



# Full wwPDB X-ray Structure Validation Report ⓘ

May 15, 2020 – 05:13 pm BST

PDB ID : 5V7P  
Title : Atomic structure of the eukaryotic intramembrane Ras methyltransferase ICMT (isoprenylcysteine carboxyl methyltransferase), in complex with a monobody  
Authors : Long, S.B.; Diver, M.M.; Pedi, L.; Koide, A.; Koide, S.  
Deposited on : 2017-03-20  
Resolution : 2.30 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.11  
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) : 2.11

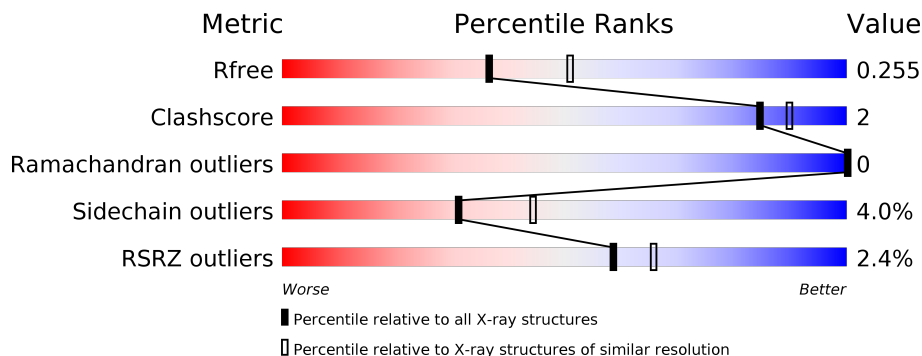
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.30 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	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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 on 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	288	 2% 88% 9%
2	D	95	 4% 93% 7%

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
5	D10	A	312	-	-	-	X
5	D10	A	313	-	-	-	X
5	D10	A	315	-	-	-	X

## 2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 3450 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 Protein-S-isoprenylcysteine O-methyltransferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	280	2292	1550	347	383	12	0	4	0

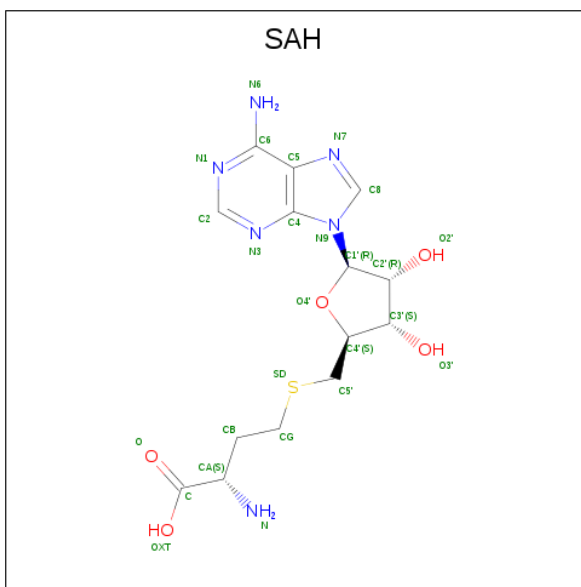
There are 7 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	282	ALA	-	expression tag	UNP D6WJ77
A	283	ALA	-	expression tag	UNP D6WJ77
A	284	GLU	-	expression tag	UNP D6WJ77
A	285	GLY	-	expression tag	UNP D6WJ77
A	286	GLU	-	expression tag	UNP D6WJ77
A	287	GLU	-	expression tag	UNP D6WJ77
A	288	PHE	-	expression tag	UNP D6WJ77

- Molecule 2 is a protein called monobody.

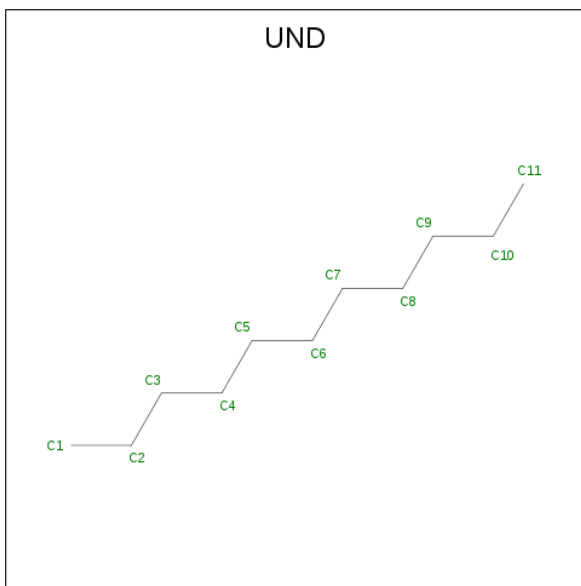
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	D	95	721	470	108	143	0	1	0

- Molecule 3 is S-ADENOSYL-L-HOMOCYSTEINE (three-letter code: SAH) (formula:  $C_{14}H_{20}N_6O_5S$ ).



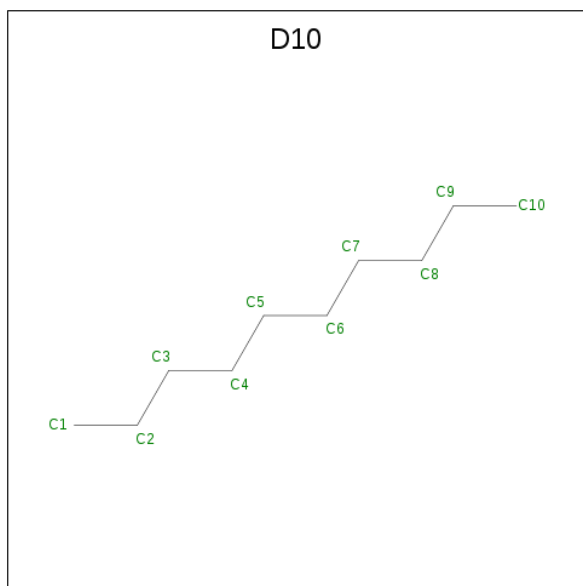
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
3	A	1	26	14	6	5	1	0	0

- Molecule 4 is UNDECANE (three-letter code: UND) (formula:  $C_{11}H_{24}$ ).



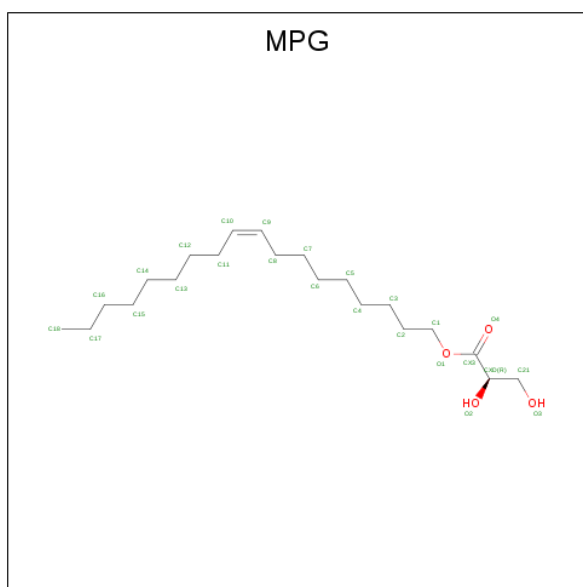
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	C		
4	A	1	11	11	0	0
4	A	1	11	11	0	0
4	A	1	11	11	0	0

- Molecule 5 is DECANE (three-letter code: D10) (formula: C<sub>10</sub>H<sub>22</sub>).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C 9 9	0	0
5	A	1	Total C 10 10	0	0
5	A	1	Total C 6 6	0	0
5	A	1	Total C 6 6	0	0
5	A	1	Total C 9 9	0	0
5	A	1	Total C 9 9	0	0
5	A	1	Total C 8 8	0	0
5	A	1	Total C 5 5	0	0
5	A	1	Total C 10 10	0	0
5	A	1	Total C 8 8	0	0
5	A	1	Total C 8 8	0	0

- Molecule 6 is [(Z)-octadec-9-enyl] (2R)-2,3-bis(oxidanyl)propanoate (three-letter code: MPG) (formula: C<sub>21</sub>H<sub>40</sub>O<sub>4</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			20	16	4		
6	A	1	Total	C	O	0	0
			21	17	4		
6	A	1	Total	C	O	0	0
			20	16	4		
6	A	1	Total	C	O	0	0
			11	7	4		
6	A	1	Total	C	O	0	0
			19	15	4		
6	A	1	Total	C	O	0	0
			21	17	4		
6	A	1	Total	C	O	0	0
			25	21	4		
6	A	1	Total	C	O	0	0
			20	16	4		
6	A	1	Total	C	O	0	0
			18	14	4		
6	A	1	Total	C	O	0	0
			23	19	4		

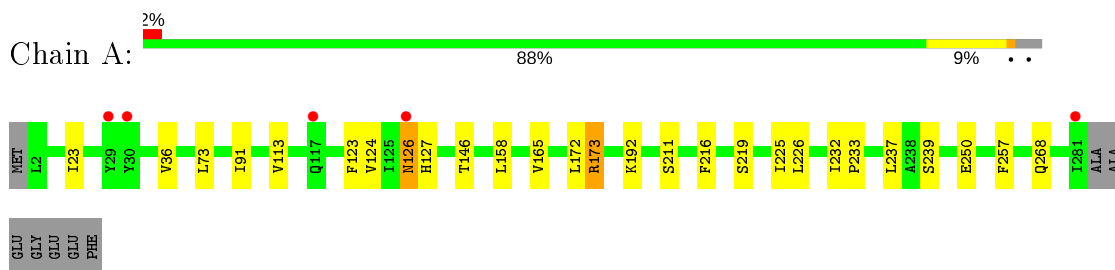
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	51	Total	O	0	0
			51	51		
7	D	41	Total	O	0	0
			41	41		

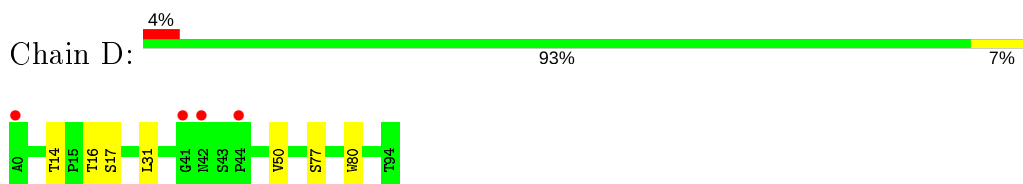
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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: Protein-S-isoprenylcysteine O-methyltransferase



- Molecule 2: monobody





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	40.55Å 87.69Å 147.68Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.77 – 2.30 29.77 – 2.30	Depositor EDS
% Data completeness (in resolution range)	95.8 (29.77-2.30) 95.8 (29.77-2.30)	Depositor EDS
$R_{merge}$	0.20	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.13 (at 2.31Å)	Xtrriage
Refinement program	PHENIX (1.11.1_2575: ???)	Depositor
R, $R_{free}$	0.214 , 0.247 0.217 , 0.255	Depositor DCC
$R_{free}$ test set	1132 reflections (4.88%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	29.2	Xtrriage
Anisotropy	0.348	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.30 , 55.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.92	EDS
Total number of atoms	3450	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	35.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.43% 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

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: D10, SAH, UND, MPG

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	0.26	0/2381	0.40	0/3243
2	D	0.26	0/745	0.45	0/1026
All	All	0.26	0/3126	0.41	0/4269

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

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	2292	0	2281	12	0
2	D	721	0	721	4	0
3	A	26	0	19	1	0
4	A	33	0	72	0	0
5	A	88	0	159	0	0
6	A	198	0	271	4	0
7	A	51	0	0	1	0
7	D	41	0	0	0	0
All	All	3450	0	3523	16	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 2.

