



# Full wwPDB X-ray Structure Validation Report ⓘ

Jan 8, 2024 – 04:40 am GMT

PDB ID : 6EKZ  
Title : Direct-evolutioned unspecific peroxygenase from *Agrocybe aegerita*, in complex with propranolol  
Authors : Ramirez-Escudero, M.; Sanz-Aparicio, J.  
Deposited on : 2017-09-27  
Resolution : 1.08 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](mailto: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>.

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

MolProbity : 4.02b-467  
Mogul : 1.8.4, 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

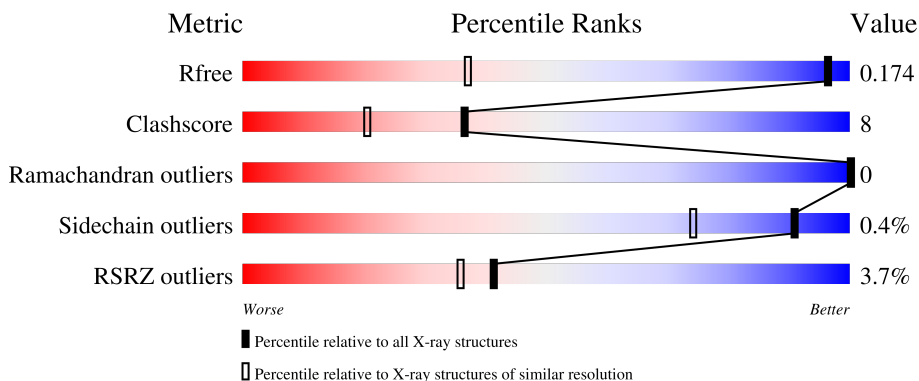
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.08 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	1386 (1.12-1.04)
Clashscore	141614	1021 (1.10-1.06)
Ramachandran outliers	138981	1381 (1.12-1.04)
Sidechain outliers	138945	1379 (1.12-1.04)
RSRZ outliers	127900	1359 (1.12-1.04)

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  $\geq 3$ , 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	328	

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
6	PO4	A	421	-	-	X	-

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<b>Mol</b>	<b>Type</b>	<b>Chain</b>	<b>Res</b>	<b>Chirality</b>	<b>Geometry</b>	<b>Clashes</b>	<b>Electron density</b>
7	GOL	A	417	-	-	X	-
8	SNP	A	413[B]	-	-	X	-

## 2 Entry composition [i](#)

There are 9 unique types of molecules in this entry. The entry contains 3270 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.

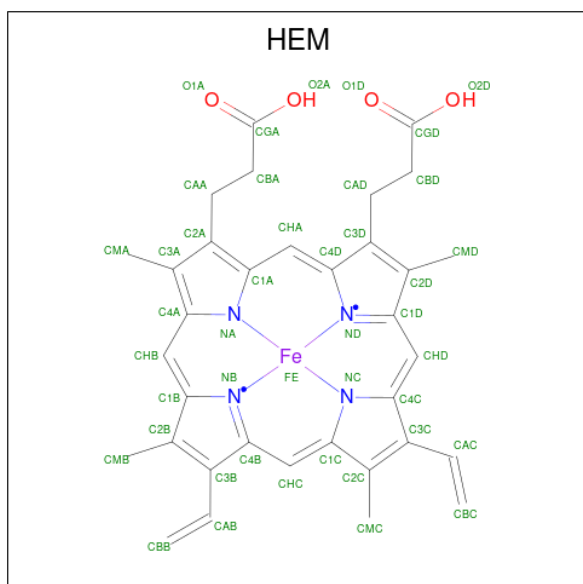
- Molecule 1 is a protein called Aromatic peroxygenase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	325	2592	1636	457	490	9	0	9	0

There are 5 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	57	ALA	VAL	engineered mutation	UNP B9W4V6
A	67	PHE	LEU	engineered mutation	UNP B9W4V6
A	75	ILE	VAL	engineered mutation	UNP B9W4V6
A	248	VAL	ILE	engineered mutation	UNP B9W4V6
A	311	LEU	PHE	engineered mutation	UNP B9W4V6

- Molecule 2 is PROTOPORPHYRIN IX CONTAINING FE (three-letter code: HEM) (formula:  $C_{34}H_{32}FeN_4O_4$ ).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	Fe	N			O
2	A	1	43	34	1	4	4	0	0

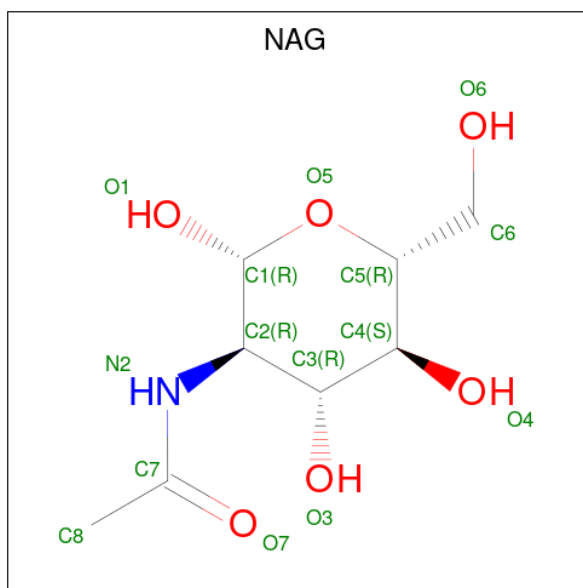
- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
3	A	1	1	1	0	0

- Molecule 4 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Cl		
4	A	1	1	1	0	0

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>).



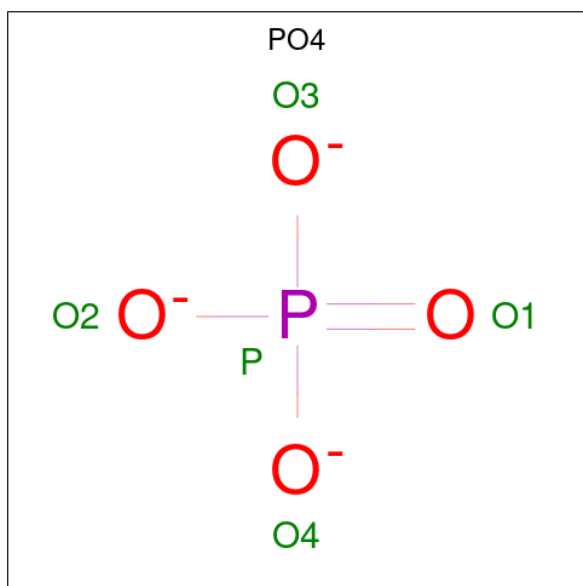
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
5	A	1	14	8	1	5	0	0
5	A	1	14	8	1	5	0	0
5	A	1	14	8	1	5	0	0
5	A	1	14	8	1	5	0	0

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

- Molecule 6 is PHOSPHATE ION (three-letter code: PO4) (formula: O<sub>4</sub>P).



