



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 10:15 AM UTC

PDB ID : 9GBR / pdb_00009gbr
Title : Human Angiotensin-1 converting enzyme N-domain in complex with a diprolyl inhibitor- SG17
Authors : Gregory, K.S.; Cozier, G.E.; Acharya, K.R.
Deposited on : 2024-07-31
Resolution : 1.90 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

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

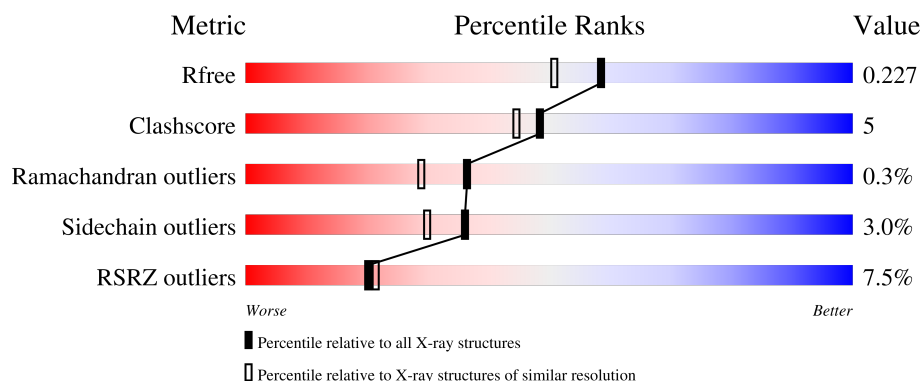
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.90 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	7789 (1.90-1.90)
Clashscore	190562	8410 (1.90-1.90)
Ramachandran outliers	187476	8333 (1.90-1.90)
Sidechain outliers	187428	8333 (1.90-1.90)
RSRZ outliers	180081	7790 (1.90-1.90)

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	2% 80% 14% • •
1	B	628	12% 74% 19% • •
2	C	2	100%
3	D	2	50% 50%
4	E	4	25% 50% 25%

2 Entry composition

There are 12 unique types of molecules in this entry. The entry contains 10778 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	7	0
			4994	3204	857	914	19			
1	B	602	Total	C	N	O	S	0	4	0
			4953	3180	849	905	19			

There are 16 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	131	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	131	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)-2-acetamido-2-deoxy-beta-D-glucopyranose.



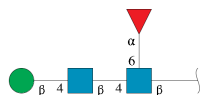
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	C	2	Total	C	N	O	0	0	0
			28	16	2	10			

- Molecule 3 is an oligosaccharide called alpha-L-fucopyranose-(1-6)-2-acetamido-2-deoxy-beta-D-glucopyranose.



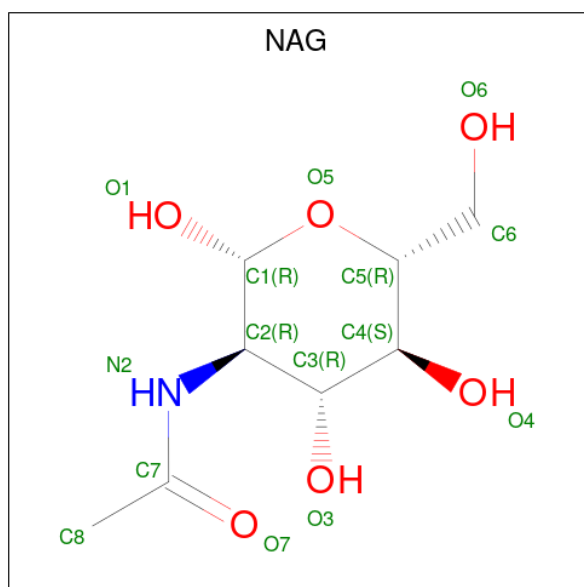
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	D	2	Total	C	N	O	0	0	0
			24	14	1	9			

- Molecule 4 is an oligosaccharide called beta-D-mannopyranose-(1-4)-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
4	E	4	Total	C	N	O	0	0	0
			49	28	2	19			

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: C₈H₁₅NO₆).



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		

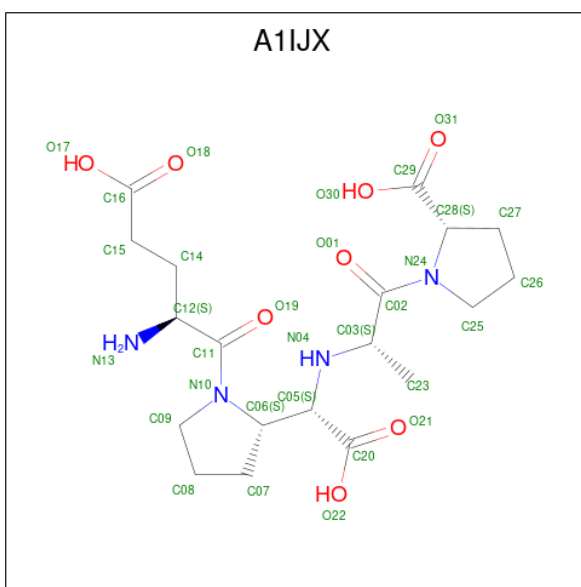
- Molecule 6 is ZINC ION (CCD ID: ZN) (formula: Zn).

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

- Molecule 7 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

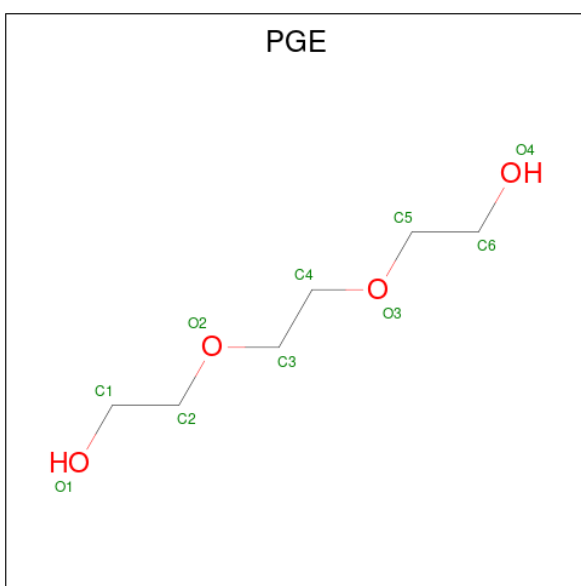
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	1	Total	Cl	0	0
			1	1		
7	B	1	Total	Cl	0	0
			1	1		

- Molecule 8 is (2S)-1-[(2S)-2-[(1S)-1-[(2S)-1-[(2S)-2-azanyl-5-oxidanyl-5-oxidanylidene-pentanoyl]pyrrolidin-2-yl]-2-oxidanyl-2-oxidanylidene-ethyl]amino]propanoyl]pyrrolidine-2-carboxylic acid (CCD ID: A1IJX) (formula: C₁₉H₃₀N₄O₈) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
8	A	1	Total	C	N	O	0	0
			31	19	4	8		
8	B	1	Total	C	N	O	0	0
			31	19	4	8		

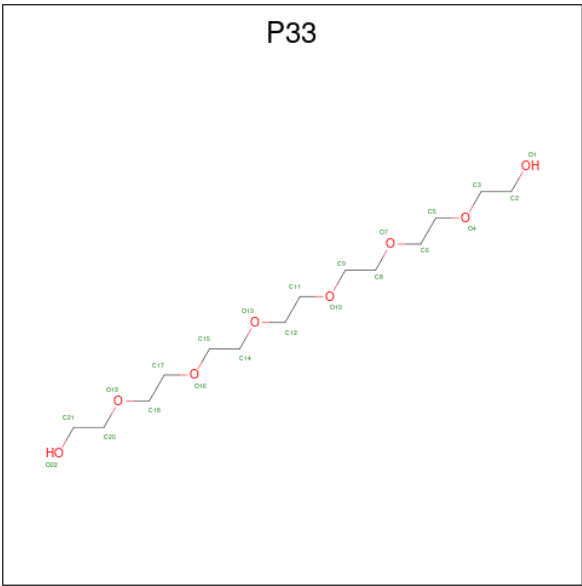
- Molecule 9 is TRIETHYLENE GLYCOL (CCD ID: PGE) (formula: $C_6H_{14}O_4$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
9	B	1	Total	C	O	0	0
			10	6	4		

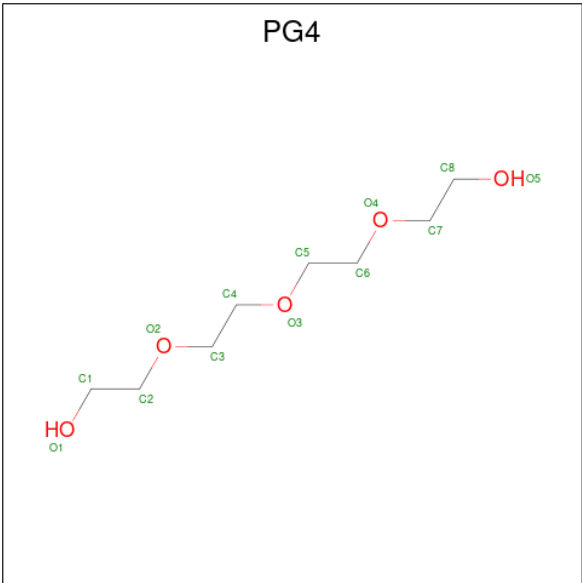
- Molecule 10 is 3,6,9,12,15,18-HEXAAXAICOSANE-1,20-DIOL (CCD ID: P33) (formula:

C₁₄H₃₀O₈).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
10	B	1	Total	C	O	0	0
			22	14	8		

- Molecule 11 is TETRAETHYLENE GLYCOL (CCD ID: PG4) (formula: C₈H₁₈O₅).



