WORLDWIDE wwPDB PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Sep 6, 2023 – 04:42 PM EDT

PDB ID	:	4GZW
Title	:	N2 neuraminidase D151G mutant of A/Tanzania/205/2010 H3N2 in complex with avian sialic acid receptor
Authors	:	Zhu, X.; Wilson, I.A.
Deposited on	:	2012-09-06
Resolution	:	2.45 Å(reported)

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

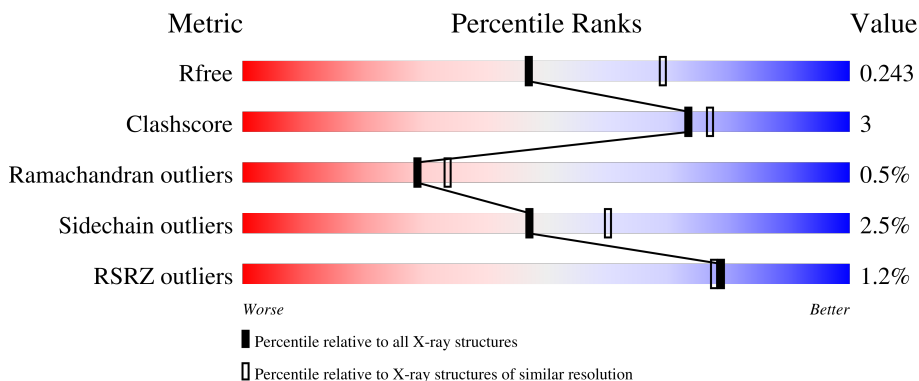|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35

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 2.45 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	Percentile Ranks	Value
Rfree		0.243
Clashscore		3
Ramachandran outliers		0.5%
Sidechain outliers		2.5%
RSRZ outliers		1.2%

Worse   *Better*

▊ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1544 (2.48-2.44)
Clashscore	141614	1613 (2.48-2.44)
Ramachandran outliers	138981	1598 (2.48-2.44)
Sidechain outliers	138945	1598 (2.48-2.44)
RSRZ outliers	127900	1523 (2.48-2.44)

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	393	.% / 88% / 10% ··
1	B	393	.% / 90% / 8% ·
1	C	393	2% / 91% / 8% ·
1	D	393	.% / 88% / 10% ··
2	E	3	100%

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Mol	Chain	Length	Quality of chain
3	F	5	100%
3	J	5	100%
3	L	5	100%
4	G	3	67% / 33%
5	H	4	25% / 75%
6	I	2	50% / 50%
7	K	2	100%
8	M	3	67% / 33%

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
4	NAG	G	1	-	-	-	X

2 Entry composition ⓘ

There are 12 unique types of molecules in this entry. The entry contains 12970 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 neuraminidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	388	Total	C	N	O	S	0	0	0
			2998	1858	531	587	22			
1	B	388	Total	C	N	O	S	0	0	0
			2998	1858	531	587	22			
1	C	388	Total	C	N	O	S	0	0	0
			2998	1858	531	587	22			
1	D	388	Total	C	N	O	S	0	0	0
			2998	1858	531	587	22			

- Molecule 2 is an oligosaccharide called N-acetyl-alpha-neuraminic acid-(2-3)-beta-D-galacto pyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.
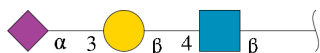
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	E	3	Total	C	N	O	0	0	0
			46	25	2	19			

- Molecule 3 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyran ose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-a cetamido-2-deoxy-beta-D-glucopyranose.
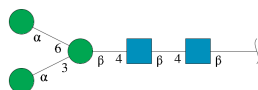
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	F	5	Total	C	N	O	0	0	0
			61	34	2	25			

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	J	5	Total	C	N	O	0	0	0
			61	34	2	25			
3	L	5	Total	C	N	O	0	0	0
			61	34	2	25			

- Molecule 4 is an oligosaccharide called N-acetyl-alpha-neuraminic acid-(2-3)-beta-D-galacto pyranose-(1-3)-2-acetamido-2-deoxy-beta-D-glucopyranose.
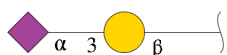

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	G	3	Total	C	N	O	0	0	0
			46	25	2	19			

- Molecule 5 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-beta-D-mannopyranos e-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-gluco pyranose.
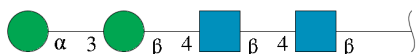
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
5	H	4	Total	C	N	O	0	0	0
			50	28	2	20			

- Molecule 6 is an oligosaccharide called N-acetyl-alpha-neuraminic acid-(2-3)-beta-D-galacto pyranose.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
6	I	2	Total	C	N	O	0	0	0
			32	17	1	14			

- Molecule 7 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-a cetamido-2-deoxy-beta-D-glucopyranose.
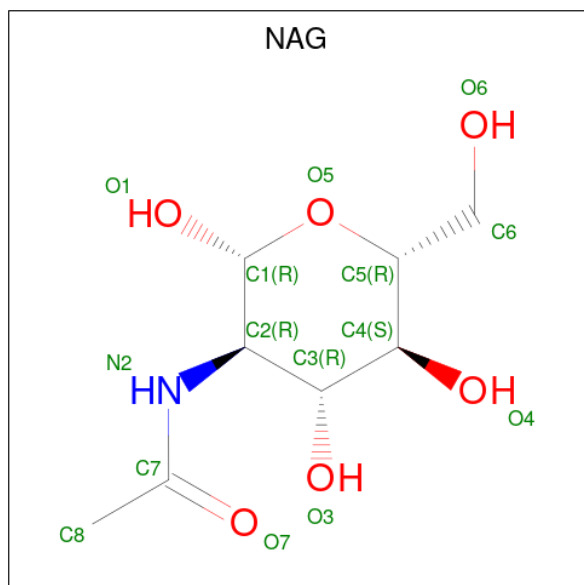
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
7	K	2	Total	C	N	O	0	0	0
			28	16	2	10			

- Molecule 8 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose.
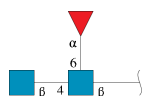
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
8	M	3	Total	C	N	O	0	0	0
			38	22	2	14			

- Molecule 9 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).

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

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

- Molecule 10 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	A	1	Total 1	Ca 1	0	0
10	B	1	Total 1	Ca 1	0	0
10	C	1	Total 1	Ca 1	0	0
10	D	2	Total 2	Ca 2	0	0

- Molecule 11 is N-acetyl-alpha-neuraminic acid (three-letter code: SIA) (formula: $C_{11}H_{19}NO_9$).

SIA
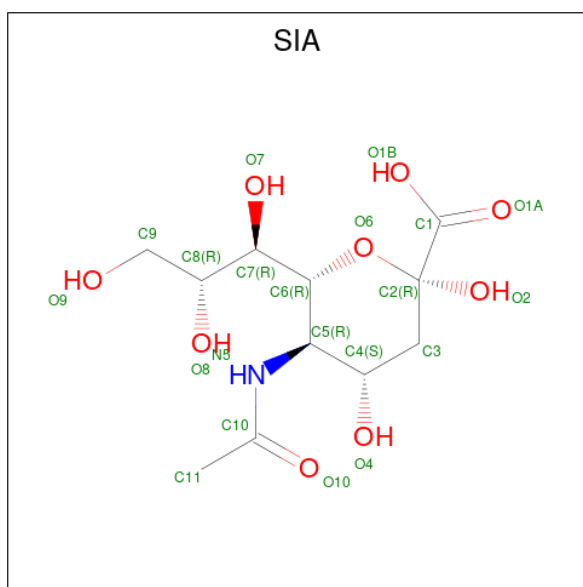
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
11	D	1	Total	C	N	O	0	0
			21	11	1	9		

• Molecule 12 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
12	A	88	Total	O	0	0
			88	88		
12	B	90	Total	O	0	0
			90	90		
12	C	92	Total	O	0	0
			92	92		
12	D	91	Total	O	0	0
			91	91		

