



wwPDB X-ray Structure Validation Summary Report ⓘ

Oct 5, 2023 – 04:48 PM EDT

PDB ID : 6NMF
Title : SFX structure of reduced cytochrome c oxidase at room temperature
Authors : Rousseau, D.L.; Yeh, S.-R.; Ishigami, I.
Deposited on : 2019-01-10
Resolution : 2.80 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 : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.35.1
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) : 2.35.1

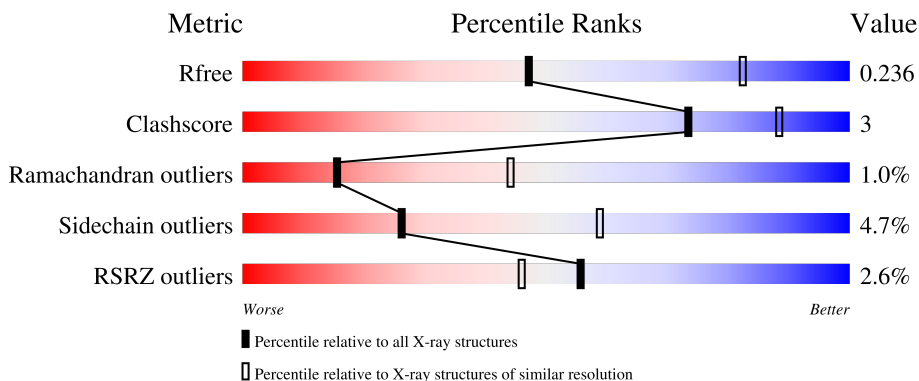
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.80 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.



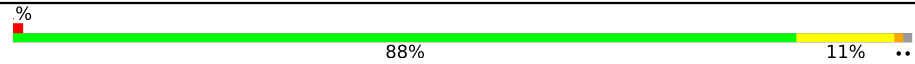
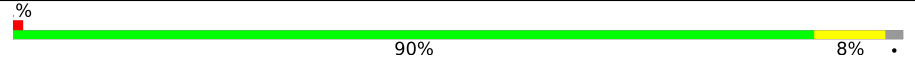
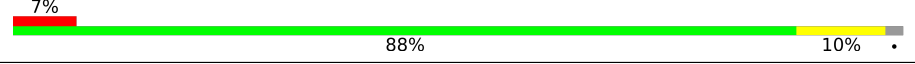
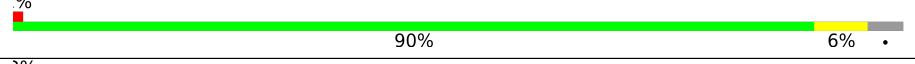
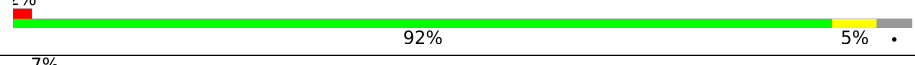
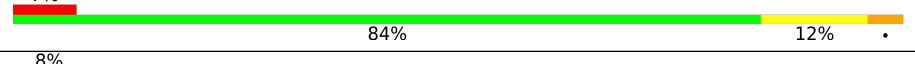


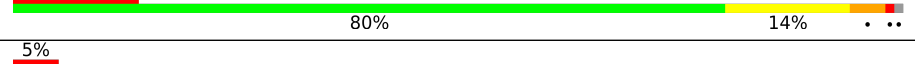


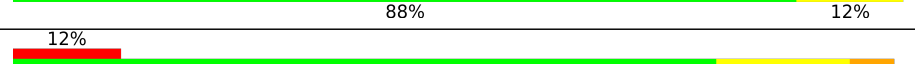

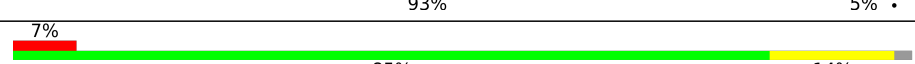
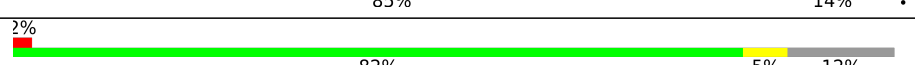
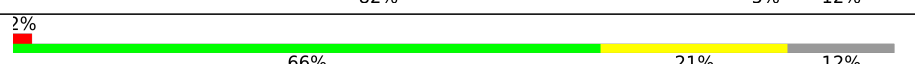
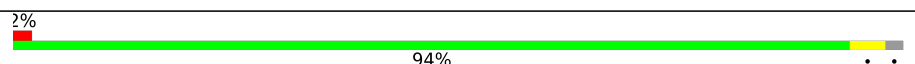
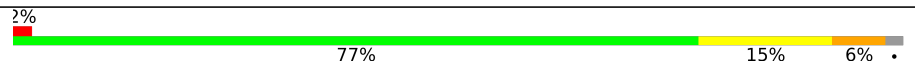
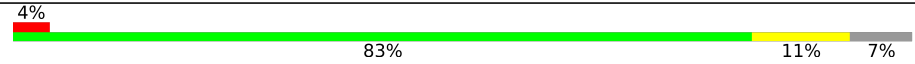


Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	3140 (2.80-2.80)
Clashscore	141614	3569 (2.80-2.80)
Ramachandran outliers	138981	3498 (2.80-2.80)
Sidechain outliers	138945	3500 (2.80-2.80)
RSRZ outliers	127900	3078 (2.80-2.80)

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	514	 93% 7%
1	N	514	 89% 11%
2	B	227	 86% 13%
2	O	227	 84% 15%
3	C	261	 95% 5%

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Mol	Chain	Length	Quality of chain
3	P	261	
4	D	147	
4	Q	147	
5	E	109	
5	R	109	
6	F	98	
6	S	98	
7	G	85	
7	T	85	
8	H	85	
8	U	85	
9	I	73	
9	V	73	
10	J	59	
10	W	59	
11	K	56	
11	X	56	
12	L	47	
12	Y	47	
13	M	46	
13	Z	46	

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
14	HEA	A	601	X	-	-	-
14	HEA	A	602	X	-	-	-

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Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
14	HEA	N	601	X	-	-	-
14	HEA	N	602	X	-	-	-
20	CDL	P	305	-	-	X	-
22	CHD	W	101	-	-	-	X
24	DMU	C	301	-	-	-	X
24	DMU	P	303	-	-	-	X
25	PEK	G	103	-	-	-	X
25	PEK	T	101	-	-	-	X
7	TPO	G	11	-	-	-	X
7	TPO	T	11	-	-	-	X
9	SAC	I	1	-	-	-	X
9	SAC	V	1	-	-	-	X

2 Entry composition [i](#)

There are 27 unique types of molecules in this entry. The entry contains 32083 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 Cytochrome c oxidase subunit 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	514	Total	C	N	O	S	0	12	0
			4124	2753	638	693	40			
1	N	514	Total	C	N	O	S	0	13	0
			4131	2757	639	694	41			

- Molecule 2 is a protein called Cytochrome c oxidase subunit 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	227	Total	C	N	O	S	0	6	0
			1874	1216	289	350	19			
2	O	227	Total	C	N	O	S	0	5	0
			1870	1215	289	348	18			

- Molecule 3 is a protein called Cytochrome c oxidase subunit 3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	C	259	Total	C	N	O	S	0	8	0
			2174	1451	345	364	14			
3	P	259	Total	C	N	O	S	0	8	0
			2173	1451	344	363	15			

- Molecule 4 is a protein called Cytochrome c oxidase subunit 4 isoform 1, mitochondrial.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	D	144	Total	C	N	O	S	0	6	0
			1249	814	206	224	5			
4	Q	144	Total	C	N	O	S	0	1	0
			1203	782	197	219	5			

- Molecule 5 is a protein called Cytochrome c oxidase subunit 5A, mitochondrial.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	E	105	Total	C	N	O	S	0	1	0
			863	550	148	163	2			
5	R	105	Total	C	N	O	S	0	0	0
			852	544	144	162	2			

- Molecule 6 is a protein called Cytochrome c oxidase subunit 5B, mitochondrial.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
6	F	98	Total	C	N	O	S	0	5	0
			789	489	142	152	6			
6	S	98	Total	C	N	O	S	0	1	0
			755	468	135	147	5			

- Molecule 7 is a protein called Cytochrome c oxidase subunit 6A2, mitochondrial.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
7	G	84	Total	C	N	O	P	S	0	1	0
			686	440	130	114	1	1			
7	T	84	Total	C	N	O	P	S	0	3	0
			706	454	133	117	1	1			

- Molecule 8 is a protein called Cytochrome c oxidase subunit 6B1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
8	H	79	Total	C	N	O	S	0	0	0
			662	417	121	119	5			
8	U	79	Total	C	N	O	S	0	0	0
			662	417	121	119	5			

- Molecule 9 is a protein called Cytochrome c oxidase subunit 6C.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
9	I	73	Total	C	N	O	S	0	0	0
			601	390	107	100	4			
9	V	73	Total	C	N	O	S	0	1	0
			609	395	108	101	5			

- Molecule 10 is a protein called Cytochrome c oxidase subunit 7A1, mitochondrial.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
10	J	58	Total	C	N	O	S	0	0	0
			460	297	78	82	3			

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
10	W	58	Total	C	N	O	S	0	0	0
			460	297	78	82	3			

- Molecule 11 is a protein called Cytochrome c oxidase subunit 7B, mitochondrial.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
11	K	49	Total	C	N	O	S	0	1	0
			391	255	66	68	2			
11	X	49	Total	C	N	O	S	0	1	0
			391	255	66	68	2			

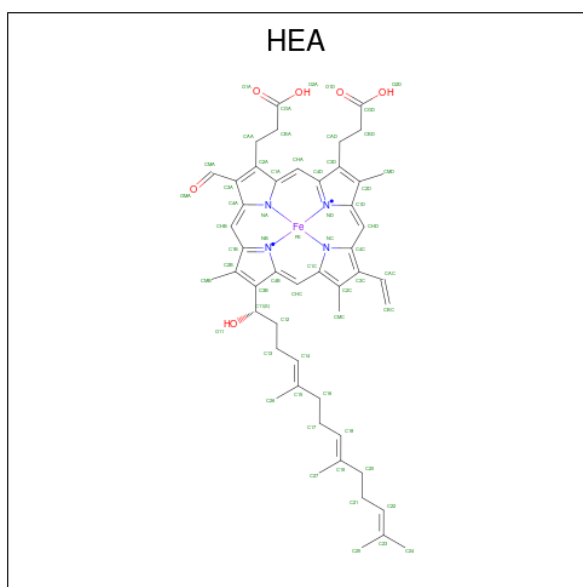
- Molecule 12 is a protein called Cytochrome c oxidase subunit 7C, mitochondrial.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
12	L	46	Total	C	N	O	S	0	0	0
			380	254	64	60	2			
12	Y	46	Total	C	N	O	S	0	0	0
			380	254	64	60	2			

- Molecule 13 is a protein called Cytochrome c oxidase subunit 8B, mitochondrial.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
13	M	43	Total	C	N	O	0	0	0
			335	223	53	59			
13	Z	43	Total	C	N	O	0	0	0
			335	223	53	59			

- Molecule 14 is HEME-A (three-letter code: HEA) (formula: C₄₉H₅₆FeN₄O₆).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
14	A	1	Total	C	Fe	N	O	0	0
			60	49	1	4	6		
14	A	1	Total	C	Fe	N	O	0	0
			60	49	1	4	6		
14	N	1	Total	C	Fe	N	O	0	0
			60	49	1	4	6		
14	N	1	Total	C	Fe	N	O	0	0
			60	49	1	4	6		

- Molecule 15 is COPPER (II) ION (three-letter code: CU) (formula: Cu).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
15	A	1	Total	Cu	0	0
			1	1		
15	N	1	Total	Cu	0	0
			1	1		

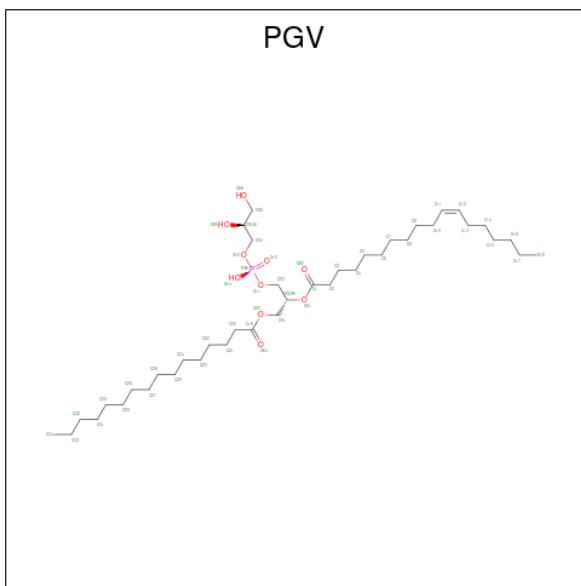
- Molecule 16 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
16	A	1	Total	Mg	0	0
			1	1		
16	N	1	Total	Mg	0	0
			1	1		

- Molecule 17 is SODIUM ION (three-letter code: NA) (formula: Na).

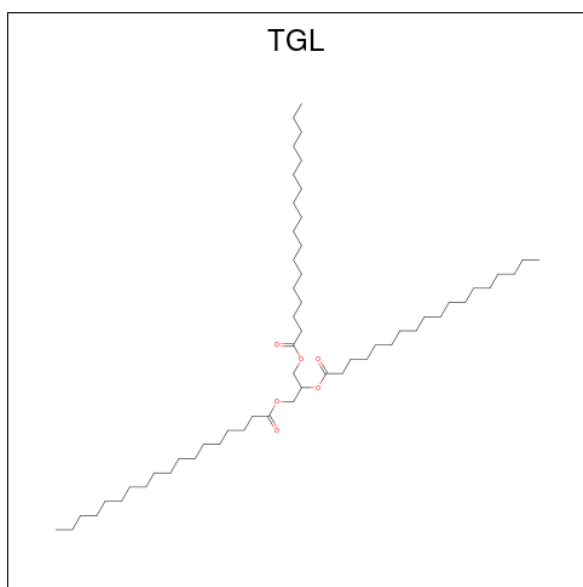
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
17	A	1	Total Na 1 1	0	0
17	N	1	Total Na 1 1	0	0

- Molecule 18 is (1R)-2-{{[[[(2S)-2,3-DIHYDROXYPROPYL]OXY}(HYDROXY)PHOSPHORYL]OXY}-1-[(PALMITOYLOXY)METHYL]ETHYL (11E)-OCTADEC-11-ENOATE (three-letter code: PGV) (formula: C₄₀H₇₇O₁₀P).



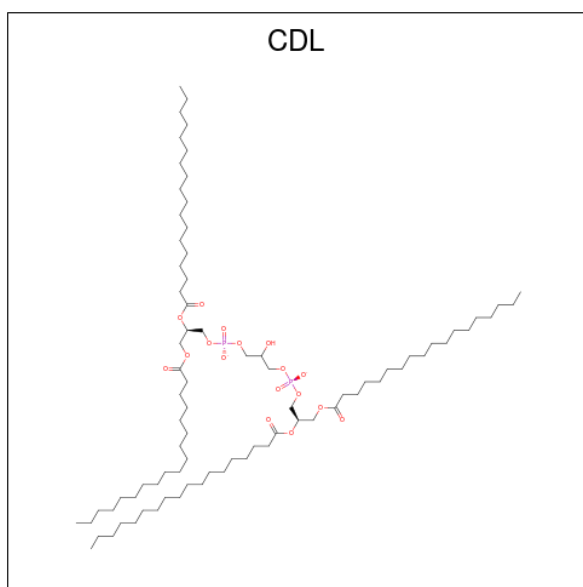
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
18	A	1	Total C O P 51 40 10 1	0	0
18	A	1	Total C O P 51 40 10 1	0	0
18	C	1	Total C O P 51 40 10 1	0	0
18	C	1	Total C O P 51 40 10 1	0	0
18	N	1	Total C O P 51 40 10 1	0	0
18	P	1	Total C O P 51 40 10 1	0	0
18	P	1	Total C O P 51 40 10 1	0	0
18	P	1	Total C O P 51 40 10 1	0	0

- Molecule 19 is TRISTEAROYLGLYCEROL (three-letter code: TGL) (formula: C₅₇H₁₁₀O₆).



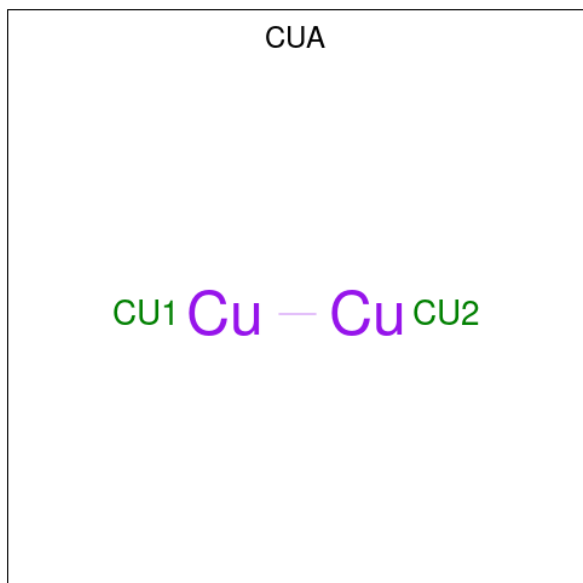
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
19	A	1	Total	C	O	0	0
			63	57	6		
19	B	1	Total	C	O	0	0
			63	57	6		
19	D	1	Total	C	O	0	0
			63	57	6		
19	N	1	Total	C	O	0	0
			63	57	6		
19	V	1	Total	C	O	0	0
			63	57	6		
19	Y	1	Total	C	O	0	0
			63	57	6		

- Molecule 20 is CARDIOLIPIN (three-letter code: CDL) (formula: C₈₁H₁₅₆O₁₇P₂).



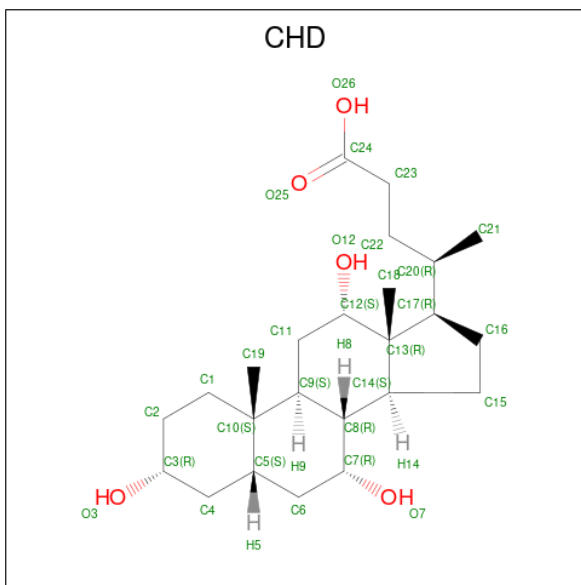
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	O	P		
20	A	1	100	81	17	2	0	0
20	C	1	100	81	17	2	0	0
20	G	1	100	81	17	2	0	0
20	P	1	100	81	17	2	0	0

- Molecule 21 is DINUCLEAR COPPER ION (three-letter code: CUA) (formula: Cu₂).



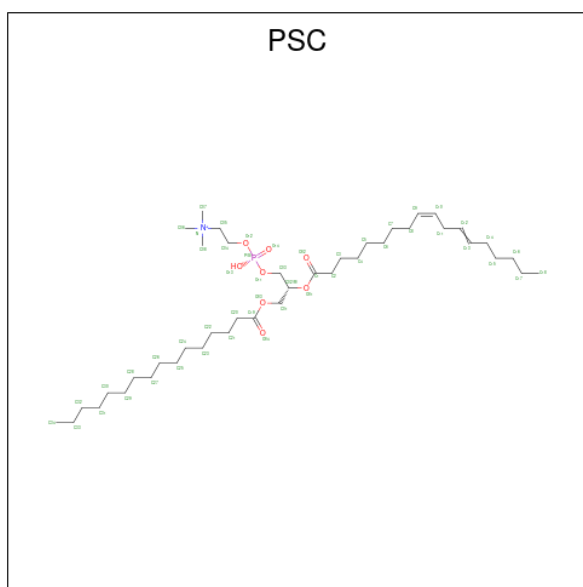
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
21	B	1	Total Cu 2 2	0	0
21	O	1	Total Cu 2 2	0	0

- Molecule 22 is CHOLIC ACID (three-letter code: CHD) (formula: C₂₄H₄₀O₅).



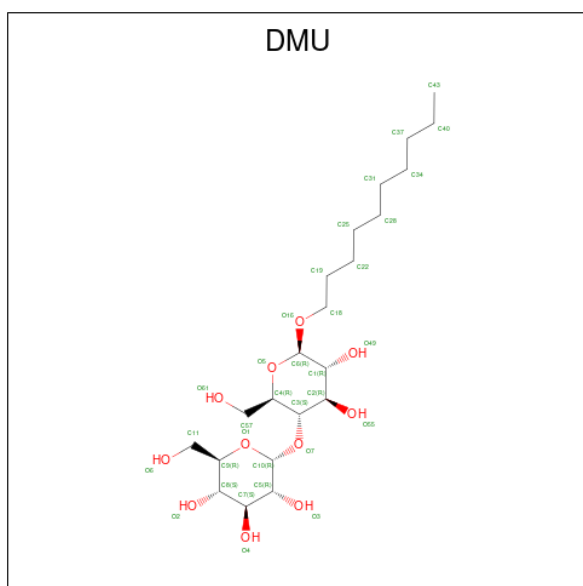
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
22	B	1	Total C O 29 24 5	0	0
22	C	1	Total C O 29 24 5	0	0
22	C	1	Total C O 29 24 5	0	0
22	G	1	Total C O 29 24 5	0	0
22	J	1	Total C O 29 24 5	0	0
22	P	1	Total C O 29 24 5	0	0
22	P	1	Total C O 29 24 5	0	0
22	W	1	Total C O 29 24 5	0	0

- Molecule 23 is (7R,17E,20E)-4-HYDROXY-N,N,N-TRIMETHYL-9-OXO-7-[(PALMITOYLOXY)METHYL]-3,5,8-TRIOXA-4-PHOSPHAHEXACOSA-17,20-DIEN-1-AMINIUM 4-OXIDE (three-letter code: PSC) (formula: C₄₂H₈₁NO₈P).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
23	B	1	Total	C	N	O	P	0	0
			52	42	1	8	1		
23	N	1	Total	C	N	O	P	0	0
			52	42	1	8	1		

- Molecule 24 is DECYL-BETA-D-MALTOPYRANOSIDE (three-letter code: DMU) (formula: C₂₂H₄₂O₁₁).



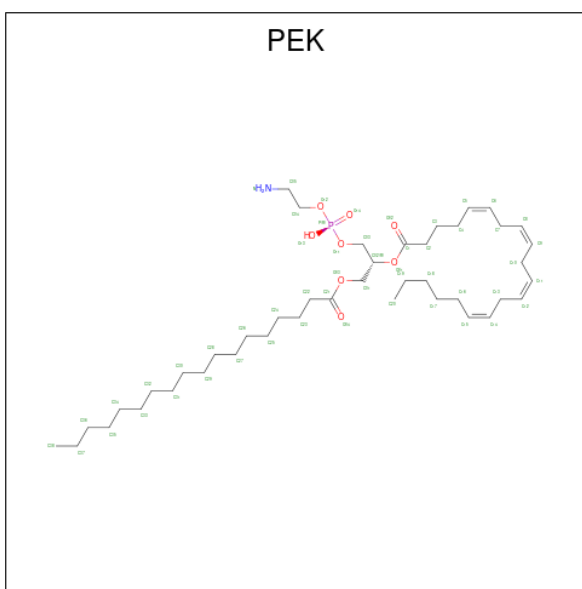
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
24	C	1	Total	C	O	0	0
			33	22	11		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
24	M	1	Total	C	O	0	0
			33	22	11		
24	P	1	Total	C	O	0	0
			33	22	11		
24	Q	1	Total	C	O	0	0
			33	22	11		

- Molecule 25 is (1S)-2-[[[(2-AMINOETHOXY)(HYDROXY)PHOSPHORYL]OXY}-1-[(STEAROYLOXY)METHYL]ETHYL (5E,8E,11E,14E)-ICOSA-5,8,11,14-TETRAENOATE (three-letter code: PEK) (formula: C₄₃H₇₈NO₈P).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
25	C	1	Total	C	N	O	P	0	0
			53	43	1	8	1		
25	G	1	Total	C	N	O	P	0	0
			53	43	1	8	1		
25	G	1	Total	C	N	O	P	0	0
			53	43	1	8	1		
25	P	1	Total	C	N	O	P	0	0
			53	43	1	8	1		
25	P	1	Total	C	N	O	P	0	0
			53	43	1	8	1		
25	T	1	Total	C	N	O	P	0	0
			53	43	1	8	1		

- Molecule 26 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
26	F	1	Total 1	Zn 1	0	0
26	S	1	Total 1	Zn 1	0	0

- Molecule 27 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
27	A	123	Total 123	O 123	0	0
27	B	74	Total 74	O 74	0	0
27	C	57	Total 57	O 57	0	0
27	D	32	Total 32	O 32	0	0
27	E	28	Total 28	O 28	0	0
27	F	28	Total 28	O 28	0	0
27	G	24	Total 24	O 24	0	0
27	H	21	Total 21	O 21	0	0
27	I	20	Total 20	O 20	0	0
27	J	11	Total 11	O 11	0	0
27	K	2	Total 2	O 2	0	0
27	L	24	Total 24	O 24	0	0
27	M	4	Total 4	O 4	0	0
27	N	83	Total 83	O 83	0	0
27	O	52	Total 52	O 52	0	0
27	P	39	Total 39	O 39	0	0
27	Q	22	Total 22	O 22	0	0
27	R	14	Total 14	O 14	0	0

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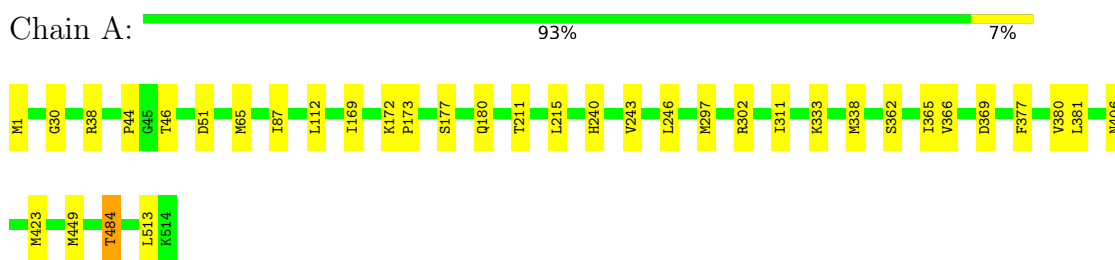
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
27	S	21	Total 21	O 21	0	0
27	T	20	Total 20	O 20	0	0
27	U	13	Total 13	O 13	0	0
27	V	16	Total 16	O 16	0	0
27	W	5	Total 5	O 5	0	0
27	X	5	Total 5	O 5	0	0
27	Y	2	Total 2	O 2	0	0
27	Z	4	Total 4	O 4	0	0

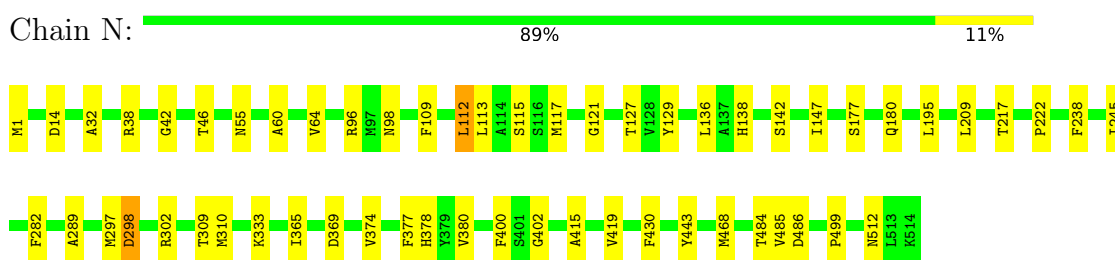
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

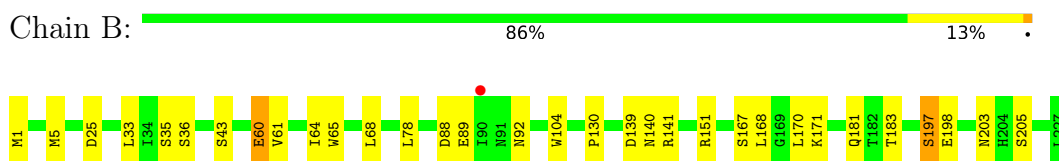
- Molecule 1: Cytochrome c oxidase subunit 1



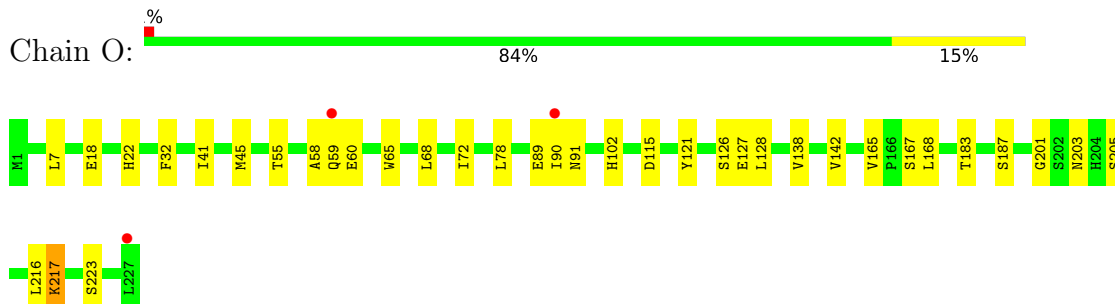
- Molecule 1: Cytochrome c oxidase subunit 1



- Molecule 2: Cytochrome c oxidase subunit 2



- Molecule 2: Cytochrome c oxidase subunit 2




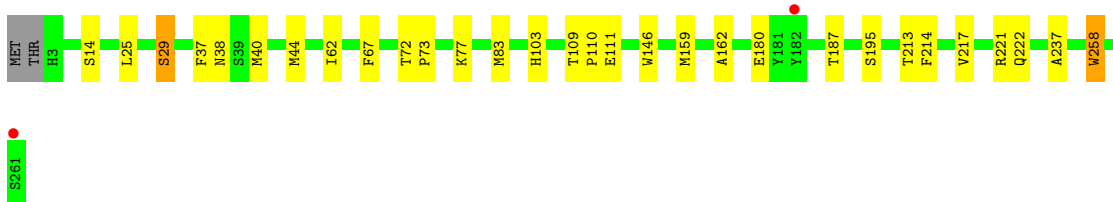
- Molecule 3: Cytochrome c oxidase subunit 3

Chain C:  95% 5%




- Molecule 3: Cytochrome c oxidase subunit 3

Chain P:  88% 11%




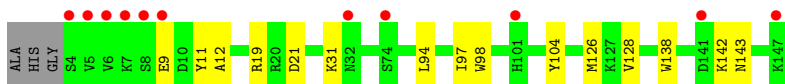
- Molecule 4: Cytochrome c oxidase subunit 4 isoform 1, mitochondrial

Chain D:  90% 8%




- Molecule 4: Cytochrome c oxidase subunit 4 isoform 1, mitochondrial

Chain Q:  88% 10%

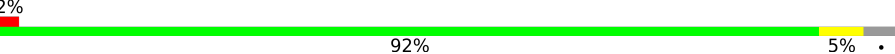


- Molecule 5: Cytochrome c oxidase subunit 5A, mitochondrial

Chain E:  90% 6%

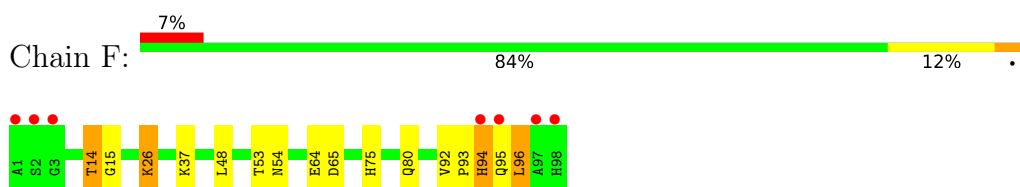


- Molecule 5: Cytochrome c oxidase subunit 5A, mitochondrial

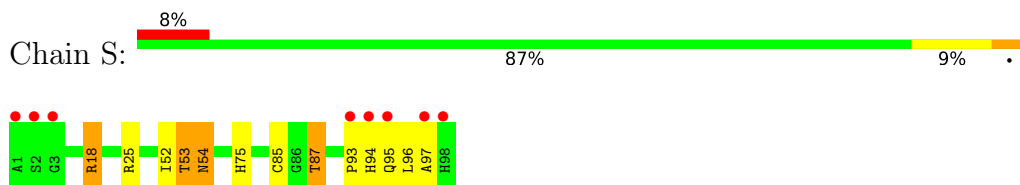
Chain R:  92% 5%



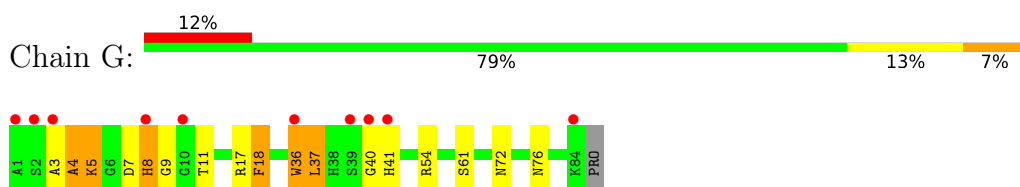
- Molecule 6: Cytochrome c oxidase subunit 5B, mitochondrial



