



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 8, 2020 – 04:10 PM BST

PDB ID : 3G0B
Title : Crystal structure of dipeptidyl peptidase IV in complex with TAK-322
Authors : Zhang, Z.; Wallace, M.B.; Feng, J.; Stafford, J.A.; Kaldor, S.W.; Shi, L.; Skene, R.J.; Aertgeerts, K.; Lee, B.; Jennings, A.; Xu, R.; Kassel, D.; Webb, D.R.; Gwaltney, S.L.
Deposited on : 2009-01-27
Resolution : 2.25 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

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

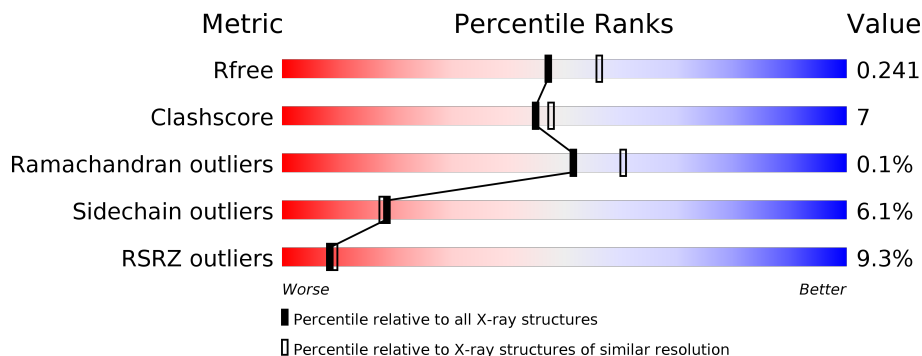
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.25 Å.

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




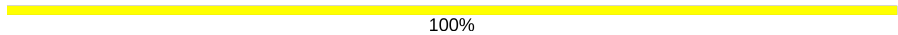
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1377 (2.26-2.26)
Clashscore	141614	1487 (2.26-2.26)
Ramachandran outliers	138981	1449 (2.26-2.26)
Sidechain outliers	138945	1450 (2.26-2.26)
RSRZ outliers	127900	1356 (2.26-2.26)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	740	
1	B	740	
1	C	740	
1	D	740	
2	E	2	
2	F	2	

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Mol	Chain	Length	Quality of chain
2	G	2	 50% 50%
2	H	2	 100%
2	I	2	 100%
2	J	2	 50% 50%
2	K	2	 100%
2	L	2	 50% 50%

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	NAG	E	2	-	-	-	X
2	NAG	H	2	-	-	-	X
2	NAG	I	2	-	-	-	X
2	NAG	L	2	-	-	-	X
3	NAG	A	804	-	-	-	X
3	NAG	A	811	-	-	-	X
3	NAG	A	812	-	-	-	X
3	NAG	C	807	-	-	-	X
3	NAG	D	807	X	-	-	-

2 Entry composition i

There are 5 unique types of molecules in this entry. The entry contains 24992 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 Dipeptidyl peptidase 4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	727	5957	3824	981	1126	26	0	0	0
1	B	733	6013	3857	997	1133	26	0	0	0
1	C	726	5946	3818	977	1125	26	0	0	0
1	D	727	5957	3824	981	1126	26	0	0	0

There are 48 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	27	ALA	-	expression tag	UNP P27487
A	28	ASP	-	expression tag	UNP P27487
A	29	PRO	-	expression tag	UNP P27487
A	30	GLY	-	expression tag	UNP P27487
A	31	GLY	-	expression tag	UNP P27487
A	32	SER	-	expression tag	UNP P27487
A	33	HIS	-	expression tag	UNP P27487
A	34	HIS	-	expression tag	UNP P27487
A	35	HIS	-	expression tag	UNP P27487
A	36	HIS	-	expression tag	UNP P27487
A	37	HIS	-	expression tag	UNP P27487
A	38	HIS	-	expression tag	UNP P27487
B	27	ALA	-	expression tag	UNP P27487
B	28	ASP	-	expression tag	UNP P27487
B	29	PRO	-	expression tag	UNP P27487
B	30	GLY	-	expression tag	UNP P27487
B	31	GLY	-	expression tag	UNP P27487
B	32	SER	-	expression tag	UNP P27487
B	33	HIS	-	expression tag	UNP P27487
B	34	HIS	-	expression tag	UNP P27487
B	35	HIS	-	expression tag	UNP P27487

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Chain	Residue	Modelled	Actual	Comment	Reference
B	36	HIS	-	expression tag	UNP P27487
B	37	HIS	-	expression tag	UNP P27487
B	38	HIS	-	expression tag	UNP P27487
C	27	ALA	-	expression tag	UNP P27487
C	28	ASP	-	expression tag	UNP P27487
C	29	PRO	-	expression tag	UNP P27487
C	30	GLY	-	expression tag	UNP P27487
C	31	GLY	-	expression tag	UNP P27487
C	32	SER	-	expression tag	UNP P27487
C	33	HIS	-	expression tag	UNP P27487
C	34	HIS	-	expression tag	UNP P27487
C	35	HIS	-	expression tag	UNP P27487
C	36	HIS	-	expression tag	UNP P27487
C	37	HIS	-	expression tag	UNP P27487
C	38	HIS	-	expression tag	UNP P27487
D	27	ALA	-	expression tag	UNP P27487
D	28	ASP	-	expression tag	UNP P27487
D	29	PRO	-	expression tag	UNP P27487
D	30	GLY	-	expression tag	UNP P27487
D	31	GLY	-	expression tag	UNP P27487
D	32	SER	-	expression tag	UNP P27487
D	33	HIS	-	expression tag	UNP P27487
D	34	HIS	-	expression tag	UNP P27487
D	35	HIS	-	expression tag	UNP P27487
D	36	HIS	-	expression tag	UNP P27487
D	37	HIS	-	expression tag	UNP P27487
D	38	HIS	-	expression tag	UNP P27487

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



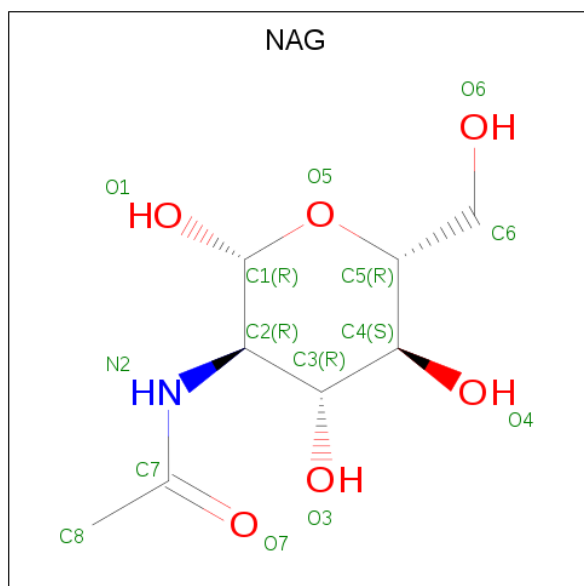
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	E	2	Total	C	N	O	0	0	0
			28	16	2	10			
2	F	2	Total	C	N	O	0	0	0
			28	16	2	10			
2	G	2	Total	C	N	O	0	0	0
			28	16	2	10			

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	H	2	Total 28	C 16	N 2	O 10	0	0	0
2	I	2	Total 28	C 16	N 2	O 10	0	0	0
2	J	2	Total 28	C 16	N 2	O 10	0	0	0
2	K	2	Total 28	C 16	N 2	O 10	0	0	0
2	L	2	Total 28	C 16	N 2	O 10	0	0	0

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).



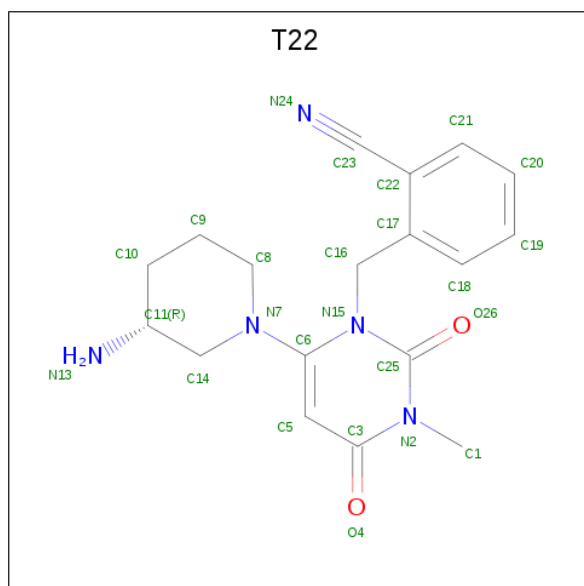
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
3	A	1	Total 14	C 8	N 1	O 5	0	0
3	A	1	Total 14	C 8	N 1	O 5	0	0
3	A	1	Total 14	C 8	N 1	O 5	0	0
3	A	1	Total 14	C 8	N 1	O 5	0	0
3	B	1	Total 14	C 8	N 1	O 5	0	0
3	B	1	Total 14	C 8	N 1	O 5	0	0

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

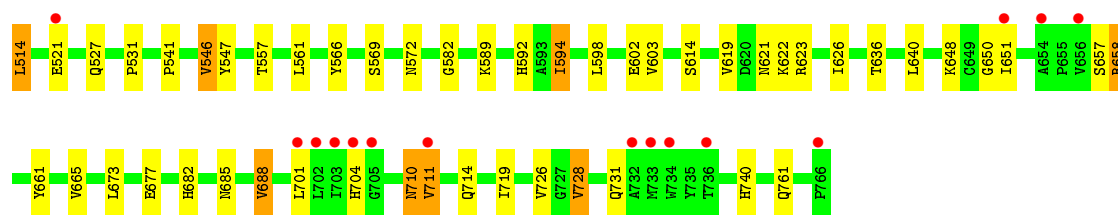
- Molecule 4 is 2-({6-[(3R)-3-aminopiperidin-1-yl]-3-methyl-2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl}methyl)benzotrile (three-letter code: T22) (formula: C₁₈H₂₁N₅O₂).



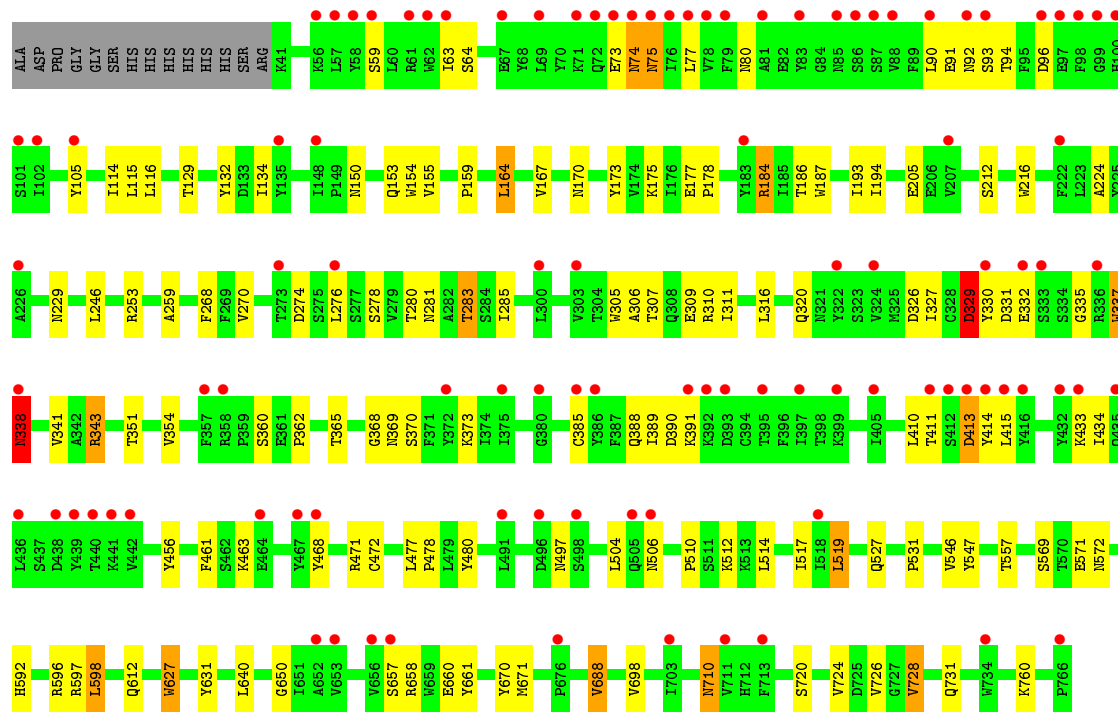
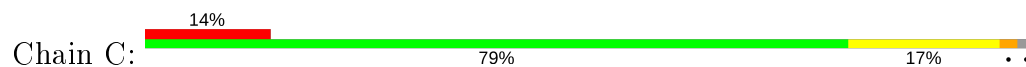
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			25	18	5	2		
4	B	1	Total	C	N	O	0	0
			25	18	5	2		
4	C	1	Total	C	N	O	0	0
			25	18	5	2		
4	D	1	Total	C	N	O	0	0
			25	18	5	2		

- Molecule 5 is water.

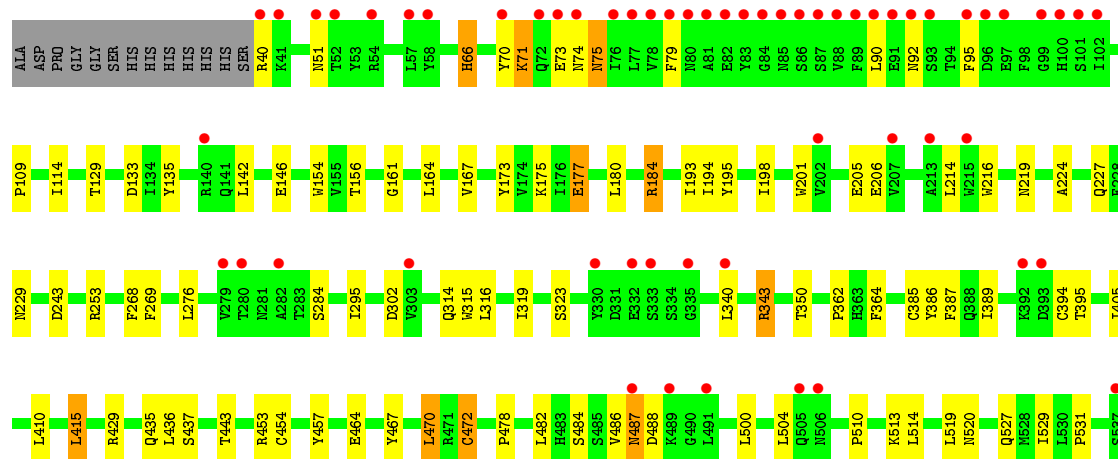
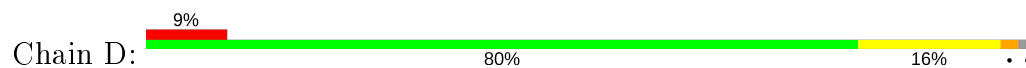
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	29	Total	O	0	0
			29	29		
5	B	509	Total	O	0	0
			509	509		
5	C	4	Total	O	0	0
			4	4		
5	D	15	Total	O	0	0
			15	15		

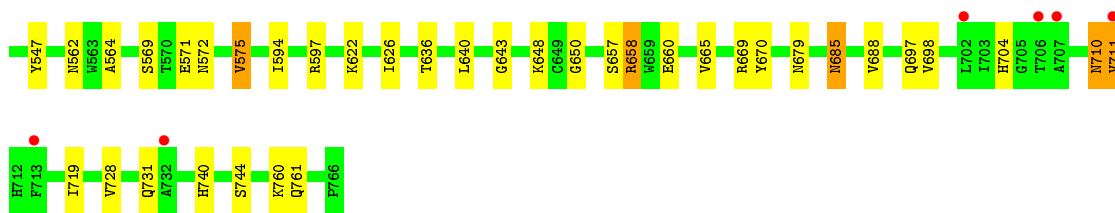


• Molecule 1: Dipeptidyl peptidase 4

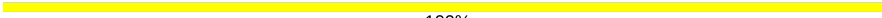


• Molecule 1: Dipeptidyl peptidase 4





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

Chain E:  100%

MAG1
MAG2

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

Chain F:  50% 50%

MAG1
MAG2

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

Chain G:  50% 50%

MAG1
MAG2

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

Chain H:  100%

MAG1
MAG2

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

Chain I:  100%

MAG1
MAG2

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

Chain J:  50% 50%

MAG1
MAG2

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

Chain K:

100%

MAG1
MAG2

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

Chain L:

50%

50%

MAG1
MAG2

4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	121.69Å 122.40Å 144.01Å 90.00° 114.72° 90.00°	Depositor
Resolution (Å)	35.00 – 2.25 34.62 – 2.25	Depositor EDS
% Data completeness (in resolution range)	97.0 (35.00-2.25) 97.0 (34.62-2.25)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.67 (at 2.24Å)	Xtrriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.207 , 0.242 0.204 , 0.241	Depositor DCC
R_{free} test set	8857 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	45.1	Xtrriage
Anisotropy	0.042	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 41.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	0.035 for h,-k,-h-l	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	24992	wwPDB-VP
Average B, all atoms (Å ²)	52.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.15% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality i

5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: T22, 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	0.49	0/6129	0.63	0/8336
1	B	0.48	0/6190	0.63	2/8419 (0.0%)
1	C	0.82	23/6118 (0.4%)	0.67	9/8322 (0.1%)
1	D	0.48	0/6129	0.62	1/8336 (0.0%)
All	All	0.59	23/24566 (0.1%)	0.64	12/33413 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	C	0	1

All (23) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	338	ASN	CG-ND2	22.47	1.89	1.32
1	C	329	ASP	CG-OD1	17.61	1.65	1.25
1	C	343	ARG	CZ-NH2	17.20	1.55	1.33
1	C	177	GLU	CD-OE2	13.47	1.40	1.25
1	C	177	GLU	CD-OE1	11.77	1.38	1.25
1	C	329	ASP	CG-OD2	11.31	1.51	1.25
1	C	343	ARG	CD-NE	10.84	1.64	1.46
1	C	309	GLU	CG-CD	10.63	1.67	1.51
1	C	274	ASP	CG-OD1	9.70	1.47	1.25
1	C	343	ARG	CZ-NH1	9.56	1.45	1.33
1	C	274	ASP	CG-OD2	8.88	1.45	1.25
1	C	331	ASP	CB-CG	7.86	1.68	1.51
1	C	332	GLU	CD-OE1	7.51	1.33	1.25
1	C	343	ARG	NE-CZ	7.16	1.42	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	337	TRP	C-O	6.97	1.36	1.23
1	C	331	ASP	CG-OD2	6.79	1.41	1.25
1	C	338	ASN	CB-CG	6.55	1.66	1.51
1	C	332	GLU	CD-OE2	6.26	1.32	1.25
1	C	369	ASN	CG-ND2	5.89	1.47	1.32
1	C	369	ASN	CG-OD1	5.88	1.36	1.24
1	C	390	ASP	CG-OD2	5.66	1.38	1.25
1	C	270	VAL	CB-CG2	5.30	1.64	1.52
1	C	283	THR	C-O	5.26	1.33	1.23

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	329	ASP	CB-CG-OD1	-19.59	100.67	118.30
1	C	343	ARG	NE-CZ-NH1	-10.23	115.19	120.30
1	C	274	ASP	CB-CG-OD2	-7.27	111.75	118.30
1	C	329	ASP	OD1-CG-OD2	6.81	136.24	123.30
1	D	415	LEU	CA-CB-CG	6.75	130.83	115.30
1	C	338	ASN	CB-CG-ND2	-5.68	103.06	116.70
1	B	202	VAL	CB-CA-C	-5.58	100.80	111.40
1	C	343	ARG	CD-NE-CZ	-5.57	115.80	123.60
1	B	164	LEU	CA-CB-CG	5.50	127.94	115.30
1	C	390	ASP	CB-CG-OD2	-5.38	113.46	118.30
1	C	331	ASP	CB-CG-OD2	-5.16	113.66	118.30
1	C	329	ASP	CB-CG-OD2	5.13	122.92	118.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	C	338	ASN	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	5957	0	5679	84	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	6013	0	5720	73	0
1	C	5946	0	5666	84	0
1	D	5957	0	5676	83	0
2	E	28	0	25	0	0
2	F	28	0	25	2	0
2	G	28	0	25	1	0
2	H	28	0	25	3	0
2	I	28	0	25	0	0
2	J	28	0	25	2	0
2	K	28	0	25	2	0
2	L	28	0	25	5	0
3	A	56	0	52	4	0
3	B	56	0	52	5	0
3	C	56	0	52	3	0
3	D	70	0	65	4	0
4	A	25	0	21	1	0
4	B	25	0	21	1	0
4	C	25	0	21	1	0
4	D	25	0	21	1	0
5	A	29	0	0	0	0
5	B	509	0	0	1	0
5	C	4	0	0	0	0
5	D	15	0	0	0	0
All	All	24992	0	23246	312	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 7.