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

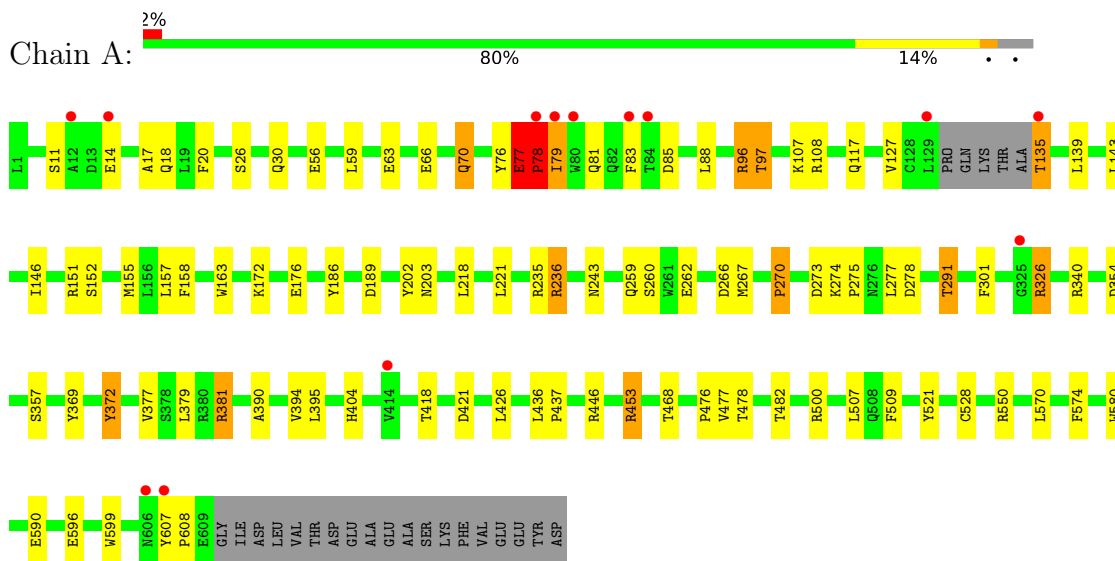
- Molecule 12 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
12	A	360	Total 360	O 360	0	0
12	B	231	Total 231	O 231	0	0

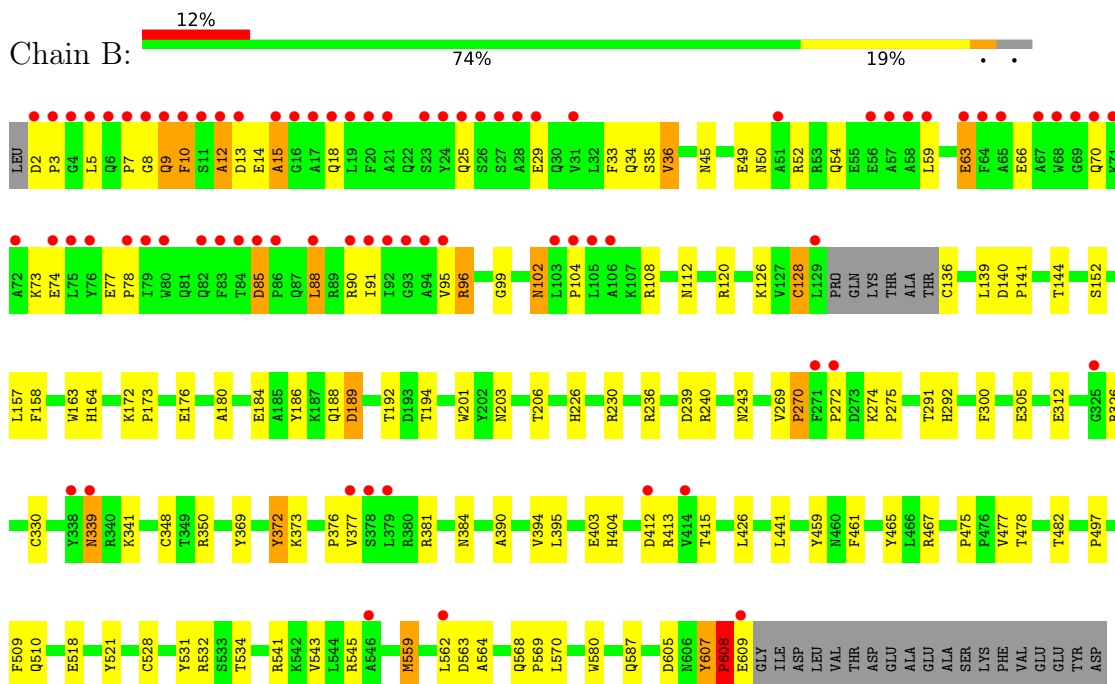
3 Residue-property plots

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



- Molecule 1: Angiotensin-converting enzyme, soluble form



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

Chain C:  100%

NAG1
NAG2

- Molecule 3: alpha-L-fucopyranose-(1-6)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain D:  50% 50%

NAG1
FUC2

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

Chain E:  25% 50% 25%

NAG1
NAG2
MAN3
FUC4

4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	73.05Å 77.38Å 82.91Å 88.38° 64.31° 74.92°	Depositor
Resolution (Å)	74.36 – 1.90 74.36 – 1.90	Depositor EDS
% Data completeness (in resolution range)	97.8 (74.36-1.90) 97.8 (74.36-1.90)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.63 (at 1.90Å)	Xtriage
Refinement program	REFMAC 5.8.0425	Depositor
R, R_{free}	0.188 , 0.225 0.188 , 0.227	Depositor DCC
R_{free} test set	5955 reflections (4.81%)	wwPDB-VP
Wilson B-factor (Å ²)	25.8	Xtriage
Anisotropy	0.209	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 41.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	10778	wwPDB-VP
Average B, all atoms (Å ²)	32.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.71% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: PGE, P33, CL, A1IJX, ZN, BMA, NAG, FUC, PG4

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	0.82	1/5149 (0.0%)	1.41	49/7011 (0.7%)
1	B	0.79	6/5108 (0.1%)	1.41	52/6956 (0.7%)
All	All	0.81	7/10257 (0.1%)	1.41	101/13967 (0.7%)

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	2
1	B	0	4
All	All	0	6

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	12	ALA	C-O	14.94	1.43	1.23
1	B	15	ALA	C-O	12.02	1.39	1.24
1	B	9	GLN	C-N	9.70	1.45	1.33
1	B	12	ALA	C-N	6.20	1.42	1.33
1	B	15	ALA	C-N	6.20	1.42	1.33
1	B	9	GLN	CA-C	6.03	1.61	1.53
1	A	500	ARG	NE-CZ	5.67	1.39	1.33

All (101) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	272	PRO	N-CA-C	13.80	131.78	113.84
1	B	339	ASN	CB-CA-C	-12.13	89.00	109.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	54	GLN	CB-CA-C	10.14	126.80	110.88
1	A	18	GLN	CB-CA-C	-9.75	95.57	110.88
1	A	97	THR	CA-CB-OG1	-8.82	96.37	109.60
1	B	412	ASP	CB-CA-C	8.74	123.96	109.53
1	B	608	PRO	N-CA-CB	-8.30	93.46	102.60
1	A	236	ARG	CA-CB-CG	-8.11	97.89	114.10
1	B	203	ASN	CB-CA-C	-8.00	94.50	110.42
1	A	478	THR	CA-CB-OG1	-7.71	98.04	109.60
1	B	50	ASN	CB-CA-C	7.53	123.29	110.79
1	B	206	THR	CA-CB-OG1	-7.33	98.60	109.60
1	A	453	ARG	CA-CB-CG	-7.17	99.75	114.10
1	A	278	ASP	CB-CA-C	7.11	122.15	110.78
1	B	9	GLN	CB-CA-C	7.10	123.89	109.76
1	A	14	GLU	CB-CG-CD	7.07	124.61	112.60
1	B	85	ASP	CA-CB-CG	7.03	119.63	112.60
1	B	403	GLU	CB-CG-CD	6.96	124.44	112.60
1	A	30	GLN	N-CA-CB	6.96	121.07	110.28
1	A	267	MET	CG-SD-CE	-6.88	85.77	100.90
1	A	509	PHE	CA-CB-CG	-6.73	107.07	113.80
1	B	158	PHE	CA-CB-CG	-6.73	107.07	113.80
1	A	77	GLU	CB-CG-CD	6.60	123.82	112.60
1	A	418	THR	CA-CB-OG1	-6.46	99.92	109.60
1	A	446	ARG	N-CA-CB	-6.45	100.29	110.28
1	A	56	GLU	CB-CG-CD	6.41	123.50	112.60
1	B	312	GLU	CB-CG-CD	6.25	123.22	112.60
1	A	326	ARG	CB-CA-C	6.20	121.97	109.38
1	A	340	ARG	CG-CD-NE	-6.20	98.37	112.00
1	B	54	GLN	N-CA-CB	-6.19	101.03	110.01
1	A	151	ARG	NE-CZ-NH2	6.17	124.75	119.20
1	A	96	ARG	CA-CB-CG	6.15	126.40	114.10
1	B	478	THR	CA-CB-OG1	-6.09	100.47	109.60
1	A	596	GLU	CB-CG-CD	6.05	122.89	112.60
1	A	372	TYR	CA-CB-CG	6.02	124.74	113.90
1	A	550	ARG	CD-NE-CZ	5.96	132.74	124.40
1	B	459	TYR	CB-CA-C	-5.93	101.33	110.81
1	B	63	GLU	CB-CG-CD	5.92	122.66	112.60
1	B	128	CYS	CB-CA-C	-5.91	97.69	109.33
1	B	144	THR	CA-CB-OG1	-5.83	100.85	109.60
1	A	421	ASP	CA-CB-CG	5.83	118.42	112.60
1	A	189	ASP	CA-CB-CG	5.80	118.41	112.60
1	A	507	LEU	N-CA-CB	-5.80	101.30	110.22
1	B	164	HIS	CA-CB-CG	-5.79	108.01	113.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	158	PHE	N-CA-CB	-5.75	101.37	110.28
1	A	235	ARG	N-CA-CB	5.68	119.82	110.39
1	B	36	VAL	N-CA-C	-5.68	104.83	110.62
1	A	70	GLN	CB-CA-C	-5.66	99.80	110.67
1	A	468	THR	CA-CB-OG1	-5.66	101.11	109.60
1	B	607	TYR	CB-CA-C	5.65	116.83	108.87
1	B	518	GLU	CB-CA-C	5.64	121.07	110.63
1	B	291	THR	CA-CB-OG1	-5.63	101.15	109.60
1	A	236	ARG	CD-NE-CZ	5.56	132.18	124.40
1	B	475	PRO	N-CA-C	-5.54	103.94	110.70
1	B	563	ASP	CA-CB-CG	5.54	118.14	112.60
1	A	277	LEU	CA-C-N	-5.51	115.67	122.84
1	A	277	LEU	C-N-CA	-5.51	115.67	122.84
1	B	96	ARG	N-CA-CB	-5.51	101.98	110.46
1	B	29	GLU	CB-CA-C	5.50	120.04	110.68
1	A	135	THR	CA-CB-OG1	-5.50	101.35	109.60
1	A	369	TYR	CB-CA-C	-5.50	101.67	110.79
1	B	270	PRO	N-CA-C	5.49	121.17	113.53
1	B	10	PHE	CB-CA-C	-5.48	101.17	109.99
1	B	404	HIS	CA-CB-CG	-5.43	108.37	113.80
1	A	404	HIS	CA-CB-CG	-5.42	108.38	113.80
1	A	83	PHE	CA-CB-CG	5.39	119.19	113.80
1	A	259	GLN	CA-C-N	-5.39	112.30	121.85
1	A	259	GLN	C-N-CA	-5.39	112.30	121.85
1	B	384	ASN	CB-CA-C	5.38	117.73	110.37
1	B	9	GLN	CA-C-O	5.36	128.14	121.81
1	A	151	ARG	CD-NE-CZ	5.35	131.88	124.40
1	B	96	ARG	CA-CB-CG	5.34	124.78	114.10
1	B	509	PHE	CA-CB-CG	-5.32	108.48	113.80
1	B	461	PHE	CA-CB-CG	5.31	119.11	113.80
1	B	239	ASP	CA-CB-CG	5.28	117.88	112.60
1	B	381	ARG	CA-C-O	-5.27	115.61	121.51
1	B	482	THR	CA-CB-OG1	-5.26	101.71	109.60
1	B	226	HIS	CA-CB-CG	5.23	119.03	113.80
1	B	104	PRO	N-CA-C	-5.22	103.91	111.22
1	B	102	ASN	N-CA-C	-5.22	106.86	113.18
1	A	574	PHE	CA-CB-CG	-5.22	108.58	113.80
1	B	192	THR	CA-CB-OG1	-5.21	101.78	109.60
1	B	34	GLN	CB-CA-C	5.19	120.64	110.67
1	A	107	LYS	CD-CE-NZ	-5.19	95.31	111.90
1	A	221	LEU	N-CA-C	-5.17	105.65	111.28
1	B	188	GLN	CB-CA-C	5.16	120.21	109.95

