



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 03:09 AM UTC

PDB ID : 6KYW / pdb_00006kyw
Title : S8-mSRK-S8-SP11 complex
Authors : Murase, K.; Hakoshima, T.; Mori, T.
Deposited on : 2019-09-20
Resolution : 2.60 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 ⓘ](#)) 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
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
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

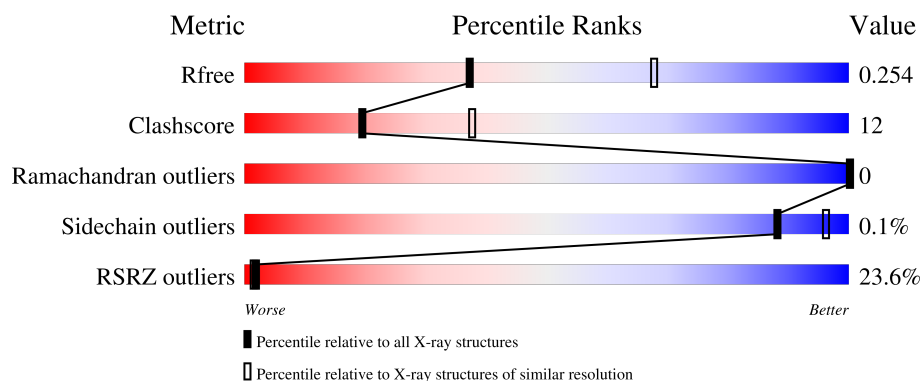
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.60 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	4008 (2.60-2.60)
Clashscore	190562	4347 (2.60-2.60)
Ramachandran outliers	187476	4277 (2.60-2.60)
Sidechain outliers	187428	4277 (2.60-2.60)
RSRZ outliers	180081	4008 (2.60-2.60)

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 $\leq 5\%$. 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	443	19% 65% 23% 12%
1	B	443	22% 69% 18% 13%
2	C	46	11% 76% 24%
2	D	46	41% 74% 26%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 7006 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 Receptor protein kinase SRK8.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	389	Total	C	N	O	S	0	0	0
			3034	1898	537	578	21			
1	B	386	Total	C	N	O	S	0	0	0
			3024	1893	532	578	21			

There are 44 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	79	SER	PRO	engineered mutation	UNP Q39276
A	80	GLU	TYR	engineered mutation	UNP Q39276
A	81	ARG	ILE	engineered mutation	UNP Q39276
A	108	VAL	PHE	engineered mutation	UNP Q39276
A	110	ARG	LEU	engineered mutation	UNP Q39276
A	180	ARG	LEU	engineered mutation	UNP Q39276
A	190	SER	PHE	engineered mutation	UNP Q39276
A	214	GLN	LEU	engineered mutation	UNP Q39276
A	239	SER	LEU	engineered mutation	UNP Q39276
A	248	GLU	LYS	engineered mutation	UNP Q39276
A	286	GLY	VAL	engineered mutation	UNP Q39276
A	287	ALA	VAL	engineered mutation	UNP Q39276
A	434	SER	-	expression tag	UNP Q39276
A	435	ARG	-	expression tag	UNP Q39276
A	436	LEU	-	expression tag	UNP Q39276
A	437	GLU	-	expression tag	UNP Q39276
A	438	VAL	-	expression tag	UNP Q39276
A	439	LEU	-	expression tag	UNP Q39276
A	440	PHE	-	expression tag	UNP Q39276
A	441	GLN	-	expression tag	UNP Q39276
A	442	GLY	-	expression tag	UNP Q39276
A	443	PRO	-	expression tag	UNP Q39276
B	79	SER	PRO	engineered mutation	UNP Q39276
B	80	GLU	TYR	engineered mutation	UNP Q39276
B	81	ARG	ILE	engineered mutation	UNP Q39276

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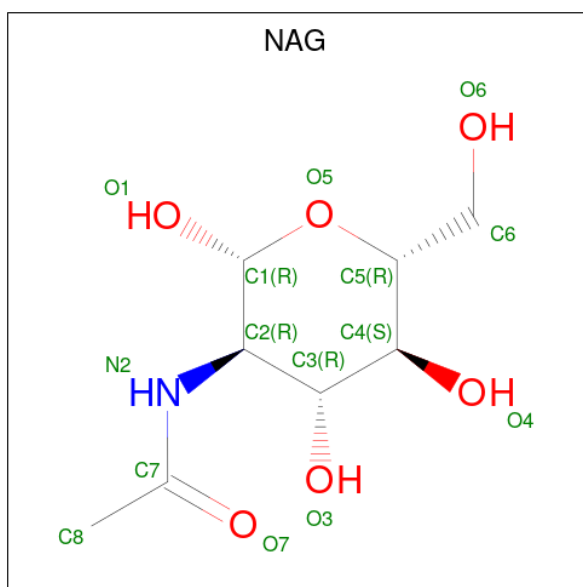
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Chain	Residue	Modelled	Actual	Comment	Reference
B	108	VAL	PHE	engineered mutation	UNP Q39276
B	110	ARG	LEU	engineered mutation	UNP Q39276
B	180	ARG	LEU	engineered mutation	UNP Q39276
B	190	SER	PHE	engineered mutation	UNP Q39276
B	214	GLN	LEU	engineered mutation	UNP Q39276
B	239	SER	LEU	engineered mutation	UNP Q39276
B	248	GLU	LYS	engineered mutation	UNP Q39276
B	286	GLY	VAL	engineered mutation	UNP Q39276
B	287	ALA	VAL	engineered mutation	UNP Q39276
B	434	SER	-	expression tag	UNP Q39276
B	435	ARG	-	expression tag	UNP Q39276
B	436	LEU	-	expression tag	UNP Q39276
B	437	GLU	-	expression tag	UNP Q39276
B	438	VAL	-	expression tag	UNP Q39276
B	439	LEU	-	expression tag	UNP Q39276
B	440	PHE	-	expression tag	UNP Q39276
B	441	GLN	-	expression tag	UNP Q39276
B	442	GLY	-	expression tag	UNP Q39276
B	443	PRO	-	expression tag	UNP Q39276

- Molecule 2 is a protein called S locus protein 11.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	46	Total	C	N	O	S	0	0	0
			356	210	68	69	9			
2	D	46	Total	C	N	O	S	0	0	0
			338	201	59	69	9			

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: C₈H₁₅NO₆) (labeled as "Ligand of Interest" by depositor).



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

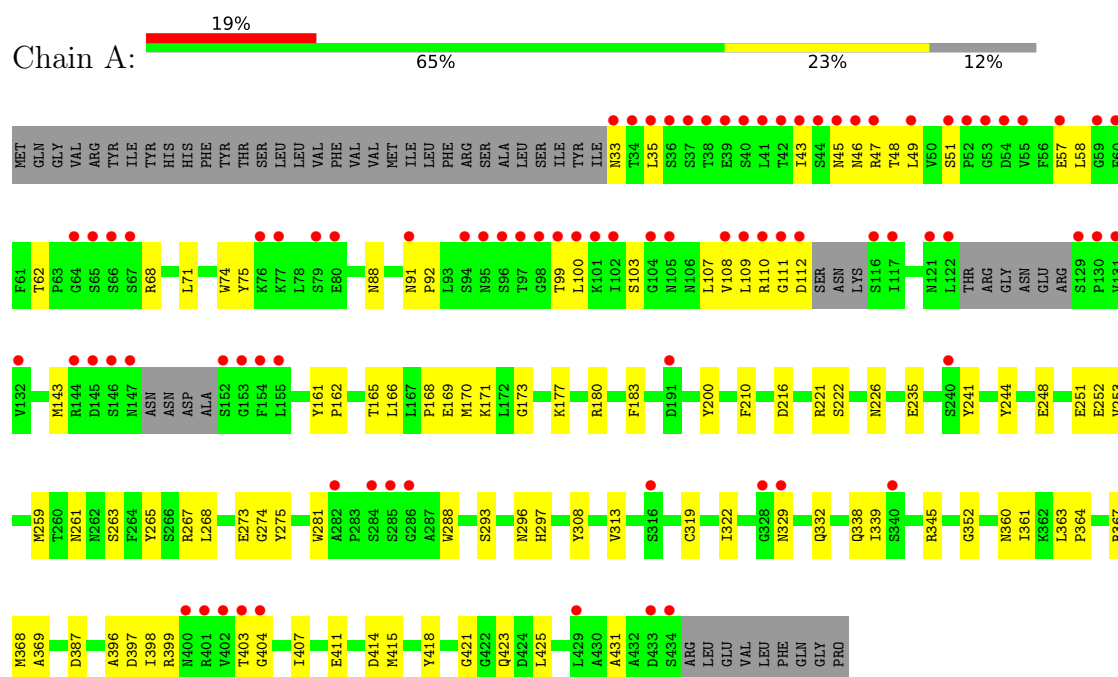
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	69	Total	O	0	0
			69	69		
4	B	90	Total	O	0	0
			90	90		
4	C	13	Total	O	0	0
			13	13		
4	D	12	Total	O	0	0
			12	12		

