



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 29, 2023 – 01:56 pm BST

PDB ID : 8BXL
Title : Patulin Synthase from *Penicillium expansum*
Authors : Tjallinks, G.; Boverio, A.; Rozeboom, H.J.; Fraaije, M.W.
Deposited on : 2022-12-09
Resolution : 2.40 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 : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.35
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.35

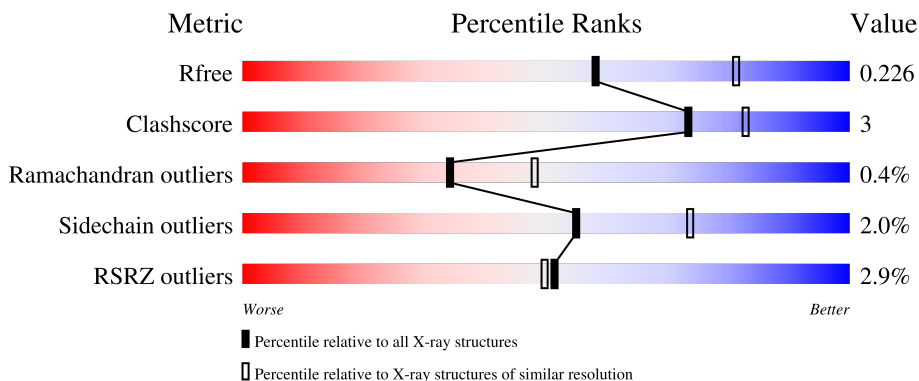
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.40 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	3907 (2.40-2.40)
Clashscore	141614	4398 (2.40-2.40)
Ramachandran outliers	138981	4318 (2.40-2.40)
Sidechain outliers	138945	4319 (2.40-2.40)
RSRZ outliers	127900	3811 (2.40-2.40)

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	628	 87% 6% • 6%
1	B	628	 87% 6% • 6%
1	C	628	 87% 6% • 6%
1	D	628	 87% 6% • 6%
1	E	628	 87% 6% • 6%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	F	628	 % 89% 5% 6%
2	G	3	 100%
2	H	3	 100%
2	I	3	 100%
2	J	3	 100%
2	K	3	 100%
3	L	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
6	PEG	F	610	-	-	X	-
7	GOL	E	607	-	-	X	X

2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 29074 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 Patulin synthase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	B	590	4526	2865	785	862	14	0	0	0
1	C	590	4490	2846	778	852	14	0	0	0
1	D	590	4446	2822	764	846	14	0	0	0
1	A	590	4530	2867	785	864	14	0	0	0
1	F	590	4506	2852	781	859	14	0	0	0
1	E	590	4530	2867	785	864	14	0	0	0

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



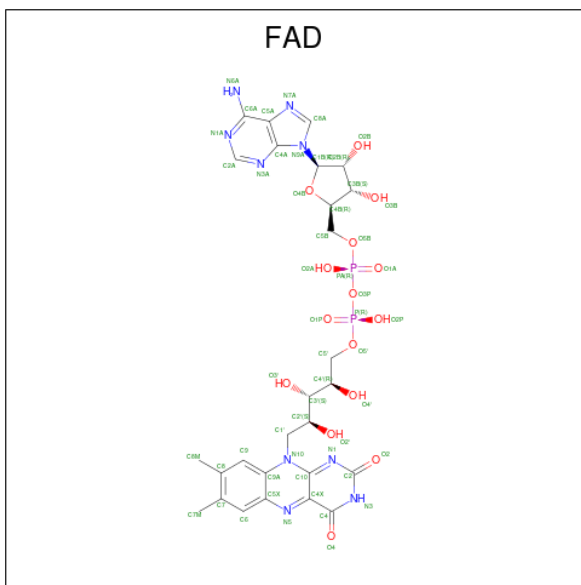
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	G	3	39	22	2	15	0	0	0
2	H	3	39	22	2	15	0	0	0
2	I	3	39	22	2	15	0	0	0
2	J	3	39	22	2	15	0	0	0
2	K	3	39	22	2	15	0	0	0

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



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	L	2	28	16	2	10	0	0	0

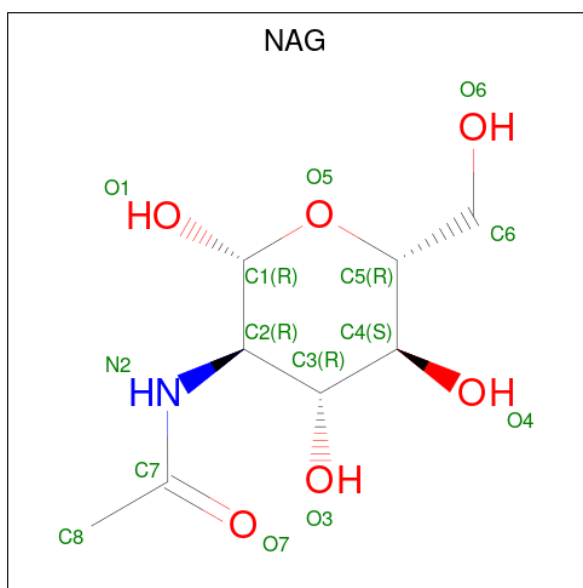
- Molecule 4 is FLAVIN-ADENINE DINUCLEOTIDE (three-letter code: FAD) (formula: C₂₇H₃₃N₉O₁₅P₂) (labeled as "Ligand of Interest" by depositor).



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

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula:

C₈H₁₅NO₆).



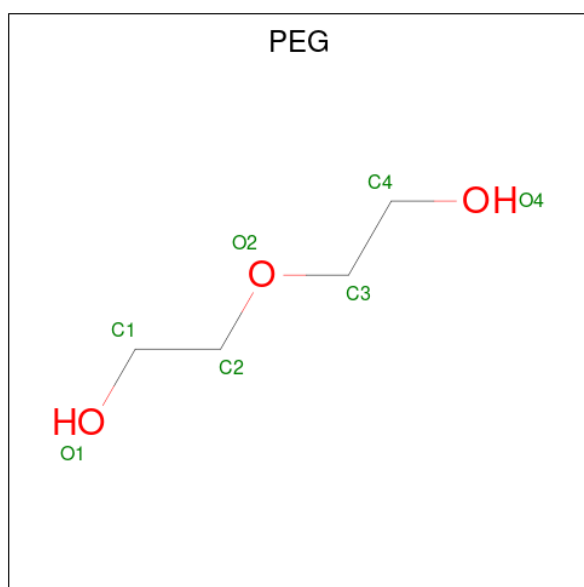
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	B	1	Total	C	N	O	0	0
			14	8	1	5		
5	B	1	Total	C	N	O	0	0
			14	8	1	5		
5	B	1	Total	C	N	O	0	0
			14	8	1	5		
5	B	1	Total	C	N	O	0	0
			14	8	1	5		
5	C	1	Total	C	N	O	0	0
			14	8	1	5		
5	C	1	Total	C	N	O	0	0
			14	8	1	5		
5	C	1	Total	C	N	O	0	0
			14	8	1	5		
5	D	1	Total	C	N	O	0	0
			14	8	1	5		
5	D	1	Total	C	N	O	0	0
			14	8	1	5		
5	D	1	Total	C	N	O	0	0
			14	8	1	5		
5	A	1	Total	C	N	O	0	0
			14	8	1	5		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total	C	N	O	0	0
			14	8	1	5		
5	A	1	Total	C	N	O	0	0
			14	8	1	5		
5	A	1	Total	C	N	O	0	0
			14	8	1	5		
5	F	1	Total	C	N	O	0	0
			14	8	1	5		
5	F	1	Total	C	N	O	0	0
			14	8	1	5		
5	F	1	Total	C	N	O	0	0
			14	8	1	5		
5	F	1	Total	C	N	O	0	0
			14	8	1	5		
5	E	1	Total	C	N	O	0	0
			14	8	1	5		
5	E	1	Total	C	N	O	0	0
			14	8	1	5		
5	E	1	Total	C	N	O	0	0
			14	8	1	5		
5	E	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 6 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula: C₄H₁₀O₃).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	B	1	Total C O 7 4 3	0	0
6	B	1	Total C O 7 4 3	0	0
6	B	1	Total C O 7 4 3	0	0
6	B	1	Total C O 7 4 3	0	0
6	C	1	Total C O 7 4 3	0	0
6	C	1	Total C O 7 4 3	0	0
6	D	1	Total C O 7 4 3	0	0
6	D	1	Total C O 7 4 3	0	0
6	A	1	Total C O 7 4 3	0	0
6	A	1	Total C O 7 4 3	0	0
6	A	1	Total C O 7 4 3	0	0
6	F	1	Total C O 7 4 3	0	0
6	F	1	Total C O 7 4 3	0	0
6	F	1	Total C O 7 4 3	0	0
6	F	1	Total C O 7 4 3	0	0
6	F	1	Total C O 7 4 3	0	0
6	E	1	Total C O 7 4 3	0	0
6	E	1	Total C O 7 4 3	0	0
6	E	1	Total C O 7 4 3	0	0
6	E	1	Total C O 7 4 3	0	0

- Molecule 7 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	B	1	Total	C	O	0	0
			6	3	3		
7	C	1	Total	C	O	0	0
			6	3	3		
7	D	1	Total	C	O	0	0
			6	3	3		
7	A	1	Total	C	O	0	0
			6	3	3		
7	F	1	Total	C	O	0	0
			6	3	3		
7	F	1	Total	C	O	0	0
			6	3	3		
7	E	1	Total	C	O	0	0
			6	3	3		

- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	B	199	Total	O	0	1
			200	200		
8	C	170	Total	O	0	0
			170	170		
8	D	63	Total	O	0	0
			63	63		
8	A	154	Total	O	0	4
			158	158		
8	F	187	Total	O	0	0
			187	187		

Continued on next page...

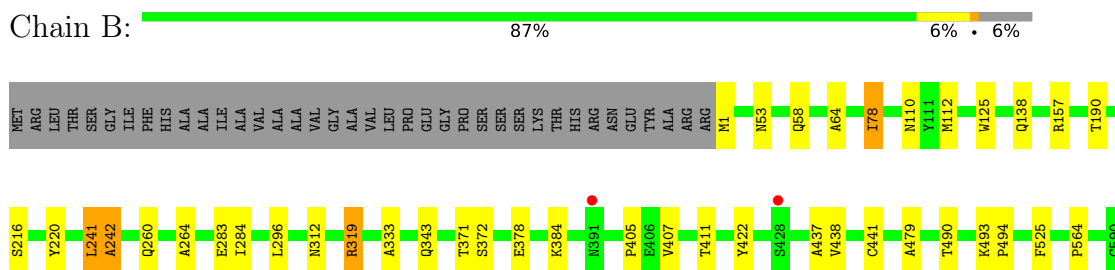
Continued from previous page...

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	E	206	Total 209	O 209	0	3

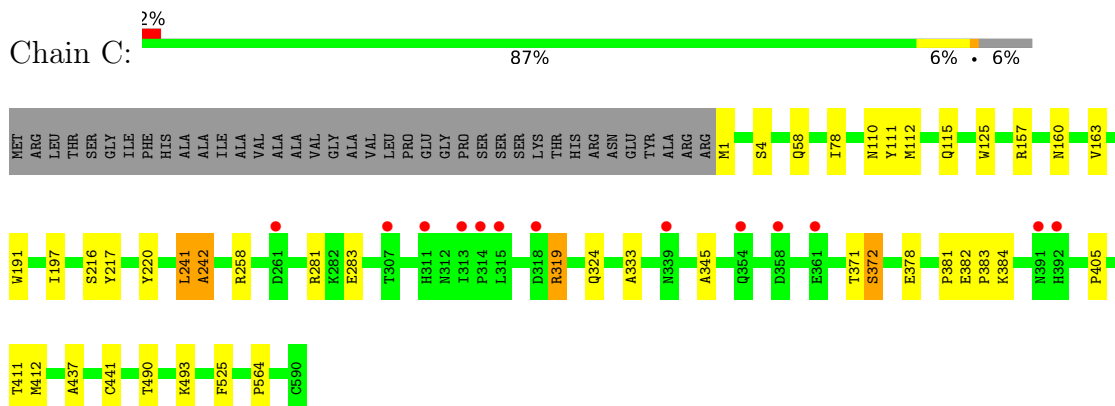
3 Residue-property plots [i](#)

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.

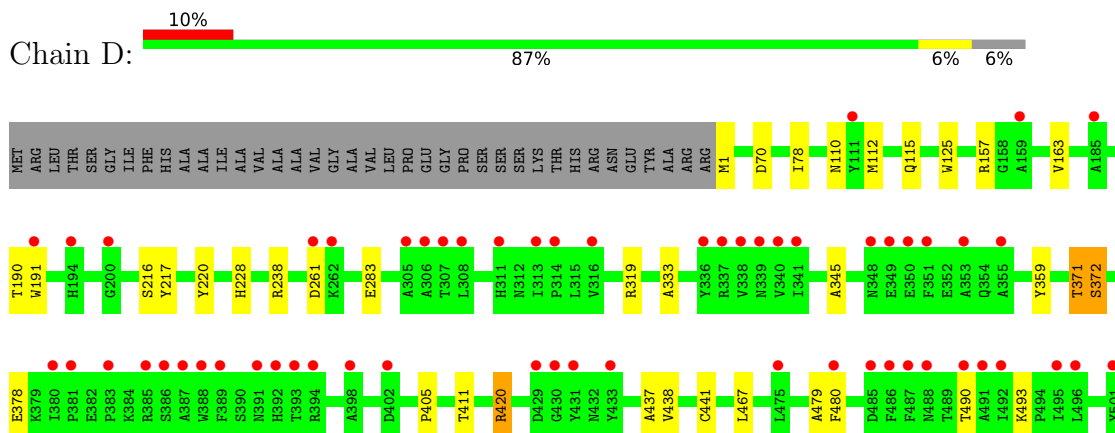
- Molecule 1: Patulin synthase



- Molecule 1: Patulin synthase

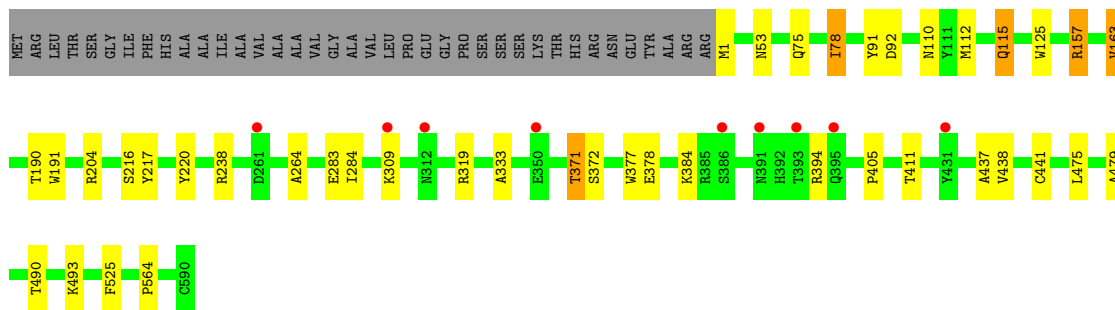
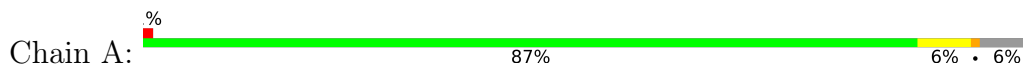


- Molecule 1: Patulin synthase

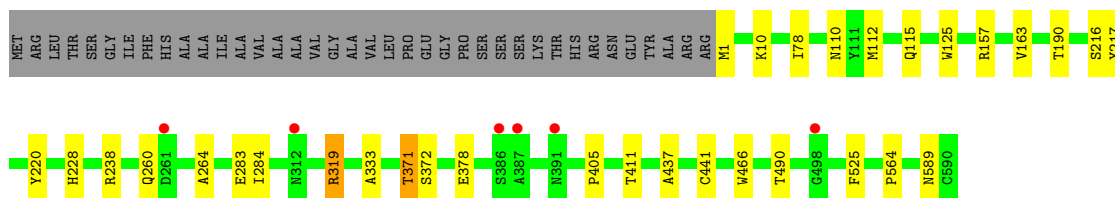
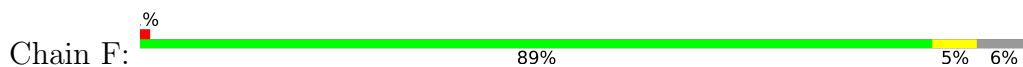




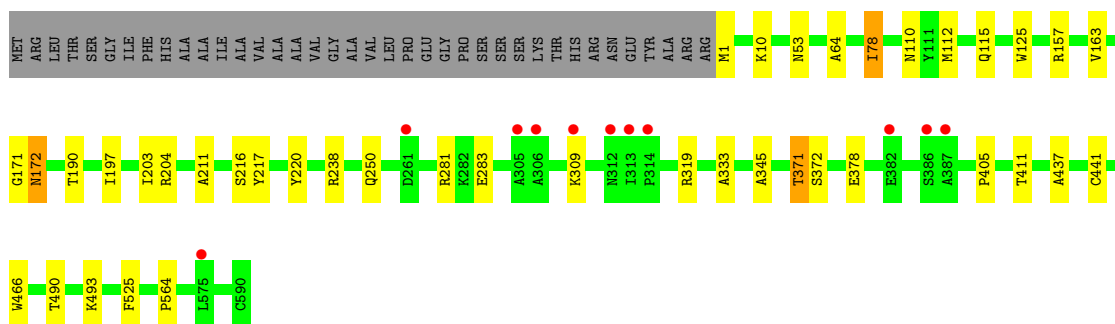
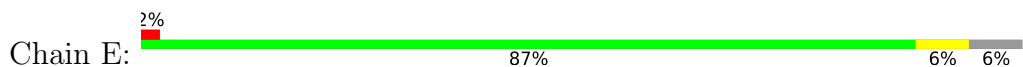
- Molecule 1: Patulin synthase



- Molecule 1: Patulin synthase




- Molecule 1: Patulin synthase



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



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

Chain H:  100%

MAG1
MAG2
MAN3

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

Chain I:  100%

MAG1
MAG2
MAN3

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

Chain J:  100%

MAG1
MAG2
MAN3

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

Chain K:  100%

MAG1
MAG2
MAN3

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

Chain L:  100%

MAG1
MAG2

4 Data and refinement statistics i

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	104.84Å 144.16Å 155.24Å 90.00° 91.53° 90.00°	Depositor
Resolution (Å)	48.74 – 2.40 48.69 – 2.40	Depositor EDS
% Data completeness (in resolution range)	100.0 (48.74-2.40) 100.0 (48.69-2.40)	Depositor EDS
R_{merge}	0.15	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.97 (at 2.39Å)	Xtrriage
Refinement program	REFMAC v7.1.018	Depositor
R, R_{free}	0.182 , 0.222 0.188 , 0.226	Depositor DCC
R_{free} test set	9411 reflections (5.23%)	wwPDB-VP
Wilson B-factor (Å ²)	36.0	Xtrriage
Anisotropy	0.011	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 49.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	0.023 for h,-k,-l	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	29074	wwPDB-VP
Average B, all atoms (Å ²)	40.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 22.65 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 5.4539e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

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

5 Model quality i

5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: NAG, PEG, GOL, MAN, 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	0.65	0/4646	0.80	3/6332 (0.0%)
1	B	0.66	0/4642	0.79	2/6327 (0.0%)
1	C	0.65	0/4606	0.79	3/6284 (0.0%)
1	D	0.65	0/4562	0.77	1/6233 (0.0%)
1	E	0.66	0/4646	0.81	5/6332 (0.1%)
1	F	0.65	0/4622	0.78	1/6305 (0.0%)
All	All	0.65	0/27724	0.79	15/37813 (0.0%)

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	1
1	B	0	1
1	C	0	2
1	D	0	1
1	E	0	1
1	F	0	1
All	All	0	7

There are no bond length outliers.

