



## wwPDB EM Validation Summary Report ⓘ

Nov 28, 2022 – 08:37 PM EST

PDB ID : 7SOM  
EMDB ID : EMD-25361  
Title : Ciliary C2 central pair apparatus isolated from *Chlamydomonas reinhardtii*  
Authors : Gui, M.; Wang, X.; Dutcher, S.K.; Brown, A.; Zhang, R.  
Deposited on : 2021-11-01  
Resolution : 3.70 Å (reported)

This is a wwPDB EM Validation Summary 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/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

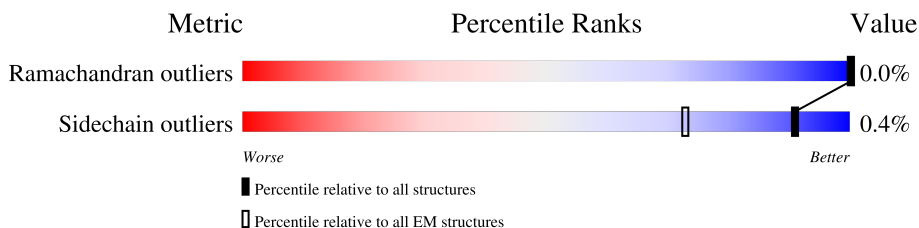
EMDB validation analysis : 0.0.1.dev43  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.2

# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:  
*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.70 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.



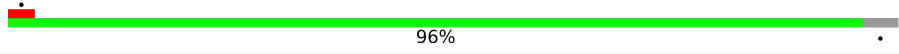
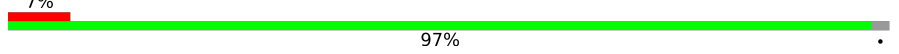
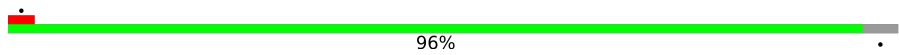
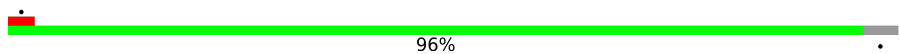
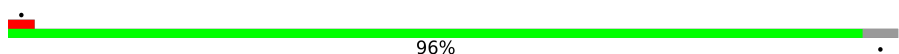
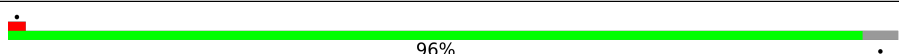
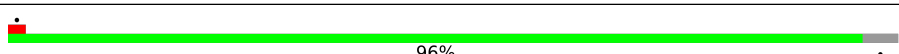
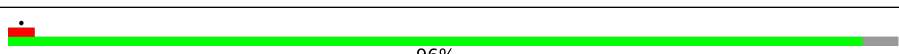
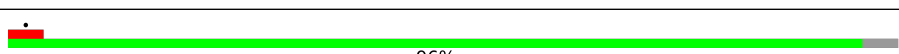
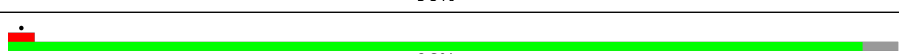
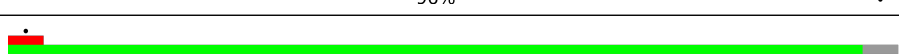
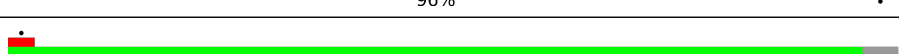
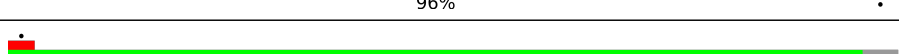
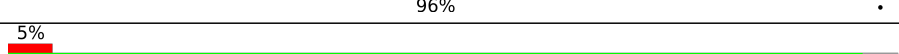
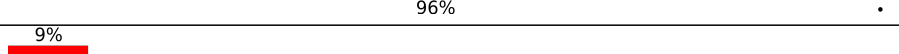
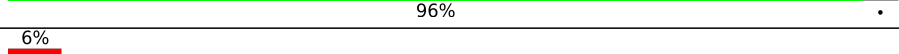
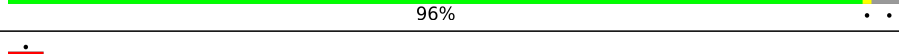
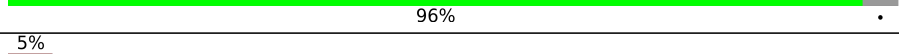
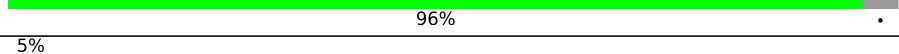
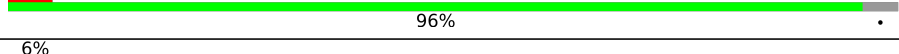
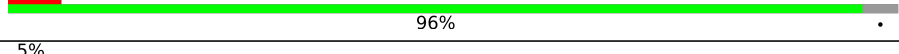
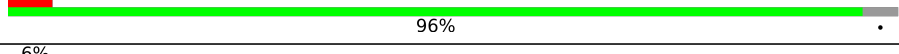
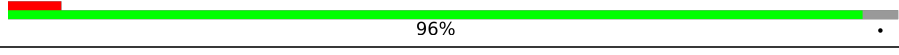
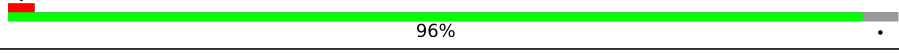
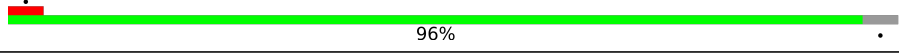
Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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 EM map (all-atom inclusion  $< 40\%$ ). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	AA	443	5% 97%
1	AC	443	97%
1	AE	443	97%
1	AG	443	97%
1	AI	443	96%
1	AK	443	97%
1	BA	443	7% 98%
1	BC	443	96%
1	BE	443	6% 97%

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Mol	Chain	Length	Quality of chain
1	BG	443	 96%
1	BI	443	 97%
1	BK	443	 96%
1	CA	443	 96%
1	CC	443	 96%
1	CE	443	 96%
1	CG	443	 96%
1	CI	443	 96%
1	CK	443	 96%
1	DC	443	 96%
1	DE	443	 96%
1	DG	443	 96%
1	DI	443	 96%
1	DK	443	 96%
1	EA	443	 96%
1	EC	443	 96%
1	EE	443	 96%
1	EG	443	 96%
1	EI	443	 96%
1	EK	443	 96%
1	FA	443	 96%
1	FC	443	 96%
1	FE	443	 96%
1	FG	443	 96%
1	FI	443	 96%

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Mol	Chain	Length	Quality of chain
1	FK	443	5% 96%
1	GC	443	6% 96%
1	GE	443	5% 96%
1	GG	443	5% 96%
1	GI	443	5% 96%
1	GK	443	6% 96%
1	GM	443	7% 96%
1	HC	443	18% 96%
1	HE	443	18% 95%
1	HG	443	13% 96%
1	HI	443	14% 95%
1	HK	443	16% 96%
1	HM	443	16% 95%
1	IC	443	11% 96%
1	IE	443	11% 96%
1	IG	443	10% 96%
1	II	443	10% 96%
1	IK	443	10% 96%
1	IM	443	10% 96%
1	JC	443	6% 95%
1	JE	443	. 96%
1	JG	443	. 96%
1	JI	443	. 96%
1	JK	443	. 96%
1	JM	443	5% 95%

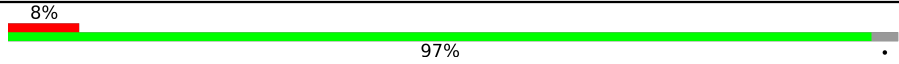
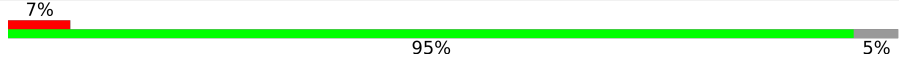
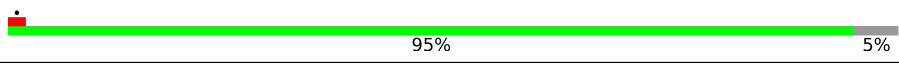
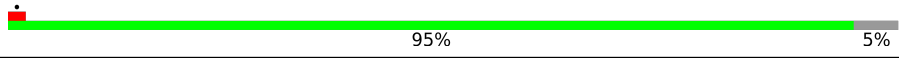
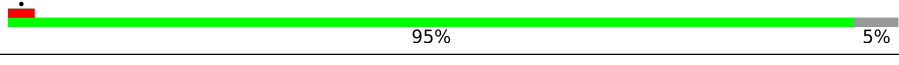
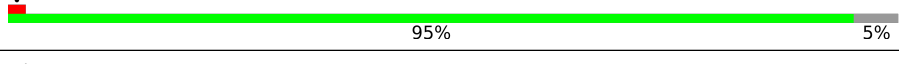
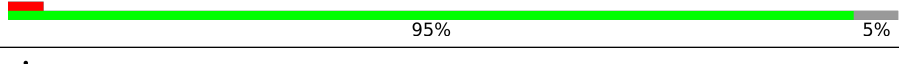
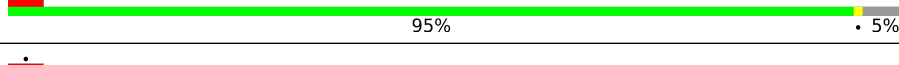
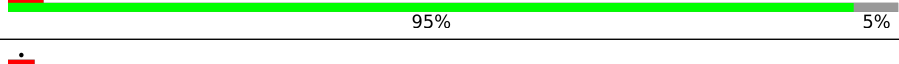
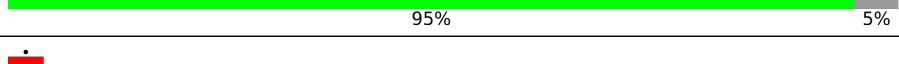
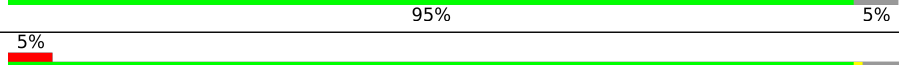
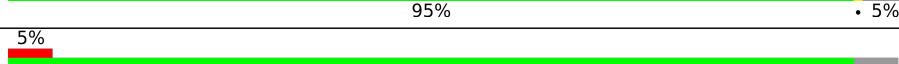
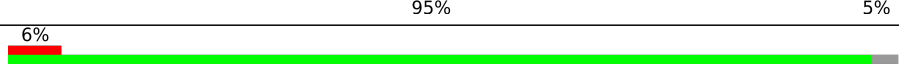
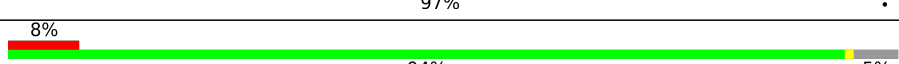
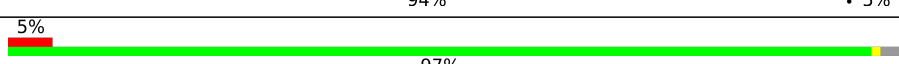
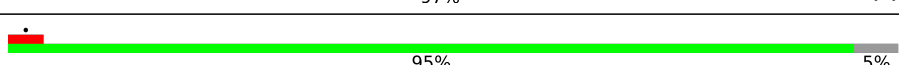
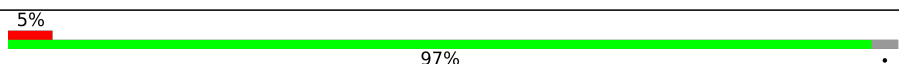
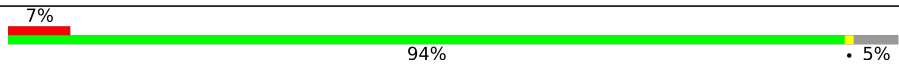
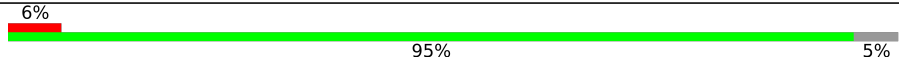
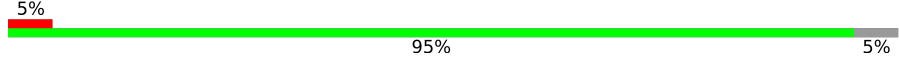
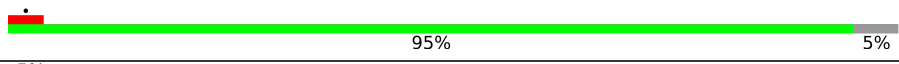
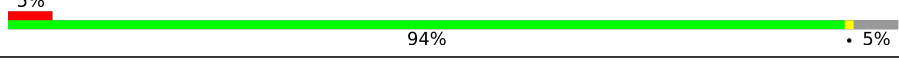
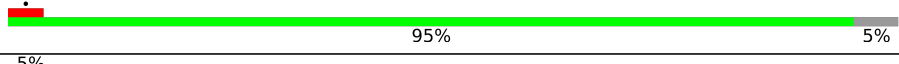
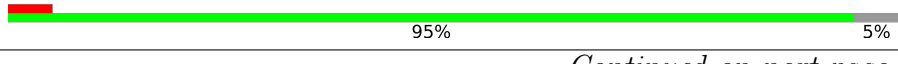

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Mol	Chain	Length	Quality of chain
1	KC	443	96%
1	KE	443	96%
1	KG	443	96%
1	KI	443	96%
1	KK	443	96%
1	LC	443	96%
1	LE	443	96%
1	LG	443	96%
1	LI	443	96%
1	LK	443	96%
1	MC	443	97%
1	ME	443	96%
1	MG	443	97%
1	MI	443	96%
1	MK	443	97%
2	AB	451	96%
2	AD	451	96%
2	AF	451	95%
2	AH	451	95%
2	AJ	451	96%
2	AL	451	95%
2	BB	451	97%
2	BD	451	95%
2	BF	451	97%
2	BH	451	95%

