Full wwPDB X-ray Structure Validation Report ⓘ

Aug 25, 2025 – 01:28 am BST

PDB ID	:	9QAV / pdb_00009qav
Title	:	Human angiotensin-1 converting enzyme N-domain in complex with enalaprilat
Authors	:	Gregory, K.S.; Acharya, K.R.
Deposited on	:	2025-02-28
Resolution	:	2.30 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

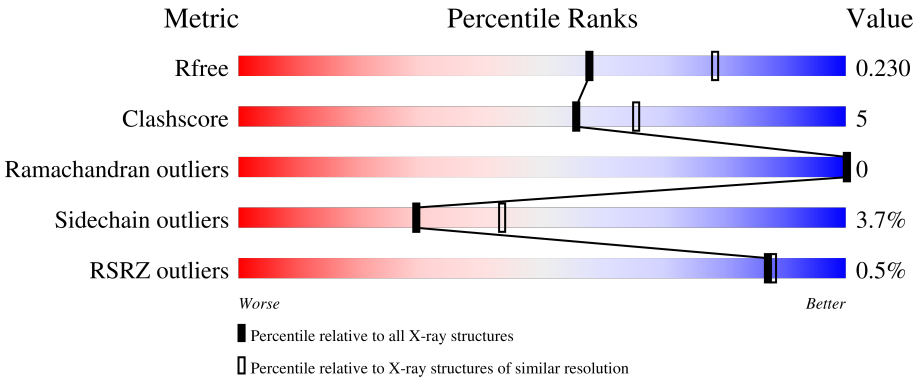
MolProbity	:	4-5-2 with Phenix2.0rc1
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.006 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.45.1

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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}	164625	5963 (2.30-2.30)
Clashscore	180529	6698 (2.30-2.30)
Ramachandran outliers	177936	6640 (2.30-2.30)
Sidechain outliers	177891	6640 (2.30-2.30)
RSRZ outliers	164620	5963 (2.30-2.30)

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 <=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	609	83% 15%
1	B	609	% 79% 18%
2	D	3	100%
2	F	3	100%
3	C	2	100%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
3	E	2	100%

2 Entry composition (i)

There are 13 unique types of molecules in this entry. The entry contains 10375 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.

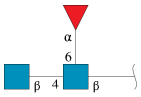
- Molecule 1 is a protein called Angiotensin-converting enzyme, soluble form.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	604	Total	C	N	O	S	0	1	0
			4945	3176	848	902	19			
1	B	603	Total	C	N	O	S	0	0	0
			4930	3168	846	897	19			

There are 14 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	9	GLN	ASN	engineered mutation	UNP P12821
A	25	GLN	ASN	engineered mutation	UNP P12821
A	82	GLN	ASN	engineered mutation	UNP P12821
A	117	GLN	ASN	engineered mutation	UNP P12821
A	289	GLN	ASN	engineered mutation	UNP P12821
A	545	ARG	GLN	engineered mutation	UNP P12821
A	576	LEU	PRO	engineered mutation	UNP P12821
B	9	GLN	ASN	engineered mutation	UNP P12821
B	25	GLN	ASN	engineered mutation	UNP P12821
B	82	GLN	ASN	engineered mutation	UNP P12821
B	117	GLN	ASN	engineered mutation	UNP P12821
B	289	GLN	ASN	engineered mutation	UNP P12821
B	545	ARG	GLN	engineered mutation	UNP P12821
B	576	LEU	PRO	engineered mutation	UNP P12821

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



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
2	D	3	Total C N O 38 22 2 14	0	0	0
2	F	3	Total C N O 38 22 2 14	0	0	0

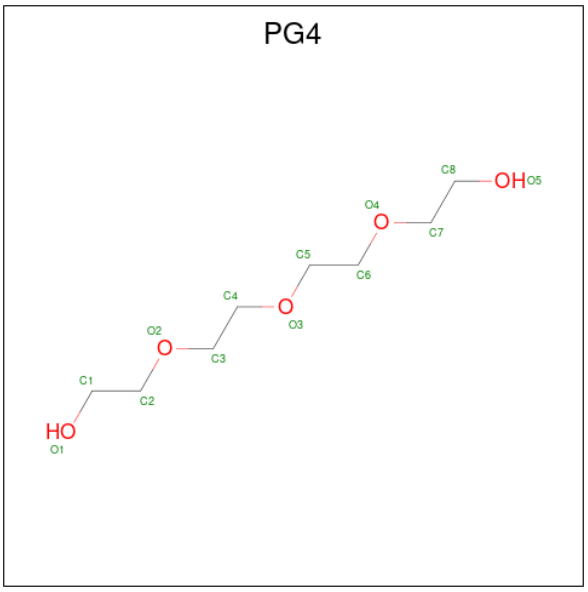
- Molecule 3 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

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

- Molecule 4 is ZINC ION (CCD ID: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

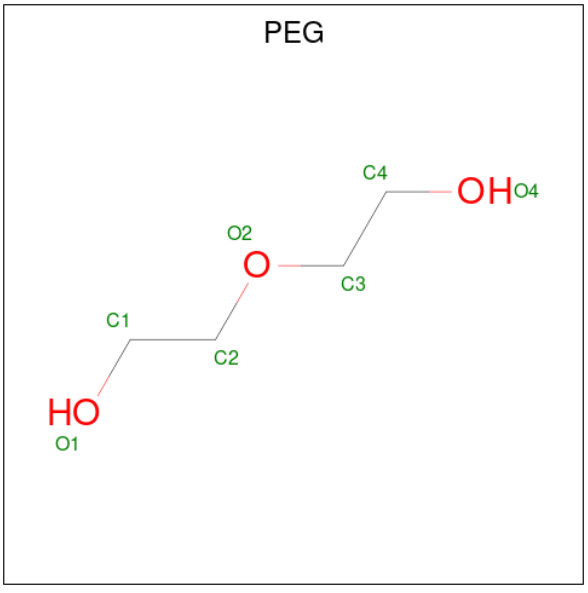
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total Zn 1 1	0	0
4	B	1	Total Zn 1 1	0	0

- Molecule 5 is TETRAETHYLENE GLYCOL (CCD ID: PG4) (formula: $C_8H_{18}O_5$).



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

- Molecule 6 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: $C_4H_{10}O_3$).



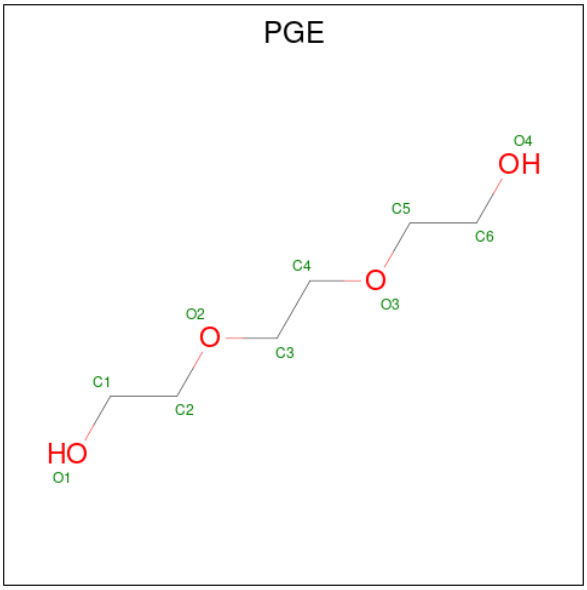
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total C O 7 4 3	0	0

Continued on next page...

Continued from previous page...

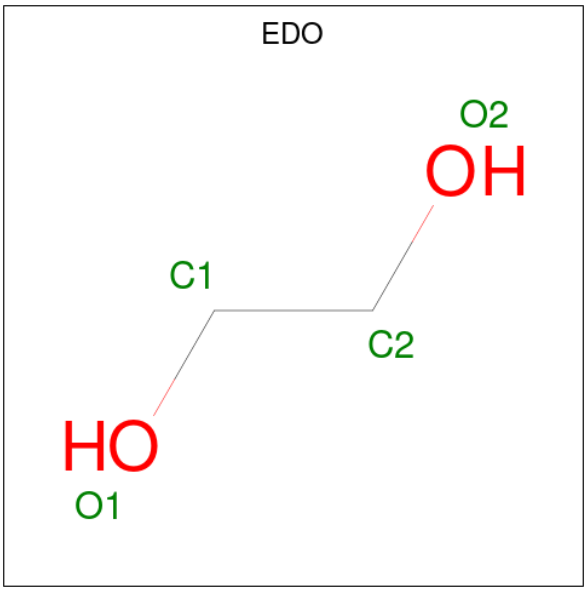
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total C O 7 4 3	0	0
6	A	1	Total C O 7 4 3	0	0
6	A	1	Total C O 7 4 3	0	0

- Molecule 7 is TRIETHYLENE GLYCOL (CCD ID: PGE) (formula: $C_6H_{14}O_4$).



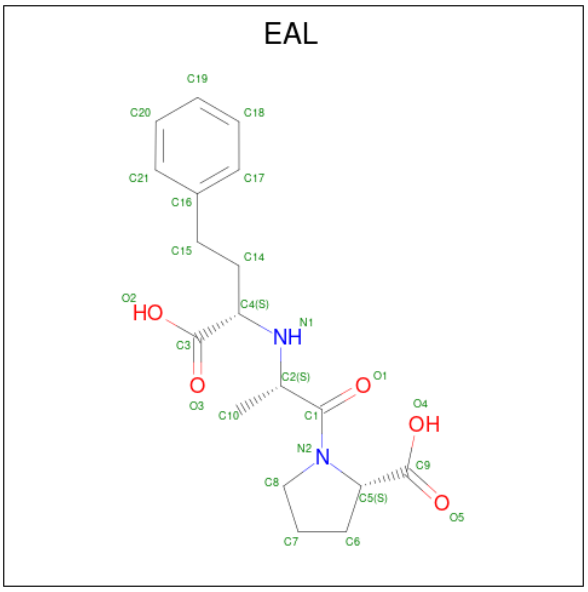
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	1	Total C O 10 6 4	0	0
7	A	1	Total C O 10 6 4	0	0

- Molecule 8 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $C_2H_6O_2$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	A	1	Total	C	O	0	0
			4	2	2		
8	B	1	Total	C	O	0	0
			4	2	2		
8	B	1	Total	C	O	0	0
			4	2	2		
8	B	1	Total	C	O	0	0
			4	2	2		
8	B	1	Total	C	O	0	0
			4	2	2		
8	B	1	Total	C	O	0	0
			4	2	2		

- Molecule 9 is 1-((2S)-2-{[(1S)-1-CARBOXY-3-PHENYLPROPYL]AMINO}PROPANOYL)-L-PROLINE (CCD ID: EAL) (formula: $C_{18}H_{24}N_2O_5$) (labeled as "Ligand of Interest" by depositor).

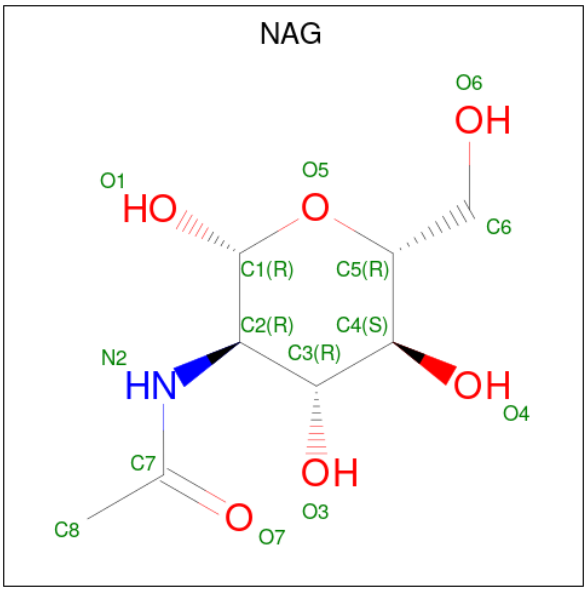


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	A	1	Total C N O 25 18 2 5	0	0
9	B	1	Total C N O 25 18 2 5	0	0

- Molecule 10 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
10	A	1	Total Cl 1 1	0	0
10	B	1	Total Cl 1 1	0	0

- Molecule 11 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



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

- Molecule 12 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
12	B	1	Total Ca 1 1	0	0

- Molecule 13 is water.