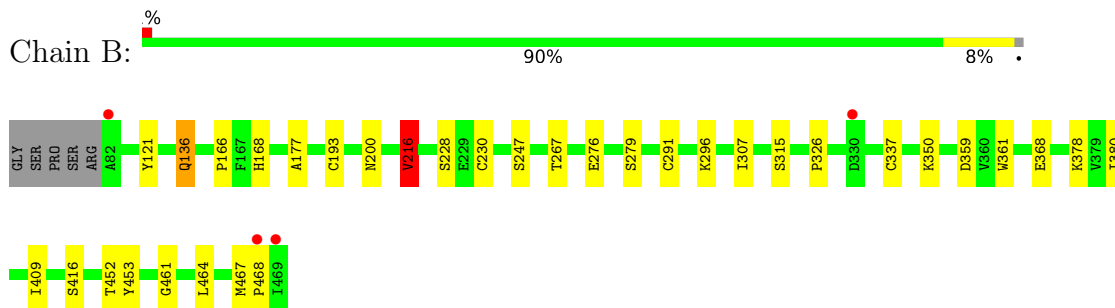# 3 Residue-property plots ⓘ

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.
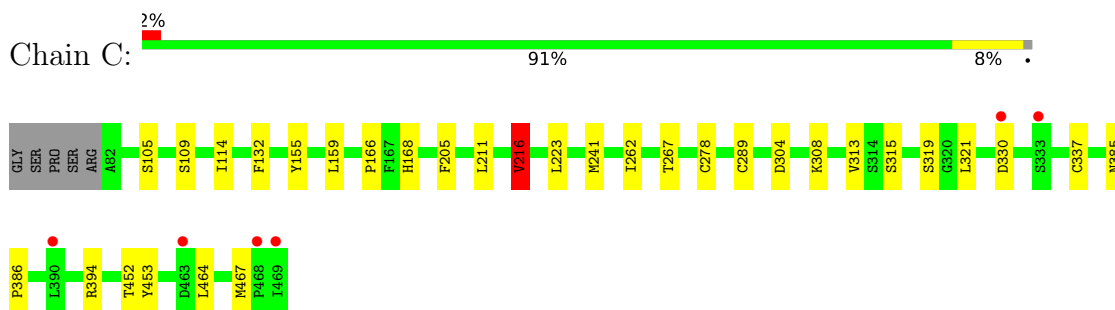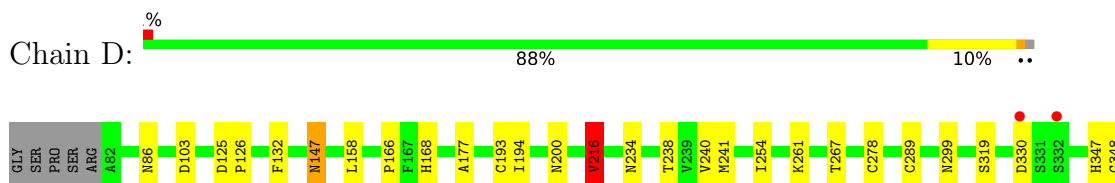
- Molecule 1: neuraminidase
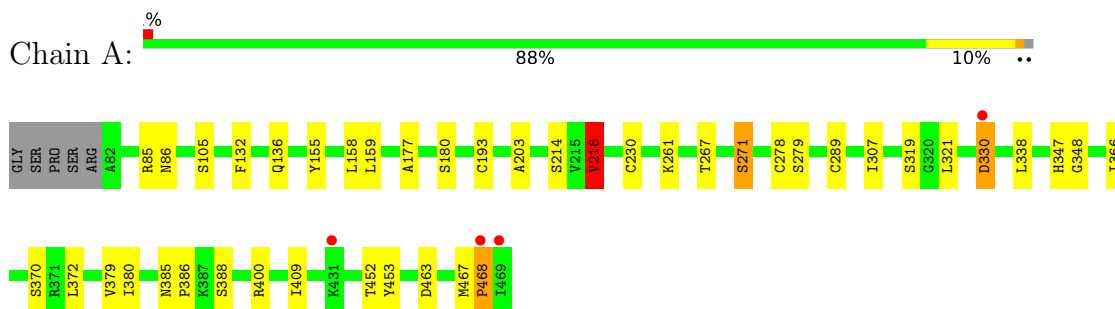
Chain A:

- Molecule 1: neuraminidase

Chain B:

- Molecule 1: neuraminidase

Chain C:

- Molecule 1: neuraminidase

Chain D:

D359 T369 I380 N385 P386 R428 S442 T452 Y453 G461 L464 N465 P468 I469

• Molecule 2: N-acetyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain E:　　　　　　　　　　　　　　　100%

NAG1 GAL2 SIA3

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

Chain F:　　　　　　　　　　　　　　　100%

NAG1 NAG2 BMA3 MAN4 MAN5

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

Chain J:　　　　　　　　　　　　　　　100%

NAG1 NAG2 BMA3 MAN4 MAN5

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

Chain L:　　　　　　　　　　　　　　　100%

NAG1 NAG2 BMA3 MAN4 MAN5

• Molecule 4: N-acetyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain G:　　　　　　　　　　67%　　　　　　　　　33%

NAG1 GAL2 SIA3

• Molecule 5: 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

Chain H:　　　25%　　　　　　　　75%

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NAG1 NAG2 BMA3 MAN4

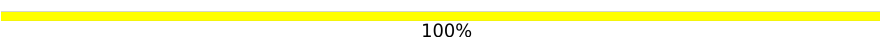• Molecule 6: N-acetyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose
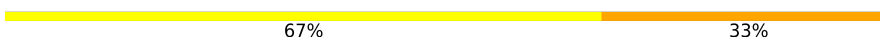
Chain I:

50% 50%

GAL1 SIA2

• Molecule 7: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain K:

100%

NAG1 NAG2

• Molecule 8: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain M:

67% 33%

NAG1 NAG2 FUC3

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	82.44Å 110.56Å 109.93Å 90.00° 97.79° 90.00°	Depositor
Resolution (Å)	50.00 – 2.45 48.44 – 2.44	Depositor EDS
% Data completeness (in resolution range)	93.7 (50.00-2.45) 92.6 (48.44-2.44)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	4.83 (at 2.45Å)	Xtriage
Refinement program	REFMAC 5.6.0117	Depositor
R, R_{free}	0.197 , 0.246 0.198 , 0.243	Depositor DCC
R_{free} test set	3387 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å^2)	22.3	Xtriage
Anisotropy	1.938	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 38.3	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	0.94	EDS
Total number of atoms	12970	wwPDB-VP
Average B, all atoms (Å^2)	28.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.55% 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, FUC, CA, BMA, SIA, GAL, NAG

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$|Z|$>5	RMSZ	#$|Z|$>5
1	A	0.49	0/3065	0.62	1/4156 (0.0%)
1	B	0.48	0/3065	0.61	1/4156 (0.0%)
1	C	0.49	0/3065	0.61	1/4156 (0.0%)
1	D	0.49	0/3065	0.62	1/4156 (0.0%)
All	All	0.49	0/12260	0.62	4/16624 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	216	VAL	CB-CA-C	-6.53	98.99	111.40
1	D	216	VAL	CB-CA-C	-5.63	100.70	111.40
1	B	216	VAL	CB-CA-C	-5.61	100.73	111.40
1	A	216	VAL	CB-CA-C	-5.08	101.76	111.40

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	2998	0	2854	23	0
1	B	2998	0	2854	21	0
1	C	2998	0	2855	21	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	D	2998	0	2855	28	0
2	E	46	0	40	0	0
3	F	61	0	52	0	0
3	J	61	0	52	0	0
3	L	61	0	52	0	0
4	G	46	0	40	1	0
5	H	50	0	43	0	0
6	I	32	0	28	1	0
7	K	28	0	25	0	0
8	M	38	0	34	1	0
9	A	56	0	52	0	0
9	B	56	0	52	0	0
9	C	28	0	26	0	0
9	D	28	0	26	0	0
10	A	1	0	0	0	0
10	B	1	0	0	0	0
10	C	1	0	0	0	0
10	D	2	0	0	0	0
11	D	21	0	18	0	0
12	A	88	0	0	2	0
12	B	90	0	0	3	0
12	C	92	0	0	1	0
12	D	91	0	0	0	0
All	All	12970	0	11958	80	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 (80) 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:452:THR:HB	1:D:216:VAL:HG22	1.69	0.72
1:C:216:VAL:HG13	1:D:453:TYR:C	2.10	0.71
1:C:216:VAL:HG13	1:D:453:TYR:O	1.91	0.70
1:A:321:LEU:HD22	12:A:951:HOH:O	1.94	0.66
1:B:216:VAL:CG2	1:C:452:THR:HB	2.27	0.64
1:A:453:TYR:C	1:D:216:VAL:HG13	2.19	0.61
1:A:467:MET:HB3	1:A:468:PRO:HD2	1.82	0.61
1:A:279:SER:HB3	1:A:409:ILE:HG22	1.82	0.61
1:B:216:VAL:HG22	1:C:452:THR:HB	1.81	0.61
12:C:912:HOH:O	6:I:2:SIA:H92	2.01	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:359:ASP:OD1	1:B:380:ILE:HA	2.03	0.57
1:D:194:ILE:HD11	1:D:241:MET:CE	2.35	0.56
1:A:380:ILE:O	1:A:388:SER:OG	2.21	0.55
1:D:194:ILE:HD11	1:D:241:MET:HE3	1.87	0.55
1:B:216:VAL:HG13	1:C:453:TYR:C	2.28	0.54
1:B:136:GLN:HA	1:B:136:GLN:HE21	1.73	0.53
1:A:385:ASN:HD22	1:A:386:PRO:HD2	1.73	0.52
1:A:453:TYR:O	1:D:216:VAL:HG13	2.10	0.51
1:A:132:PHE:HB3	1:A:158:LEU:HD11	1.93	0.51
1:C:385:ASN:HD22	1:C:386:PRO:HD2	1.77	0.50
1:B:464:LEU:HA	1:B:467:MET:HG2	1.92	0.50
1:A:452:THR:CB	1:D:216:VAL:HG22	2.40	0.50
1:C:321:LEU:HD22	1:C:330:ASP:OD1	2.12	0.49
1:D:347:HIS:CG	1:D:348:GLY:H	2.30	0.49
1:A:216:VAL:HG22	1:B:453:TYR:N	2.28	0.49
1:D:240:VAL:HG22	1:D:254:ILE:HG13	1.94	0.49
1:C:155:TYR:CE1	1:D:461:GLY:HA3	2.49	0.48
1:C:223:LEU:HD11	1:C:241:MET:HE1	1.94	0.48
1:B:279:SER:HB3	1:B:409:ILE:HG22	1.96	0.48
1:C:278:CYS:HB3	1:C:289:CYS:HB3	1.96	0.48
1:A:177:ALA:HB2	1:A:193:CYS:HB3	1.95	0.47
1:D:428:ARG:NH2	1:D:464:LEU:HG	2.30	0.47
1:C:216:VAL:HG22	1:D:452:THR:HB	1.98	0.46
1:C:464:LEU:HA	1:C:467:MET:HG3	1.97	0.46
1:A:216:VAL:CG2	1:B:452:THR:HB	2.46	0.46
1:B:228:SER:HB3	1:B:350:LYS:HE2	1.97	0.46
1:A:155:TYR:CE1	1:B:461:GLY:HA3	2.51	0.46
1:D:465:ASN:HD22	1:D:465:ASN:H	1.62	0.46
1:B:296:LYS:HB2	12:B:902:HOH:O	2.15	0.46
12:B:960:HOH:O	1:C:394:ARG:HD3	2.15	0.46
1:D:125:ASP:HB2	1:D:126:PRO:HD2	1.98	0.45
1:B:276:GLU:O	1:B:291:CYS:HB3	2.17	0.45
1:B:315:SER:HB2	1:B:337:CYS:O	2.17	0.45
1:C:216:VAL:CG1	1:D:453:TYR:O	2.61	0.45
1:A:347:HIS:CG	1:A:348:GLY:H	2.35	0.45
1:C:304:ASP:HB2	1:C:313:VAL:CG2	2.47	0.45
1:B:464:LEU:HA	1:B:467:MET:CG	2.47	0.45
1:D:86:ASN:OD1	1:D:234:ASN:OD1	2.35	0.45
1:D:465:ASN:H	1:D:465:ASN:ND2	2.14	0.45
1:A:132:PHE:HA	1:A:159:LEU:O	2.17	0.44
1:D:177:ALA:HB2	1:D:193:CYS:HB3	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:177:ALA:HB2	1:B:193:CYS:HB3	1.99	0.44
1:D:278:CYS:HB3	1:D:289:CYS:HB3	2.00	0.43
1:C:205:PHE:CE1	1:C:262:ILE:HD11	2.52	0.43
1:D:147:ASN:ND2	8:M:1:NAG:H62	2.32	0.43
1:C:109:SER:HB3	1:C:114:ILE:HB	2.01	0.43
1:D:166:PRO:O	1:D:168:HIS:HD2	2.02	0.43
1:B:326:PRO:HA	1:B:368:GLU:O	2.19	0.42
1:C:304:ASP:HB2	1:C:313:VAL:HG23	2.00	0.42
1:A:278:CYS:HB3	1:A:289:CYS:HB3	2.01	0.42
1:A:330:ASP:OD1	1:A:330:ASP:N	2.51	0.42
1:B:361:TRP:CE2	1:B:378:LYS:HD3	2.55	0.42
1:C:132:PHE:HA	1:C:159:LEU:O	2.19	0.42
1:B:296:LYS:HB2	1:B:296:LYS:HE3	1.84	0.41
1:C:166:PRO:O	1:C:168:HIS:HD2	2.03	0.41
1:D:299:ASN:OD1	1:D:299:ASN:N	2.53	0.41
1:D:359:ASP:OD1	1:D:380:ILE:HA	2.20	0.41
1:A:203:ALA:O	1:A:214:SER:HA	2.20	0.41
1:D:103:ASP:OD1	1:D:442:SER:HB2	2.20	0.41
1:D:125:ASP:HB2	1:D:126:PRO:CD	2.51	0.41
1:C:315:SER:HB2	1:C:337:CYS:O	2.20	0.41
1:B:166:PRO:O	1:B:168:HIS:HD2	2.04	0.41
1:A:85:ARG:HD3	12:A:969:HOH:O	2.20	0.41
1:A:271:SER:HB3	1:A:338:LEU:O	2.21	0.41
1:D:385:ASN:HA	1:D:386:PRO:HD2	2.00	0.41
1:B:121:TYR:CG	1:B:228:SER:HA	2.56	0.40
1:D:132:PHE:HB3	1:D:158:LEU:HD11	2.02	0.40
1:A:321:LEU:HD12	1:A:379:VAL:HG22	2.02	0.40
12:B:990:HOH:O	4:G:3:SIA:H92	2.22	0.40
1:A:366:ILE:HG21	1:A:400:ARG:HB3	2.04	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	A	386/393 (98%)	364 (94%)	20 (5%)	2 (0%)	29	34
1	B	386/393 (98%)	368 (95%)	16 (4%)	2 (0%)	29	34
1	C	386/393 (98%)	365 (95%)	20 (5%)	1 (0%)	41	49
1	D	386/393 (98%)	366 (95%)	17 (4%)	3 (1%)	19	22
All	All	1544/1572 (98%)	1463 (95%)	73 (5%)	8 (0%)	29	34