All (16) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:126:ASN:HA	1:A:127:HIS:HB2	1.78	0.66
1:A:216:PHE:HD1	1:A:239:SER:HG	1.45	0.64
1:A:268:GLN:NE2	7:A:403:HOH:O	2.43	0.51
6:A:325:MPG:H42C	2:D:80:TRP:CZ2	2.46	0.50
1:A:219:SER:HB2	6:A:325:MPG:H52C	1.94	0.49
1:A:232:ILE:HB	1:A:233:PRO:HD3	1.97	0.47
2:D:14:THR:HG23	2:D:16:THR:H	1.80	0.45
1:A:192:LYS:NZ	1:A:257:PHE:O	2.51	0.44
2:D:14:THR:HG22	2:D:17:SER:OG	2.19	0.43
1:A:124:VAL:O	1:A:124:VAL:HG13	2.21	0.41
6:A:325:MPG:H131	2:D:77:SER:HB3	2.02	0.41
1:A:123:PHE:O	1:A:124:VAL:HG12	2.21	0.41
1:A:173:ARG:HD2	1:A:211:SER:O	2.20	0.41
1:A:250:GLU:OE2	3:A:301:SAH:H8	2.21	0.41
1:A:91:ILE:CG2	1:A:225:ILE:O	2.68	0.40
1:A:23:ILE:HG12	6:A:324:MPG:H31C	2.03	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	282/288 (98%)	277 (98%)	5 (2%)	0	100	100
2	D	94/95 (99%)	92 (98%)	2 (2%)	0	100	100
All	All	376/383 (98%)	369 (98%)	7 (2%)	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	248/249 (100%)	236 (95%)	12 (5%)	25	36
2	D	82/81 (101%)	80 (98%)	2 (2%)	49	66
All	All	330/330 (100%)	316 (96%)	14 (4%)	31	42

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	36	VAL
1	A	73	LEU
1	A	113	VAL
1	A	126	ASN
1	A	146	THR
1	A	158	LEU
1	A	165	VAL
1	A	172	LEU
1	A	173	ARG
1	A	226	LEU
1	A	237[A]	LEU
1	A	237[B]	LEU
2	D	31	LEU
2	D	50	VAL

Some 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 carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

25 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
6	MPG	A	319	-	10,10,24	1.36	1 (10%)	10,11,25	1.76	2 (20%)
5	D10	A	305	-	9,9,9	0.29	0	8,8,8	0.82	0
5	D10	A	311	-	7,7,9	0.30	0	6,6,8	0.73	0
6	MPG	A	317	-	20,20,24	0.98	1 (5%)	20,21,25	1.26	2 (10%)
3	SAH	A	301	-	21,28,28	1.14	2 (9%)	20,40,40	1.65	3 (15%)
4	UND	A	309	-	10,10,10	0.32	0	9,9,9	0.76	0
6	MPG	A	323	-	19,19,24	1.03	1 (5%)	19,20,25	1.37	2 (10%)
5	D10	A	307	-	5,5,9	0.31	0	4,4,8	0.56	0
6	MPG	A	321	-	20,20,24	1.00	1 (5%)	20,21,25	1.26	1 (5%)
6	MPG	A	325	-	22,22,24	0.98	2 (9%)	22,23,25	1.07	1 (4%)
6	MPG	A	324	-	17,17,24	1.07	1 (5%)	17,18,25	1.44	2 (11%)
5	D10	A	306	-	5,5,9	0.31	0	4,4,8	0.59	0
4	UND	A	302	-	10,10,10	0.31	0	9,9,9	0.80	0
5	D10	A	308	-	8,8,9	0.30	0	7,7,8	0.76	0
5	D10	A	314	-	7,7,9	0.31	0	6,6,8	0.69	0
5	D10	A	310	-	8,8,9	0.30	0	7,7,8	0.78	0
5	D10	A	304	-	8,8,9	0.31	0	7,7,8	0.73	0
6	MPG	A	322	-	24,24,24	0.91	1 (4%)	24,25,25	1.24	2 (8%)
6	MPG	A	316	-	19,19,24	1.01	1 (5%)	19,20,25	1.23	1 (5%)
5	D10	A	313	-	9,9,9	0.31	0	8,8,8	0.76	0
5	D10	A	312	-	4,4,9	0.33	0	3,3,8	0.54	0
4	UND	A	303	-	10,10,10	0.30	0	9,9,9	0.80	0
6	MPG	A	320	-	18,18,24	1.05	1 (5%)	17,19,25	1.37	2 (11%)
6	MPG	A	318	-	19,19,24	1.00	1 (5%)	19,20,25	1.26	2 (10%)
5	D10	A	315	-	7,7,9	0.31	0	6,6,8	0.72	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
6	MPG	A	319	-	-	5/11/11/25	-
5	D10	A	305	-	-	5/7/7/7	-
5	D10	A	311	-	-	0/5/5/7	-
6	MPG	A	317	-	-	4/21/21/25	-
3	SAH	A	301	-	-	0/7/31/31	0/3/3/3
4	UND	A	309	-	-	5/8/8/8	-
6	MPG	A	323	-	-	9/20/20/25	-
5	D10	A	307	-	-	0/3/3/7	-
6	MPG	A	321	-	-	11/21/21/25	-
6	MPG	A	325	-	-	9/23/23/25	-
6	MPG	A	324	-	-	8/18/18/25	-
5	D10	A	306	-	-	1/3/3/7	-
4	UND	A	302	-	-	0/8/8/8	-
5	D10	A	308	-	-	0/6/6/7	-
5	D10	A	314	-	-	0/5/5/7	-
5	D10	A	310	-	-	0/6/6/7	-
5	D10	A	304	-	-	3/6/6/7	-
6	MPG	A	322	-	-	12/25/25/25	-
6	MPG	A	316	-	-	4/20/20/25	-
5	D10	A	313	-	-	1/7/7/7	-
5	D10	A	312	-	-	0/2/2/7	-
4	UND	A	303	-	-	2/8/8/8	-
6	MPG	A	320	-	-	3/19/19/25	-
6	MPG	A	318	-	-	11/20/20/25	-
5	D10	A	315	-	-	0/5/5/7	-

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	301	SAH	C2-N3	3.75	1.38	1.32
6	A	323	MPG	O1-CX3	3.56	1.40	1.33
6	A	319	MPG	O1-CX3	3.50	1.40	1.33
6	A	321	MPG	O1-CX3	3.50	1.40	1.33
6	A	320	MPG	O1-CX3	3.45	1.40	1.33
6	A	322	MPG	O1-CX3	3.44	1.40	1.33
6	A	316	MPG	O1-CX3	3.43	1.40	1.33

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	A	317	MPG	O1-CX3	3.41	1.40	1.33
6	A	318	MPG	O1-CX3	3.38	1.40	1.33
6	A	324	MPG	O1-CX3	3.37	1.40	1.33
6	A	325	MPG	O1-CX3	3.27	1.40	1.33
3	A	301	SAH	C2-N1	2.33	1.38	1.33
6	A	325	MPG	O1-C1	-2.05	1.39	1.45

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	301	SAH	N3-C2-N1	-5.49	120.10	128.68
6	A	319	MPG	O1-CX3-CXD	4.55	120.76	111.68
6	A	323	MPG	O1-CX3-CXD	4.51	120.67	111.68
6	A	322	MPG	O1-CX3-CXD	4.23	120.11	111.68
6	A	324	MPG	O1-CX3-CXD	4.16	119.97	111.68
6	A	317	MPG	O1-CX3-CXD	4.15	119.96	111.68
6	A	320	MPG	O1-CX3-CXD	4.11	119.87	111.68
6	A	321	MPG	O1-CX3-CXD	4.10	119.86	111.68
6	A	318	MPG	O1-CX3-CXD	3.99	119.63	111.68
6	A	316	MPG	O1-CX3-CXD	3.86	119.38	111.68
6	A	325	MPG	O1-CX3-CXD	3.36	118.39	111.68
3	A	301	SAH	C5'-SD-CG	-2.46	94.87	102.27
6	A	319	MPG	O1-CX3-O4	-2.43	119.52	124.13
6	A	322	MPG	O1-CX3-O4	-2.30	119.78	124.13
3	A	301	SAH	C3'-C2'-C1'	2.19	104.28	100.98
6	A	324	MPG	O1-CX3-O4	-2.18	120.00	124.13
6	A	317	MPG	O1-CX3-O4	-2.16	120.04	124.13
6	A	320	MPG	O1-CX3-O4	-2.13	120.10	124.13
6	A	318	MPG	O1-CX3-O4	-2.11	120.14	124.13
6	A	323	MPG	O1-CX3-O4	-2.08	120.18	124.13

There are no chirality outliers.

All (93) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	A	317	MPG	O3-C21-CXD-O2
6	A	319	MPG	CXD-CX3-O1-C1
6	A	319	MPG	O4-CX3-O1-C1
6	A	319	MPG	O3-C21-CXD-O2
6	A	321	MPG	O3-C21-CXD-O2
6	A	321	MPG	O1-CX3-CXD-C21
6	A	321	MPG	O4-CX3-CXD-C21

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>Atoms</b>
6	A	325	MPG	O3-C21-CXD-O2
6	A	325	MPG	O1-CX3-CXD-C21
6	A	325	MPG	O4-CX3-CXD-C21
6	A	324	MPG	CXD-CX3-O1-C1
6	A	324	MPG	O4-CX3-O1-C1
6	A	324	MPG	O3-C21-CXD-O2
6	A	316	MPG	O3-C21-CXD-O2
6	A	320	MPG	O3-C21-CXD-O2
6	A	318	MPG	C10-C11-C12-C13
6	A	318	MPG	O4-CX3-O1-C1
6	A	321	MPG	O4-CX3-O1-C1
6	A	323	MPG	O4-CX3-O1-C1
6	A	318	MPG	CXD-CX3-O1-C1
6	A	322	MPG	O4-CX3-O1-C1
6	A	323	MPG	CXD-CX3-O1-C1
6	A	321	MPG	CXD-CX3-O1-C1
6	A	322	MPG	CXD-CX3-O1-C1
6	A	324	MPG	O1-C1-C2-C3
4	A	309	UND	C7-C8-C9-C10
6	A	318	MPG	O1-C1-C2-C3
6	A	323	MPG	C4-C5-C6-C7
4	A	309	UND	C2-C3-C4-C5
4	A	303	UND	C6-C7-C8-C9
6	A	324	MPG	C1-C2-C3-C4
6	A	321	MPG	O1-C1-C2-C3
6	A	322	MPG	C5-C6-C7-C8
6	A	324	MPG	C4-C5-C6-C7
6	A	322	MPG	C11-C12-C13-C14
6	A	318	MPG	C3-C4-C5-C6
6	A	321	MPG	C1-C2-C3-C4
6	A	323	MPG	C6-C7-C8-C9
5	A	305	D10	C6-C7-C8-C9
6	A	320	MPG	O1-C1-C2-C3
6	A	321	MPG	C10-C11-C12-C13
6	A	318	MPG	C6-C7-C8-C9
6	A	317	MPG	O3-C21-CXD-CX3
6	A	319	MPG	O3-C21-CXD-CX3
6	A	325	MPG	O3-C21-CXD-CX3
6	A	324	MPG	O3-C21-CXD-CX3
6	A	325	MPG	C13-C14-C15-C16
6	A	323	MPG	C2-C3-C4-C5
6	A	325	MPG	C5-C6-C7-C8

