



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 02:47 PM UTC

PDB ID : 1NCA / pdb\_00001nca  
Title : REFINED CRYSTAL STRUCTURE OF THE INFLUENZA VIRUS N9  
NEURAMINIDASE-NC41 FAB COMPLEX  
Authors : Tulip, W.R.; Varghese, J.N.; Colman, P.M.  
Deposited on : 1992-01-21  
Resolution : 2.50 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](mailto:validation@mail.wwpdb.org)

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

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

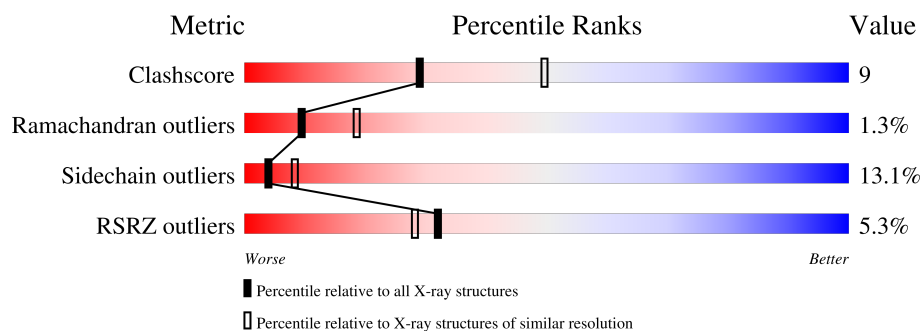
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.50 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))
Clashscore	190562	6492 (2.50-2.50)
Ramachandran outliers	187476	6378 (2.50-2.50)
Sidechain outliers	187428	6380 (2.50-2.50)
RSRZ outliers	180081	5833 (2.50-2.50)

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  $\geq 3$ , 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	N	389	
2	L	214	
3	H	221	
4	A	6	

## 2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 6577 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 INFLUENZA A SUBTYPE N9 NEURAMINIDASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	N	389	Total	C	N	O	S	0	0	0
			3075	1920	539	593	23			

- Molecule 2 is a protein called IGG2A-KAPPA NC41 FAB (LIGHT CHAIN).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	L	214	Total	C	N	O	S	0	0	0
			1667	1043	280	336	8			

There are 21 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
L	20	THR	SER	conflict	EMBL Y11589
L	21	ILE	VAL	conflict	EMBL Y11589
L	28	ASP	ILE	conflict	EMBL Y11589
L	30	SER	GLY	conflict	EMBL Y11589
L	32	ALA	ASN	conflict	EMBL Y11589
L	34	VAL	ALA	conflict	EMBL Y11589
L	46	LEU	ALA	conflict	EMBL Y11589
L	50	TRP	SER	conflict	EMBL Y11589
L	53	THR	TYR	conflict	EMBL Y11589
L	55	HIS	TYR	conflict	EMBL Y11589
L	56	ILE	SER	conflict	EMBL Y11589
L	63	ALA	THR	conflict	EMBL Y11589
L	71	TYR	PHE	conflict	EMBL Y11589
L	77	SER	ASN	conflict	EMBL Y11589
L	80	ALA	SER	conflict	EMBL Y11589
L	85	LEU	GLU	conflict	EMBL Y11589
L	87	TYR	PHE	conflict	EMBL Y11589
L	91	HIS	TYR	conflict	EMBL Y11589
L	92	TYR	ASN	conflict	EMBL Y11589
L	93	SER	ARG	conflict	EMBL Y11589

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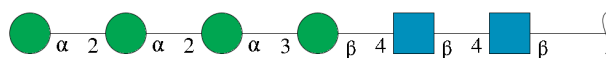
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Chain	Residue	Modelled	Actual	Comment	Reference
L	94	PRO	TYR	conflict	EMBL Y11589

- Molecule 3 is a protein called IGG2A-KAPPA NC41 FAB (HEAVY CHAIN).

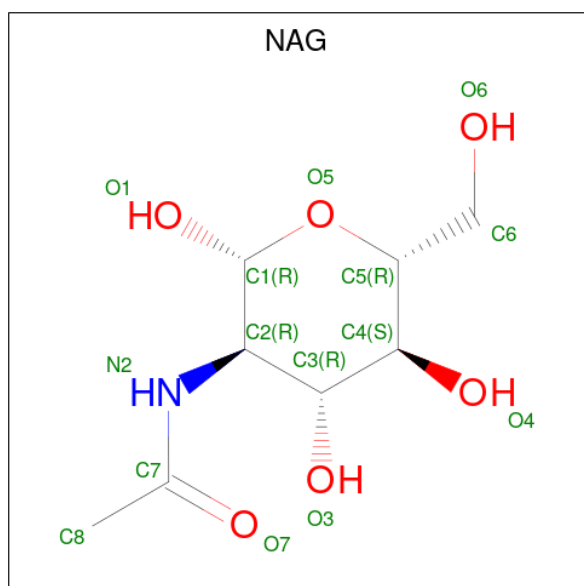
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	H	221	Total	C	N	O	S	0	0	0
			1662	1048	273	334	7			

- Molecule 4 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-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
4	A	6	Total	C	N	O	0	0	0
			72	40	2	30			

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula:  $C_8H_{15}NO_6$ ).



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

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

- Molecule 6 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	N	1	Total	Ca	0	0
			1	1		

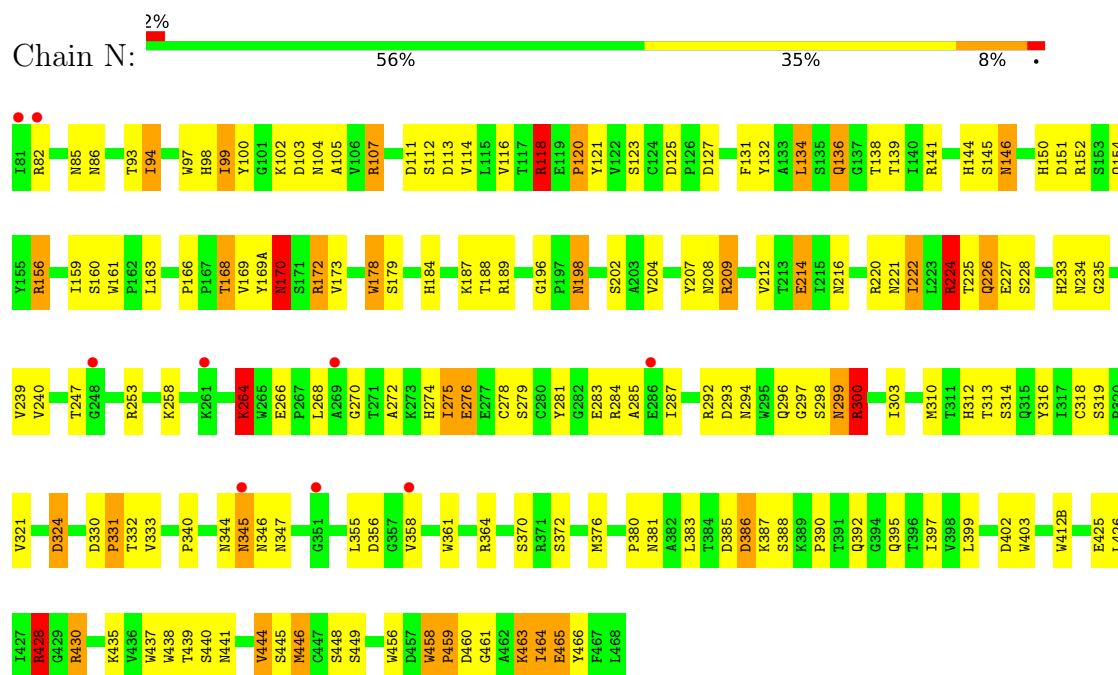
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	N	66	Total	O	0	0
			66	66		
7	L	2	Total	O	0	0
			2	2		
7	H	4	Total	O	0	0
			4	4		