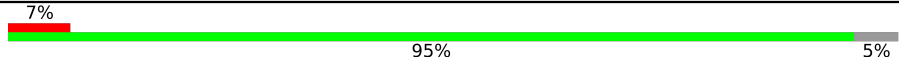
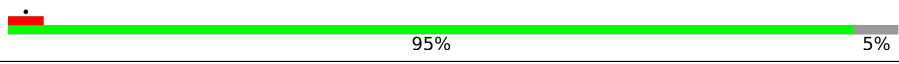
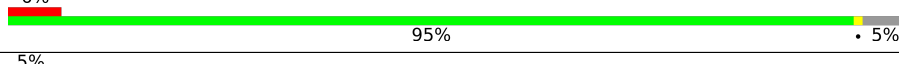
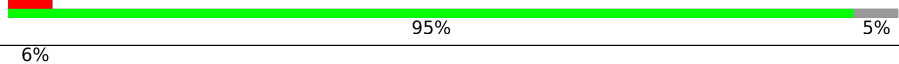
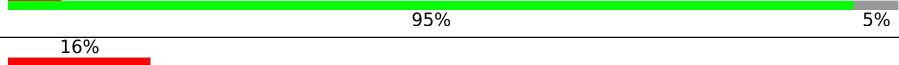
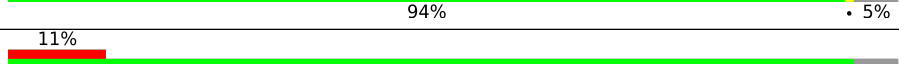
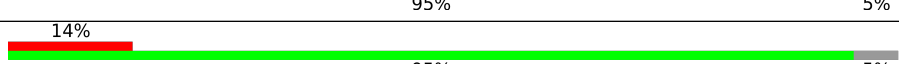
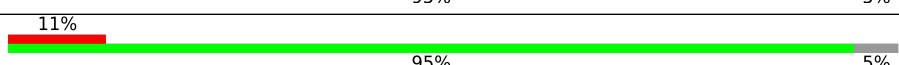
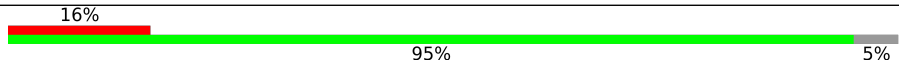
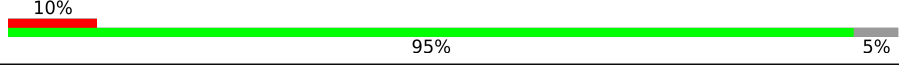
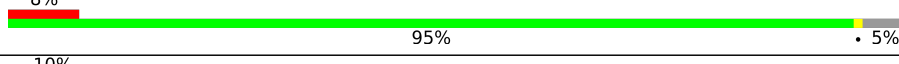
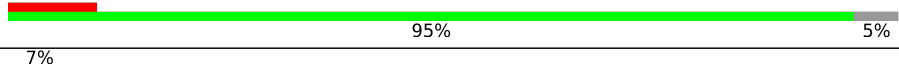
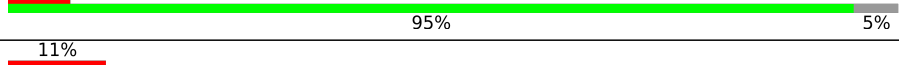
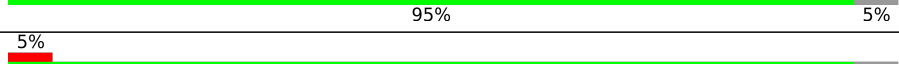
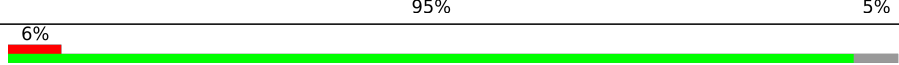
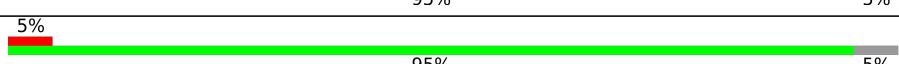
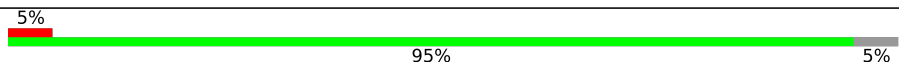
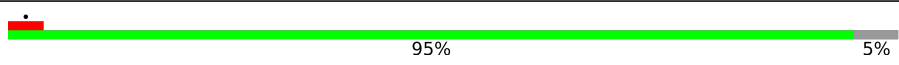
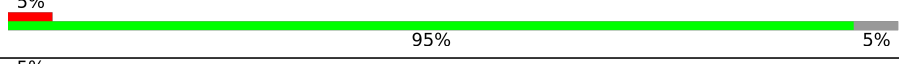
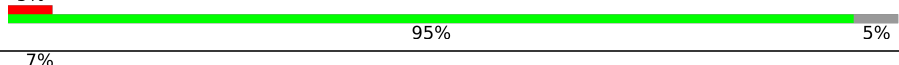
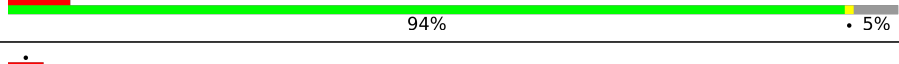
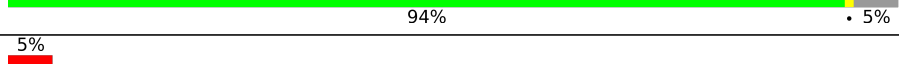
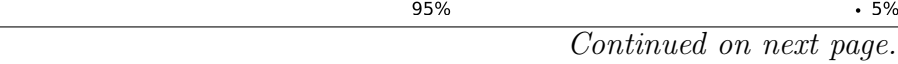


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Mol	Chain	Length	Quality of chain
2	BJ	451	
2	BL	451	
2	CB	451	
2	CD	451	
2	CF	451	
2	CH	451	
2	CJ	451	
2	DB	451	
2	DD	451	
2	DF	451	
2	DH	451	
2	DJ	451	
2	DL	451	
2	EB	451	
2	ED	451	
2	EF	451	
2	EH	451	
2	EJ	451	
2	EL	451	
2	FB	451	
2	FD	451	
2	FF	451	
2	FH	451	
2	FJ	451	
2	FL	451	

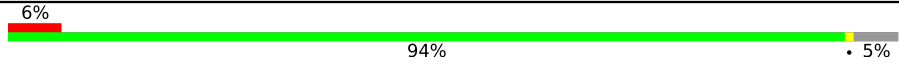
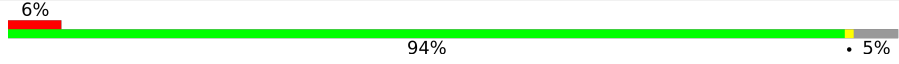
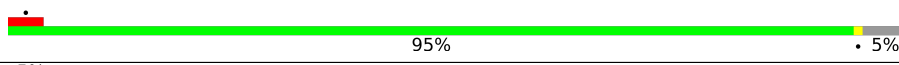
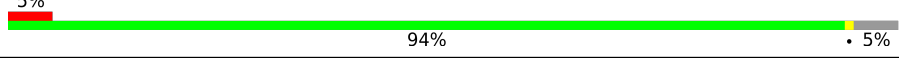
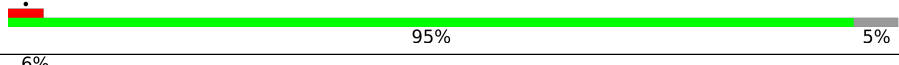
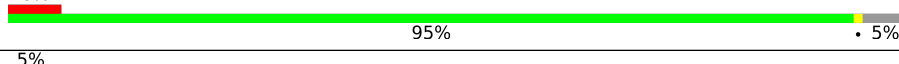
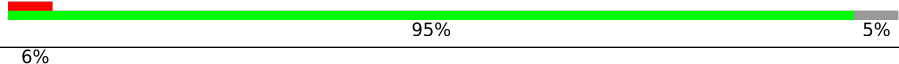
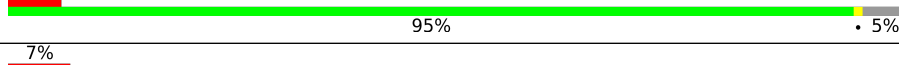
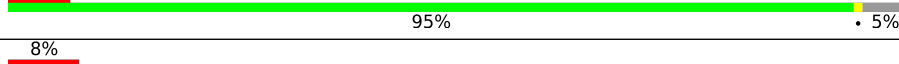
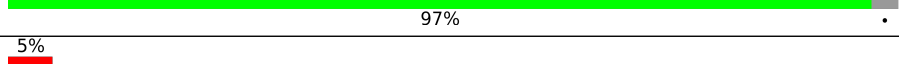
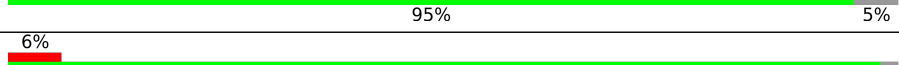
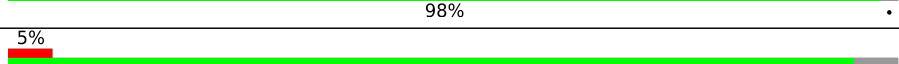
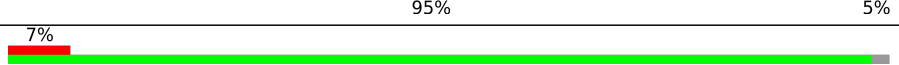
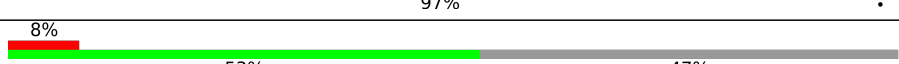
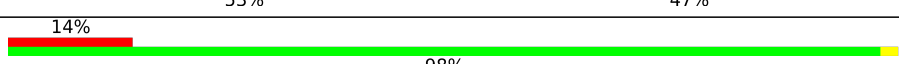
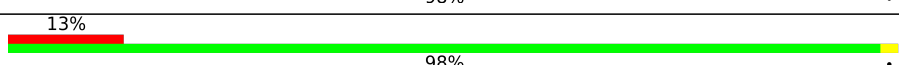

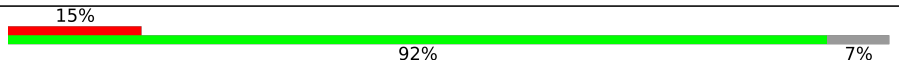
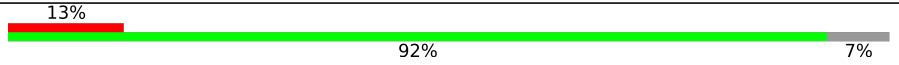


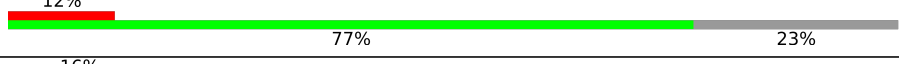
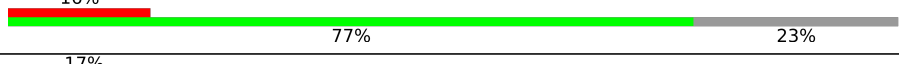


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Mol	Chain	Length	Quality of chain
2	GD	451	
2	GF	451	
2	GH	451	
2	GJ	451	
2	GL	451	
2	HD	451	
2	HF	451	
2	HH	451	
2	HJ	451	
2	HL	451	
2	ID	451	
2	IF	451	
2	IH	451	
2	IJ	451	
2	IL	451	
2	JB	451	
2	JD	451	
2	JF	451	
2	JH	451	
2	JJ	451	
2	JL	451	
2	KB	451	
2	KD	451	
2	KF	451	
2	KH	451	

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Mol	Chain	Length	Quality of chain
2	KJ	451	
2	KL	451	
2	LB	451	
2	LD	451	
2	LF	451	
2	LH	451	
2	LJ	451	
2	LL	451	
2	MB	451	
2	MD	451	
2	MF	451	
2	MH	451	
2	MJ	451	
2	ML	451	
3	a	618	
3	b	618	
3	c	618	
3	d	618	
4	e	201	
4	f	201	
4	g	201	
5	h	758	
5	i	758	
5	j	758	
6	k	528	

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Mol	Chain	Length	Quality of chain		
6	l	528	16%	73%	27%
6	s	528	12%	54%	46%
7	m	421	15%	82%	16%
7	n	421	12%	83%	16%
7	o	421	17%	83%	16%
8	p	89	19%	99%	.
8	q	89	13%	99%	.
8	r	89	16%	99%	.
9	A	190	23%	98%	.
9	B	190	17%	97%	..
9	C	190	28%	98%	.
10	P	606	50%	71%	29%
10	Q	606	36%	71%	29%
10	R	606	50%	71%	29%
10	S	606	32%	71%	29%
10	Z	606	15%	85%	.
10	aa	606	34%	48%	52%
10	cc	606	15%	85%	.
11	T	93	28%	68%	32%
11	U	93	23%	62%	38%
11	V	93	37%	72%	28%
11	W	93	25%	68%	32%
12	D	2257	20%	67%	33%
12	E	2257	20%	67%	33%
12	bb	2257	8%	92%	.

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Mol	Chain	Length	Quality of chain
13	F	1074	27% 91% 9%
13	G	1074	31% 92% 8%
13	H	1074	27% 91% 9%
13	I	1074	31% 92% 8%
14	J	976	15% 68% 32%
14	K	976	14% 68% 32%
15	L	222	32% 48% 52%
15	M	222	42% 48% 52%
15	N	222	27% 48% 52%
15	O	222	38% 48% 52%
15	X	222	31% 48% 52%
15	Y	222	43% 48% 52%
16	A1	48	17% 100%
17	A2	77	12% 100%
17	A4	77	13% 100%
18	A3	47	13% 100%

## 2 Entry composition [i](#)

There are 21 unique types of molecules in this entry. The entry contains 618760 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 Tubulin beta.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	AA	431	3379	2121	579	649	30	0	0
1	AC	430	3370	2116	578	646	30	0	0
1	AE	431	3379	2121	579	649	30	0	0
1	AG	431	3379	2121	579	649	30	0	0
1	AI	431	3379	2121	579	649	30	0	0
1	AK	431	3379	2121	579	649	30	0	0
1	BA	432	3388	2126	580	652	30	0	0
1	BC	427	3354	2107	575	642	30	0	0
1	BE	432	3388	2126	580	652	30	0	0
1	BG	427	3354	2107	575	642	30	0	0
1	BI	432	3388	2126	580	652	30	0	0
1	BK	427	3354	2107	575	642	30	0	0
1	CC	427	3354	2107	575	642	30	0	0
1	CE	427	3354	2107	575	642	30	0	0
1	CG	427	3354	2107	575	642	30	0	0
1	CI	427	3354	2107	575	642	30	0	0
1	CK	427	3354	2107	575	642	30	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
1	DC	427	Total 3354	C 2107	N 575	O 642	S 30	0	0
1	DE	427	Total 3354	C 2107	N 575	O 642	S 30	0	0
1	DG	427	Total 3354	C 2107	N 575	O 642	S 30	0	0
1	DI	427	Total 3354	C 2107	N 575	O 642	S 30	0	0
1	DK	427	Total 3354	C 2107	N 575	O 642	S 30	0	0
1	EA	427	Total 3354	C 2107	N 575	O 642	S 30	0	0
1	EC	427	Total 3354	C 2107	N 575	O 642	S 30	0	0
1	EE	427	Total 3354	C 2107	N 575	O 642	S 30	0	0
1	EG	427	Total 3354	C 2107	N 575	O 642	S 30	0	0
1	EI	427	Total 3354	C 2107	N 575	O 642	S 30	0	0
1	EK	427	Total 3354	C 2107	N 575	O 642	S 30	0	0
1	FA	427	Total 3354	C 2107	N 575	O 642	S 30	0	0
1	FC	427	Total 3354	C 2107	N 575	O 642	S 30	0	0
1	FE	427	Total 3354	C 2107	N 575	O 642	S 30	0	0
1	FG	427	Total 3354	C 2107	N 575	O 642	S 30	0	0
1	FI	427	Total 3354	C 2107	N 575	O 642	S 30	0	0
1	FK	427	Total 3354	C 2107	N 575	O 642	S 30	0	0
1	GC	427	Total 3354	C 2107	N 575	O 642	S 30	0	0
1	GE	427	Total 3354	C 2107	N 575	O 642	S 30	0	0
1	GG	427	Total 3354	C 2107	N 575	O 642	S 30	0	0
1	GI	427	Total 3354	C 2107	N 575	O 642	S 30	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	GK	427	3354	2107	575	642	30	0	0
1	GM	427	3354	2107	575	642	30	0	0
1	HC	427	3354	2107	575	642	30	0	0
1	HE	427	3354	2107	575	642	30	0	0
1	HG	427	3354	2107	575	642	30	0	0
1	HI	427	3354	2107	575	642	30	0	0
1	HK	427	3354	2107	575	642	30	0	0
1	HM	427	3354	2107	575	642	30	0	0
1	IC	427	3354	2107	575	642	30	0	0
1	IE	427	3354	2107	575	642	30	0	0
1	IG	427	3354	2107	575	642	30	0	0
1	II	427	3354	2107	575	642	30	0	0
1	IK	427	3354	2107	575	642	30	0	0
1	IM	427	3354	2107	575	642	30	0	0
1	JC	427	3354	2107	575	642	30	0	0
1	JE	427	3354	2107	575	642	30	0	0
1	JG	427	3354	2107	575	642	30	0	0
1	JI	426	3346	2103	574	639	30	0	0
1	JK	427	3354	2107	575	642	30	0	0
1	JM	426	3346	2103	574	639	30	0	0
1	KC	427	3354	2107	575	642	30	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
1	KE	427	Total	C	N	O	S	0	0
			3354	2107	575	642	30		
1	KG	427	Total	C	N	O	S	0	0
			3354	2107	575	642	30		
1	KI	427	Total	C	N	O	S	0	0
			3354	2107	575	642	30		
1	KK	427	Total	C	N	O	S	0	0
			3354	2107	575	642	30		
1	LC	427	Total	C	N	O	S	0	0
			3354	2107	575	642	30		
1	LE	427	Total	C	N	O	S	0	0
			3354	2107	575	642	30		
1	LG	427	Total	C	N	O	S	0	0
			3354	2107	575	642	30		
1	LI	427	Total	C	N	O	S	0	0
			3354	2107	575	642	30		
1	LK	427	Total	C	N	O	S	0	0
			3354	2107	575	642	30		
1	MC	431	Total	C	N	O	S	0	0
			3379	2121	579	649	30		
1	ME	427	Total	C	N	O	S	0	0
			3354	2107	575	642	30		
1	MG	431	Total	C	N	O	S	0	0
			3379	2121	579	649	30		
1	MI	427	Total	C	N	O	S	0	0
			3354	2107	575	642	30		
1	MK	431	Total	C	N	O	S	0	0
			3379	2121	579	649	30		
1	CA	427	Total	C	N	O	S	0	0
			3354	2107	575	642	30		