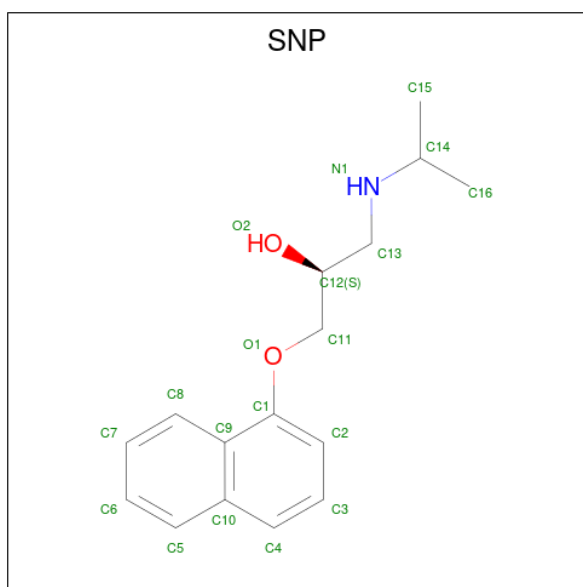
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	O	P	0	0
			5	4	1		
6	A	1	Total	O	P	0	0
			5	4	1		
6	A	1	Total	O	P	0	0
			5	4	1		

- Molecule 7 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	1	Total C O 6 3 3	0	0
7	A	1	Total C O 6 3 3	0	0
7	A	1	Total C O 6 3 3	0	0
7	A	1	Total C O 6 3 3	0	0
7	A	1	Total C O 6 3 3	0	0
7	A	1	Total C O 6 3 3	0	0

- Molecule 8 is 1-(ISOPROPYLAMINO)-3-(1-NAPHTHYLOXY)-2-PROPANOL (three-letter code: SNP) (formula: C<sub>16</sub>H<sub>21</sub>NO<sub>2</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
8	A	1	38	32	2	4	0	1
8	A	1	19	16	1	2	0	0
8	A	1	19	16	1	2	0	0
8	A	1	19	16	1	2	0	0

- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
9	A	417	417	417	0	0



### 3 Residue-property plots

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

Chain A: 



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	51.03Å 57.88Å 60.89Å 90.00° 110.09° 90.00°	Depositor
Resolution (Å)	47.92 – 1.08 47.92 – 1.08	Depositor EDS
% Data completeness (in resolution range)	89.8 (47.92-1.08) 89.8 (47.92-1.08)	Depositor EDS
$R_{merge}$	0.06	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.14 (at 1.08Å)	Xtrriage
Refinement program	REFMAC 5.8.0158	Depositor
R, $R_{free}$	0.158 , 0.163 0.170 , 0.174	Depositor DCC
$R_{free}$ test set	6330 reflections (4.95%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	10.1	Xtrriage
Anisotropy	0.502	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.39 , 38.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.97	EDS
Total number of atoms	3270	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	15.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.12% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: MG, HEM, PO4, CL, SNP, GOL, 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	0.37	0/2662	0.63	0/3619

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	2592	0	2465	23	0
2	A	43	0	30	9	0
3	A	1	0	0	0	0
4	A	1	0	0	0	0
5	A	70	0	65	0	0
6	A	15	0	0	2	0
7	A	36	0	47	10	0
8	A	95	0	105	22	0
9	A	417	0	0	2	0
All	All	3270	0	2712	44	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 8.

All (44) 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)
8:A:413[A]:SNP:H161	6:A:421:PO4:O3	1.87	0.75
1:A:196:GLU:CG	7:A:417:GOL:H32	2.20	0.72
2:A:401:HEM:HMC2	2:A:401:HEM:HBC2	1.73	0.71
1:A:196:GLU:OE2	7:A:417:GOL:H31	1.90	0.71
2:A:401:HEM:HBC2	2:A:401:HEM:CMC	2.21	0.70
1:A:240:SER:OG	8:A:413[B]:SNP:H112	1.92	0.69
2:A:401:HEM:HBB2	2:A:401:HEM:HHC	1.74	0.69
8:A:413[B]:SNP:C11	8:A:413[B]:SNP:H8	2.24	0.68
2:A:401:HEM:HHA	2:A:401:HEM:HBA1	1.74	0.68
1:A:199:PHE:CE2	7:A:417:GOL:H12	2.29	0.68
1:A:199:PHE:HE2	7:A:417:GOL:H12	1.58	0.67
1:A:268:ASP:OD1	1:A:270[B]:THR:HG22	1.96	0.66
8:A:413[A]:SNP:H152	9:A:731:HOH:O	1.96	0.65
1:A:196:GLU:HG3	7:A:417:GOL:H32	1.83	0.60
1:A:301:ARG:HD2	8:A:416:SNP:H12	1.84	0.59
1:A:196:GLU:OE2	7:A:417:GOL:C3	2.53	0.56
1:A:257:ARG:NH1	7:A:419:GOL:O1	2.38	0.56
8:A:413[A]:SNP:C16	6:A:421:PO4:O3	2.54	0.54
8:A:413[B]:SNP:C3	8:A:414:SNP:H112	2.38	0.53
8:A:413[B]:SNP:C11	8:A:413[B]:SNP:C8	2.86	0.53
1:A:241:GLY:HA3	8:A:413[B]:SNP:O1	2.10	0.52
1:A:241:GLY:H	8:A:413[B]:SNP:H112	1.75	0.51
2:A:401:HEM:HMC2	2:A:401:HEM:CBC	2.39	0.51
1:A:325:TYR:HA	8:A:416:SNP:H131	1.93	0.51
1:A:257:ARG:NH2	9:A:506:HOH:O	2.44	0.49
2:A:401:HEM:HBA1	2:A:401:HEM:CHA	2.41	0.49
8:A:413[B]:SNP:H112	8:A:413[B]:SNP:H8	1.93	0.48
8:A:413[B]:SNP:H151	8:A:414:SNP:H111	1.95	0.47
2:A:401:HEM:HHC	2:A:401:HEM:CBB	2.43	0.47
1:A:39:LEU:HD11	2:A:401:HEM:C2B	2.50	0.47
8:A:416:SNP:O2	8:A:416:SNP:H8	2.14	0.47
8:A:413[B]:SNP:H152	8:A:414:SNP:C2	2.45	0.46
1:A:48:LEU:HD21	1:A:59:ILE:HA	1.99	0.45
1:A:220:ARG:HH21	7:A:412:GOL:C3	2.29	0.45
1:A:301:ARG:CD	8:A:416:SNP:H12	2.46	0.44
8:A:413[A]:SNP:H2	8:A:413[A]:SNP:H112	1.77	0.43
8:A:413[B]:SNP:C8	8:A:413[B]:SNP:H111	2.47	0.43
8:A:413[B]:SNP:H8	8:A:413[B]:SNP:H111	2.02	0.42
1:A:301:ARG:HD2	8:A:416:SNP:C12	2.50	0.41
8:A:413[B]:SNP:C4	8:A:414:SNP:H2	2.50	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:167:GLU:HB3	7:A:418:GOL:H32	2.03	0.41
1:A:301:ARG:NE	8:A:416:SNP:H12	2.35	0.41
1:A:196:GLU:HG2	7:A:417:GOL:H32	2.01	0.41
1:A:126:SER:OG	2:A:401:HEM:O2A	2.39	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	332/328 (101%)	322 (97%)	10 (3%)	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	278/272 (102%)	277 (100%)	1 (0%)	91 74

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

Mol	Chain	Res	Type
1	A	239	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 22 ligands modelled in this entry, 2 are monoatomic - leaving 20 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
8	SNP	A	415	-	20,20,20	1.19	2 (10%)	26,26,26	0.89	1 (3%)
8	SNP	A	413[B]	-	20,20,20	1.19	2 (10%)	26,26,26	0.89	1 (3%)
8	SNP	A	416	-	20,20,20	1.19	2 (10%)	26,26,26	0.89	1 (3%)
5	NAG	A	408	1	14,14,15	0.39	0	17,19,21	1.49	2 (11%)
6	PO4	A	421	-	4,4,4	0.91	0	6,6,6	0.42	0
7	GOL	A	410	-	5,5,5	0.30	0	5,5,5	0.62	0
7	GOL	A	418	-	5,5,5	0.34	0	5,5,5	0.33	0
5	NAG	A	407	1	14,14,15	0.44	0	17,19,21	0.90	1 (5%)
8	SNP	A	414	-	20,20,20	1.20	2 (10%)	26,26,26	0.89	1 (3%)
2	HEM	A	401	1,3	41,50,50	1.31	5 (12%)	45,82,82	1.72	6 (13%)
7	GOL	A	419	-	5,5,5	0.58	0	5,5,5	1.30	0
5	NAG	A	405	1	14,14,15	0.20	0	17,19,21	0.69	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
7	GOL	A	412	-	5,5,5	0.31	0	5,5,5	0.39	0
6	PO4	A	420	-	4,4,4	0.92	0	6,6,6	0.43	0
6	PO4	A	409	-	4,4,4	0.93	0	6,6,6	0.43	0
7	GOL	A	417	-	5,5,5	0.26	0	5,5,5	0.28	0
8	SNP	A	413[A]	-	20,20,20	1.19	2 (10%)	26,26,26	0.89	1 (3%)
5	NAG	A	404	1	14,14,15	0.27	0	17,19,21	0.80	0
5	NAG	A	406	1	14,14,15	0.29	0	17,19,21	1.11	2 (11%)
7	GOL	A	411	-	5,5,5	0.31	0	5,5,5	0.31	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
8	SNP	A	415	-	-	3/10/10/10	0/2/2/2
8	SNP	A	414	-	-	2/10/10/10	0/2/2/2
7	GOL	A	417	-	-	2/4/4/4	-
7	GOL	A	418	-	-	2/4/4/4	-
5	NAG	A	407	1	-	0/6/23/26	0/1/1/1
8	SNP	A	413[A]	-	-	3/10/10/10	0/2/2/2
2	HEM	A	401	1,3	-	4/12/54/54	-
7	GOL	A	419	-	-	2/4/4/4	-
5	NAG	A	405	1	-	0/6/23/26	0/1/1/1
8	SNP	A	413[B]	-	-	5/10/10/10	0/2/2/2
5	NAG	A	408	1	-	2/6/23/26	0/1/1/1
8	SNP	A	416	-	-	7/10/10/10	0/2/2/2
7	GOL	A	410	-	-	0/4/4/4	-
7	GOL	A	412	-	-	2/4/4/4	-
5	NAG	A	404	1	-	0/6/23/26	0/1/1/1
5	NAG	A	406	1	-	2/6/23/26	0/1/1/1
7	GOL	A	411	-	-	2/4/4/4	-

