



Full wwPDB X-ray Structure Validation Report ⓘ

Nov 25, 2024 – 03:05 PM EST

PDB ID : 1INW
Title : A SIALIC ACID DERIVED PHOSPHONATE ANALOG INHIBITS DIFFERENT STRAINS OF INFLUENZA VIRUS NEURAMINIDASE WITH DIFFERENT EFFICIENCIES
Authors : White, C.L.; Janakiraman, M.N.; Laver, W.G.; Philippon, C.; Vasella, A.; Air, G.M.; Luo, M.
Deposited on : 1994-09-26
Resolution : 2.40 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

MolProbity : 4.02b-467
Mogul : 2022.3.0, CSD as543be (2022)
Xtrriage (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

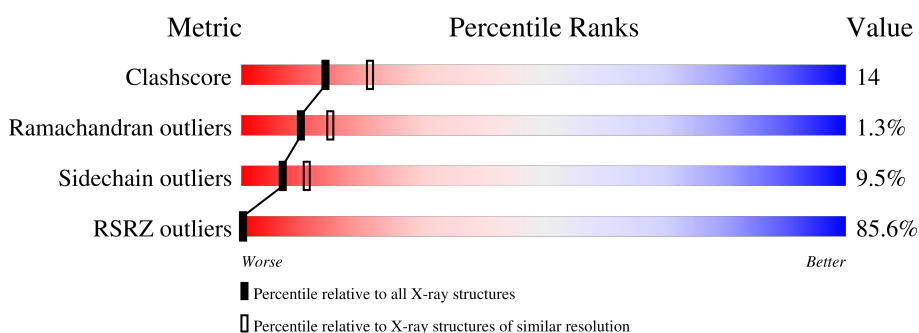
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.40 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	180529	5218 (2.40-2.40)
Ramachandran outliers	177936	5158 (2.40-2.40)
Sidechain outliers	177891	5159 (2.40-2.40)
RSRZ outliers	164620	4642 (2.40-2.40)

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

Mol	Chain	Length	Quality of chain
1	A	388	
2	B	5	

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	MAN	B	3	X	-	-	-

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 4246 atoms, of which 1013 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.

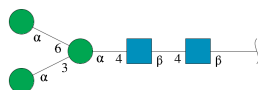
- Molecule 1 is a protein called INFLUENZA A SUBTYPE N2 NEURAMINIDASE.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
1	A	388	3745	1866	723	545	588	23	0	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	339	ASP	ASN	conflict	UNP P06820

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



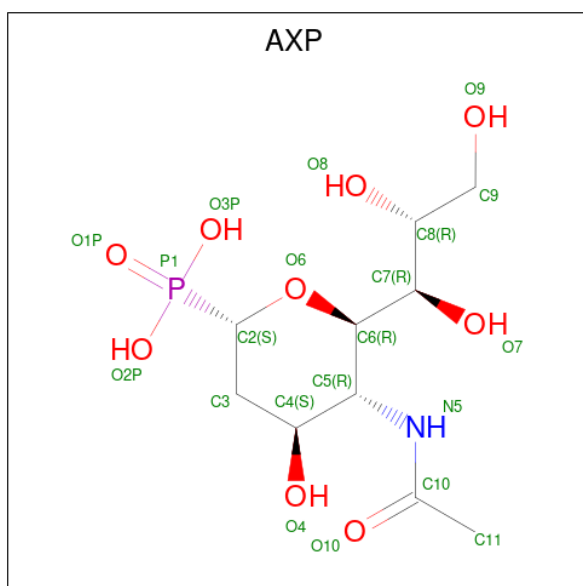
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	H	N	O			
2	B	5	118	34	57	2	25	0	0	0

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C₈H₁₅NO₆).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	H	N	O		
3	A	1	Total	C	H	N	O	0	0
			28	8	14	1	5		
3	A	1	Total	C	H	N	O	0	0
			28	8	14	1	5		
3	A	1	Total	C	H	N	O	0	0
			28	8	14	1	5		

- Molecule 4 is (1S)-4-acetamido-1,5-anhydro-2,4-dideoxy-1-phosphono-D-glycero-D-galacto-ocitol (three-letter code: AXP) (formula: $C_{10}H_{20}NO_9P$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	H	N	O			P
4	A	1	40	10	19	1	9	1	0	0

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

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Ca		
5	A	1	1	1	0	0

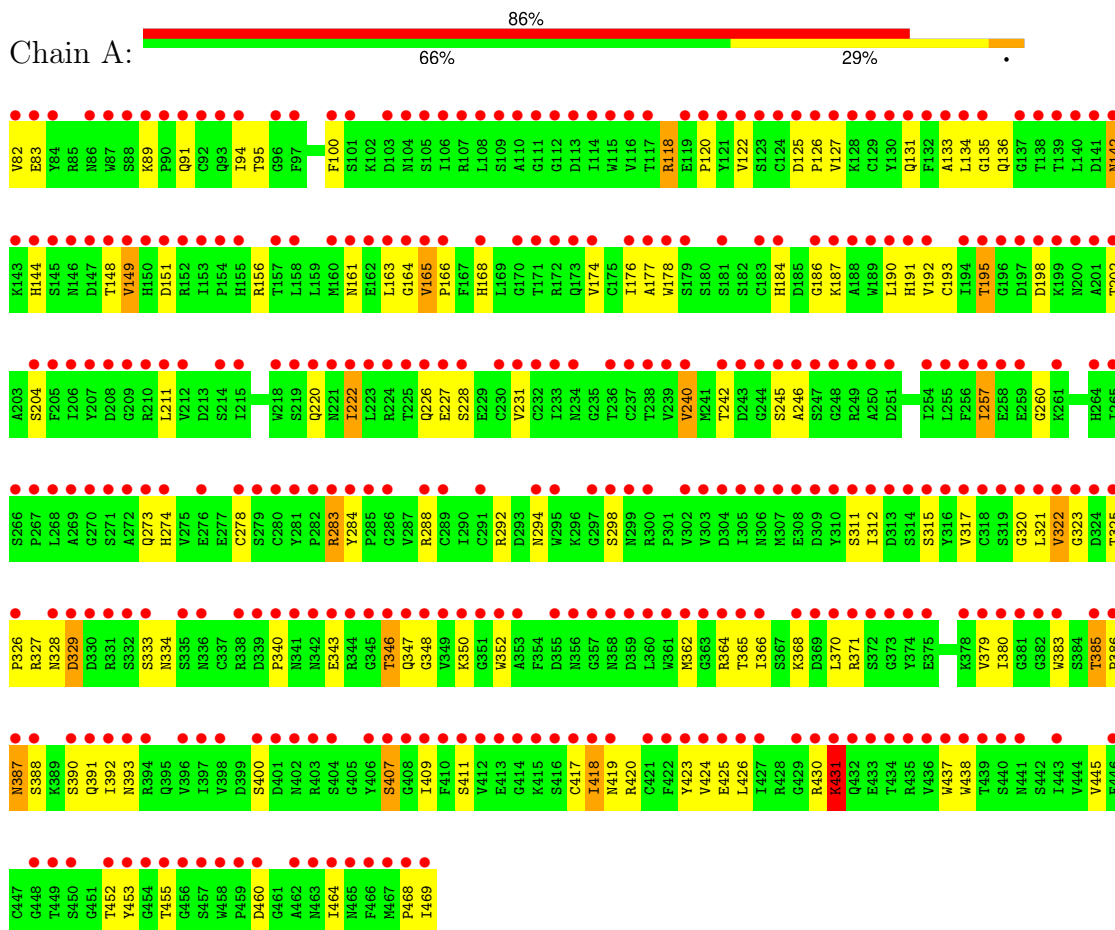
- Molecule 6 is water.