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	468	PRO
1	D	319	SER
1	B	200	ASN
1	D	468	PRO
1	A	319	SER
1	B	468	PRO
1	C	319	SER
1	D	200	ASN

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	337/341 (99%)	323 (96%)	14 (4%)	30	39
1	B	337/341 (99%)	330 (98%)	7 (2%)	53	66
1	C	337/341 (99%)	332 (98%)	5 (2%)	65	76
1	D	337/341 (99%)	329 (98%)	8 (2%)	49	61
All	All	1348/1364 (99%)	1314 (98%)	34 (2%)	47	60

All (34) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	86	ASN
1	A	105	SER
1	A	136	GLN

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Mol	Chain	Res	Type
1	A	180	SER
1	A	216	VAL
1	A	230	CYS
1	A	261	LYS
1	A	267	THR
1	A	271	SER
1	A	307	ILE
1	A	330	ASP
1	A	370	SER
1	A	372	LEU
1	A	463	ASP
1	B	136	GLN
1	B	216	VAL
1	B	230	CYS
1	B	247	SER
1	B	267	THR
1	B	307	ILE
1	B	416	SER
1	C	105	SER
1	C	211	LEU
1	C	216	VAL
1	C	267	THR
1	C	308	LYS
1	D	147	ASN
1	D	216	VAL
1	D	238	THR
1	D	261	LYS
1	D	267	THR
1	D	330	ASP
1	D	369	THR
1	D	385	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (24) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	136	GLN
1	A	168	HIS
1	A	358	ASN
1	A	385	ASN
1	A	393	ASN
1	B	136	GLN
1	B	168	HIS

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Mol	Chain	Res	Type
1	B	173	GLN
1	B	385	ASN
1	B	402	ASN
1	C	86	ASN
1	C	136	GLN
1	C	147	ASN
1	C	168	HIS
1	C	385	ASN
1	C	393	ASN
1	D	136	GLN
1	D	147	ASN
1	D	168	HIS
1	D	234	ASN
1	D	358	ASN
1	D	385	ASN
1	D	393	ASN
1	D	465	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 ⓘ

32 monosaccharides are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#$|Z| > 2$	Counts	RMSZ	#$|Z| > 2$
2	NAG	E	1	2	15,15,15	0.49	0	21,21,21	1.13	2 (9%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
2	GAL	E	2	2	11,11,12	0.60	0	15,15,17	1.17	2 (13%)
2	SIA	E	3	2	20,20,21	0.65	0	24,28,31	1.84	4 (16%)
3	NAG	F	1	1,3	14,14,15	0.68	0	17,19,21	1.15	1 (5%)
3	NAG	F	2	3	14,14,15	0.52	0	17,19,21	1.27	3 (17%)
3	BMA	F	3	3	11,11,12	0.80	0	15,15,17	0.89	1 (6%)
3	MAN	F	4	3	11,11,12	0.66	0	15,15,17	1.09	1 (6%)
3	MAN	F	5	3	11,11,12	0.62	0	15,15,17	1.14	2 (13%)
4	NAG	G	1	4	15,15,15	0.83	1 (6%)	21,21,21	1.35	2 (9%)
4	GAL	G	2	4	11,11,12	0.74	0	15,15,17	1.48	3 (20%)
4	SIA	G	3	4	20,20,21	0.82	1 (5%)	24,28,31	1.97	4 (16%)
5	NAG	H	1	1,5	14,14,15	0.66	0	17,19,21	1.08	1 (5%)
5	NAG	H	2	5	14,14,15	0.48	0	17,19,21	1.23	2 (11%)
5	BMA	H	3	5	11,11,12	0.69	0	15,15,17	0.64	0
5	MAN	H	4	5	11,11,12	0.70	0	15,15,17	0.92	1 (6%)
6	GAL	I	1	6	12,12,12	0.81	0	17,17,17	0.76	0
6	SIA	I	2	6	20,20,21	0.75	0	24,28,31	1.85	4 (16%)
3	NAG	J	1	1,3	14,14,15	0.62	0	17,19,21	1.18	2 (11%)
3	NAG	J	2	3	14,14,15	0.40	0	17,19,21	1.26	2 (11%)
3	BMA	J	3	3	11,11,12	0.86	0	15,15,17	0.90	1 (6%)
3	MAN	J	4	3	11,11,12	0.65	0	15,15,17	1.54	1 (6%)
3	MAN	J	5	3	11,11,12	0.54	0	15,15,17	1.45	2 (13%)
7	NAG	K	1	7,1	14,14,15	0.62	0	17,19,21	1.27	2 (11%)
7	NAG	K	2	7	14,14,15	0.62	0	17,19,21	1.45	2 (11%)
3	NAG	L	1	1,3	14,14,15	0.62	0	17,19,21	0.88	1 (5%)
3	NAG	L	2	3	14,14,15	0.52	0	17,19,21	1.36	2 (11%)
3	BMA	L	3	3	11,11,12	0.70	0	15,15,17	1.10	1 (6%)
3	MAN	L	4	3	11,11,12	0.55	0	15,15,17	1.55	1 (6%)
3	MAN	L	5	3	11,11,12	0.59	0	15,15,17	2.10	3 (20%)
8	NAG	M	1	8,1	14,14,15	0.57	0	17,19,21	1.51	5 (29%)
8	NAG	M	2	8	14,14,15	0.57	0	17,19,21	1.19	2 (11%)
8	FUC	M	3	8	10,10,11	0.72	0	14,14,16	1.83	3 (21%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	E	1	2	-	2/6/26/26	0/1/1/1
2	GAL	E	2	2	-	2/2/19/22	0/1/1/1
2	SIA	E	3	2	-	0/18/34/38	0/1/1/1
3	NAG	F	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	F	2	3	-	2/6/23/26	0/1/1/1
3	BMA	F	3	3	-	0/2/19/22	0/1/1/1
3	MAN	F	4	3	-	0/2/19/22	0/1/1/1
3	MAN	F	5	3	-	2/2/19/22	0/1/1/1
4	NAG	G	1	4	-	1/6/26/26	0/1/1/1
4	GAL	G	2	4	-	0/2/19/22	0/1/1/1
4	SIA	G	3	4	-	4/18/34/38	0/1/1/1
5	NAG	H	1	1,5	-	0/6/23/26	0/1/1/1
5	NAG	H	2	5	-	0/6/23/26	0/1/1/1
5	BMA	H	3	5	-	0/2/19/22	0/1/1/1
5	MAN	H	4	5	-	1/2/19/22	0/1/1/1
6	GAL	I	1	6	-	1/2/22/22	0/1/1/1
6	SIA	I	2	6	-	3/18/34/38	0/1/1/1
3	NAG	J	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	J	2	3	-	0/6/23/26	0/1/1/1
3	BMA	J	3	3	-	2/2/19/22	0/1/1/1
3	MAN	J	4	3	-	0/2/19/22	0/1/1/1
3	MAN	J	5	3	-	2/2/19/22	0/1/1/1
7	NAG	K	1	7,1	-	0/6/23/26	0/1/1/1
7	NAG	K	2	7	-	2/6/23/26	0/1/1/1
3	NAG	L	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	L	2	3	-	0/6/23/26	0/1/1/1
3	BMA	L	3	3	-	2/2/19/22	0/1/1/1
3	MAN	L	4	3	-	0/2/19/22	0/1/1/1
3	MAN	L	5	3	-	1/2/19/22	0/1/1/1
8	NAG	M	1	8,1	-	0/6/23/26	0/1/1/1
8	NAG	M	2	8	-	2/6/23/26	0/1/1/1
8	FUC	M	3	8	-	-	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	G	3	SIA	C4-C5	-2.40	1.51	1.53
4	G	1	NAG	O3-C3	2.30	1.48	1.43