All (15) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	401	HEM	C4D-ND	-3.32	1.34	1.40
2	A	401	HEM	C1B-NB	-3.31	1.34	1.40
8	A	414	SNP	C9-C10	3.07	1.48	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	A	415	SNP	C9-C10	3.05	1.48	1.43
8	A	416	SNP	C9-C10	3.05	1.48	1.43
8	A	413[A]	SNP	C9-C10	3.04	1.48	1.43
8	A	413[B]	SNP	C9-C10	3.03	1.48	1.43
2	A	401	HEM	FE-NB	2.79	2.10	1.96
8	A	413[A]	SNP	C1-C9	2.42	1.49	1.42
8	A	416	SNP	C1-C9	2.41	1.49	1.42
8	A	415	SNP	C1-C9	2.40	1.48	1.42
8	A	413[B]	SNP	C1-C9	2.40	1.48	1.42
8	A	414	SNP	C1-C9	2.39	1.48	1.42
2	A	401	HEM	CHB-C1B	2.24	1.40	1.35
2	A	401	HEM	FE-ND	-2.02	1.86	1.96

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	401	HEM	C1B-NB-C4B	4.62	109.85	105.07
5	A	408	NAG	C1-C2-N2	4.50	118.18	110.49
2	A	401	HEM	CHC-C4B-NB	4.24	129.03	124.43
2	A	401	HEM	CHD-C1D-ND	3.88	128.64	124.43
2	A	401	HEM	C4D-ND-C1D	3.04	108.22	105.07
5	A	408	NAG	O5-C5-C6	3.03	111.96	107.20
2	A	401	HEM	CHB-C1B-NB	2.98	128.06	124.38
2	A	401	HEM	CHA-C4D-ND	2.88	127.94	124.38
5	A	406	NAG	C2-N2-C7	2.64	126.66	122.90
5	A	406	NAG	C1-C2-N2	2.33	114.46	110.49
5	A	407	NAG	O5-C1-C2	-2.27	107.70	111.29
8	A	414	SNP	O1-C1-C9	2.06	120.76	115.01
8	A	413[A]	SNP	O1-C1-C9	2.04	120.71	115.01
8	A	413[B]	SNP	O1-C1-C9	2.04	120.71	115.01
8	A	416	SNP	O1-C1-C9	2.04	120.71	115.01
8	A	415	SNP	O1-C1-C9	2.04	120.70	115.01

There are no chirality outliers.

All (38) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	401	HEM	C1A-C2A-CAA-CBA
7	A	418	GOL	C1-C2-C3-O3
7	A	418	GOL	O2-C2-C3-O3
8	A	413[B]	SNP	C2-C1-O1-C11
8	A	413[B]	SNP	C9-C1-O1-C11

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Mol	Chain	Res	Type	Atoms
8	A	414	SNP	C16-C14-N1-C13
8	A	416	SNP	C9-C1-O1-C11
5	A	408	NAG	O5-C5-C6-O6
8	A	416	SNP	C2-C1-O1-C11
8	A	415	SNP	C9-C1-O1-C11
5	A	408	NAG	C4-C5-C6-O6
8	A	413[B]	SNP	O1-C11-C12-O2
7	A	411	GOL	O1-C1-C2-C3
7	A	412	GOL	O1-C1-C2-C3
7	A	417	GOL	C1-C2-C3-O3
7	A	419	GOL	O1-C1-C2-C3
8	A	415	SNP	C2-C1-O1-C11
7	A	412	GOL	O1-C1-C2-O2
7	A	419	GOL	O1-C1-C2-O2
8	A	416	SNP	C12-C11-O1-C1
8	A	414	SNP	C15-C14-N1-C13
8	A	413[A]	SNP	C12-C11-O1-C1
8	A	413[A]	SNP	C11-C12-C13-N1
8	A	416	SNP	C11-C12-C13-N1
8	A	413[B]	SNP	C12-C11-O1-C1
8	A	413[A]	SNP	C12-C13-N1-C14
8	A	416	SNP	O1-C11-C12-O2
8	A	416	SNP	C15-C14-N1-C13
8	A	416	SNP	C16-C14-N1-C13
5	A	406	NAG	C1-C2-N2-C7
2	A	401	HEM	C3A-C2A-CAA-CBA
8	A	413[B]	SNP	O1-C11-C12-C13
7	A	417	GOL	O2-C2-C3-O3
8	A	415	SNP	C16-C14-N1-C13
2	A	401	HEM	CAA-CBA-CGA-O1A
2	A	401	HEM	CAA-CBA-CGA-O2A
7	A	411	GOL	O1-C1-C2-O2
5	A	406	NAG	C3-C2-N2-C7

There are no ring outliers.

10 monomers are involved in 41 short contacts:

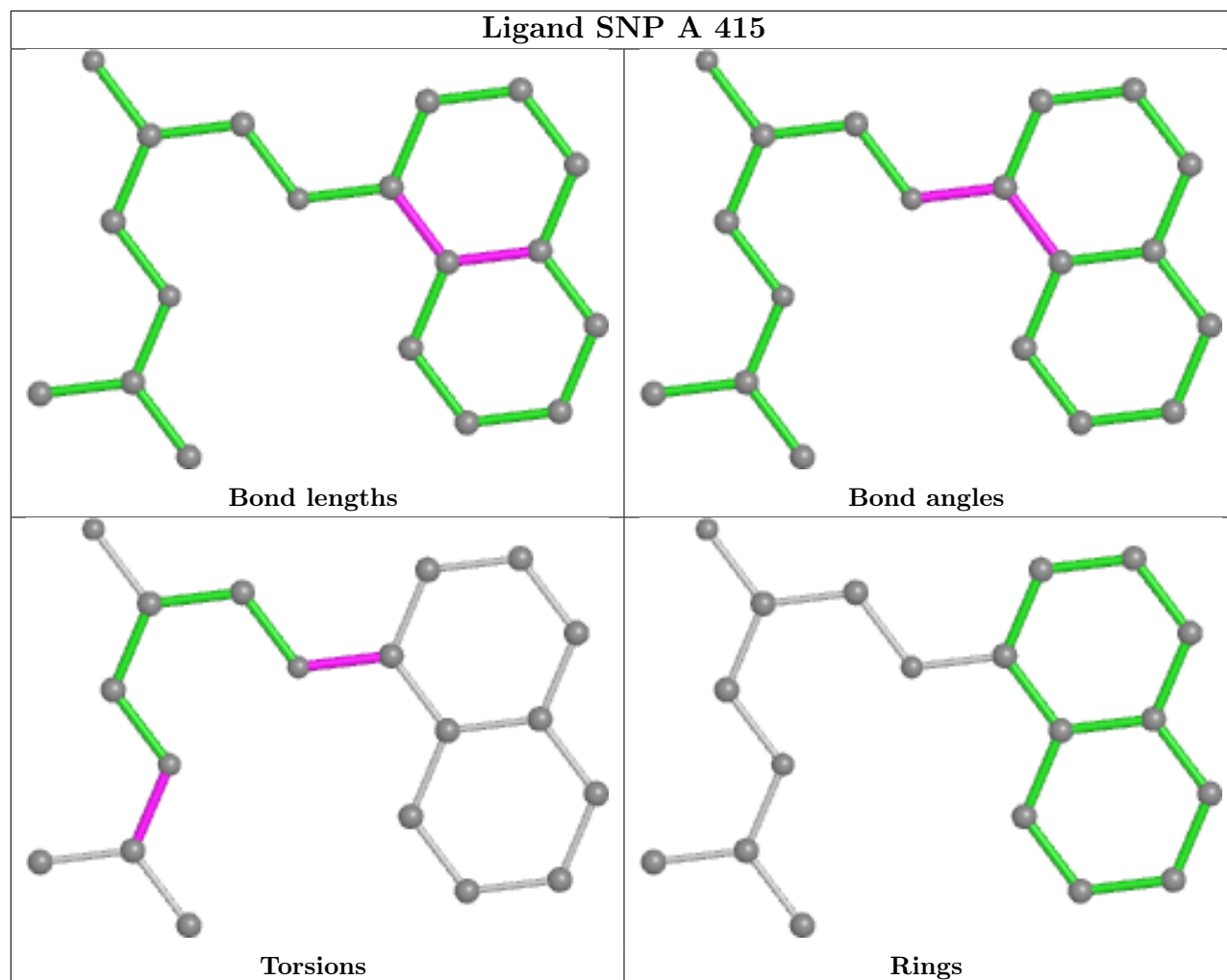
Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	A	413[B]	SNP	12	0
8	A	416	SNP	6	0
6	A	421	PO4	2	0
7	A	418	GOL	1	0

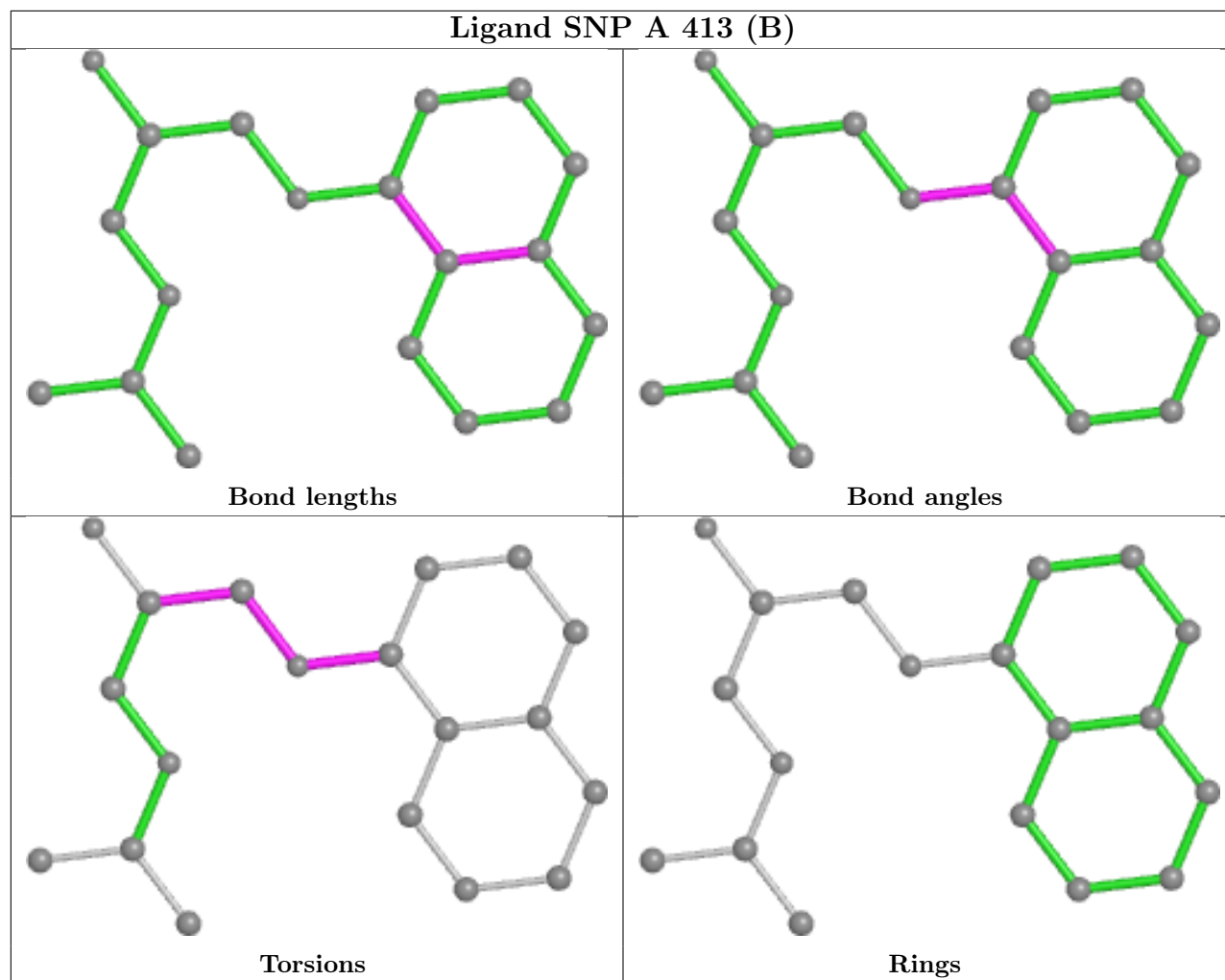
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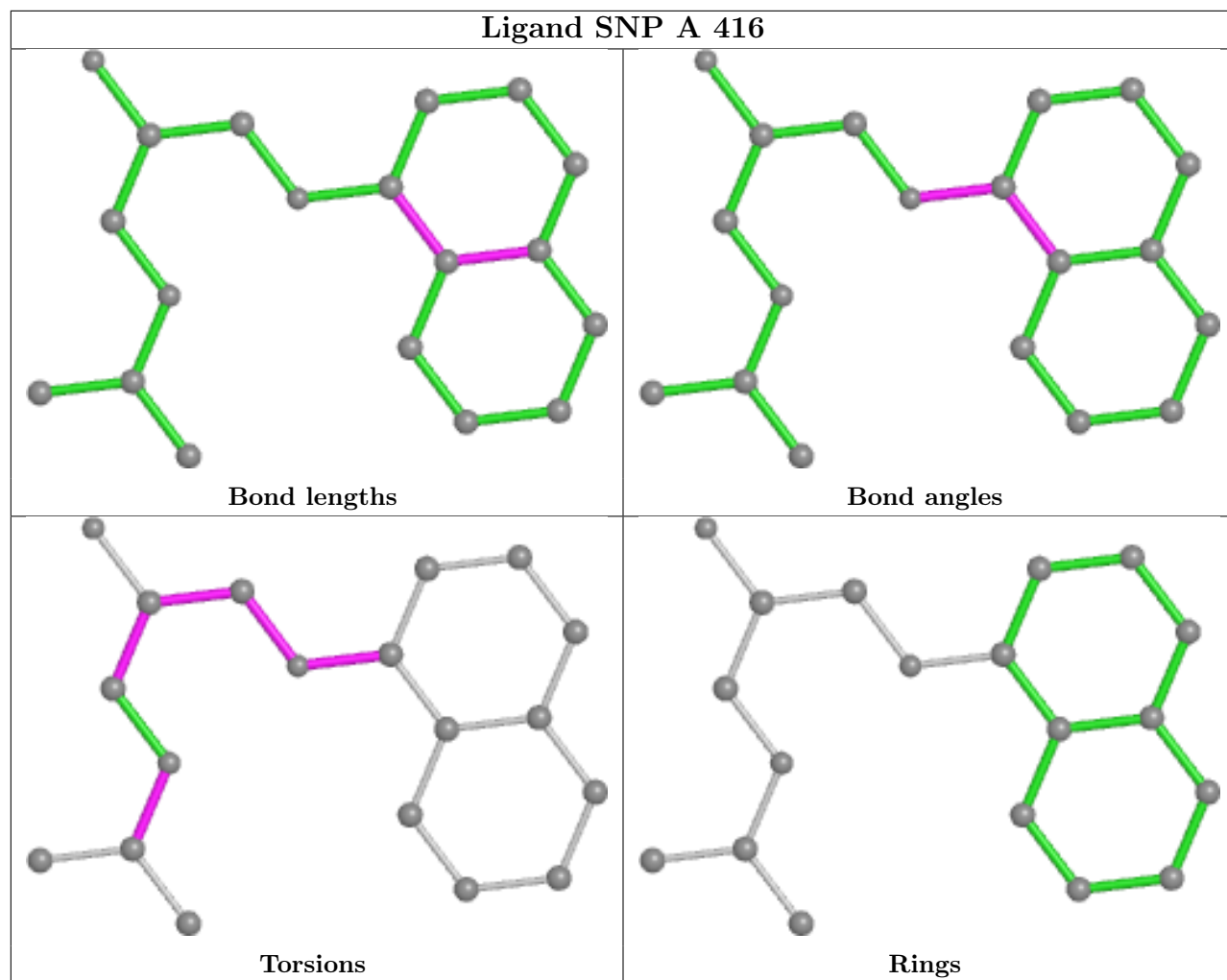
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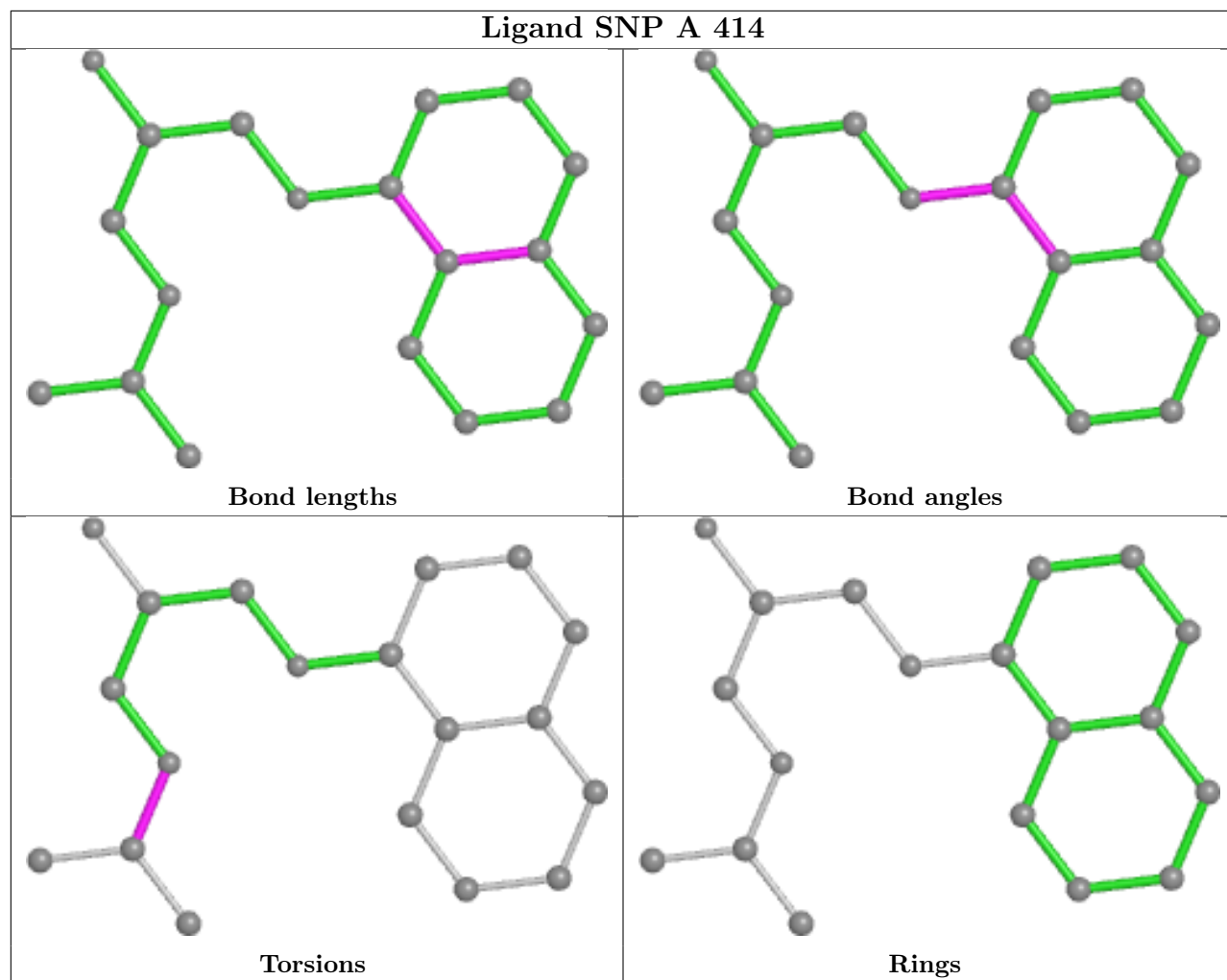
Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	A	414	SNP	4	0
2	A	401	HEM	9	0
7	A	419	GOL	1	0
7	A	412	GOL	1	0
7	A	417	GOL	7	0
8	A	413[A]	SNP	4	0

