wwPDB X-ray Structure Validation Summary Report (i)

Oct 15, 2023 – 08:11 PM EDT

PDB ID	:	8G18
Title	:	Heterodimer of the GluN1b-GluN2B NMDA receptor amino-terminal domains bound to allosteric inhibitor 93-108
Authors	:	Regan, M.C.; Furukawa, H.
Deposited on	:	2023-02-01
Resolution	:	2.85 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 (i) 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 (i)) were used in the production of this report:

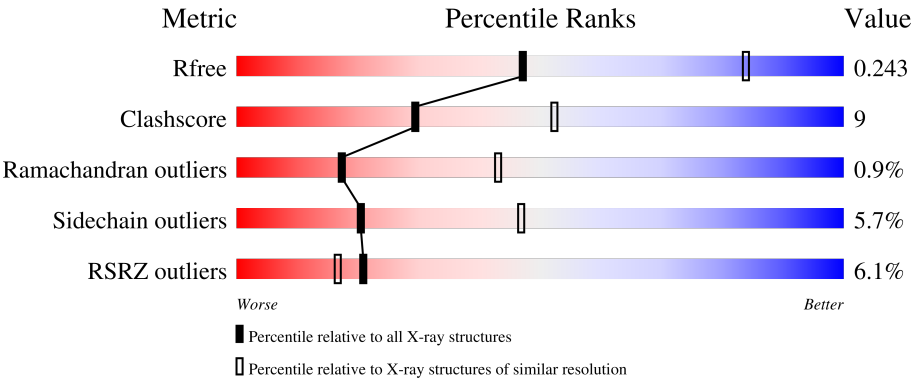
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.85 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}	130704	3168 (2.90-2.82)
Clashscore	141614	3438 (2.90-2.82)
Ramachandran outliers	138981	3348 (2.90-2.82)
Sidechain outliers	138945	3351 (2.90-2.82)
RSRZ outliers	127900	3103 (2.90-2.82)

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	385	2% 77% 15% • 7%
1	C	385	8% 66% 25% • 7%
2	B	363	6% 73% 23% •
2	D	363	7% 79% 20% •
3	E	5	20% 80%

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	B	502	X	-	-	-

2 Entry composition (i)

There are 7 unique types of molecules in this entry. The entry contains 11400 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 Glutamate receptor ionotropic, NMDA 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	359	Total	C	N	O	S	0	0	0
			2765	1763	482	509	11			
1	C	358	Total	C	N	O	S	0	0	0
			2743	1746	477	509	11			

There are 54 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	61	GLN	ASN	conflict	UNP A0A1L8F5J9
A	186	GLY	-	linker	UNP A0A1L8F5J9
A	187	UNK	-	linker	UNP A0A1L8F5J9
A	188	UNK	-	linker	UNP A0A1L8F5J9
A	189	UNK	-	linker	UNP A0A1L8F5J9
A	190	UNK	-	linker	UNP A0A1L8F5J9
A	191	UNK	-	linker	UNP A0A1L8F5J9
A	192	UNK	-	linker	UNP A0A1L8F5J9
A	193	UNK	-	linker	UNP A0A1L8F5J9
A	194	UNK	-	linker	UNP A0A1L8F5J9
A	195	UNK	-	linker	UNP A0A1L8F5J9
A	196	UNK	-	linker	UNP A0A1L8F5J9
A	197	UNK	-	linker	UNP A0A1L8F5J9
A	198	UNK	-	linker	UNP A0A1L8F5J9
A	199	UNK	-	linker	UNP A0A1L8F5J9
A	200	UNK	-	linker	UNP A0A1L8F5J9
A	201	UNK	-	linker	UNP A0A1L8F5J9
A	202	UNK	-	linker	UNP A0A1L8F5J9
A	203	UNK	-	linker	UNP A0A1L8F5J9
A	204	UNK	-	linker	UNP A0A1L8F5J9
A	205	UNK	-	linker	UNP A0A1L8F5J9
A	206	UNK	-	linker	UNP A0A1L8F5J9
A	207	UNK	-	linker	UNP A0A1L8F5J9
A	208	UNK	-	linker	UNP A0A1L8F5J9
A	209	GLY	-	linker	UNP A0A1L8F5J9

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Chain	Residue	Modelled	Actual	Comment	Reference
A	210	PRO	-	linker	UNP A0A1L8F5J9
A	371	GLN	ASN	conflict	UNP A0A1L8F5J9
C	61	GLN	ASN	conflict	UNP A0A1L8F5J9
C	186	GLY	-	linker	UNP A0A1L8F5J9
C	187	UNK	-	linker	UNP A0A1L8F5J9
C	188	UNK	-	linker	UNP A0A1L8F5J9
C	189	UNK	-	linker	UNP A0A1L8F5J9
C	190	UNK	-	linker	UNP A0A1L8F5J9
C	191	UNK	-	linker	UNP A0A1L8F5J9
C	192	UNK	-	linker	UNP A0A1L8F5J9
C	193	UNK	-	linker	UNP A0A1L8F5J9
C	194	UNK	-	linker	UNP A0A1L8F5J9
C	195	UNK	-	linker	UNP A0A1L8F5J9
C	196	UNK	-	linker	UNP A0A1L8F5J9
C	197	UNK	-	linker	UNP A0A1L8F5J9
C	198	UNK	-	linker	UNP A0A1L8F5J9
C	199	UNK	-	linker	UNP A0A1L8F5J9
C	200	UNK	-	linker	UNP A0A1L8F5J9
C	201	UNK	-	linker	UNP A0A1L8F5J9
C	202	UNK	-	linker	UNP A0A1L8F5J9
C	203	UNK	-	linker	UNP A0A1L8F5J9
C	204	UNK	-	linker	UNP A0A1L8F5J9
C	205	UNK	-	linker	UNP A0A1L8F5J9
C	206	UNK	-	linker	UNP A0A1L8F5J9
C	207	UNK	-	linker	UNP A0A1L8F5J9
C	208	UNK	-	linker	UNP A0A1L8F5J9
C	209	GLY	-	linker	UNP A0A1L8F5J9
C	210	PRO	-	linker	UNP A0A1L8F5J9
C	371	GLN	ASN	conflict	UNP A0A1L8F5J9

- Molecule 2 is a protein called Glutamate receptor ionotropic, NMDA 2B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	363	Total	C	N	O	S	0	0	0
			2820	1809	453	542	16			
2	D	363	Total	C	N	O	S	0	0	0
			2757	1771	445	525	16			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	348	ASP	ASN	conflict	UNP Q00960

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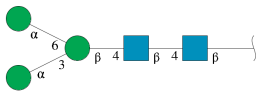
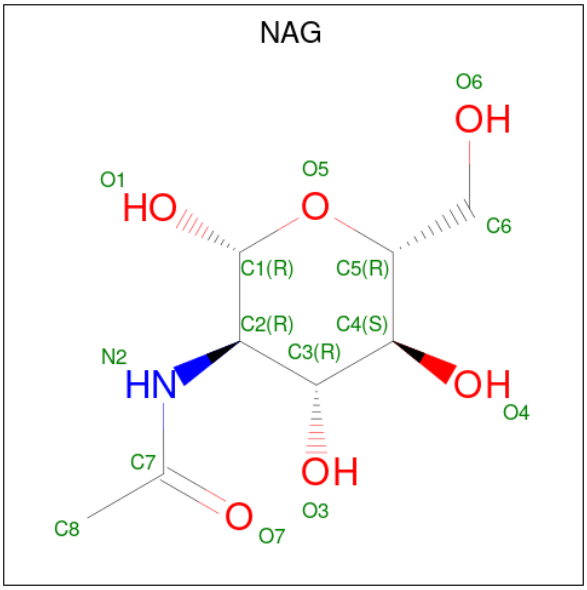
Chain	Residue	Modelled	Actual	Comment	Reference
D	348	ASP	ASN	conflict	UNP Q00960

- Molecule 3 is an oligosaccharide called 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.



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

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$) (labeled as "Ligand of Interest" by depositor).