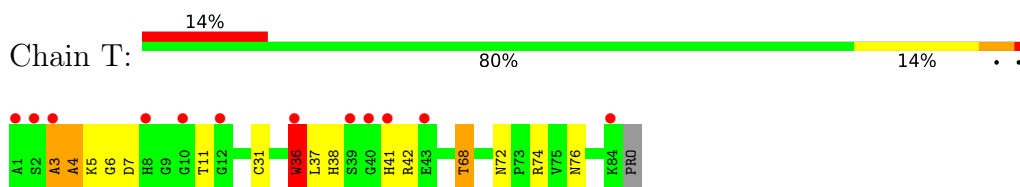
- Molecule 6: Cytochrome c oxidase subunit 5B, mitochondrial



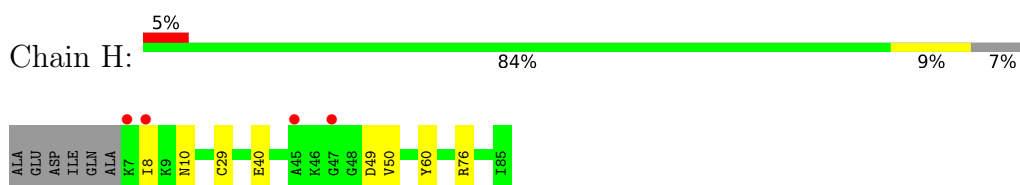
- Molecule 7: Cytochrome c oxidase subunit 6A2, mitochondrial



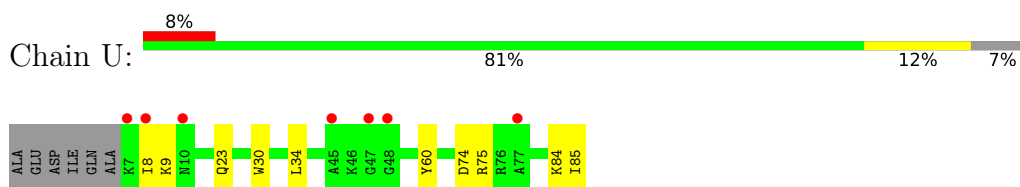
- Molecule 7: Cytochrome c oxidase subunit 6A2, mitochondrial



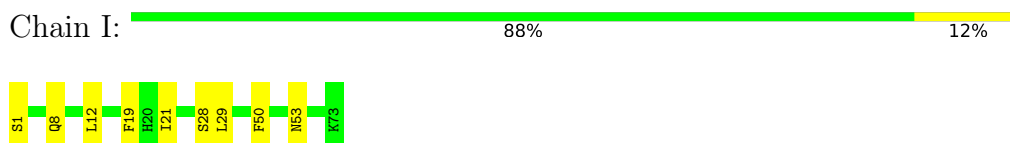
- Molecule 8: Cytochrome c oxidase subunit 6B1



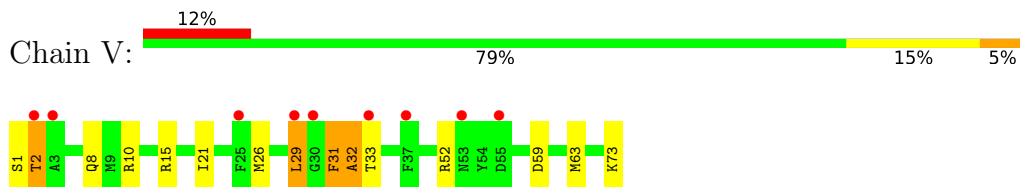
- Molecule 8: Cytochrome c oxidase subunit 6B1



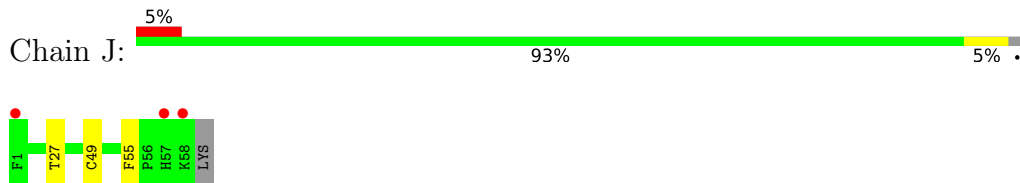
- Molecule 9: Cytochrome c oxidase subunit 6C



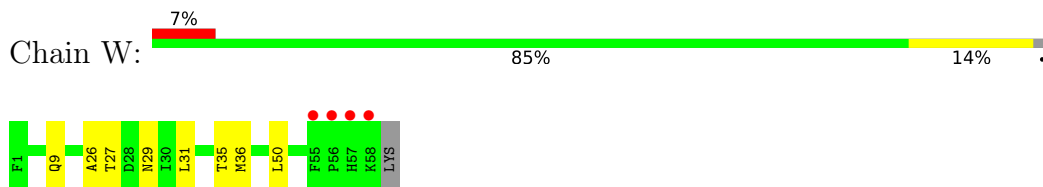
- Molecule 9: Cytochrome c oxidase subunit 6C



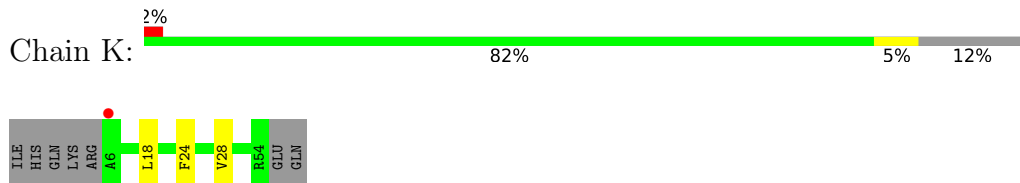
- Molecule 10: Cytochrome c oxidase subunit 7A1, mitochondrial



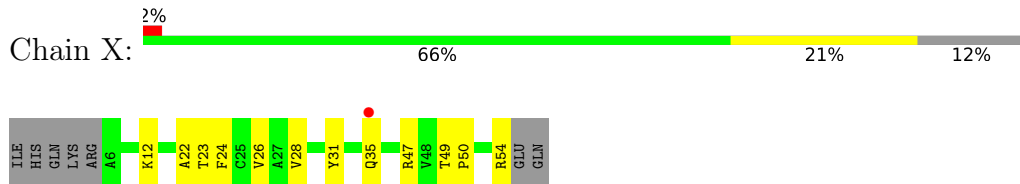
- Molecule 10: Cytochrome c oxidase subunit 7A1, mitochondrial



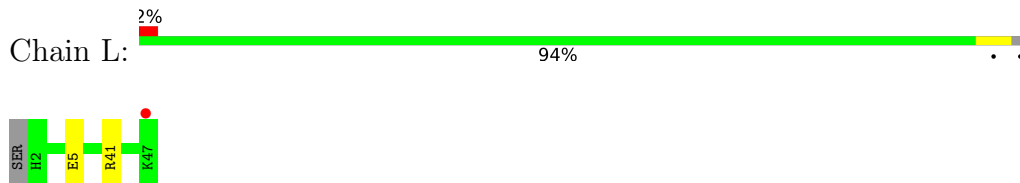
- Molecule 11: Cytochrome c oxidase subunit 7B, mitochondrial



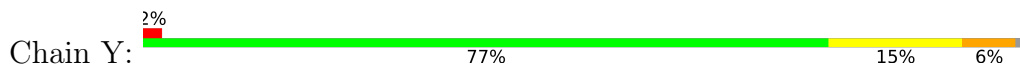
- Molecule 11: Cytochrome c oxidase subunit 7B, mitochondrial

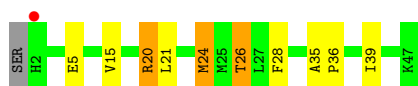


- Molecule 12: Cytochrome c oxidase subunit 7C, mitochondrial

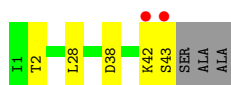
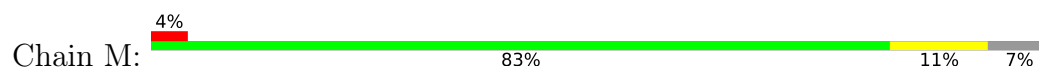


- Molecule 12: Cytochrome c oxidase subunit 7C, mitochondrial

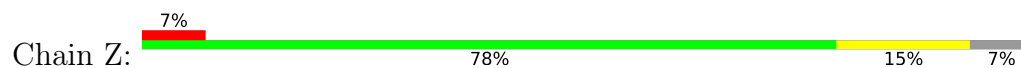




- Molecule 13: Cytochrome c oxidase subunit 8B, mitochondrial



- Molecule 13: Cytochrome c oxidase subunit 8B, mitochondrial



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	178.70Å 189.80Å 211.30Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	15.00 – 2.80 15.00 – 2.80	Depositor EDS
% Data completeness (in resolution range)	99.3 (15.00-2.80) 100.0 (15.00-2.80)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.16 (at 2.81Å)	Xtrriage
Refinement program	REFMAC 5.8.0189	Depositor
R, R_{free}	0.176 , 0.232 0.186 , 0.236	Depositor DCC
R_{free} test set	8641 reflections (4.93%)	wwPDB-VP
Wilson B-factor (Å ²)	68.0	Xtrriage
Anisotropy	0.092	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 64.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	32083	wwPDB-VP
Average B, all atoms (Å ²)	73.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.86% 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: CU, PEK, PGV, SAC, CHD, CUA, NA, MG, TGL, DMU, TPO, ZN, CDL, FME, HEA, PSC

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	0.56	0/4253	0.71	1/5805 (0.0%)
1	N	0.57	0/4260	0.73	2/5814 (0.0%)
2	B	0.60	2/1912 (0.1%)	0.84	2/2603 (0.1%)
2	O	0.58	0/1908	0.78	0/2599
3	C	0.55	0/2261	0.67	0/3090
3	P	0.57	0/2260	0.70	0/3088
4	D	0.54	0/1284	0.73	1/1730 (0.1%)
4	Q	0.53	0/1237	0.69	0/1668
5	E	0.51	0/882	0.74	0/1196
5	R	0.49	0/871	0.72	1/1182 (0.1%)
6	F	0.60	0/806	0.83	0/1093
6	S	0.55	0/772	0.79	1/1048 (0.1%)
7	G	0.63	1/702 (0.1%)	0.75	0/953
7	T	0.69	2/724 (0.3%)	0.83	0/984
8	H	0.56	0/682	0.75	0/921
8	U	0.55	0/682	0.74	0/921
9	I	0.61	0/605	0.82	0/802
9	V	0.64	0/613	0.87	2/812 (0.2%)
10	J	0.51	0/471	0.69	0/636
10	W	0.54	0/471	0.69	0/636
11	K	0.61	0/405	0.67	0/556
11	X	0.61	0/405	0.69	0/556
12	L	0.59	0/393	0.75	1/526 (0.2%)
12	Y	0.58	0/393	0.72	0/526
13	M	0.56	0/345	0.72	0/470
13	Z	0.51	0/345	0.66	0/470
All	All	0.57	5/29942 (0.0%)	0.74	11/40685 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a

sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
2	O	0	1
6	F	0	1
6	S	0	1
7	T	0	1
All	All	0	4

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	T	36[A]	TRP	CB-CG	7.10	1.63	1.50
7	T	36[B]	TRP	CB-CG	7.10	1.63	1.50
2	B	198	GLU	C-O	6.27	1.35	1.23
7	G	36	TRP	CB-CG	5.88	1.60	1.50
2	B	197	SER	CB-OG	5.11	1.48	1.42

The worst 5 of 11 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	N	96	ARG	NE-CZ-NH2	-5.86	117.37	120.30
6	S	18	ARG	NE-CZ-NH1	5.69	123.14	120.30
9	V	10	ARG	NE-CZ-NH2	-5.63	117.48	120.30
4	D	20	ARG	NE-CZ-NH1	5.48	123.04	120.30
2	B	141	ARG	NE-CZ-NH1	5.46	123.03	120.30

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
6	F	93	PRO	Peptide
2	O	91	ASN	Peptide
6	S	94	HIS	Peptide
7	T	6	GLY	Peptide

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	4124	0	4102	17	0
1	N	4131	0	4107	30	0
2	B	1874	0	1869	12	0
2	O	1870	0	1867	13	0
3	C	2174	0	2082	6	0
3	P	2173	0	2083	25	0
4	D	1249	0	1242	9	0
4	Q	1203	0	1191	9	0
5	E	863	0	857	2	0
5	R	852	0	845	1	0
6	F	789	0	769	9	0
6	S	755	0	734	7	0
7	G	686	0	651	8	0
7	T	706	0	664	9	0
8	H	662	0	623	2	0
8	U	662	0	623	4	0
9	I	601	0	613	4	0
9	V	609	0	621	6	0
10	J	460	0	459	1	0
10	W	460	0	459	4	0
11	K	391	0	374	2	0
11	X	391	0	374	4	0
12	L	380	0	380	0	0
12	Y	380	0	380	6	0
13	M	335	0	352	2	0
13	Z	335	0	352	5	0
14	A	120	0	108	2	0
14	N	120	0	108	4	0
15	A	1	0	0	0	0
15	N	1	0	0	0	0
16	A	1	0	0	0	0
16	N	1	0	0	0	0
17	A	1	0	0	0	0
17	N	1	0	0	0	0
18	A	102	0	152	1	0
18	C	102	0	152	0	0
18	N	51	0	76	0	0
18	P	153	0	228	6	0
19	A	63	0	110	2	0
19	B	63	0	110	0	0
19	D	63	0	110	0	0
19	N	63	0	110	0	0
19	V	63	0	110	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
19	Y	63	0	110	1	0
20	A	100	0	156	5	0
20	C	100	0	156	0	0
20	G	100	0	156	4	0
20	P	100	0	156	22	0
21	B	2	0	0	0	0
21	O	2	0	0	0	0
22	B	29	0	39	0	0
22	C	58	0	78	0	0
22	G	29	0	39	1	0
22	J	29	0	39	2	0
22	P	58	0	78	1	0
22	W	29	0	38	1	0
23	B	52	0	80	0	0
23	N	52	0	80	0	0
24	C	33	0	42	2	0
24	M	33	0	42	0	0
24	P	33	0	42	1	0
24	Q	33	0	42	3	0
25	C	53	0	77	1	0
25	G	106	0	154	1	0
25	P	106	0	154	3	0
25	T	53	0	77	0	0
26	F	1	0	0	0	0
26	S	1	0	0	0	0
27	A	123	0	0	6	0
27	B	74	0	0	2	0
27	C	57	0	0	3	0
27	D	32	0	0	1	0
27	E	28	0	0	0	0
27	F	28	0	0	1	0
27	G	24	0	0	1	0
27	H	21	0	0	1	0
27	I	20	0	0	1	0
27	J	11	0	0	2	0
27	K	2	0	0	0	0
27	L	24	0	0	2	0
27	M	4	0	0	1	0
27	N	83	0	0	0	0
27	O	52	0	0	4	0
27	P	39	0	0	6	0
27	Q	22	0	0	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
27	R	14	0	0	0	0
27	S	21	0	0	1	0
27	T	20	0	0	0	0
27	U	13	0	0	1	0
27	V	16	0	0	6	0
27	W	5	0	0	2	0
27	X	5	0	0	0	0
27	Y	2	0	0	0	0
27	Z	4	0	0	0	0
All	All	32083	0	31882	208	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 3.

The worst 5 of 208 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)
20:P:305:CDL:H531	20:P:305:CDL:H641	1.21	1.14
1:A:65:MET:SD	27:A:811:HOH:O	2.24	0.95
3:P:258:TRP:CG	27:P:424:HOH:O	2.26	0.89
20:P:305:CDL:H531	20:P:305:CDL:C64	2.02	0.88
1:A:423:MET:SD	27:A:804:HOH:O	2.30	0.87

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	524/514 (102%)	504 (96%)	20 (4%)	0	100 100
1	N	525/514 (102%)	499 (95%)	26 (5%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	B	231/227 (102%)	215 (93%)	13 (6%)	3 (1%)	12	36
2	O	230/227 (101%)	209 (91%)	17 (7%)	4 (2%)	9	29
3	C	265/261 (102%)	258 (97%)	5 (2%)	2 (1%)	19	49
3	P	265/261 (102%)	256 (97%)	8 (3%)	1 (0%)	34	66
4	D	148/147 (101%)	143 (97%)	5 (3%)	0	100	100
4	Q	143/147 (97%)	134 (94%)	8 (6%)	1 (1%)	22	53
5	E	104/109 (95%)	99 (95%)	5 (5%)	0	100	100
5	R	103/109 (94%)	100 (97%)	3 (3%)	0	100	100
6	F	101/98 (103%)	87 (86%)	11 (11%)	3 (3%)	4	15
6	S	97/98 (99%)	91 (94%)	4 (4%)	2 (2%)	7	23
7	G	82/85 (96%)	68 (83%)	7 (8%)	7 (8%)	1	1
7	T	84/85 (99%)	70 (83%)	10 (12%)	4 (5%)	2	7
8	H	77/85 (91%)	72 (94%)	4 (5%)	1 (1%)	12	36
8	U	77/85 (91%)	72 (94%)	4 (5%)	1 (1%)	12	36
9	I	71/73 (97%)	64 (90%)	7 (10%)	0	100	100
9	V	72/73 (99%)	59 (82%)	10 (14%)	3 (4%)	3	9
10	J	56/59 (95%)	55 (98%)	1 (2%)	0	100	100
10	W	56/59 (95%)	51 (91%)	5 (9%)	0	100	100
11	K	48/56 (86%)	43 (90%)	5 (10%)	0	100	100
11	X	48/56 (86%)	43 (90%)	4 (8%)	1 (2%)	7	23
12	L	44/47 (94%)	40 (91%)	4 (9%)	0	100	100
12	Y	44/47 (94%)	42 (96%)	1 (2%)	1 (2%)	6	21
13	M	41/46 (89%)	40 (98%)	0	1 (2%)	6	20
13	Z	41/46 (89%)	37 (90%)	4 (10%)	0	100	100
All	All	3577/3614 (99%)	3351 (94%)	191 (5%)	35 (1%)	15	44

5 of 35 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
6	F	94	HIS
7	G	4	ALA
7	G	8	HIS
2	O	59	GLN
2	O	89	GLU

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	438/426 (103%)	425 (97%)	13 (3%)	41	75
1	N	439/426 (103%)	417 (95%)	22 (5%)	24	56
2	B	216/210 (103%)	205 (95%)	11 (5%)	24	55
2	O	215/210 (102%)	201 (94%)	14 (6%)	17	44
3	C	232/226 (103%)	228 (98%)	4 (2%)	60	87
3	P	232/226 (103%)	223 (96%)	9 (4%)	32	66
4	D	134/129 (104%)	129 (96%)	5 (4%)	34	68
4	Q	129/129 (100%)	125 (97%)	4 (3%)	40	74
5	E	93/95 (98%)	88 (95%)	5 (5%)	22	53
5	R	92/95 (97%)	90 (98%)	2 (2%)	52	83
6	F	86/81 (106%)	79 (92%)	7 (8%)	11	33
6	S	82/81 (101%)	76 (93%)	6 (7%)	14	38
7	G	68/68 (100%)	61 (90%)	7 (10%)	7	21
7	T	70/68 (103%)	62 (89%)	8 (11%)	5	18
8	H	71/75 (95%)	67 (94%)	4 (6%)	21	51
8	U	71/75 (95%)	66 (93%)	5 (7%)	15	40
9	I	57/57 (100%)	53 (93%)	4 (7%)	15	40
9	V	58/57 (102%)	51 (88%)	7 (12%)	5	15
10	J	49/50 (98%)	47 (96%)	2 (4%)	30	64
10	W	49/50 (98%)	47 (96%)	2 (4%)	30	64
11	K	40/46 (87%)	40 (100%)	0	100	100
11	X	40/46 (87%)	36 (90%)	4 (10%)	7	22
12	L	39/40 (98%)	38 (97%)	1 (3%)	46	79
12	Y	39/40 (98%)	35 (90%)	4 (10%)	7	21
13	M	37/38 (97%)	35 (95%)	2 (5%)	22	53
13	Z	37/38 (97%)	36 (97%)	1 (3%)	44	78

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	3113/3082 (101%)	2960 (95%)	153 (5%)	26 57

5 of 153 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
5	R	7	THR
10	W	50	LEU
6	S	54	ASN
8	U	9	LYS
12	Y	24	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 42 such sidechains are listed below:

Mol	Chain	Res	Type
3	P	148	HIS
7	T	66	ASN
3	P	161	GLN
5	R	94	ASN
8	U	23	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

8 non-standard protein/DNA/RNA residues 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
9	SAC	V	1	9	7,8,9	1.86	1 (14%)	8,9,11	1.62	2 (25%)
2	FME	O	1	2	8,9,10	0.65	0	7,9,11	1.02	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
1	FME	A	1	1	8,9,10	0.53	0	7,9,11	1.83	3 (42%)
9	SAC	I	1	9	7,8,9	2.04	1 (14%)	8,9,11	2.17	3 (37%)
7	TPO	T	11	7	8,10,11	1.26	1 (12%)	10,14,16	1.32	2 (20%)
1	FME	N	1	1	8,9,10	0.65	0	7,9,11	2.03	3 (42%)
7	TPO	G	11	7	8,10,11	1.34	1 (12%)	10,14,16	1.55	2 (20%)
2	FME	B	1	2	8,9,10	0.73	0	7,9,11	2.69	3 (42%)

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
9	SAC	V	1	9	-	4/7/8/10	-
2	FME	O	1	2	-	0/7/9/11	-
1	FME	A	1	1	-	3/7/9/11	-
9	SAC	I	1	9	-	2/7/8/10	-
7	TPO	T	11	7	-	4/9/11/13	-
1	FME	N	1	1	-	2/7/9/11	-
7	TPO	G	11	7	-	3/9/11/13	-
2	FME	B	1	2	-	1/7/9/11	-

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	I	1	SAC	CA-N	4.76	1.53	1.46
9	V	1	SAC	CA-N	4.38	1.52	1.46
7	T	11	TPO	P-OG1	2.71	1.64	1.59
7	G	11	TPO	P-OG1	2.32	1.63	1.59

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	1	FME	CA-N-CN	-5.64	114.15	122.82
1	N	1	FME	CA-N-CN	4.11	129.15	122.82
9	I	1	SAC	OAC-C1A-C2A	-3.53	115.51	122.06
9	I	1	SAC	C-CA-N	3.50	116.05	109.73
7	G	11	TPO	CG2-CB-CA	3.27	119.61	113.16

There are no chirality outliers.

5 of 19 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	1	FME	N-CA-CB-CG
1	A	1	FME	C-CA-CB-CG
2	B	1	FME	O1-CN-N-CA
7	G	11	TPO	N-CA-CB-CG2
7	G	11	TPO	N-CA-CB-OG1

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 52 ligands modelled in this entry, 8 are monoatomic - leaving 44 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
18	PGV	A	606	-	50,50,50	0.93	2 (4%)	53,56,56	0.90	3 (5%)
14	HEA	A	601	1	57,67,67	2.02	17 (29%)	61,103,103	2.16	19 (31%)
21	CUA	O	301	2	0,1,1	-	-	-	-	-
18	PGV	C	307	-	50,50,50	1.12	2 (4%)	53,56,56	0.91	3 (5%)
18	PGV	P	301	-	50,50,50	0.91	2 (4%)	53,56,56	1.05	3 (5%)
22	CHD	C	305	-	32,32,32	0.62	0	51,51,51	1.54	8 (15%)
18	PGV	N	606	-	50,50,50	0.99	2 (4%)	53,56,56	0.97	4 (7%)
22	CHD	W	101	-	32,32,32	0.81	1 (3%)	51,51,51	2.10	15 (29%)
18	PGV	P	304	-	50,50,50	0.97	2 (4%)	53,56,56	0.93	2 (3%)
24	DMU	P	303	-	34,34,34	1.69	1 (2%)	45,45,45	1.46	5 (11%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
18	PGV	C	303	-	50,50,50	0.90	2 (4%)	53,56,56	0.90	3 (5%)
20	CDL	G	102	-	99,99,99	1.09	4 (4%)	105,111,111	1.08	8 (7%)
23	PSC	B	304	-	51,51,51	0.99	2 (3%)	57,59,59	1.74	8 (14%)
24	DMU	M	101	-	34,34,34	1.08	1 (2%)	45,45,45	1.17	3 (6%)
25	PEK	C	302	-	52,52,52	0.85	2 (3%)	55,57,57	1.06	3 (5%)
22	CHD	G	104	-	32,32,32	0.82	0	51,51,51	1.53	10 (19%)
24	DMU	C	301	-	34,34,34	1.89	6 (17%)	45,45,45	2.26	8 (17%)
22	CHD	P	307	-	32,32,32	0.71	0	51,51,51	1.28	5 (9%)
22	CHD	C	306	-	32,32,32	0.90	0	51,51,51	1.20	7 (13%)
20	CDL	P	305	-	99,99,99	1.09	4 (4%)	105,111,111	1.21	10 (9%)
14	HEA	N	601	1	57,67,67	2.10	18 (31%)	61,103,103	2.14	25 (40%)
19	TGL	D	201	-	62,62,62	1.21	3 (4%)	65,65,65	1.17	6 (9%)
24	DMU	Q	201	-	34,34,34	0.83	1 (2%)	45,45,45	1.02	2 (4%)
25	PEK	P	309	-	52,52,52	1.13	2 (3%)	55,57,57	1.40	6 (10%)
19	TGL	Y	101	-	62,62,62	1.13	3 (4%)	65,65,65	1.02	5 (7%)
19	TGL	B	301	-	62,62,62	1.17	3 (4%)	65,65,65	1.19	6 (9%)
19	TGL	A	608	-	62,62,62	1.20	3 (4%)	65,65,65	1.14	5 (7%)
21	CUA	B	302	2	0,1,1	-	-	-	-	-
25	PEK	T	101	-	52,52,52	1.13	2 (3%)	55,57,57	1.10	5 (9%)
14	HEA	A	602	1	57,67,67	1.95	16 (28%)	61,103,103	2.46	24 (39%)
25	PEK	G	103	-	52,52,52	1.10	2 (3%)	55,57,57	1.50	6 (10%)
25	PEK	P	308	-	52,52,52	0.87	2 (3%)	55,57,57	1.01	2 (3%)
23	PSC	N	608	-	51,51,51	1.09	2 (3%)	57,59,59	1.79	9 (15%)
18	PGV	P	302	-	50,50,50	1.10	2 (4%)	53,56,56	1.16	5 (9%)
20	CDL	A	609	-	99,99,99	1.11	4 (4%)	105,111,111	1.15	8 (7%)
14	HEA	N	602	1	57,67,67	1.91	14 (24%)	61,103,103	2.45	25 (40%)
20	CDL	C	304	-	99,99,99	1.10	4 (4%)	105,111,111	1.02	5 (4%)
19	TGL	V	101	-	62,62,62	1.13	3 (4%)	65,65,65	1.25	8 (12%)
22	CHD	J	101	-	32,32,32	0.82	0	51,51,51	1.60	5 (9%)
22	CHD	P	306	-	32,32,32	0.56	0	51,51,51	1.69	15 (29%)
25	PEK	G	101	-	52,52,52	1.04	2 (3%)	55,57,57	1.19	4 (7%)
22	CHD	B	303	-	32,32,32	0.71	1 (3%)	51,51,51	1.48	7 (13%)
19	TGL	N	607	-	62,62,62	1.18	3 (4%)	65,65,65	1.14	8 (12%)
18	PGV	A	607	-	50,50,50	1.08	2 (4%)	53,56,56	1.08	4 (7%)

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
18	PGV	A	606	-	-	9/55/55/55	-
14	HEA	A	601	1	3/3/7/16	4/32/76/76	-
18	PGV	C	307	-	-	30/55/55/55	-
18	PGV	P	301	-	-	13/55/55/55	-
22	CHD	C	305	-	-	8/9/74/74	0/4/4/4
18	PGV	N	606	-	-	27/55/55/55	-
22	CHD	W	101	-	-	7/9/74/74	0/4/4/4
18	PGV	P	304	-	-	15/55/55/55	-
24	DMU	P	303	-	-	6/19/59/59	0/2/2/2
18	PGV	C	303	-	-	15/55/55/55	-
20	CDL	G	102	-	-	56/110/110/110	-
23	PSC	B	304	-	-	26/55/55/55	-
24	DMU	M	101	-	-	9/19/59/59	0/2/2/2
25	PEK	C	302	-	-	18/56/56/56	-
22	CHD	G	104	-	-	2/9/74/74	0/4/4/4
24	DMU	C	301	-	-	12/19/59/59	0/2/2/2
22	CHD	P	307	-	-	0/9/74/74	0/4/4/4
22	CHD	C	306	-	-	2/9/74/74	0/4/4/4
20	CDL	P	305	-	-	52/110/110/110	-
14	HEA	N	601	1	3/3/7/16	4/32/76/76	-
19	TGL	D	201	-	-	36/65/65/65	-
24	DMU	Q	201	-	-	7/19/59/59	0/2/2/2
25	PEK	P	309	-	-	22/56/56/56	-
19	TGL	Y	101	-	-	35/65/65/65	-
19	TGL	B	301	-	-	35/65/65/65	-
19	TGL	A	608	-	-	33/65/65/65	-
25	PEK	T	101	-	-	21/56/56/56	-
14	HEA	A	602	1	3/3/7/16	5/32/76/76	-
25	PEK	G	103	-	-	30/56/56/56	-
25	PEK	P	308	-	-	16/56/56/56	-
23	PSC	N	608	-	-	29/55/55/55	-
18	PGV	P	302	-	-	32/55/55/55	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
20	CDL	A	609	-	-	59/110/110/110	-
14	HEA	N	602	1	3/3/7/16	4/32/76/76	-
20	CDL	C	304	-	-	65/110/110/110	-
19	TGL	V	101	-	-	32/65/65/65	-
22	CHD	J	101	-	-	6/9/74/74	0/4/4/4
22	CHD	P	306	-	-	3/9/74/74	0/4/4/4
25	PEK	G	101	-	-	23/56/56/56	-
22	CHD	B	303	-	-	2/9/74/74	0/4/4/4
19	TGL	N	607	-	-	36/65/65/65	-
18	PGV	A	607	-	-	30/55/55/55	-

The worst 5 of 142 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
24	C	301	DMU	O16-C6	8.30	1.54	1.40
24	P	303	DMU	O16-C6	8.13	1.54	1.40
14	N	601	HEA	C3B-C2B	5.85	1.47	1.34
25	P	309	PEK	O01-C1	5.49	1.49	1.34
14	A	601	HEA	C3B-C2B	5.45	1.47	1.34

The worst 5 of 322 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
24	C	301	DMU	C18-O16-C6	10.11	130.61	113.84
25	G	103	PEK	O01-C1-C2	7.17	126.96	111.50
20	P	305	CDL	OA6-CA5-C11	6.61	125.75	111.50
23	N	608	PSC	C08-N-C06	-6.61	91.98	108.97
14	N	602	HEA	C2D-C1D-ND	6.47	117.50	109.84

5 of 12 chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
14	A	601	HEA	NB
14	A	601	HEA	ND
14	A	601	HEA	NA
14	A	602	HEA	NB
14	A	602	HEA	ND

5 of 876 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
18	A	607	PGV	C03-O11-P-O14
18	A	607	PGV	C02-C03-O11-P
18	A	607	PGV	C04-C05-C06-O06
18	A	607	PGV	O05-C05-C06-O06
18	A	607	PGV	O02-C1-O01-C02

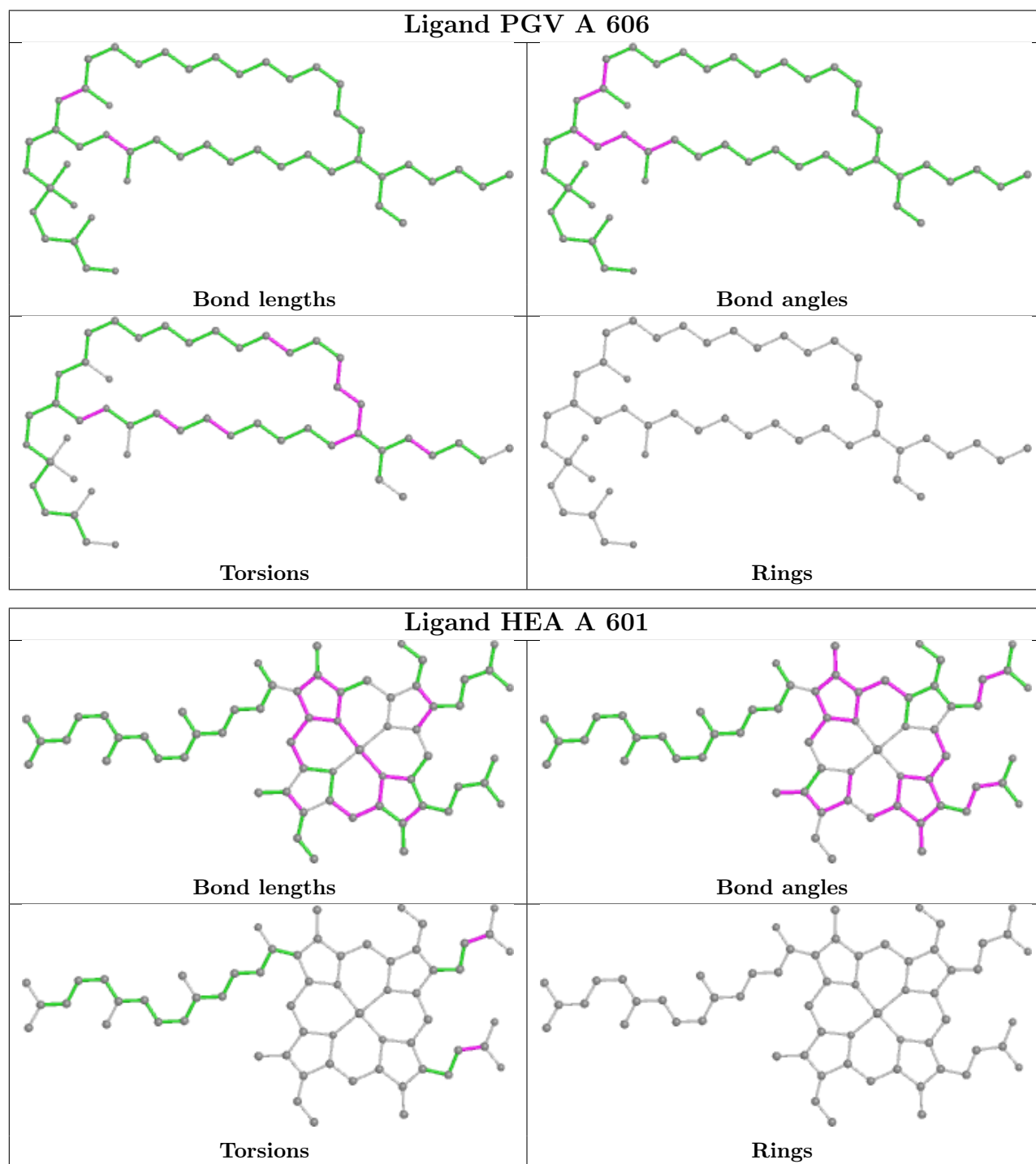
There are no ring outliers.