All (63) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	L	5	MAN	C1-O5-C5	5.91	120.20	112.19
4	G	3	SIA	C6-O6-C2	5.79	123.73	111.34
6	I	2	SIA	C6-O6-C2	5.61	123.34	111.34
3	J	4	MAN	C1-O5-C5	5.03	119.01	112.19
3	L	4	MAN	C1-O5-C5	4.71	118.58	112.19
2	E	3	SIA	C6-O6-C2	4.69	121.38	111.34
2	E	3	SIA	O6-C2-C3	4.64	116.84	110.46
2	E	3	SIA	C4-C3-C2	4.38	117.67	109.81
6	I	2	SIA	C4-C3-C2	4.29	117.50	109.81
4	G	3	SIA	O6-C2-C3	4.21	116.25	110.46
8	M	3	FUC	O5-C5-C4	4.10	116.87	109.52
4	G	1	NAG	C3-C4-C5	3.74	116.91	110.24
8	M	3	FUC	C3-C4-C5	3.68	115.50	109.77
3	J	5	MAN	C1-C2-C3	3.43	113.88	109.67
5	H	2	NAG	C1-O5-C5	3.39	116.79	112.19
4	G	3	SIA	C4-C3-C2	3.36	115.83	109.81
7	K	2	NAG	C4-C3-C2	3.35	115.92	111.02
3	F	4	MAN	C1-O5-C5	3.32	116.69	112.19
7	K	2	NAG	O5-C5-C6	3.31	112.39	107.20
4	G	2	GAL	C1-O5-C5	3.28	116.64	112.19
3	J	5	MAN	C1-O5-C5	3.28	116.64	112.19
3	F	1	NAG	C1-O5-C5	3.23	116.57	112.19
3	L	5	MAN	O5-C5-C6	3.20	112.23	107.20
3	L	5	MAN	C1-C2-C3	3.14	113.53	109.67
2	E	2	GAL	C1-C2-C3	3.13	113.51	109.67
6	I	2	SIA	C9-C8-C7	-3.10	105.70	112.41
4	G	2	GAL	C1-C2-C3	3.08	113.45	109.67
3	J	1	NAG	C1-O5-C5	3.07	116.34	112.19
8	M	3	FUC	C1-O5-C5	3.01	119.60	112.78
3	L	2	NAG	C3-C4-C5	-2.98	104.93	110.24
8	M	1	NAG	O3-C3-C2	-2.97	103.33	109.47
3	F	2	NAG	C1-O5-C5	2.87	116.08	112.19
4	G	3	SIA	C9-C8-C7	-2.85	106.23	112.41
8	M	2	NAG	C1-O5-C5	2.77	115.95	112.19
3	F	5	MAN	O5-C5-C6	2.68	111.41	107.20
4	G	1	NAG	C4-C3-C2	2.68	114.27	110.34
5	H	2	NAG	O4-C4-C3	-2.67	104.17	110.35
8	M	1	NAG	C4-C3-C2	2.59	114.81	111.02
3	F	5	MAN	C1-O5-C5	2.54	115.63	112.19
8	M	2	NAG	C4-C3-C2	2.52	114.72	111.02
3	F	2	NAG	C3-C4-C5	-2.52	105.75	110.24
5	H	1	NAG	C2-N2-C7	-2.50	119.35	122.90
7	K	1	NAG	C4-C3-C2	2.49	114.67	111.02

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	F	3	BMA	C1-C2-C3	2.48	112.72	109.67
7	K	1	NAG	O3-C3-C2	-2.48	104.34	109.47
8	M	1	NAG	C1-O5-C5	2.43	115.49	112.19
3	J	2	NAG	C1-O5-C5	2.40	115.45	112.19
2	E	1	NAG	C3-C4-C5	2.39	114.50	110.24
4	G	2	GAL	O5-C5-C6	2.36	110.90	107.20
3	L	2	NAG	C2-N2-C7	2.31	126.19	122.90
3	L	1	NAG	C1-O5-C5	2.30	115.31	112.19
2	E	2	GAL	O5-C5-C6	2.30	110.81	107.20
3	J	1	NAG	C1-C2-N2	2.25	114.33	110.49
3	J	2	NAG	C2-N2-C7	2.25	126.10	122.90
6	I	2	SIA	O1B-C1-C2	2.21	119.35	113.03
3	J	3	BMA	C1-O5-C5	2.21	115.18	112.19
3	L	3	BMA	O5-C5-C6	2.21	110.66	107.20
5	H	4	MAN	C1-O5-C5	2.18	115.14	112.19
3	F	2	NAG	O4-C4-C3	-2.15	105.37	110.35
2	E	1	NAG	C4-C3-C2	2.14	113.47	110.34
8	M	1	NAG	C2-N2-C7	-2.13	119.87	122.90
2	E	3	SIA	O1B-C1-C2	2.06	118.92	113.03
8	M	1	NAG	O3-C3-C4	2.02	115.02	110.35

There are no chirality outliers.

All (29) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	L	3	BMA	O5-C5-C6-O6
2	E	1	NAG	O5-C5-C6-O6
3	F	5	MAN	O5-C5-C6-O6
2	E	2	GAL	C4-C5-C6-O6
3	J	3	BMA	O5-C5-C6-O6
2	E	2	GAL	O5-C5-C6-O6
3	L	3	BMA	C4-C5-C6-O6
3	F	5	MAN	C4-C5-C6-O6
2	E	1	NAG	C4-C5-C6-O6
3	L	5	MAN	O5-C5-C6-O6
3	J	3	BMA	C4-C5-C6-O6
3	J	5	MAN	C4-C5-C6-O6
3	F	2	NAG	C4-C5-C6-O6
6	I	1	GAL	O5-C5-C6-O6
4	G	1	NAG	O5-C5-C6-O6
7	K	2	NAG	C4-C5-C6-O6
7	K	2	NAG	O5-C5-C6-O6

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Mol	Chain	Res	Type	Atoms
3	J	5	MAN	O5-C5-C6-O6
6	I	2	SIA	O8-C8-C9-O9
4	G	3	SIA	C6-C7-C8-O8
3	F	2	NAG	O5-C5-C6-O6
6	I	2	SIA	O1A-C1-C2-O6
8	M	2	NAG	O5-C5-C6-O6
6	I	2	SIA	C7-C8-C9-O9
8	M	2	NAG	C4-C5-C6-O6
4	G	3	SIA	C6-C7-C8-C9
4	G	3	SIA	O7-C7-C8-C9
4	G	3	SIA	O1A-C1-C2-O6
5	H	4	MAN	C4-C5-C6-O6

There are no ring outliers.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	I	2	SIA	1	0
8	M	1	NAG	1	0
4	G	3	SIA	1	0

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

Oligosaccharide Chain E

Bond lengths

Bond angles

Torsions

Rings

Full wwPDB X-ray Structure Validation Report

Oligosaccharide Chain F

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain J

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain L

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain G

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain H

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain I

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain K

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain M

Bond lengths

Bond angles

Torsions

Rings

5.6 Ligand geometry ⓘ

Of 18 ligands modelled in this entry, 5 are monoatomic - leaving 13 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
9	NAG	C	810	1	14,14,15	0.59	0	17,19,21	0.80	0
9	NAG	C	811	1	14,14,15	0.48	0	17,19,21	0.99	1 (5%)
9	NAG	B	511	1	14,14,15	0.47	0	17,19,21	1.19	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
9	NAG	A	512	1	14,14,15	0.51	0	17,19,21	1.69	3 (17%)
9	NAG	A	509	1	14,14,15	0.60	0	17,19,21	1.65	4 (23%)
9	NAG	A	510	1	14,14,15	0.56	0	17,19,21	1.30	3 (17%)
9	NAG	B	510	1	14,14,15	0.60	0	17,19,21	0.96	1 (5%)
9	NAG	D	508	1	14,14,15	0.50	0	17,19,21	1.34	2 (11%)
9	NAG	D	512	1	14,14,15	0.52	0	17,19,21	1.59	3 (17%)
9	NAG	B	508	1	14,14,15	0.50	0	17,19,21	1.32	1 (5%)
9	NAG	A	511	1	14,14,15	0.50	0	17,19,21	1.08	1 (5%)
9	NAG	B	509	1	14,14,15	0.54	0	17,19,21	1.37	4 (23%)
11	SIA	D	502	-	21,21,21	1.48	2 (9%)	25,31,31	3.56	3 (12%)