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	112	ASN	CA-CB-CG	5.13	117.73	112.60
1	A	78	PRO	CA-C-N	5.13	131.20	121.97
1	A	78	PRO	C-N-CA	5.13	131.20	121.97
1	B	33	PHE	N-CA-CB	5.13	118.14	109.78
1	B	381	ARG	N-CA-C	-5.12	101.52	109.14
1	B	605	ASP	CB-CA-C	5.10	117.86	109.90
1	A	291	THR	CA-CB-OG1	-5.09	101.96	109.60
1	A	186	TYR	CA-CB-CG	-5.08	104.76	113.90
1	A	482	THR	CA-CB-OG1	-5.07	102.00	109.60
1	A	63	GLU	CB-CA-C	-5.06	102.39	110.79
1	B	194	THR	CA-CB-OG1	-5.05	102.03	109.60
1	A	590	GLU	CB-CG-CD	5.04	121.17	112.60
1	A	379	LEU	N-CA-CB	-5.03	103.21	110.56
1	B	240	ARG	CD-NE-CZ	5.03	131.45	124.40
1	A	270	PRO	N-CD-CG	-5.01	95.69	103.20

There are no chirality outliers.

All (6) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	381	ARG	Sidechain
1	A	453	ARG	Sidechain
1	B	120	ARG	Sidechain
1	B	236	ARG	Sidechain
1	B	467	ARG	Sidechain
1	B	78	PRO	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	4994	0	4764	33	0
1	B	4953	0	4725	68	0
2	C	28	0	25	0	0
3	D	24	0	22	0	0
4	E	49	0	43	1	0
5	A	28	0	26	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	A	1	0	0	0	0
6	B	1	0	0	0	0
7	A	1	0	0	0	0
7	B	1	0	0	0	0
8	A	31	0	0	1	0
8	B	31	0	0	0	0
9	B	10	0	14	1	0
10	B	22	0	30	5	0
11	B	13	0	18	4	0
12	A	360	0	0	2	0
12	B	231	0	0	10	0
All	All	10778	0	9667	107	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 (107) 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:7:PRO:O	12:B:801:HOH:O	1.85	0.92
1:B:292:HIS:NE2	10:B:702:P33:H171	1.85	0.90
1:B:102:ASN:ND2	1:B:189:ASP:OD1	2.04	0.89
1:B:66:GLU:O	1:B:70:GLN:HG3	1.73	0.88
1:B:59:LEU:O	1:B:63:GLU:HG3	1.75	0.87
1:B:8:GLY:HA3	12:B:848:HOH:O	1.75	0.83
1:B:292:HIS:HE2	10:B:702:P33:H171	1.39	0.83
1:A:117:GLN:HG2	12:A:1027:HOH:O	1.77	0.83
1:B:330:CYS:HG	1:B:348:CYS:HG	0.85	0.83
1:B:128:CYS:HG	1:B:136:CYS:HG	1.22	0.82
1:B:91:ILE:O	1:B:95:VAL:HG23	1.81	0.80
1:B:270:PRO:HB3	1:B:580:TRP:CH2	2.25	0.71
1:B:25:GLN:OE1	1:B:376:PRO:HB2	1.92	0.69
1:B:18:GLN:HE21	1:B:88:LEU:HG	1.60	0.67
1:B:90:ARG:NH1	12:B:804:HOH:O	2.27	0.67
11:B:703:PG4:C6	12:B:1008:HOH:O	2.44	0.65
1:A:157:LEU:HD11	1:A:477:VAL:HG13	1.80	0.64
1:B:413:ARG:HH21	1:B:413:ARG:HG2	1.62	0.64
1:A:66:GLU:O	1:A:70:GLN:HG3	1.98	0.63
1:A:260:SER:OG	1:A:262:GLU:OE1	2.13	0.63
1:B:180:ALA:O	1:B:184[B]:GLU:HG3	1.98	0.62
12:A:1144:HOH:O	4:E:1:NAG:H5	1.99	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
11:B:703:PG4:H61	12:B:1008:HOH:O	2.00	0.59
1:B:25:GLN:CD	1:B:376:PRO:HB2	2.27	0.58
1:A:157:LEU:HD13	1:A:476:PRO:HB2	1.85	0.57
1:B:15:ALA:O	1:B:18:GLN:HB2	2.03	0.57
1:B:2:ASP:OD1	1:B:3:PRO:HD2	2.04	0.57
1:B:49:GLU:HB2	12:B:919:HOH:O	2.03	0.57
1:B:9:GLN:C	1:B:10:PHE:CD1	2.82	0.57
1:B:66:GLU:CD	1:B:108:ARG:HH22	2.13	0.57
1:B:2:ASP:HB3	1:B:5:LEU:HD12	1.88	0.56
1:B:305:GLU:HG3	1:B:534:THR:HG22	1.88	0.56
1:A:172:LYS:O	1:A:176[A]:GLU:HG3	2.06	0.55
1:B:292:HIS:CD2	10:B:702:P33:H142	2.41	0.55
1:B:18:GLN:NE2	1:B:88:LEU:HG	2.21	0.55
1:B:274:LYS:HB3	1:B:275:PRO:CD	2.37	0.54
1:A:66:GLU:CD	1:A:108:ARG:HH22	2.15	0.54
1:B:274:LYS:HB3	1:B:275:PRO:HD2	1.89	0.54
1:B:390:ALA:O	1:B:394:VAL:HG23	2.07	0.54
11:B:703:PG4:H62	12:B:1008:HOH:O	2.04	0.54
1:B:59:LEU:O	1:B:63:GLU:CG	2.53	0.54
1:B:201:TRP:HZ3	1:B:497:PRO:HG2	1.72	0.53
1:B:15:ALA:O	1:B:18:GLN:N	2.42	0.53
1:B:12:ALA:O	1:B:13:ASP:HB3	2.09	0.53
1:A:390:ALA:O	1:A:394:VAL:HG23	2.10	0.52
1:B:426:LEU:C	1:B:426:LEU:HD13	2.34	0.52
1:B:99:GLY:HA2	1:B:186:TYR:CE1	2.44	0.52
1:A:426:LEU:C	1:A:426:LEU:HD13	2.36	0.51
1:A:270:PRO:HB3	1:A:580:TRP:CH2	2.46	0.51
1:B:18:GLN:HE21	1:B:88:LEU:CG	2.23	0.51
1:B:465:TYR:CZ	11:B:703:PG4:H51	2.46	0.50
1:B:201:TRP:CZ3	1:B:497:PRO:HG2	2.46	0.50
1:B:292:HIS:CE1	10:B:702:P33:H171	2.46	0.50
1:B:73:LYS:HA	1:B:77:GLU:HB2	1.94	0.49
1:A:260:SER:CB	1:A:262:GLU:OE1	2.61	0.49
1:B:140:ASP:OD1	12:B:802:HOH:O	2.19	0.49
1:A:243:ASN:HD22	1:A:599:TRP:CG	2.31	0.48
1:B:510:GLN:HG2	1:B:569:PRO:HG2	1.96	0.48
1:B:570:LEU:C	1:B:570:LEU:HD23	2.40	0.47
1:B:8:GLY:CA	12:B:848:HOH:O	2.48	0.47
1:B:157:LEU:HD11	1:B:477:VAL:HG13	1.96	0.47
1:A:146:ILE:HD13	1:A:155:MET:HE2	1.97	0.47
1:B:13:ASP:OD1	1:B:13:ASP:C	2.58	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:141:PRO:HB3	1:B:350:ARG:HD3	1.97	0.47
1:A:381:ARG:NH2	8:A:705:A1IJX:O17	2.48	0.47
1:A:570:LEU:C	1:A:570:LEU:HD23	2.40	0.47
1:B:568:GLN:N	1:B:569:PRO:CD	2.79	0.46
1:B:139:LEU:HD22	1:B:163:TRP:CZ2	2.50	0.46
1:B:543:VAL:CG2	1:B:559:MET:HG3	2.46	0.45
1:A:218:LEU:HD13	1:A:436:LEU:HD13	1.97	0.45
1:A:85:ASP:HB3	1:A:88:LEU:HB3	1.98	0.45
1:B:172:LYS:O	1:B:176:GLU:HG3	2.17	0.45
1:B:172:LYS:HB3	1:B:173:PRO:HD3	1.99	0.45
1:B:413:ARG:HG2	1:B:413:ARG:NH2	2.29	0.45
1:A:521:TYR:CE2	1:A:528:CYS:HB2	2.52	0.44
1:B:339:ASN:HB2	1:B:341:LYS:H	1.82	0.44
1:A:381:ARG:HA	1:A:381:ARG:HE	1.81	0.44
1:A:158:PHE:HA	1:A:607:TYR:OH	2.17	0.44
1:B:562:LEU:HD23	1:B:564:ALA:O	2.18	0.44
1:A:354:ASP:O	1:A:357[B]:SER:HB3	2.18	0.43
1:A:127:VAL:HG23	1:A:143:LEU:HD11	2.00	0.43
10:B:702:P33:H121	10:B:702:P33:H91	1.92	0.43
1:B:140:ASP:HA	1:B:141:PRO:HA	1.85	0.43
1:B:441:LEU:C	1:B:441:LEU:HD12	2.44	0.43
1:B:608:PRO:C	1:B:609:GLU:HG3	2.43	0.43
1:B:607:TYR:HA	1:B:608:PRO:HA	1.76	0.43
9:B:701:PGE:H22	12:B:914:HOH:O	2.19	0.42
1:A:77:GLU:HB3	1:A:78:PRO:HD3	2.01	0.42
1:A:274:LYS:HB3	1:A:275:PRO:CD	2.49	0.42
1:A:301:PHE:CZ	1:A:395:LEU:HD22	2.55	0.42
1:B:18:GLN:HG2	1:B:88:LEU:HD11	2.01	0.42
1:B:369:TYR:HA	1:B:372:TYR:CE1	2.55	0.42
1:B:35:SER:O	1:B:36:VAL:C	2.61	0.42
1:B:541:ARG:O	1:B:545:ARG:HG3	2.20	0.42
1:A:17:ALA:O	1:A:20:PHE:HB3	2.19	0.41
1:B:531:TYR:O	1:B:532:ARG:HB2	2.20	0.41
1:A:77:GLU:HA	1:A:77:GLU:OE1	2.21	0.41
1:A:139:LEU:HD22	1:A:163:TRP:CZ2	2.56	0.41
1:A:436:LEU:N	1:A:437:PRO:HD2	2.35	0.41
1:A:202:TYR:O	1:A:203:ASN:C	2.64	0.41
1:A:81:GLN:HE21	1:A:81:GLN:HB2	1.68	0.41
1:B:230:ARG:HD2	1:B:243:ASN:O	2.21	0.41
1:B:521:TYR:CD2	1:B:528:CYS:HB2	2.56	0.41
1:A:76:TYR:HD1	1:A:79:ILE:HD11	1.86	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:607:TYR:HA	1:A:608:PRO:HA	1.85	0.40
1:B:14:GLU:OE2	1:B:85:ASP:HB3	2.22	0.40
1:B:300:PHE:CD1	1:B:395:LEU:HD23	2.56	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	607/628 (97%)	594 (98%)	12 (2%)	1 (0%)	43	36
1	B	602/628 (96%)	585 (97%)	14 (2%)	3 (0%)	24	16
All	All	1209/1256 (96%)	1179 (98%)	26 (2%)	4 (0%)	36	29