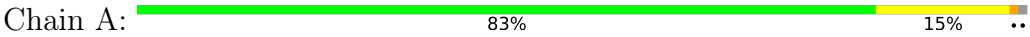
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
13	A	101	Total O 101 101	0	0
13	B	73	Total O 73 73	0	0

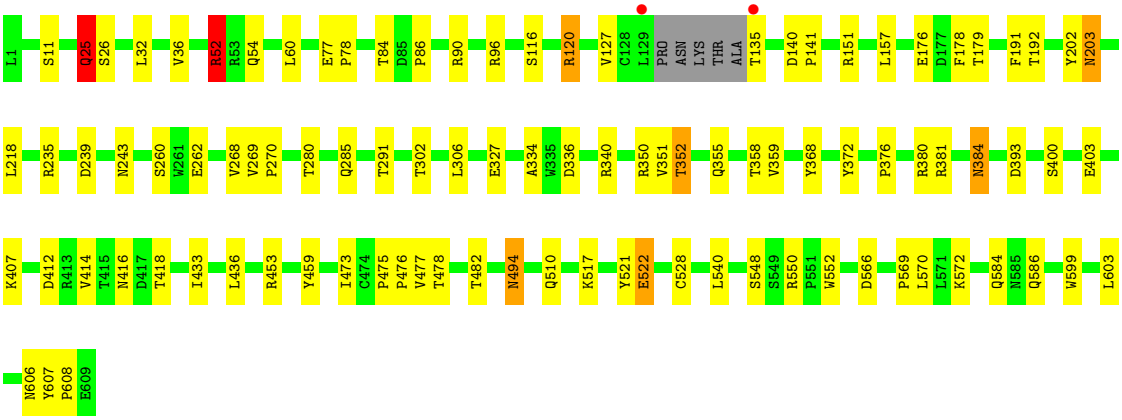
3 Residue-property plots (i)

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

• Molecule 1: Angiotensin-converting enzyme, soluble form

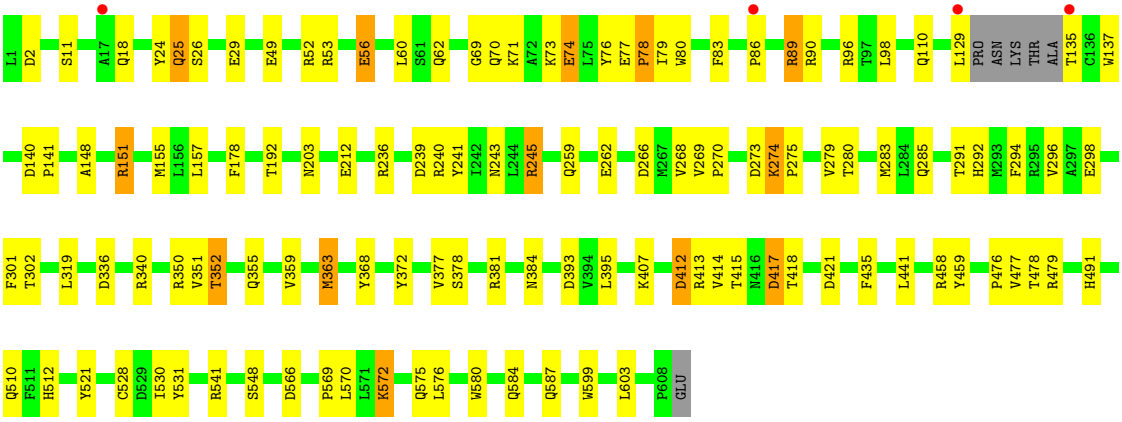
Chain A:





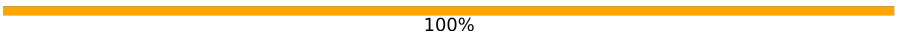
• Molecule 1: Angiotensin-converting enzyme, soluble form

Chain B:

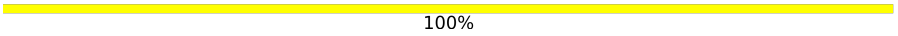


• Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

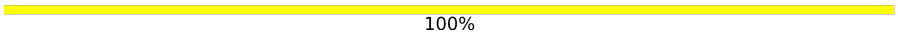
Chain D:



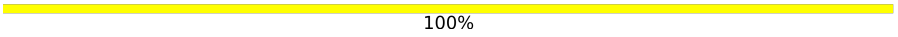
• Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain F: 

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

Chain C: 

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

Chain E: 

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	72.28Å 77.59Å 81.00Å 88.71° 64.86° 75.07°	Depositor
Resolution (Å)	74.59 – 2.30 74.59 – 2.30	Depositor EDS
% Data completeness (in resolution range)	98.5 (74.59-2.30) 97.7 (74.59-2.30)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.23 (at 2.29Å)	Xtriage
Refinement program	REFMAC 5.8.0430 (refmacat 0.4.100)	Depositor
R, R_{free}	0.177 , 0.224 0.187 , 0.230	Depositor DCC
R_{free} test set	3311 reflections (4.87%)	wwPDB-VP
Wilson B-factor (Å^2)	34.6	Xtriage
Anisotropy	0.270	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 38.0	EDS
L-test for twinning[2]	$< \|L\| > = 0.51$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	10375	wwPDB-VP
Average B, all atoms (Å^2)	40.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.14% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

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

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: PGE, FUC, EAL, ZN, EDO, PG4, CL, CA, PEG, NAG

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	0.80	0/5100	1.32	33/6947 (0.5%)
1	B	0.75	0/5085	1.31	33/6926 (0.5%)
All	All	0.78	0/10185	1.31	66/13873 (0.5%)

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	7
1	B	0	5
All	All	0	12

There are no bond length outliers.

All (66) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	418	THR	CA-CB-OG1	-8.87	96.29	109.60
1	A	291	THR	CA-CB-OG1	-8.59	96.71	109.60
1	A	192	THR	CA-CB-OG1	-8.18	97.33	109.60
1	B	178	PHE	CA-CB-CG	-7.97	105.83	113.80
1	B	351	VAL	N-CA-CB	-7.72	104.57	112.06
1	A	572	LYS	CB-CA-C	7.41	125.50	110.38
1	B	56	GLU	N-CA-CB	7.25	121.52	110.28
1	A	407	LYS	N-CA-CB	7.21	122.16	110.40
1	B	25	GLN	CB-CA-C	7.02	123.56	110.70
1	B	135	THR	CA-CB-OG1	-6.70	99.55	109.60
1	B	192	THR	CA-CB-OG1	-6.69	99.57	109.60
1	B	212	GLU	CB-CG-CD	6.68	123.95	112.60

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	2	ASP	CA-CB-CG	6.63	119.23	112.60
1	A	25	GLN	CB-CA-C	6.47	121.85	110.85
1	B	393	ASP	CA-CB-CG	6.47	119.07	112.60
1	B	587	GLN	CB-CA-C	-6.34	99.90	110.68
1	A	384	ASN	O-C-N	-6.32	117.67	121.71
1	A	475	PRO	CB-CA-C	6.29	118.59	110.92
1	B	566	ASP	CA-CB-CG	6.23	118.83	112.60
1	B	384	ASN	O-C-N	-6.18	117.75	121.71
1	A	412	ASP	CA-CB-CG	6.15	118.75	112.60
1	B	459	TYR	N-CA-CB	6.10	119.03	109.94
1	A	178	PHE	CA-CB-CG	-6.10	107.70	113.80
1	B	336	ASP	CA-CB-CG	6.07	118.67	112.60
1	B	212	GLU	CG-CD-OE1	6.05	132.32	118.40
1	A	566	ASP	CA-CB-CG	6.03	118.63	112.60
1	A	54	GLN	N-CA-CB	-5.99	101.31	110.12
1	B	239	ASP	CB-CA-C	-5.95	99.24	110.67
1	A	586	GLN	CB-CA-C	-5.91	101.57	110.90
1	A	494	ASN	CA-CB-CG	-5.90	106.70	112.60
1	A	393	ASP	CA-CB-CG	5.85	118.45	112.60
1	A	270	PRO	N-CA-C	5.85	121.17	113.86
1	B	491	HIS	CA-CB-CG	-5.85	107.95	113.80
1	B	584	GLN	CB-CA-C	-5.81	101.15	110.79
1	B	74	GLU	CB-CA-C	-5.73	101.28	110.79
1	B	291	THR	CA-CB-OG1	-5.73	101.01	109.60
1	B	575	GLN	N-CA-CB	-5.64	100.95	110.49
1	B	352	THR	CA-CB-OG1	-5.64	101.14	109.60
1	A	418	THR	CA-CB-OG1	-5.61	101.18	109.60
1	A	403	GLU	CB-CA-C	-5.61	101.83	110.81
1	A	336	ASP	CA-CB-CG	5.61	118.21	112.60
1	B	407	LYS	N-CA-CB	5.57	118.92	110.28
1	A	203	ASN	CA-CB-CG	-5.56	107.04	112.60
1	A	327	GLU	CB-CA-C	5.56	118.90	109.84
1	B	62	GLN	CB-CA-C	5.53	120.26	110.85
1	A	584	GLN	CB-CA-C	-5.53	101.61	110.79
1	B	417	ASP	CA-CB-CG	5.48	118.08	112.60
1	A	127	VAL	N-CA-CB	-5.47	104.53	111.64
1	A	416	ASN	CA-CB-CG	5.46	118.06	112.60
1	A	351	VAL	N-CA-CB	-5.45	106.77	112.06
1	A	352	THR	CA-CB-OG1	-5.43	101.45	109.60
1	B	302	THR	OG1-CB-CG2	-5.38	98.54	109.30
1	B	245	ARG	CA-CB-CG	-5.37	103.36	114.10
1	A	302	THR	OG1-CB-CG2	-5.34	98.62	109.30

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	606	ASN	CB-CA-C	5.26	119.76	111.72
1	A	25	GLN	N-CA-CB	-5.20	102.47	110.16
1	B	262	GLU	CB-CG-CD	5.16	121.38	112.60
1	B	412	ASP	CA-CB-CG	5.16	117.76	112.60
1	B	140	ASP	CA-CB-CG	5.15	117.75	112.60
1	B	572	LYS	CB-CG-CD	5.14	123.13	111.30
1	B	236	ARG	NE-CZ-NH1	-5.11	116.39	121.50
1	A	522	GLU	CB-CG-CD	5.10	121.27	112.60
1	A	482	THR	CA-CB-OG1	-5.09	101.96	109.60
1	A	176	GLU	CB-CA-C	-5.09	102.86	110.90
1	A	52	ARG	CB-CA-C	5.05	119.98	110.63
1	A	358	THR	CA-CB-OG1	-5.01	102.08	109.60

There are no chirality outliers.