All (312) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:229:ASN:HD21	2:F:1:NAG:C1	1.12	1.58
1:C:329:ASP:CG	1:C:329:ASP:OD1	1.65	1.31
1:C:338:ASN:ND2	1:C:338:ASN:CG	1.89	1.26
1:A:229:ASN:ND2	2:F:1:NAG:C1	1.95	1.25
1:D:229:ASN:HD21	2:L:1:NAG:C1	1.69	1.04
1:A:321:ASN:HD21	2:H:1:NAG:C1	1.76	0.99
1:B:229:ASN:HD21	2:J:1:NAG:C1	1.76	0.99
1:C:93:SER:HB2	1:C:96:ASP:HB3	1.47	0.95
1:C:253:ARG:HH21	1:D:253:ARG:HH21	0.95	0.95
1:A:253:ARG:HH21	1:B:253:ARG:HH21	1.07	0.93

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:193:ILE:HG22	1:D:194:ILE:HD12	1.49	0.92
1:A:731:GLN:HE22	1:B:731:GLN:HE22	1.12	0.90
1:C:153:GLN:HE22	1:C:170:ASN:H	1.18	0.89
1:A:153:GLN:HE22	1:A:170:ASN:H	1.16	0.89
1:B:150:ASN:HD21	3:B:802:NAG:C1	1.87	0.87
1:A:731:GLN:HE22	1:B:731:GLN:NE2	1.71	0.86
1:A:520:ASN:ND2	3:A:811:NAG:H2	1.92	0.85
1:D:531:PRO:HB3	1:D:572:ASN:HD22	1.42	0.85
1:A:74:ASN:HB3	1:A:92:ASN:HB3	1.59	0.84
1:B:331:ASP:HB2	1:B:338:ASN:HD21	1.40	0.84
1:C:253:ARG:NH2	1:D:253:ARG:HH21	1.76	0.83
1:D:711:VAL:HG13	1:D:740:HIS:CE1	2.13	0.82
1:B:281:ASN:HD21	3:B:807:NAG:C1	1.92	0.81
1:C:253:ARG:HH21	1:D:253:ARG:NH2	1.76	0.80
1:A:731:GLN:NE2	1:B:731:GLN:HE22	1.79	0.79
1:B:471:ARG:HG3	1:B:480:TYR:CE1	2.19	0.78
1:A:281:ASN:HD21	2:G:1:NAG:C1	2.00	0.75
1:B:711:VAL:HG13	1:B:740:HIS:CE1	2.23	0.74
1:D:173:TYR:CE1	1:D:184:ARG:HG2	2.23	0.74
1:A:346:ILE:H	1:A:392:LYS:NZ	1.86	0.73
1:A:520:ASN:HD21	3:A:811:NAG:H2	1.52	0.73
1:A:364:PHE:HE2	1:A:389:ILE:HD11	1.54	0.73
1:B:351:THR:OG1	1:B:592:HIS:HD2	1.72	0.72
1:B:334:SER:HB3	1:B:336:ARG:HG3	1.72	0.72
1:B:321:ASN:HD21	3:B:808:NAG:C1	2.03	0.72
1:A:598:LEU:HD22	1:A:671:MET:HG2	1.70	0.71
1:D:219:ASN:HD21	3:D:803:NAG:C1	2.04	0.71
1:A:253:ARG:HH21	1:B:253:ARG:NH2	1.88	0.69
1:A:516:PHE:CD1	1:A:523:LYS:HG2	2.26	0.69
1:B:331:ASP:HB2	1:B:338:ASN:ND2	2.07	0.69
1:A:40:ARG:HB3	1:A:40:ARG:HH11	1.56	0.69
1:A:78:VAL:HG22	1:A:89:PHE:HB2	1.73	0.68
1:B:726:VAL:HG23	1:B:728:VAL:HG12	1.75	0.68
1:D:205:GLU:OE2	4:D:800:T22:N13	2.26	0.68
1:D:229:ASN:ND2	2:L:1:NAG:C1	2.50	0.68
1:B:184:ARG:HD3	1:B:186:THR:O	1.94	0.67
1:C:388:GLN:HB2	1:C:391:LYS:HG2	1.76	0.67
1:D:711:VAL:CG1	1:D:740:HIS:CE1	2.78	0.67
1:A:40:ARG:NH1	1:A:40:ARG:HB3	2.10	0.66
1:D:206:GLU:HB3	1:D:665:VAL:HG22	1.77	0.65
1:D:529:ILE:HB	1:D:575:VAL:HG13	1.78	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:415:LEU:HB3	1:A:434:ILE:HG23	1.77	0.65
1:B:205:GLU:OE2	4:B:800:T22:N13	2.30	0.65
1:A:658:ARG:HB2	1:A:687:THR:HG22	1.77	0.65
1:D:643:GLY:HA2	1:D:697:GLN:HE22	1.61	0.65
1:A:726:VAL:HG23	1:A:728:VAL:HG23	1.79	0.64
1:B:88:VAL:HG11	1:B:91:GLU:HG3	1.79	0.64
1:B:82:GLU:HG2	1:B:467:TYR:OH	1.97	0.64
1:A:253:ARG:NH2	1:B:253:ARG:HH21	1.88	0.64
1:B:688:VAL:HG22	1:B:719:ILE:HG12	1.80	0.63
1:A:77:LEU:HD12	1:A:86:SER:HB2	1.81	0.63
1:A:156:THR:HG23	1:A:216:TRP:HE1	1.63	0.63
1:B:602:GLU:HG3	1:B:603:VAL:H	1.64	0.63
1:C:329:ASP:CB	1:C:329:ASP:OD1	2.47	0.63
1:C:311:ILE:HG22	1:C:337:TRP:CZ3	2.34	0.62
1:D:453:ARG:HG3	1:D:454:CYS:SG	2.39	0.62
1:D:206:GLU:CB	1:D:665:VAL:HG22	2.31	0.61
1:C:731:GLN:HE22	1:D:731:GLN:NE2	1.97	0.61
1:D:340:LEU:HB2	1:D:343:ARG:HG3	1.82	0.61
1:B:173:TYR:CE1	1:B:184:ARG:HG3	2.36	0.60
1:A:105:TYR:HB2	1:A:114:ILE:HD11	1.84	0.60
1:C:726:VAL:HG23	1:C:728:VAL:HG12	1.83	0.60
1:C:726:VAL:HG23	1:C:728:VAL:CG1	2.31	0.60
1:C:415:LEU:HB3	1:C:434:ILE:HG23	1.84	0.60
1:A:696:LYS:HG3	1:A:728:VAL:HG22	1.83	0.59
1:A:435:GLN:OE1	1:A:441:LYS:HD3	2.02	0.59
1:C:154:TRP:CE2	1:C:212:SER:HB3	2.37	0.59
1:B:327:ILE:HD13	1:B:389:ILE:HG13	1.83	0.59
1:C:90:LEU:HD12	1:C:94:THR:HB	1.84	0.59
1:B:229:ASN:ND2	2:J:1:NAG:C1	2.57	0.59
1:B:385:CYS:HB3	1:B:387:PHE:CE2	2.37	0.59
1:D:133:ASP:HB3	1:D:142:LEU:HD11	1.83	0.59
1:C:205:GLU:OE1	4:C:800:T22:N13	2.36	0.58
1:C:710:ASN:C	1:C:710:ASN:HD22	2.06	0.58
1:D:520:ASN:HB2	3:D:807:NAG:H62	1.86	0.58
1:B:510:PRO:HD3	1:B:569:SER:HB2	1.84	0.58
1:C:75:ASN:HB3	1:C:91:GLU:HA	1.84	0.58
1:C:229:ASN:ND2	2:K:1:NAG:O5	2.36	0.58
1:D:74:ASN:HB3	1:D:92:ASN:HD22	1.69	0.57
1:A:114:ILE:HG23	1:A:135:TYR:HB3	1.84	0.57
1:D:146:GLU:O	1:D:175:LYS:HE2	2.04	0.57
1:A:327:ILE:HD12	1:A:343:ARG:O	2.04	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:40:ARG:CB	1:A:40:ARG:HH11	2.17	0.57
1:C:343:ARG:HD2	1:C:389:ILE:HG23	1.87	0.57
2:H:1:NAG:H4	2:H:2:NAG:N2	2.20	0.57
1:C:657:SER:HA	1:C:688:VAL:HG13	1.86	0.57
1:C:731:GLN:NE2	1:D:731:GLN:NE2	2.52	0.57
1:B:177:GLU:HB2	1:B:180:LEU:HD22	1.86	0.56
1:B:85:ASN:HD21	3:B:801:NAG:C1	2.18	0.56
1:C:598:LEU:HD22	1:C:671:MET:HG2	1.88	0.56
1:C:74:ASN:HD22	1:C:75:ASN:N	2.04	0.56
1:C:731:GLN:HE22	1:D:731:GLN:HE21	1.52	0.56
1:A:346:ILE:H	1:A:392:LYS:HZ1	1.54	0.56
1:D:114:ILE:HG23	1:D:135:TYR:HB3	1.88	0.56
1:B:302:ASP:HB3	1:B:314:GLN:HB2	1.89	0.55
1:B:351:THR:OG1	1:B:592:HIS:CD2	2.58	0.55
1:A:321:ASN:HD21	2:H:1:NAG:C2	2.20	0.55
1:D:510:PRO:HD3	1:D:569:SER:HB2	1.88	0.55
1:A:504:LEU:HA	1:A:507:VAL:HG12	1.89	0.55
1:B:614:SER:HA	1:B:619:VAL:HB	1.89	0.54
1:D:685:ASN:ND2	3:D:808:NAG:C1	2.70	0.54
1:D:685:ASN:HD21	3:D:808:NAG:C1	2.21	0.54
1:C:281:ASN:HD21	3:C:805:NAG:C1	2.20	0.54
1:A:531:PRO:HB3	1:A:572:ASN:HD22	1.71	0.54
1:D:90:LEU:HD21	1:D:95:PHE:HE2	1.72	0.54
1:B:710:ASN:C	1:B:710:ASN:HD22	2.10	0.54
1:B:360:SER:O	1:B:373:LYS:HE3	2.08	0.54
1:C:115:LEU:HD21	1:C:155:VAL:CG1	2.37	0.54
1:A:343:ARG:HD2	1:A:389:ILE:HG23	1.90	0.54
1:D:194:ILE:HG12	2:L:1:NAG:H82	1.90	0.54
1:C:159:PRO:HD3	1:C:216:TRP:HB3	1.89	0.53
1:A:85:ASN:HD21	3:A:801:NAG:C1	2.21	0.53
1:A:546:VAL:HG12	1:A:627:TRP:O	2.08	0.53
1:A:351:THR:OG1	1:A:592:HIS:HD2	1.91	0.53
1:C:150:ASN:HD21	3:C:802:NAG:C1	2.22	0.53
1:D:343:ARG:HD2	1:D:389:ILE:HG23	1.89	0.52
1:A:334:SER:HB3	1:A:336:ARG:HB2	1.90	0.52
1:B:688:VAL:CG2	1:B:719:ILE:HG12	2.38	0.52
1:A:510:PRO:HD3	1:A:569:SER:HB2	1.93	0.51
1:B:626:ILE:HG23	1:B:636:THR:HG23	1.91	0.51
1:C:193:ILE:HG22	1:C:194:ILE:HD12	1.93	0.51
1:C:410:LEU:HD13	1:C:415:LEU:HD23	1.92	0.51
1:D:435:GLN:HE21	1:D:437:SER:HG	1.58	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:657:SER:HA	1:D:688:VAL:HG13	1.92	0.51
1:D:229:ASN:ND2	2:L:1:NAG:O5	2.38	0.51
1:B:546:VAL:HG11	1:B:626:ILE:HD11	1.93	0.51
1:C:184:ARG:HD2	1:C:187:TRP:CE2	2.45	0.51
1:C:351:THR:OG1	1:C:592:HIS:HD2	1.94	0.51
1:C:285:ILE:HG13	1:C:335:GLY:O	2.10	0.51
1:B:55:LEU:HD13	1:B:561:LEU:HD12	1.91	0.50
1:A:66:HIS:HB3	1:A:467:TYR:HE1	1.76	0.50
1:C:329:ASP:N	1:C:329:ASP:OD1	2.44	0.50
1:B:453:ARG:HG3	1:B:454:CYS:SG	2.51	0.50
1:D:711:VAL:HG13	1:D:740:HIS:ND1	2.26	0.50
1:A:472:CYS:O	1:A:478:PRO:HA	2.12	0.50
1:A:688:VAL:HG22	1:A:719:ILE:HG12	1.94	0.50
1:D:319:ILE:HD12	1:D:319:ILE:H	1.76	0.50
1:D:640:LEU:HD11	1:D:650:GLY:HA3	1.94	0.50
1:B:657:SER:HA	1:B:688:VAL:HG13	1.94	0.50
1:C:517:ILE:HD12	1:C:612:GLN:HG3	1.94	0.49
1:B:70:TYR:HB3	1:B:79:PHE:CE1	2.47	0.49
1:A:179:ASN:H	1:A:179:ASN:HD22	1.60	0.49
1:C:184:ARG:HD3	1:C:186:THR:O	2.12	0.49
1:A:129:THR:HG23	1:A:151:ASN:HA	1.94	0.49
1:C:307:THR:OG1	1:C:310:ARG:HB3	2.12	0.49
1:D:364:PHE:HE2	1:D:389:ILE:HD11	1.77	0.49
1:A:74:ASN:HB3	1:A:92:ASN:CB	2.37	0.49
1:B:458:SER:OG	1:B:471:ARG:HD2	2.13	0.49
1:B:711:VAL:CG1	1:B:740:HIS:CE1	2.95	0.49
1:A:331:ASP:HB3	1:A:334:SER:HB2	1.95	0.49
1:A:513:LYS:O	1:A:527:GLN:HA	2.12	0.48
1:B:531:PRO:HB3	1:B:572:ASN:HD22	1.78	0.48
1:C:598:LEU:HG	1:C:631:TYR:OH	2.12	0.48
1:A:154:TRP:CE2	1:A:212:SER:HB3	2.48	0.48
1:C:571:GLU:CD	1:C:760:LYS:HD3	2.34	0.48
1:A:98:PHE:CD1	1:A:100:HIS:HB2	2.49	0.48
1:C:115:LEU:HD21	1:C:155:VAL:HG13	1.95	0.48
1:C:310:ARG:NH1	1:C:368:GLY:O	2.41	0.48
1:B:658:ARG:HG2	1:B:661:TYR:CE2	2.49	0.48
1:A:170:ASN:N	1:A:170:ASN:HD22	2.12	0.48
1:B:193:ILE:HG22	1:B:194:ILE:HG12	1.96	0.48
1:B:79:PHE:CD2	1:B:86:SER:HB3	2.49	0.48
1:C:531:PRO:HB3	1:C:572:ASN:HD22	1.79	0.47
1:B:224:ALA:HB1	1:B:268:PHE:CZ	2.49	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:321:ASN:HD21	3:B:808:NAG:C2	2.26	0.47
1:A:327:ILE:HD13	1:A:389:ILE:HD12	1.95	0.47
1:C:173:TYR:CE1	1:C:184:ARG:HG3	2.49	0.47
1:D:643:GLY:HA2	1:D:697:GLN:NE2	2.30	0.47
1:D:626:ILE:HG23	1:D:636:THR:HG23	1.97	0.47
1:B:114:ILE:CG2	1:B:135:TYR:HB3	2.45	0.46
1:D:75:ASN:N	1:D:75:ASN:HD22	2.13	0.46
1:B:541:PRO:HG3	1:B:623:ARG:CZ	2.44	0.46
1:A:598:LEU:HB2	1:A:671:MET:SD	2.55	0.46
1:B:640:LEU:HD11	1:B:650:GLY:HA3	1.96	0.46
1:D:167:VAL:HG11	1:D:198:ILE:HG12	1.97	0.46
1:D:688:VAL:HG22	1:D:719:ILE:HG12	1.97	0.46
1:A:206:GLU:OE2	1:A:663:ASP:OD2	2.34	0.46
1:A:657:SER:HA	1:A:688:VAL:HG13	1.97	0.46
1:A:205:GLU:OE1	4:A:800:T22:N13	2.48	0.46
1:A:500:LEU:HG	1:A:504:LEU:HD22	1.97	0.46
1:B:109:PRO:HG2	1:B:158:SER:O	2.15	0.46
1:D:224:ALA:HB1	1:D:268:PHE:CZ	2.51	0.46
1:D:500:LEU:O	1:D:504:LEU:HB2	2.16	0.45
1:D:472:CYS:O	1:D:478:PRO:HA	2.17	0.45
1:C:159:PRO:HD3	1:C:216:TRP:CB	2.46	0.45
1:A:520:ASN:ND2	3:A:811:NAG:C2	2.73	0.45
1:A:640:LEU:HB3	1:A:698:VAL:HG21	1.99	0.45
1:B:157:TRP:CE3	1:B:164:LEU:HD13	2.51	0.45
1:C:229:ASN:ND2	2:K:1:NAG:C1	2.79	0.45
1:C:306:ALA:HB3	1:C:310:ARG:HG2	1.98	0.45
1:B:387:PHE:CD1	1:B:394:CYS:HB3	2.52	0.45
1:C:510:PRO:HD3	1:C:569:SER:HB2	1.97	0.45
1:C:414:TYR:CE2	1:C:433:LYS:HE3	2.52	0.45
1:C:461:PHE:CD2	1:C:468:TYR:HB3	2.51	0.45
1:D:109:PRO:HD2	1:D:161:GLY:O	2.16	0.45
1:D:640:LEU:HB3	1:D:698:VAL:HG21	1.99	0.45
1:A:242:SER:HB3	1:A:246:LEU:HD12	1.98	0.45
1:D:386:TYR:O	1:D:394:CYS:HB2	2.16	0.45
1:C:338:ASN:ND2	1:C:338:ASN:CB	2.78	0.44
1:C:472:CYS:O	1:C:478:PRO:HA	2.18	0.44
1:D:486:VAL:C	1:D:487:ASN:HD22	2.21	0.44
1:C:259:ALA:HB3	1:C:660:GLU:HA	1.99	0.44
1:C:519:LEU:HB3	3:C:807:NAG:H61	1.99	0.44
1:D:597:ARG:NH2	1:D:679:ASN:OD1	2.50	0.44
1:D:710:ASN:C	1:D:710:ASN:HD22	2.20	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:614:SER:HB2	1:B:621:ASN:OD1	2.18	0.44
1:C:456:TYR:HB2	1:C:557:THR:OG1	2.17	0.44
1:C:640:LEU:HB3	1:C:698:VAL:HG21	1.99	0.44
1:D:206:GLU:HB3	1:D:665:VAL:CG2	2.46	0.44
5:B:996:HOH:O	1:D:562:ASN:HB2	2.18	0.44
1:A:634:TYR:O	1:A:638:MET:HG2	2.18	0.44
1:D:70:TYR:HB3	1:D:79:PHE:CE1	2.53	0.44
1:A:110:ASP:OD1	1:A:162:HIS:ND1	2.44	0.44
1:D:314:GLN:NE2	1:D:362:PRO:HD3	2.31	0.44
1:D:531:PRO:HB3	1:D:572:ASN:ND2	2.21	0.44
1:A:302:ASP:HB3	1:A:314:GLN:HB2	2.00	0.44
1:A:751:ILE:O	1:A:755:MET:HG3	2.18	0.44
1:D:71:LYS:H	1:D:71:LYS:HD2	1.83	0.44
1:A:82:GLU:HG2	1:A:467:TYR:OH	2.17	0.43
1:B:513:LYS:O	1:B:527:GLN:HA	2.17	0.43
1:C:362:PRO:HA	1:C:373:LYS:HB3	2.00	0.43
1:D:156:THR:HG23	1:D:216:TRP:HE1	1.83	0.43
1:D:405:ILE:HG13	1:D:429:ARG:CD	2.48	0.43
1:A:669:ARG:HD2	1:A:670:TYR:CZ	2.53	0.43
1:C:116:LEU:O	1:C:132:TYR:HA	2.17	0.43
1:A:364:PHE:O	1:A:410:LEU:HD21	2.18	0.43
1:B:159:PRO:HD3	1:B:216:TRP:CB	2.49	0.43
1:B:127:SER:HB3	1:B:211:TYR:CG	2.54	0.43
1:A:185:ILE:HG22	1:A:186:THR:HG23	2.01	0.43
1:A:299:TYR:CE1	1:A:665:VAL:HG22	2.52	0.43
1:C:184:ARG:HD2	1:C:187:TRP:CZ2	2.52	0.43
1:C:310:ARG:NH2	1:C:329:ASP:OD2	2.52	0.43
1:A:159:PRO:HD3	1:A:216:TRP:HB3	2.00	0.43
1:B:598:LEU:O	1:B:682:HIS:NE2	2.48	0.43
1:C:471:ARG:HG3	1:C:480:TYR:CE1	2.54	0.43
1:D:114:ILE:CG2	1:D:135:TYR:HB3	2.48	0.43
1:A:237:GLU:HA	1:A:252:VAL:O	2.19	0.43
1:A:455:GLN:HE21	1:A:557:THR:HG21	1.84	0.43
1:A:80:ASN:ND2	1:A:82:GLU:HB2	2.33	0.43
1:D:269:PHE:HB3	1:D:284:SER:HB3	1.99	0.43
1:C:596:ARG:N	1:C:670:TYR:O	2.50	0.42
1:D:315:TRP:O	1:D:323:SER:HB2	2.19	0.42
1:D:484:SER:O	1:D:488:ASP:HA	2.19	0.42
1:B:89:PHE:CE1	1:B:107:ILE:HD13	2.54	0.42
1:D:229:ASN:HD21	2:L:1:NAG:C2	2.27	0.42
1:C:164:LEU:HB2	1:C:175:LYS:HB2	2.00	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:330:TYR:HB2	1:C:337:TRP:CZ2	2.54	0.42
1:D:66:HIS:HB3	1:D:467:TYR:HE1	1.85	0.42
1:D:201:TRP:CZ2	1:D:710:ASN:HA	2.55	0.42
1:C:153:GLN:NE2	1:C:167:VAL:HG12	2.34	0.42
1:D:457:TYR:CD1	1:D:470:LEU:HG	2.54	0.42
1:A:455:GLN:HB2	1:A:475:PRO:HD3	2.02	0.42
1:D:564:ALA:HB1	1:D:575:VAL:HG11	2.02	0.42
1:B:106:SER:HB3	1:B:115:LEU:HB3	2.02	0.42
1:C:224:ALA:HB1	1:C:268:PHE:CZ	2.55	0.42
1:C:184:ARG:HH11	1:C:187:TRP:HA	1.85	0.41
1:C:411:THR:C	1:C:413:ASP:H	2.23	0.41
1:C:327:ILE:HD13	1:C:389:ILE:HD13	2.02	0.41
1:C:546:VAL:HG12	1:C:627:TRP:O	2.20	0.41
1:A:70:TYR:HD2	1:A:72:GLN:HG2	1.84	0.41
1:B:237:GLU:HG2	1:B:253:ARG:HG2	2.01	0.41
1:B:370:SER:HB2	1:B:387:PHE:O	2.20	0.41
1:D:658:ARG:HD3	1:D:660:GLU:OE2	2.20	0.41
1:B:237:GLU:HA	1:B:252:VAL:O	2.21	0.41
1:C:115:LEU:HD21	1:C:155:VAL:HG11	2.01	0.41
1:C:63:ILE:HG13	1:C:64:SER:N	2.36	0.41
1:C:640:LEU:HD11	1:C:650:GLY:HA3	2.03	0.41
1:D:513:LYS:O	1:D:527:GLN:HA	2.21	0.41
1:C:320:GLN:O	1:C:354:VAL:HG12	2.20	0.41
1:B:651:ILE:HA	1:B:701:LEU:O	2.21	0.41
1:D:177:GLU:HB2	1:D:180:LEU:HD22	2.03	0.41
1:D:195:TYR:O	1:D:227:GLN:HA	2.20	0.41
1:D:302:ASP:HB3	1:D:314:GLN:HB2	2.03	0.41
1:A:512:LYS:HE2	1:A:527:GLN:OE1	2.20	0.41
1:D:154:TRP:HD1	1:D:214:LEU:HD12	1.85	0.41
1:D:405:ILE:HG13	1:D:429:ARG:HD2	2.02	0.41
1:D:622:LYS:O	1:D:648:LYS:HD2	2.20	0.41
1:A:127:SER:HB3	1:A:211:TYR:CD2	2.56	0.41
1:A:179:ASN:N	1:A:179:ASN:HD22	2.17	0.41
1:B:622:LYS:O	1:B:648:LYS:HD2	2.20	0.41
1:B:582:GLY:HA2	1:B:594:ILE:HD12	2.01	0.41
1:C:477:LEU:HD23	1:C:497:ASN:HB3	2.02	0.41
1:D:40:ARG:HA	1:D:40:ARG:HD2	1.94	0.41
1:B:602:GLU:HG3	1:B:603:VAL:N	2.32	0.40
1:C:658:ARG:HG2	1:C:661:TYR:CE2	2.56	0.40
1:D:387:PHE:CD1	1:D:394:CYS:HB3	2.56	0.40
1:D:571:GLU:CD	1:D:760:LYS:HD3	2.41	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:184:ARG:HD2	1:B:187:TRP:CE2	2.56	0.40
1:B:308:GLN:OE1	1:B:308:GLN:HA	2.21	0.40
1:B:514:LEU:HD12	1:B:557:THR:HG22	2.03	0.40
1:C:134:ILE:HD13	1:C:178:PRO:HB3	2.03	0.40
1:C:305:TRP:CE2	1:C:311:ILE:HD12	2.56	0.40
1:C:720:SER:O	1:C:724:VAL:HG23	2.21	0.40
1:A:177:GLU:HA	1:A:178:PRO:HD3	1.92	0.40
1:C:512:LYS:HE3	1:C:527:GLN:OE1	2.22	0.40
1:D:669:ARG:HD2	1:D:670:TYR:CZ	2.56	0.40
1:A:95:PHE:CE1	1:A:116:LEU:HD11	2.56	0.40
1:C:657:SER:HA	1:C:688:VAL:CG1	2.50	0.40
1:A:134:ILE:HD13	1:A:178:PRO:HB3	2.03	0.40
1:A:470:LEU:HD12	1:A:483:HIS:NE2	2.37	0.40
1:C:105:TYR:HB2	1:C:114:ILE:HD11	2.04	0.40
1:C:731:GLN:NE2	1:D:731:GLN:HE22	2.18	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	725/740 (98%)	697 (96%)	28 (4%)	0	100	100
1	B	731/740 (99%)	704 (96%)	26 (4%)	1 (0%)	51	60
1	C	724/740 (98%)	690 (95%)	32 (4%)	2 (0%)	41	46
1	D	725/740 (98%)	692 (95%)	33 (5%)	0	100	100
All	All	2905/2960 (98%)	2783 (96%)	119 (4%)	3 (0%)	51	60

