WORLDWIDE wwPDB PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Dec 13, 2024 – 03:33 AM EST

PDB ID	:	7G5Z
Title	:	Crystal Structure of rat Autotaxin in complex with N-(5-chloro-2,3-dihydro-1 H-inden-2-yl)-6-(5-methylpyrimidin-2-yl)-5,7-dihydropyrrolo[3,4-d]pyrimidin-2-amine, i.e. SMILES Clc1cc2c(cc1)C[C@@H](C2)Nc1ncc2CN(Cc2n1)c1ncc(c n1)C with IC50=0.0693825 microM
Authors	:	Stihle, M.; Benz, J.; Hunziker, D.; Pinard, E.; Rudolph, M.G.
Deposited on	:	2023-06-05
Resolution	:	1.44 Å(reported)

The following versions of software and data (see references ①) were used in the production of this report:

|		
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.21
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.004 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.40

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 1.44 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.
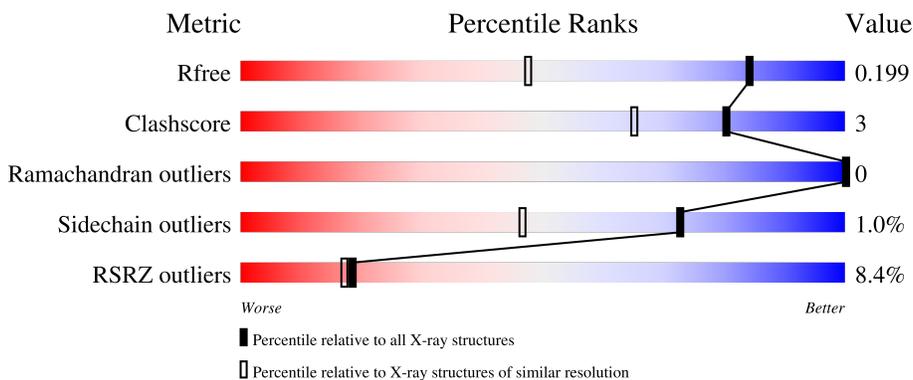
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	2809 (1.46-1.42)
Clashscore	180529	3008 (1.46-1.42)
Ramachandran outliers	177936	2971 (1.46-1.42)
Sidechain outliers	177891	2971 (1.46-1.42)
RSRZ outliers	164620	2809 (1.46-1.42)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	846	8% / 89% / 6% / 5%
2	B	8	100%

2 Entry composition ⓘ

There are 10 unique types of molecules in this entry. The entry contains 7531 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.
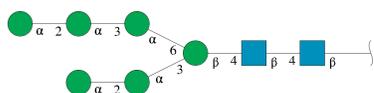
- Molecule 1 is a protein called Isoform 2 of Ectonucleotide pyrophosphatase/phosphodiesterase family member 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	805	6685	4257	1141	1233	54	0	35	0

There are 14 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	53	ALA	ASN	engineered mutation	UNP Q64610
A	410	ALA	ASN	engineered mutation	UNP Q64610
A	591	THR	ARG	engineered mutation	UNP Q64610
A	863	GLY	-	expression tag	UNP Q64610
A	864	GLY	-	expression tag	UNP Q64610
A	865	ARG	-	expression tag	UNP Q64610
A	866	HIS	-	expression tag	UNP Q64610
A	867	HIS	-	expression tag	UNP Q64610
A	868	HIS	-	expression tag	UNP Q64610
A	869	HIS	-	expression tag	UNP Q64610
A	870	HIS	-	expression tag	UNP Q64610
A	871	HIS	-	expression tag	UNP Q64610
A	872	HIS	-	expression tag	UNP Q64610
A	873	HIS	-	expression tag	UNP Q64610

- Molecule 2 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	B	8	Total 94	C 52	N 2	O 40	0	0	0

- Molecule 3 is N-[(2S)-5-chloro-2,3-dihydro-1H-inden-2-yl]-6-(5-methylpyrimidin-2-yl)-6,7-dihydro-5H-pyrrolo[3,4-d]pyrimidin-2-amine (three-letter code: Y9I) (formula: $C_{20}H_{19}ClN_6$) (labeled as "Ligand of Interest" by depositor).
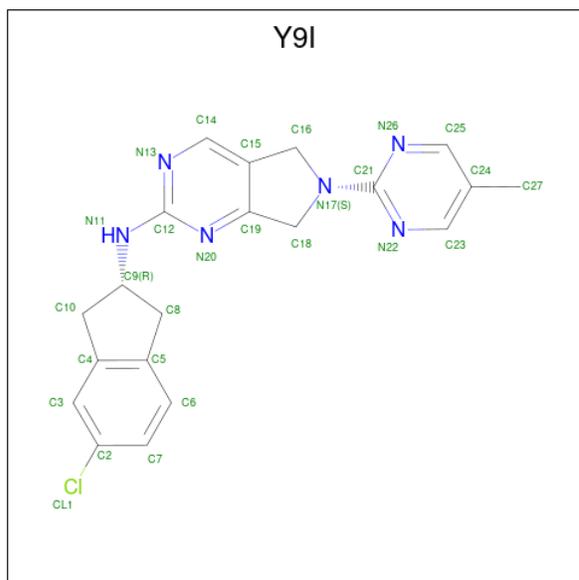
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total 54	C 40	Cl 2	N 12	0	1