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	H	O		
6	A	86	258	172	86	7	0

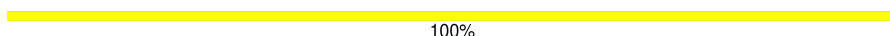
3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. 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. 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 N2 NEURAMINIDASE



- Molecule 2: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain B: 

MAG1
MAG2
MAN3
MAN4
MAN5

4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	122.08Å 141.67Å 141.87Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	8.00 – 2.40 8.00 – 2.40	Depositor EDS
% Data completeness (in resolution range)	(Not available) (8.00-2.40) 63.0 (8.00-2.40)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.21 (at 2.41Å)	Xtrriage
Refinement program	X-PLOR	Depositor
R, R_{free}	0.206 , (Not available) 0.518 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å ²)	27.9	Xtrriage
Anisotropy	0.691	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.84 , 223.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.44	EDS
Total number of atoms	4246	wwPDB-VP
Average B, all atoms (Å ²)	10.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.26% 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: CA, NAG, MAN, AXP

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	0.71	0/3092	0.89	3/4194 (0.1%)

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

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

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
1	A	431	LYS	N-CA-C	-5.76	95.45	111.00
1	A	292	ARG	NE-CZ-NH1	5.51	123.06	120.30
1	A	323	GLY	N-CA-C	5.02	125.65	113.10

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	423	TYR	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	3022	723	2852	87	0
2	B	61	57	52	0	0
3	A	42	42	39	0	0
4	A	21	19	18	1	0
5	A	1	0	0	0	0
6	A	86	172	0	5	0
All	All	3233	1013	2961	87	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 14.