*Continued on next page...*



*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>Atoms</b>
6	A	318	MPG	C5-C6-C7-C8
5	A	306	D10	C3-C4-C5-C6
6	A	320	MPG	C9-C10-C11-C12
6	A	318	MPG	C7-C8-C9-C10
5	A	304	D10	C3-C4-C5-C6
6	A	322	MPG	O4-CX3-CXD-C21
6	A	318	MPG	C4-C5-C6-C7
6	A	322	MPG	O1-C1-C2-C3
6	A	321	MPG	C6-C7-C8-C9
6	A	325	MPG	O4-CX3-CXD-O2
5	A	305	D10	C5-C6-C7-C8
6	A	318	MPG	O3-C21-CXD-O2
6	A	323	MPG	C5-C6-C7-C8
6	A	316	MPG	O1-C1-C2-C3
6	A	316	MPG	C3-C4-C5-C6
6	A	318	MPG	C9-C10-C11-C12
6	A	317	MPG	C2-C3-C4-C5
6	A	319	MPG	O4-CX3-CXD-O2
6	A	316	MPG	O4-CX3-CXD-O2
4	A	303	UND	C3-C4-C5-C6
5	A	305	D10	C2-C3-C4-C5
6	A	322	MPG	C6-C7-C8-C9
5	A	304	D10	C5-C6-C7-C8
6	A	323	MPG	C10-C11-C12-C13
6	A	322	MPG	C13-C14-C15-C16
6	A	325	MPG	O1-C1-C2-C3
5	A	313	D10	C5-C6-C7-C8
6	A	322	MPG	C2-C3-C4-C5
5	A	305	D10	C4-C5-C6-C7
5	A	305	D10	C7-C8-C9-C10
6	A	322	MPG	O1-CX3-CXD-C21
6	A	323	MPG	C9-C10-C11-C12
6	A	322	MPG	C7-C8-C9-C10
6	A	325	MPG	O4-CX3-O1-C1
6	A	323	MPG	C7-C8-C9-C10
6	A	317	MPG	C7-C8-C9-C10
6	A	321	MPG	C9-C10-C11-C12
5	A	304	D10	C2-C3-C4-C5
6	A	322	MPG	C12-C13-C14-C15
4	A	309	UND	C1-C2-C3-C4
4	A	309	UND	C4-C5-C6-C7
6	A	324	MPG	C3-C4-C5-C6

*Continued on next page...*

*Continued from previous page...*

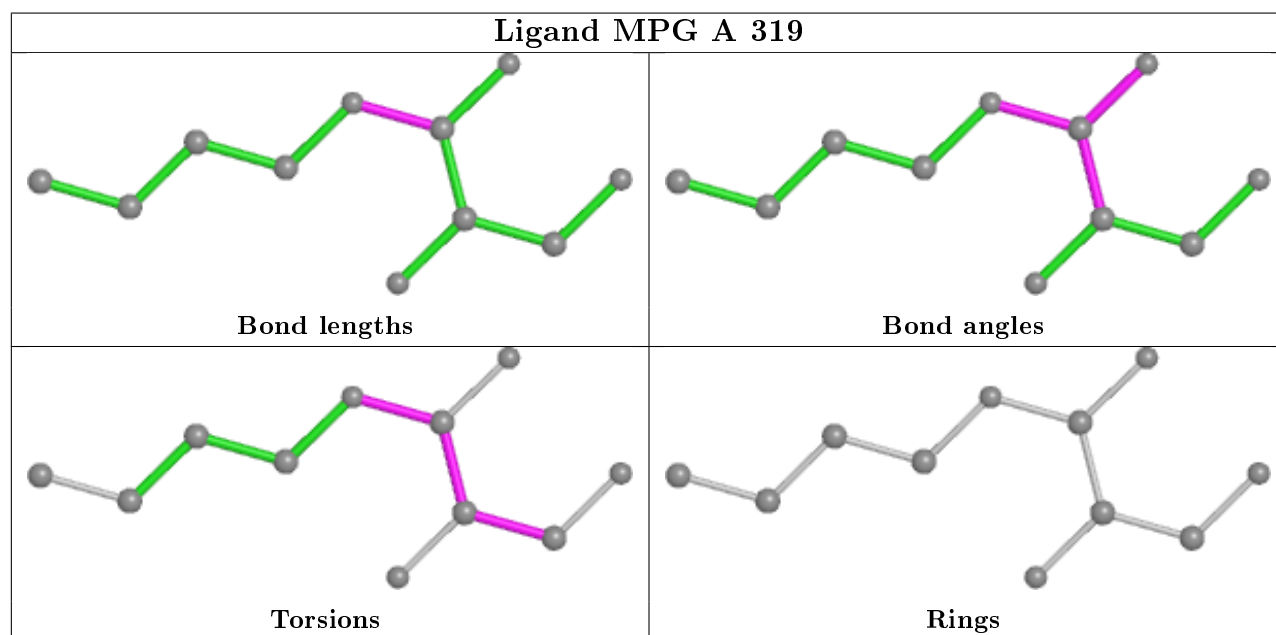
Mol	Chain	Res	Type	Atoms
4	A	309	UND	C3-C4-C5-C6
6	A	321	MPG	C7-C8-C9-C10

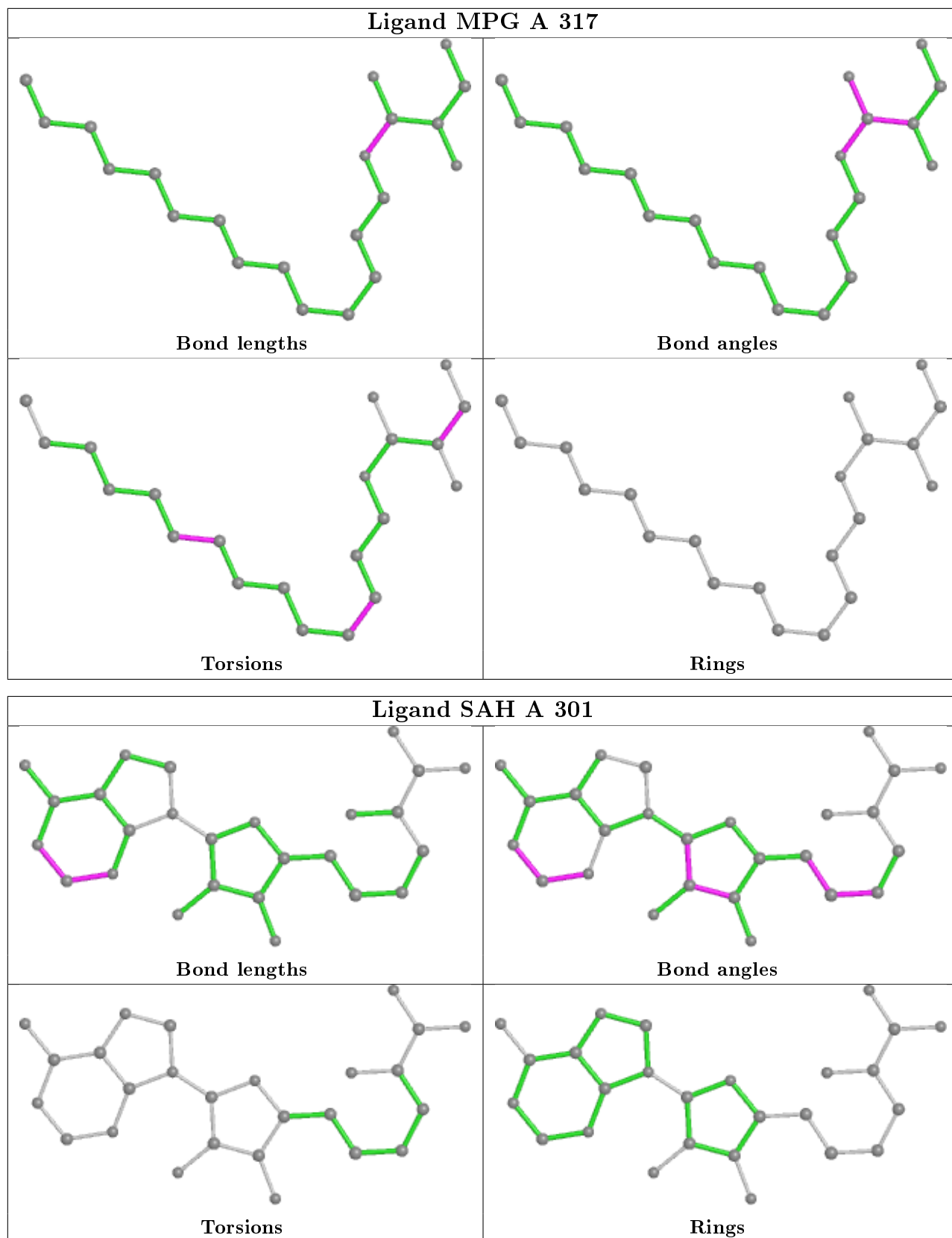
There are no ring outliers.