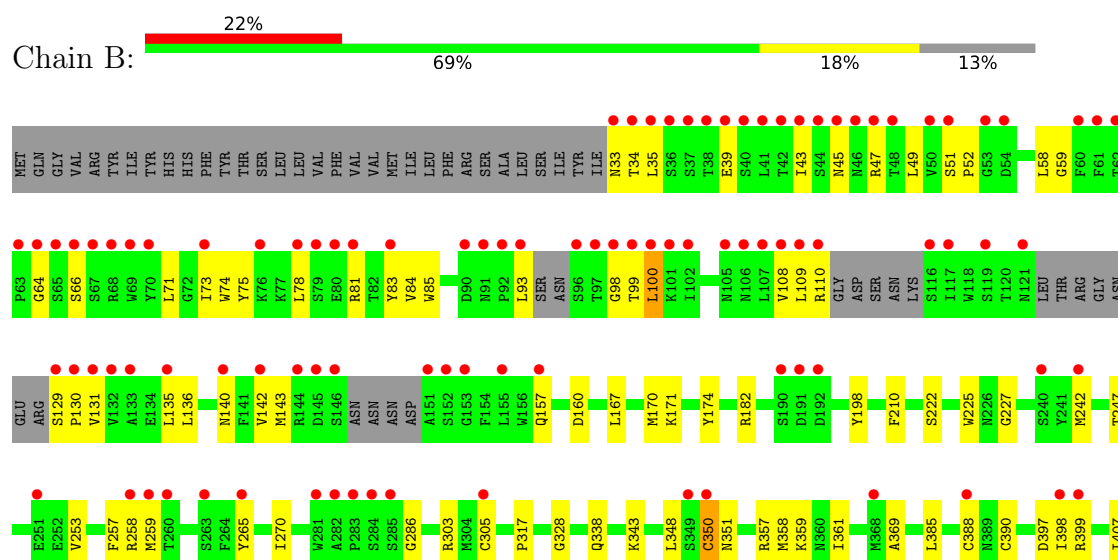
3 Residue-property plots

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: Receptor protein kinase SRK8

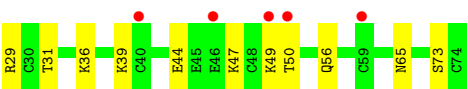
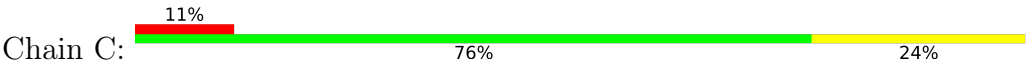


• Molecule 1: Receptor protein kinase SRK8

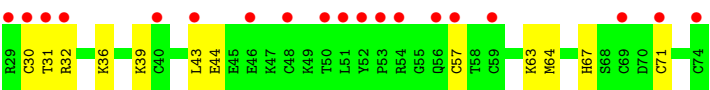
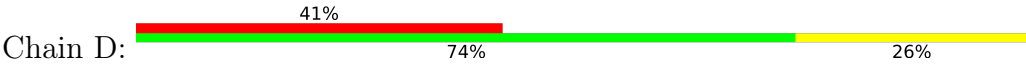




● Molecule 2: S locus protein 11



● Molecule 2: S locus protein 11



4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, α , β , γ	143.56Å 143.56Å 194.40Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	43.84 – 2.60 43.84 – 2.60	Depositor EDS
% Data completeness (in resolution range)	94.9 (43.84-2.60) 94.9 (43.84-2.60)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	5.22 (at 2.61Å)	Xtriage
Refinement program	PHENIX 1.11.1 _2575	Depositor
R, R_{free}	0.220 , 0.251 0.222 , 0.254	Depositor DCC
R_{free} test set	2000 reflections (3.18%)	wwPDB-VP
Wilson B-factor (Å ²)	50.8	Xtriage
Anisotropy	0.024	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 55.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	7006	wwPDB-VP
Average B, all atoms (Å ²)	61.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.66% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 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	0.45	0/3105	0.69	2/4215 (0.0%)
1	B	0.45	2/3094 (0.1%)	0.64	1/4198 (0.0%)
2	C	0.42	0/359	0.67	0/475
2	D	0.38	0/341	0.60	0/454
All	All	0.44	2/6899 (0.0%)	0.66	3/9342 (0.0%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	351	ASN	C-N	-7.98	1.22	1.33
1	B	348	LEU	C-N	7.54	1.43	1.33

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	173	GLY	N-CA-C	6.55	119.27	110.43
1	A	51	SER	N-CA-C	5.33	117.64	110.29
1	B	350	CYS	N-CA-C	5.29	122.06	110.80

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	3034	0	2801	69	0
1	B	3024	0	2811	68	0
2	C	356	0	346	10	0
2	D	338	0	313	12	0
3	A	42	0	39	2	0
3	B	28	0	26	0	0
4	A	69	0	0	4	0
4	B	90	0	0	2	0
4	C	13	0	0	0	0
4	D	12	0	0	2	0
All	All	7006	0	6336	151	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 12.

