



wwPDB X-ray Structure Validation Summary Report ⓘ

Apr 26, 2026 – 05:47 AM EDT

PDB ID : 9HKK / pdb_00009hkk
Title : Structure of the malarial hexose transporter 1 (PfHT1) in complex with 2,5-anhydro-D-mannitol.
Authors : Ahn, D.; Gulati, A.; Claesson, M.; Drew, D.
Deposited on : 2024-12-03
Resolution : 3.55 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 ⓘ 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

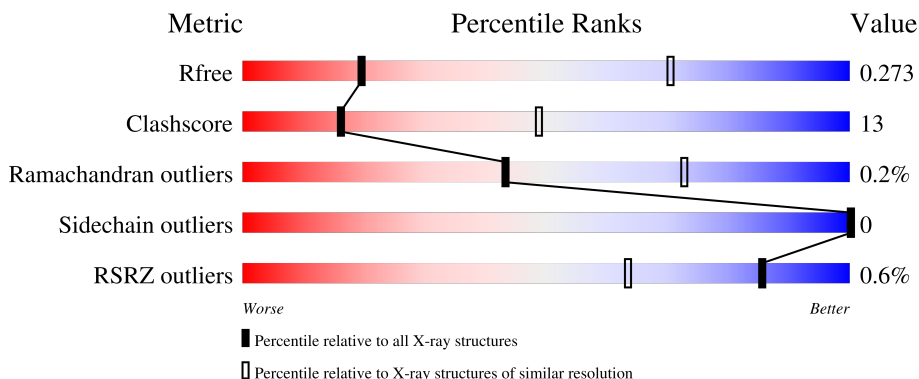
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.55 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	1410 (3.62-3.50)
Clashscore	190562	1480 (3.62-3.50)
Ramachandran outliers	187476	1440 (3.62-3.50)
Sidechain outliers	187428	1441 (3.62-3.50)
RSRZ outliers	180081	1409 (3.62-3.50)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 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	496	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 1%, orange 1%, yellow 71%, green 25%, grey 5%);"></div> <div style="display: flex; justify-content: space-between; width: 90%; margin: 0 auto;"> 71% 25% </div> </div>
1	B	496	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 1%, orange 1%, yellow 72%, green 25%, grey 5%);"></div> <div style="display: flex; justify-content: space-between; width: 90%; margin: 0 auto;"> 72% 25% </div> </div>
1	C	496	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, yellow 65%, green 31%, grey 5%);"></div> <div style="display: flex; justify-content: space-between; width: 90%; margin: 0 auto;"> 65% 31% </div> </div>
1	D	496	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, yellow 66%, green 30%, grey 5%);"></div> <div style="display: flex; justify-content: space-between; width: 90%; margin: 0 auto;"> 66% 30% </div> </div>

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 31052 atoms, of which 15731 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 Hexose transporter 1.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	477	Total	C	H	N	O	S	0	0	0
			7619	2504	3858	581	656	20			
1	B	478	Total	C	H	N	O	S	0	0	0
			7605	2505	3848	582	651	19			
1	C	478	Total	C	H	N	O	S	0	0	0
			7457	2475	3750	572	640	20			
1	D	478	Total	C	H	N	O	S	0	0	0
			7545	2492	3807	580	647	19			

There are 44 discrepancies between the modelled and reference sequences:

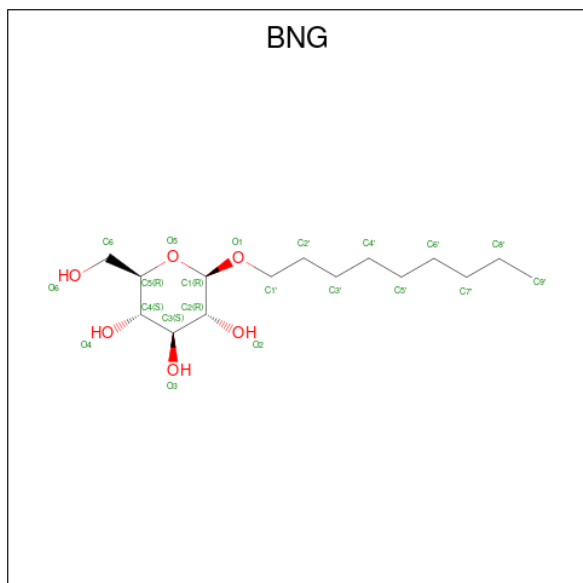
Chain	Residue	Modelled	Actual	Comment	Reference
A	15	MET	-	initiating methionine	UNP O97467
A	16	GLU	-	expression tag	UNP O97467
A	17	LYS	-	expression tag	UNP O97467
A	18	GLU	-	expression tag	UNP O97467
A	19	ASP	-	expression tag	UNP O97467
A	505	GLU	-	expression tag	UNP O97467
A	506	ASN	-	expression tag	UNP O97467
A	507	LEU	-	expression tag	UNP O97467
A	508	TYR	-	expression tag	UNP O97467
A	509	PHE	-	expression tag	UNP O97467
A	510	GLN	-	expression tag	UNP O97467
B	15	MET	-	initiating methionine	UNP O97467
B	16	GLU	-	expression tag	UNP O97467
B	17	LYS	-	expression tag	UNP O97467
B	18	GLU	-	expression tag	UNP O97467
B	19	ASP	-	expression tag	UNP O97467
B	505	GLU	-	expression tag	UNP O97467
B	506	ASN	-	expression tag	UNP O97467
B	507	LEU	-	expression tag	UNP O97467
B	508	TYR	-	expression tag	UNP O97467
B	509	PHE	-	expression tag	UNP O97467

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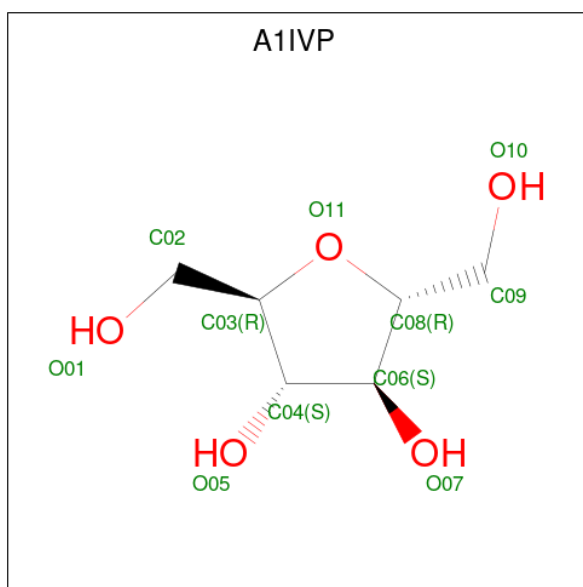
Chain	Residue	Modelled	Actual	Comment	Reference
B	510	GLN	-	expression tag	UNP O97467
C	15	MET	-	initiating methionine	UNP O97467
C	16	GLU	-	expression tag	UNP O97467
C	17	LYS	-	expression tag	UNP O97467
C	18	GLU	-	expression tag	UNP O97467
C	19	ASP	-	expression tag	UNP O97467
C	505	GLU	-	expression tag	UNP O97467
C	506	ASN	-	expression tag	UNP O97467
C	507	LEU	-	expression tag	UNP O97467
C	508	TYR	-	expression tag	UNP O97467
C	509	PHE	-	expression tag	UNP O97467
C	510	GLN	-	expression tag	UNP O97467
D	15	MET	-	initiating methionine	UNP O97467
D	16	GLU	-	expression tag	UNP O97467
D	17	LYS	-	expression tag	UNP O97467
D	18	GLU	-	expression tag	UNP O97467
D	19	ASP	-	expression tag	UNP O97467
D	505	GLU	-	expression tag	UNP O97467
D	506	ASN	-	expression tag	UNP O97467
D	507	LEU	-	expression tag	UNP O97467
D	508	TYR	-	expression tag	UNP O97467
D	509	PHE	-	expression tag	UNP O97467
D	510	GLN	-	expression tag	UNP O97467

- Molecule 2 is nonyl beta-D-glucopyranoside (CCD ID: BNG) (formula: C₁₅H₃₀O₆).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	H	O	0	0
			51	15	30	6		
2	A	1	Total	C	H	O	0	0
			51	15	30	6		
2	A	1	Total	C	H	O	0	0
			51	15	30	6		
2	B	1	Total	C	H	O	0	0
			51	15	30	6		
2	B	1	Total	C	H	O	0	0
			51	15	30	6		
2	B	1	Total	C	H	O	0	0
			51	15	30	6		
2	B	1	Total	C	H	O	0	0
			51	15	30	6		
2	B	1	Total	C	H	O	0	0
			51	15	30	6		
2	C	1	Total	C	H	O	0	0
			51	15	30	6		
2	C	1	Total	C	H	O	0	0
			51	15	30	6		
2	C	1	Total	C	H	O	0	0
			51	15	30	6		
2	C	1	Total	C	H	O	0	0
			51	15	30	6		
2	D	1	Total	C	H	O	0	0
			51	15	30	6		
2	D	1	Total	C	H	O	0	0
			51	15	30	6		

- Molecule 3 is 2,5-anhydro-D-mannitol (CCD ID: A1IVP) (formula: $C_6H_{12}O_5$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	H	O	0	0
			23	6	12	5		
3	B	1	Total	C	H	O	0	0
			23	6	12	5		
3	C	1	Total	C	H	O	0	0
			23	6	12	5		
3	D	1	Total	C	H	O	0	0
			23	6	12	5		

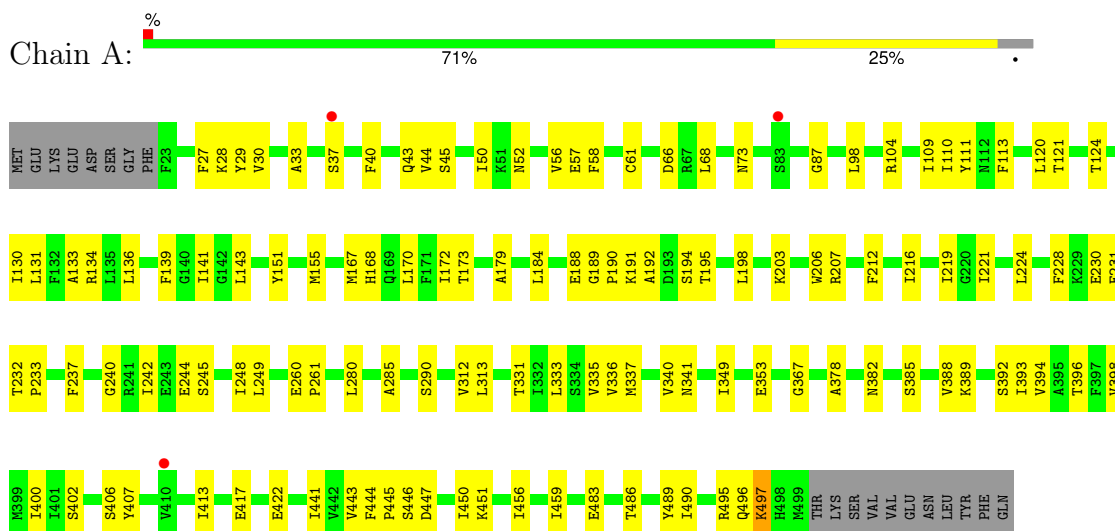
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	7	Total	O	0	0
			7	7		
4	B	4	Total	O	0	0
			4	4		
4	C	5	Total	O	0	0
			5	5		
4	D	4	Total	O	0	0
			4	4		

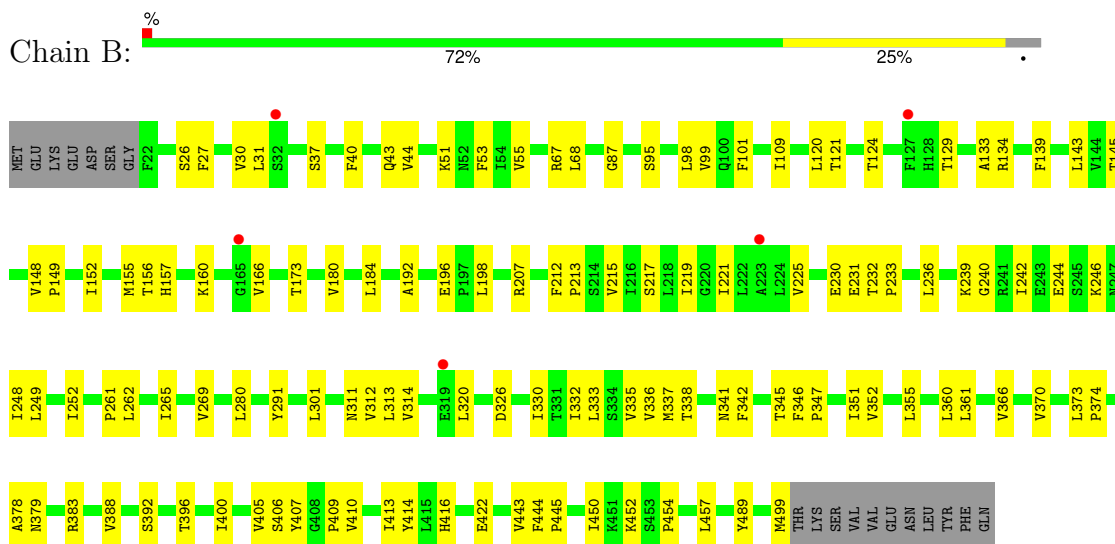
3 Residue-property plots [i](#)