All (87) 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:431:LYS:HA	1:A:431:LYS:NZ	1.89	0.86
1:A:437:TRP:H	1:A:469:ILE:HG21	1.40	0.85
1:A:226:GLN:HE21	1:A:240:VAL:H	1.27	0.81
1:A:419:ASN:ND2	1:A:420:ARG:H	1.78	0.81
1:A:430:ARG:O	1:A:431:LYS:HB2	1.81	0.79
1:A:419:ASN:HD22	1:A:420:ARG:H	1.27	0.78
1:A:431:LYS:HA	1:A:431:LYS:HZ3	1.47	0.78
1:A:228:SER:HB3	1:A:350:LYS:HE2	1.71	0.72
1:A:184:HIS:CD2	1:A:186:GLY:H	2.10	0.70
1:A:177:ALA:HB2	1:A:193:CYS:HB3	1.76	0.68
1:A:274:HIS:HD2	1:A:294:ASN:H	1.43	0.67
1:A:135:GLY:O	1:A:156:ARG:HD2	1.96	0.66
1:A:184:HIS:HD2	1:A:186:GLY:H	1.43	0.64
1:A:142:ASN:HD22	1:A:144:HIS:H	1.46	0.64
1:A:419:ASN:ND2	1:A:420:ARG:N	2.46	0.64
1:A:317:VAL:HG23	6:A:549:HOH:O	1.99	0.63
1:A:380:ILE:HB	1:A:390:SER:HB2	1.81	0.62
1:A:131:GLN:HE21	1:A:163:LEU:HD12	1.63	0.62
1:A:437:TRP:N	1:A:469:ILE:HG21	2.13	0.61
1:A:273:GLN:HG3	1:A:340:PRO:HG3	1.84	0.60
1:A:198:ASP:HB3	1:A:222:ILE:HG12	1.85	0.59
1:A:149:VAL:HG22	6:A:509:HOH:O	2.02	0.59
1:A:328:ASN:O	1:A:329:ASP:HB2	2.01	0.59
1:A:409:ILE:HD11	1:A:420:ARG:HD3	1.86	0.58
1:A:240:VAL:HG21	1:A:278:CYS:SG	2.44	0.57
1:A:118:ARG:HD2	1:A:425:GLU:OE2	2.03	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:419:ASN:HD22	1:A:420:ARG:N	2.02	0.56
1:A:131:GLN:NE2	1:A:164:GLY:H	2.04	0.56
1:A:288:ARG:NH1	1:A:383:TRP:CZ2	2.73	0.55
1:A:437:TRP:HD1	1:A:469:ILE:CG2	2.20	0.55
1:A:166:PRO:O	1:A:168:HIS:HD2	1.89	0.55
1:A:411:SER:HB3	1:A:418:ILE:CD1	2.37	0.54
1:A:95:THR:HG22	1:A:453:TYR:HE2	1.71	0.54
1:A:246:ALA:O	1:A:274:HIS:NE2	2.41	0.53
1:A:333:SER:HA	1:A:343:GLU:OE1	2.08	0.53
1:A:326:PRO:HA	1:A:368:LYS:O	2.09	0.52
1:A:468:PRO:O	1:A:469:ILE:HB	2.10	0.51
1:A:437:TRP:H	1:A:469:ILE:CG2	2.20	0.51
1:A:346:THR:O	1:A:347:GLN:HB2	2.11	0.51
1:A:391:GLN:HG2	1:A:392:ILE:N	2.27	0.49
1:A:228:SER:HB3	1:A:350:LYS:CE	2.42	0.49
1:A:347:GLN:HB3	6:A:573:HOH:O	2.12	0.49
1:A:190:LEU:HD11	1:A:257:ILE:HD11	1.95	0.48
1:A:366:ILE:HG21	1:A:400:SER:HB3	1.94	0.48
1:A:136:GLN:OE1	1:A:156:ARG:HD3	2.14	0.48
1:A:168:HIS:HB2	6:A:567:HOH:O	2.13	0.48
1:A:328:ASN:HB2	6:A:548:HOH:O	2.14	0.48
1:A:325:THR:O	1:A:348:GLY:HA2	2.14	0.48
1:A:321:LEU:HD12	1:A:379:VAL:HG22	1.94	0.47
1:A:320:GLY:HA3	1:A:387:ASN:HD22	1.79	0.47
1:A:385:THR:HA	1:A:386:PRO:HD2	1.81	0.46
1:A:174:VAL:HG11	1:A:191:HIS:CD2	2.51	0.46
1:A:283:ARG:O	1:A:284:TYR:C	2.53	0.46
1:A:418:ILE:HD11	1:A:420:ARG:NH2	2.31	0.45
1:A:245:SER:O	1:A:274:HIS:HE1	2.00	0.45
1:A:311:SER:C	1:A:312:ILE:HD13	2.37	0.45
1:A:392:ILE:HG12	1:A:393:ASN:N	2.30	0.45
1:A:198:ASP:HB3	1:A:222:ILE:CG1	2.46	0.45
1:A:365:THR:HG21	1:A:371:ARG:HA	1.99	0.45
1:A:321:LEU:O	1:A:322:VAL:HB	2.17	0.45
1:A:334:ASN:HA	1:A:387:ASN:HD21	1.82	0.44
1:A:184:HIS:HD2	1:A:186:GLY:N	2.13	0.44
1:A:136:GLN:CD	1:A:156:ARG:HD3	2.39	0.43
1:A:452:THR:CG2	1:A:453:TYR:N	2.81	0.43
1:A:151:ASP:HB3	4:A:500:AXP:O4	2.19	0.43
1:A:362:MET:CE	1:A:364:ARG:HD3	2.49	0.43
1:A:82:VAL:O	1:A:187:LYS:HE2	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:226:GLN:NE2	1:A:240:VAL:H	2.04	0.43
1:A:120:PRO:HA	1:A:133:ALA:HA	2.00	0.42
1:A:464:ILE:HD12	1:A:464:ILE:HA	1.86	0.42
1:A:438:TRP:HD1	1:A:469:ILE:HD12	1.84	0.42
1:A:89:LYS:HB2	1:A:418:ILE:CG2	2.50	0.42
1:A:204:SER:HB3	1:A:211:LEU:HD11	2.02	0.42
1:A:298:SER:O	1:A:322:VAL:HG13	2.19	0.42
1:A:89:LYS:HB3	1:A:417:CYS:HA	2.01	0.42
1:A:176:ILE:HG22	1:A:195:THR:HG21	2.02	0.42
1:A:91:GLN:HG3	1:A:420:ARG:NH1	2.35	0.41
1:A:100:PHE:HB3	1:A:445:VAL:O	2.20	0.41
1:A:321:LEU:HD23	1:A:321:LEU:HA	1.64	0.41
1:A:125:ASP:HB2	1:A:126:PRO:HD2	2.02	0.41
1:A:174:VAL:O	1:A:174:VAL:HG12	2.20	0.41
1:A:257:ILE:HD11	1:A:260:GLY:HA2	2.03	0.41
1:A:226:GLN:O	1:A:227:GLU:HB2	2.21	0.41
1:A:426:LEU:HD13	1:A:460:ASP:N	2.35	0.41
1:A:165:VAL:HA	1:A:166:PRO:HD2	1.94	0.41
1:A:100:PHE:HD2	1:A:445:VAL:CG2	2.34	0.40
1:A:352:TRP:HD1	1:A:407:SER:HG	1.69	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	386/388 (100%)	342 (89%)	39 (10%)	5 (1%)	10 15

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	329	ASP

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Mol	Chain	Res	Type
1	A	431	LYS
1	A	220	GLN
1	A	322	VAL
1	A	222	ILE

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	338/338 (100%)	306 (90%)	32 (10%)	7 11

All (32) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	83	GLU
1	A	94	ILE
1	A	118	ARG
1	A	122	VAL
1	A	127	VAL
1	A	134	LEU
1	A	142	ASN
1	A	148	THR
1	A	149	VAL
1	A	161	ASN
1	A	165	VAL
1	A	178	TRP
1	A	192	VAL
1	A	195	THR
1	A	202	THR
1	A	231	VAL
1	A	240	VAL
1	A	242	THR
1	A	257	ILE
1	A	283	ARG
1	A	315	SER
1	A	327	ARG

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Mol	Chain	Res	Type
1	A	346	THR
1	A	370	LEU
1	A	385	THR
1	A	387	ASN
1	A	388	SER
1	A	407	SER
1	A	418	ILE
1	A	424	VAL
1	A	431	LYS
1	A	455	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	131	GLN
1	A	142	ASN
1	A	168	HIS
1	A	184	HIS
1	A	226	GLN
1	A	274	HIS
1	A	334	ASN
1	A	356	ASN
1	A	358	ASN
1	A	387	ASN
1	A	393	ASN
1	A	419	ASN

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](#)

5 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	1.07	0	17,19,21	1.35	2 (11%)
2	NAG	B	2	2	14,14,15	0.96	1 (7%)	17,19,21	1.15	1 (5%)
2	MAN	B	3	2	11,11,12	1.01	1 (9%)	15,15,17	1.12	1 (6%)
2	MAN	B	4	2	11,11,12	0.85	0	15,15,17	1.33	2 (13%)
2	MAN	B	5	2	11,11,12	0.83	1 (9%)	15,15,17	0.86	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	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	MAN	B	3	2	1/1/5/5	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	-	1/2/19/22	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	3	MAN	C4-C5	2.76	1.58	1.53
2	B	5	MAN	C4-C5	2.07	1.57	1.53
2	B	2	NAG	C4-C5	2.07	1.57	1.53

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	1	NAG	C1-C2-N2	-2.84	105.95	110.43
2	B	1	NAG	C1-O5-C5	2.49	115.52	112.19
2	B	2	NAG	O7-C7-C8	-2.28	118.00	122.05
2	B	4	MAN	C1-C2-C3	2.14	112.76	109.64
2	B	3	MAN	C2-C3-C4	-2.03	107.29	110.86

