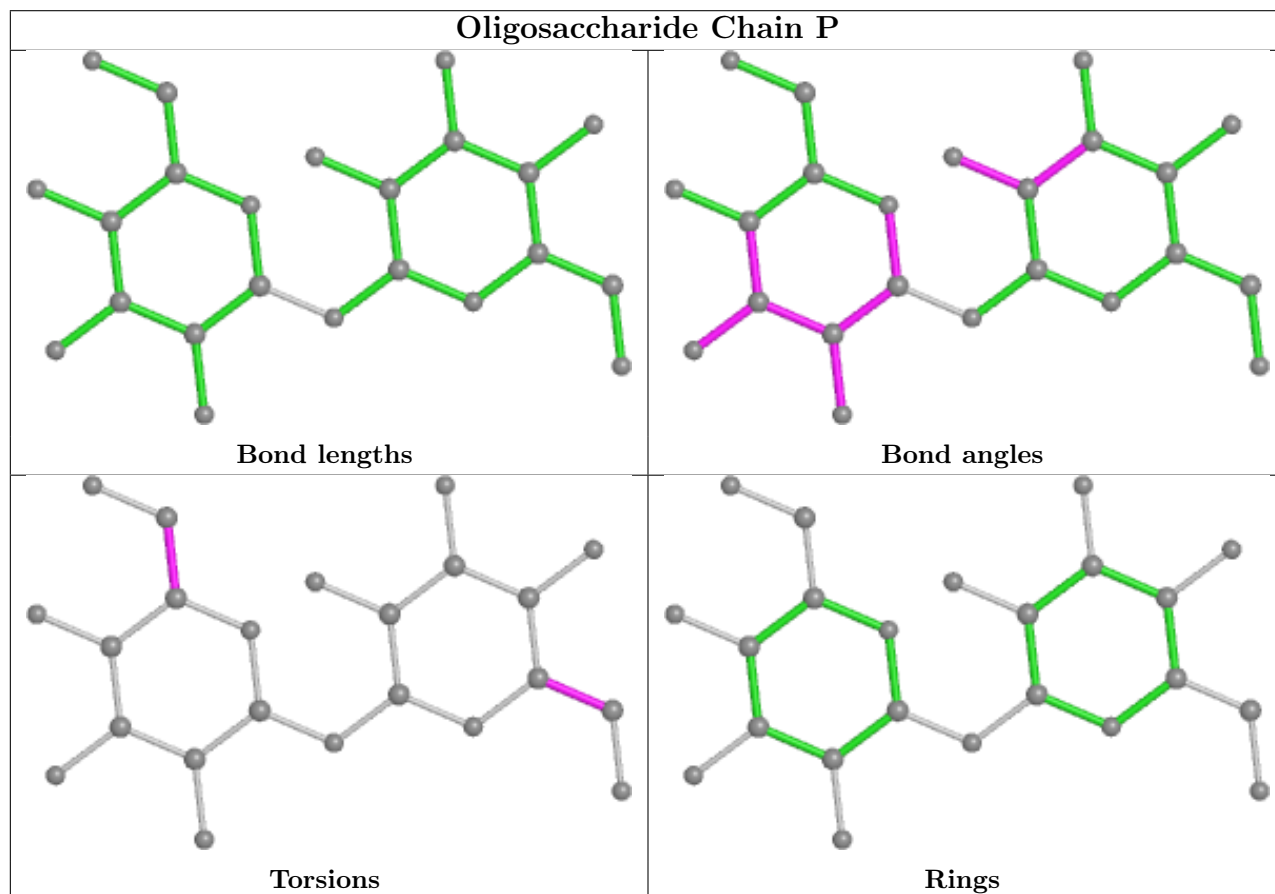
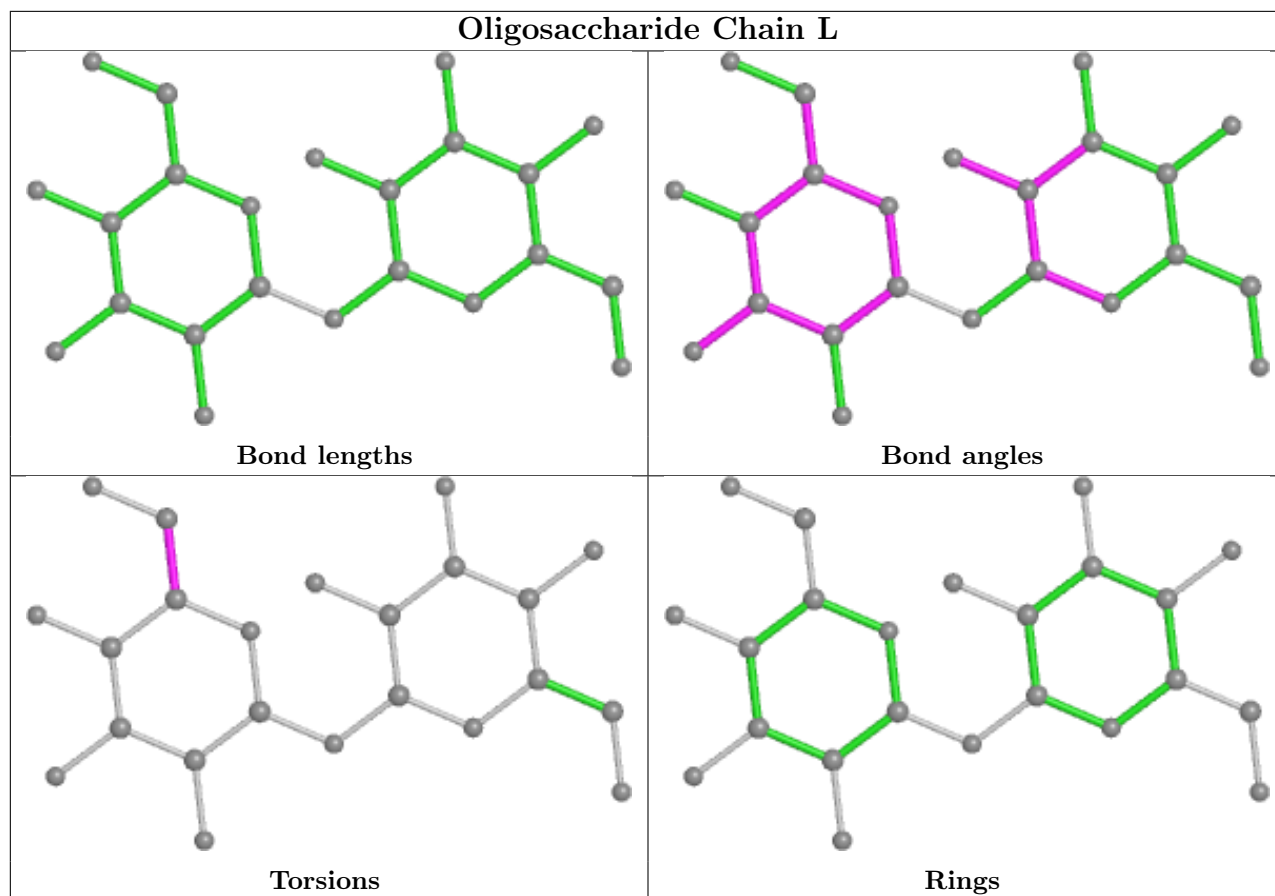
15 monomers are involved in 26 short contacts:

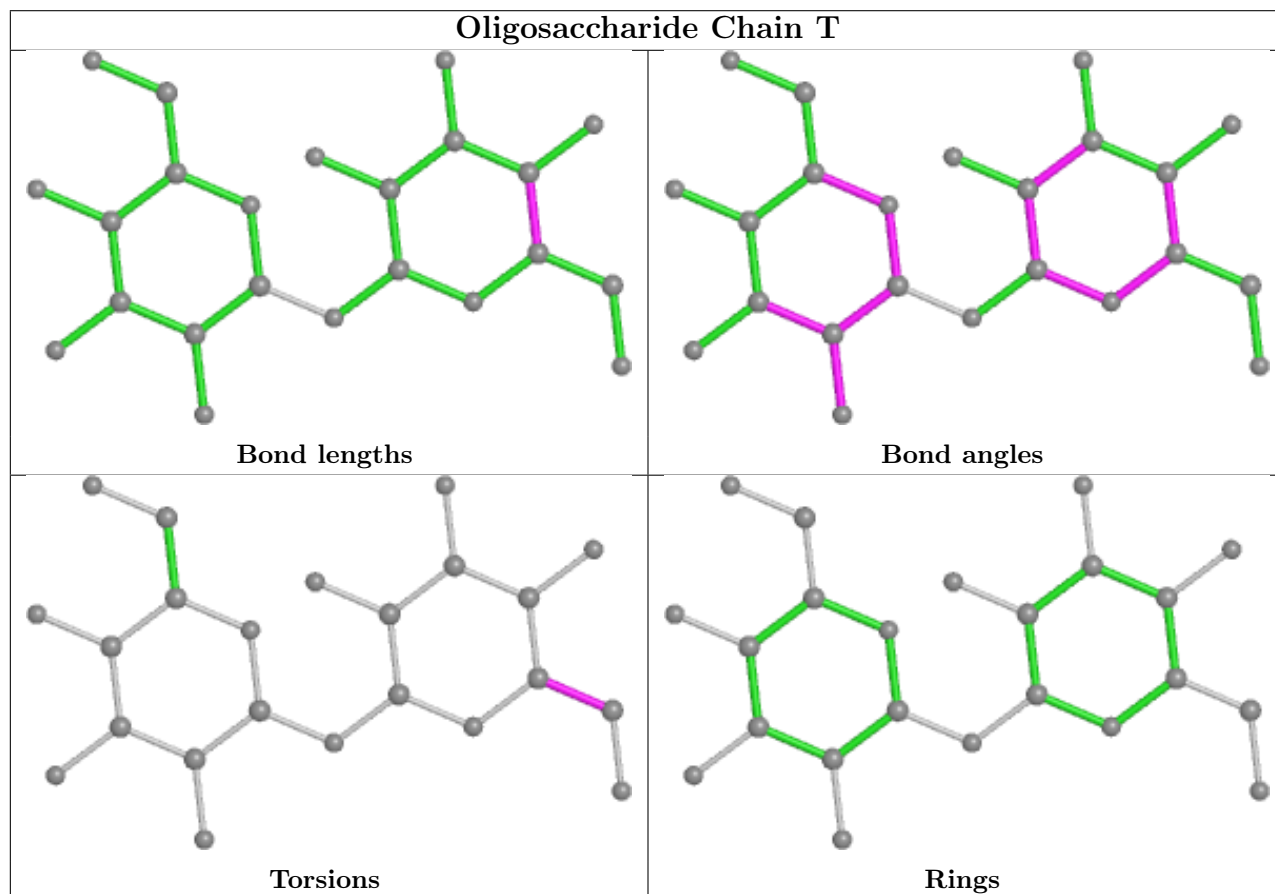
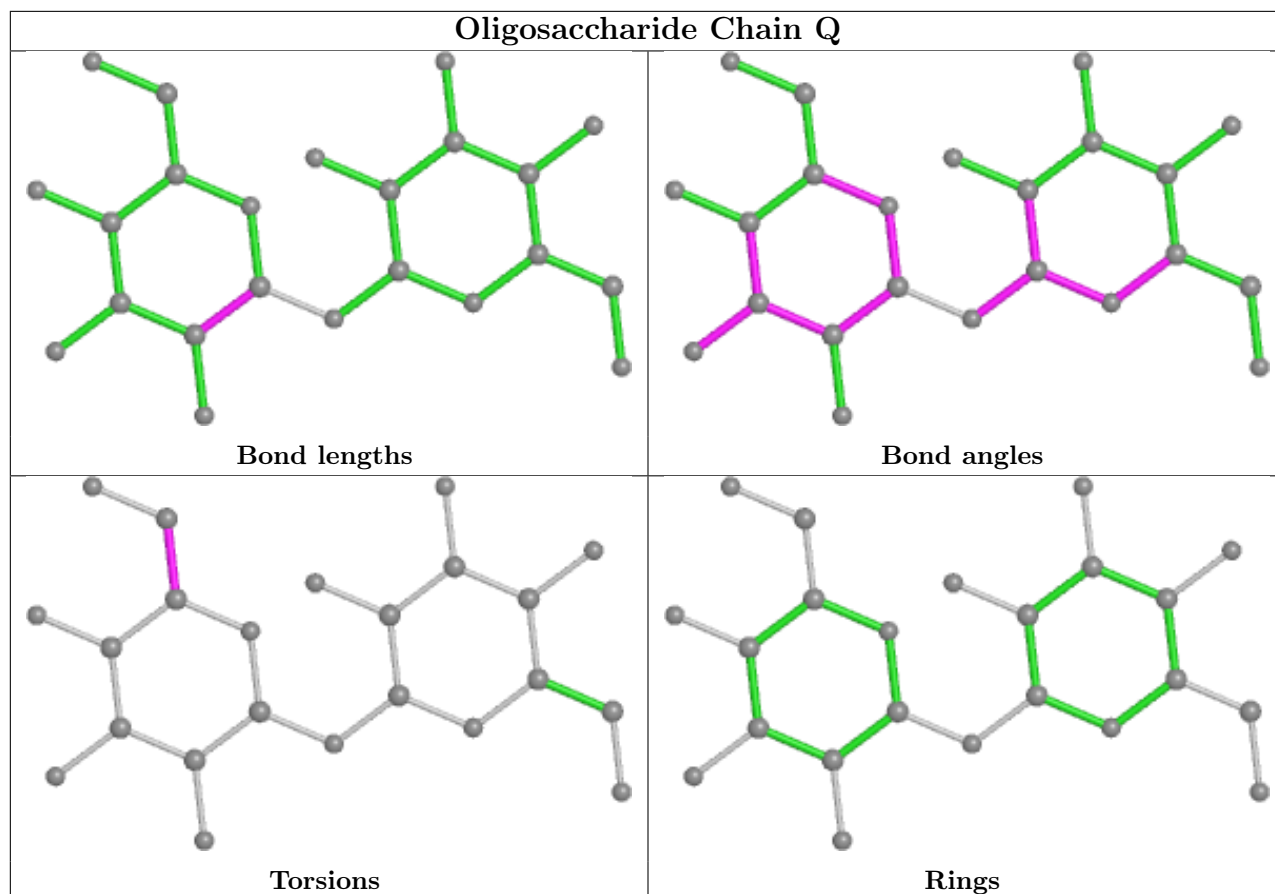
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	E	1	GLC	1	0
2	E	2	GLC	1	0
2	W	1	GLC	1	0
2	U	1	GLC	4	0
3	R	1	GLC	1	0
3	F	2	GLC	3	0
2	W	2	GLC	6	0
2	G	1	GLC	2	0
2	G	2	GLC	2	0
3	Y	1	GLC	3	0
3	S	1	GLC	2	0
2	Q	2	GLC	1	0
2	P	1	GLC	1	0
2	U	2	GLC	3	0
3	N	2	GLC	1	0