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	78	PRO
1	B	45	ASN
1	B	377	VAL
1	B	608	PRO

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	527/540 (98%)	511 (97%)	16 (3%)	36	30
1	B	522/540 (97%)	507 (97%)	15 (3%)	37	31
All	All	1049/1080 (97%)	1018 (97%)	31 (3%)	36	30

All (31) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	11	SER
1	A	26	SER
1	A	59	LEU
1	A	77	GLU
1	A	79	ILE
1	A	96	ARG
1	A	97	THR
1	A	135	THR
1	A	152	SER
1	A	236	ARG
1	A	266	ASP
1	A	273	ASP
1	A	291	THR
1	A	326	ARG
1	A	372	TYR
1	A	377	VAL
1	B	52	ARG
1	B	74	GLU
1	B	88	LEU
1	B	96	ARG
1	B	126	LYS
1	B	152	SER
1	B	189	ASP
1	B	269	VAL
1	B	326	ARG
1	B	372	TYR
1	B	373	LYS
1	B	415	THR
1	B	559	MET
1	B	587	GLN
1	B	608	PRO

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

Mol	Chain	Res	Type
1	A	54	GLN
1	A	70	GLN
1	A	81	GLN
1	A	188	GLN
1	A	224	ASN
1	A	568	GLN
1	A	579	GLN
1	A	585	ASN
1	A	588	ASN
1	B	6	GLN
1	B	9	GLN
1	B	18	GLN
1	B	117	GLN
1	B	263	ASN
1	B	371	GLN
1	B	527	GLN
1	B	586	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

8 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	C	1	1,2	14,14,15	0.43	0	17,19,21	2.33	3 (17%)
2	NAG	C	2	2	14,14,15	0.39	0	17,19,21	1.55	2 (11%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	NAG	D	1	3,1	14,14,15	0.44	0	17,19,21	1.67	1 (5%)
3	FUC	D	2	3	10,10,11	0.47	0	14,14,16	0.61	0
4	NAG	E	1	4,1	14,14,15	0.58	0	17,19,21	1.43	3 (17%)
4	NAG	E	2	4	14,14,15	0.31	0	17,19,21	1.20	1 (5%)
4	BMA	E	3	4	11,11,12	0.96	0	15,15,17	1.10	2 (13%)
4	FUC	E	4	4	10,10,11	0.56	0	14,14,16	0.73	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
2	NAG	C	1	1,2	-	5/6/23/26	0/1/1/1
2	NAG	C	2	2	-	0/6/23/26	0/1/1/1
3	NAG	D	1	3,1	-	3/6/23/26	0/1/1/1
3	FUC	D	2	3	-	-	0/1/1/1
4	NAG	E	1	4,1	-	1/6/23/26	0/1/1/1
4	NAG	E	2	4	-	2/6/23/26	0/1/1/1
4	BMA	E	3	4	-	0/2/19/22	0/1/1/1
4	FUC	E	4	4	-	-	0/1/1/1

There are no bond length outliers.

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	1	NAG	C1-C2-N2	5.82	119.60	110.43
2	C	1	NAG	C1-C2-N2	5.77	119.53	110.43
2	C	1	NAG	C1-O5-C5	5.26	119.23	112.19
2	C	1	NAG	C2-N2-C7	5.12	129.76	122.90
2	C	2	NAG	C2-N2-C7	5.01	129.62	122.90
4	E	1	NAG	C1-O5-C5	3.31	116.62	112.19
2	C	2	NAG	C1-O5-C5	3.04	116.26	112.19
4	E	2	NAG	C1-C2-N2	3.04	115.22	110.43
4	E	1	NAG	C1-C2-N2	-2.92	105.83	110.43
4	E	3	BMA	O2-C2-C3	2.81	115.96	110.15
4	E	3	BMA	C1-O5-C5	2.36	115.35	112.19
4	E	1	NAG	O5-C5-C4	-2.14	105.62	110.83

There are no chirality outliers.