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	4	MAN	O2-C2-C1	2.00	113.81	109.22

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
2	B	3	MAN	C1

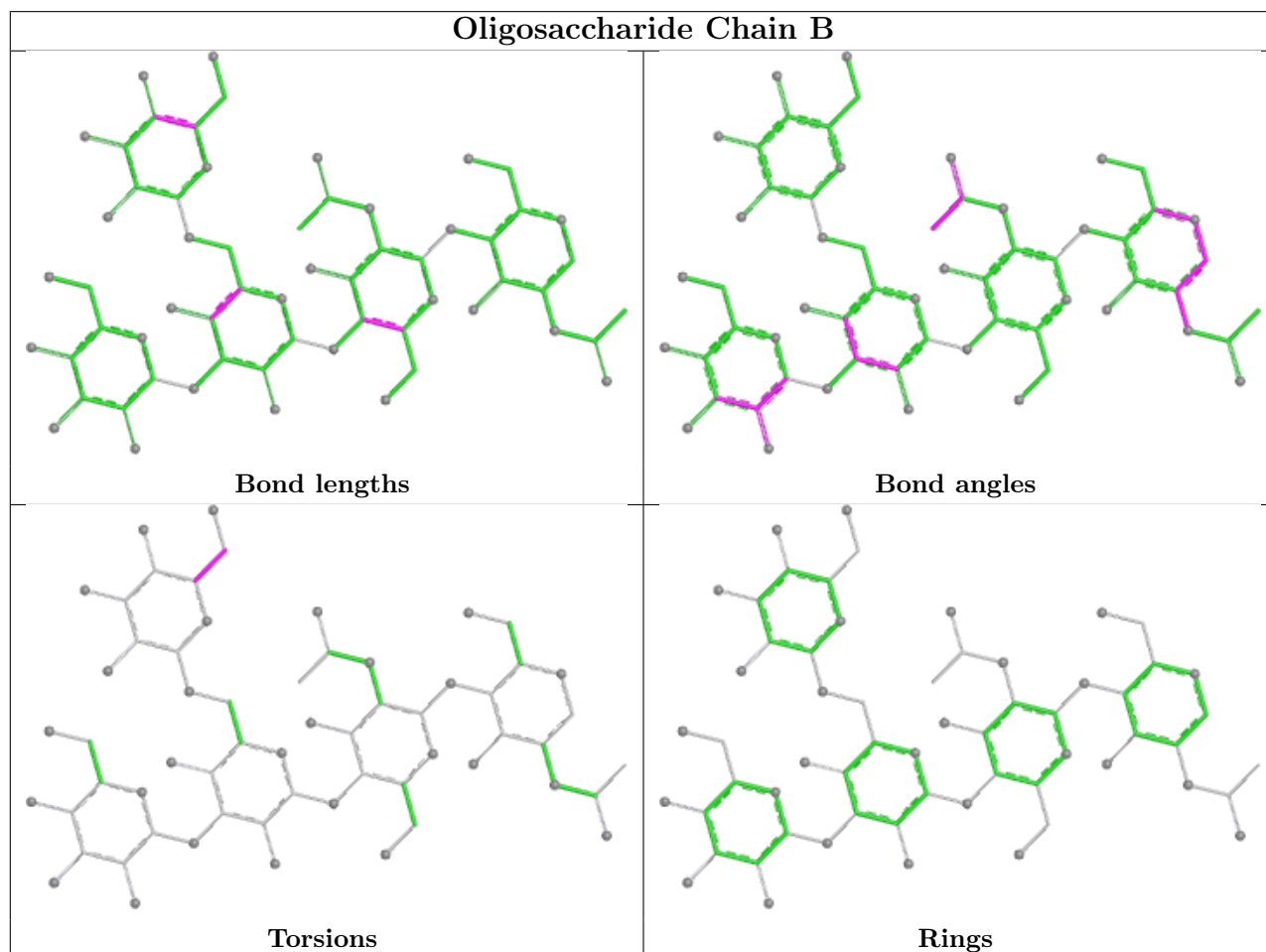
All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	5	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 5 ligands modelled in this entry, 1 is monoatomic - leaving 4 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
3	NAG	A	477(A)	1	14,14,15	1.00	1 (7%)	17,19,21	1.99	3 (17%)
3	NAG	A	471(A)	1	14,14,15	1.17	2 (14%)	17,19,21	1.70	3 (17%)
3	NAG	A	470(A)	1	14,14,15	1.05	1 (7%)	17,19,21	1.41	1 (5%)
4	AXP	A	500	-	18,21,21	1.91	6 (33%)	22,31,31	2.33	8 (36%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	A	477(A)	1	-	0/6/23/26	0/1/1/1
3	NAG	A	471(A)	1	-	2/6/23/26	0/1/1/1
3	NAG	A	470(A)	1	-	2/6/23/26	0/1/1/1
4	AXP	A	500	-	-	2/14/36/36	0/1/1/1

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	500	AXP	P1-O2P	-4.38	1.47	1.54
4	A	500	AXP	C8-C7	-3.30	1.47	1.53
4	A	500	AXP	P1-O3P	-3.26	1.49	1.54
3	A	477(A)	NAG	C1-C2	2.76	1.56	1.52
3	A	471(A)	NAG	C2-N2	-2.62	1.41	1.46
3	A	471(A)	NAG	C1-C2	-2.34	1.49	1.52
3	A	470(A)	NAG	C3-C2	-2.30	1.47	1.52
4	A	500	AXP	C6-C5	2.29	1.56	1.53
4	A	500	AXP	O6-C6	2.03	1.47	1.44
4	A	500	AXP	O8-C8	-2.01	1.39	1.43

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	477(A)	NAG	C1-O5-C5	5.90	120.09	112.19
4	A	500	AXP	C2-O6-C6	5.11	123.16	112.36
4	A	500	AXP	O3P-P1-O2P	-4.94	94.19	107.58
4	A	500	AXP	O3P-P1-O1P	-4.84	101.31	113.45
3	A	471(A)	NAG	C1-O5-C5	4.55	118.28	112.19
3	A	470(A)	NAG	C1-O5-C5	4.42	118.11	112.19
3	A	477(A)	NAG	C3-C4-C5	-3.33	104.20	110.23
4	A	500	AXP	O4-C4-C5	-3.11	102.78	109.84
4	A	500	AXP	O6-C2-C3	2.87	114.51	110.66
3	A	471(A)	NAG	C1-C2-N2	2.66	114.63	110.43
4	A	500	AXP	O8-C8-C7	-2.43	103.55	109.25
4	A	500	AXP	O7-C7-C6	-2.43	104.19	109.44
3	A	471(A)	NAG	O5-C1-C2	-2.17	107.93	111.29
4	A	500	AXP	O1P-P1-C2	2.17	118.24	113.34
3	A	477(A)	NAG	C1-C2-N2	2.03	113.63	110.43

There are no chirality outliers.