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	714	GLN
1	C	73	GLU
1	C	463	LYS

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	652/662 (98%)	613 (94%)	39 (6%)	19	18
1	B	658/662 (99%)	610 (93%)	48 (7%)	14	12
1	C	651/662 (98%)	617 (95%)	34 (5%)	23	24
1	D	652/662 (98%)	613 (94%)	39 (6%)	19	18
All	All	2613/2648 (99%)	2453 (94%)	160 (6%)	18	18

All (160) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	61	ARG
1	A	63	ILE
1	A	66	HIS
1	A	78	VAL
1	A	80	ASN
1	A	129	THR
1	A	170	ASN
1	A	179	ASN
1	A	246	LEU
1	A	276	LEU
1	A	283	THR
1	A	313	LEU
1	A	316	LEU
1	A	379	GLU
1	A	385	CYS
1	A	388	GLN
1	A	392	LYS
1	A	395	THR
1	A	410	LEU

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Mol	Chain	Res	Type
1	A	436	LEU
1	A	448	GLU
1	A	464	GLU
1	A	472	CYS
1	A	477	LEU
1	A	482	LEU
1	A	492	ARG
1	A	504	LEU
1	A	514	LEU
1	A	519	LEU
1	A	538	LYS
1	A	547	TYR
1	A	566	TYR
1	A	575	VAL
1	A	598	LEU
1	A	614	SER
1	A	673	LEU
1	A	685	ASN
1	A	704	HIS
1	A	710	ASN
1	B	40	ARG
1	B	51	ASN
1	B	55	LEU
1	B	57	LEU
1	B	66	HIS
1	B	71	LYS
1	B	96	ASP
1	B	164	LEU
1	B	184	ARG
1	B	202	VAL
1	B	230	ASP
1	B	276	LEU
1	B	278	SER
1	B	316	LEU
1	B	350	THR
1	B	360	SER
1	B	366	LEU
1	B	378	GLU
1	B	385	CYS
1	B	388	GLN
1	B	389	ILE
1	B	395	THR

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Mol	Chain	Res	Type
1	B	436	LEU
1	B	448	GLU
1	B	453	ARG
1	B	463	LYS
1	B	471	ARG
1	B	472	CYS
1	B	482	LEU
1	B	504	LEU
1	B	514	LEU
1	B	521	GLU
1	B	546	VAL
1	B	547	TYR
1	B	566	TYR
1	B	589	LYS
1	B	594	ILE
1	B	658	ARG
1	B	665	VAL
1	B	673	LEU
1	B	677	GLU
1	B	685	ASN
1	B	688	VAL
1	B	704	HIS
1	B	710	ASN
1	B	711	VAL
1	B	728	VAL
1	B	761	GLN
1	C	59	SER
1	C	74	ASN
1	C	75	ASN
1	C	77	LEU
1	C	80	ASN
1	C	92	ASN
1	C	129	THR
1	C	164	LEU
1	C	184	ARG
1	C	246	LEU
1	C	276	LEU
1	C	278	SER
1	C	280	THR
1	C	283	THR
1	C	316	LEU
1	C	326	ASP

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Mol	Chain	Res	Type
1	C	329	ASP
1	C	341	VAL
1	C	360	SER
1	C	365	THR
1	C	370	SER
1	C	385	CYS
1	C	413	ASP
1	C	504	LEU
1	C	506	ASN
1	C	514	LEU
1	C	519	LEU
1	C	547	TYR
1	C	597	ARG
1	C	598	LEU
1	C	627	TRP
1	C	688	VAL
1	C	710	ASN
1	C	728	VAL
1	D	51	ASN
1	D	66	HIS
1	D	71	LYS
1	D	73	GLU
1	D	75	ASN
1	D	129	THR
1	D	164	LEU
1	D	177	GLU
1	D	184	ARG
1	D	243	ASP
1	D	276	LEU
1	D	295	ILE
1	D	316	LEU
1	D	343	ARG
1	D	350	THR
1	D	385	CYS
1	D	395	THR
1	D	410	LEU
1	D	415	LEU
1	D	436	LEU
1	D	443	THR
1	D	464	GLU
1	D	470	LEU
1	D	472	CYS

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Mol	Chain	Res	Type
1	D	482	LEU
1	D	487	ASN
1	D	514	LEU
1	D	519	LEU
1	D	547	TYR
1	D	575	VAL
1	D	594	ILE
1	D	658	ARG
1	D	685	ASN
1	D	704	HIS
1	D	710	ASN
1	D	711	VAL
1	D	728	VAL
1	D	744	SER
1	D	761	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (67) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	80	ASN
1	A	138	ASN
1	A	151	ASN
1	A	153	GLN
1	A	169	ASN
1	A	170	ASN
1	A	179	ASN
1	A	229	ASN
1	A	281	ASN
1	A	321	ASN
1	A	344	GLN
1	A	455	GLN
1	A	520	ASN
1	A	572	ASN
1	A	592	HIS
1	A	685	ASN
1	A	697	GLN
1	A	710	ASN
1	A	748	HIS
1	B	150	ASN
1	B	169	ASN
1	B	196	ASN
1	B	227	GLN

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Mol	Chain	Res	Type
1	B	229	ASN
1	B	281	ASN
1	B	321	ASN
1	B	338	ASN
1	B	344	GLN
1	B	450	ASN
1	B	508	GLN
1	B	572	ASN
1	B	592	HIS
1	B	710	ASN
1	B	731	GLN
1	C	74	ASN
1	C	75	ASN
1	C	80	ASN
1	C	119	ASN
1	C	150	ASN
1	C	153	GLN
1	C	169	ASN
1	C	170	ASN
1	C	281	ASN
1	C	388	GLN
1	C	430	ASN
1	C	455	GLN
1	C	508	GLN
1	C	520	ASN
1	C	572	ASN
1	C	592	HIS
1	C	710	ASN
1	C	731	GLN
1	D	75	ASN
1	D	92	ASN
1	D	123	GLN
1	D	138	ASN
1	D	169	ASN
1	D	196	ASN
1	D	227	GLN
1	D	344	GLN
1	D	345	HIS
1	D	487	ASN
1	D	572	ASN
1	D	685	ASN
1	D	697	GLN

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Mol	Chain	Res	Type
1	D	710	ASN
1	D	731	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](#)

16 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	E	1	1,2	14,14,15	0.52	0	17,19,21	1.79	2 (11%)
2	NAG	E	2	2	14,14,15	0.58	0	17,19,21	1.19	1 (5%)
2	NAG	F	1	2	14,14,15	0.72	0	17,19,21	1.32	1 (5%)
2	NAG	F	2	2	14,14,15	0.46	0	17,19,21	1.53	3 (17%)
2	NAG	G	1	2	14,14,15	0.60	0	17,19,21	1.53	3 (17%)
2	NAG	G	2	2	14,14,15	0.55	0	17,19,21	0.71	0
2	NAG	H	1	2	14,14,15	0.56	0	17,19,21	1.66	4 (23%)
2	NAG	H	2	2	14,14,15	0.64	0	17,19,21	1.23	2 (11%)
2	NAG	I	1	2	14,14,15	0.52	0	17,19,21	0.92	0
2	NAG	I	2	2	14,14,15	0.50	0	17,19,21	0.82	0
2	NAG	J	1	2	14,14,15	0.70	0	17,19,21	1.14	2 (11%)
2	NAG	J	2	2	14,14,15	0.52	0	17,19,21	1.17	3 (17%)
2	NAG	K	1	2	14,14,15	0.62	0	17,19,21	0.94	0
2	NAG	K	2	2	14,14,15	0.51	0	17,19,21	1.62	3 (17%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	NAG	L	1	2	14,14,15	0.66	0	17,19,21	1.63	2 (11%)
2	NAG	L	2	2	14,14,15	0.55	0	17,19,21	1.41	3 (17%)

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	E	1	1,2	-	3/6/23/26	0/1/1/1
2	NAG	E	2	2	-	4/6/23/26	0/1/1/1
2	NAG	F	1	2	-	0/6/23/26	0/1/1/1
2	NAG	F	2	2	-	4/6/23/26	0/1/1/1
2	NAG	G	1	2	-	3/6/23/26	0/1/1/1
2	NAG	G	2	2	-	4/6/23/26	0/1/1/1
2	NAG	H	1	2	-	2/6/23/26	0/1/1/1
2	NAG	H	2	2	-	3/6/23/26	0/1/1/1
2	NAG	I	1	2	-	3/6/23/26	0/1/1/1
2	NAG	I	2	2	-	4/6/23/26	0/1/1/1
2	NAG	J	1	2	-	0/6/23/26	0/1/1/1
2	NAG	J	2	2	-	4/6/23/26	0/1/1/1
2	NAG	K	1	2	-	0/6/23/26	0/1/1/1
2	NAG	K	2	2	-	2/6/23/26	0/1/1/1
2	NAG	L	1	2	-	2/6/23/26	0/1/1/1
2	NAG	L	2	2	-	4/6/23/26	0/1/1/1

There are no bond length outliers.

All (29) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	1	NAG	C1-O5-C5	5.65	119.85	112.19
2	K	2	NAG	C1-O5-C5	4.59	118.41	112.19
2	F	2	NAG	C1-O5-C5	4.58	118.40	112.19
2	L	1	NAG	C3-C4-C5	4.12	117.59	110.24
2	L	1	NAG	O5-C1-C2	-3.98	105.01	111.29
2	H	1	NAG	C3-C4-C5	3.66	116.77	110.24
2	F	1	NAG	C1-O5-C5	-3.62	107.29	112.19
2	E	2	NAG	C4-C3-C2	3.58	116.27	111.02

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	G	1	NAG	O5-C1-C2	-3.33	106.04	111.29
2	G	1	NAG	C3-C4-C5	3.30	116.13	110.24
2	H	1	NAG	O5-C1-C2	-3.02	106.52	111.29
2	H	2	NAG	C4-C3-C2	2.91	115.29	111.02
2	H	1	NAG	C1-O5-C5	2.89	116.11	112.19
2	J	2	NAG	C1-O5-C5	2.88	116.10	112.19
2	J	1	NAG	O5-C1-C2	-2.82	106.84	111.29
2	L	2	NAG	C2-N2-C7	2.79	126.88	122.90
2	L	2	NAG	C4-C3-C2	2.76	115.06	111.02
2	E	1	NAG	C2-N2-C7	2.75	126.82	122.90
2	L	2	NAG	C8-C7-N2	2.64	120.57	116.10
2	K	2	NAG	C8-C7-N2	2.61	120.52	116.10
2	F	2	NAG	C8-C7-N2	2.52	120.37	116.10
2	G	1	NAG	C4-C3-C2	2.49	114.67	111.02
2	J	1	NAG	C3-C4-C5	2.44	114.59	110.24
2	K	2	NAG	O7-C7-C8	-2.43	117.55	122.06
2	H	1	NAG	O5-C5-C4	2.41	116.69	110.83
2	H	2	NAG	O5-C5-C6	2.38	110.94	107.20
2	J	2	NAG	C8-C7-N2	2.15	119.74	116.10
2	J	2	NAG	C2-N2-C7	2.05	125.83	122.90
2	F	2	NAG	O7-C7-C8	-2.01	118.32	122.06

There are no chirality outliers.