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
9	NAG	C	810	1	-	2/6/23/26	0/1/1/1
9	NAG	C	811	1	-	0/6/23/26	0/1/1/1
9	NAG	B	511	1	-	1/6/23/26	0/1/1/1
9	NAG	A	512	1	-	2/6/23/26	0/1/1/1
9	NAG	A	509	1	-	2/6/23/26	0/1/1/1
9	NAG	A	510	1	-	2/6/23/26	0/1/1/1
9	NAG	B	510	1	-	0/6/23/26	0/1/1/1
9	NAG	D	508	1	-	2/6/23/26	0/1/1/1
9	NAG	D	512	1	-	2/6/23/26	0/1/1/1
9	NAG	B	508	1	-	1/6/23/26	0/1/1/1
9	NAG	A	511	1	-	0/6/23/26	0/1/1/1
9	NAG	B	509	1	-	2/6/23/26	0/1/1/1
11	SIA	D	502	-	-	1/20/38/38	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
11	D	502	SIA	O2-C2	5.43	1.46	1.39
11	D	502	SIA	C3-C2	2.77	1.55	1.51

All (27) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
11	D	502	SIA	O2-C2-C3	-15.34	87.23	109.40
11	D	502	SIA	O2-C2-O6	7.39	128.18	109.42
9	A	512	NAG	C1-O5-C5	5.07	119.06	112.19
9	B	511	NAG	C1-O5-C5	4.39	118.13	112.19
9	B	508	NAG	C1-O5-C5	4.37	118.11	112.19
9	D	508	NAG	C1-O5-C5	4.03	117.66	112.19
9	A	509	NAG	C3-C4-C5	3.93	117.25	110.24
9	A	511	NAG	C1-O5-C5	3.89	117.46	112.19
9	D	512	NAG	C1-C2-N2	3.44	116.36	110.49
9	A	510	NAG	C4-C3-C2	3.34	115.92	111.02
9	A	509	NAG	C4-C3-C2	2.93	115.31	111.02
9	D	512	NAG	C4-C3-C2	-2.82	106.88	111.02
9	B	509	NAG	C4-C3-C2	2.74	115.03	111.02
9	A	509	NAG	O5-C1-C2	-2.69	107.05	111.29
11	D	502	SIA	O1A-C1-C2	-2.67	119.54	123.59
9	C	811	NAG	O5-C5-C6	2.66	111.37	107.20
9	A	509	NAG	C1-O5-C5	2.63	115.76	112.19
9	A	512	NAG	O5-C5-C6	2.56	111.22	107.20
9	B	510	NAG	C1-O5-C5	2.49	115.57	112.19
9	A	512	NAG	C3-C4-C5	-2.47	105.83	110.24
9	A	510	NAG	O5-C5-C6	2.36	110.90	107.20
9	D	508	NAG	C3-C4-C5	2.35	114.43	110.24
9	D	512	NAG	O5-C1-C2	-2.27	107.70	111.29
9	B	509	NAG	O3-C3-C2	-2.22	104.88	109.47
9	B	509	NAG	O5-C5-C6	2.21	110.67	107.20
9	B	509	NAG	C2-N2-C7	-2.03	120.01	122.90
9	A	510	NAG	C1-O5-C5	2.02	114.92	112.19

There are no chirality outliers.

All (17) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
11	D	502	SIA	O1B-C1-C2-O2
9	C	810	NAG	O5-C5-C6-O6
9	A	512	NAG	C4-C5-C6-O6
9	A	512	NAG	O5-C5-C6-O6
9	A	510	NAG	O5-C5-C6-O6
9	A	509	NAG	O5-C5-C6-O6
9	C	810	NAG	C4-C5-C6-O6
9	D	512	NAG	C4-C5-C6-O6
9	A	509	NAG	C4-C5-C6-O6
9	A	510	NAG	C4-C5-C6-O6
9	B	509	NAG	C4-C5-C6-O6

Continued from previous page...

Mol	Chain	Res	Type	Atoms
9	B	509	NAG	O5-C5-C6-O6
9	D	512	NAG	O5-C5-C6-O6
9	D	508	NAG	C4-C5-C6-O6
9	B	508	NAG	O5-C5-C6-O6
9	B	511	NAG	O5-C5-C6-O6
9	D	508	NAG	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 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 SIA D 502

Bond lengths

Bond angles

Torsions

Rings
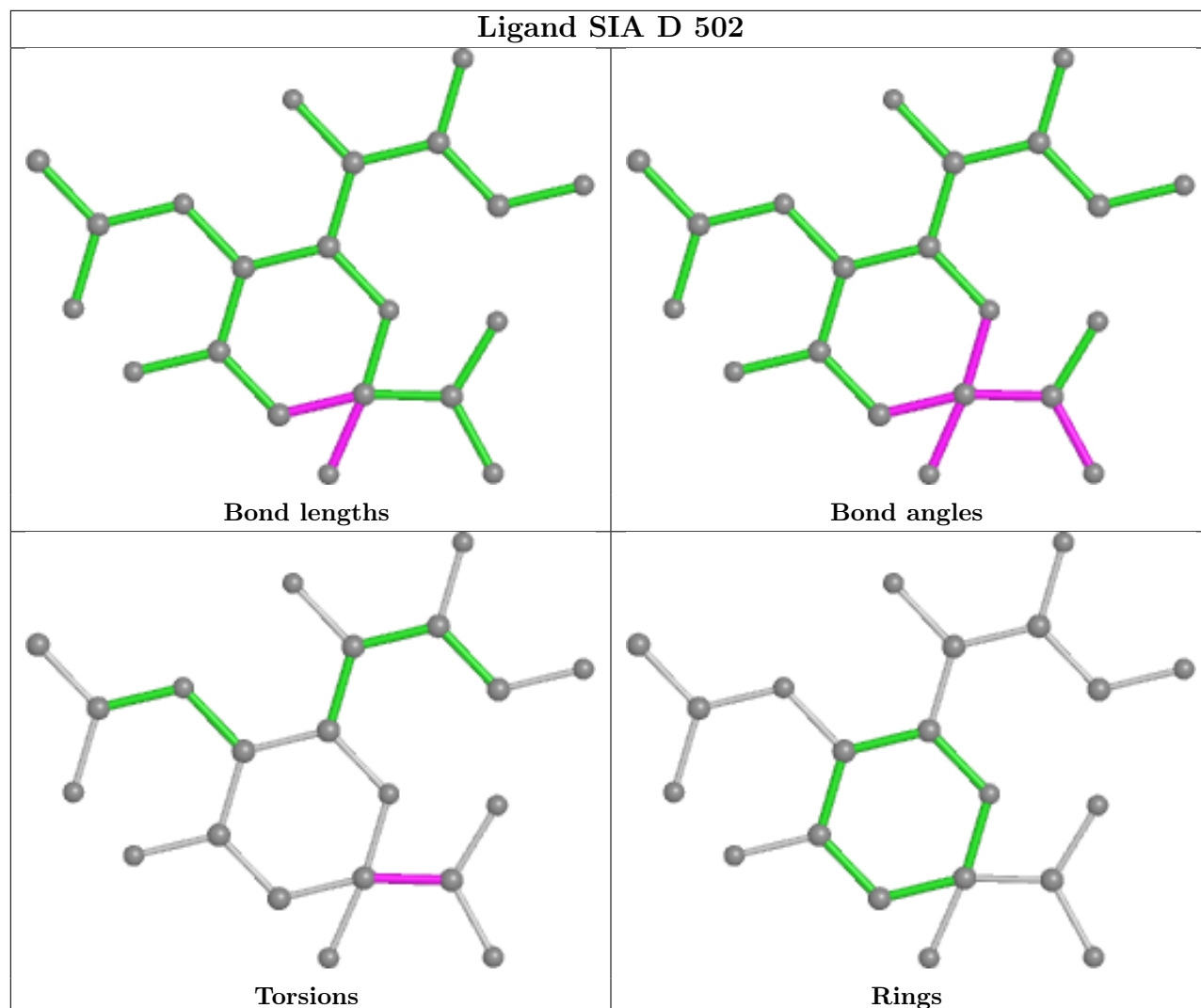
5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6　Fit of model and data ⓘ

6.1　Protein, DNA and RNA chains ⓘ

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	388/393 (98%)	-0.22	4 (1%)	82	83	11, 26, 42, 58	0
1	B	388/393 (98%)	-0.16	4 (1%)	82	83	12, 26, 41, 59	0
1	C	388/393 (98%)	-0.22	6 (1%)	73	71	14, 26, 42, 59	0
1	D	388/393 (98%)	-0.24	4 (1%)	82	83	15, 26, 40, 56	0
All	All	1552/1572 (98%)	-0.21	18 (1%)	79	77	11, 26, 42, 59	0