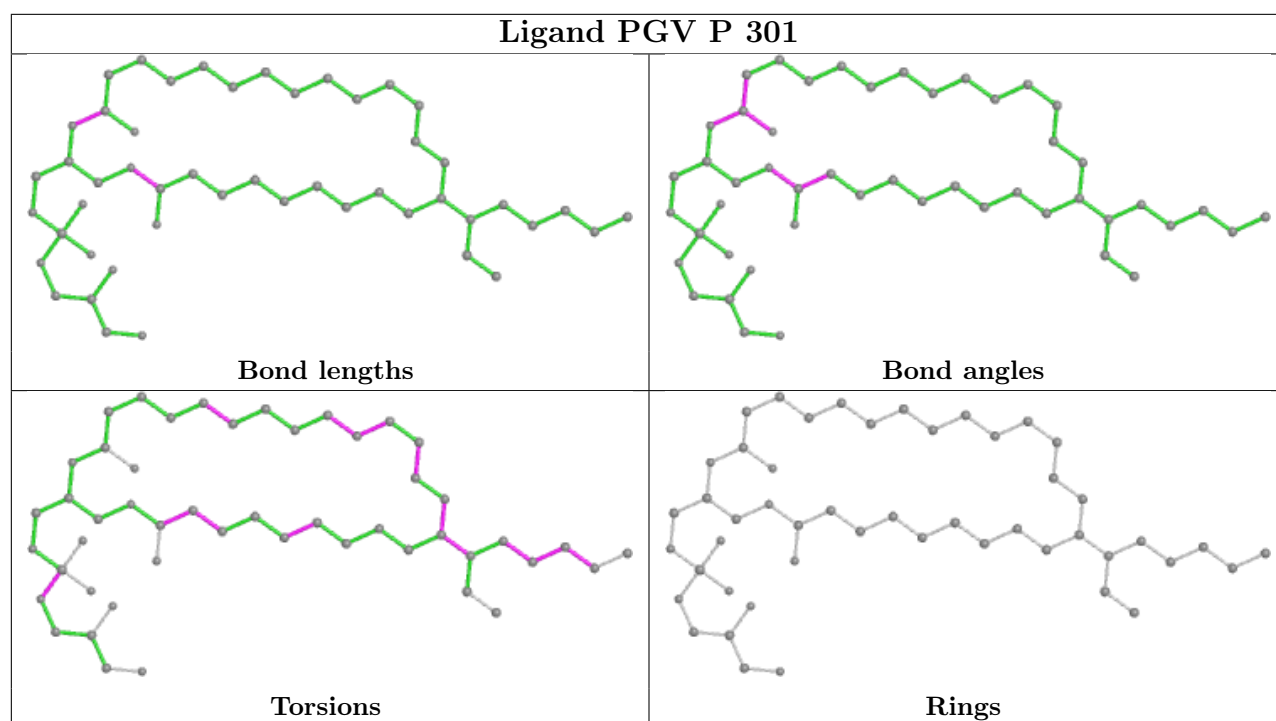
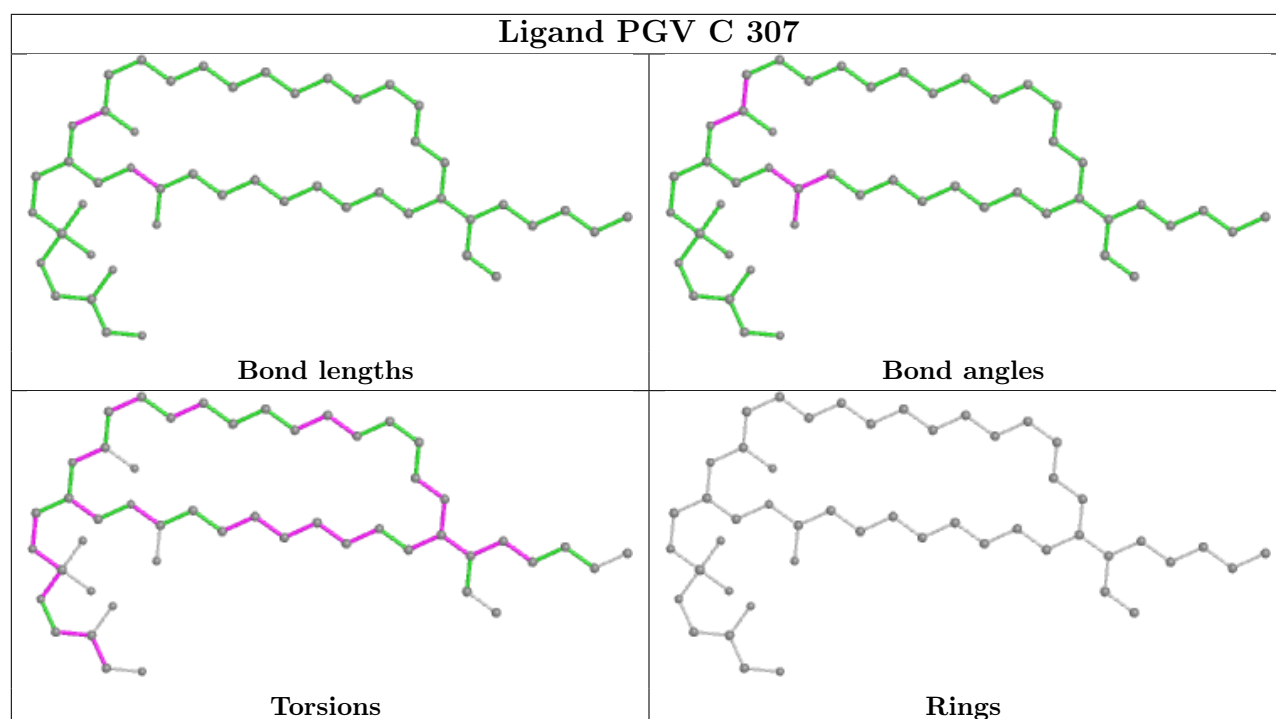
22 monomers are involved in 60 short contacts:

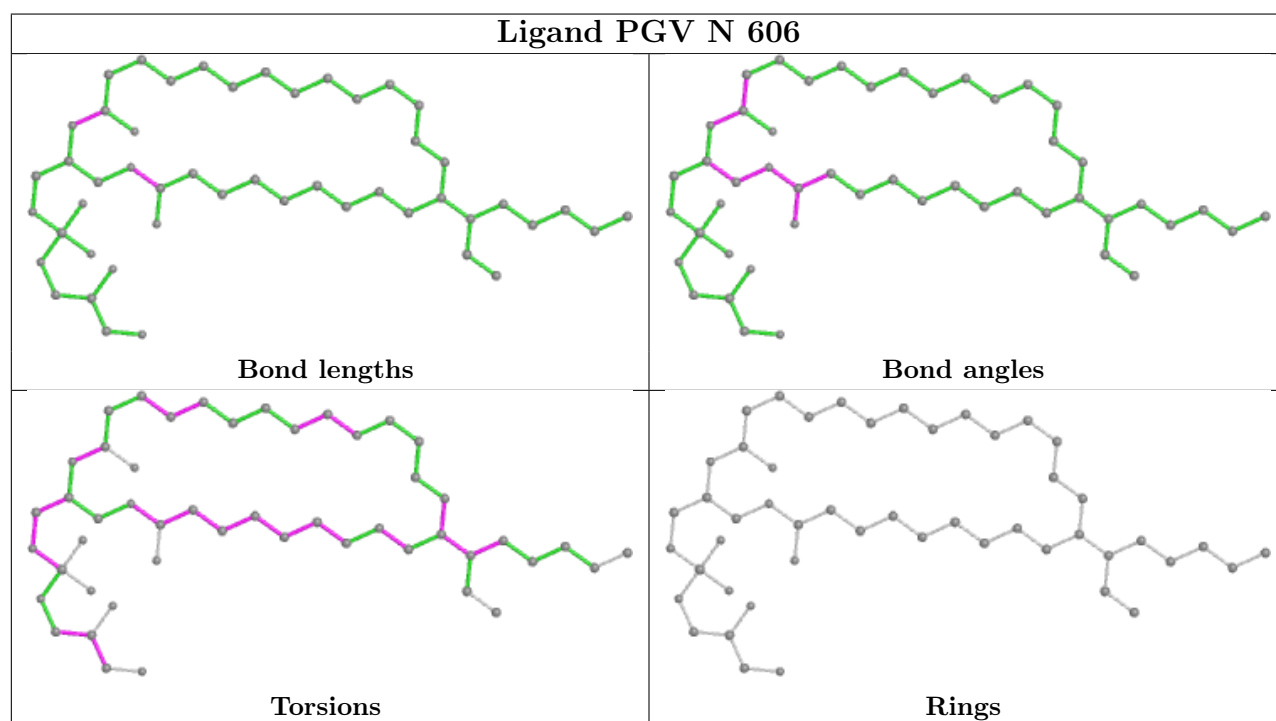
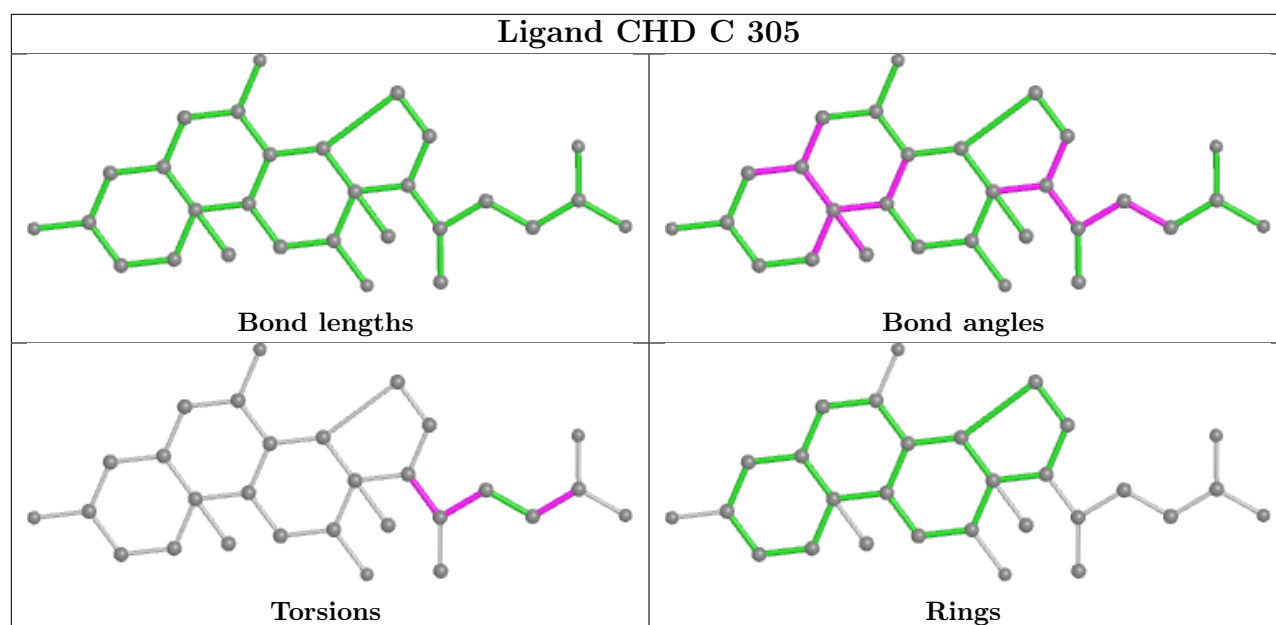
Mol	Chain	Res	Type	Clashes	Symm-Clashes
14	A	601	HEA	1	0
22	W	101	CHD	1	0
18	P	304	PGV	6	0
24	P	303	DMU	1	0
20	G	102	CDL	4	0
25	C	302	PEK	1	0
22	G	104	CHD	1	0
24	C	301	DMU	2	0
22	P	307	CHD	1	0
20	P	305	CDL	22	0
14	N	601	HEA	2	0
24	Q	201	DMU	3	0
19	Y	101	TGL	1	0
19	A	608	TGL	2	0
14	A	602	HEA	1	0
25	G	103	PEK	1	0
25	P	308	PEK	3	0
20	A	609	CDL	5	0
14	N	602	HEA	2	0
19	V	101	TGL	3	0
22	J	101	CHD	2	0
18	A	607	PGV	1	0

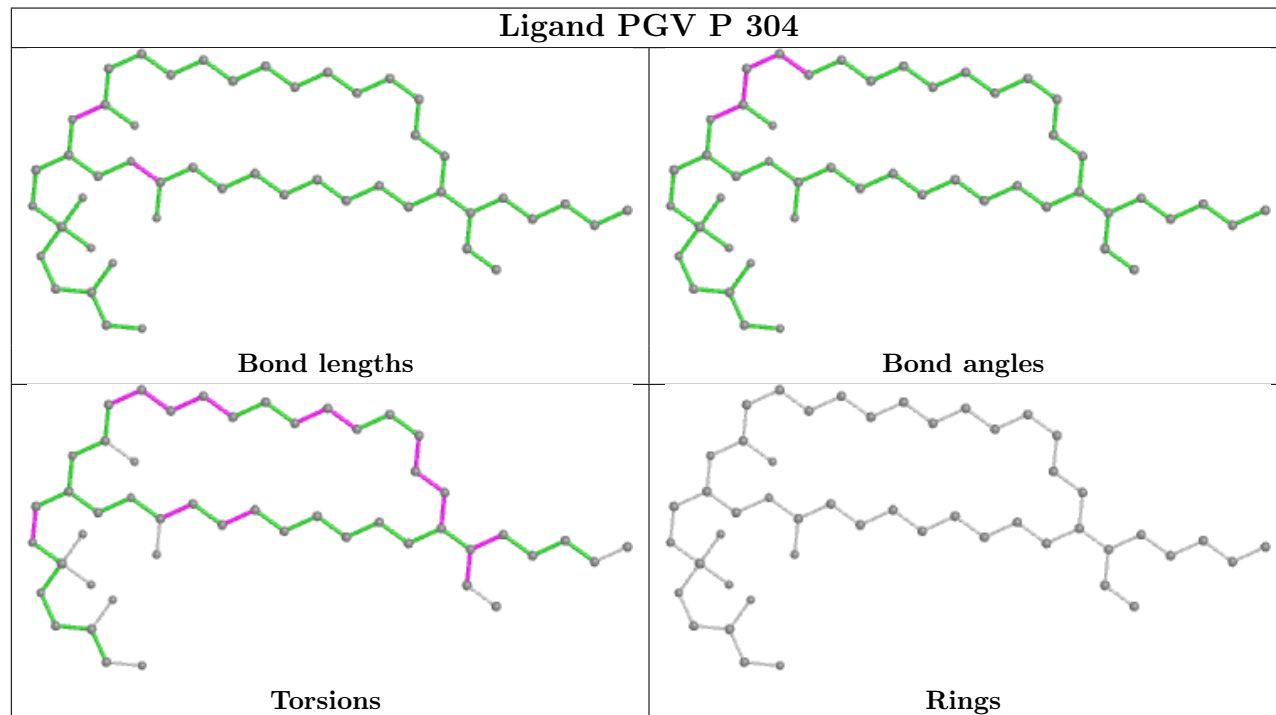
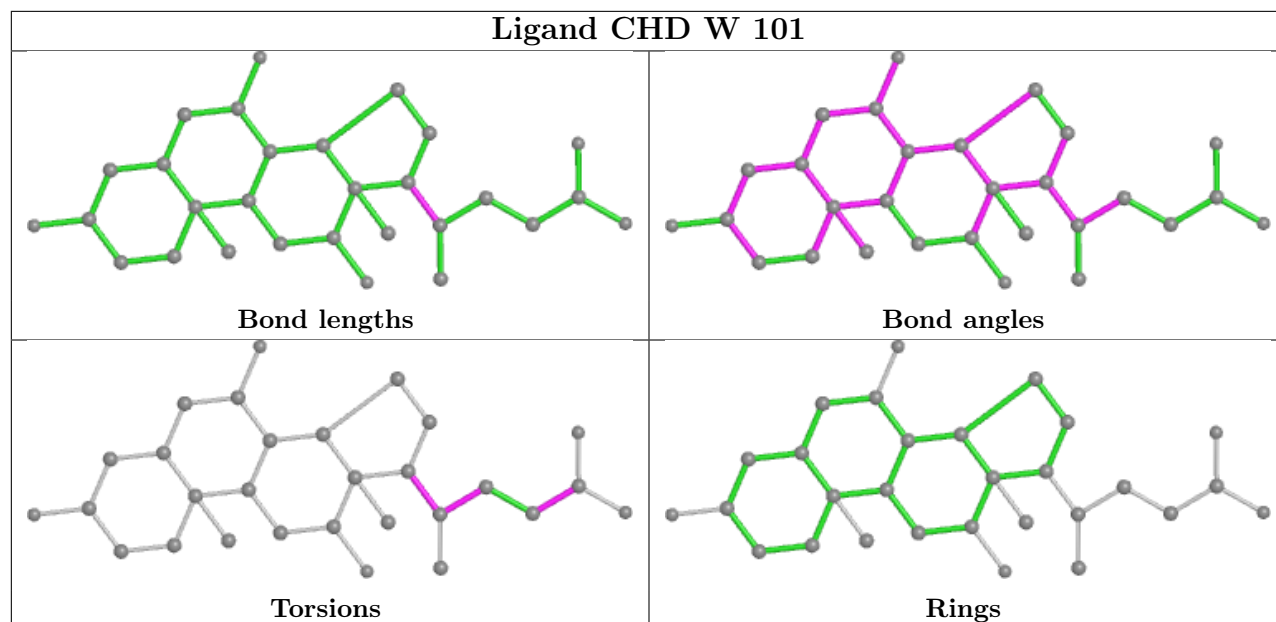
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

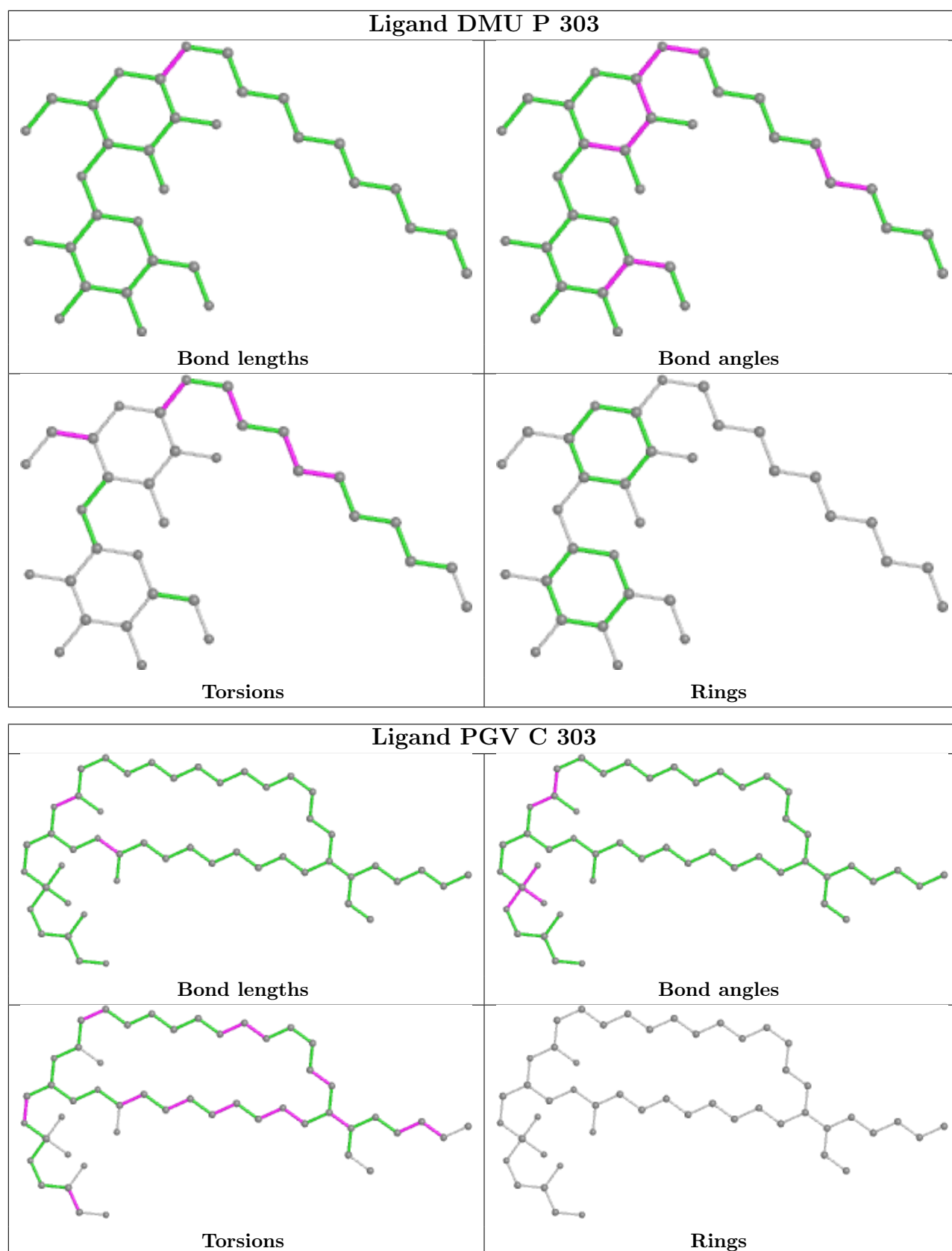
The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

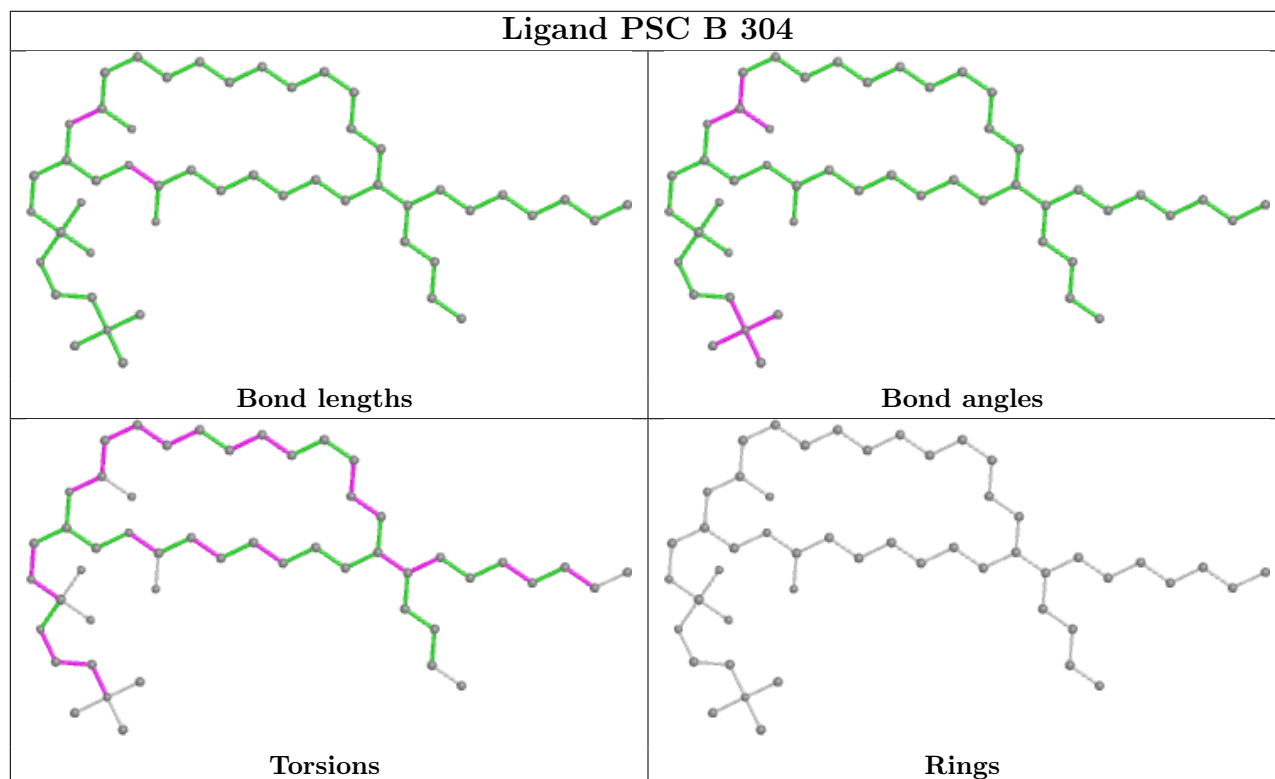
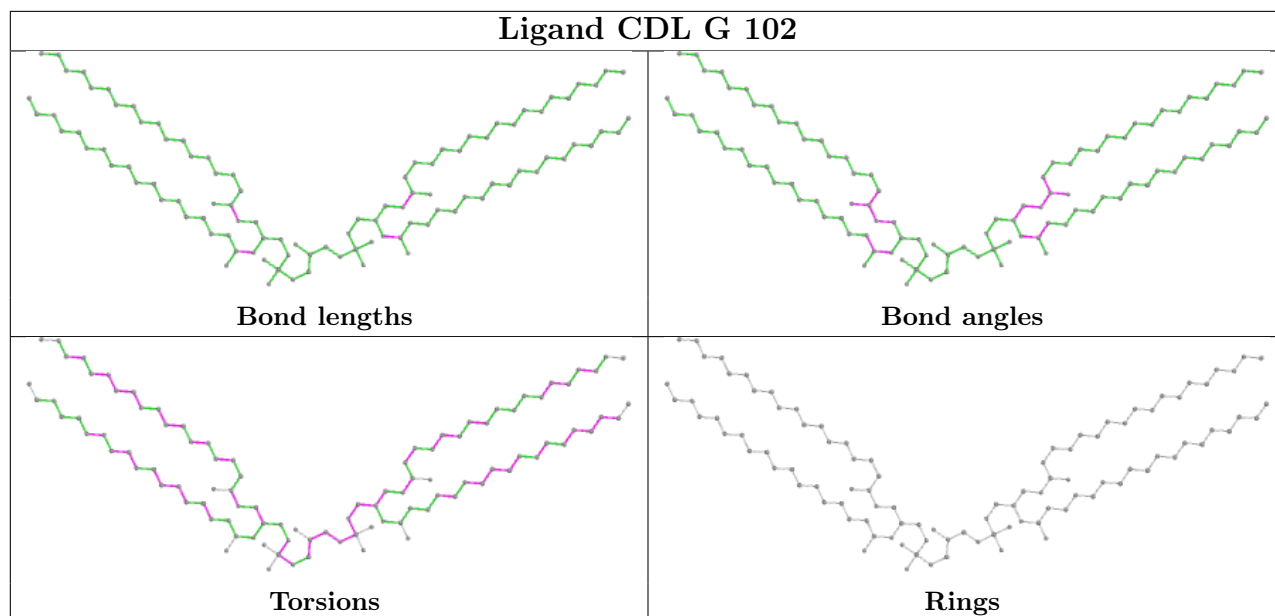