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	157	ARG	NE-CZ-NH2	8.75	124.67	120.30
1	A	157	ARG	NE-CZ-NH2	8.44	124.52	120.30
1	F	157	ARG	NE-CZ-NH2	-7.91	116.35	120.30
1	E	172	ASN	CB-CA-C	7.53	125.45	110.40

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	160	ASN	CB-CA-C	-7.09	96.22	110.40
1	A	204	ARG	NE-CZ-NH2	-6.53	117.04	120.30
1	A	157	ARG	NE-CZ-NH1	-6.23	117.18	120.30
1	C	157	ARG	NE-CZ-NH2	-6.16	117.22	120.30
1	D	157	ARG	NE-CZ-NH2	-5.66	117.47	120.30
1	B	241	LEU	N-CA-C	-5.49	96.17	111.00
1	E	172	ASN	N-CA-C	-5.49	96.19	111.00
1	B	157	ARG	NE-CZ-NH2	-5.40	117.60	120.30
1	C	241	LEU	N-CA-C	-5.18	97.01	111.00
1	E	319	ARG	NE-CZ-NH2	-5.14	117.73	120.30
1	E	157	ARG	NE-CZ-NH1	-5.08	117.76	120.30

There are no chirality outliers.

All (7) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	378	GLU	Peptide
1	B	378	GLU	Peptide
1	C	378	GLU	Peptide
1	C	381	PRO	Peptide
1	D	378	GLU	Peptide
1	E	378	GLU	Peptide
1	F	378	GLU	Peptide

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	4530	0	4370	30	0
1	B	4526	0	4366	31	0
1	C	4490	0	4310	36	0
1	D	4446	0	4227	34	0
1	E	4530	0	4370	28	0
1	F	4506	0	4324	25	0
2	G	39	0	34	0	0
2	H	39	0	34	0	0
2	I	39	0	34	2	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	J	39	0	34	0	0
2	K	39	0	34	2	0
3	L	28	0	25	0	0
4	A	53	0	31	5	0
4	B	53	0	31	5	0
4	C	53	0	31	6	0
4	D	53	0	31	6	0
4	E	53	0	31	5	0
4	F	53	0	31	5	0
5	A	56	0	52	3	0
5	B	56	0	52	1	0
5	C	56	0	52	5	0
5	D	56	0	52	2	0
5	E	56	0	52	3	0
5	F	56	0	52	1	0
6	A	21	0	30	2	0
6	B	28	0	40	1	0
6	C	14	0	20	2	0
6	D	14	0	20	2	0
6	E	28	0	40	3	0
6	F	35	0	50	12	0
7	A	6	0	8	2	0
7	B	6	0	8	3	0
7	C	6	0	8	3	0
7	D	6	0	8	1	0
7	E	6	0	8	4	0
7	F	12	0	16	4	0
8	A	158	0	0	4	0
8	B	200	0	0	5	0
8	C	170	0	0	3	0
8	D	63	0	0	3	0
8	E	209	0	0	1	0
8	F	187	0	0	1	0
All	All	29074	0	26916	180	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

All (180) 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:A:438:VAL:HG21	1:A:479:ALA:HB1	1.47	0.96
1:D:438:VAL:HG21	1:D:479:ALA:HB1	1.48	0.94
1:B:438:VAL:HG21	1:B:479:ALA:HB1	1.48	0.93
1:A:157:ARG:NH1	8:A:744[B]:HOH:O	1.91	0.91
1:A:371:THR:HG21	7:A:606:GOL:H2	1.52	0.91
1:E:1:MET:N	6:E:605:PEG:O4	2.07	0.88
1:D:507:VAL:HG12	1:D:513:ILE:HD13	1.58	0.86
1:F:589:ASN:ND2	6:F:610:PEG:C3	2.39	0.85
1:B:1:MET:N	6:B:603:PEG:O4	2.11	0.84
1:A:1:MET:N	6:A:603:PEG:O4	2.12	0.83
6:A:605:PEG:H21	8:A:835:HOH:O	1.79	0.83
1:D:261:ASP:CB	8:D:759:HOH:O	2.27	0.81
1:F:589:ASN:HD21	6:F:610:PEG:H22	1.43	0.81
1:D:110:ASN:HA	4:D:601:FAD:C6	2.11	0.80
1:D:70:ASP:OD1	1:D:420:ARG:HG2	1.82	0.79
1:C:110:ASN:HA	4:C:601:FAD:C6	2.13	0.78
1:E:371:THR:HG21	7:E:607:GOL:H2	1.66	0.78
1:F:110:ASN:HA	4:F:601:FAD:C6	2.12	0.78
1:F:589:ASN:ND2	6:F:610:PEG:H31	2.01	0.76
1:C:412:MET:CE	7:C:606:GOL:H2	2.18	0.74
1:D:480:PHE:CD2	1:D:513:ILE:HD12	2.23	0.74
1:E:110:ASN:HA	4:E:603:FAD:C6	2.16	0.74
7:F:609:GOL:H31	6:F:610:PEG:O2	1.86	0.73
1:C:319:ARG:HD2	8:C:705:HOH:O	1.87	0.73
1:A:110:ASN:HA	4:A:601:FAD:C6	2.19	0.72
1:B:319:ARG:HD2	8:B:741:HOH:O	1.90	0.72
1:B:110:ASN:HA	4:B:601:FAD:C6	2.20	0.71
1:C:110:ASN:HB2	4:C:601:FAD:C4X	2.21	0.71
1:A:115:GLN:NE2	1:A:377:TRP:CH2	2.58	0.71
1:F:589:ASN:HD21	6:F:610:PEG:C2	2.03	0.70
1:B:241:LEU:O	1:B:242:ALA:HB3	1.92	0.69
1:E:281:ARG:HD3	8:E:785:HOH:O	1.92	0.69
1:F:589:ASN:ND2	6:F:610:PEG:H32	2.06	0.69
1:C:241:LEU:O	1:C:242:ALA:HB3	1.93	0.69
1:A:115:GLN:NE2	1:A:377:TRP:CZ2	2.60	0.69
1:C:191:TRP:CE2	5:C:604:NAG:H61	2.28	0.68
1:D:110:ASN:HB2	4:D:601:FAD:C4X	2.23	0.68
1:A:110:ASN:HB2	4:A:601:FAD:C4X	2.24	0.68
1:D:1:MET:N	6:D:603:PEG:O4	2.27	0.68
1:E:190:THR:HG22	5:E:609:NAG:H82	1.76	0.68
1:B:110:ASN:HB2	4:B:601:FAD:C4X	2.26	0.66
1:F:110:ASN:HB2	4:F:601:FAD:C4X	2.27	0.65

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:110:ASN:HB2	4:E:603:FAD:C4X	2.27	0.65
1:F:319:ARG:HD2	8:F:715:HOH:O	1.95	0.65
1:C:191:TRP:CZ2	5:C:604:NAG:H61	2.31	0.64
1:F:589:ASN:HD22	6:F:610:PEG:H31	1.63	0.63
1:C:241:LEU:O	1:C:242:ALA:CB	2.47	0.63
1:B:241:LEU:O	1:B:242:ALA:CB	2.46	0.63
1:B:407:VAL:HG13	1:B:438:VAL:CG2	2.29	0.62
1:F:371:THR:HG21	7:F:606:GOL:H2	1.81	0.62
1:D:190:THR:HG22	5:D:604:NAG:H82	1.82	0.62
1:A:371:THR:HG21	7:A:606:GOL:C2	2.30	0.61
1:A:190:THR:HG22	5:A:604:NAG:H82	1.82	0.61
1:C:281:ARG:NH2	8:C:702:HOH:O	2.33	0.60
1:C:58:GLN:HB2	1:D:1:MET:HE2	1.83	0.60
1:C:412:MET:HE1	7:C:606:GOL:H2	1.84	0.59
1:D:546:LYS:CB	8:D:763:HOH:O	2.51	0.59
1:D:507:VAL:CG1	1:D:513:ILE:HD13	2.32	0.58
1:F:190:THR:HG22	5:F:604:NAG:H82	1.86	0.58
1:D:110:ASN:HB2	4:D:601:FAD:N5	2.20	0.57
1:B:138:GLN:HG3	8:B:826:HOH:O	2.03	0.57
1:B:407:VAL:HG13	1:B:438:VAL:HG23	1.87	0.56
1:C:110:ASN:HB2	4:C:601:FAD:N5	2.19	0.56
1:E:64:ALA:HB2	7:E:607:GOL:H12	1.86	0.56
1:B:296:LEU:HG	8:B:850:HOH:O	2.05	0.56
1:F:1:MET:N	6:F:603:PEG:O4	2.37	0.56
1:E:64:ALA:HB2	7:E:607:GOL:C1	2.35	0.56
1:F:110:ASN:HB2	4:F:601:FAD:N5	2.22	0.55
1:C:58:GLN:HB2	1:D:1:MET:CE	2.36	0.55
1:D:110:ASN:HB2	4:D:601:FAD:C5X	2.37	0.54
2:I:2:NAG:H4	2:I:3:MAN:O2	2.06	0.54
1:B:372:SER:HB3	8:B:880:HOH:O	2.08	0.54
1:D:480:PHE:CE2	1:D:513:ILE:HD12	2.43	0.53
1:B:110:ASN:HB2	4:B:601:FAD:N5	2.23	0.53
1:D:589:ASN:ND2	8:D:703:HOH:O	2.41	0.53
1:B:58:GLN:HB2	1:A:1:MET:HE1	1.89	0.53
1:E:345:ALA:HA	6:E:606:PEG:H31	1.90	0.53
1:F:589:ASN:HD21	6:F:610:PEG:C3	2.20	0.52
1:B:319:ARG:CD	8:B:741:HOH:O	2.52	0.52
1:F:110:ASN:HB2	4:F:601:FAD:C5X	2.40	0.52
1:A:110:ASN:HB2	4:A:601:FAD:N5	2.24	0.52
1:C:110:ASN:HB2	4:C:601:FAD:C5X	2.40	0.52
1:C:191:TRP:NE1	5:C:604:NAG:H61	2.24	0.51

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:64:ALA:CB	7:B:606:GOL:H11	2.40	0.51
1:C:110:ASN:HA	4:C:601:FAD:C5X	2.40	0.51
7:F:609:GOL:H12	6:F:610:PEG:H12	1.92	0.51
1:D:333:ALA:HB2	1:D:437:ALA:HA	1.93	0.51
1:A:333:ALA:HB2	1:A:437:ALA:HA	1.93	0.51
1:A:91:TYR:CD1	1:E:203:ILE:HD12	2.46	0.50
1:D:371:THR:HG21	7:D:606:GOL:H2	1.93	0.50
1:C:1:MET:N	6:C:603:PEG:O4	2.45	0.49
1:C:345:ALA:HA	6:C:605:PEG:H31	1.93	0.49
1:D:110:ASN:HA	4:D:601:FAD:C5X	2.42	0.49
1:E:110:ASN:HB2	4:E:603:FAD:N5	2.27	0.49
1:B:110:ASN:HB2	4:B:601:FAD:C5X	2.43	0.49
1:B:333:ALA:HB2	1:B:437:ALA:HA	1.94	0.49
1:C:333:ALA:HB2	1:C:437:ALA:HA	1.95	0.48
1:F:333:ALA:HB2	1:F:437:ALA:HA	1.95	0.48
1:C:1:MET:HE3	1:D:228:HIS:CD2	2.49	0.48
1:A:475:LEU:HD13	8:A:703:HOH:O	2.12	0.48
1:E:110:ASN:HA	4:E:603:FAD:C5X	2.44	0.48
1:E:333:ALA:HB2	1:E:437:ALA:HA	1.95	0.48
1:C:324:GLN:HE22	5:C:608:NAG:H81	1.79	0.47
1:B:190:THR:HG22	5:B:604:NAG:H82	1.95	0.47
1:E:10:LYS:HE2	6:E:602:PEG:H22	1.96	0.47
1:D:507:VAL:HG12	1:D:513:ILE:CD1	2.37	0.47
1:A:92:ASP:HB2	1:E:197:ILE:HD13	1.96	0.47
1:A:110:ASN:HB2	4:A:601:FAD:C5X	2.44	0.47
1:B:407:VAL:CG1	1:B:438:VAL:HG23	2.45	0.46
1:E:125:TRP:CD1	1:E:564:PRO:HG3	2.50	0.46
1:C:125:TRP:CD1	1:C:564:PRO:HG3	2.51	0.46
1:A:110:ASN:HA	4:A:601:FAD:C5X	2.44	0.46
1:C:111:TYR:CE1	7:C:606:GOL:H12	2.50	0.46
1:D:125:TRP:CD1	1:D:564:PRO:HG3	2.50	0.46
1:B:343:GLN:HE22	7:B:606:GOL:C1	2.29	0.46
1:E:372:SER:HA	1:E:411:THR:O	2.16	0.46
1:A:125:TRP:CD1	1:A:564:PRO:HG3	2.50	0.46
1:E:110:ASN:HB2	4:E:603:FAD:C5X	2.45	0.45
1:B:125:TRP:CD1	1:B:564:PRO:HG3	2.51	0.45
1:C:1:MET:CE	1:D:228:HIS:CD2	3.00	0.45
1:C:382:GLU:N	1:C:383:PRO:CD	2.79	0.45
1:F:125:TRP:CD1	1:F:564:PRO:HG3	2.52	0.45
1:D:345:ALA:HA	6:D:605:PEG:H31	1.99	0.45
1:A:372:SER:HA	1:A:411:THR:O	2.17	0.45

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:163:VAL:HG22	1:A:217:TYR:HB2	1.99	0.44
1:C:372:SER:HA	1:C:411:THR:O	2.17	0.44
1:F:228:HIS:CD2	1:E:1:MET:HE3	2.52	0.44
1:F:10:LYS:HE2	6:F:608:PEG:H12	1.99	0.44
1:F:112:MET:O	1:F:220:TYR:HA	2.18	0.44
1:F:110:ASN:HA	4:F:601:FAD:C5X	2.46	0.44
1:C:493:LYS:HE2	8:C:731:HOH:O	2.18	0.44
1:F:372:SER:HA	1:F:411:THR:O	2.18	0.44
1:E:112:MET:O	1:E:220:TYR:HA	2.17	0.44
1:E:371:THR:HG21	7:E:607:GOL:C2	2.42	0.44
1:B:112:MET:O	1:B:220:TYR:HA	2.18	0.43
1:C:110:ASN:CB	4:C:601:FAD:C5X	2.96	0.43
1:C:112:MET:O	1:C:220:TYR:HA	2.18	0.43
1:D:372:SER:HA	1:D:411:THR:O	2.18	0.43
1:A:112:MET:O	1:A:220:TYR:HA	2.18	0.43
1:B:405:PRO:O	1:B:441:CYS:HB2	2.19	0.43
1:D:110:ASN:CB	4:D:601:FAD:C5X	2.96	0.43
1:C:258:ARG:NH2	5:C:607:NAG:O6	2.52	0.43
1:F:163:VAL:HG22	1:F:217:TYR:HB2	2.01	0.43
1:E:163:VAL:HG22	1:E:217:TYR:HB2	2.00	0.43
1:D:163:VAL:HG22	1:D:217:TYR:HB2	2.00	0.42
1:B:58:GLN:CB	1:A:1:MET:HE1	2.49	0.42
1:D:112:MET:O	1:D:220:TYR:HA	2.19	0.42
1:D:191:TRP:CE2	5:D:604:NAG:H83	2.55	0.42
1:C:1:MET:HE3	1:D:359:TYR:HE2	1.83	0.42
7:F:609:GOL:C1	6:F:610:PEG:H12	2.49	0.42
1:E:405:PRO:O	1:E:441:CYS:HB2	2.20	0.42
1:B:372:SER:HA	1:B:411:THR:O	2.18	0.42
2:K:1:NAG:H62	2:K:2:NAG:C1	2.50	0.42
1:F:405:PRO:O	1:F:441:CYS:HB2	2.20	0.42
1:E:171:GLY:C	1:E:172:ASN:O	2.58	0.42
1:D:405:PRO:O	1:D:441:CYS:HB2	2.20	0.41
1:D:467:LEU:HD23	1:D:467:LEU:HA	1.89	0.41
1:B:264:ALA:HB1	1:B:284:ILE:HD12	2.02	0.41
1:C:405:PRO:O	1:C:441:CYS:HB2	2.20	0.41
1:A:191:TRP:CE2	5:A:604:NAG:H83	2.55	0.41
1:B:110:ASN:HA	4:B:601:FAD:C5X	2.50	0.41
1:B:422:TYR:CD2	7:B:606:GOL:H31	2.55	0.41
1:C:58:GLN:CB	1:D:1:MET:CE	2.99	0.41
1:E:190:THR:HG22	5:E:609:NAG:C8	2.48	0.41
1:B:53:ASN:CG	1:B:78:ILE:HG12	2.41	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:190:THR:HG21	5:E:609:NAG:N2	2.35	0.41
1:B:493:LYS:N	1:B:494:PRO:CD	2.84	0.41
1:A:190:THR:HG21	5:A:604:NAG:N2	2.36	0.41
1:A:264:ALA:HB1	1:A:284:ILE:HD12	2.02	0.41
1:A:405:PRO:O	1:A:441:CYS:HB2	2.20	0.41
1:E:204:ARG:NH2	1:E:211:ALA:HB3	2.36	0.41
1:A:394:ARG:HD2	8:A:841:HOH:O	2.20	0.41
1:A:53:ASN:CG	1:A:78:ILE:HG12	2.41	0.41
1:C:4:SER:O	2:I:1:NAG:H61	2.21	0.40
1:A:75:GLN:HG3	1:A:78:ILE:HD11	2.03	0.40
1:F:264:ALA:HB1	1:F:284:ILE:HD12	2.04	0.40
1:C:163:VAL:HG22	1:C:217:TYR:HB2	2.02	0.40
1:E:53:ASN:CG	1:E:78:ILE:HG12	2.42	0.40
2:K:2:NAG:H4	2:K:3:MAN:O2	2.21	0.40
1:C:382:GLU:N	1:C:383:PRO:HD2	2.36	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	588/628 (94%)	570 (97%)	16 (3%)	2 (0%)	41 55
1	B	588/628 (94%)	569 (97%)	16 (3%)	3 (0%)	29 41
1	C	588/628 (94%)	568 (97%)	17 (3%)	3 (0%)	29 41
1	D	588/628 (94%)	570 (97%)	16 (3%)	2 (0%)	41 55
1	E	588/628 (94%)	570 (97%)	16 (3%)	2 (0%)	41 55
1	F	588/628 (94%)	569 (97%)	17 (3%)	2 (0%)	41 55
All	All	3528/3768 (94%)	3416 (97%)	98 (3%)	14 (0%)	34 48

All (14) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	371	THR
1	C	371	THR
1	D	371	THR
1	A	371	THR
1	F	371	THR
1	E	371	THR
1	B	242	ALA
1	E	525	PHE
1	B	525	PHE
1	C	242	ALA
1	C	525	PHE
1	D	525	PHE
1	A	525	PHE
1	F	525	PHE