All (18) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	468	PRO	6.0
1	C	469	ILE	6.0
1	A	469	ILE	5.9
1	C	468	PRO	4.4
1	D	469	ILE	4.1
1	B	468	PRO	3.9
1	B	469	ILE	3.6
1	A	330	ASP	3.5
1	D	332	SER	3.1
1	A	468	PRO	3.0
1	C	390	LEU	2.4
1	B	82	ALA	2.4
1	A	431	LYS	2.3
1	C	333	SER	2.3
1	D	330	ASP	2.2
1	C	463	ASP	2.2
1	C	330	ASP	2.0
1	B	330	ASP	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
4	NAG	G	1	15/15	0.67	0.47	74,78,81,82	0
6	GAL	I	1	12/12	0.74	0.27	47,51,54,54	0
4	GAL	G	2	11/12	0.75	0.32	57,66,69,70	0
7	NAG	K	1	14/15	0.78	0.16	52,57,63,63	0
2	NAG	E	1	15/15	0.80	0.37	71,76,78,78	0
8	NAG	M	2	14/15	0.80	0.27	58,59,60,61	0
7	NAG	K	2	14/15	0.82	0.24	65,67,68,69	0
3	MAN	F	4	11/12	0.82	0.20	45,46,47,50	0
8	FUC	M	3	10/11	0.83	0.25	57,58,59,59	0
3	MAN	J	4	11/12	0.84	0.17	36,39,42,45	0
5	BMA	H	3	11/12	0.85	0.15	38,41,46,53	0
3	MAN	L	4	11/12	0.85	0.18	46,47,49,51	0
3	MAN	L	5	11/12	0.86	0.16	53,55,57,58	0
2	GAL	E	2	11/12	0.87	0.29	60,65,68,68	0
3	MAN	J	5	11/12	0.88	0.23	54,56,58,59	0
3	MAN	F	5	11/12	0.89	0.15	43,45,47,47	0
4	SIA	G	3	20/21	0.90	0.15	33,41,46,48	0
8	NAG	M	1	14/15	0.90	0.17	46,49,55,55	0
3	BMA	J	3	11/12	0.92	0.12	38,40,45,51	0
5	MAN	H	4	11/12	0.92	0.18	38,43,45,48	0
6	SIA	I	2	20/21	0.93	0.14	33,37,39,40	0
3	NAG	J	1	14/15	0.93	0.14	25,32,35,35	0
3	NAG	L	1	14/15	0.93	0.15	25,31,35,36	0
2	SIA	E	3	20/21	0.94	0.14	45,47,52,52	0
3	NAG	L	2	14/15	0.94	0.19	29,32,37,37	0
3	NAG	F	1	14/15	0.94	0.14	26,31,37,38	0
3	BMA	F	3	11/12	0.94	0.17	36,39,41,42	0
5	NAG	H	1	14/15	0.95	0.14	26,27,36,36	0
3	BMA	L	3	11/12	0.95	0.12	40,43,47,51	0
3	NAG	J	2	14/15	0.96	0.12	32,33,34,36	0
3	NAG	F	2	14/15	0.96	0.14	29,30,31,34	0
5	NAG	H	2	14/15	0.98	0.12	28,30,31,34	0