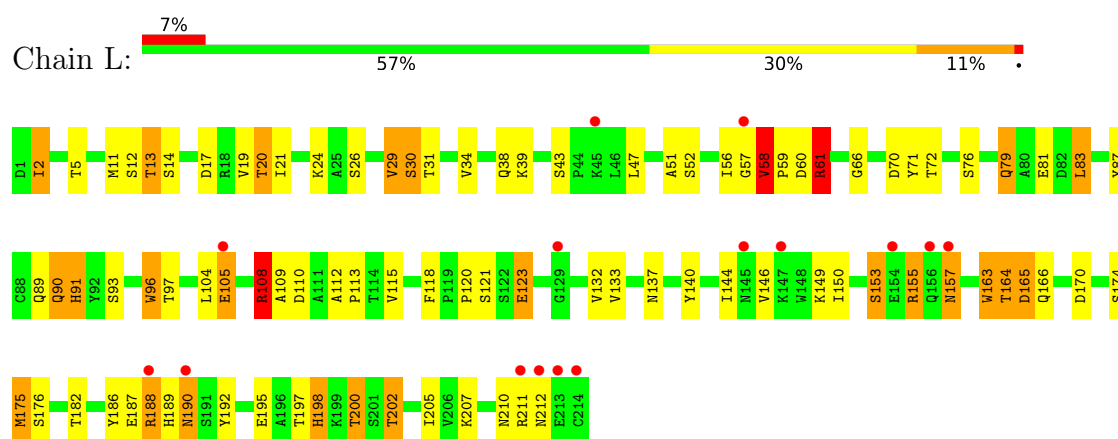
### 3 Residue-property plots

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: INFLUENZA A SUBTYPE N9 NEURAMINIDASE

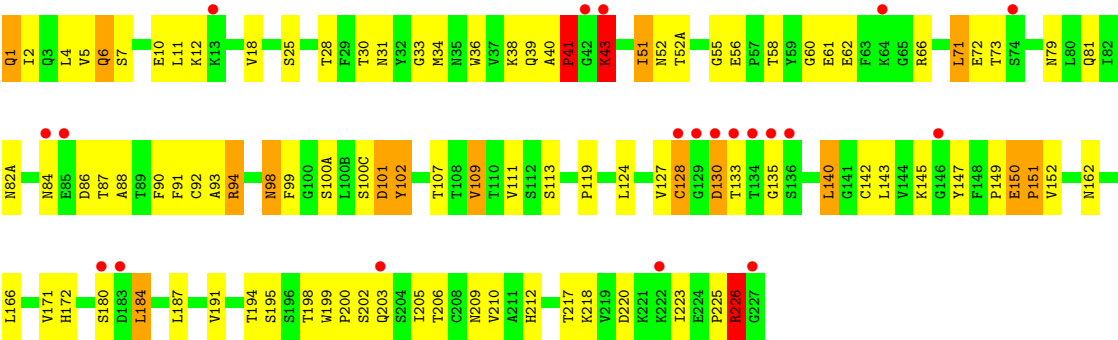


#### • Molecule 2: IGG2A-KAPPA NC41 FAB (LIGHT CHAIN)

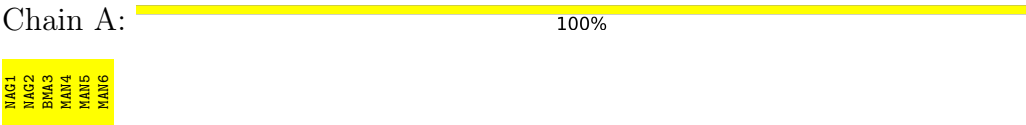


#### • Molecule 3: IGG2A-KAPPA NC41 FAB (HEAVY CHAIN)





● Molecule 4: alpha-D-mannopyranose-(1-2)-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



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 4 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	167.00Å 167.00Å 124.00Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	8.00 – 2.50 8.00 – 2.90	Depositor EDS
% Data completeness (in resolution range)	(Not available) (8.00-2.50) 47.5 (8.00-2.90)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$	-	Xtriage
Refinement program	X-PLOR	Depositor
R, $R_{free}$	0.191 , (Not available) 0.199 , (Not available)	Depositor DCC
$R_{free}$ test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	26.5	Xtriage
Anisotropy	0.118	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.17 , 30.3	EDS
L-test for twinning <sup>1</sup>	$\langle  L  \rangle = 0.34$ , $\langle L^2 \rangle = 0.17$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.84	EDS
Total number of atoms	6577	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	18.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.63% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Theoretical 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: BMA, MAN, NAG, CA

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	N	1.25	15/3158 (0.5%)	2.15	148/4301 (3.4%)
2	L	1.06	6/1708 (0.4%)	2.08	61/2323 (2.6%)
3	H	1.06	5/1704 (0.3%)	1.98	45/2323 (1.9%)
All	All	1.15	26/6570 (0.4%)	2.09	254/8947 (2.8%)

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	N	0	7
2	L	0	3
All	All	0	10

All (26) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	N	144	HIS	CD2-NE2	-7.52	1.29	1.37
1	N	312	HIS	CD2-NE2	-7.20	1.29	1.37
2	L	198	HIS	CD2-NE2	-6.85	1.30	1.37
1	N	233	HIS	CD2-NE2	-6.69	1.30	1.37
1	N	274	HIS	CD2-NE2	-6.52	1.30	1.37
1	N	312	HIS	CG-ND1	-6.30	1.31	1.38
1	N	98	HIS	CD2-NE2	-6.26	1.30	1.37
2	L	189	HIS	CD2-NE2	-6.13	1.31	1.37
2	L	58	VAL	CA-CB	6.05	1.61	1.54
3	H	212	HIS	CD2-NE2	-6.03	1.31	1.37
1	N	144	HIS	CG-ND1	-5.99	1.31	1.38
1	N	150	HIS	CD2-NE2	-5.98	1.31	1.37
1	N	466	TYR	C-N	-5.89	1.25	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	L	91	HIS	CD2-NE2	-5.83	1.31	1.37
3	H	172	HIS	CD2-NE2	-5.81	1.31	1.37
1	N	184	HIS	CD2-NE2	-5.64	1.31	1.37
3	H	212	HIS	CG-ND1	-5.59	1.32	1.38
1	N	275	ILE	CA-CB	5.44	1.61	1.54
3	H	172	HIS	CG-ND1	-5.23	1.32	1.38
1	N	399	LEU	CA-CB	-5.21	1.45	1.53
2	L	146	VAL	CA-CB	5.19	1.60	1.54
3	H	51	ILE	CA-CB	5.17	1.60	1.54
1	N	293	ASP	C-O	5.16	1.30	1.23
1	N	274	HIS	CG-ND1	-5.12	1.32	1.38
1	N	297	GLY	C-O	5.11	1.30	1.23
2	L	56	ILE	CA-CB	5.01	1.61	1.54