All (12) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	120	ARG	Sidechain
1	A	151	ARG	Sidechain
1	A	340	ARG	Sidechain
1	A	350	ARG	Sidechain
1	A	380	ARG	Sidechain
1	A	52	ARG	Sidechain
1	A	550	ARG	Sidechain
1	B	245	ARG	Sidechain
1	B	458	ARG	Sidechain
1	B	541	ARG	Sidechain
1	B	78	PRO	Peptide
1	B	89	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	4945	0	4723	41	0
1	B	4930	0	4712	46	0
2	D	38	0	34	3	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	F	38	0	34	0	0
3	C	28	0	25	0	0
3	E	28	0	25	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
5	A	13	0	18	1	0
5	B	26	0	36	3	0
6	A	28	0	40	5	0
7	A	20	0	28	3	0
8	A	4	0	6	0	0
8	B	20	0	30	1	0
9	A	25	0	22	0	0
9	B	25	0	22	2	0
10	A	1	0	0	0	0
10	B	1	0	0	0	0
11	B	28	0	26	0	0
12	B	1	0	0	0	0
13	A	101	0	0	0	0
13	B	73	0	0	1	0
All	All	10375	0	9781	91	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

All (91) 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:298:GLU:HA	1:B:363:MET:HE1	1.43	0.99
1:A:260:SER:OG	1:A:262:GLU:OE2	2.04	0.74
1:B:298:GLU:CA	1:B:363:MET:HE1	2.18	0.72
1:B:240:ARG:NH2	1:B:241:TYR:OH	2.24	0.70
1:A:25:GLN:OE1	1:A:376:PRO:HA	1.95	0.66
1:A:355:GLN:O	1:A:359:VAL:HG23	1.97	0.64
1:A:477:VAL:HG12	1:A:603:LEU:HD21	1.80	0.64
1:B:355:GLN:O	1:B:359:VAL:HG23	1.97	0.64
1:A:157:LEU:HD11	1:A:477:VAL:HG13	1.80	0.63
5:B:704:PG4:H62	9:B:711:EAL:C19	2.28	0.62
1:A:191:PHE:CZ	6:A:703:PEG:H31	2.34	0.62
5:B:704:PG4:H62	9:B:711:EAL:C20	2.29	0.61
1:B:157:LEU:HD11	1:B:477:VAL:HG13	1.82	0.61
1:A:478:THR:HB	2:D:3:FUC:H63	1.85	0.59

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:453:ARG:NH1	6:A:710:PEG:O1	2.35	0.58
1:B:71:LYS:HA	1:B:74:GLU:HG3	1.86	0.58
1:A:116:SER:O	1:A:120:ARG:HG3	2.04	0.58
1:B:412:ASP:O	1:B:413:ARG:C	2.48	0.57
1:B:270:PRO:HB3	1:B:580:TRP:CH2	2.39	0.56
1:B:280:THR:HG23	1:B:352:THR:HA	1.88	0.56
1:A:90:ARG:HB3	7:A:704:PGE:H6	1.88	0.55
1:B:477:VAL:HG12	1:B:603:LEU:HD21	1.89	0.55
1:A:52:ARG:NH2	1:A:52:ARG:HG3	2.22	0.54
1:A:607:TYR:CG	1:A:608:PRO:HA	2.42	0.54
1:A:280:THR:HG23	1:A:352:THR:HA	1.90	0.54
1:A:517:LYS:HD3	1:A:517:LYS:C	2.33	0.53
1:A:77:GLU:CD	1:A:96:ARG:HH21	2.16	0.52
2:D:1:NAG:O5	2:D:3:FUC:H5	2.09	0.52
1:A:381:ARG:HG3	1:A:548:SER:HB3	1.92	0.51
1:B:275:PRO:HG2	1:B:414:VAL:HG23	1.92	0.51
1:B:381:ARG:HG3	1:B:548:SER:HB3	1.93	0.51
1:B:279:VAL:O	1:B:283:MET:HG3	2.10	0.51
1:B:570:LEU:C	1:B:570:LEU:HD23	2.36	0.51
1:A:52:ARG:HG3	1:A:52:ARG:HH21	1.76	0.51
1:B:141:PRO:HB3	1:B:350:ARG:HD3	1.93	0.51
1:B:510:GLN:HG2	1:B:569:PRO:HG2	1.94	0.50
1:B:24:TYR:HD2	1:B:25:GLN:HG3	1.76	0.50
1:A:84:THR:O	1:A:86:PRO:HD3	2.13	0.49
1:B:151:ARG:NH1	1:B:266:ASP:OD1	2.46	0.48
1:A:570:LEU:C	1:A:570:LEU:HD23	2.37	0.48
1:B:296:VAL:HG22	8:B:707:EDO:H12	1.96	0.48
1:B:477:VAL:HG12	1:B:603:LEU:CD2	2.43	0.48
1:A:459:TYR:HE1	6:A:705:PEG:H31	1.78	0.47
2:D:2:NAG:H2	2:D:2:NAG:O6	2.15	0.47
1:B:78:PRO:HB2	1:B:79:ILE:HG23	1.97	0.47
1:B:86:PRO:O	1:B:90:ARG:HG3	2.15	0.47
1:B:69:GLY:HA3	1:B:98:LEU:HD11	1.97	0.47
1:B:148:ALA:O	1:B:151:ARG:NH2	2.48	0.47
1:A:179:THR:HG21	6:A:705:PEG:H32	1.98	0.46
1:B:292:HIS:NE2	5:B:705:PG4:H21	2.30	0.46
1:B:29:GLU:OE1	1:B:340:ARG:NH1	2.49	0.46
1:B:521:TYR:CD2	1:B:528:CYS:HB2	2.49	0.46
1:A:32:LEU:O	1:A:36:VAL:HG23	2.16	0.46
1:B:49:GLU:HG3	1:B:53:ARG:NH2	2.30	0.46
1:B:259:GLN:O	1:B:435:PHE:HA	2.16	0.46

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:521:TYR:CD2	1:A:528:CYS:HB2	2.50	0.46
1:A:607:TYR:CD1	1:A:608:PRO:HA	2.50	0.46
1:B:137:TRP:CH2	1:B:155:MET:HE1	2.51	0.46
1:B:76:TYR:O	1:B:80:TRP:HD1	1.99	0.46
1:A:477:VAL:HG12	1:A:603:LEU:CD2	2.46	0.45
1:A:90:ARG:HB3	7:A:704:PGE:C6	2.45	0.45
1:B:273:ASP:OD1	1:B:273:ASP:N	2.41	0.45
1:B:301:PHE:CZ	1:B:395:LEU:HD22	2.52	0.45
1:A:433:ILE:HD11	1:A:570:LEU:HD21	1.98	0.45
1:B:441:LEU:C	1:B:441:LEU:HD12	2.42	0.45
1:A:381:ARG:HD3	7:A:704:PGE:H22	1.98	0.44
1:B:83:PHE:O	1:B:89:ARG:HD3	2.18	0.44
1:B:77:GLU:N	1:B:78:PRO:CD	2.80	0.44
1:A:510:GLN:HG2	1:A:569:PRO:HG2	2.00	0.44
1:B:294:PHE:CZ	1:B:319:LEU:HD22	2.53	0.43
1:A:202:TYR:O	1:A:203:ASN:C	2.59	0.43
1:A:218:LEU:HD13	1:A:436:LEU:HD13	2.00	0.43
1:B:512:HIS:ND1	13:B:801:HOH:O	2.32	0.42
1:A:77:GLU:N	1:A:78:PRO:CD	2.83	0.42
1:B:157:LEU:HD13	1:B:476:PRO:HB2	2.01	0.42
1:A:334:ALA:O	5:A:702:PG4:H61	2.20	0.42
1:A:157:LEU:HD13	1:A:476:PRO:HB2	2.01	0.42
1:B:274:LYS:HB3	1:B:275:PRO:HD2	2.02	0.42
1:B:73:LYS:HA	1:B:77:GLU:HB2	2.01	0.42
1:B:52:ARG:O	1:B:56:GLU:HG2	2.20	0.41
1:B:268:VAL:O	1:B:269:VAL:C	2.63	0.41
1:A:77:GLU:HB3	1:A:78:PRO:HD3	2.01	0.41
1:A:179:THR:HB	6:A:705:PEG:H22	2.01	0.41
1:A:243:ASN:HD22	1:A:599:TRP:CG	2.37	0.41
1:B:478:THR:O	1:B:479:ARG:HD2	2.21	0.41
1:A:268:VAL:O	1:A:269:VAL:C	2.61	0.41
1:B:530:ILE:O	1:B:531:TYR:C	2.62	0.40
1:A:306:LEU:HD11	1:A:540:LEU:HD23	2.03	0.40
1:A:384:ASN:HD22	1:A:552:TRP:CG	2.40	0.40
1:A:140:ASP:HA	1:A:141:PRO:HA	1.89	0.40
1:B:243:ASN:HD22	1:B:599:TRP:CG	2.39	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	601/609 (99%)	586 (98%)	15 (2%)	0	100	100
1	B	599/609 (98%)	583 (97%)	16 (3%)	0	100	100
All	All	1200/1218 (98%)	1169 (97%)	31 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	521/524 (99%)	505 (97%)	16 (3%)	35	51
1	B	519/524 (99%)	497 (96%)	22 (4%)	25	37
All	All	1040/1048 (99%)	1002 (96%)	38 (4%)	29	43

All (38) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	11	SER
1	A	25	GLN
1	A	26	SER
1	A	52	ARG
1	A	60	LEU
1	A	135	THR
1	A	235	ARG
1	A	239	ASP

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	285	GLN
1	A	368	TYR
1	A	372	TYR
1	A	400	SER
1	A	414	VAL
1	A	473	ILE
1	A	494	ASN
1	A	522	GLU
1	B	11	SER
1	B	18	GLN
1	B	26	SER
1	B	60	LEU
1	B	70	GLN
1	B	96	ARG
1	B	110	GLN
1	B	129	LEU
1	B	151	ARG
1	B	203	ASN
1	B	274	LYS
1	B	285	GLN
1	B	363	MET
1	B	368	TYR
1	B	372	TYR
1	B	377	VAL
1	B	378	SER
1	B	415	THR
1	B	417	ASP
1	B	421	ASP
1	B	572	LYS
1	B	576	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	82	GLN
1	A	371	GLN
1	B	70	GLN
1	B	87	GLN
1	B	213	HIS
1	B	371	GLN

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates

10 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	$\#\|Z\| > 2$
3	NAG	C	1	1,3	14,14,15	0.55	0	17,19,21	1.61	4 (23%)
3	NAG	C	2	3	14,14,15	0.68	0	17,19,21	1.63	4 (23%)
2	NAG	D	1	2,1	14,14,15	0.46	0	17,19,21	1.38	3 (17%)
2	NAG	D	2	2	14,14,15	0.59	0	17,19,21	2.35	6 (35%)
2	FUC	D	3	2	10,10,11	0.88	1 (10%)	14,14,16	1.41	3 (21%)
3	NAG	E	1	1,3	14,14,15	0.74	0	17,19,21	2.02	4 (23%)
3	NAG	E	2	3	14,14,15	0.50	0	17,19,21	1.45	3 (17%)
2	NAG	F	1	2,1	14,14,15	0.92	0	17,19,21	1.40	1 (5%)
2	NAG	F	2	2	14,14,15	0.52	0	17,19,21	2.41	6 (35%)
2	FUC	F	3	2	10,10,11	0.43	0	14,14,16	2.06	5 (35%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	C	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	C	2	3	-	2/6/23/26	0/1/1/1

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	D	1	2,1	-	3/6/23/26	0/1/1/1
2	NAG	D	2	2	-	3/6/23/26	0/1/1/1
2	FUC	D	3	2	-	-	0/1/1/1
3	NAG	E	1	1,3	-	2/6/23/26	0/1/1/1
3	NAG	E	2	3	-	2/6/23/26	0/1/1/1
2	NAG	F	1	2,1	-	3/6/23/26	0/1/1/1
2	NAG	F	2	2	-	5/6/23/26	0/1/1/1
2	FUC	F	3	2	-	-	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	3	FUC	C2-C3	2.11	1.55	1.52