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: Hexose transporter 1

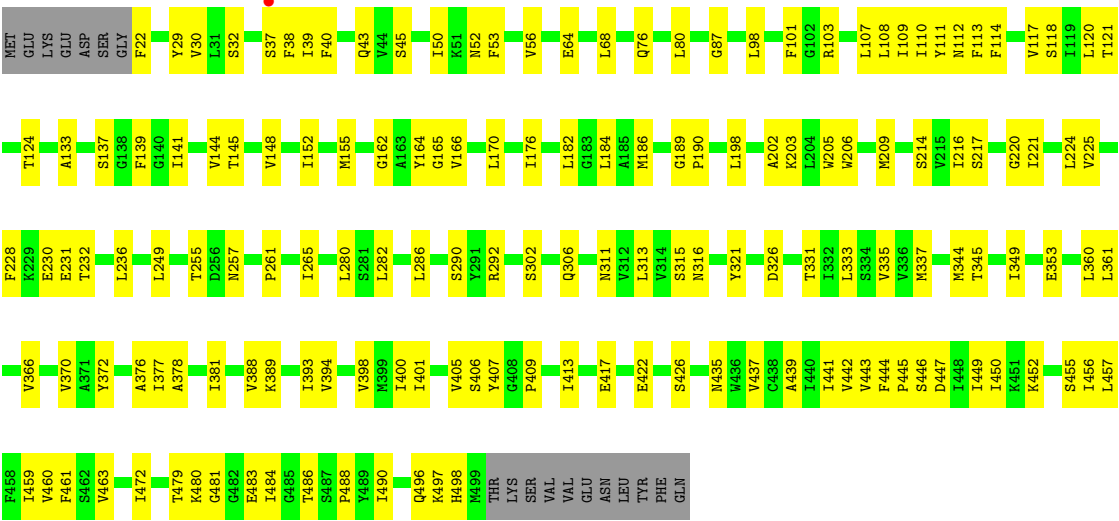


• Molecule 1: Hexose transporter 1

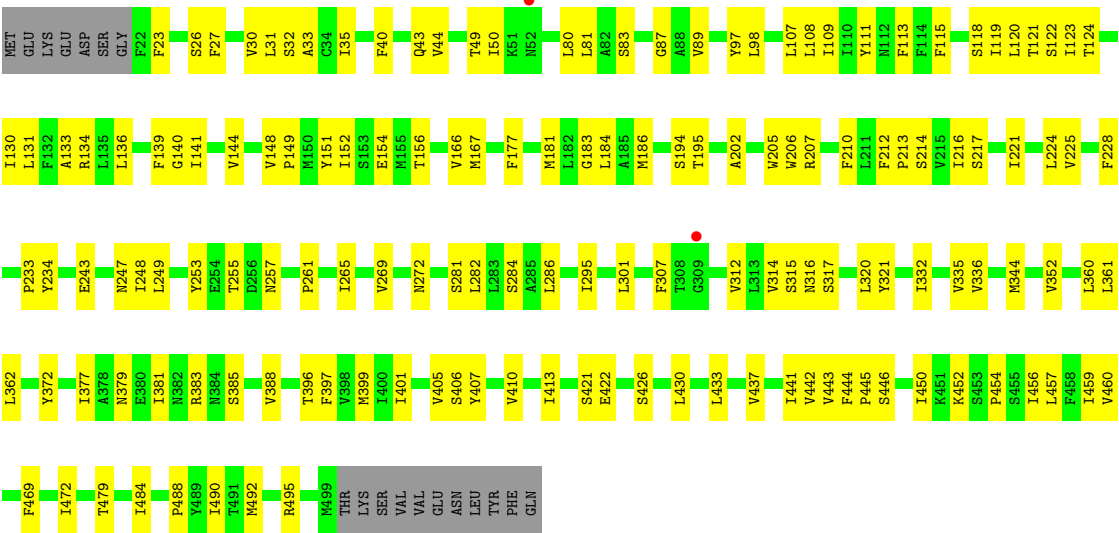


• Molecule 1: Hexose transporter 1





● Molecule 1: Hexose transporter 1



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	123.92Å 70.75Å 181.36Å 90.00° 107.06° 90.00°	Depositor
Resolution (Å)	25.36 – 3.55 25.36 – 3.55	Depositor EDS
% Data completeness (in resolution range)	96.8 (25.36-3.55) 96.4 (25.36-3.55)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.05 (at 3.55Å)	Xtriage
Refinement program	PHENIX 1.20.1_4487	Depositor
R, R_{free}	0.233 , 0.276 0.234 , 0.273	Depositor DCC
R_{free} test set	1779 reflections (4.56%)	wwPDB-VP
Wilson B-factor (Å ²)	123.1	Xtriage
Anisotropy	0.324	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 122.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.37$, $\langle L^2 \rangle = 0.20$	Xtriage
Estimated twinning fraction	0.106 for h,-k,-h-l	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	31052	wwPDB-VP
Average B, all atoms (Å ²)	151.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.08% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: A1IVP, BNG

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	0.16	0/3853	0.40	0/5227
1	B	0.17	0/3850	0.39	0/5225
1	C	0.17	0/3800	0.38	0/5168
1	D	0.16	0/3831	0.38	0/5203
All	All	0.17	0/15334	0.39	0/20823

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

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	3761	3858	3856	98	0
1	B	3757	3848	3846	91	0
1	C	3707	3750	3748	110	0
1	D	3738	3807	3807	102	0
2	A	63	90	90	6	0
2	B	105	150	150	4	0
2	C	84	120	120	6	0
2	D	42	60	60	2	0
3	A	11	12	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	11	12	0	2	0
3	C	11	12	0	1	0
3	D	11	12	0	1	0
4	A	7	0	0	0	0
4	B	4	0	0	0	0
4	C	5	0	0	0	0
4	D	4	0	0	0	0
All	All	15321	15731	15677	405	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 13.

The worst 5 of 405 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:602:A1IVP:O11	3:A:602:A1IVP:C08	1.68	1.22
3:C:604:A1IVP:C08	3:C:604:A1IVP:O11	1.68	1.22
3:D:603:A1IVP:C08	3:D:603:A1IVP:O11	1.68	1.15
3:B:706:A1IVP:O11	3:B:706:A1IVP:C08	1.69	1.13
1:B:249:LEU:HD23	1:B:262:LEU:HD12	1.46	0.94

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	475/496 (96%)	464 (98%)	10 (2%)	1 (0%)	43 73
1	B	476/496 (96%)	461 (97%)	15 (3%)	0	100 100
1	C	476/496 (96%)	448 (94%)	26 (6%)	2 (0%)	30 61
1	D	476/496 (96%)	465 (98%)	10 (2%)	1 (0%)	43 73

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
All	All	1903/1984 (96%)	1838 (97%)	61 (3%)	4 (0%)	43	73

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	497	LYS
1	C	315	SER
1	A	497	LYS
1	D	23	PHE

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	418/441 (95%)	418 (100%)	0	100	100
1	B	415/441 (94%)	415 (100%)	0	100	100
1	C	402/441 (91%)	402 (100%)	0	100	100
1	D	410/441 (93%)	410 (100%)	0	100	100
All	All	1645/1764 (93%)	1645 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 12 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	306	GLN
1	C	311	ASN
1	D	496	GLN
1	C	328	HIS
1	B	48	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 ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

18 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$
2	BNG	B	702	-	21,21,21	1.14	1 (4%)	26,26,26	1.01	2 (7%)
3	A1IVP	D	603	-	11,11,11	4.97	5 (45%)	15,15,15	0.64	0
2	BNG	B	701	-	21,21,21	1.13	1 (4%)	26,26,26	1.02	2 (7%)
2	BNG	D	602	-	21,21,21	1.11	1 (4%)	26,26,26	0.88	0
2	BNG	C	601	-	21,21,21	1.17	1 (4%)	26,26,26	1.35	2 (7%)
2	BNG	A	603	-	21,21,21	1.09	1 (4%)	26,26,26	1.21	1 (3%)
2	BNG	B	703	-	21,21,21	1.10	1 (4%)	26,26,26	0.91	0
2	BNG	B	704	-	21,21,21	1.09	1 (4%)	26,26,26	0.78	0
2	BNG	C	602	-	21,21,21	1.14	1 (4%)	26,26,26	1.32	3 (11%)
2	BNG	D	601	-	21,21,21	1.11	2 (9%)	26,26,26	0.92	0
3	A1IVP	A	602	-	11,11,11	5.00	5 (45%)	15,15,15	0.87	0
2	BNG	A	604	-	21,21,21	1.11	1 (4%)	26,26,26	0.89	0
3	A1IVP	B	706	-	11,11,11	5.01	5 (45%)	15,15,15	0.83	0
2	BNG	A	601	-	21,21,21	1.13	2 (9%)	26,26,26	0.91	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	A1IVP	C	604	-	11,11,11	5.00	5 (45%)	15,15,15	0.93	2 (13%)
2	BNG	C	605	-	21,21,21	1.10	2 (9%)	26,26,26	0.98	3 (11%)
2	BNG	B	705	-	21,21,21	1.13	2 (9%)	26,26,26	0.93	2 (7%)
2	BNG	C	603	-	21,21,21	1.12	1 (4%)	26,26,26	1.01	1 (3%)

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	BNG	B	702	-	-	4/12/32/32	0/1/1/1
3	A1IVP	D	603	-	-	2/4/20/20	0/1/1/1
2	BNG	B	701	-	-	6/12/32/32	0/1/1/1
2	BNG	D	602	-	-	3/12/32/32	0/1/1/1
2	BNG	C	601	-	-	9/12/32/32	0/1/1/1
2	BNG	A	603	-	-	8/12/32/32	0/1/1/1
2	BNG	B	703	-	-	7/12/32/32	0/1/1/1
2	BNG	B	704	-	-	10/12/32/32	0/1/1/1
2	BNG	C	602	-	-	7/12/32/32	0/1/1/1
2	BNG	D	601	-	-	8/12/32/32	0/1/1/1
3	A1IVP	A	602	-	-	2/4/20/20	0/1/1/1
2	BNG	A	604	-	-	10/12/32/32	0/1/1/1
3	A1IVP	B	706	-	-	2/4/20/20	0/1/1/1
2	BNG	A	601	-	-	8/12/32/32	0/1/1/1
3	A1IVP	C	604	-	-	0/4/20/20	0/1/1/1
2	BNG	C	605	-	-	6/12/32/32	0/1/1/1
2	BNG	B	705	-	-	3/12/32/32	0/1/1/1
2	BNG	C	603	-	-	4/12/32/32	0/1/1/1

The worst 5 of 38 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	706	A1IVP	O11-C08	10.82	1.69	1.45
3	A	602	A1IVP	O11-C08	10.68	1.68	1.45
3	C	604	A1IVP	O11-C08	10.65	1.68	1.45
3	D	603	A1IVP	O11-C08	10.57	1.68	1.45
3	D	603	A1IVP	C06-C08	-9.39	1.29	1.53

The worst 5 of 18 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	601	BNG	O5-C5-C4	3.78	116.51	109.70
2	C	601	BNG	C3-C4-C5	3.48	116.55	110.23
2	A	603	BNG	O5-C1-C2	3.38	117.31	110.37
2	C	602	BNG	C1-O5-C5	3.35	120.26	113.72
2	C	602	BNG	O5-C5-C4	3.28	115.61	109.70

There are no chirality outliers.