All (42) torsion outliers are listed below:

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

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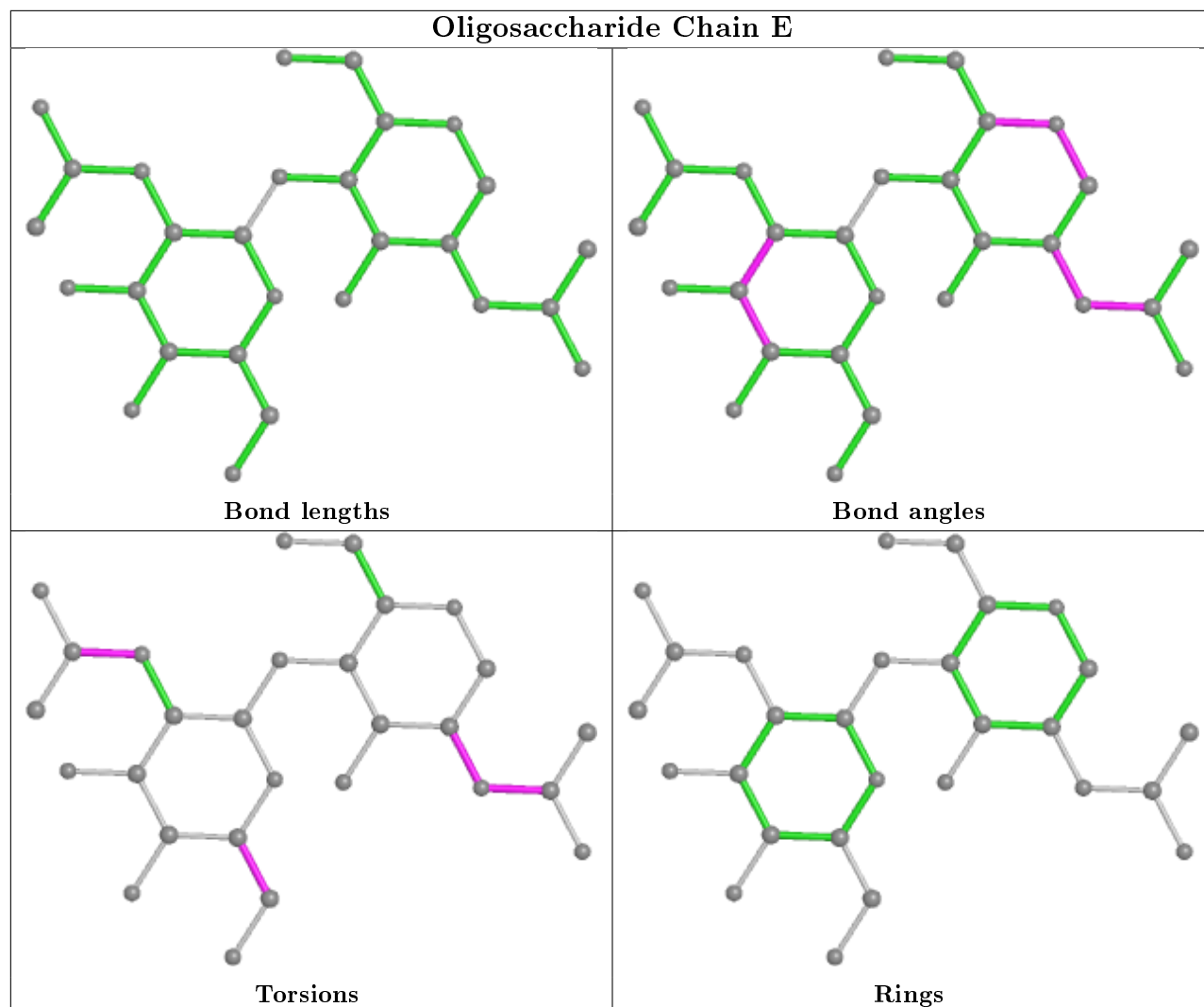
Mol	Chain	Res	Type	Atoms
2	G	2	NAG	C4-C5-C6-O6
2	I	2	NAG	C4-C5-C6-O6
2	J	2	NAG	C4-C5-C6-O6
2	F	2	NAG	C8-C7-N2-C2
2	F	2	NAG	O7-C7-N2-C2
2	L	2	NAG	C8-C7-N2-C2
2	L	2	NAG	O7-C7-N2-C2
2	J	2	NAG	C8-C7-N2-C2
2	J	2	NAG	O7-C7-N2-C2
2	L	1	NAG	C4-C5-C6-O6
2	G	2	NAG	O5-C5-C6-O6
2	E	2	NAG	C8-C7-N2-C2
2	F	2	NAG	C4-C5-C6-O6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

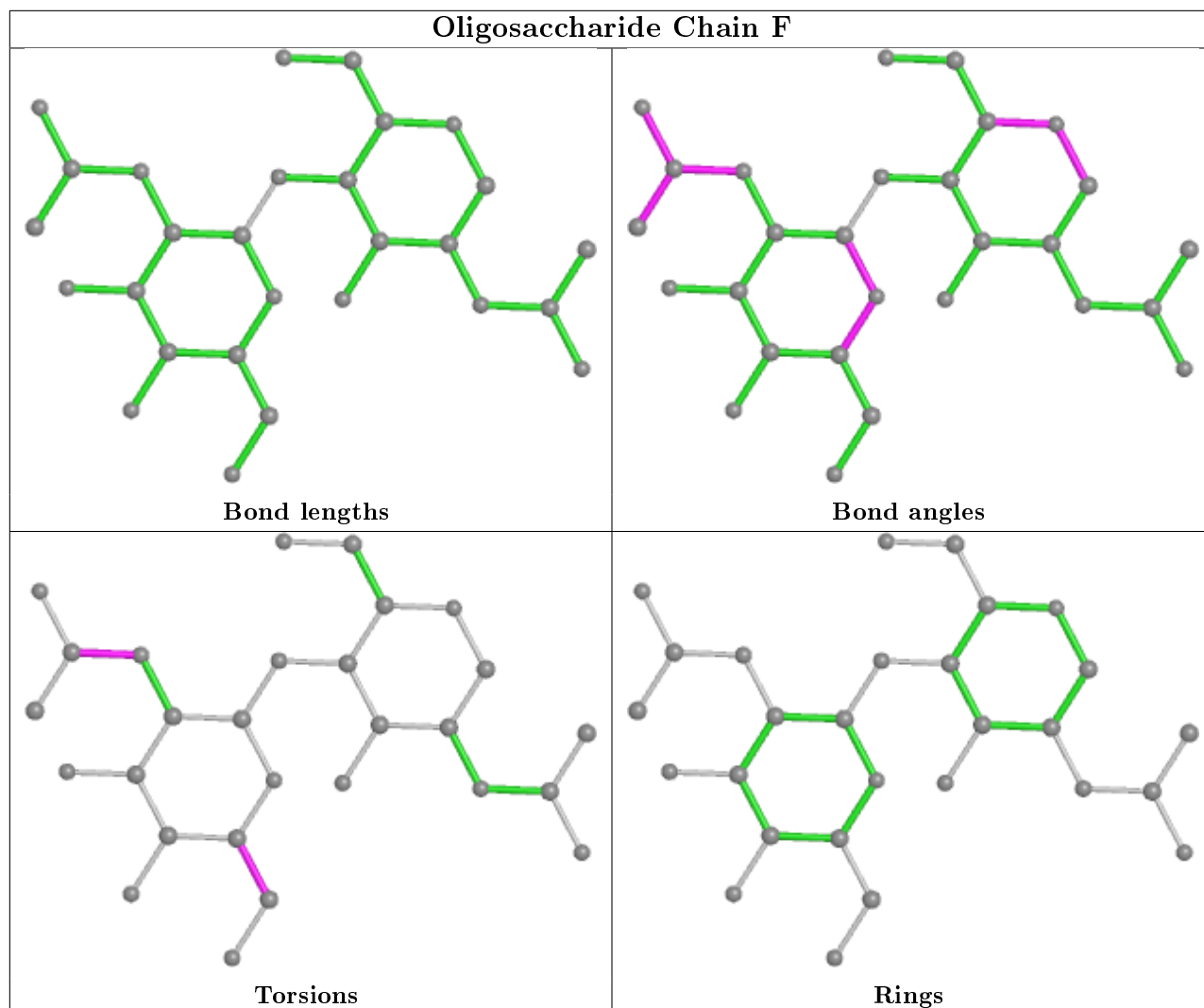
There are no ring outliers.

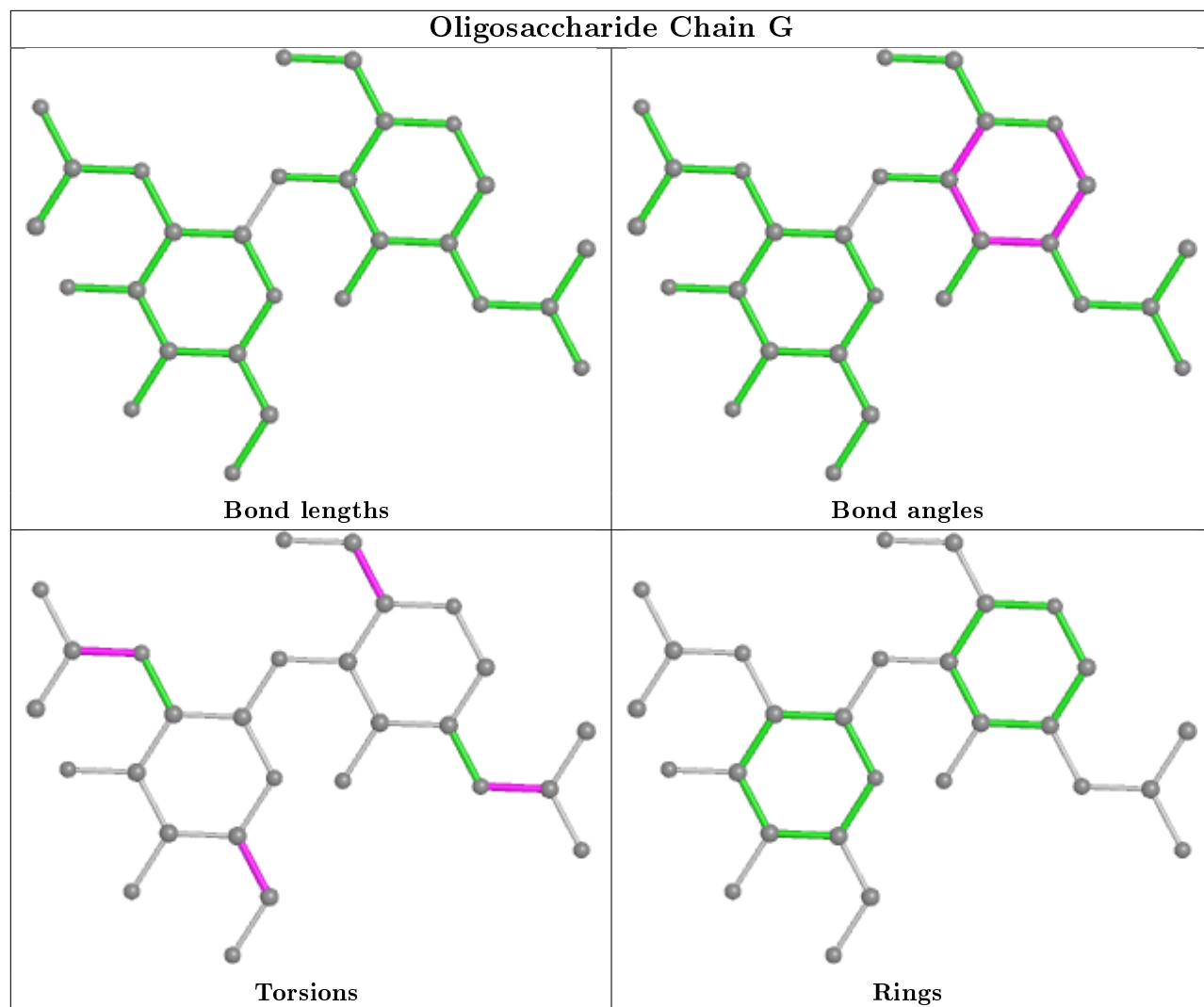
7 monomers are involved in 15 short contacts:

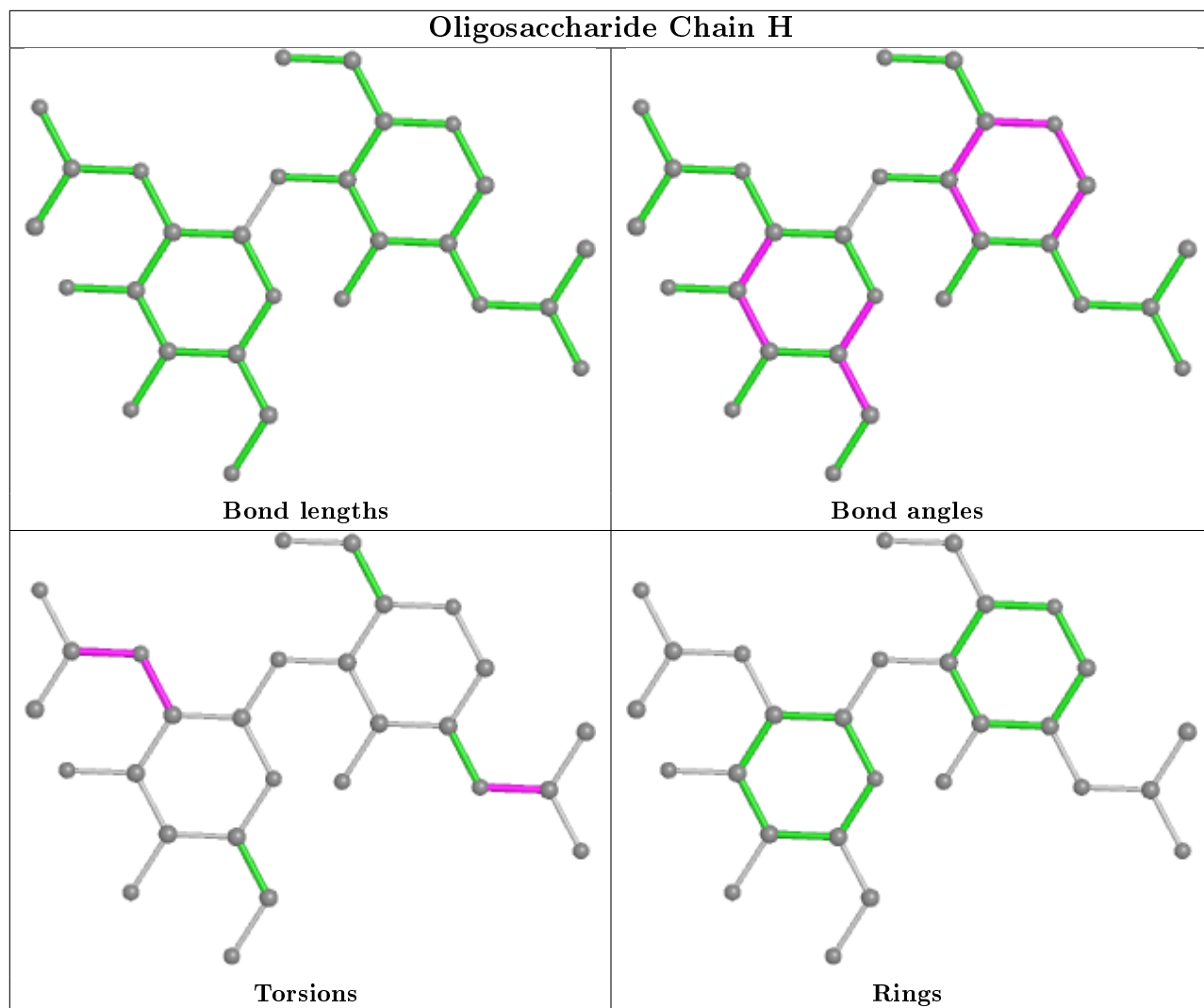
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	H	1	NAG	3	0
2	G	1	NAG	1	0
2	J	1	NAG	2	0
2	L	1	NAG	5	0
2	H	2	NAG	1	0
2	F	1	NAG	2	0
2	K	1	NAG	2	0

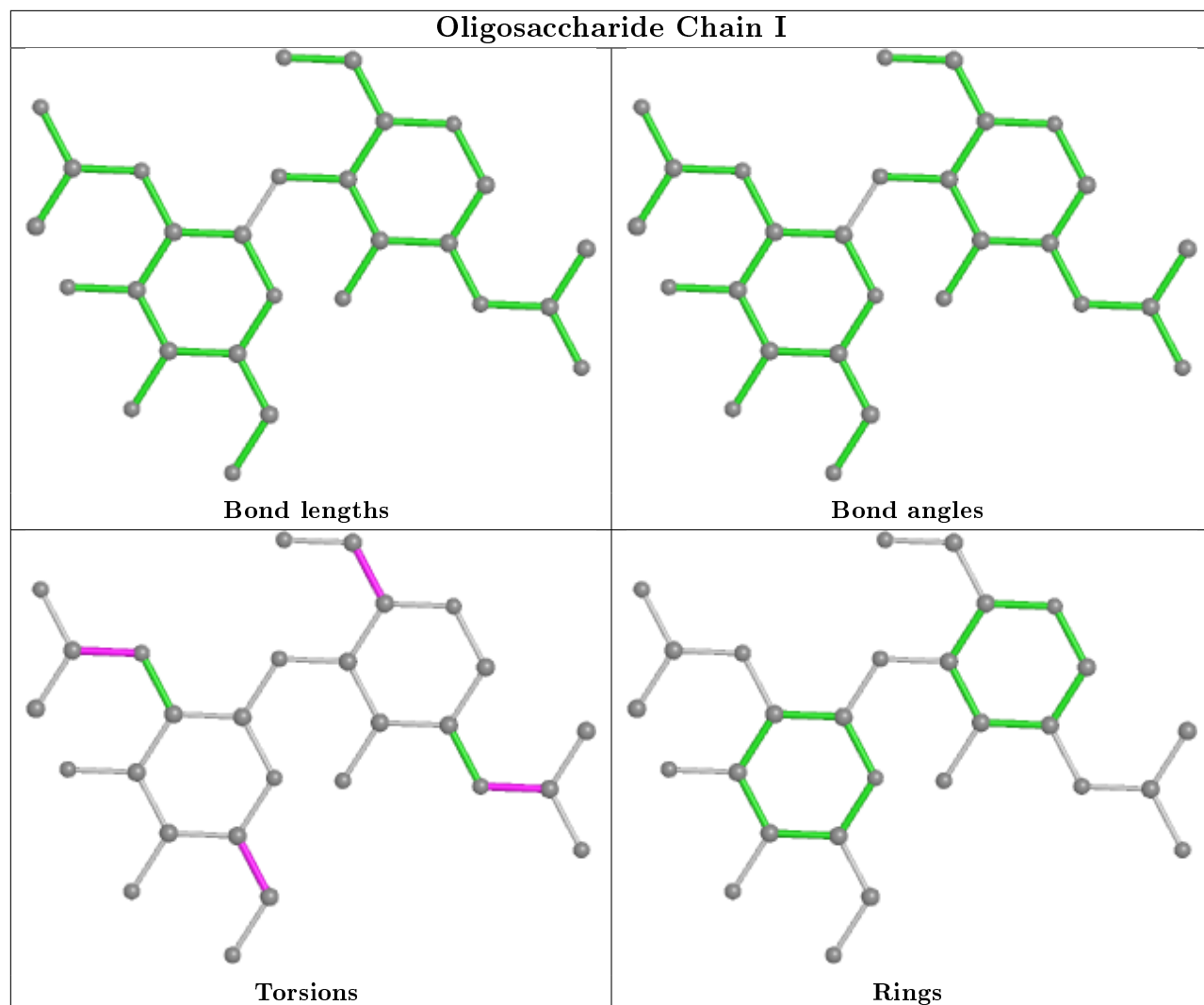
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