All (39) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	F	2	NAG	C1-C2-N2	5.99	120.72	110.49
3	E	1	NAG	C2-N2-C7	5.89	131.28	122.90
2	D	2	NAG	C1-O5-C5	5.82	120.07	112.19
2	F	1	NAG	C1-O5-C5	4.62	118.45	112.19
2	F	3	FUC	C1-C2-C3	4.44	115.12	109.67
2	D	2	NAG	C2-N2-C7	4.33	129.06	122.90
3	E	2	NAG	C2-N2-C7	4.29	129.01	122.90
2	D	2	NAG	C1-C2-N2	4.20	117.67	110.49
3	C	1	NAG	C1-O5-C5	4.08	117.72	112.19
3	C	2	NAG	C1-O5-C5	3.89	117.47	112.19
2	F	2	NAG	C2-N2-C7	3.83	128.36	122.90
2	F	2	NAG	C1-O5-C5	3.43	116.83	112.19
2	F	2	NAG	C3-C4-C5	-3.09	104.73	110.24
2	F	2	NAG	O3-C3-C2	3.06	115.79	109.47
2	F	3	FUC	C2-C3-C4	3.00	116.09	110.89
3	E	1	NAG	O6-C6-C5	2.92	121.32	111.29
2	F	2	NAG	C4-C3-C2	-2.81	106.90	111.02
2	D	2	NAG	O5-C5-C4	2.74	117.48	110.83
2	D	1	NAG	O5-C1-C2	-2.65	107.10	111.29
3	E	1	NAG	C4-C3-C2	2.64	114.89	111.02
2	D	3	FUC	C1-C2-C3	2.64	112.91	109.67
3	C	1	NAG	O3-C3-C2	-2.62	104.04	109.47
2	F	3	FUC	O3-C3-C2	-2.57	105.08	109.99
3	E	2	NAG	C1-C2-N2	2.48	114.72	110.49

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	E	1	NAG	C1-O5-C5	2.47	115.54	112.19
2	D	3	FUC	C3-C4-C5	2.46	113.61	109.77
2	D	2	NAG	C4-C3-C2	2.46	114.62	111.02
3	C	1	NAG	C4-C3-C2	2.46	114.62	111.02
2	D	2	NAG	C3-C4-C5	2.36	114.46	110.24
2	F	3	FUC	C1-O5-C5	2.34	118.08	112.78
3	C	2	NAG	C2-N2-C7	2.34	126.23	122.90
3	E	2	NAG	C1-O5-C5	2.31	115.32	112.19
2	D	1	NAG	C1-C2-N2	2.26	114.34	110.49
2	F	3	FUC	O2-C2-C1	2.25	113.75	109.15
2	D	3	FUC	O4-C4-C3	-2.22	105.22	110.35
3	C	2	NAG	O4-C4-C5	2.19	114.74	109.30
3	C	1	NAG	O4-C4-C3	-2.07	105.57	110.35
3	C	2	NAG	O5-C5-C6	-2.04	104.01	107.20
2	D	1	NAG	C1-O5-C5	-2.01	109.47	112.19

There are no chirality outliers.

All (20) torsion outliers are listed below:

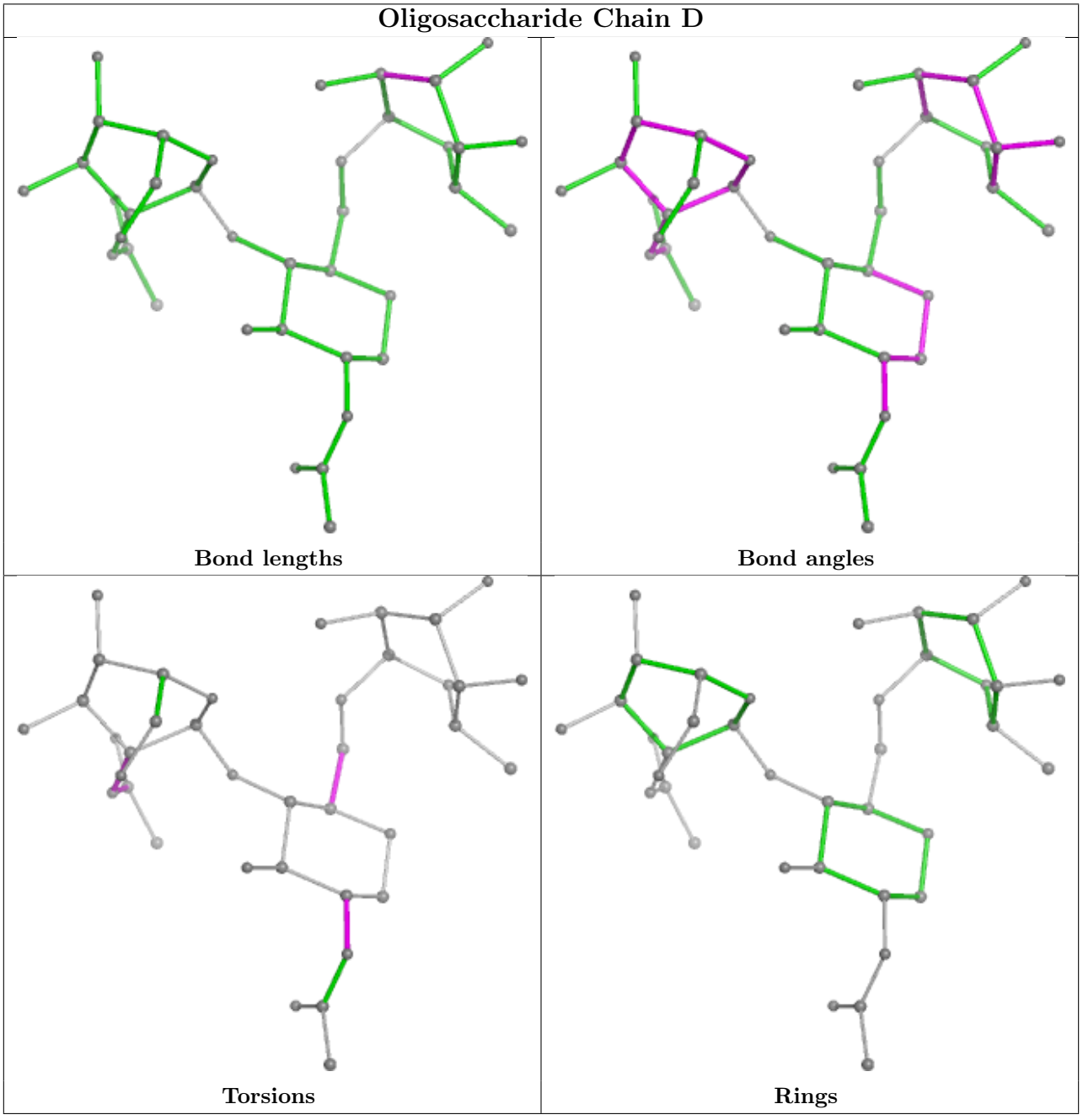
Mol	Chain	Res	Type	Atoms
2	D	2	NAG	C8-C7-N2-C2
2	D	2	NAG	O7-C7-N2-C2
2	F	2	NAG	C1-C2-N2-C7
2	F	2	NAG	C8-C7-N2-C2
2	F	2	NAG	O7-C7-N2-C2
3	E	1	NAG	O7-C7-N2-C2
3	E	1	NAG	C8-C7-N2-C2
3	E	2	NAG	O5-C5-C6-O6
2	F	1	NAG	C8-C7-N2-C2
2	D	2	NAG	C1-C2-N2-C7
2	F	2	NAG	O5-C5-C6-O6
3	E	2	NAG	C4-C5-C6-O6
2	F	2	NAG	C4-C5-C6-O6
2	F	1	NAG	O7-C7-N2-C2
2	D	1	NAG	C4-C5-C6-O6
3	C	2	NAG	O5-C5-C6-O6
3	C	2	NAG	C4-C5-C6-O6
2	D	1	NAG	O5-C5-C6-O6
2	F	1	NAG	O5-C5-C6-O6
2	D	1	NAG	C3-C2-N2-C7

There are no ring outliers.

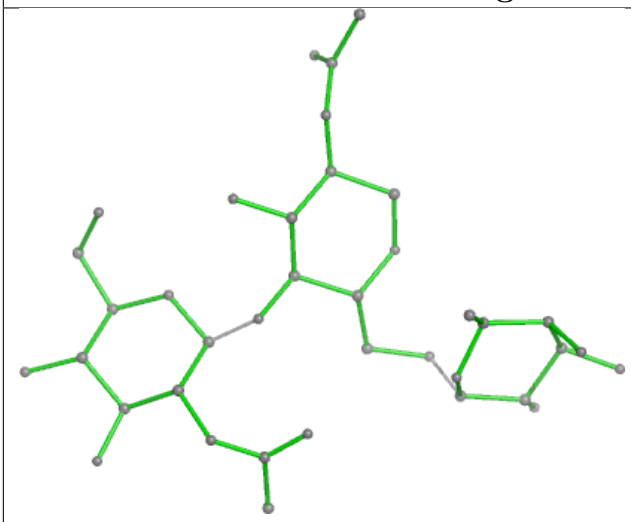
3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	2	NAG	1	0
2	D	1	NAG	1	0
2	D	3	FUC	2	0

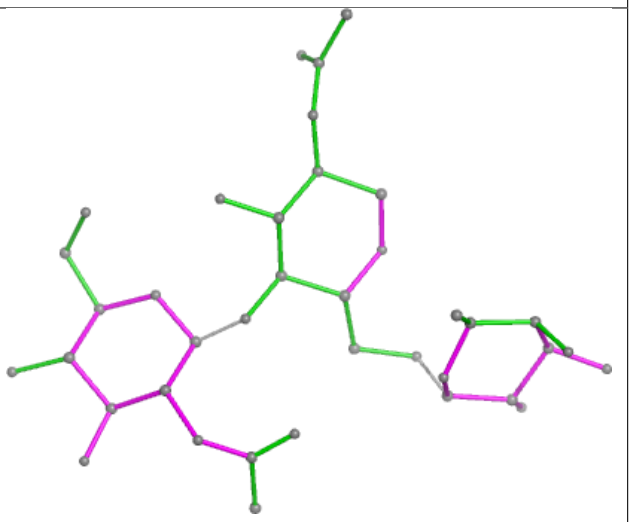
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.