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	472/500 (94%)	461 (98%)	11 (2%)	50	70
1	B	471/500 (94%)	463 (98%)	8 (2%)	60	78
1	C	462/500 (92%)	453 (98%)	9 (2%)	57	75
1	D	452/500 (90%)	442 (98%)	10 (2%)	52	71
1	E	472/500 (94%)	462 (98%)	10 (2%)	53	72
1	F	466/500 (93%)	457 (98%)	9 (2%)	57	75
All	All	2795/3000 (93%)	2738 (98%)	57 (2%)	55	74

All (57) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	78	ILE
1	B	216	SER
1	B	260	GLN
1	B	283	GLU
1	B	312	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	B	319	ARG
1	B	384	LYS
1	B	490	THR
1	C	78	ILE
1	C	115	GLN
1	C	197	ILE
1	C	216	SER
1	C	283	GLU
1	C	319	ARG
1	C	372	SER
1	C	384	LYS
1	C	490	THR
1	D	78	ILE
1	D	115	GLN
1	D	216	SER
1	D	238	ARG
1	D	283	GLU
1	D	319	ARG
1	D	372	SER
1	D	420	ARG
1	D	490	THR
1	D	493	LYS
1	A	78	ILE
1	A	115	GLN
1	A	163	VAL
1	A	216	SER
1	A	238	ARG
1	A	283	GLU
1	A	309	LYS
1	A	319	ARG
1	A	384	LYS
1	A	490	THR
1	A	493	LYS
1	F	78	ILE
1	F	115	GLN
1	F	216	SER
1	F	238	ARG
1	F	260	GLN
1	F	283	GLU
1	F	319	ARG
1	F	466	TRP
1	F	490	THR

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	E	78	ILE
1	E	115	GLN
1	E	216	SER
1	E	238	ARG
1	E	250	GLN
1	E	283	GLU
1	E	309	LYS
1	E	466	TRP
1	E	490	THR
1	E	493	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	228	HIS
1	B	343	GLN
1	B	589	ASN
1	C	324	GLN
1	C	343	GLN
1	D	343	GLN
1	D	516	HIS
1	A	115	GLN
1	A	343	GLN
1	A	488	ASN
1	A	516	HIS
1	F	343	GLN
1	F	516	HIS
1	F	589	ASN
1	E	343	GLN
1	E	488	ASN
1	E	516	HIS

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

17 monosaccharides are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	NAG	G	1	1,2	14,14,15	0.73	0	17,19,21	2.13	3 (17%)
2	NAG	G	2	2	14,14,15	0.80	0	17,19,21	1.79	3 (17%)
2	MAN	G	3	2	11,11,12	0.80	0	15,15,17	2.14	4 (26%)
2	NAG	H	1	1,2	14,14,15	0.45	0	17,19,21	2.95	3 (17%)
2	NAG	H	2	2	14,14,15	0.61	0	17,19,21	1.73	4 (23%)
2	MAN	H	3	2	11,11,12	0.87	0	15,15,17	1.61	3 (20%)
2	NAG	I	1	1,2	14,14,15	0.55	0	17,19,21	2.28	4 (23%)
2	NAG	I	2	2	14,14,15	0.53	0	17,19,21	1.77	3 (17%)
2	MAN	I	3	2	11,11,12	0.67	0	15,15,17	1.76	3 (20%)
2	NAG	J	1	1,2	14,14,15	0.78	1 (7%)	17,19,21	2.01	4 (23%)
2	NAG	J	2	2	14,14,15	0.61	0	17,19,21	1.17	1 (5%)
2	MAN	J	3	2	11,11,12	0.69	0	15,15,17	1.59	2 (13%)
2	NAG	K	1	1,2	14,14,15	0.74	0	17,19,21	2.67	5 (29%)
2	NAG	K	2	2	14,14,15	0.75	0	17,19,21	2.04	7 (41%)
2	MAN	K	3	2	11,11,12	0.85	0	15,15,17	1.82	3 (20%)
3	NAG	L	1	1,3	14,14,15	0.55	0	17,19,21	2.20	4 (23%)
3	NAG	L	2	3	14,14,15	0.98	1 (7%)	17,19,21	2.04	7 (41%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	G	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	G	2	2	-	0/6/23/26	0/1/1/1
2	MAN	G	3	2	-	2/2/19/22	1/1/1/1

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	H	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	H	2	2	-	2/6/23/26	0/1/1/1
2	MAN	H	3	2	-	2/2/19/22	1/1/1/1
2	NAG	I	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	I	2	2	-	2/6/23/26	0/1/1/1
2	MAN	I	3	2	-	1/2/19/22	1/1/1/1
2	NAG	J	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	J	2	2	-	4/6/23/26	0/1/1/1
2	MAN	J	3	2	-	2/2/19/22	0/1/1/1
2	NAG	K	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	K	2	2	-	1/6/23/26	0/1/1/1
2	MAN	K	3	2	-	1/2/19/22	1/1/1/1
3	NAG	L	1	1,3	-	2/6/23/26	0/1/1/1
3	NAG	L	2	3	-	1/6/23/26	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	L	2	NAG	C4-C5	2.35	1.58	1.53
2	J	1	NAG	O7-C7	-2.15	1.18	1.23

All (63) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	1	NAG	C1-O5-C5	10.11	125.89	112.19
2	K	1	NAG	C1-O5-C5	9.13	124.56	112.19
3	L	1	NAG	C1-O5-C5	7.40	122.22	112.19
2	I	1	NAG	C1-O5-C5	7.21	121.96	112.19
2	G	3	MAN	C1-O5-C5	5.91	120.19	112.19
2	J	1	NAG	C1-O5-C5	5.42	119.53	112.19
2	G	1	NAG	C1-O5-C5	4.97	118.93	112.19
2	I	2	NAG	O5-C1-C2	-4.90	103.56	111.29
2	G	1	NAG	O5-C5-C6	4.72	114.60	107.20
2	I	3	MAN	C1-O5-C5	4.64	118.47	112.19
2	G	1	NAG	C6-C5-C4	-4.32	102.89	113.00
2	K	2	NAG	O5-C5-C6	-4.29	100.48	107.20
2	K	3	MAN	C1-O5-C5	4.01	117.63	112.19
2	H	3	MAN	C1-O5-C5	3.98	117.58	112.19
2	K	3	MAN	O5-C5-C6	3.98	113.44	107.20
2	I	1	NAG	C6-C5-C4	-3.89	103.89	113.00

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	G	2	NAG	O3-C3-C2	-3.84	101.51	109.47
2	H	1	NAG	C6-C5-C4	-3.79	104.13	113.00
2	H	2	NAG	C4-C3-C2	3.75	116.52	111.02
2	J	3	MAN	C1-O5-C5	3.71	117.21	112.19
2	G	2	NAG	C2-N2-C7	-3.70	117.64	122.90
2	K	2	NAG	C1-O5-C5	3.68	117.18	112.19
2	J	3	MAN	O5-C5-C6	3.67	112.95	107.20
2	G	3	MAN	O5-C5-C6	3.65	112.93	107.20
2	H	2	NAG	O4-C4-C3	-3.63	101.95	110.35
2	K	1	NAG	O3-C3-C4	-3.57	102.09	110.35
3	L	2	NAG	O5-C5-C6	-3.46	101.78	107.20
2	I	3	MAN	C1-C2-C3	3.45	113.90	109.67
2	I	2	NAG	C4-C3-C2	3.42	116.03	111.02
3	L	2	NAG	C1-O5-C5	3.37	116.76	112.19
2	G	3	MAN	C1-C2-C3	3.25	113.67	109.67
3	L	2	NAG	C4-C3-C2	-3.24	106.28	111.02
2	H	1	NAG	O5-C5-C4	3.19	118.58	110.83
2	H	2	NAG	O4-C4-C5	3.18	117.18	109.30
2	J	1	NAG	C6-C5-C4	-3.06	105.85	113.00
2	J	1	NAG	O3-C3-C2	-2.95	103.36	109.47
2	H	3	MAN	O5-C5-C6	2.94	111.81	107.20
2	K	1	NAG	C6-C5-C4	-2.92	106.16	113.00
3	L	2	NAG	O5-C5-C4	2.70	117.39	110.83
2	H	3	MAN	O4-C4-C3	2.66	116.50	110.35
2	I	1	NAG	O5-C5-C4	2.66	117.29	110.83
3	L	2	NAG	O3-C3-C4	2.54	116.22	110.35
2	K	2	NAG	O4-C4-C3	-2.51	104.53	110.35
2	K	2	NAG	C4-C3-C2	2.49	114.67	111.02
2	I	2	NAG	O6-C6-C5	-2.49	102.75	111.29
2	G	2	NAG	C4-C3-C2	2.44	114.59	111.02
2	I	1	NAG	O3-C3-C4	-2.36	104.90	110.35
3	L	2	NAG	C2-N2-C7	2.31	126.19	122.90
2	K	2	NAG	O4-C4-C5	2.24	114.85	109.30
3	L	1	NAG	C4-C3-C2	-2.21	107.78	111.02
3	L	1	NAG	C3-C4-C5	2.21	114.17	110.24
2	K	2	NAG	O6-C6-C5	-2.20	103.73	111.29
2	K	3	MAN	O4-C4-C3	2.20	115.44	110.35
2	K	1	NAG	O5-C5-C6	2.18	110.62	107.20
2	G	3	MAN	O2-C2-C3	-2.17	105.79	110.14
3	L	1	NAG	O3-C3-C4	-2.16	105.35	110.35
2	J	1	NAG	O6-C6-C5	-2.15	103.92	111.29
2	K	2	NAG	O5-C5-C4	2.10	115.93	110.83

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	I	3	MAN	O5-C5-C6	2.10	110.49	107.20
3	L	2	NAG	O3-C3-C2	-2.09	105.14	109.47
2	J	2	NAG	C4-C3-C2	2.08	114.07	111.02
2	K	1	NAG	O6-C6-C5	-2.08	104.17	111.29
2	H	2	NAG	C6-C5-C4	2.02	117.75	113.00

There are no chirality outliers.

All (26) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	G	3	MAN	O5-C5-C6-O6
2	I	1	NAG	C4-C5-C6-O6
2	G	3	MAN	C4-C5-C6-O6
2	J	3	MAN	C4-C5-C6-O6
2	J	3	MAN	O5-C5-C6-O6
2	H	3	MAN	O5-C5-C6-O6
2	I	2	NAG	C4-C5-C6-O6
2	H	3	MAN	C4-C5-C6-O6
2	K	1	NAG	C4-C5-C6-O6
2	I	1	NAG	O5-C5-C6-O6
2	I	2	NAG	O5-C5-C6-O6
2	K	3	MAN	O5-C5-C6-O6
3	L	1	NAG	C4-C5-C6-O6
2	K	1	NAG	O5-C5-C6-O6
2	I	3	MAN	O5-C5-C6-O6
2	J	2	NAG	C8-C7-N2-C2
2	H	2	NAG	C4-C5-C6-O6
2	K	2	NAG	C4-C5-C6-O6
2	G	1	NAG	O5-C5-C6-O6
2	H	2	NAG	O5-C5-C6-O6
2	J	2	NAG	O7-C7-N2-C2
2	J	2	NAG	C4-C5-C6-O6
3	L	1	NAG	O5-C5-C6-O6
3	L	2	NAG	C3-C2-N2-C7
2	J	2	NAG	O5-C5-C6-O6
2	G	1	NAG	C4-C5-C6-O6

All (4) ring outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	G	3	MAN	C1-C2-C3-C4-C5-O5
2	I	3	MAN	C1-C2-C3-C4-C5-O5

Continued on next page...

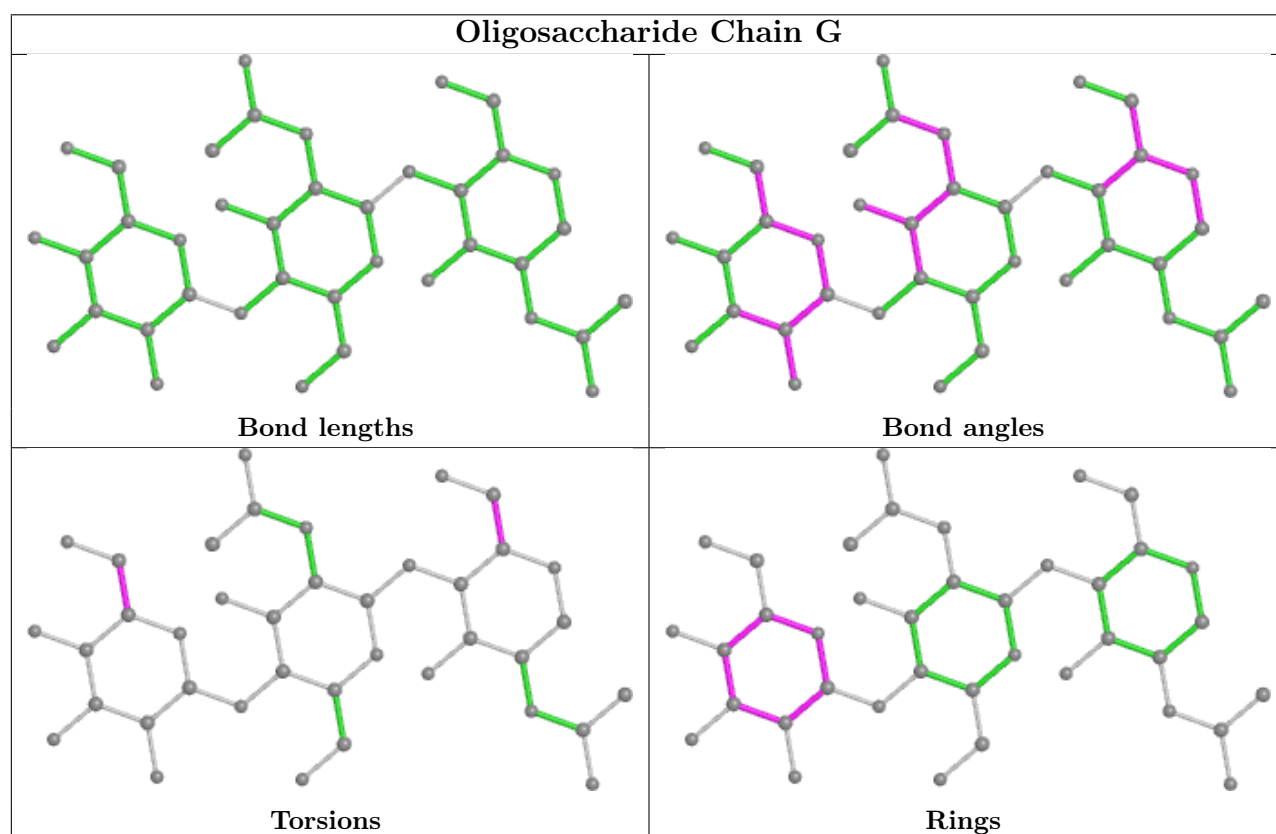
Continued from previous page...

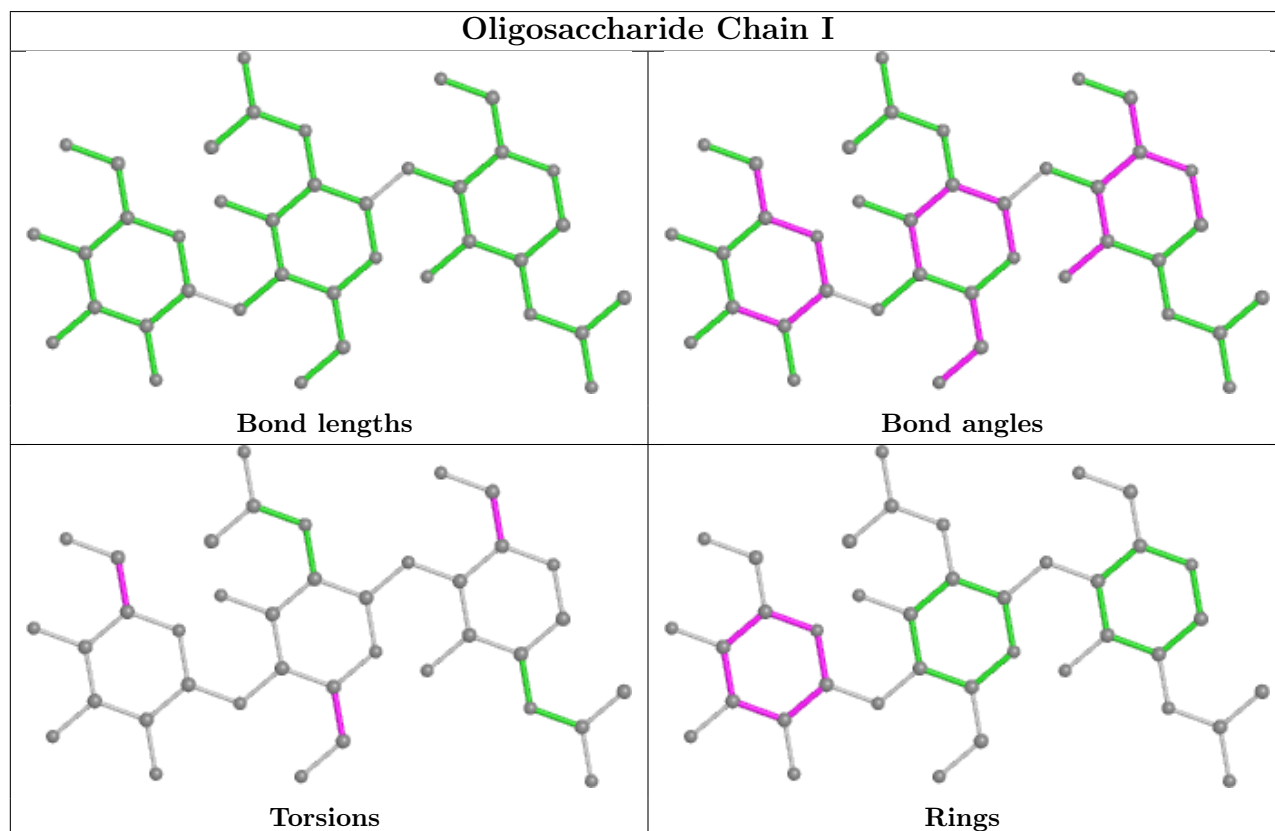
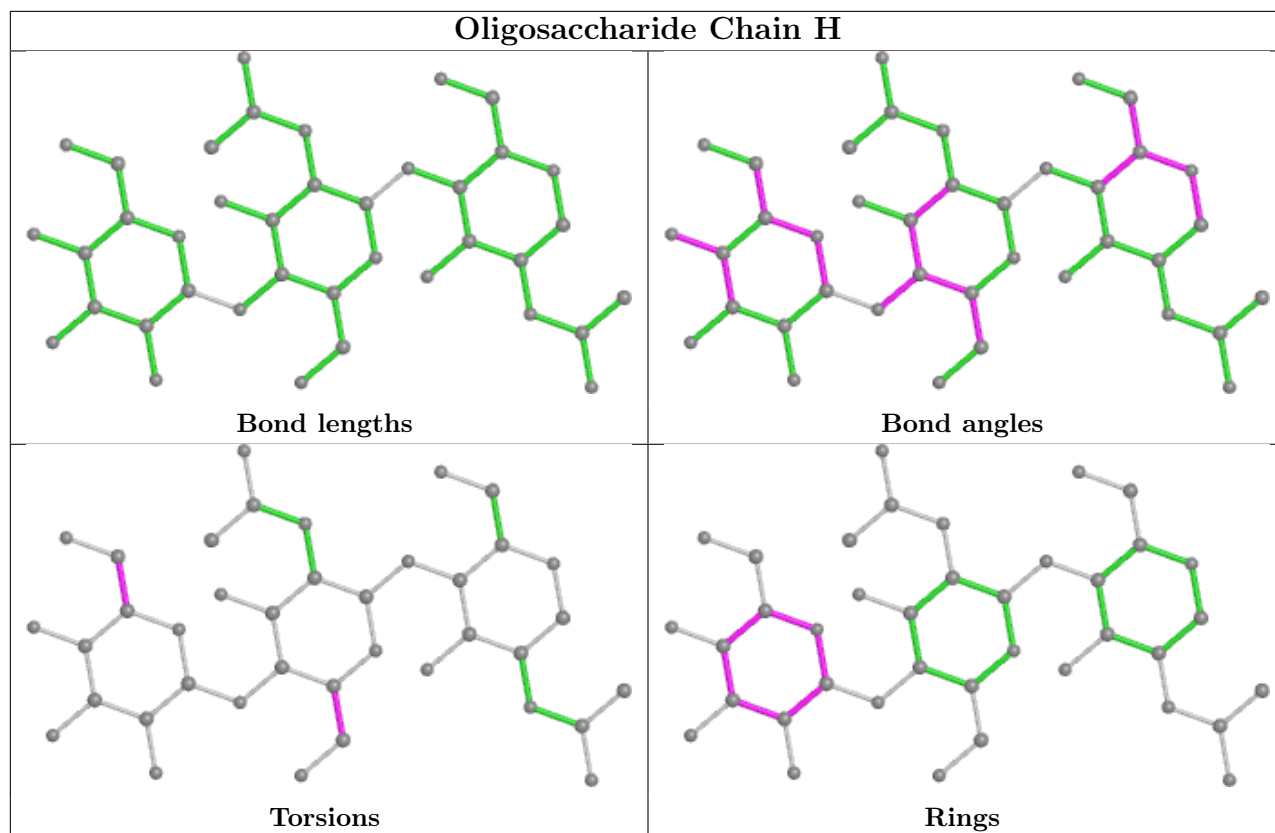
Mol	Chain	Res	Type	Atoms
2	H	3	MAN	C1-C2-C3-C4-C5-O5
2	K	3	MAN	C1-C2-C3-C4-C5-O5