- Molecule 2 is a protein called Tubulin alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	AB	432	Total	C	N	O	S	0	0
			3355	2124	570	639	22		
2	AD	432	Total	C	N	O	S	0	0
			3355	2123	570	640	22		
2	AF	432	Total	C	N	O	S	0	0
			3355	2124	570	639	22		
2	AH	430	Total	C	N	O	S	0	0
			3341	2116	568	635	22		

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Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	AJ	432	3355	2124	570	639	22	0	0
2	AL	430	3341	2116	568	635	22	0	0
2	BB	438	3393	2146	577	648	22	0	0
2	BD	430	3341	2116	568	635	22	0	0
2	BF	438	3393	2146	577	648	22	0	0
2	BH	430	3341	2116	568	635	22	0	0
2	BJ	438	3393	2146	577	648	22	0	0
2	BL	430	3341	2116	568	635	22	0	0
2	CB	429	3335	2113	567	633	22	0	0
2	CD	429	3335	2113	567	633	22	0	0
2	CF	429	3335	2113	567	633	22	0	0
2	CH	429	3335	2113	567	633	22	0	0
2	CJ	430	3341	2116	568	635	22	0	0
2	DB	430	3341	2116	568	635	22	0	0
2	DD	429	3335	2113	567	633	22	0	0
2	DF	430	3341	2116	568	635	22	0	0
2	DH	430	3341	2116	568	635	22	0	0
2	DJ	430	3341	2116	568	635	22	0	0
2	DL	430	3341	2116	568	635	22	0	0
2	EB	438	3393	2146	577	648	22	0	0
2	ED	429	3335	2113	567	633	22	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	EF	439	Total 3399	C 2149	N 578	O 650	S 22	0	0
2	EH	429	Total 3335	C 2113	N 567	O 633	S 22	0	0
2	EJ	438	Total 3393	C 2146	N 577	O 648	S 22	0	0
2	EL	429	Total 3335	C 2113	N 567	O 633	S 22	0	0
2	FB	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	FD	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	FF	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	FH	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	FJ	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	FL	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	GD	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	GF	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	GH	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	GJ	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	GL	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	HD	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	HF	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	HH	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	HJ	428	Total 3326	C 2108	N 566	O 630	S 22	0	0
2	HL	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	ID	429	Total 3335	C 2113	N 567	O 633	S 22	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	IF	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	IH	429	Total 3335	C 2113	N 567	O 633	S 22	0	0
2	IJ	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	IL	429	Total 3335	C 2113	N 567	O 633	S 22	0	0
2	JB	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	JD	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	JF	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	JH	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	JJ	429	Total 3335	C 2113	N 567	O 633	S 22	0	0
2	JL	429	Total 3335	C 2113	N 567	O 633	S 22	0	0
2	KB	429	Total 3335	C 2113	N 567	O 633	S 22	0	0
2	KD	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	KF	429	Total 3335	C 2113	N 567	O 633	S 22	0	0
2	KH	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	KJ	429	Total 3335	C 2113	N 567	O 633	S 22	0	0
2	KL	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	LB	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	LD	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	LF	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	LH	430	Total 3341	C 2116	N 568	O 635	S 22	0	0
2	LJ	430	Total 3341	C 2116	N 568	O 635	S 22	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
2	LL	430	Total	C	N	O	S	0	0
			3341	2116	568	635	22		
2	MB	430	Total	C	N	O	S	0	0
			3341	2116	568	635	22		
2	MD	439	Total	C	N	O	S	0	0
			3399	2149	578	650	22		
2	MF	430	Total	C	N	O	S	0	0
			3341	2116	568	635	22		
2	MH	440	Total	C	N	O	S	0	0
			3404	2152	579	651	22		
2	MJ	430	Total	C	N	O	S	0	0
			3341	2116	568	635	22		
2	ML	440	Total	C	N	O	S	0	0
			3404	2152	579	651	22		

- Molecule 3 is a protein called Cilia- and flagella-associated protein 20.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	a	325	Total	C	N	O	S	0	0
			2380	1491	422	453	14		
3	b	617	Total	C	N	O	S	0	0
			4537	2823	824	857	33		
3	c	617	Total	C	N	O	S	0	0
			4537	2823	824	857	33		
3	d	295	Total	C	N	O	S	0	0
			2180	1345	407	409	19		

- Molecule 4 is a protein called Unknown protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	e	186	Total	C	N	O	S	0	0
			1464	886	289	286	3		
4	f	186	Total	C	N	O	S	0	0
			1464	886	289	286	3		
4	g	145	Total	C	N	O	S	0	0
			1136	690	220	223	3		

- Molecule 5 is a protein called Unknown protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	h	585	Total	C	N	O	S	0	0
			4525	2788	856	866	15		

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Mol	Chain	Residues	Atoms					AltConf	Trace
5	i	585	Total	C	N	O	S	0	0
			4525	2788	856	866	15		
5	j	585	Total	C	N	O	S	0	0
			4525	2788	856	866	15		

- Molecule 6 is a protein called Unknown protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	k	388	Total	C	N	O	S	0	0
			3017	1857	582	572	6		
6	l	388	Total	C	N	O	S	0	0
			3017	1857	582	572	6		
6	s	285	Total	C	N	O	S	0	0
			2208	1369	420	415	4		

- Molecule 7 is a protein called FAP65.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	m	352	Total	C	N	O	S	0	0
			2737	1685	532	512	8		
7	n	352	Total	C	N	O	S	0	0
			2737	1685	532	512	8		
7	o	352	Total	C	N	O	S	0	0
			2737	1685	532	512	8		

- Molecule 8 is a protein called FAP70.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	p	88	Total	C	N	O	S	0	0
			698	432	135	129	2		
8	q	88	Total	C	N	O	S	0	0
			698	432	135	129	2		
8	r	88	Total	C	N	O	S	0	0
			698	432	135	129	2		

- Molecule 9 is a protein called FAP147.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	A	186	Total	C	N	O	S	0	0
			1530	982	266	275	7		
9	B	186	Total	C	N	O	S	0	0
			1530	982	266	275	7		

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Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	C	186	1530	982	266	275	7	0	0

- Molecule 10 is a protein called FAP178.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	P	433	2493	1507	495	486	5	0	0
10	Q	432	2488	1504	494	485	5	0	0
10	R	433	2493	1507	495	486	5	0	0
10	S	432	2488	1504	494	485	5	0	0
10	aa	292	1435	850	292	293		0	0
10	cc	89	758	475	147	131	5	0	0
10	Z	92	775	486	150	134	5	0	0

- Molecule 11 is a protein called Flagellar WD repeat-containing protein Pf20.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
11	T	63	312	186	63	63	0	0
11	U	58	287	171	58	58	0	0
11	V	67	332	198	67	67	0	0
11	W	63	312	186	63	63	0	0

- Molecule 12 is a protein called Flagellar associated protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	bb	175	1065	650	211	202	2	0	0
12	D	1516	7474	4442	1516	1516		0	0
12	E	1516	7474	4442	1516	1516		0	0

- Molecule 13 is a protein called FAP196.

Mol	Chain	Residues	Atoms				AltConf	Trace
13	F	982	Total	C	N	O	0	0
			4832	2868	982	982		
13	G	993	Total	C	N	O	0	0
			4884	2898	993	993		
13	H	982	Total	C	N	O	0	0
			4832	2868	982	982		
13	I	993	Total	C	N	O	0	0
			4884	2898	993	993		

- Molecule 14 is a protein called FAP213.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	J	666	Total	C	N	O	S	0	0
			3874	2350	768	752	4		
14	K	666	Total	C	N	O	S	0	0
			3874	2350	768	752	4		

- Molecule 15 is a protein called FAP225.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	O	107	Total	C	N	O	S	0	0
			841	534	154	149	4		
15	Y	107	Total	C	N	O	S	0	0
			841	534	154	149	4		
15	L	107	Total	C	N	O	S	0	0
			841	534	154	149	4		
15	M	107	Total	C	N	O	S	0	0
			841	534	154	149	4		
15	N	107	Total	C	N	O	S	0	0
			841	534	154	149	4		
15	X	107	Total	C	N	O	S	0	0
			841	534	154	149	4		

- Molecule 16 is a protein called FAP239.

Mol	Chain	Residues	Atoms				AltConf	Trace
16	A1	48	Total	C	N	O	0	0
			240	144	48	48		

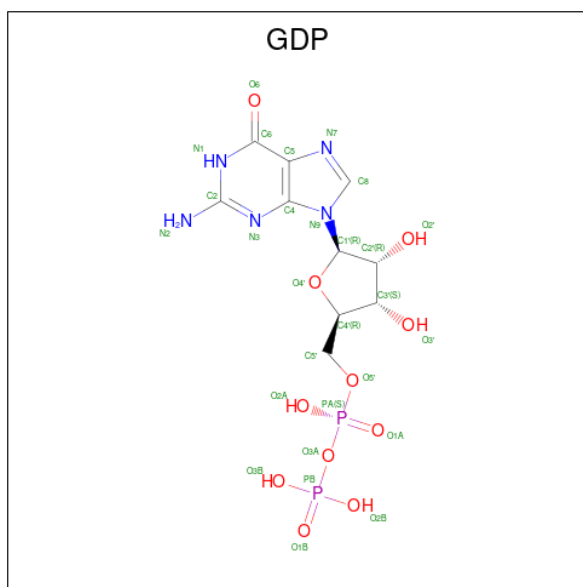
- Molecule 17 is a protein called FAP388.

Mol	Chain	Residues	Atoms				AltConf	Trace
17	A2	77	Total	C	N	O	0	0
			385	231	77	77		
17	A4	77	Total	C	N	O	0	0
			385	231	77	77		

- Molecule 18 is a protein called FAP424.

Mol	Chain	Residues	Atoms				AltConf	Trace
18	A3	47	Total	C	N	O	0	0
			235	141	47	47		

- Molecule 19 is GUANOSINE-5'-DIPHOSPHATE (three-letter code: GDP) (formula:  $C_{10}H_{15}N_5O_{11}P_2$ ).



Mol	Chain	Residues	Atoms					AltConf
19	AA	1	Total	C	N	O	P	0
			28	10	5	11	2	
19	AC	1	Total	C	N	O	P	0
			28	10	5	11	2	
19	AE	1	Total	C	N	O	P	0
			28	10	5	11	2	
19	AG	1	Total	C	N	O	P	0
			28	10	5	11	2	
19	AI	1	Total	C	N	O	P	0
			28	10	5	11	2	
19	AK	1	Total	C	N	O	P	0
			28	10	5	11	2	

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Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
19	BA	1	28	10	5	11	2	0
19	BC	1	28	10	5	11	2	0
19	BE	1	28	10	5	11	2	0
19	BG	1	28	10	5	11	2	0
19	BI	1	28	10	5	11	2	0
19	BK	1	28	10	5	11	2	0
19	CC	1	28	10	5	11	2	0
19	CE	1	28	10	5	11	2	0
19	CG	1	28	10	5	11	2	0
19	CI	1	28	10	5	11	2	0
19	CK	1	28	10	5	11	2	0
19	DC	1	28	10	5	11	2	0
19	DE	1	28	10	5	11	2	0
19	DG	1	28	10	5	11	2	0
19	DI	1	28	10	5	11	2	0
19	DK	1	28	10	5	11	2	0
19	EA	1	28	10	5	11	2	0
19	EC	1	28	10	5	11	2	0
19	EE	1	28	10	5	11	2	0
19	EG	1	28	10	5	11	2	0
19	EI	1	28	10	5	11	2	0

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Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
19	EK	1	Total 28	C 10	N 5	O 11	P 2	0
19	FA	1	Total 28	C 10	N 5	O 11	P 2	0
19	FC	1	Total 28	C 10	N 5	O 11	P 2	0
19	FE	1	Total 28	C 10	N 5	O 11	P 2	0
19	FG	1	Total 28	C 10	N 5	O 11	P 2	0
19	FI	1	Total 28	C 10	N 5	O 11	P 2	0
19	FK	1	Total 28	C 10	N 5	O 11	P 2	0
19	GC	1	Total 28	C 10	N 5	O 11	P 2	0
19	GE	1	Total 28	C 10	N 5	O 11	P 2	0
19	GG	1	Total 28	C 10	N 5	O 11	P 2	0
19	GI	1	Total 28	C 10	N 5	O 11	P 2	0
19	GK	1	Total 28	C 10	N 5	O 11	P 2	0
19	GM	1	Total 28	C 10	N 5	O 11	P 2	0
19	HC	1	Total 28	C 10	N 5	O 11	P 2	0
19	HE	1	Total 28	C 10	N 5	O 11	P 2	0
19	HG	1	Total 28	C 10	N 5	O 11	P 2	0
19	HI	1	Total 28	C 10	N 5	O 11	P 2	0
19	HK	1	Total 28	C 10	N 5	O 11	P 2	0
19	HM	1	Total 28	C 10	N 5	O 11	P 2	0
19	IC	1	Total 28	C 10	N 5	O 11	P 2	0
19	IE	1	Total 28	C 10	N 5	O 11	P 2	0