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

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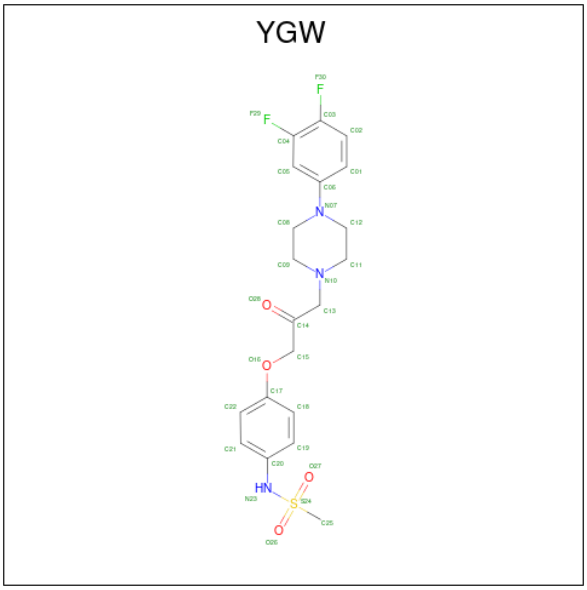
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	C	1	Total C N O 14 8 1 5	14	0
4	D	1	Total C N O 14 8 1 5	14	0
4	D	1	Total C N O 14 8 1 5	14	0

- Molecule 5 is SODIUM ION (three-letter code: NA) (formula: Na) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total Na 1 1	1	0
5	C	1	Total Na 1 1	1	0

- Molecule 6 is N-(4-{3-[4-(3,4-difluorophenyl)piperazin-1-yl]-2-oxopropoxy}phenyl)methanesulfonamide (three-letter code: YGW) (formula: $C_{20}H_{23}F_2N_3O_4S$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	B	1	Total C F N O S 30 20 2 3 4 1	0	0
6	D	1	Total C F N O S 30 20 2 3 4 1	0	0

- Molecule 7 is water.

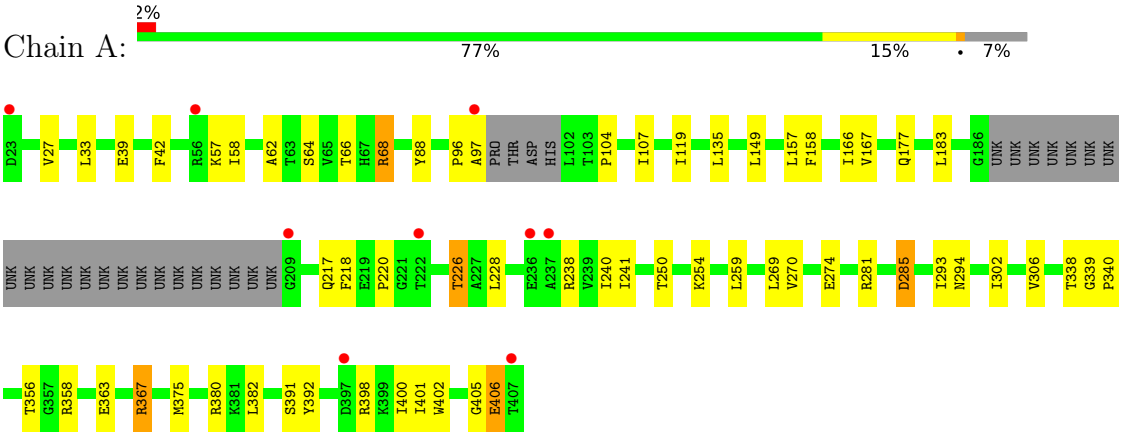
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	36	Total O 36 36	0	0
7	B	21	Total O 21 21	0	0
7	C	18	Total O 18 18	0	0
7	D	19	Total O 19 19	0	0

3 Residue-property plots (i)

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.

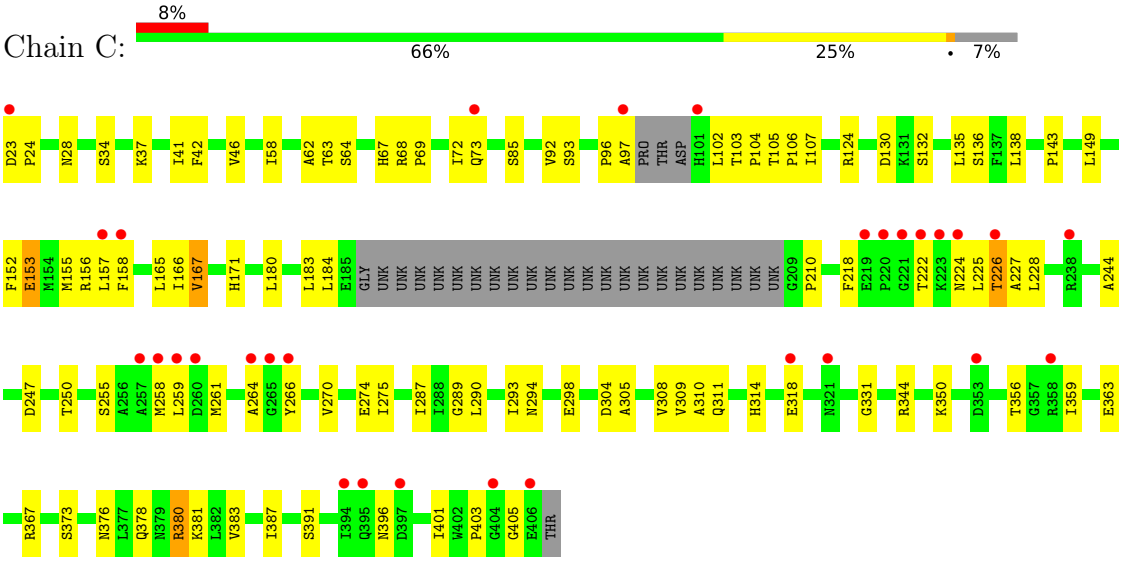
• Molecule 1: Glutamate receptor ionotropic, NMDA 1

Chain A:



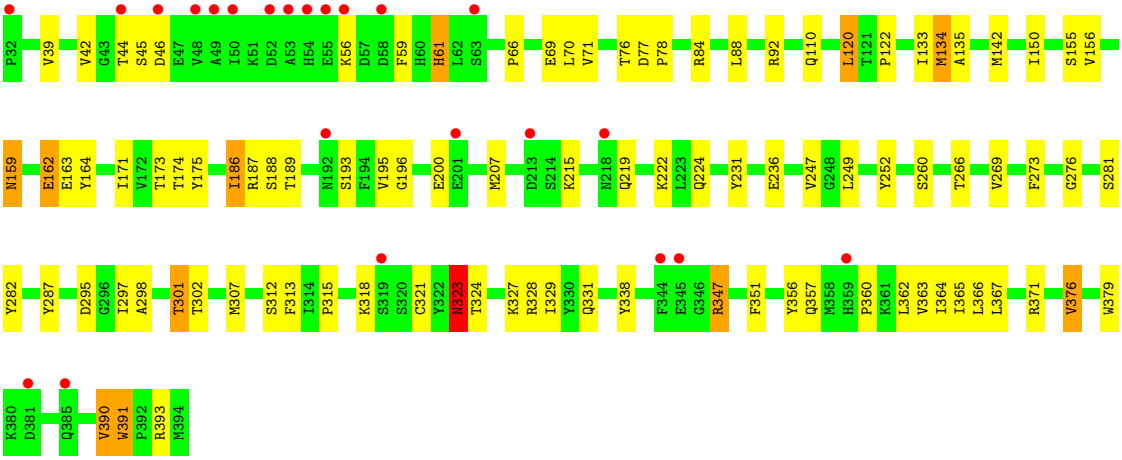
• Molecule 1: Glutamate receptor ionotropic, NMDA 1

Chain C:

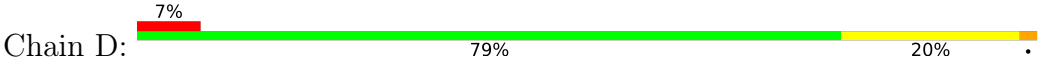


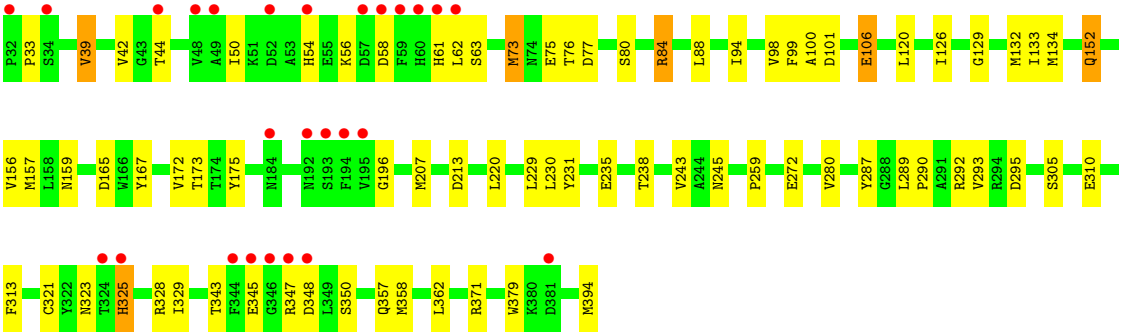
• Molecule 2: Glutamate receptor ionotropic, NMDA 2B

Chain B:



• Molecule 2: Glutamate receptor ionotropic, NMDA 2B





• 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

4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	269.17Å 60.08Å 145.57Å 90.00° 117.02° 90.00°	Depositor
Resolution (Å)	34.37 – 2.85 34.37 – 2.85	Depositor EDS
% Data completeness (in resolution range)	84.0 (34.37-2.85) 84.1 (34.37-2.85)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.03 (at 2.85Å)	Xtriage
Refinement program	PHENIX 1.20.1-4487	Depositor
R, R_{free}	0.174 , 0.246 0.188 , 0.243	Depositor DCC
R_{free} test set	2034 reflections (4.94%)	wwPDB-VP
Wilson B-factor (Å^2)	51.2	Xtriage
Anisotropy	0.107	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.39 , 73.8	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	11400	wwPDB-VP
Average B, all atoms (Å^2)	56.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.48% of the height of the origin peak. No significant pseudotranslation is detected.*

[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: YGW, MAN, BMA, NAG, NA

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	0.48	0/2822	0.83	0/3834
1	C	0.41	0/2799	0.73	0/3805
2	B	0.44	0/2883	0.81	1/3929 (0.0%)
2	D	0.38	0/2821	0.75	0/3853
All	All	0.43	0/11325	0.78	1/15421 (0.0%)

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	2

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	187	ARG	NE-CZ-NH2	-5.50	117.55	120.30

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	281	ARG	Sidechain
1	A	398	ARG	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	2765	0	2730	32	0
1	C	2743	0	2709	58	3
2	B	2820	0	2683	69	0
2	D	2757	0	2590	52	0
3	E	61	0	52	0	0
4	A	14	0	13	0	0
4	B	28	0	26	0	0
4	C	28	0	26	0	0
4	D	28	0	26	0	0
5	A	1	0	0	0	0
5	C	1	0	0	0	0
6	B	30	0	0	2	0
6	D	30	0	0	3	0
7	A	36	0	0	0	0
7	B	21	0	0	5	3
7	C	18	0	0	3	0
7	D	19	0	0	2	0
All	All	11400	0	10855	207	3

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 9.

The worst 5 of 207 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)
2:B:61:HIS:HA	7:B:610:HOH:O	1.63	0.97
2:D:343:THR:HG22	2:D:348:ASP:HA	1.55	0.86
2:D:61:HIS:HA	7:D:604:HOH:O	1.77	0.84
1:A:270:VAL:CG1	1:A:274:GLU:HB2	2.08	0.84
2:B:323:ASN:O	2:B:323:ASN:ND2	2.12	0.82

All (3) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:380:ARG:NE	7:B:601:HOH:O[4_7410]	2.08	0.12
1:C:380:ARG:NH2	7:B:601:HOH:O[4_7410]	2.18	0.02
1:C:380:ARG:CB	7:B:603:HOH:O[4_7410]	2.19	0.01

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	353/385 (92%)	329 (93%)	22 (6%)	2 (1%)	25	53
1	C	352/385 (91%)	319 (91%)	31 (9%)	2 (1%)	25	53
2	B	361/363 (99%)	312 (86%)	44 (12%)	5 (1%)	11	31
2	D	361/363 (99%)	317 (88%)	40 (11%)	4 (1%)	14	38
All	All	1427/1496 (95%)	1277 (90%)	137 (10%)	13 (1%)	17	43

5 of 13 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	46	ASP
2	D	44	THR
2	D	323	ASN
1	A	405	GLY
1	A	406	GLU

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	289/309 (94%)	276 (96%)	13 (4%)	27	57
1	C	290/309 (94%)	275 (95%)	15 (5%)	23	51
2	B	300/326 (92%)	279 (93%)	21 (7%)	15	37
2	D	286/326 (88%)	269 (94%)	17 (6%)	19	45
All	All	1165/1270 (92%)	1099 (94%)	66 (6%)	20	47

5 of 66 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	D	245	ASN
2	D	310	GLU
2	D	394	MET
2	B	266	THR
2	B	260	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 13 such sidechains are listed below:

Mol	Chain	Res	Type
2	B	385	GLN
1	C	67	HIS
2	D	159	ASN
1	C	146	HIS
1	C	314	HIS

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	$\#\|Z\| > 2$
3	NAG	E	1	3	14,14,15	0.47	0	17,19,21	0.84	1 (5%)
3	NAG	E	2	3	14,14,15	0.32	0	17,19,21	1.10	2 (11%)
3	BMA	E	3	3	11,11,12	0.34	0	15,15,17	0.90	0
3	MAN	E	4	3	11,11,12	0.51	0	15,15,17	1.99	4 (26%)
3	MAN	E	5	3	11,11,12	0.51	0	15,15,17	1.01	1 (6%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	E	1	3	-	0/6/23/26	0/1/1/1
3	NAG	E	2	3	-	0/6/23/26	0/1/1/1
3	BMA	E	3	3	-	0/2/19/22	0/1/1/1
3	MAN	E	4	3	-	0/2/19/22	0/1/1/1
3	MAN	E	5	3	-	0/2/19/22	0/1/1/1

There are no bond length outliers.

The worst 5 of 8 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	E	4	MAN	C1-C2-C3	5.99	117.03	109.67
3	E	4	MAN	C2-C3-C4	3.19	116.41	110.89
3	E	5	MAN	O5-C5-C6	2.34	110.87	107.20
3	E	2	NAG	C1-C2-N2	-2.26	106.62	110.49
3	E	1	NAG	O4-C4-C3	-2.17	105.33	110.35

There are no chirality outliers.