5 of 99 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	601	BNG	C2'-C1'-O1-C1
2	A	603	BNG	C2-C1-O1-C1'
2	A	603	BNG	O5-C1-O1-C1'
2	A	604	BNG	O5-C1-O1-C1'
2	B	703	BNG	C2-C1-O1-C1'

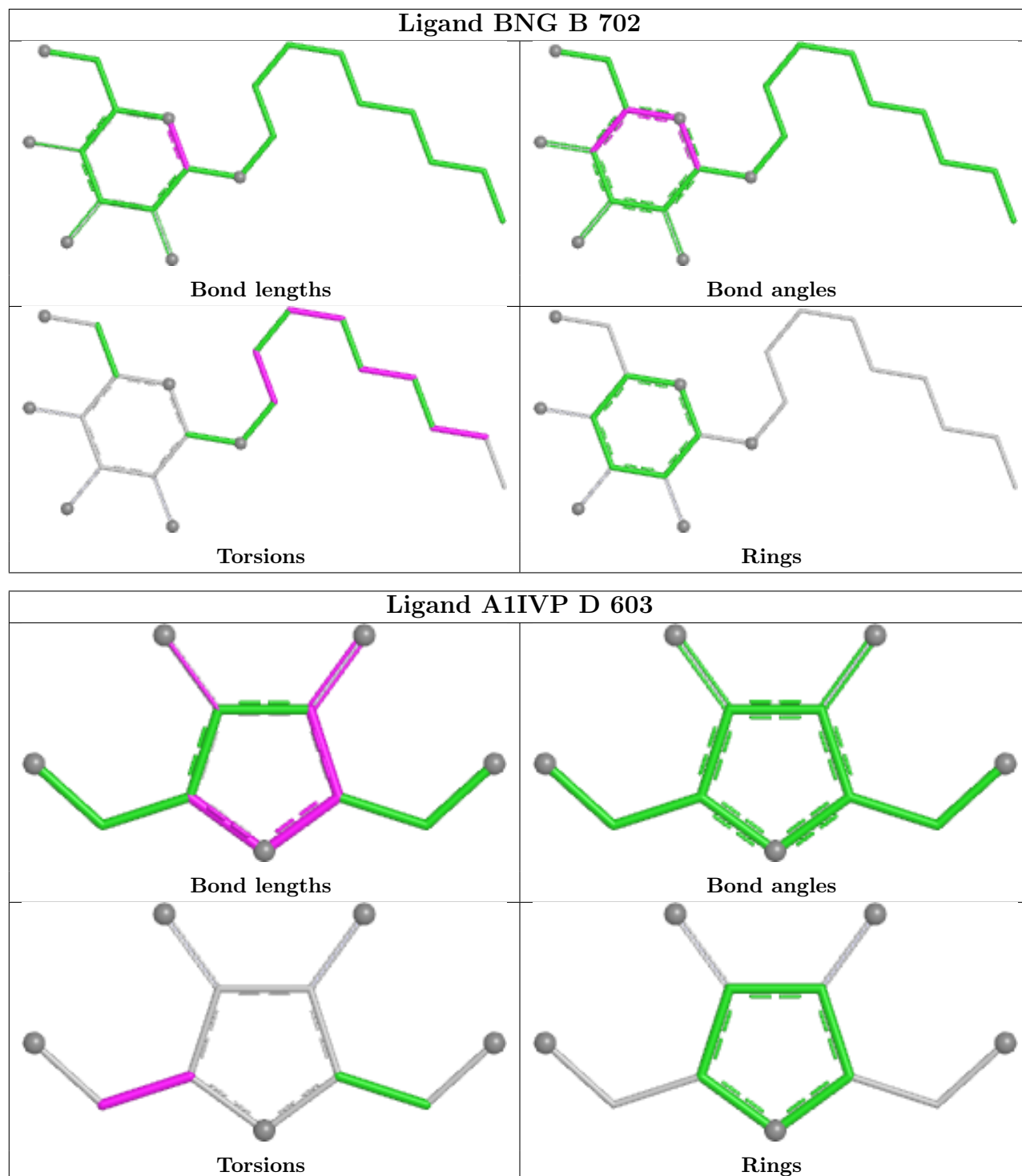
There are no ring outliers.

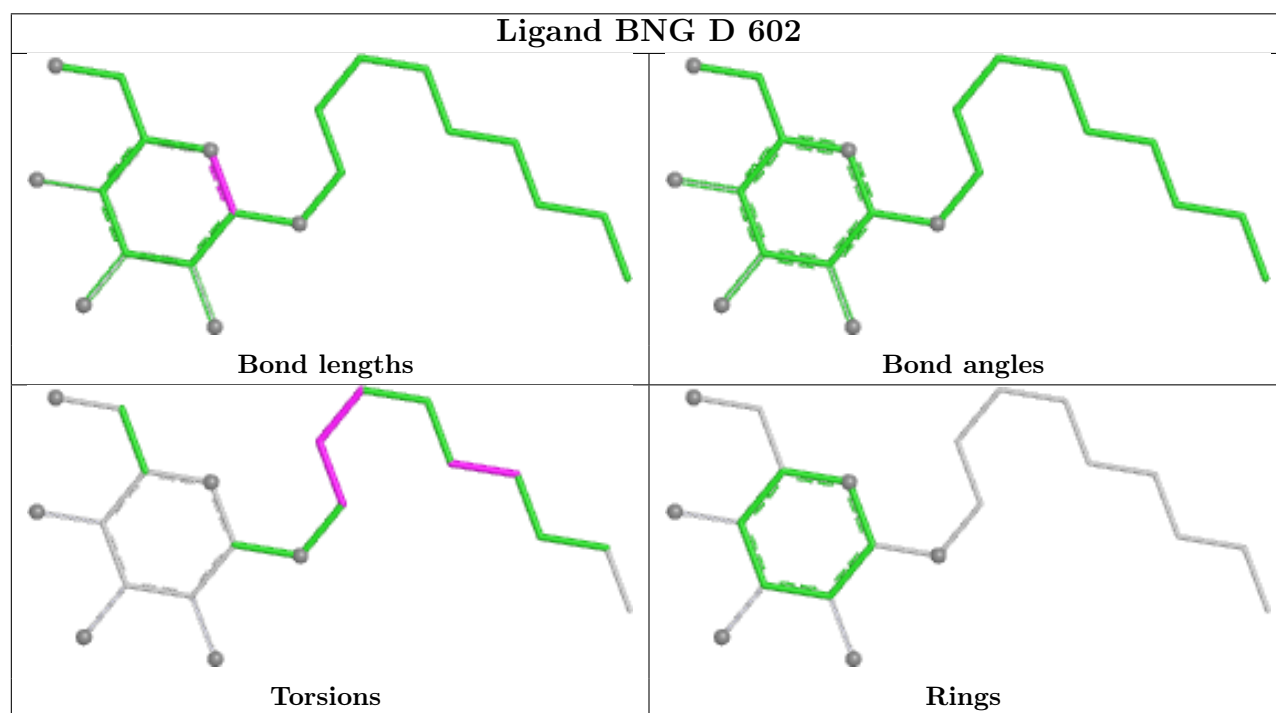
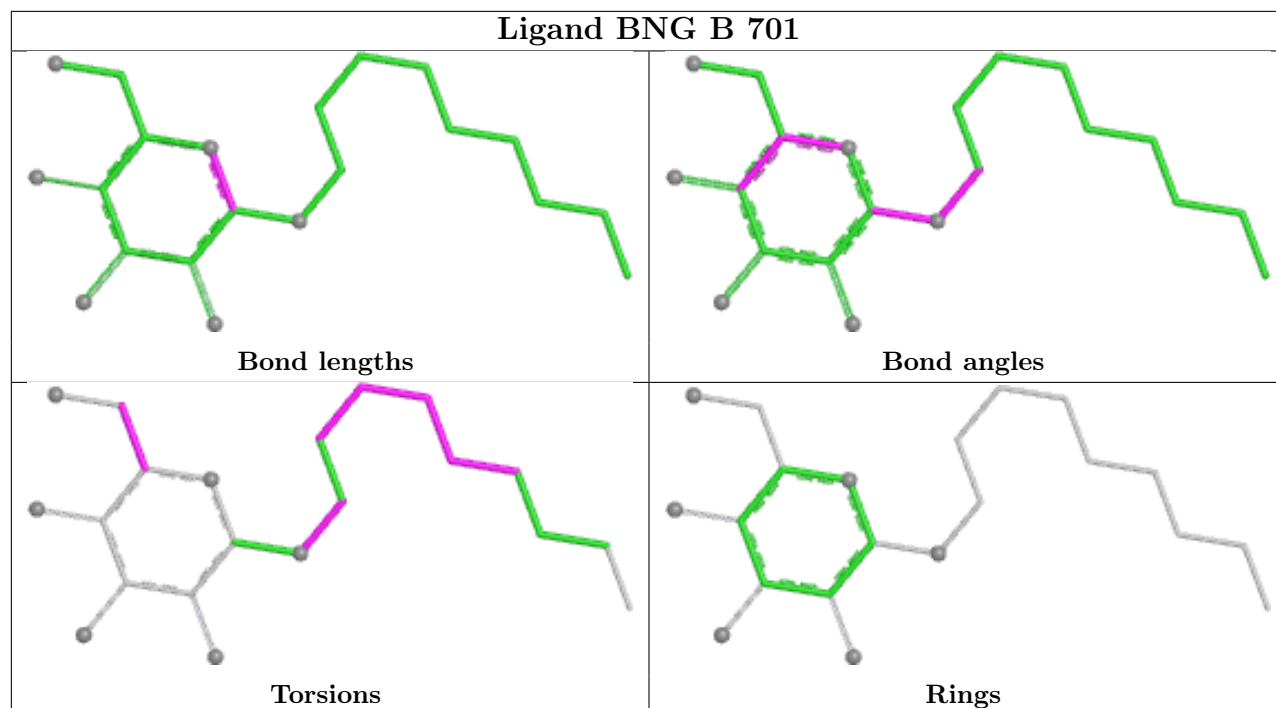
13 monomers are involved in 23 short contacts:

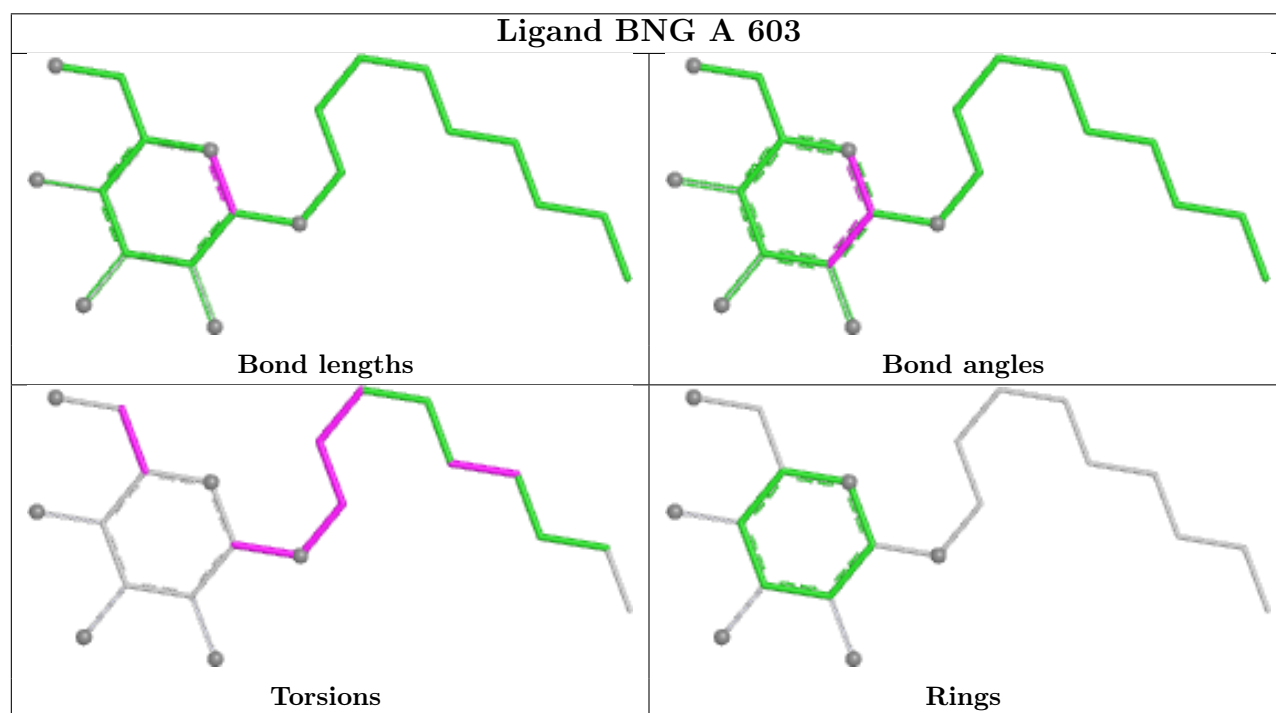
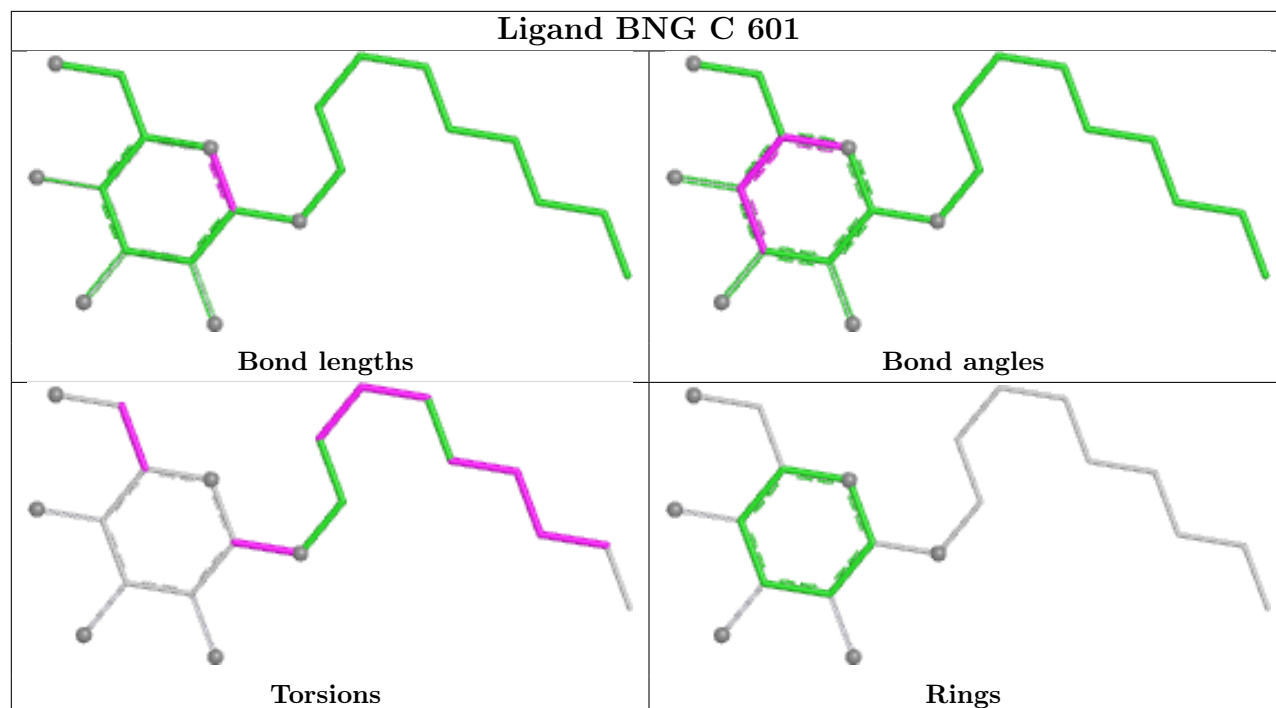
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	702	BNG	2	0
3	D	603	A1IVP	1	0
2	D	602	BNG	2	0
2	C	601	BNG	2	0
2	A	603	BNG	2	0
2	B	704	BNG	2	0
3	A	602	A1IVP	1	0
2	A	604	BNG	2	0
3	B	706	A1IVP	2	0
2	A	601	BNG	2	0
3	C	604	A1IVP	1	0
2	C	605	BNG	3	0
2	C	603	BNG	1	0