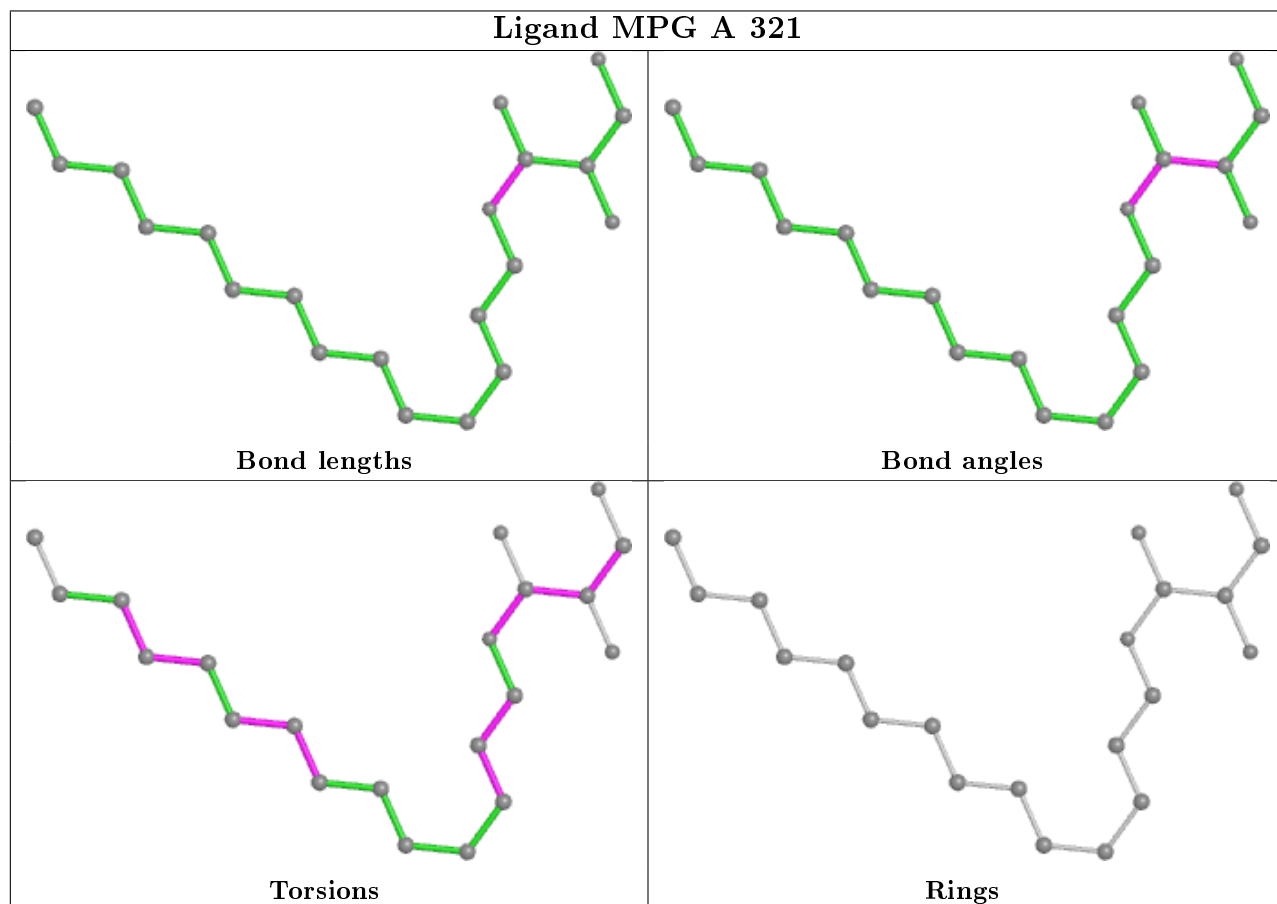
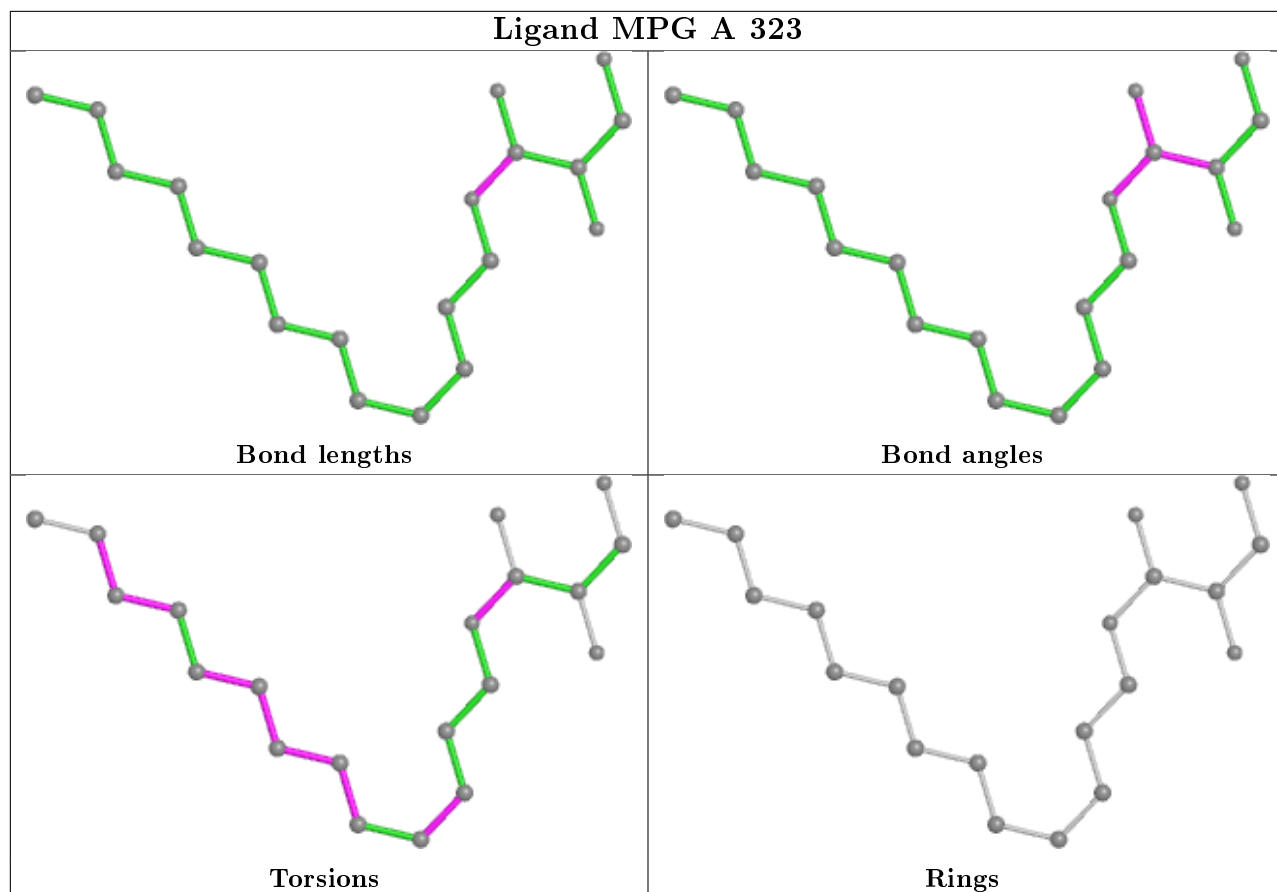
3 monomers are involved in 5 short contacts:

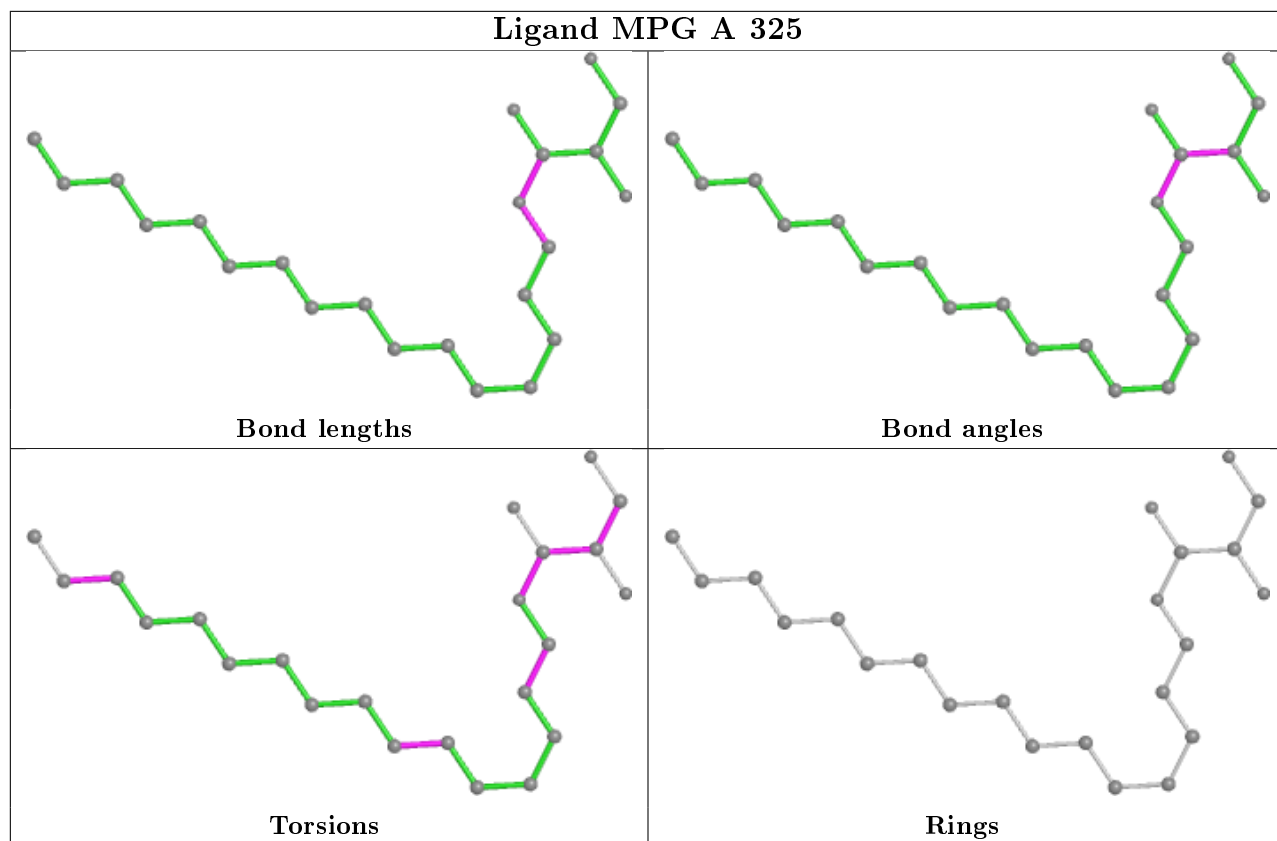
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	301	SAH	1	0
6	A	325	MPG	3	0
6	A	324	MPG	1	0