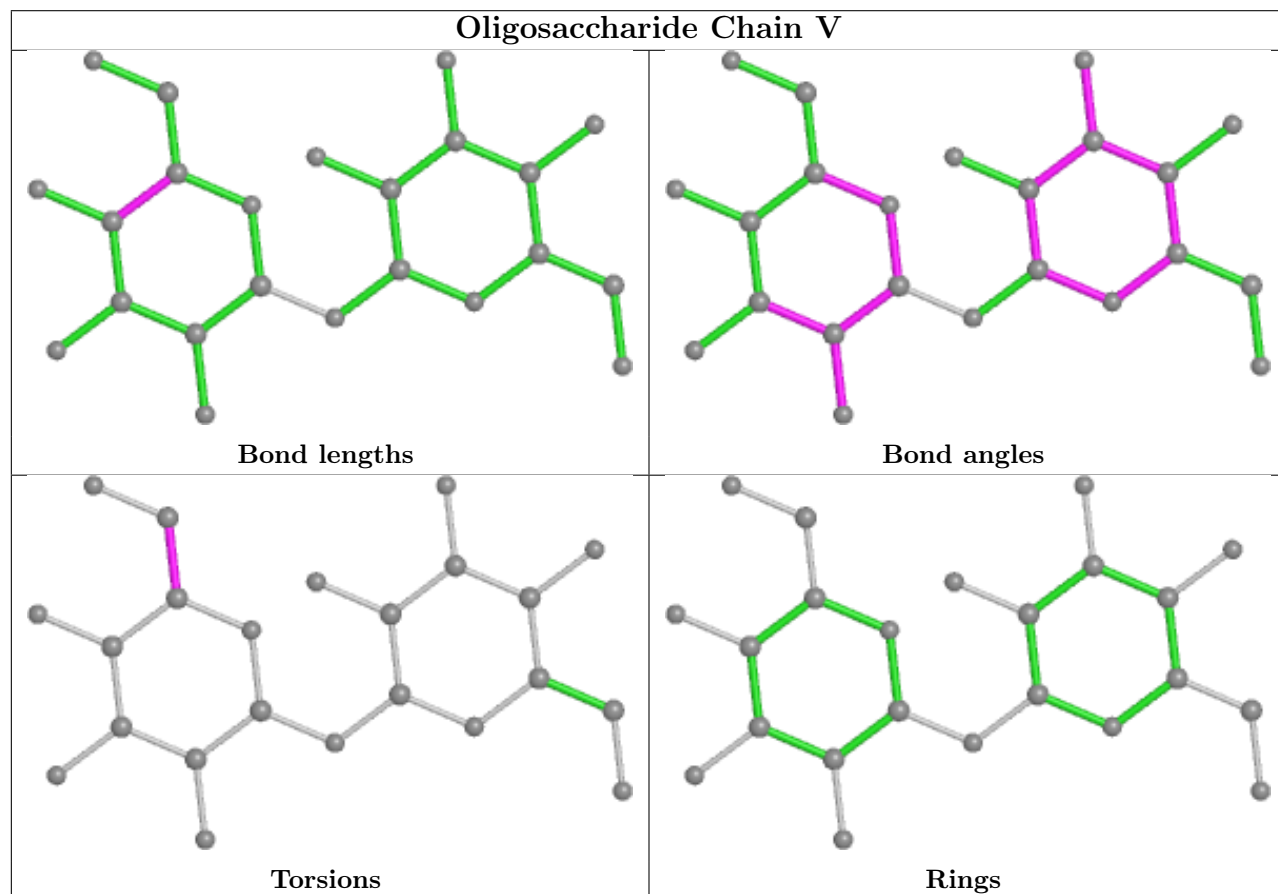
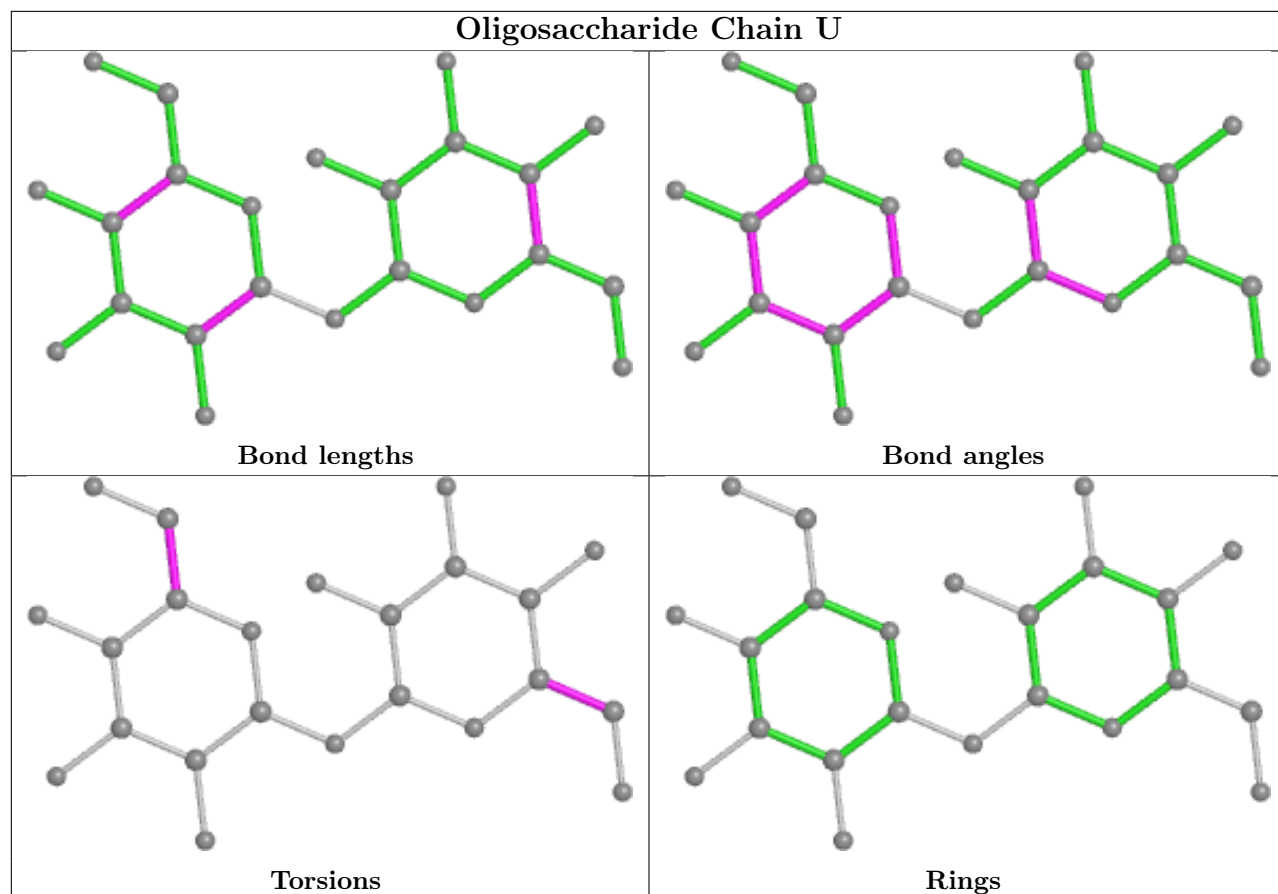
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

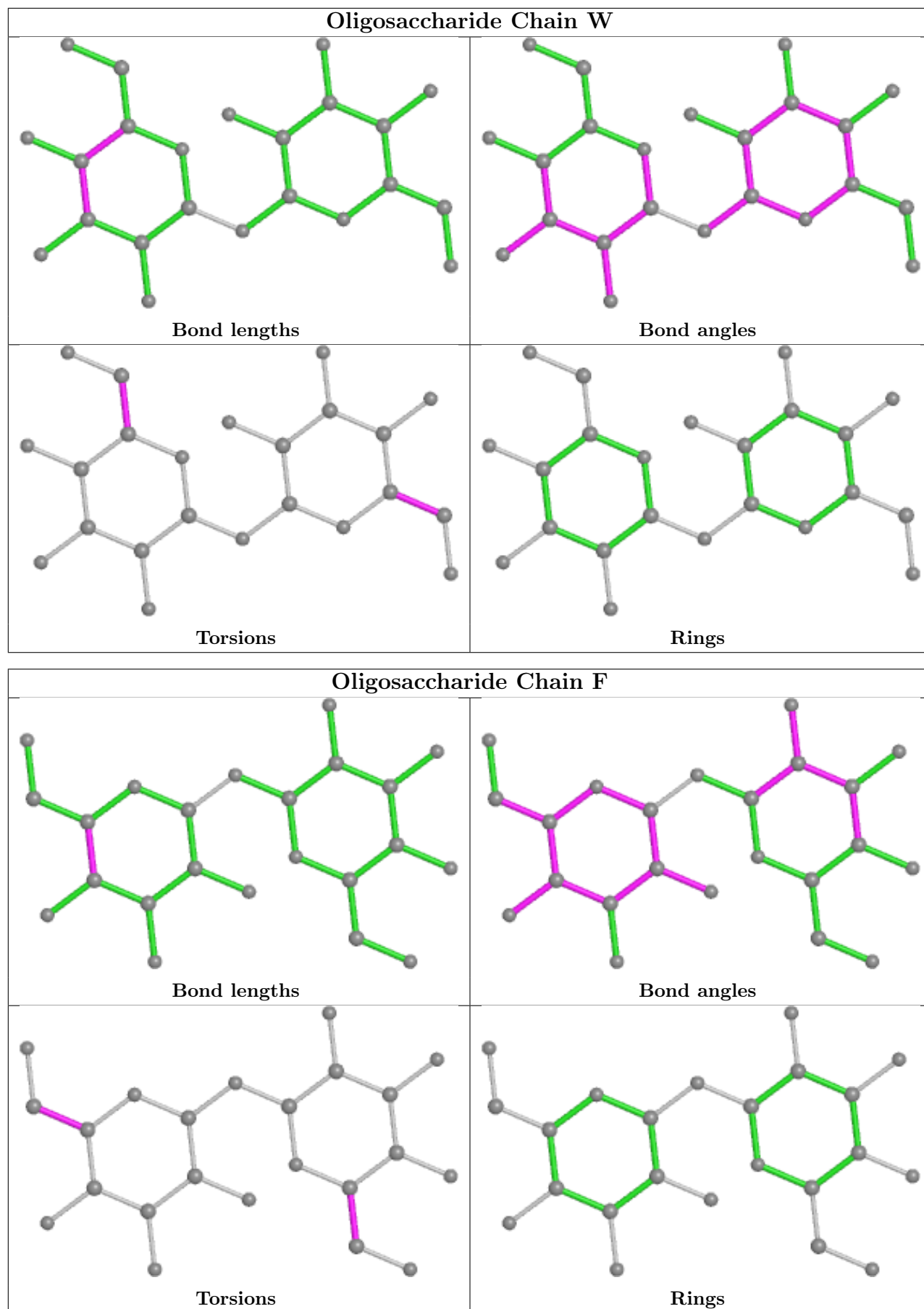


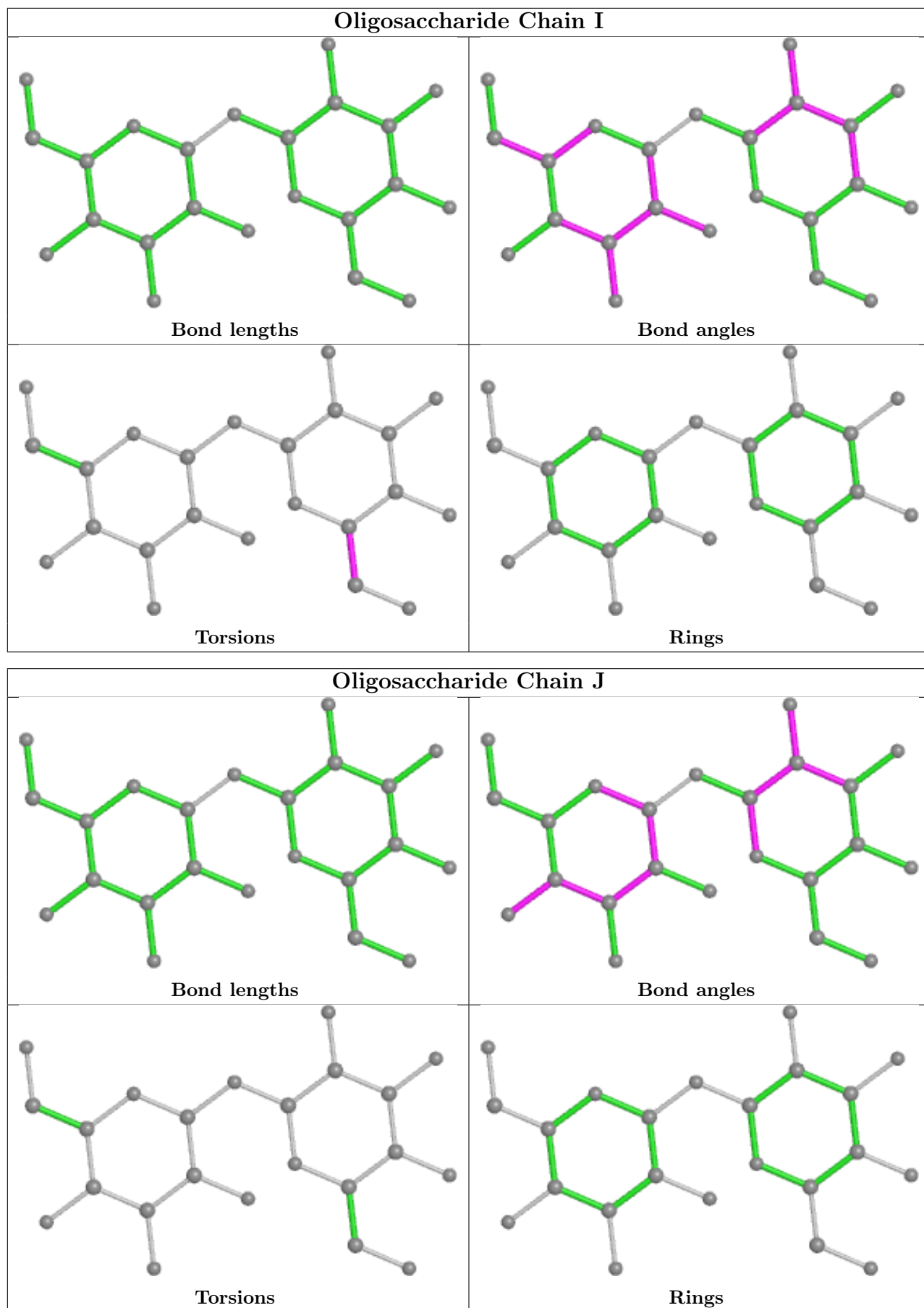


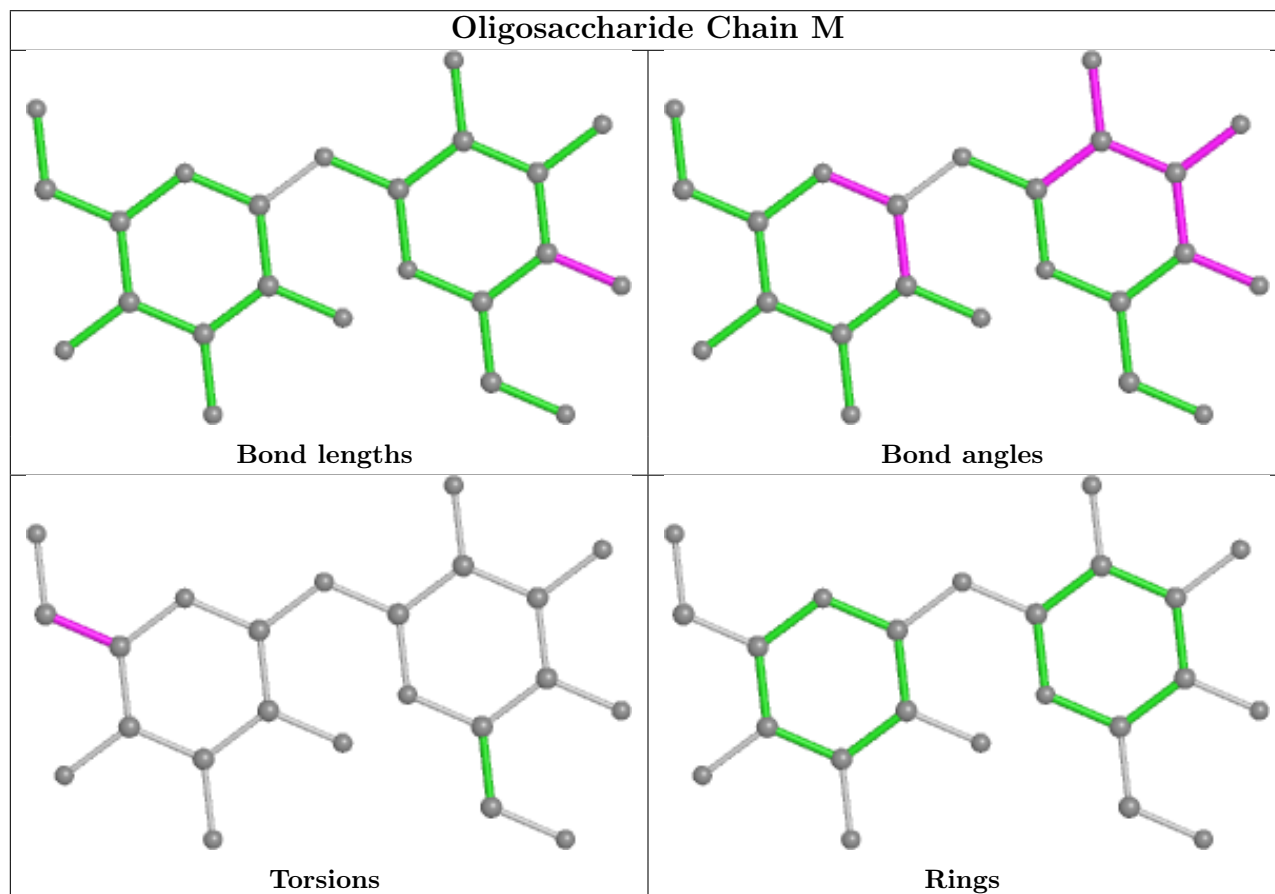
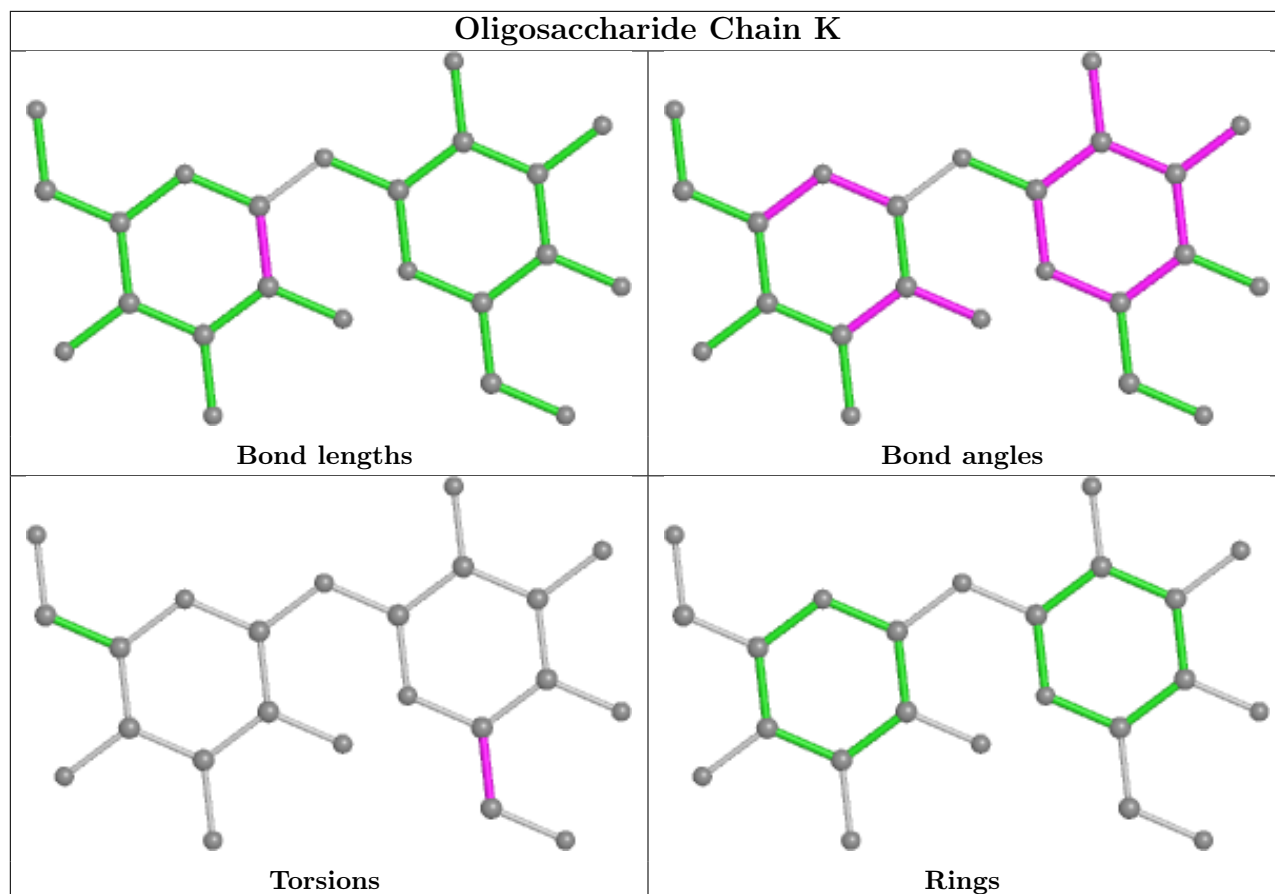