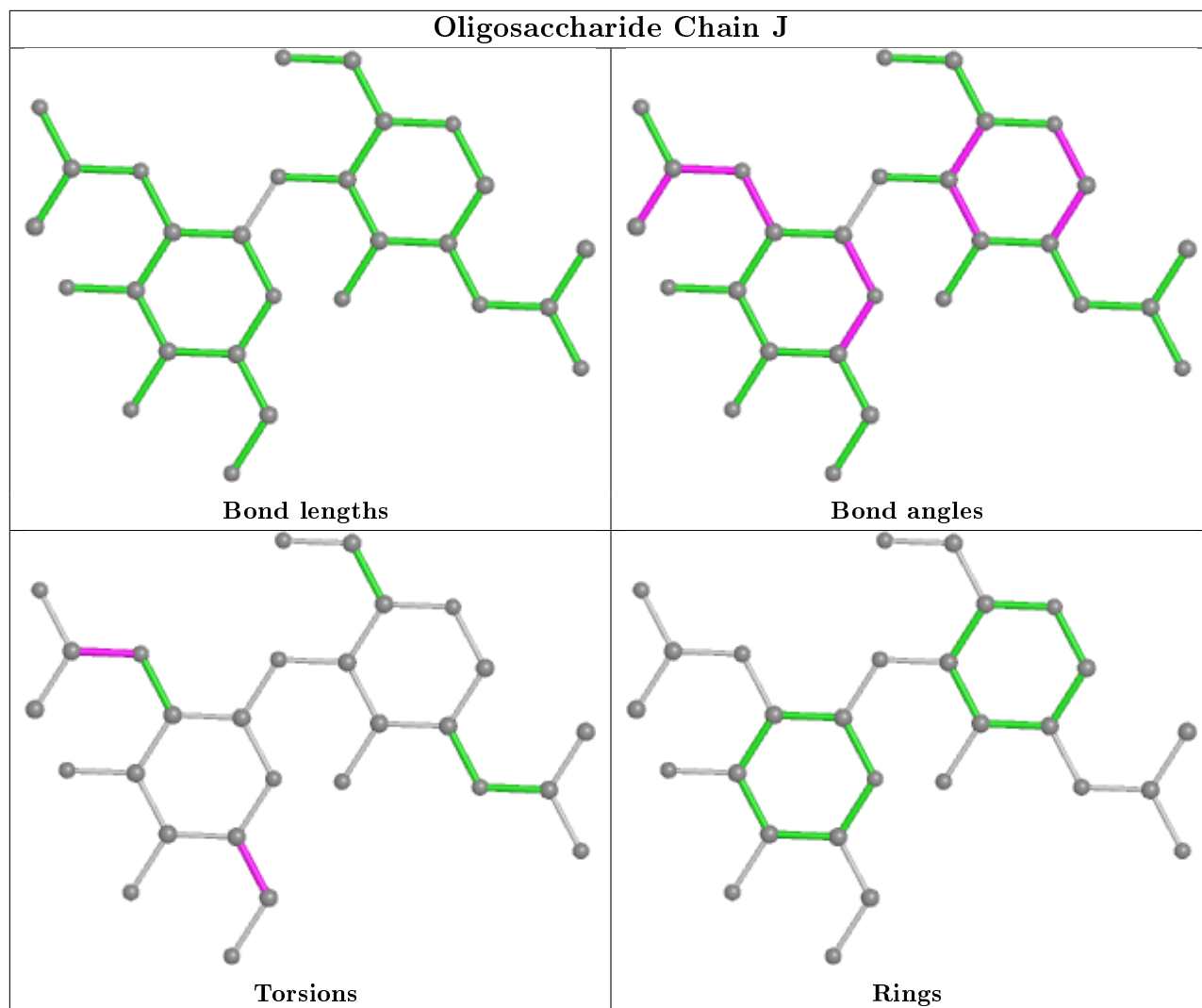


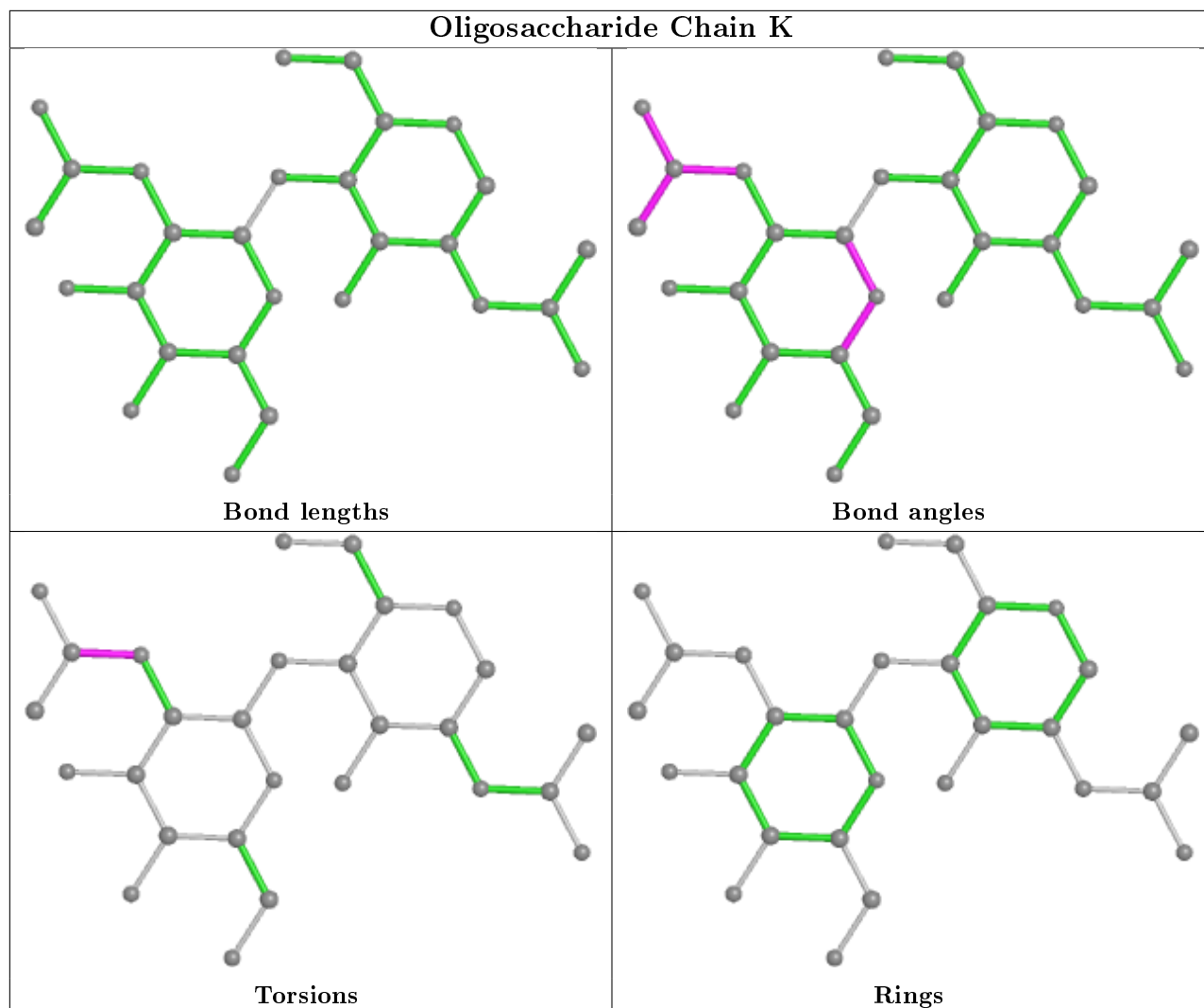


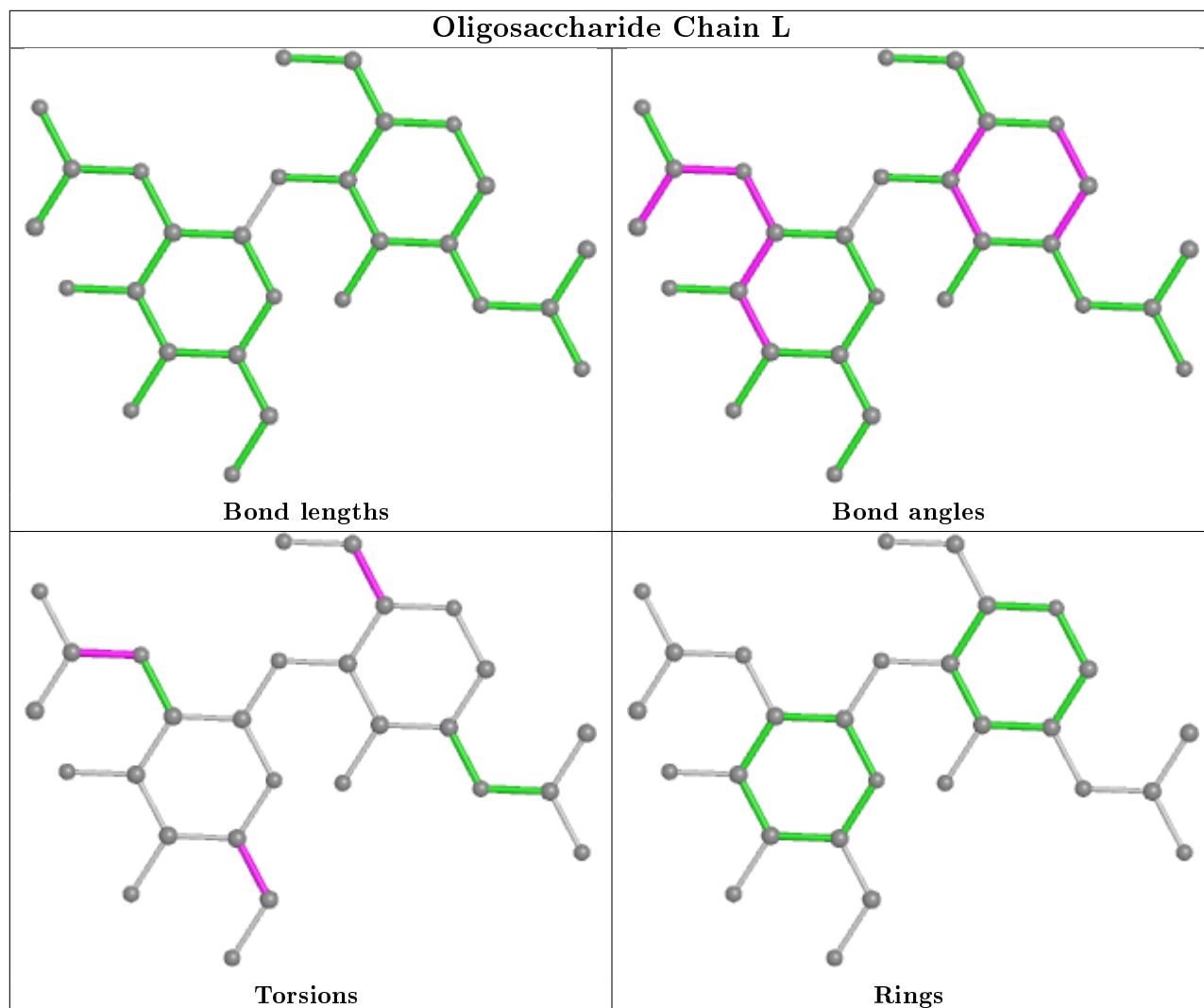












5.6 Ligand geometry [i](#)

21 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z > 2$	Counts	RMSZ	# $ Z > 2$
4	T22	C	800	-	23,27,27	2.01	1 (4%)	28,38,38	1.50	4 (14%)
3	NAG	B	801	-	14,14,15	0.47	0	17,19,21	1.03	1 (5%)
3	NAG	D	808	-	14,14,15	0.48	0	17,19,21	1.12	2 (11%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	NAG	A	804	-	14,14,15	0.61	0	17,19,21	1.14	1 (5%)
4	T22	D	800	-	23,27,27	2.00	1 (4%)	28,38,38	1.49	4 (14%)
3	NAG	C	807	-	14,14,15	0.64	0	17,19,21	1.47	3 (17%)
3	NAG	D	803	-	14,14,15	0.62	0	17,19,21	1.27	2 (11%)
3	NAG	A	812	-	14,14,15	0.48	0	17,19,21	0.90	1 (5%)
3	NAG	B	807	-	14,14,15	0.50	0	17,19,21	0.83	1 (5%)
3	NAG	C	805	-	14,14,15	0.52	0	17,19,21	0.82	0
3	NAG	D	807	1	14,14,15	0.55	0	17,19,21	1.19	2 (11%)
3	NAG	A	801	-	14,14,15	0.52	0	17,19,21	0.65	0
3	NAG	B	808	-	14,14,15	0.56	0	17,19,21	1.18	1 (5%)
3	NAG	B	802	-	14,14,15	0.55	0	17,19,21	1.20	1 (5%)
3	NAG	C	806	1	14,14,15	0.56	0	17,19,21	1.03	1 (5%)
3	NAG	D	802	1	14,14,15	1.20	1 (7%)	17,19,21	1.72	5 (29%)
3	NAG	A	811	-	14,14,15	0.54	0	17,19,21	1.41	4 (23%)
4	T22	B	800	-	23,27,27	2.01	1 (4%)	28,38,38	1.50	4 (14%)
3	NAG	C	802	-	14,14,15	0.58	0	17,19,21	1.29	2 (11%)
3	NAG	D	806	1	14,14,15	0.75	0	17,19,21	1.40	3 (17%)
4	T22	A	800	-	23,27,27	2.01	1 (4%)	28,38,38	1.50	4 (14%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	T22	C	800	-	-	5/10/20/20	0/3/3/3
3	NAG	B	801	-	-	4/6/23/26	0/1/1/1
3	NAG	D	808	-	-	2/6/23/26	0/1/1/1
3	NAG	A	804	-	-	3/6/23/26	0/1/1/1
4	T22	D	800	-	-	5/10/20/20	0/3/3/3
3	NAG	C	807	-	-	2/6/23/26	0/1/1/1
3	NAG	D	803	-	-	3/6/23/26	0/1/1/1
3	NAG	A	812	-	-	6/6/23/26	0/1/1/1
3	NAG	B	807	-	-	4/6/23/26	0/1/1/1
3	NAG	C	805	-	-	4/6/23/26	0/1/1/1
3	NAG	D	807	1	1/1/5/7	4/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	A	801	-	-	2/6/23/26	0/1/1/1
3	NAG	B	808	-	-	0/6/23/26	0/1/1/1
3	NAG	B	802	-	-	4/6/23/26	0/1/1/1
3	NAG	C	806	1	-	2/6/23/26	0/1/1/1
3	NAG	D	802	1	-	3/6/23/26	0/1/1/1
3	NAG	A	811	-	-	4/6/23/26	0/1/1/1
4	T22	B	800	-	-	5/10/20/20	0/3/3/3
3	NAG	C	802	-	-	2/6/23/26	0/1/1/1
3	NAG	D	806	1	-	2/6/23/26	0/1/1/1
4	T22	A	800	-	-	5/10/20/20	0/3/3/3

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	800	T22	C22-C23	-8.78	1.31	1.44
4	A	800	T22	C22-C23	-8.78	1.31	1.44
4	D	800	T22	C22-C23	-8.77	1.31	1.44
4	C	800	T22	C22-C23	-8.76	1.31	1.44
3	D	802	NAG	O5-C1	-4.11	1.37	1.43

All (46) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	806	NAG	C4-C3-C2	4.39	117.46	111.02
3	C	807	NAG	C4-C3-C2	4.34	117.37	111.02
4	B	800	T22	C11-C14-N7	4.06	114.76	109.64
4	A	800	T22	C11-C14-N7	4.04	114.74	109.64
4	C	800	T22	C11-C14-N7	4.04	114.73	109.64
4	D	800	T22	C11-C14-N7	4.02	114.72	109.64
3	D	802	NAG	C2-N2-C7	3.50	127.88	122.90
3	A	804	NAG	O5-C5-C6	3.16	112.16	107.20
3	D	807	NAG	C1-O5-C5	3.13	116.44	112.19
3	D	803	NAG	C3-C4-C5	3.12	115.80	110.24
3	D	802	NAG	C1-O5-C5	3.09	116.38	112.19
4	C	800	T22	C17-C22-C23	3.03	123.04	120.14
4	B	800	T22	C17-C22-C23	3.02	123.04	120.14
4	A	800	T22	C17-C22-C23	3.00	123.02	120.14
4	D	800	T22	C17-C22-C23	2.97	122.98	120.14
3	C	807	NAG	C3-C4-C5	2.90	115.42	110.24
3	C	802	NAG	O5-C1-C2	-2.86	106.77	111.29

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	808	NAG	O5-C1-C2	-2.77	106.92	111.29
3	C	802	NAG	C3-C4-C5	2.72	115.10	110.24
3	A	811	NAG	C3-C4-C5	2.68	115.02	110.24
3	A	811	NAG	C2-N2-C7	2.64	126.67	122.90
3	D	807	NAG	C2-N2-C7	2.58	126.58	122.90
3	A	812	NAG	O5-C5-C6	2.53	111.17	107.20
3	A	811	NAG	C1-O5-C5	2.49	115.56	112.19
3	D	802	NAG	C4-C3-C2	-2.46	107.41	111.02
4	B	800	T22	C5-C6-N7	-2.46	114.68	122.70
4	A	800	T22	C5-C6-N7	-2.46	114.69	122.70
4	C	800	T22	C5-C6-N7	-2.45	114.71	122.70
4	D	800	T22	C5-C6-N7	-2.44	114.73	122.70
3	C	806	NAG	C1-O5-C5	2.42	115.47	112.19
3	B	802	NAG	O5-C1-C2	-2.37	107.55	111.29
3	D	806	NAG	C3-C4-C5	2.23	114.22	110.24
3	D	808	NAG	C8-C7-N2	2.21	119.84	116.10
3	D	802	NAG	O3-C3-C2	2.19	114.00	109.47
3	A	811	NAG	C4-C3-C2	2.11	114.11	111.02
4	B	800	T22	C1-N2-C3	2.11	120.92	118.12
4	C	800	T22	C1-N2-C3	2.11	120.91	118.12
4	A	800	T22	C1-N2-C3	2.10	120.90	118.12
3	B	807	NAG	C1-O5-C5	2.08	115.01	112.19
3	D	808	NAG	O5-C1-C2	-2.08	108.00	111.29
4	D	800	T22	C1-N2-C3	2.08	120.87	118.12
3	D	802	NAG	O5-C1-C2	-2.06	108.04	111.29
3	C	807	NAG	O5-C5-C6	2.05	110.42	107.20
3	D	806	NAG	O5-C5-C6	2.03	110.39	107.20
3	D	803	NAG	C1-O5-C5	2.03	114.94	112.19
3	B	801	NAG	O5-C1-C2	-2.00	108.12	111.29

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
3	D	807	NAG	C1

All (71) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	801	NAG	O7-C7-N2-C2
3	A	804	NAG	C8-C7-N2-C2
3	A	804	NAG	O7-C7-N2-C2
3	D	803	NAG	O7-C7-N2-C2

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Mol	Chain	Res	Type	Atoms
3	A	812	NAG	C8-C7-N2-C2
3	A	812	NAG	O7-C7-N2-C2
3	B	807	NAG	C8-C7-N2-C2
3	B	807	NAG	O7-C7-N2-C2
3	D	807	NAG	C8-C7-N2-C2
3	D	807	NAG	O7-C7-N2-C2
3	B	802	NAG	C8-C7-N2-C2
3	B	802	NAG	O7-C7-N2-C2
3	A	811	NAG	C1-C2-N2-C7
3	A	811	NAG	C8-C7-N2-C2
3	A	811	NAG	O7-C7-N2-C2
3	A	801	NAG	C8-C7-N2-C2
3	A	801	NAG	O7-C7-N2-C2
3	C	802	NAG	C8-C7-N2-C2
3	C	802	NAG	O7-C7-N2-C2
3	B	801	NAG	C8-C7-N2-C2
3	D	808	NAG	C8-C7-N2-C2
3	D	803	NAG	C8-C7-N2-C2
3	C	807	NAG	O5-C5-C6-O6
3	C	805	NAG	C8-C7-N2-C2
3	C	805	NAG	O7-C7-N2-C2
3	B	802	NAG	O5-C5-C6-O6
4	C	800	T22	C5-C6-N7-C8
4	B	800	T22	C5-C6-N7-C8
4	D	800	T22	C5-C6-N7-C8
4	A	800	T22	C5-C6-N7-C8
3	B	807	NAG	O5-C5-C6-O6
3	C	805	NAG	O5-C5-C6-O6
3	B	801	NAG	O5-C5-C6-O6
3	C	807	NAG	C4-C5-C6-O6
3	D	808	NAG	O7-C7-N2-C2
3	B	801	NAG	C4-C5-C6-O6
3	B	807	NAG	C4-C5-C6-O6
3	C	805	NAG	C4-C5-C6-O6
3	B	802	NAG	C4-C5-C6-O6
3	D	806	NAG	C4-C5-C6-O6
3	D	806	NAG	O5-C5-C6-O6
3	A	812	NAG	C4-C5-C6-O6
4	C	800	T22	C5-C6-N7-C14
4	B	800	T22	C5-C6-N7-C14
4	D	800	T22	C5-C6-N7-C14
4	A	800	T22	C5-C6-N7-C14

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Mol	Chain	Res	Type	Atoms
3	D	802	NAG	C1-C2-N2-C7
3	A	804	NAG	O5-C5-C6-O6
3	D	807	NAG	O5-C5-C6-O6
4	C	800	T22	N15-C16-C17-C22
4	B	800	T22	N15-C16-C17-C22
4	D	800	T22	N15-C16-C17-C22
4	A	800	T22	N15-C16-C17-C22
4	C	800	T22	N15-C16-C17-C18
4	B	800	T22	N15-C16-C17-C18
4	D	800	T22	N15-C16-C17-C18
4	A	800	T22	N15-C16-C17-C18
3	D	807	NAG	C1-C2-N2-C7
3	A	812	NAG	O5-C5-C6-O6
3	A	811	NAG	O5-C5-C6-O6
3	A	812	NAG	C1-C2-N2-C7
3	D	803	NAG	C4-C5-C6-O6
3	C	806	NAG	C8-C7-N2-C2
3	C	806	NAG	O7-C7-N2-C2
3	A	812	NAG	C3-C2-N2-C7
3	D	802	NAG	O7-C7-N2-C2
3	D	802	NAG	C8-C7-N2-C2
4	C	800	T22	C17-C16-N15-C25
4	B	800	T22	C17-C16-N15-C25
4	D	800	T22	C17-C16-N15-C25
4	A	800	T22	C17-C16-N15-C25

There are no ring outliers.