All (254) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	N	107	ARG	CD-NE-CZ	-15.47	102.75	124.40
2	L	210	ASN	CA-CB-CG	-14.48	98.12	112.60
1	N	146	ASN	OD1-CG-ND2	-13.96	108.64	122.60
1	N	136	GLN	OE1-CD-NE2	-11.77	110.83	122.60
1	N	107	ARG	CB-CG-CD	-11.60	84.62	111.30
1	N	297	GLY	O-C-N	10.57	133.93	123.35
1	N	226	GLN	OE1-CD-NE2	-10.56	112.04	122.60
3	H	101	ASP	CA-CB-CG	10.51	123.11	112.60
1	N	127	ASP	CA-CB-CG	-9.77	102.83	112.60
1	N	293	ASP	CA-C-O	9.56	130.86	120.92
3	H	98	ASN	OD1-CG-ND2	-9.20	113.40	122.60
1	N	284	ARG	CB-CG-CD	-9.07	90.44	111.30
3	H	101	ASP	N-CA-C	-9.00	95.68	110.17
1	N	428	ARG	CD-NE-CZ	-8.92	111.92	124.40
2	L	205	ILE	N-CA-C	-8.79	98.32	109.30
1	N	386	ASP	CA-CB-CG	8.66	121.26	112.60
1	N	136	GLN	CG-CD-NE2	8.66	129.38	116.40
2	L	190	ASN	CA-CB-CG	8.66	121.26	112.60
1	N	226	GLN	N-CA-C	8.60	125.56	111.37
1	N	264	LYS	CA-CB-CG	8.55	131.21	114.10
3	H	31	ASN	OD1-CG-ND2	-8.50	114.10	122.60
2	L	187	GLU	CB-CG-CD	8.41	126.90	112.60
2	L	91	HIS	CA-CB-CG	8.35	122.15	113.80
1	N	146	ASN	CB-CG-ND2	8.35	128.93	116.40
1	N	198	ASN	OD1-CG-ND2	-8.31	114.29	122.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	N	151	ASP	N-CA-C	8.29	120.32	111.28
2	L	2	ILE	N-CA-C	-8.17	98.11	108.89
1	N	346	ASN	OD1-CG-ND2	-8.16	114.44	122.60
2	L	61	ARG	CB-CG-CD	-8.10	92.67	111.30
2	L	57	GLY	CA-C-N	-8.00	114.71	123.02
2	L	57	GLY	C-N-CA	-8.00	114.71	123.02
1	N	170	ASN	OD1-CG-ND2	-7.99	114.61	122.60
1	N	319	SER	N-CA-C	7.91	118.70	109.60
3	H	30	THR	CA-CB-OG1	-7.91	97.74	109.60
1	N	438	TRP	CG-CD2-CE3	7.83	141.73	133.90
1	N	444	VAL	CA-C-O	-7.71	112.30	120.39
1	N	300	ARG	CA-C-N	7.70	127.69	119.76
1	N	300	ARG	C-N-CA	7.70	127.69	119.76
1	N	161	TRP	CG-CD2-CE3	7.64	141.54	133.90
2	L	61	ARG	CD-NE-CZ	-7.56	113.81	124.40
1	N	300	ARG	CD-NE-CZ	-7.47	113.94	124.40
1	N	300	ARG	NE-CZ-NH2	-7.46	112.49	119.20
3	H	209	ASN	OD1-CG-ND2	-7.46	115.14	122.60
2	L	79	GLN	OE1-CD-NE2	-7.45	115.15	122.60
1	N	107	ARG	CG-CD-NE	7.43	128.34	112.00
2	L	137	ASN	N-CA-C	7.42	121.93	109.76
1	N	438	TRP	CB-CG-CD1	-7.34	115.88	126.90
1	N	439	THR	N-CA-C	-7.34	97.43	109.40
1	N	458	TRP	O-C-N	7.34	127.14	121.27
1	N	298	SER	CA-C-O	7.28	126.76	118.97
1	N	458	TRP	CA-C-N	7.28	127.04	119.76
1	N	458	TRP	C-N-CA	7.28	127.04	119.76
3	H	130	ASP	CA-CB-CG	7.24	119.84	112.60
1	N	125	ASP	N-CA-C	-7.23	101.81	110.13
1	N	107	ARG	CA-CB-CG	7.21	128.51	114.10
1	N	103	ASP	CA-CB-CG	7.20	119.80	112.60
3	H	6	GLN	OE1-CD-NE2	-7.20	115.41	122.60
3	H	52	ASN	OD1-CG-ND2	-7.20	115.40	122.60
1	N	118	ARG	CD-NE-CZ	-7.14	114.41	124.40
1	N	361	TRP	CG-CD2-CE3	7.07	140.97	133.90
1	N	356	ASP	CA-CB-CG	7.04	119.64	112.60
1	N	428	ARG	NE-CZ-NH1	-7.01	114.49	121.50
1	N	456	TRP	O-C-N	7.00	132.40	122.74
2	L	93	SER	O-C-N	-6.97	116.93	121.88
1	N	99	ILE	CB-CA-C	-6.94	100.01	111.32
1	N	403	TRP	CG-CD2-CE3	6.87	140.77	133.90
1	N	150	HIS	O-C-N	6.85	131.59	122.96