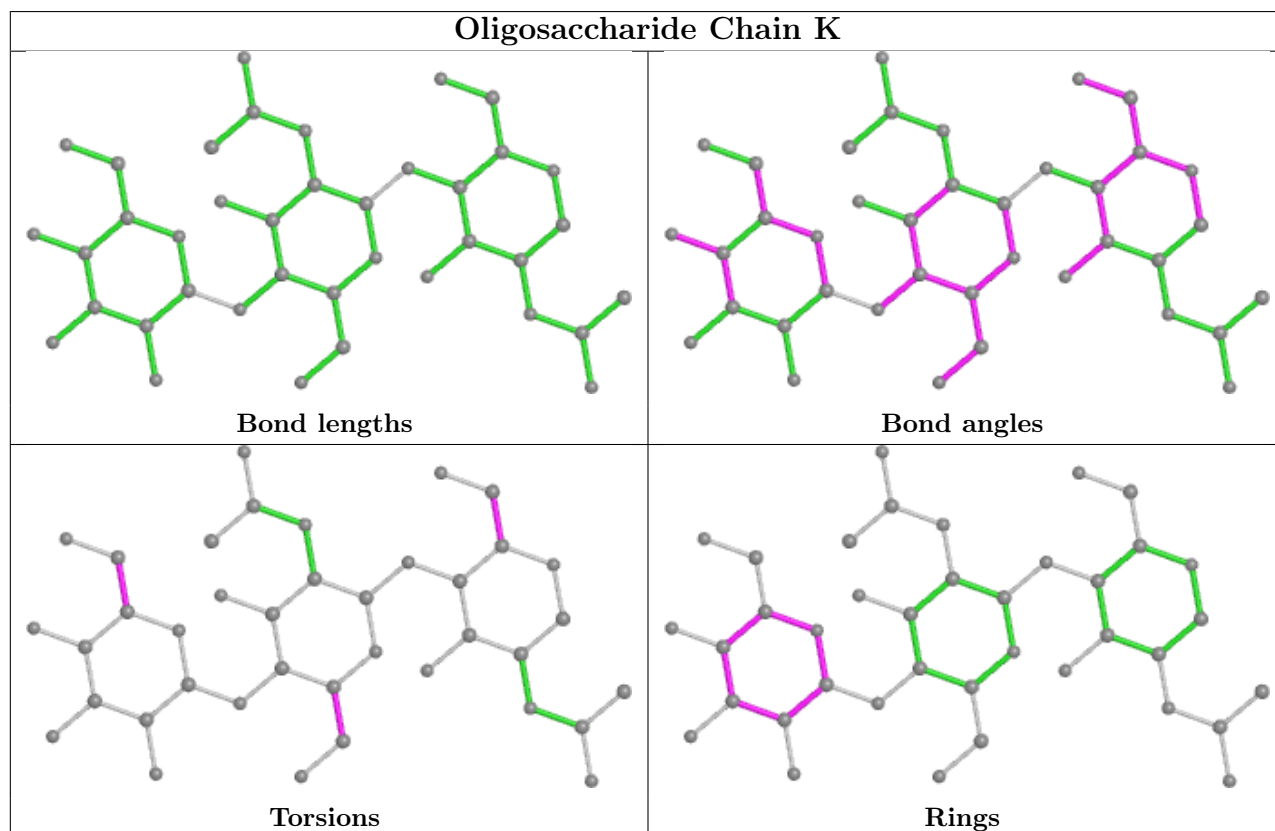
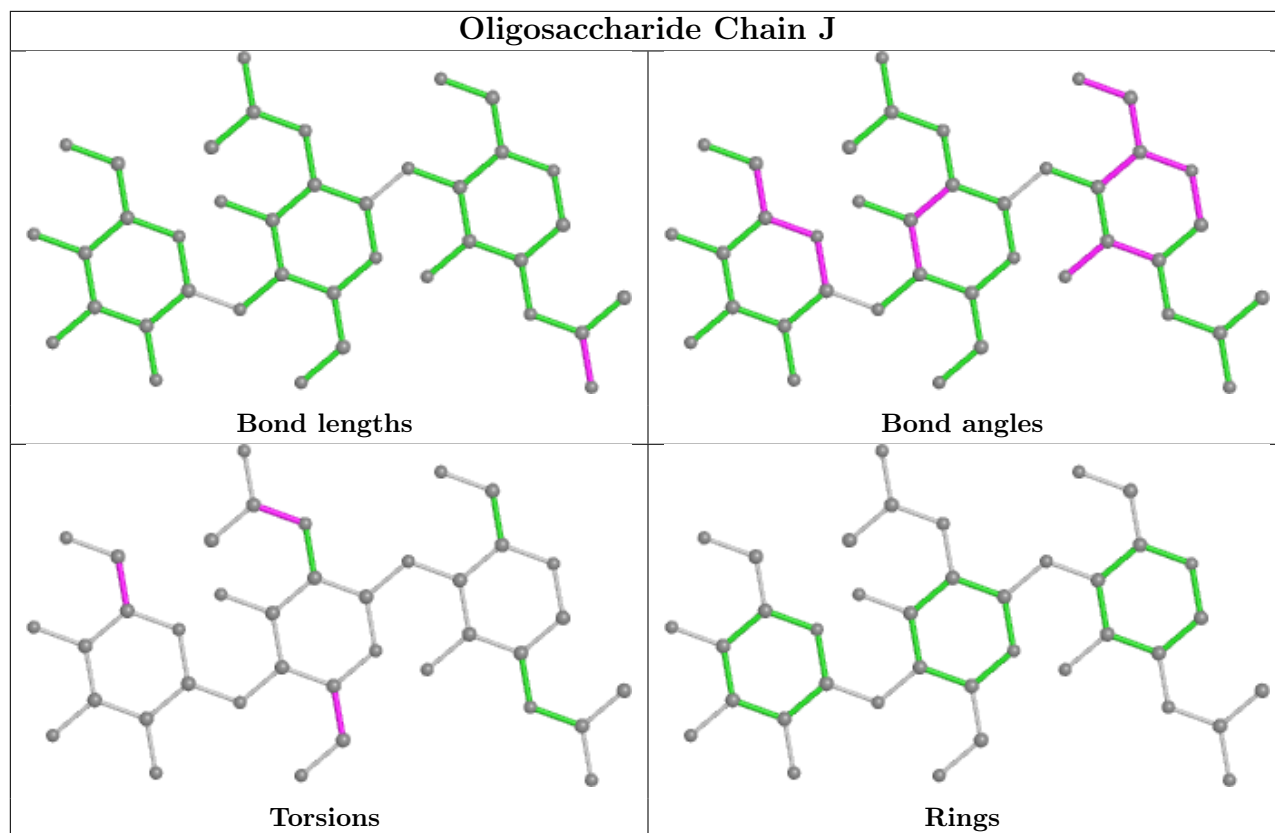
6 monomers are involved in 4 short contacts:

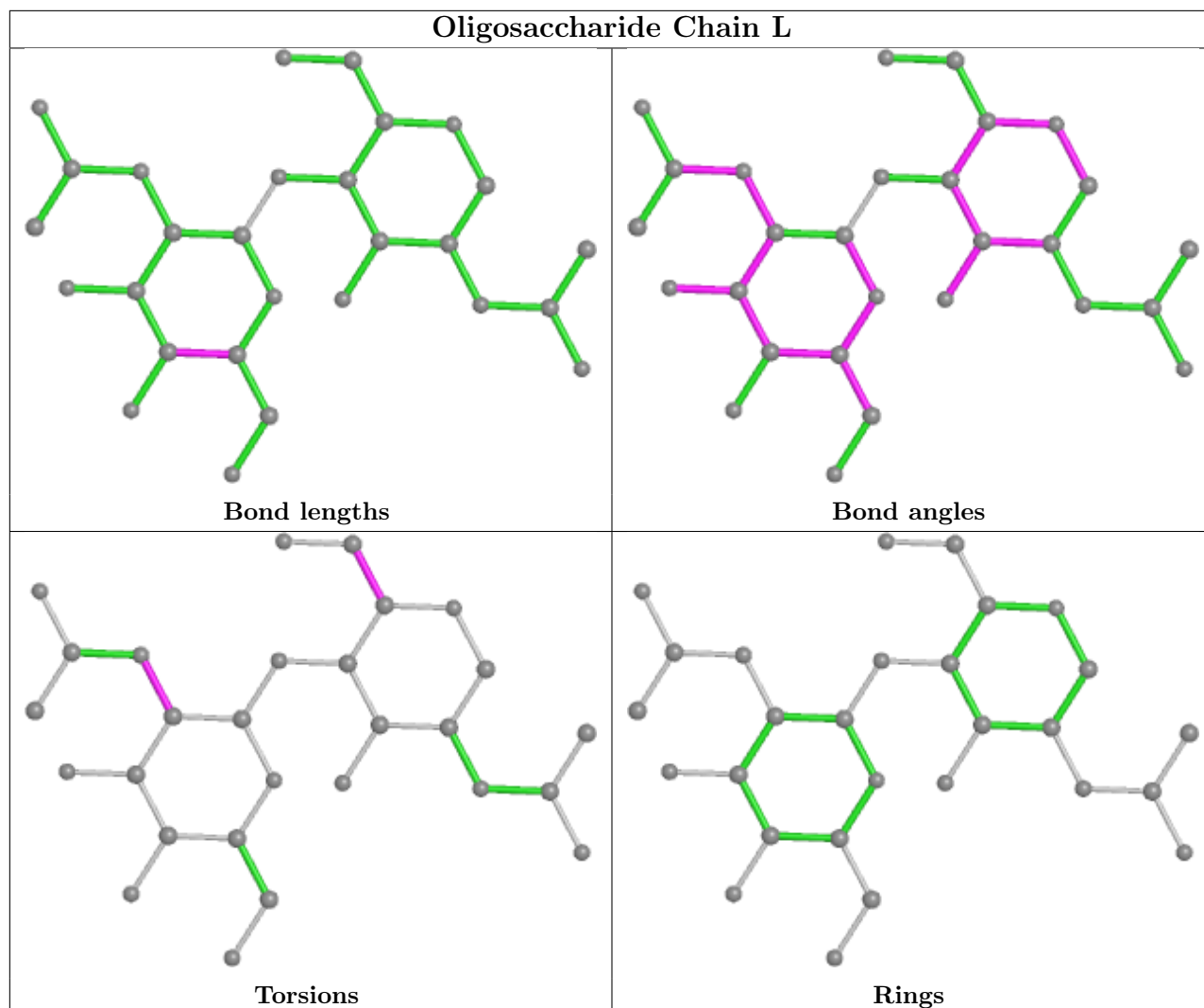
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	I	3	MAN	1	0
2	I	2	NAG	1	0
2	I	1	NAG	1	0
2	K	1	NAG	1	0
2	K	3	MAN	1	0
2	K	2	NAG	2	0

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









5.6 Ligand geometry [i](#)

57 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	$\# Z > 2$
6	PEG	A	608	-	6,6,6	0.33	0	5,5,5	0.35	0
7	GOL	A	606	-	5,5,5	0.39	0	5,5,5	0.56	0
6	PEG	E	605	-	6,6,6	0.28	0	5,5,5	0.14	0
6	PEG	B	610	-	6,6,6	0.38	0	5,5,5	0.29	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	FAD	B	601	-	53,58,58	0.88	1 (1%)	68,89,89	0.90	2 (2%)
6	PEG	D	603	-	6,6,6	0.37	0	5,5,5	0.24	0
5	NAG	A	607	1	14,14,15	0.61	0	17,19,21	2.06	7 (41%)
4	FAD	D	601	-	53,58,58	0.65	0	68,89,89	0.86	3 (4%)
6	PEG	A	603	-	6,6,6	0.22	0	5,5,5	0.14	0
5	NAG	C	602	1	14,14,15	0.91	1 (7%)	17,19,21	1.99	6 (35%)
6	PEG	F	603	-	6,6,6	0.30	0	5,5,5	0.21	0
5	NAG	D	602	1	14,14,15	0.77	0	17,19,21	1.63	5 (29%)
6	PEG	F	608	-	6,6,6	0.33	0	5,5,5	0.35	0
5	NAG	C	604	1	14,14,15	0.42	0	17,19,21	1.34	2 (11%)
5	NAG	B	604	1	14,14,15	0.87	1 (7%)	17,19,21	1.71	3 (17%)
6	PEG	C	605	-	6,6,6	0.22	0	5,5,5	0.26	0
5	NAG	D	604	1	14,14,15	0.56	0	17,19,21	2.41	3 (17%)
4	FAD	F	601	-	53,58,58	0.65	0	68,89,89	0.81	3 (4%)
5	NAG	E	609	1	14,14,15	0.53	0	17,19,21	1.58	4 (23%)
6	PEG	B	608	-	6,6,6	0.38	0	5,5,5	0.23	0
5	NAG	F	612	1	14,14,15	0.66	0	17,19,21	1.51	3 (17%)
7	GOL	F	606	-	5,5,5	0.25	0	5,5,5	0.52	0
5	NAG	F	607	1	14,14,15	0.46	0	17,19,21	2.23	5 (29%)
5	NAG	E	604	1	14,14,15	0.75	0	17,19,21	2.71	7 (41%)
6	PEG	B	605	-	6,6,6	0.52	0	5,5,5	0.38	0
6	PEG	D	605	-	6,6,6	0.18	0	5,5,5	0.18	0
6	PEG	A	605	-	6,6,6	0.31	0	5,5,5	0.31	0
6	PEG	C	603	-	6,6,6	0.29	0	5,5,5	0.32	0
7	GOL	C	606	-	5,5,5	0.17	0	5,5,5	0.42	0
7	GOL	E	607	-	5,5,5	0.32	0	5,5,5	0.55	0
7	GOL	F	609	-	5,5,5	0.21	0	5,5,5	0.59	0
5	NAG	F	604	1	14,14,15	0.43	0	17,19,21	1.83	1 (5%)
5	NAG	C	607	1	14,14,15	0.29	0	17,19,21	1.31	2 (11%)
5	NAG	F	602	1	14,14,15	0.74	0	17,19,21	2.04	6 (35%)
6	PEG	F	611	-	6,6,6	0.19	0	5,5,5	0.12	0
6	PEG	E	602	-	6,6,6	0.44	0	5,5,5	0.32	0
4	FAD	A	601	-	53,58,58	0.75	0	68,89,89	0.84	1 (1%)
5	NAG	D	607	1	14,14,15	0.25	0	17,19,21	1.40	3 (17%)
5	NAG	C	608	1	14,14,15	0.50	0	17,19,21	0.86	0
5	NAG	D	608	1	14,14,15	0.62	0	17,19,21	1.55	4 (23%)
5	NAG	A	609	1	14,14,15	0.42	0	17,19,21	1.17	1 (5%)
4	FAD	E	603	-	53,58,58	0.64	0	68,89,89	0.91	4 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	NAG	B	607	1	14,14,15	0.46	0	17,19,21	1.50	4 (23%)
6	PEG	B	603	-	6,6,6	0.32	0	5,5,5	0.25	0
6	PEG	F	610	-	6,6,6	0.32	0	5,5,5	0.50	0
6	PEG	F	605	-	6,6,6	0.41	0	5,5,5	0.33	0
7	GOL	B	606	-	5,5,5	0.18	0	5,5,5	0.38	0
7	GOL	D	606	-	5,5,5	0.13	0	5,5,5	0.35	0
5	NAG	A	604	1	14,14,15	0.77	1 (7%)	17,19,21	1.56	2 (11%)
5	NAG	B	609	1	14,14,15	0.60	0	17,19,21	1.82	4 (23%)
5	NAG	A	602	1	14,14,15	0.84	0	17,19,21	1.61	4 (23%)
5	NAG	E	608	1	14,14,15	0.30	0	17,19,21	1.30	2 (11%)
5	NAG	B	602	1	14,14,15	0.65	0	17,19,21	1.71	4 (23%)
4	FAD	C	601	-	53,58,58	0.66	1 (1%)	68,89,89	0.85	1 (1%)
5	NAG	E	610	1	14,14,15	0.47	0	17,19,21	1.85	5 (29%)
6	PEG	E	601	-	6,6,6	0.18	0	5,5,5	0.13	0
6	PEG	E	606	-	6,6,6	0.38	0	5,5,5	0.33	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	PEG	A	608	-	-	2/4/4/4	-
7	GOL	A	606	-	-	4/4/4/4	-
6	PEG	E	605	-	-	2/4/4/4	-
6	PEG	B	610	-	-	4/4/4/4	-
4	FAD	B	601	-	-	2/30/50/50	0/6/6/6
6	PEG	D	603	-	-	2/4/4/4	-
5	NAG	A	607	1	-	2/6/23/26	0/1/1/1
4	FAD	D	601	-	-	2/30/50/50	0/6/6/6
6	PEG	A	603	-	-	1/4/4/4	-
5	NAG	C	602	1	-	2/6/23/26	0/1/1/1
6	PEG	F	603	-	-	3/4/4/4	-
5	NAG	D	602	1	-	1/6/23/26	0/1/1/1
6	PEG	F	608	-	-	2/4/4/4	-
5	NAG	C	604	1	-	5/6/23/26	0/1/1/1
5	NAG	B	604	1	-	2/6/23/26	0/1/1/1
6	PEG	C	605	-	-	3/4/4/4	-