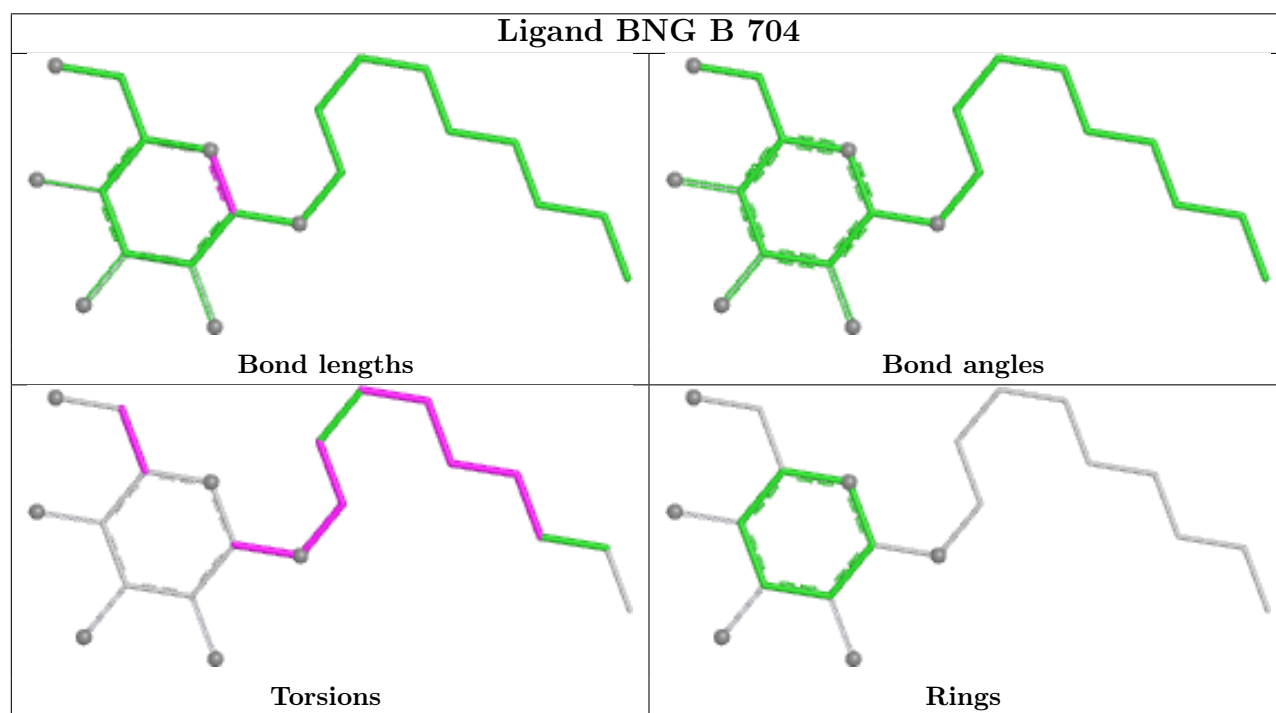
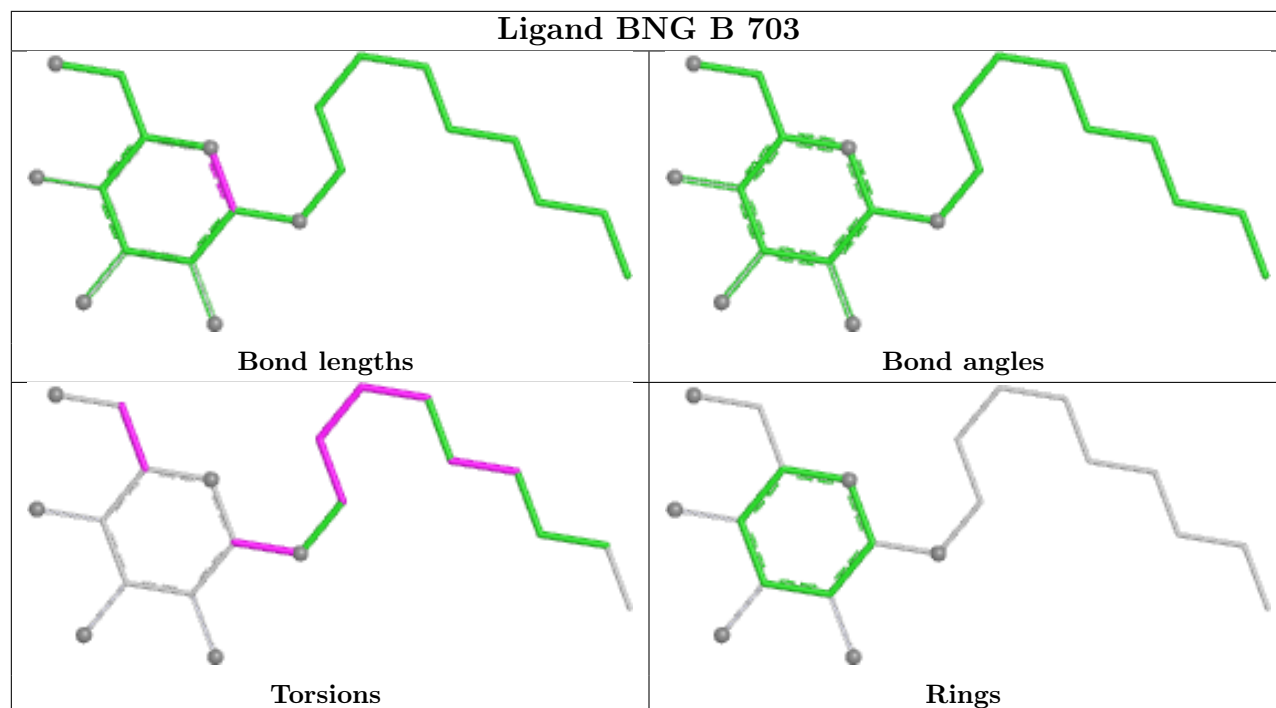
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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

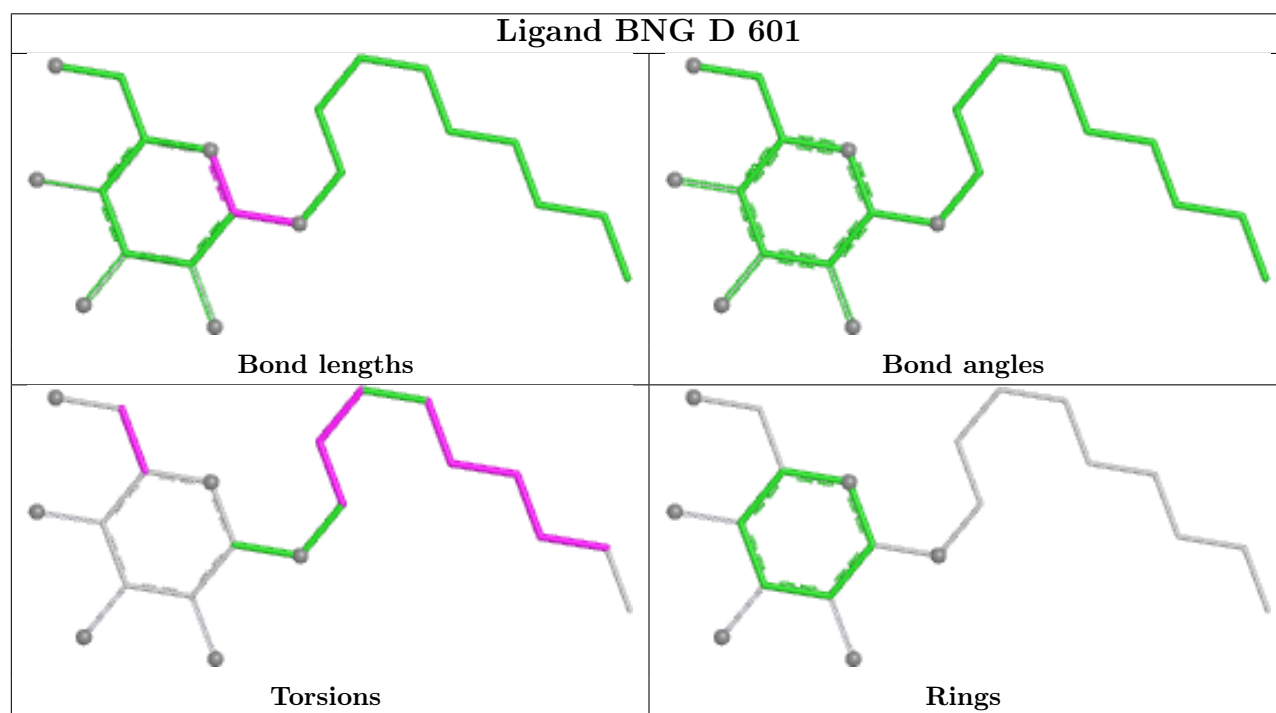
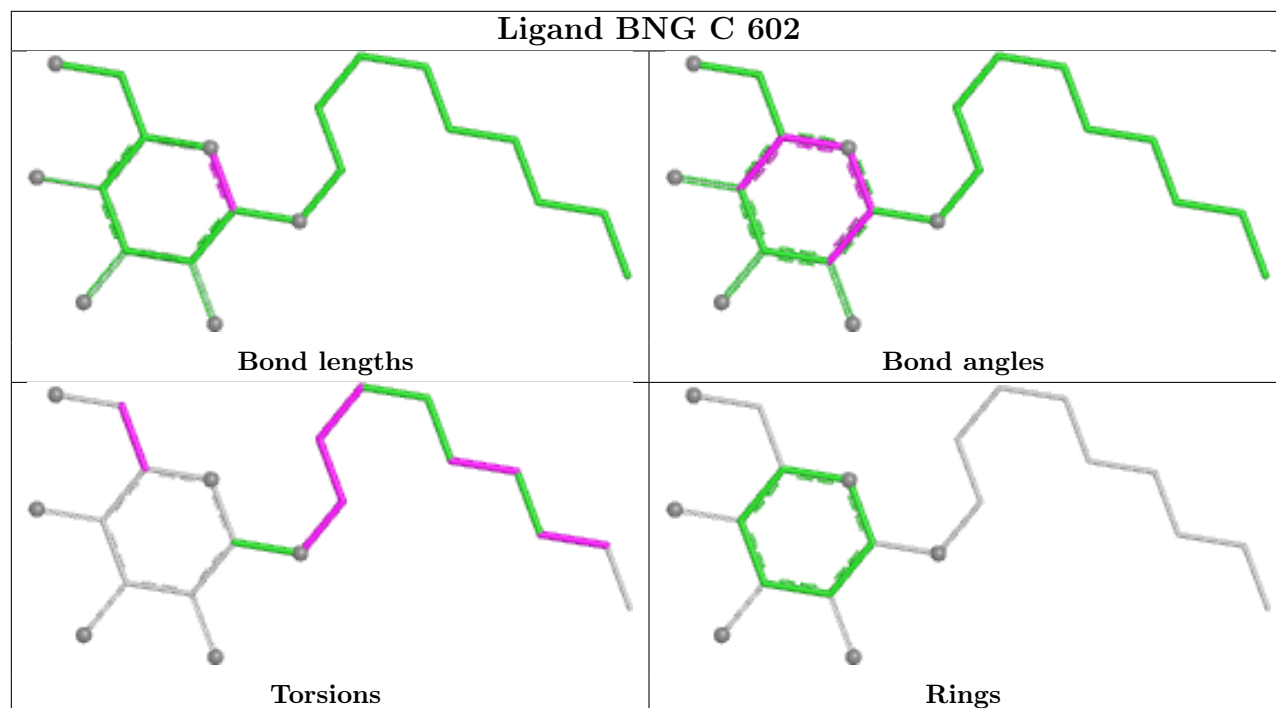
in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