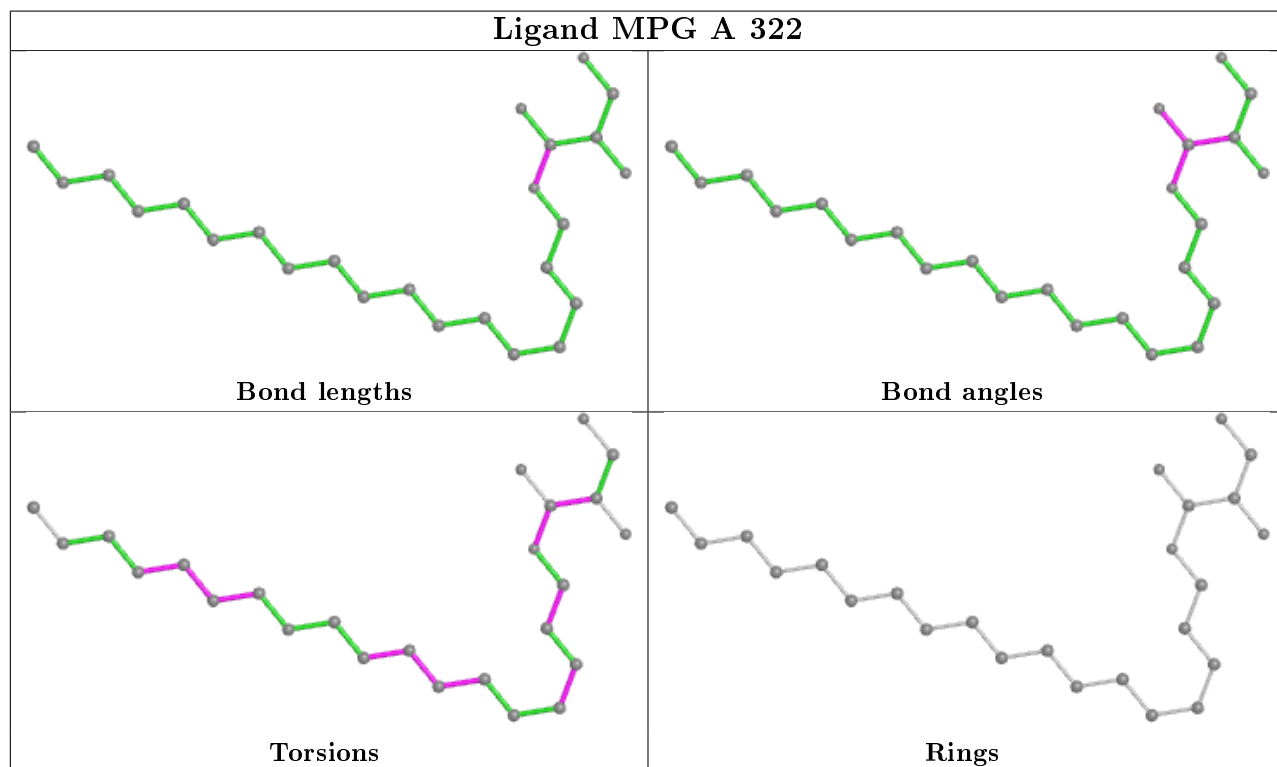
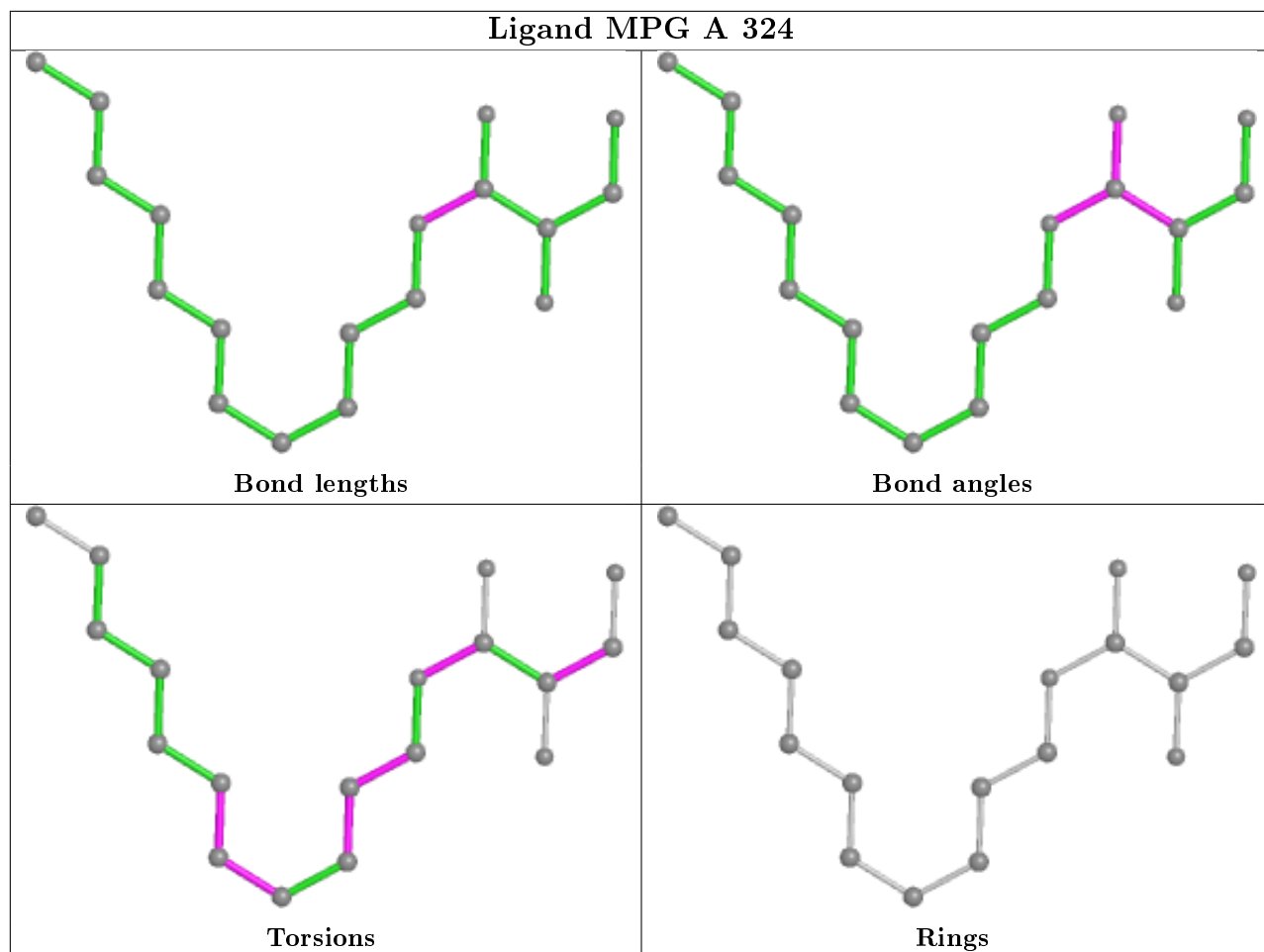
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