All (11) torsion outliers are listed below:

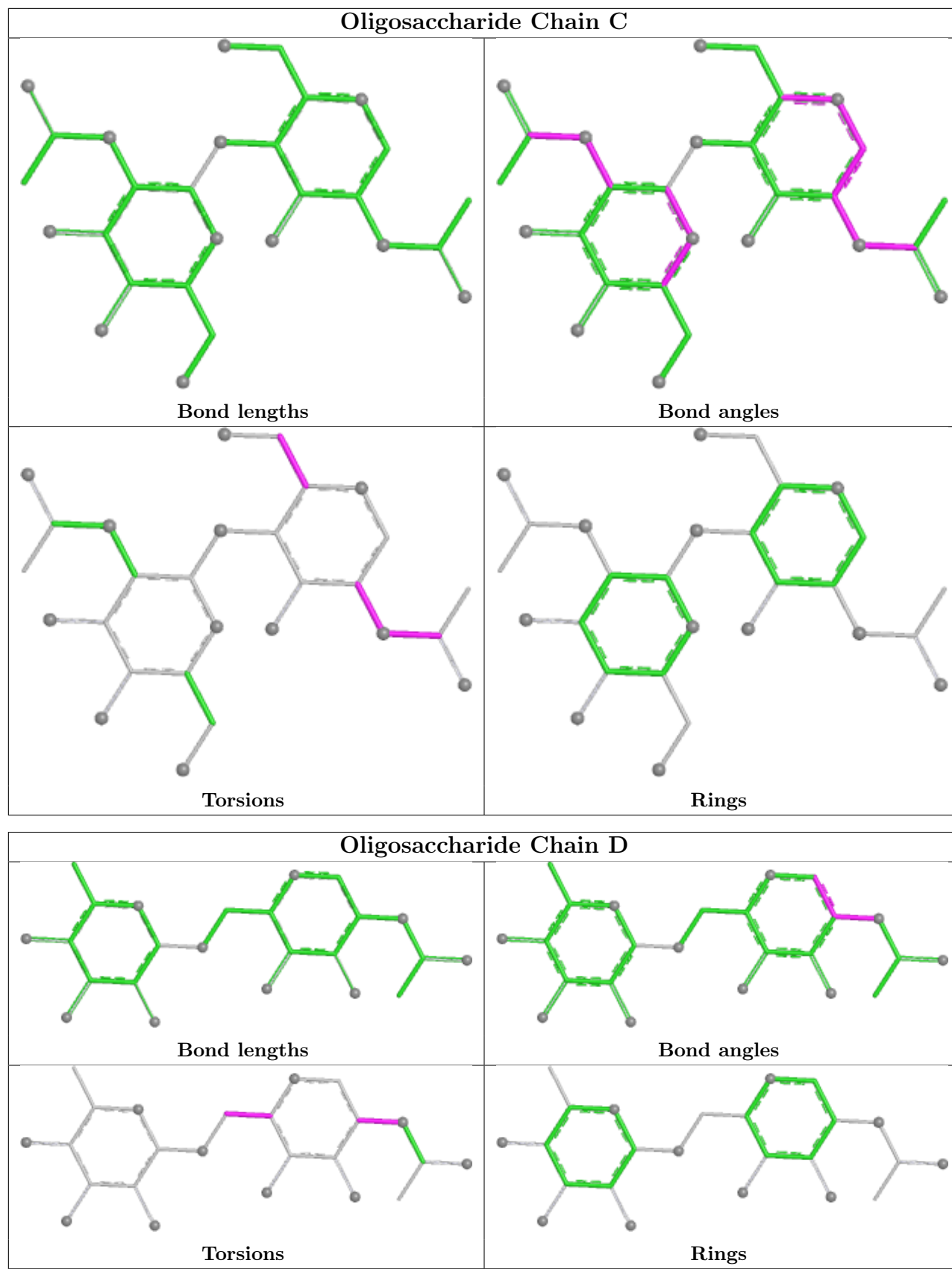
Mol	Chain	Res	Type	Atoms
2	C	1	NAG	C1-C2-N2-C7
2	C	1	NAG	O7-C7-N2-C2
3	D	1	NAG	C1-C2-N2-C7
2	C	1	NAG	C8-C7-N2-C2
2	C	1	NAG	C4-C5-C6-O6
2	C	1	NAG	O5-C5-C6-O6
4	E	2	NAG	C8-C7-N2-C2
4	E	1	NAG	C4-C5-C6-O6
4	E	2	NAG	O7-C7-N2-C2
3	D	1	NAG	C3-C2-N2-C7
3	D	1	NAG	C4-C5-C6-O6

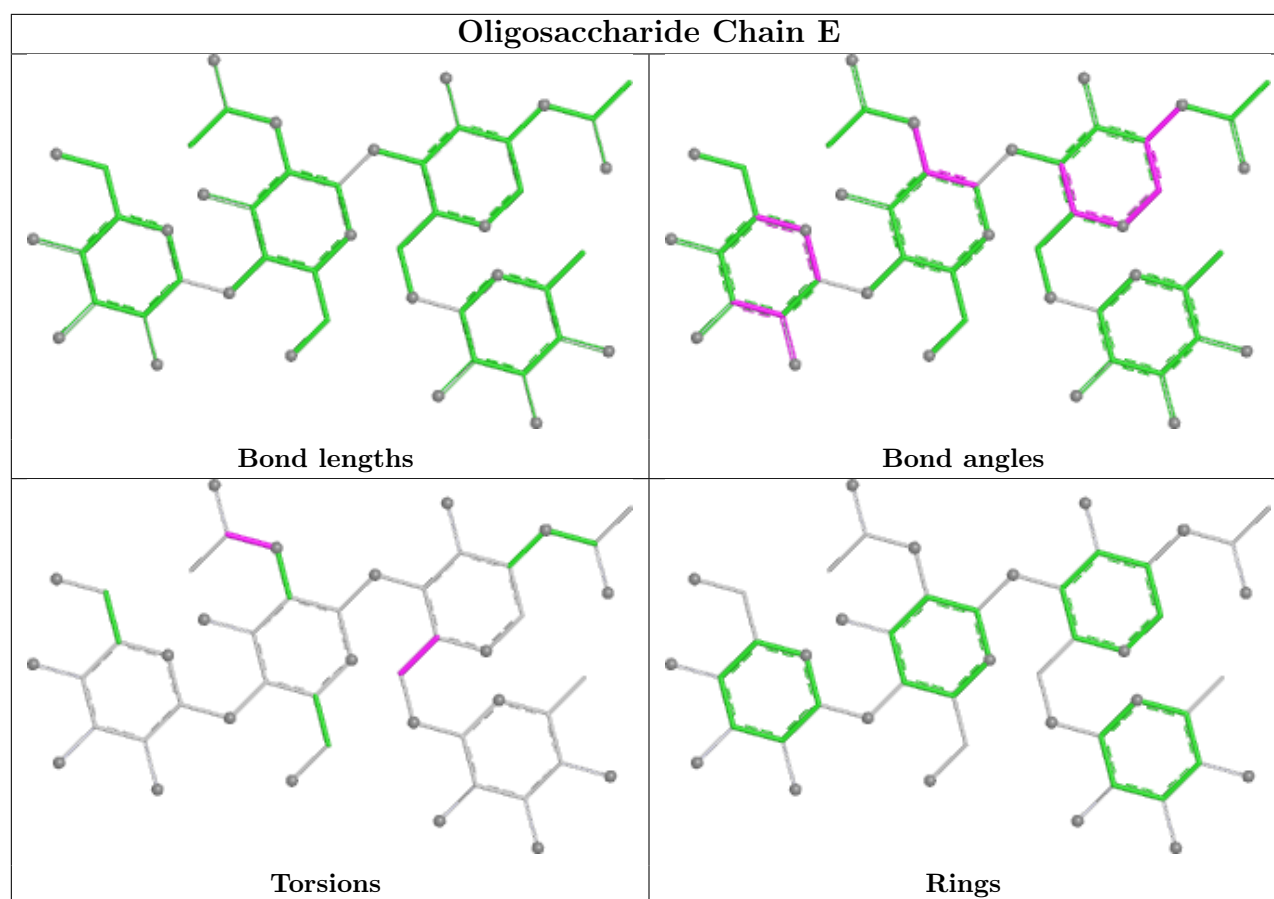
There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	E	1	NAG	1	0

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





5.6 Ligand geometry [i](#)

Of 11 ligands modelled in this entry, 4 are monoatomic - leaving 7 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	$\# Z > 2$
5	NAG	A	701	1	14,14,15	0.51	0	17,19,21	1.25	3 (17%)
8	A1IJX	B	706	6	32,32,32	3.94	13 (40%)	38,45,45	1.66	9 (23%)
8	A1IJX	A	705	6	32,32,32	3.48	14 (43%)	38,45,45	1.76	12 (31%)
5	NAG	A	702	1	14,14,15	0.55	0	17,19,21	2.24	5 (29%)
10	P33	B	702	-	21,21,21	0.34	0	20,20,20	0.30	0
9	PGE	B	701	-	9,9,9	0.23	0	8,8,8	0.33	0
11	PG4	B	703	-	12,12,12	0.37	0	11,11,11	0.38	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
5	NAG	A	701	1	-	0/6/23/26	0/1/1/1
8	A1IJX	B	706	6	-	3/37/57/57	0/2/2/2
8	A1IJX	A	705	6	-	3/37/57/57	0/2/2/2
5	NAG	A	702	1	-	2/6/23/26	0/1/1/1
10	P33	B	702	-	-	11/19/19/19	-
9	PGE	B	701	-	-	3/7/7/7	-
11	PG4	B	703	-	-	8/10/10/10	-

All (27) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	B	706	A1IJX	C09-N10	9.63	1.66	1.47
8	A	705	A1IJX	C06-N10	-9.42	1.35	1.46
8	B	706	A1IJX	C25-N24	9.13	1.65	1.47
8	A	705	A1IJX	C25-N24	8.64	1.64	1.47
8	B	706	A1IJX	C06-N10	-8.60	1.36	1.46
8	B	706	A1IJX	C11-N10	8.57	1.54	1.34
8	A	705	A1IJX	C09-N10	8.49	1.64	1.47
8	B	706	A1IJX	C02-N24	7.82	1.52	1.34
8	A	705	A1IJX	C02-N24	5.90	1.47	1.34
8	B	706	A1IJX	C07-C06	5.50	1.62	1.53
8	A	705	A1IJX	C11-N10	4.74	1.45	1.34
8	A	705	A1IJX	C07-C06	4.47	1.61	1.53
8	A	705	A1IJX	C28-N24	-4.18	1.38	1.47
8	B	706	A1IJX	C26-C25	-3.06	1.41	1.51
8	A	705	A1IJX	C26-C25	-2.98	1.41	1.51
8	B	706	A1IJX	C05-N04	2.80	1.49	1.46
8	B	706	A1IJX	C27-C28	2.69	1.60	1.53
8	B	706	A1IJX	C28-N24	-2.68	1.41	1.47
8	B	706	A1IJX	C08-C09	-2.64	1.42	1.51
8	B	706	A1IJX	O21-C20	2.37	1.29	1.22
8	A	705	A1IJX	C26-C27	2.36	1.61	1.51
8	B	706	A1IJX	O22-C20	-2.34	1.23	1.30
8	A	705	A1IJX	C08-C09	-2.31	1.43	1.51
8	A	705	A1IJX	C08-C07	2.23	1.60	1.51
8	A	705	A1IJX	O18-C16	2.19	1.29	1.22
8	A	705	A1IJX	C15-C16	2.16	1.55	1.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	A	705	A1IJX	O21-C20	2.16	1.28	1.22