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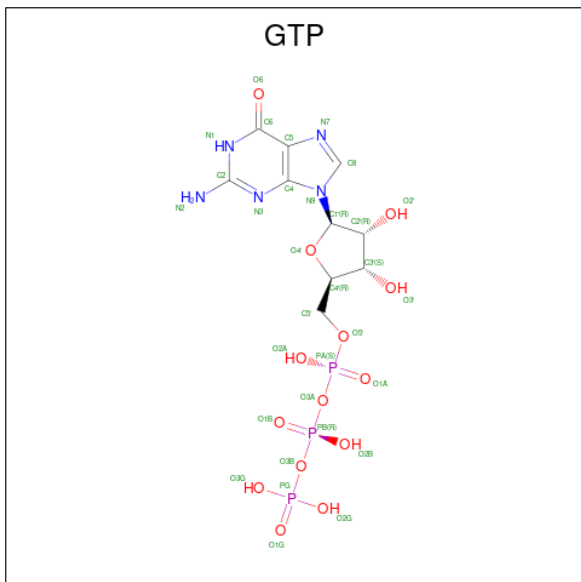
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
19	IG	1	Total 28	C 10	N 5	O 11	P 2	0
19	II	1	Total 28	C 10	N 5	O 11	P 2	0
19	IK	1	Total 28	C 10	N 5	O 11	P 2	0
19	IM	1	Total 28	C 10	N 5	O 11	P 2	0
19	JC	1	Total 28	C 10	N 5	O 11	P 2	0
19	JE	1	Total 28	C 10	N 5	O 11	P 2	0
19	JG	1	Total 28	C 10	N 5	O 11	P 2	0
19	JI	1	Total 28	C 10	N 5	O 11	P 2	0
19	JK	1	Total 28	C 10	N 5	O 11	P 2	0
19	JM	1	Total 28	C 10	N 5	O 11	P 2	0
19	KC	1	Total 28	C 10	N 5	O 11	P 2	0
19	KE	1	Total 28	C 10	N 5	O 11	P 2	0
19	KG	1	Total 28	C 10	N 5	O 11	P 2	0
19	KI	1	Total 28	C 10	N 5	O 11	P 2	0
19	KK	1	Total 28	C 10	N 5	O 11	P 2	0
19	LC	1	Total 28	C 10	N 5	O 11	P 2	0
19	LE	1	Total 28	C 10	N 5	O 11	P 2	0
19	LG	1	Total 28	C 10	N 5	O 11	P 2	0
19	LI	1	Total 28	C 10	N 5	O 11	P 2	0
19	LK	1	Total 28	C 10	N 5	O 11	P 2	0
19	MC	1	Total 28	C 10	N 5	O 11	P 2	0

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Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
19	ME	1	Total 28	C 10	N 5	O 11	P 2	0
19	MG	1	Total 28	C 10	N 5	O 11	P 2	0
19	MI	1	Total 28	C 10	N 5	O 11	P 2	0
19	MK	1	Total 28	C 10	N 5	O 11	P 2	0
19	CA	1	Total 28	C 10	N 5	O 11	P 2	0

- Molecule 20 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula:  $C_{10}H_{16}N_5O_{14}P_3$ ).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
20	AB	1	Total 32	C 10	N 5	O 14	P 3	0
20	AD	1	Total 32	C 10	N 5	O 14	P 3	0
20	AF	1	Total 32	C 10	N 5	O 14	P 3	0
20	AH	1	Total 32	C 10	N 5	O 14	P 3	0
20	AJ	1	Total 32	C 10	N 5	O 14	P 3	0
20	AL	1	Total 32	C 10	N 5	O 14	P 3	0

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Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
20	BB	1	Total 32	C 10	N 5	O 14	P 3	0
20	BD	1	Total 32	C 10	N 5	O 14	P 3	0
20	BF	1	Total 32	C 10	N 5	O 14	P 3	0
20	BH	1	Total 32	C 10	N 5	O 14	P 3	0
20	BJ	1	Total 32	C 10	N 5	O 14	P 3	0
20	BL	1	Total 32	C 10	N 5	O 14	P 3	0
20	CB	1	Total 32	C 10	N 5	O 14	P 3	0
20	CD	1	Total 32	C 10	N 5	O 14	P 3	0
20	CF	1	Total 32	C 10	N 5	O 14	P 3	0
20	CH	1	Total 32	C 10	N 5	O 14	P 3	0
20	CJ	1	Total 32	C 10	N 5	O 14	P 3	0
20	DB	1	Total 32	C 10	N 5	O 14	P 3	0
20	DD	1	Total 32	C 10	N 5	O 14	P 3	0
20	DF	1	Total 32	C 10	N 5	O 14	P 3	0
20	DH	1	Total 32	C 10	N 5	O 14	P 3	0
20	DJ	1	Total 32	C 10	N 5	O 14	P 3	0
20	DL	1	Total 32	C 10	N 5	O 14	P 3	0
20	EB	1	Total 32	C 10	N 5	O 14	P 3	0
20	ED	1	Total 32	C 10	N 5	O 14	P 3	0
20	EF	1	Total 32	C 10	N 5	O 14	P 3	0
20	EH	1	Total 32	C 10	N 5	O 14	P 3	0

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Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
20	EJ	1	Total 32	C 10	N 5	O 14	P 3	0
20	EL	1	Total 32	C 10	N 5	O 14	P 3	0
20	FB	1	Total 32	C 10	N 5	O 14	P 3	0
20	FD	1	Total 32	C 10	N 5	O 14	P 3	0
20	FF	1	Total 32	C 10	N 5	O 14	P 3	0
20	FH	1	Total 32	C 10	N 5	O 14	P 3	0
20	FJ	1	Total 32	C 10	N 5	O 14	P 3	0
20	FL	1	Total 32	C 10	N 5	O 14	P 3	0
20	GD	1	Total 32	C 10	N 5	O 14	P 3	0
20	GF	1	Total 32	C 10	N 5	O 14	P 3	0
20	GH	1	Total 32	C 10	N 5	O 14	P 3	0
20	GJ	1	Total 32	C 10	N 5	O 14	P 3	0
20	GL	1	Total 32	C 10	N 5	O 14	P 3	0
20	HD	1	Total 32	C 10	N 5	O 14	P 3	0
20	HF	1	Total 32	C 10	N 5	O 14	P 3	0
20	HI	1	Total 32	C 10	N 5	O 14	P 3	0
20	HJ	1	Total 32	C 10	N 5	O 14	P 3	0
20	HL	1	Total 32	C 10	N 5	O 14	P 3	0
20	ID	1	Total 32	C 10	N 5	O 14	P 3	0
20	IF	1	Total 32	C 10	N 5	O 14	P 3	0
20	IH	1	Total 32	C 10	N 5	O 14	P 3	0

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Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
20	IJ	1	Total 32	C 10	N 5	O 14	P 3	0
20	IL	1	Total 32	C 10	N 5	O 14	P 3	0
20	JB	1	Total 32	C 10	N 5	O 14	P 3	0
20	JD	1	Total 32	C 10	N 5	O 14	P 3	0
20	JF	1	Total 32	C 10	N 5	O 14	P 3	0
20	JH	1	Total 32	C 10	N 5	O 14	P 3	0
20	JJ	1	Total 32	C 10	N 5	O 14	P 3	0
20	JL	1	Total 32	C 10	N 5	O 14	P 3	0
20	KB	1	Total 32	C 10	N 5	O 14	P 3	0
20	KD	1	Total 32	C 10	N 5	O 14	P 3	0
20	KF	1	Total 32	C 10	N 5	O 14	P 3	0
20	KH	1	Total 32	C 10	N 5	O 14	P 3	0
20	KJ	1	Total 32	C 10	N 5	O 14	P 3	0
20	KL	1	Total 32	C 10	N 5	O 14	P 3	0
20	LB	1	Total 32	C 10	N 5	O 14	P 3	0
20	LD	1	Total 32	C 10	N 5	O 14	P 3	0
20	LF	1	Total 32	C 10	N 5	O 14	P 3	0
20	LH	1	Total 32	C 10	N 5	O 14	P 3	0
20	LJ	1	Total 32	C 10	N 5	O 14	P 3	0
20	LL	1	Total 32	C 10	N 5	O 14	P 3	0
20	MB	1	Total 32	C 10	N 5	O 14	P 3	0

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Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
20	MD	1	32	10	5	14	3	0
20	MF	1	32	10	5	14	3	0
20	MH	1	32	10	5	14	3	0
20	MJ	1	32	10	5	14	3	0
20	ML	1	32	10	5	14	3	0

- Molecule 21 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
21	AB	1	1	1	0
21	AD	1	1	1	0
21	AF	1	1	1	0
21	AH	1	1	1	0
21	AJ	1	1	1	0
21	AL	1	1	1	0
21	BB	1	1	1	0
21	BD	1	1	1	0
21	BF	1	1	1	0
21	BH	1	1	1	0
21	BJ	1	1	1	0
21	BL	1	1	1	0
21	CB	1	1	1	0
21	CD	1	1	1	0

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Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
21	CF	1	1	1	0
21	CH	1	1	1	0
21	CJ	1	1	1	0
21	DB	1	1	1	0
21	DD	1	1	1	0
21	DF	1	1	1	0
21	DH	1	1	1	0
21	DJ	1	1	1	0
21	DL	1	1	1	0
21	EB	1	1	1	0
21	EE	1	1	1	0
21	EF	1	1	1	0
21	EH	1	1	1	0
21	EJ	1	1	1	0
21	EL	1	1	1	0
21	FB	1	1	1	0
21	FD	1	1	1	0
21	FF	1	1	1	0
21	FH	1	1	1	0
21	FJ	1	1	1	0
21	FL	1	1	1	0

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Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
21	GD	1	1	1	0
21	GF	1	1	1	0
21	GH	1	1	1	0
21	GJ	1	1	1	0
21	GL	1	1	1	0
21	HD	1	1	1	0
21	HF	1	1	1	0
21	HH	1	1	1	0
21	HJ	1	1	1	0
21	HL	1	1	1	0
21	ID	1	1	1	0
21	IF	1	1	1	0
21	IH	1	1	1	0
21	IJ	1	1	1	0
21	IL	1	1	1	0
21	JB	1	1	1	0
21	JD	1	1	1	0
21	JF	1	1	1	0
21	JH	1	1	1	0
21	JJ	1	1	1	0
21	JL	1	1	1	0

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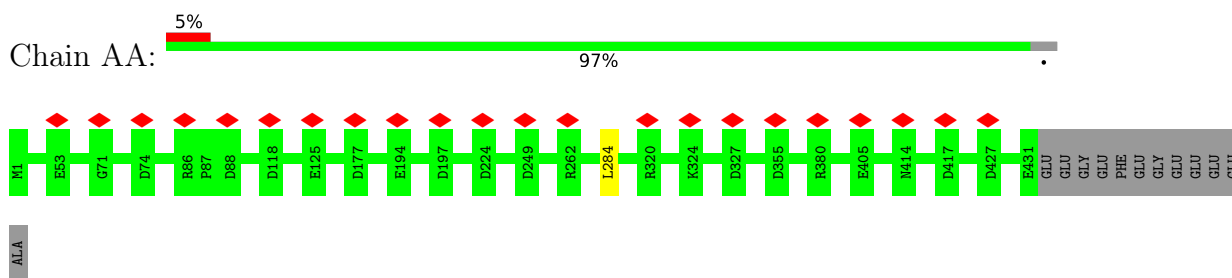
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Mol	Chain	Residues	Atoms		AltConf
21	KB	1	Total 1	Mg 1	0
21	KD	1	Total 1	Mg 1	0
21	KF	1	Total 1	Mg 1	0
21	KI	1	Total 1	Mg 1	0
21	KJ	1	Total 1	Mg 1	0
21	KL	1	Total 1	Mg 1	0
21	LB	1	Total 1	Mg 1	0
21	LD	1	Total 1	Mg 1	0
21	LF	1	Total 1	Mg 1	0
21	LH	1	Total 1	Mg 1	0
21	LJ	1	Total 1	Mg 1	0
21	LL	1	Total 1	Mg 1	0
21	MB	1	Total 1	Mg 1	0
21	MD	1	Total 1	Mg 1	0
21	MF	1	Total 1	Mg 1	0
21	MH	1	Total 1	Mg 1	0
21	MJ	1	Total 1	Mg 1	0
21	ML	1	Total 1	Mg 1	0

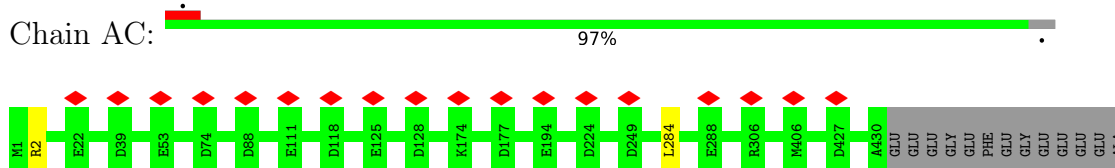
### 3 Residue-property plots [i](#)

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 atom inclusion in map 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 diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). 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.