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	D	604	1	-	2/6/23/26	0/1/1/1
4	FAD	F	601	-	-	5/30/50/50	0/6/6/6
5	NAG	E	609	1	-	2/6/23/26	0/1/1/1
6	PEG	B	608	-	-	2/4/4/4	-
5	NAG	F	612	1	-	0/6/23/26	0/1/1/1
7	GOL	F	606	-	-	0/4/4/4	-
5	NAG	F	607	1	-	0/6/23/26	0/1/1/1
5	NAG	E	604	1	-	2/6/23/26	0/1/1/1
6	PEG	B	605	-	-	1/4/4/4	-
6	PEG	D	605	-	-	2/4/4/4	-
6	PEG	A	605	-	-	3/4/4/4	-
6	PEG	C	603	-	-	1/4/4/4	-
7	GOL	C	606	-	-	2/4/4/4	-
7	GOL	E	607	-	-	4/4/4/4	-
7	GOL	F	609	-	-	2/4/4/4	-
5	NAG	F	604	1	-	2/6/23/26	0/1/1/1
5	NAG	C	607	1	-	2/6/23/26	0/1/1/1
5	NAG	F	602	1	-	2/6/23/26	0/1/1/1
6	PEG	F	611	-	-	1/4/4/4	-
6	PEG	E	602	-	-	4/4/4/4	-
4	FAD	A	601	-	-	3/30/50/50	0/6/6/6
5	NAG	D	607	1	-	2/6/23/26	0/1/1/1
5	NAG	C	608	1	-	4/6/23/26	0/1/1/1
5	NAG	D	608	1	-	2/6/23/26	0/1/1/1
5	NAG	A	609	1	-	1/6/23/26	0/1/1/1
4	FAD	E	603	-	-	2/30/50/50	0/6/6/6
5	NAG	B	607	1	-	2/6/23/26	0/1/1/1
6	PEG	B	603	-	-	2/4/4/4	-
6	PEG	F	610	-	-	2/4/4/4	-
6	PEG	F	605	-	-	3/4/4/4	-
7	GOL	B	606	-	-	0/4/4/4	-
7	GOL	D	606	-	-	2/4/4/4	-
5	NAG	A	604	1	-	2/6/23/26	0/1/1/1
5	NAG	B	609	1	-	0/6/23/26	0/1/1/1
5	NAG	A	602	1	-	2/6/23/26	0/1/1/1
5	NAG	E	608	1	-	2/6/23/26	0/1/1/1

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	B	602	1	-	0/6/23/26	0/1/1/1
4	FAD	C	601	-	-	2/30/50/50	0/6/6/6
5	NAG	E	610	1	-	2/6/23/26	0/1/1/1
6	PEG	E	601	-	-	4/4/4/4	-
6	PEG	E	606	-	-	3/4/4/4	-

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	601	FAD	C1'-C2'	-3.43	1.47	1.52
5	B	604	NAG	C1-C2	2.72	1.56	1.52
4	C	601	FAD	C1'-C2'	-2.26	1.49	1.52
5	A	604	NAG	C1-C2	2.08	1.55	1.52
5	C	602	NAG	O4-C4	2.04	1.47	1.43

All (101) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	D	604	NAG	C1-O5-C5	8.23	123.35	112.19
5	F	607	NAG	C1-O5-C5	7.20	121.94	112.19
5	F	604	NAG	C1-O5-C5	5.98	120.30	112.19
5	E	604	NAG	C2-N2-C7	5.46	130.68	122.90
5	B	604	NAG	C2-N2-C7	4.93	129.92	122.90
5	B	609	NAG	C3-C4-C5	-4.92	101.47	110.24
5	E	604	NAG	O5-C1-C2	-4.53	104.13	111.29
5	E	610	NAG	C1-O5-C5	4.40	118.16	112.19
5	E	604	NAG	C8-C7-N2	-4.35	108.73	116.10
5	A	609	NAG	C1-O5-C5	4.15	117.82	112.19
5	D	608	NAG	C1-O5-C5	4.13	117.79	112.19
5	E	609	NAG	O5-C1-C2	-3.94	105.07	111.29
5	E	604	NAG	O7-C7-N2	3.81	128.97	121.95
5	C	602	NAG	O5-C1-C2	-3.81	105.27	111.29
5	E	604	NAG	C3-C4-C5	-3.80	103.47	110.24
5	F	602	NAG	O5-C1-C2	-3.78	105.31	111.29
5	F	602	NAG	O7-C7-N2	3.71	128.76	121.95
5	B	602	NAG	O5-C1-C2	-3.59	105.62	111.29
5	A	604	NAG	C1-O5-C5	3.54	116.99	112.19
5	C	602	NAG	O7-C7-N2	3.51	128.40	121.95
5	A	607	NAG	O5-C5-C6	-3.44	101.81	107.20
5	C	604	NAG	C1-O5-C5	3.43	116.84	112.19
5	F	612	NAG	C1-O5-C5	3.32	116.69	112.19

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	C	607	NAG	C1-O5-C5	3.25	116.59	112.19
5	B	607	NAG	C1-O5-C5	3.23	116.56	112.19
4	E	603	FAD	O2P-P-O1P	3.21	128.12	112.24
5	A	604	NAG	O5-C1-C2	-3.15	106.31	111.29
5	D	602	NAG	O5-C1-C2	-3.15	106.31	111.29
5	A	607	NAG	C4-C3-C2	3.15	115.63	111.02
5	D	604	NAG	C3-C4-C5	3.14	115.85	110.24
5	B	602	NAG	C4-C3-C2	3.11	115.57	111.02
5	F	607	NAG	C6-C5-C4	-3.10	105.75	113.00
5	D	607	NAG	O5-C1-C2	-3.09	106.41	111.29
5	C	602	NAG	C1-C2-N2	3.09	115.76	110.49
5	E	604	NAG	C4-C3-C2	3.07	115.52	111.02
5	A	607	NAG	C1-O5-C5	3.01	116.27	112.19
5	E	610	NAG	O5-C5-C6	2.96	111.85	107.20
5	D	604	NAG	O5-C5-C4	2.85	117.77	110.83
5	C	604	NAG	C4-C3-C2	-2.84	106.86	111.02
5	A	607	NAG	C3-C4-C5	2.83	115.30	110.24
4	B	601	FAD	C5A-C6A-N6A	2.83	124.66	120.35
5	F	602	NAG	C4-C3-C2	2.82	115.15	111.02
5	D	607	NAG	C1-C2-N2	2.81	115.29	110.49
5	B	604	NAG	C1-O5-C5	2.79	115.97	112.19
5	A	607	NAG	C1-C2-N2	-2.78	105.75	110.49
5	A	602	NAG	O4-C4-C5	2.76	116.14	109.30
5	C	602	NAG	C3-C4-C5	-2.74	105.34	110.24
5	B	607	NAG	O5-C5-C6	2.73	111.49	107.20
5	A	602	NAG	O5-C1-C2	-2.71	107.01	111.29
5	C	607	NAG	C3-C4-C5	2.69	115.03	110.24
5	B	609	NAG	O4-C4-C5	2.67	115.93	109.30
4	A	601	FAD	O2P-P-O1P	2.65	125.34	112.24
5	D	607	NAG	O5-C5-C6	2.64	111.34	107.20
5	E	604	NAG	O5-C5-C6	2.64	111.34	107.20
5	E	608	NAG	C4-C3-C2	-2.62	107.18	111.02
5	A	607	NAG	O4-C4-C3	-2.56	104.44	110.35
5	B	602	NAG	C8-C7-N2	-2.53	111.81	116.10
5	F	602	NAG	C2-N2-C7	2.53	126.51	122.90
5	E	610	NAG	C4-C3-C2	-2.52	107.32	111.02
5	D	602	NAG	C4-C3-C2	2.52	114.71	111.02
4	D	601	FAD	C5A-C6A-N6A	2.52	124.18	120.35
5	E	609	NAG	C3-C4-C5	-2.47	105.84	110.24
4	E	603	FAD	C5A-C6A-N6A	2.45	124.08	120.35
5	C	602	NAG	C8-C7-N2	-2.45	111.95	116.10
5	E	609	NAG	O4-C4-C5	2.44	115.35	109.30

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	D	602	NAG	O4-C4-C5	2.41	115.27	109.30
5	F	602	NAG	C8-C7-N2	-2.40	112.04	116.10
5	D	608	NAG	O5-C5-C6	2.38	110.94	107.20
5	F	612	NAG	O4-C4-C5	2.34	115.11	109.30
5	D	602	NAG	C1-C2-N2	2.33	114.47	110.49
4	F	601	FAD	O4B-C1B-C2B	-2.32	103.53	106.93
4	D	601	FAD	O2P-P-O1P	2.31	123.66	112.24
5	B	602	NAG	O7-C7-N2	2.31	126.20	121.95
5	E	608	NAG	C3-C4-C5	-2.30	106.13	110.24
4	F	601	FAD	O2P-P-O1P	2.30	123.60	112.24
5	B	604	NAG	O5-C1-C2	-2.29	107.67	111.29
5	D	608	NAG	O5-C1-C2	2.28	114.88	111.29
5	D	602	NAG	C8-C7-N2	-2.26	112.27	116.10
5	A	607	NAG	C2-N2-C7	-2.25	119.70	122.90
5	D	608	NAG	C3-C4-C5	2.23	114.22	110.24
5	E	610	NAG	C3-C4-C5	-2.23	106.26	110.24
5	B	609	NAG	O5-C1-C2	-2.22	107.78	111.29
5	C	602	NAG	O4-C4-C5	2.21	114.79	109.30
5	B	609	NAG	C4-C3-C2	-2.20	107.80	111.02
5	E	610	NAG	O4-C4-C5	2.16	114.67	109.30
4	E	603	FAD	O5'-P-O1P	-2.16	100.61	109.07
5	A	602	NAG	C3-C4-C5	-2.13	106.44	110.24
5	B	607	NAG	O5-C1-C2	-2.12	107.95	111.29
5	E	609	NAG	C4-C3-C2	-2.11	107.92	111.02
5	F	602	NAG	C3-C4-C5	-2.11	106.47	110.24
5	F	607	NAG	C1-C2-N2	2.08	114.04	110.49
4	C	601	FAD	O2P-P-O1P	2.07	122.49	112.24
5	A	602	NAG	C8-C7-N2	-2.07	112.60	116.10
4	B	601	FAD	C4-N3-C2	-2.06	121.83	125.64
5	F	607	NAG	C3-C4-C5	2.06	113.92	110.24
4	F	601	FAD	C5A-C6A-N6A	2.06	123.48	120.35
5	F	612	NAG	O6-C6-C5	-2.05	104.27	111.29
5	B	607	NAG	C2-N2-C7	-2.03	120.01	122.90
4	D	601	FAD	O4B-C1B-C2B	-2.02	103.98	106.93
4	E	603	FAD	C4-N3-C2	-2.01	121.92	125.64
5	F	607	NAG	O5-C5-C4	2.00	115.70	110.83

There are no chirality outliers.

All (120) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	C	601	FAD	PA-O3P-P-O5'

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
4	D	601	FAD	PA-O3P-P-O5'
4	E	603	FAD	PA-O3P-P-O5'
5	C	604	NAG	C3-C2-N2-C7
5	C	604	NAG	C8-C7-N2-C2
5	C	604	NAG	O7-C7-N2-C2
5	C	608	NAG	C8-C7-N2-C2
5	C	608	NAG	O7-C7-N2-C2
7	D	606	GOL	O1-C1-C2-C3
7	E	607	GOL	O1-C1-C2-C3
7	E	607	GOL	C1-C2-C3-O3
5	E	610	NAG	O5-C5-C6-O6
5	A	607	NAG	C4-C5-C6-O6
5	D	608	NAG	O5-C5-C6-O6
5	E	609	NAG	O5-C5-C6-O6
5	D	607	NAG	O5-C5-C6-O6
5	E	610	NAG	C4-C5-C6-O6
6	B	605	PEG	C4-C3-O2-C2
6	F	605	PEG	C4-C3-O2-C2
5	A	607	NAG	O5-C5-C6-O6
5	F	604	NAG	O5-C5-C6-O6
5	A	604	NAG	C4-C5-C6-O6
5	B	607	NAG	O5-C5-C6-O6
5	C	607	NAG	C4-C5-C6-O6
6	E	605	PEG	O2-C3-C4-O4
5	B	607	NAG	C4-C5-C6-O6
5	D	608	NAG	C4-C5-C6-O6
5	C	604	NAG	O5-C5-C6-O6
5	E	609	NAG	C4-C5-C6-O6
5	A	604	NAG	O5-C5-C6-O6
5	D	604	NAG	C4-C5-C6-O6
5	D	607	NAG	C4-C5-C6-O6
5	F	604	NAG	C4-C5-C6-O6
7	E	607	GOL	O1-C1-C2-O2
6	B	608	PEG	O2-C3-C4-O4
6	C	605	PEG	O1-C1-C2-O2
6	F	603	PEG	O1-C1-C2-O2
5	C	604	NAG	C4-C5-C6-O6
5	C	607	NAG	O5-C5-C6-O6
5	E	604	NAG	C4-C5-C6-O6
6	F	610	PEG	O2-C3-C4-O4
6	F	611	PEG	O2-C3-C4-O4
6	E	602	PEG	O1-C1-C2-O2

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
6	E	606	PEG	O1-C1-C2-O2
5	E	604	NAG	O5-C5-C6-O6
5	B	604	NAG	C4-C5-C6-O6
7	A	606	GOL	O1-C1-C2-C3
6	B	603	PEG	O1-C1-C2-O2
6	B	608	PEG	O1-C1-C2-O2
5	C	602	NAG	O5-C5-C6-O6
5	B	604	NAG	O5-C5-C6-O6
5	C	602	NAG	C4-C5-C6-O6
7	D	606	GOL	O1-C1-C2-O2
7	A	606	GOL	O1-C1-C2-O2
6	A	605	PEG	O2-C3-C4-O4
6	A	608	PEG	O2-C3-C4-O4
6	B	603	PEG	O2-C3-C4-O4
6	B	610	PEG	O1-C1-C2-O2
6	B	610	PEG	O2-C3-C4-O4
6	C	603	PEG	O2-C3-C4-O4
6	C	605	PEG	O2-C3-C4-O4
6	D	605	PEG	O2-C3-C4-O4
6	A	605	PEG	O1-C1-C2-O2
6	F	608	PEG	O1-C1-C2-O2
6	F	608	PEG	O2-C3-C4-O4
7	E	607	GOL	O2-C2-C3-O3
5	E	608	NAG	O5-C5-C6-O6
6	E	601	PEG	O1-C1-C2-O2
6	E	601	PEG	O2-C3-C4-O4
5	A	602	NAG	C4-C5-C6-O6
4	A	601	FAD	O4B-C4B-C5B-O5B
6	E	602	PEG	O2-C3-C4-O4
5	E	608	NAG	C4-C5-C6-O6
7	A	606	GOL	O2-C2-C3-O3
4	B	601	FAD	PA-O3P-P-O5'
4	A	601	FAD	PA-O3P-P-O5'
4	F	601	FAD	PA-O3P-P-O5'
4	B	601	FAD	O4B-C4B-C5B-O5B
6	F	605	PEG	O2-C3-C4-O4
6	E	602	PEG	C4-C3-O2-C2
6	F	603	PEG	C1-C2-O2-C3
6	D	603	PEG	C4-C3-O2-C2
6	A	603	PEG	C4-C3-O2-C2
6	C	605	PEG	C4-C3-O2-C2
6	E	601	PEG	C4-C3-O2-C2

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
7	F	609	GOL	O1-C1-C2-C3
5	F	602	NAG	C4-C5-C6-O6
4	F	601	FAD	N10-C1'-C2'-O2'
5	A	602	NAG	O5-C5-C6-O6
6	B	610	PEG	C4-C3-O2-C2
5	C	608	NAG	O5-C5-C6-O6
6	D	605	PEG	O1-C1-C2-O2
6	E	606	PEG	O2-C3-C4-O4
6	F	610	PEG	C1-C2-O2-C3
6	A	608	PEG	C1-C2-O2-C3
6	E	605	PEG	C1-C2-O2-C3
5	F	602	NAG	O5-C5-C6-O6
4	D	601	FAD	O4B-C4B-C5B-O5B
6	F	605	PEG	O1-C1-C2-O2
5	C	608	NAG	C4-C5-C6-O6
5	D	604	NAG	O5-C5-C6-O6
6	F	603	PEG	C4-C3-O2-C2
6	E	602	PEG	C1-C2-O2-C3
6	E	606	PEG	C4-C3-O2-C2
6	A	605	PEG	C4-C3-O2-C2
6	B	610	PEG	C1-C2-O2-C3
7	F	609	GOL	O1-C1-C2-O2
4	A	601	FAD	C3B-C4B-C5B-O5B
5	A	609	NAG	C4-C5-C6-O6
6	D	603	PEG	O1-C1-C2-O2
4	F	601	FAD	O4B-C4B-C5B-O5B
4	F	601	FAD	P-O3P-PA-O1A
4	F	601	FAD	P-O3P-PA-O2A
7	C	606	GOL	O1-C1-C2-C3
7	C	606	GOL	C1-C2-C3-O3
7	A	606	GOL	C1-C2-C3-O3
6	E	601	PEG	C1-C2-O2-C3
4	C	601	FAD	O4B-C4B-C5B-O5B
4	E	603	FAD	O4B-C4B-C5B-O5B
5	D	602	NAG	C4-C5-C6-O6

There are no ring outliers.