16 monomers are involved in 20 short contacts:

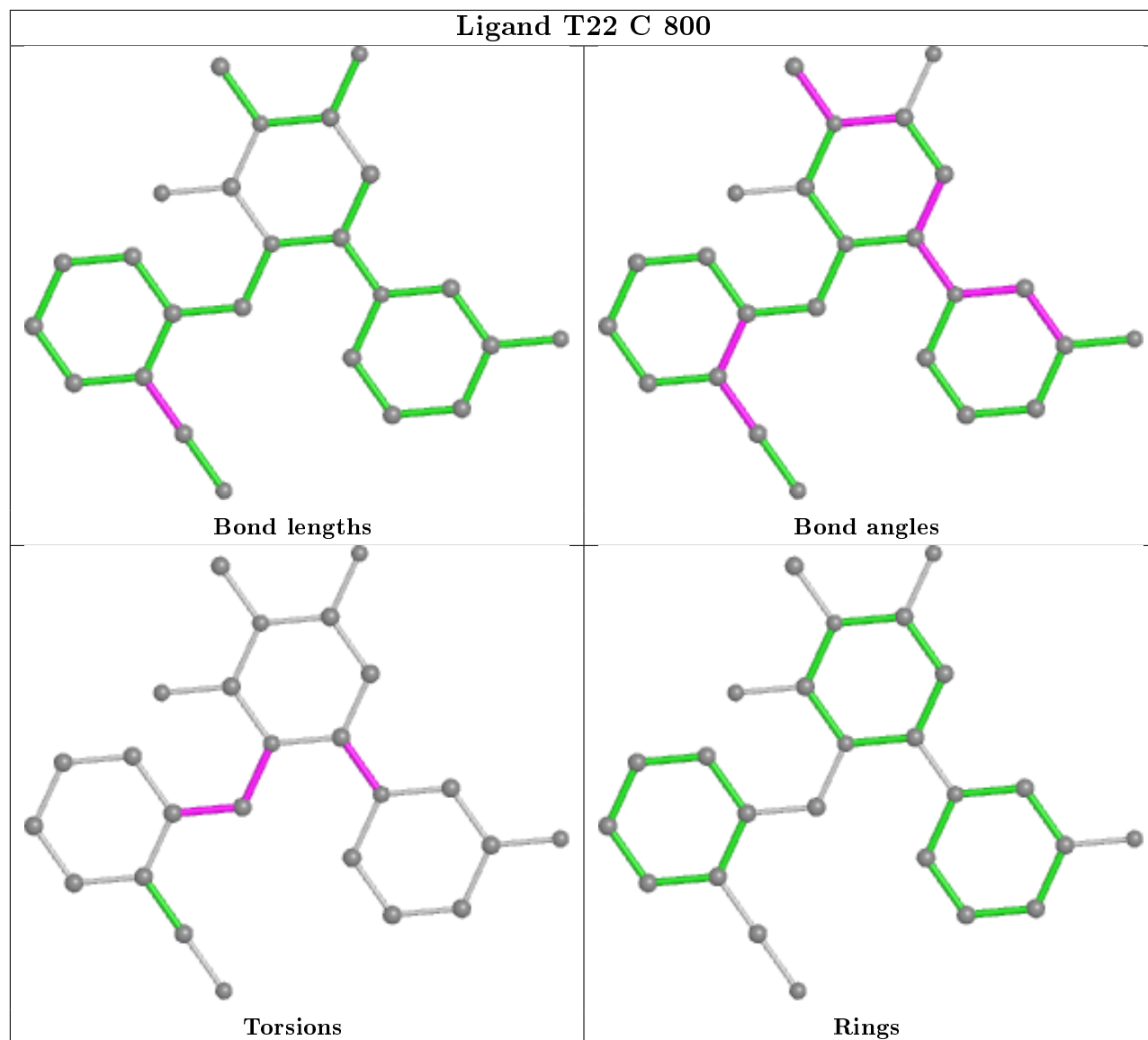
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	800	T22	1	0
3	B	801	NAG	1	0
3	D	808	NAG	2	0
4	D	800	T22	1	0
3	C	807	NAG	1	0
3	D	803	NAG	1	0
3	B	807	NAG	1	0
3	C	805	NAG	1	0
3	D	807	NAG	1	0
3	A	801	NAG	1	0
3	B	808	NAG	2	0
3	B	802	NAG	1	0

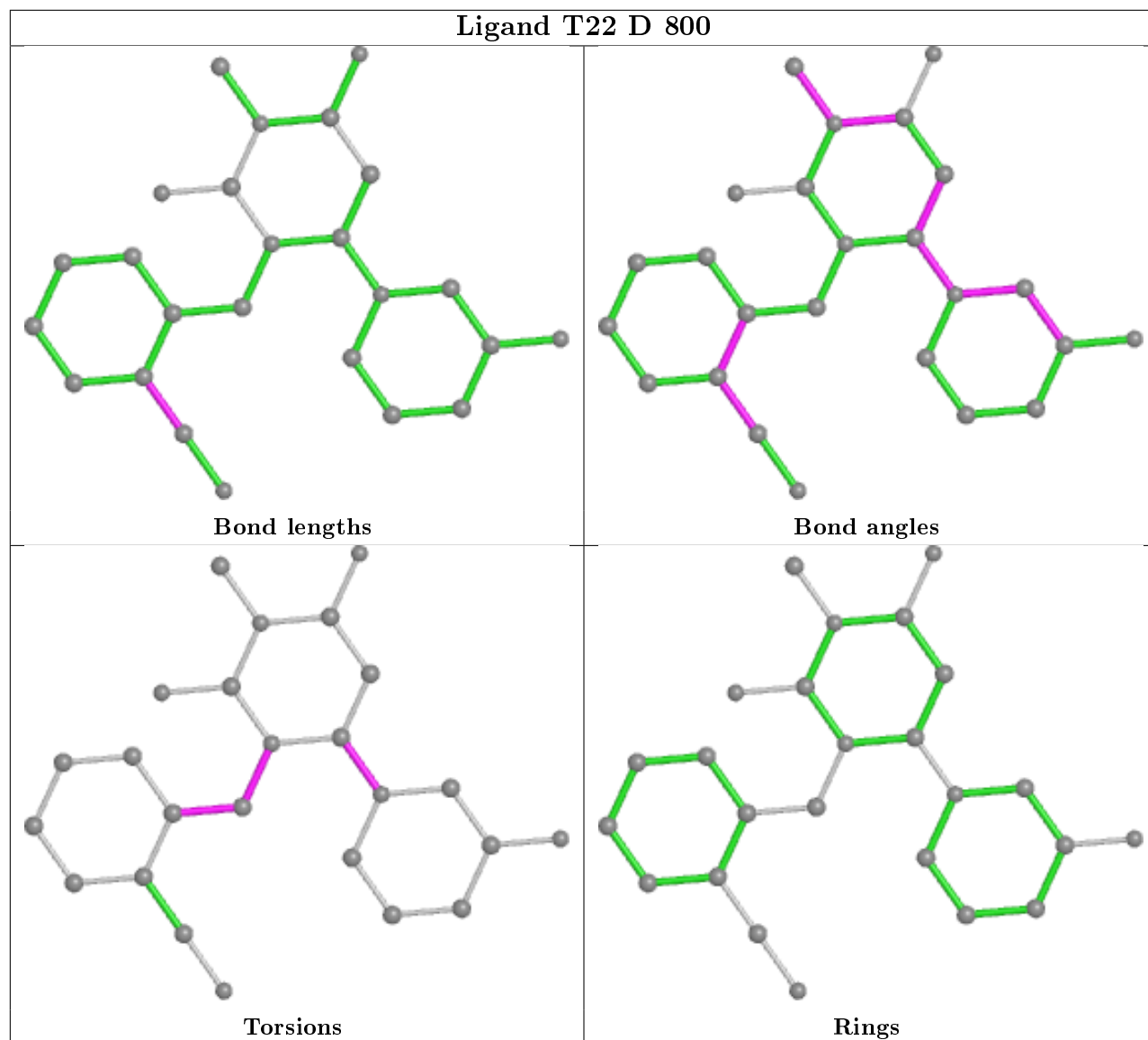
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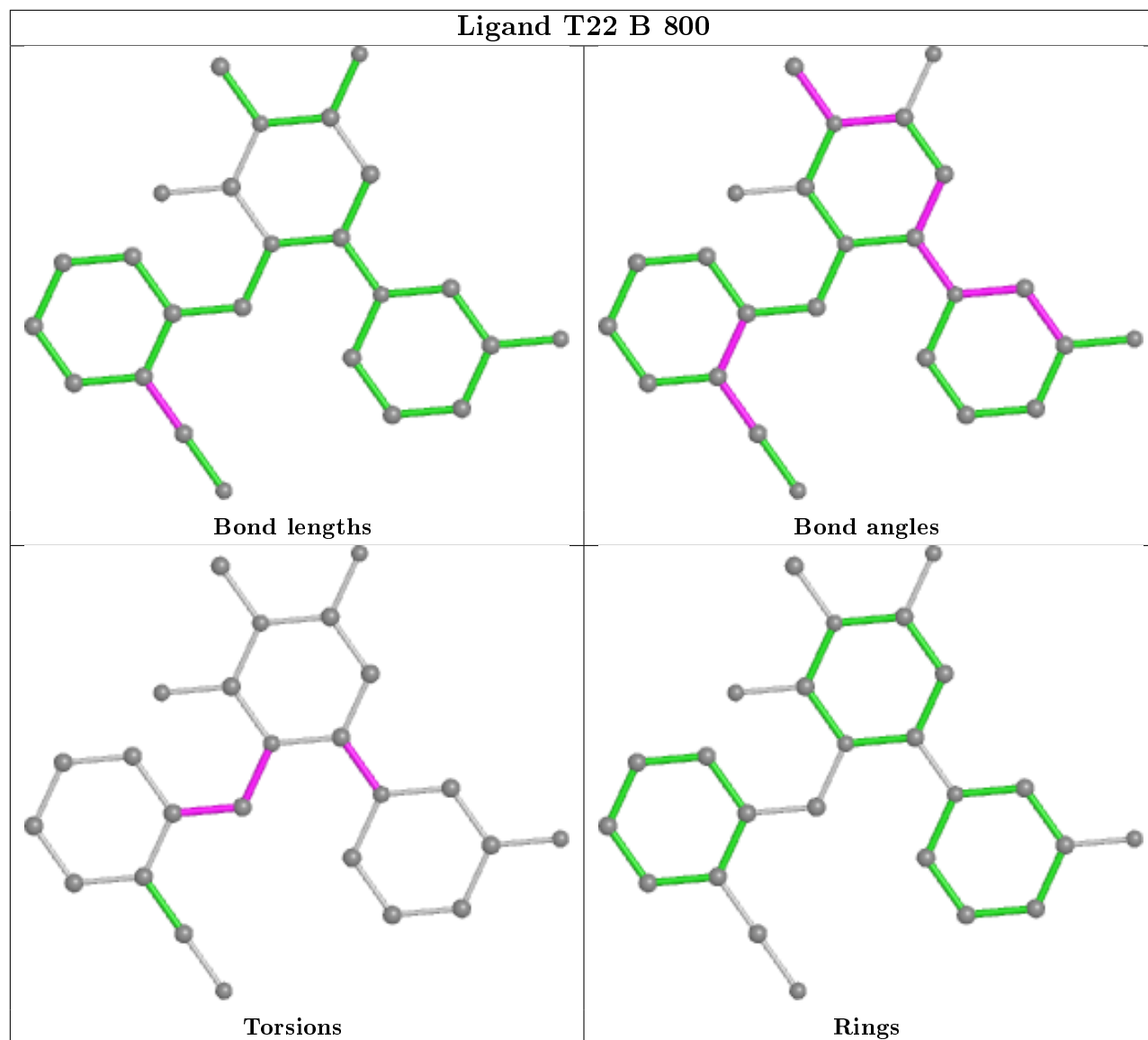
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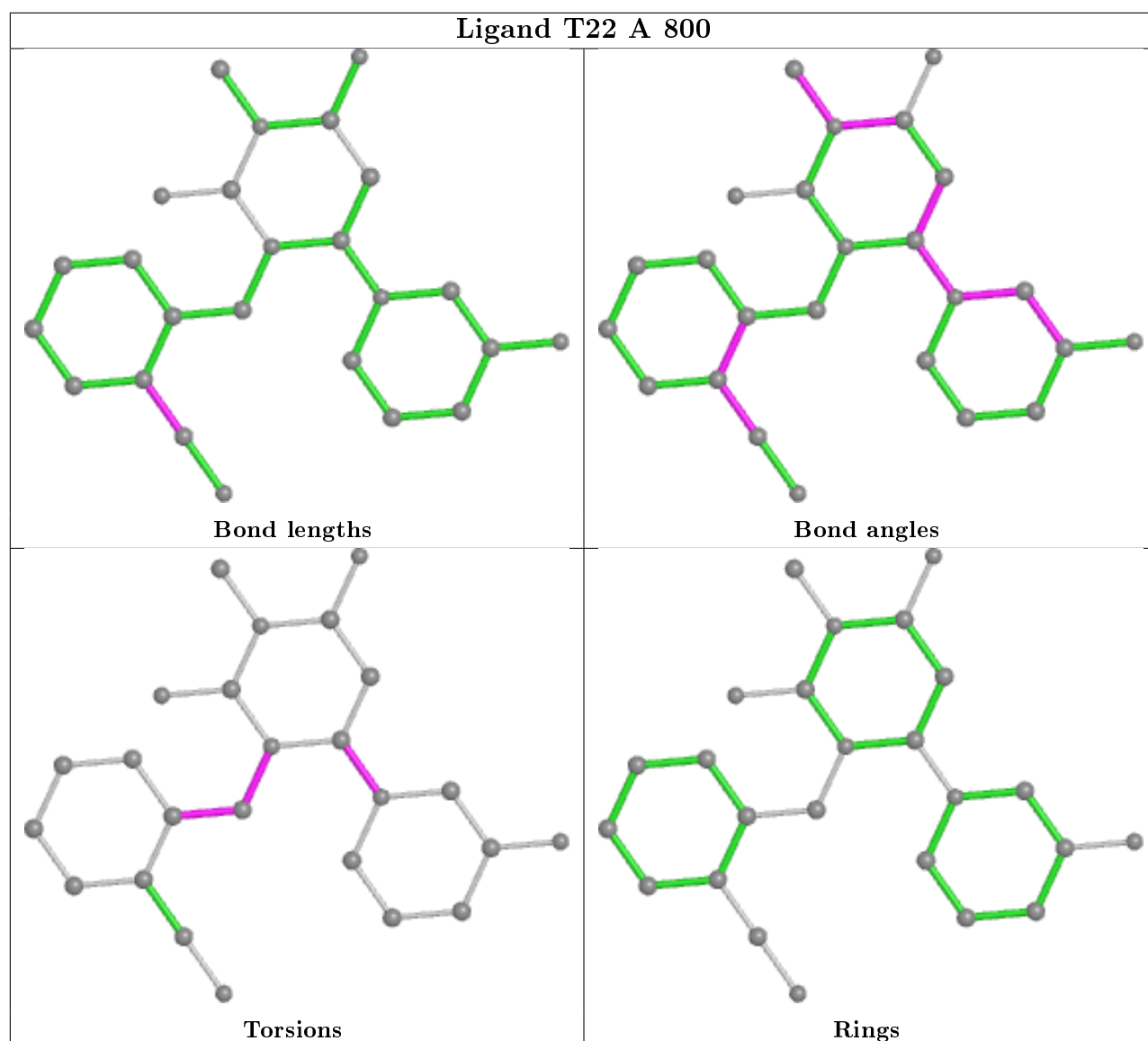
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	811	NAG	3	0
4	B	800	T22	1	0
3	C	802	NAG	1	0
4	A	800	T22	1	0

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









5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	727/740 (98%)	0.47	70 (9%) 8 8	41, 50, 64, 77	0
1	B	733/740 (99%)	0.27	38 (5%) 27 30	38, 50, 64, 77	0
1	C	726/740 (98%)	0.79	100 (13%) 2 2	44, 51, 73, 88	0
1	D	727/740 (98%)	0.50	64 (8%) 10 11	43, 50, 66, 79	0
All	All	2913/2960 (98%)	0.51	272 (9%) 8 9	38, 50, 67, 88	0

All (272) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	88	VAL	10.5
1	C	86	SER	7.6
1	C	77	LEU	7.4
1	C	97	GLU	6.9
1	D	81	ALA	6.5
1	C	99	GLY	6.0
1	C	73	GLU	5.8
1	A	73	GLU	5.8
1	C	76	ILE	5.7
1	C	72	GLN	5.6
1	C	330	TYR	5.4
1	C	92	ASN	5.3
1	C	59	SER	5.3
1	D	89	PHE	5.2
1	C	333	SER	5.1
1	C	93	SER	5.1
1	C	74	ASN	4.8
1	C	222	PHE	4.7
1	D	93	SER	4.7
1	C	391	LYS	4.7
1	A	93	SER	4.6

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Mol	Chain	Res	Type	RSRZ
1	D	96	ASP	4.5
1	C	105	TYR	4.5
1	A	95	PHE	4.4
1	B	72	GLN	4.3
1	A	86	SER	4.3
1	C	442	VAL	4.3
1	A	97	GLU	4.2
1	D	97	GLU	4.2
1	D	78	VAL	4.2
1	B	34	HIS	4.2
1	A	88	VAL	4.2
1	A	84	GLY	4.1
1	A	72	GLN	4.1
1	D	72	GLN	4.1
1	D	83	TYR	4.1
1	D	92	ASN	4.0
1	C	135	TYR	3.9
1	C	322	TYR	3.9
1	C	62	TRP	3.9
1	D	393	ASP	3.9
1	B	81	ALA	3.9
1	D	95	PHE	3.8
1	A	652	ALA	3.8
1	D	84	GLY	3.8
1	C	100	HIS	3.8
1	D	85	ASN	3.8
1	A	140	ARG	3.8
1	A	40	ARG	3.8
1	C	79	PHE	3.7
1	D	40	ARG	3.7
1	C	412	SER	3.7
1	A	656	VAL	3.7
1	B	734	TRP	3.7
1	C	58	TYR	3.7
1	B	733	MET	3.7
1	C	441	LYS	3.7
1	A	703	ILE	3.7
1	C	372	TYR	3.6
1	C	464	GLU	3.6
1	D	102	ILE	3.6
1	A	635	VAL	3.6
1	C	436	LEU	3.6