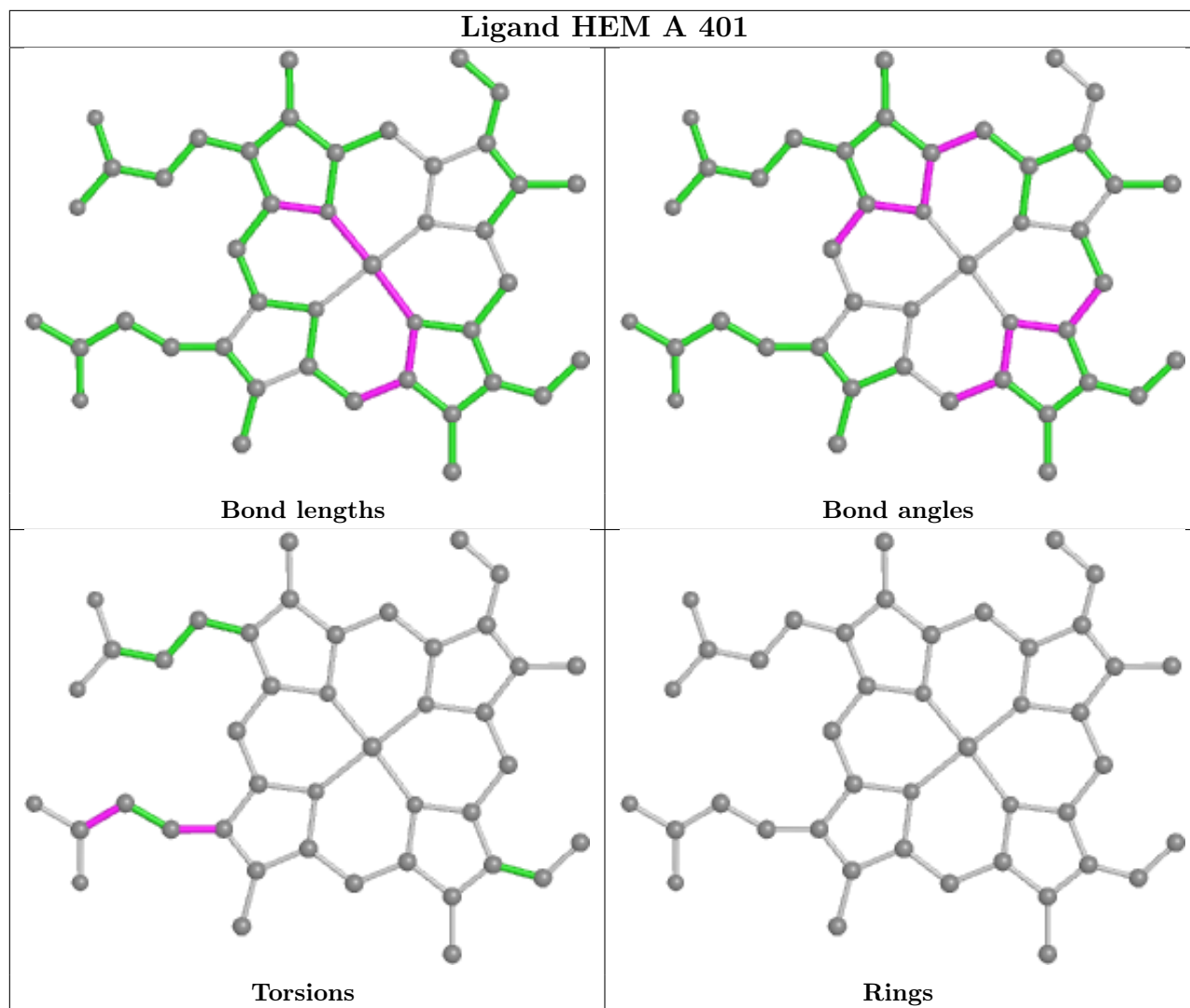
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