All (29) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	702	NAG	C1-C2-N2	-5.68	101.48	110.43
8	B	706	A1IJX	O30-C29-C28	3.94	126.19	113.34
8	A	705	A1IJX	C27-C28-N24	3.92	108.76	103.02
8	A	705	A1IJX	C27-C28-C29	-3.57	103.68	111.26
5	A	702	NAG	C1-O5-C5	3.34	116.66	112.19
8	B	706	A1IJX	C25-N24-C28	-3.24	106.93	112.01
8	B	706	A1IJX	C29-C28-N24	-3.21	106.11	112.54
8	B	706	A1IJX	C27-C28-N24	3.10	107.57	103.02
8	A	705	A1IJX	C14-C12-C11	-2.98	104.90	110.75
8	B	706	A1IJX	C03-C02-N24	2.95	123.94	118.09
8	A	705	A1IJX	C25-N24-C28	-2.86	107.53	112.01
5	A	702	NAG	C4-C3-C2	2.82	115.15	111.02
8	A	705	A1IJX	O30-C29-C28	2.81	122.51	113.34
5	A	701	NAG	C1-O5-C5	2.73	115.84	112.19
5	A	702	NAG	O5-C1-C2	2.70	115.47	111.29
5	A	702	NAG	C2-N2-C7	-2.68	119.31	122.90
8	B	706	A1IJX	O30-C29-O31	-2.67	118.03	124.08
8	A	705	A1IJX	C07-C06-N10	-2.66	100.43	102.66
5	A	701	NAG	O4-C4-C5	2.61	115.75	109.32
8	A	705	A1IJX	O01-C02-N24	-2.38	117.10	121.38
5	A	701	NAG	O3-C3-C2	-2.38	104.45	109.40
8	B	706	A1IJX	C09-N10-C06	-2.35	107.99	111.69
8	A	705	A1IJX	C08-C07-C06	-2.31	100.34	104.21
8	B	706	A1IJX	O01-C02-C03	-2.21	115.60	120.15
8	B	706	A1IJX	O31-C29-C28	-2.18	115.76	122.44
8	A	705	A1IJX	C06-C05-N04	2.17	114.44	110.02
8	A	705	A1IJX	C23-C03-N04	-2.04	104.59	108.89
8	A	705	A1IJX	C29-C28-N24	-2.03	108.47	112.54
8	A	705	A1IJX	O30-C29-O31	-2.00	119.54	124.08

There are no chirality outliers.

All (30) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	A	705	A1IJX	N04-C05-C20-O21
8	A	705	A1IJX	N04-C05-C20-O22
11	B	703	PG4	C4-C3-O2-C2

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Mol	Chain	Res	Type	Atoms
5	A	702	NAG	O5-C5-C6-O6
5	A	702	NAG	C4-C5-C6-O6
10	B	702	P33	O13-C14-C15-O16
10	B	702	P33	C12-C11-O10-C9
11	B	703	PG4	O3-C5-C6-O4
11	B	703	PG4	O1-C1-C2-O2
8	B	706	A1IJX	N04-C05-C20-O22
10	B	702	P33	O10-C11-C12-O13
10	B	702	P33	O7-C8-C9-O10
11	B	703	PG4	O4-C7-C8-O5
10	B	702	P33	O4-C5-C6-O7
8	B	706	A1IJX	N04-C05-C20-O21
11	B	703	PG4	O2-C3-C4-O3
8	A	705	A1IJX	C20-C05-N04-C03
9	B	701	PGE	O1-C1-C2-O2
8	B	706	A1IJX	N04-C05-C06-C07
10	B	702	P33	C6-C5-O4-C3
9	B	701	PGE	C4-C3-O2-C2
11	B	703	PG4	C6-C5-O3-C4
9	B	701	PGE	O3-C5-C6-O4
10	B	702	P33	O16-C17-C18-O19
11	B	703	PG4	C5-C6-O4-C7
10	B	702	P33	C8-C9-O10-C11
10	B	702	P33	C11-C12-O13-C14
11	B	703	PG4	C8-C7-O4-C6
10	B	702	P33	C17-C18-O19-C20
10	B	702	P33	C21-C20-O19-C18

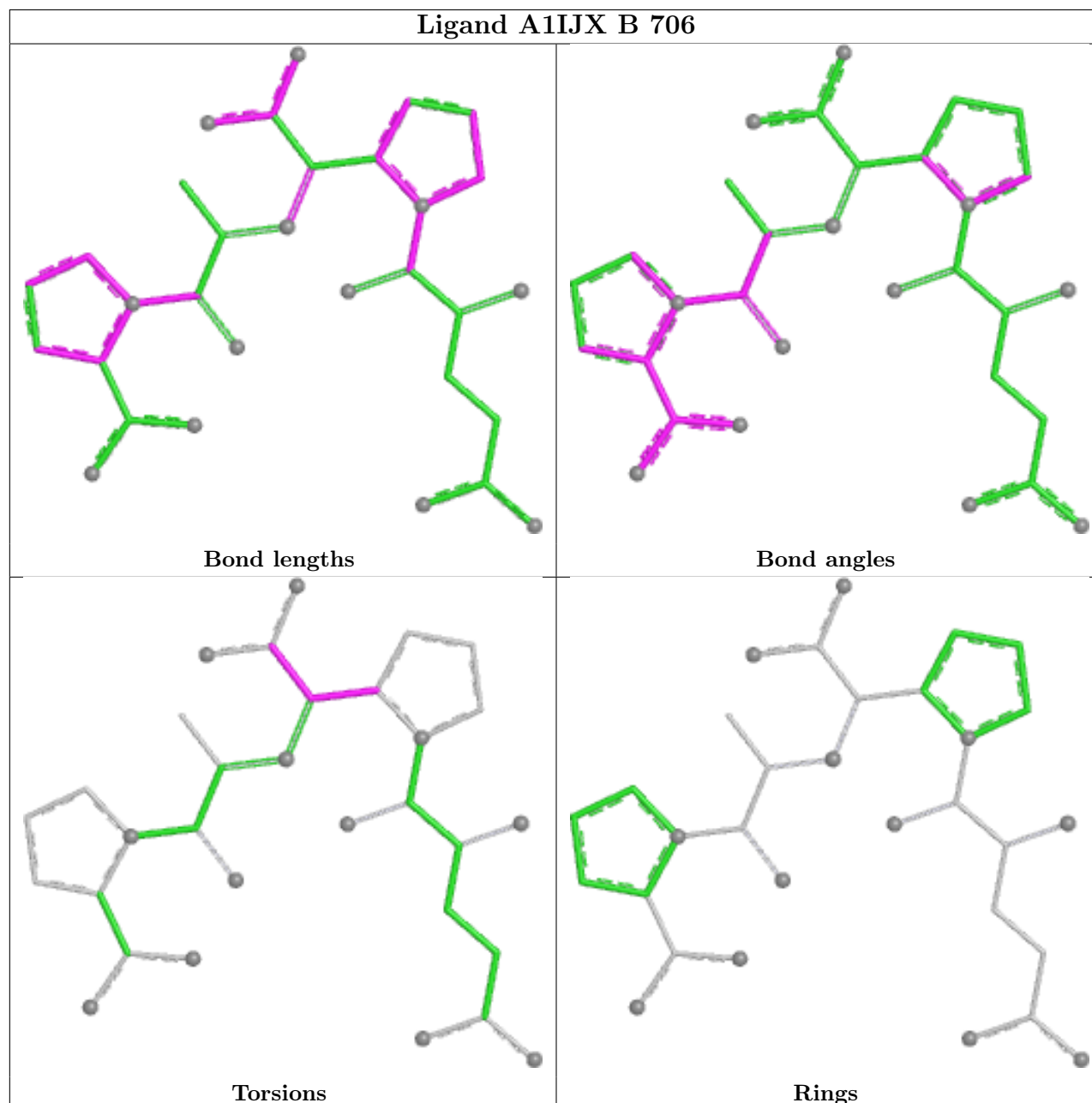
There are no ring outliers.