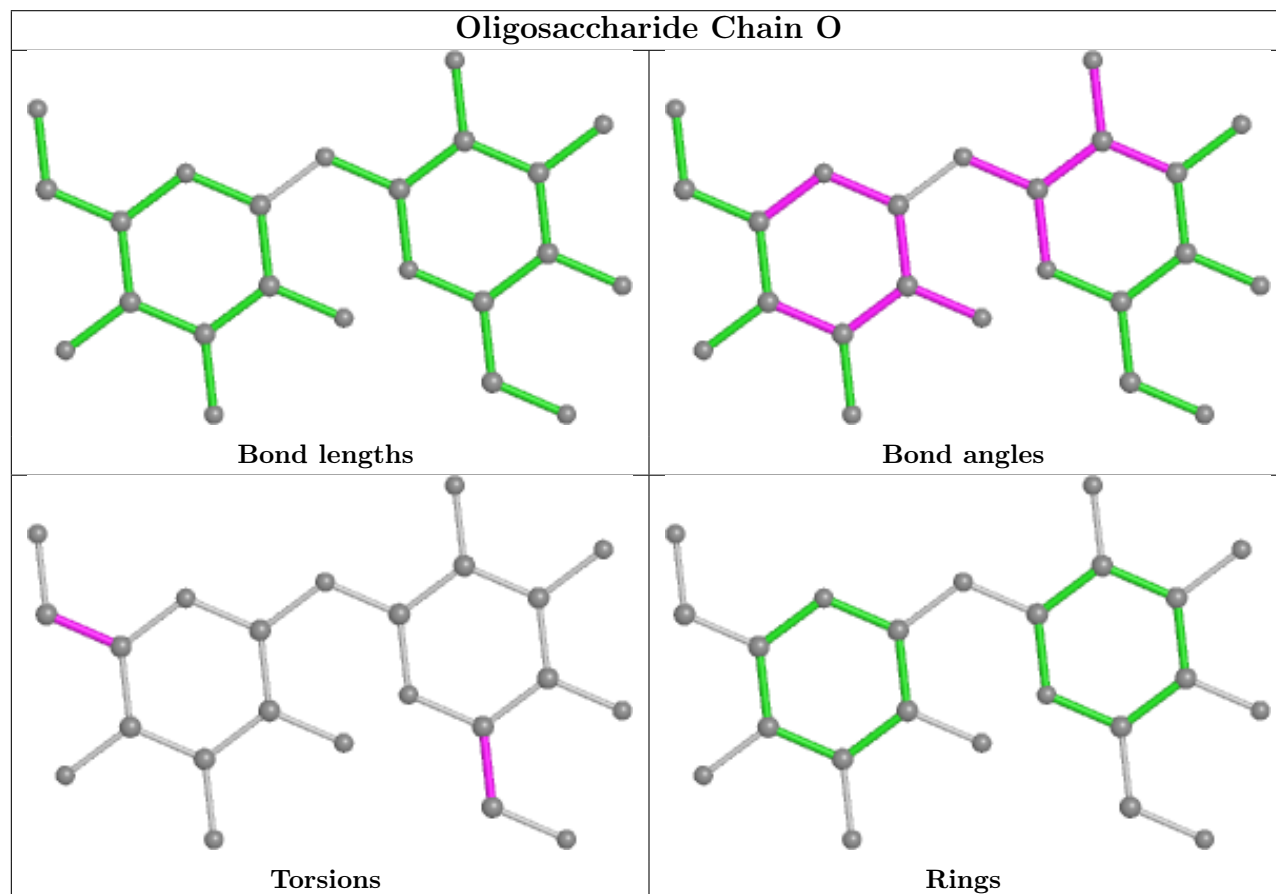
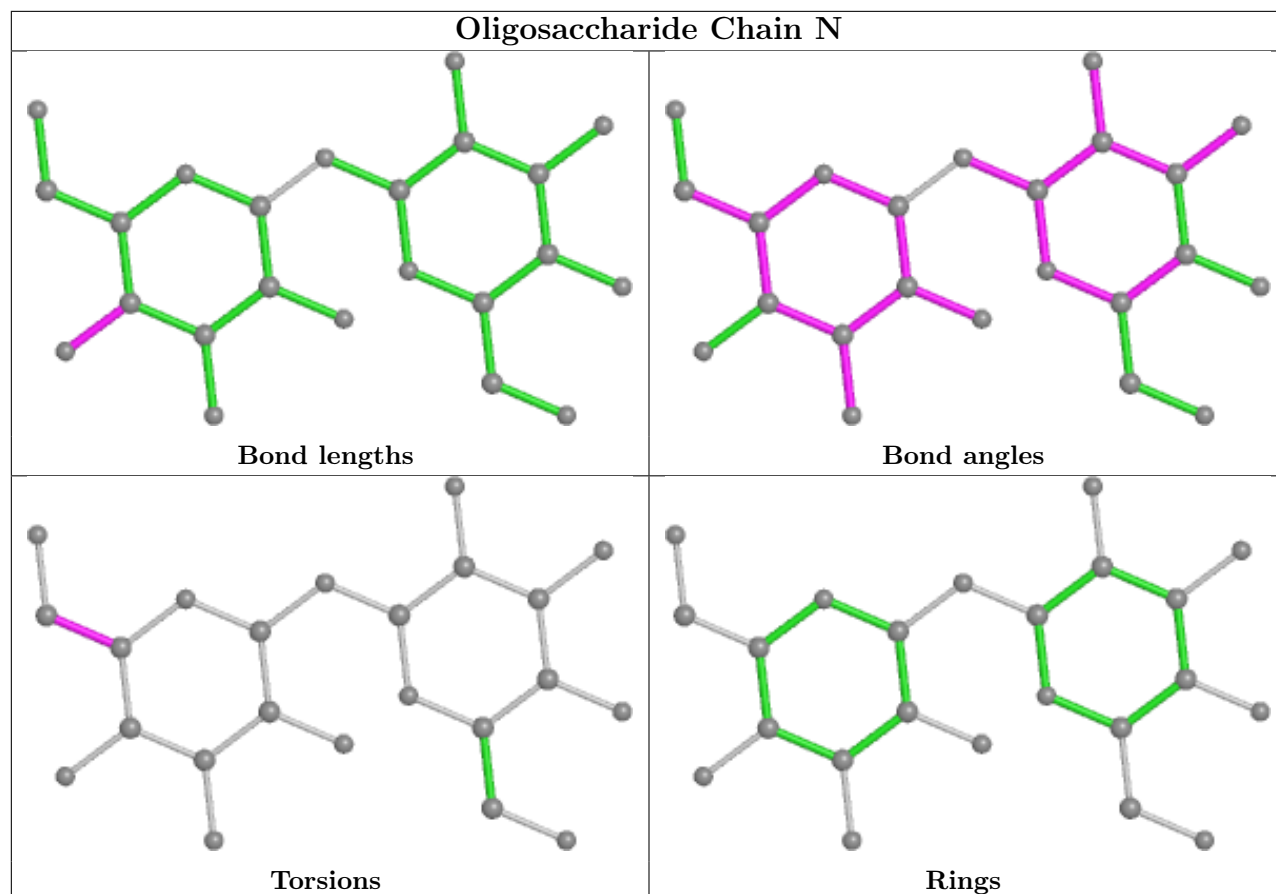