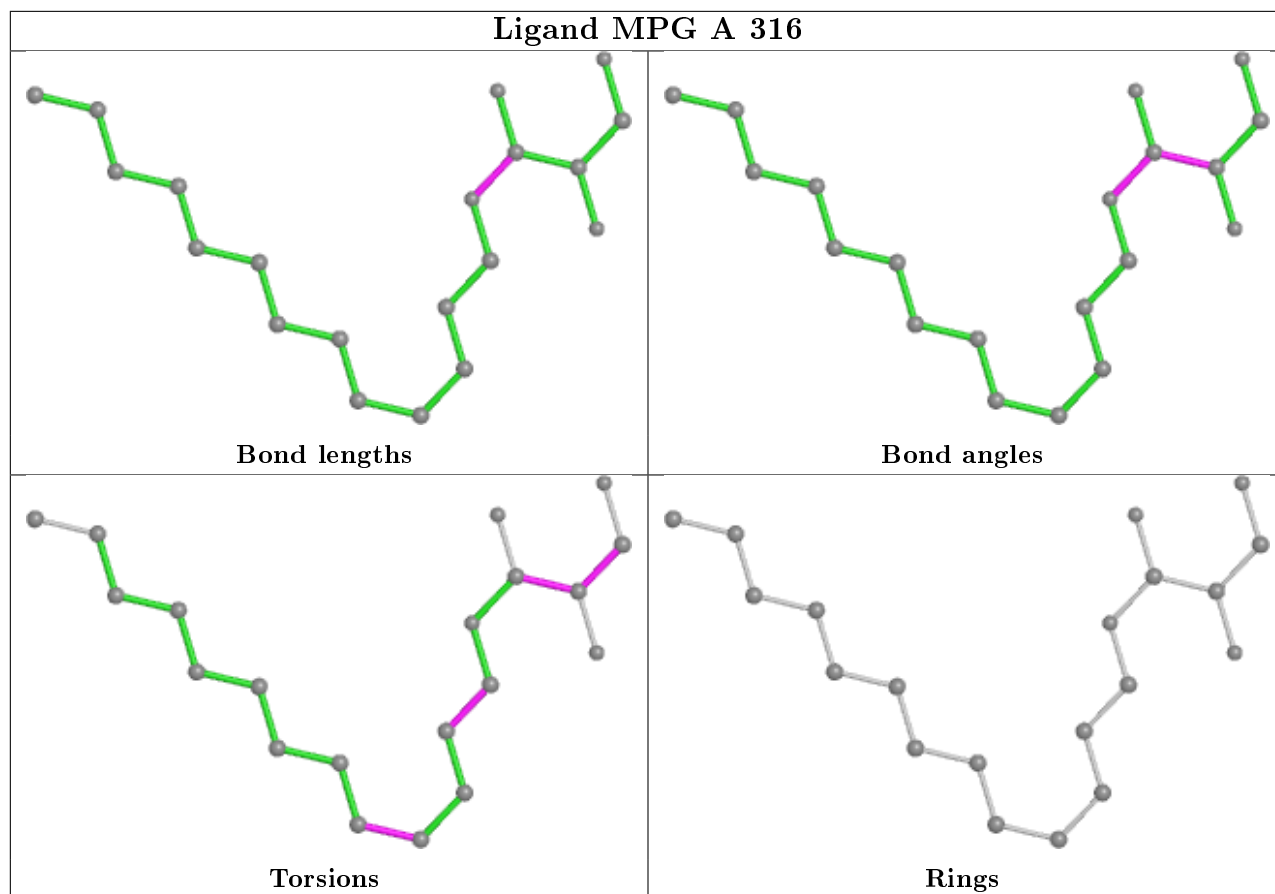


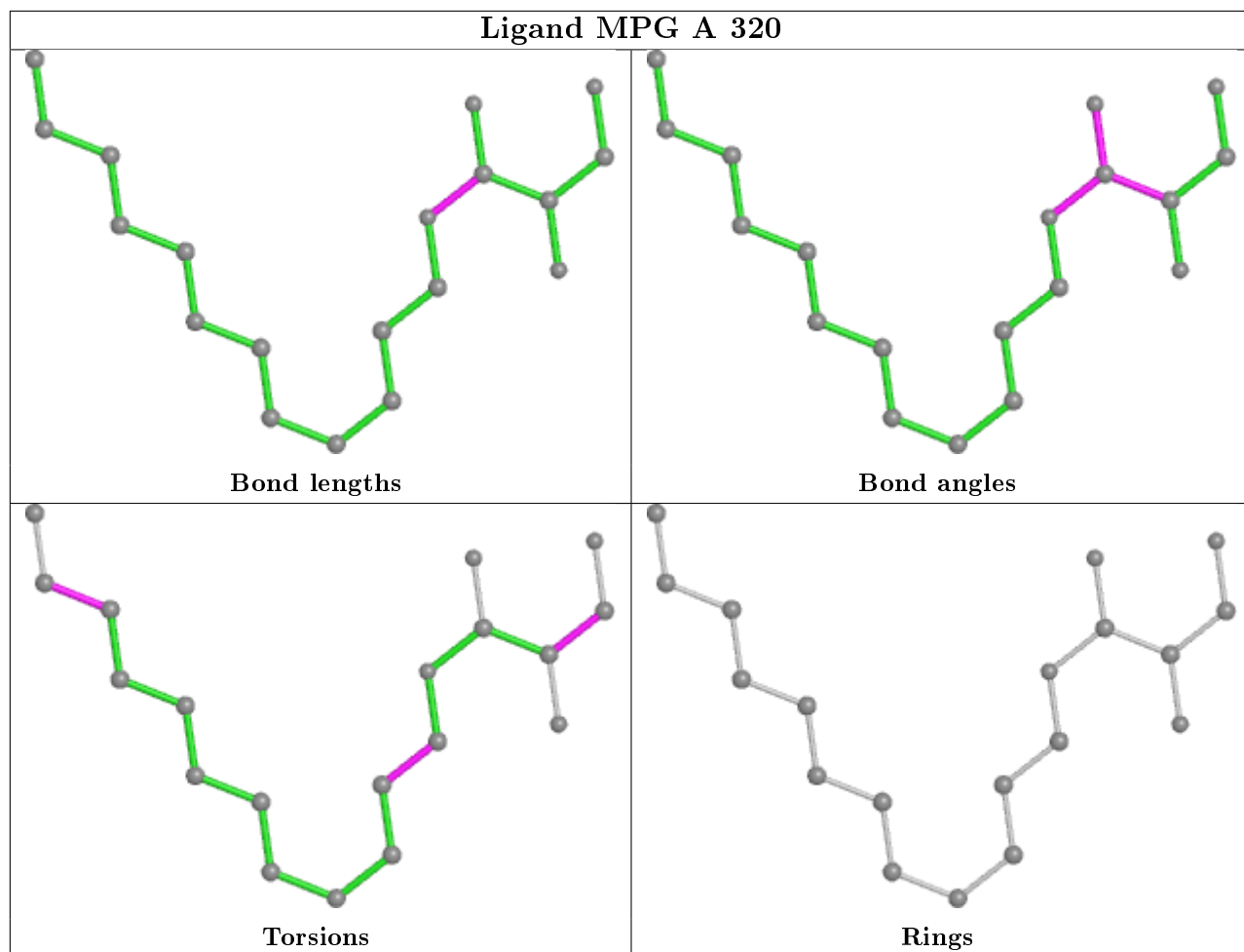




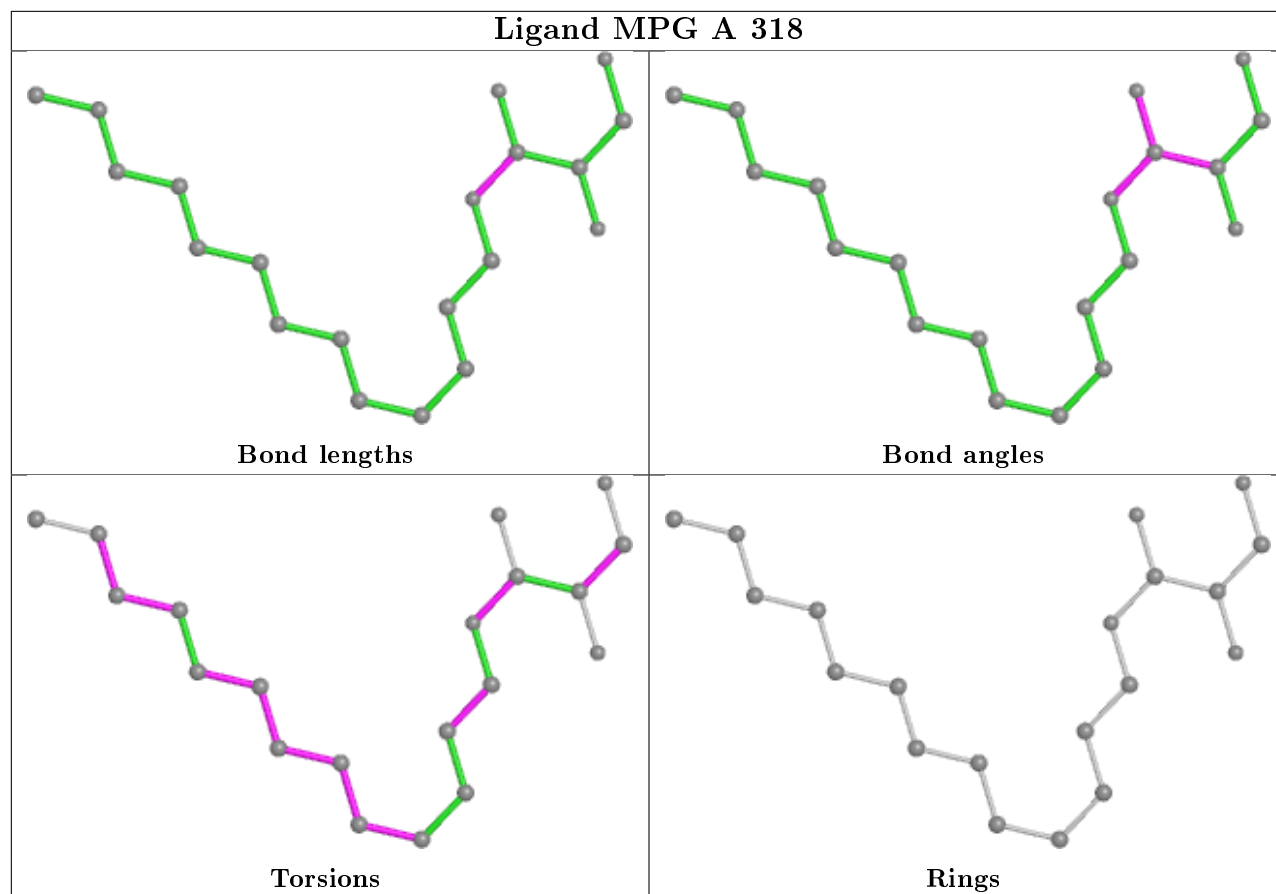












## 5.7 Other polymers [i](#)

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, 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	280/288 (97%)	-0.25	5 (1%) 68 74	18, 30, 49, 72	0
2	D	95/95 (100%)	-0.13	4 (4%) 36 43	22, 35, 67, 103	0
All	All	375/383 (97%)	-0.22	9 (2%) 59 66	18, 31, 53, 103	0

All (9) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	D	42	ASN	4.7
2	D	0	ALA	4.7
2	D	41	GLY	3.9
1	A	117	GLN	2.3
1	A	30	TYR	2.2
2	D	44	PRO	2.2
1	A	281	ILE	2.2
1	A	126	ASN	2.1
1	A	29	TYR	2.0

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

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

### 6.3 Carbohydrates [i](#)

There are no carbohydrates 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,

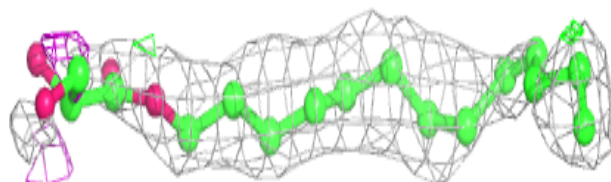
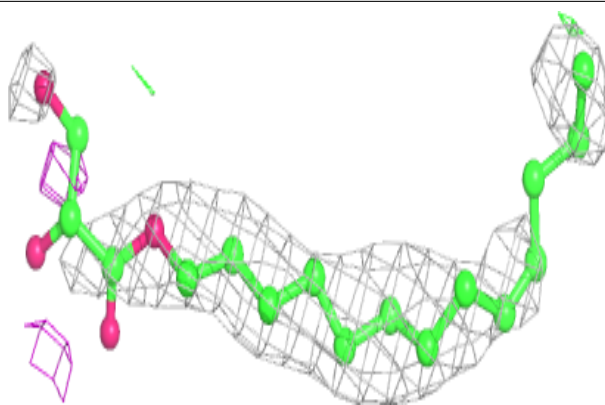
median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
6	MPG	A	323	20/25	0.47	0.39	43,63,81,83	0
5	D10	A	313	10/10	0.59	0.46	54,61,77,80	0
6	MPG	A	318	20/25	0.59	0.38	48,63,82,86	0
5	D10	A	312	5/10	0.61	0.50	51,58,66,75	0
4	UND	A	309	11/11	0.69	0.21	35,49,57,66	0
6	MPG	A	317	21/25	0.72	0.35	46,56,68,80	0
6	MPG	A	316	20/25	0.73	0.25	36,56,80,83	0
5	D10	A	314	8/10	0.73	0.30	43,55,65,66	0
6	MPG	A	321	21/25	0.74	0.28	38,60,77,81	0
6	MPG	A	322	25/25	0.76	0.37	56,63,76,83	0
5	D10	A	304	9/10	0.77	0.26	45,57,59,63	0
5	D10	A	315	8/10	0.78	0.54	50,66,73,75	0
5	D10	A	311	8/10	0.79	0.20	50,51,58,64	0
6	MPG	A	325	23/25	0.80	0.37	51,59,70,73	0
6	MPG	A	324	18/25	0.81	0.25	58,62,71,75	0
5	D10	A	306	6/10	0.82	0.13	47,57,59,61	0
4	UND	A	303	11/11	0.83	0.14	33,42,50,51	0
6	MPG	A	319	11/25	0.83	0.26	52,64,74,80	0
5	D10	A	305	10/10	0.83	0.16	22,38,44,45	0
4	UND	A	302	11/11	0.84	0.23	34,50,59,60	0
6	MPG	A	320	19/25	0.84	0.23	40,56,82,89	0
5	D10	A	308	9/10	0.88	0.29	32,35,43,48	0
5	D10	A	307	6/10	0.88	0.38	40,43,47,56	0
5	D10	A	310	9/10	0.88	0.19	38,51,54,64	0
3	SAH	A	301	26/26	0.97	0.11	15,22,28,33	0

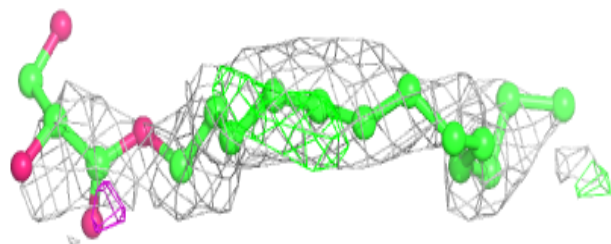
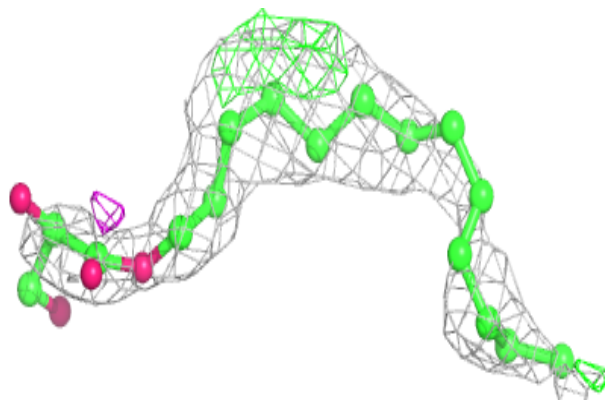
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