All (151) 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:45:ASN:HA	1:A:46:ASN:HB2	1.42	1.00
1:B:358:MET:HE2	1:B:361:ILE:HD13	1.52	0.89
1:B:242:MET:HG2	1:B:259:MET:HE1	1.59	0.85
1:B:242:MET:HG2	1:B:259:MET:CE	2.10	0.81
1:A:221:ARG:NH2	1:A:363:LEU:O	2.18	0.77
1:B:257:PHE:HE2	1:B:259:MET:HE3	1.52	0.75
1:B:257:PHE:CE2	1:B:259:MET:HE3	2.26	0.71
1:B:33:ASN:O	1:B:47:ARG:NH2	2.26	0.69
1:B:75:TYR:HB3	1:B:78:LEU:HD12	1.75	0.69
1:A:107:LEU:HG	1:A:143:MET:HE3	1.76	0.68
2:C:56:GLN:H	2:C:73:SER:HB2	1.56	0.68
1:B:167:LEU:H	1:B:170:MET:HE3	1.58	0.68
3:A:502:NAG:O4	4:A:602:HOH:O	2.13	0.67
1:B:49:LEU:HD13	1:B:58:LEU:HD23	1.76	0.67
1:A:103:SER:O	4:A:601:HOH:O	2.12	0.66
1:A:35:LEU:C	1:A:49:LEU:HD12	2.22	0.64
1:A:345:ARG:NH1	4:A:603:HOH:O	2.31	0.64
1:B:49:LEU:H	1:B:49:LEU:HD12	1.62	0.64
1:B:350:CYS:HG	1:B:388:CYS:CB	2.12	0.62
1:B:328:GLY:HA2	1:B:343:LYS:HE3	1.81	0.62
2:D:30:CYS:HB3	2:D:71:CYS:O	1.99	0.62
1:B:43:ILE:C	1:B:45:ASN:H	2.08	0.61
1:A:396:ALA:HB3	1:A:404:GLY:HA3	1.82	0.61
1:A:45:ASN:CA	1:A:46:ASN:HB2	2.26	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:258:ARG:NH2	4:B:602:HOH:O	2.33	0.60
1:A:110:ARG:NH2	1:A:112:ASP:O	2.34	0.60
1:B:99:THR:N	1:B:110:ARG:O	2.34	0.60
1:A:47:ARG:HG2	1:A:48:THR:N	2.17	0.59
1:A:361:ILE:HG22	1:A:423:GLN:O	2.02	0.59
2:D:39:LYS:O	4:D:101:HOH:O	2.16	0.59
1:B:74:TRP:HB3	1:B:83:TYR:CD1	2.38	0.58
1:B:225:TRP:CD1	1:B:227:GLY:H	2.22	0.57
1:A:297:HIS:CE1	1:A:313:VAL:HG12	2.40	0.57
2:C:47:LYS:O	2:C:50:THR:HG22	2.05	0.56
1:B:100:LEU:HB2	1:B:108:VAL:O	2.05	0.55
1:B:136:LEU:HD11	1:B:142:VAL:HG21	1.89	0.54
1:A:58:LEU:HD21	1:A:71:LEU:HD21	1.90	0.54
1:B:167:LEU:H	1:B:170:MET:CE	2.20	0.53
1:A:397:ASP:OD2	1:A:399:ARG:NH2	2.39	0.53
1:A:162:PRO:HB3	1:A:170:MET:HE3	1.90	0.53
1:B:81:ARG:HD2	1:B:83:TYR:OH	2.07	0.53
2:D:64:MET:O	4:D:102:HOH:O	2.19	0.52
1:B:242:MET:CG	1:B:259:MET:HE1	2.36	0.52
1:B:357:ARG:NH1	1:B:359:LYS:HE3	2.24	0.52
1:A:216:ASP:OD1	1:A:216:ASP:N	2.42	0.52
1:B:73:ILE:HD12	1:B:85:TRP:CE3	2.44	0.52
1:B:98:GLY:HA2	1:B:110:ARG:O	2.09	0.52
1:A:45:ASN:HA	1:A:46:ASN:CB	2.26	0.52
1:B:100:LEU:HB3	1:B:109:LEU:HA	1.91	0.52
1:A:352:GLY:O	1:A:431:ALA:HB2	2.09	0.52
1:A:226:ASN:HB2	1:A:398:ILE:HG23	1.91	0.52
1:A:403:THR:OG1	1:A:404:GLY:N	2.43	0.51
2:D:44:GLU:HG2	2:D:67:HIS:NE2	2.26	0.51
1:B:100:LEU:CD1	1:B:100:LEU:N	2.74	0.51
1:A:57:GLU:HG2	1:A:74:TRP:CZ2	2.46	0.51
1:B:358:MET:CE	1:B:361:ILE:HD13	2.34	0.50
1:A:274:GLY:O	2:D:63:LYS:NZ	2.44	0.50
1:B:227:GLY:O	1:B:399:ARG:NH2	2.45	0.50
1:B:317:PRO:HB2	1:B:338:GLN:HE22	1.76	0.49
1:A:273:GLU:HG2	2:C:39:LYS:HE2	1.93	0.49
1:A:43:ILE:C	1:A:45:ASN:H	2.20	0.49
1:B:100:LEU:H	1:B:100:LEU:HD13	1.78	0.49
1:A:68:ARG:HB3	1:A:92:PRO:HB2	1.94	0.49
1:A:339:ILE:HD13	2:D:36:LYS:HE3	1.95	0.49
1:B:35:LEU:HD13	1:B:52:PRO:HG3	1.95	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:358:MET:HE2	1:B:361:ILE:CD1	2.34	0.49
1:B:247:THR:O	1:B:253:VAL:HA	2.13	0.48
1:A:177:LYS:NZ	1:A:251:GLU:OE2	2.46	0.48
1:B:78:LEU:HD11	1:B:265:TYR:HE2	1.77	0.48
1:A:166:LEU:HB3	1:A:268:LEU:HB2	1.96	0.48
1:A:235:GLU:HB3	1:A:244:TYR:CZ	2.48	0.48
1:B:73:ILE:HD12	1:B:85:TRP:HE3	1.78	0.48
1:B:369:ALA:HA	1:B:407:ILE:O	2.13	0.48
1:B:43:ILE:C	1:B:45:ASN:N	2.72	0.47
1:B:100:LEU:N	1:B:100:LEU:HD13	2.30	0.47
1:B:78:LEU:HD11	1:B:265:TYR:CE2	2.49	0.47
1:A:210:PHE:HB2	1:A:222:SER:HB3	1.95	0.47
1:B:170:MET:HE3	1:B:170:MET:HB2	1.59	0.47
1:A:33:ASN:O	1:A:47:ARG:NH2	2.48	0.47
1:A:248:GLU:HG3	1:A:253:VAL:HG13	1.95	0.47
1:B:74:TRP:HB3	1:B:83:TYR:HD1	1.79	0.47
1:A:293:SER:OG	2:C:65:ASN:ND2	2.44	0.46
1:A:367:ARG:HG2	1:A:368:MET:HE2	1.97	0.46
1:A:265:TYR:HB2	1:A:281:TRP:HB3	1.96	0.46
1:A:275:TYR:CE1	2:C:65:ASN:HB2	2.50	0.46
1:B:34:THR:HA	1:B:47:ARG:HH21	1.81	0.46
1:A:165:THR:O	1:A:170:MET:HE1	2.16	0.46
1:A:415:MET:HE3	1:A:415:MET:HB2	1.87	0.46
1:B:359:LYS:HE2	1:B:424:ASP:OD1	2.16	0.46
1:A:221:ARG:NH1	1:A:414:ASP:OD2	2.43	0.46
2:C:49:LYS:HE3	2:C:49:LYS:HB2	1.50	0.46
1:A:296:ASN:C	2:D:64:MET:HE1	2.40	0.45
1:A:297:HIS:ND1	1:A:313:VAL:HG12	2.32	0.45
1:B:198:TYR:HB3	1:B:270:ILE:HD11	1.99	0.45
1:A:360:ASN:ND2	1:A:421:GLY:O	2.35	0.45
1:B:129:SER:OG	1:B:130:PRO:HD2	2.17	0.44
1:A:168:PRO:O	1:A:169:GLU:HB2	2.17	0.44
1:A:261:ASN:OD1	1:A:263:SER:OG	2.34	0.44
1:B:397:ASP:OD1	1:B:399:ARG:HG2	2.18	0.44
1:B:303:ARG:C	1:B:305:CYS:N	2.73	0.44
1:A:275:TYR:CZ	2:C:65:ASN:HB2	2.53	0.44
1:A:162:PRO:HB3	1:A:170:MET:CE	2.48	0.43
1:B:59:GLY:O	1:B:71:LEU:HD12	2.17	0.43
1:B:64:GLY:C	1:B:66:SER:H	2.26	0.43
1:A:241:TYR:O	1:A:259:MET:HE3	2.18	0.43
2:D:31:THR:HG23	2:D:32:ARG:N	2.33	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:411:GLU:HG3	4:A:654:HOH:O	2.18	0.43
1:B:43:ILE:HA	1:B:99:THR:HG22	2.01	0.43
1:B:286:GLY:O	2:D:43:LEU:HD13	2.18	0.43
1:A:387:ASP:CG	3:A:503:NAG:H82	2.44	0.43
2:C:29:ARG:HD2	2:C:31:THR:HG22	2.00	0.43
2:D:57:CYS:HA	2:D:71:CYS:HA	2.00	0.43
1:B:390:CYS:SG	1:B:407:ILE:HG23	2.59	0.43
1:A:329:ASN:HB3	1:A:332:GLN:HE21	1.83	0.42
1:B:73:ILE:HD12	1:B:85:TRP:HB3	2.01	0.42
1:B:210:PHE:HB2	1:B:222:SER:HB3	2.01	0.42
1:A:62:THR:OG1	1:A:68:ARG:O	2.32	0.42
1:B:51:SER:HB3	1:B:135:LEU:HD23	2.01	0.42
1:A:360:ASN:HA	1:A:421:GLY:O	2.19	0.42
1:A:62:THR:O	1:A:62:THR:HG23	2.19	0.42
2:C:29:ARG:C	2:C:29:ARG:HD3	2.43	0.42
1:B:93:LEU:HA	1:B:93:LEU:HD23	1.86	0.42
1:A:99:THR:O	1:A:109:LEU:HA	2.19	0.42
1:A:100:LEU:HD11	1:A:107:LEU:HD22	2.01	0.42
1:B:174:TYR:CZ	1:B:253:VAL:HG22	2.55	0.42
1:A:267:ARG:HH21	1:A:288:TRP:CG	2.38	0.41
1:A:297:HIS:N	2:D:64:MET:HE1	2.34	0.41
1:A:171:LYS:HD3	1:A:252:GLU:OE2	2.20	0.41
1:B:171:LYS:NZ	4:B:612:HOH:O	2.53	0.41
1:A:161:TYR:OH	1:A:180:ARG:NH2	2.53	0.41
1:B:84:VAL:HG11	1:B:167:LEU:HD21	2.03	0.41
1:A:360:ASN:HB3	1:A:418:TYR:O	2.20	0.41
1:A:364:PRO:HD3	1:A:425:LEU:HD22	2.01	0.41
1:B:131:VAL:HG21	1:B:143:MET:HE3	2.01	0.41
2:D:31:THR:HG23	2:D:32:ARG:H	1.84	0.41
1:A:74:TRP:HD1	1:A:75:TYR:O	2.04	0.41
1:A:369:ALA:HA	1:A:407:ILE:O	2.20	0.41
1:A:111:GLY:O	1:A:112:ASP:CB	2.69	0.41
1:B:398:ILE:HD12	1:B:398:ILE:HA	1.86	0.41
1:A:100:LEU:HD12	1:A:108:VAL:O	2.20	0.41
1:B:34:THR:O	1:B:34:THR:OG1	2.35	0.41
1:B:361:ILE:HD12	1:B:417:ASN:HB3	2.03	0.41
1:B:385:LEU:HD23	1:B:385:LEU:HA	1.81	0.41
1:B:140:ASN:OD1	1:B:157:GLN:HG2	2.21	0.40
1:A:319:CYS:HB2	1:A:338:GLN:OE1	2.22	0.40
2:C:36:LYS:HD2	2:C:44:GLU:OE2	2.21	0.40
1:A:88:ASN:ND2	1:A:91:ASN:O	2.32	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:183:PHE:HB2	1:A:200:TYR:O	2.21	0.40
1:B:39:GLU:CD	1:B:39:GLU:H	2.28	0.40
1:B:160:ASP:HA	1:B:182:ARG:HD3	2.02	0.40
1:A:308:TYR:O	1:A:322:ILE:HG13	2.22	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	381/443 (86%)	360 (94%)	21 (6%)	0	100	100
1	B	376/443 (85%)	350 (93%)	26 (7%)	0	100	100
2	C	44/46 (96%)	44 (100%)	0	0	100	100
2	D	44/46 (96%)	40 (91%)	4 (9%)	0	100	100
All	All	845/978 (86%)	794 (94%)	51 (6%)	0	100	100