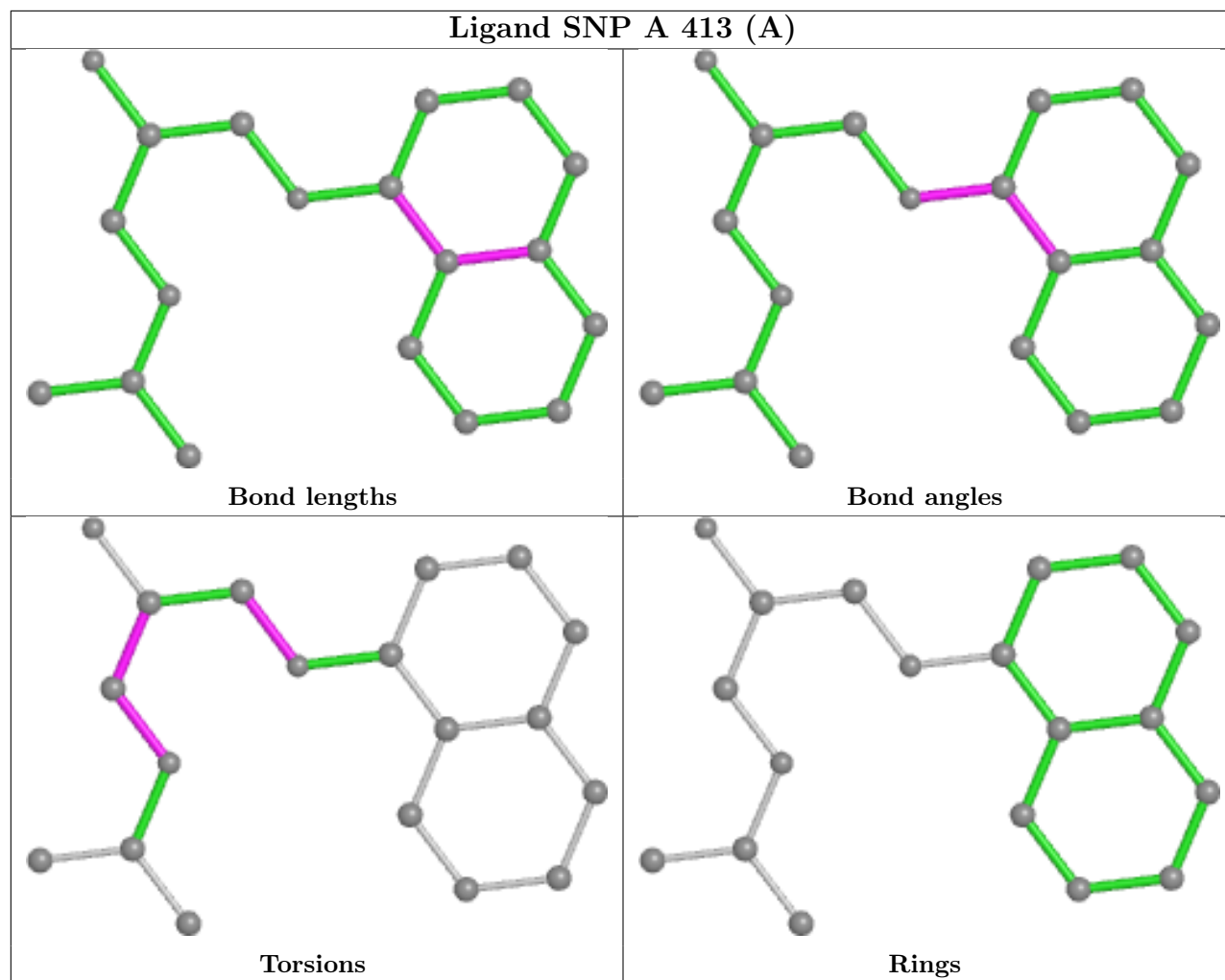












## 5.7 Other polymers [\(i\)](#)

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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	325/328 (99%)	0.33	12 (3%) 41 36	8, 12, 21, 42	0

All (12) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	317	ALA	5.2
1	A	3	GLY	4.0
1	A	295	ASN	3.8
1	A	327	ARG	3.5
1	A	10	GLU	3.4
1	A	316	ALA	3.1
1	A	299	GLN	2.9
1	A	4	LEU	2.8
1	A	320	THR	2.5
1	A	297	THR	2.3
1	A	20	GLU	2.2
1	A	100	ARG	2.2

### 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 monosaccharides 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,