34 monomers are involved in 83 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	A	606	GOL	2	0
6	E	605	PEG	1	0

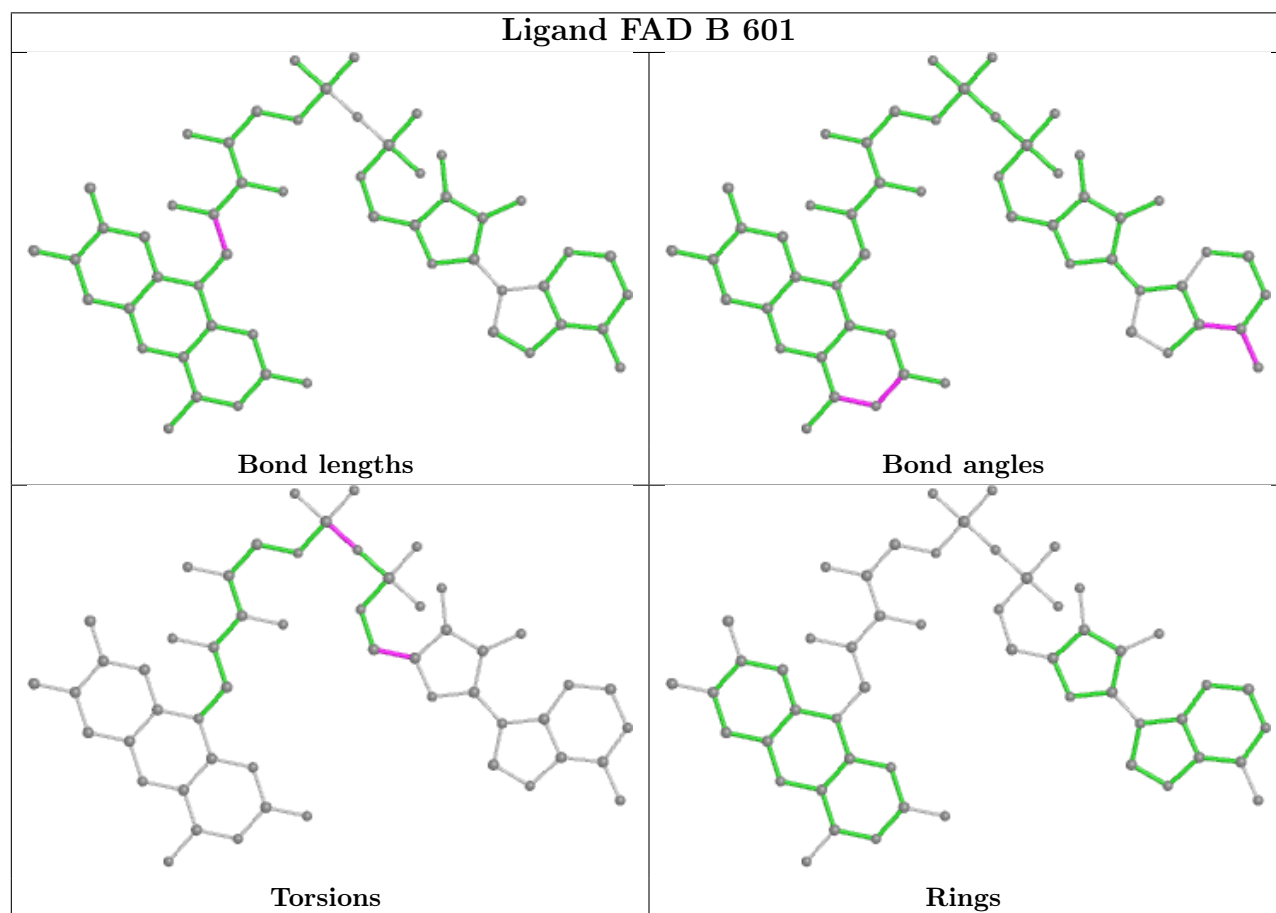
Continued on next page...

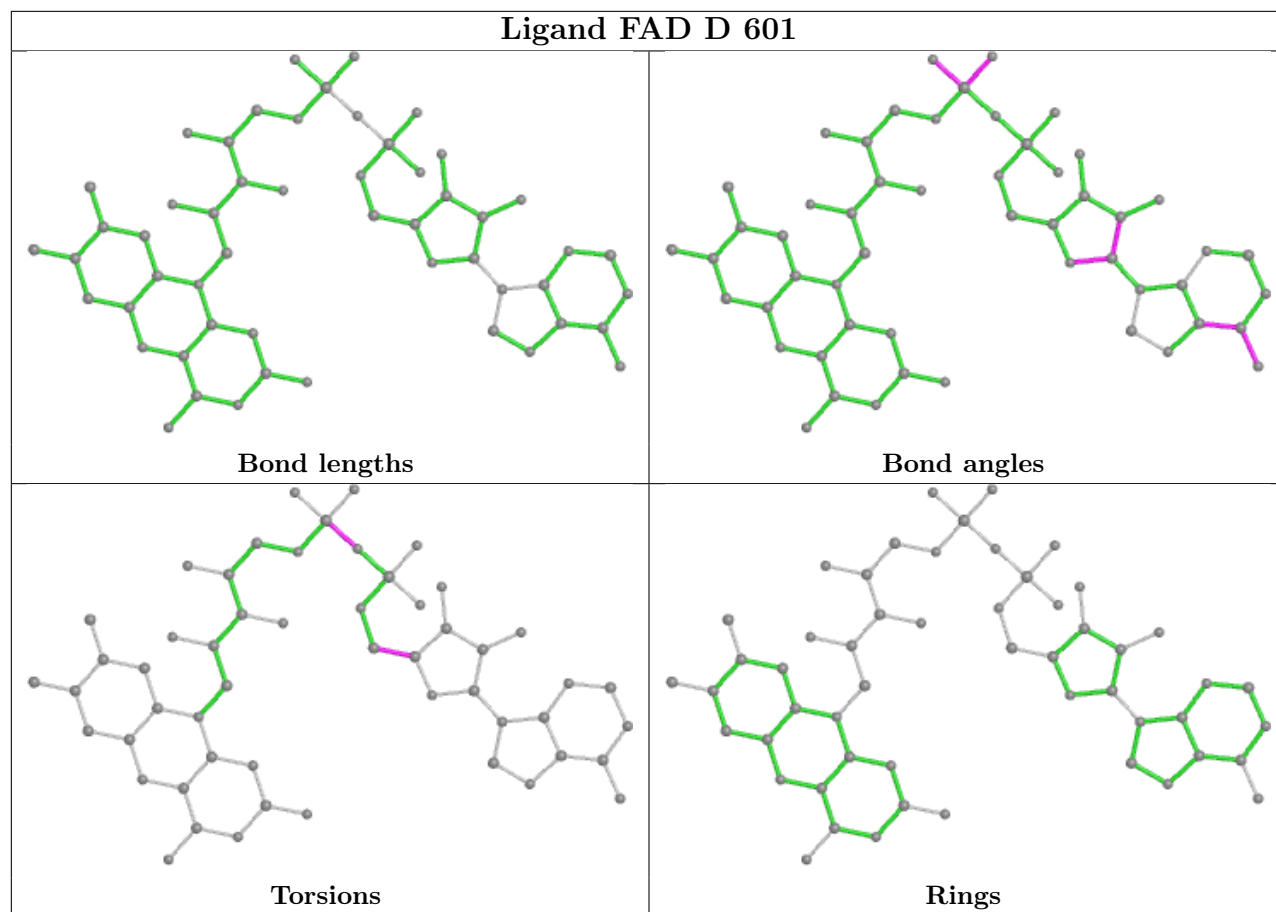
Continued from previous page...

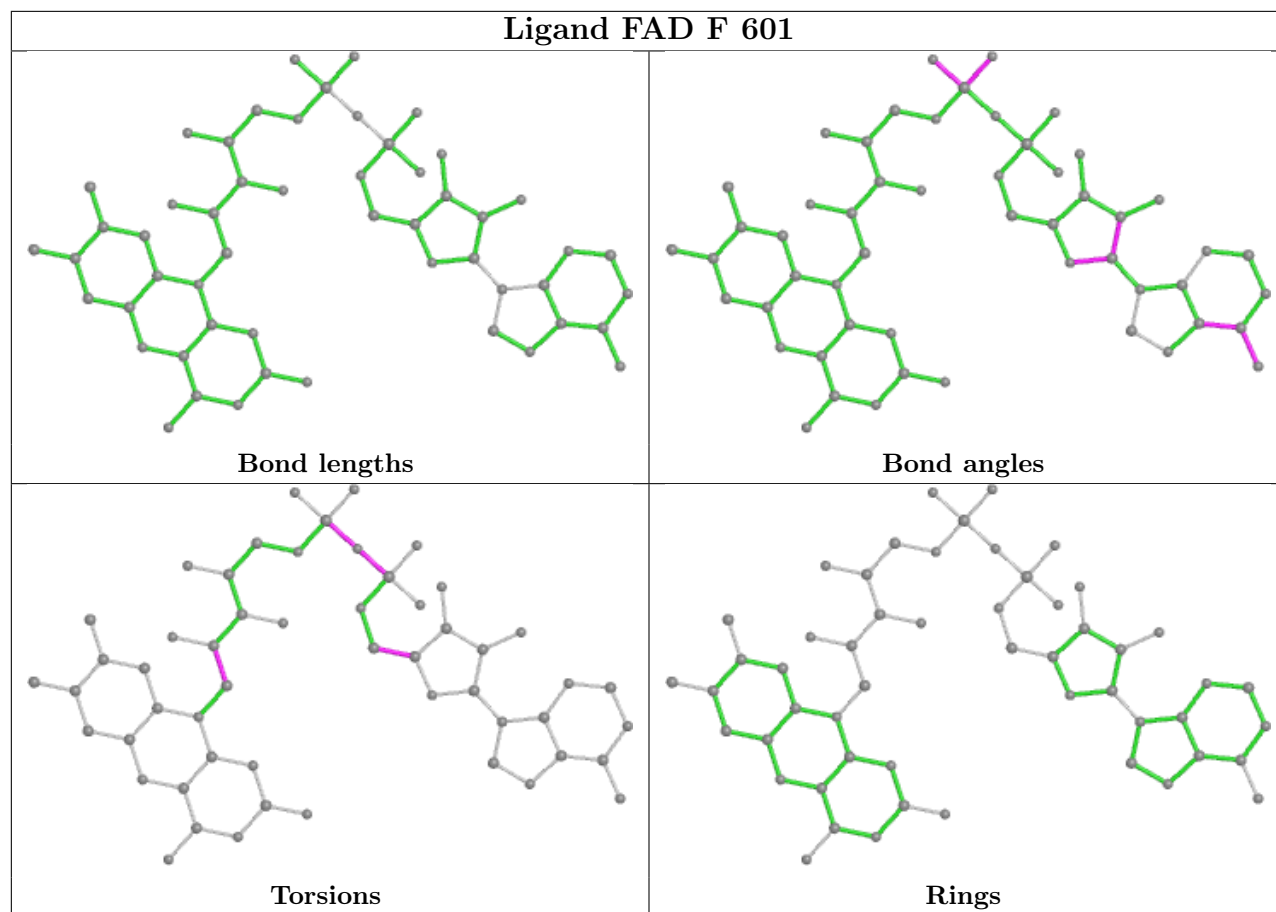
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	601	FAD	5	0
6	D	603	PEG	1	0
4	D	601	FAD	6	0
6	A	603	PEG	1	0
6	F	603	PEG	1	0
6	F	608	PEG	1	0
5	C	604	NAG	3	0
5	B	604	NAG	1	0
6	C	605	PEG	1	0
5	D	604	NAG	2	0
4	F	601	FAD	5	0
5	E	609	NAG	3	0
7	F	606	GOL	1	0
6	D	605	PEG	1	0
6	A	605	PEG	1	0
6	C	603	PEG	1	0
7	C	606	GOL	3	0
7	E	607	GOL	4	0
7	F	609	GOL	3	0
5	F	604	NAG	1	0
5	C	607	NAG	1	0
6	E	602	PEG	1	0
4	A	601	FAD	5	0
5	C	608	NAG	1	0
4	E	603	FAD	5	0
6	B	603	PEG	1	0
6	F	610	PEG	10	0
7	B	606	GOL	3	0
7	D	606	GOL	1	0
5	A	604	NAG	3	0
4	C	601	FAD	6	0
6	E	606	PEG	1	0

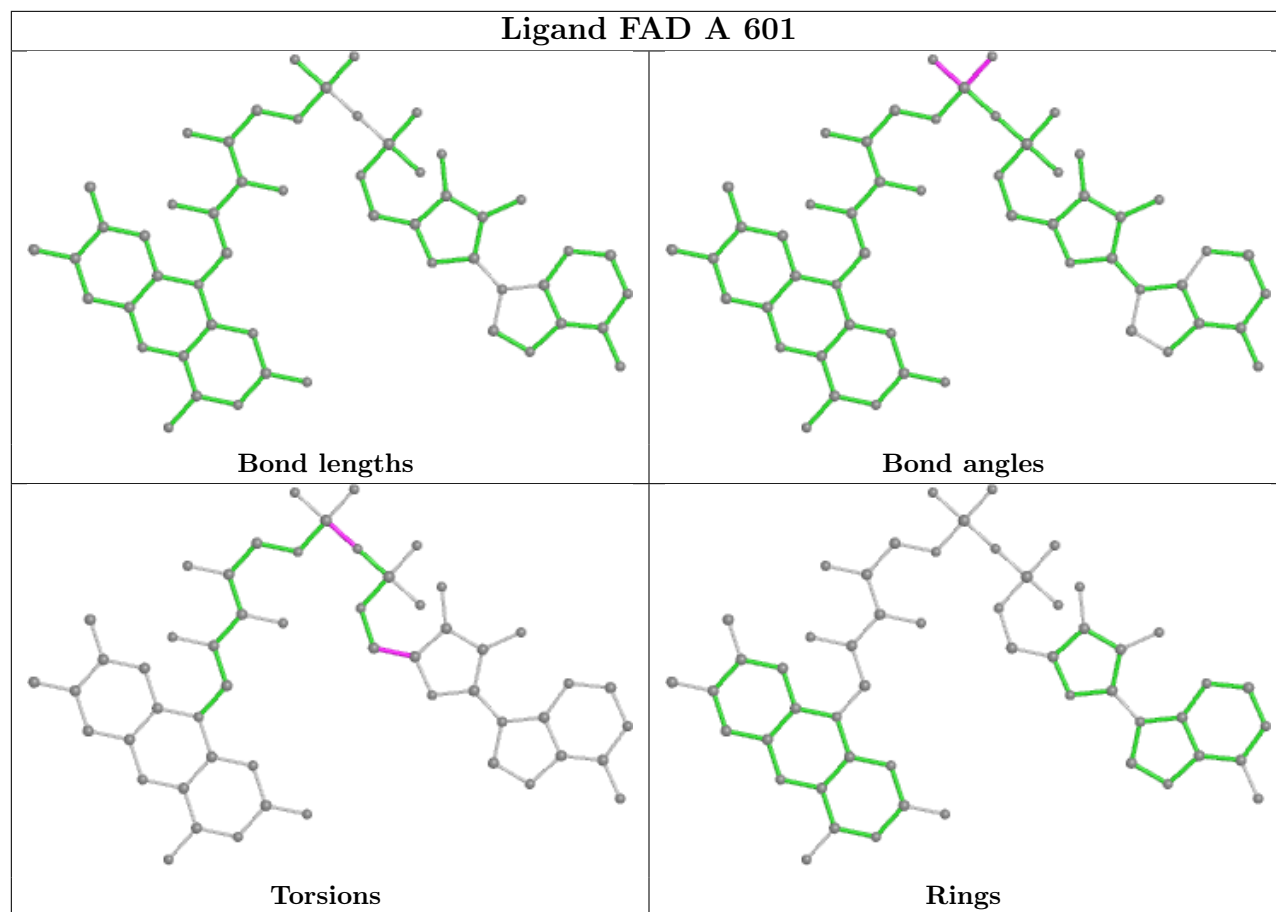
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier.

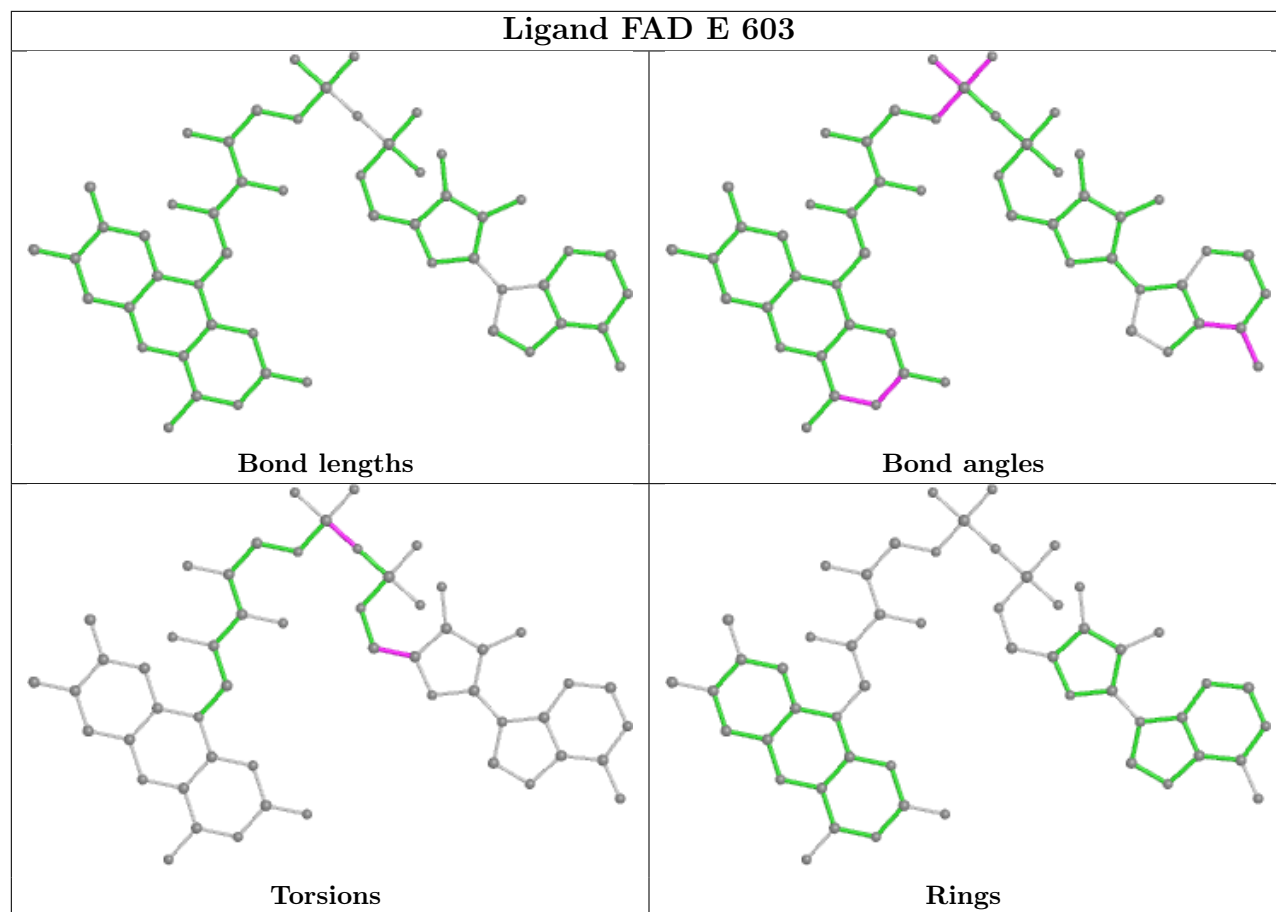
The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