The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.
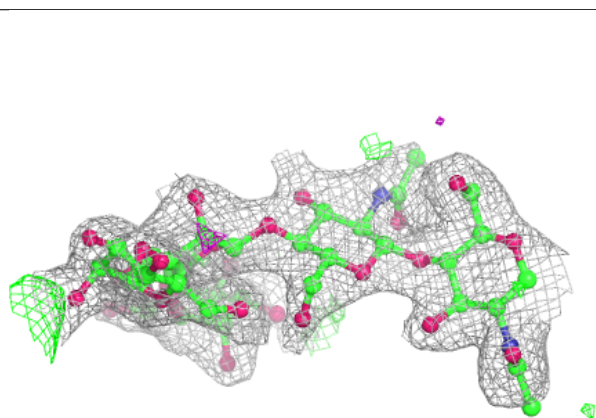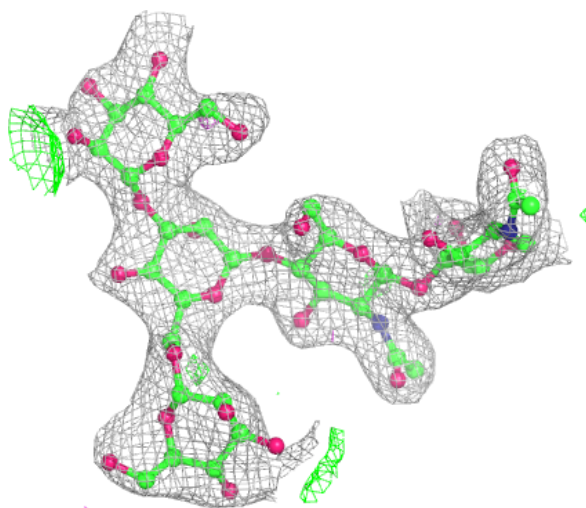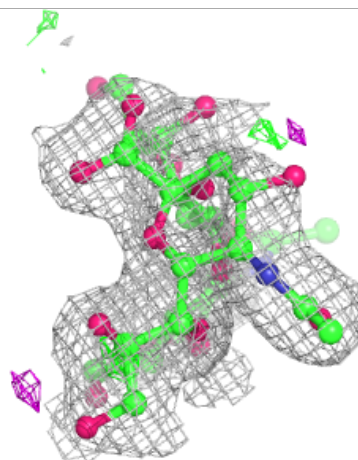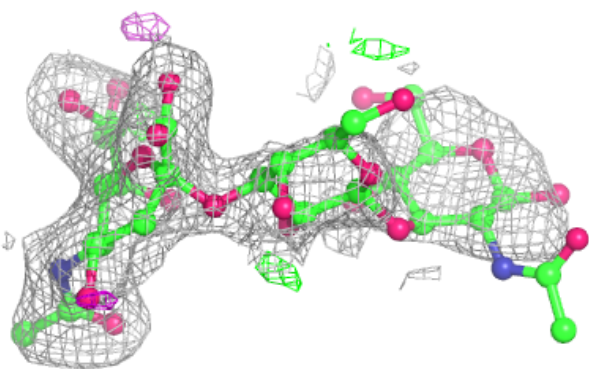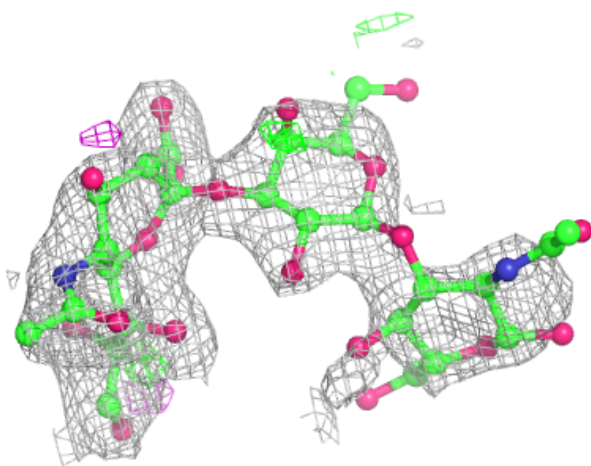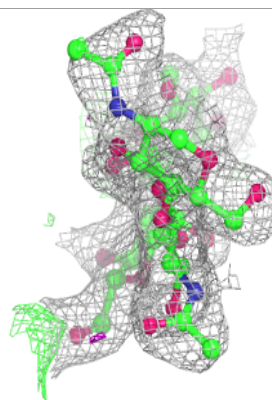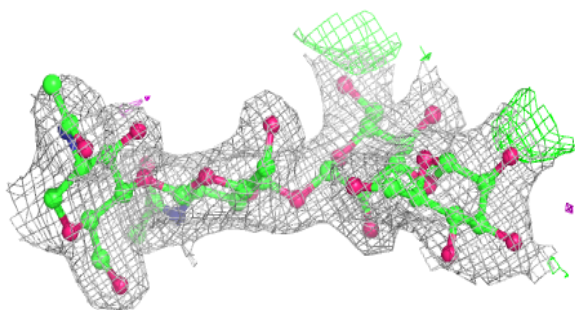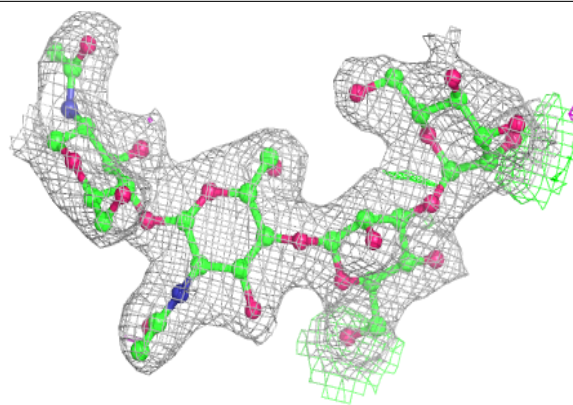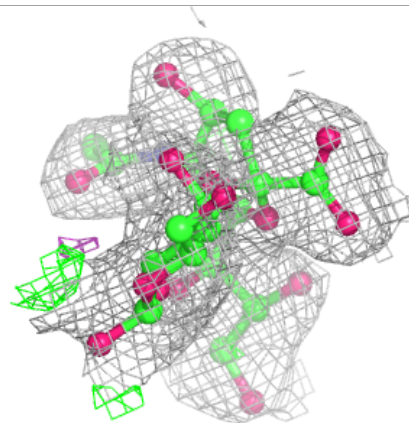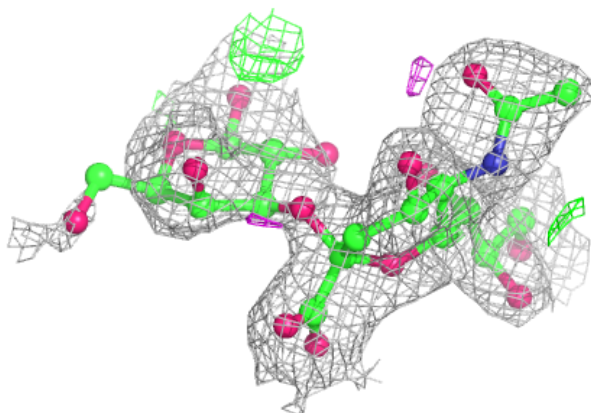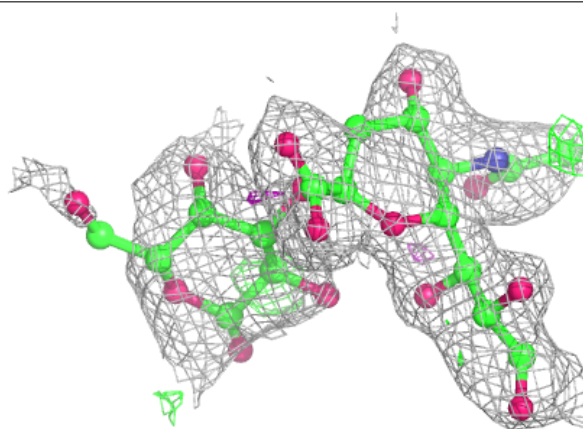
Electron density around Chain E:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
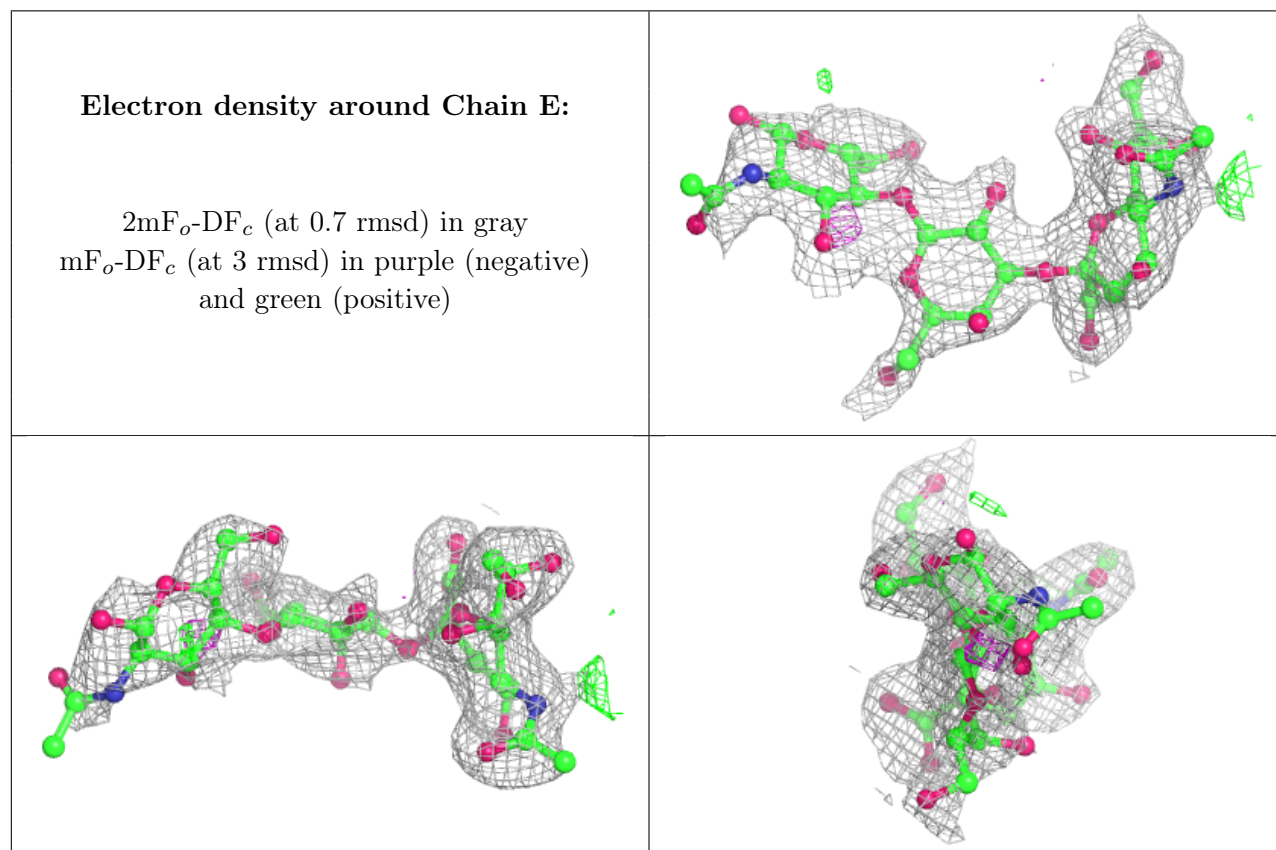
Electron density around Chain F:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
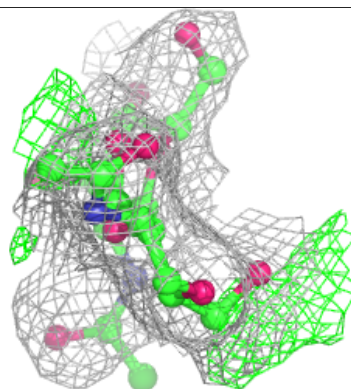and green (positive)
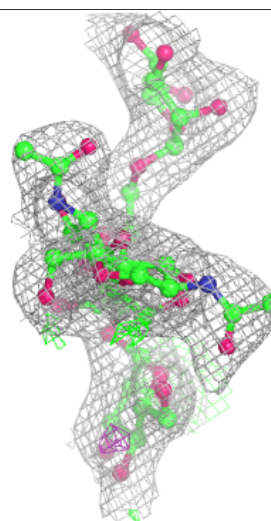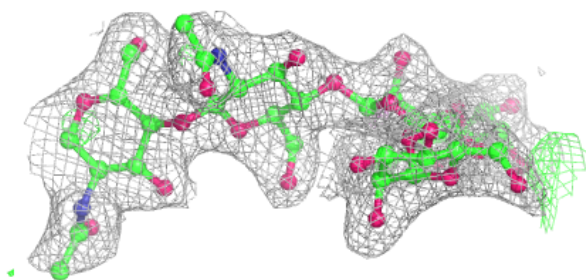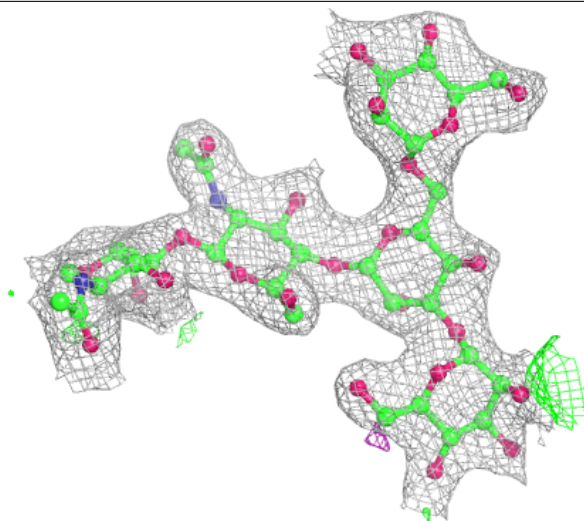
Electron density around Chain J:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
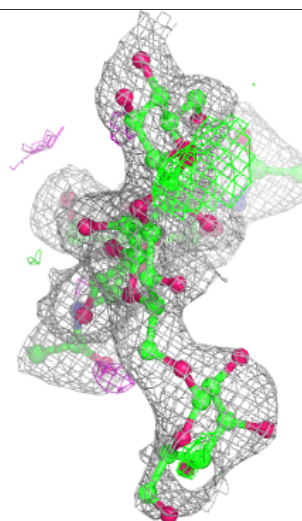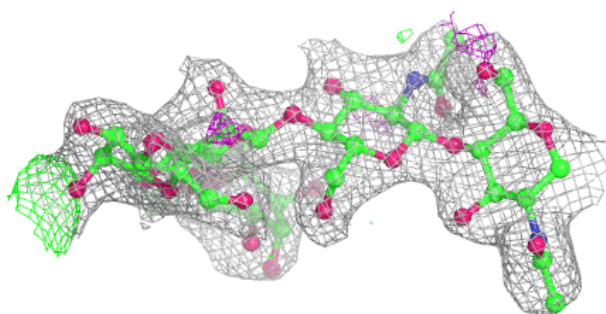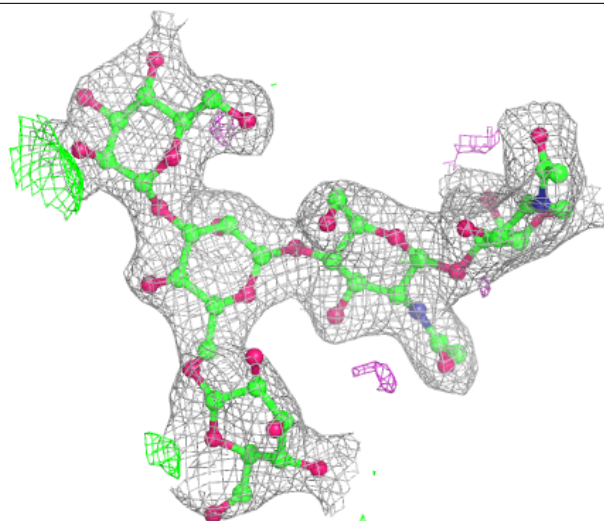
Electron density around Chain L:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)

Electron density around Chain G:

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

Electron density around Chain H:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
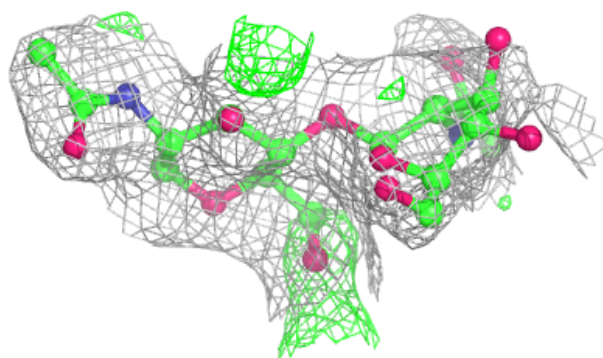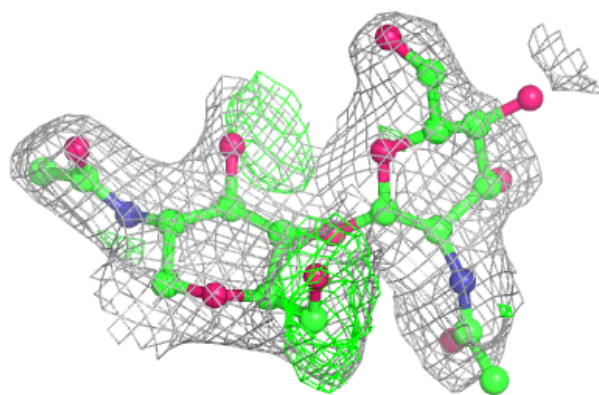and green (positive)