There are no Ramachandran outliers to report.

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	319/394 (81%)	319 (100%)	0	100	100
1	B	321/394 (82%)	320 (100%)	1 (0%)	86	94

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	C	43/43 (100%)	43 (100%)	0	100	100
2	D	40/43 (93%)	40 (100%)	0	100	100
All	All	723/874 (83%)	722 (100%)	1 (0%)	88	96

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	100	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	320	ASN
1	A	332	GLN
1	A	423	GLN
1	B	320	ASN
1	B	331	GLN
1	B	332	GLN
1	B	338	GLN
2	C	56	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

5 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
3	NAG	A	501	1	14,14,15	0.54	0	17,19,21	0.62	0
3	NAG	B	501	1	14,14,15	0.45	0	17,19,21	1.00	1 (5%)
3	NAG	A	503	1	14,14,15	0.39	0	17,19,21	0.60	0
3	NAG	A	502	1	14,14,15	0.41	0	17,19,21	0.54	0
3	NAG	B	502	1	14,14,15	0.27	0	17,19,21	0.63	1 (5%)

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	501	1	-	0/6/23/26	0/1/1/1
3	NAG	B	501	1	-	2/6/23/26	0/1/1/1
3	NAG	A	503	1	-	2/6/23/26	0/1/1/1
3	NAG	A	502	1	-	0/6/23/26	0/1/1/1
3	NAG	B	502	1	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	501	NAG	C1-O5-C5	3.52	116.91	112.19
3	B	502	NAG	C1-O5-C5	2.08	114.97	112.19

There are no chirality outliers.

All (6) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	501	NAG	O5-C5-C6-O6
3	B	502	NAG	O5-C5-C6-O6
3	B	501	NAG	C4-C5-C6-O6

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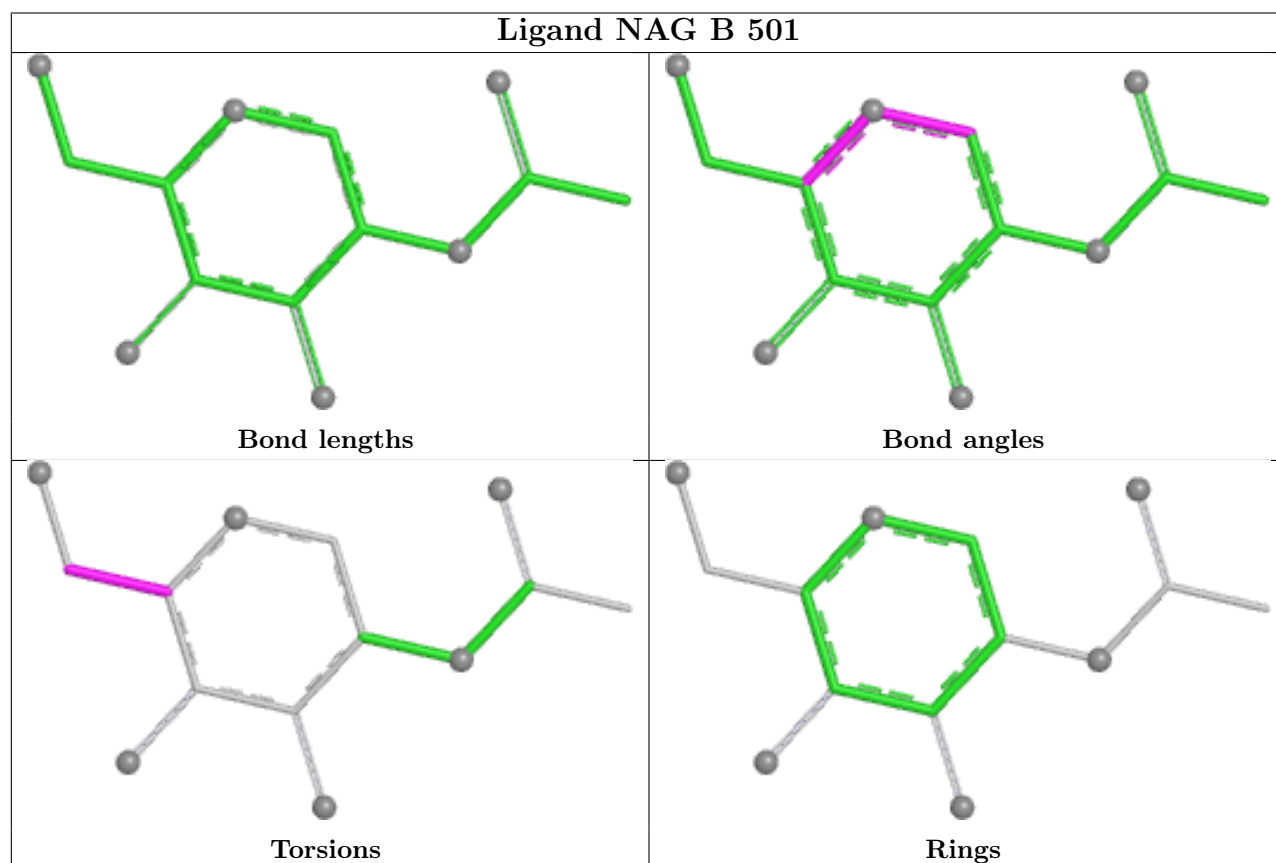
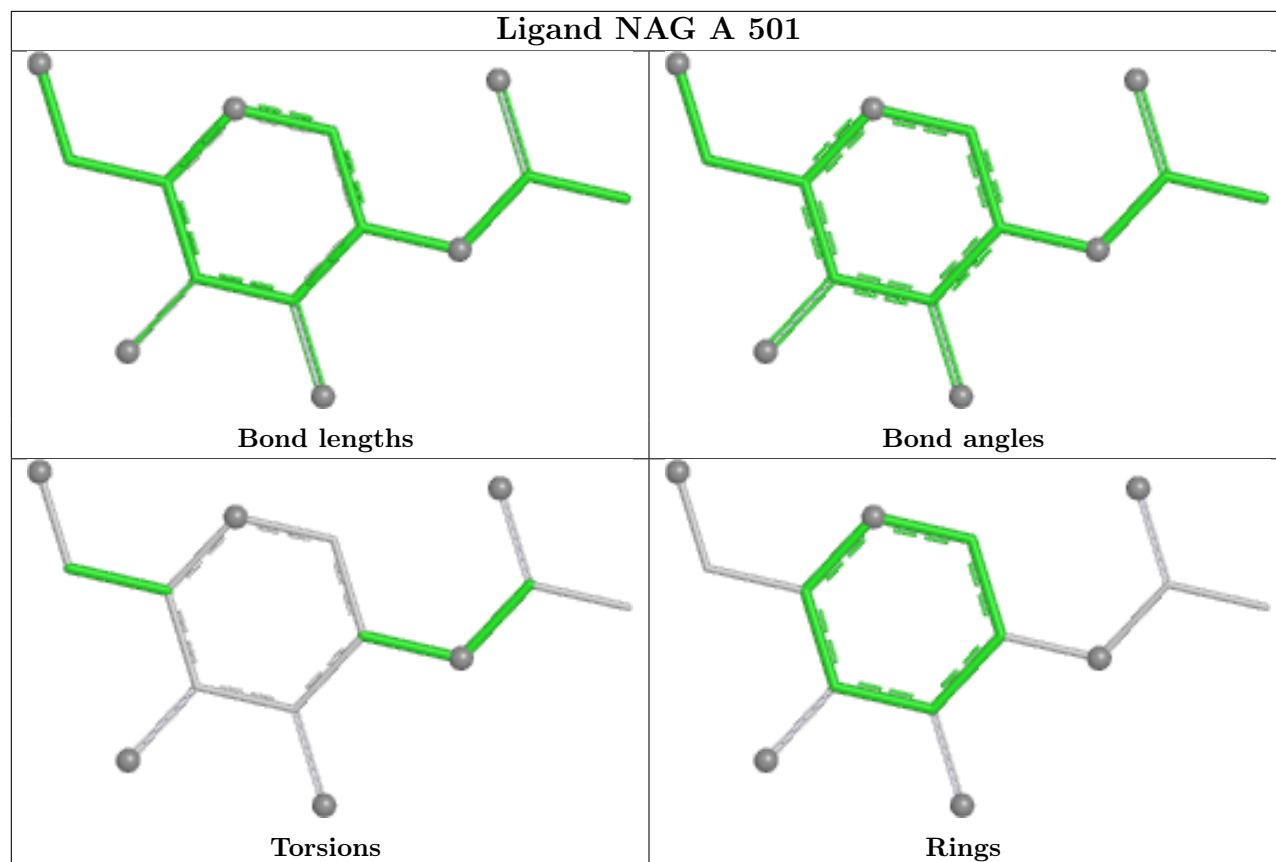
Mol	Chain	Res	Type	Atoms
3	B	502	NAG	C4-C5-C6-O6
3	A	503	NAG	O5-C5-C6-O6
3	A	503	NAG	C4-C5-C6-O6