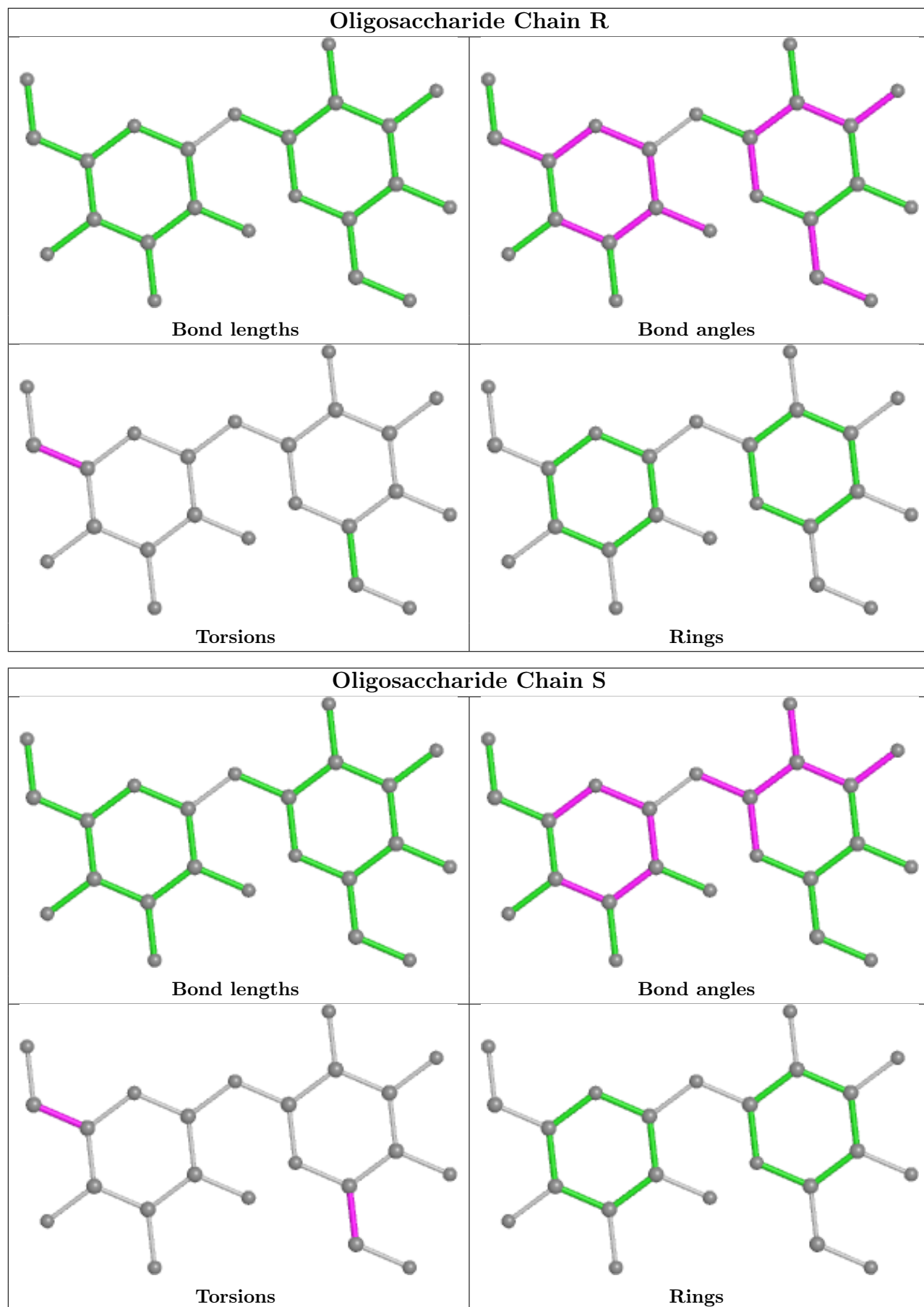


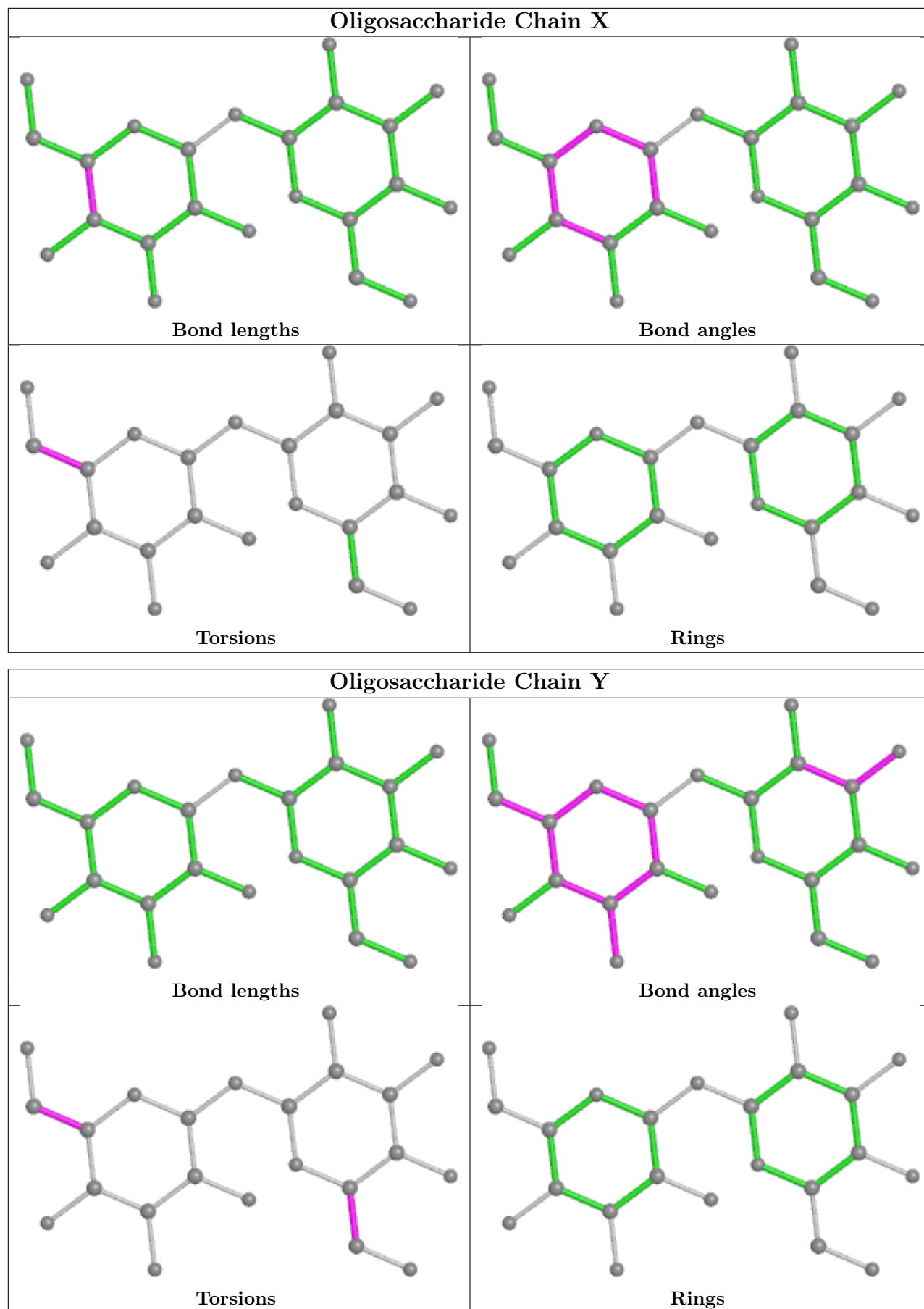


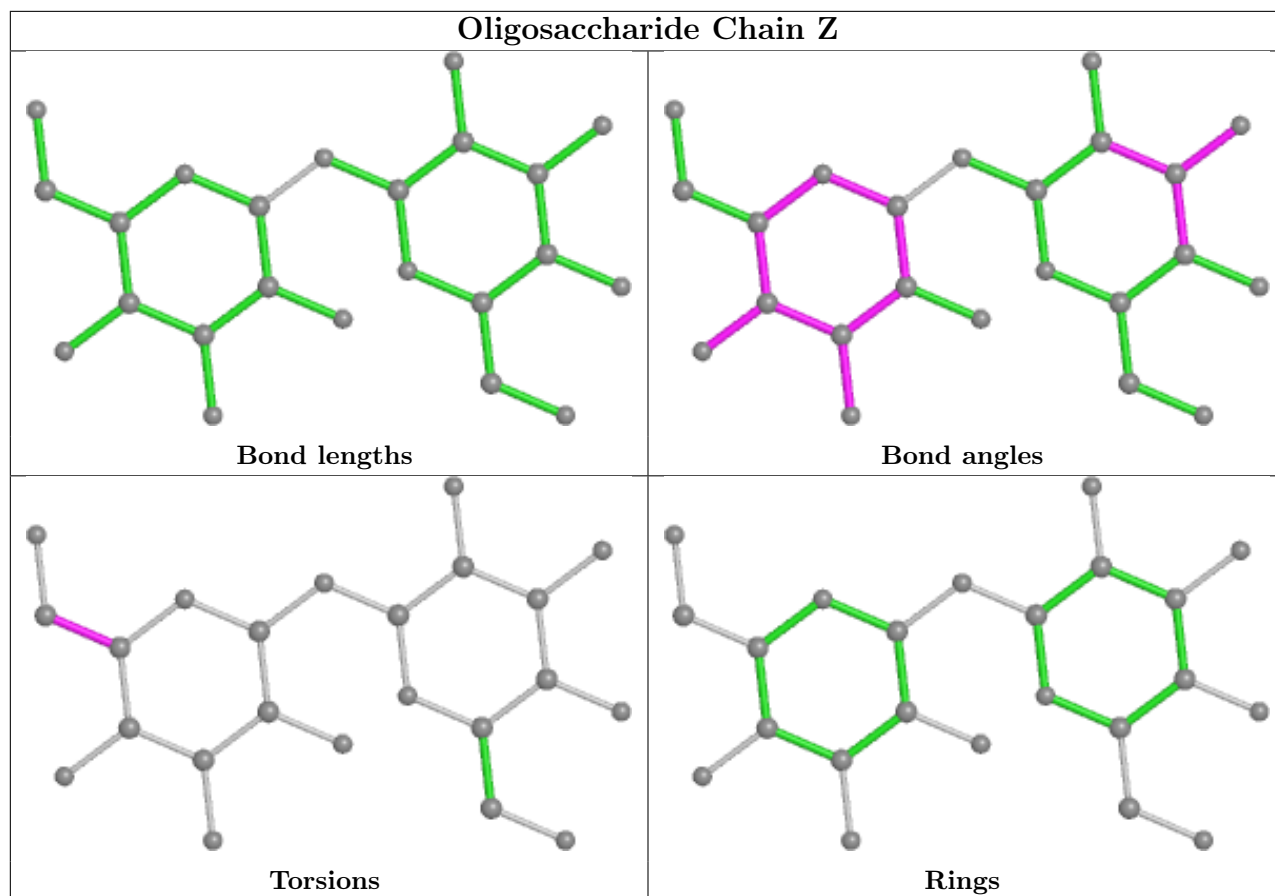












5.6 Ligand geometry [i](#)

4 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z > 2$	Counts	RMSZ	# $ Z > 2$
4	NAD	B	501	-	42,48,48	0.98	2 (4%)	50,73,73	1.29	8 (16%)
4	NAD	D	501	-	42,48,48	0.75	1 (2%)	50,73,73	1.11	4 (8%)
4	NAD	C	501	-	42,48,48	0.88	2 (4%)	50,73,73	1.47	8 (16%)
4	NAD	A	501	-	42,48,48	0.87	1 (2%)	50,73,73	1.12	5 (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
4	NAD	B	501	-	-	3/26/62/62	0/5/5/5
4	NAD	D	501	-	-	5/26/62/62	0/5/5/5
4	NAD	C	501	-	-	7/26/62/62	0/5/5/5
4	NAD	A	501	-	-	5/26/62/62	0/5/5/5

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	501	NAD	C2N-N1N	3.59	1.39	1.35
4	A	501	NAD	C2N-N1N	3.35	1.39	1.35
4	B	501	NAD	O4D-C1D	3.12	1.45	1.41
4	C	501	NAD	O4D-C1D	2.91	1.45	1.41
4	D	501	NAD	C2N-N1N	2.53	1.38	1.35
4	C	501	NAD	C2N-N1N	2.38	1.37	1.35

All (25) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	501	NAD	C2N-C3N-C4N	3.62	122.36	118.26
4	C	501	NAD	O2B-C2B-C1B	3.52	123.86	110.85
4	C	501	NAD	C6N-N1N-C2N	-3.27	119.00	121.97
4	B	501	NAD	C2N-C3N-C4N	3.16	121.84	118.26
4	C	501	NAD	C4N-C3N-C7N	-3.00	113.02	121.04
4	A	501	NAD	O2B-C2B-C1B	2.99	121.88	110.85
4	D	501	NAD	C6N-N1N-C2N	-2.97	119.27	121.97
4	B	501	NAD	O3D-C3D-C4D	-2.83	102.85	111.05
4	B	501	NAD	C3N-C2N-N1N	-2.72	117.77	120.43
4	D	501	NAD	O2N-PN-O1N	2.59	125.06	112.24
4	B	501	NAD	O4B-C1B-C2B	-2.51	103.26	106.93
4	D	501	NAD	C5A-C6A-N6A	2.38	123.96	120.35
4	B	501	NAD	O2N-PN-O1N	2.35	123.84	112.24
4	D	501	NAD	C2N-C3N-C4N	2.27	120.84	118.26
4	B	501	NAD	C6N-N1N-C2N	-2.25	119.92	121.97
4	A	501	NAD	C4A-C5A-N7A	2.21	111.70	109.40
4	C	501	NAD	C5A-C6A-N6A	2.19	123.68	120.35
4	A	501	NAD	C6N-N1N-C2N	-2.16	120.01	121.97
4	A	501	NAD	C2N-C3N-C7N	2.15	125.70	119.46
4	C	501	NAD	C3B-C2B-C1B	-2.14	97.76	100.98
4	C	501	NAD	C3N-C2N-N1N	-2.12	118.35	120.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	501	NAD	O2D-C2D-C3D	2.11	118.64	111.82
4	B	501	NAD	O2A-PA-O1A	2.09	122.57	112.24
4	C	501	NAD	O2D-C2D-C1D	2.07	118.51	110.85
4	A	501	NAD	O2A-PA-O1A	2.00	122.14	112.24

There are no chirality outliers.

All (20) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	501	NAD	O4D-C1D-N1N-C2N
4	A	501	NAD	O4D-C1D-N1N-C6N
4	A	501	NAD	C2D-C1D-N1N-C2N
4	A	501	NAD	C2D-C1D-N1N-C6N
4	B	501	NAD	O4D-C1D-N1N-C6N
4	C	501	NAD	O4D-C1D-N1N-C2N
4	C	501	NAD	O4D-C1D-N1N-C6N
4	C	501	NAD	C2D-C1D-N1N-C2N
4	D	501	NAD	C5D-O5D-PN-O2N
4	D	501	NAD	O4D-C1D-N1N-C6N
4	C	501	NAD	O4B-C4B-C5B-O5B
4	C	501	NAD	C3B-C4B-C5B-O5B
4	D	501	NAD	PN-O3-PA-O5B
4	D	501	NAD	C4N-C3N-C7N-N7N
4	C	501	NAD	PN-O3-PA-O1A
4	B	501	NAD	C4N-C3N-C7N-N7N
4	D	501	NAD	O4B-C4B-C5B-O5B
4	C	501	NAD	PN-O3-PA-O2A
4	A	501	NAD	O4B-C4B-C5B-O5B
4	B	501	NAD	O4B-C4B-C5B-O5B

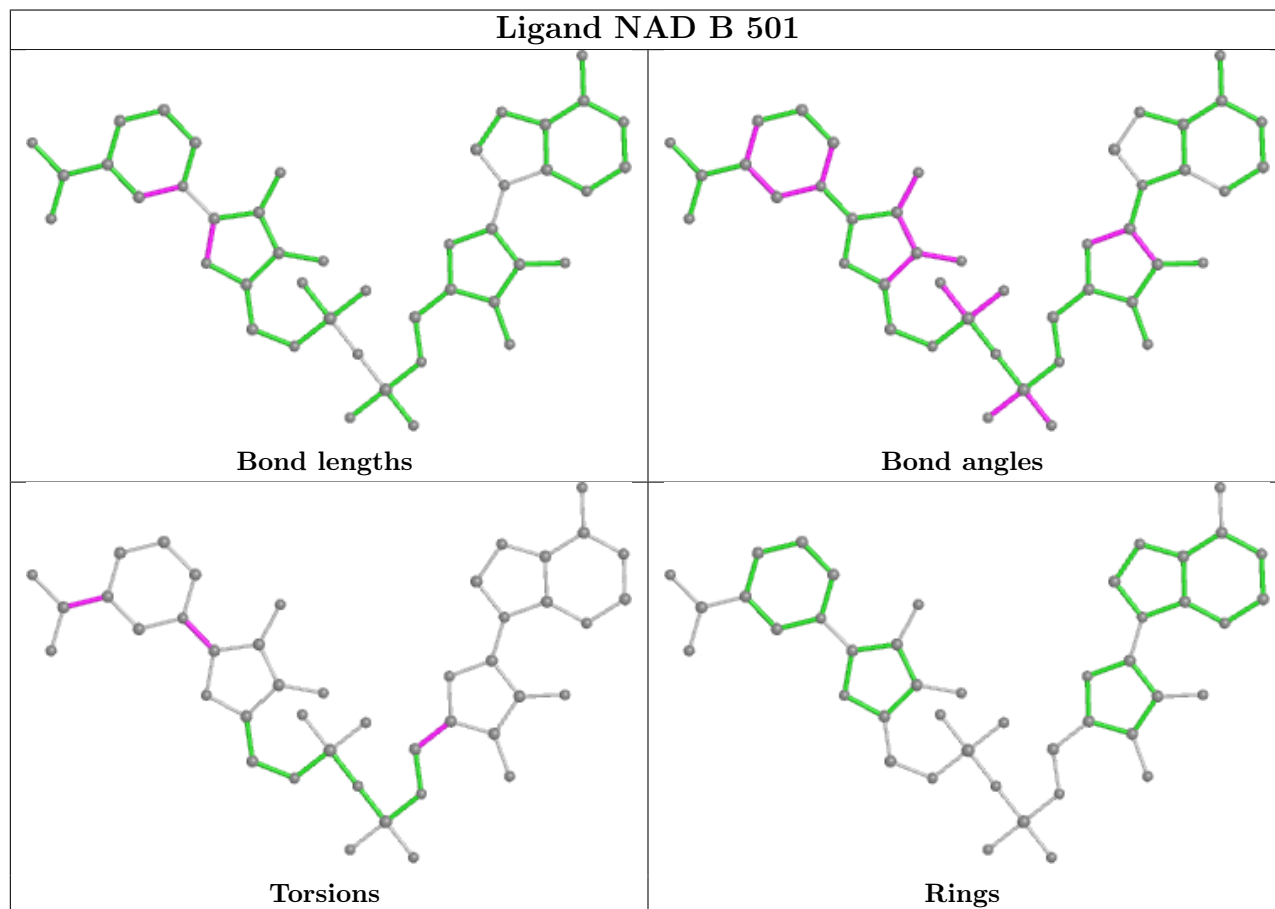
There are no ring outliers.

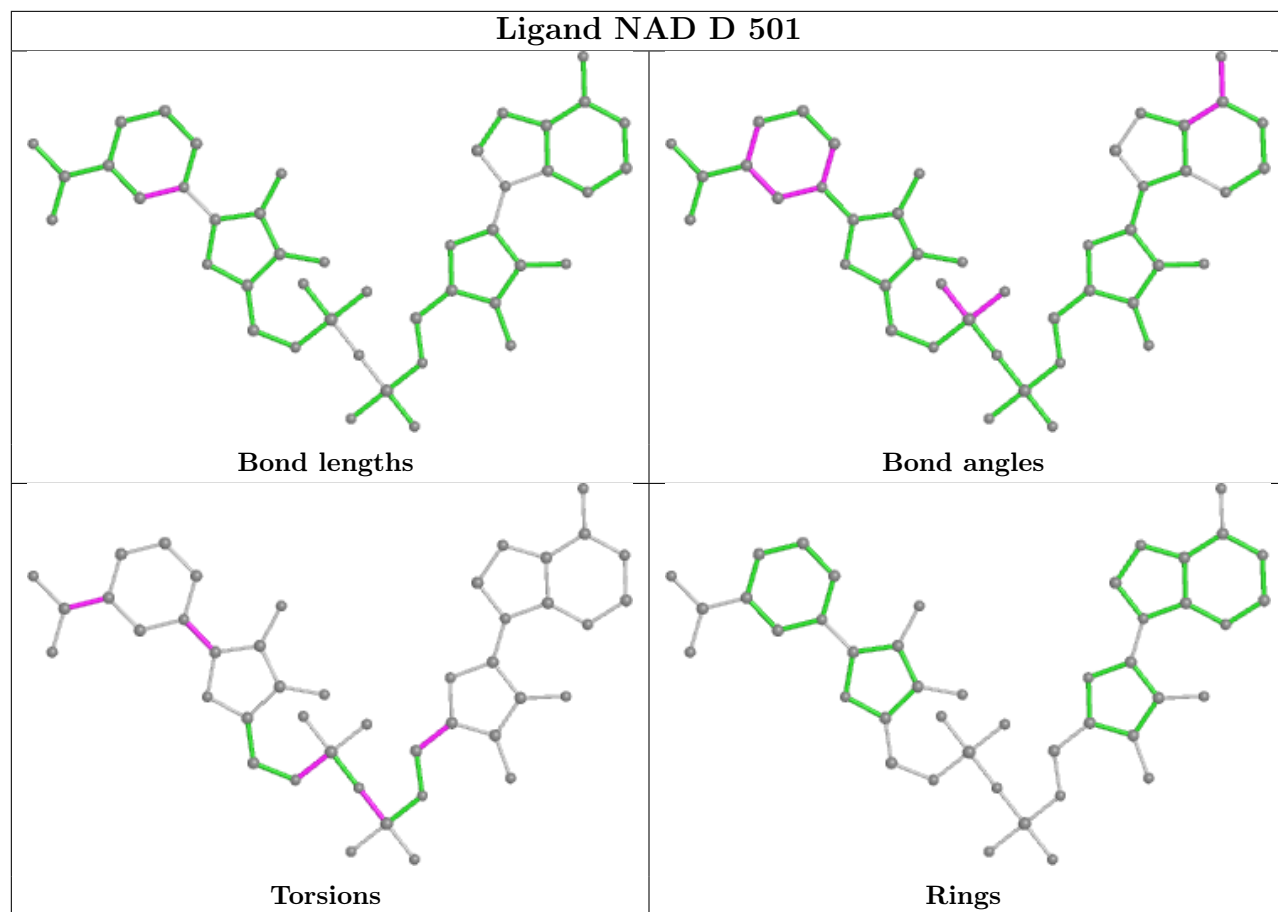
4 monomers are involved in 10 short contacts:

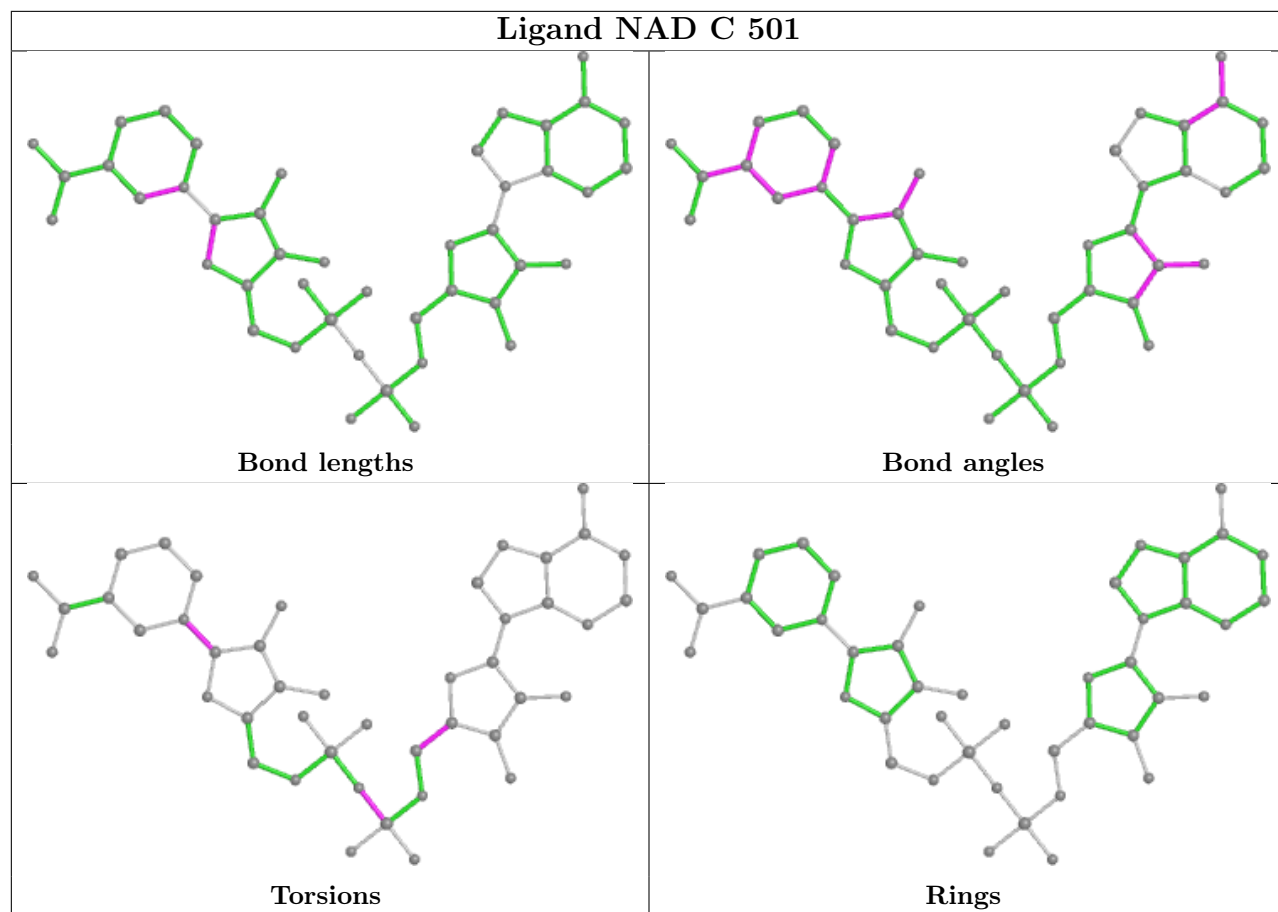
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	501	NAD	3	0
4	D	501	NAD	2	0
4	C	501	NAD	2	0
4	A	501	NAD	3	0