- Molecule 4 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: $C_2H_6O_2$).
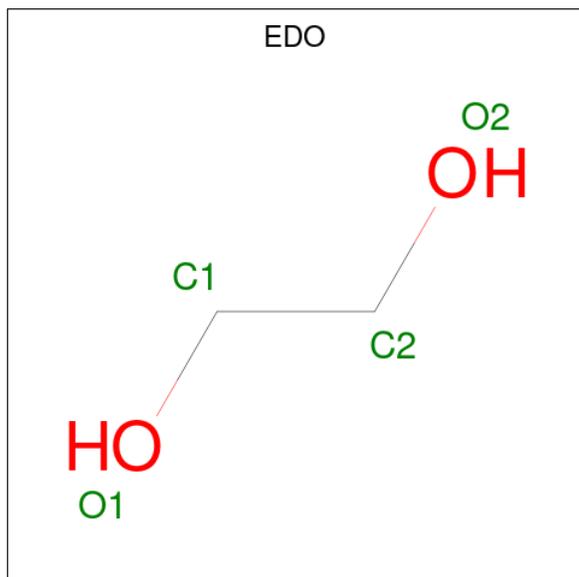
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total 4	C 2	O 2	0	0
4	A	1	Total 4	C 2	O 2	0	0

- Molecule 5 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	2	Total 2	Ca 2	0	0

- Molecule 6 is ACETATE ION (three-letter code: ACT) (formula: $C_2H_3O_2$).
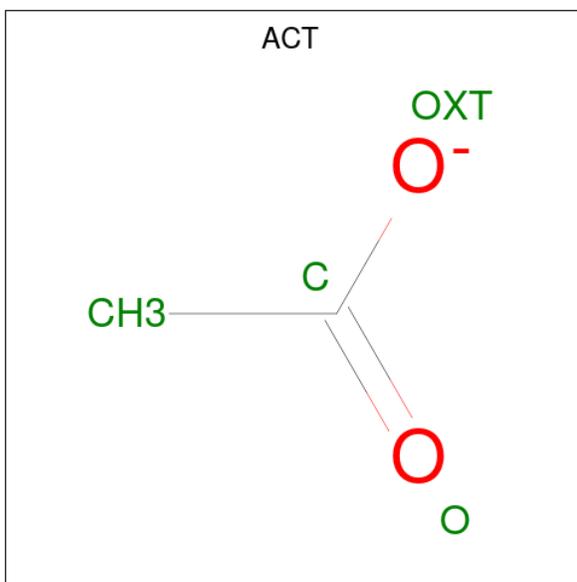
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total 4	C 2	O 2	0	0
6	A	1	Total 4	C 2	O 2	0	0

- Molecule 7 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	1	Total 1	Zn 1	0	0

- Molecule 8 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	1	Total Na 1 1		0	0

- Molecule 9 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	1	Total K 1 1		0	0

- Molecule 10 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	A	671	Total O 677 677		0	6

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: Isoform 2 of Ectonucleotide pyrophosphatase/phosphodiesterase family member 2

Chain A:
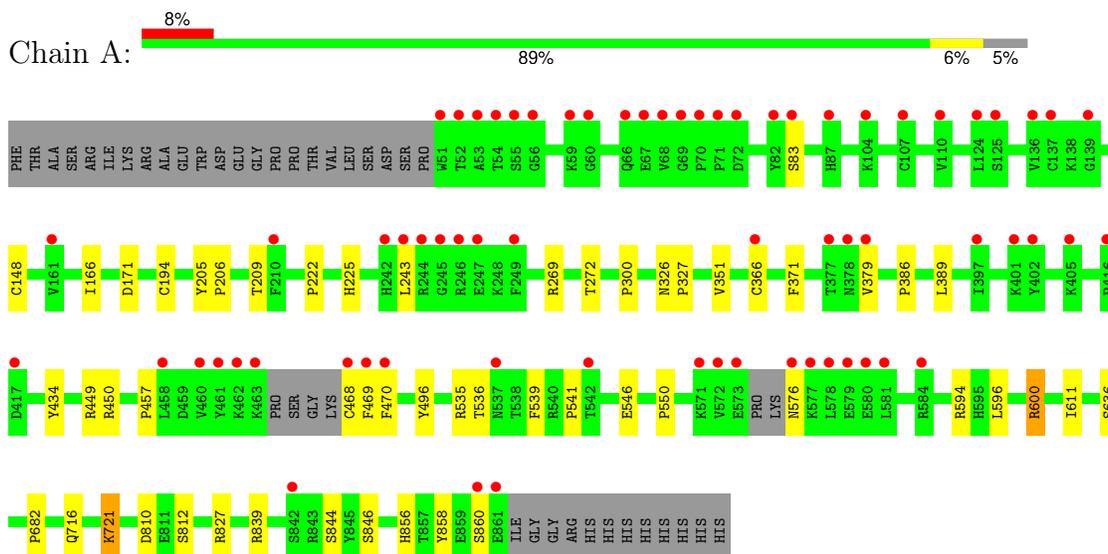
• Molecule 2: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-alpha-D-mannopyran ose-(1-6)-[alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1 -4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranos e

Chain B:

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	83.67Å 91.46Å 119.49Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	72.63 – 1.44 72.63 – 1.44	Depositor EDS
% Data completeness (in resolution range)	77.0 (72.63-1.44) 77.3 (72.63-1.44)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.95 (at 1.44Å)	Xtriage
Refinement program	REFMAC 5.8.0238	Depositor
R, R_{free}	0.174 , 0.199 0.174 , 0.199	Depositor DCC
R_{free} test set	8307 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å^2)	14.6	Xtriage
Anisotropy	0.015	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 32.4	EDS
L-test for twinning[2]	$< |L| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	7531	wwPDB-VP
Average B, all atoms (Å^2)	21.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.43% of the height of the origin peak. No significant pseudotranslation is detected.*

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

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: MAN, K, CA, ACT, Y9I, NA, EDO, ZN, BMA, 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	0.74	1/6965 (0.0%)	0.88	8/9439 (0.1%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	546	GLU	CD-OE1	10.54	1.37	1.25

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	827	ARG	CG-CD-NE	-7.11	96.86	111.80
1	A	194[A]	CYS	CA-CB-SG	-6.63	102.07	114.00
1	A	194[B]	CYS	CA-CB-SG	-6.63	102.07	114.00
1	A	839	ARG	NE-CZ-NH1	-6.48	117.06	120.30
1	A	600	ARG	CG-CD-NE	-6.36	98.45	111.80
1	A	827	ARG	NE-CZ-NH1	-5.93	117.34	120.30
1	A	194[A]	CYS	CB-CA-C	5.20	120.79	110.40
1	A	194[B]	CYS	CB-CA-C	5.20	120.79	110.40

There are no chirality outliers.