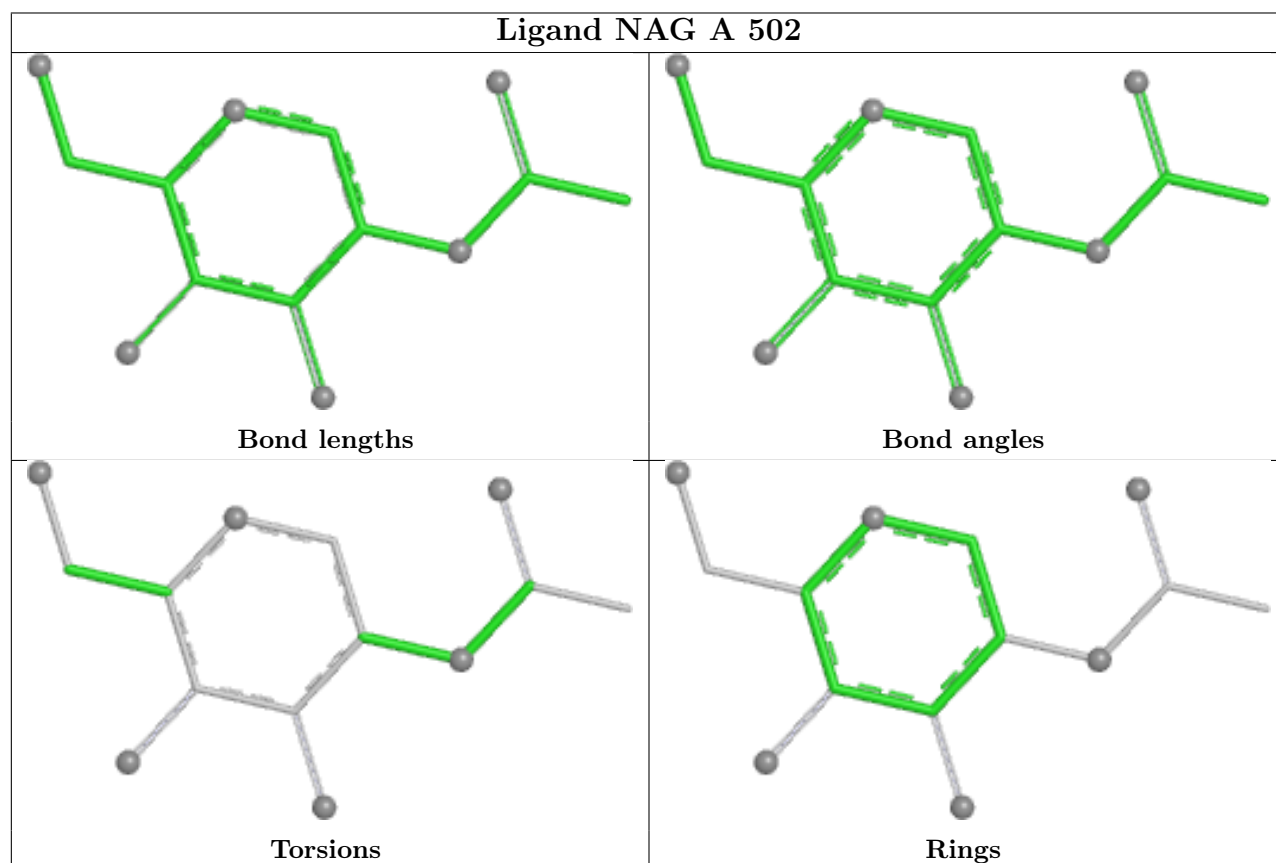
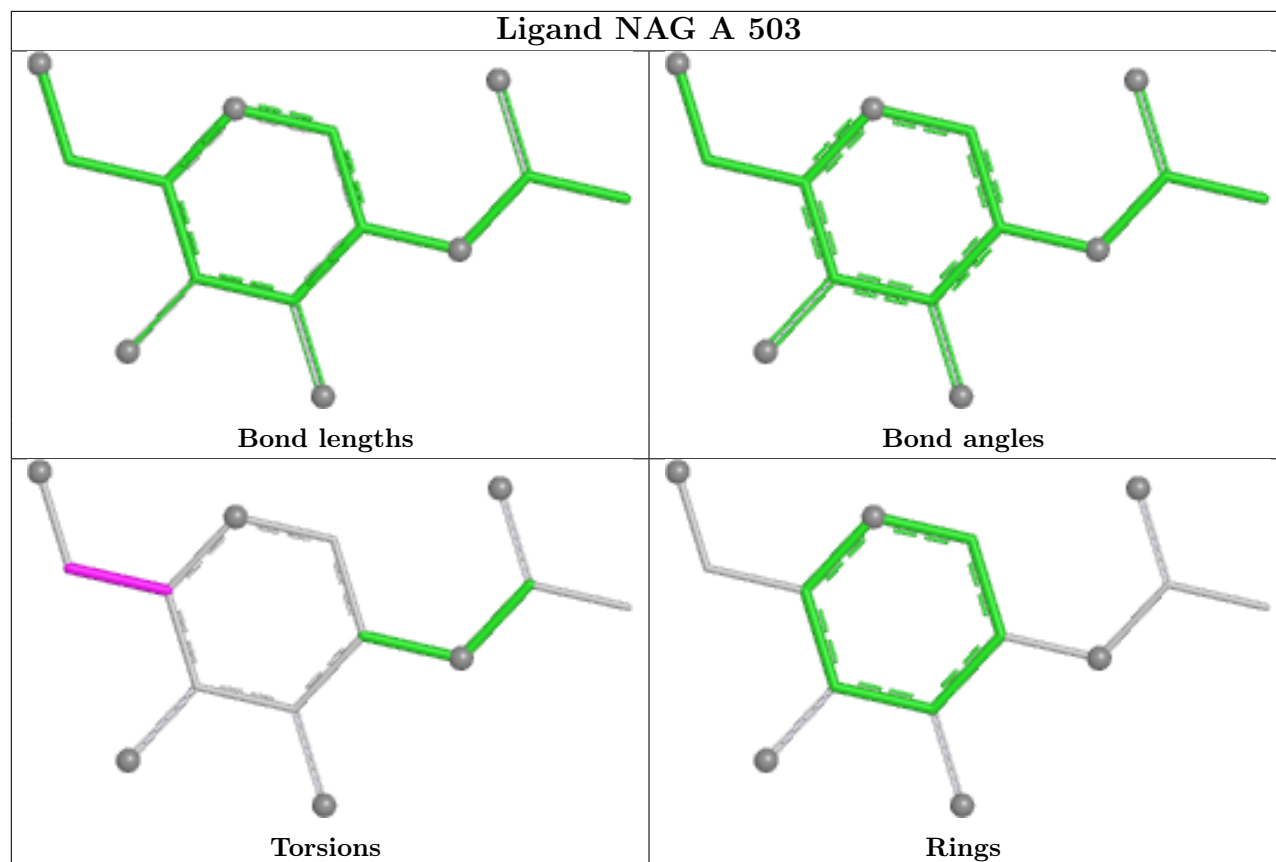
There are no ring outliers.