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	N	127	ASP	N-CA-C	6.81	121.92	112.45
1	N	216	ASN	O-C-N	-6.79	114.30	122.65
1	N	299	ASN	N-CA-C	-6.78	99.92	110.42
2	L	165	ASP	N-CA-C	-6.76	101.81	110.53
1	N	247	THR	N-CA-C	-6.75	102.35	110.44
2	L	198	HIS	CB-CG-CD2	-6.71	122.47	131.20
1	N	344	ASN	OD1-CG-ND2	-6.69	115.91	122.60
2	L	58	VAL	N-CA-C	-6.67	100.30	107.77
2	L	90	GLN	CA-CB-CG	6.66	127.43	114.10
1	N	345	ASN	OD1-CG-ND2	-6.65	115.95	122.60
1	N	428	ARG	CG-CD-NE	6.65	126.63	112.00
3	H	4	LEU	N-CA-C	-6.64	97.59	108.41
1	N	184	HIS	CB-CG-CD2	-6.62	122.60	131.20
3	H	43	LYS	N-CA-C	6.60	124.85	110.80
3	H	30	THR	N-CA-C	6.58	120.56	112.54
1	N	385	ASP	CA-CB-CG	6.54	119.14	112.60
1	N	118	ARG	NE-CZ-NH2	-6.53	113.32	119.20
3	H	210	VAL	N-CA-C	6.47	116.94	107.37
2	L	188	ARG	N-CA-C	-6.41	105.46	113.28
1	N	220	ARG	N-CA-C	6.39	120.23	111.54
2	L	113	PRO	N-CA-C	6.38	120.85	111.03
1	N	189	ARG	N-CA-C	6.36	119.55	109.50
1	N	161	TRP	O-C-N	-6.35	117.01	121.65
2	L	19	VAL	N-CA-C	-6.35	99.34	108.42
1	N	100	TYR	N-CA-C	-6.34	103.44	112.13
3	H	56	GLU	CB-CA-C	-6.34	99.14	109.41
2	L	70	ASP	CA-CB-CG	-6.33	106.27	112.60
1	N	85	ASN	OD1-CG-ND2	-6.33	116.27	122.60
1	N	296	GLN	O-C-N	-6.32	115.68	122.19
3	H	84	ASN	OD1-CG-ND2	-6.31	116.29	122.60
1	N	247	THR	CA-CB-OG1	-6.30	100.16	109.60
1	N	318	CYS	N-CA-C	6.29	118.94	111.33
1	N	284	ARG	CA-CB-CG	6.25	126.59	114.10
1	N	344	ASN	CA-CB-CG	-6.24	106.36	112.60
1	N	456	TRP	N-CA-C	-6.20	100.38	109.18
2	L	30	SER	CA-C-N	6.20	132.95	123.47
2	L	30	SER	C-N-CA	6.20	132.95	123.47
1	N	381	ASN	N-CA-C	6.16	120.38	112.86
2	L	188	ARG	CA-CB-CG	6.13	126.36	114.10
1	N	285	ALA	N-CA-C	6.12	120.06	112.47
1	N	226	GLN	CG-CD-NE2	6.08	125.53	116.40
1	N	146	ASN	CA-CB-CG	-6.08	106.53	112.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	N	461	GLY	O-C-N	-6.05	115.52	122.42
1	N	116	VAL	N-CA-C	-6.02	100.94	108.89
2	L	110	ASP	CA-CB-CG	6.01	118.61	112.60
1	N	111	ASP	CA-CB-CG	5.98	118.58	112.60
3	H	128	CYS	N-CA-C	5.98	123.53	110.80
3	H	184	LEU	N-CA-C	5.97	118.48	109.41
3	H	194	THR	N-CA-C	-5.97	101.69	110.52
3	H	79	ASN	CB-CG-ND2	5.97	125.35	116.40
1	N	456	TRP	CA-C-N	-5.96	112.80	122.81
1	N	456	TRP	C-N-CA	-5.96	112.80	122.81
2	L	11	MET	CA-CB-CG	-5.93	102.24	114.10
1	N	247	THR	N-CA-CB	-5.93	98.36	111.69
1	N	184	HIS	CB-CG-ND1	5.91	131.56	122.70
3	H	36	TRP	CG-CD2-CE3	5.88	139.78	133.90
1	N	224	ARG	CA-CB-CG	5.87	125.84	114.10
1	N	121	TYR	CA-CB-CG	5.84	124.41	113.90
1	N	346	ASN	N-CA-C	5.82	119.58	111.90
3	H	34	MET	N-CA-C	5.81	118.37	108.90
1	N	430	ARG	NE-CZ-NH2	-5.79	113.99	119.20
2	L	137	ASN	CB-CG-ND2	5.79	125.08	116.40
1	N	226	GLN	CA-C-O	-5.77	114.45	120.92
2	L	13	THR	O-C-N	-5.76	117.26	123.42
1	N	168	THR	CA-C-O	-5.75	114.86	121.47
2	L	72	THR	N-CA-CB	-5.74	100.86	110.57
1	N	216	ASN	OD1-CG-ND2	-5.73	116.87	122.60
1	N	402	ASP	CA-CB-CG	5.72	118.33	112.60
1	N	330	ASP	CA-CB-CG	5.71	118.31	112.60
1	N	428	ARG	CB-CG-CD	-5.70	98.18	111.30
3	H	30	THR	CA-CB-CG2	5.70	120.19	110.50
2	L	164	THR	N-CA-C	-5.70	100.39	109.96
1	N	170	ASN	CB-CG-ND2	5.69	124.93	116.40
1	N	103	ASP	N-CA-CB	-5.67	100.91	110.49
1	N	361	TRP	CB-CG-CD1	-5.66	118.41	126.90
2	L	108	ARG	CG-CD-NE	-5.65	99.56	112.00
3	H	30	THR	N-CA-CB	-5.65	101.01	110.39
2	L	90	GLN	N-CA-CB	-5.65	101.70	110.29
1	N	287	ILE	N-CA-CB	-5.65	104.61	111.21
1	N	150	HIS	CB-CG-CD2	-5.64	123.86	131.20
3	H	226	ARG	N-CA-C	5.64	122.80	110.80
2	L	170	ASP	N-CA-C	5.63	119.73	112.41
1	N	370	SER	N-CA-C	5.63	117.53	109.14
3	H	39	GLN	N-CA-C	-5.61	98.20	108.02

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	N	202	SER	CA-CB-OG	-5.61	99.88	111.10
3	H	203	GLN	OE1-CD-NE2	-5.60	117.00	122.60
2	L	188	ARG	NE-CZ-NH2	-5.60	114.16	119.20
1	N	239	VAL	CG1-CB-CG2	-5.59	98.51	110.80
3	H	218	LYS	N-CA-C	-5.58	98.72	107.93
2	L	79	GLN	CG-CD-NE2	5.57	124.75	116.40
1	N	279	SER	N-CA-C	-5.55	99.85	108.90
2	L	155	ARG	N-CA-C	-5.55	100.75	109.25
1	N	98	HIS	CB-CG-CD2	-5.55	123.98	131.20