There are no planarity outliers.

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	6685	0	6532	33	0
2	B	94	0	79	0	0
3	A	54	0	0	4	0
4	A	8	0	12	0	0
5	A	2	0	0	1	0
6	A	8	0	6	0	0
7	A	1	0	0	0	0
8	A	1	0	0	0	0
9	A	1	0	0	0	0
10	A	677	0	0	5	0
All	All	7531	0	6629	34	0

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

All (34) 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:243[A]:LEU:HB2	3:A:1001[A]:Y9I:C27	2.19	0.72
1:A:856:HIS:HD2	1:A:858[A]:TYR:CZ	2.08	0.72
3:A:1001[B]:Y9I:C25	10:A:1125:HOH:O	2.41	0.68
1:A:856:HIS:CD2	1:A:858[A]:TYR:CZ	2.89	0.60
1:A:171[B]:ASP:OD1	5:A:1004:CA:CA	1.76	0.59
1:A:856:HIS:CD2	1:A:858[A]:TYR:CE1	2.93	0.56
1:A:371:PHE:CE1	1:A:457:PRO:HA	2.45	0.52
1:A:810:ASP:OD2	1:A:812:SER:OG	2.16	0.51
1:A:243[A]:LEU:CB	3:A:1001[A]:Y9I:C27	2.88	0.51
1:A:366:CYS:SG	1:A:470:PHE:CE2	3.04	0.51
1:A:269:ARG:HB3	1:A:300:PRO:HA	1.92	0.50
1:A:539:PHE:O	1:A:541:PRO:HD3	2.12	0.50
1:A:222:PRO:HA	1:A:225:HIS:CE1	2.47	0.50
1:A:550:PRO:HB2	1:A:611:ILE:HG12	1.94	0.49
1:A:576:ASN:C	1:A:576:ASN:OD1	2.51	0.48
1:A:535:ARG:HG2	1:A:536:THR:HG23	1.95	0.48
1:A:594:ARG:HH21	1:A:594:ARG:HG2	1.79	0.47
1:A:682:PRO:HB3	1:A:716:GLN:HB3	1.96	0.47
1:A:856:HIS:HD2	1:A:858[A]:TYR:CE1	2.32	0.46
1:A:468:CYS:SG	1:A:469:PHE:N	2.87	0.46
1:A:596:LEU:HD21	1:A:600:ARG:HB3	1.98	0.46
1:A:269:ARG:CZ	1:A:269:ARG:HB2	2.47	0.45
1:A:166:ILE:HD12	1:A:351[A]:VAL:HG11	1.99	0.44
1:A:206:PRO:HD3	1:A:434:TYR:CE1	2.53	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:636:SER:O	1:A:721[A]:LYS:NZ	2.52	0.43
1:A:846[B]:SER:OG	10:A:1101:HOH:O	2.21	0.43
1:A:269:ARG:HD3	10:A:1192:HOH:O	2.18	0.43
1:A:205:TYR:CD1	1:A:206:PRO:HA	2.53	0.43
1:A:326[B]:ASN:HB3	1:A:327:PRO:HD3	2.02	0.42
1:A:209:THR:HG21	3:A:1001[B]:Y9I:C23	2.49	0.42
1:A:600:ARG:NE	10:A:1113:HOH:O	2.48	0.42
1:A:449:ARG:O	1:A:450[A]:ARG:HB2	2.20	0.41
1:A:148[B]:CYS:SG	1:A:496:TYR:HE1	2.44	0.41
1:A:272:THR:HB	10:A:1432:HOH:O	2.20	0.41

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	834/846 (99%)	809 (97%)	25 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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	763/765 (100%)	755 (99%)	8 (1%)	73	46

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	83	SER
1	A	379	VAL
1	A	386	PRO
1	A	389	LEU
1	A	721[A]	LYS
1	A	721[B]	LYS
1	A	844	SER
1	A	860	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	398	ASN
1	A	436	ASN
1	A	586	HIS
1	A	856	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

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	B	1	2,1	14,14,15	1.21	1 (7%)	17,19,21	0.99	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
2	NAG	B	2	2	14,14,15	1.11	2 (14%)	17,19,21	2.37	6 (35%)
2	BMA	B	3	2	11,11,12	0.72	0	15,15,17	1.84	4 (26%)
2	MAN	B	4	2	11,11,12	0.91	0	15,15,17	1.43	3 (20%)
2	MAN	B	5	2	11,11,12	1.03	0	15,15,17	1.81	4 (26%)
2	MAN	B	6	2	11,11,12	0.67	0	15,15,17	1.48	2 (13%)
2	MAN	B	7	2	11,11,12	0.64	0	15,15,17	1.11	2 (13%)
2	MAN	B	8	2	11,11,12	0.82	0	15,15,17	1.21	2 (13%)

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	B	1	2,1	-	0/6/23/26	0/1/1/1
2	NAG	B	2	2	-	0/6/23/26	0/1/1/1
2	BMA	B	3	2	-	0/2/19/22	0/1/1/1
2	MAN	B	4	2	-	0/2/19/22	0/1/1/1
2	MAN	B	5	2	-	0/2/19/22	0/1/1/1
2	MAN	B	6	2	-	0/2/19/22	0/1/1/1
2	MAN	B	7	2	-	2/2/19/22	0/1/1/1
2	MAN	B	8	2	-	0/2/19/22	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1	NAG	C1-C2	-2.53	1.48	1.52
2	B	2	NAG	C6-C5	2.09	1.58	1.51
2	B	2	NAG	O6-C6	2.07	1.51	1.42