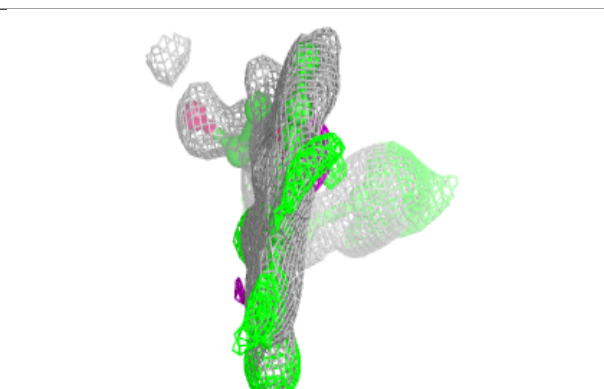
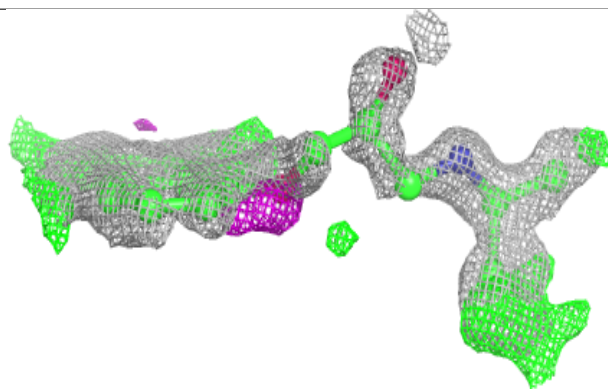
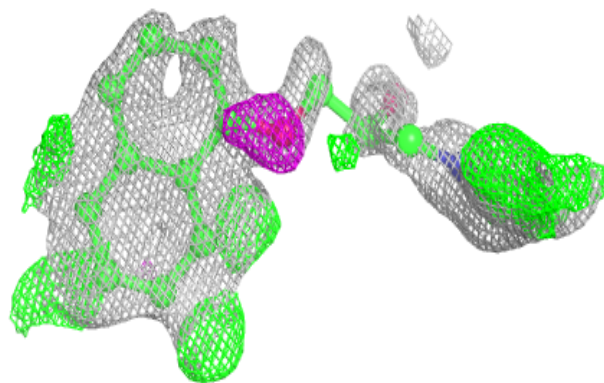
median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
7	GOL	A	417	6/6	0.37	0.27	19,20,21,21	0
7	GOL	A	411	6/6	0.43	0.37	31,32,33,33	0
8	SNP	A	415	19/19	0.50	0.23	23,24,27,28	19
7	GOL	A	412	6/6	0.53	0.21	32,33,34,34	0
8	SNP	A	416	19/19	0.55	0.34	45,46,51,51	0
7	GOL	A	419	6/6	0.56	0.33	31,31,32,32	0
5	NAG	A	404	14/15	0.59	0.31	35,39,41,42	0
8	SNP	A	414	19/19	0.68	0.23	21,21,23,23	0
6	PO4	A	421	5/5	0.73	0.26	58,58,58,58	5
5	NAG	A	408	14/15	0.74	0.19	14,18,20,20	14
6	PO4	A	409	5/5	0.74	0.24	25,25,26,26	5
7	GOL	A	418	6/6	0.75	0.29	19,20,21,21	2
8	SNP	A	413[B]	19/19	0.76	0.24	23,23,31,31	19
8	SNP	A	413[A]	19/19	0.76	0.24	25,25,32,32	19
5	NAG	A	405	14/15	0.80	0.18	23,24,25,25	0
7	GOL	A	410	6/6	0.85	0.22	16,20,20,21	1
6	PO4	A	420	5/5	0.86	0.20	34,34,34,34	5
2	HEM	A	401	43/43	0.88	0.17	8,8,10,13	0
5	NAG	A	406	14/15	0.94	0.08	10,11,13,14	0
5	NAG	A	407	14/15	0.96	0.07	10,11,13,13	0
4	CL	A	403	1/1	0.99	0.05	26,26,26,26	1
3	MG	A	402	1/1	1.00	0.07	7,7,7,7	0

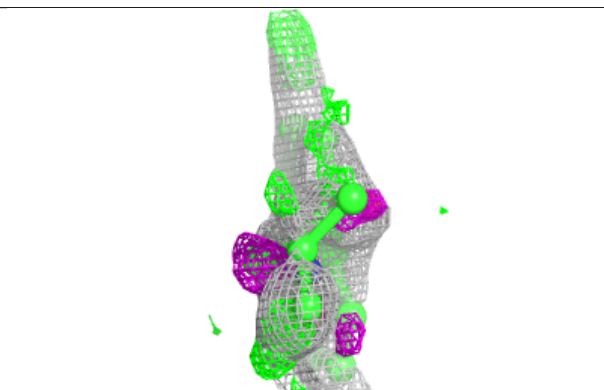
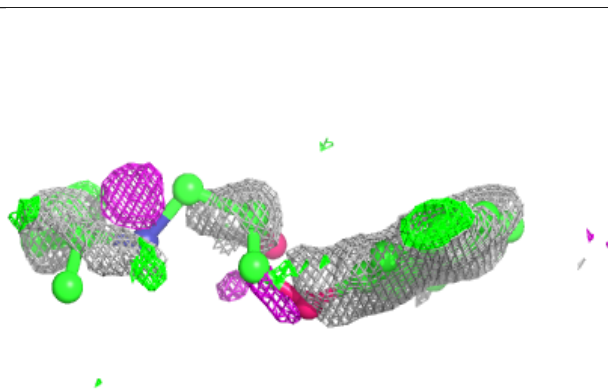
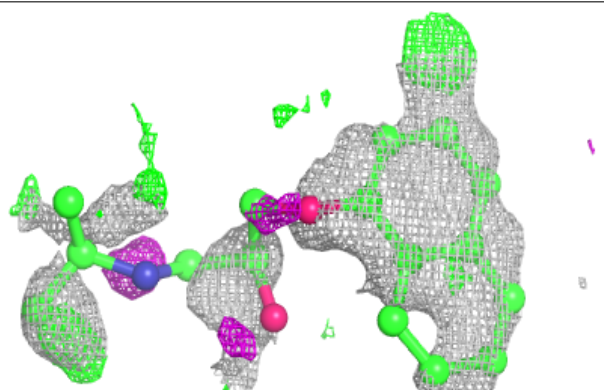
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