Electron density around Chain I:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)

Electron density around Chain K:

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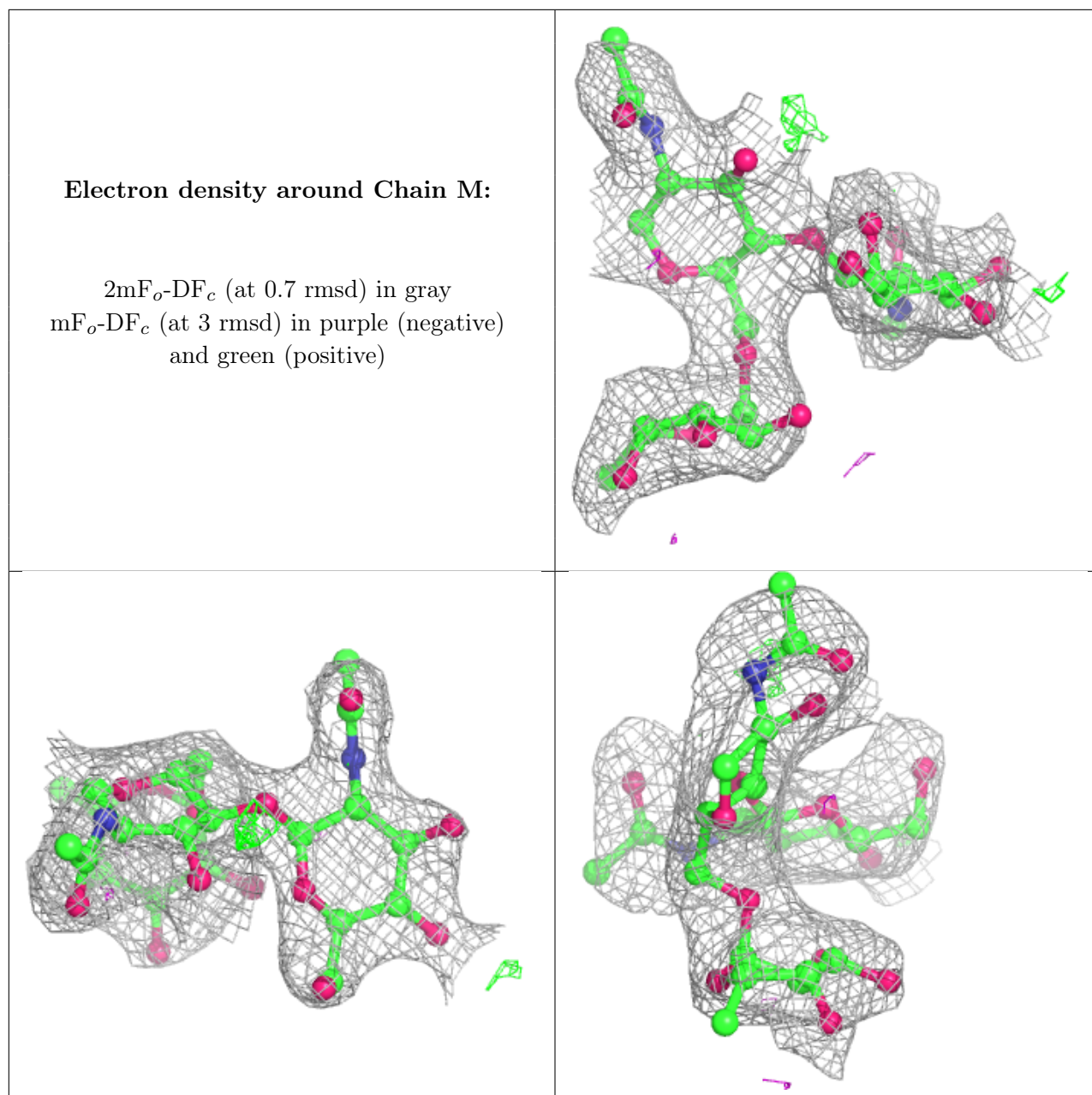and green (positive)

Electron density around Chain M:

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

6.4 Ligands ⓘ

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.
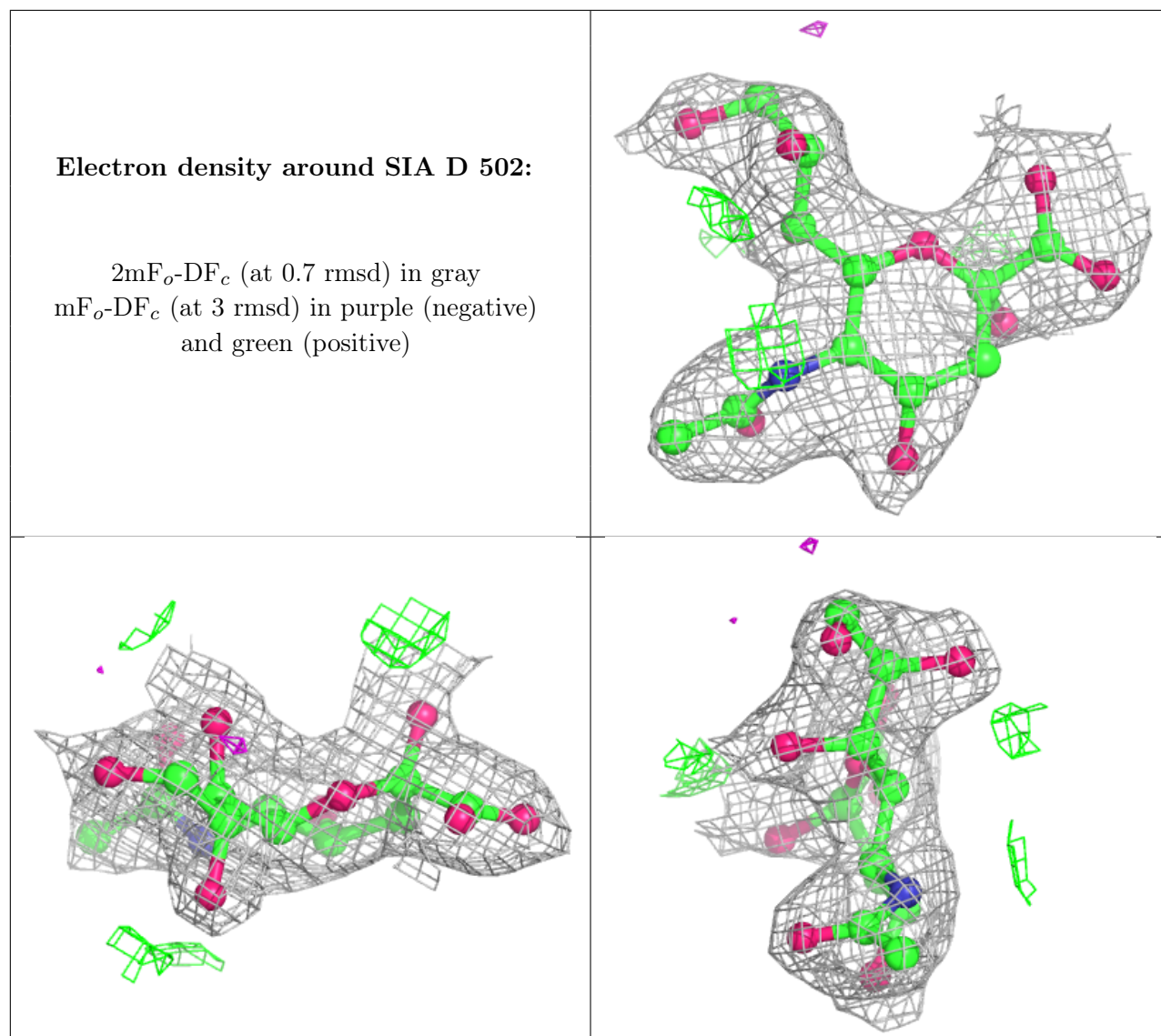
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
9	NAG	A	509	14/15	0.69	0.26	58,61,64,64	0
9	NAG	A	510	14/15	0.77	0.17	53,58,65,67	0
9	NAG	A	511	14/15	0.80	0.31	48,52,54,54	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
9	NAG	B	508	14/15	0.81	0.31	56,59,60,60	0
9	NAG	B	509	14/15	0.81	0.19	54,59,66,66	0
9	NAG	B	511	14/15	0.83	0.31	50,54,54,55	0
9	NAG	D	512	14/15	0.84	0.24	48,52,52,53	0
9	NAG	D	508	14/15	0.85	0.34	56,60,62,62	0
9	NAG	C	810	14/15	0.85	0.31	49,53,54,54	0
9	NAG	A	512	14/15	0.86	0.29	48,52,56,56	0
9	NAG	B	510	14/15	0.89	0.33	45,49,50,51	0
10	CA	D	501	1/1	0.89	0.07	69,69,69,69	0
9	NAG	C	811	14/15	0.90	0.20	47,51,52,52	0
11	SIA	D	502	21/21	0.91	0.16	39,41,45,53	0
10	CA	C	812	1/1	0.99	0.05	29,29,29,29	0
10	CA	A	513	1/1	0.99	0.07	27,27,27,27	0
10	CA	D	513	1/1	0.99	0.06	26,26,26,26	0
10	CA	B	512	1/1	0.99	0.05	30,30,30,30	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 SIA D 502:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.