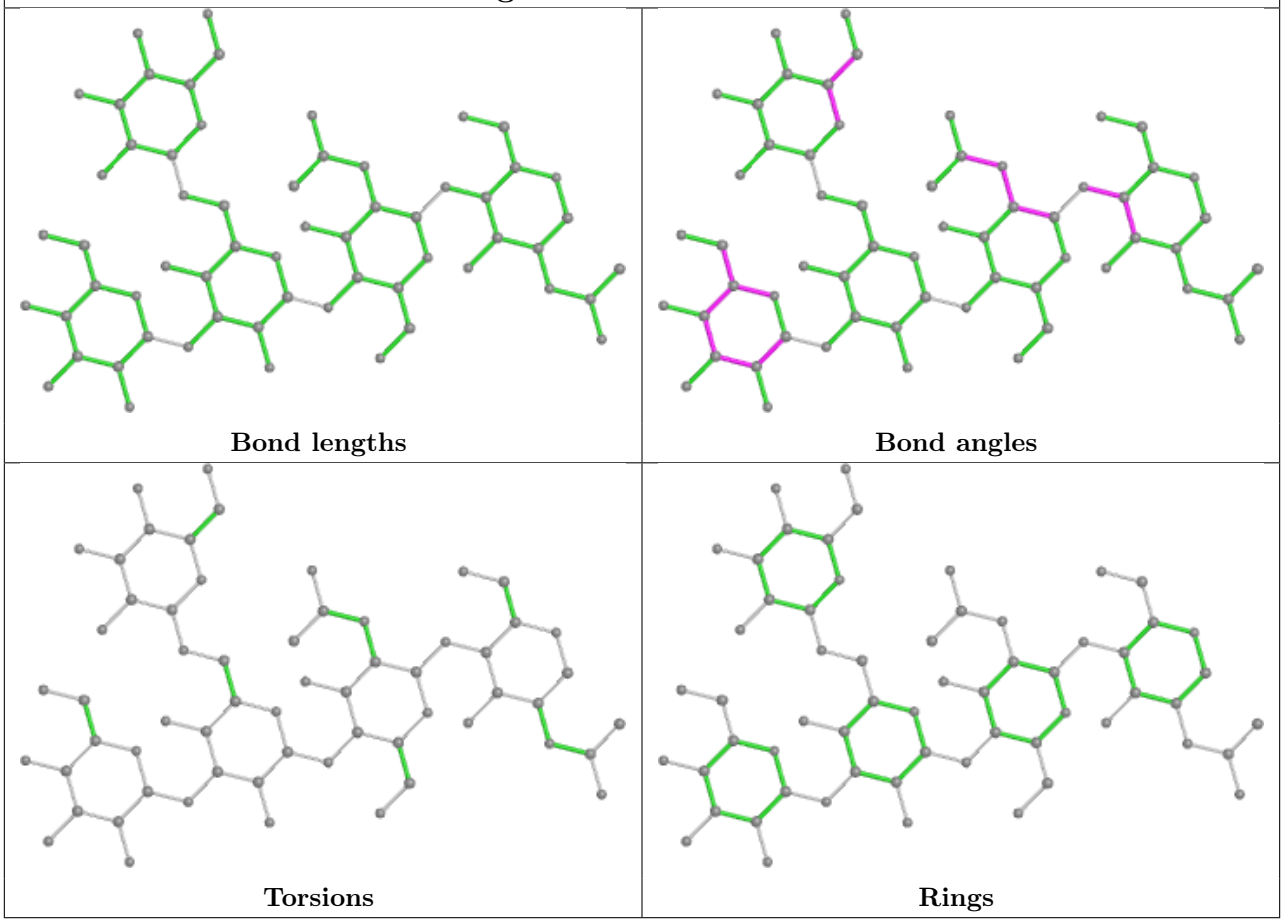
There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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

Oligosaccharide Chain E



5.6 Ligand geometry (i)

Of 11 ligands modelled in this entry, 2 are monoatomic - leaving 9 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
4	NAG	C	502	1	14,14,15	0.55	0	17,19,21	1.39	4 (23%)
4	NAG	B	502	2	14,14,15	0.42	0	17,19,21	2.41	5 (29%)
4	NAG	B	501	2	14,14,15	0.50	0	17,19,21	1.08	2 (11%)
6	YGW	D	503	-	31,32,32	3.34	9 (29%)	42,45,45	5.45	14 (33%)
6	YGW	B	503	-	31,32,32	3.32	7 (22%)	42,45,45	5.38	11 (26%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
4	NAG	C	501	1	14,14,15	0.45	0	17,19,21	0.69	0
4	NAG	A	501	1	14,14,15	0.75	1 (7%)	17,19,21	1.54	4 (23%)
4	NAG	D	501	-	14,14,15	0.52	0	17,19,21	1.17	1 (5%)
4	NAG	D	502	-	14,14,15	0.29	0	17,19,21	2.37	2 (11%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	C	502	1	-	4/6/23/26	0/1/1/1
4	NAG	B	502	2	1/1/5/7	4/6/23/26	0/1/1/1
4	NAG	B	501	2	-	0/6/23/26	0/1/1/1
6	YGW	D	503	-	-	8/18/28/28	0/3/3/3
6	YGW	B	503	-	-	4/18/28/28	0/3/3/3
4	NAG	C	501	1	-	0/6/23/26	0/1/1/1
4	NAG	A	501	1	-	2/6/23/26	0/1/1/1
4	NAG	D	501	-	-	4/6/23/26	0/1/1/1
4	NAG	D	502	-	-	3/6/23/26	0/1/1/1

The worst 5 of 17 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	B	503	YGW	O27-S24	13.51	1.67	1.43
6	D	503	YGW	O27-S24	13.01	1.66	1.43
6	D	503	YGW	S24-N23	8.41	1.74	1.63
6	B	503	YGW	C13-N10	-7.89	1.30	1.47
6	B	503	YGW	S24-N23	7.16	1.72	1.63

The worst 5 of 43 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	B	503	YGW	C25-S24-N23	28.43	139.05	106.63
6	D	503	YGW	C25-S24-N23	24.07	134.08	106.63
6	D	503	YGW	O27-S24-C25	-20.26	75.74	108.28
6	B	503	YGW	O27-S24-C25	-15.90	82.75	108.28
6	D	503	YGW	O27-S24-N23	-9.10	88.54	107.10

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
4	B	502	NAG	C1

5 of 29 torsion outliers are listed below:

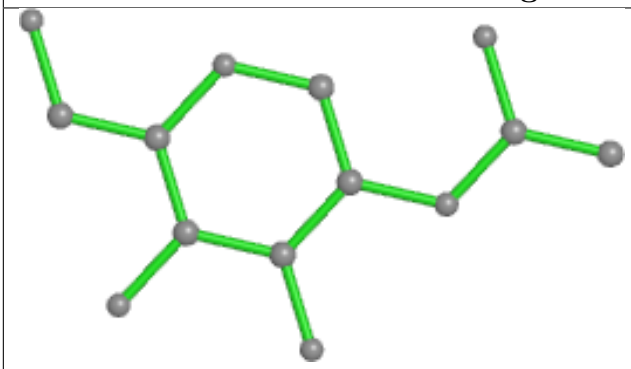
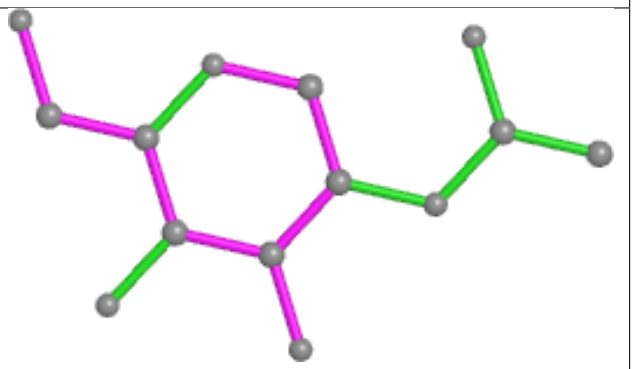
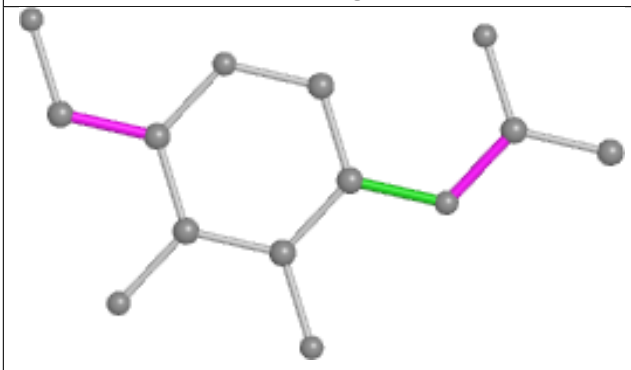
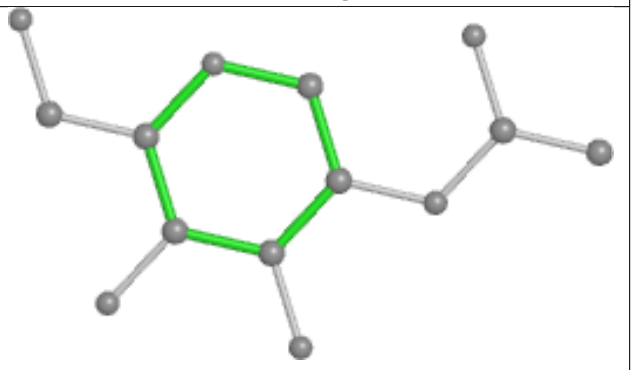
Mol	Chain	Res	Type	Atoms
6	B	503	YGW	C20-N23-S24-O26
6	D	503	YGW	N10-C13-C14-C15
6	D	503	YGW	N10-C13-C14-O28
6	D	503	YGW	C20-N23-S24-O27
4	B	502	NAG	O5-C5-C6-O6