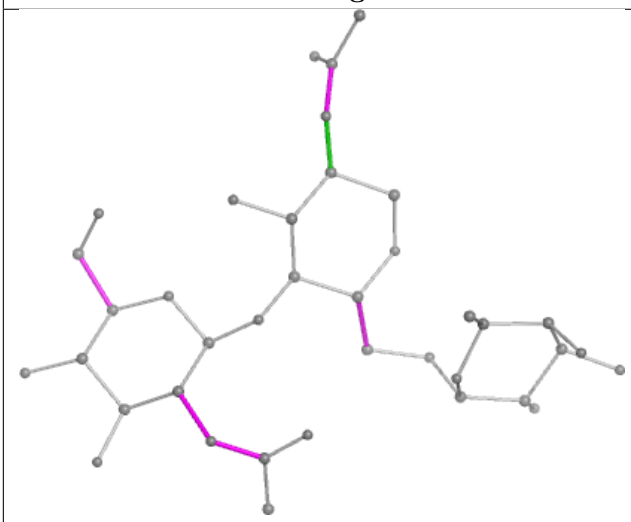
Oligosaccharide Chain F



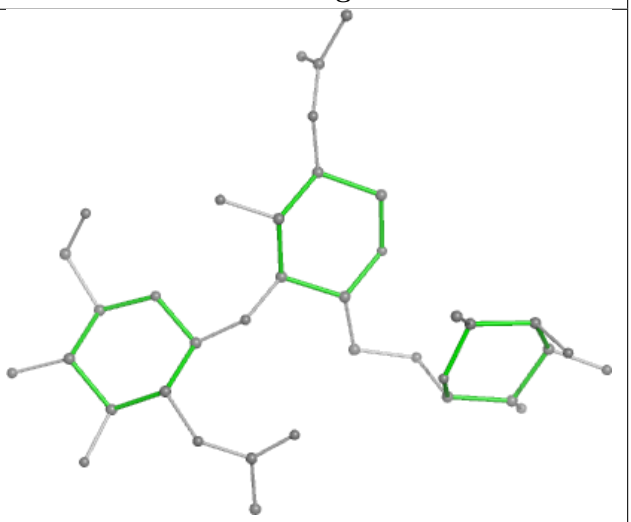
Bond lengths



Bond angles

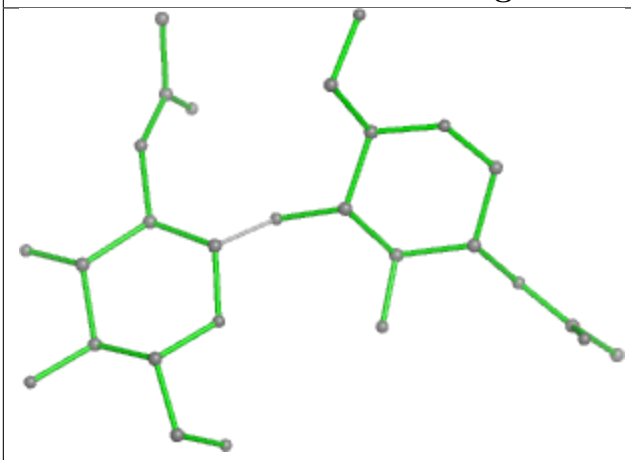


Torsions

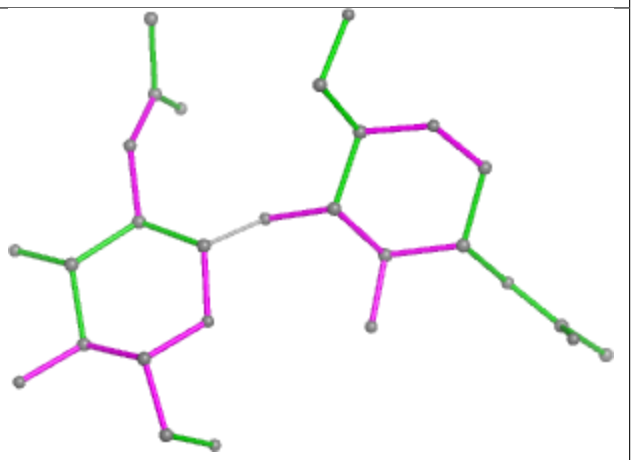


Rings

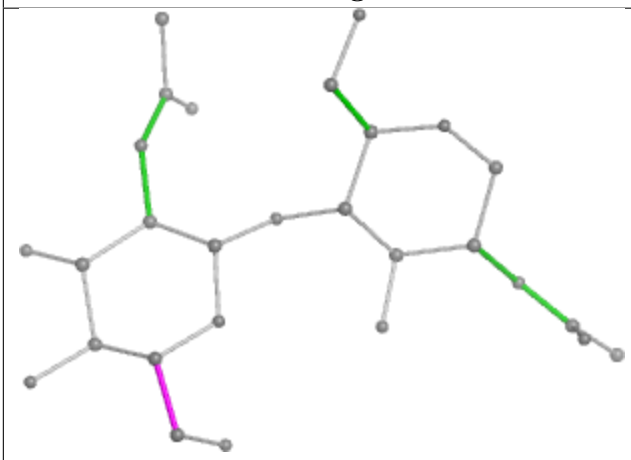
Oligosaccharide Chain C



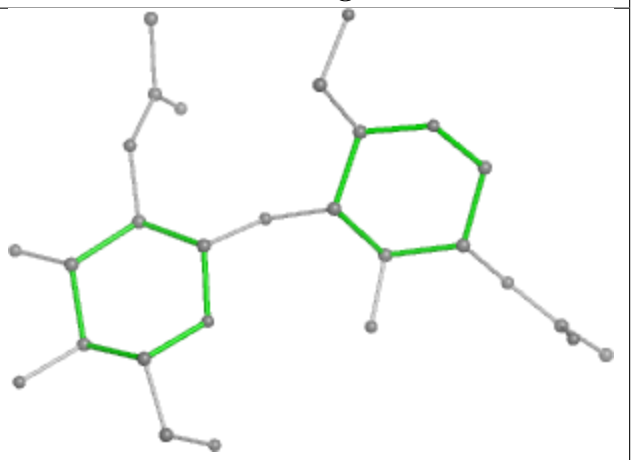
Bond lengths



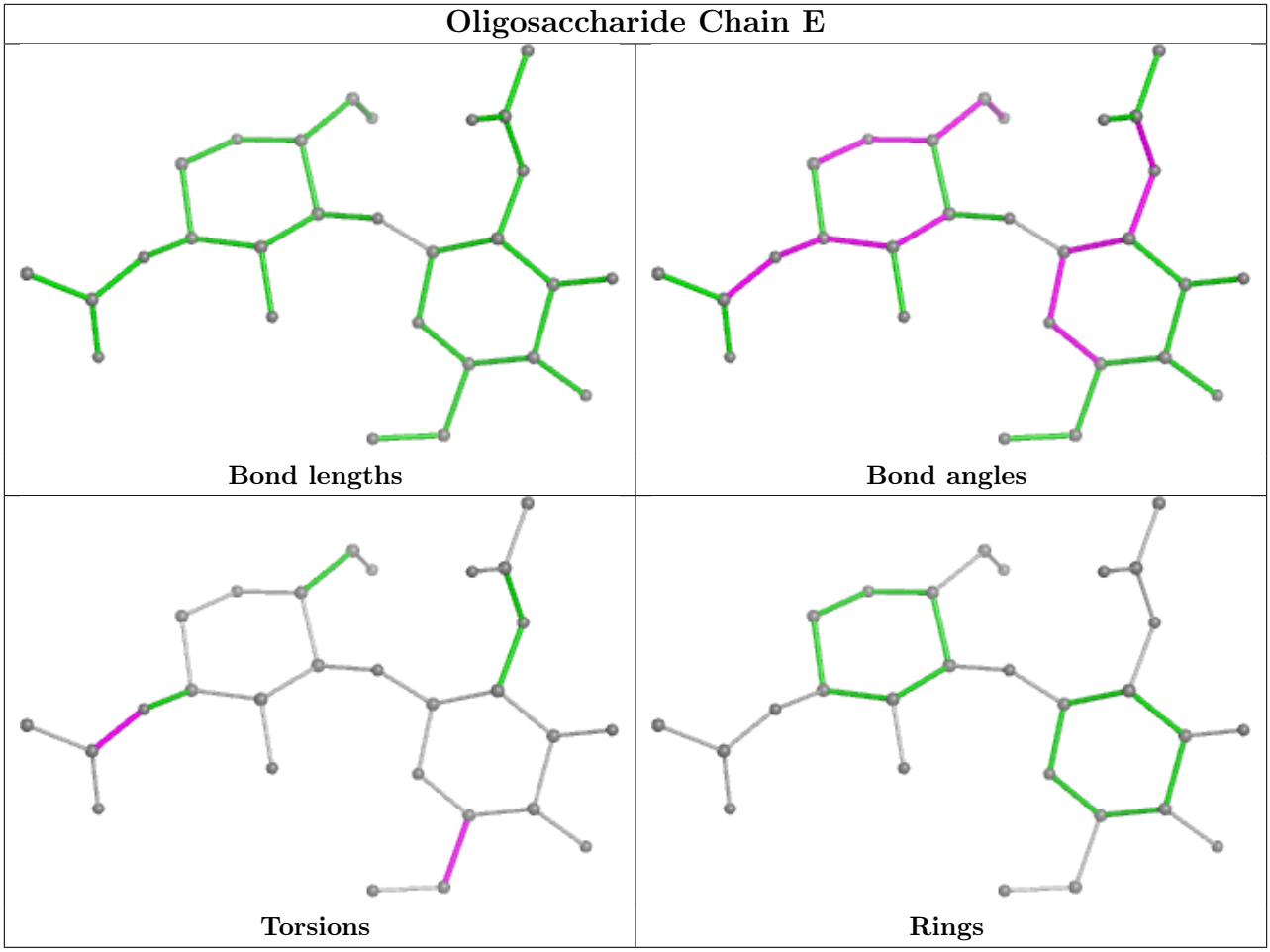
Bond angles



Torsions



Rings



5.6 Ligand geometry (i)

Of 24 ligands modelled in this entry, 5 are monoatomic - leaving 19 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
8	EDO	B	708	-	3,3,3	0.27	0	2,2,2	0.24	0
8	EDO	B	710	-	3,3,3	0.30	0	2,2,2	0.43	0
11	NAG	B	701	1	14,14,15	0.49	0	17,19,21	1.57	4 (23%)
7	PGE	A	706	-	9,9,9	0.43	0	8,8,8	0.30	0
8	EDO	B	706	-	3,3,3	0.23	0	2,2,2	0.34	0
8	EDO	A	707	-	3,3,3	0.27	0	2,2,2	0.32	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
5	PG4	B	704	-	12,12,12	0.41	0	11,11,11	0.43	0
5	PG4	B	705	-	12,12,12	0.57	0	11,11,11	0.41	0
6	PEG	A	708	-	6,6,6	0.67	0	5,5,5	0.41	0
6	PEG	A	705	-	6,6,6	0.47	0	5,5,5	0.58	0
5	PG4	A	702	-	12,12,12	0.45	0	11,11,11	0.41	0
8	EDO	B	709	-	3,3,3	0.54	0	2,2,2	0.16	0
6	PEG	A	703	-	6,6,6	0.28	0	5,5,5	0.22	0
9	EAL	A	709	4	26,26,26	0.78	0	33,35,35	0.92	1 (3%)
11	NAG	B	702	1	14,14,15	0.56	0	17,19,21	1.83	4 (23%)
9	EAL	B	711	4	26,26,26	0.98	1 (3%)	33,35,35	1.56	5 (15%)
8	EDO	B	707	-	3,3,3	0.27	0	2,2,2	0.38	0
6	PEG	A	710	-	6,6,6	0.75	0	5,5,5	0.57	0
7	PGE	A	704	-	9,9,9	0.34	0	8,8,8	0.35	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
8	EDO	B	708	-	-	0/1/1/1	-
8	EDO	B	710	-	-	1/1/1/1	-
11	NAG	B	701	1	-	2/6/23/26	0/1/1/1
7	PGE	A	706	-	-	1/7/7/7	-
8	EDO	B	706	-	-	1/1/1/1	-
8	EDO	A	707	-	-	1/1/1/1	-
5	PG4	B	704	-	-	5/10/10/10	-
5	PG4	B	705	-	-	4/10/10/10	-
6	PEG	A	708	-	-	2/4/4/4	-
6	PEG	A	705	-	-	2/4/4/4	-
5	PG4	A	702	-	-	2/10/10/10	-
8	EDO	B	709	-	-	1/1/1/1	-
6	PEG	A	703	-	-	2/4/4/4	-
9	EAL	A	709	4	-	4/25/35/35	0/2/2/2
11	NAG	B	702	1	-	0/6/23/26	0/1/1/1
9	EAL	B	711	4	-	4/25/35/35	0/2/2/2
8	EDO	B	707	-	-	1/1/1/1	-
6	PEG	A	710	-	-	1/4/4/4	-
7	PGE	A	704	-	-	3/7/7/7	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	B	711	EAL	O5-C9	2.29	1.29	1.22

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
9	B	711	EAL	O3-C3-C4	-4.54	107.34	122.26
11	B	702	NAG	O3-C3-C2	-4.43	100.30	109.47
9	B	711	EAL	C14-C4-C3	-4.11	100.44	110.35
11	B	702	NAG	C4-C3-C2	3.71	116.45	111.02
9	B	711	EAL	O2-C3-C4	3.54	125.16	113.40
11	B	701	NAG	O3-C3-C2	-2.90	103.46	109.47
11	B	701	NAG	C1-O5-C5	2.83	116.03	112.19
11	B	702	NAG	C1-C2-N2	-2.63	105.99	110.49
9	B	711	EAL	C10-C2-N1	2.53	114.20	108.85
9	A	709	EAL	O3-C3-C4	-2.16	115.17	122.26
11	B	702	NAG	C2-N2-C7	2.16	125.97	122.90
11	B	701	NAG	C2-N2-C7	2.12	125.92	122.90
9	B	711	EAL	C14-C4-N1	2.09	127.35	112.29
11	B	701	NAG	O5-C5-C6	2.05	110.42	107.20

There are no chirality outliers.