All (6) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	500	AXP	C7-C8-C9-O9
4	A	500	AXP	O8-C8-C9-O9
3	A	471(A)	NAG	O5-C5-C6-O6
3	A	471(A)	NAG	C4-C5-C6-O6
3	A	470(A)	NAG	O5-C5-C6-O6
3	A	470(A)	NAG	C4-C5-C6-O6

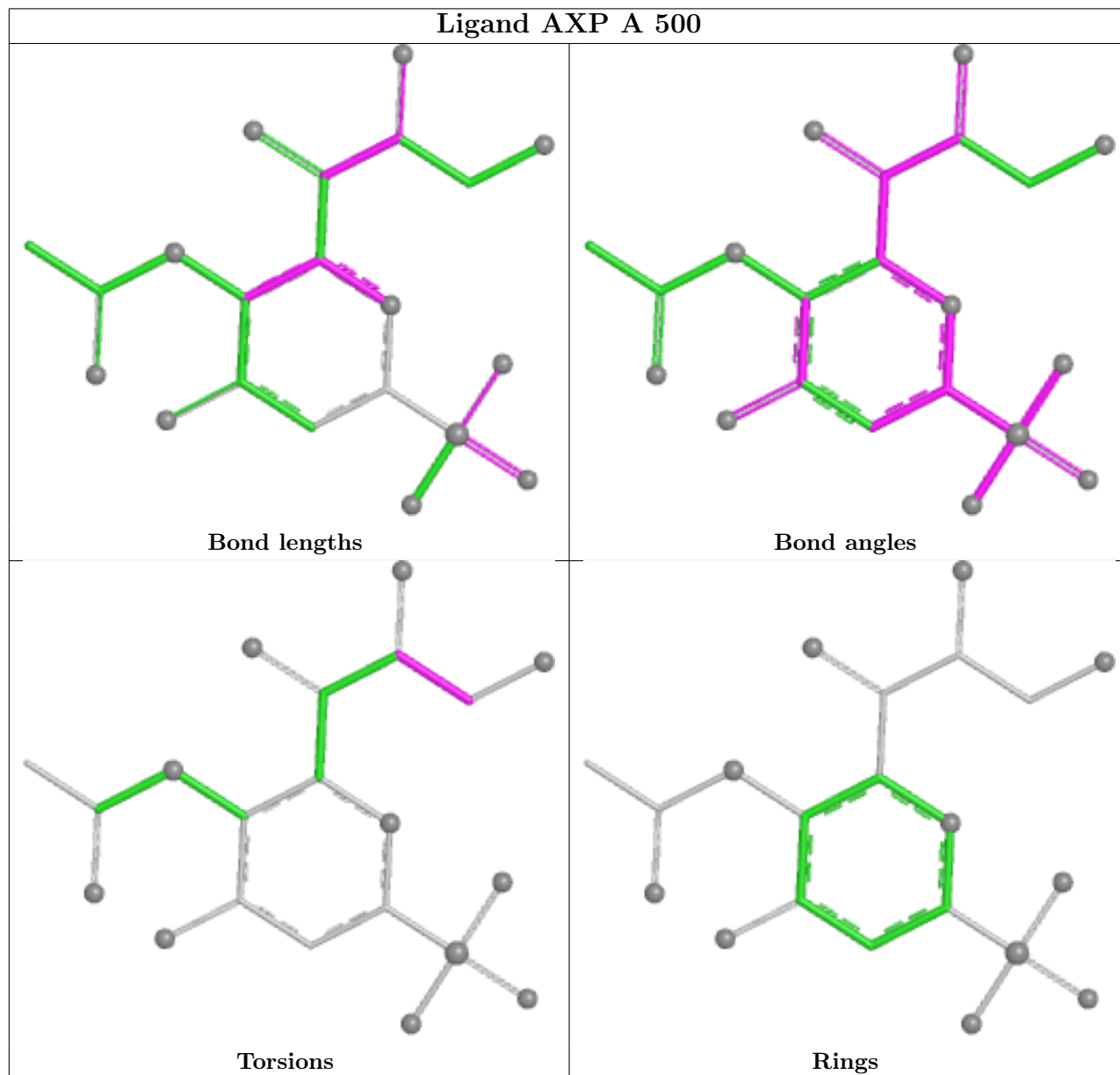
There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	500	AXP	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

Warning: The R factor obtained from EDS is 0.5223, which does not match the depositor's R factor of 0.206. Please interpret the results in this section carefully.

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	388/388 (100%)	3.45	332 (85%) 0 0	1, 9, 17, 25	118 (30%)

All (332) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	320	GLY	9.1
1	A	339	ASP	7.5
1	A	432	GLN	7.1
1	A	372	SER	7.1
1	A	221	ASN	7.0
1	A	326	PRO	6.8
1	A	387	ASN	6.8
1	A	168	HIS	6.8
1	A	331	ARG	6.7
1	A	313	ASP	6.7
1	A	349	VAL	6.7
1	A	335	SER	6.5
1	A	332	SER	6.5
1	A	414	GLY	6.4
1	A	328	ASN	6.4
1	A	392	ILE	6.3
1	A	348	GLY	6.1
1	A	165	VAL	6.1
1	A	210	ARG	6.0
1	A	407	SER	6.0
1	A	456	GLY	6.0
1	A	86	ASN	6.0
1	A	234	ASN	5.9
1	A	249	ARG	5.8