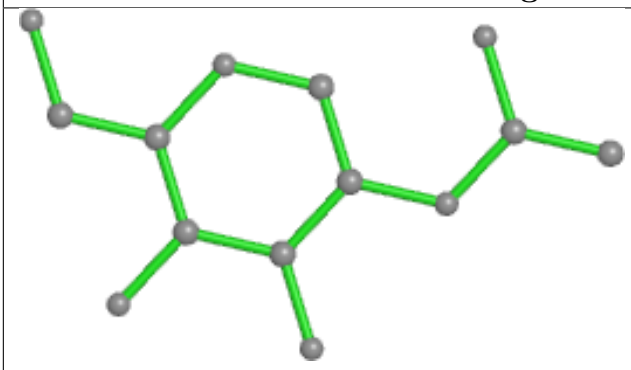
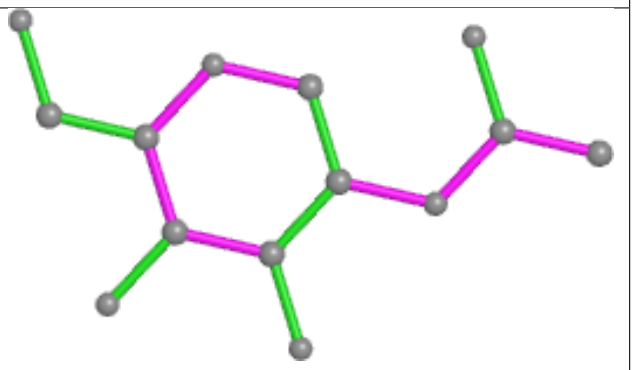
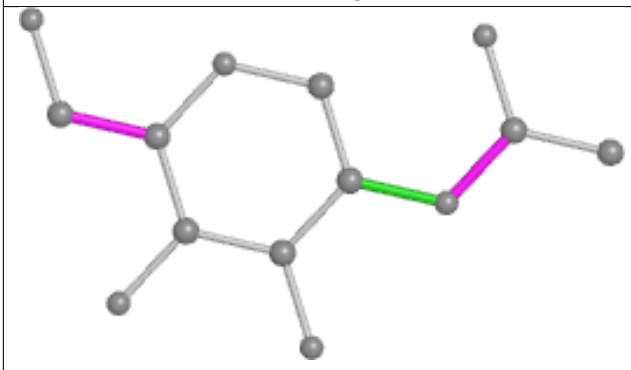
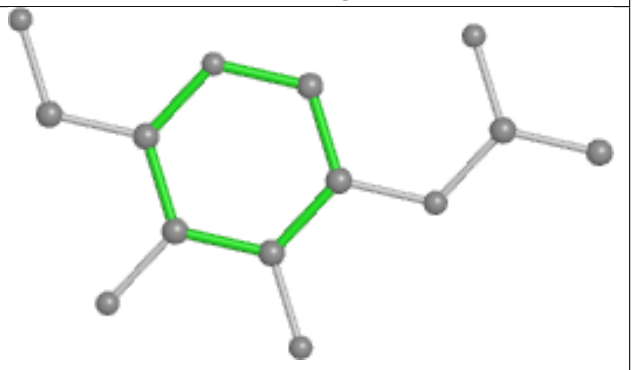
There are no ring outliers.

2 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	D	503	YGW	3	0
6	B	503	YGW	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand NAG C 502	
 Bond lengths	 Bond angles
 Torsions	 Rings

Ligand NAG B 502	
 Bond lengths	 Bond angles
 Torsions	 Rings

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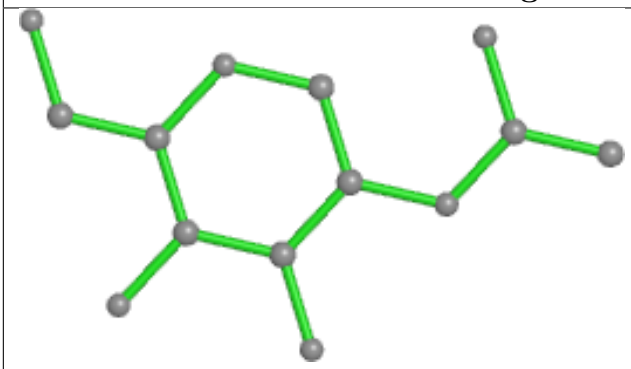
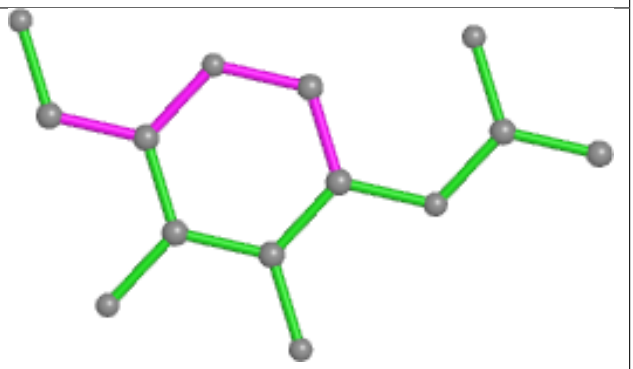


Bond lengths



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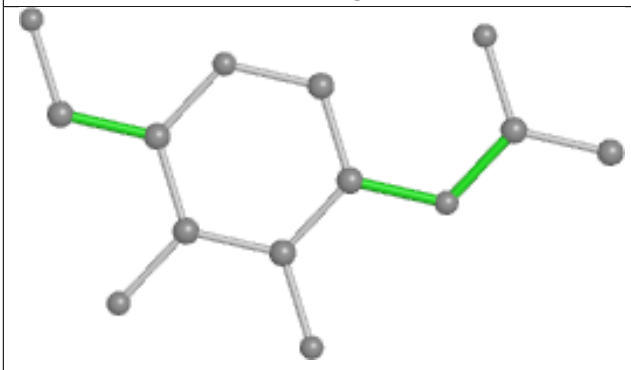