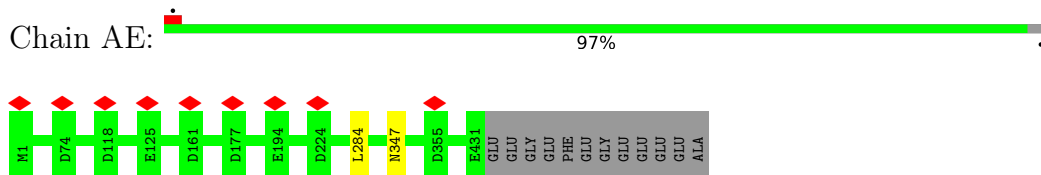
- Molecule 1: Tubulin beta



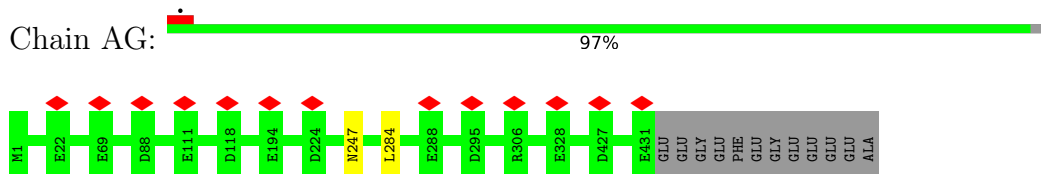
- Molecule 1: Tubulin beta



- Molecule 1: Tubulin beta

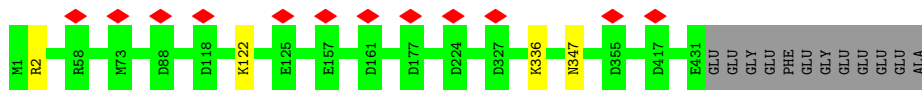


- Molecule 1: Tubulin beta

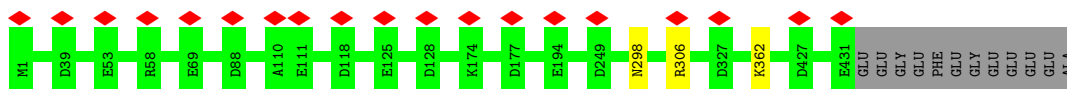


- Molecule 1: Tubulin beta

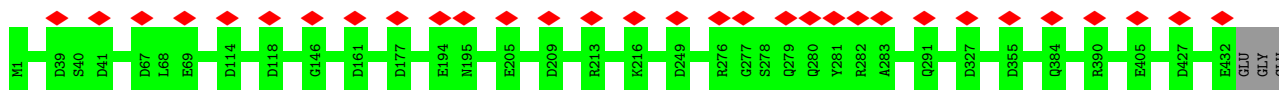




• Molecule 1: Tubulin beta



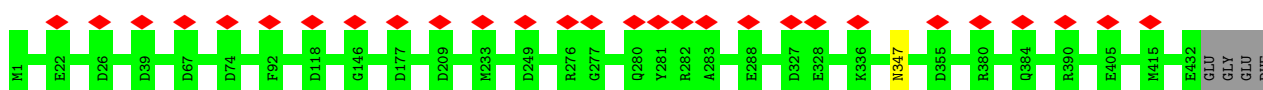
• Molecule 1: Tubulin beta



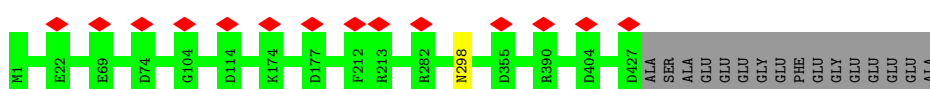
• Molecule 1: Tubulin beta



• Molecule 1: Tubulin beta

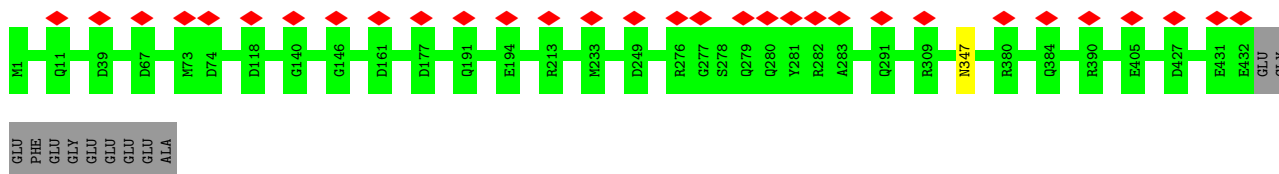


• Molecule 1: Tubulin beta

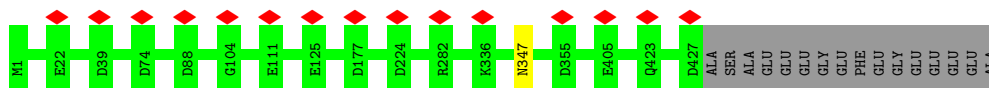


• Molecule 1: Tubulin beta

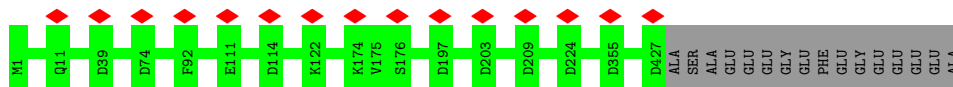




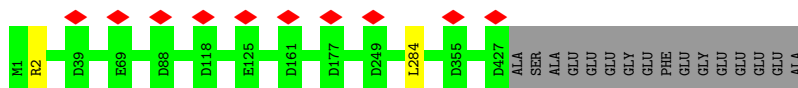
• Molecule 1: Tubulin beta



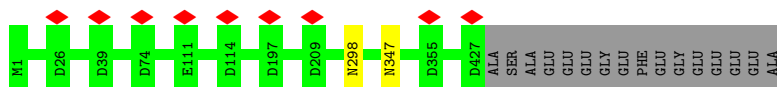
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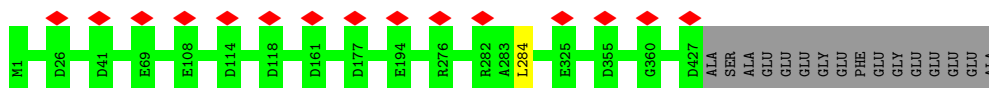
• Molecule 1: Tubulin beta



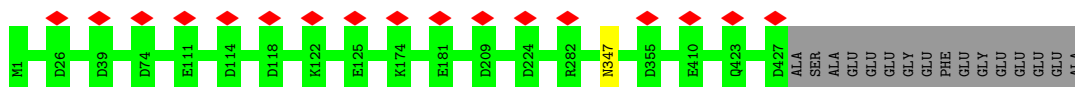
• Molecule 1: Tubulin beta



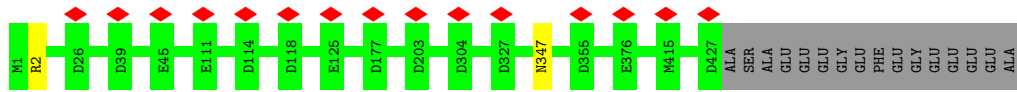
• Molecule 1: Tubulin beta



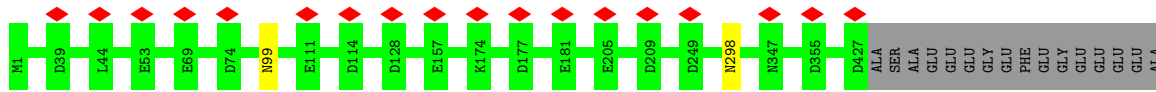
• Molecule 1: Tubulin beta



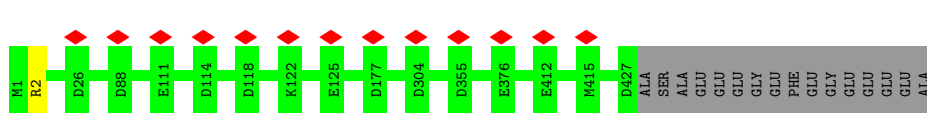
• Molecule 1: Tubulin beta



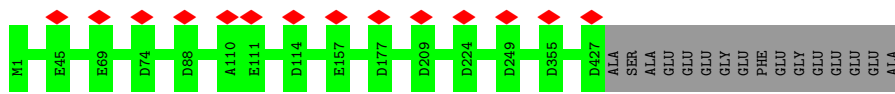
• Molecule 1: Tubulin beta



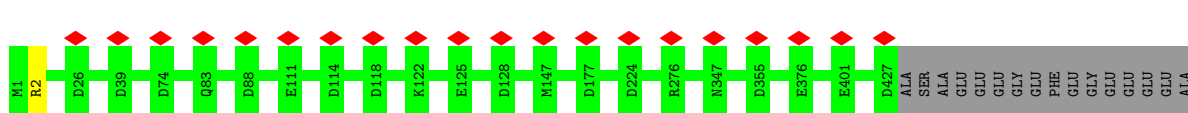
• Molecule 1: Tubulin beta



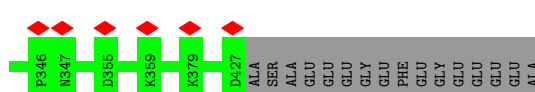
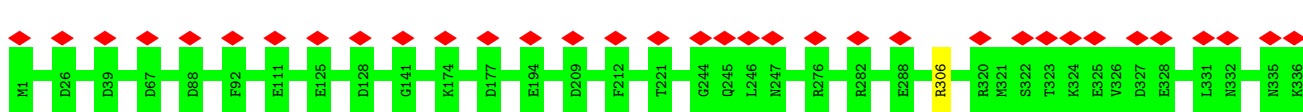
• Molecule 1: Tubulin beta



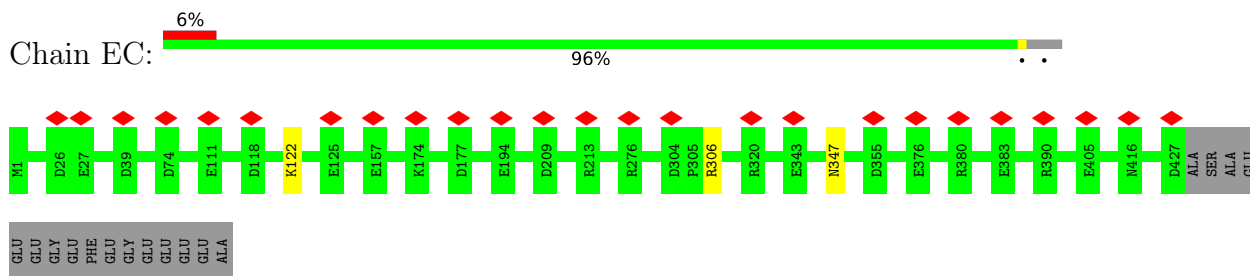
• Molecule 1: Tubulin beta



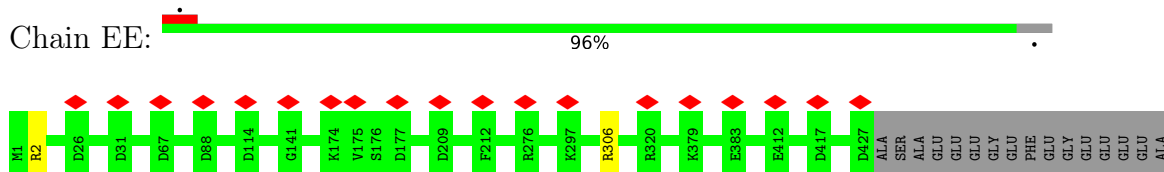
• Molecule 1: Tubulin beta



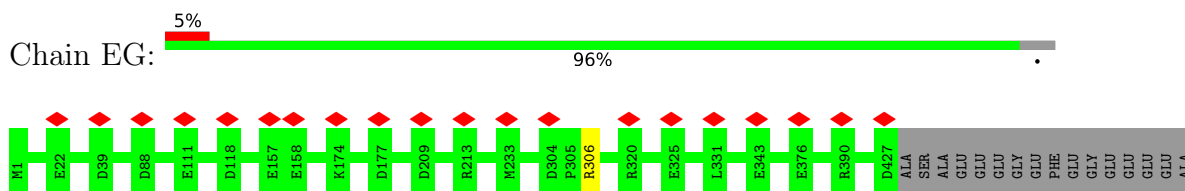
• Molecule 1: Tubulin beta



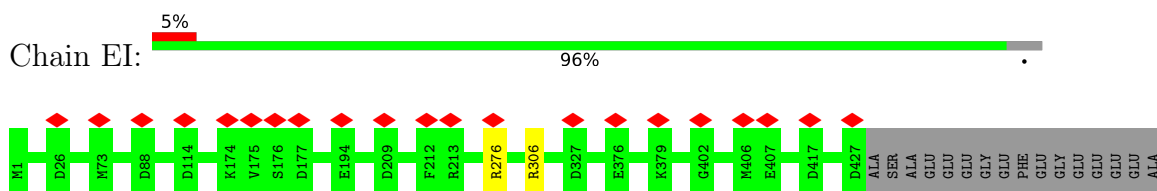
• Molecule 1: Tubulin beta



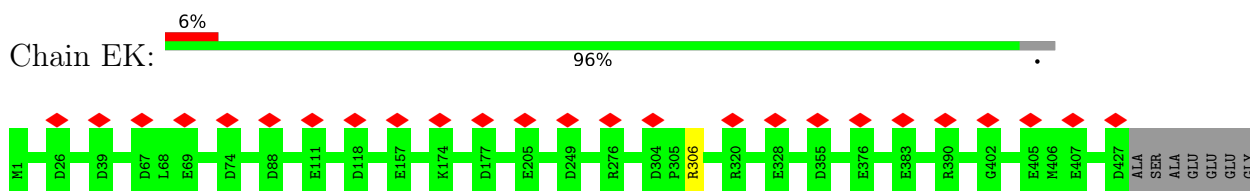
• Molecule 1: Tubulin beta



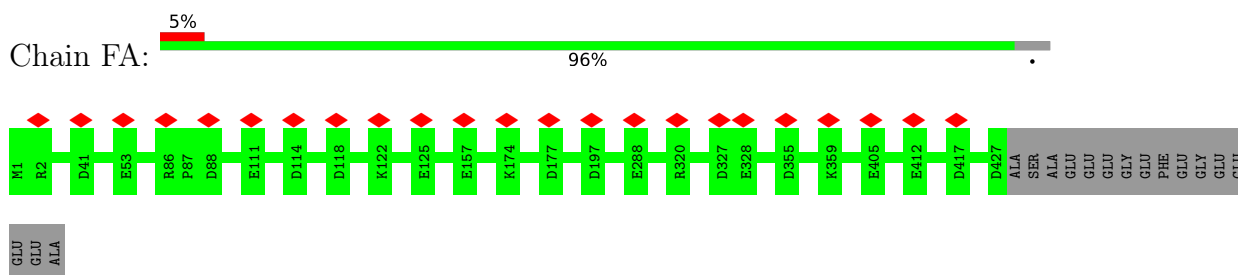
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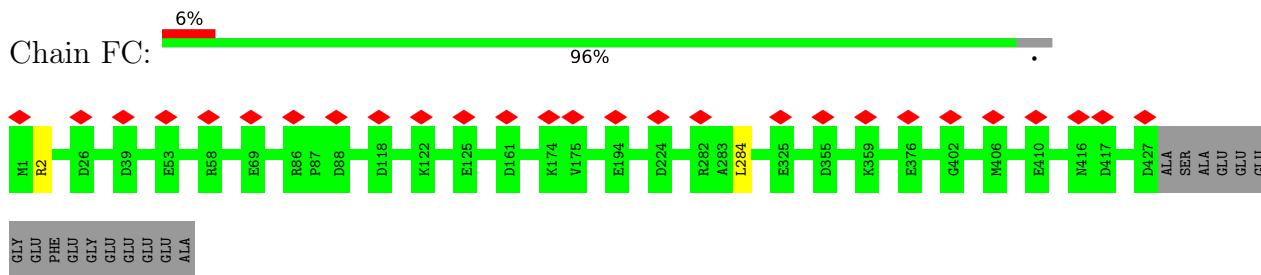
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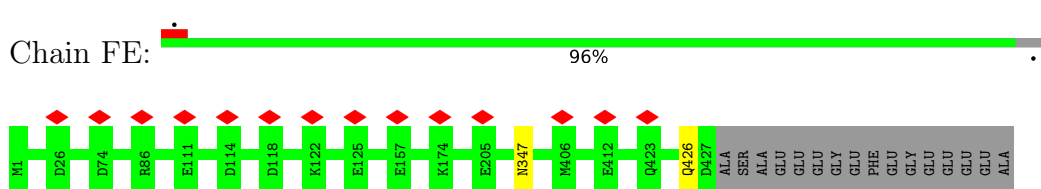
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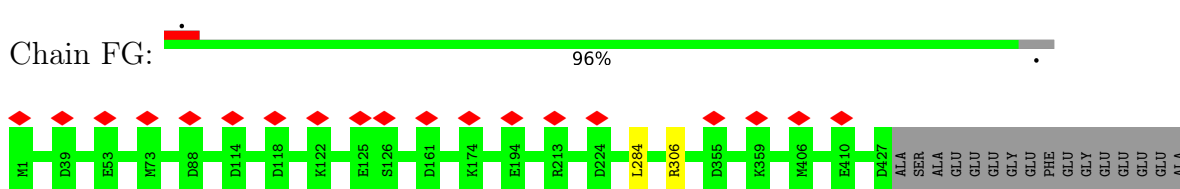
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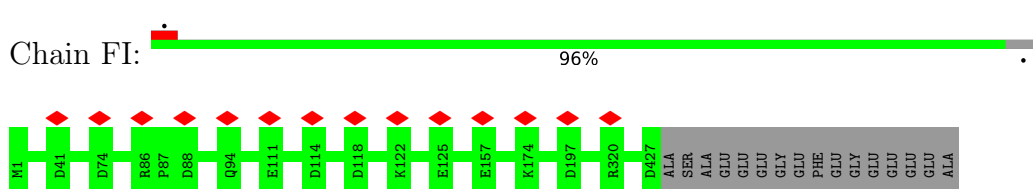
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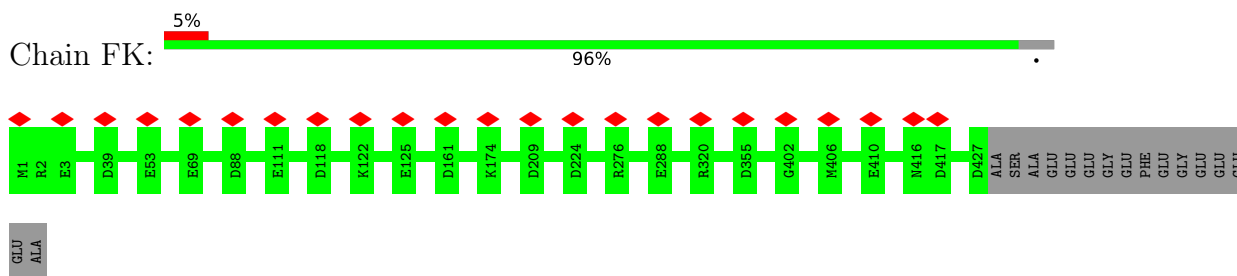
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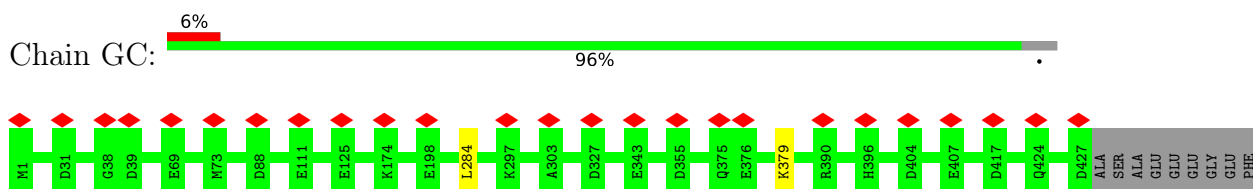
• Molecule 1: Tubulin beta