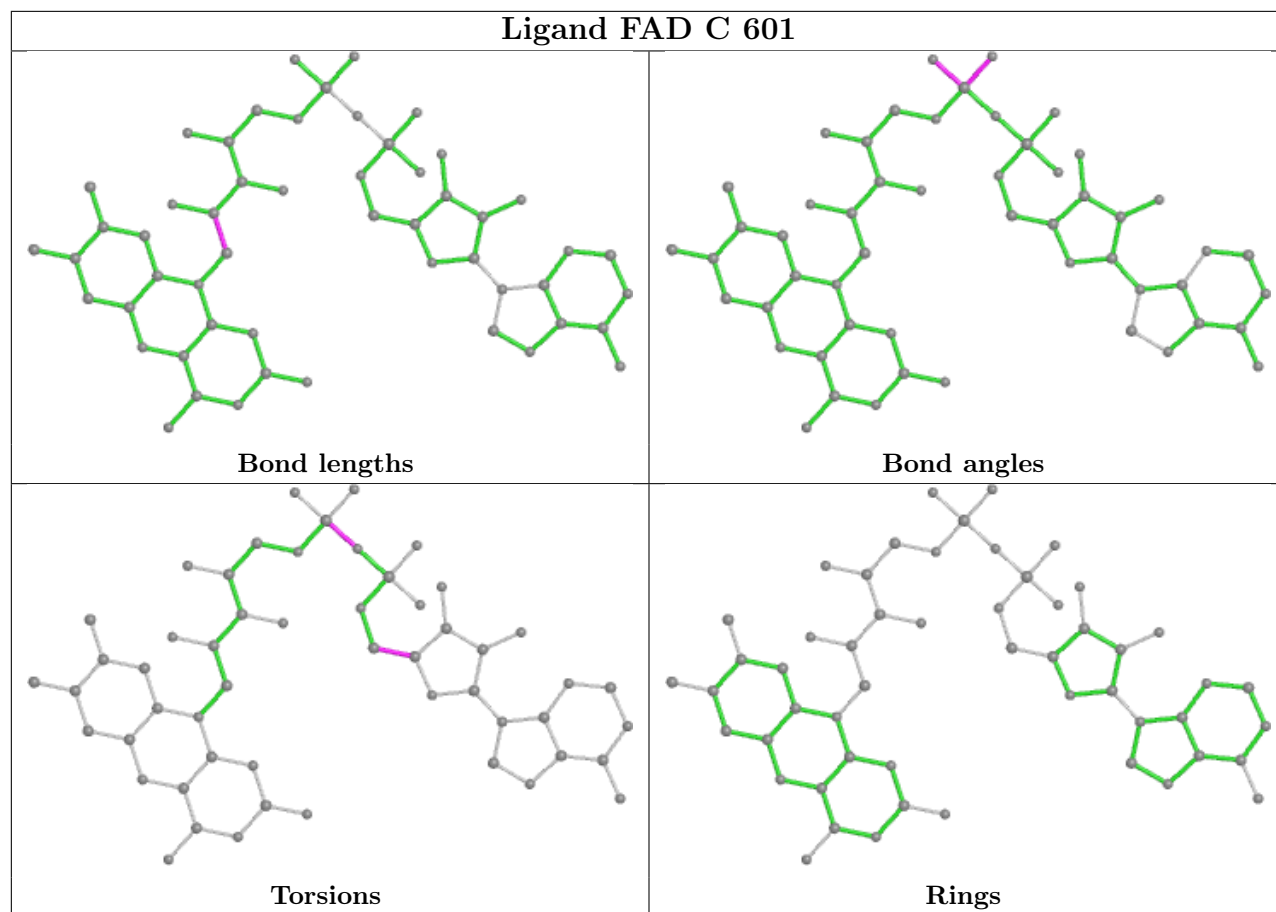












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	590/628 (93%)	-0.17	9 (1%) 73 72	19, 32, 52, 86	0
1	B	590/628 (93%)	-0.24	2 (0%) 94 93	19, 31, 50, 71	0
1	C	590/628 (93%)	-0.07	13 (2%) 62 60	26, 39, 61, 87	0
1	D	590/628 (93%)	0.48	63 (10%) 6 5	28, 53, 80, 104	0
1	E	590/628 (93%)	-0.15	11 (1%) 66 64	20, 32, 54, 80	0
1	F	590/628 (93%)	-0.13	6 (1%) 82 80	23, 38, 58, 87	0
All	All	3540/3768 (93%)	-0.05	104 (2%) 51 50	19, 37, 66, 104	0

All (104) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	387	ALA	5.1
1	D	491	ALA	4.7
1	D	386	SER	4.7
1	D	306	ALA	4.3
1	D	431	TYR	4.2
1	D	393	THR	4.2
1	D	353	ALA	4.2
1	D	389	PHE	4.2
1	A	261	ASP	4.1
1	D	383	PRO	4.1
1	D	391	ASN	4.1
1	D	307	THR	4.1
1	D	490	THR	3.9
1	D	402	ASP	3.9
1	D	336	TYR	3.8
1	D	381	PRO	3.8
1	E	261	ASP	3.8
1	F	386	SER	3.7
1	D	191	TRP	3.5

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	386	SER	3.4
1	D	513	ILE	3.4
1	D	185	ALA	3.4
1	D	537	ASN	3.4
1	D	348	ASN	3.3
1	C	314	PRO	3.2
1	F	261	ASP	3.2
1	D	388	TRP	3.2
1	D	496	LEU	3.2
1	C	358	ASP	3.2
1	C	261	ASP	3.0
1	D	380	ILE	3.0
1	D	394	ARG	3.0
1	D	398	ALA	3.0
1	D	433	TYR	3.0
1	E	312	ASN	3.0
1	D	351	PHE	2.9
1	D	308	LEU	2.9
1	D	313	ILE	2.9
1	D	194	HIS	2.9
1	F	391	ASN	2.9
1	F	387	ALA	2.9
1	D	340	VAL	2.8
1	C	313	ILE	2.8
1	D	485	ASP	2.8
1	D	486	PHE	2.7
1	D	488	ASN	2.7
1	D	385	ARG	2.7
1	D	508	ALA	2.6
1	D	487	PHE	2.6
1	D	316	VAL	2.6
1	D	341	ILE	2.6
1	D	314	PRO	2.5
1	E	313	ILE	2.5
1	D	430	GLY	2.5
1	D	339	ASN	2.5
1	A	312	ASN	2.5
1	A	393	THR	2.5
1	C	315	LEU	2.5
1	D	495	ILE	2.5
1	B	391	ASN	2.5
1	B	428	SER	2.4

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	395	GLN	2.4
1	D	159	ALA	2.4
1	D	305	ALA	2.4
1	E	387	ALA	2.4
1	A	350	GLU	2.4
1	D	111	TYR	2.4
1	C	354	GLN	2.4
1	D	338	VAL	2.3
1	A	431	TYR	2.3
1	C	311	HIS	2.3
1	E	314	PRO	2.3
1	D	501	TYR	2.3
1	A	391	ASN	2.3
1	E	386	SER	2.3
1	E	306	ALA	2.3
1	E	305	ALA	2.2
1	C	361	GLU	2.2
1	C	307	THR	2.2
1	D	337	ARG	2.2
1	D	392	HIS	2.2
1	D	492	ILE	2.2
1	D	261	ASP	2.2
1	D	575	LEU	2.2
1	F	498	GLY	2.2
1	A	309	LYS	2.2
1	C	339	ASN	2.2
1	C	391	ASN	2.2
1	D	475	LEU	2.2
1	D	429	ASP	2.1
1	D	480	PHE	2.1
1	D	355	ALA	2.1
1	E	575	LEU	2.1
1	C	318	ASP	2.1
1	D	350	GLU	2.1
1	D	349	GLU	2.1
1	D	262	LYS	2.1
1	F	312	ASN	2.1
1	E	309	LYS	2.1
1	C	392	HIS	2.0
1	D	200	GLY	2.0
1	E	382	GLU	2.0
1	D	311	HIS	2.0

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	D	504	GLY	2.0

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

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

6.3 Carbohydrates [i](#)

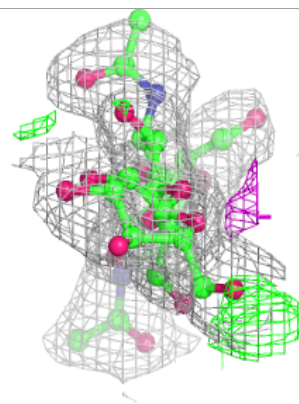
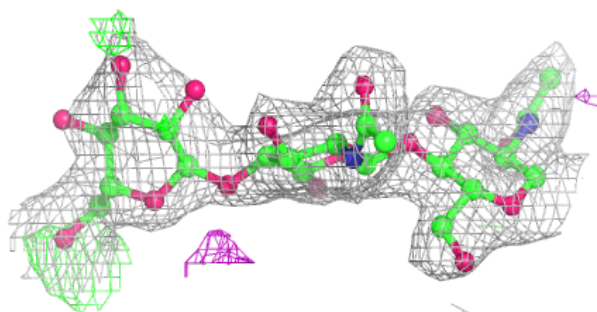
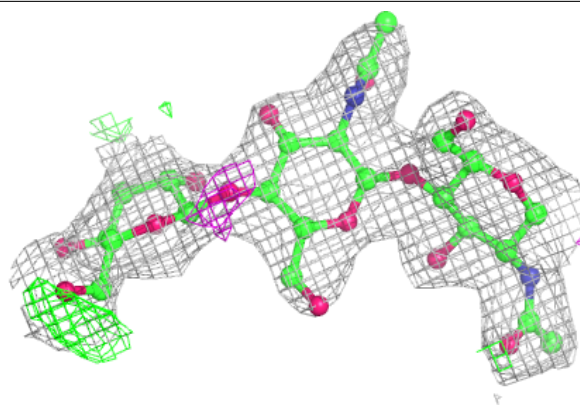
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	MAN	J	3	11/12	0.67	0.28	55,74,92,95	0
2	MAN	I	3	11/12	0.71	0.31	70,89,104,105	0
2	MAN	G	3	11/12	0.76	0.27	57,84,93,95	0
2	MAN	K	3	11/12	0.76	0.26	54,76,91,99	0
2	MAN	H	3	11/12	0.80	0.37	53,76,105,108	0
3	NAG	L	2	14/15	0.90	0.20	41,52,59,61	0
2	NAG	H	2	14/15	0.92	0.26	50,62,74,74	0
2	NAG	I	2	14/15	0.92	0.25	53,66,82,99	0
2	NAG	H	1	14/15	0.93	0.19	26,37,45,46	0
2	NAG	J	2	14/15	0.95	0.20	44,54,74,85	0
3	NAG	L	1	14/15	0.95	0.13	23,33,42,54	0
2	NAG	I	1	14/15	0.95	0.11	37,42,53,55	0
2	NAG	K	2	14/15	0.96	0.17	38,45,55,73	0
2	NAG	G	1	14/15	0.96	0.13	22,28,36,46	0
2	NAG	J	1	14/15	0.96	0.12	24,28,34,52	0
2	NAG	K	1	14/15	0.96	0.11	22,29,34,47	0
2	NAG	G	2	14/15	0.97	0.22	36,49,64,67	0

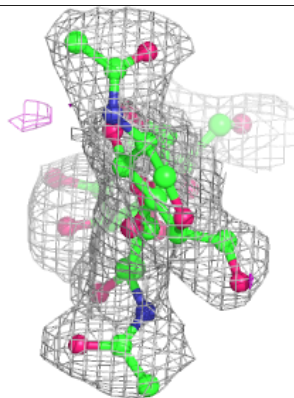
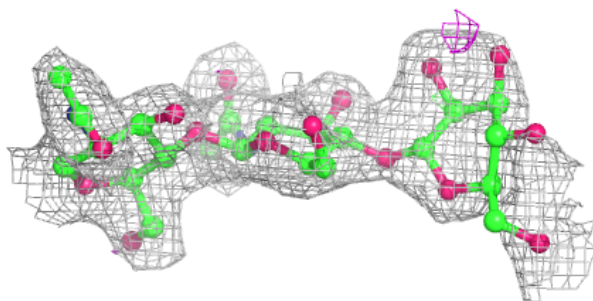
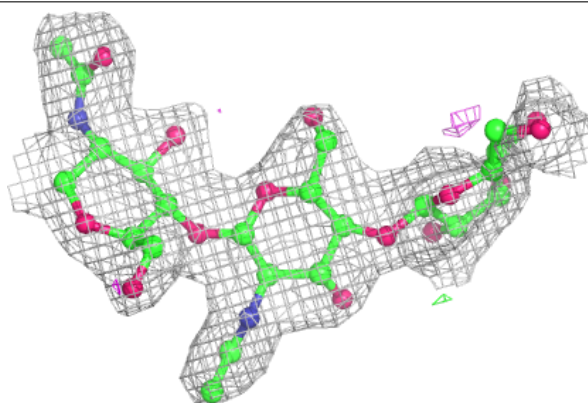
The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.

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)

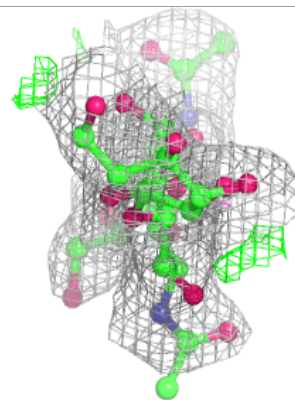
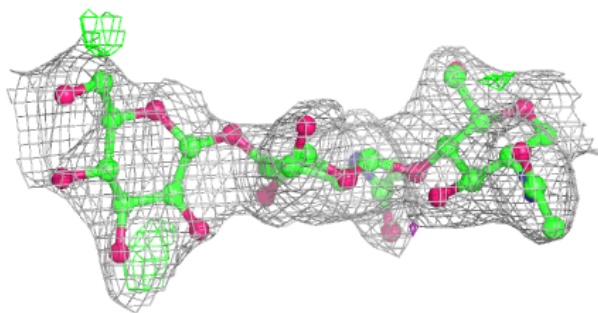
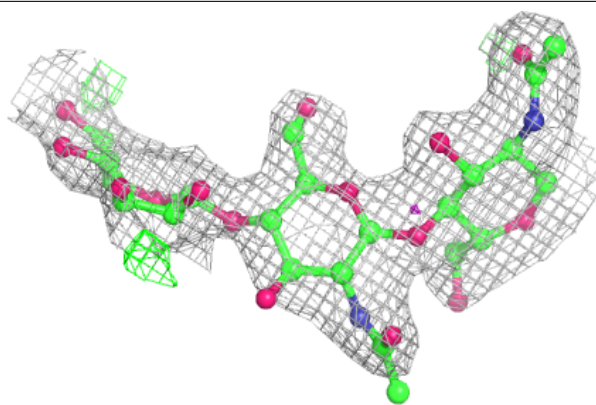
**Electron density around Chain H:**

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

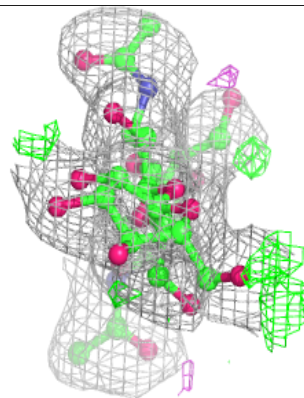
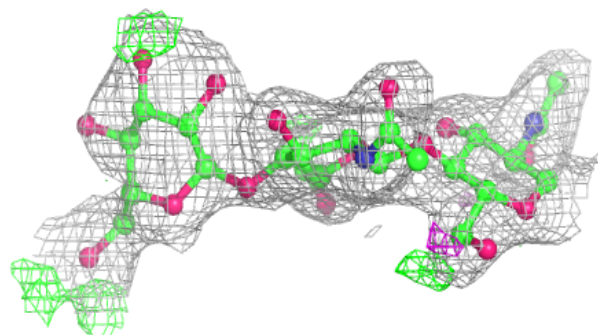
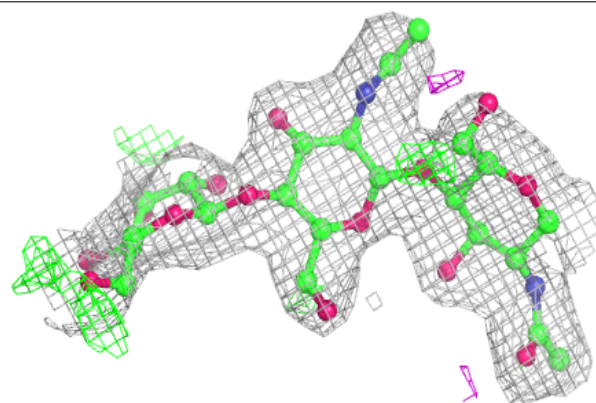


Electron density around Chain I:

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

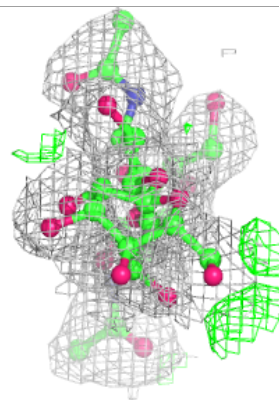
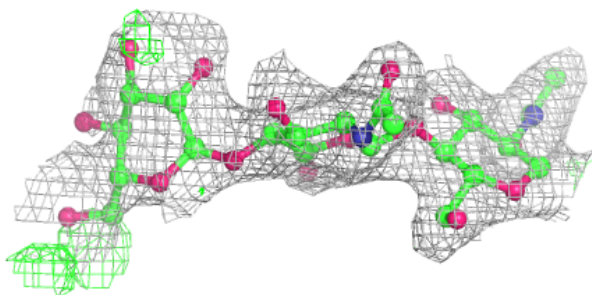
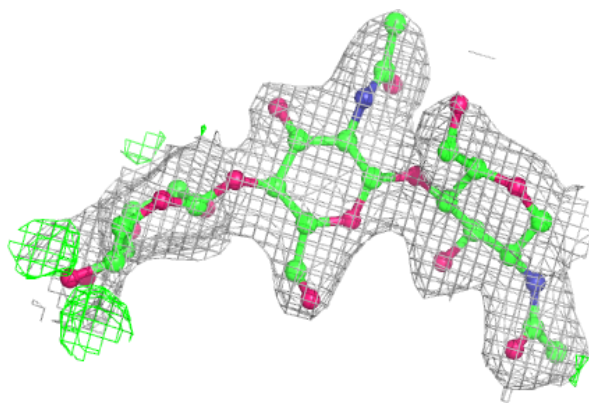
**Electron density around Chain J:**

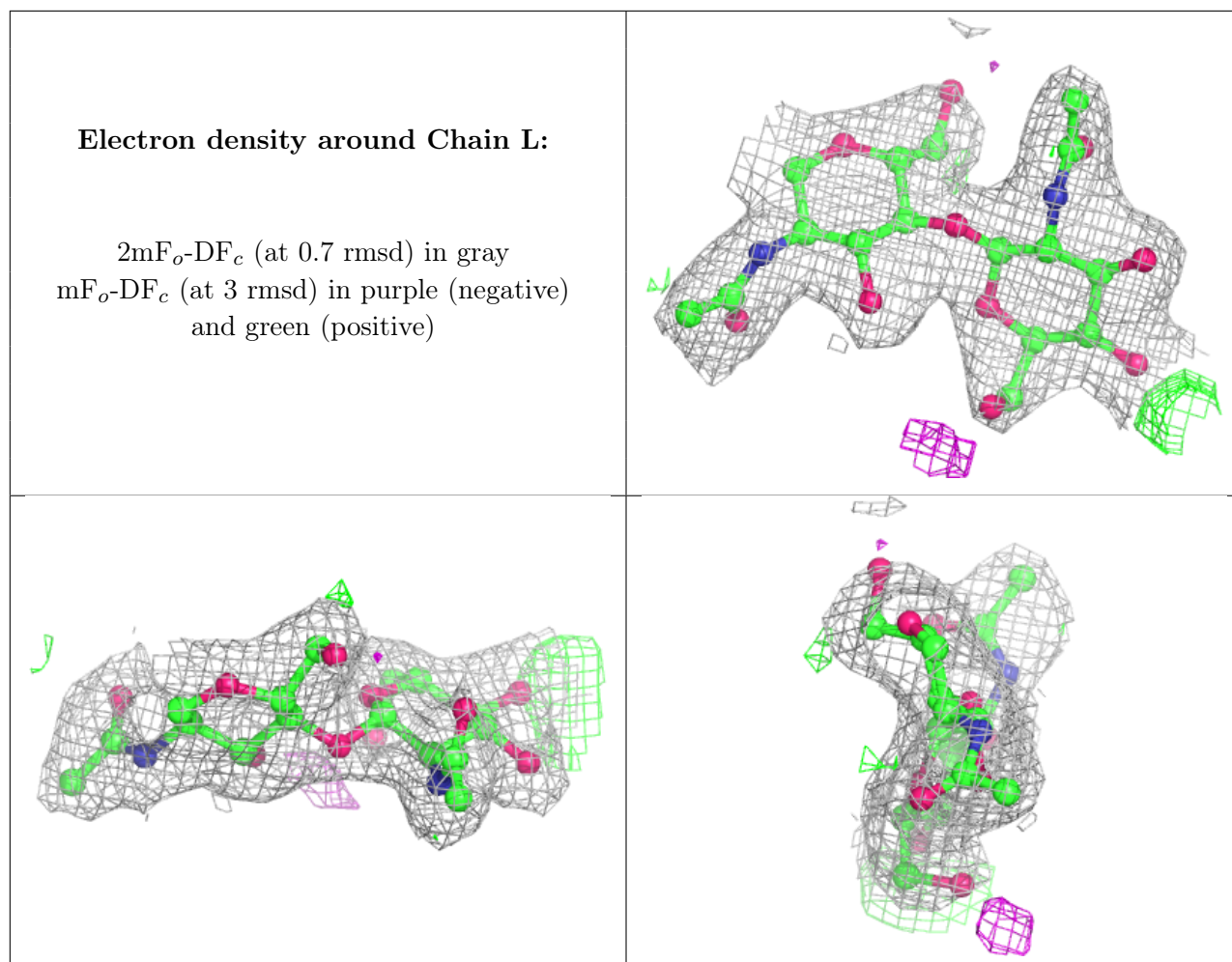
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



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)





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
7	GOL	F	606	6/6	0.53	0.39	56,68,78,80	0
6	PEG	F	610	7/7	0.55	0.29	67,86,106,122	0
7	GOL	E	607	6/6	0.60	0.40	41,64,88,88	0
6	PEG	F	611	7/7	0.61	0.15	62,85,98,100	0
5	NAG	C	604	14/15	0.62	0.35	51,69,112,130	0
7	GOL	D	606	6/6	0.69	0.38	78,89,97,98	0
7	GOL	A	606	6/6	0.71	0.31	43,52,53,56	0
7	GOL	F	609	6/6	0.73	0.26	61,73,86,89	0
7	GOL	B	606	6/6	0.74	0.26	40,52,76,79	0
6	PEG	B	608	7/7	0.74	0.12	56,68,83,100	0

Continued on next page...