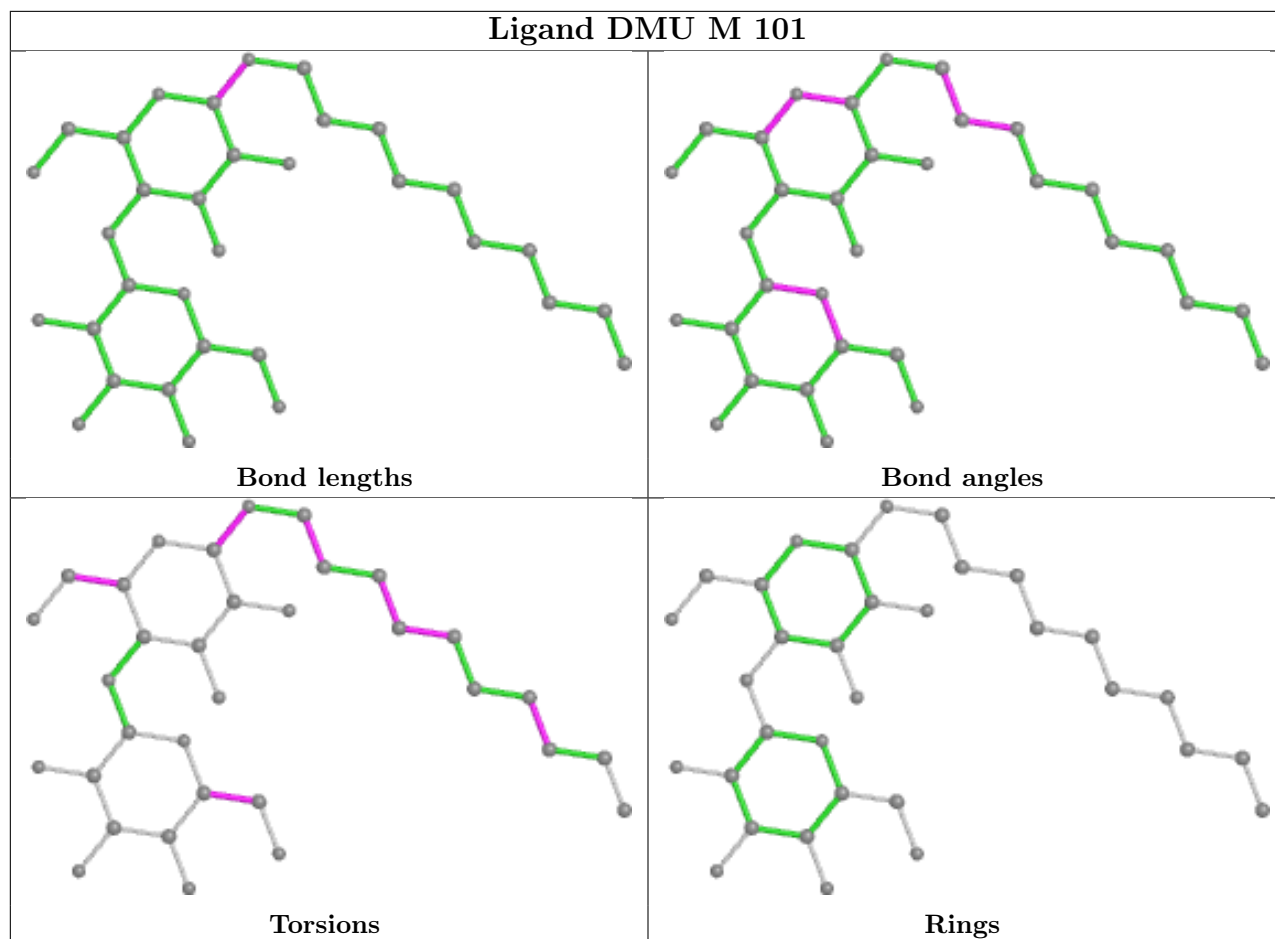


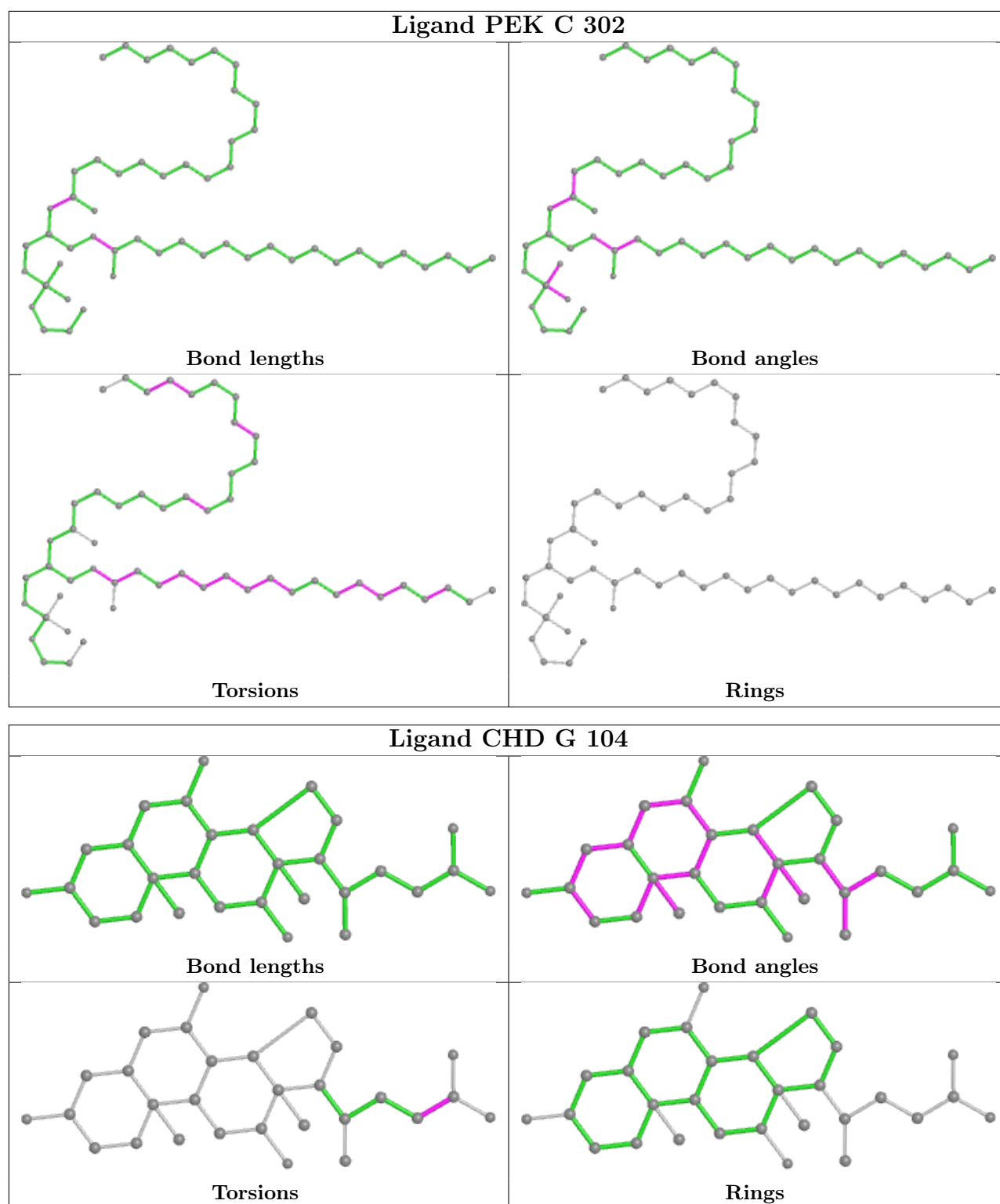


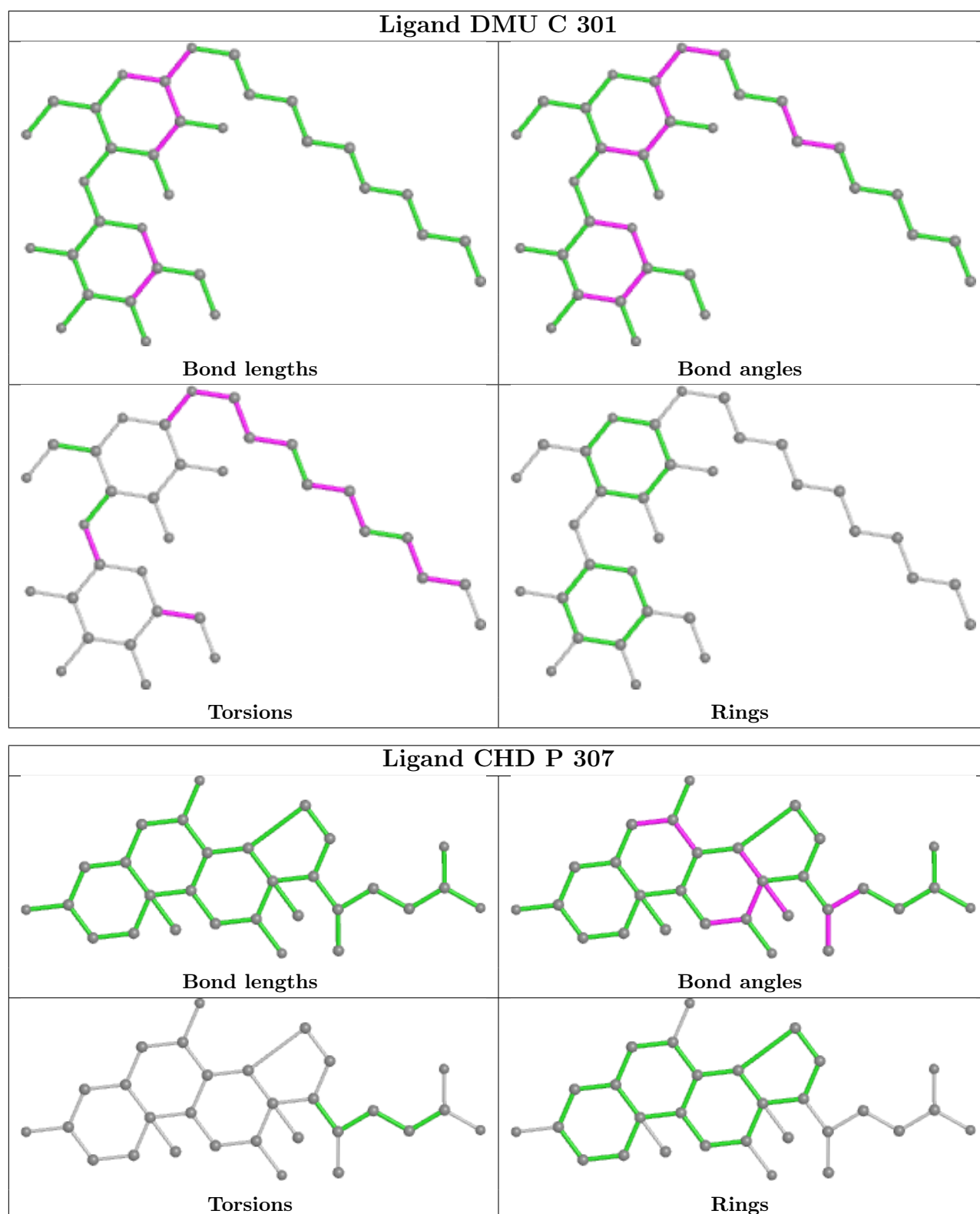


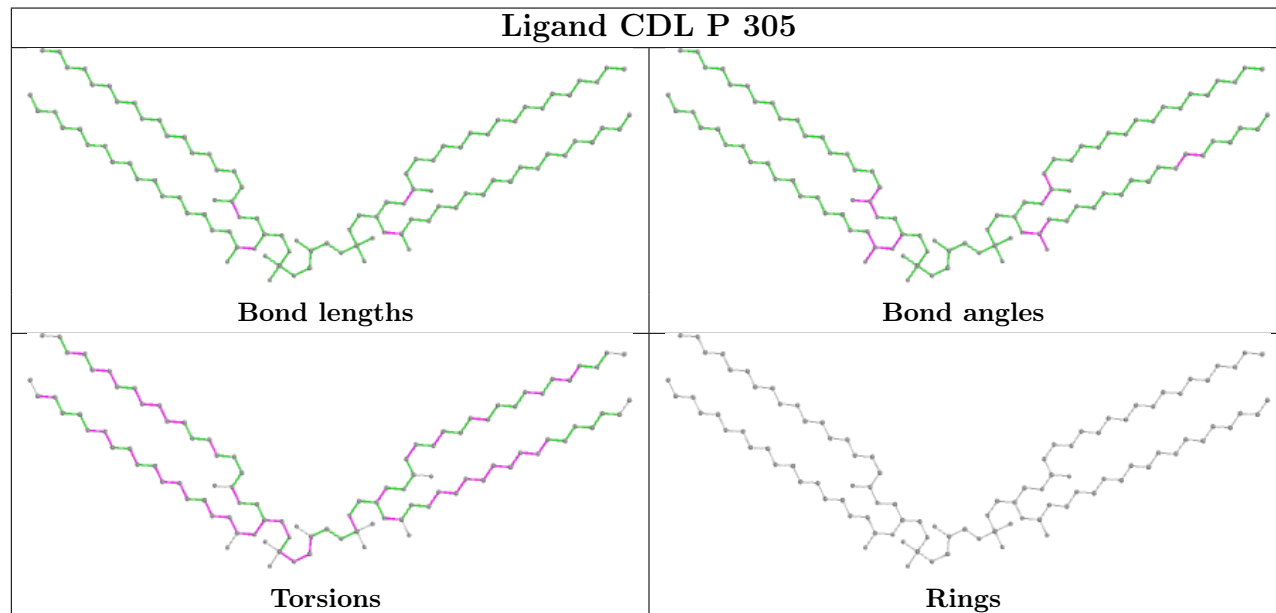
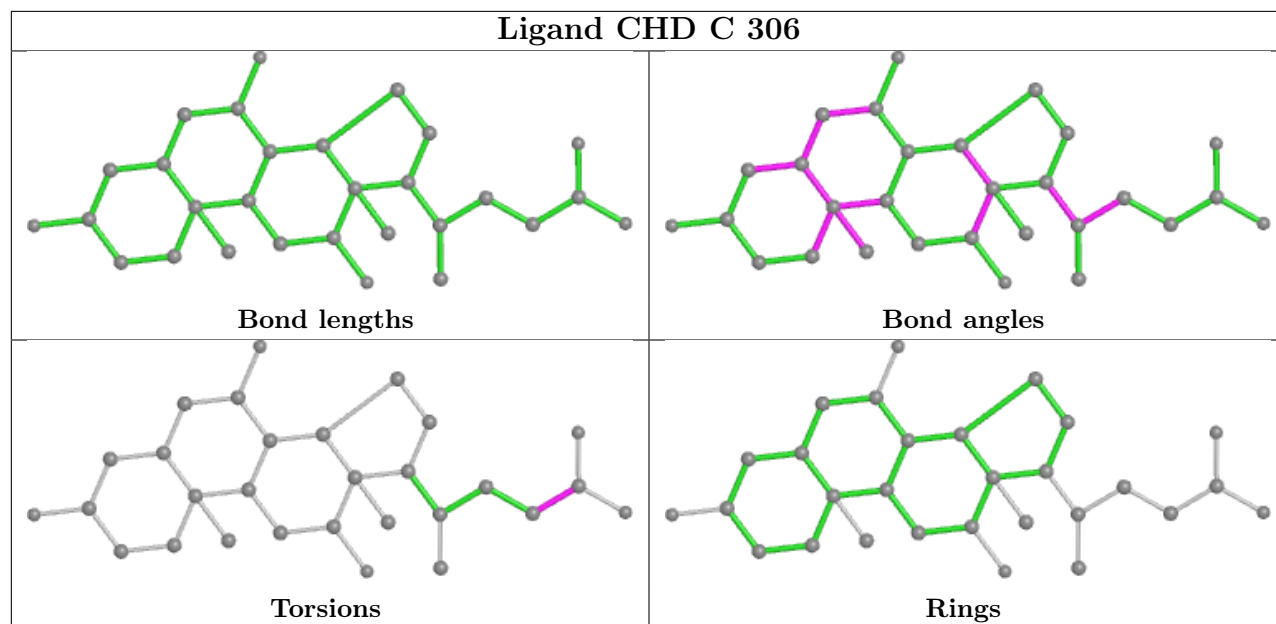


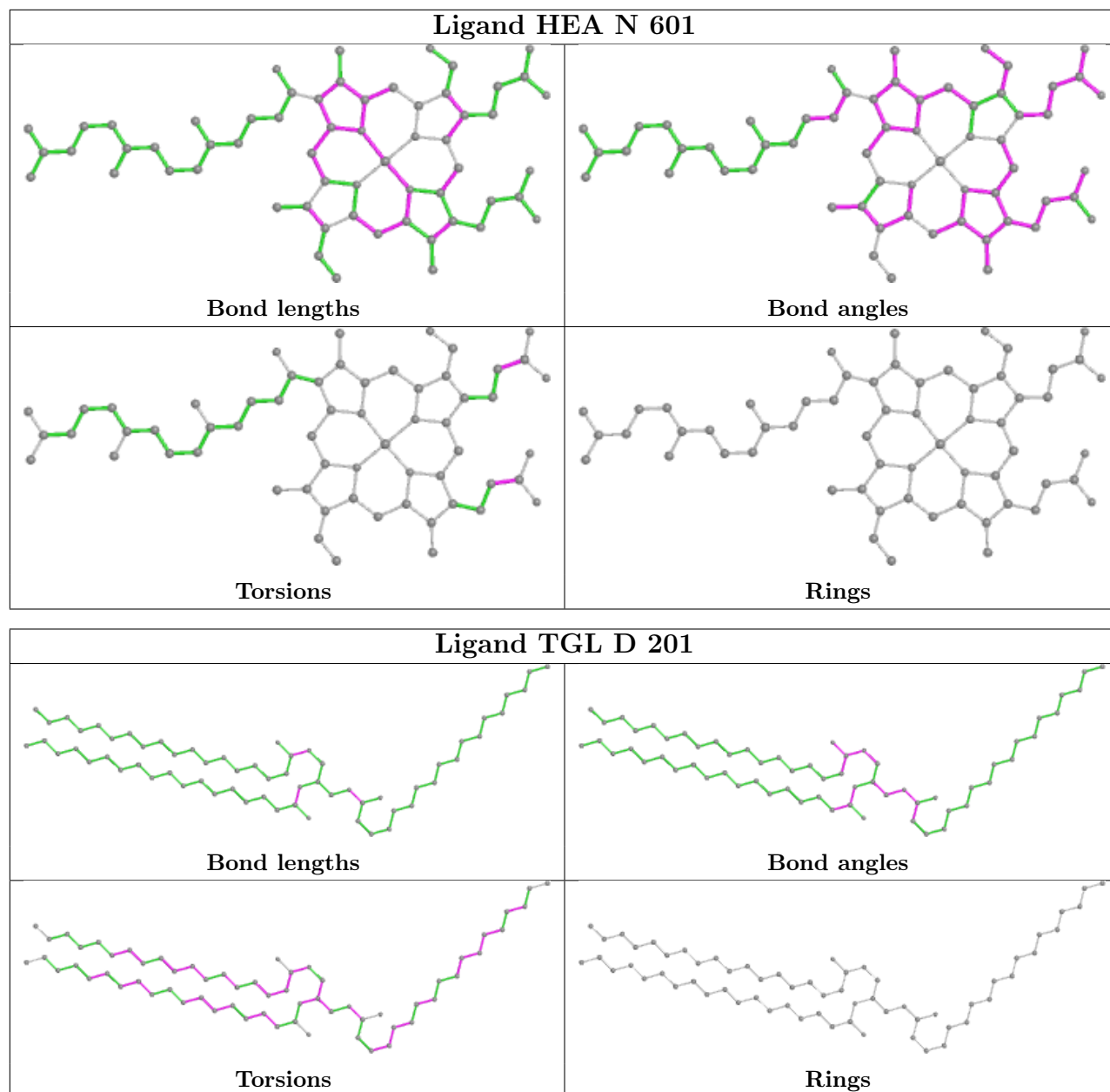


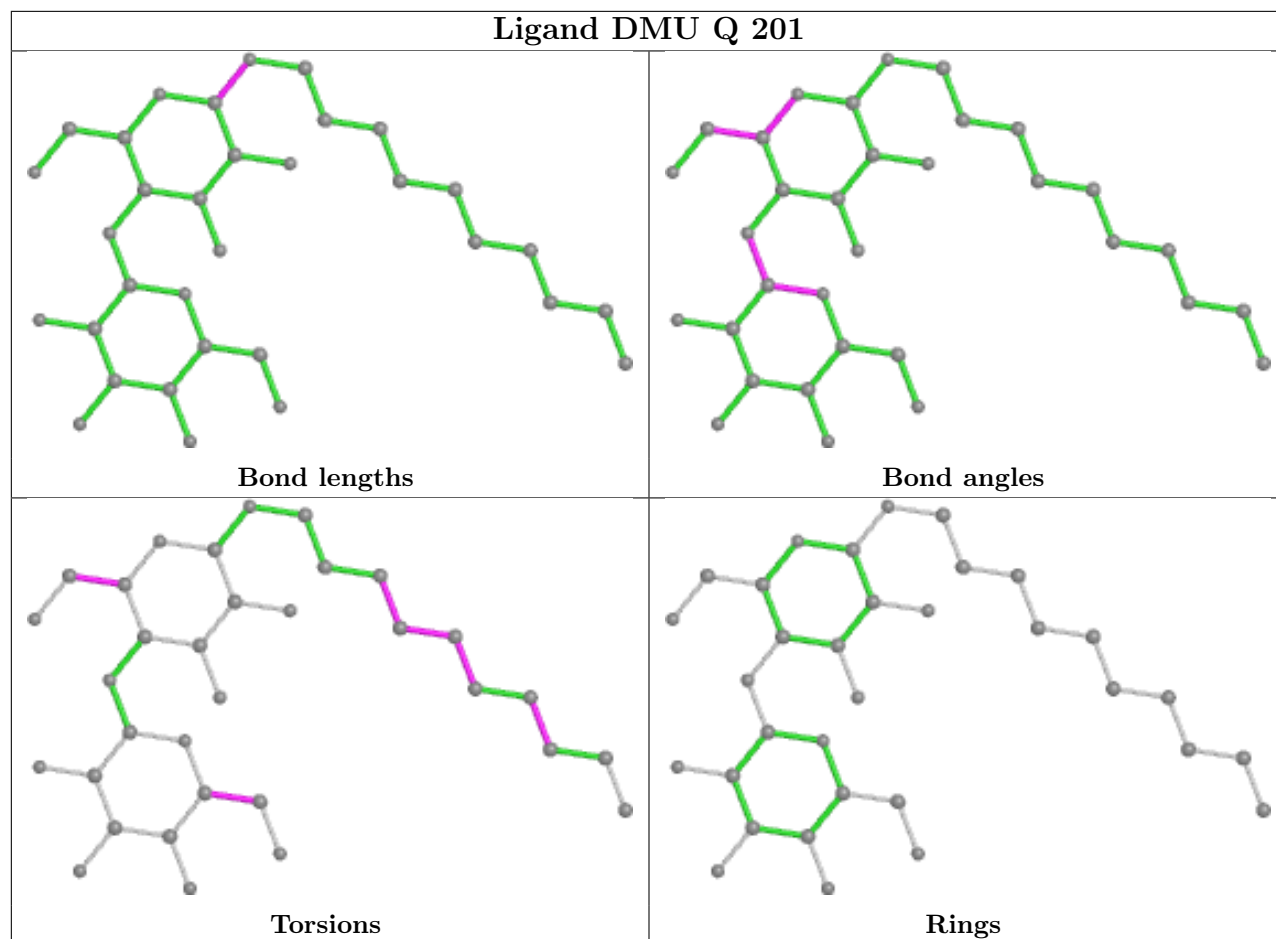


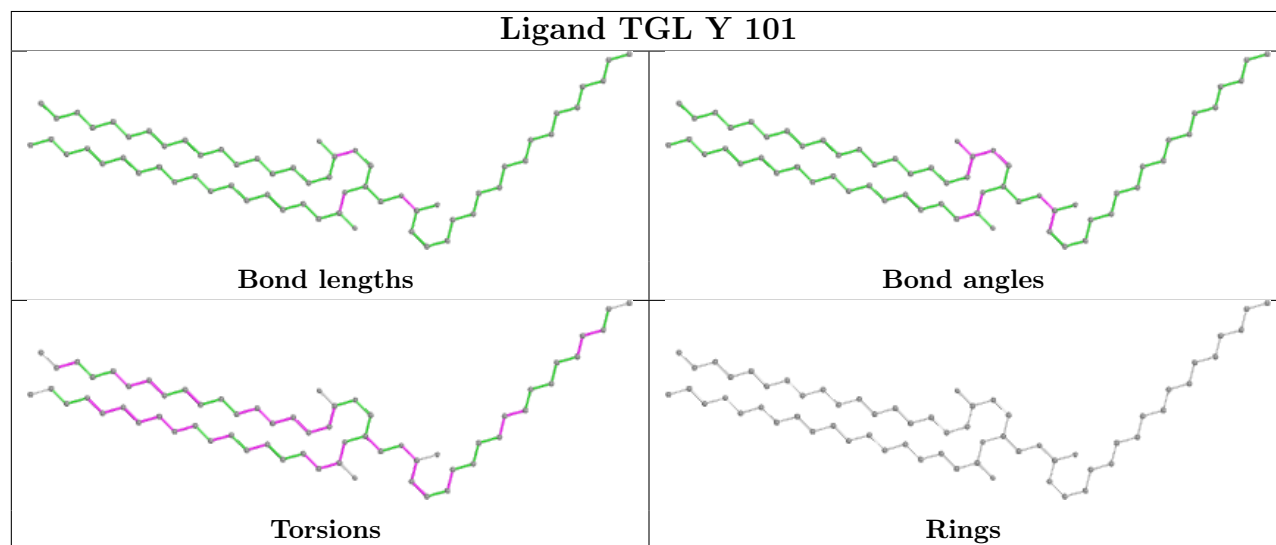
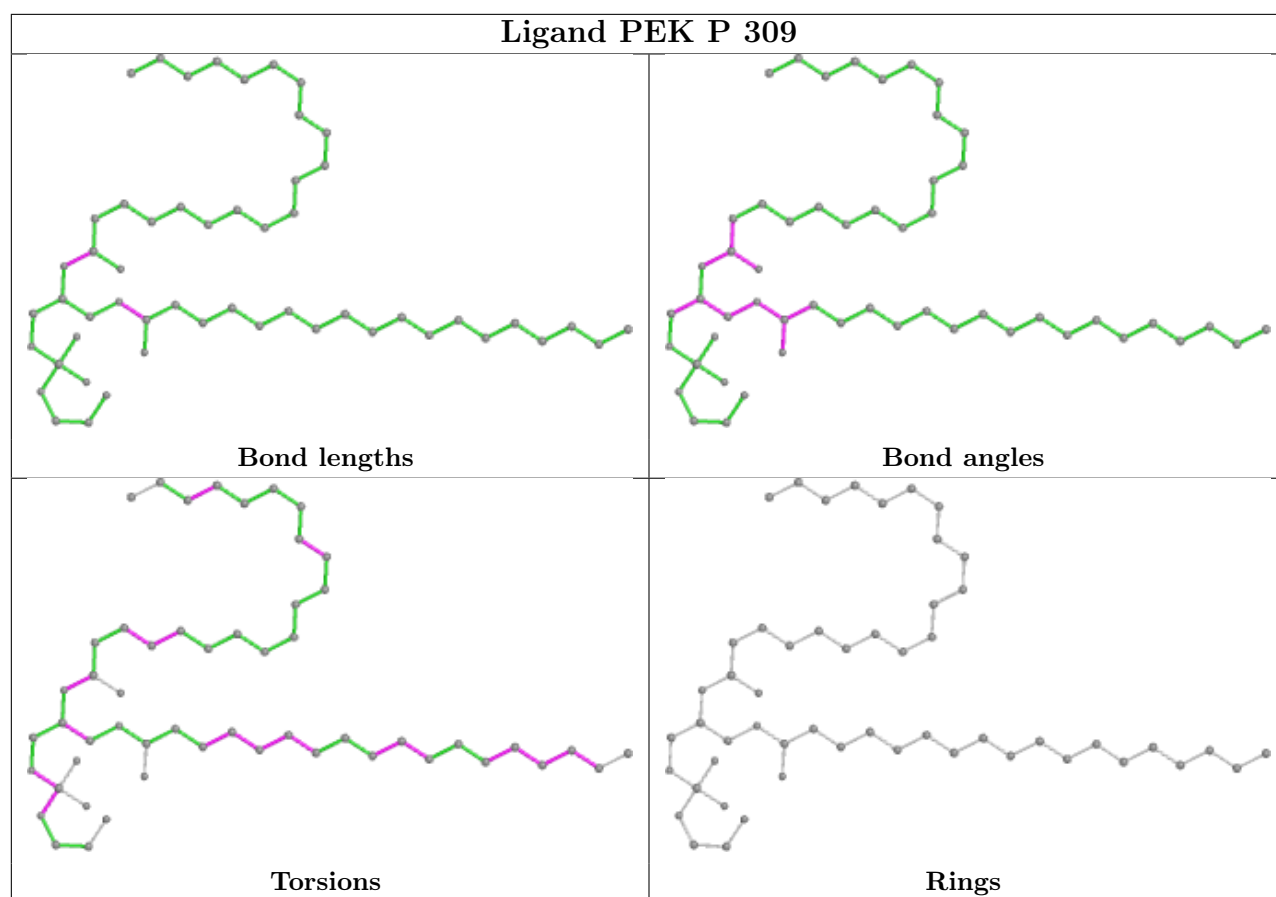


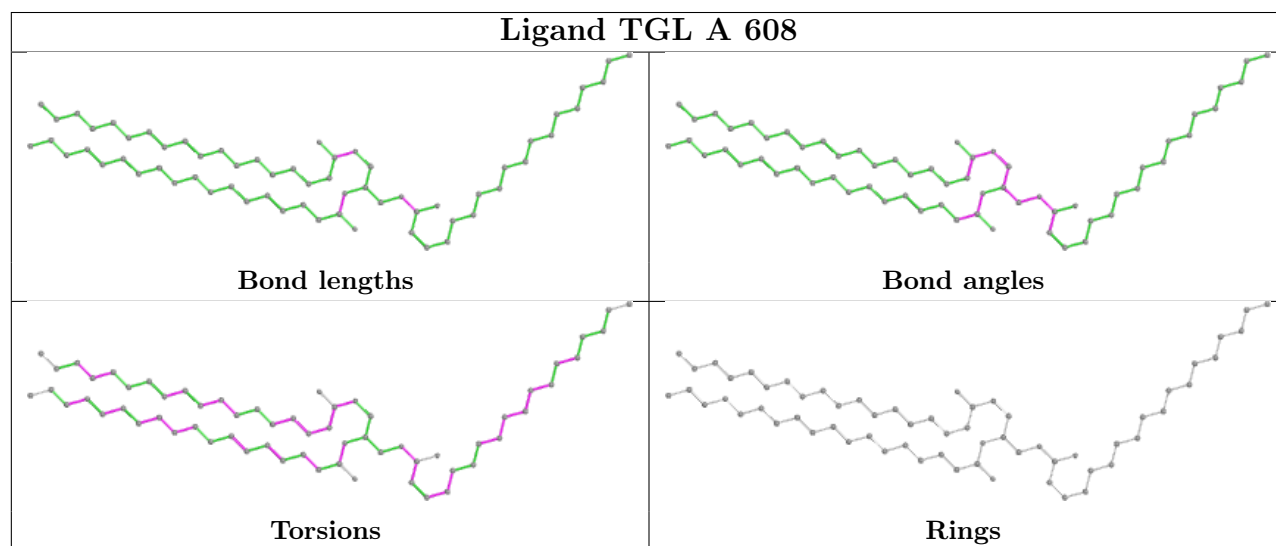
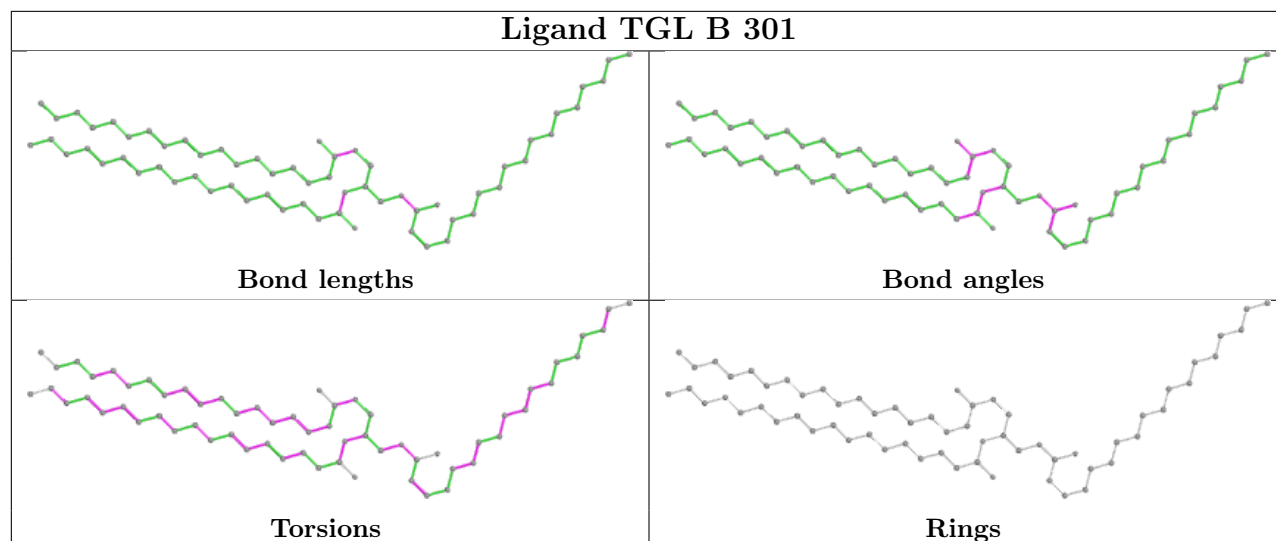