• Molecule 1: Tubulin beta

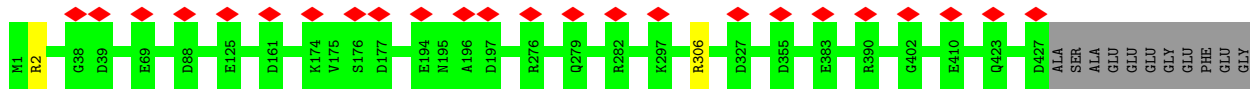


• Molecule 1: Tubulin beta



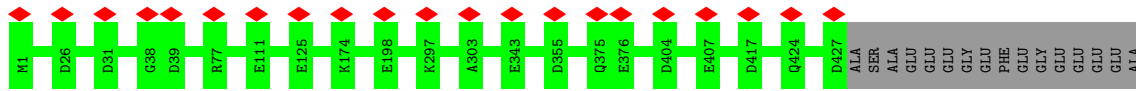
GLU  
GLY  
GLU  
GLU  
GLU  
GLU  
GLU  
ALA

• Molecule 1: Tubulin beta

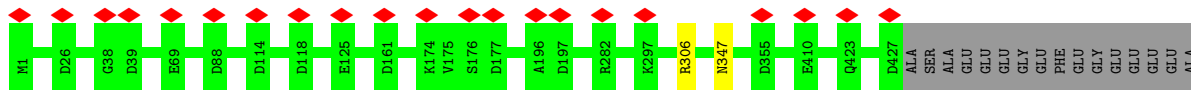


GLU  
GLU  
GLU  
GLU  
ALA

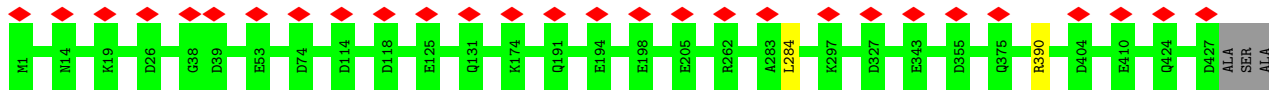
• Molecule 1: Tubulin beta



• Molecule 1: Tubulin beta



• Molecule 1: Tubulin beta



GLU  
GLU  
GLY  
PHE  
GLU  
GLU  
GLU  
GLU  
GLU  
ALA

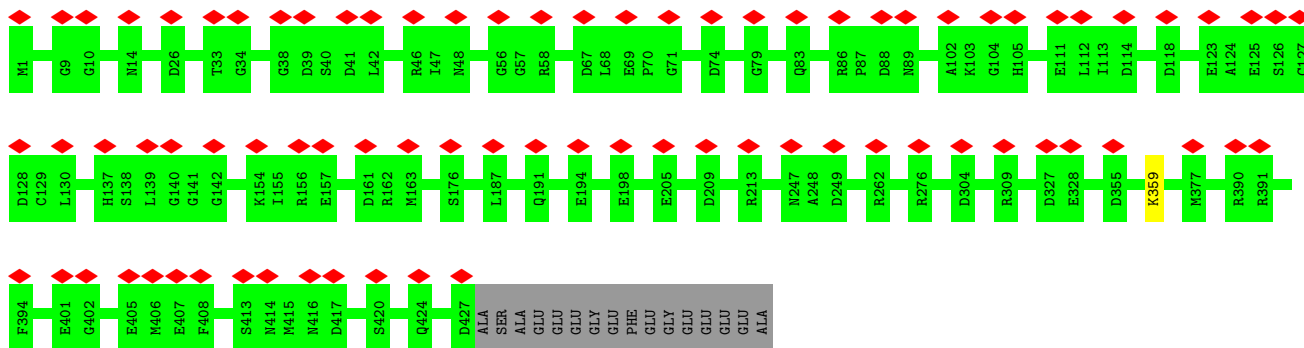
• Molecule 1: Tubulin beta



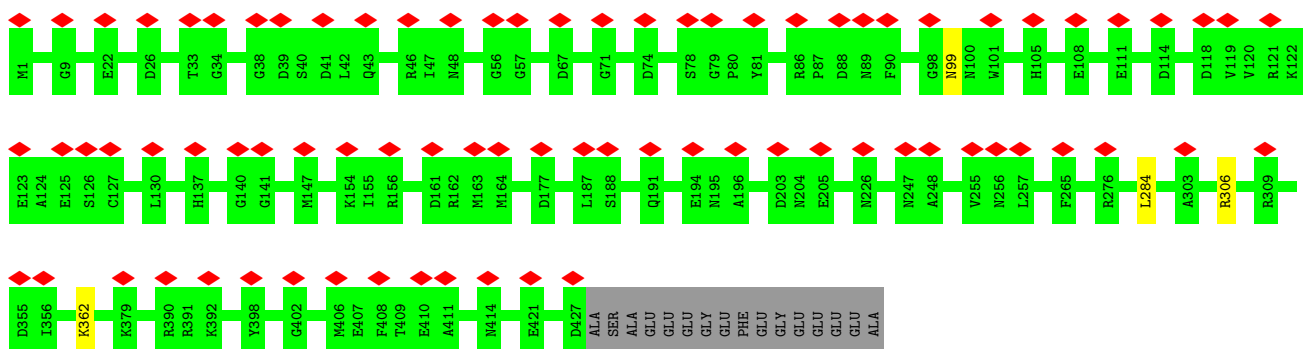
Q423 D427  
ALA SER ALA GLU GLU GLU GLY PHE GLU GLY GLU GLU GLU ALA

• Molecule 1: Tubulin beta

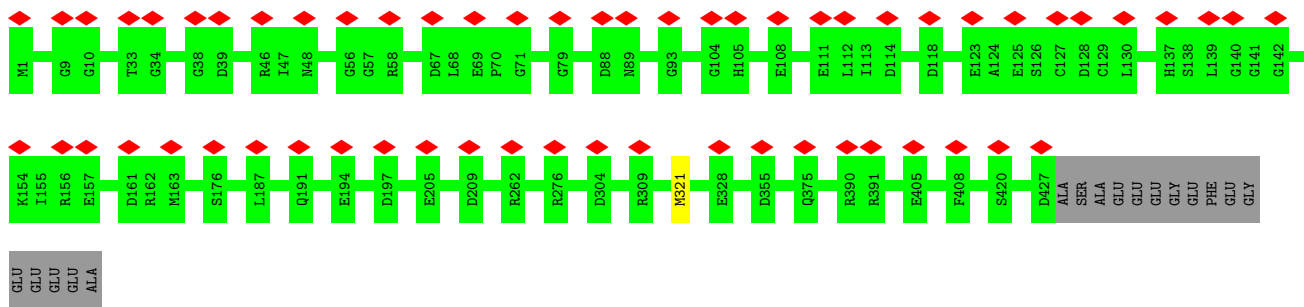




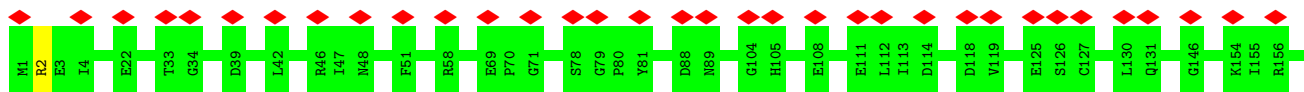
• Molecule 1: Tubulin beta

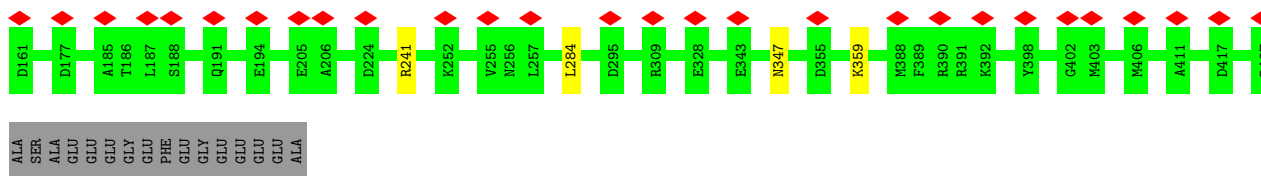


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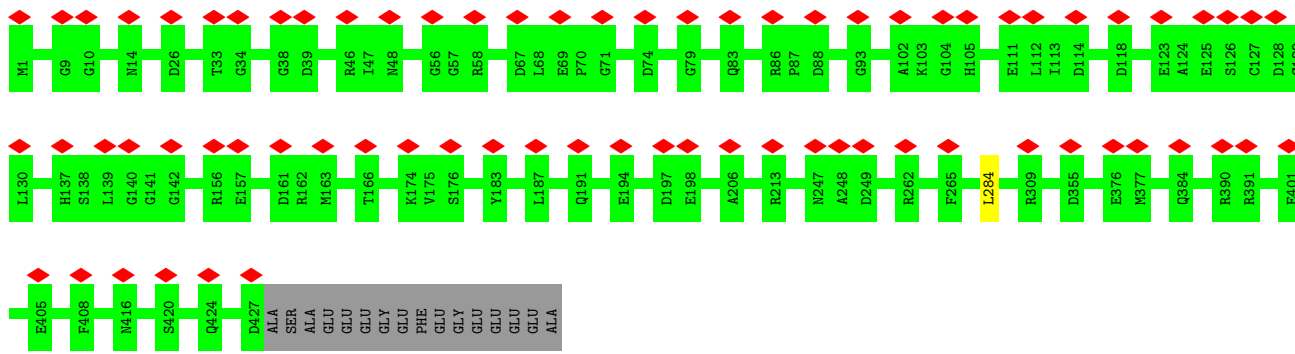