3	H	60	GLY	N-CA-C	-5.52	105.02	112.14
2	L	31	THR	CA-CB-OG1	-5.51	101.34	109.60
2	L	210	ASN	N-CA-C	-5.50	99.09	110.80
3	H	107	THR	N-CA-C	-5.50	99.33	108.34
1	N	93	THR	CA-CB-OG1	-5.50	101.36	109.60
1	N	227	GLU	N-CA-C	5.49	119.27	112.24
2	L	105	GLU	N-CA-C	-5.48	101.23	109.95
1	N	102	LYS	CA-C-N	5.48	132.00	121.54
1	N	102	LYS	C-N-CA	5.48	132.00	121.54
2	L	38	GLN	CA-C-O	5.46	126.22	120.33
3	H	127	VAL	N-CA-C	-5.46	97.99	109.34
1	N	303	ILE	O-C-N	-5.43	117.48	123.18
1	N	104	ASN	OD1-CG-ND2	-5.42	117.18	122.60
2	L	26	SER	N-CA-C	5.41	119.50	113.01
1	N	216	ASN	N-CA-C	5.40	117.49	110.53
1	N	170	ASN	CA-CB-CG	5.39	117.99	112.60
1	N	105	ALA	N-CA-C	5.38	120.25	111.37
1	N	266	GLU	CA-C-N	5.38	125.68	119.92
1	N	266	GLU	C-N-CA	5.38	125.68	119.92
1	N	347	ASN	OD1-CG-ND2	-5.35	117.25	122.60
2	L	58	VAL	CA-C-O	5.35	123.11	119.20
1	N	274	HIS	CB-CG-CD2	-5.34	124.25	131.20
2	L	29	VAL	N-CA-CB	-5.34	103.11	112.08
1	N	233	HIS	CB-CG-CD2	-5.33	124.27	131.20
1	N	150	HIS	CA-C-N	5.33	127.42	120.28
1	N	150	HIS	C-N-CA	5.33	127.42	120.28
2	L	198	HIS	CB-CG-ND1	5.33	130.69	122.70
1	N	166	PRO	CB-CA-C	5.32	117.42	110.92
1	N	438	TRP	CE2-CD2-CG	-5.32	100.82	107.20
1	N	160	SER	N-CA-CB	-5.31	101.63	111.13
1	N	161	TRP	CB-CG-CD1	-5.31	118.94	126.90
3	H	92	CYS	N-CA-C	-5.30	101.05	109.96
2	L	190	ASN	OD1-CG-ND2	-5.30	117.30	122.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	N	125	ASP	CA-CB-CG	5.30	117.90	112.60
2	L	87	TYR	CA-C-O	-5.29	114.98	120.70
1	N	345	ASN	CB-CG-ND2	5.29	124.34	116.40
1	N	459	PRO	CB-CA-C	-5.26	104.22	111.21
2	L	24	LYS	CA-CB-CG	5.25	124.61	114.10
2	L	104	LEU	O-C-N	5.25	129.20	123.22
3	H	200	PRO	CA-C-N	5.24	128.07	120.79
3	H	200	PRO	C-N-CA	5.24	128.07	120.79
2	L	137	ASN	OD1-CG-ND2	-5.24	117.36	122.60
1	N	144	HIS	CB-CG-CD2	-5.23	124.40	131.20
1	N	324	ASP	N-CA-C	-5.23	101.64	109.79
1	N	344	ASN	N-CA-C	-5.23	102.01	110.32
2	L	20	THR	CB-CA-C	5.22	118.18	110.14
3	H	36	TRP	CE2-CD2-CG	-5.22	100.94	107.20
3	H	84	ASN	CB-CG-ND2	5.22	124.23	116.40
1	N	221	ASN	O-C-N	5.21	129.32	123.28
1	N	300	ARG	NE-CZ-NH1	5.20	126.70	121.50
3	H	40	ALA	CA-C-N	5.20	126.33	119.84
3	H	40	ALA	C-N-CA	5.20	126.33	119.84
2	L	96	TRP	CE2-CD2-CG	-5.17	101.00	107.20
1	N	99	ILE	N-CA-CB	5.16	118.80	110.13
2	L	163	TRP	CE2-CD2-CG	-5.16	101.01	107.20
3	H	82(A)	ASN	OD1-CG-ND2	-5.16	117.44	122.60
1	N	294	ASN	CB-CG-ND2	5.16	124.13	116.40
1	N	161	TRP	CE2-CD2-CG	-5.14	101.03	107.20
1	N	440	SER	CA-C-O	-5.14	115.65	121.05
3	H	94	ARG	N-CA-C	-5.14	102.08	110.20
1	N	430	ARG	CB-CG-CD	5.13	123.11	111.30
2	L	81	GLU	CB-CG-CD	5.13	121.32	112.60
1	N	156	ARG	CB-CG-CD	-5.12	99.53	111.30
1	N	196	GLY	CA-C-N	5.11	125.39	119.92
1	N	196	GLY	C-N-CA	5.11	125.39	119.92
1	N	154	GLN	CA-CB-CG	5.11	124.31	114.10
1	N	465	GLU	CA-C-N	-5.10	114.48	122.65
1	N	465	GLU	C-N-CA	-5.10	114.48	122.65
2	L	110	ASP	N-CA-C	5.10	117.43	110.24
1	N	403	TRP	CE2-CD2-CG	-5.10	101.08	107.20
1	N	247	THR	CA-CB-CG2	5.10	119.16	110.50
2	L	202	THR	N-CA-C	-5.09	104.71	112.04
2	L	60	ASP	CA-CB-CG	-5.08	107.52	112.60
3	H	58	THR	N-CA-C	-5.08	101.41	109.59
2	L	61	ARG	N-CA-C	5.08	118.58	112.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	L	34	VAL	CB-CA-C	-5.08	102.77	110.95
1	N	113	ASP	N-CA-C	5.08	117.39	108.56
1	N	300	ARG	CB-CG-CD	5.06	122.95	111.30
3	H	150	GLU	CA-C-O	-5.06	116.05	120.60
1	N	107	ARG	NH1-CZ-NH2	-5.06	112.73	119.30
1	N	178	TRP	CE2-CD2-CG	-5.05	101.14	107.20
3	H	109	VAL	CA-CB-CG1	5.04	118.98	110.40
2	L	190	ASN	CB-CG-ND2	5.04	123.96	116.40
1	N	428	ARG	NE-CZ-NH2	5.04	123.74	119.20
2	L	132	VAL	N-CA-C	-5.04	100.64	107.99
3	H	1	GLN	CA-C-O	-5.03	112.25	120.80
3	H	55	GLY	O-C-N	-5.03	116.57	122.50
2	L	210	ASN	OD1-CG-ND2	-5.02	117.58	122.60
3	H	166	LEU	CB-CA-C	5.01	118.96	110.79
1	N	120	PRO	CA-N-CD	-5.01	104.98	112.00
1	N	372	SER	CA-CB-OG	5.01	121.12	111.10
1	N	94	ILE	CA-CB-CG1	5.00	118.91	110.40
1	N	412(B)	TRP	CE2-CD2-CG	-5.00	101.19	107.20
1	N	187	LYS	O-C-N	-5.00	116.57	122.32