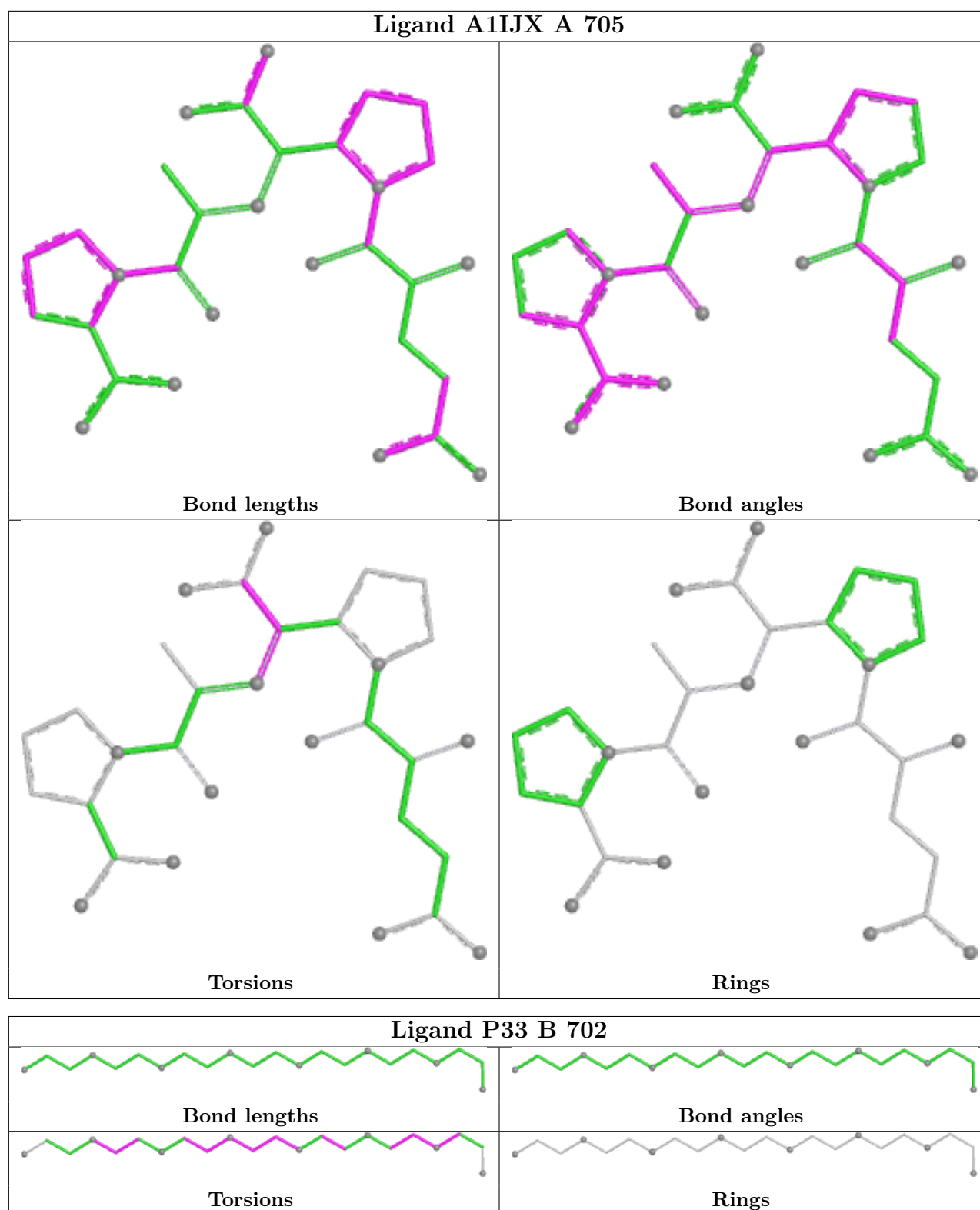
4 monomers are involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	A	705	A1IJX	1	0
10	B	702	P33	5	0
9	B	701	PGE	1	0
11	B	703	PG4	4	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 ⓘ

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	604/628 (96%)	-0.22	13 (2%) 62 66	6, 25, 47, 80	7 (1%)
1	B	602/628 (95%)	0.48	77 (12%) 7 8	8, 34, 75, 104	4 (0%)
All	All	1206/1256 (96%)	0.13	90 (7%) 20 21	6, 28, 66, 104	11 (0%)

All (90) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	15	ALA	7.1
1	A	129	LEU	5.6
1	B	19	LEU	5.5
1	B	5	LEU	5.2
1	B	11	SER	5.2
1	B	17	ALA	4.9
1	B	80	TRP	4.9
1	B	129	LEU	4.7
1	B	88	LEU	4.6
1	B	10	PHE	4.6
1	B	92	ILE	4.6
1	B	12	ALA	4.5
1	B	20	PHE	4.5
1	A	78	PRO	4.3
1	B	18	GLN	4.3
1	B	8	GLY	4.3
1	B	67	ALA	4.2
1	B	91	ILE	4.1
1	A	79	ILE	4.1
1	B	13	ASP	4.0
1	B	4	GLY	4.0
1	B	83	PHE	4.0
1	B	95	VAL	3.9
1	B	79	ILE	3.9

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Mol	Chain	Res	Type	RSRZ
1	B	377	VAL	3.9
1	B	16	GLY	3.8
1	B	68	TRP	3.8
1	B	84	THR	3.7
1	B	26	SER	3.7
1	B	9	GLN	3.7
1	B	64	PHE	3.6
1	B	78	PRO	3.6
1	A	325	GLY	3.6
1	B	24	TYR	3.5
1	B	59	LEU	3.4
1	B	86	PRO	3.4
1	B	71	LYS	3.4
1	B	93	GLY	3.4
1	B	23	SER	3.3
1	B	75	LEU	3.3
1	B	31	VAL	3.3
1	B	76	TYR	3.3
1	B	94	ALA	3.2
1	B	72	ALA	3.2
1	B	69	GLY	3.1
1	B	2	ASP	3.1
1	B	7	PRO	3.1
1	B	25	GLN	3.0
1	B	6	GLN	3.0
1	B	378	SER	2.9
1	B	51	ALA	2.9
1	B	379	LEU	2.9
1	A	606	ASN	2.8
1	B	272	PRO	2.8
1	B	56	GLU	2.7
1	B	58	ALA	2.7
1	A	83	PHE	2.7
1	B	90	ARG	2.7
1	B	28	ALA	2.6
1	B	546	ALA	2.6
1	A	135	THR	2.6
1	B	412	ASP	2.6
1	B	21	ALA	2.6
1	B	27	SER	2.6
1	B	325	GLY	2.5
1	B	82	GLN	2.5

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Mol	Chain	Res	Type	RSRZ
1	A	12	ALA	2.5
1	A	84	THR	2.5
1	B	63	GLU	2.4
1	A	14	GLU	2.4
1	A	607	TYR	2.4
1	B	106	ALA	2.4
1	B	74	GLU	2.4
1	B	338	TYR	2.3
1	B	3	PRO	2.3
1	B	414	VAL	2.3
1	B	85	ASP	2.3
1	A	80	TRP	2.3
1	B	105	LEU	2.3
1	B	57	ALA	2.3
1	B	104	PRO	2.3
1	B	609	GLU	2.3
1	B	103	LEU	2.3
1	B	29	GLU	2.2
1	B	70	GLN	2.2
1	B	562	LEU	2.2
1	B	65	ALA	2.2
1	B	339	ASN	2.1
1	B	271	PHE	2.0
1	A	414	VAL	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
4	BMA	E	3	11/12	0.79	0.14	50,62,68,69	0
2	NAG	C	2	14/15	0.81	0.13	74,81,84,84	0
3	FUC	D	2	10/11	0.82	0.13	66,70,80,81	0
2	NAG	C	1	14/15	0.82	0.12	60,64,71,72	0

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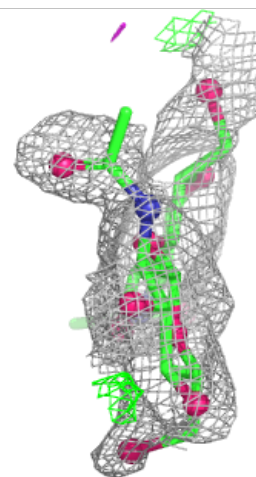
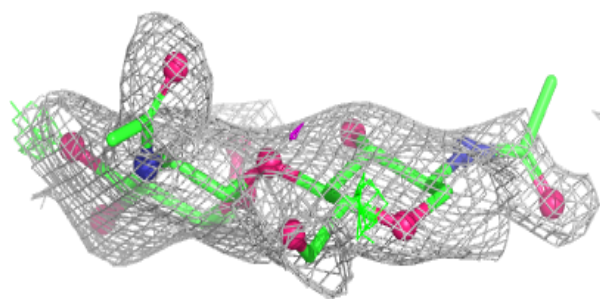
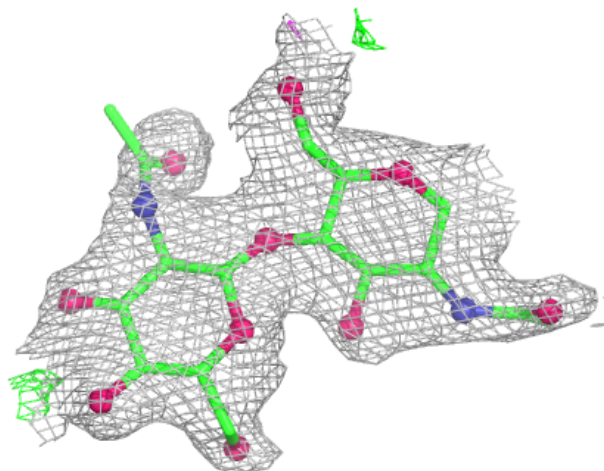
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	FUC	E	4	10/11	0.84	0.13	37,44,54,59	0
4	NAG	E	2	14/15	0.89	0.10	38,47,59,67	0
4	NAG	E	1	14/15	0.92	0.09	26,33,38,39	0
3	NAG	D	1	14/15	0.92	0.08	33,35,45,55	0

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.