All (37) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
9	B	711	EAL	C15-C14-C4-N1
11	B	701	NAG	O5-C5-C6-O6
5	B	705	PG4	O3-C5-C6-O4
11	B	701	NAG	C4-C5-C6-O6
5	A	702	PG4	O1-C1-C2-O2
5	B	704	PG4	O1-C1-C2-O2
5	B	704	PG4	O4-C7-C8-O5
5	B	705	PG4	O1-C1-C2-O2
5	B	705	PG4	O4-C7-C8-O5
6	A	703	PEG	O2-C3-C4-O4
6	A	703	PEG	O1-C1-C2-O2
6	A	710	PEG	O2-C3-C4-O4
7	A	704	PGE	O2-C3-C4-O3
5	B	704	PG4	O2-C3-C4-O3
9	B	711	EAL	C15-C14-C4-C3
8	B	706	EDO	O1-C1-C2-O2
6	A	705	PEG	O2-C3-C4-O4

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
8	A	707	EDO	O1-C1-C2-O2
5	B	704	PG4	O3-C5-C6-O4
6	A	708	PEG	C4-C3-O2-C2
7	A	706	PGE	C3-C4-O3-C5
6	A	705	PEG	C1-C2-O2-C3
9	A	709	EAL	O3-C3-C4-N1
7	A	704	PGE	C1-C2-O2-C3
5	B	705	PG4	C8-C7-O4-C6
5	B	704	PG4	C3-C4-O3-C5
8	B	707	EDO	O1-C1-C2-O2
9	A	709	EAL	C14-C15-C16-C21
9	A	709	EAL	C14-C15-C16-C17
7	A	704	PGE	C4-C3-O2-C2
9	A	709	EAL	O2-C3-C4-N1
8	B	710	EDO	O1-C1-C2-O2
9	B	711	EAL	C14-C15-C16-C17
9	B	711	EAL	C14-C15-C16-C21
6	A	708	PEG	C1-C2-O2-C3
8	B	709	EDO	O1-C1-C2-O2
5	A	702	PG4	O3-C5-C6-O4

There are no ring outliers.

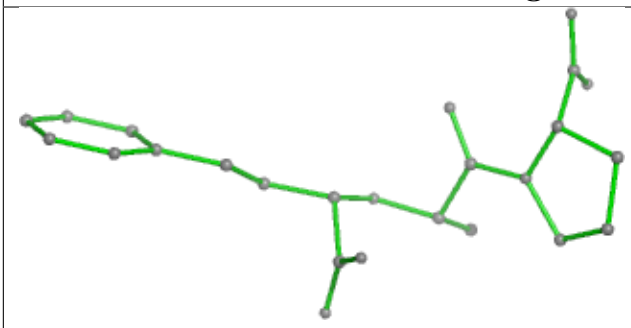
9 monomers are involved in 13 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	704	PG4	2	0
5	B	705	PG4	1	0
6	A	705	PEG	3	0
5	A	702	PG4	1	0
6	A	703	PEG	1	0
9	B	711	EAL	2	0
8	B	707	EDO	1	0
6	A	710	PEG	1	0
7	A	704	PGE	3	0

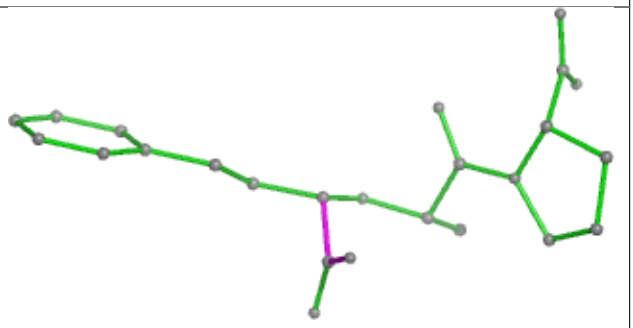
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

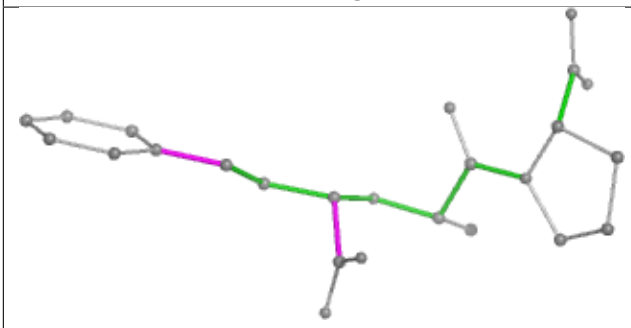
Ligand EAL A 709



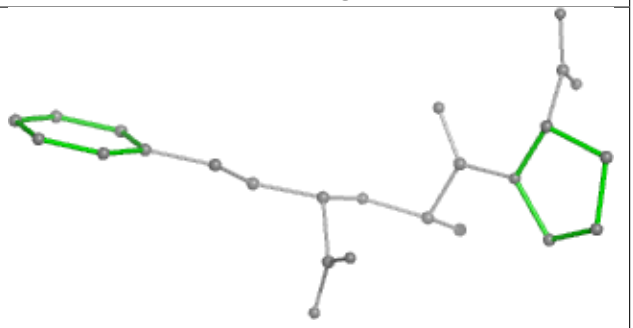
Bond lengths



Bond angles

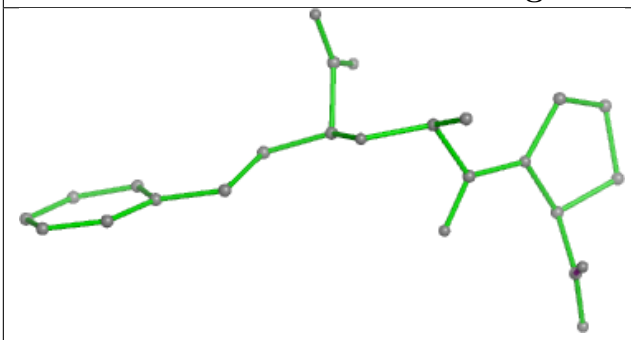


Torsions

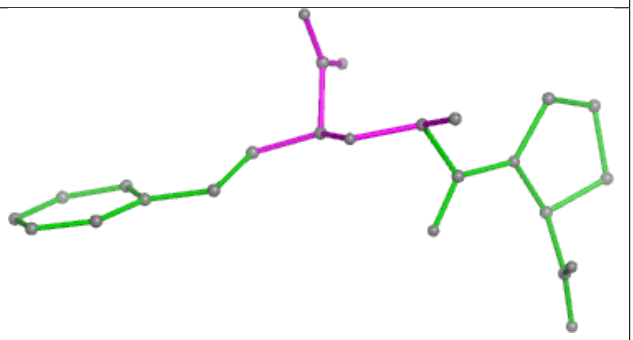


Rings

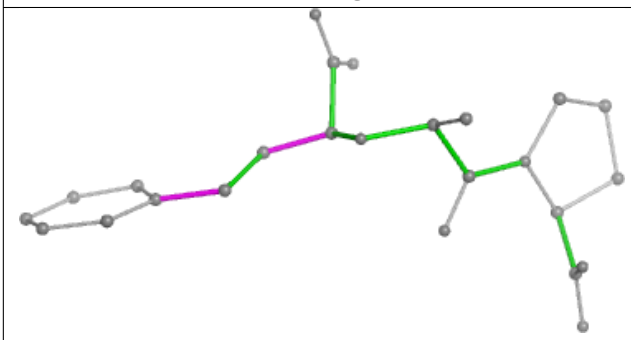
Ligand EAL B 711



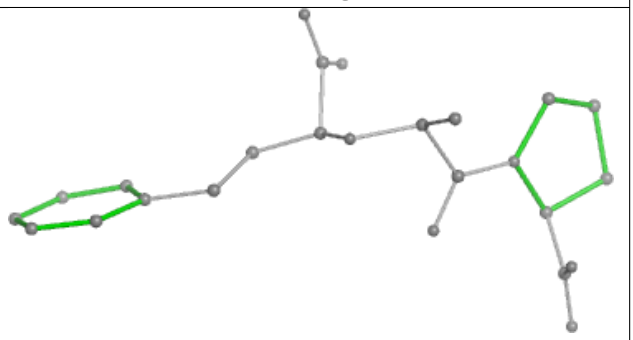
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	604/609 (99%)	-0.43	2 (0%)	90	90	15, 35, 56, 90	1 (0%)
1	B	603/609 (99%)	-0.23	4 (0%)	84	84	25, 39, 66, 88	0
All	All	1207/1218 (99%)	-0.33	6 (0%)	87	88	15, 37, 62, 90	1 (0%)

All (6) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	129	LEU	5.0
1	A	135	THR	2.5
1	A	129	LEU	2.4
1	B	135	THR	2.3
1	B	86	PRO	2.1
1	B	17	ALA	2.1

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

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

6.3 Carbohydrates

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	FUC	F	3	10/11	0.61	0.17	70,83,91,98	0
3	NAG	C	2	14/15	0.62	0.16	44,64,80,82	0
2	FUC	D	3	10/11	-	-	53,68,79,83	0

Continued on next page...

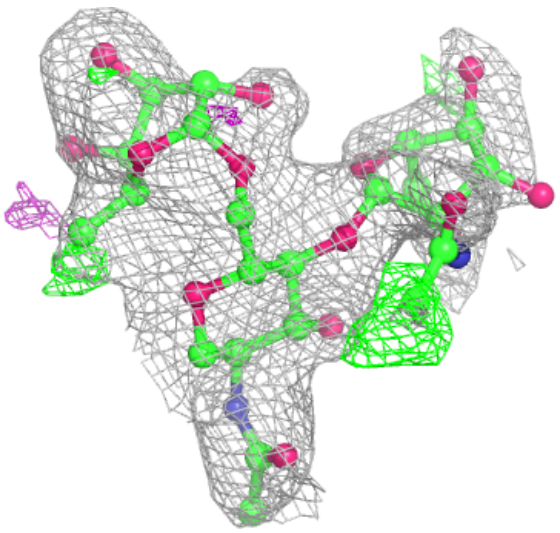
Continued from previous page...