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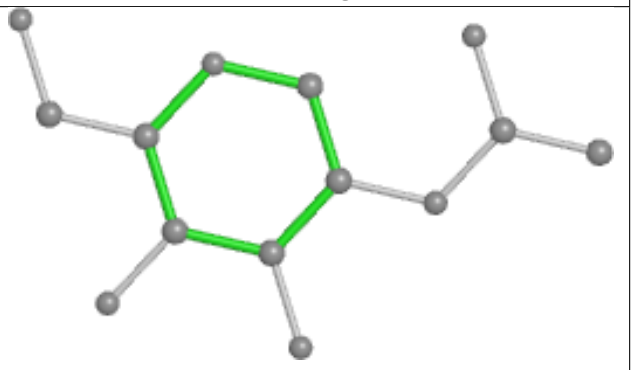
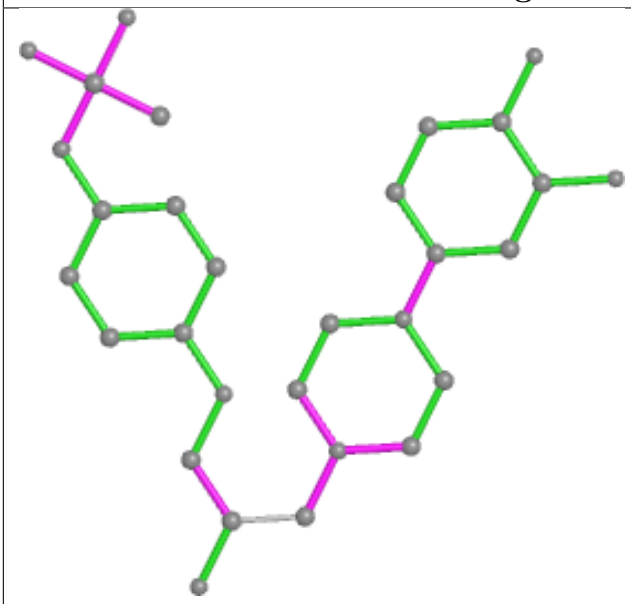
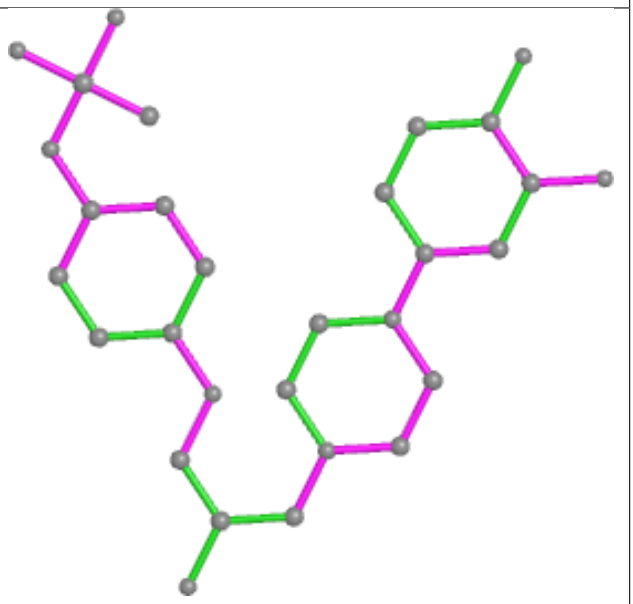


Rings

Ligand YGW D 503



Bond lengths



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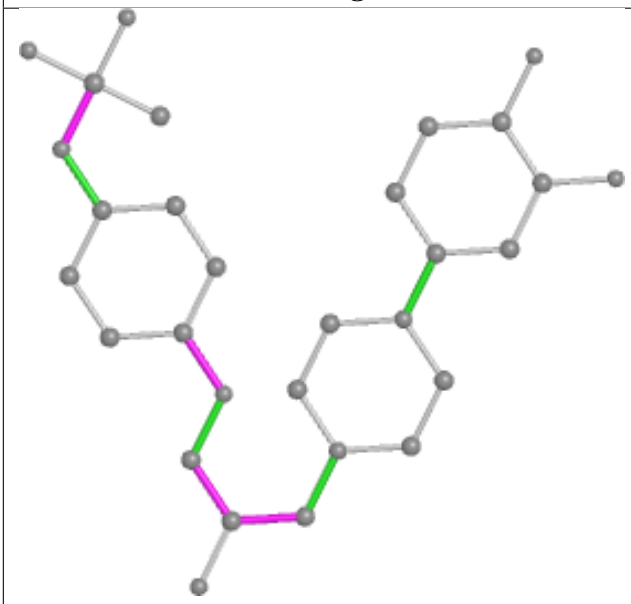
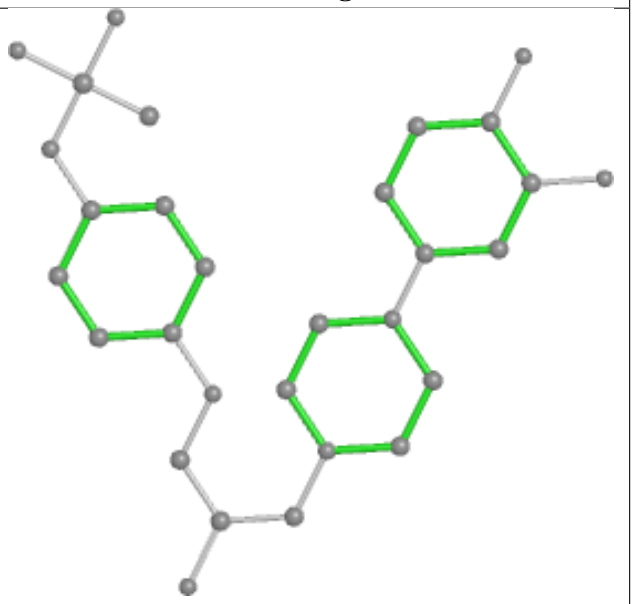
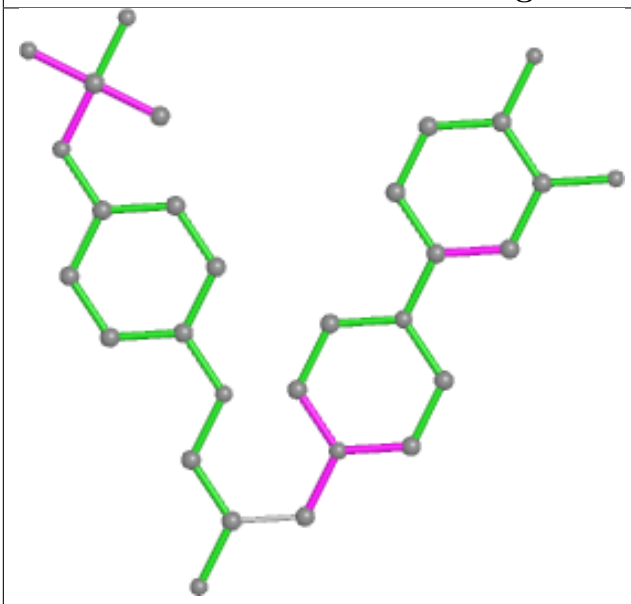