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Mol	Chain	Res	Type	RSRZ
1	A	469	ILE	5.8
1	A	261	LYS	5.8
1	A	243	ASP	5.8
1	A	322	VAL	5.8
1	A	265	ILE	5.8
1	A	346	THR	5.7
1	A	274	HIS	5.6
1	A	202	THR	5.6
1	A	341	ASN	5.6
1	A	273	GLN	5.6
1	A	402	ASN	5.6
1	A	147	ASP	5.6
1	A	304	ASP	5.5
1	A	329	ASP	5.5
1	A	450	SER	5.5
1	A	214	SER	5.5
1	A	269	ALA	5.4
1	A	321	LEU	5.4
1	A	431	LYS	5.4
1	A	317	VAL	5.4
1	A	375	GLU	5.3
1	A	220	GLN	5.3
1	A	139	THR	5.3
1	A	330	ASP	5.3
1	A	199	LYS	5.2
1	A	201	ALA	5.2
1	A	162	GLU	5.2
1	A	181	SER	5.2
1	A	266	SER	5.2
1	A	189	TRP	5.1
1	A	416	SER	5.1
1	A	336	ASN	5.1
1	A	148	THR	5.1
1	A	358	ASN	5.1
1	A	351	GLY	5.1
1	A	425	GLU	5.1
1	A	184	HIS	5.0
1	A	194	ILE	5.0
1	A	312	ILE	4.9
1	A	324	ASP	4.9
1	A	177	ALA	4.9
1	A	123	SER	4.8

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Mol	Chain	Res	Type	RSRZ
1	A	406	TYR	4.8
1	A	82	VAL	4.8
1	A	309	ASP	4.8
1	A	299	ASN	4.8
1	A	319	SER	4.8
1	A	340	PRO	4.7
1	A	271	SER	4.7
1	A	338	ARG	4.7
1	A	240	VAL	4.7
1	A	353	ALA	4.7
1	A	279	SER	4.6
1	A	465	ASN	4.6
1	A	310	TYR	4.6
1	A	151	ASP	4.6
1	A	369	ASP	4.6
1	A	345	GLY	4.6
1	A	218	TRP	4.6
1	A	94	ILE	4.5
1	A	164	GLY	4.5
1	A	206	ILE	4.5
1	A	359	ASP	4.4
1	A	117	THR	4.4
1	A	231	VAL	4.4
1	A	225	THR	4.4
1	A	227	GLU	4.4
1	A	153	ILE	4.4
1	A	258	GLU	4.4
1	A	90	PRO	4.3
1	A	154	PRO	4.3
1	A	179	SER	4.3
1	A	264	HIS	4.3
1	A	124	CYS	4.3
1	A	211	LEU	4.3
1	A	232	CYS	4.3
1	A	239	VAL	4.3
1	A	200	ASN	4.3
1	A	300	ARG	4.3
1	A	84	TYR	4.3
1	A	343	GLU	4.3
1	A	363	GLY	4.3
1	A	286	GLY	4.2
1	A	398	VAL	4.2

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Mol	Chain	Res	Type	RSRZ
1	A	390	SER	4.2
1	A	237	CYS	4.2
1	A	347	GLN	4.2
1	A	88	SER	4.2
1	A	244	GLY	4.2
1	A	413	GLU	4.2
1	A	436	VAL	4.2
1	A	295	TRP	4.1
1	A	93	GLN	4.1
1	A	344	ARG	4.1
1	A	125	ASP	4.1
1	A	170	GLY	4.1
1	A	186	GLY	4.1
1	A	412	VAL	4.1
1	A	423	TYR	4.1
1	A	112	GLY	4.1
1	A	308	GLU	4.1
1	A	171	THR	4.1
1	A	289	CYS	4.0
1	A	108	LEU	4.0
1	A	342	ASN	4.0
1	A	371	ARG	4.0
1	A	360	LEU	4.0
1	A	130	TYR	3.9
1	A	116	VAL	3.9
1	A	357	GLY	3.9
1	A	437	TRP	3.9
1	A	257	ILE	3.9
1	A	396	VAL	3.9
1	A	267	PRO	3.9
1	A	333	SER	3.8
1	A	383	TRP	3.8
1	A	439	THR	3.8
1	A	366	ILE	3.8
1	A	111	GLY	3.8
1	A	176	ILE	3.8
1	A	397	ILE	3.8
1	A	364	ARG	3.8
1	A	113	ASP	3.7
1	A	306	ASN	3.7
1	A	370	LEU	3.7
1	A	415	LYS	3.7

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Mol	Chain	Res	Type	RSRZ
1	A	138	THR	3.7
1	A	368	LYS	3.7
1	A	283	ARG	3.7
1	A	391	GLN	3.7
1	A	388	SER	3.7
1	A	101	SER	3.6
1	A	311	SER	3.6
1	A	100	PHE	3.6
1	A	144	HIS	3.6
1	A	385	THR	3.6
1	A	424	VAL	3.6
1	A	284	TYR	3.6
1	A	131	GLN	3.6
1	A	464	ILE	3.6
1	A	105	SER	3.6
1	A	89	LYS	3.5
1	A	178	TRP	3.5
1	A	248	GLY	3.5
1	A	297	GLY	3.5
1	A	91	GLN	3.5
1	A	380	ILE	3.5
1	A	134	LEU	3.5
1	A	268	LEU	3.5
1	A	246	ALA	3.5
1	A	281	TYR	3.5
1	A	83	GLU	3.5
1	A	188	ALA	3.5
1	A	434	THR	3.5
1	A	374	TYR	3.4
1	A	146	ASN	3.4
1	A	429	GLY	3.4
1	A	204	SER	3.4
1	A	466	PHE	3.4
1	A	133	ALA	3.4
1	A	141	ASP	3.4
1	A	197	ASP	3.4
1	A	198	ASP	3.4
1	A	401	ASP	3.4
1	A	463	ASN	3.4
1	A	233	ILE	3.4
1	A	291	CYS	3.3
1	A	121	TYR	3.3

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Mol	Chain	Res	Type	RSRZ
1	A	365	THR	3.3
1	A	212	VAL	3.3
1	A	303	VAL	3.3
1	A	298	SER	3.3
1	A	411	SER	3.3
1	A	302	VAL	3.3
1	A	400	SER	3.3
1	A	427	ILE	3.2
1	A	314	SER	3.2
1	A	114	ILE	3.2
1	A	255	LEU	3.2
1	A	96	GLY	3.2
1	A	250	ALA	3.2
1	A	106	ILE	3.2
1	A	129	CYS	3.2
1	A	208	ASP	3.1
1	A	441	ASN	3.1
1	A	459	PRO	3.1
1	A	440	SER	3.1
1	A	430	ARG	3.1
1	A	408	GLY	3.1
1	A	222	ILE	3.1
1	A	278	CYS	3.1
1	A	228	SER	3.1
1	A	97	PHE	3.1
1	A	224	ARG	3.1
1	A	352	TRP	3.1
1	A	161	ASN	3.1
1	A	449	THR	3.1
1	A	247	SER	3.1
1	A	467	MET	3.1
1	A	356	ASN	3.0
1	A	152	ARG	3.0
1	A	87	TRP	3.0
1	A	382	GLY	3.0
1	A	157	THR	3.0
1	A	457	SER	3.0
1	A	137	GLY	3.0
1	A	209	GLY	3.0
1	A	282	PRO	3.0
1	A	142	ASN	3.0
1	A	183	CYS	3.0