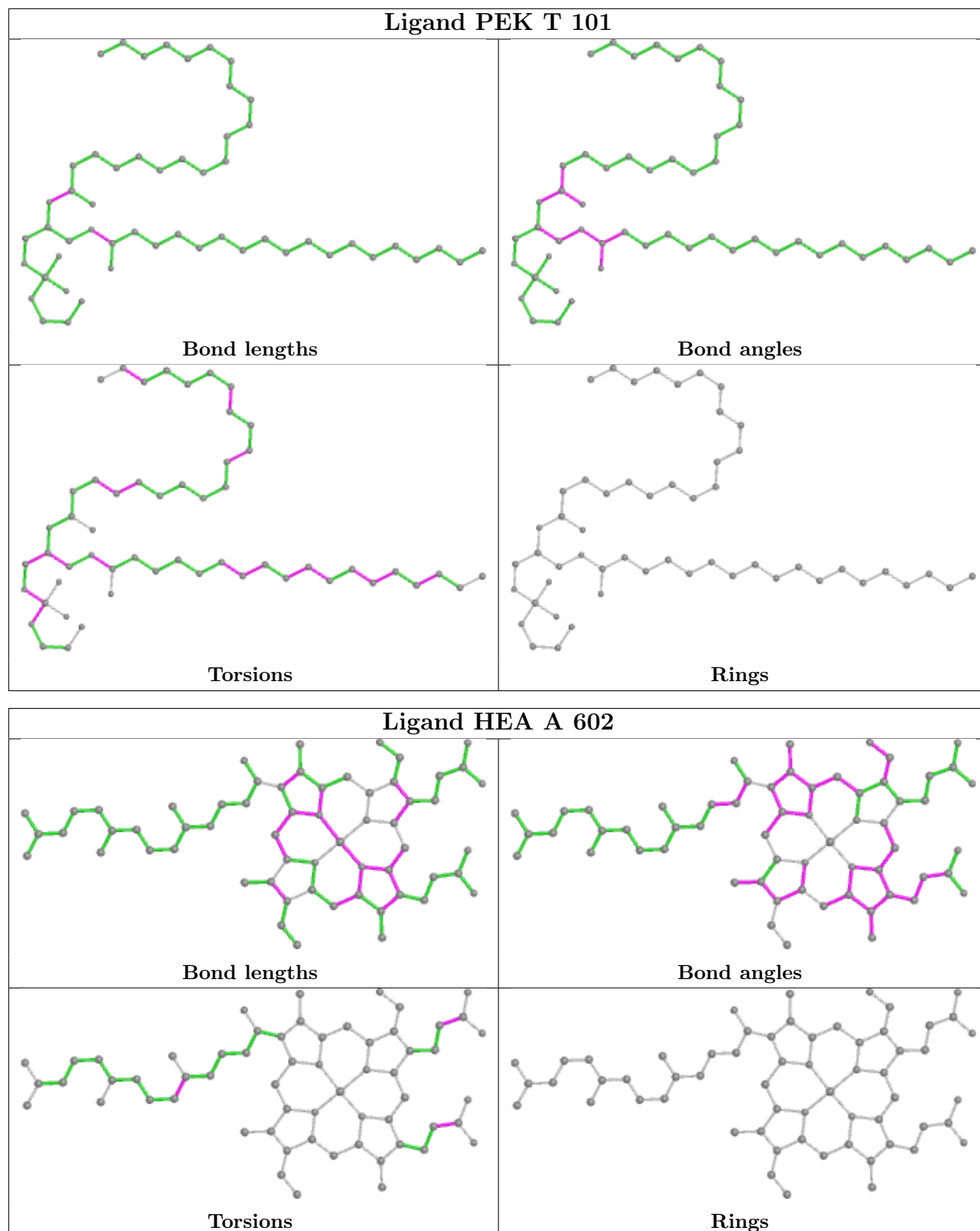


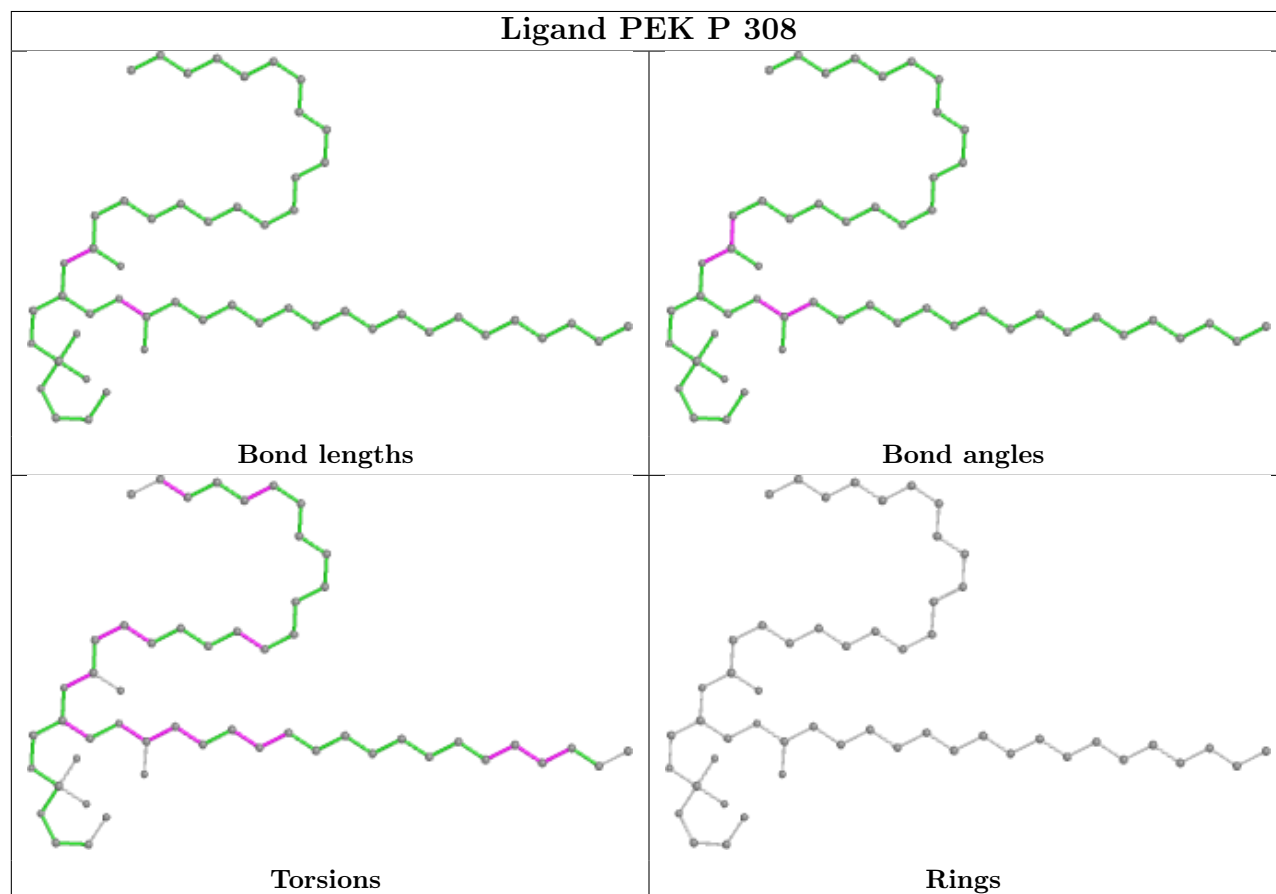
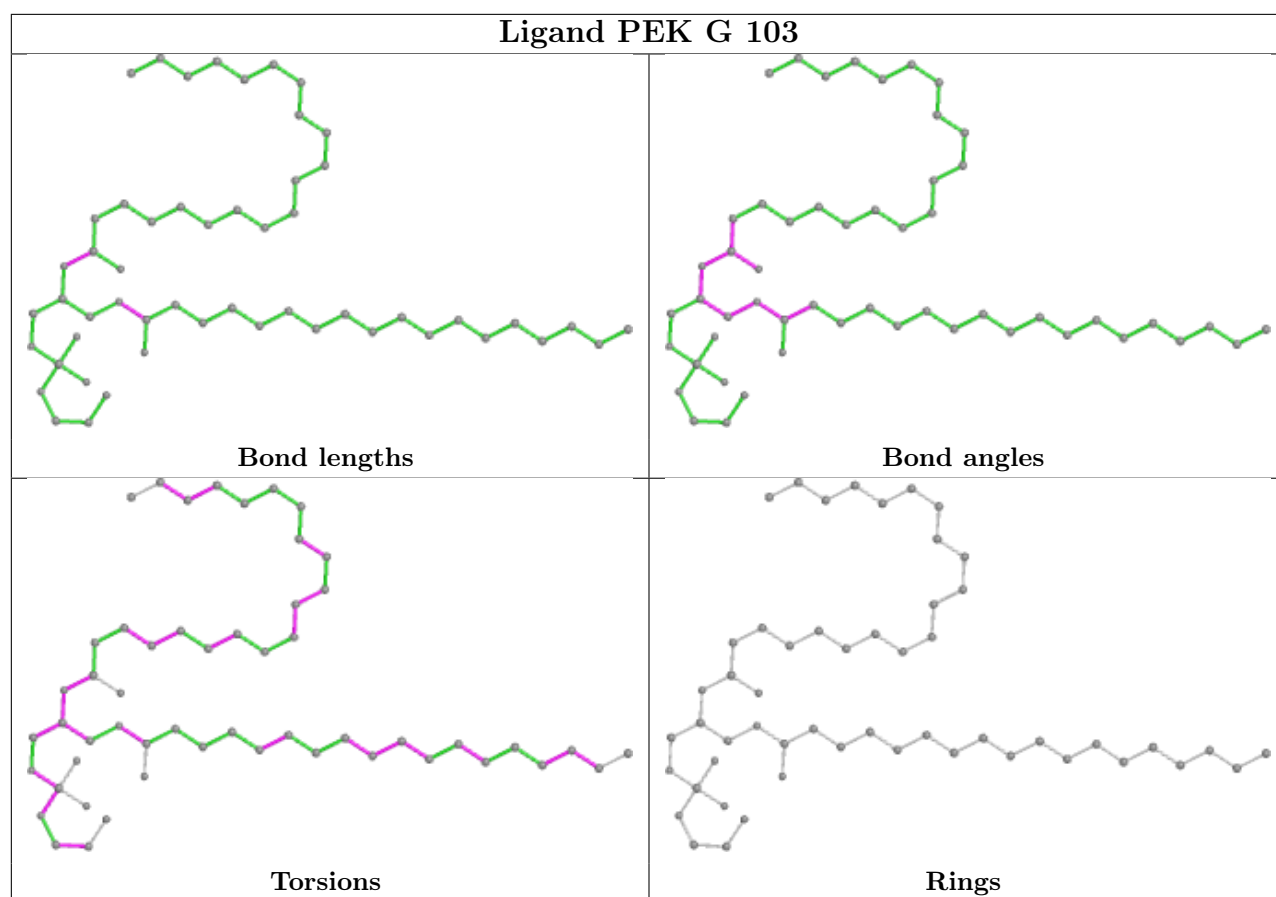


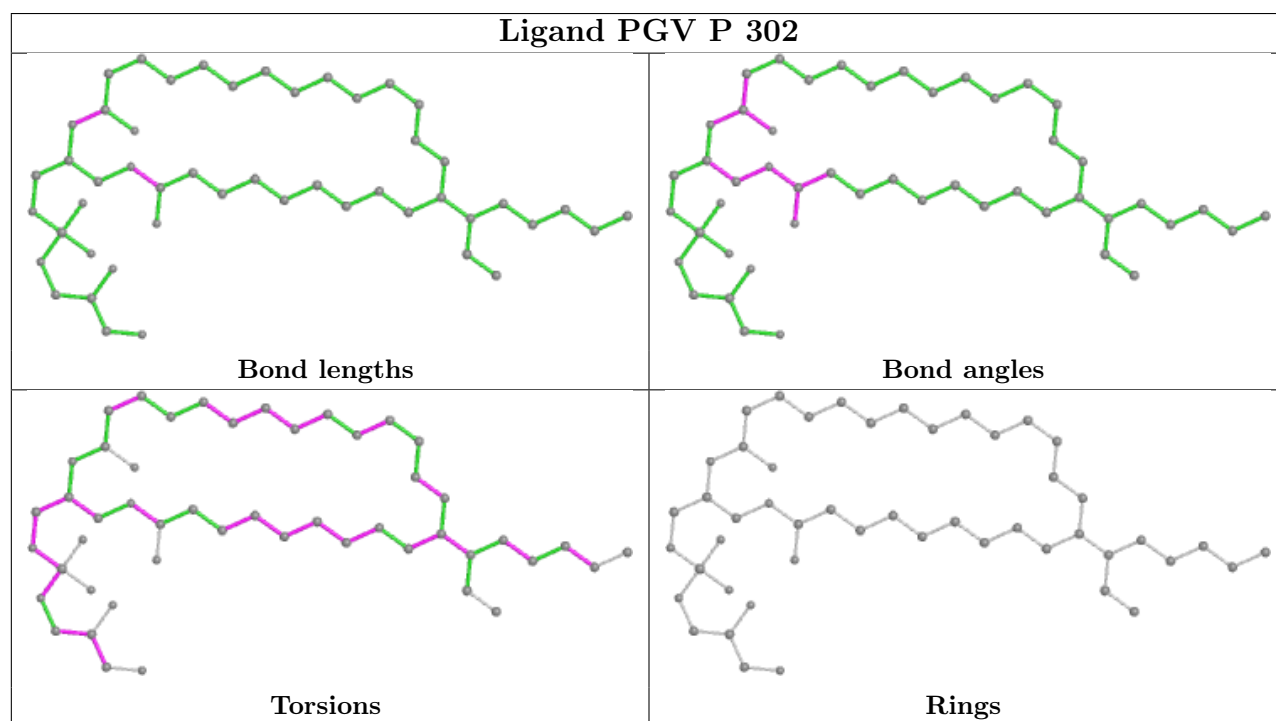
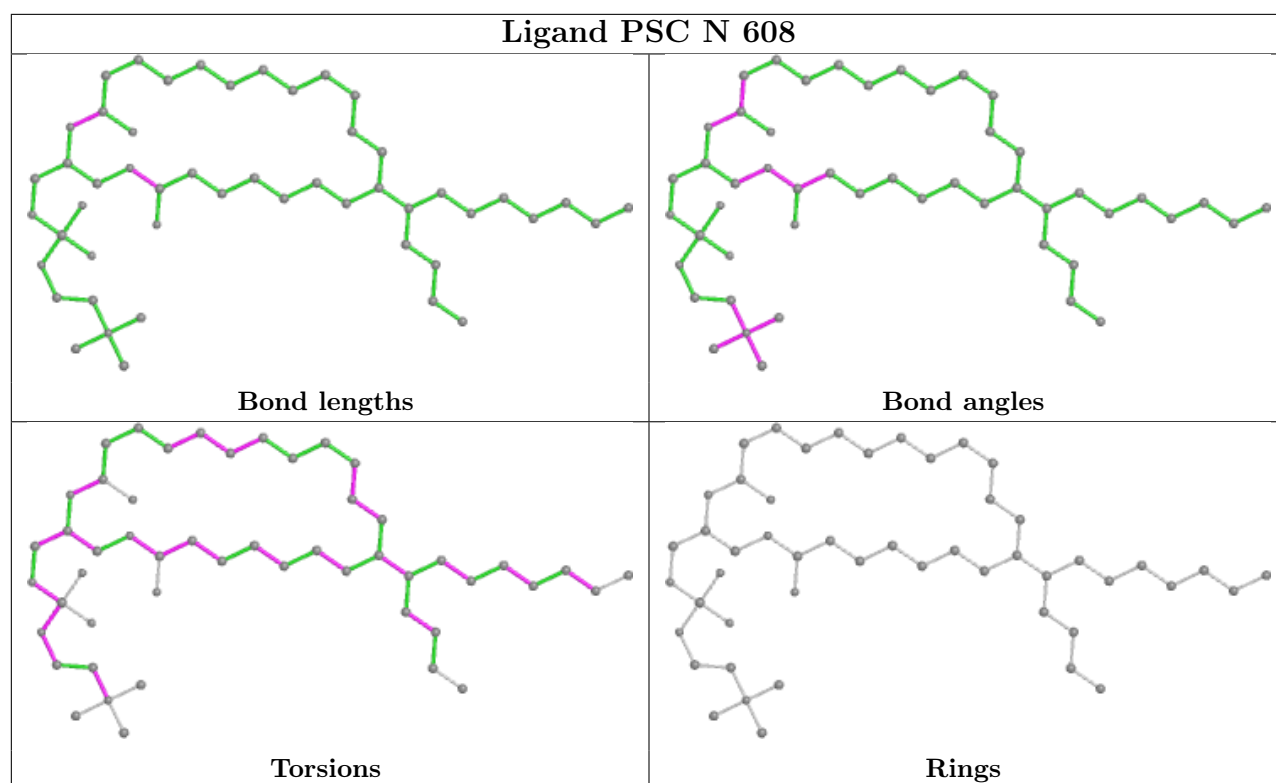


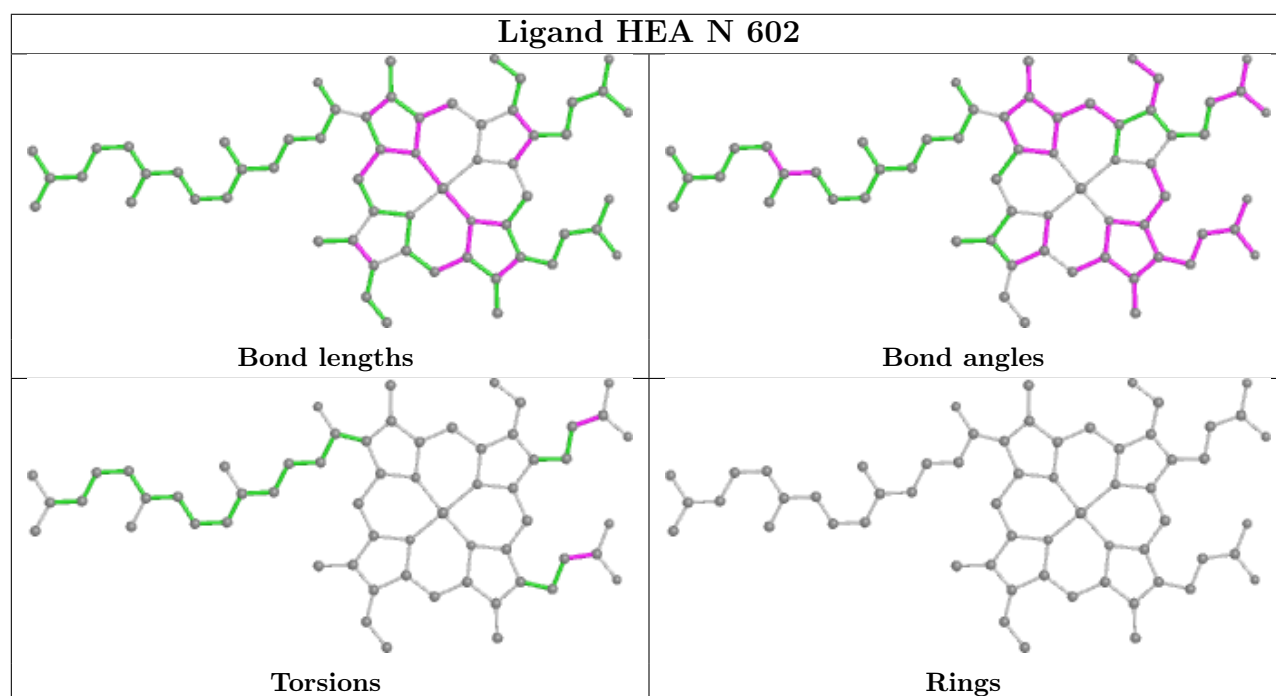
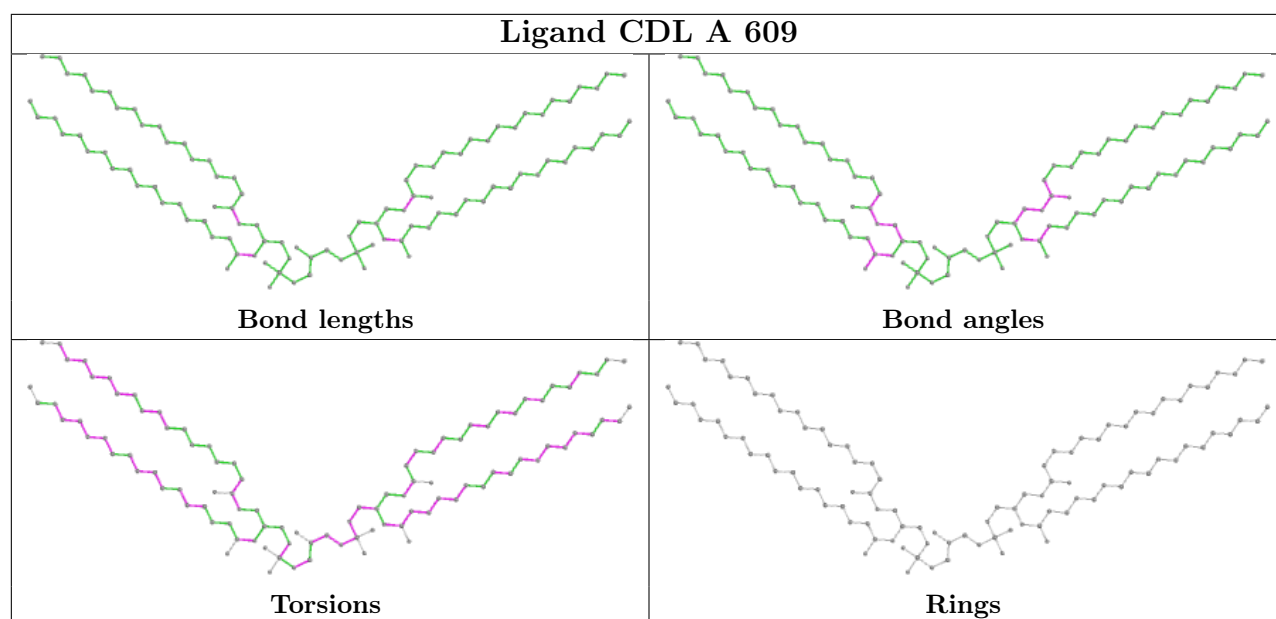


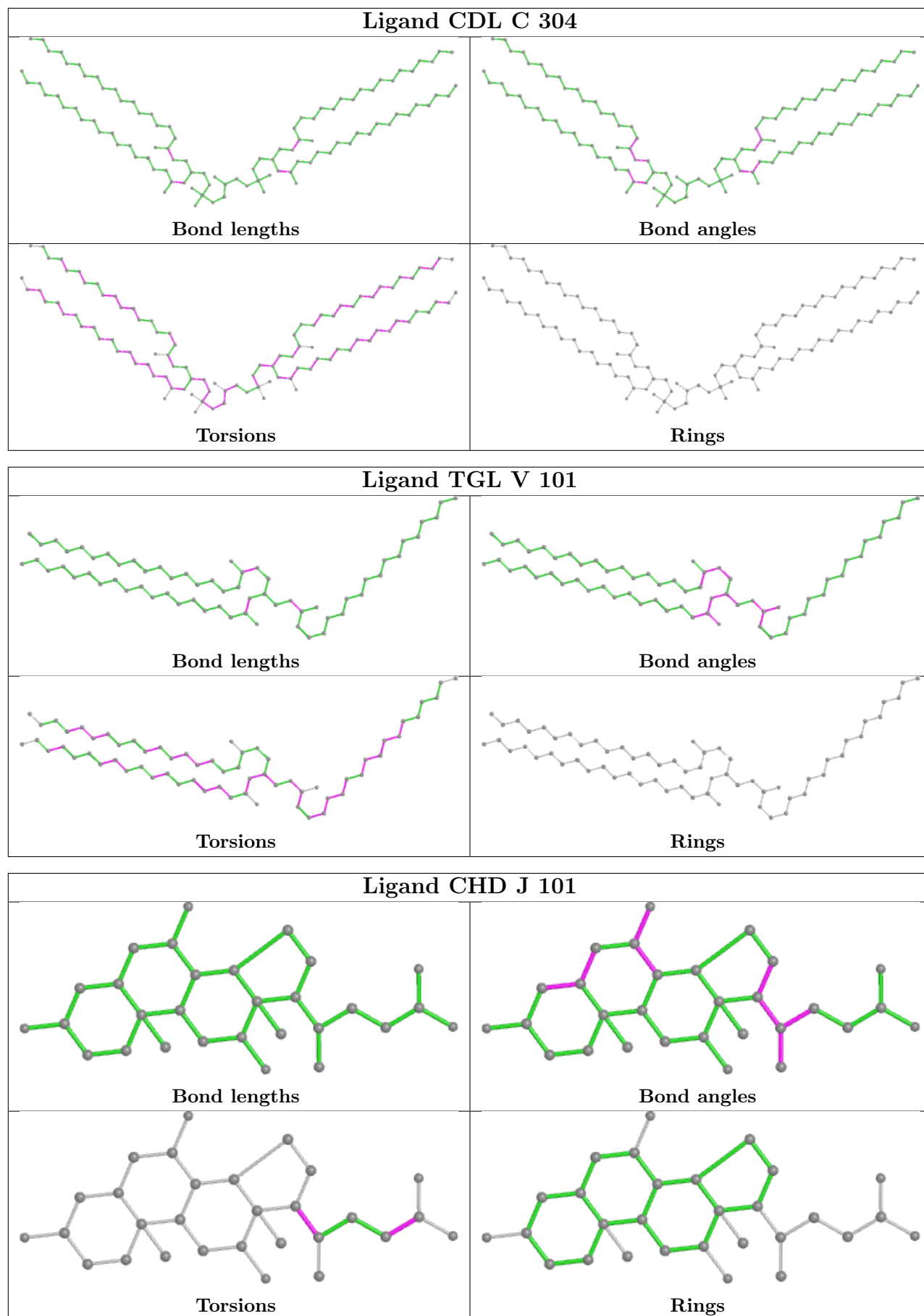


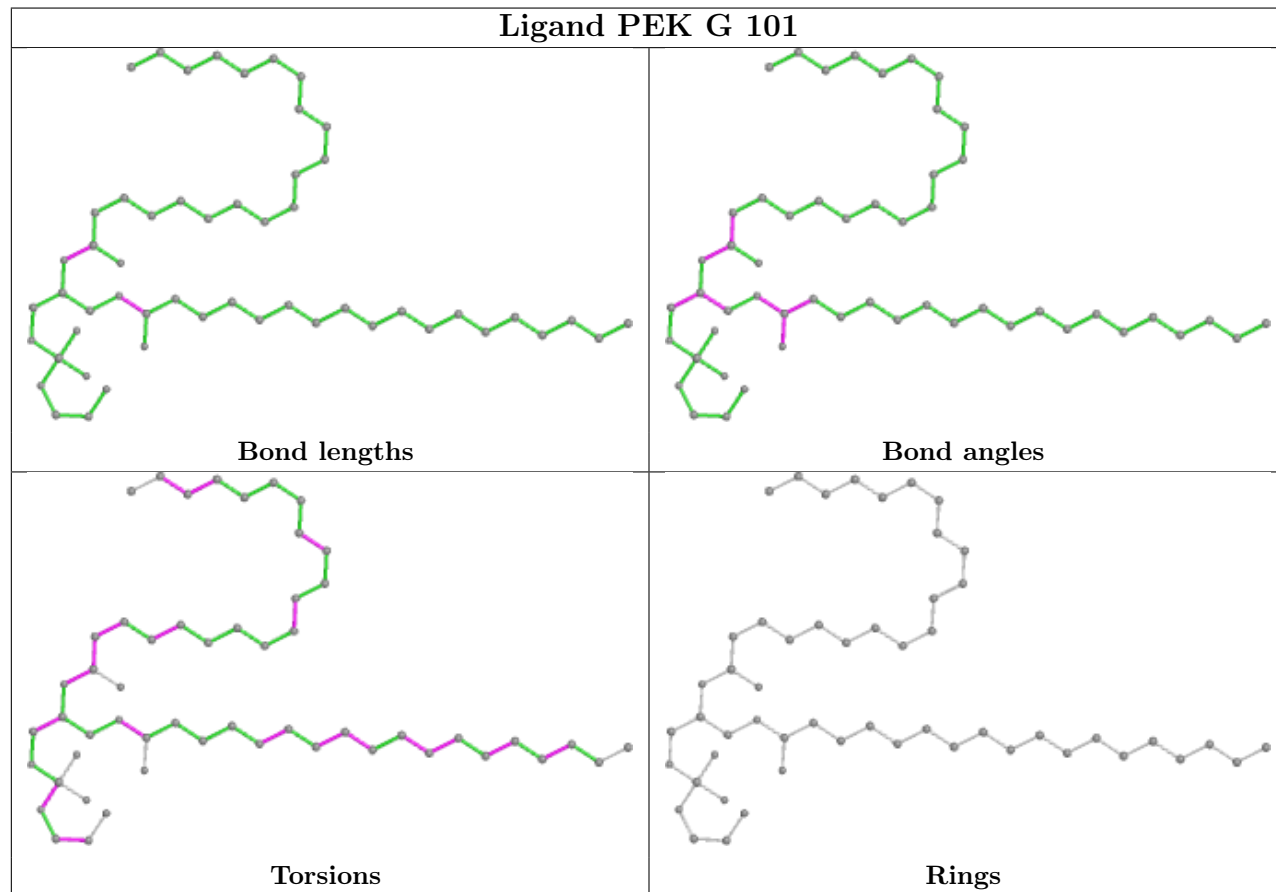
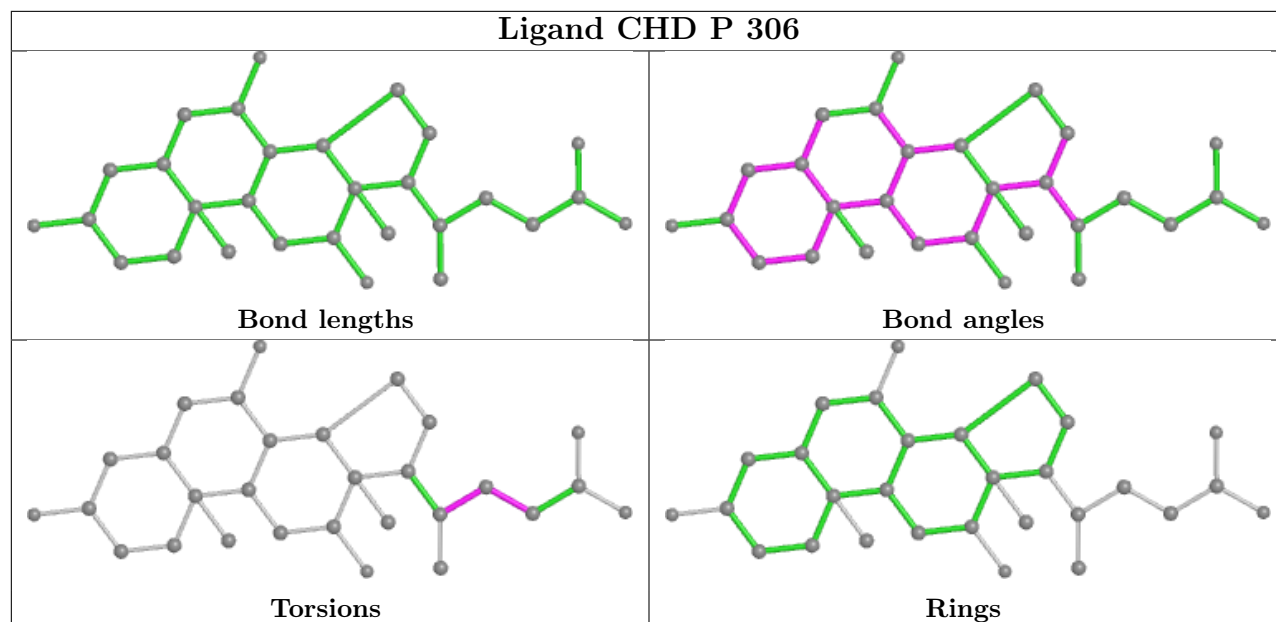