**Electron density around MPG A 323:**

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

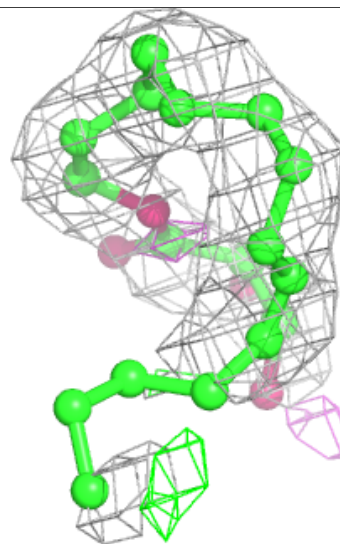
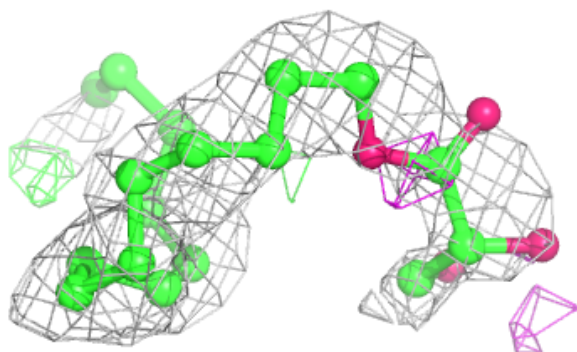
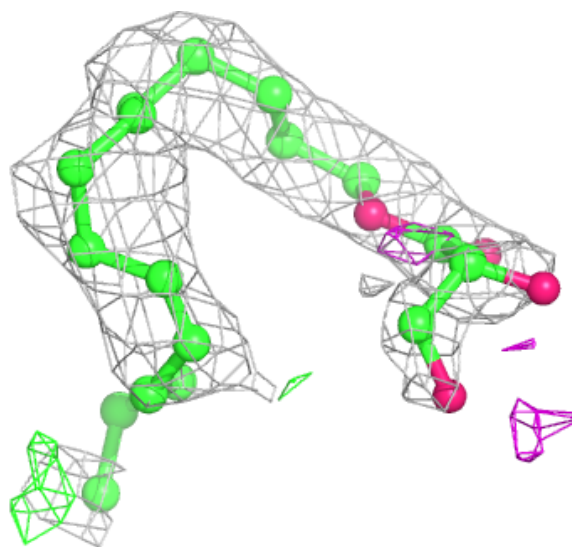
**Electron density around MPG A 318:**

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



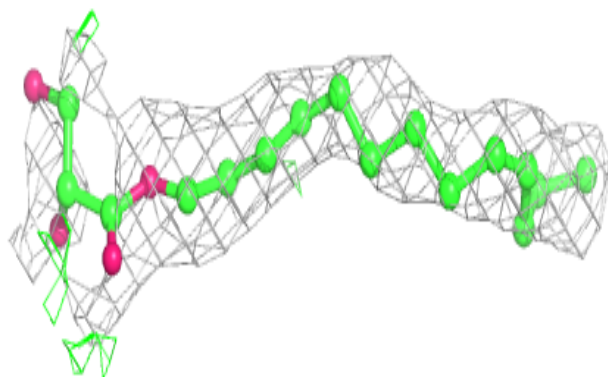
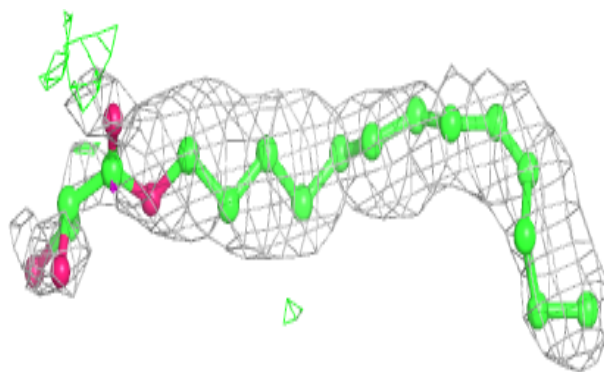
**Electron density around MPG A 317:**

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

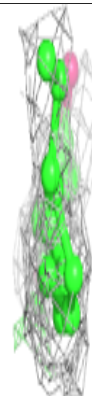
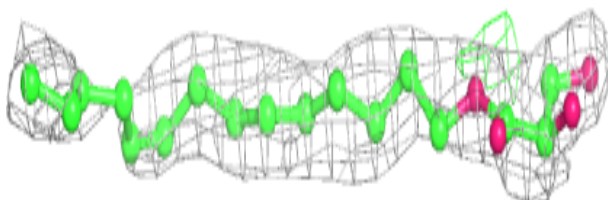
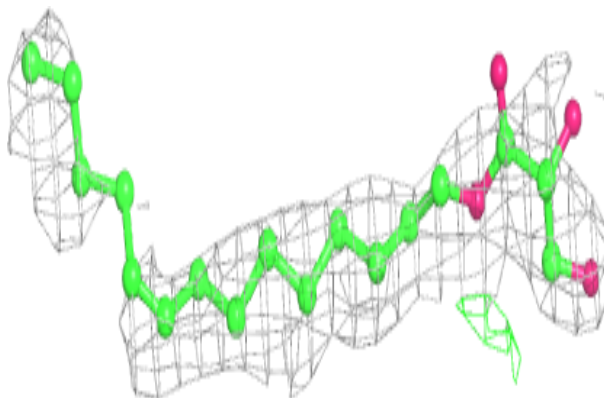


**Electron density around MPG A 316:**

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

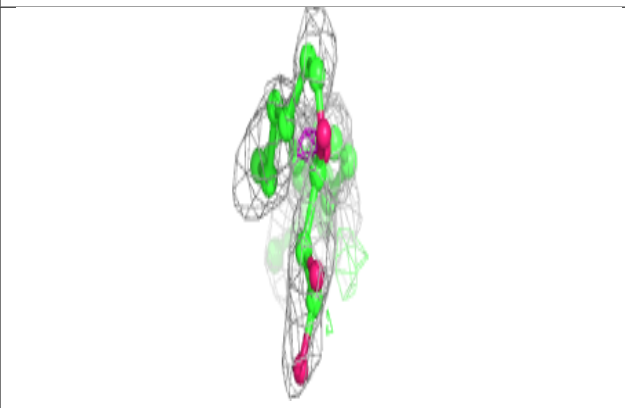
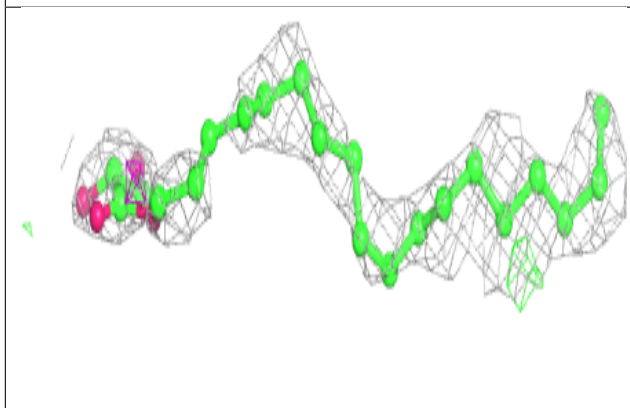
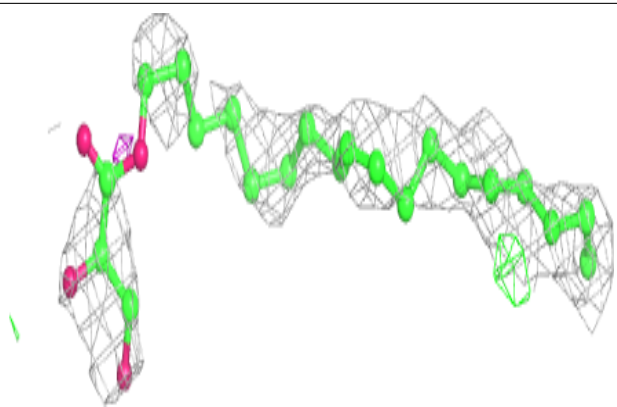
**Electron density around MPG A 321:**

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

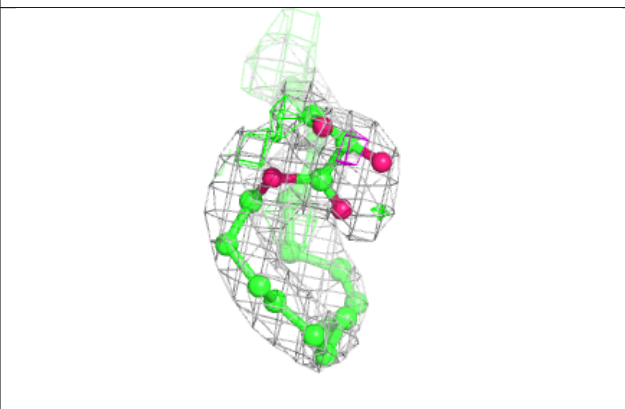
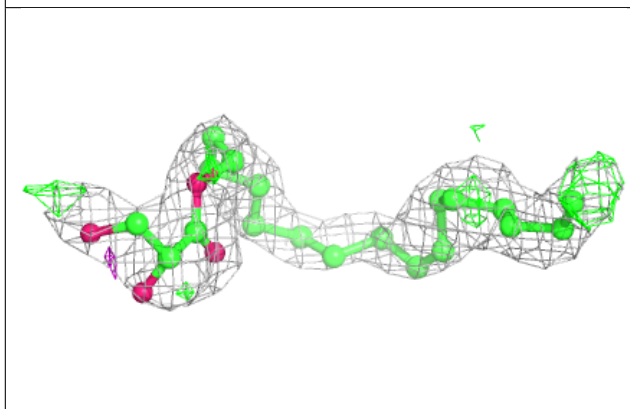
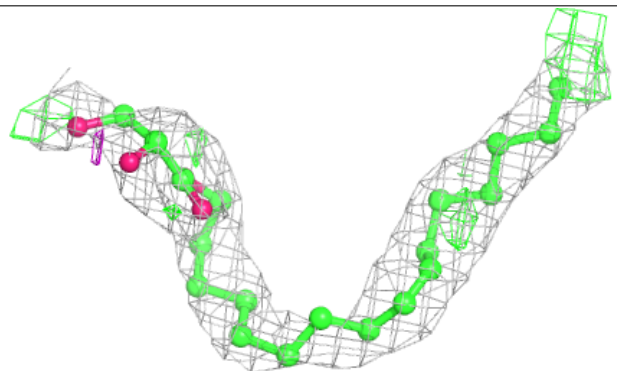