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Mol	Chain	Res	Type	RSRZ
1	A	109	SER	2.9
1	A	143	LYS	2.9
1	A	381	GLY	2.9
1	A	403	ARG	2.9
1	A	272	ALA	2.9
1	A	126	PRO	2.9
1	A	110	ALA	2.9
1	A	417	CYS	2.9
1	A	373	GLY	2.9
1	A	174	VAL	2.9
1	A	195	THR	2.9
1	A	223	LEU	2.8
1	A	230	CYS	2.8
1	A	378	LYS	2.8
1	A	150	HIS	2.8
1	A	251	ASP	2.8
1	A	355	ASP	2.8
1	A	254	ILE	2.8
1	A	443	ILE	2.8
1	A	419	ASN	2.8
1	A	394	ARG	2.8
1	A	305	ILE	2.8
1	A	256	PHE	2.8
1	A	393	ASN	2.7
1	A	386	PRO	2.7
1	A	128	LYS	2.7
1	A	421	CYS	2.7
1	A	433	GLU	2.7
1	A	172	ARG	2.7
1	A	361	TRP	2.7
1	A	160	MET	2.6
1	A	426	LEU	2.6
1	A	462	ALA	2.6
1	A	460	ASP	2.6
1	A	448	GLY	2.6
1	A	245	SER	2.6
1	A	192	VAL	2.6
1	A	215	ILE	2.6
1	A	446	PHE	2.6
1	A	158	LEU	2.6
1	A	187	LYS	2.6
1	A	285	PRO	2.6

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Mol	Chain	Res	Type	RSRZ
1	A	226	GLN	2.6
1	A	163	LEU	2.5
1	A	120	PRO	2.5
1	A	325	THR	2.5
1	A	140	LEU	2.5
1	A	422	PHE	2.5
1	A	149	VAL	2.5
1	A	145	SER	2.5
1	A	468	PRO	2.5
1	A	455	THR	2.5
1	A	92	CYS	2.5
1	A	166	PRO	2.5
1	A	219	SER	2.5
1	A	104	ASN	2.5
1	A	155	HIS	2.4
1	A	238	THR	2.4
1	A	242	THR	2.4
1	A	452	THR	2.4
1	A	132	PHE	2.4
1	A	205	PHE	2.4
1	A	318	CYS	2.4
1	A	276	GLU	2.4
1	A	270	GLY	2.3
1	A	103	ASP	2.3
1	A	207	TYR	2.3
1	A	127	VAL	2.3
1	A	418	ILE	2.3
1	A	362	MET	2.3
1	A	280	CYS	2.3
1	A	294	ASN	2.3
1	A	107	ARG	2.3
1	A	119	GLU	2.3
1	A	288	ARG	2.2
1	A	196	GLY	2.2
1	A	350	LYS	2.2
1	A	404	SER	2.2
1	A	307	MET	2.2
1	A	173	GLN	2.2
1	A	190	LEU	2.1
1	A	409	ILE	2.1
1	A	115	TRP	2.1
1	A	458	TRP	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	435	ARG	2.1
1	A	236	THR	2.1
1	A	410	PHE	2.1
1	A	259	GLU	2.1
1	A	122	VAL	2.1
1	A	438	TRP	2.1
1	A	453	TYR	2.1
1	A	315	SER	2.1
1	A	323	GLY	2.1
1	A	454	GLY	2.1
1	A	316	TYR	2.1
1	A	191	HIS	2.1
1	A	379	VAL	2.0
1	A	135	GLY	2.0

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

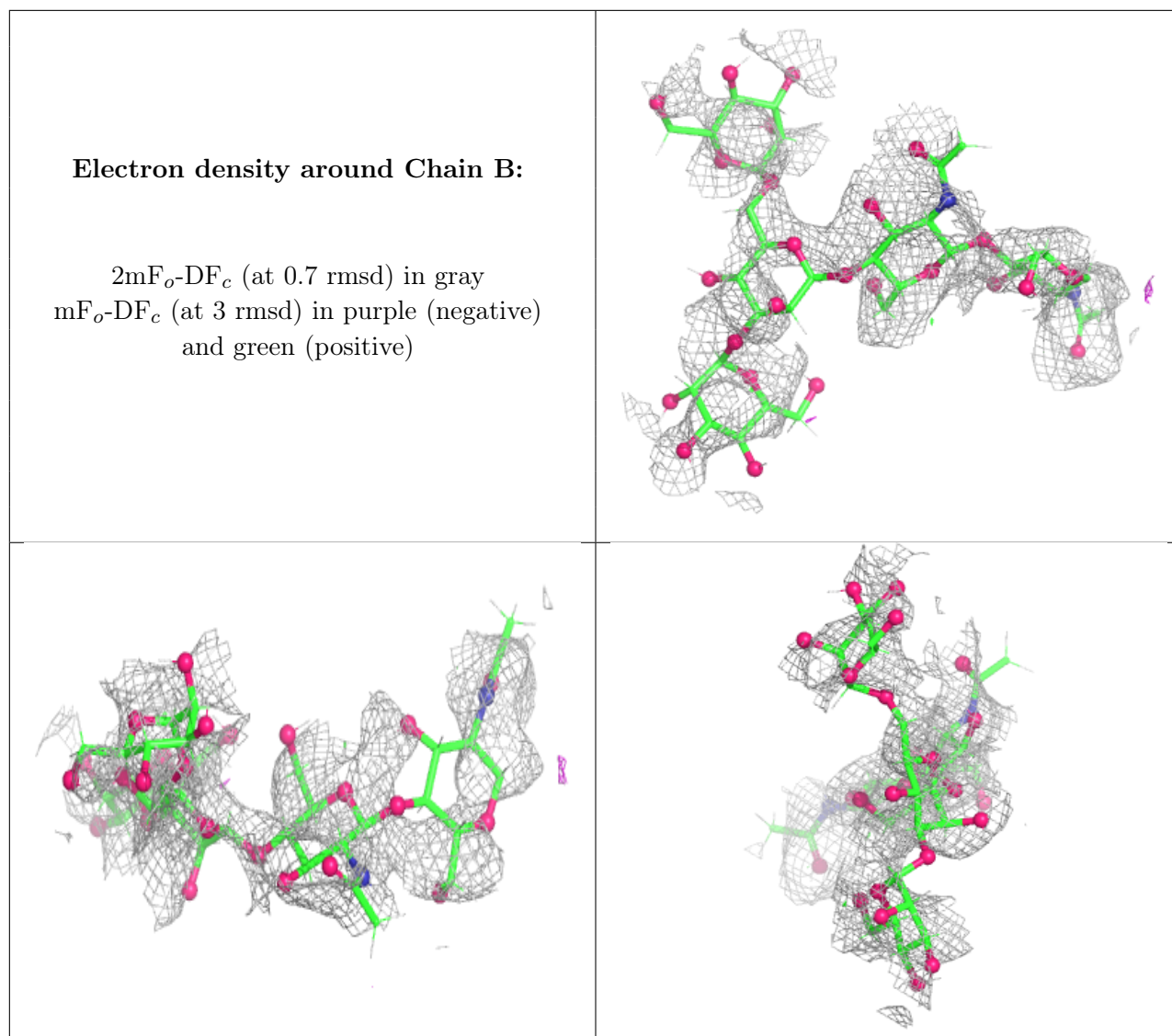
There are no non-standard protein/DNA/RNA residues in this entry.