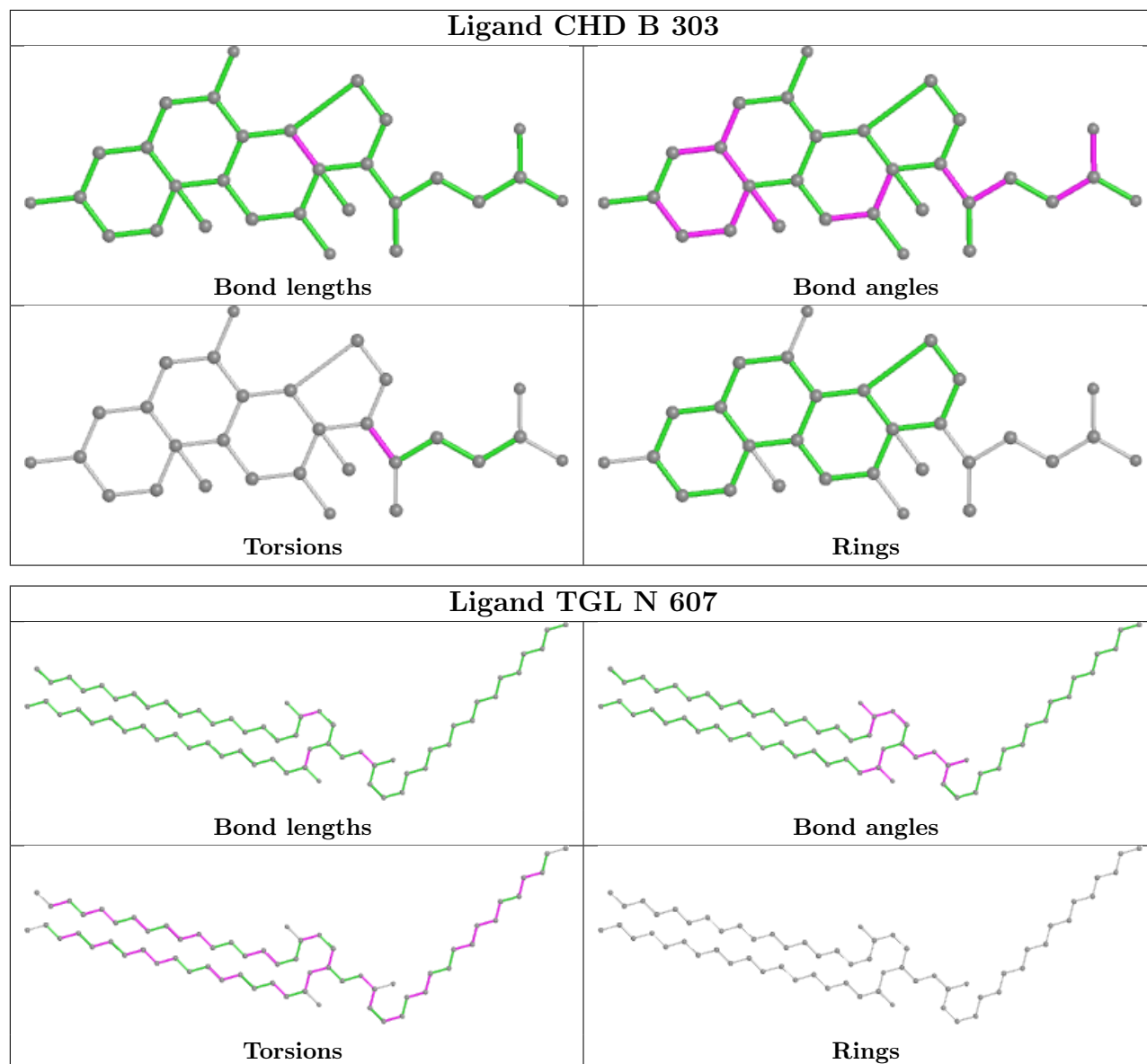


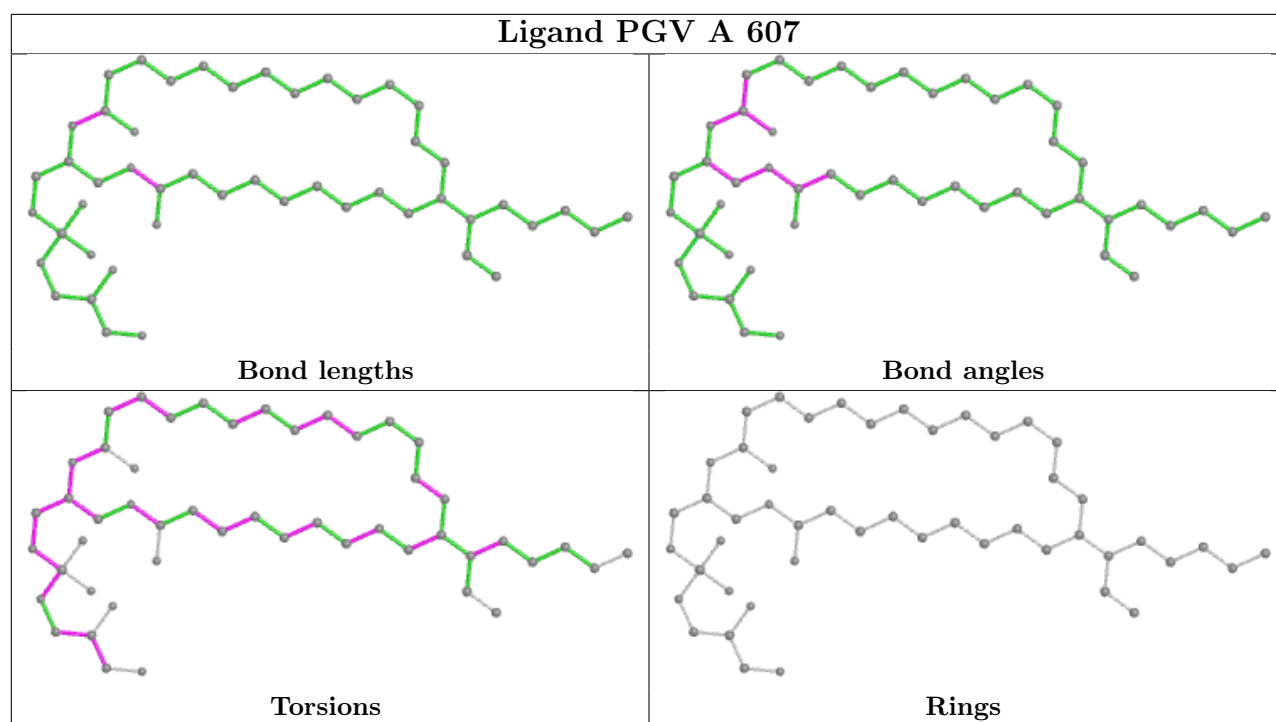












5.7 Other polymers [i](#)

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	513/514 (99%)	-1.08	0 100 100	37, 49, 63, 102	0
1	N	513/514 (99%)	-0.97	0 100 100	48, 64, 86, 108	0
2	B	226/227 (99%)	-0.82	1 (0%) 92 91	42, 57, 86, 152	0
2	O	226/227 (99%)	-0.56	3 (1%) 77 72	57, 76, 115, 162	0
3	C	259/261 (99%)	-0.88	0 100 100	43, 54, 75, 111	0
3	P	259/261 (99%)	-0.82	2 (0%) 86 81	48, 66, 89, 144	0
4	D	144/147 (97%)	-0.61	1 (0%) 87 84	47, 62, 91, 127	0
4	Q	144/147 (97%)	-0.01	11 (7%) 13 7	67, 91, 136, 199	0
5	E	105/109 (96%)	-0.70	1 (0%) 82 77	47, 61, 98, 151	0
5	R	105/109 (96%)	-0.57	2 (1%) 66 59	57, 80, 102, 148	0
6	F	98/98 (100%)	-0.15	7 (7%) 16 9	47, 64, 144, 210	0
6	S	98/98 (100%)	-0.00	8 (8%) 11 6	54, 77, 156, 217	0
7	G	83/85 (97%)	0.02	10 (12%) 4 2	46, 65, 155, 191	0
7	T	83/85 (97%)	0.08	12 (14%) 2 1	52, 81, 152, 230	0
8	H	79/85 (92%)	-0.30	4 (5%) 28 19	49, 70, 142, 155	0
8	U	79/85 (92%)	-0.01	7 (8%) 9 5	66, 87, 145, 161	0
9	I	72/73 (98%)	-0.47	0 100 100	52, 70, 99, 126	0
9	V	72/73 (98%)	0.09	9 (12%) 3 2	63, 93, 136, 155	0
10	J	58/59 (98%)	-0.33	3 (5%) 27 18	55, 68, 132, 159	0
10	W	58/59 (98%)	-0.01	4 (6%) 16 10	75, 90, 131, 176	0
11	K	49/56 (87%)	-0.30	1 (2%) 65 56	54, 66, 90, 132	0
11	X	49/56 (87%)	0.03	1 (2%) 65 56	76, 92, 116, 129	0
12	L	46/47 (97%)	-0.75	1 (2%) 62 52	44, 57, 83, 137	0
12	Y	46/47 (97%)	-0.39	1 (2%) 62 52	68, 86, 109, 139	0

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Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
13	M	43/46 (93%)	-0.48	2 (4%) 31 22	49, 57, 102, 141	0
13	Z	43/46 (93%)	0.01	3 (6%) 16 9	71, 86, 133, 165	0
All	All	3550/3614 (98%)	-0.62	94 (2%) 56 46	37, 65, 113, 230	0

The worst 5 of 94 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
4	Q	8	SER	8.2
6	S	98	HIS	8.2
7	G	39	SER	8.1
13	Z	43	SER	7.8
6	S	2	SER	7.2

6.2 Non-standard residues in protein, DNA, RNA chains [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(Å ²)	Q<0.9
9	SAC	I	1	9/10	0.57	0.60	121,144,159,160	0
7	TPO	G	11	11/12	0.63	0.52	121,154,184,184	0
7	TPO	T	11	11/12	0.74	0.47	115,155,185,188	0
9	SAC	V	1	9/10	0.74	0.56	135,147,156,162	0
1	FME	N	1	10/11	0.91	0.43	101,115,136,144	0
1	FME	A	1	10/11	0.94	0.35	78,86,113,125	0
2	FME	O	1	10/11	0.96	0.13	67,85,98,100	0
2	FME	B	1	10/11	0.98	0.10	49,56,61,63	0

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, 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.

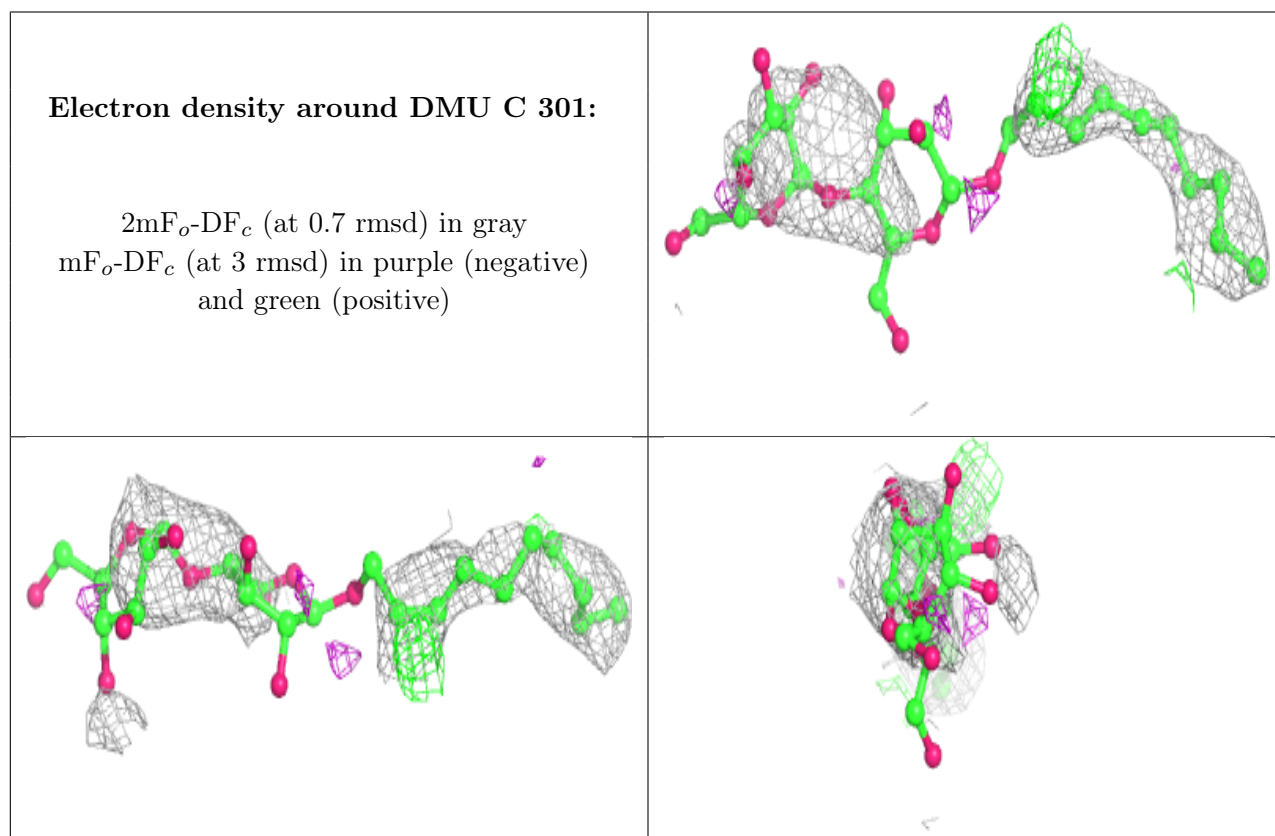
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
24	DMU	C	301	33/33	0.48	0.60	86,191,206,210	0
25	PEK	G	103	53/53	0.52	0.42	74,142,205,215	0
18	PGV	N	606	51/51	0.54	0.36	79,110,191,215	0
25	PEK	T	101	53/53	0.60	0.41	87,156,204,213	0
25	PEK	P	309	53/53	0.61	0.31	78,122,173,183	0
24	DMU	P	303	33/33	0.65	0.51	96,163,206,222	0
19	TGL	Y	101	63/63	0.67	0.34	83,122,160,163	0
20	CDL	A	609	100/100	0.68	0.34	96,129,187,213	0
25	PEK	G	101	53/53	0.69	0.27	74,117,202,210	0
18	PGV	A	607	51/51	0.69	0.30	72,120,163,176	0
20	CDL	C	304	100/100	0.70	0.32	68,127,168,183	0
23	PSC	N	608	52/52	0.70	0.34	83,137,241,271	0
19	TGL	N	607	63/63	0.72	0.28	84,123,138,143	0
23	PSC	B	304	52/52	0.74	0.30	81,130,210,219	0
20	CDL	G	102	100/100	0.74	0.30	105,135,187,207	0
19	TGL	V	101	63/63	0.76	0.25	53,114,164,179	0
22	CHD	W	101	29/29	0.77	0.41	110,149,184,190	0
19	TGL	B	301	63/63	0.77	0.23	47,103,141,146	0
20	CDL	P	305	100/100	0.77	0.30	84,133,190,254	0
19	TGL	D	201	63/63	0.78	0.24	72,109,128,135	0
18	PGV	C	307	51/51	0.79	0.28	81,118,146,150	0
24	DMU	Q	201	33/33	0.80	0.29	86,110,126,137	0
19	TGL	A	608	63/63	0.81	0.27	56,105,138,148	0
18	PGV	P	302	51/51	0.81	0.28	74,117,160,166	0
17	NA	N	605	1/1	0.84	0.21	81,81,81,81	0
22	CHD	J	101	29/29	0.85	0.32	87,116,136,140	0
24	DMU	M	101	33/33	0.87	0.20	62,69,85,91	0
22	CHD	C	305	29/29	0.89	0.25	99,115,136,140	0
22	CHD	P	306	29/29	0.92	0.23	102,113,124,126	0
25	PEK	P	308	53/53	0.92	0.19	65,94,152,173	0
25	PEK	C	302	53/53	0.95	0.17	49,72,125,132	0
18	PGV	P	304	51/51	0.95	0.17	55,67,117,123	0
18	PGV	P	301	51/51	0.96	0.15	47,71,94,108	0
18	PGV	C	303	51/51	0.96	0.14	45,60,107,114	0
22	CHD	G	104	29/29	0.96	0.12	49,54,62,73	0
26	ZN	S	101	1/1	0.96	0.03	72,72,72,72	0
22	CHD	P	307	29/29	0.97	0.09	55,60,67,69	0
18	PGV	A	606	51/51	0.97	0.16	40,69,89,93	0
14	HEA	A	601	60/60	0.97	0.13	40,47,65,75	0
14	HEA	N	602	60/60	0.98	0.11	43,52,61,64	0
21	CUA	B	302	2/2	0.98	0.04	53,53,53,57	0
21	CUA	O	301	2/2	0.98	0.04	76,76,76,76	0

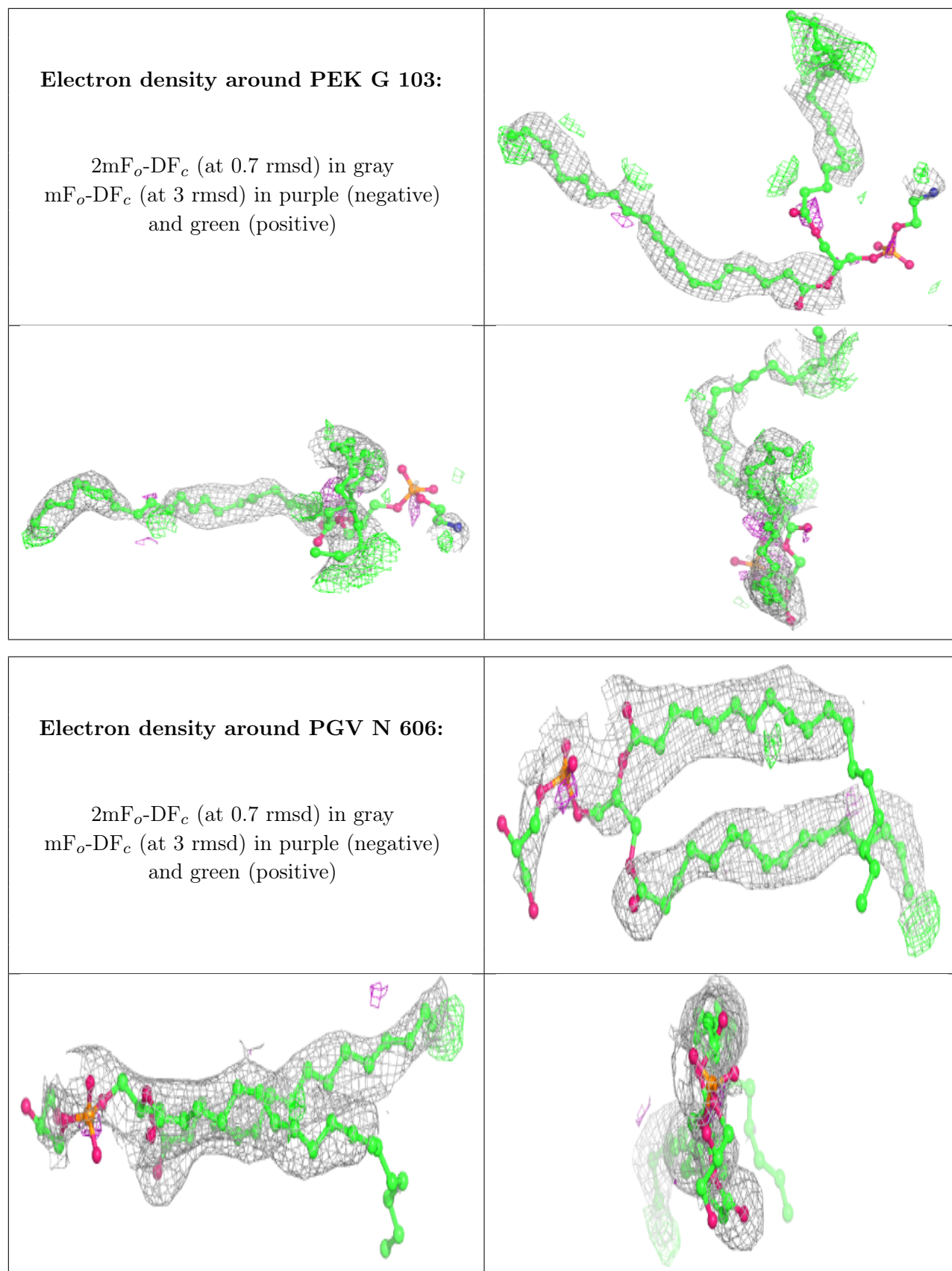
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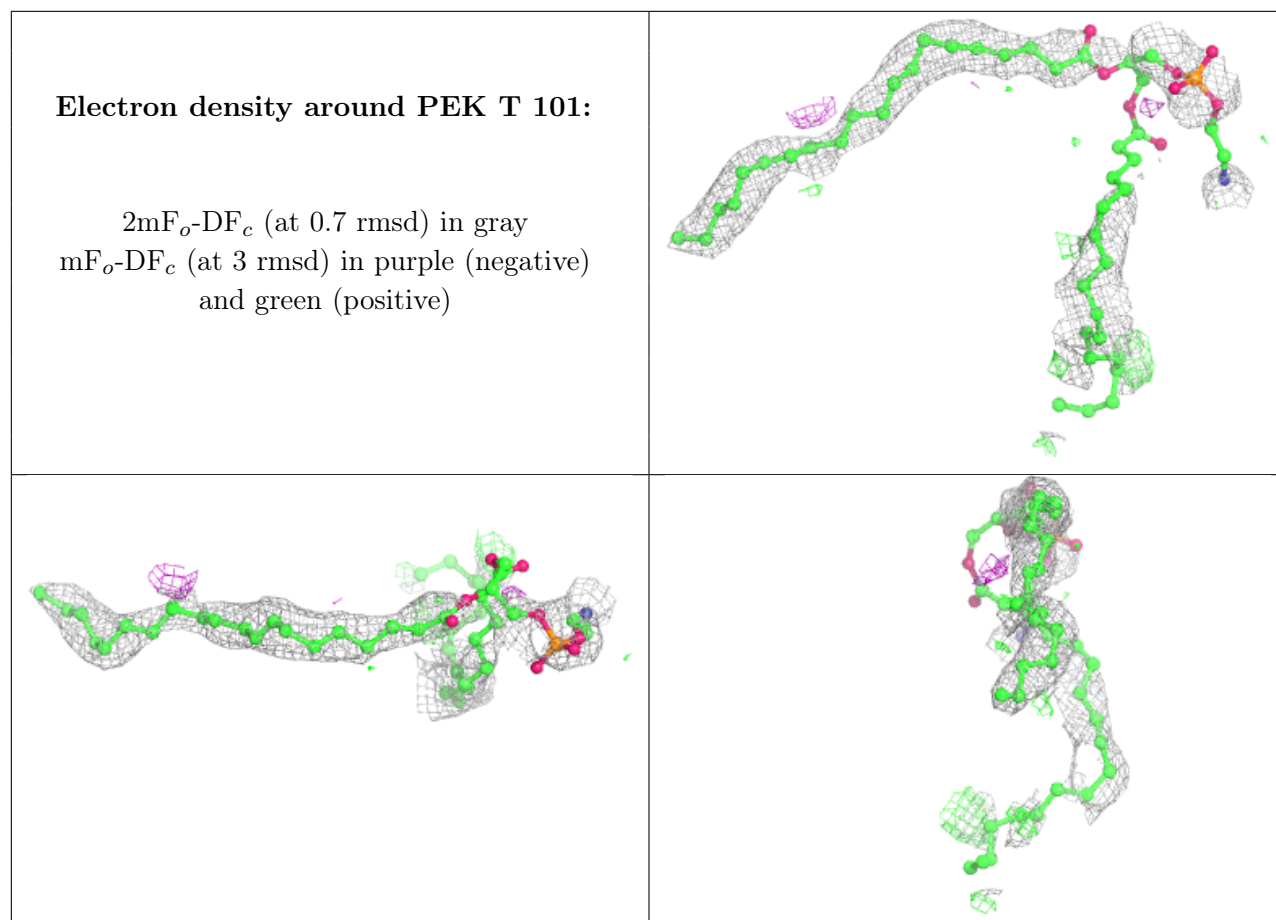
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
22	CHD	B	303	29/29	0.98	0.10	52,55,64,72	0
17	NA	A	605	1/1	0.98	0.06	55,55,55,55	0
22	CHD	C	306	29/29	0.98	0.10	41,52,60,68	0
14	HEA	A	602	60/60	0.98	0.13	34,43,60,70	0
14	HEA	N	601	60/60	0.98	0.12	42,62,77,82	0
16	MG	N	604	1/1	0.99	0.13	60,60,60,60	0
26	ZN	F	101	1/1	0.99	0.02	65,65,65,65	0
16	MG	A	604	1/1	0.99	0.06	43,43,43,43	0
15	CU	A	603	1/1	1.00	0.09	53,53,53,53	0
15	CU	N	603	1/1	1.00	0.09	64,64,64,64	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.

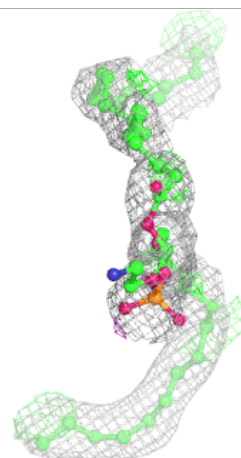
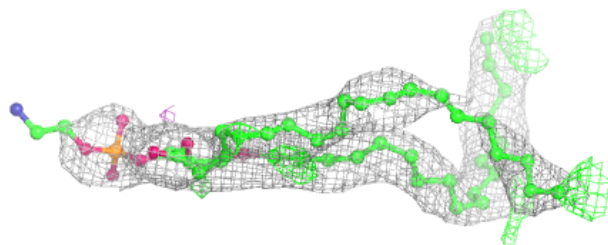
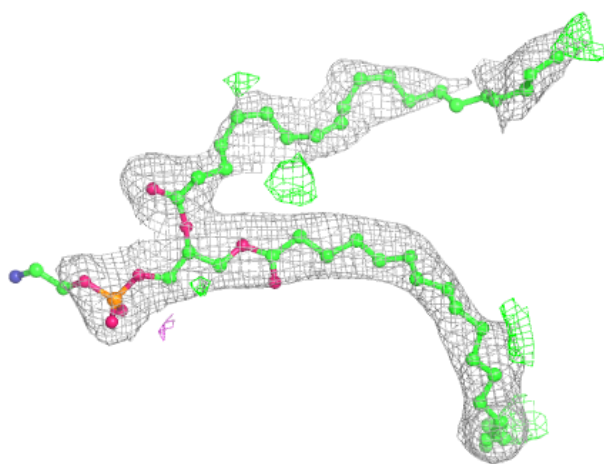






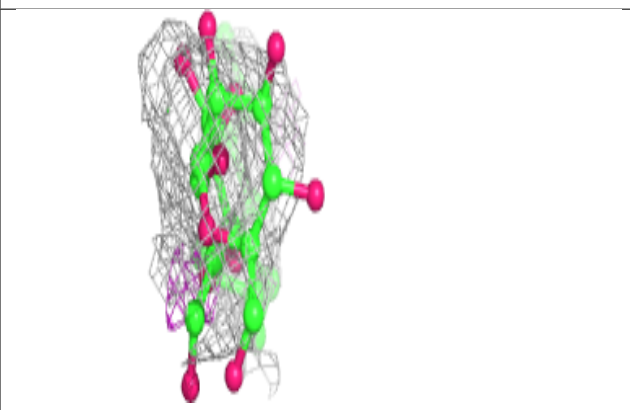
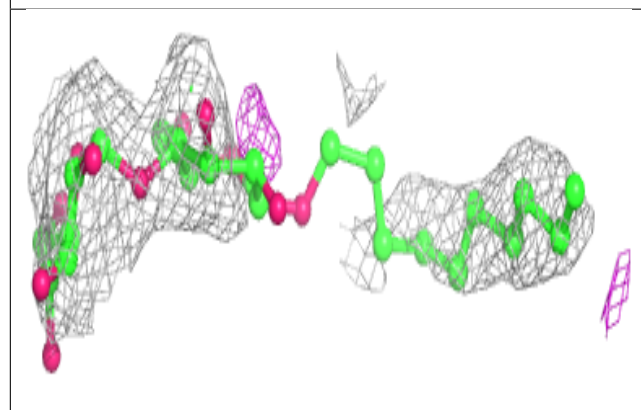
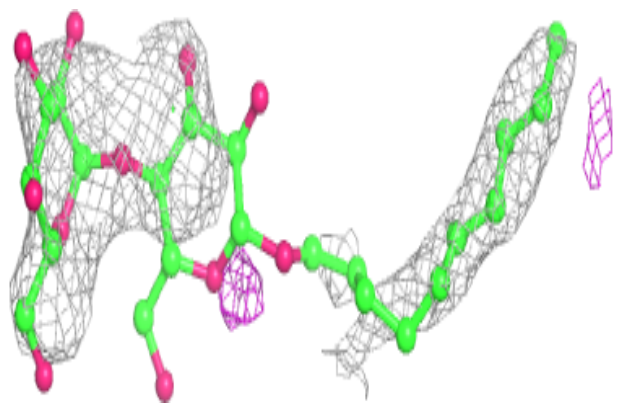
Electron density around PEK P 309:

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

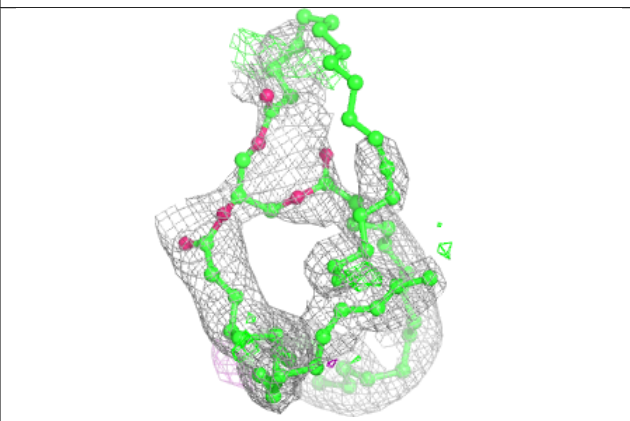
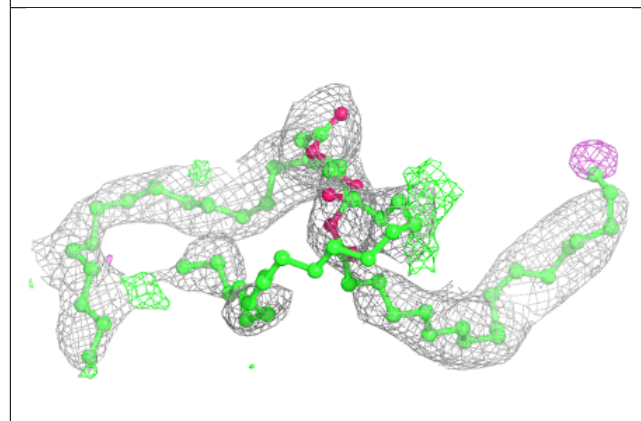
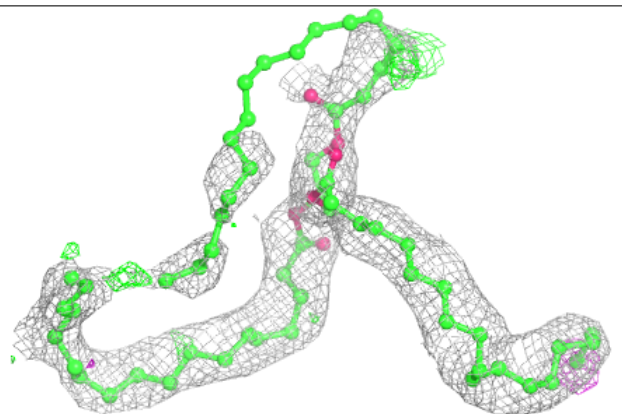


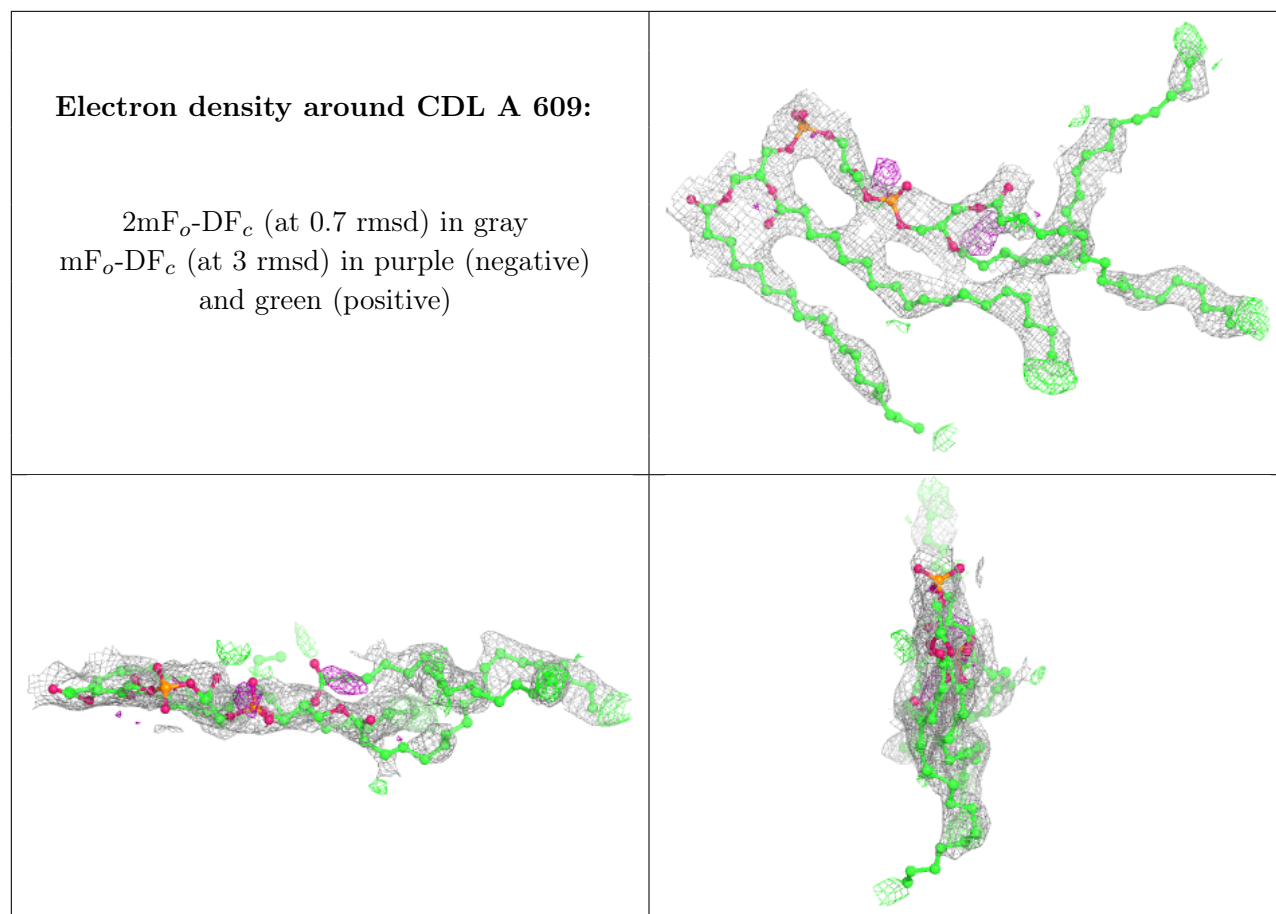
Electron density around DMU P 303:

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

**Electron density around TGL Y 101:**

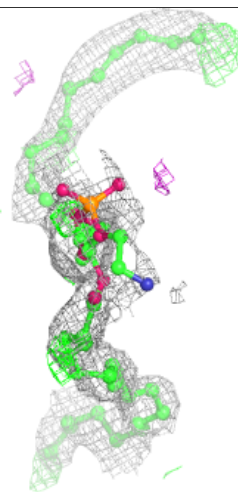
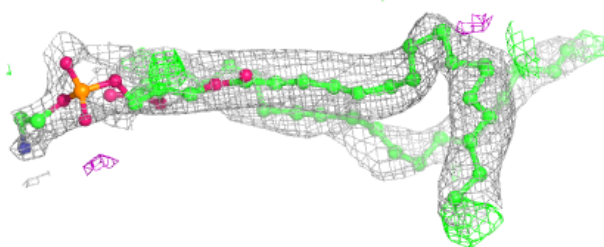
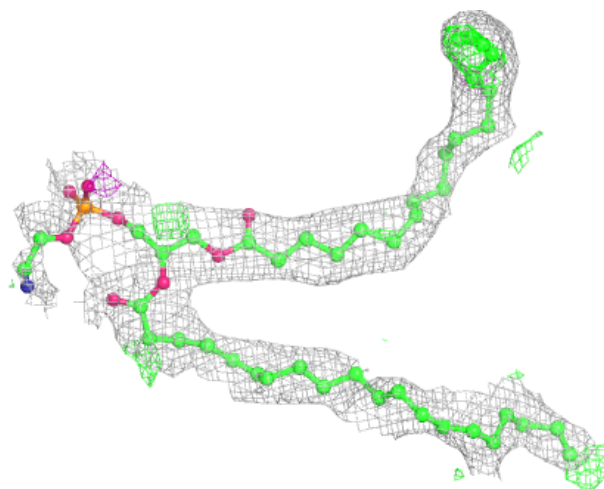
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)