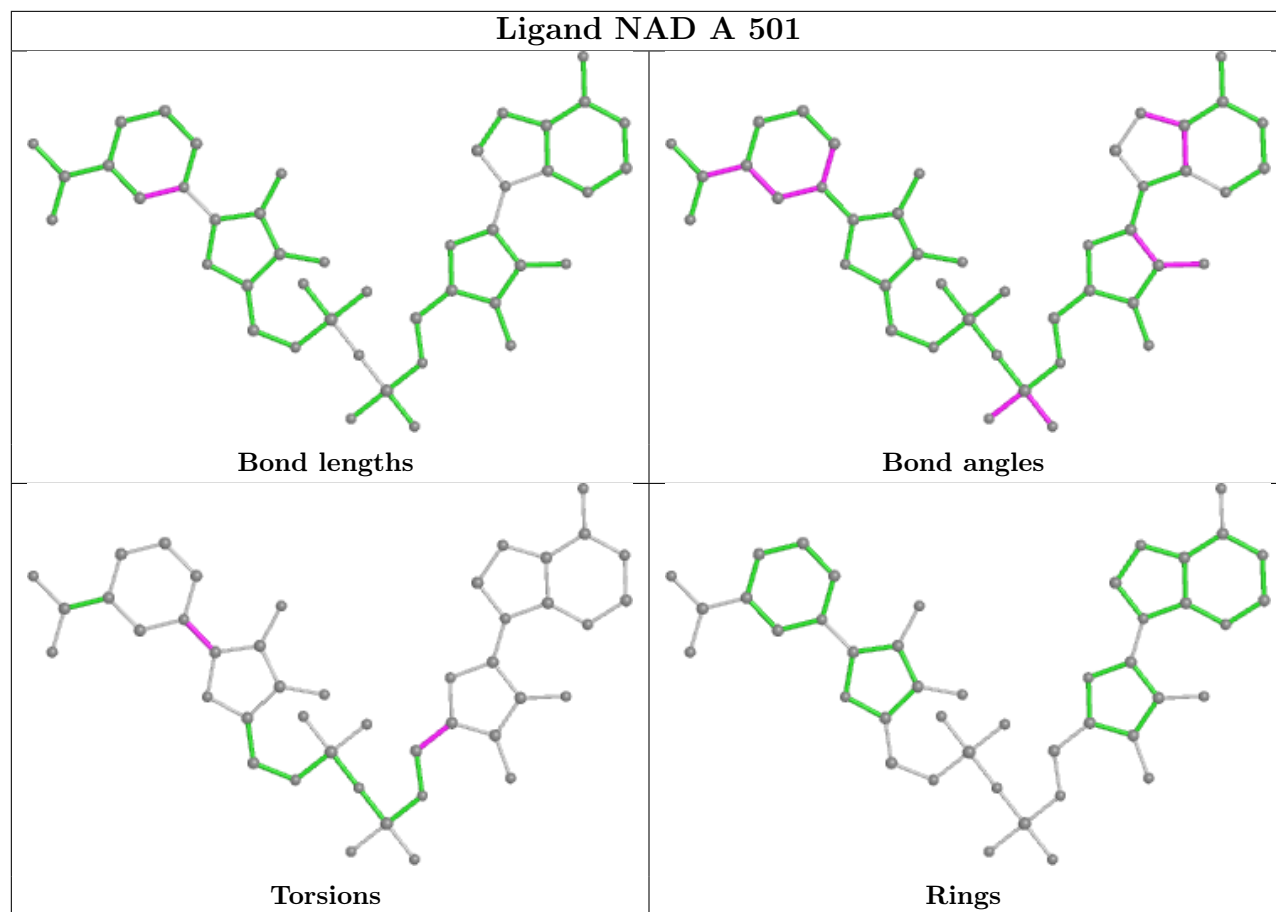
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In

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









5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

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

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

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	451/451 (100%)	-0.29	0 100 100	20, 27, 39, 48	0
1	B	451/451 (100%)	-0.10	1 (0%) 95 90	25, 37, 54, 76	0
1	C	451/451 (100%)	-0.06	2 (0%) 92 84	28, 44, 67, 92	0
1	D	451/451 (100%)	0.06	4 (0%) 84 71	32, 51, 73, 94	0
All	All	1804/1804 (100%)	-0.10	7 (0%) 92 84	20, 40, 66, 94	0

All (7) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	452	ASP	4.2
1	B	67	GLY	2.7
1	D	200	SER	2.3
1	D	440	ILE	2.2
1	D	45	LEU	2.1
1	D	479	TYR	2.1
1	C	453	GLY	2.1

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

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

6.3 Carbohydrates [i](#)

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.

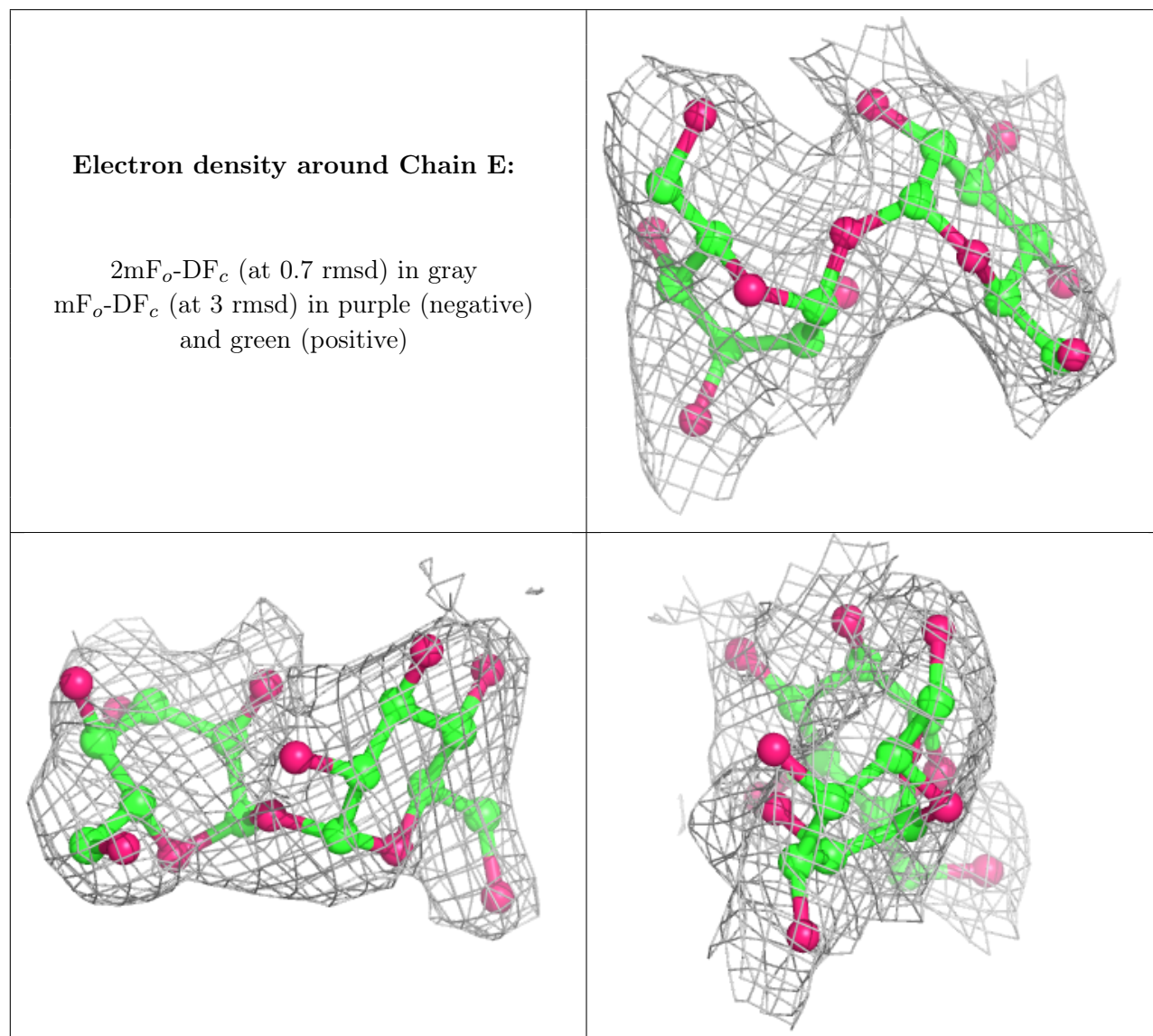
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	GLC	X	2	11/12	0.80	0.23	45,73,89,93	0
2	GLC	H	2	12/12	0.81	0.24	71,76,78,80	0
2	GLC	G	1	11/12	0.82	0.29	68,69,70,70	0
2	GLC	H	1	11/12	0.85	0.26	84,87,89,90	0
2	GLC	W	1	11/12	0.87	0.24	39,55,61,65	0
2	GLC	T	2	12/12	0.87	0.17	47,57,73,73	0
2	GLC	U	2	12/12	0.89	0.28	46,68,78,78	0
2	GLC	G	2	12/12	0.89	0.26	63,68,69,69	0
2	GLC	U	1	11/12	0.89	0.24	46,53,63,68	0
3	GLC	R	2	11/12	0.90	0.15	38,46,48,49	0
2	GLC	W	2	12/12	0.90	0.19	47,65,70,71	0
3	GLC	Z	2	11/12	0.91	0.26	45,60,72,88	0
3	GLC	N	2	11/12	0.92	0.23	28,36,45,49	0
2	GLC	E	1	11/12	0.92	0.16	48,52,55,60	0
3	GLC	X	1	12/12	0.92	0.24	50,58,66,75	0
2	GLC	V	1	11/12	0.92	0.26	48,53,63,63	0
3	GLC	Z	1	12/12	0.92	0.24	40,50,62,82	0
3	GLC	F	1	12/12	0.92	0.14	54,58,63,63	0
3	GLC	I	2	11/12	0.93	0.17	34,42,46,48	0
2	GLC	L	1	11/12	0.94	0.17	32,33,44,48	0
2	GLC	Q	1	11/12	0.94	0.16	35,40,48,50	0
2	GLC	T	1	11/12	0.94	0.17	39,59,71,83	0
2	GLC	E	2	12/12	0.94	0.16	43,53,57,59	0
3	GLC	O	2	11/12	0.94	0.12	43,49,53,59	0
2	GLC	Q	2	12/12	0.95	0.16	36,42,51,52	0
3	GLC	K	1	12/12	0.95	0.19	19,23,35,48	0
3	GLC	S	2	11/12	0.95	0.14	28,40,47,48	0
3	GLC	K	2	11/12	0.95	0.14	29,35,38,38	0
3	GLC	M	2	11/12	0.95	0.18	35,40,42,46	0
3	GLC	N	1	12/12	0.95	0.14	26,31,38,43	0
3	GLC	F	2	11/12	0.95	0.18	53,56,58,58	0
2	GLC	V	2	12/12	0.96	0.12	36,41,46,50	0
3	GLC	I	1	12/12	0.96	0.18	23,28,33,39	0
3	GLC	Y	2	11/12	0.96	0.10	32,35,46,48	0
2	GLC	L	2	12/12	0.96	0.12	26,35,42,45	0
3	GLC	J	2	11/12	0.96	0.15	32,36,45,47	0
2	GLC	P	2	12/12	0.97	0.12	31,46,49,51	0
3	GLC	J	1	12/12	0.97	0.12	22,28,34,35	0
3	GLC	M	1	12/12	0.97	0.14	20,22,31,34	0
3	GLC	Y	1	12/12	0.97	0.12	23,26,27,31	0
3	GLC	R	1	12/12	0.97	0.15	26,36,42,47	0
2	GLC	P	1	11/12	0.97	0.12	22,26,28,29	0
3	GLC	S	1	12/12	0.97	0.14	30,32,38,38	0

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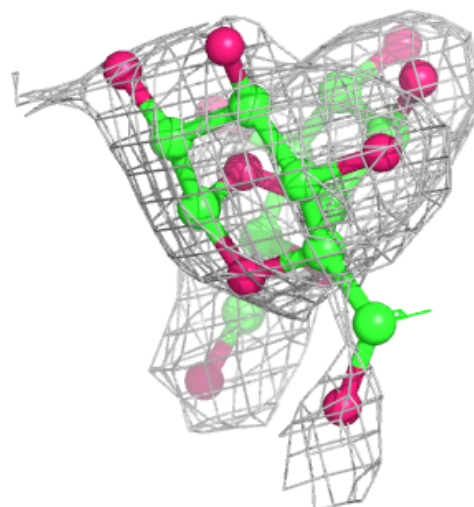
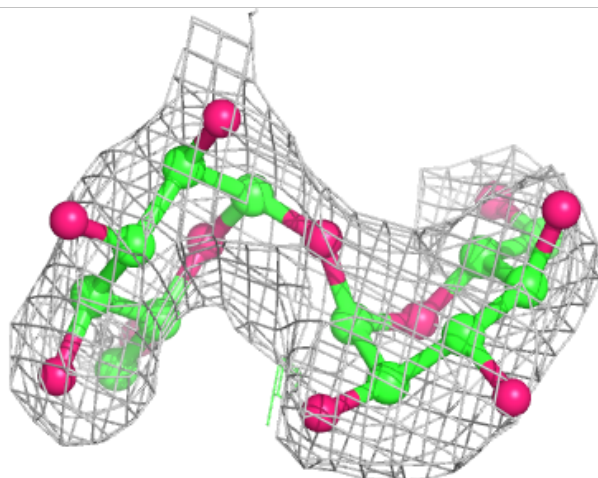
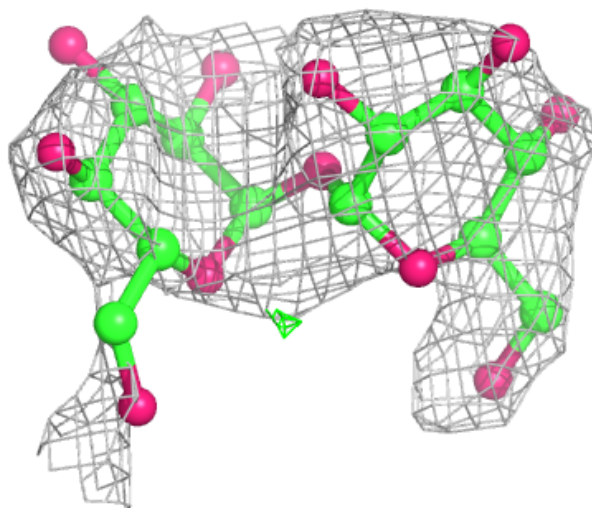
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	GLC	O	1	12/12	0.98	0.19	30,34,44,47	0

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.