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	2	NAG	C1-O5-C5	6.63	121.07	112.19
2	B	5	MAN	C3-C4-C5	3.93	117.36	110.23
2	B	3	BMA	O2-C2-C1	-3.89	100.31	109.22
2	B	3	BMA	C1-C2-C3	3.76	115.11	109.64
2	B	6	MAN	O2-C2-C3	-3.69	102.50	110.15
2	B	2	NAG	O7-C7-C8	-3.20	116.36	122.05
2	B	2	NAG	O7-C7-N2	3.07	127.41	121.98

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	3	BMA	C1-O5-C5	3.03	116.25	112.19
2	B	4	MAN	O3-C3-C2	2.98	116.13	110.05
2	B	5	MAN	C1-O5-C5	2.86	116.02	112.19
2	B	2	NAG	C3-C4-C5	2.83	115.36	110.23
2	B	5	MAN	C6-C5-C4	-2.79	106.16	113.02
2	B	3	BMA	O6-C6-C5	-2.60	102.47	111.33
2	B	5	MAN	O3-C3-C4	-2.58	104.30	110.38
2	B	8	MAN	O3-C3-C2	2.56	115.28	110.05
2	B	6	MAN	C1-O5-C5	2.50	115.54	112.19
2	B	1	NAG	O4-C4-C3	-2.45	104.61	110.38
2	B	2	NAG	O3-C3-C2	-2.35	104.51	109.40
2	B	8	MAN	C1-O5-C5	2.35	115.33	112.19
2	B	4	MAN	O4-C4-C3	-2.20	105.19	110.38
2	B	2	NAG	O5-C5-C4	-2.16	105.58	110.83
2	B	7	MAN	C1-C2-C3	2.16	112.78	109.64
2	B	4	MAN	O4-C4-C5	2.13	114.56	109.32
2	B	7	MAN	O2-C2-C3	-2.11	105.79	110.15

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	7	MAN	O5-C5-C6-O6
2	B	7	MAN	C4-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