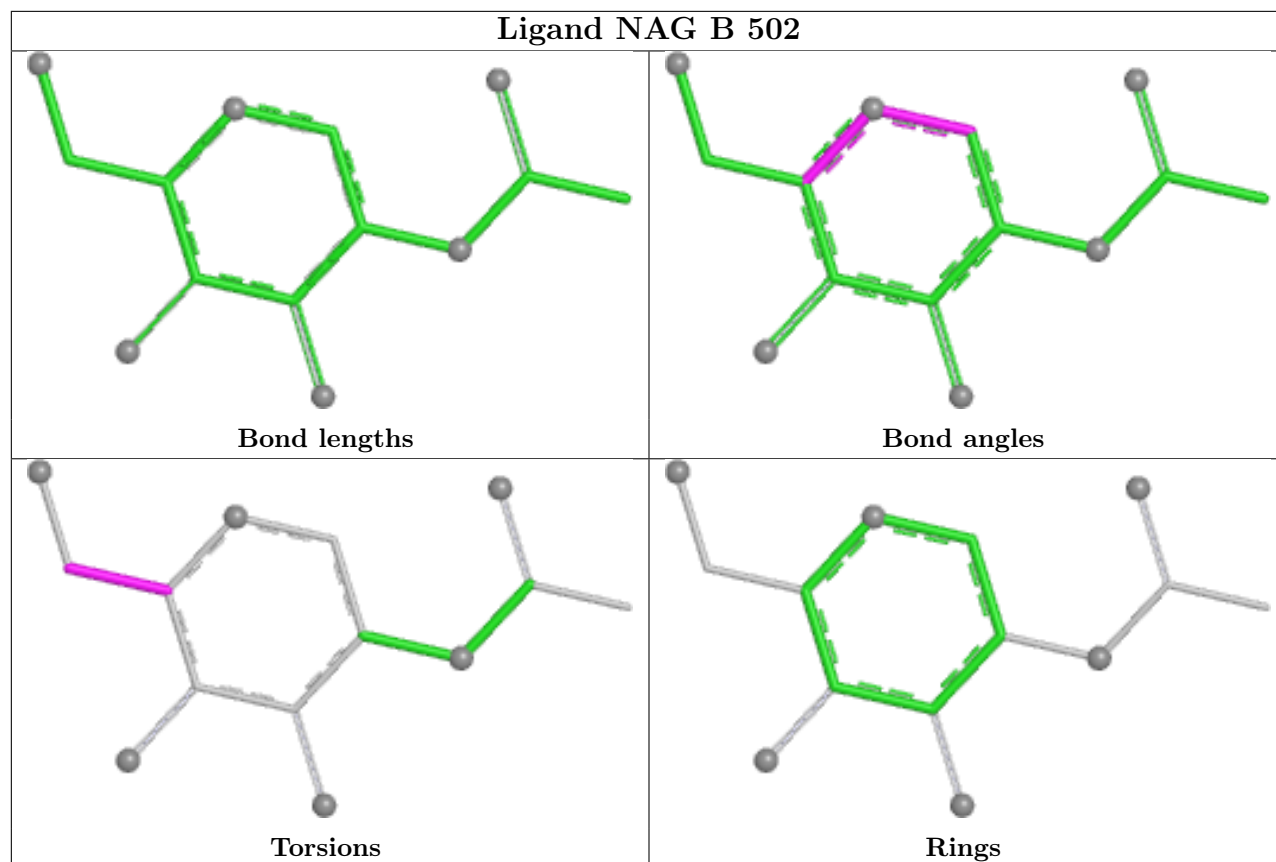
2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	503	NAG	1	0
3	A	502	NAG	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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	389/443 (87%)	1.15	83 (21%) 2 2	33, 59, 104, 125	0
1	B	386/443 (87%)	1.07	98 (25%) 1 1	30, 53, 104, 115	0
2	C	46/46 (100%)	0.69	5 (10%) 10 8	35, 57, 71, 79	0
2	D	46/46 (100%)	1.56	19 (41%) 0 0	42, 69, 98, 103	0
All	All	867/978 (88%)	1.11	205 (23%) 2 1	30, 58, 103, 125	0

All (205) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	146	SER	9.1
1	A	112	ASP	7.6
1	A	54	ASP	7.2
1	A	34	THR	7.0
1	A	96	SER	6.7
1	A	95	ASN	6.6
1	A	43	ILE	6.4
1	B	98	GLY	6.3
1	B	43	ILE	6.3
1	B	54	ASP	6.3
1	A	145	ASP	5.9
1	B	116	SER	5.9
1	A	33	ASN	5.8
1	A	40	SER	5.8
1	B	105	ASN	5.7
1	B	96	SER	5.7
1	B	45	ASN	5.6
1	B	151	ALA	5.6
1	B	46	ASN	5.6
1	B	67	SER	5.6
1	A	35	LEU	5.6

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Mol	Chain	Res	Type	RSRZ
2	D	51	LEU	5.5
1	A	152	SER	5.5
1	B	398	ILE	5.5
1	A	122	LEU	5.4
1	A	105	ASN	5.3
1	A	403	THR	5.2
1	A	147	ASN	5.2
1	B	93	LEU	5.2
1	B	42	THR	5.0
1	B	41	LEU	5.0
1	B	145	ASP	4.8
1	B	69	TRP	4.8
1	A	98	GLY	4.8
1	B	106	ASN	4.7
1	B	34	THR	4.6
1	B	80	GLU	4.6
1	A	65	SER	4.6
1	A	44	SER	4.5
1	A	97	THR	4.5
1	A	45	ASN	4.5
1	A	41	LEU	4.5
1	A	101	LYS	4.4
1	B	283	PRO	4.4
1	B	44	SER	4.4
1	B	110	ARG	4.4
1	B	350	CYS	4.3
1	B	285	SER	4.3
2	D	29	ARG	4.1
1	A	400	ASN	4.0
1	B	40	SER	4.0
1	B	153	GLY	4.0
1	B	99	THR	4.0
1	B	33	ASN	4.0
1	B	132	VAL	4.0
1	A	130	PRO	3.9
1	B	38	THR	3.9
1	B	64	GLY	3.9
1	B	399	ARG	3.9
1	A	38	THR	3.8
1	A	42	THR	3.8
1	A	94	SER	3.8
1	A	129	SER	3.8