Torsions



Rings

Ligand YGW B 503



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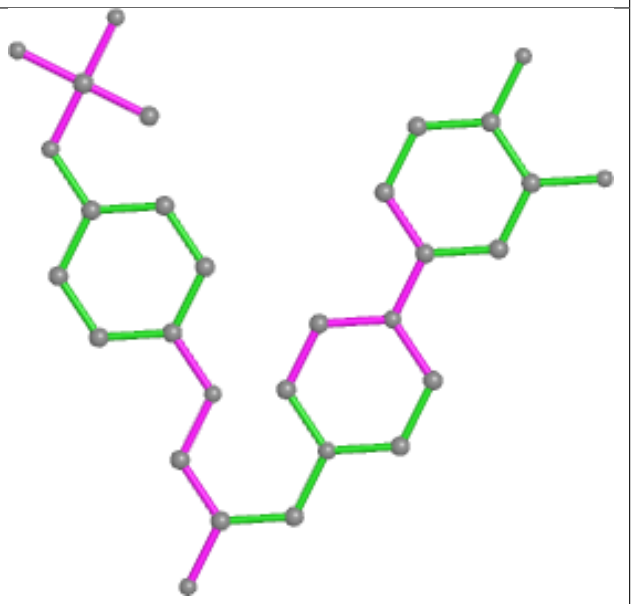
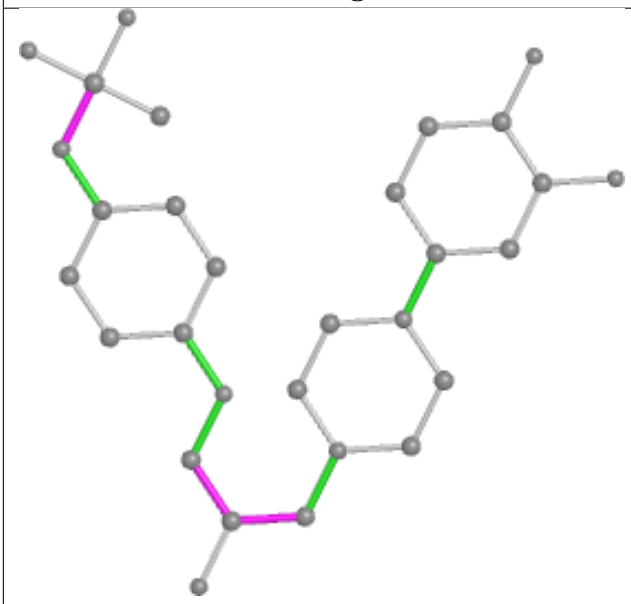
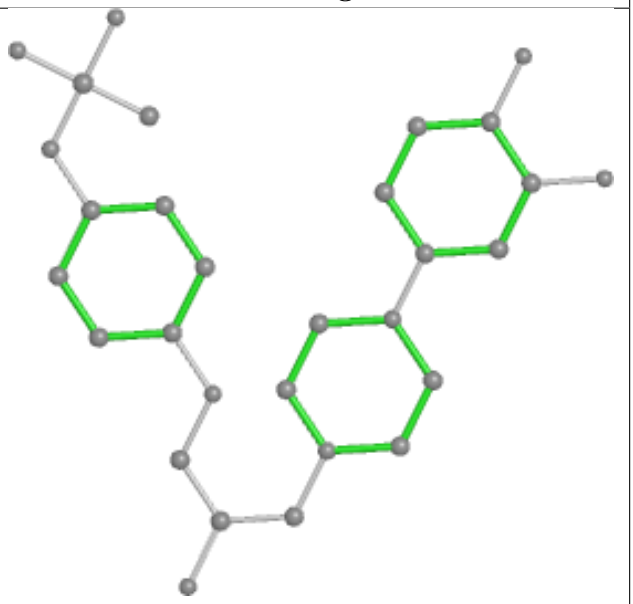


Bond angles

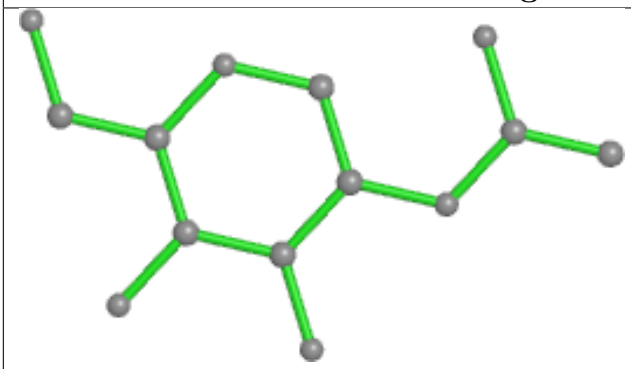


Torsions



Rings

Ligand NAG C 501



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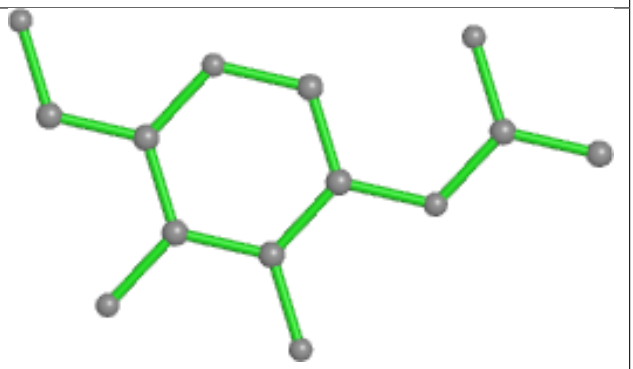
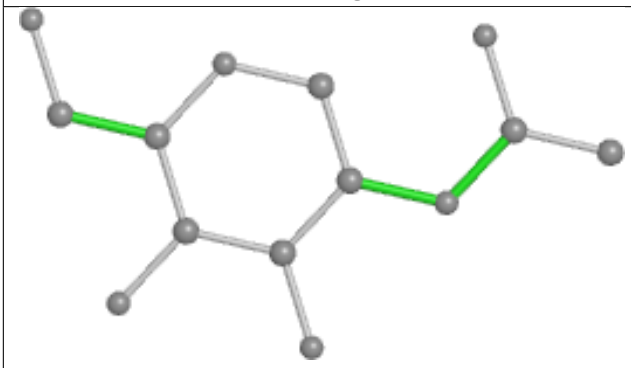
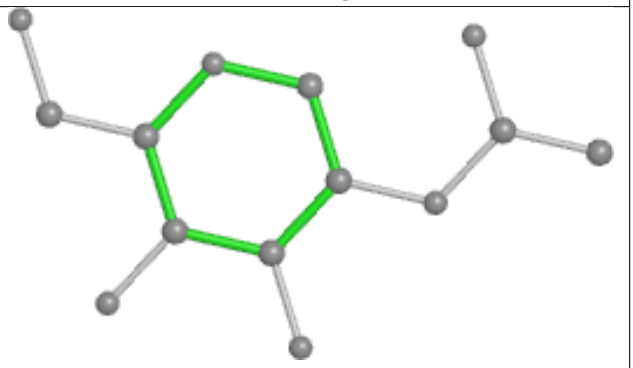