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

Oligosaccharide Chain B

Bond lengths

Bond angles

Torsions

Rings
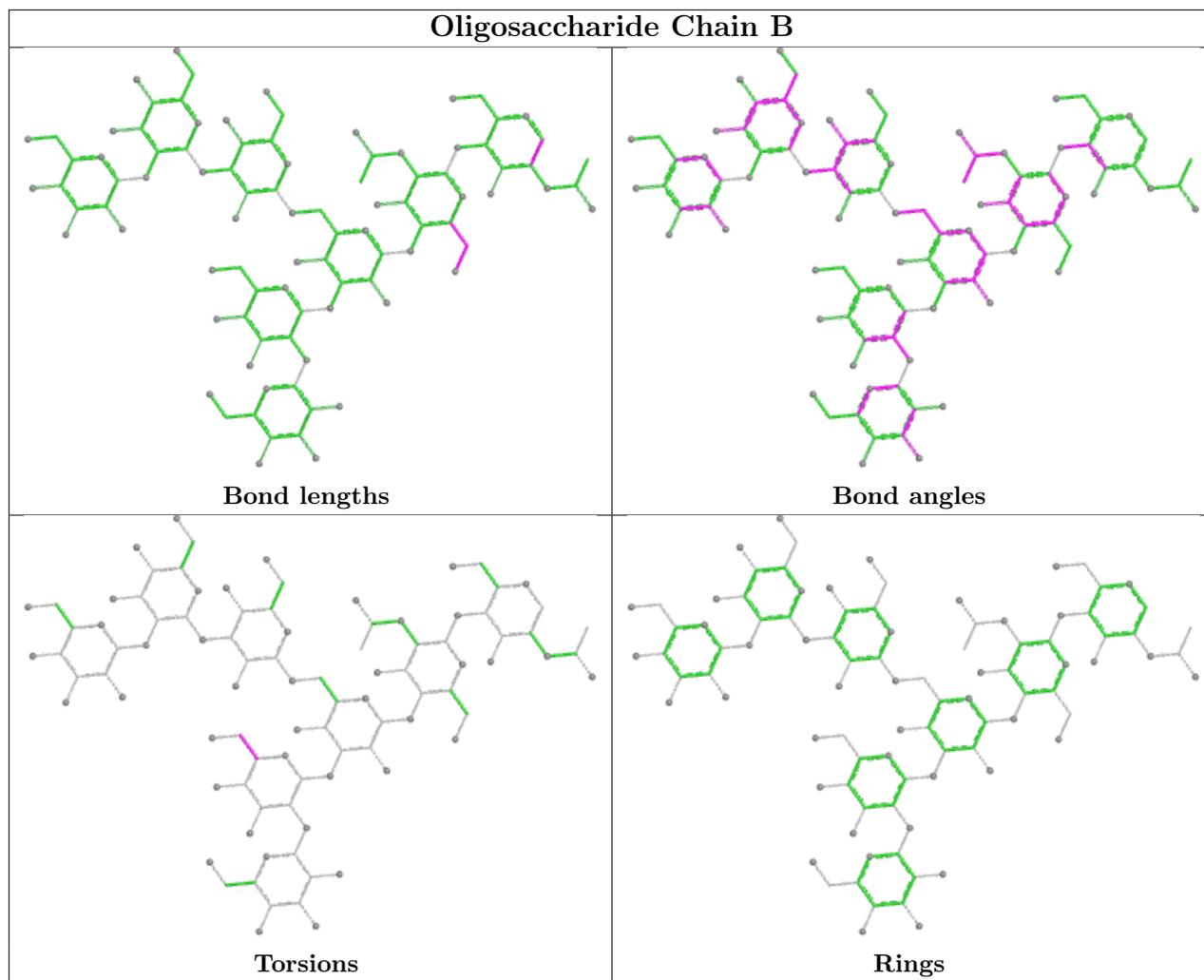
5.6 Ligand geometry ⓘ

Of 11 ligands modelled in this entry, 5 are monoatomic - leaving 6 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	#$|Z|>2$
4	EDO	A	1003	-	3,3,3	0.97	0	2,2,2	0.71	0
6	ACT	A	1005	-	3,3,3	1.61	0	3,3,3	0.61	0
3	Y9I	A	1001[B]	-	30,31,31	1.15	3 (10%)	34,45,45	2.94	12 (35%)
4	EDO	A	1002	-	3,3,3	0.40	0	2,2,2	0.33	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
3	Y9I	A	1001[A]	-	30,31,31	1.11	3 (10%)	34,45,45	2.53	11 (32%)
6	ACT	A	1006	-	3,3,3	1.06	0	3,3,3	0.82	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
3	Y9I	A	1001[B]	-	-	2/8/24/24	0/5/5/5
4	EDO	A	1003	-	-	0/1/1/1	-
4	EDO	A	1002	-	-	0/1/1/1	-
3	Y9I	A	1001[A]	-	-	2/8/24/24	0/5/5/5

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1001[B]	Y9I	C21-N17	2.77	1.41	1.35
3	A	1001[A]	Y9I	C18-N17	2.76	1.50	1.46
3	A	1001[B]	Y9I	C18-N17	2.70	1.50	1.46
3	A	1001[A]	Y9I	C21-N17	2.50	1.40	1.35
3	A	1001[B]	Y9I	C12-N11	2.48	1.37	1.34
3	A	1001[A]	Y9I	C12-N11	2.32	1.37	1.34

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	1001[B]	Y9I	C15-C16-N17	7.84	106.01	102.42
3	A	1001[B]	Y9I	C25-N26-C21	6.90	121.79	115.68
3	A	1001[B]	Y9I	C23-N22-C21	6.81	121.71	115.68
3	A	1001[A]	Y9I	C23-N22-C21	6.54	121.47	115.68
3	A	1001[A]	Y9I	C25-N26-C21	6.50	121.44	115.68
3	A	1001[B]	Y9I	N26-C21-N17	4.89	121.98	116.90
3	A	1001[B]	Y9I	C15-C19-N20	-4.76	120.20	125.35
3	A	1001[B]	Y9I	N26-C21-N22	-4.59	119.94	127.06
3	A	1001[A]	Y9I	C15-C19-N20	-4.51	120.47	125.35
3	A	1001[A]	Y9I	C24-C23-N22	-3.98	118.83	124.56
3	A	1001[B]	Y9I	C24-C25-N26	-3.93	118.90	124.56
3	A	1001[A]	Y9I	N26-C21-N22	-3.88	121.05	127.06
3	A	1001[A]	Y9I	N26-C21-N17	3.79	120.83	116.90
3	A	1001[A]	Y9I	C24-C25-N26	-3.66	119.28	124.56

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	1001[B]	Y9I	C24-C23-N22	-3.55	119.44	124.56
3	A	1001[A]	Y9I	C14-N13-C12	3.26	120.28	115.81
3	A	1001[A]	Y9I	N13-C12-N20	-3.09	123.44	126.42
3	A	1001[A]	Y9I	C15-C14-N13	-3.06	118.85	123.83
3	A	1001[B]	Y9I	N13-C12-N20	-2.80	123.72	126.42
3	A	1001[B]	Y9I	C15-C14-N13	-2.56	119.67	123.83
3	A	1001[B]	Y9I	C12-N11-C9	-2.55	120.35	124.32
3	A	1001[B]	Y9I	C14-N13-C12	2.51	119.25	115.81
3	A	1001[A]	Y9I	C12-N11-C9	-2.44	120.53	124.32

There are no chirality outliers.