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Mol	Chain	Res	Type	RSRZ
1	A	37	SER	3.8
1	B	100	LEU	3.7
1	B	242	MET	3.7
1	A	121	ASN	3.7
1	B	91	ASN	3.7
1	A	402	VAL	3.6
1	A	39	GLU	3.6
1	B	50	VAL	3.6
1	A	117	ILE	3.5
1	B	284	SER	3.5
2	D	48	CYS	3.5
1	A	285	SER	3.5
1	A	108	VAL	3.4
1	A	110	ARG	3.4
1	B	79	SER	3.4
1	B	140	ASN	3.4
1	A	100	LEU	3.4
1	B	191	ASP	3.4
1	A	36	SER	3.3
1	B	92	PRO	3.3
1	B	251	GLU	3.3
1	A	46	ASN	3.3
1	A	116	SER	3.3
1	B	119	SER	3.3
1	A	401	ARG	3.3
1	B	388	CYS	3.3
1	B	129	SER	3.3
1	B	135	LEU	3.3
1	B	282	ALA	3.2
2	D	59	CYS	3.2
2	D	46	GLU	3.2
1	A	67	SER	3.2
1	B	51	SER	3.2
1	B	83	TYR	3.2
1	B	157	GLN	3.1
1	A	102	ILE	3.1
1	B	144	ARG	3.1
1	B	305	CYS	3.1
2	D	32	ARG	3.1
1	B	108	VAL	3.1
1	B	131	VAL	3.1
1	A	99	THR	3.0

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Mol	Chain	Res	Type	RSRZ
1	B	76	LYS	3.0
1	A	111	GLY	3.0
1	A	109	LEU	3.0
1	A	144	ARG	3.0
1	A	131	VAL	3.0
2	D	71	CYS	3.0
1	A	52	PRO	3.0
1	B	63	PRO	3.0
2	D	53	PRO	3.0
1	A	104	GLY	3.0
1	B	62	THR	3.0
1	A	53	GLY	2.9
1	B	121	ASN	2.9
1	A	60	PHE	2.9
1	B	117	ILE	2.9
1	B	142	VAL	2.9
1	A	80	GLU	2.8
1	B	37	SER	2.8
1	B	60	PHE	2.8
1	B	130	PRO	2.8
2	D	52	TYR	2.8
1	A	434	SER	2.8
2	D	31	THR	2.8
1	B	47	ARG	2.8
1	B	61	PHE	2.8
2	D	30	CYS	2.7
1	A	146	SER	2.7
1	B	152	SER	2.7
1	A	328	GLY	2.7
1	B	97	THR	2.7
1	A	66	SER	2.7
1	B	36	SER	2.7
2	D	74	CYS	2.7
2	C	50	THR	2.7
2	D	69	CYS	2.6
1	B	39	GLU	2.6
1	B	65	SER	2.6
1	B	260	THR	2.6
1	B	259	MET	2.6
1	A	286	GLY	2.6
1	A	49	LEU	2.6
1	A	153	GLY	2.5

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Mol	Chain	Res	Type	RSRZ
1	A	240	SER	2.5
1	B	90	ASP	2.5
1	A	77	LYS	2.5
1	A	155	LEU	2.5
1	A	132	VAL	2.5
1	A	59	GLY	2.5
1	B	133	ALA	2.5
1	B	48	THR	2.4
1	A	91	ASN	2.4
1	B	73	ILE	2.4
2	D	43	LEU	2.4
1	A	404	GLY	2.4
1	A	282	ALA	2.4
1	B	35	LEU	2.4
1	A	433	ASP	2.4
1	A	51	SER	2.4
1	B	190	SER	2.4
1	A	191	ASP	2.4
1	B	109	LEU	2.3
2	D	50	THR	2.3
2	D	40	CYS	2.3
2	D	56	GLN	2.3
1	B	70	TYR	2.3
1	A	79	SER	2.3
1	A	47	ARG	2.3
1	A	55	VAL	2.3
1	B	155	LEU	2.3
2	D	54	ARG	2.3
1	B	78	LEU	2.3
1	B	349	SER	2.3
1	A	64	GLY	2.3
2	C	40	CYS	2.2
2	D	57	CYS	2.2
1	A	76	LYS	2.2
1	A	340	SER	2.2
1	B	281	TRP	2.2
1	B	101	LYS	2.2
2	C	49	LYS	2.2
2	C	59	CYS	2.2
1	A	57	GLU	2.2
1	B	81	ARG	2.2
1	B	66	SER	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	368	MET	2.2
1	A	429	LEU	2.2
1	B	107	LEU	2.2
1	A	154	PHE	2.2
1	A	284	SER	2.2
1	B	192	ASP	2.1
2	C	46	GLU	2.1
1	B	53	GLY	2.1
1	B	263	SER	2.1
1	A	329	ASN	2.1
1	B	265	TYR	2.1
1	B	68	ARG	2.1
1	B	102	ILE	2.1
1	B	258	ARG	2.0
1	A	316	SER	2.0
1	B	240	SER	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](#)

There are no oligosaccharides in this entry.

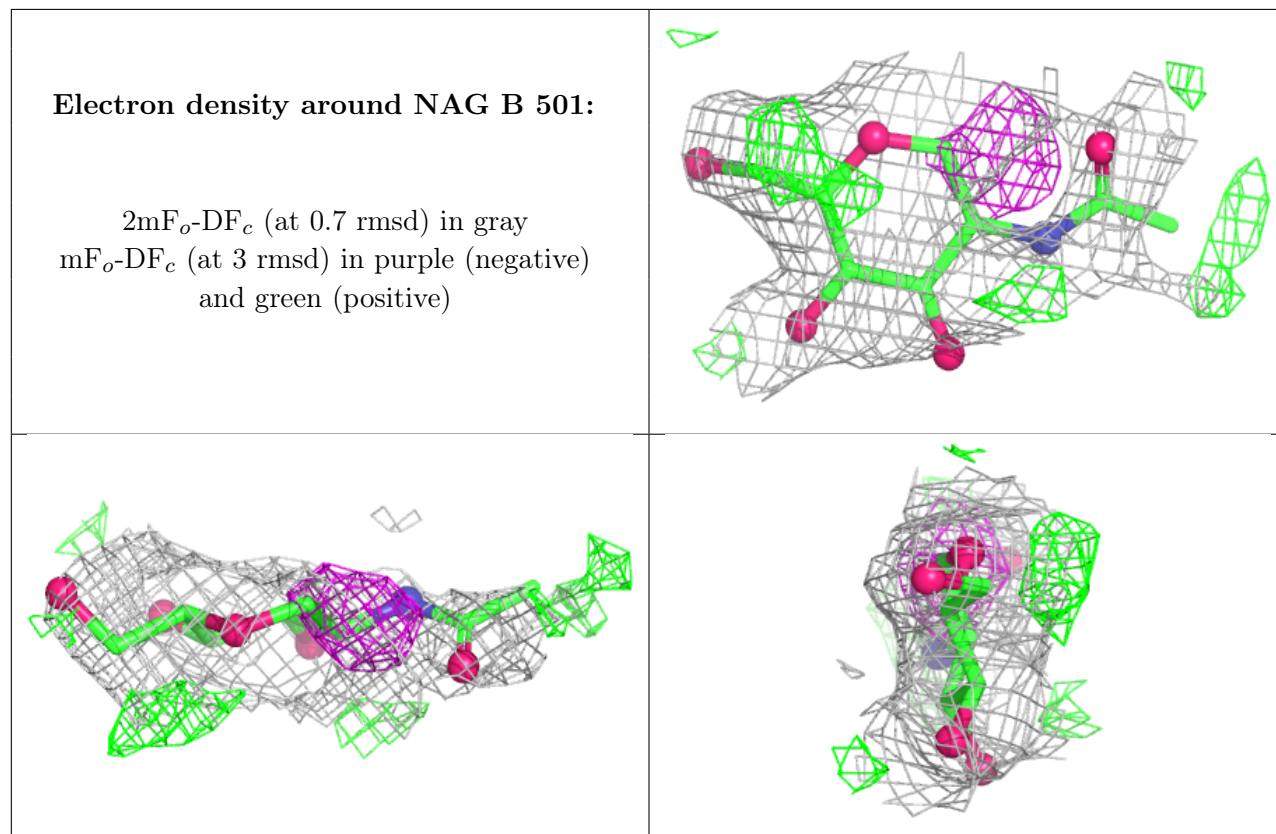
6.4 Ligands [i](#)

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($\text{\AA}^2$)	Q<0.9
3	NAG	B	501	14/15	0.53	0.27	78,85,93,94	14
3	NAG	A	502	14/15	0.58	0.28	75,82,90,91	14
3	NAG	A	501	14/15	0.62	0.23	81,87,96,97	14
3	NAG	A	503	14/15	0.63	0.33	72,85,94,112	14
3	NAG	B	502	14/15	0.64	0.27	83,91,96,103	14