Bond angles

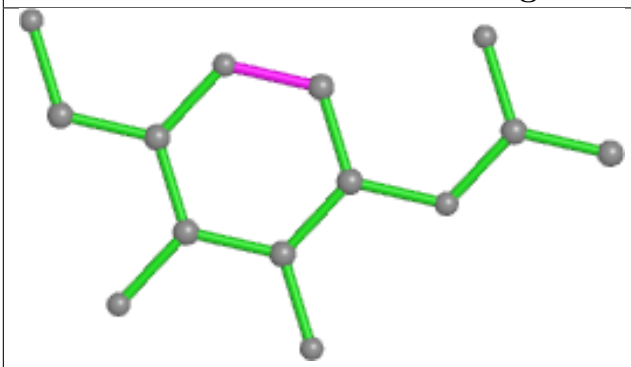


Torsions

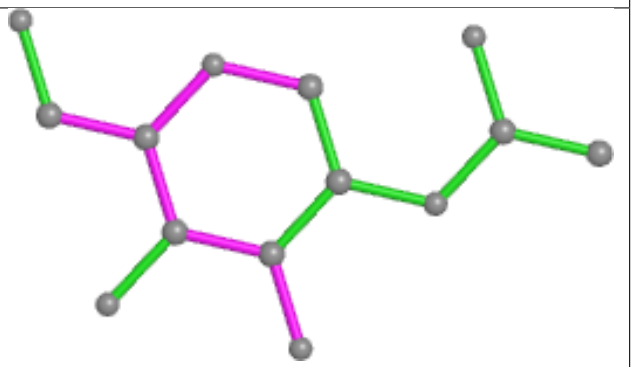


Rings

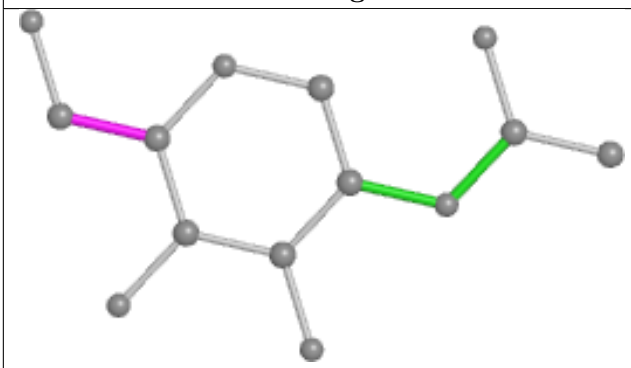
Ligand NAG A 501



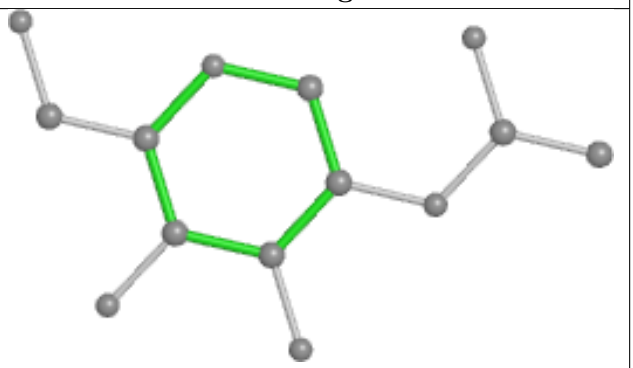
Bond lengths



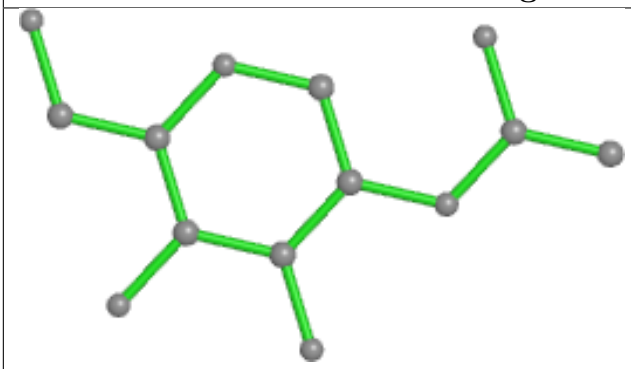
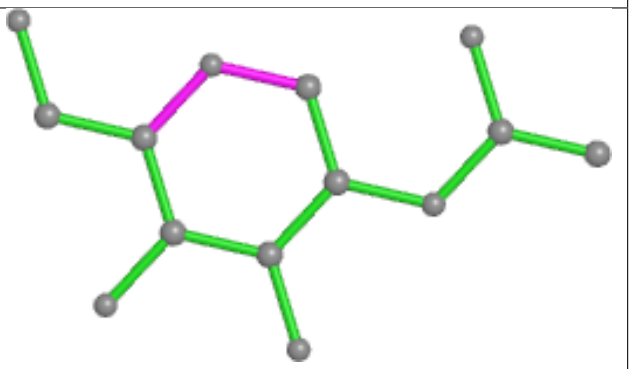
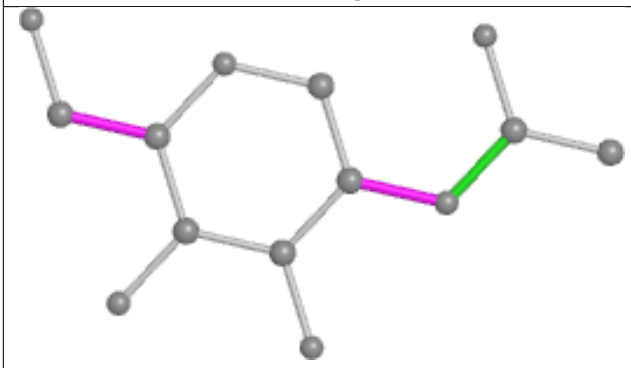
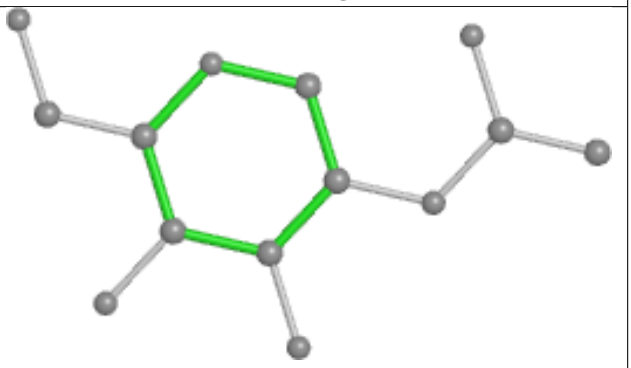
Bond angles

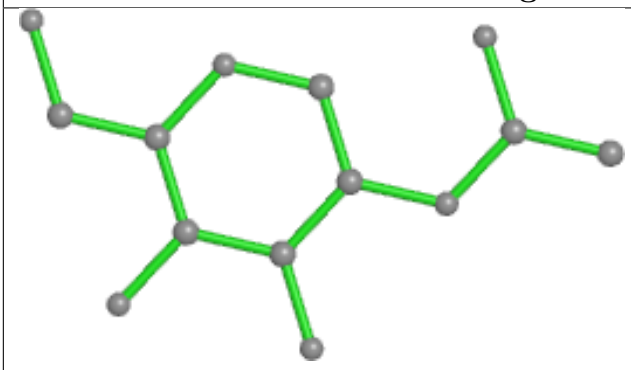
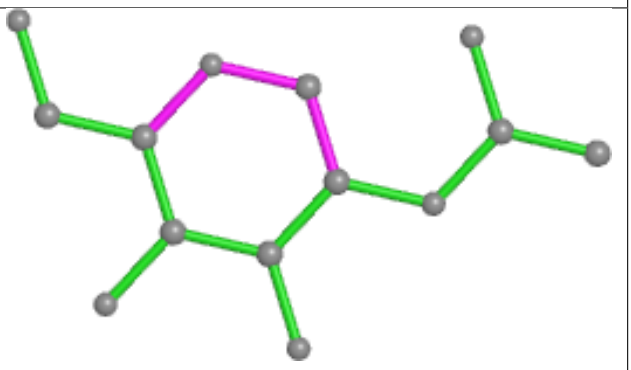
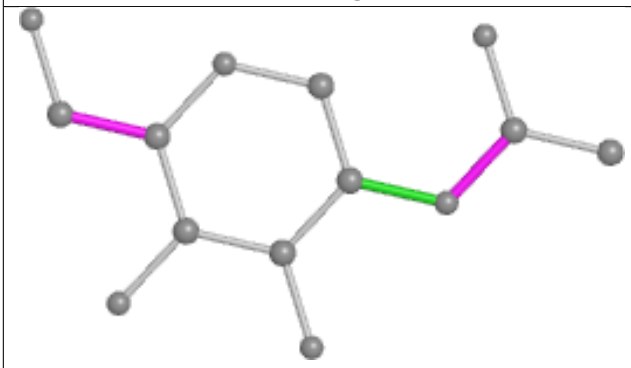
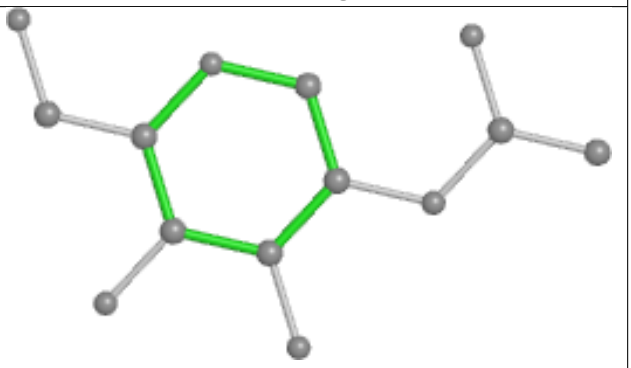


Torsions



Rings

Ligand NAG D 501	
 Bond lengths	 Bond angles
 Torsions	 Rings

Ligand NAG 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, 95^{th} 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	359/385 (93%)	-0.22	9 (2%) 57 54	16, 37, 82, 112	0
1	C	358/385 (92%)	0.26	30 (8%) 11 7	31, 62, 102, 124	0
2	B	363/363 (100%)	0.25	23 (6%) 20 15	17, 53, 99, 134	0
2	D	363/363 (100%)	0.25	26 (7%) 15 11	32, 60, 110, 147	0
All	All	1443/1496 (96%)	0.14	88 (6%) 21 17	16, 54, 101, 147	0

The worst 5 of 88 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	D	48	VAL	6.0
1	C	101	HIS	5.9
2	B	58	ASP	5.4
1	C	353	ASP	4.9
2	D	192	ASN	4.9

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

SUGAR-RSR INFOmissingINFO

6.4 Ligands

LIGAND-RSR INFOmissingINFO

6.5 Other polymers (i)

There are no such residues in this entry.