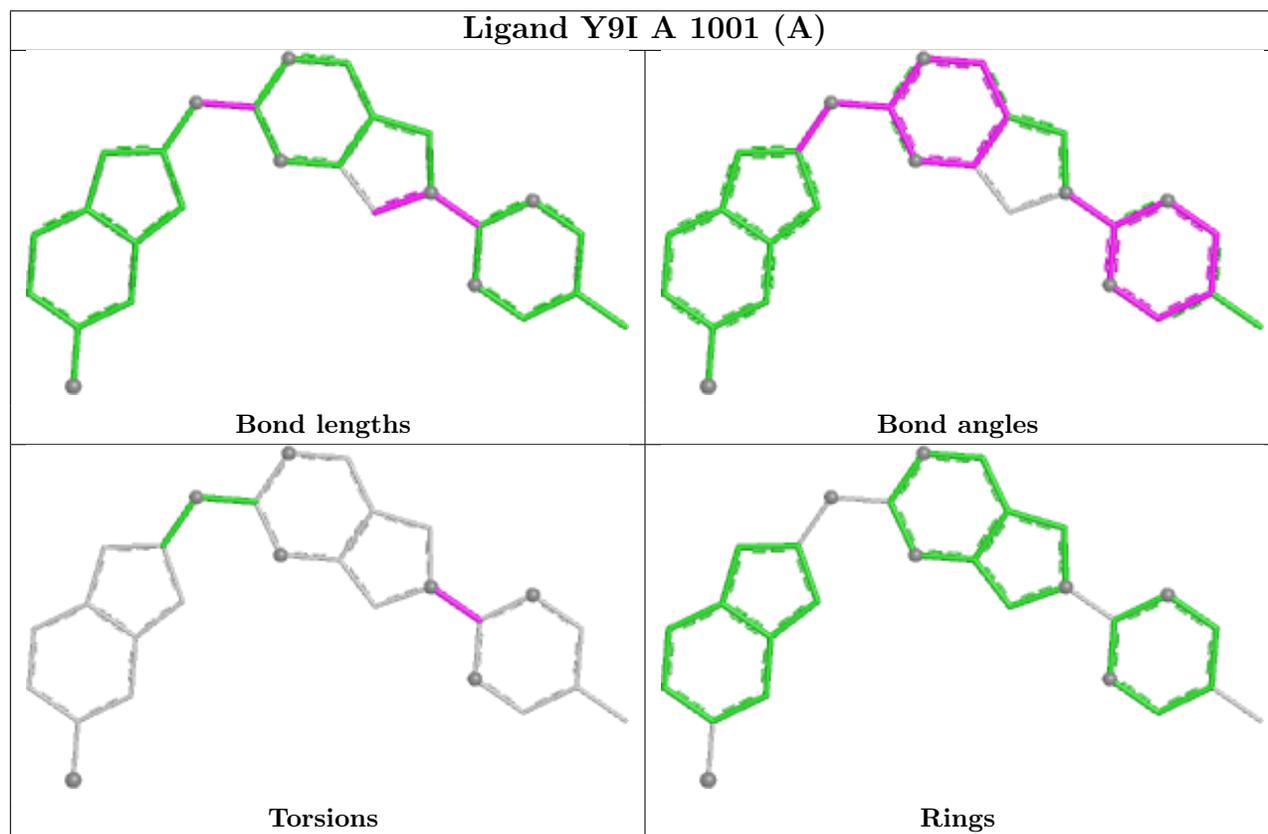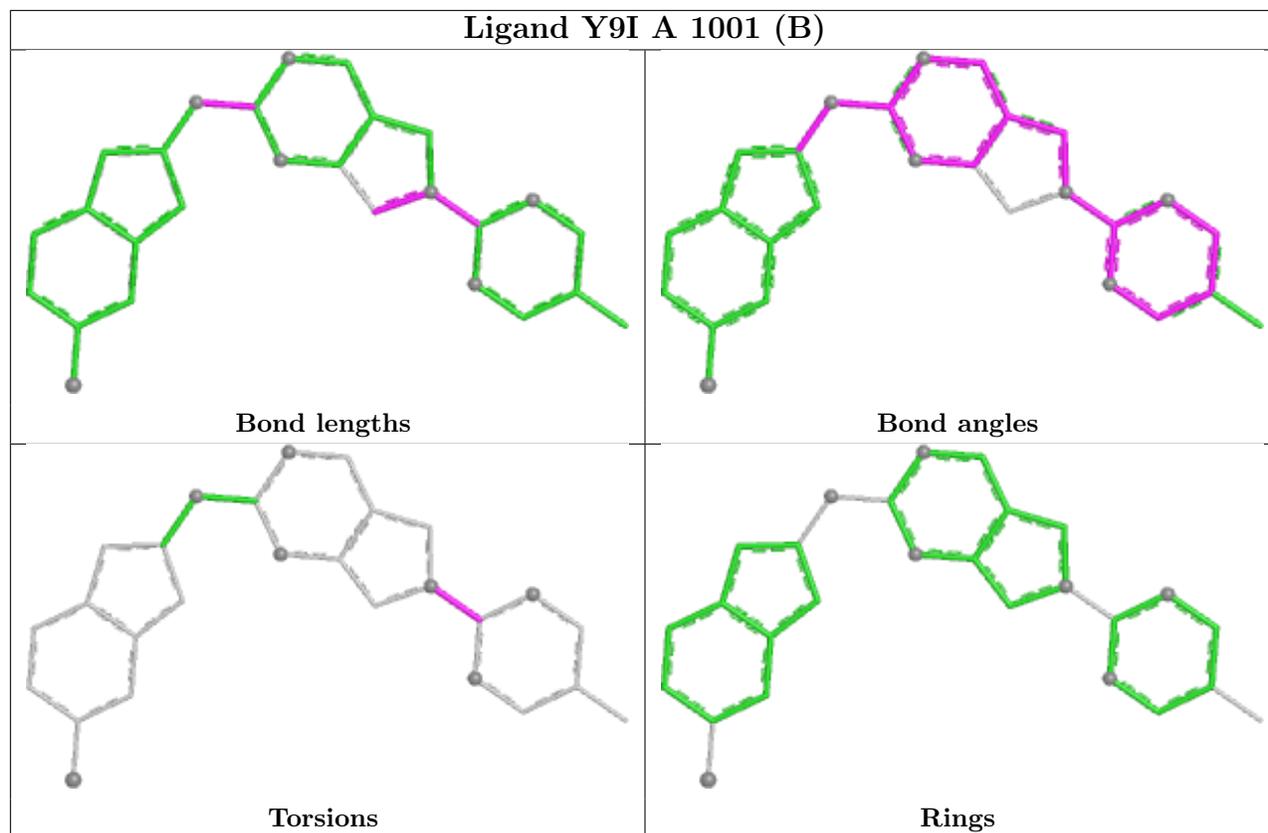All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	1001[A]	Y9I	N22-C21-N17-C18
3	A	1001[A]	Y9I	N26-C21-N17-C18
3	A	1001[B]	Y9I	N22-C21-N17-C18
3	A	1001[B]	Y9I	N26-C21-N17-C18

There are no ring outliers.