There are no chirality outliers.

All (10) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	L	108	ARG	Sidechain
2	L	140	TYR	Sidechain
2	L	61	ARG	Sidechain
1	N	107	ARG	Sidechain
1	N	118	ARG	Sidechain
1	N	172	ARG	Sidechain
1	N	209	ARG	Sidechain
1	N	224	ARG	Sidechain
1	N	300	ARG	Sidechain
1	N	428	ARG	Sidechain

## 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	N	3075	0	2903	54	0
2	L	1667	0	1598	23	0
3	H	1662	0	1611	29	0
4	A	72	0	61	0	0
5	N	28	0	26	0	0
6	N	1	0	0	0	0
7	H	4	0	0	0	0
7	L	2	0	0	0	0
7	N	66	0	0	2	0
All	All	6577	0	6199	104	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 9.

All (104) 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)
3:H:150:GLU:HG2	3:H:151:PRO:HA	1.58	0.85
3:H:87:THR:HG22	3:H:111:VAL:H	1.44	0.83
3:H:11:LEU:HD22	3:H:149:PRO:HG3	1.61	0.80
1:N:146:ASN:OD1	1:N:437:TRP:HB3	1.83	0.77
2:L:112:ALA:HB2	2:L:200:THR:HG21	1.72	0.70
3:H:140:LEU:HD12	3:H:223:ILE:HG21	1.76	0.67
2:L:61:ARG:HD2	2:L:76:SER:O	1.96	0.66
3:H:6:GLN:HE22	3:H:91:PHE:HA	1.62	0.65
1:N:276:GLU:HB3	1:N:292:ARG:HD3	1.79	0.65
3:H:41:PRO:HD3	3:H:88:ALA:HA	1.79	0.64
3:H:162:ASN:ND2	3:H:206:THR:H	1.96	0.64
1:N:97:TRP:H	1:N:395:GLN:HE22	1.49	0.59
3:H:199:TRP:CH2	3:H:225:PRO:HA	2.38	0.59
1:N:152:ARG:HD2	1:N:198:ASN:HD21	1.67	0.58
3:H:171:VAL:HG22	3:H:191:VAL:HG23	1.86	0.57
1:N:152:ARG:HB2	1:N:178:TRP:CG	2.40	0.57
2:L:163:TRP:CZ2	2:L:175:MET:HE2	2.41	0.56
1:N:118:ARG:HA	1:N:441:ASN:ND2	2.21	0.56
1:N:333:VAL:HG22	1:N:387:LYS:HE3	1.88	0.56
1:N:226:GLN:NE2	1:N:240:VAL:H	2.04	0.55
1:N:168:THR:HG22	1:N:169(A):TYR:H	1.71	0.55
2:L:164:THR:HG22	2:L:165:ASP:O	2.07	0.54
2:L:96:TRP:HZ2	3:H:99:PHE:HB3	1.72	0.54
1:N:299:ASN:HA	7:N:64:HOH:O	2.08	0.53
2:L:83:LEU:HD11	2:L:166:GLN:HB3	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:L:150:ILE:HD12	2:L:155:ARG:HH11	1.75	0.52
3:H:199:TRP:CZ2	3:H:225:PRO:HA	2.45	0.52
1:N:188:THR:HG21	1:N:208:ASN:HB2	1.92	0.52
3:H:119:PRO:HB3	3:H:147:TYR:HB3	1.91	0.51
1:N:397:ILE:HD12	1:N:446:MET:HE2	1.92	0.51
2:L:144:ILE:HB	2:L:198:HIS:HD2	1.76	0.51
2:L:115:VAL:O	2:L:207:LYS:HE3	2.10	0.51
1:N:428:ARG:HD2	1:N:460:ASP:OD2	2.11	0.51
1:N:426:LEU:HD11	1:N:444:VAL:CG2	2.41	0.51
1:N:118:ARG:HD3	1:N:425:GLU:OE2	2.11	0.50
1:N:138:THR:HG21	1:N:145:SER:HA	1.93	0.50
3:H:11:LEU:HD22	3:H:149:PRO:CG	2.38	0.50
1:N:152:ARG:HD2	1:N:198:ASN:ND2	2.26	0.50
1:N:226:GLN:HG2	1:N:278:CYS:O	2.12	0.50
1:N:463:LYS:C	1:N:465:GLU:H	2.19	0.50
1:N:123:SER:HB3	1:N:132:TYR:CE1	2.47	0.49
1:N:430:ARG:HD2	1:N:437:TRP:HA	1.93	0.49
1:N:94:ILE:HG23	1:N:448:SER:HB3	1.94	0.49
2:L:149:LYS:HA	2:L:153:SER:O	2.12	0.49
1:N:168:THR:HB	1:N:170:ASN:ND2	2.27	0.49
1:N:173:VAL:O	1:N:209:ARG:NH2	2.45	0.49
2:L:12:SER:HA	2:L:105:GLU:O	2.12	0.49
1:N:333:VAL:HA	1:N:386:ASP:O	2.12	0.49
2:L:121:SER:OG	2:L:123:GLU:HG2	2.13	0.48
3:H:2:ILE:HA	3:H:25:SER:O	2.13	0.48
2:L:155:ARG:HD2	2:L:155:ARG:HA	1.71	0.48
2:L:89:GLN:NE2	2:L:96:TRP:HB3	2.28	0.48
1:N:300:ARG:NH1	1:N:324:ASP:HA	2.28	0.48
3:H:199:TRP:CD1	3:H:205:ILE:HG12	2.49	0.48
3:H:10:GLU:OE2	3:H:12:LYS:NZ	2.46	0.48
1:N:281:TYR:HA	7:N:59:HOH:O	2.14	0.47
1:N:264:LYS:NZ	1:N:310:MET:O	2.47	0.47
1:N:463:LYS:C	1:N:465:GLU:N	2.72	0.47
1:N:134:LEU:HB3	1:N:156:ARG:NH1	2.29	0.47
1:N:355:LEU:HD13	1:N:383:LEU:HD13	1.97	0.47
3:H:18:VAL:O	3:H:81:GLN:HA	2.14	0.47
1:N:97:TRP:CZ2	1:N:376:MET:HE2	2.49	0.47
2:L:108:ARG:HD3	2:L:109:ALA:O	2.14	0.47
1:N:270:GLY:HA3	1:N:314:SER:H	1.80	0.46
3:H:119:PRO:HD2	3:H:217:THR:HG21	1.98	0.46
2:L:155:ARG:NE	2:L:157:ASN:OD1	2.47	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:N:97:TRP:N	1:N:395:GLN:HE22	2.13	0.46
3:H:93:ALA:HB1	3:H:100(C):SER:HB3	1.97	0.46
1:N:168:THR:HG22	1:N:169:VAL:N	2.31	0.46
1:N:316:TYR:CZ	1:N:340:PRO:HD3	2.50	0.45
1:N:159:ILE:HG22	1:N:173:VAL:HG22	1.98	0.45
1:N:207:TYR:HB3	1:N:212:VAL:HG21	1.99	0.45
2:L:2:ILE:O	2:L:97:THR:HG21	2.17	0.45
3:H:52(A):THR:HA	3:H:71:LEU:HD21	1.99	0.45
1:N:321:VAL:HG21	1:N:390:PRO:HD3	1.97	0.45
3:H:33:GLY:HA2	3:H:52(A):THR:HG23	1.99	0.45
2:L:58:VAL:HA	2:L:59:PRO:HD2	1.80	0.45
1:N:131:PHE:CE1	1:N:163:LEU:HD12	2.53	0.43
3:H:124:LEU:HD11	3:H:143:LEU:HB2	2.00	0.43
1:N:426:LEU:HD11	1:N:444:VAL:HG23	2.01	0.43
1:N:358:VAL:HA	1:N:380:PRO:HB3	2.01	0.43
2:L:91:HIS:HB2	3:H:100(A):SER:HB2	2.01	0.43
1:N:235:GLY:O	1:N:258:LYS:HA	2.19	0.43
1:N:464:ILE:O	1:N:464:ILE:CG2	2.66	0.43
2:L:66:GLY:HA3	2:L:71:TYR:CD1	2.53	0.43
2:L:118:PHE:HB2	2:L:133:VAL:HB	2.01	0.43
3:H:2:ILE:HD12	3:H:102:TYR:CD2	2.53	0.43
1:N:214:GLU:N	1:N:214:GLU:CD	2.77	0.43
2:L:186:TYR:HA	2:L:192:TYR:OH	2.20	0.42
1:N:458:TRP:HA	1:N:459:PRO:HD2	1.80	0.42
3:H:12:LYS:O	3:H:111:VAL:HA	2.19	0.41
3:H:66:ARG:HH22	3:H:86:ASP:CG	2.28	0.41
3:H:94:ARG:HD3	3:H:101:ASP:OD1	2.20	0.41
1:N:114:VAL:O	1:N:139:THR:HA	2.21	0.41
1:N:272:ALA:HA	1:N:316:TYR:CE1	2.56	0.41
1:N:355:LEU:HD22	1:N:383:LEU:HB2	2.02	0.41
2:L:175:MET:HG2	2:L:176:SER:N	2.36	0.41
1:N:168:THR:H	1:N:170:ASN:HD21	1.68	0.41
1:N:226:GLN:HE21	1:N:240:VAL:H	1.67	0.41
3:H:162:ASN:ND2	3:H:206:THR:N	2.66	0.41
1:N:222:ILE:O	1:N:224:ARG:HD2	2.21	0.40
1:N:86:ASN:OD1	1:N:234:ASN:HB2	2.22	0.40
3:H:38:LYS:HG3	3:H:90:PHE:CE1	2.57	0.40
1:N:179:SER:OG	1:N:225:THR:HG22	2.22	0.40

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	N	387/389 (100%)	362 (94%)	23 (6%)	2 (0%)	24	43
2	L	212/214 (99%)	197 (93%)	14 (7%)	1 (0%)	24	43
3	H	219/221 (99%)	195 (89%)	16 (7%)	8 (4%)	2	3
All	All	818/824 (99%)	754 (92%)	53 (6%)	11 (1%)	9	18

All (11) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	H	43	LYS
3	H	102	TYR
3	H	226	ARG
3	H	41	PRO
3	H	128	CYS
3	H	130	ASP
3	H	180	SER
1	N	222	ILE
1	N	331	PRO
2	L	51	ALA
3	H	135	GLY

### 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	N	342/342 (100%)	308 (90%)	34 (10%)	7	16

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	L	190/190 (100%)	158 (83%)	32 (17%)	2	4
3	H	187/187 (100%)	159 (85%)	28 (15%)	3	6
All	All	719/719 (100%)	625 (87%)	94 (13%)	4	8

All (94) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	N	82	ARG
1	N	99	ILE
1	N	112	SER
1	N	118	ARG
1	N	120	PRO
1	N	134	LEU
1	N	136	GLN
1	N	141	ARG
1	N	170	ASN
1	N	172	ARG
1	N	204	VAL
1	N	214	GLU
1	N	224	ARG
1	N	228	SER
1	N	253	ARG
1	N	264	LYS
1	N	268	LEU
1	N	275	ILE
1	N	276	GLU
1	N	283	GLU
1	N	313	THR
1	N	331	PRO
1	N	332	THR
1	N	345	ASN
1	N	364	ARG
1	N	388	SER
1	N	392	GLN
1	N	428	ARG
1	N	435	LYS
1	N	445	SER
1	N	446	MET
1	N	449	SER
1	N	463	LYS
1	N	464	ILE