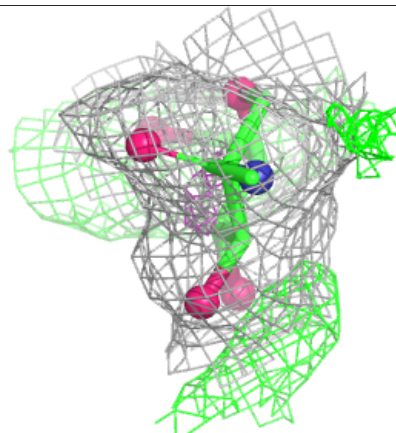
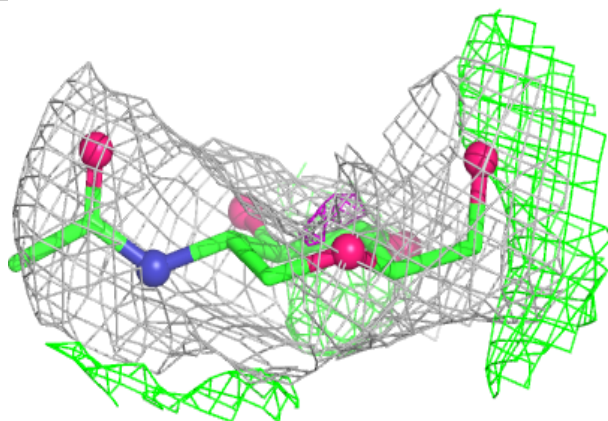
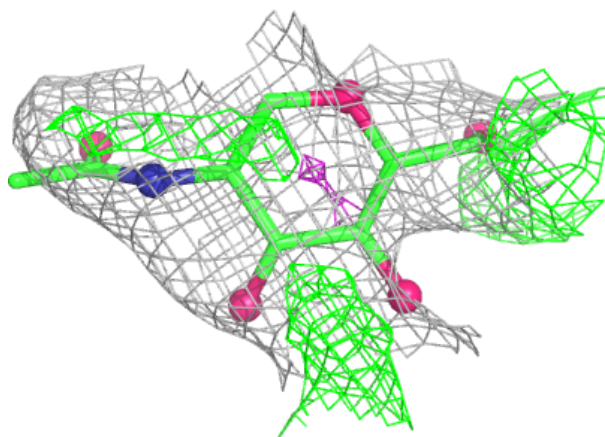
The following is a graphical depiction of the model fit to experimental electron density of all

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.

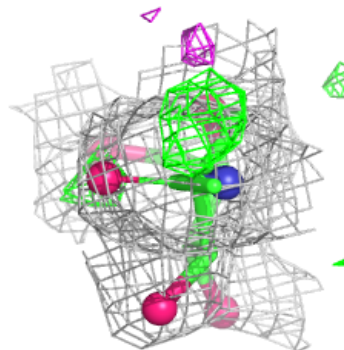
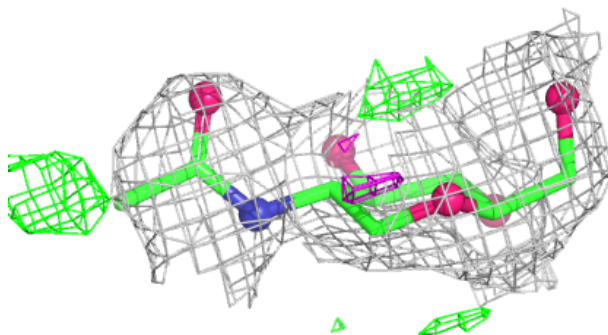
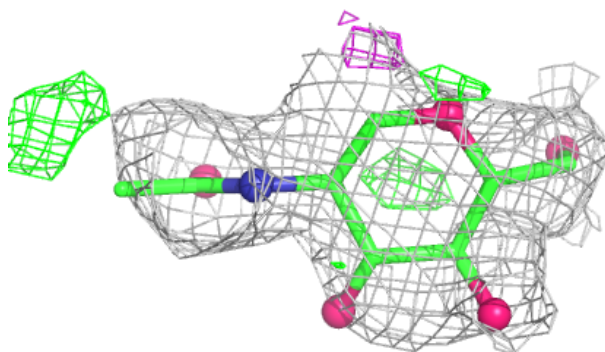


Electron density around NAG A 502:

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

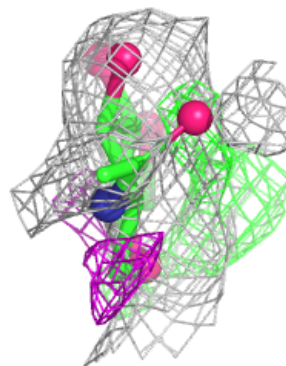
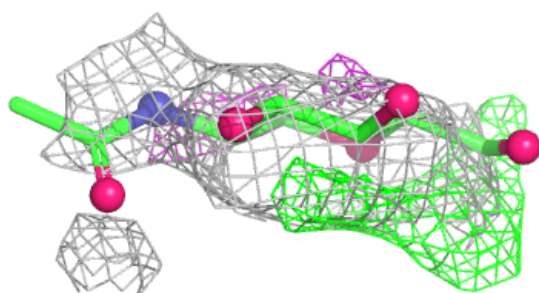
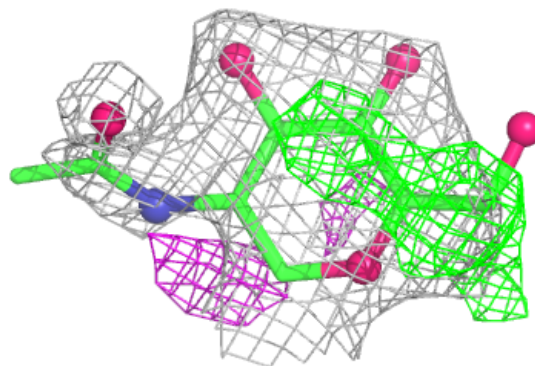
**Electron density around NAG A 501:**

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



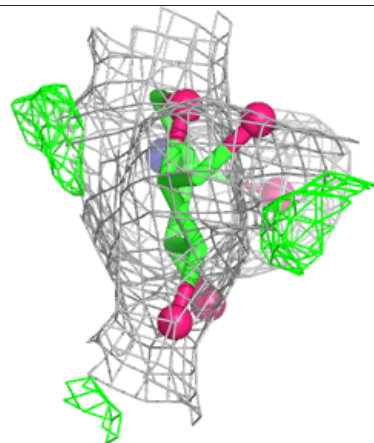
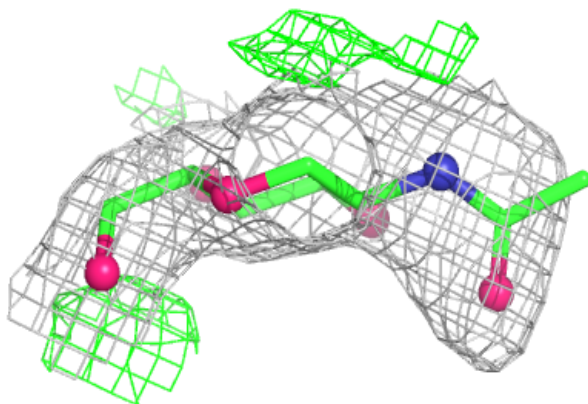
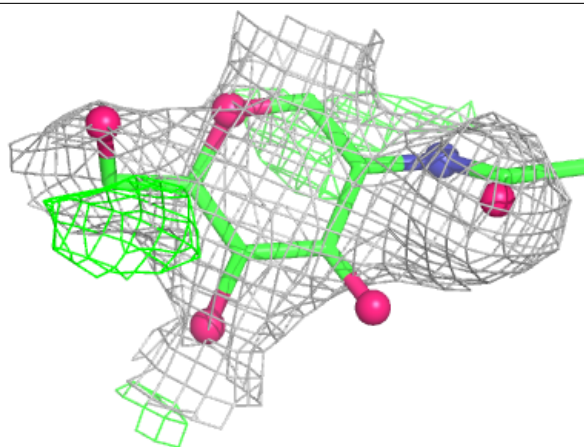
Electron density around NAG A 503:

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



Electron density around NAG B 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.