2 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	1001[B]	Y9I	2	0
3	A	1001[A]	Y9I	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 all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand Y9I A 1001 (B)

Bond lengths

Bond angles

Torsions

Rings

Ligand Y9I A 1001 (A)

Bond lengths

Bond angles

Torsions

Rings

5.7 Other polymers ⓘ

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	805/846 (95%)	0.27	68 (8%)	18	17	7, 16, 43, 94	35 (4%)

All (68) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	578	LEU	10.7
1	A	469	PHE	9.9
1	A	51	TRP	9.0
1	A	572	VAL	8.0
1	A	463	LYS	7.0
1	A	468	CYS	6.4
1	A	243[A]	LEU	6.4
1	A	71	PRO	5.5
1	A	573	GLU	5.4
1	A	70	PRO	5.4
1	A	462	LYS	5.3
1	A	461	TYR	4.8
1	A	470	PHE	4.6
1	A	860	SER	4.5
1	A	53	ALA	4.4
1	A	577	LYS	4.3
1	A	397	ILE	4.0
1	A	52	THR	4.0
1	A	460	VAL	4.0
1	A	244	ARG	3.9
1	A	576	ASN	3.9
1	A	68	VAL	3.9
1	A	366	CYS	3.8
1	A	110	VAL	3.6
1	A	69	GLY	3.6
1	A	458	LEU	3.4
1	A	55	SER	3.4

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Mol	Chain	Res	Type	RSRZ
1	A	378	ASN	3.4
1	A	861	GLU	3.3
1	A	246	ARG	3.3
1	A	249	PHE	3.3
1	A	401	LYS	3.2
1	A	581	LEU	3.1
1	A	842	SER	3.1
1	A	83	SER	3.1
1	A	377	THR	3.0
1	A	124	LEU	3.0
1	A	82	TYR	3.0
1	A	571	LYS	2.9
1	A	245	GLY	2.9
1	A	67	GLU	2.9
1	A	161	VAL	2.8
1	A	379	VAL	2.8
1	A	72	ASP	2.8
1	A	416	PRO	2.7
1	A	107	CYS	2.7
1	A	579	GLU	2.7
1	A	417	ASP	2.6
1	A	210	PHE	2.6
1	A	56	GLY	2.5
1	A	537	ASN	2.5
1	A	242	HIS	2.5
1	A	60	GLY	2.4
1	A	104	LYS	2.4
1	A	402	TYR	2.4
1	A	54	THR	2.4
1	A	59	LYS	2.4
1	A	139	GLY	2.3
1	A	405	LYS	2.3
1	A	66	GLN	2.3
1	A	136	VAL	2.2
1	A	247	GLU	2.2
1	A	584	ARG	2.2
1	A	580	GLU	2.1
1	A	87	HIS	2.1
1	A	125	SER	2.1
1	A	137	CYS	2.1
1	A	542	THR	2.0

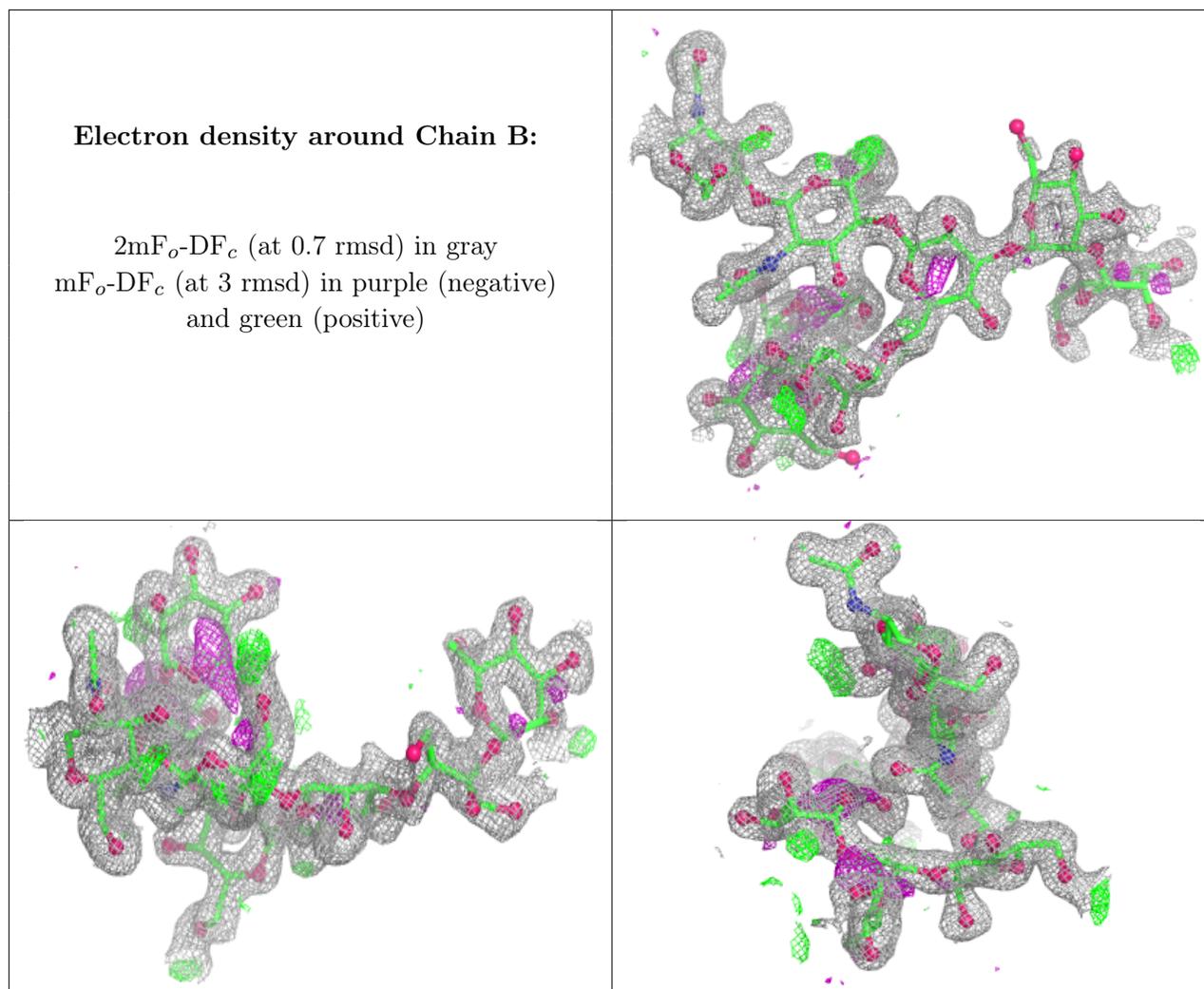## 6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