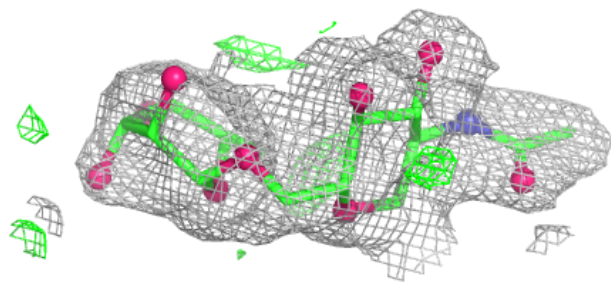
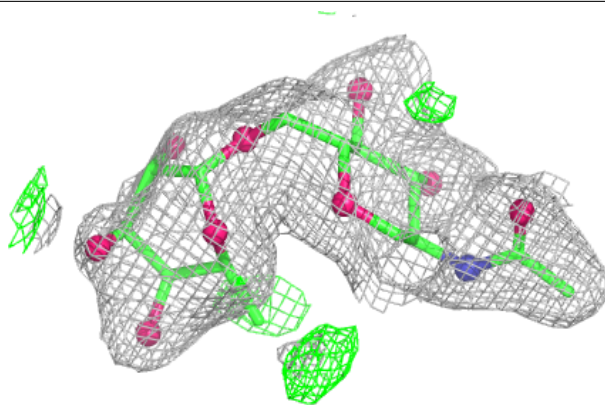
Electron density around Chain C:

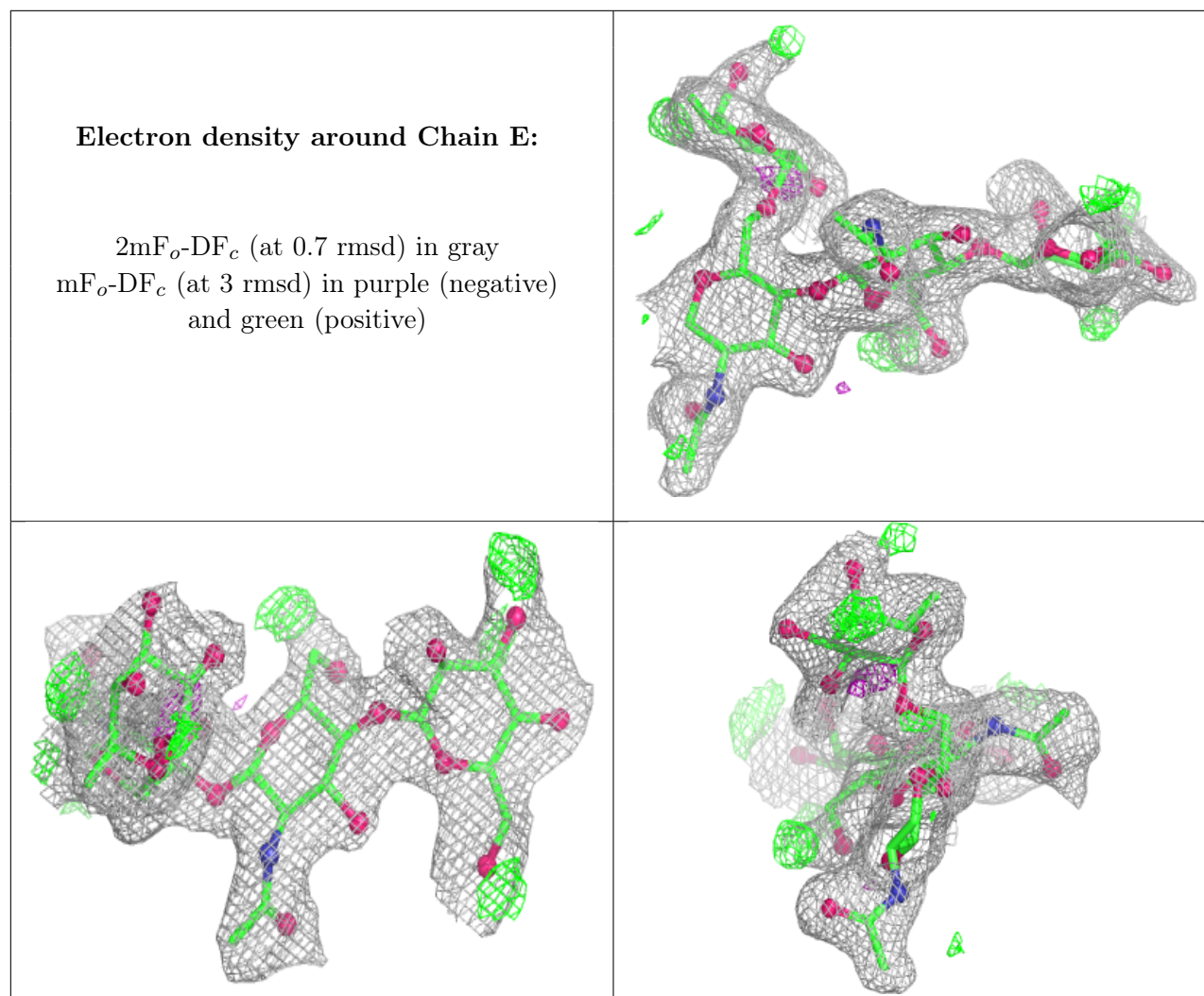
2mF_o-DF_c (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
 and green (positive)



Electron density around Chain D:

$2mF_o-DF_c$ (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($\text{\AA}^2$)	Q<0.9
11	PG4	B	703	13/13	0.85	0.16	45,51,65,72	0
10	P33	B	702	22/22	0.86	0.15	47,53,65,66	0
5	NAG	A	701	14/15	0.87	0.10	42,45,48,52	0
5	NAG	A	702	14/15	0.88	0.12	30,35,45,50	0
8	A1IJX	B	706	31/31	0.92	0.11	22,37,50,62	0
9	PGE	B	701	10/10	0.92	0.12	47,51,60,62	0
8	A1IJX	A	705	31/31	0.95	0.08	18,25,47,54	0
6	ZN	B	704	1/1	1.00	0.01	19,19,19,19	0
7	CL	A	704	1/1	1.00	0.02	17,17,17,17	0

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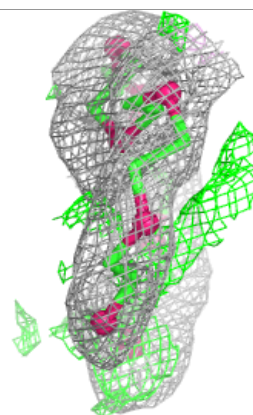
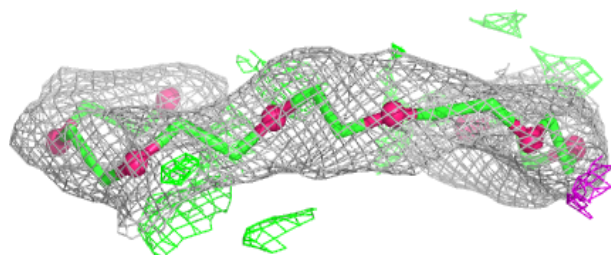
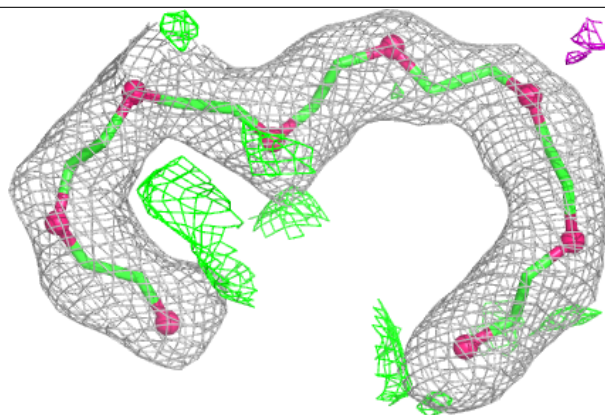
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
7	CL	B	705	1/1	1.00	0.03	25,25,25,25	0
6	ZN	A	703	1/1	1.00	0.01	17,17,17,17	0

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.

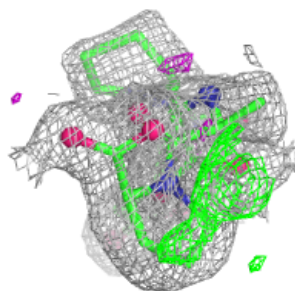
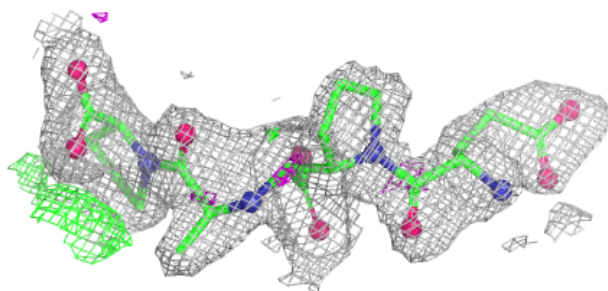
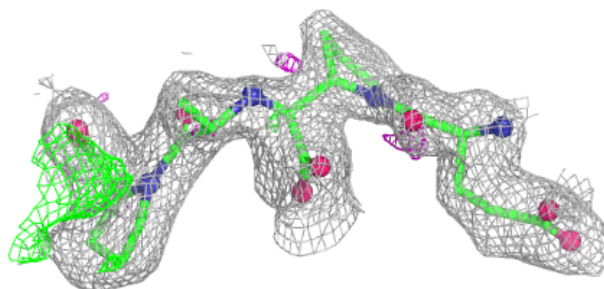
Electron density around P33 B 702:

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

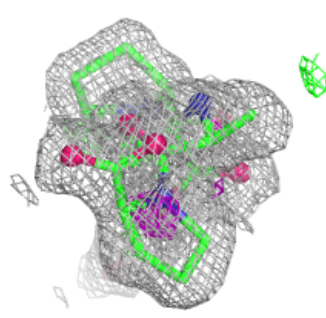
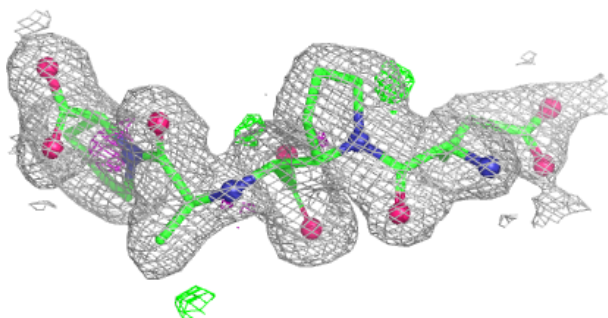
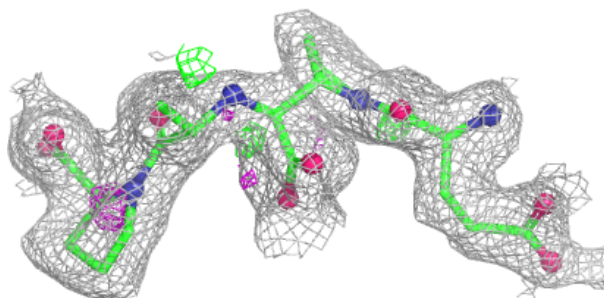


Electron density around A1IJX B 706:

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

**Electron density around A1IJX A 705:**

$2mF_o-DF_c$ (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.