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	MAN	B	5	11/12	0.21	0.41	0,0,59,61	11
2	NAG	B	2	14/15	0.41	0.33	0,0,34,34	5
2	MAN	B	4	11/12	0.44	0.31	0,0,54,56	5
2	MAN	B	3	11/12	0.53	0.27	0,16,39,39	5
2	NAG	B	1	14/15	0.65	0.24	0,0,36,43	13

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.



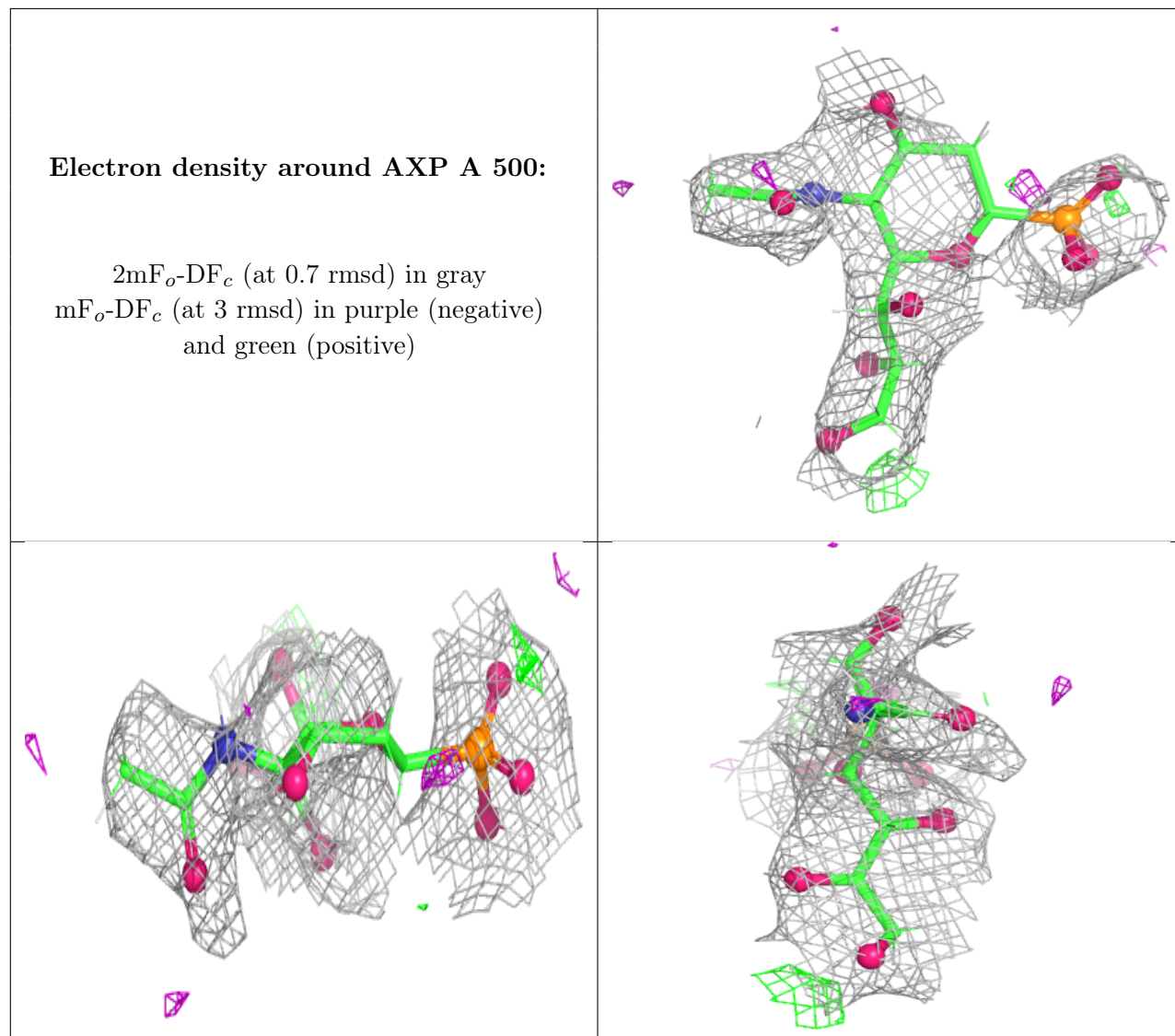
6.4 Ligands [i](#)

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	470(A)	14/15	0.38	0.41	0,0,38,46	14
5	CA	A	501	1/1	0.45	0.28	11,11,11,11	0
3	NAG	A	477(A)	14/15	0.64	0.31	0,0,39,42	14
4	AXP	A	500	21/21	0.66	0.22	0,15,19,25	1
3	NAG	A	471(A)	14/15	0.69	0.30	0,0,43,52	13

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.



6.5 Other polymers [i](#)

There are no such residues in this entry.