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Mol	Chain	Res	Type	RSRZ
1	C	71	LYS	3.6
1	C	415	LEU	3.6
1	C	439	TYR	3.6
1	B	71	LYS	3.5
1	B	70	TYR	3.5
1	C	467	TYR	3.5
1	C	81	ALA	3.5
1	B	89	PHE	3.5
1	A	69	LEU	3.5
1	A	711	VAL	3.5
1	D	86	SER	3.5
1	C	392	LYS	3.5
1	D	87	SER	3.5
1	D	332	GLU	3.4
1	A	96	ASP	3.4
1	B	87	SER	3.4
1	C	491	LEU	3.4
1	D	279	VAL	3.4
1	C	397	ILE	3.4
1	D	100	HIS	3.4
1	A	701	LEU	3.3
1	C	78	VAL	3.3
1	C	386	TYR	3.2
1	C	148	ILE	3.2
1	C	385	CYS	3.2
1	D	79	PHE	3.2
1	A	98	PHE	3.2
1	B	711	VAL	3.2
1	C	393	ASP	3.2
1	D	91	GLU	3.1
1	A	636	THR	3.1
1	A	651	ILE	3.1
1	B	703	ILE	3.1
1	A	74	ASN	3.1
1	A	92	ASN	3.1
1	C	395	THR	3.1
1	C	83	TYR	3.0
1	D	487	ASN	3.0
1	B	88	VAL	3.0
1	C	380	GLY	3.0
1	C	98	PHE	3.0
1	C	399	LYS	3.0

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Mol	Chain	Res	Type	RSRZ
1	D	330	TYR	2.9
1	D	88	VAL	2.9
1	A	702	LEU	2.9
1	B	702	LEU	2.9
1	C	87	SER	2.9
1	B	84	GLY	2.9
1	D	82	GLU	2.9
1	B	100	HIS	2.9
1	A	626	ILE	2.9
1	C	440	THR	2.9
1	A	135	TYR	2.9
1	C	57	LEU	2.9
1	B	86	SER	2.9
1	C	303	VAL	2.9
1	B	77	LEU	2.8
1	A	279	VAL	2.8
1	D	303	VAL	2.8
1	A	654	ALA	2.8
1	C	276	LEU	2.8
1	C	432	TYR	2.8
1	A	81	ALA	2.8
1	C	96	ASP	2.8
1	C	413	ASP	2.8
1	A	733	MET	2.8
1	D	99	GLY	2.8
1	C	505	GLN	2.8
1	A	467	TYR	2.8
1	C	416	TYR	2.8
1	A	214	LEU	2.7
1	C	414	TYR	2.7
1	D	58	TYR	2.7
1	D	207	VAL	2.7
1	C	438	ASP	2.7
1	D	340	LEU	2.7
1	A	719	ILE	2.7
1	B	651	ILE	2.7
1	A	655	PRO	2.7
1	A	662	TYR	2.7
1	B	83	TYR	2.7
1	C	358	ARG	2.7
1	A	632	GLY	2.7
1	A	138	ASN	2.7

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Mol	Chain	Res	Type	RSRZ
1	D	280	THR	2.7
1	A	704	HIS	2.7
1	C	63	ILE	2.6
1	C	85	ASN	2.6
1	D	505	GLN	2.6
1	C	676	PRO	2.6
1	C	766	PRO	2.6
1	A	633	GLY	2.6
1	B	701	LEU	2.6
1	D	392	LYS	2.6
1	D	713	PHE	2.6
1	A	332	GLU	2.6
1	C	357	PHE	2.6
1	A	77	LEU	2.5
1	A	546	VAL	2.5
1	A	634	TYR	2.5
1	A	732	ALA	2.5
1	D	282	ALA	2.5
1	C	69	LEU	2.5
1	C	90	LEU	2.5
1	D	54	ARG	2.5
1	C	273	THR	2.5
1	D	489	LYS	2.5
1	D	57	LEU	2.5
1	D	80	ASN	2.5
1	A	666	TYR	2.5
1	C	652	ALA	2.5
1	C	338	ASN	2.5
1	C	56	LYS	2.5
1	D	702	LEU	2.5
1	C	498	SER	2.5
1	B	203	TYR	2.5
1	B	393	ASP	2.5
1	A	75	ASN	2.4
1	C	435	GLN	2.4
1	B	732	ALA	2.4
1	D	732	ALA	2.4
1	A	207	VAL	2.4
1	A	54	ARG	2.4
1	D	90	LEU	2.4
1	D	491	LEU	2.4
1	C	411	THR	2.4

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Mol	Chain	Res	Type	RSRZ
1	B	76	ILE	2.4
1	D	76	ILE	2.4
1	C	207	VAL	2.4
1	D	202	VAL	2.4
1	C	405	ILE	2.4
1	D	215	TRP	2.4
1	B	40	ARG	2.3
1	A	547	TYR	2.3
1	A	627	TRP	2.3
1	B	654	ALA	2.3
1	C	332	GLU	2.3
1	C	336	ARG	2.3
1	C	375	ILE	2.3
1	C	468	TYR	2.3
1	D	706	THR	2.3
1	C	656	VAL	2.3
1	C	67	GLU	2.3
1	C	102	ILE	2.3
1	C	518	ILE	2.3
1	D	70	TYR	2.3
1	B	704	HIS	2.3
1	B	766	PRO	2.3
1	C	75	ASN	2.3
1	A	224	ALA	2.3
1	A	717	ALA	2.3
1	B	521	GLU	2.3
1	D	101	SER	2.3
1	C	324	VAL	2.3
1	B	92	ASN	2.3
1	A	637	SER	2.3
1	D	213	ALA	2.3
1	B	79	PHE	2.3
1	C	653	VAL	2.3
1	C	711	VAL	2.3
1	C	433	LYS	2.3
1	A	90	LEU	2.2
1	A	544	LEU	2.2
1	A	713	PHE	2.2
1	A	101	SER	2.2
1	D	707	ALA	2.2
1	D	333	SER	2.2
1	A	625	ALA	2.2

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Mol	Chain	Res	Type	RSRZ
1	C	703	ILE	2.2
1	D	335	GLY	2.2
1	C	506	ASN	2.2
1	D	140	ARG	2.2
1	D	711	VAL	2.2
1	C	734	TRP	2.2
1	C	61	ARG	2.2
1	C	300	LEU	2.2
1	B	705	GLY	2.2
1	D	74	ASN	2.2
1	A	76	ILE	2.2
1	D	77	LEU	2.2
1	C	101	SER	2.2
1	C	657	SER	2.2
1	B	241	TYR	2.1
1	D	52	THR	2.1
1	B	300	LEU	2.1
1	A	630	SER	2.1
1	D	537	SER	2.1
1	A	631	TYR	2.1
1	A	665	VAL	2.1
1	B	736	THR	2.1
1	D	506	ASN	2.1
1	A	57	LEU	2.1
1	A	71	LYS	2.1
1	C	496	ASP	2.1
1	D	41	LYS	2.1
1	B	38	HIS	2.1
1	C	226	ALA	2.1
1	A	203	TYR	2.1
1	D	73	GLU	2.0
1	A	213	ALA	2.0
1	A	548	ALA	2.0
1	A	141	GLN	2.0
1	B	656	VAL	2.0
1	A	70	TYR	2.0
1	C	713	PHE	2.0
1	A	50	LYS	2.0
1	B	338	ASN	2.0
1	D	51	ASN	2.0
1	C	183	TYR	2.0

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

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

6.3 Carbohydrates [i](#)

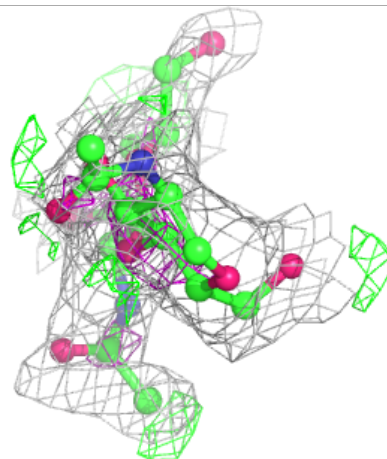
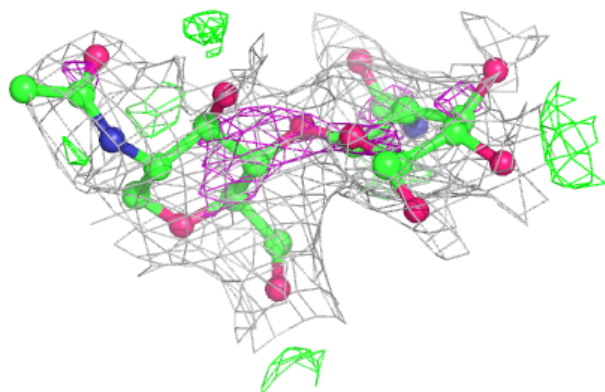
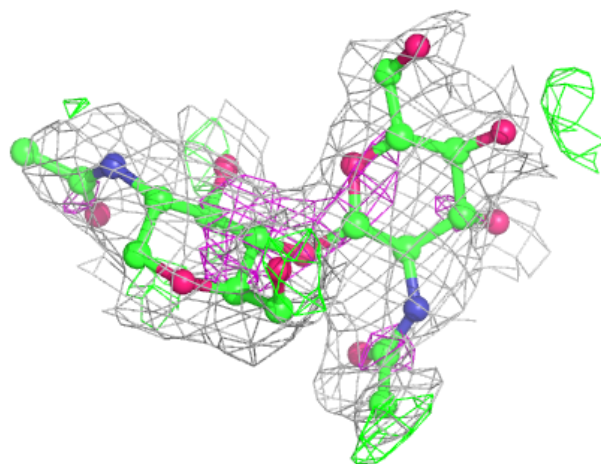
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	NAG	I	2	14/15	0.58	0.41	117,119,119,119	0
2	NAG	H	2	14/15	0.60	0.51	106,107,108,108	0
2	NAG	G	1	14/15	0.62	0.23	97,101,102,102	0
2	NAG	I	1	14/15	0.64	0.31	116,118,119,119	0
2	NAG	J	2	14/15	0.65	0.39	81,85,86,87	0
2	NAG	E	2	14/15	0.75	0.44	88,91,91,91	0
2	NAG	L	2	14/15	0.76	0.43	80,85,87,87	0
2	NAG	G	2	14/15	0.78	0.29	102,103,103,103	0
2	NAG	E	1	14/15	0.82	0.34	73,78,81,85	0
2	NAG	J	1	14/15	0.85	0.21	69,76,79,82	0
2	NAG	H	1	14/15	0.85	0.29	99,102,103,105	0
2	NAG	F	2	14/15	0.86	0.29	71,71,74,74	0
2	NAG	L	1	14/15	0.87	0.20	74,77,79,81	0
2	NAG	K	2	14/15	0.89	0.26	64,65,66,67	0
2	NAG	F	1	14/15	0.91	0.23	61,66,68,69	0
2	NAG	K	1	14/15	0.91	0.12	54,58,60,62	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.

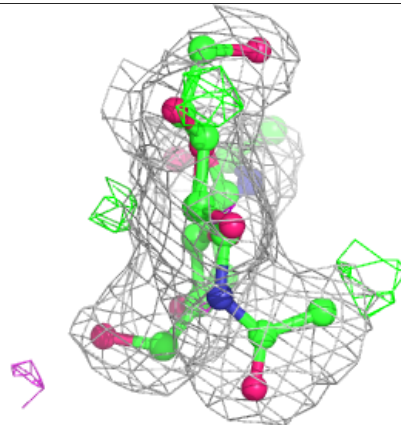
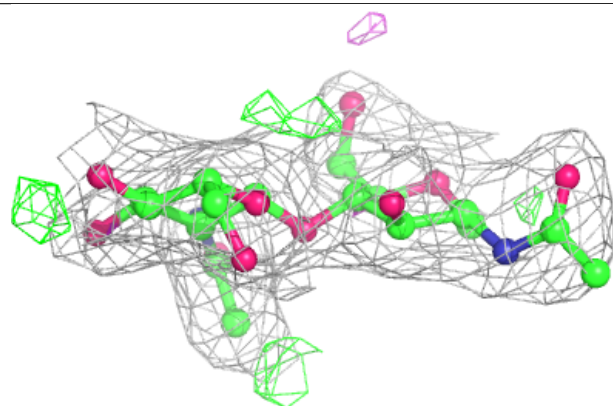
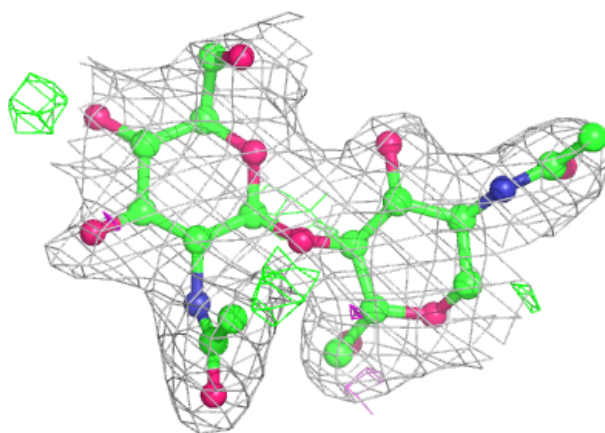
Electron density around Chain E:

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



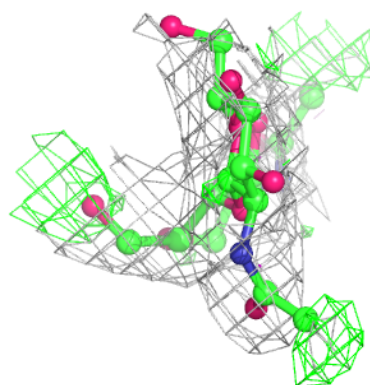
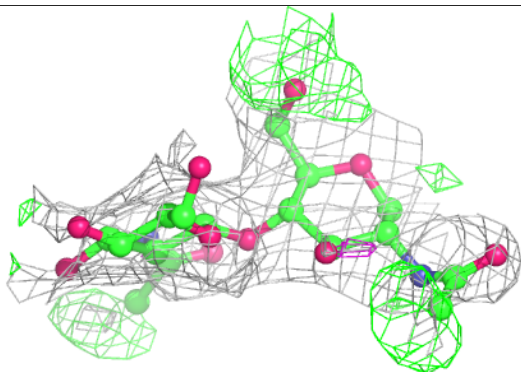
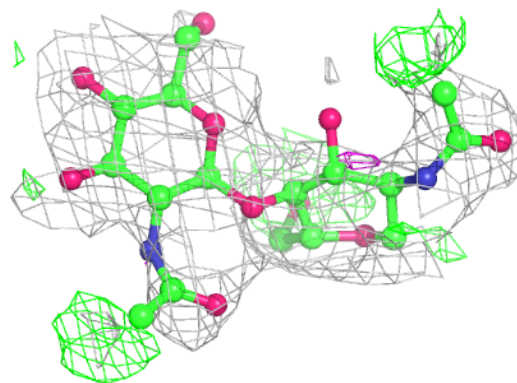
Electron density around Chain F:

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

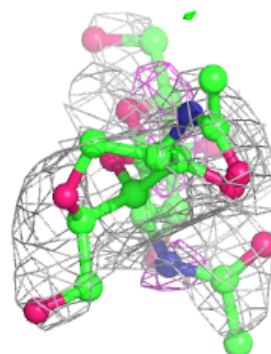
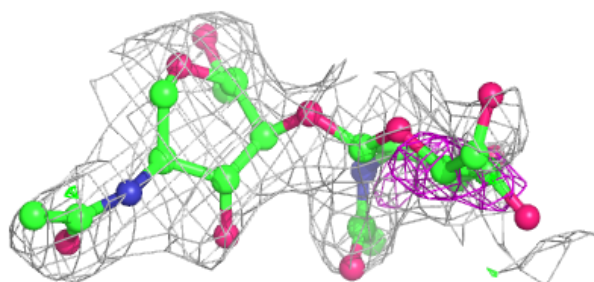
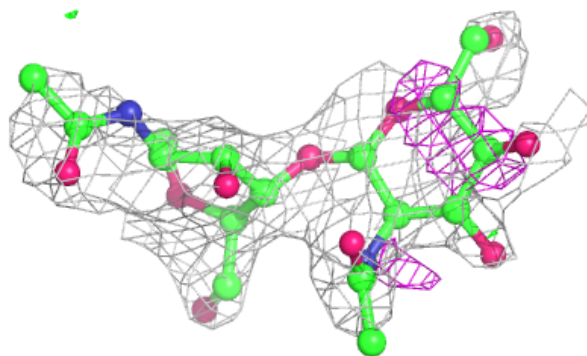


Electron density around Chain G:

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

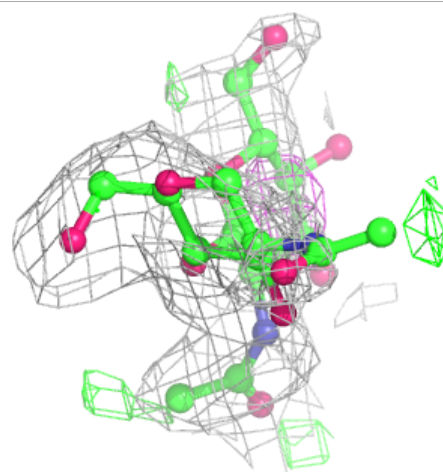
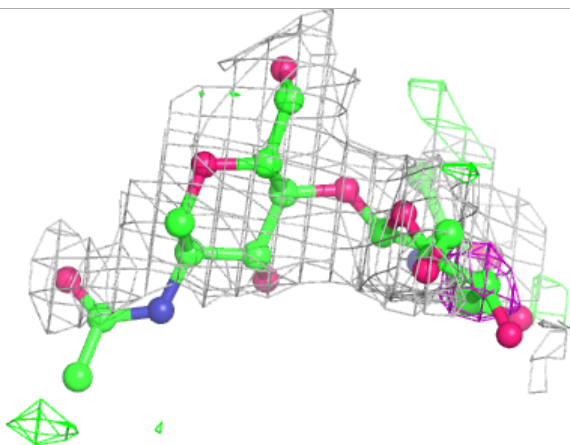
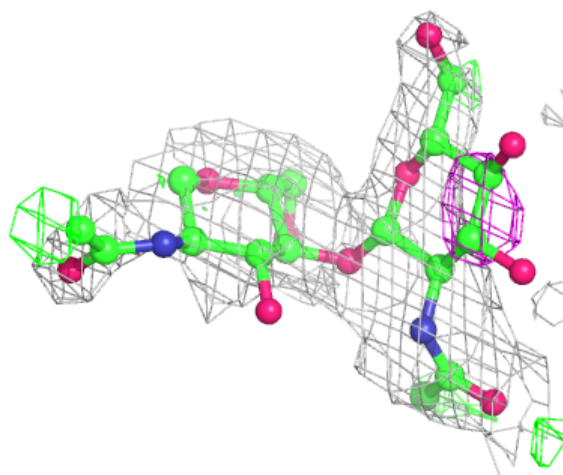
**Electron density around Chain H:**