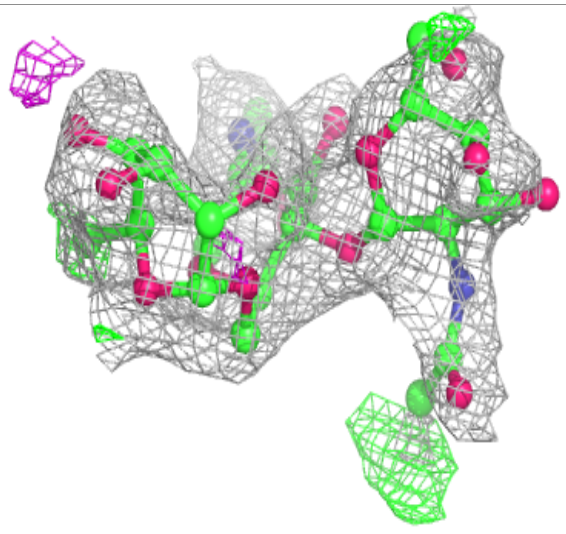
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	NAG	F	2	14/15	0.83	0.12	58,65,72,79	0
2	NAG	D	2	14/15	0.84	0.11	58,81,92,92	0
2	NAG	F	1	14/15	0.88	0.10	50,60,72,87	0
3	NAG	E	1	14/15	0.88	0.09	46,54,65,68	0
3	NAG	E	2	14/15	0.88	0.10	57,69,77,77	0
2	NAG	D	1	14/15	0.93	0.08	36,51,69,71	0
3	NAG	C	1	14/15	0.95	0.08	41,45,50,52	0

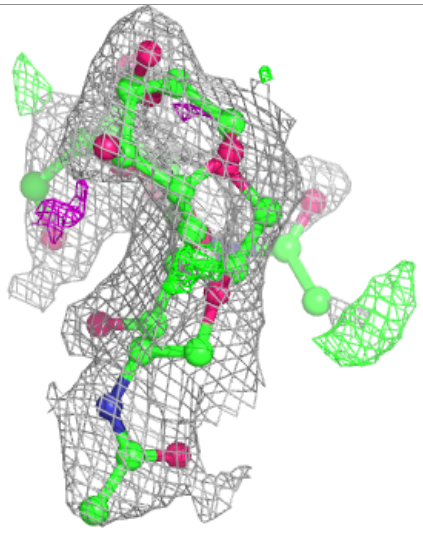
The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around Chain D:

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

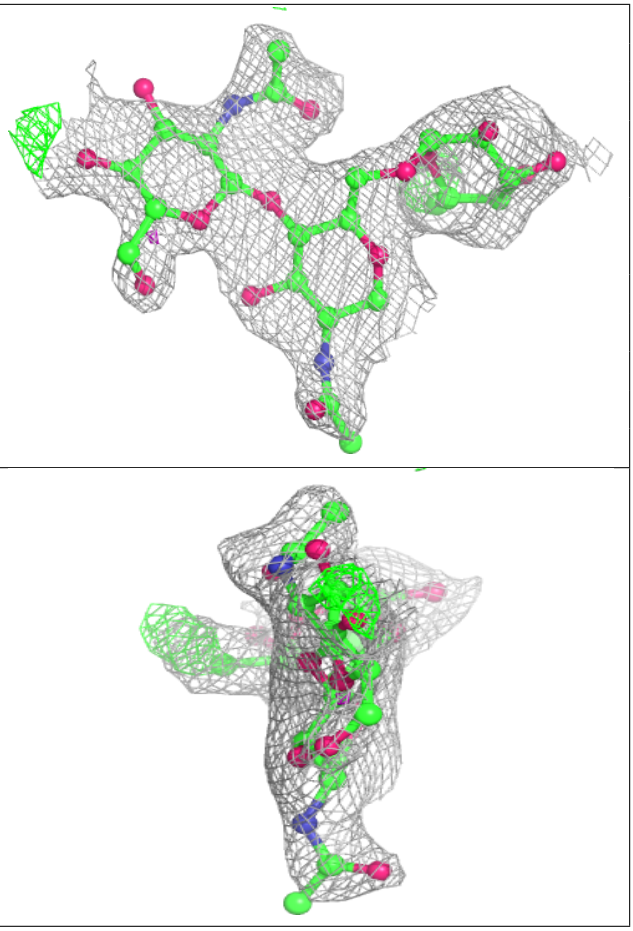






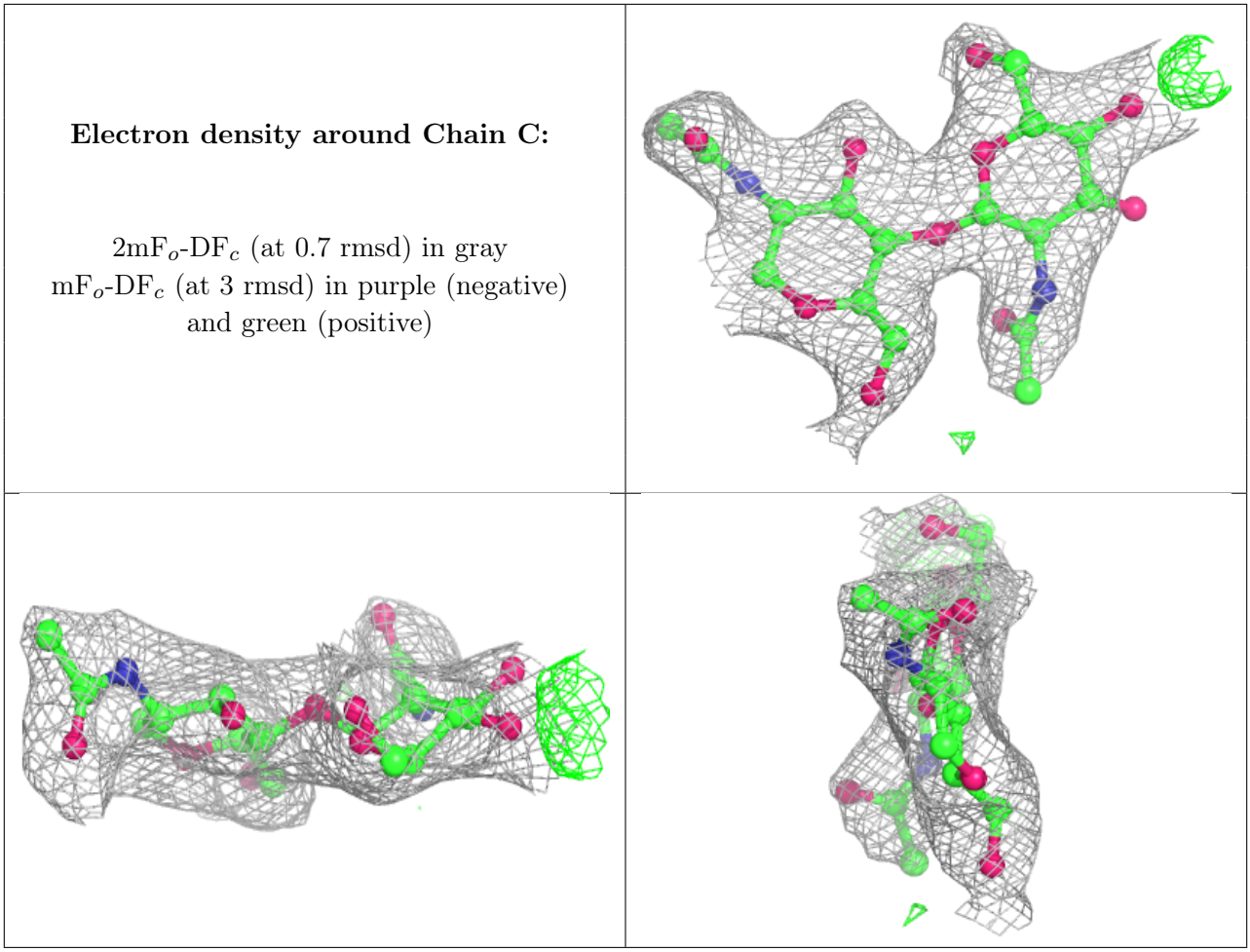
Electron density around Chain F:

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



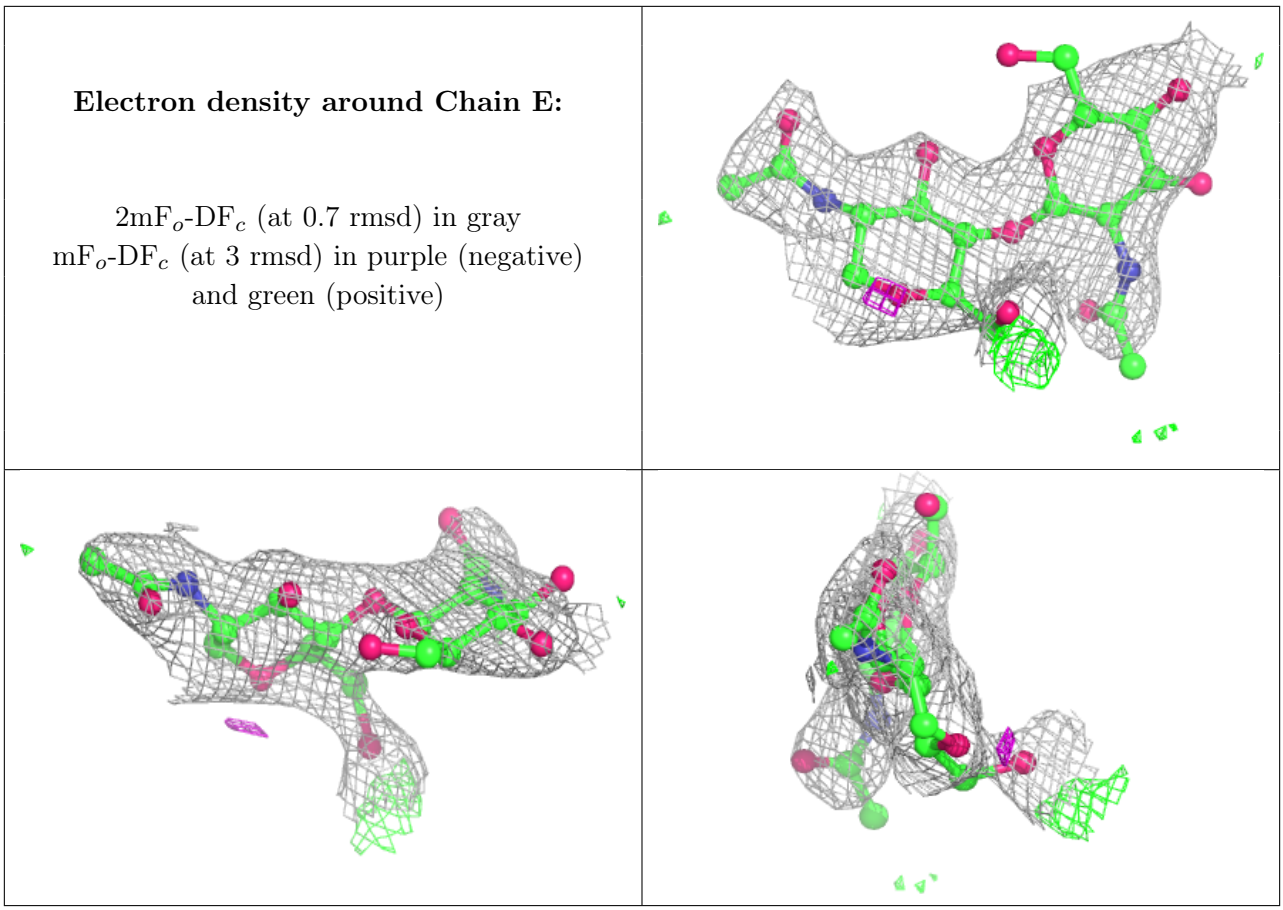
Electron density around Chain C:

$2mF_o$-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 E:

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



6.4 Ligands

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
8	EDO	B	709	4/4	0.75	0.17	51,58,60,64	0
8	EDO	A	707	4/4	0.77	0.20	57,60,61,62	0
6	PEG	A	708	7/7	0.84	0.17	56,57,63,66	0
6	PEG	A	710	7/7	0.84	0.14	48,52,57,60	0
11	NAG	B	701	14/15	0.87	0.11	46,52,58,62	0
11	NAG	B	702	14/15	0.87	0.11	54,63,70,71	0
8	EDO	B	708	4/4	0.88	0.13	50,53,53,56	0
6	PEG	A	705	7/7	0.88	0.19	42,48,57,66	0
7	PGE	A	706	10/10	0.89	0.13	58,62,67,77	0
7	PGE	A	704	10/10	0.89	0.17	43,64,83,87	0
6	PEG	A	703	7/7	0.91	0.10	44,47,51,53	0
8	EDO	B	707	4/4	0.91	0.10	42,44,44,46	0
5	PG4	B	705	13/13	0.91	0.10	50,52,58,59	0

Continued on next page...

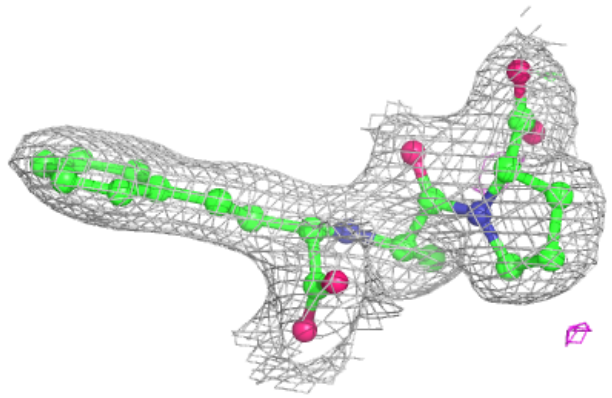
Continued from previous page...