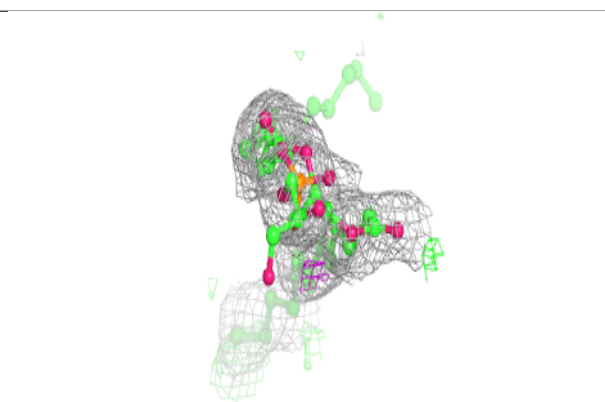
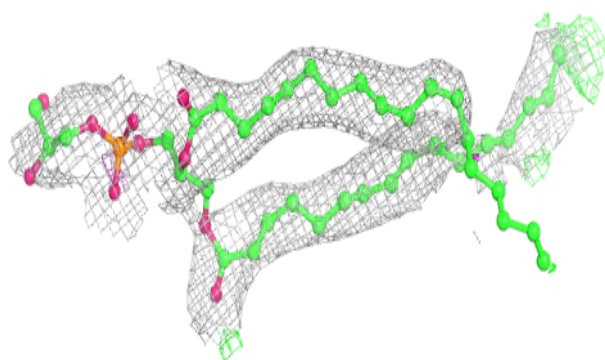
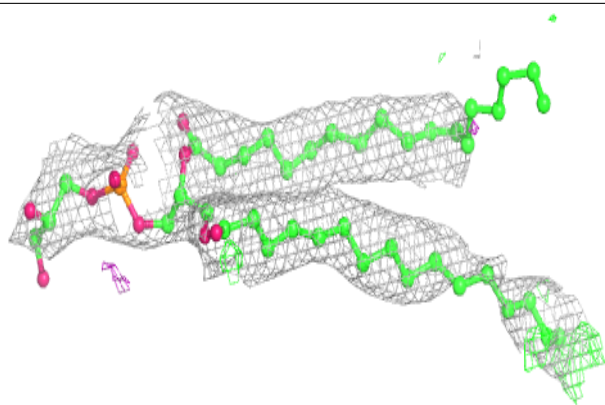
Electron density around PEK G 101:

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

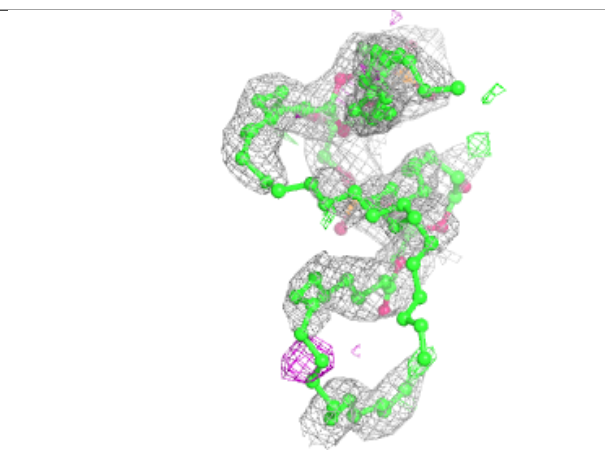
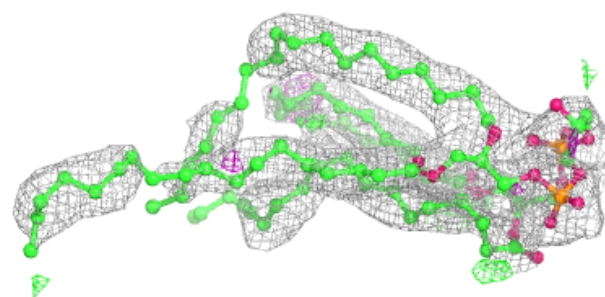
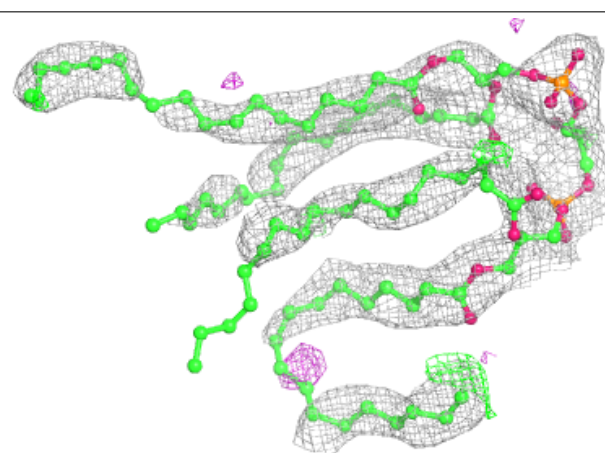


Electron density around PGV A 607:

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

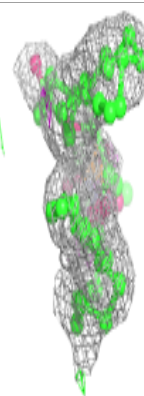
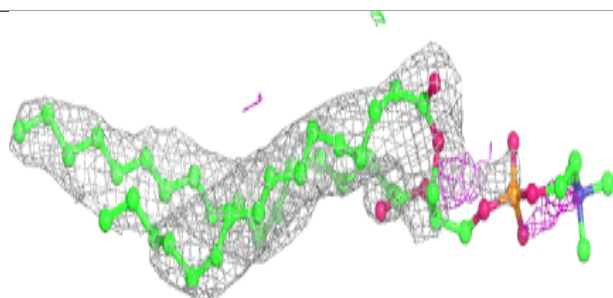
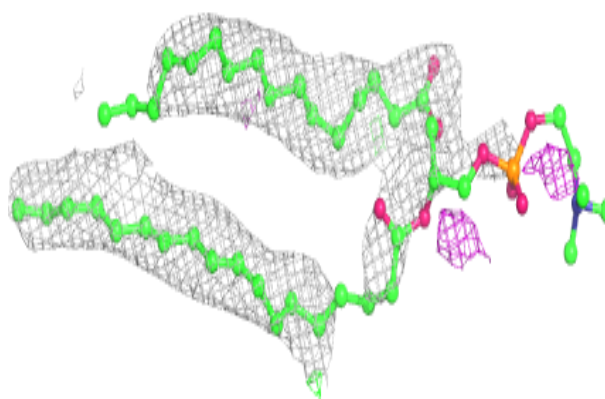
**Electron density around CDL C 304:**

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

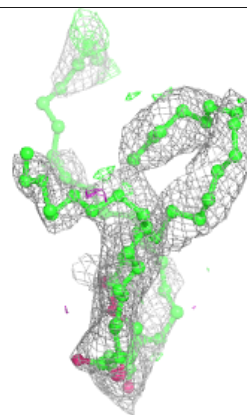
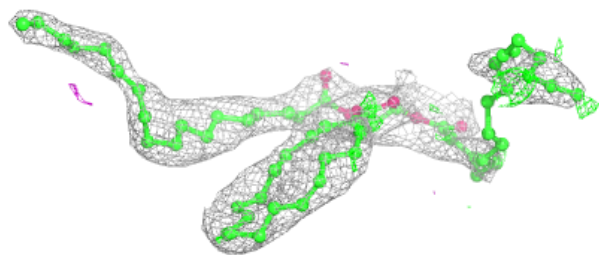
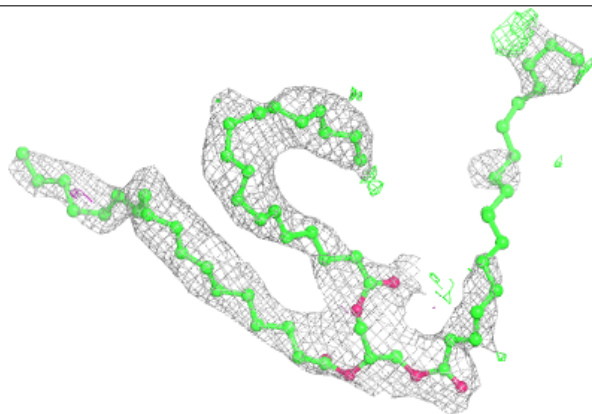


Electron density around PSC N 608:

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

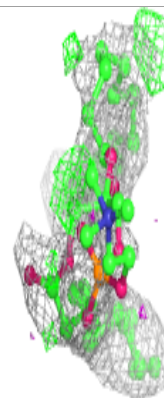
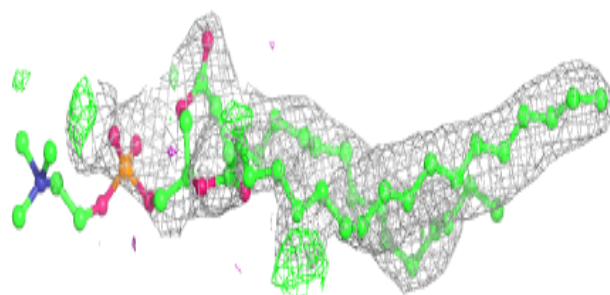
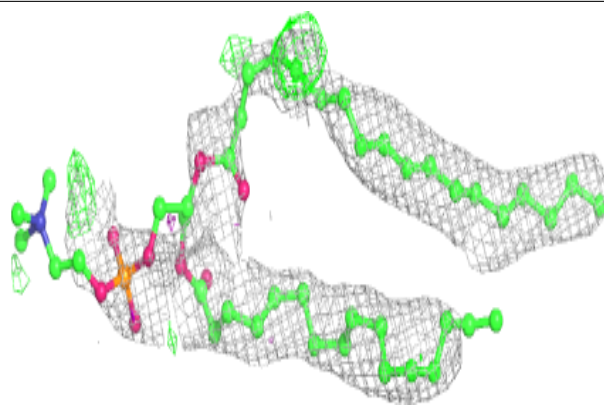
**Electron density around TGL N 607:**

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

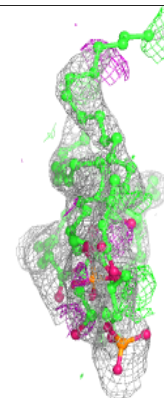
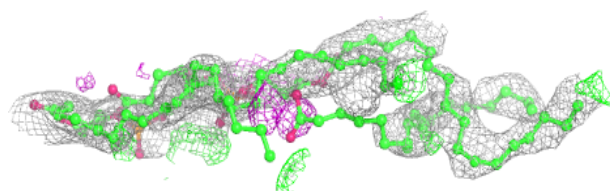
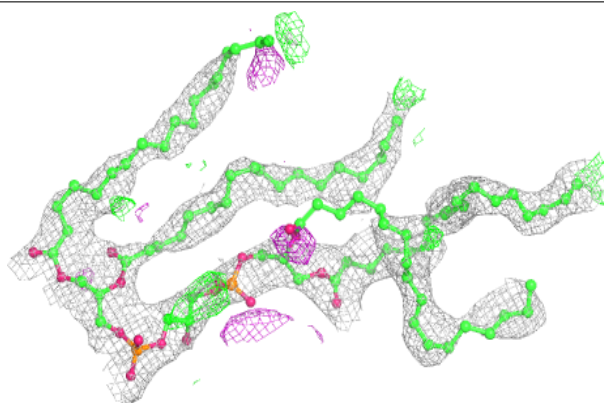


Electron density around PSC B 304:

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

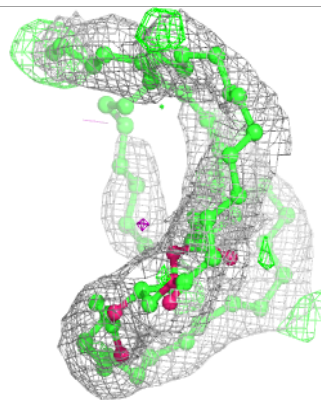
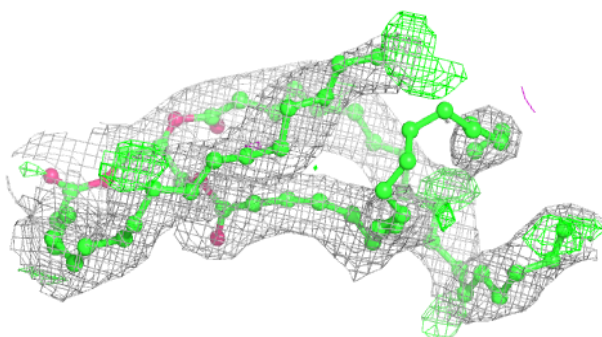
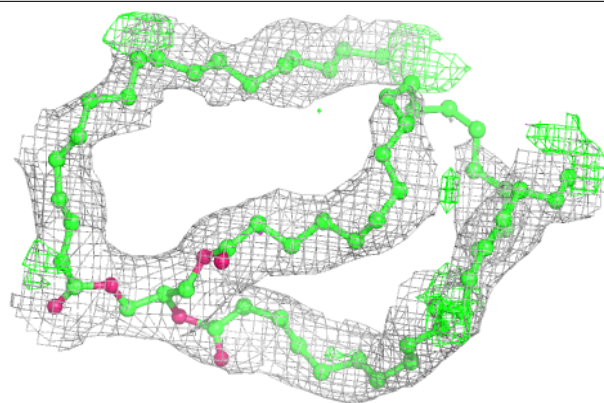
**Electron density around CDL G 102:**

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

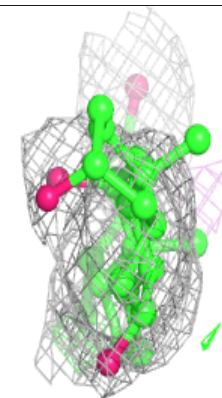
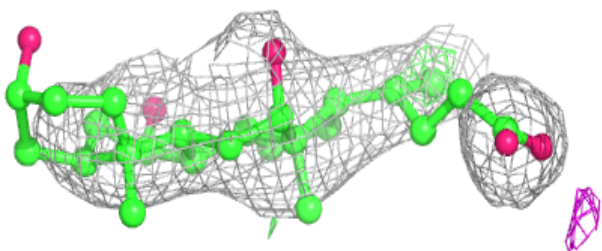
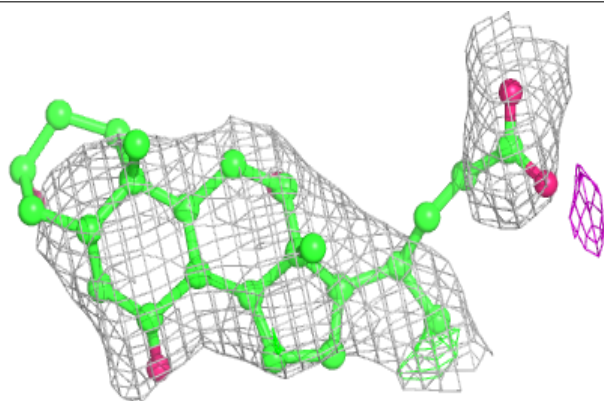


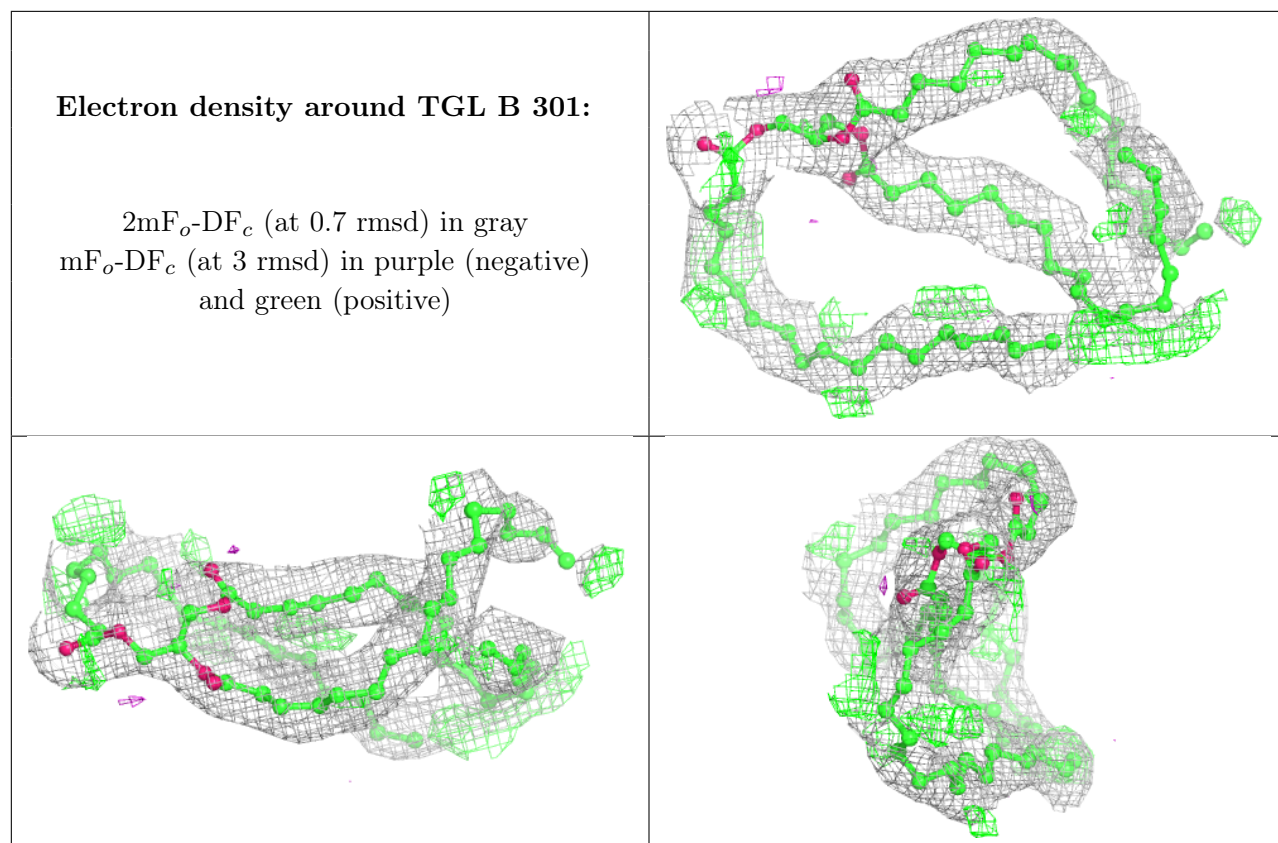
Electron density around TGL V 101:

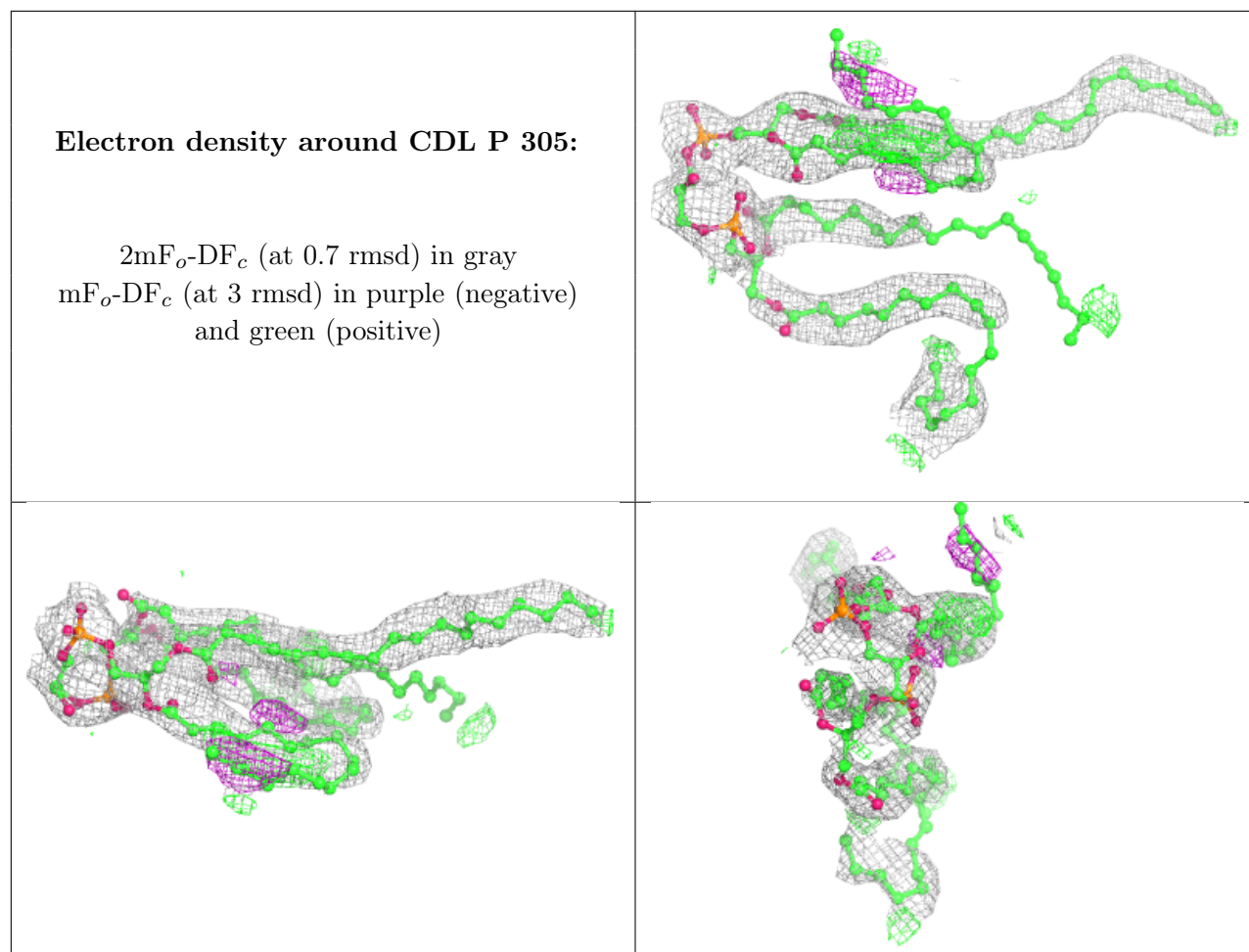
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

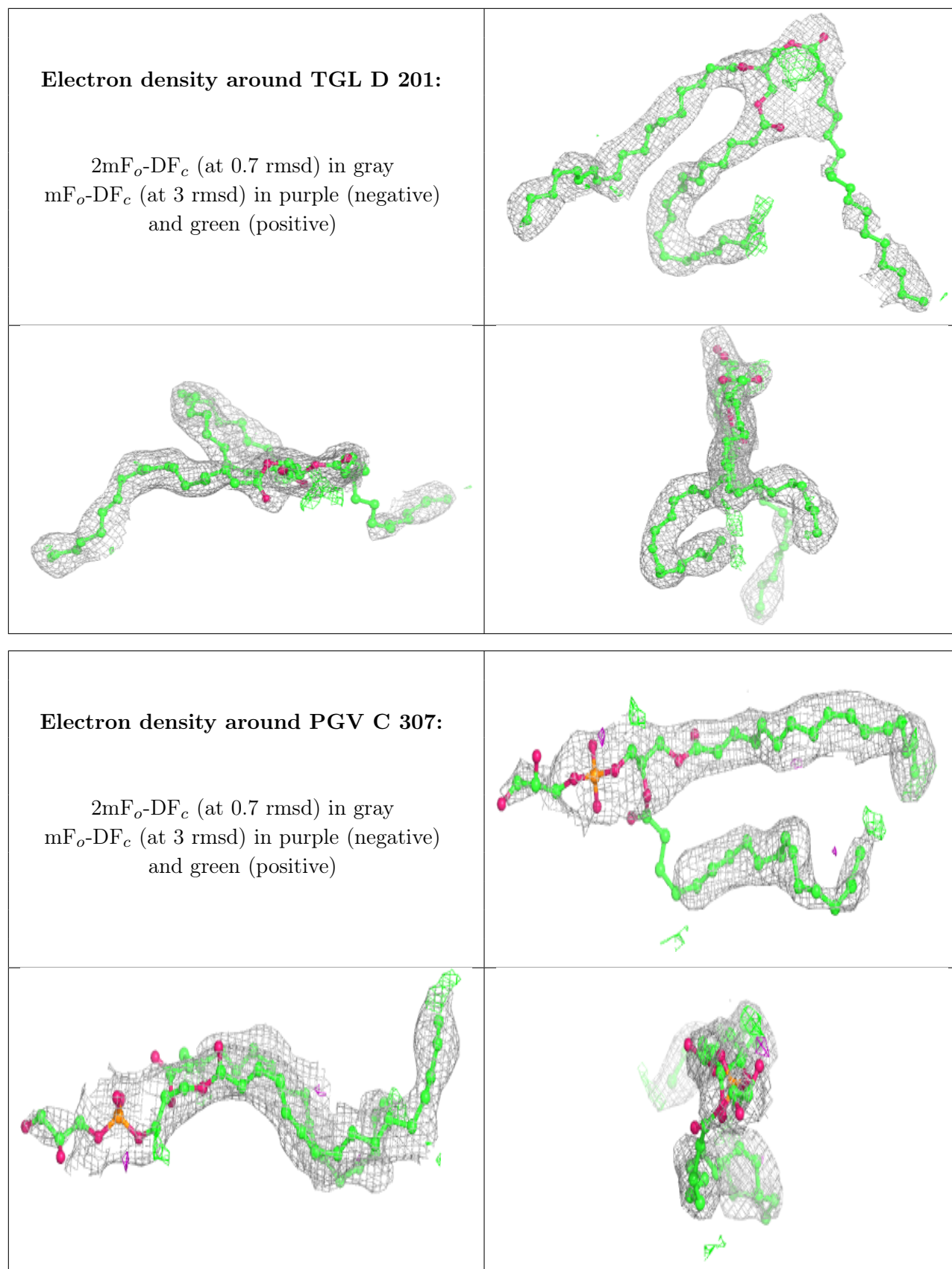
**Electron density around CHD W 101:**

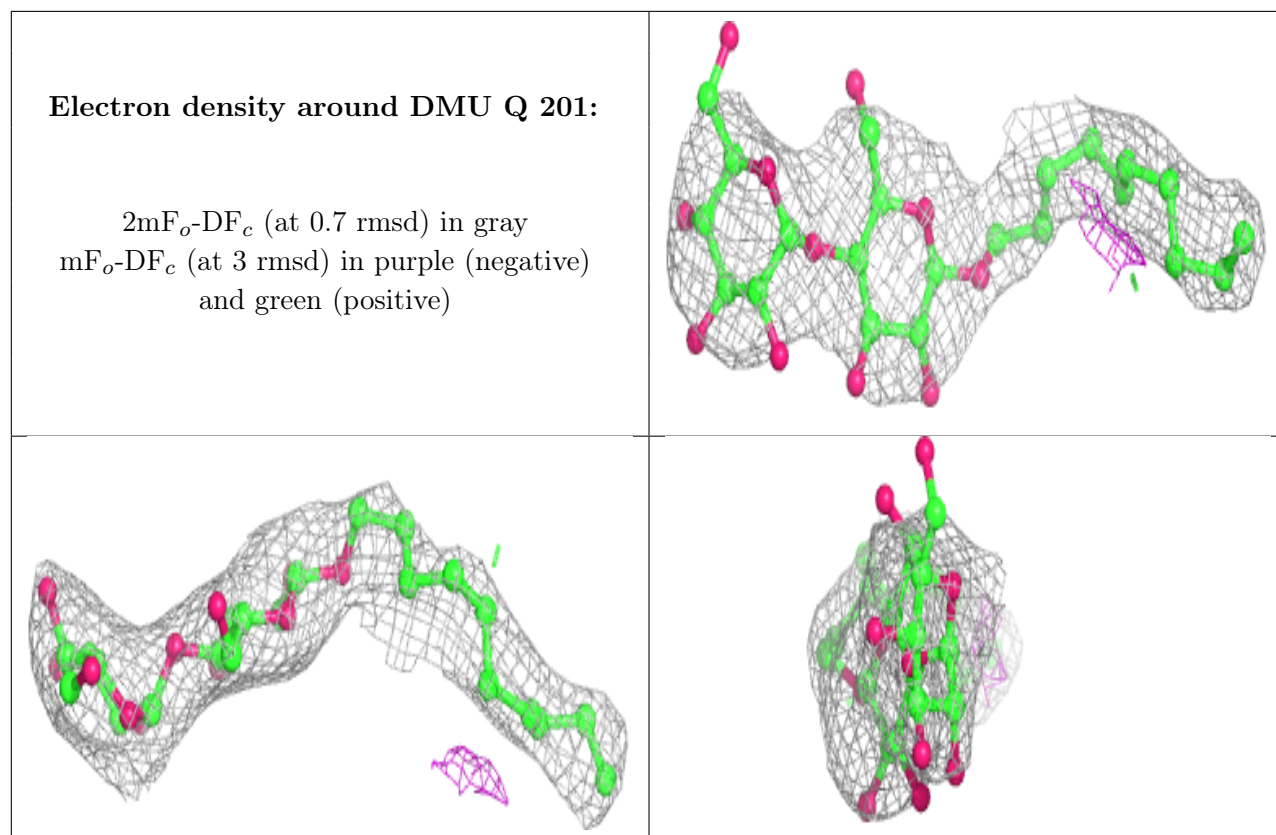
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)





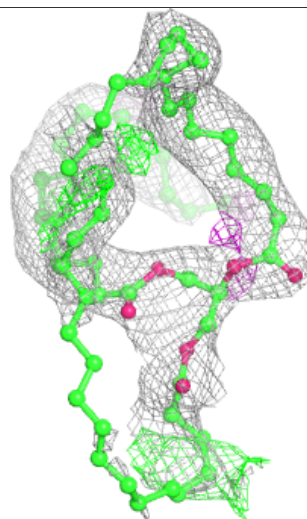
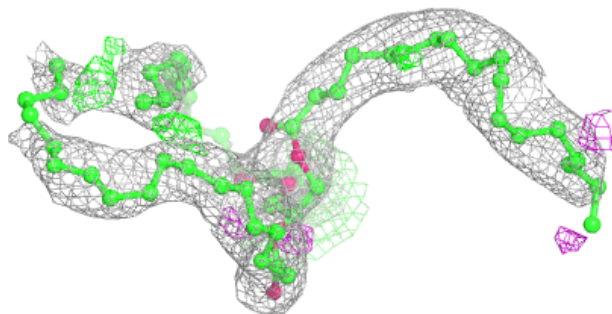
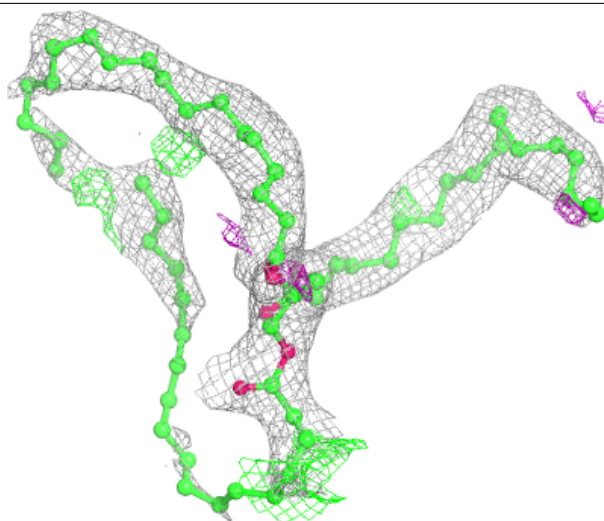