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



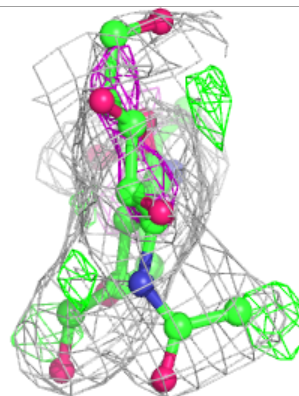
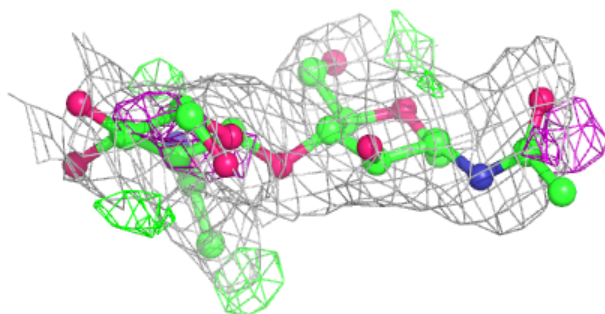
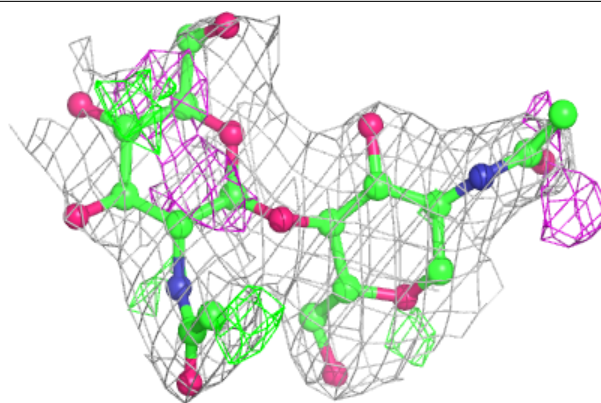
Electron density around Chain I:

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

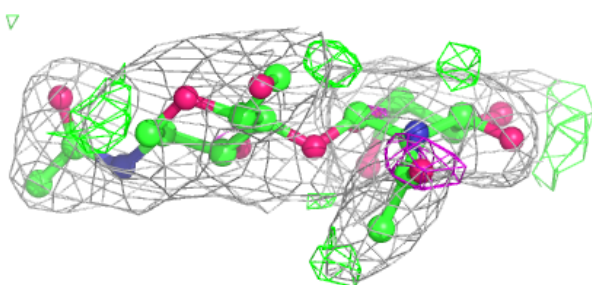
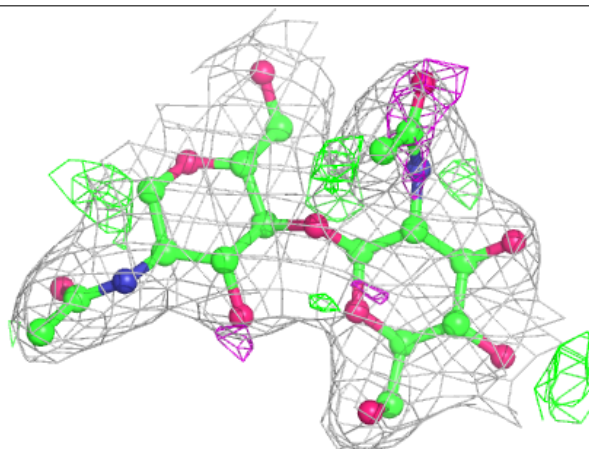


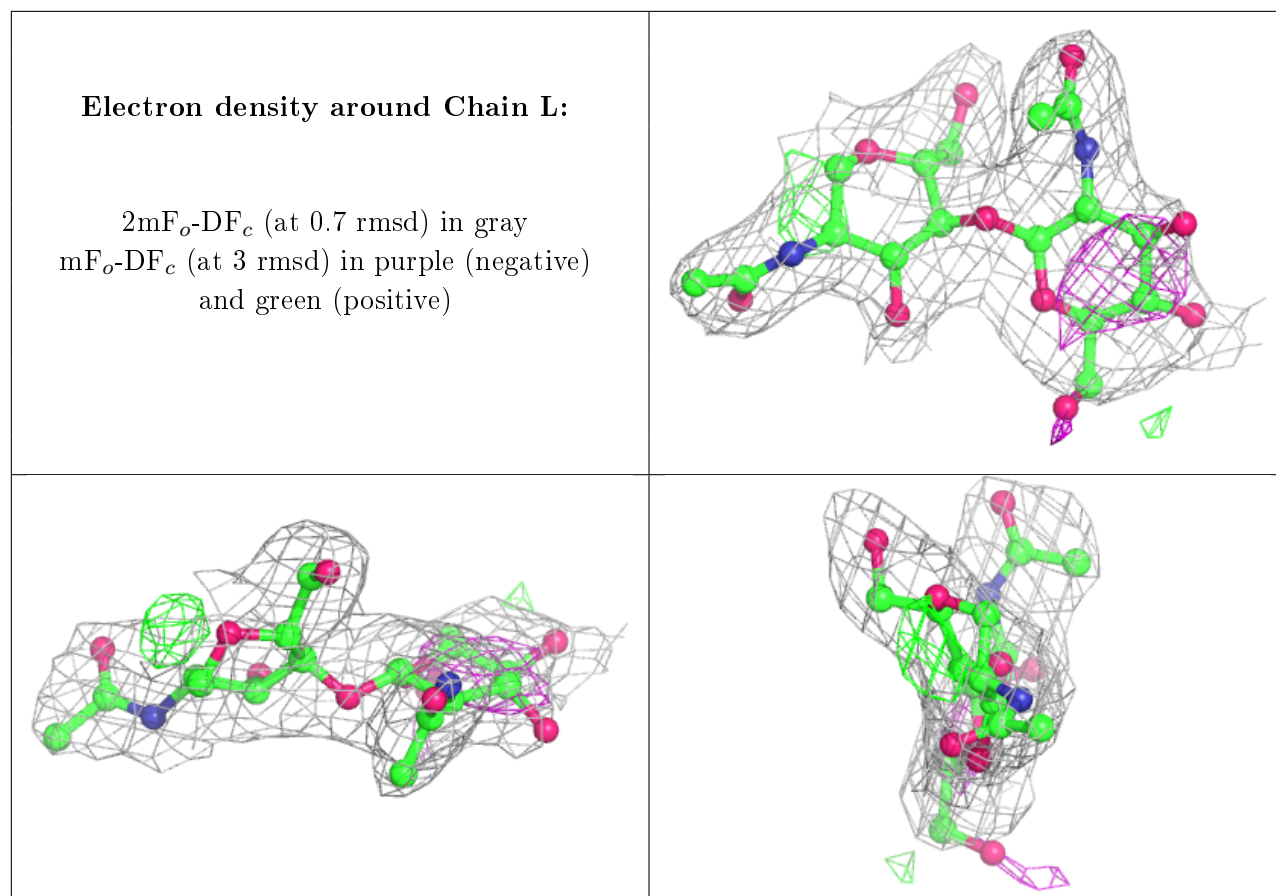
Electron density around Chain J:

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

**Electron density around Chain K:**

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





6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	NAG	A	804	14/15	0.53	0.42	97,98,99,99	0
3	NAG	C	807	14/15	0.56	0.41	89,91,92,92	0
3	NAG	A	812	14/15	0.58	0.50	111,112,114,114	0
3	NAG	C	802	14/15	0.63	0.21	88,90,90,90	0
3	NAG	B	807	14/15	0.70	0.13	93,94,95,96	0
3	NAG	B	808	14/15	0.70	0.38	90,92,92,92	0
3	NAG	B	801	14/15	0.70	0.25	84,86,86,87	0
3	NAG	D	808	14/15	0.72	0.31	91,93,94,94	0
3	NAG	A	801	14/15	0.75	0.17	94,97,97,98	0
3	NAG	D	803	14/15	0.75	0.33	84,85,86,86	0
3	NAG	D	806	14/15	0.77	0.23	70,74,75,76	0
3	NAG	B	802	14/15	0.78	0.27	88,89,90,90	0
3	NAG	A	811	14/15	0.79	0.41	71,75,77,78	0

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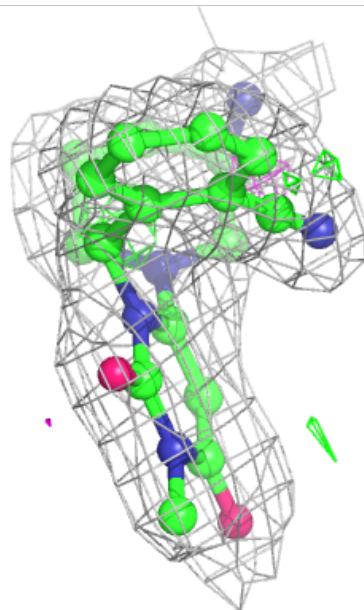
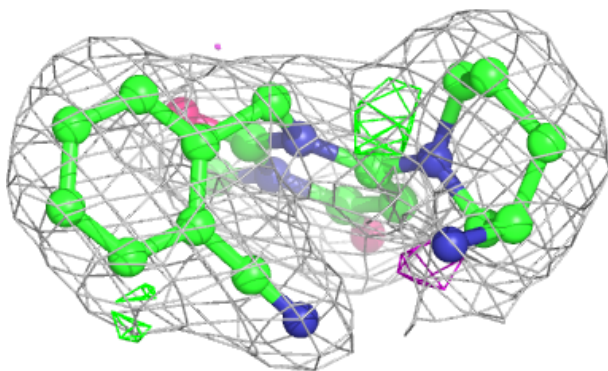
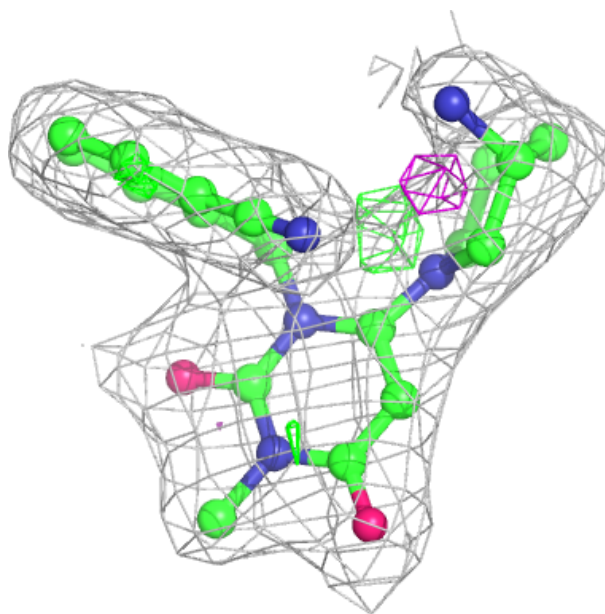
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	NAG	D	802	14/15	0.80	0.32	66,69,70,71	0
3	NAG	C	805	14/15	0.81	0.16	92,95,96,96	0
3	NAG	D	807	14/15	0.82	0.37	73,75,80,80	0
3	NAG	C	806	14/15	0.83	0.30	71,75,78,78	0
4	T22	D	800	25/25	0.93	0.15	48,50,51,52	0
4	T22	B	800	25/25	0.94	0.17	48,50,51,52	0
4	T22	A	800	25/25	0.95	0.23	48,50,51,52	0
4	T22	C	800	25/25	0.96	0.14	48,50,51,52	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.

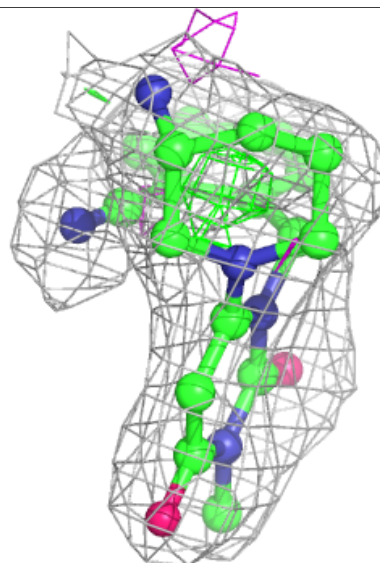
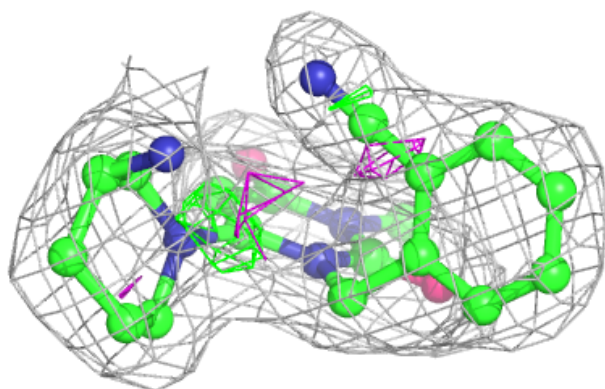
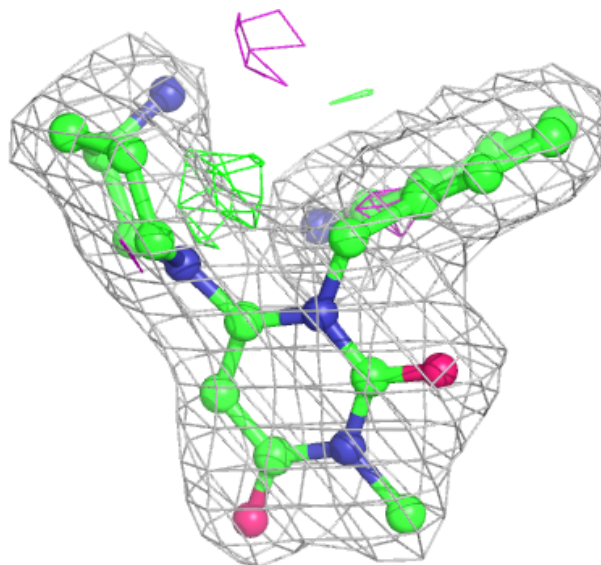
Electron density around T22 D 800:

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



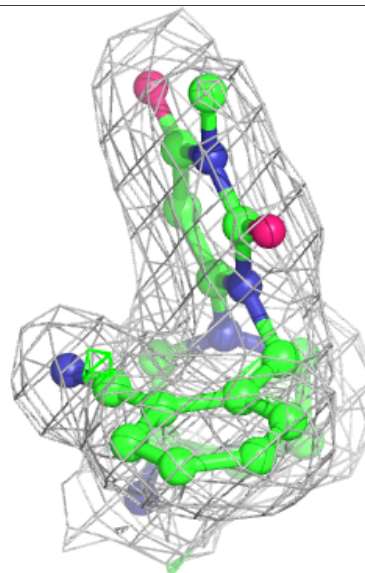
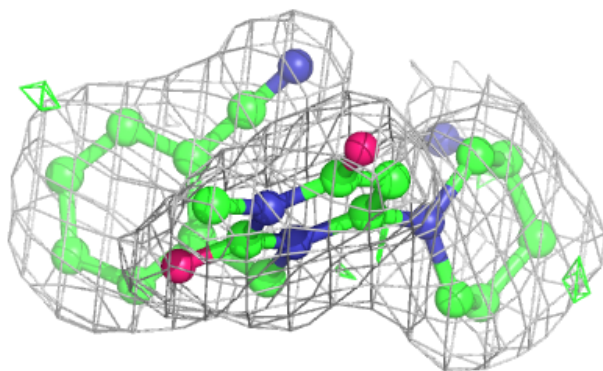
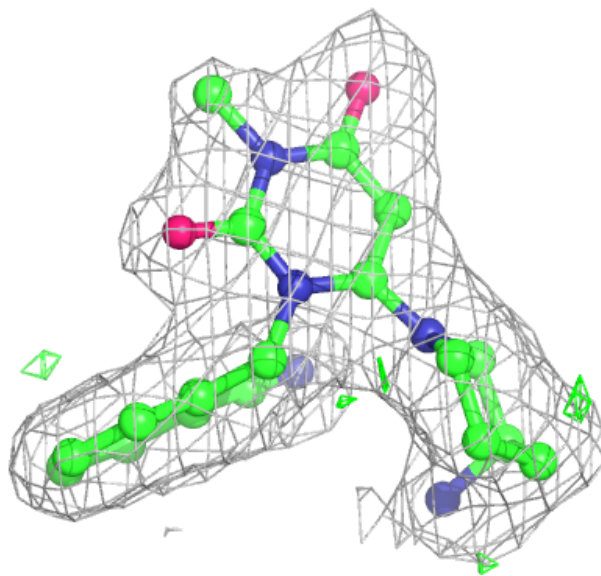
Electron density around T22 B 800:

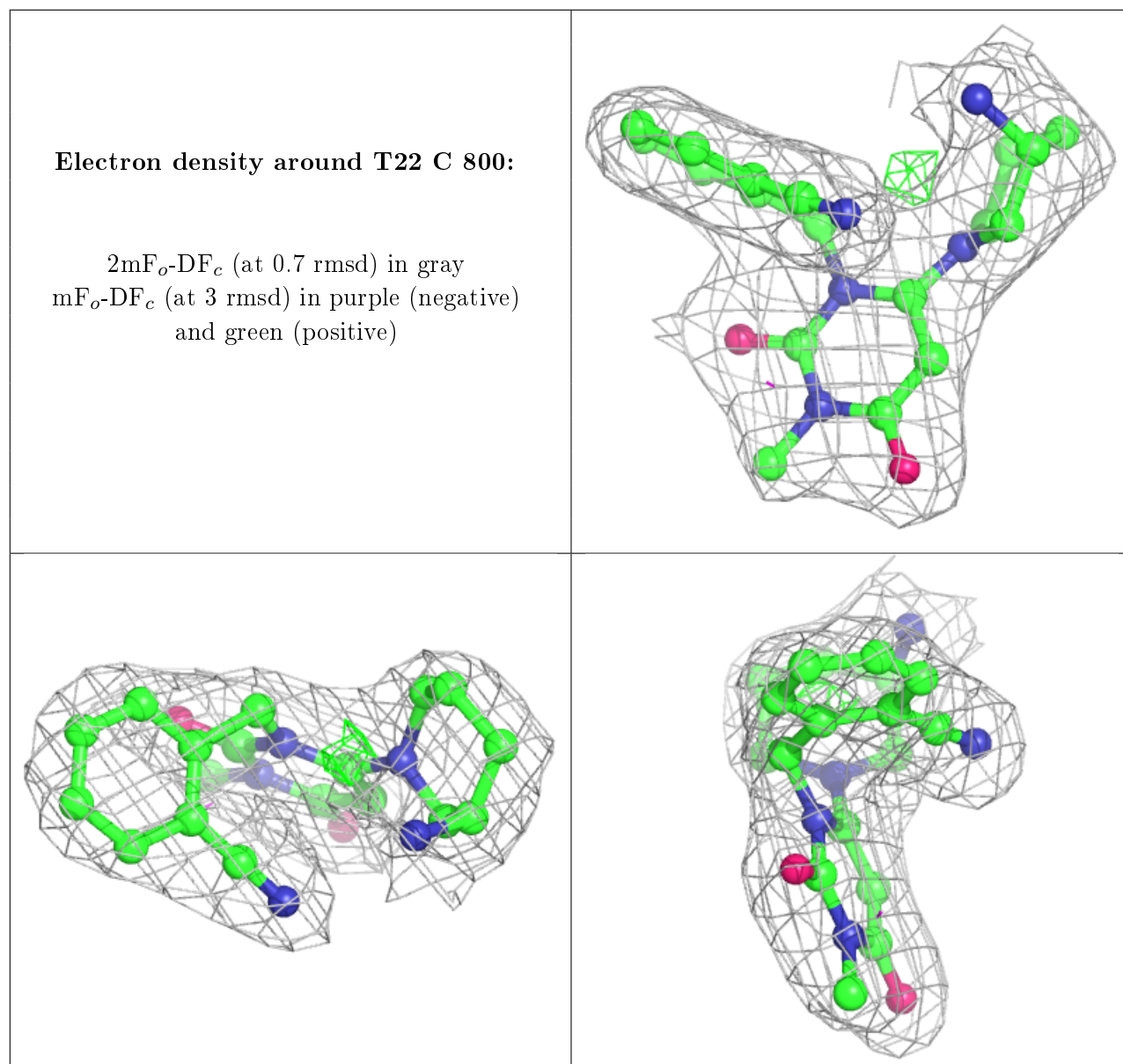
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around T22 A 800:

$2mF_o-DF_c$ (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.