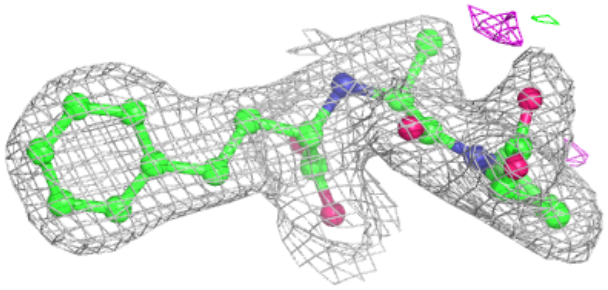
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
8	EDO	B	706	4/4	0.93	0.09	42,42,42,43	0
8	EDO	B	710	4/4	0.93	0.13	55,56,57,60	0
5	PG4	A	702	13/13	0.93	0.09	35,39,50,52	0
5	PG4	B	704	13/13	0.93	0.09	36,40,53,53	0
9	EAL	A	709	25/25	0.96	0.07	24,28,31,36	0
9	EAL	B	711	25/25	0.96	0.07	28,34,36,39	0
12	CA	B	713	1/1	0.97	0.06	62,62,62,62	0
10	CL	B	712	1/1	0.98	0.05	33,33,33,33	0
4	ZN	A	701	1/1	0.99	0.02	26,26,26,26	0
10	CL	A	711	1/1	0.99	0.03	31,31,31,31	0
4	ZN	B	703	1/1	0.99	0.03	30,30,30,30	0

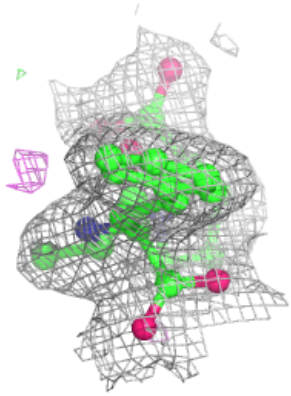
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around EAL A 709:

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

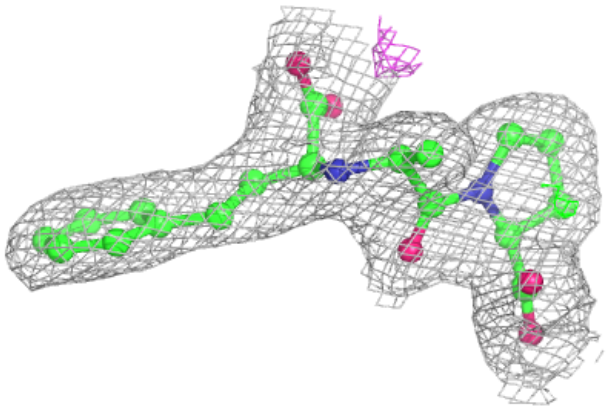


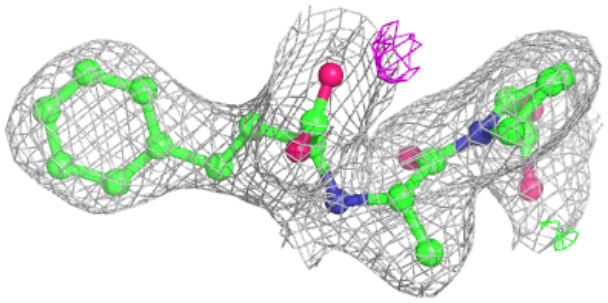


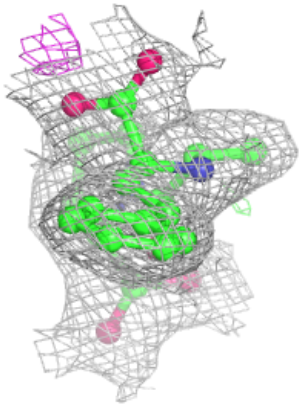


Electron density around EAL B 711:

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

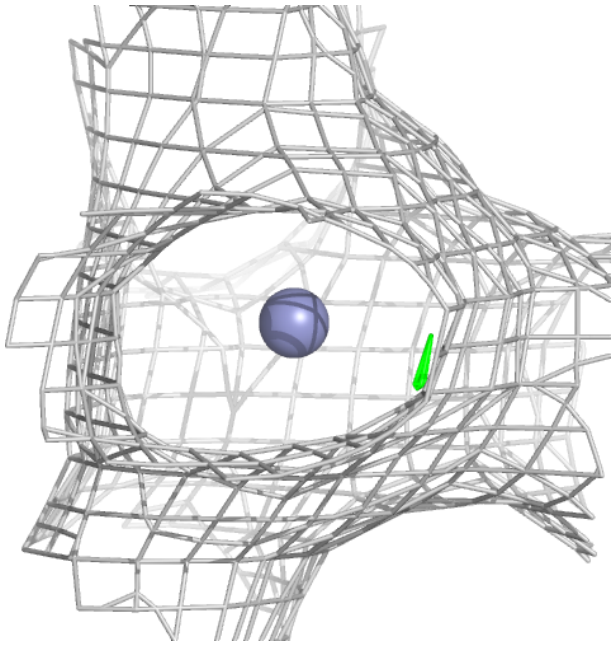


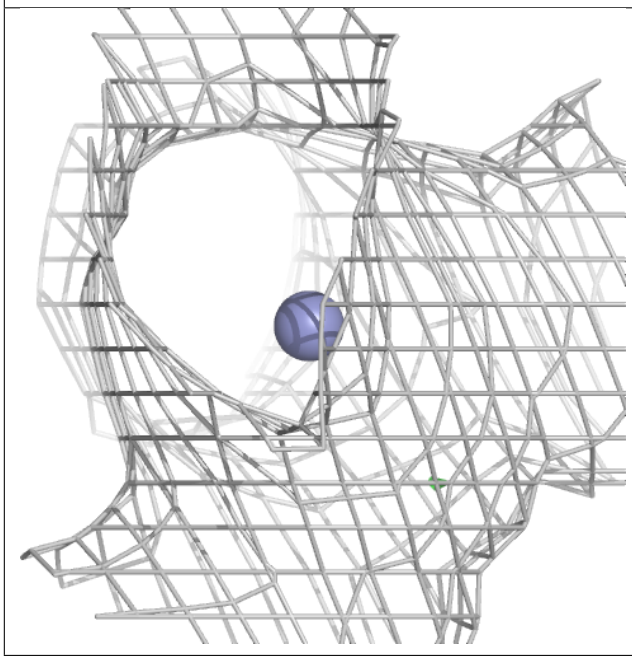


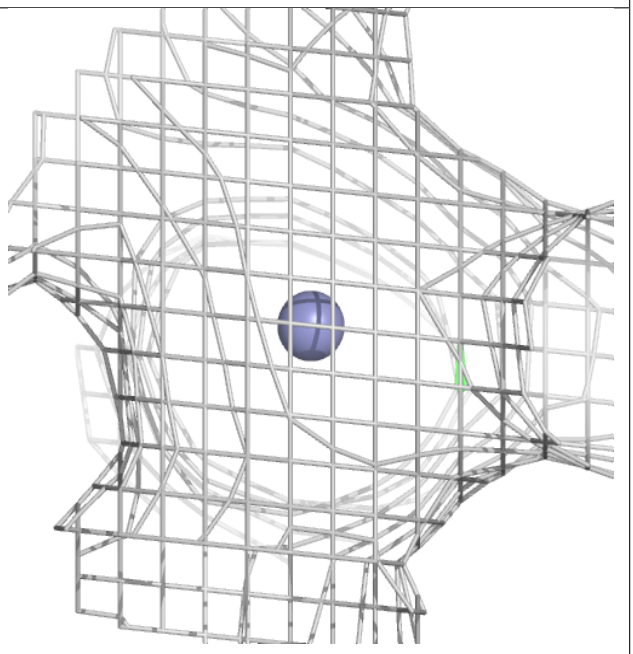


Electron density around ZN A 701:

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

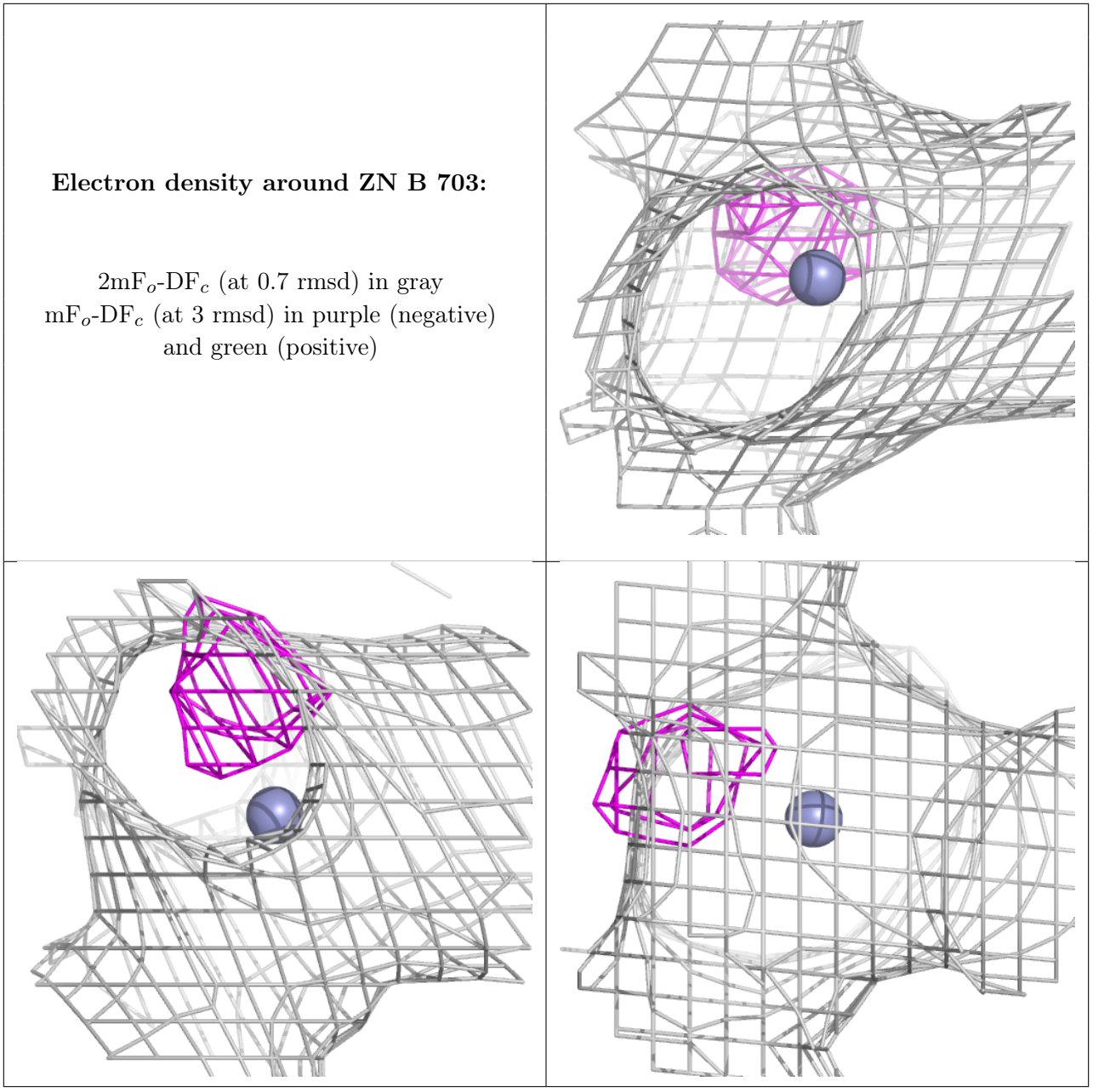






Electron density around ZN B 703:

$2mF_o$-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

There are no such residues in this entry.