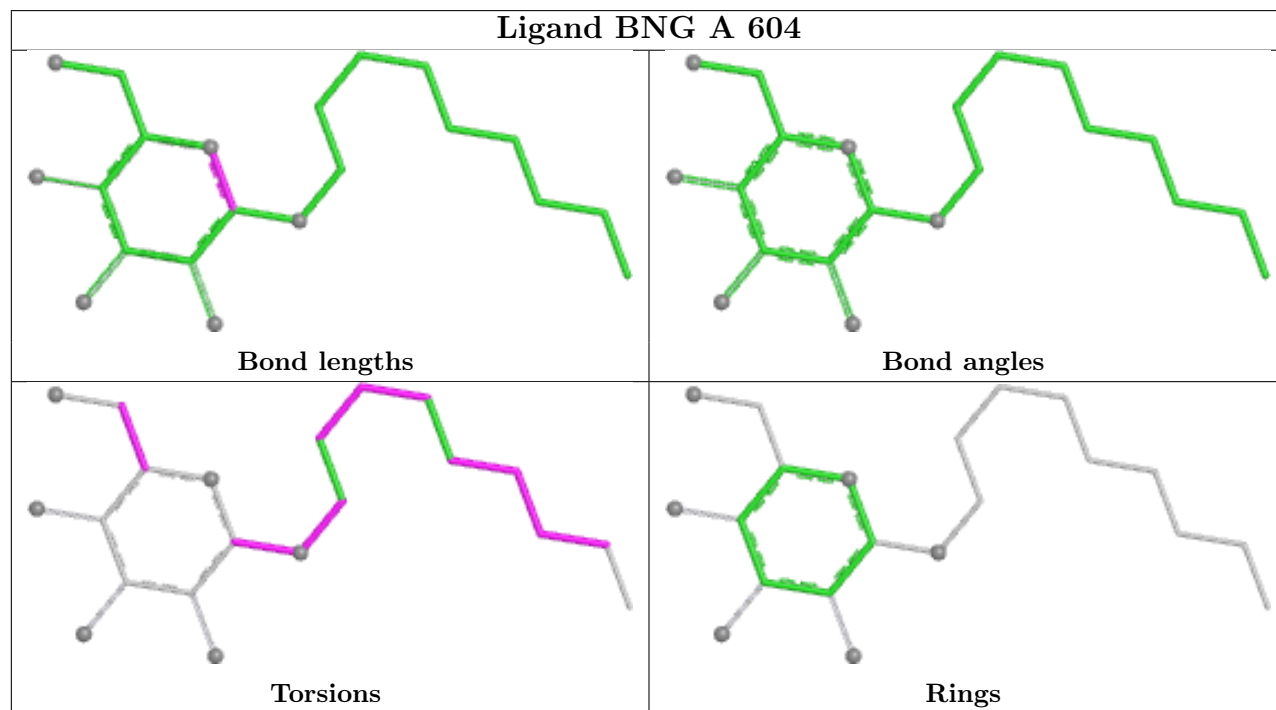
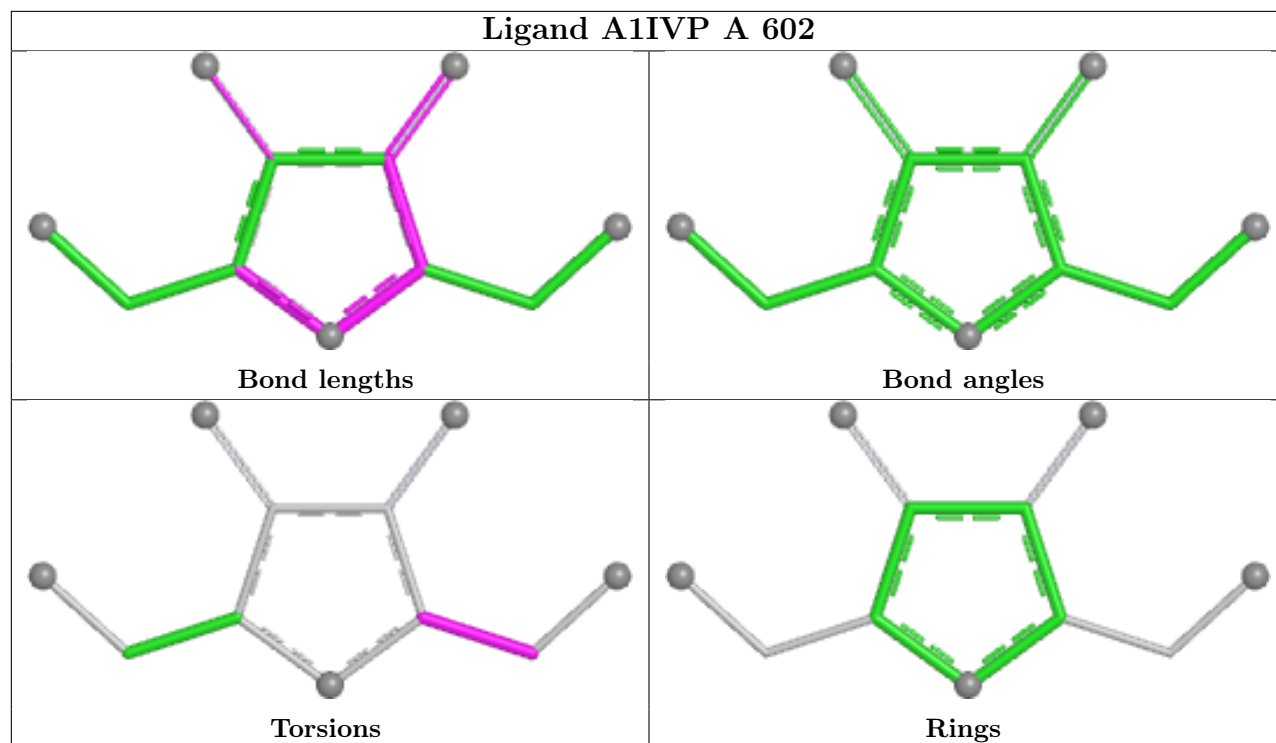


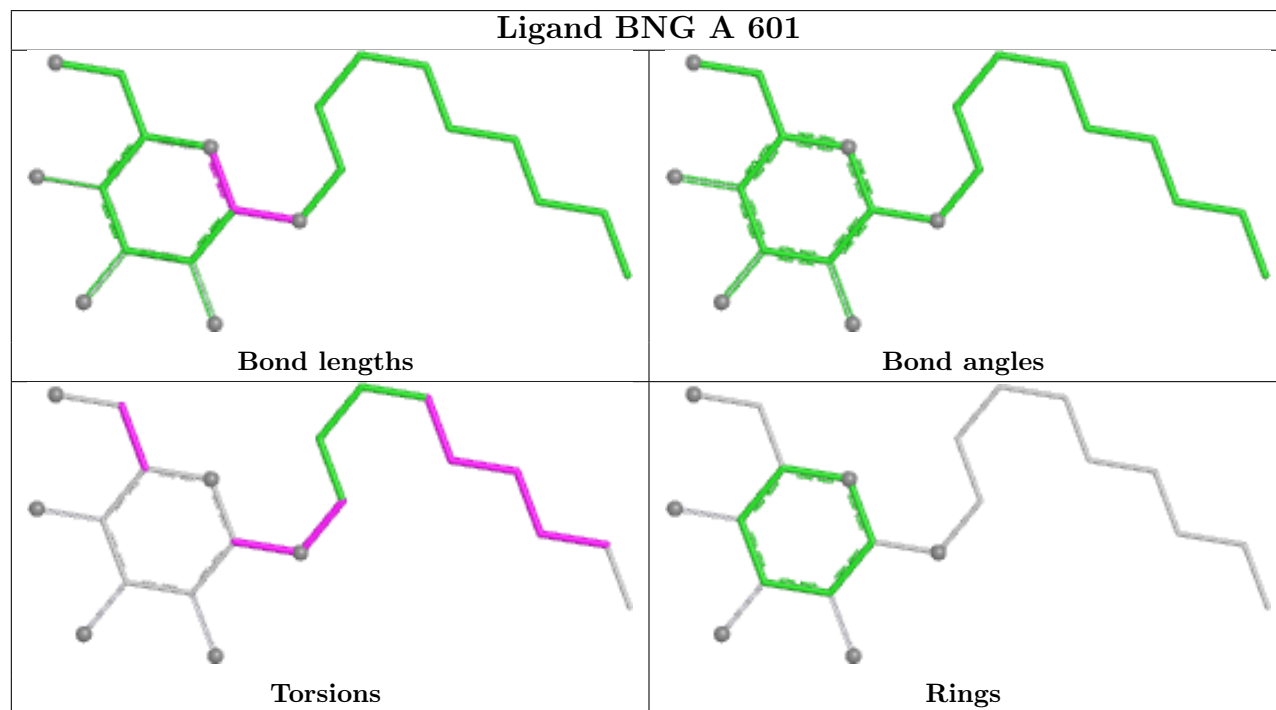
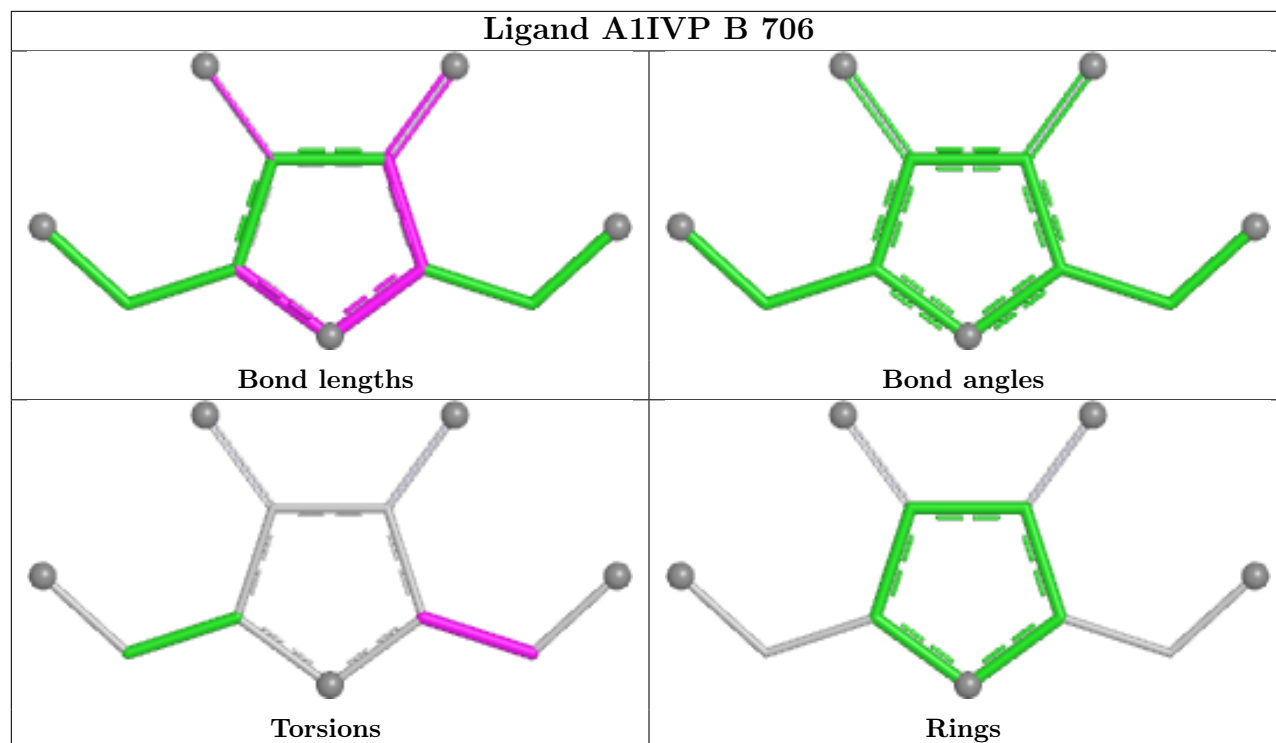