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Mol	Chain	Res	Type
2	L	5	THR
2	L	13	THR
2	L	14	SER
2	L	17	ASP
2	L	20	THR
2	L	21	ILE
2	L	29	VAL
2	L	30	SER
2	L	39	LYS
2	L	43	SER
2	L	47	LEU
2	L	52	SER
2	L	58	VAL
2	L	79	GLN
2	L	83	LEU
2	L	90	GLN
2	L	108	ARG
2	L	120	PRO
2	L	123	GLU
2	L	153	SER
2	L	157	ASN
2	L	174	SER
2	L	175	MET
2	L	182	THR
2	L	188	ARG
2	L	190	ASN
2	L	195	GLU
2	L	197	THR
2	L	200	THR
2	L	202	THR
2	L	211	ARG
2	L	212	ASN
3	H	1	GLN
3	H	5	VAL
3	H	7	SER
3	H	28	THR
3	H	41	PRO
3	H	43	LYS
3	H	51	ILE
3	H	61	GLU
3	H	62	GLU
3	H	71	LEU

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Mol	Chain	Res	Type
3	H	72	GLU
3	H	73	THR
3	H	98	ASN
3	H	109	VAL
3	H	113	SER
3	H	133	THR
3	H	140	LEU
3	H	142	CYS
3	H	145	LYS
3	H	151	PRO
3	H	152	VAL
3	H	184	LEU
3	H	187	LEU
3	H	195	SER
3	H	198	THR
3	H	202	SER
3	H	220	ASP
3	H	226	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (22) such sidechains are listed below:

Mol	Chain	Res	Type
1	N	144	HIS
1	N	150	HIS
1	N	170	ASN
1	N	198	ASN
1	N	226	GLN
1	N	345	ASN
1	N	381	ASN
1	N	395	GLN
1	N	441	ASN
1	N	455	GLN
2	L	38	GLN
2	L	89	GLN
3	H	6	GLN
3	H	39	GLN
3	H	53	ASN
3	H	79	ASN
3	H	82(B)	ASN
3	H	84	ASN
3	H	98	ASN
3	H	105	GLN

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Mol	Chain	Res	Type
3	H	162	ASN
3	H	209	ASN

### 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 ⓘ

6 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	$\# Z  > 2$
4	NAG	A	1	4,1	14,14,15	0.57	0	17,19,21	1.18	1 (5%)
4	NAG	A	2	4	14,14,15	1.08	1 (7%)	17,19,21	1.34	1 (5%)
4	BMA	A	3	4	11,11,12	1.06	1 (9%)	15,15,17	1.25	2 (13%)
4	MAN	A	4	4	11,11,12	0.33	0	15,15,17	1.10	1 (6%)
4	MAN	A	5	4	11,11,12	0.65	0	15,15,17	0.94	1 (6%)
4	MAN	A	6	4	11,11,12	0.83	0	15,15,17	1.66	1 (6%)

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	NAG	A	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	A	2	4	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	BMA	A	3	4	-	2/2/19/22	0/1/1/1
4	MAN	A	4	4	-	1/2/19/22	0/1/1/1
4	MAN	A	5	4	-	0/2/19/22	0/1/1/1
4	MAN	A	6	4	-	2/2/19/22	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	2	NAG	C4-C3	2.42	1.58	1.52
4	A	3	BMA	C6-C5	2.03	1.58	1.51

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	6	MAN	C1-O5-C5	6.00	120.23	112.19
4	A	2	NAG	C4-C3-C2	-3.17	106.37	111.02
4	A	3	BMA	C6-C5-C4	2.97	120.31	113.02
4	A	3	BMA	O5-C5-C4	-2.30	105.23	110.83
4	A	1	NAG	C1-C2-N2	-2.19	106.98	110.43
4	A	4	MAN	O2-C2-C1	-2.15	104.29	109.22
4	A	5	MAN	C6-C5-C4	-2.14	107.77	113.02

There are no chirality outliers.

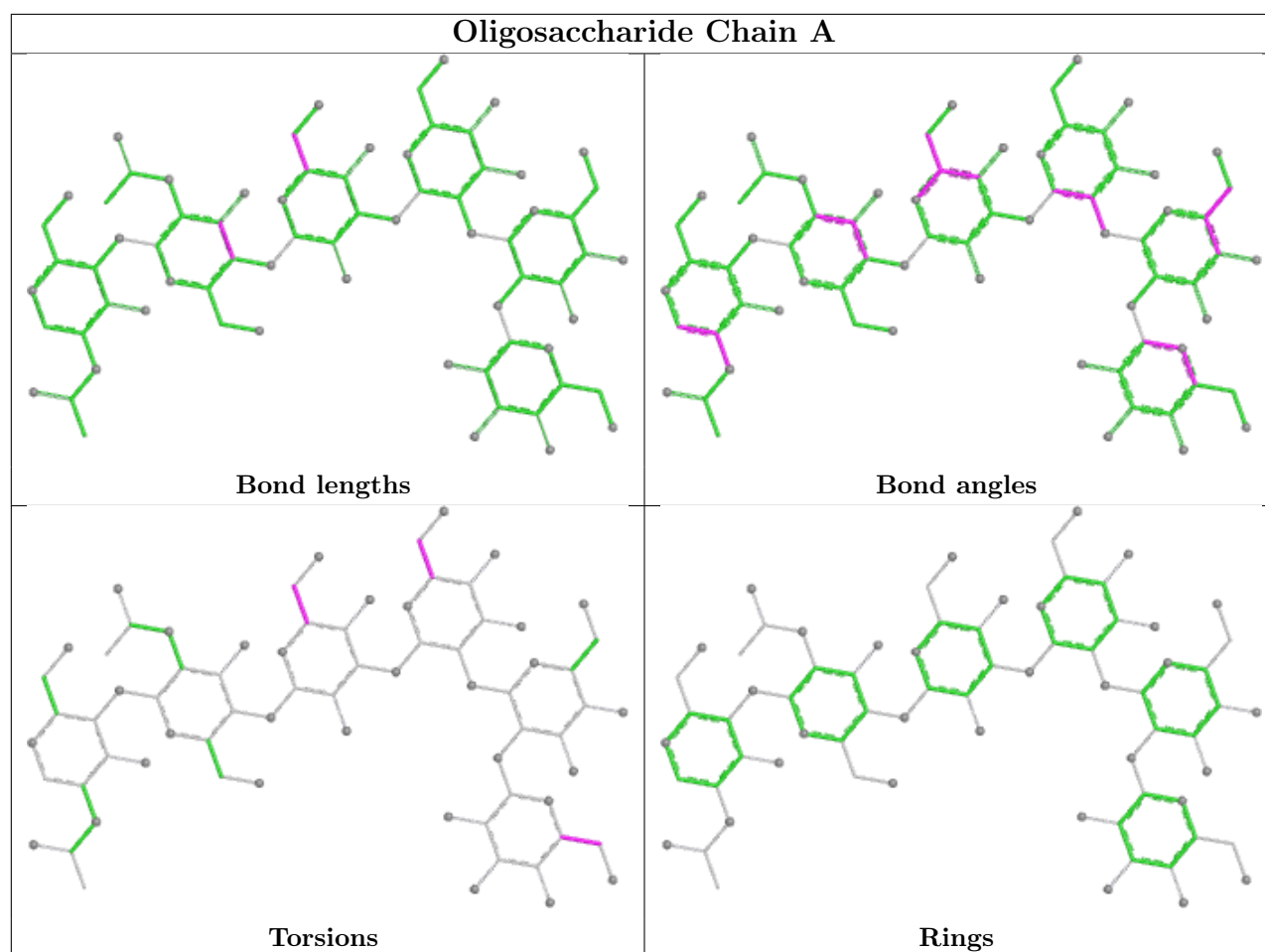
All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	3	BMA	C4-C5-C6-O6
4	A	3	BMA	O5-C5-C6-O6
4	A	6	MAN	O5-C5-C6-O6
4	A	6	MAN	C4-C5-C6-O6
4	A	4	MAN	O5-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.