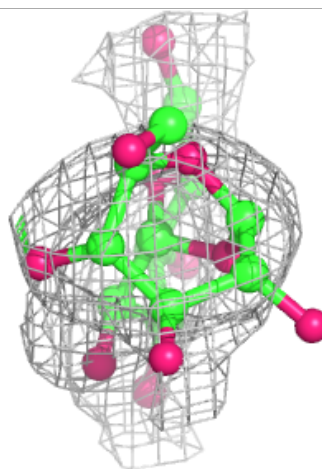
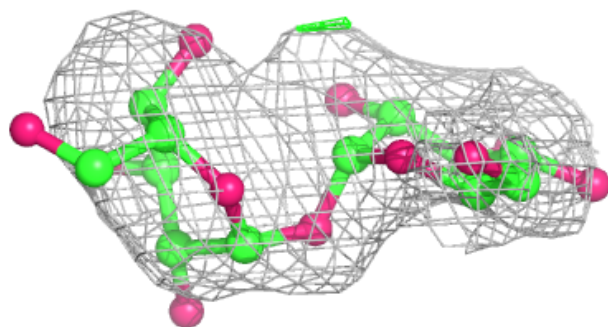
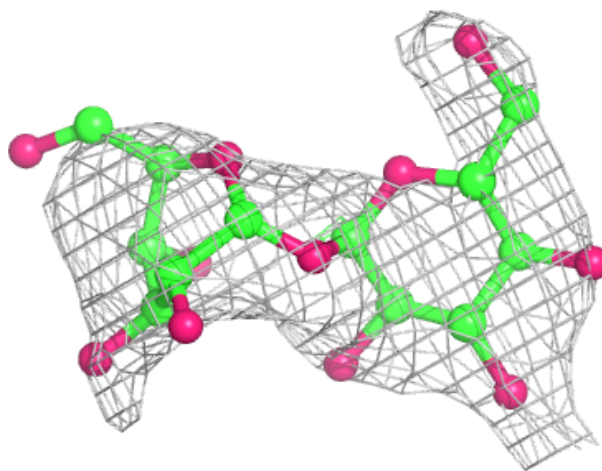
Electron density around Chain G:

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



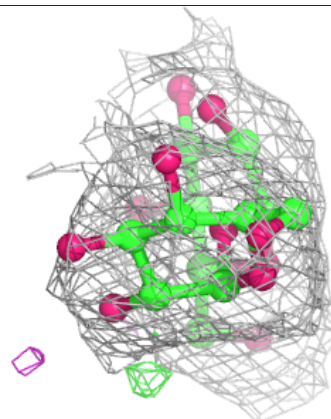
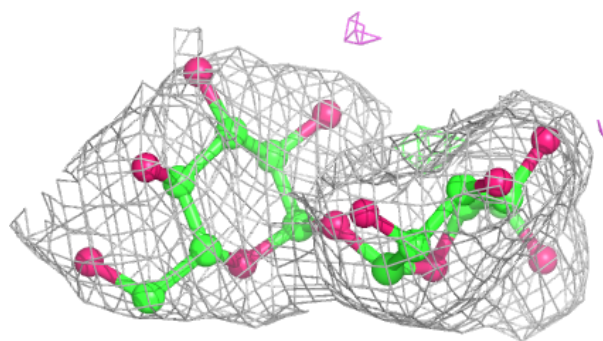
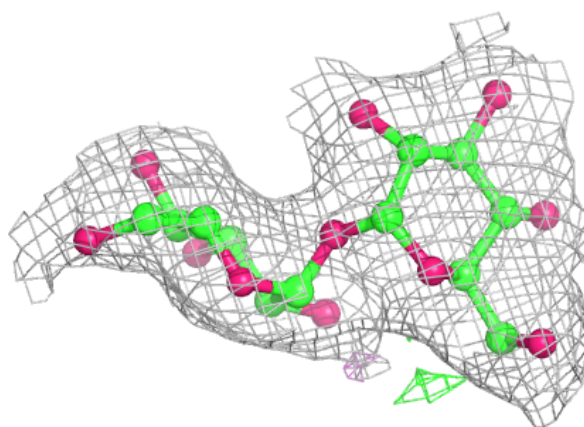
Electron density around Chain H:

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and green (positive)



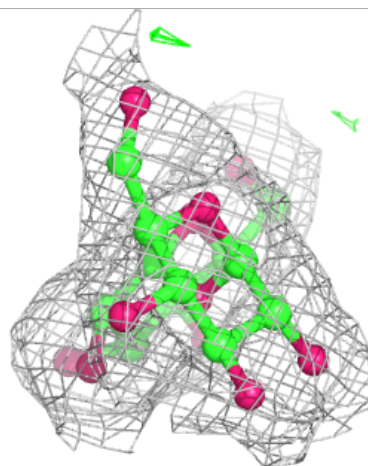
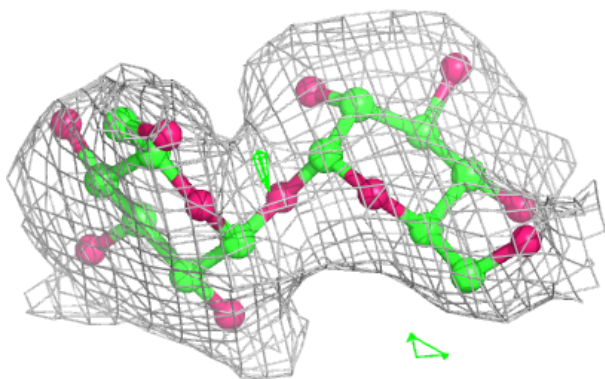
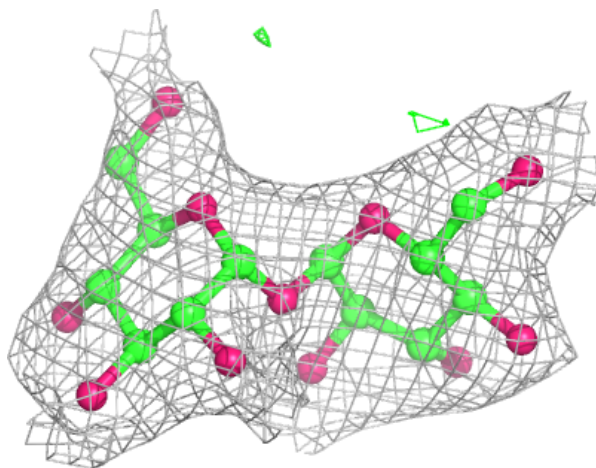
Electron density around Chain L:

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



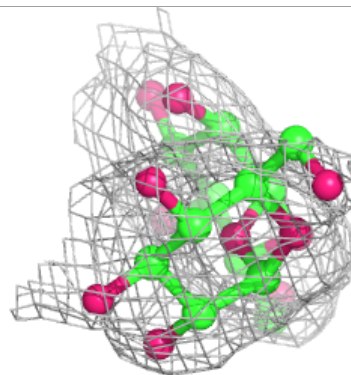
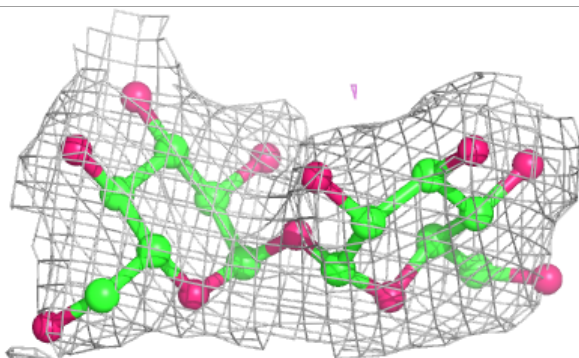
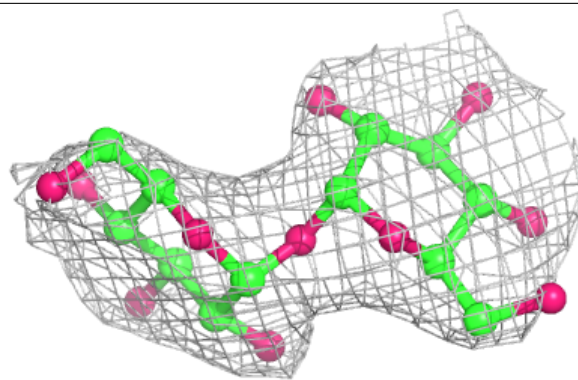
Electron density around Chain P:

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and green (positive)



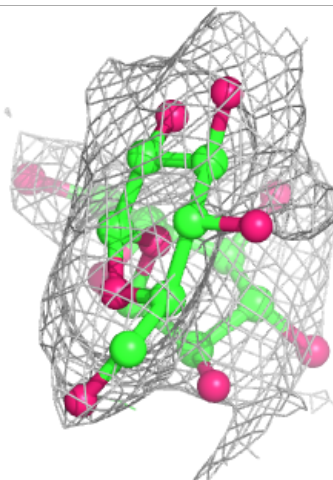
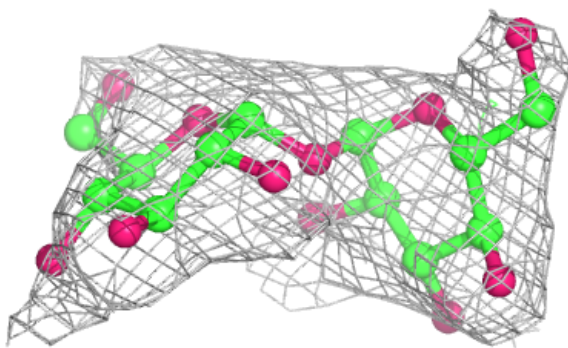
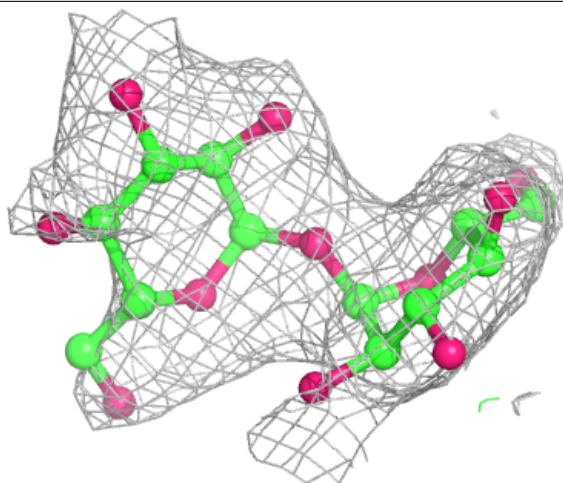
Electron density around Chain Q:

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



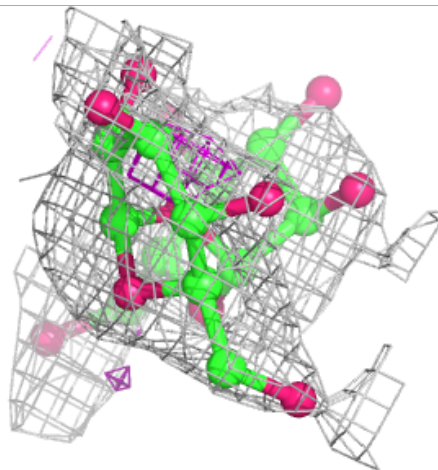
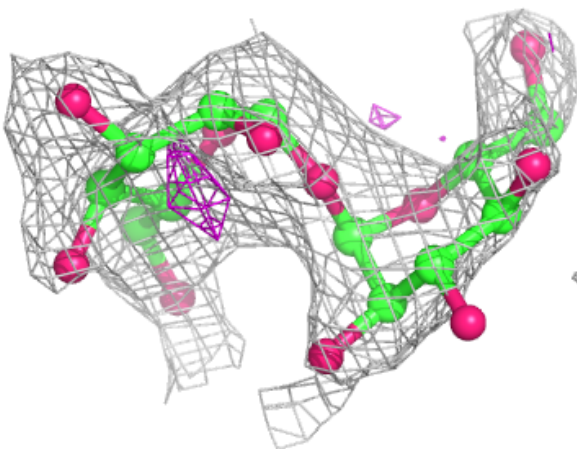
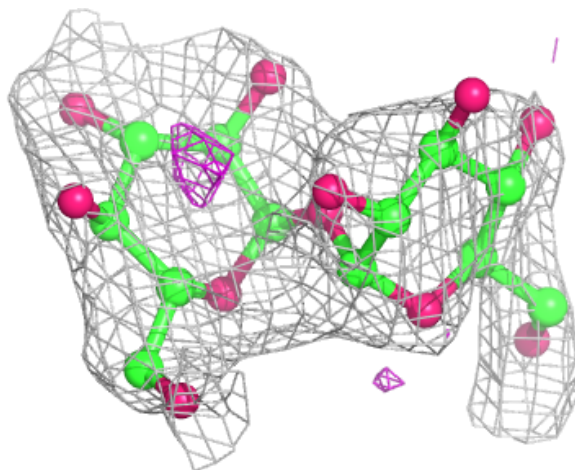
Electron density around Chain T:

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



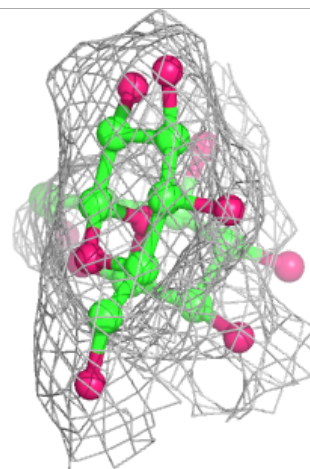
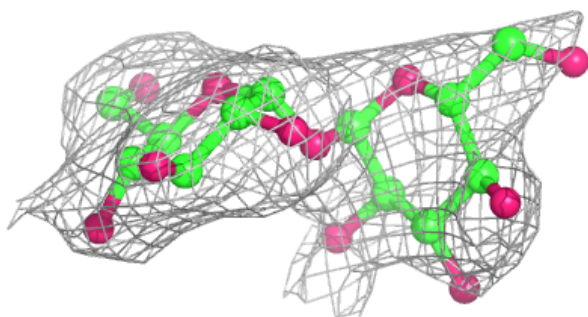
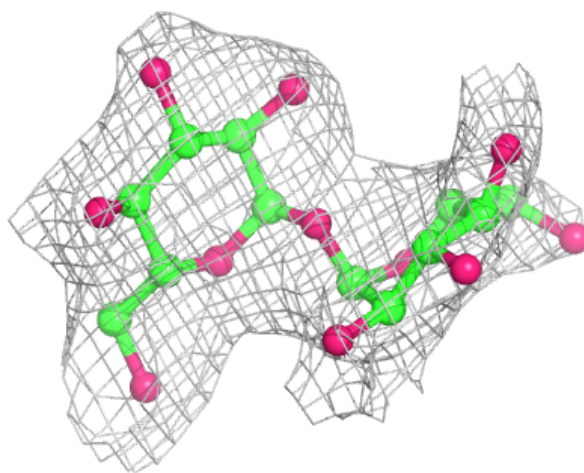
Electron density around Chain U:

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



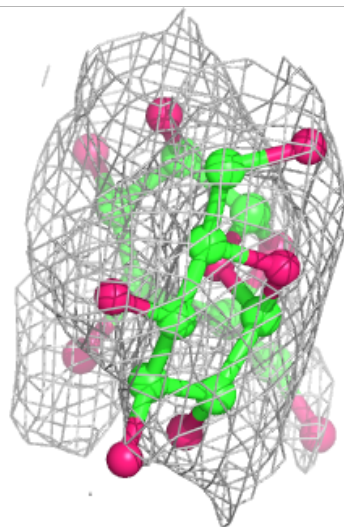
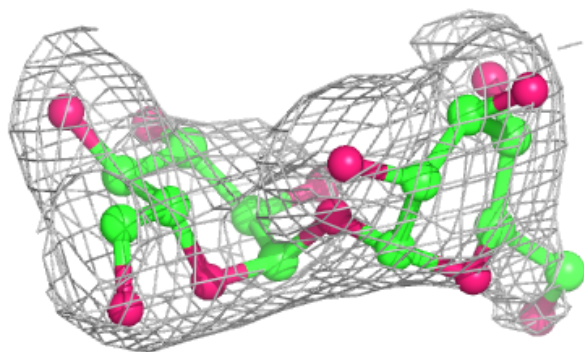
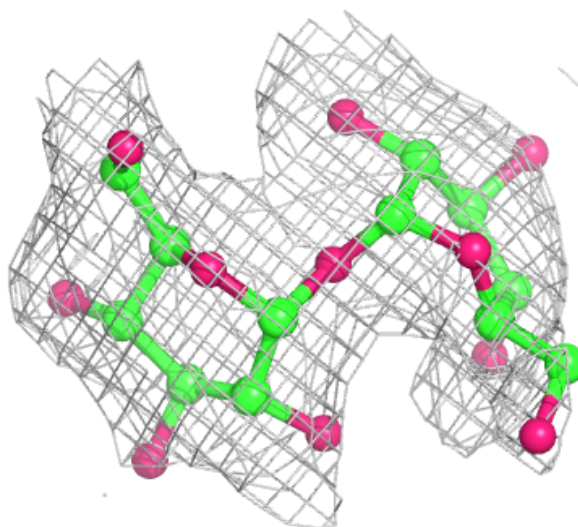
Electron density around Chain V:

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



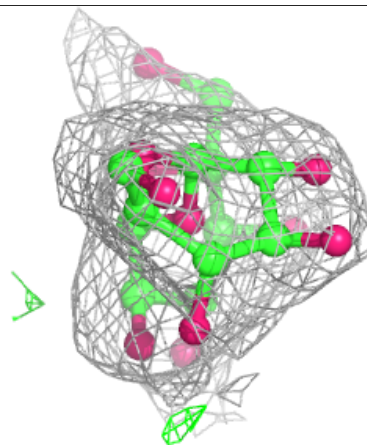
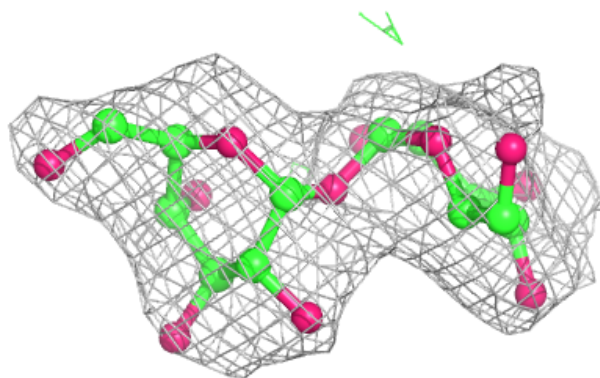
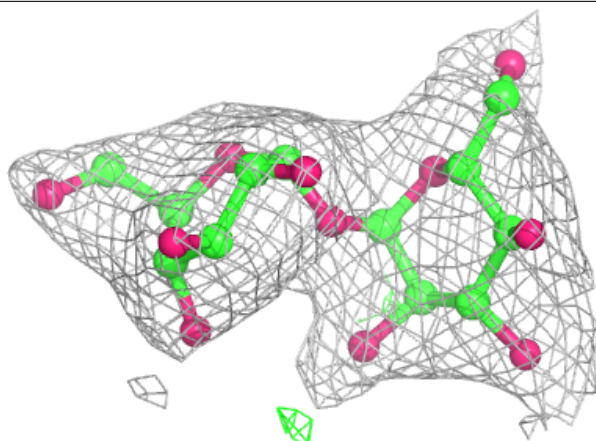
Electron density around Chain W:

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and green (positive)



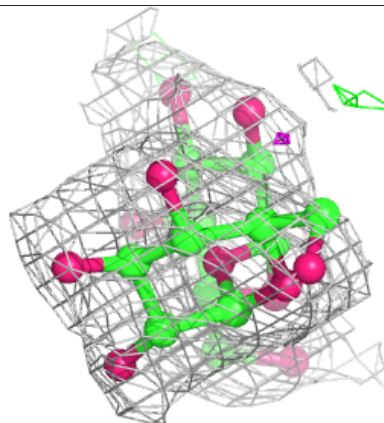
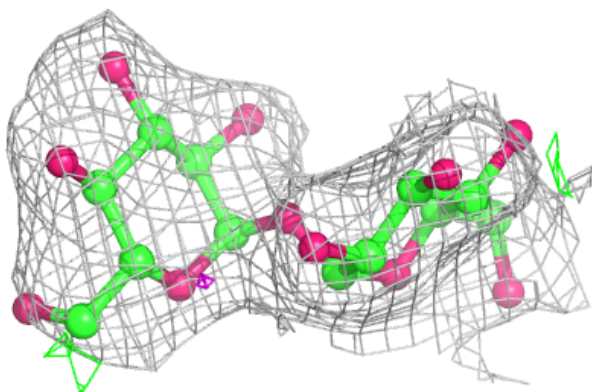
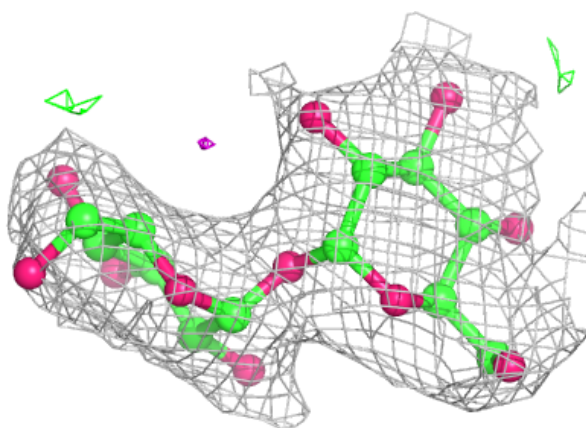
Electron density around Chain F:

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and green (positive)



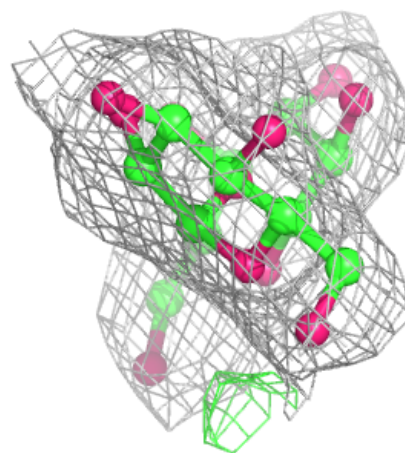
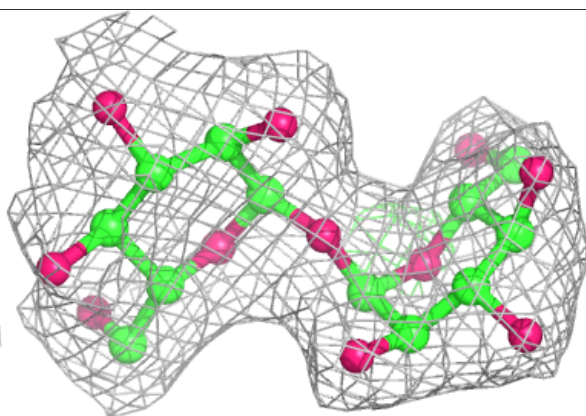
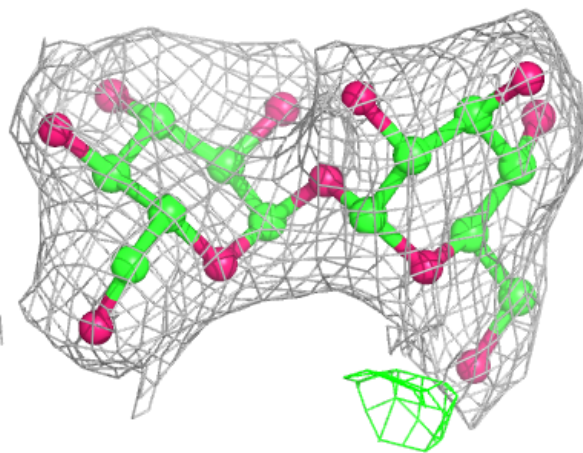
Electron density around Chain I:

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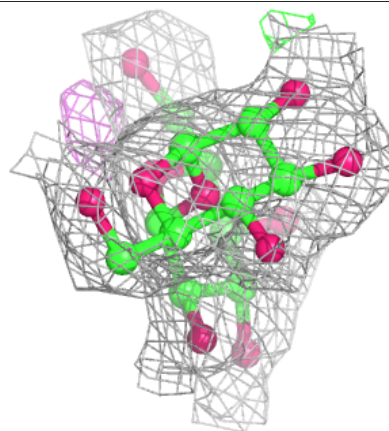
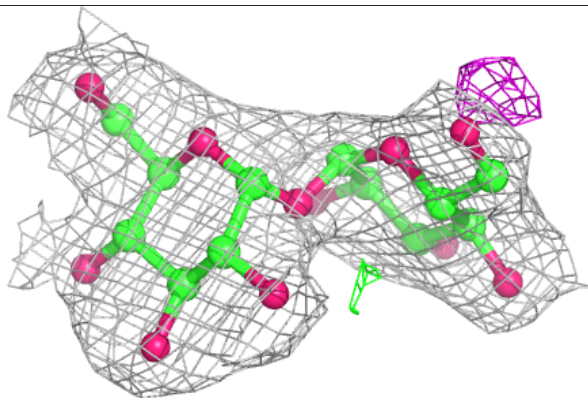
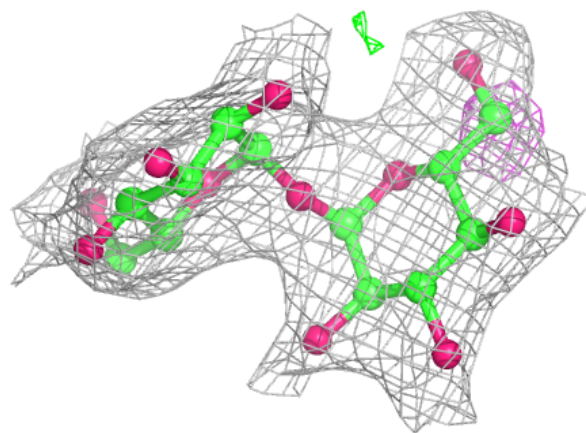
Electron density around Chain J:

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and green (positive)



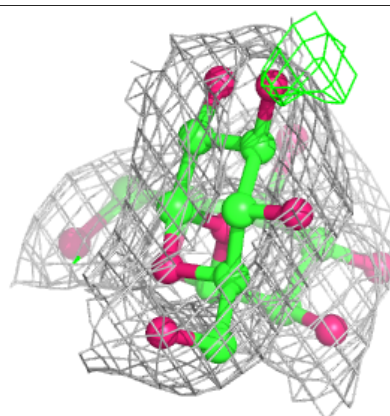
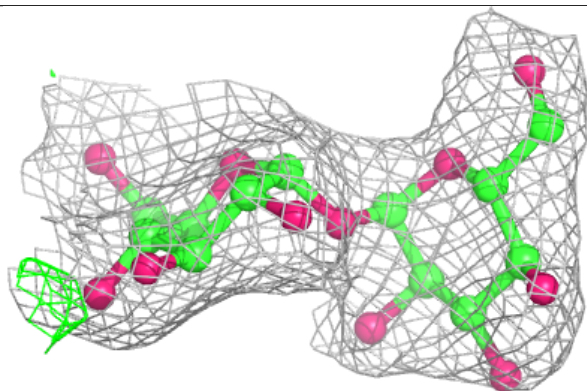
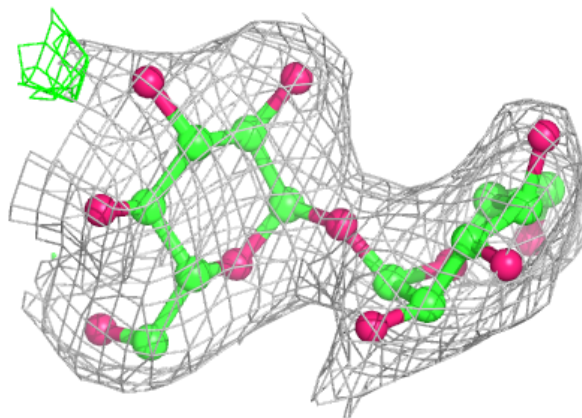
Electron density around Chain K:

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and green (positive)



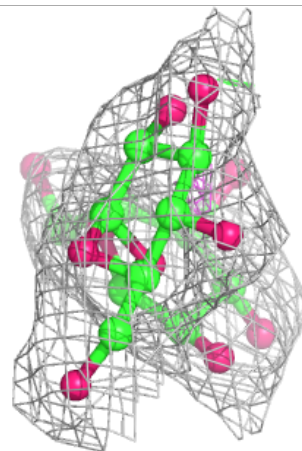
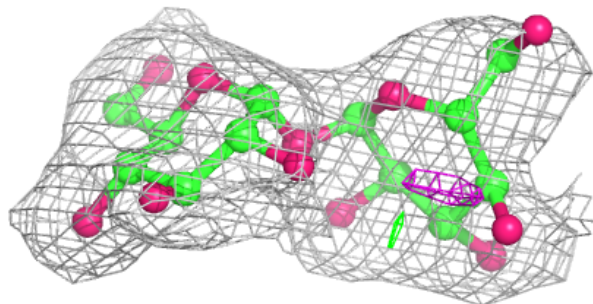
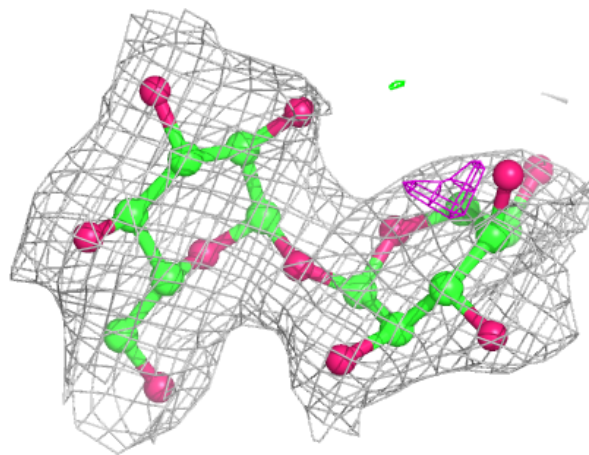
Electron density around Chain M:

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and green (positive)



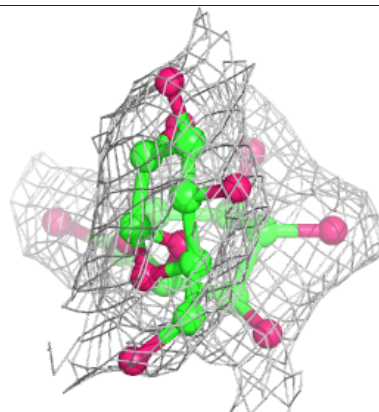
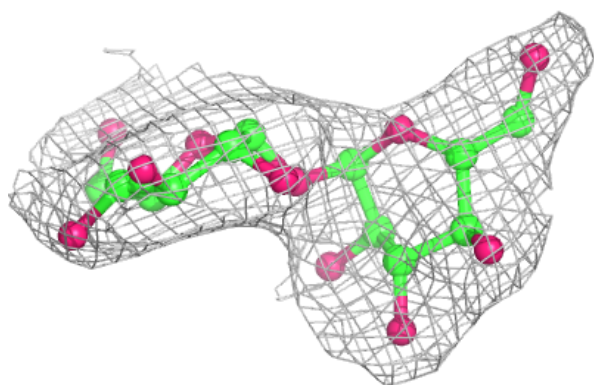
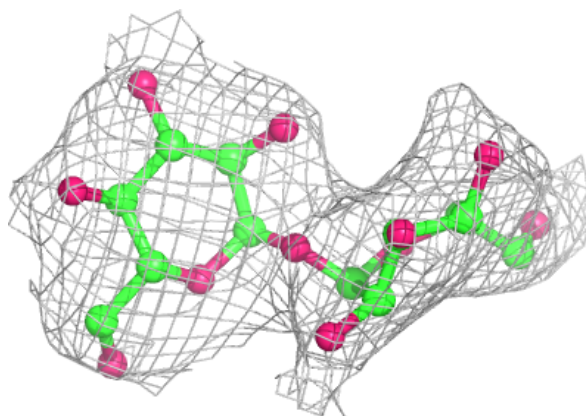
Electron density around Chain N:

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and green (positive)



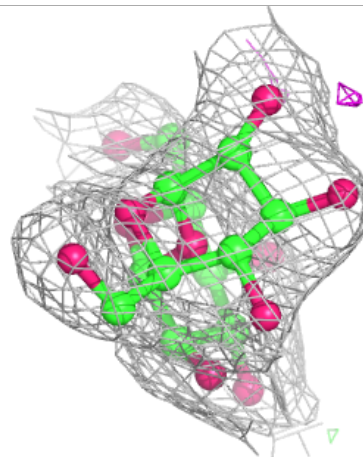
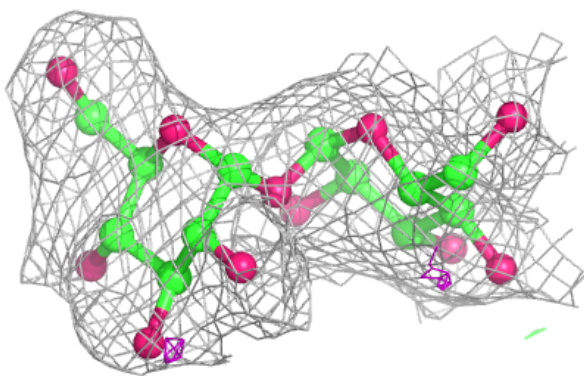
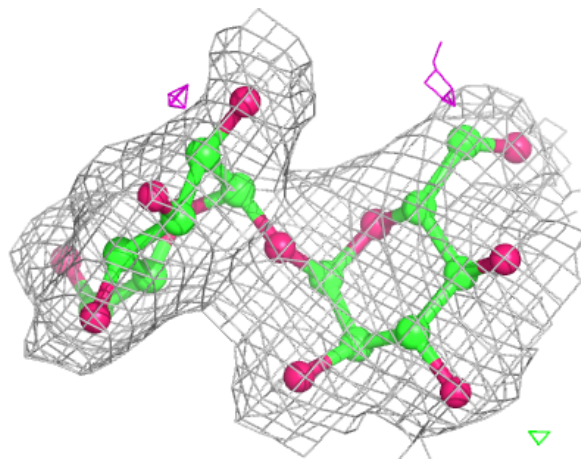
Electron density around Chain O:

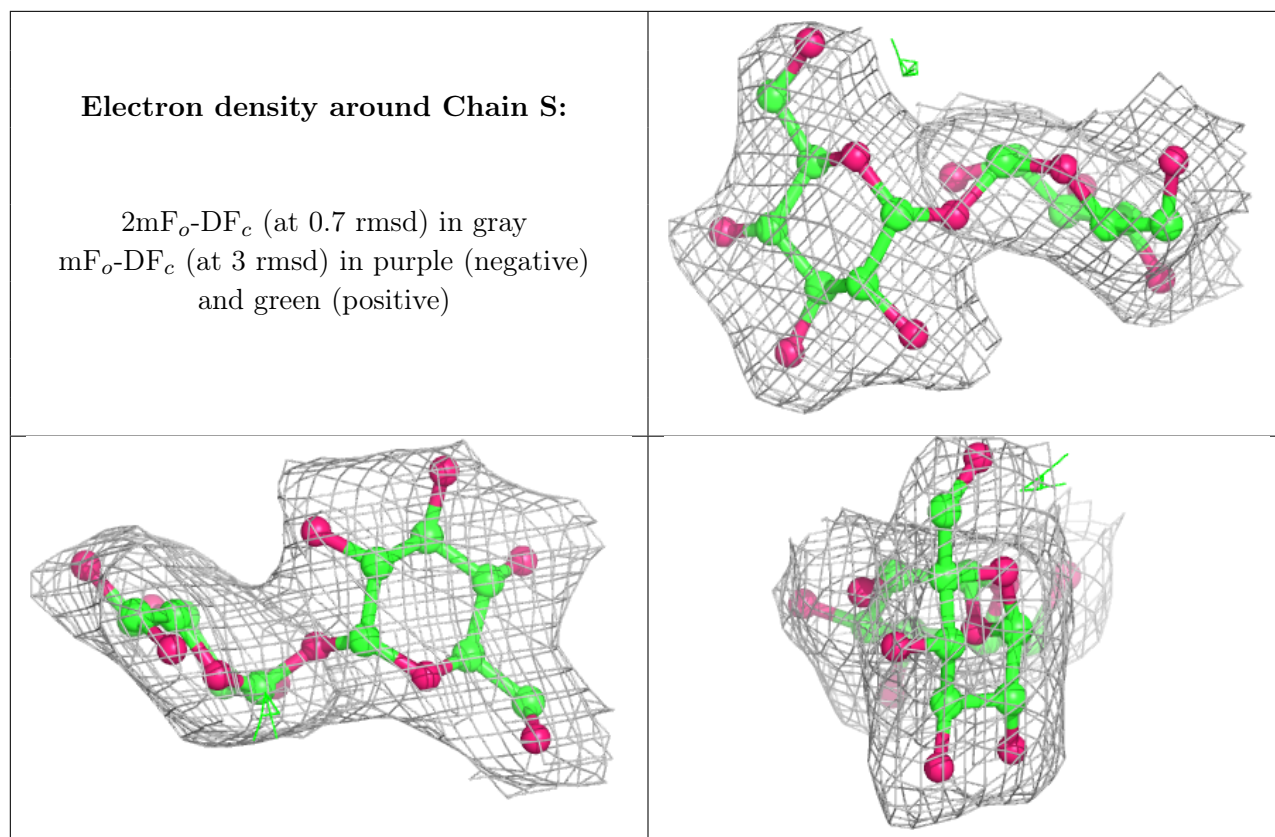
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around Chain R:

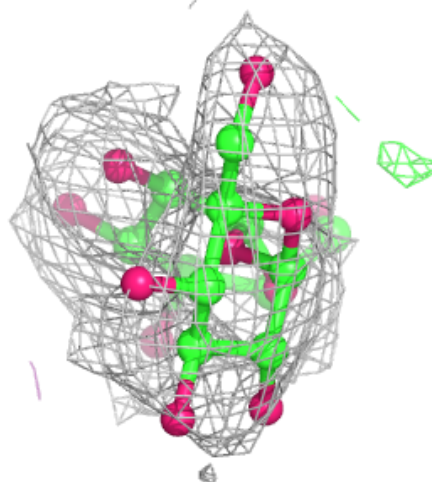
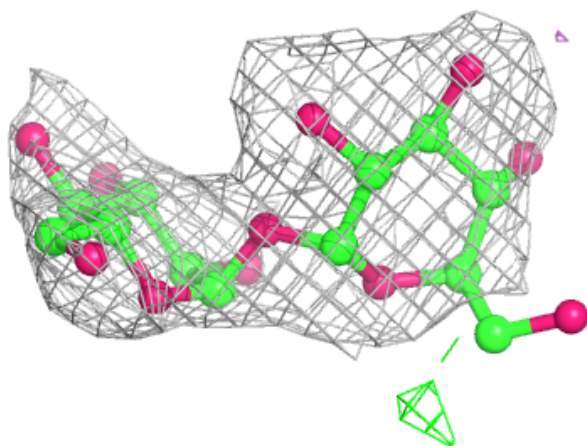
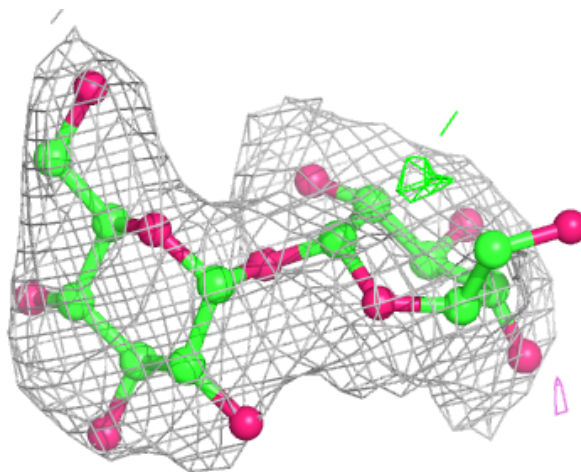
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)





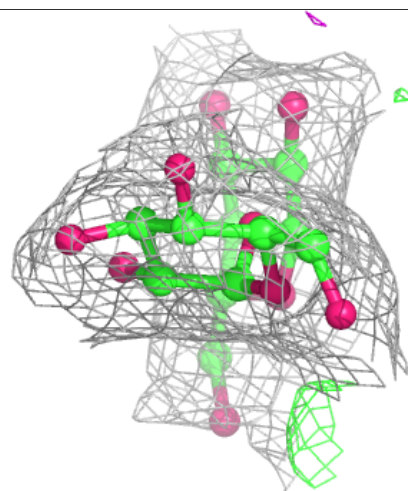
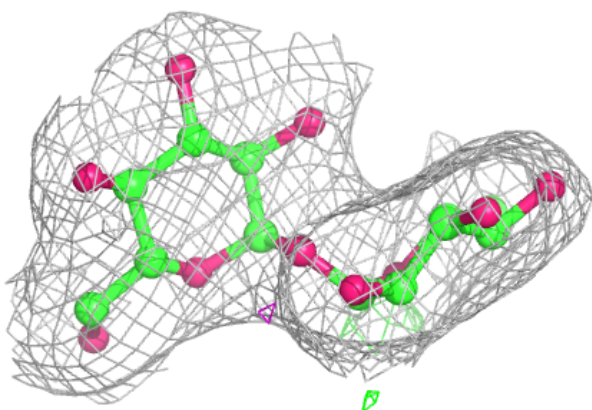
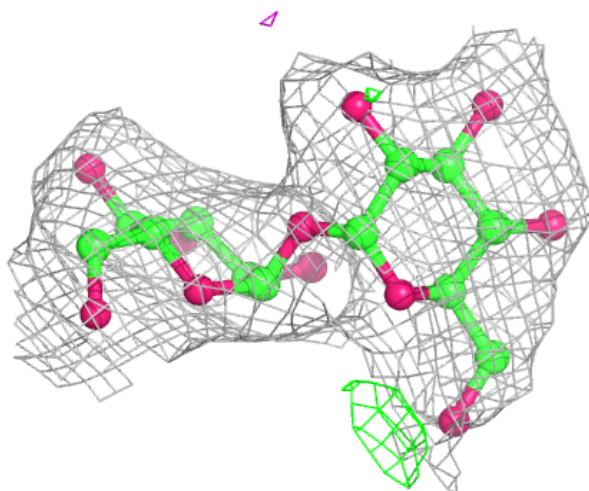
Electron density around Chain X:

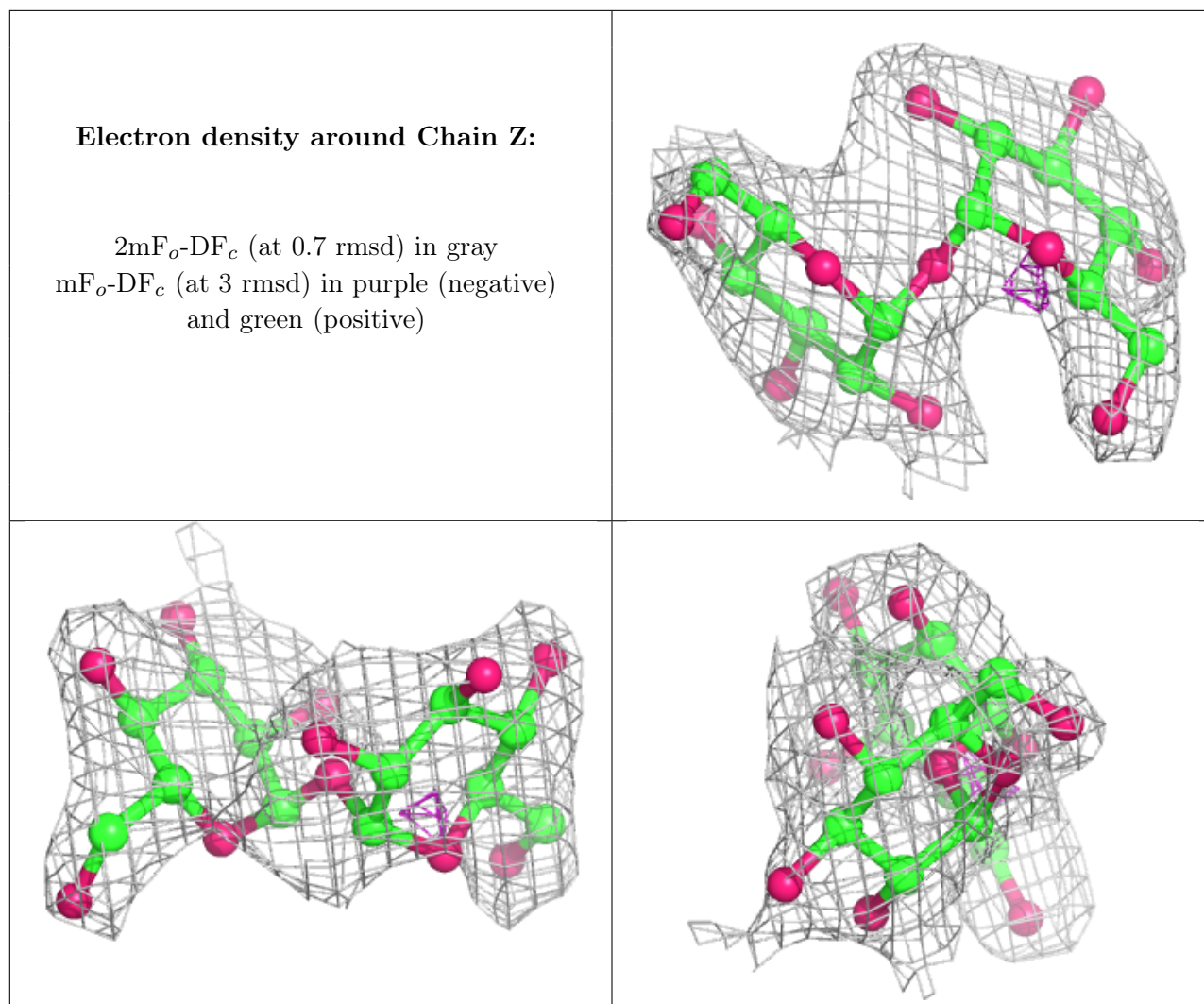
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around Chain Y:

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





6.4 Ligands [\(i\)](#)

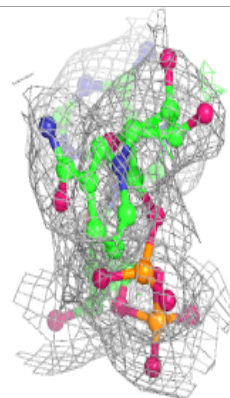
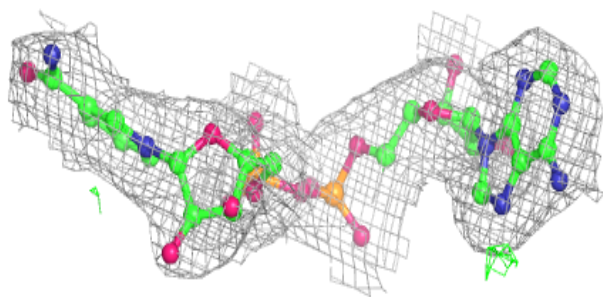
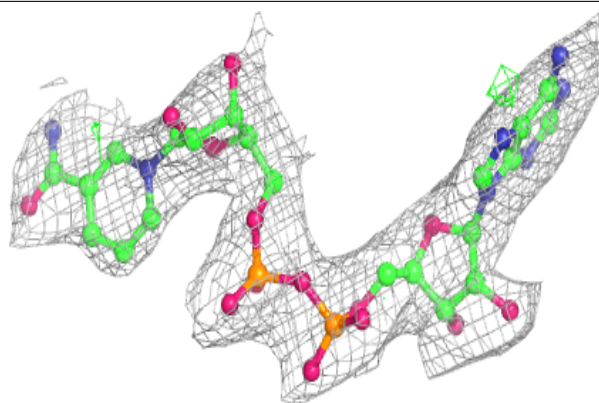
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	NAD	C	501	44/44	0.97	0.16	37,43,48,50	0
4	NAD	D	501	44/44	0.97	0.15	41,44,52,52	0
4	NAD	A	501	44/44	0.98	0.15	19,21,23,23	0
4	NAD	B	501	44/44	0.98	0.14	26,29,33,34	0

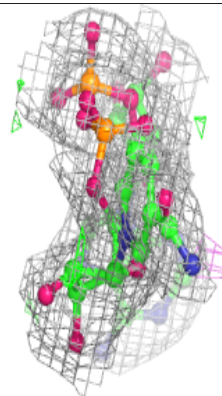
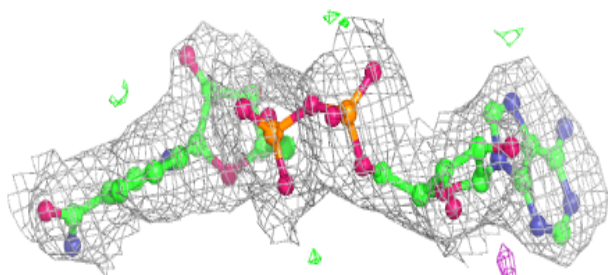
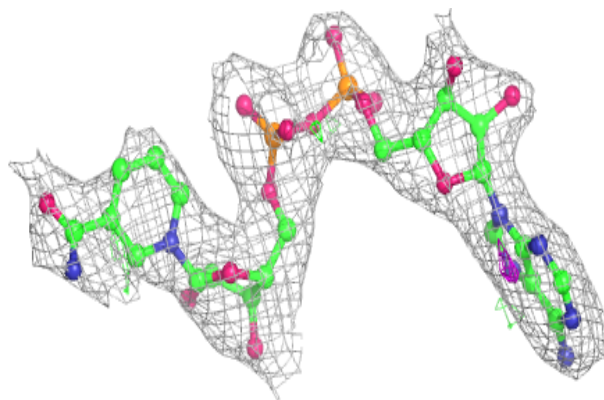
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around NAD C 501:

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

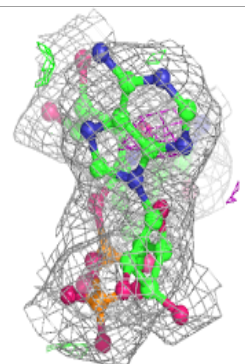
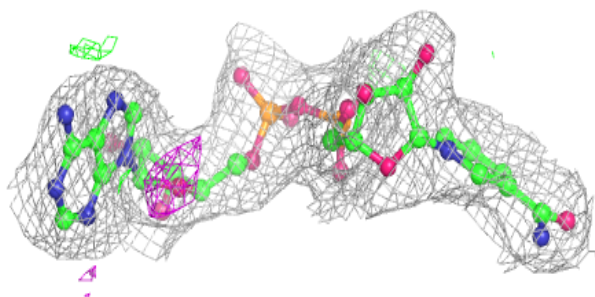
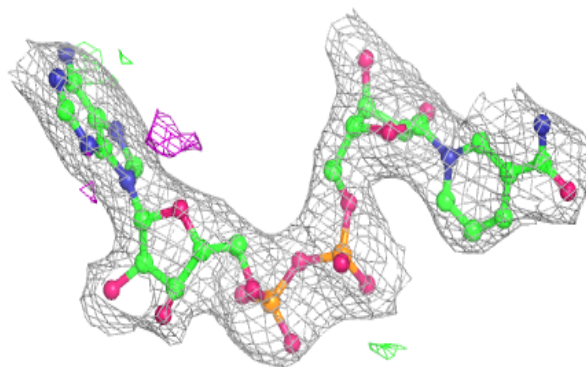
**Electron density around NAD D 501:**

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

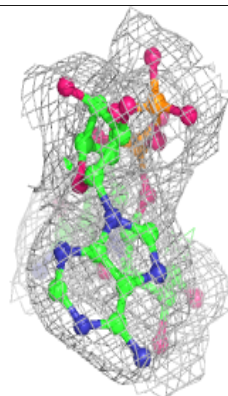
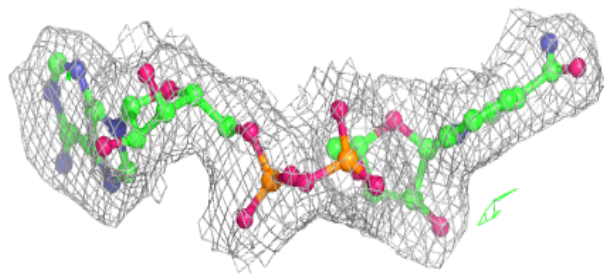
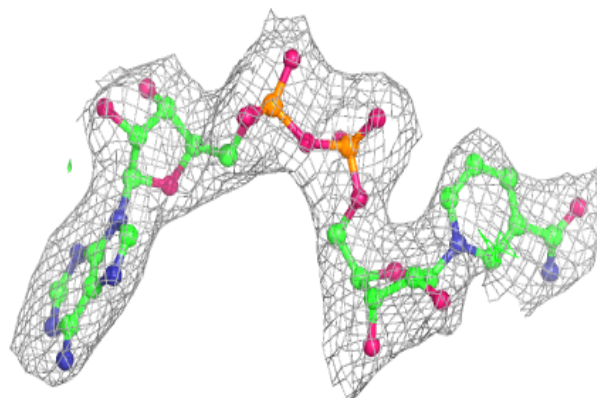


Electron density around NAD A 501:

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

**Electron density around NAD B 501:**

$2mF_o-DF_c$ (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.