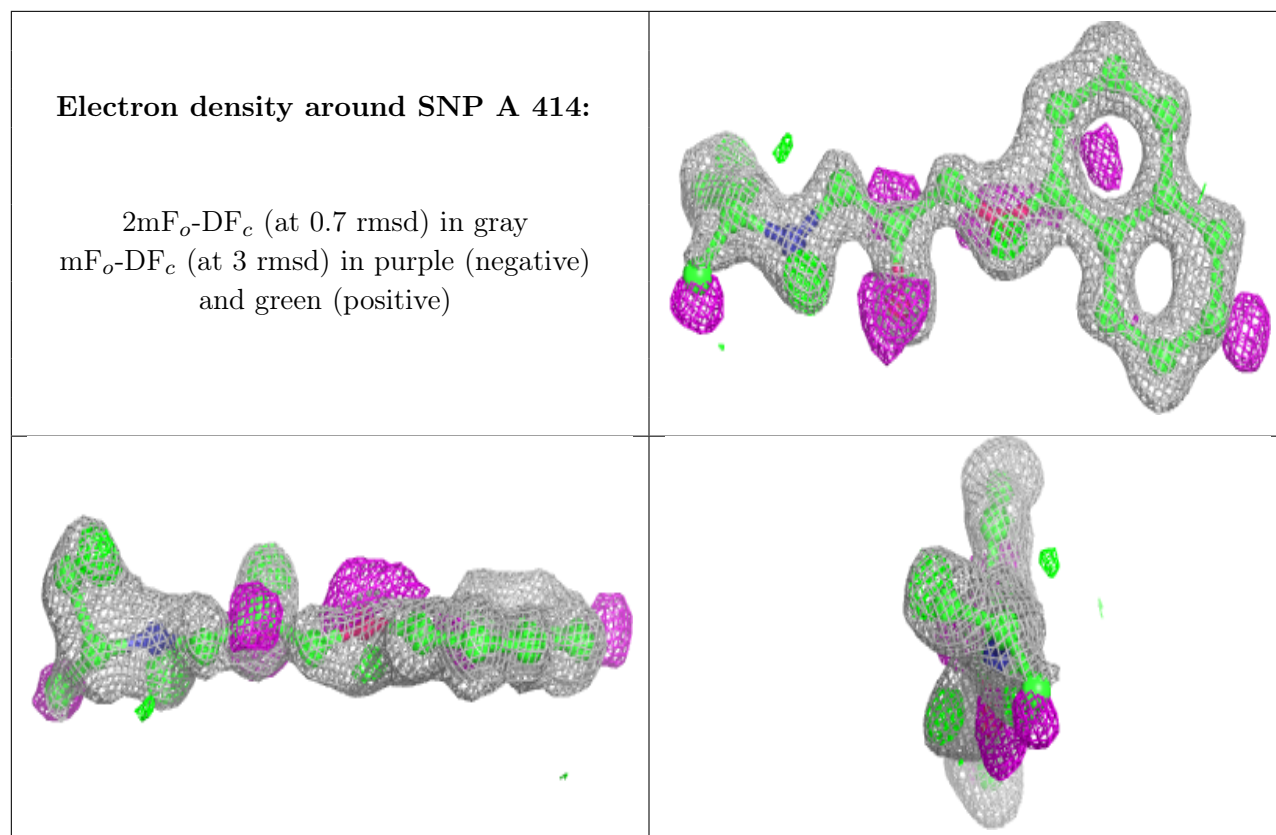
**Electron density around SNP A 415:**

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

**Electron density around SNP A 416:**

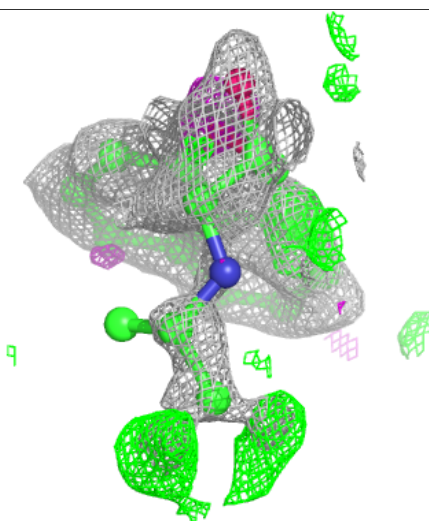
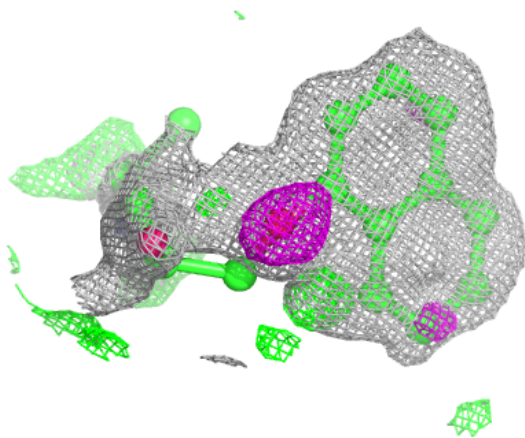
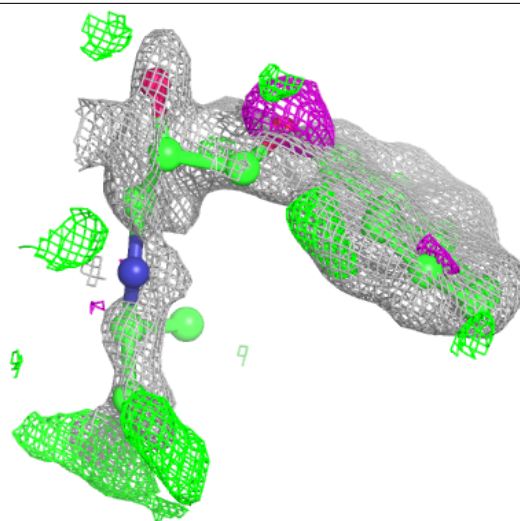
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





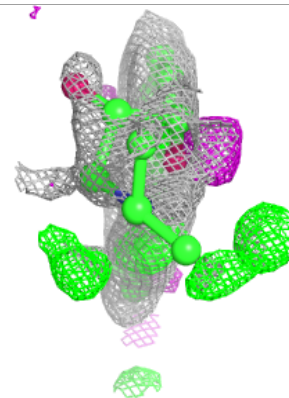
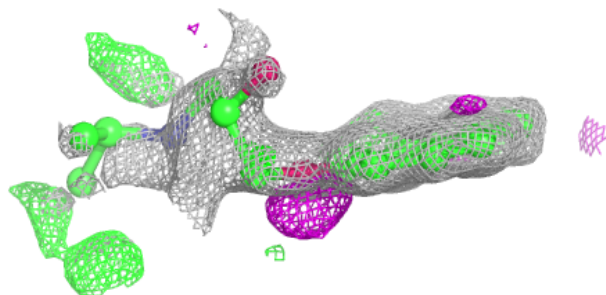
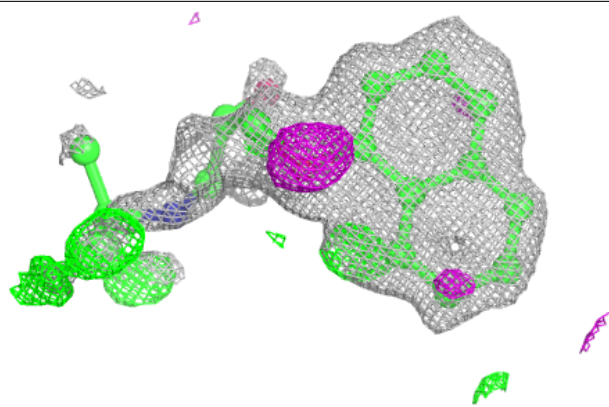
**Electron density around SNP A 413 (B):**

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

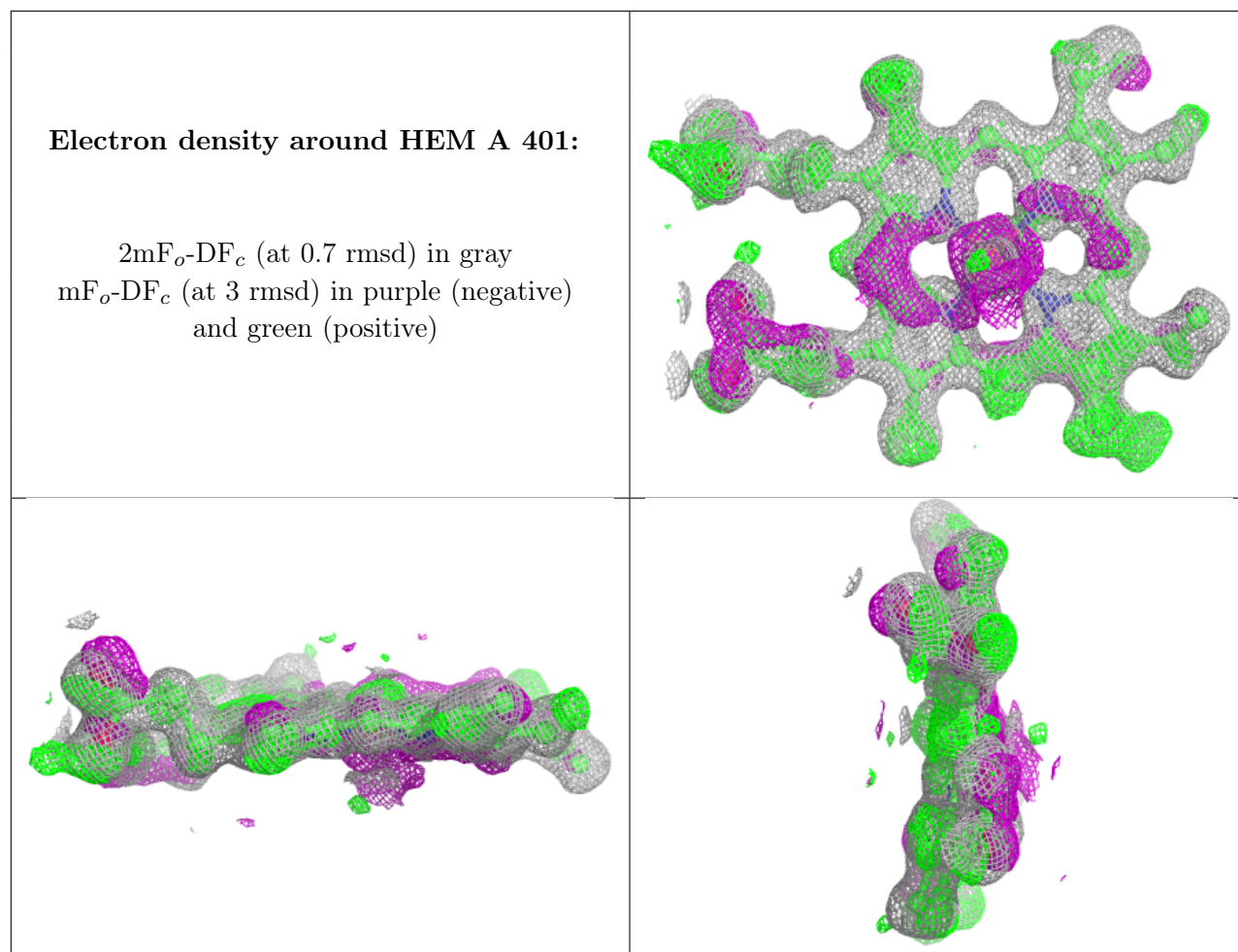


**Electron density around SNP A 413 (A):**

$2mF_o-DF_c$  (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.