• Molecule 1: Tubulin beta

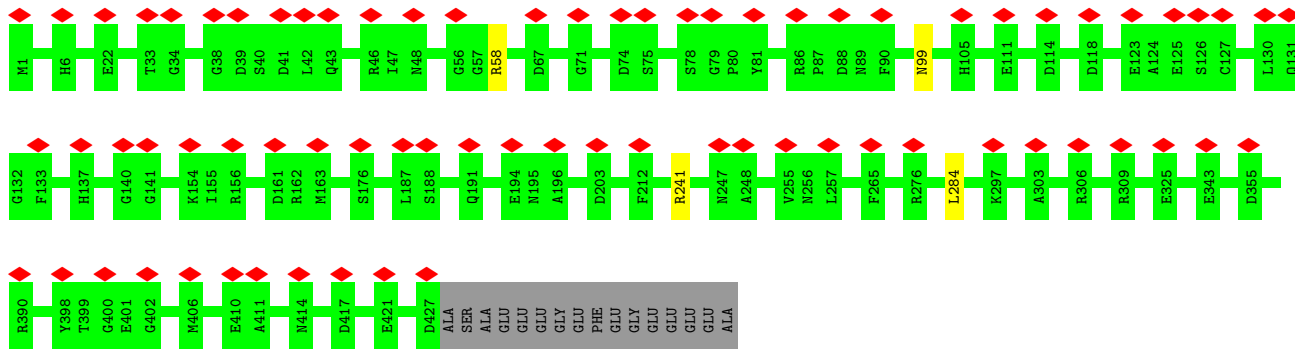




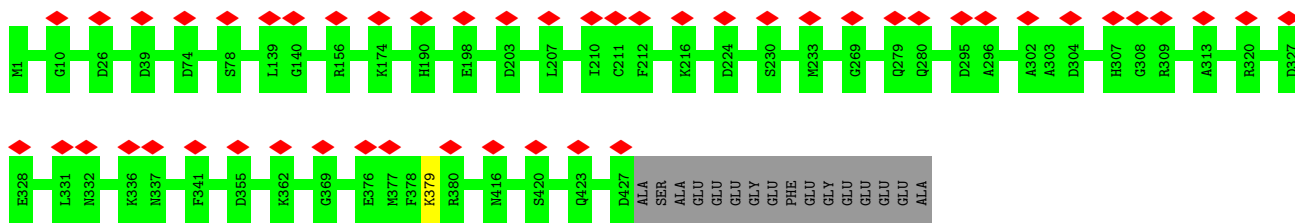
• Molecule 1: Tubulin beta



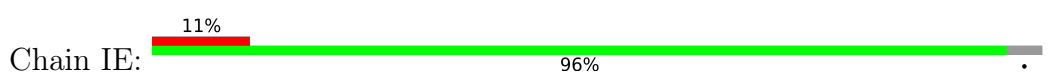
• Molecule 1: Tubulin beta

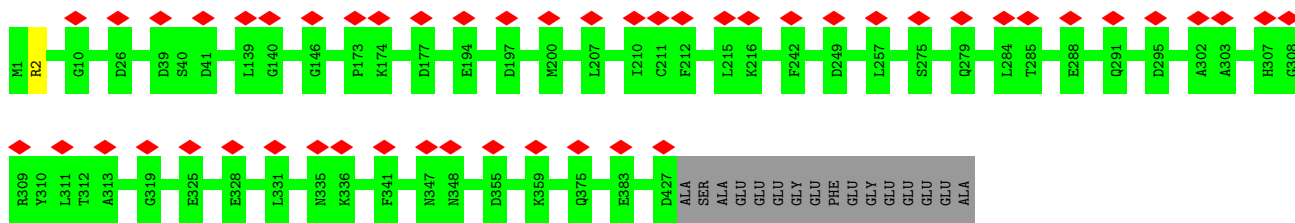


• Molecule 1: Tubulin beta

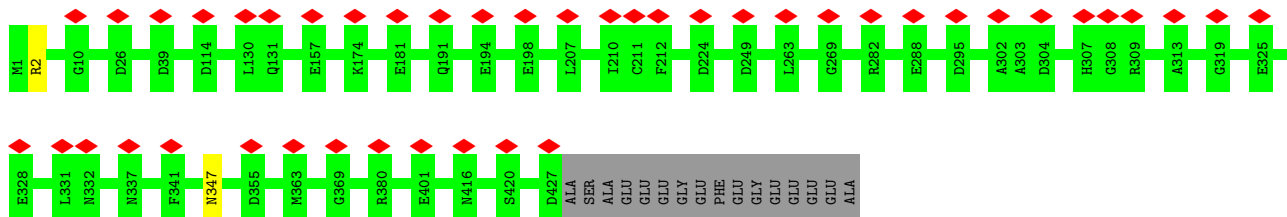


• Molecule 1: Tubulin beta

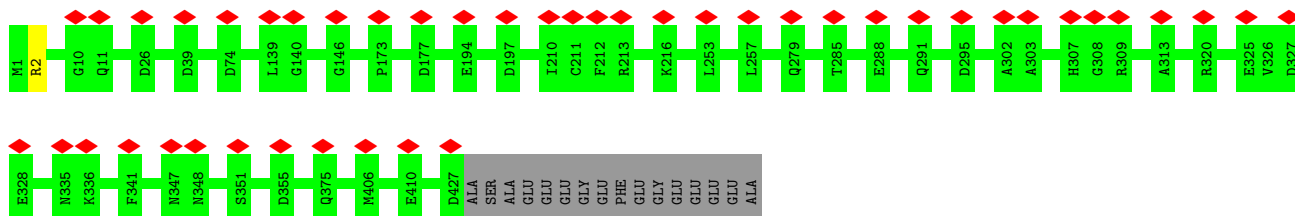




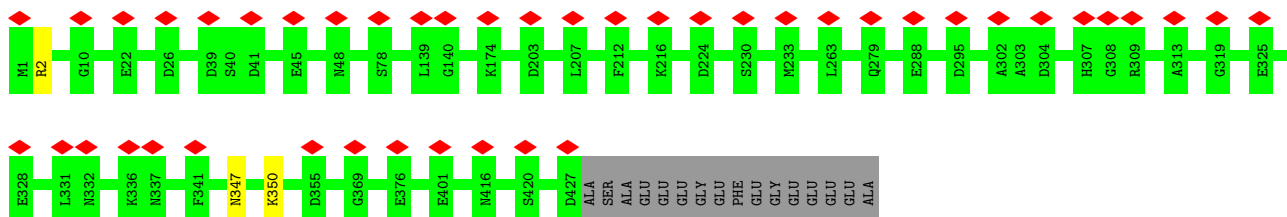
• Molecule 1: Tubulin beta



• Molecule 1: Tubulin beta

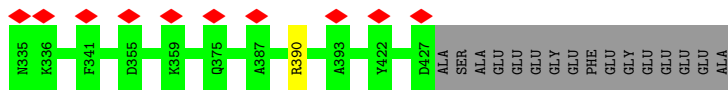


• Molecule 1: Tubulin beta

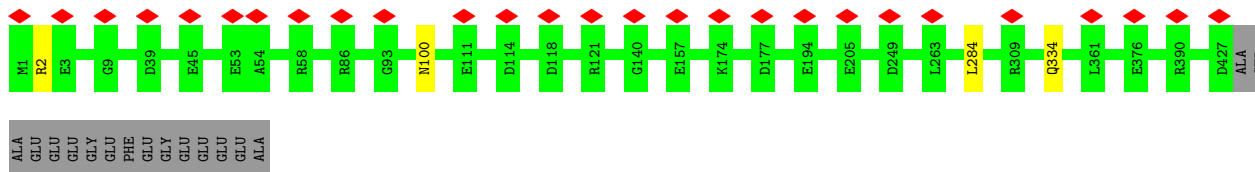


• Molecule 1: Tubulin beta

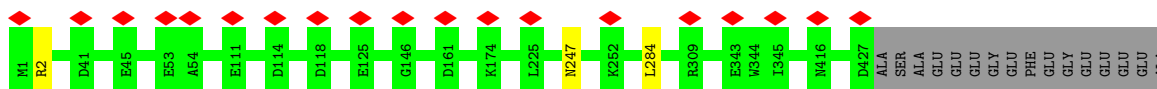




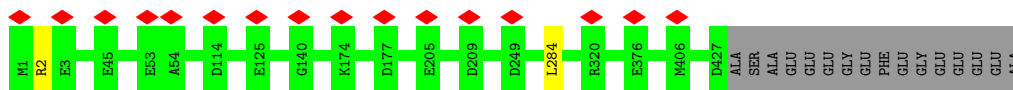
• Molecule 1: Tubulin beta



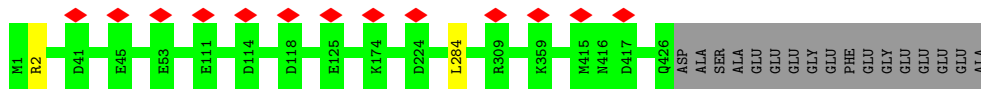
• Molecule 1: Tubulin beta



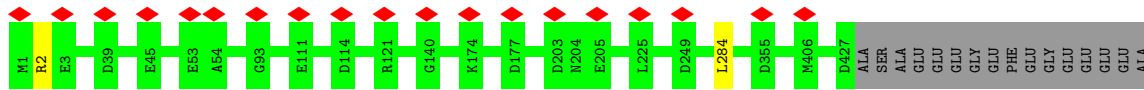
• Molecule 1: Tubulin beta



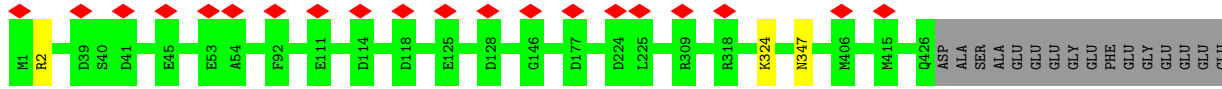
• Molecule 1: Tubulin beta



• Molecule 1: Tubulin beta

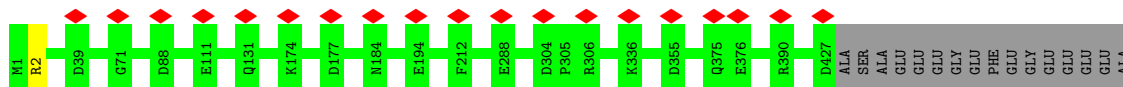


• Molecule 1: Tubulin beta

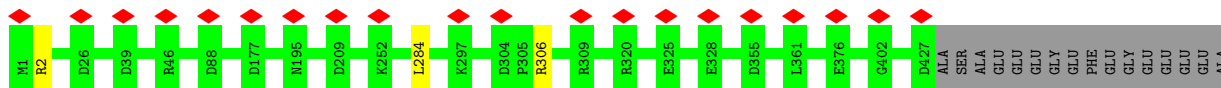


ALA

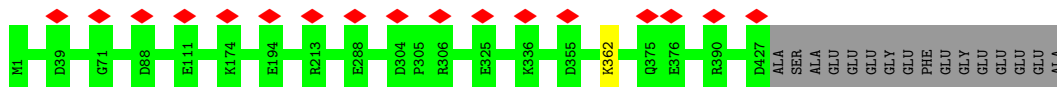
• Molecule 1: Tubulin beta



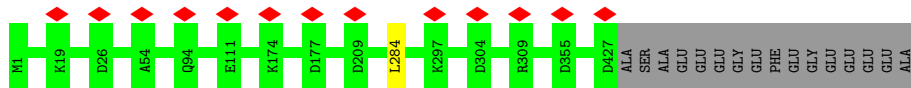
• Molecule 1: Tubulin beta



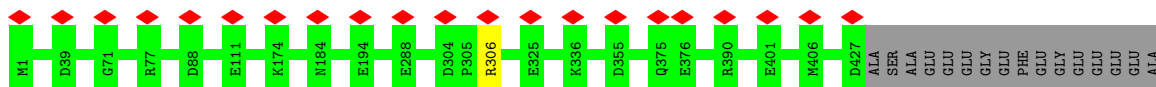
• Molecule 1: Tubulin beta



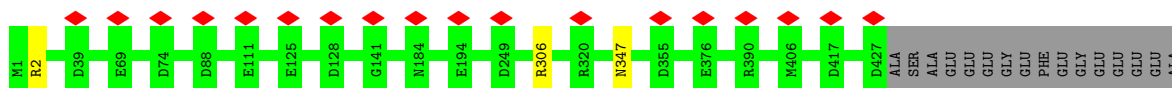
• Molecule 1: Tubulin beta



• Molecule 1: Tubulin beta

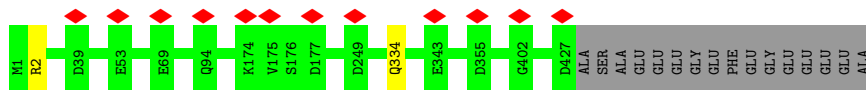


• Molecule 1: Tubulin beta

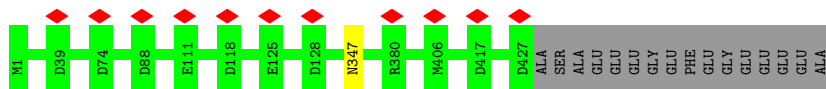


• Molecule 1: Tubulin beta

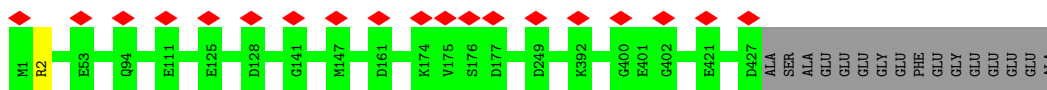




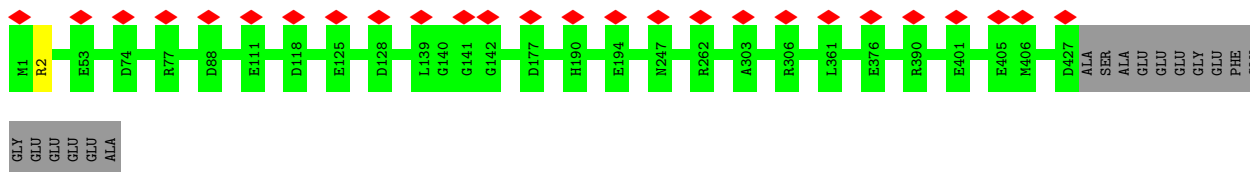
• Molecule 1: Tubulin beta



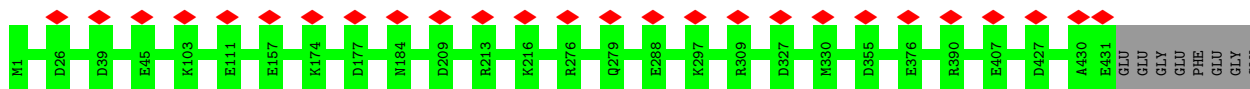
• Molecule 1: Tubulin beta



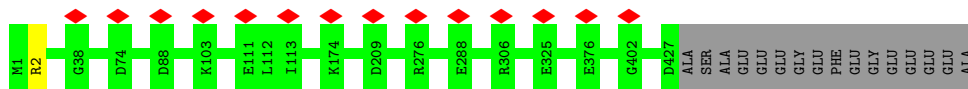
• Molecule 1: Tubulin beta



• Molecule 1: Tubulin beta

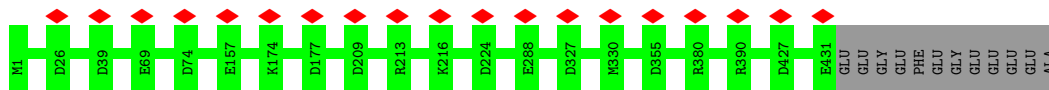


• Molecule 1: Tubulin beta

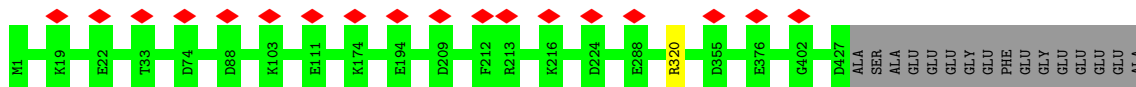


• Molecule 1: Tubulin beta

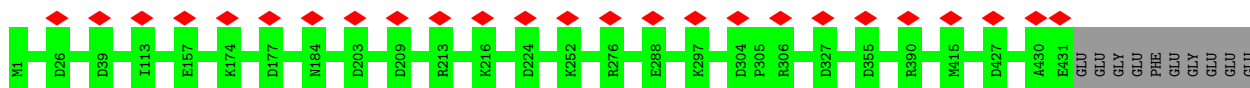




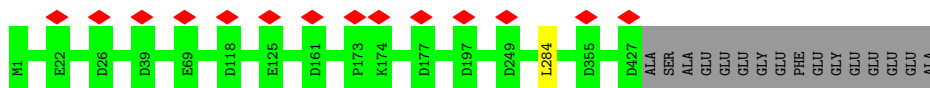
• Molecule 1: Tubulin beta



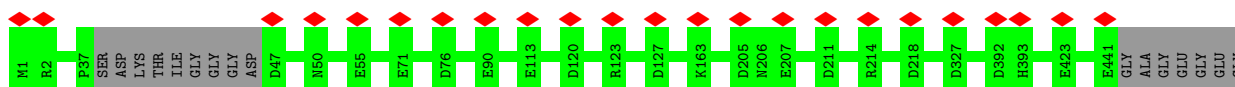
• Molecule 1: Tubulin beta



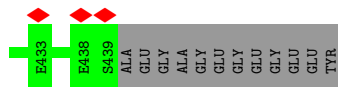
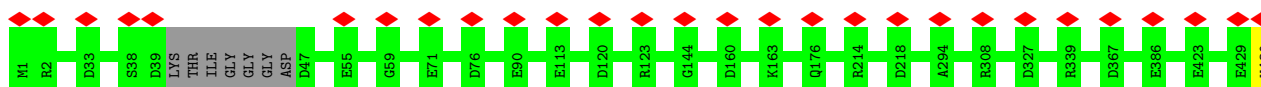
• Molecule 1: Tubulin beta