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

6.3 Carbohydrates ⓘ

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	MAN	B	7	11/12	0.68	0.16	44,50,59,69	0
2	BMA	B	3	11/12	0.72	0.15	33,41,45,46	0
2	MAN	B	8	11/12	0.76	0.15	30,44,47,50	0
2	MAN	B	4	11/12	0.78	0.14	31,40,42,43	0
2	MAN	B	5	11/12	0.82	0.15	27,34,43,54	0
2	MAN	B	6	11/12	0.87	0.14	20,31,32,33	0
2	NAG	B	2	14/15	0.89	0.10	17,19,26,33	0
2	NAG	B	1	14/15	0.97	0.06	8,10,13,13	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 B:

$2mF_o-DF_c$ (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.
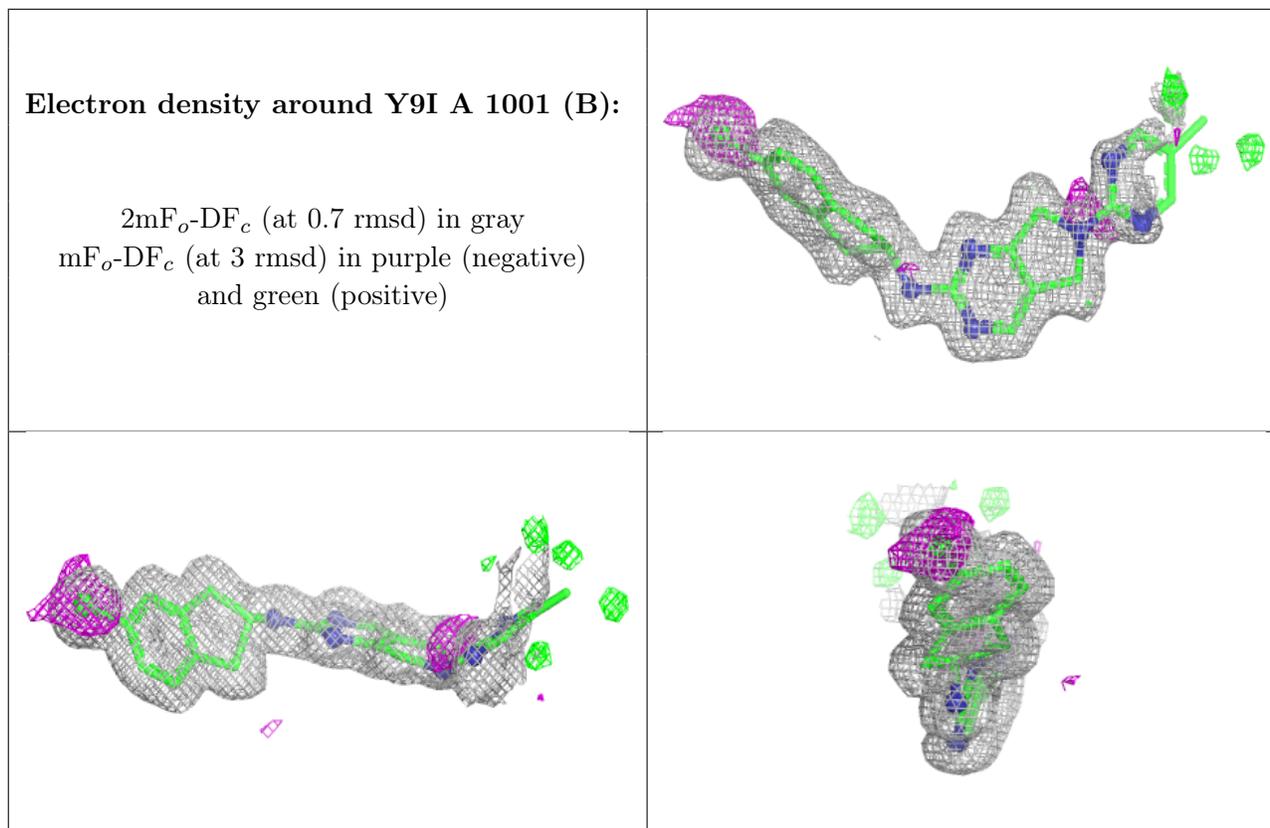
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($Å^2$)	Q<0.9
6	ACT	A	1005	4/4	0.89	0.10	21,23,25,28	0
3	Y9I	A	1001[B]	27/27	0.92	0.13	14,17,33,34	27
3	Y9I	A	1001[A]	27/27	0.92	0.13	14,18,37,41	27
4	EDO	A	1003	4/4	0.94	0.08	13,17,17,18	0
6	ACT	A	1006	4/4	0.95	0.08	20,21,22,23	0
8	NA	A	1008	1/1	0.95	0.09	27,27,27,27	0
4	EDO	A	1002	4/4	0.98	0.04	14,15,15,15	0
9	K	A	1010	1/1	0.99	0.06	17,17,17,17	0
7	ZN	A	1007	1/1	1.00	0.02	13,13,13,13	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
5	CA	A	1004	1/1	1.00	0.08	16,16,16,16	0
5	CA	A	1009	1/1	1.00	0.02	9,9,9,9	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 Y9I A 1001 (B):

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

Electron density around Y9I A 1001 (A):

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

6.5 Other polymers ⓘ

There are no such residues in this entry.