Continued from previous page...

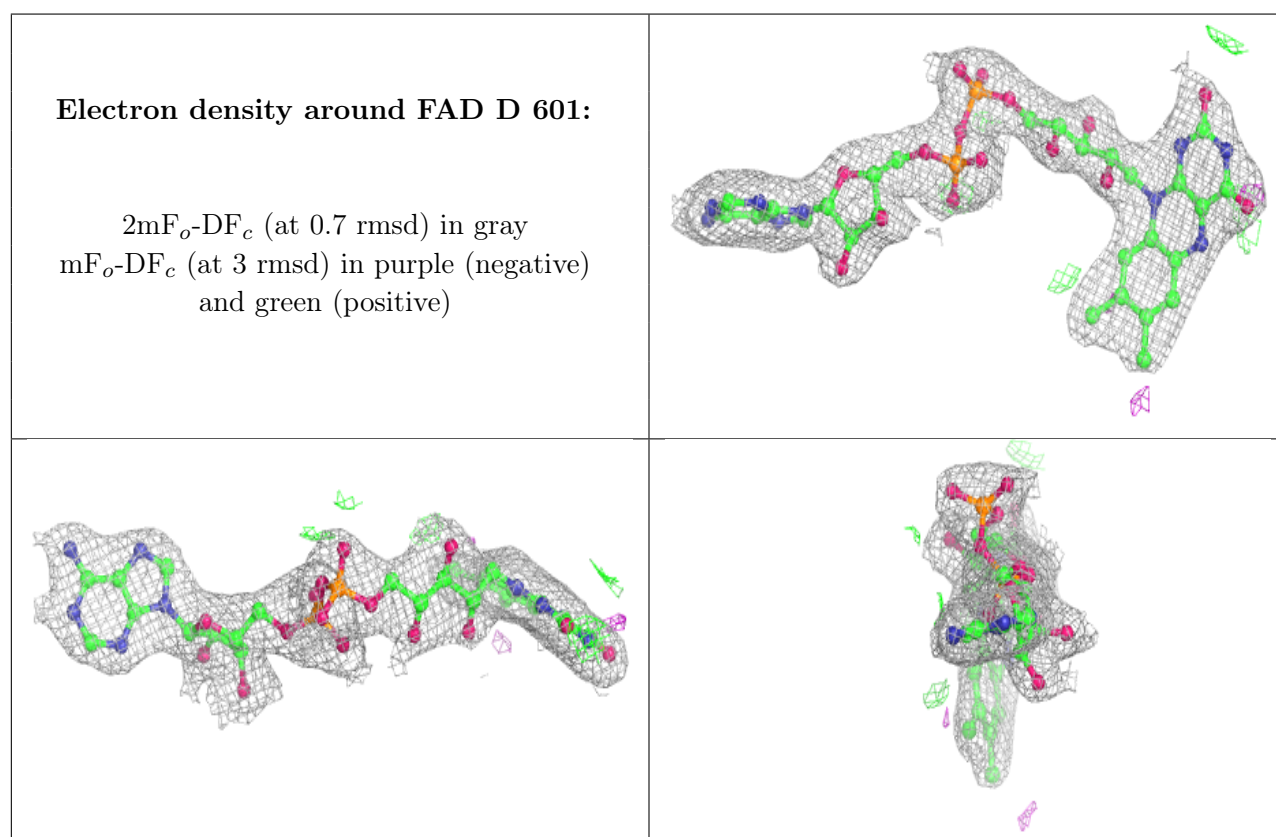
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
7	GOL	C	606	6/6	0.79	0.36	66,73,84,94	0
6	PEG	E	606	7/7	0.81	0.14	46,50,56,66	0
6	PEG	C	603	7/7	0.81	0.21	42,58,63,76	0
6	PEG	E	602	7/7	0.82	0.17	49,52,64,71	0
6	PEG	B	605	7/7	0.84	0.16	43,43,50,51	0
5	NAG	A	607	14/15	0.84	0.26	51,73,106,159	0
6	PEG	C	605	7/7	0.85	0.15	45,51,58,65	0
5	NAG	C	607	14/15	0.85	0.38	59,78,85,86	0
5	NAG	D	608	14/15	0.85	0.24	55,73,100,113	0
5	NAG	C	602	14/15	0.85	0.16	36,56,68,79	0
6	PEG	F	605	7/7	0.87	0.15	47,49,54,67	0
5	NAG	B	604	14/15	0.87	0.27	47,58,73,76	0
5	NAG	C	608	14/15	0.87	0.23	58,79,89,94	0
5	NAG	D	607	14/15	0.88	0.21	62,77,88,94	0
5	NAG	D	602	14/15	0.88	0.15	38,53,62,71	0
5	NAG	D	604	14/15	0.88	0.41	61,93,104,110	0
6	PEG	B	603	7/7	0.88	0.19	26,43,53,53	0
6	PEG	D	603	7/7	0.88	0.21	51,54,70,72	0
6	PEG	F	603	7/7	0.88	0.20	39,45,62,65	0
6	PEG	A	608	7/7	0.89	0.29	40,50,58,70	0
6	PEG	B	610	7/7	0.89	0.14	45,48,54,55	0
6	PEG	E	601	7/7	0.90	0.32	47,53,58,60	0
5	NAG	F	602	14/15	0.90	0.14	37,54,63,75	0
5	NAG	A	602	14/15	0.91	0.12	34,41,53,74	0
5	NAG	F	604	14/15	0.91	0.29	45,62,73,92	0
6	PEG	A	603	7/7	0.91	0.17	37,45,60,61	0
5	NAG	F	612	14/15	0.91	0.12	38,50,64,65	0
5	NAG	E	609	14/15	0.91	0.24	31,44,58,61	0
5	NAG	E	610	14/15	0.91	0.14	38,51,62,62	0
6	PEG	E	605	7/7	0.92	0.14	35,40,55,56	0
5	NAG	A	604	14/15	0.92	0.23	33,42,53,59	0
6	PEG	D	605	7/7	0.92	0.28	55,62,66,68	0
5	NAG	B	607	14/15	0.93	0.29	45,57,71,81	0
6	PEG	F	608	7/7	0.93	0.14	38,42,55,59	0
5	NAG	A	609	14/15	0.93	0.19	44,63,75,84	0
6	PEG	A	605	7/7	0.94	0.13	37,45,51,54	0
5	NAG	E	604	14/15	0.94	0.12	35,42,55,60	0
5	NAG	B	602	14/15	0.94	0.13	31,43,60,65	0
5	NAG	E	608	14/15	0.95	0.19	45,64,74,74	0
5	NAG	F	607	14/15	0.95	0.20	44,55,67,71	0
5	NAG	B	609	14/15	0.96	0.11	33,46,56,58	0
4	FAD	D	601	53/53	0.96	0.18	24,37,46,54	0

Continued on next page...

Continued from previous page...

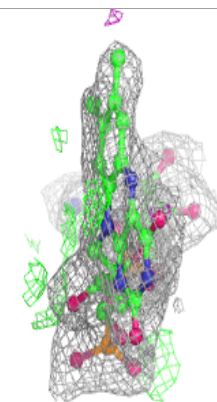
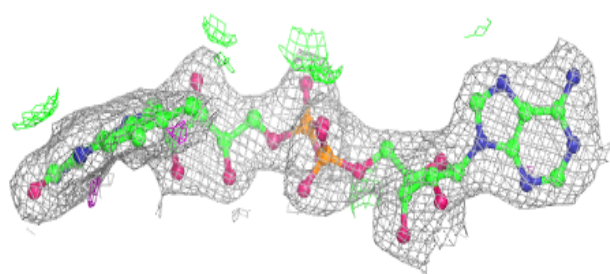
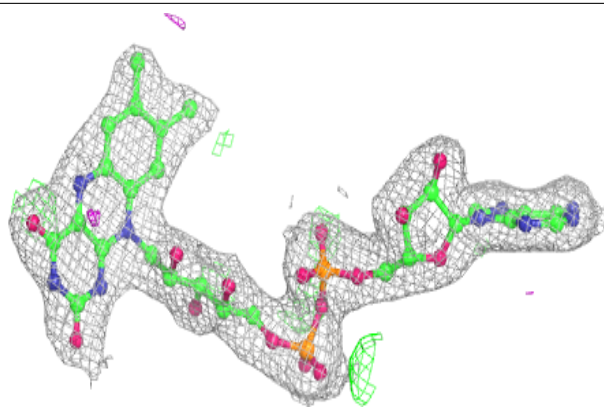
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	FAD	C	601	53/53	0.96	0.17	25,36,44,49	0
4	FAD	A	601	53/53	0.97	0.16	18,24,32,39	0
4	FAD	B	601	53/53	0.98	0.17	17,25,32,35	0
4	FAD	F	601	53/53	0.98	0.16	18,27,40,42	0
4	FAD	E	603	53/53	0.98	0.16	18,26,35,39	0

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.

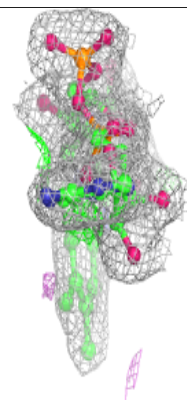
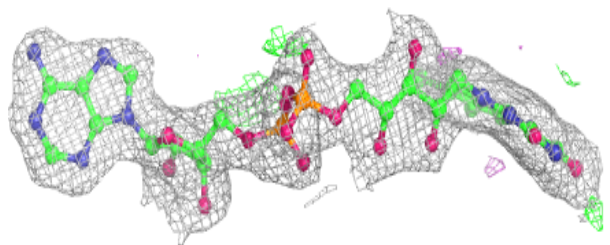
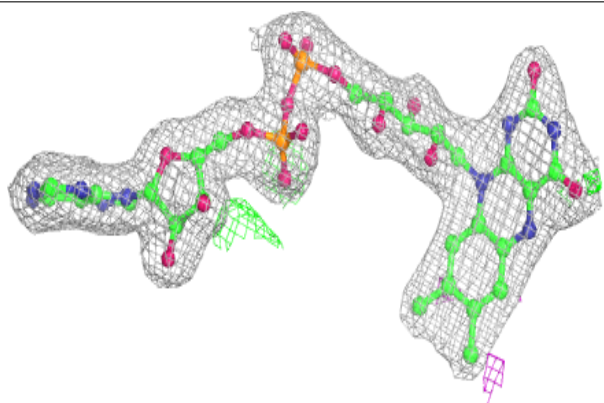


Electron density around FAD C 601:

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

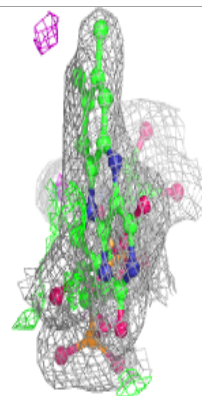
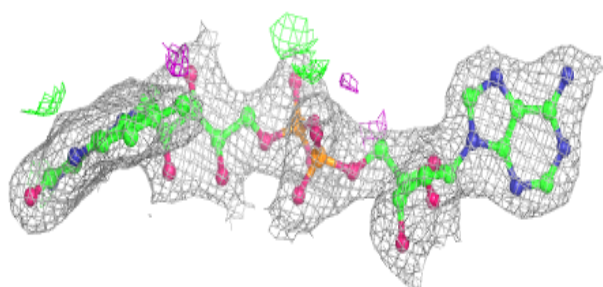
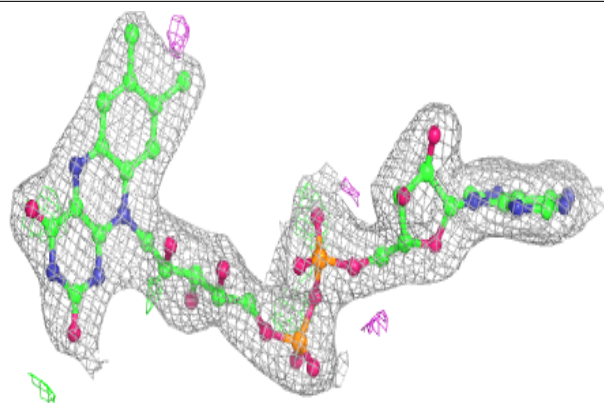
**Electron density around FAD A 601:**

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

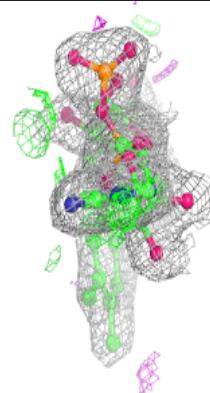
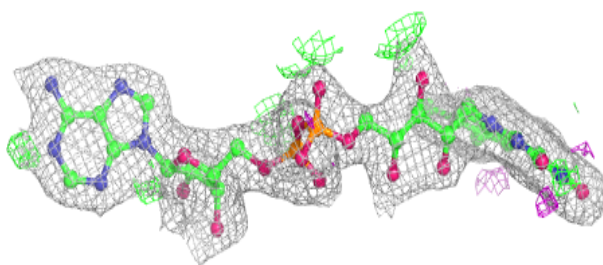
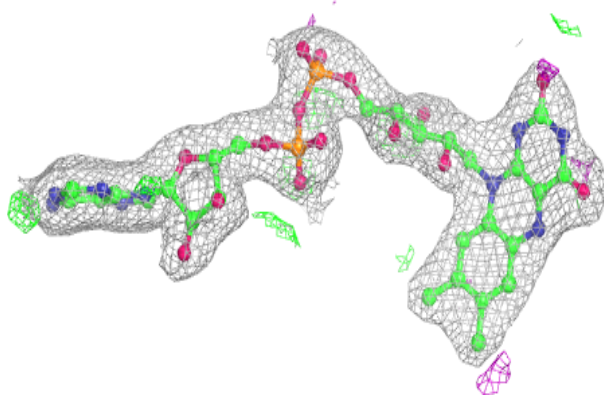


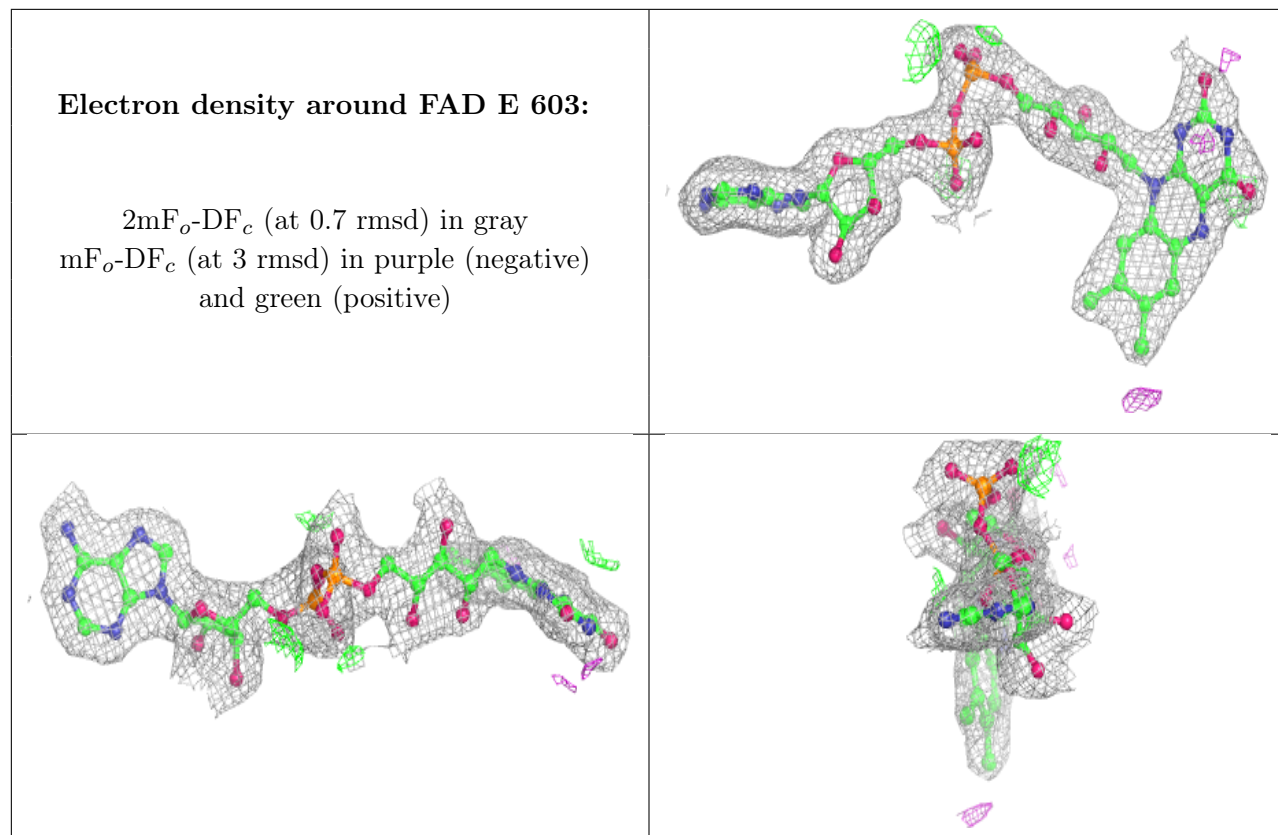
Electron density around FAD B 601:

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

**Electron density around FAD F 601:**

$2mF_o-DF_c$ (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.