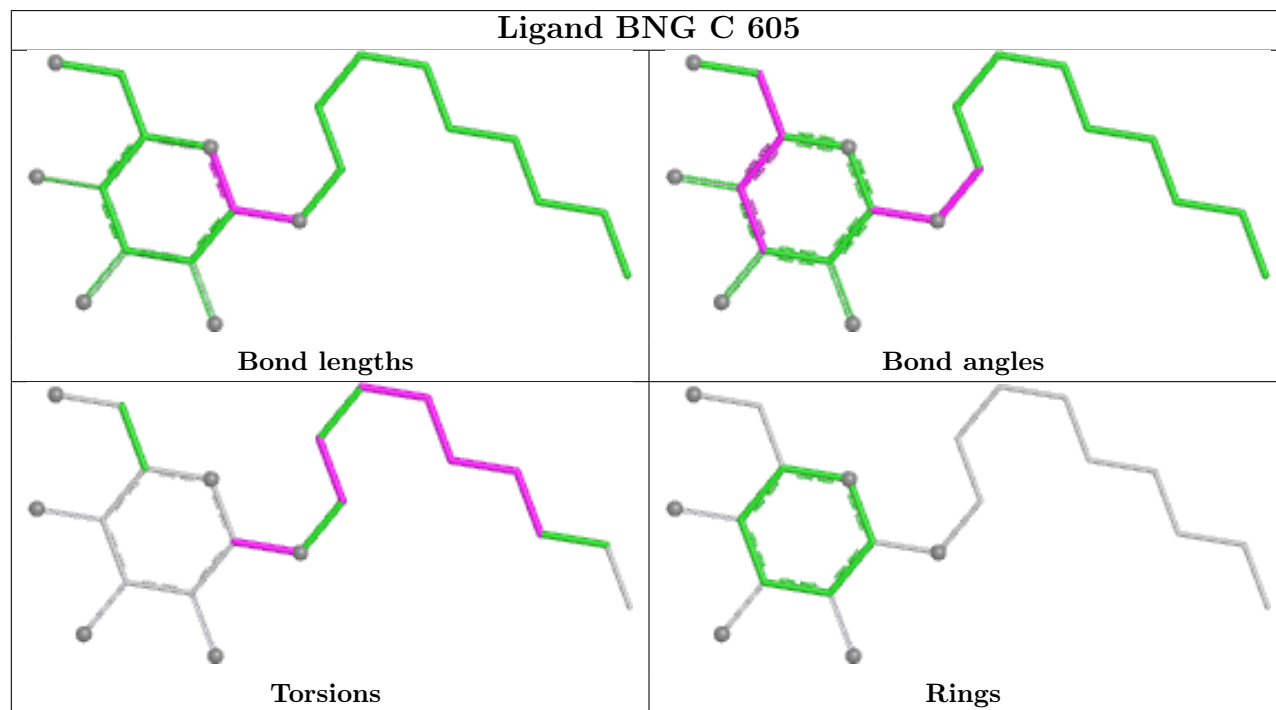
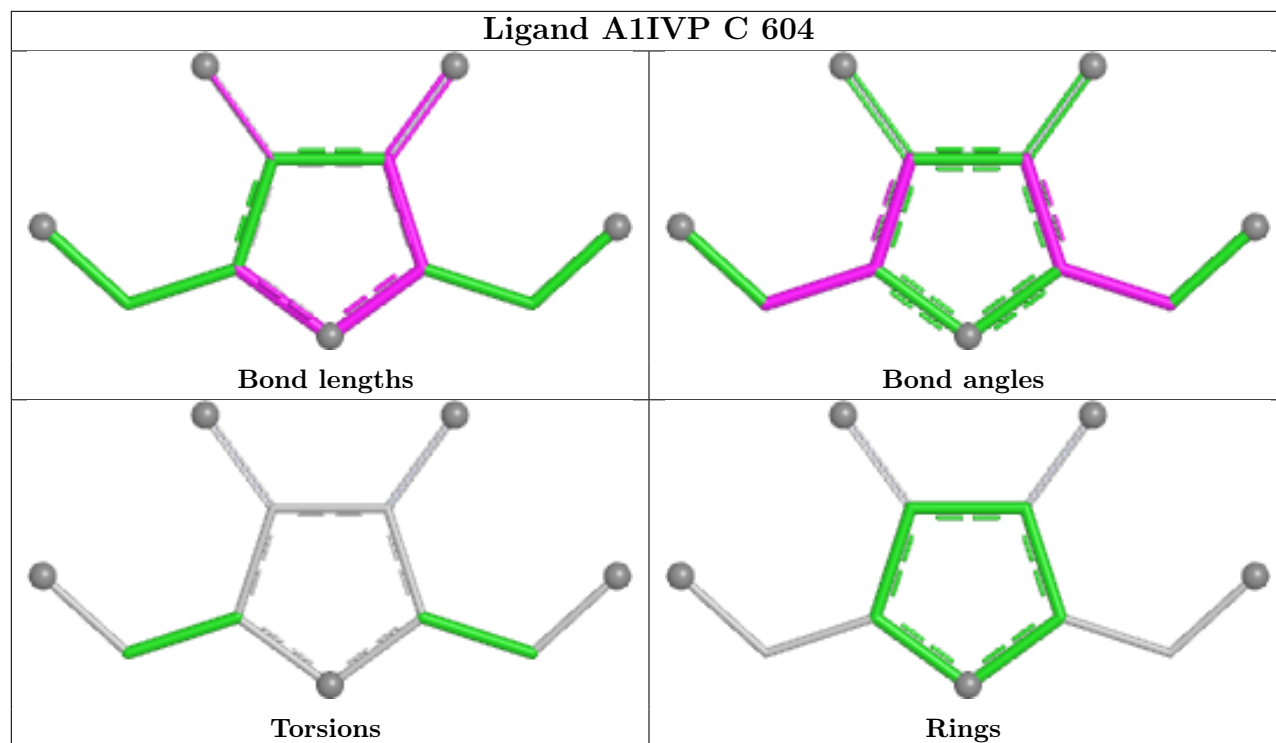


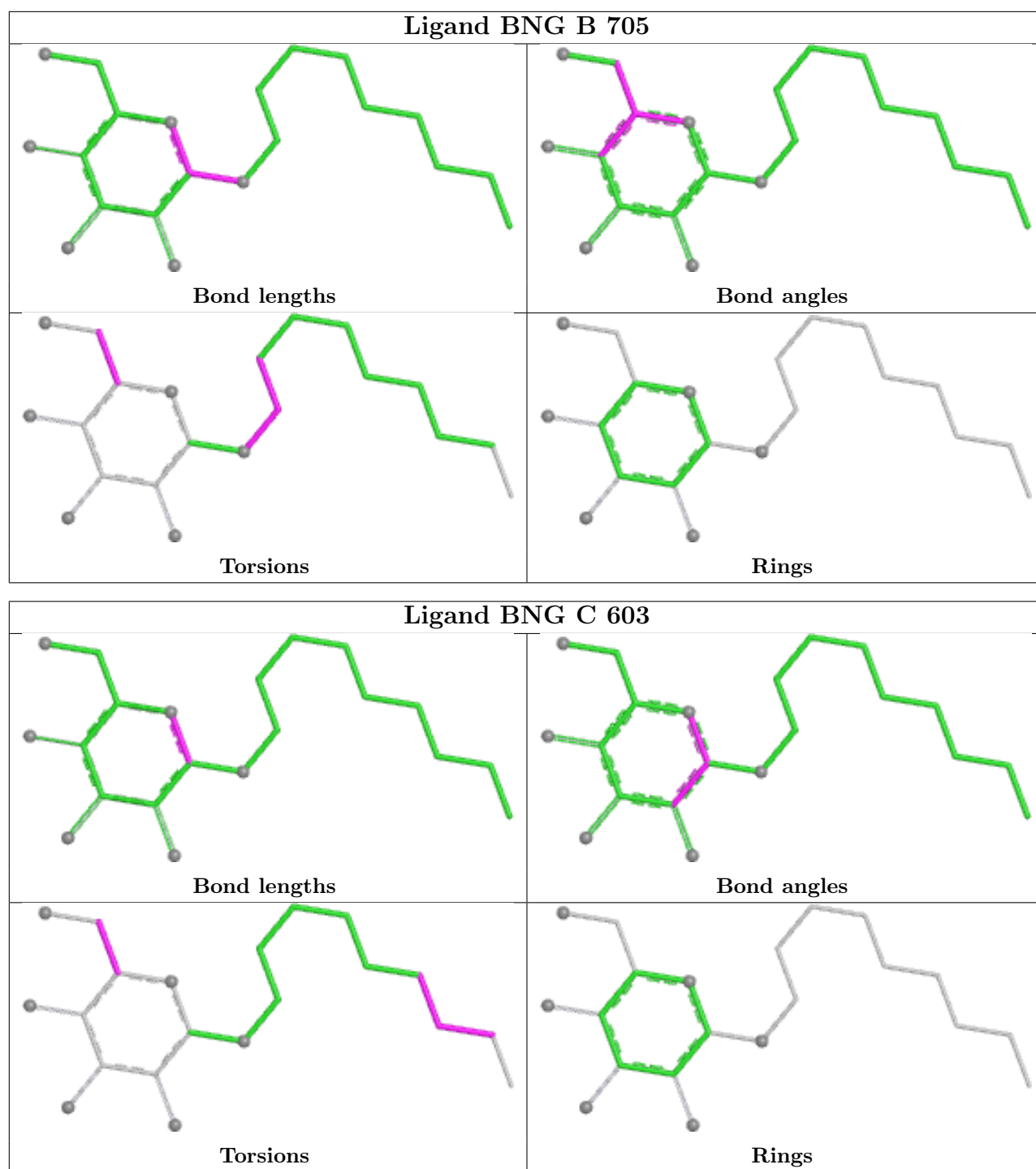












5.7 Other polymers [i](#)

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	477/496 (96%)	-0.27	3 (0%) 85 63	86, 141, 220, 292	0
1	B	478/496 (96%)	-0.32	5 (1%) 79 54	79, 132, 209, 291	0
1	C	478/496 (96%)	-0.35	1 (0%) 91 80	94, 165, 226, 260	0
1	D	478/496 (96%)	-0.33	2 (0%) 88 70	85, 145, 223, 306	0
All	All	1911/1984 (96%)	-0.32	11 (0%) 85 63	79, 147, 221, 306	0

The worst 5 of 11 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	37	SER	3.4
1	C	37	SER	3.3
1	A	410	VAL	3.2
1	A	83	SER	2.5
1	D	309	GLY	2.3

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](#)