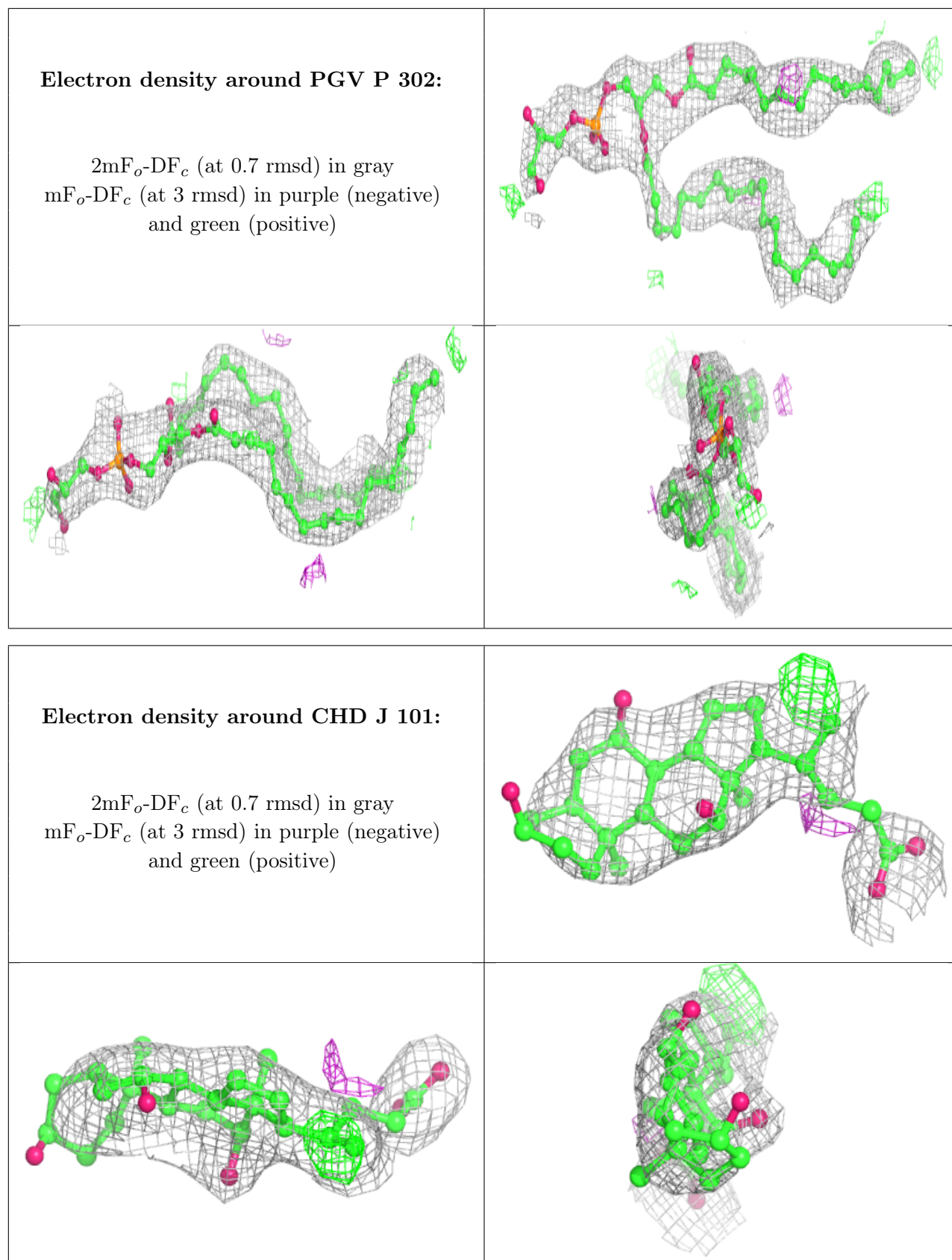




Electron density around TGL A 608:

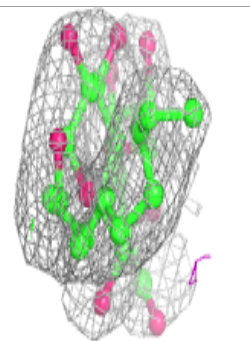
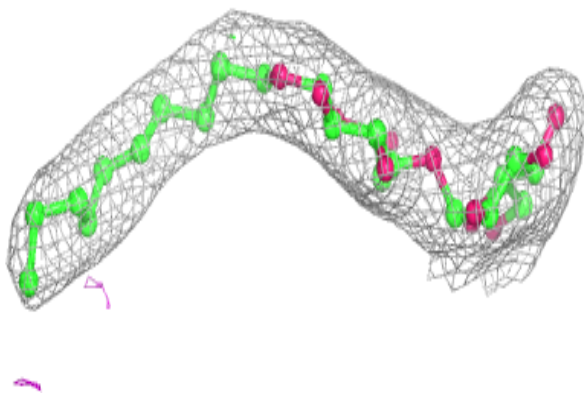
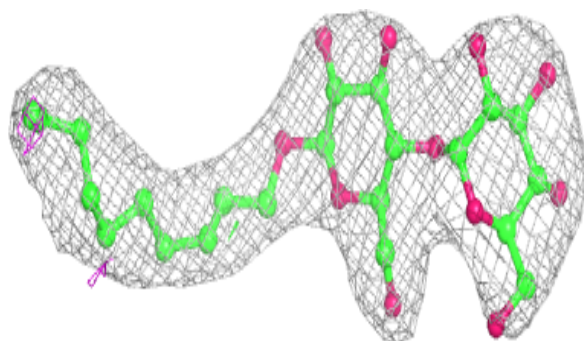
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



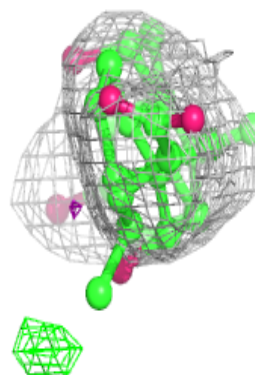
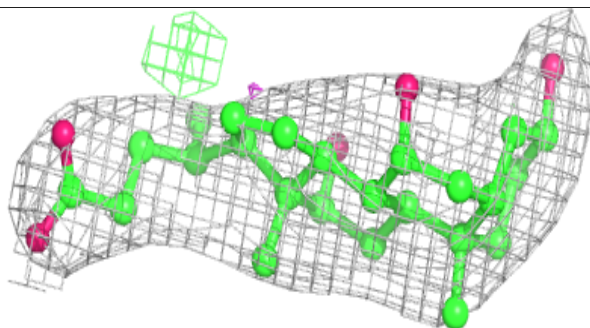
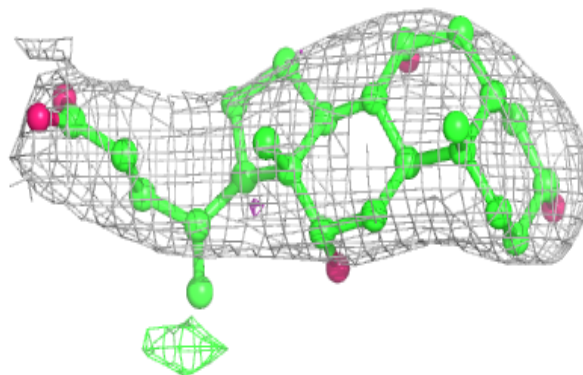


Electron density around DMU M 101:

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

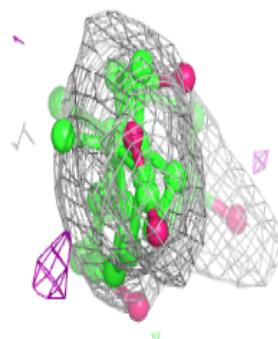
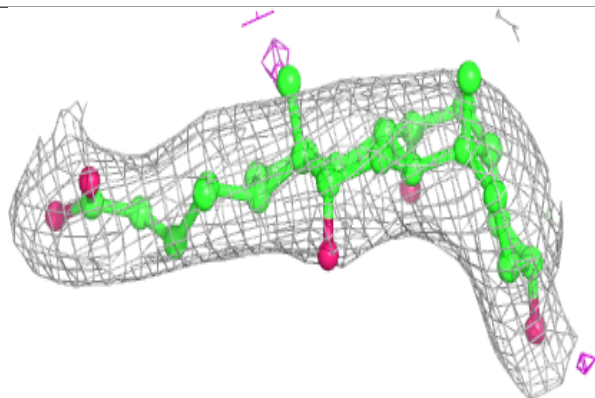
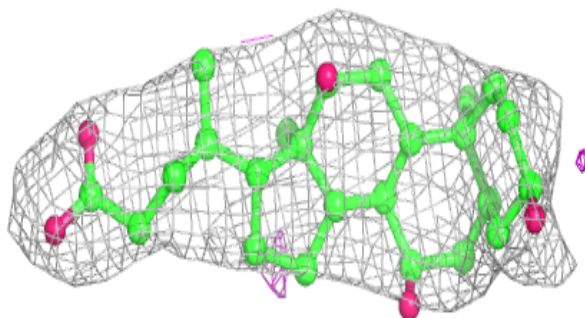
**Electron density around CHD C 305:**

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

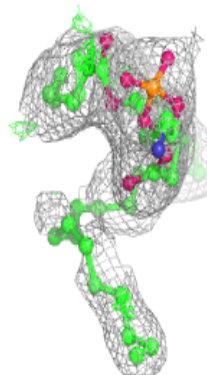
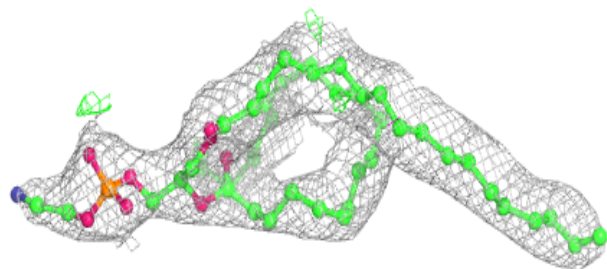
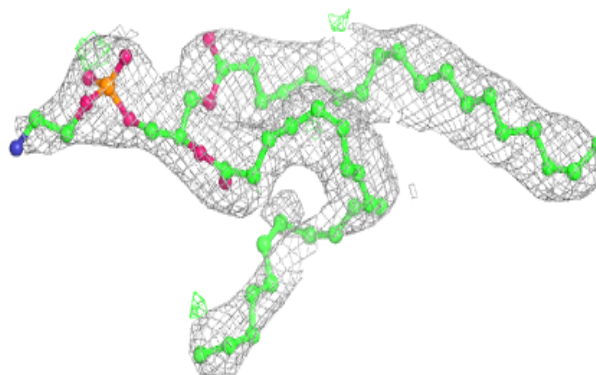


Electron density around CHD P 306:

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

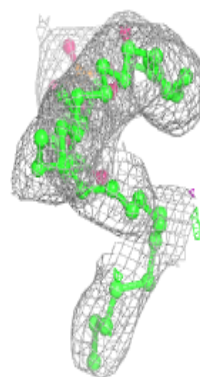
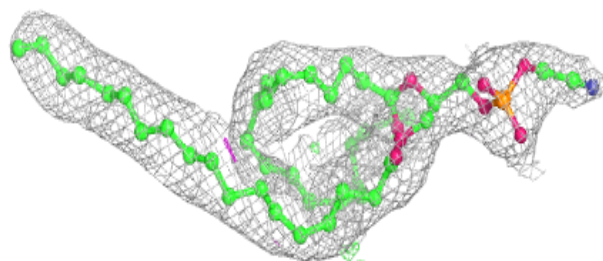
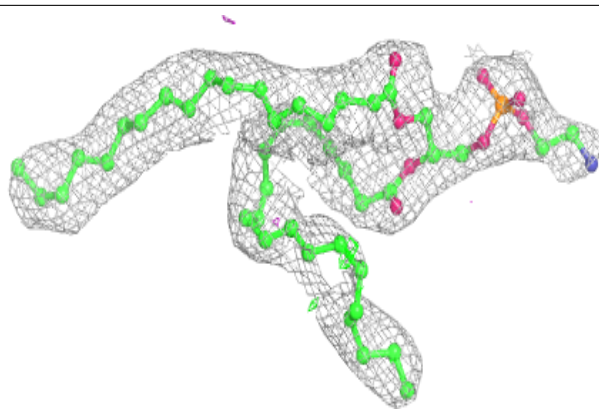
**Electron density around PEK P 308:**

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

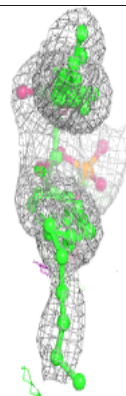
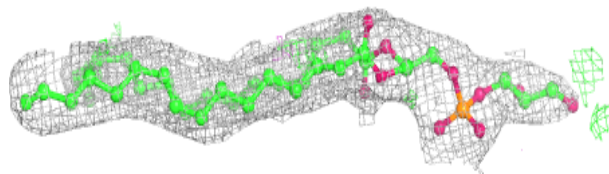
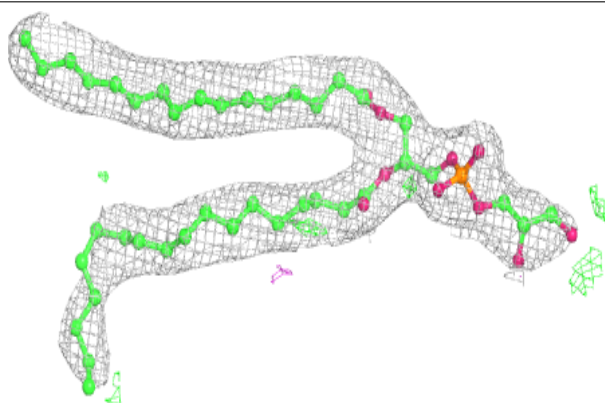


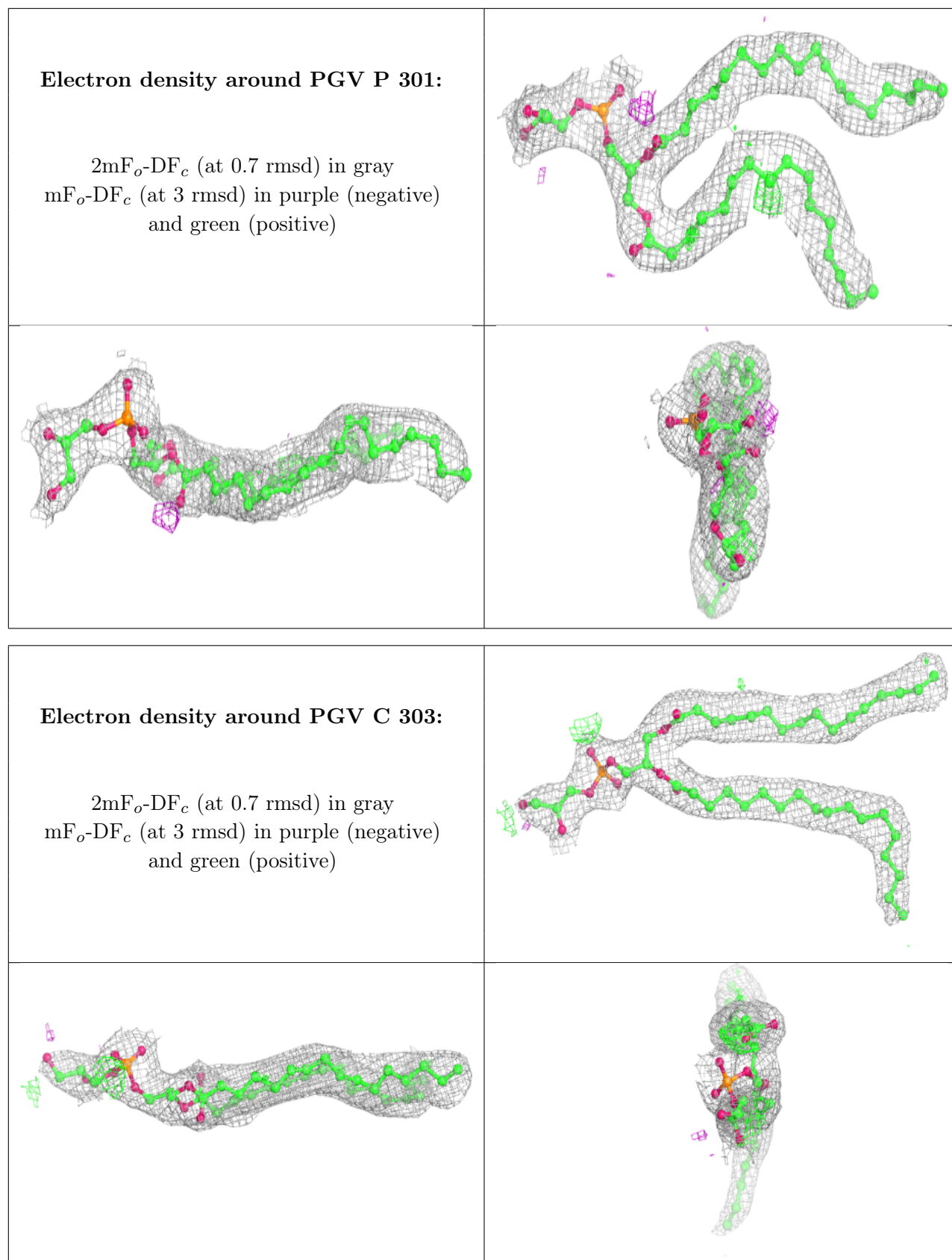
Electron density around PEK C 302:

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

**Electron density around PGV P 304:**

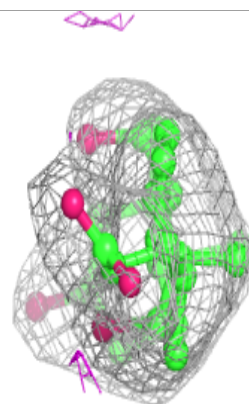
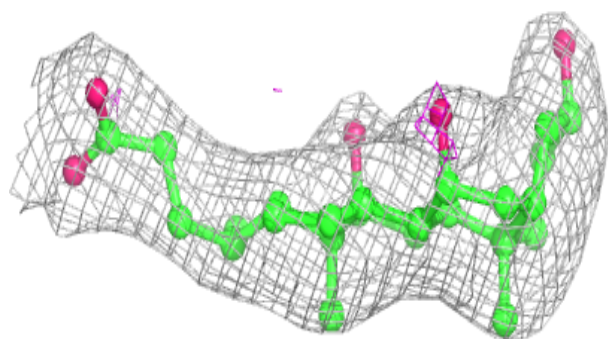
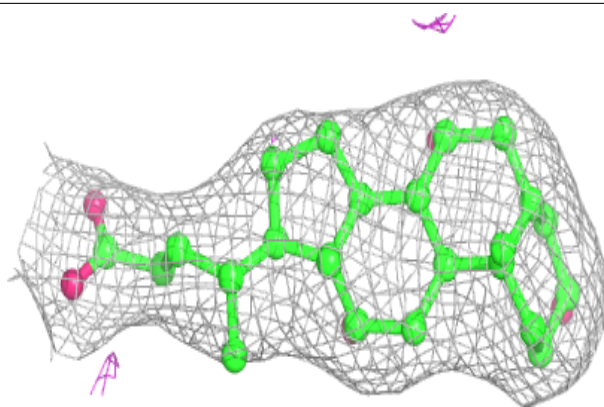
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



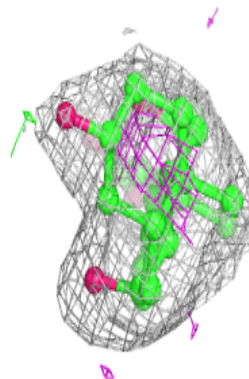
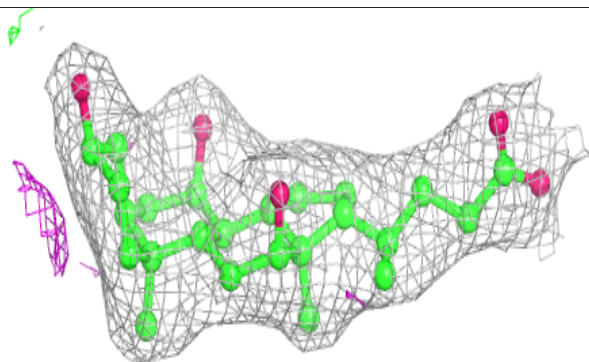
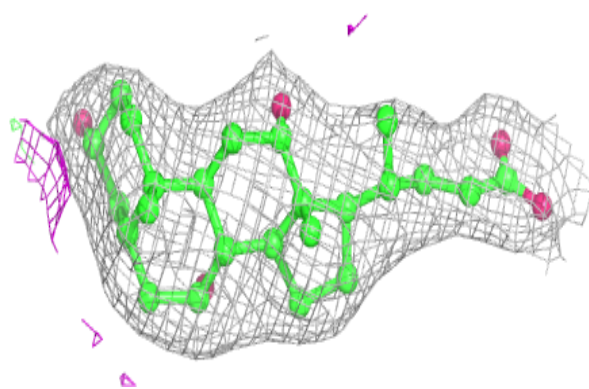


Electron density around CHD G 104:

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

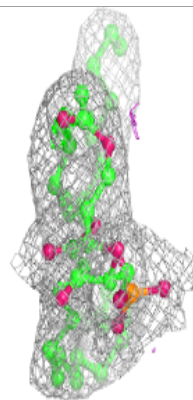
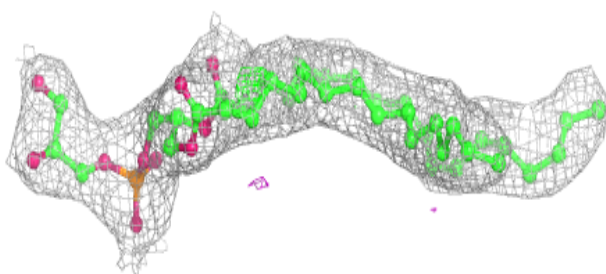
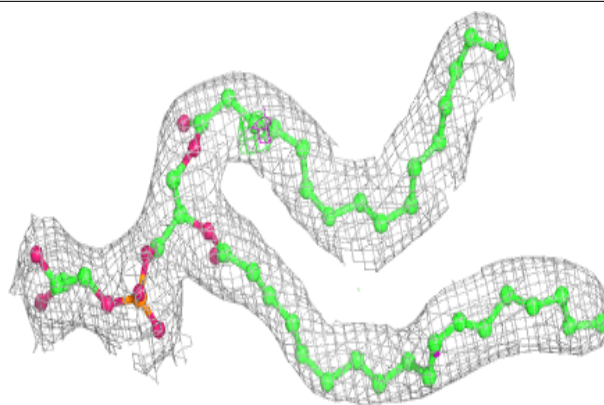
**Electron density around CHD P 307:**

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

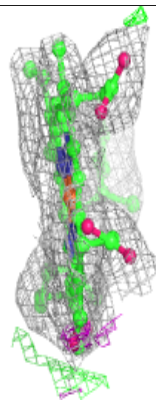
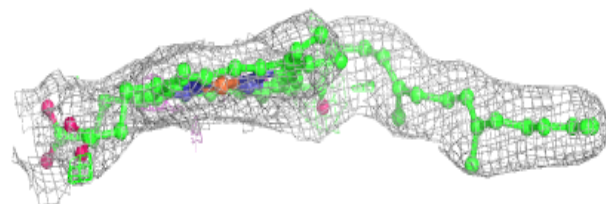
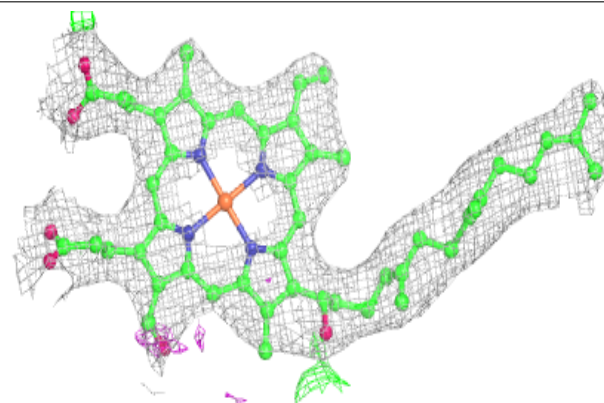


Electron density around PGV A 606:

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

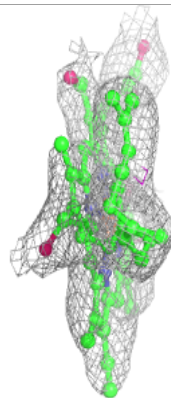
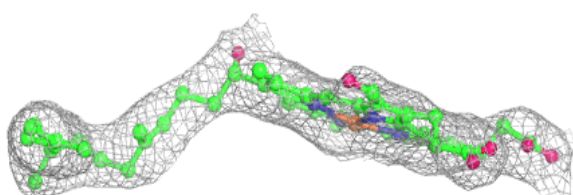
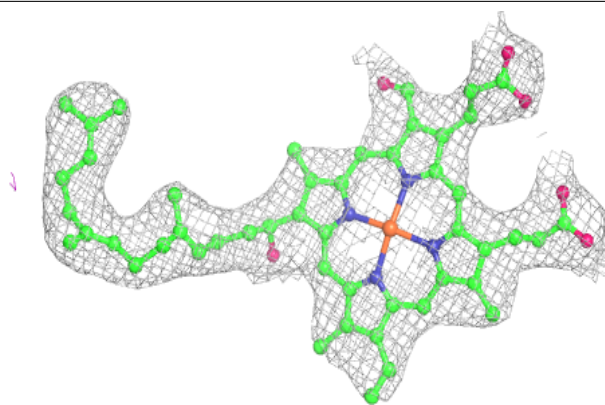
**Electron density around HEA A 601:**

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

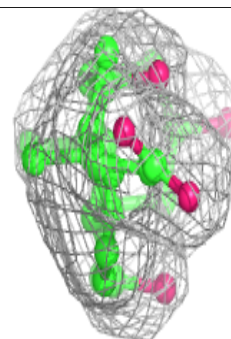
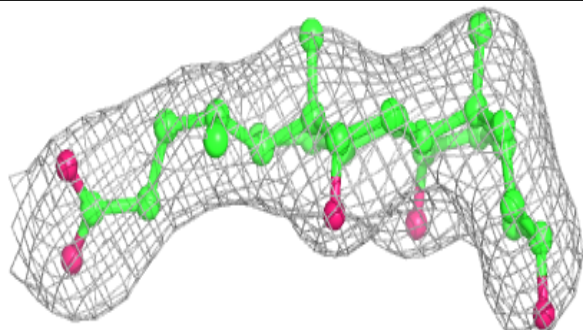
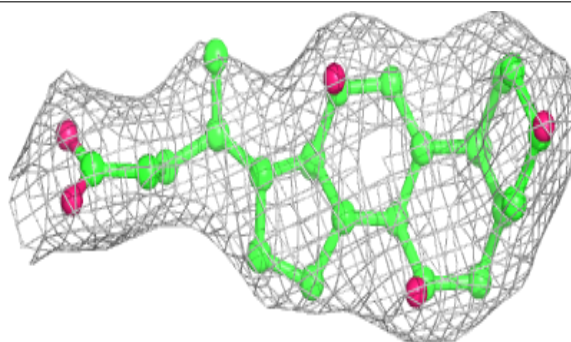


Electron density around HEA N 602:

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

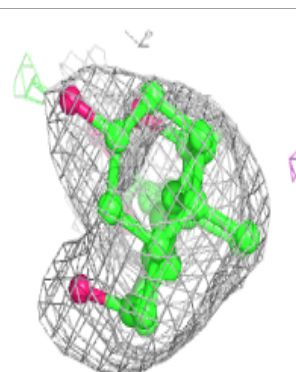
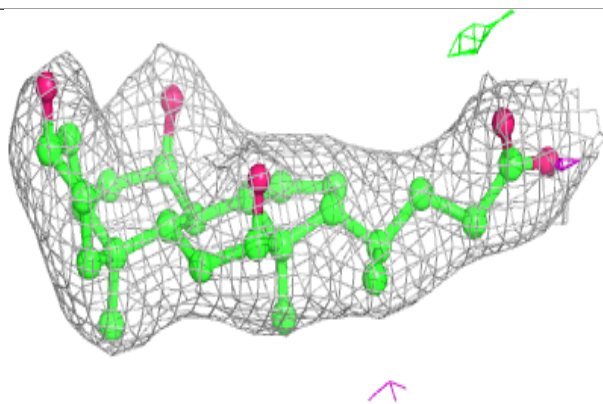
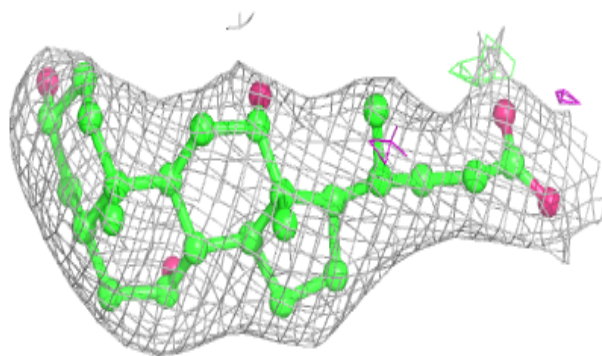
**Electron density around CHD B 303:**

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

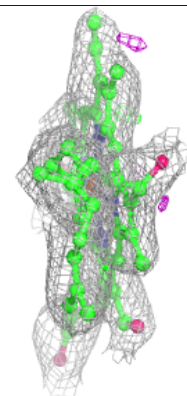
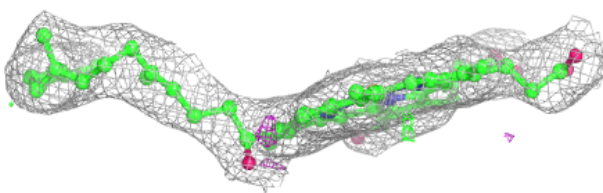
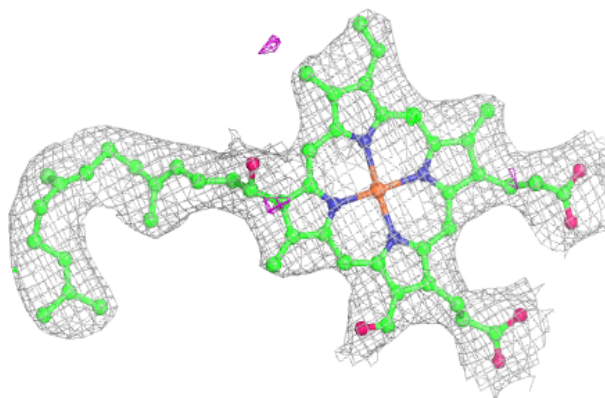


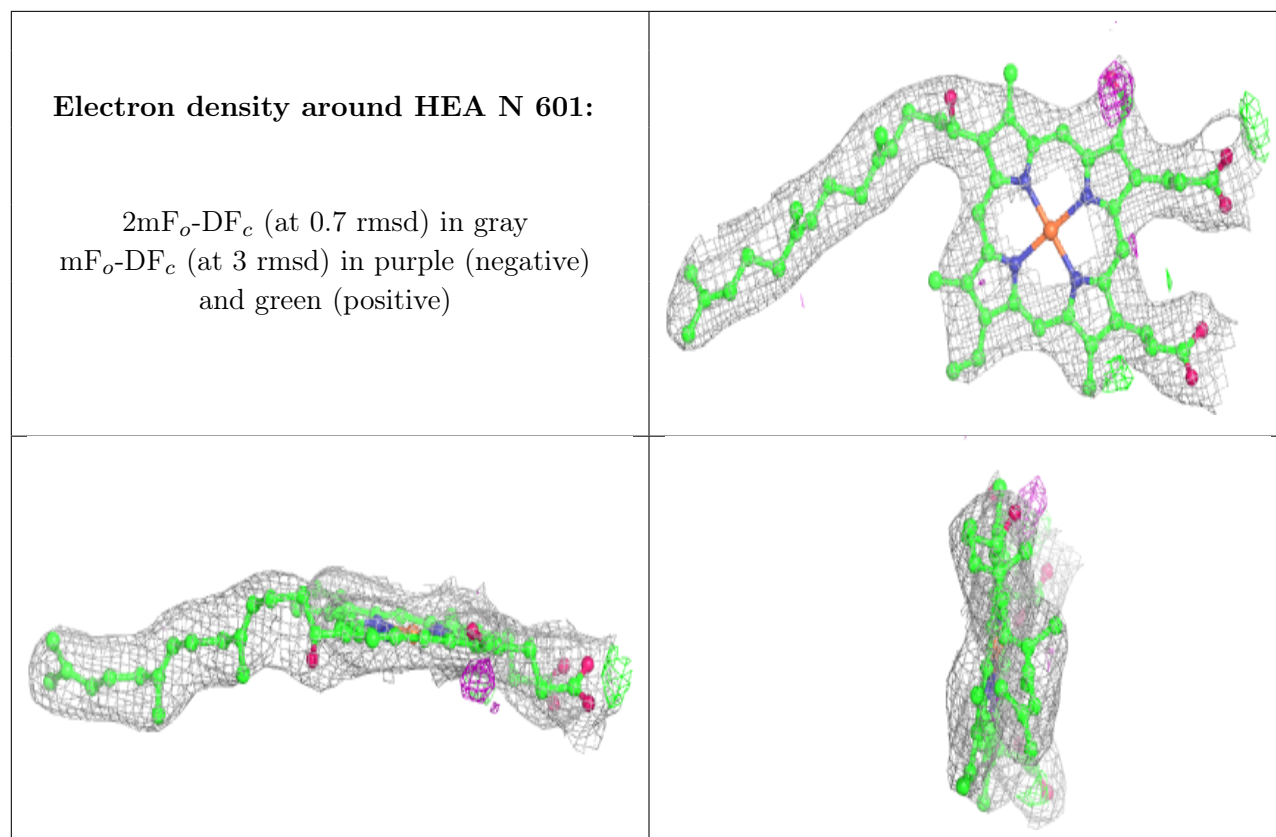
Electron density around CHD C 306:

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

**Electron density around HEA A 602:**

$2mF_o-DF_c$ (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.