**Electron density around MPG A 322:**

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

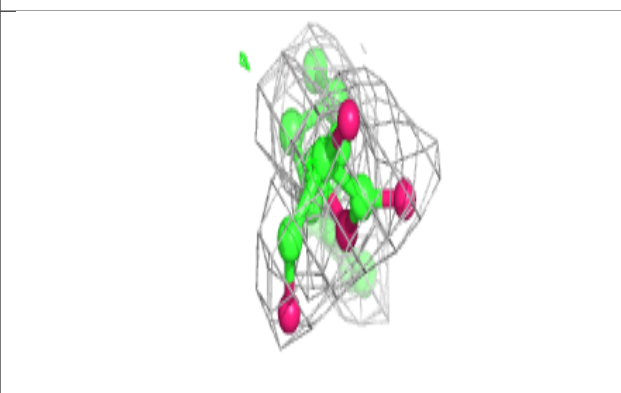
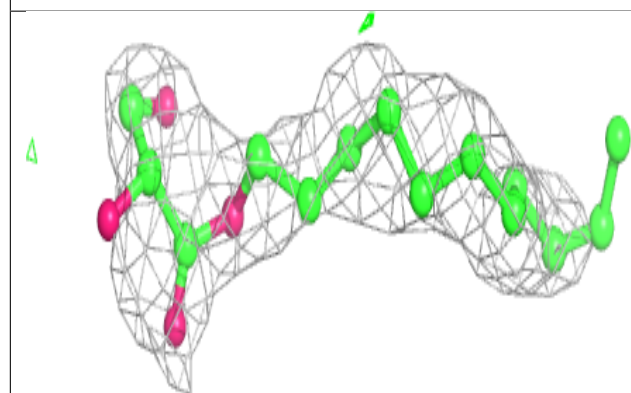
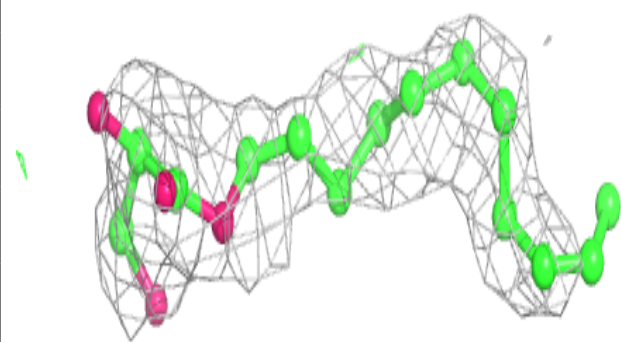
**Electron density around MPG A 325:**

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

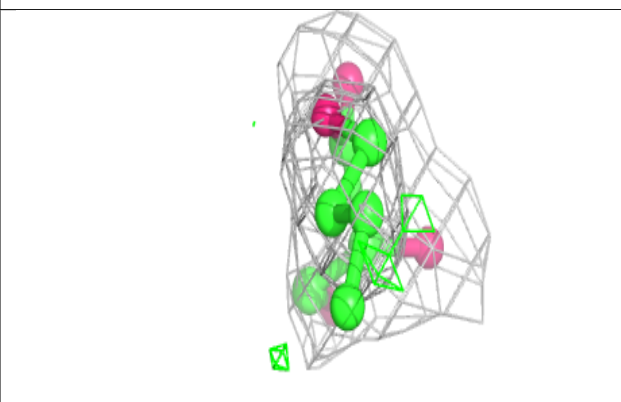
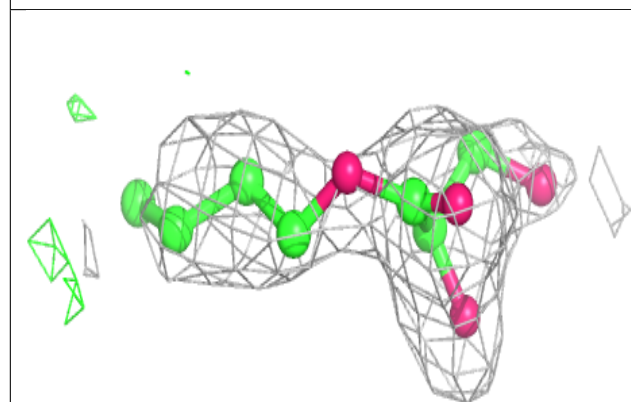
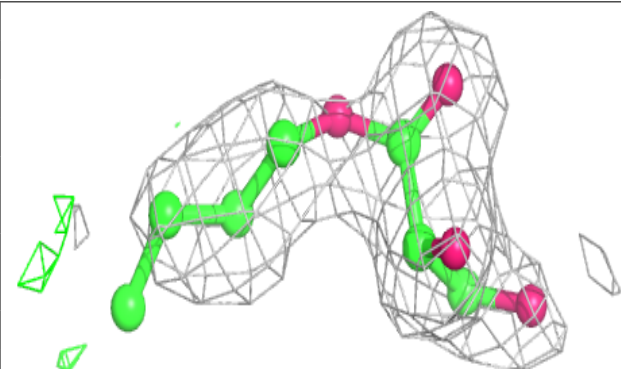


**Electron density around MPG A 324:**

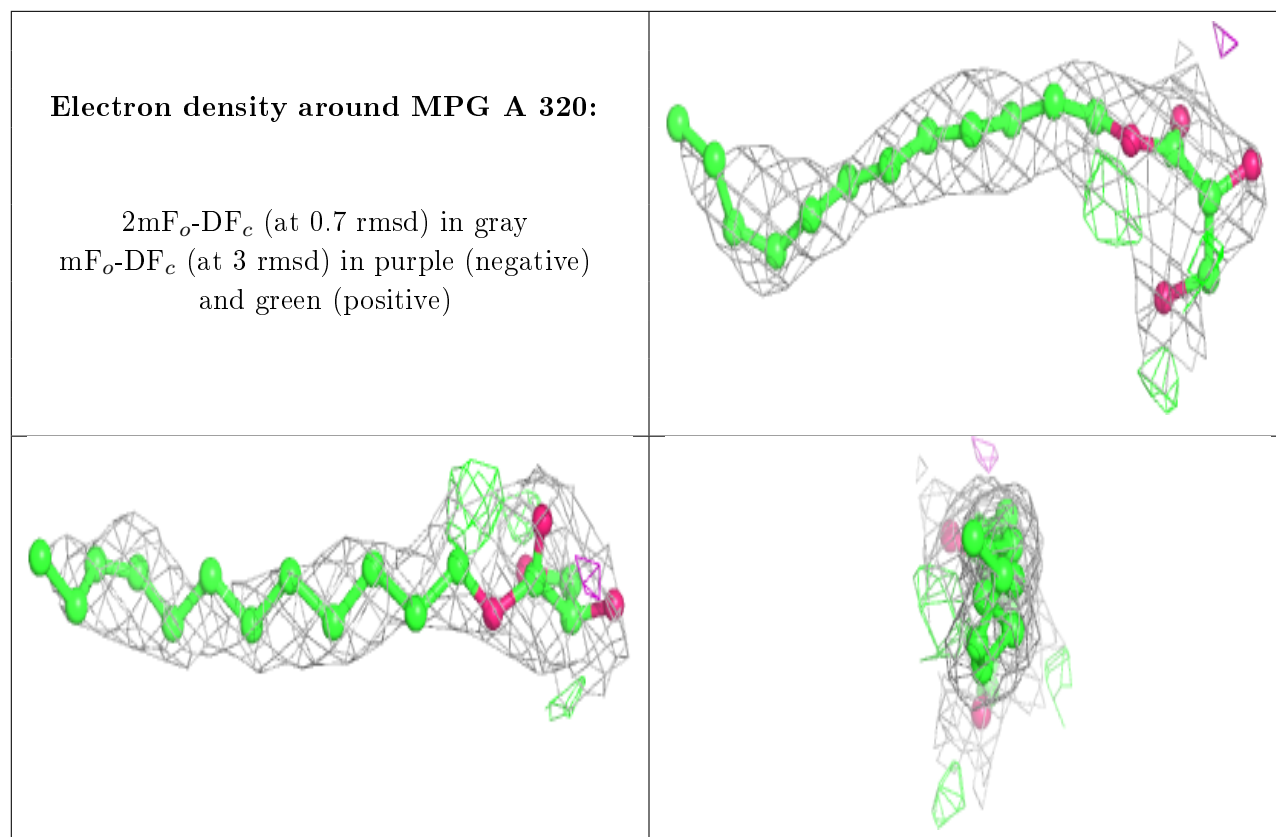
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

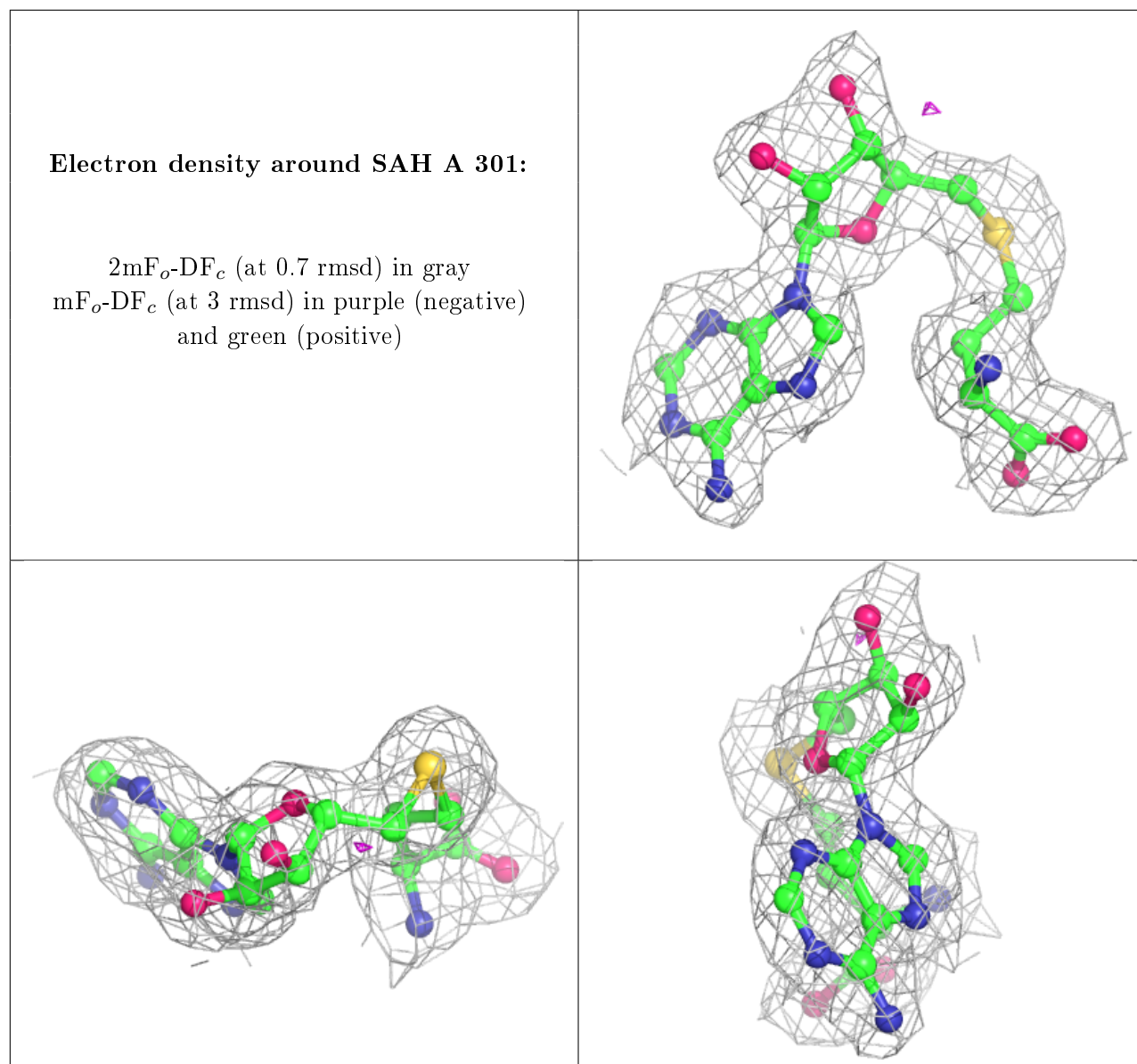
**Electron density around MPG A 319:**

$2mF_o-DF_c$  (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.