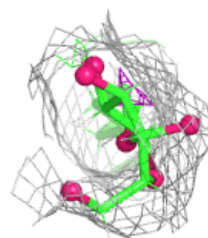
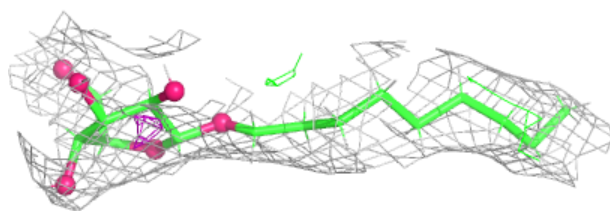
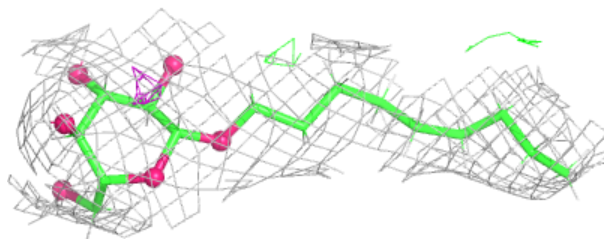
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q < 0.9’ lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	BNG	C	601	21/21	0.65	0.11	111,144,180,204	0
2	BNG	A	604	21/21	0.69	0.10	79,128,167,178	0
2	BNG	B	704	21/21	0.74	0.12	126,174,207,216	0
2	BNG	C	605	21/21	0.78	0.11	81,131,161,176	0
2	BNG	C	603	21/21	0.79	0.10	85,140,167,176	0
2	BNG	B	701	21/21	0.79	0.10	98,137,182,190	0
2	BNG	A	603	21/21	0.87	0.13	109,144,189,203	0
2	BNG	B	702	21/21	0.87	0.11	89,131,183,209	0
2	BNG	C	602	21/21	0.90	0.12	130,169,204,219	0
2	BNG	B	705	21/21	0.90	0.08	83,117,162,166	0
2	BNG	A	601	21/21	0.90	0.09	112,165,216,231	0
2	BNG	D	601	21/21	0.90	0.10	109,148,196,212	0
3	A1IVP	A	602	11/11	0.90	0.11	83,112,137,144	0
2	BNG	B	703	21/21	0.92	0.12	97,147,193,207	0
3	A1IVP	B	706	11/11	0.92	0.09	50,84,101,118	0
2	BNG	D	602	21/21	0.93	0.11	101,149,192,197	0
3	A1IVP	D	603	11/11	0.94	0.13	77,96,115,116	0
3	A1IVP	C	604	11/11	0.95	0.10	79,107,127,134	0

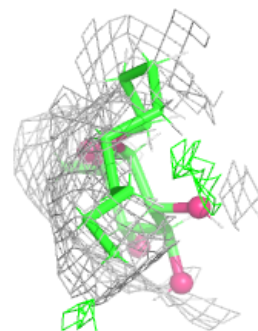
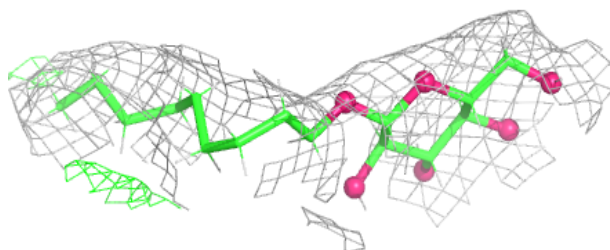
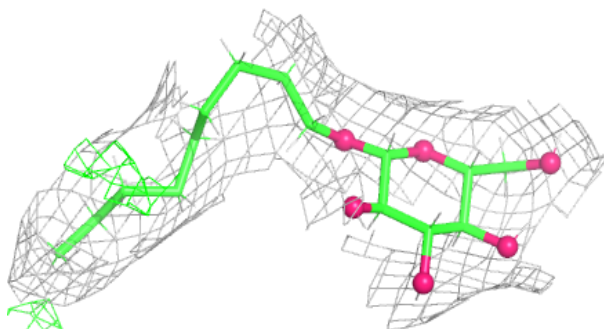
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around BNG C 601:

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

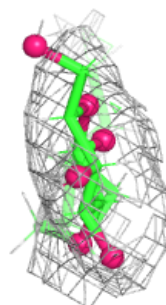
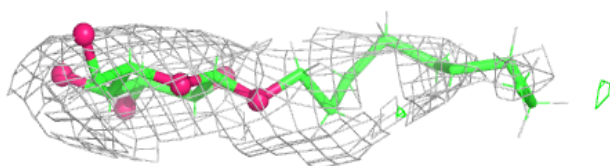
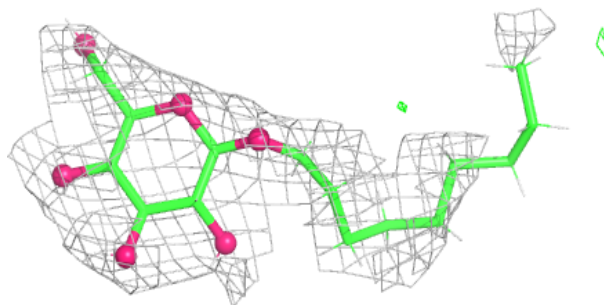
**Electron density around BNG A 604:**

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

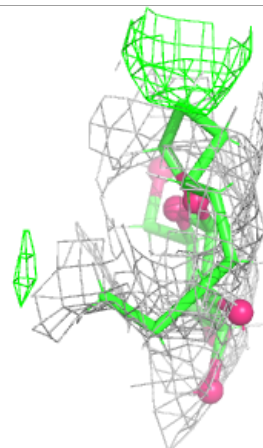
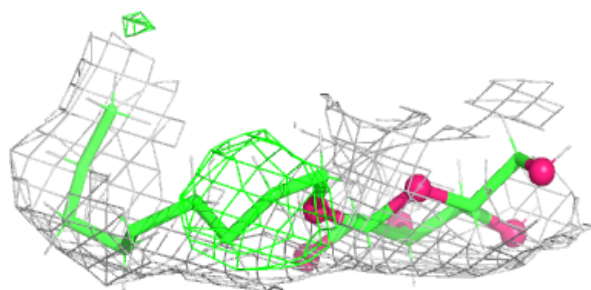
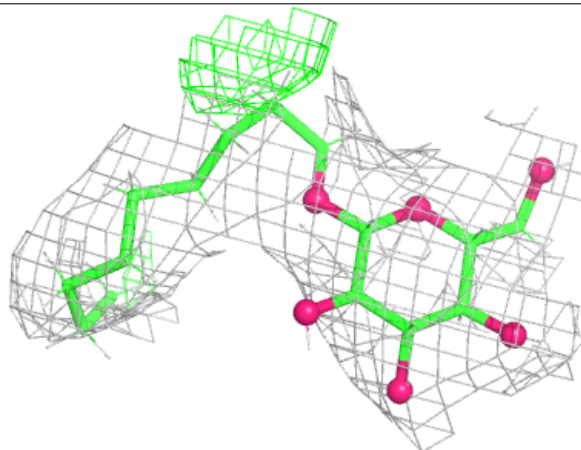


Electron density around BNG B 704:

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

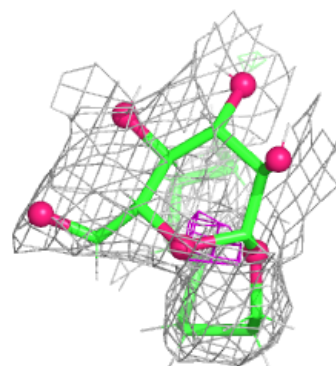
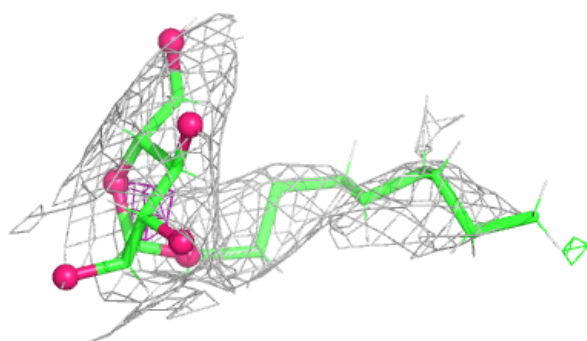
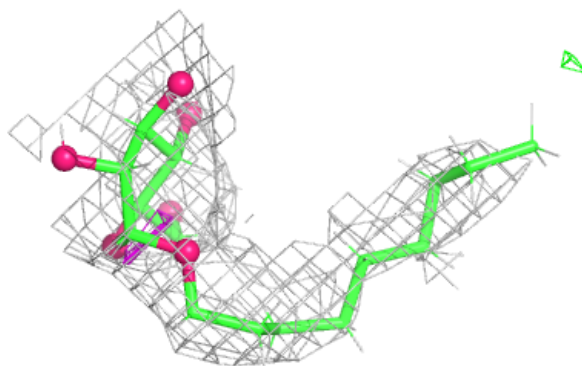
**Electron density around BNG C 605:**

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

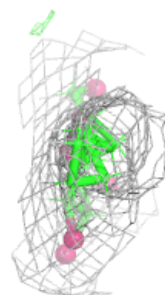
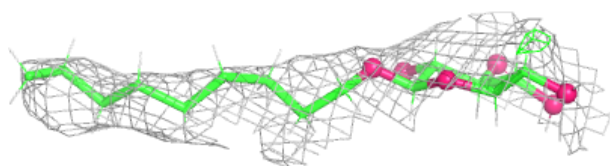
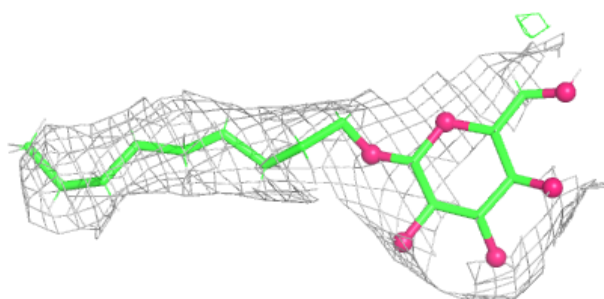


Electron density around BNG C 603:

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 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

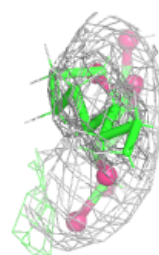
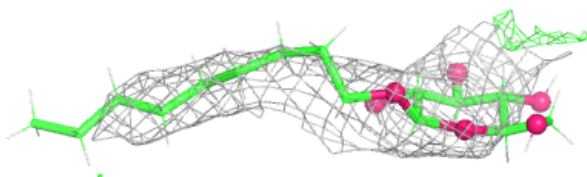
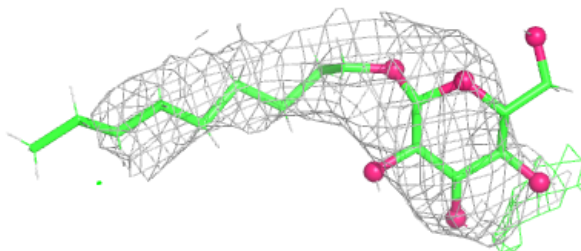
**Electron density around BNG B 701:**

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 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

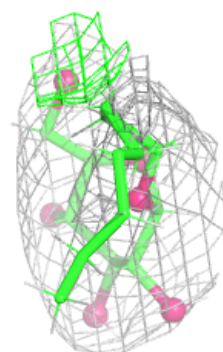
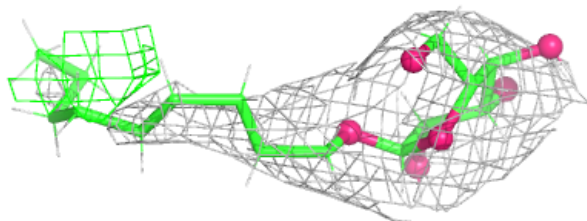
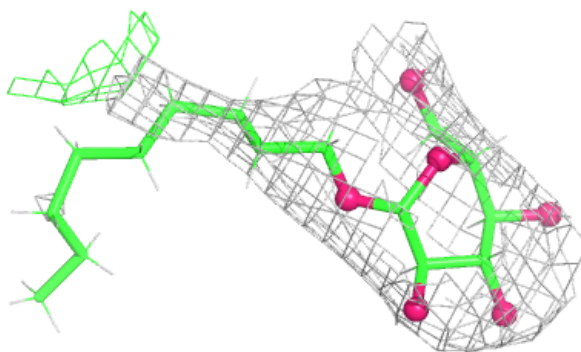


Electron density around BNG A 603:

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

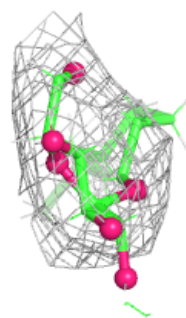
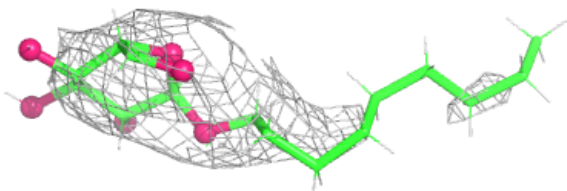
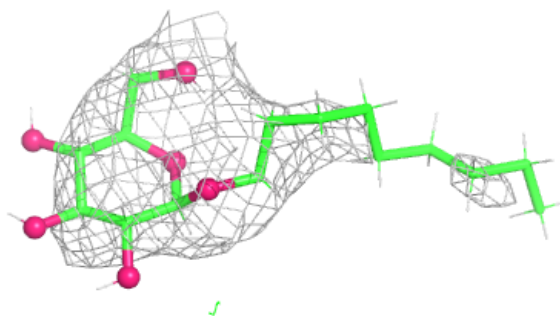
**Electron density around BNG B 702:**