## 5.6 Ligand geometry [i](#)

Of 3 ligands modelled in this entry, 1 is monoatomic - leaving 2 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
5	NAG	N	475(A)	1	14,14,15	0.97	0	17,19,21	1.42	2 (11%)
5	NAG	N	476(A)	1	14,14,15	1.21	1 (7%)	17,19,21	1.91	5 (29%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns.

'-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	N	475(A)	1	-	1/6/23/26	0/1/1/1
5	NAG	N	476(A)	1	-	3/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	N	476(A)	NAG	C1-C2	3.75	1.57	1.52

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	N	476(A)	NAG	C4-C3-C2	-5.35	103.18	111.02
5	N	475(A)	NAG	C1-O5-C5	3.85	117.35	112.19
5	N	476(A)	NAG	C8-C7-N2	3.15	121.34	116.12
5	N	475(A)	NAG	C1-C2-N2	2.64	114.59	110.43
5	N	476(A)	NAG	O3-C3-C4	2.61	116.52	110.38
5	N	476(A)	NAG	C6-C5-C4	2.33	118.75	113.02
5	N	476(A)	NAG	O7-C7-C8	-2.21	118.12	122.05

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	N	476(A)	NAG	C1-C2-N2-C7
5	N	476(A)	NAG	O5-C5-C6-O6
5	N	475(A)	NAG	O5-C5-C6-O6
5	N	476(A)	NAG	C3-C2-N2-C7

There are no ring outliers.

No monomer is involved in short contacts.

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	N	389/389 (100%)	-0.16	9 (2%) 61 57	2, 7, 23, 48	5 (1%)
2	L	214/214 (100%)	0.51	15 (7%) 22 20	1, 26, 43, 48	11 (5%)
3	H	221/221 (100%)	0.81	20 (9%) 15 13	1, 25, 39, 45	22 (9%)
All	All	824/824 (100%)	0.27	44 (5%) 32 28	1, 16, 39, 48	38 (4%)

All (44) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	H	42	GLY	16.4
3	H	133	THR	13.4
3	H	180	SER	11.1
2	L	212	ASN	10.2
3	H	134	THR	10.0
3	H	130	ASP	9.8
2	L	213	GLU	9.2
2	L	214	CYS	9.0
3	H	129	GLY	8.4
3	H	136	SER	8.4
3	H	227	GLY	7.7
2	L	211	ARG	7.6
3	H	128	CYS	6.8
3	H	43	LYS	5.5
3	H	203	GLN	4.7
2	L	154	GLU	4.6
3	H	13	LYS	4.2
2	L	188	ARG	3.9
2	L	129	GLY	3.9
3	H	135	GLY	3.8
1	N	286	GLU	3.6
1	N	81	ILE	3.2
3	H	85	GLU	3.2

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Mol	Chain	Res	Type	RSRZ
2	L	105	GLU	3.0
3	H	84	ASN	2.8
3	H	64	LYS	2.8
1	N	345	ASN	2.6
2	L	145	ASN	2.6
2	L	190	ASN	2.6
1	N	358	VAL	2.6
3	H	146	GLY	2.4
2	L	156	GLN	2.4
1	N	269	ALA	2.4
3	H	222	LYS	2.4
1	N	248	GLY	2.4
2	L	57	GLY	2.3
2	L	147	LYS	2.3
1	N	82	ARG	2.3
1	N	261	LYS	2.2
2	L	157	ASN	2.1
3	H	74	SER	2.1
3	H	183	ASP	2.1
1	N	351	GLY	2.0
2	L	45	LYS	2.0

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

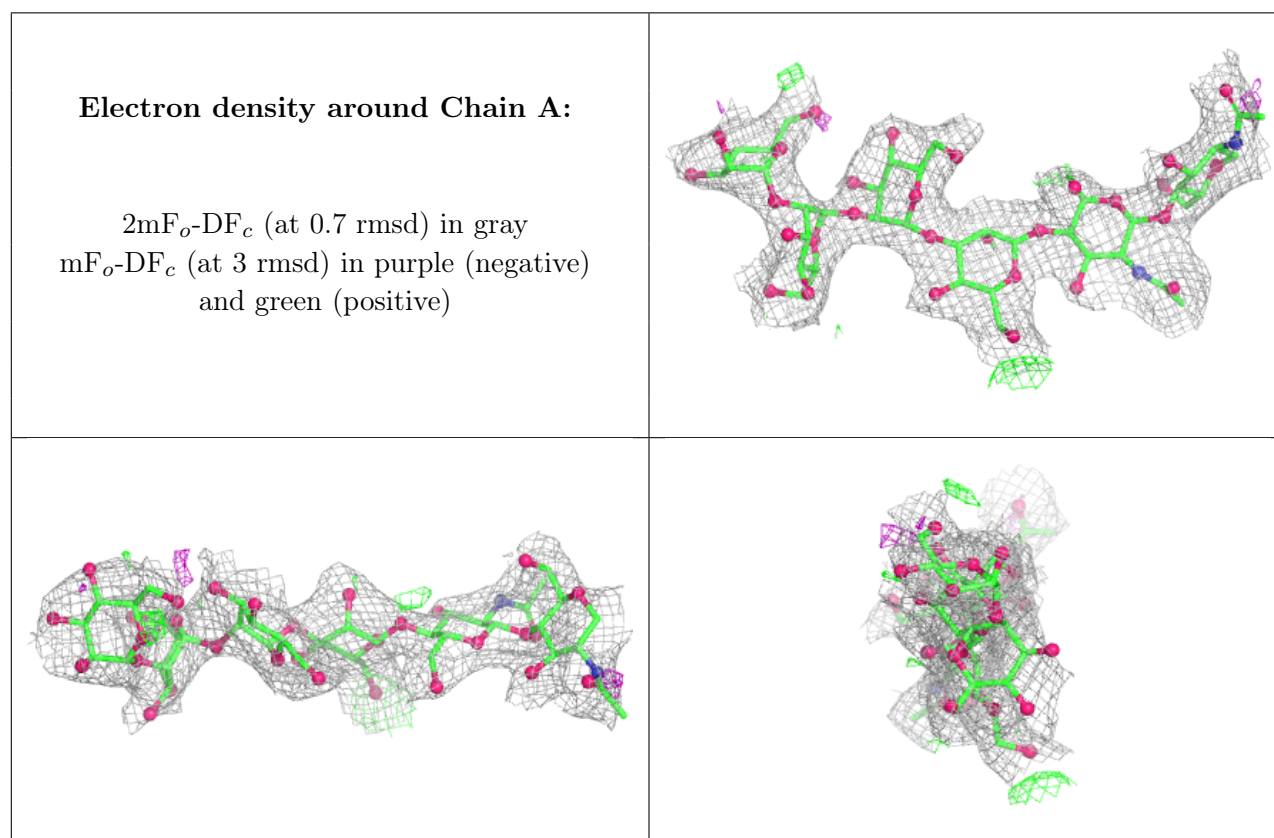
There are no non-standard protein/DNA/RNA residues in this entry.

## 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, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
4	NAG	A	1	14/15	-	-	8,13,22,22	0
4	NAG	A	2	14/15	-	-	12,14,18,24	0
4	BMA	A	3	11/12	-	-	6,10,12,12	0
4	MAN	A	4	11/12	-	-	9,12,14,18	0
4	MAN	A	5	11/12	-	-	11,15,19,19	0
4	MAN	A	6	11/12	-	-	11,14,15,16	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.



## 6.4 Ligands ⓘ

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
5	NAG	N	476(A)	14/15	0.77	0.16	40,44,54,57	0
5	NAG	N	475(A)	14/15	0.90	0.11	38,41,43,43	0
6	CA	N	1	1/1	0.93	0.11	85,85,85,85	0

## 6.5 Other polymers ⓘ

There are no such residues in this entry.