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 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

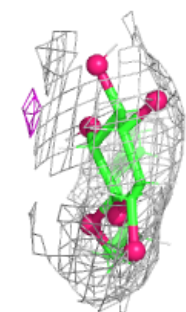
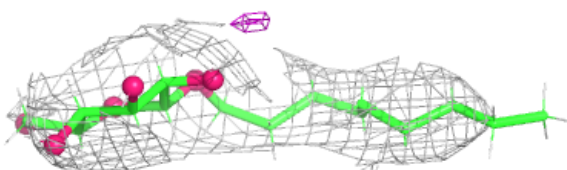
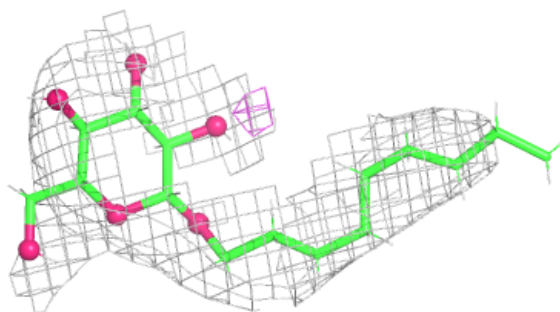


Electron density around BNG C 602:

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

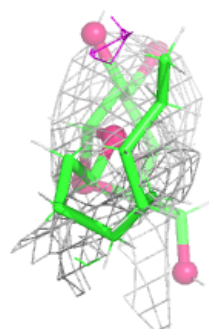
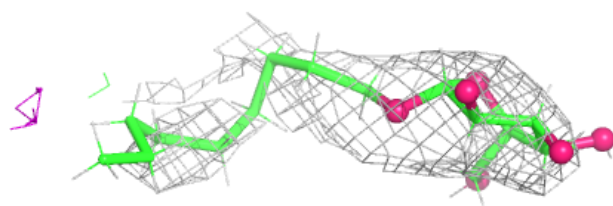
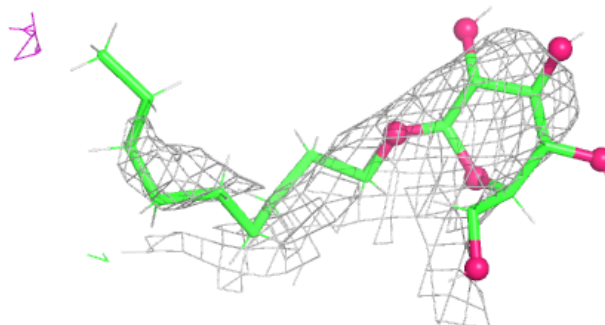
**Electron density around BNG B 705:**

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

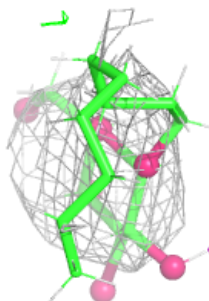
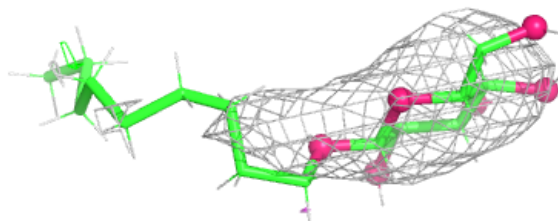
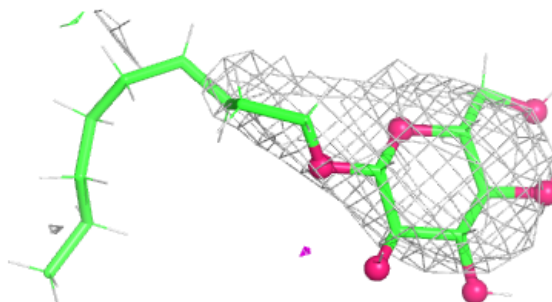


Electron density around BNG A 601:

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

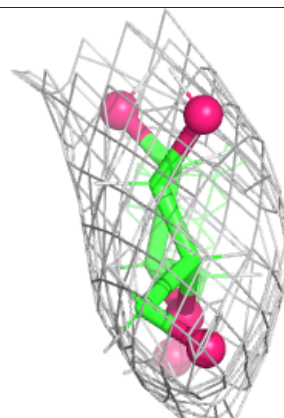
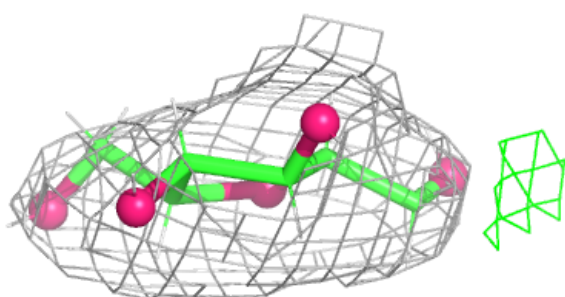
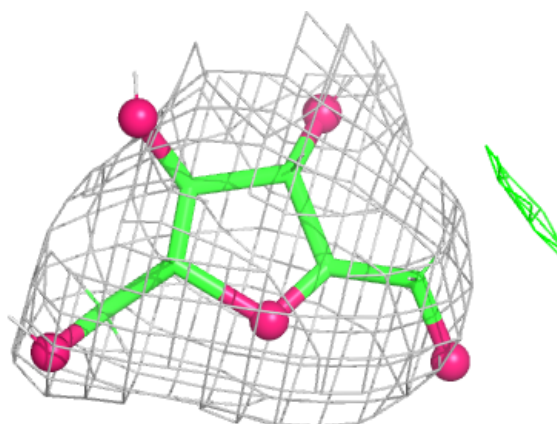
**Electron density around BNG D 601:**

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

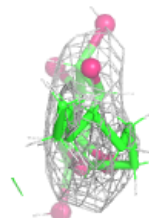
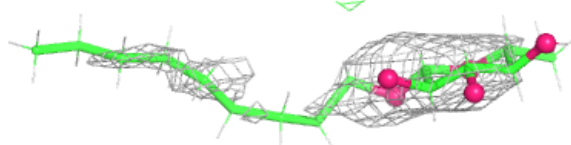
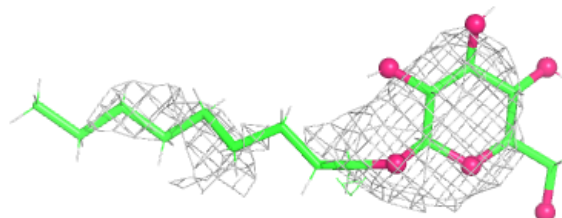


Electron density around A1IVP A 602:

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

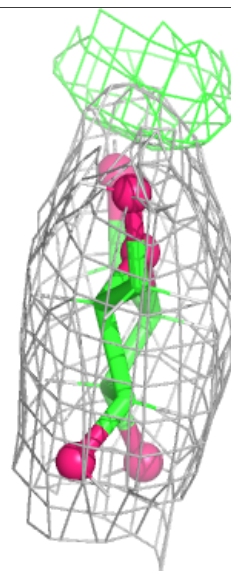
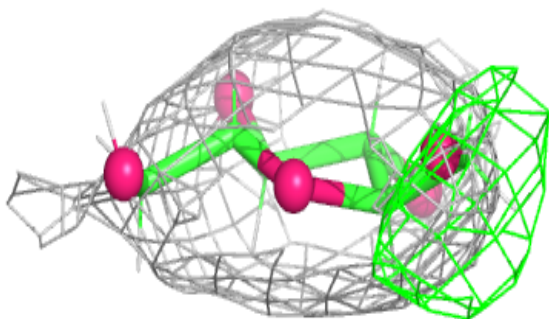
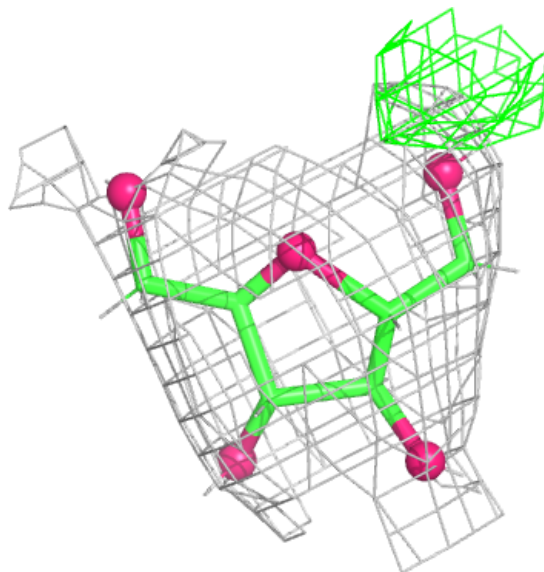
**Electron density around BNG B 703:**

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and green (positive)



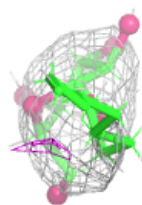
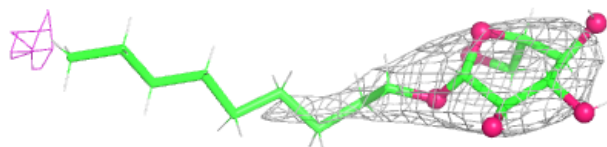
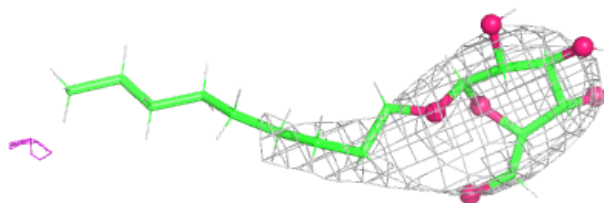
Electron density around A1IVP B 706:

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



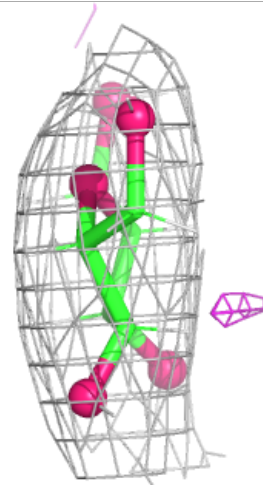
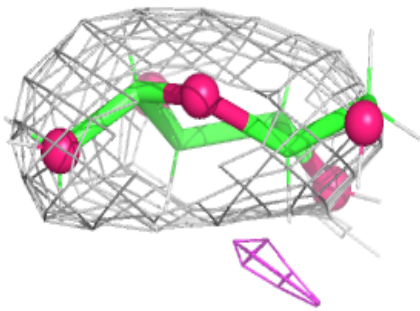
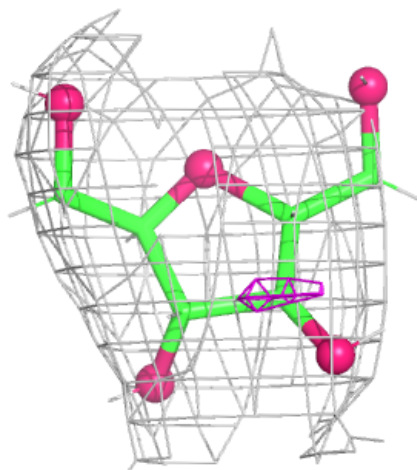
Electron density around BNG D 602:

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



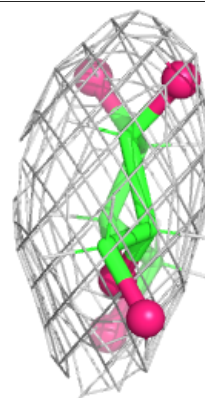
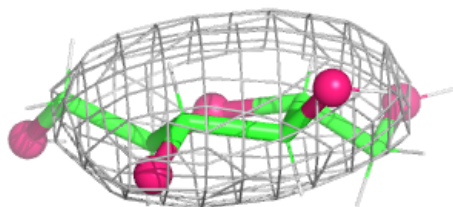
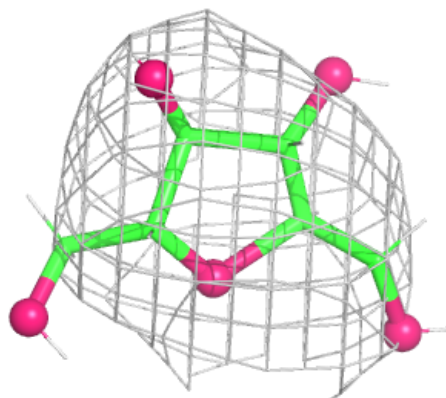
Electron density around A1IVP D 603:

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



Electron density around A1IVP C 604:

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



6.5 Other polymers [i](#)

There are no such residues in this entry.