• Molecule 2: Tubulin alpha

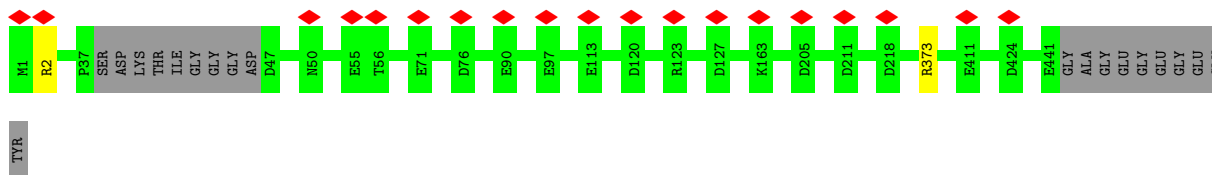


• Molecule 2: Tubulin alpha



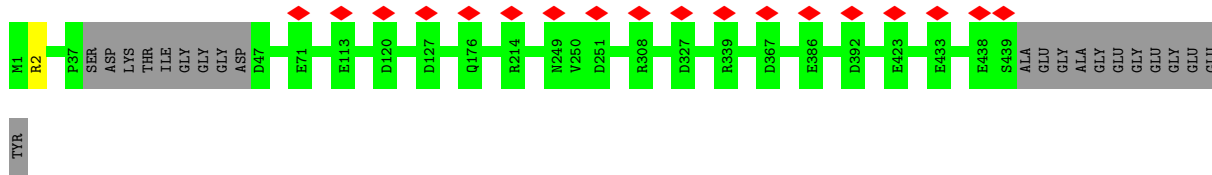
• Molecule 2: Tubulin alpha

Chain AF:  95%



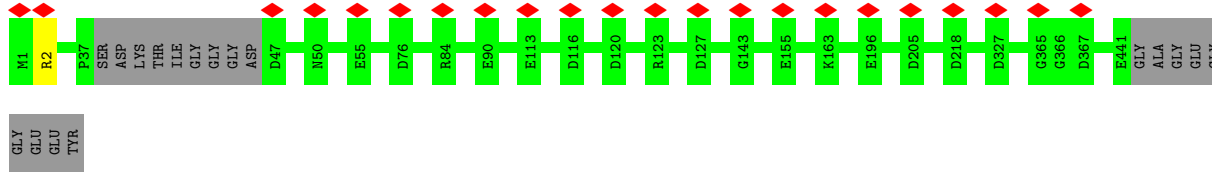
• Molecule 2: Tubulin alpha

Chain AH:  95%



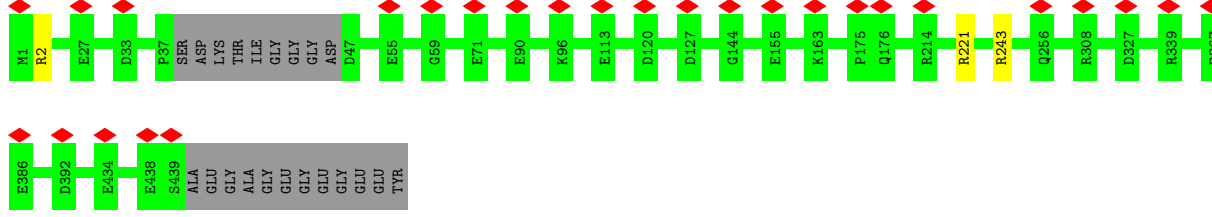
• Molecule 2: Tubulin alpha

Chain AJ:  96%



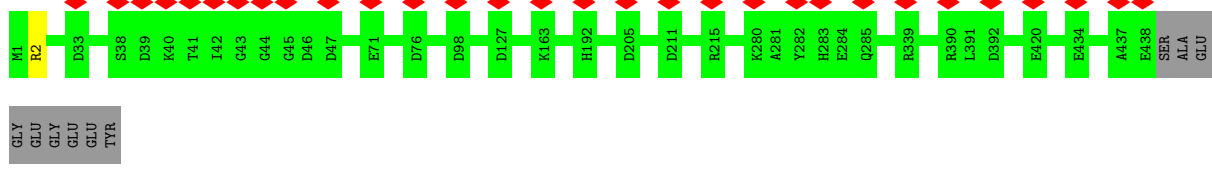
• Molecule 2: Tubulin alpha

Chain AL:  95%



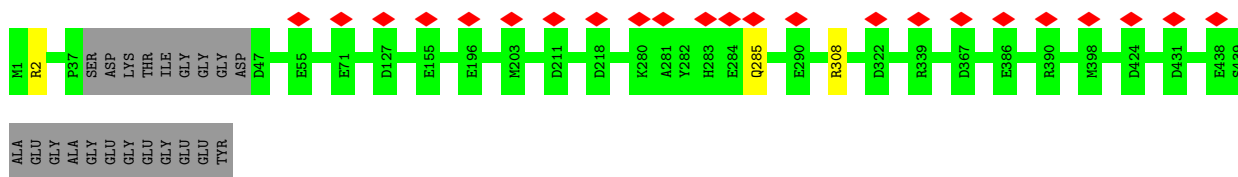
• Molecule 2: Tubulin alpha

Chain BB:  97%

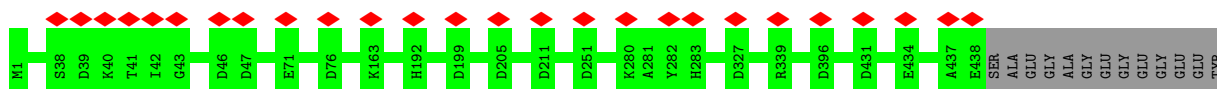


• Molecule 2: Tubulin alpha

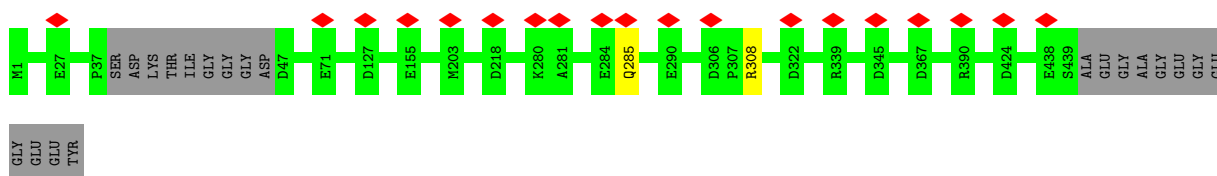




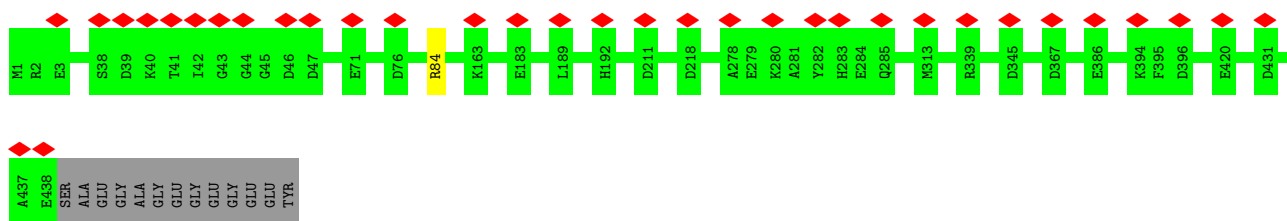
• Molecule 2: Tubulin alpha



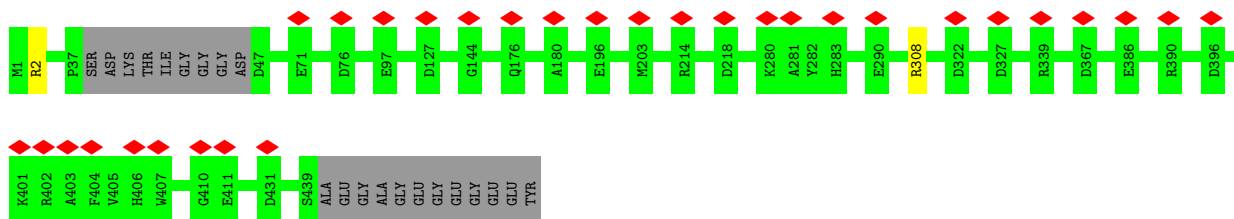
• Molecule 2: Tubulin alpha



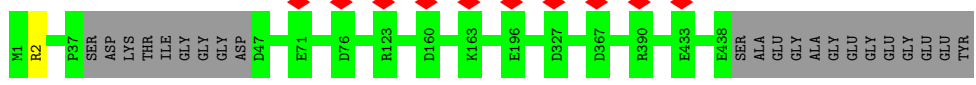
• Molecule 2: Tubulin alpha



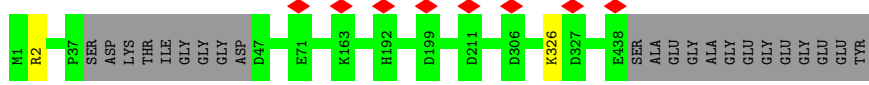
• Molecule 2: Tubulin alpha



• Molecule 2: Tubulin alpha



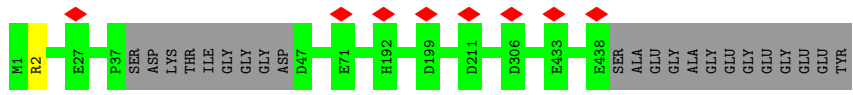
• Molecule 2: Tubulin alpha



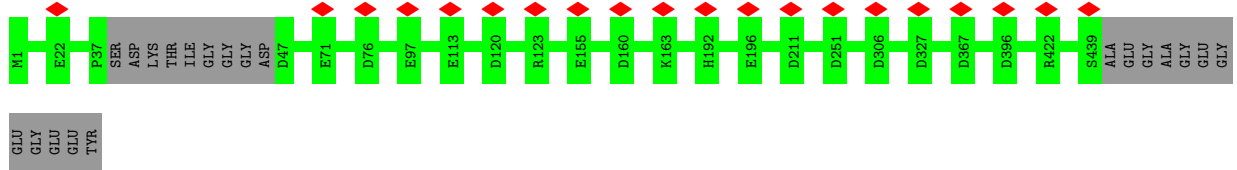
• Molecule 2: Tubulin alpha



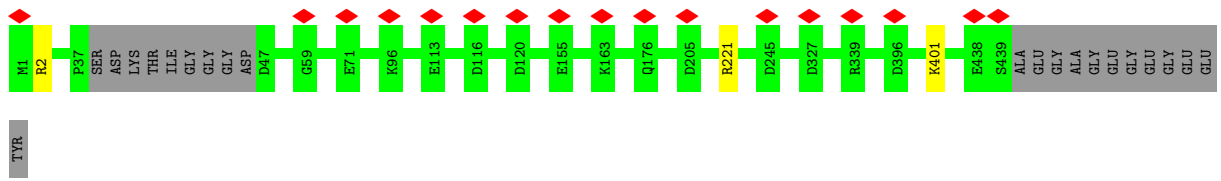
• Molecule 2: Tubulin alpha



• Molecule 2: Tubulin alpha

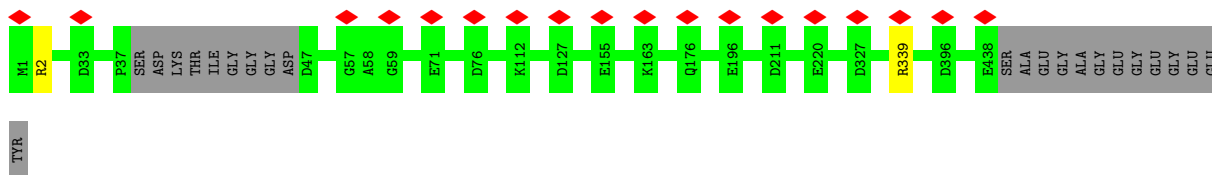


• Molecule 2: Tubulin alpha



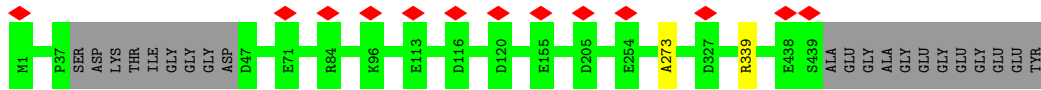
• Molecule 2: Tubulin alpha

Chain DD:  95% 5%



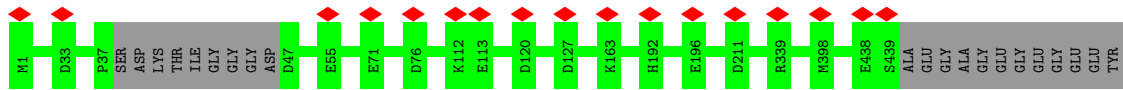
• Molecule 2: Tubulin alpha

Chain DF:  95% 5%



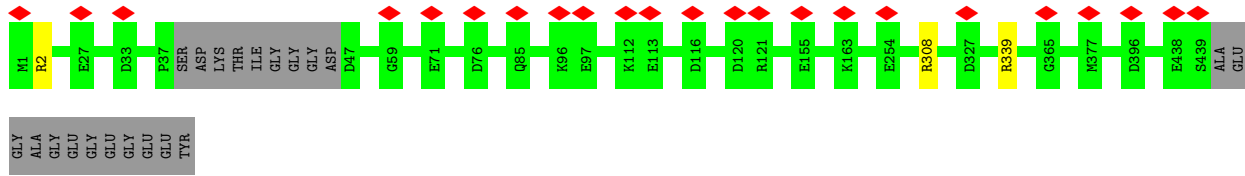
• Molecule 2: Tubulin alpha

Chain DH:  95% 5%



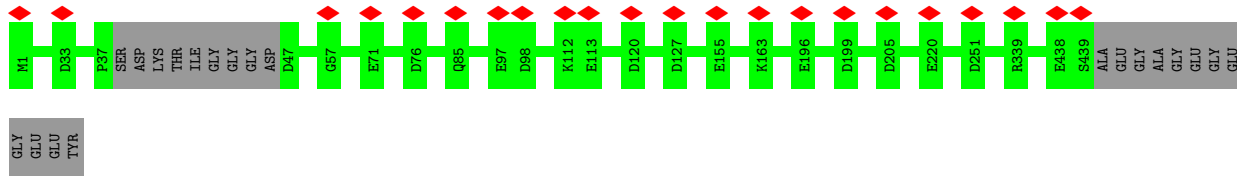
• Molecule 2: Tubulin alpha

Chain DJ:  95% 5% 5%



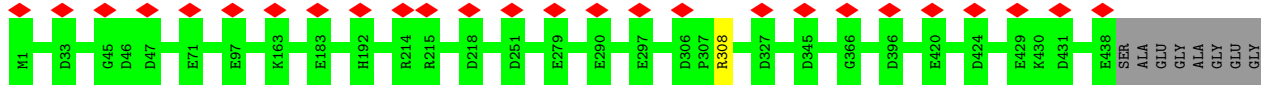
• Molecule 2: Tubulin alpha

Chain DL:  95% 5% 5%



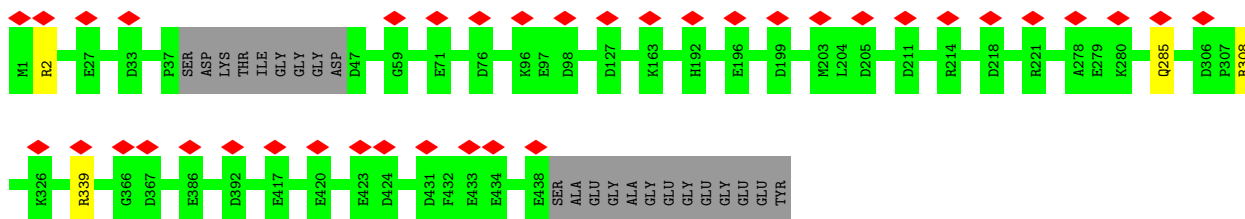
• Molecule 2: Tubulin alpha

Chain EB:  97% 6%



GLU  
GLY  
GLU  
GLU  
TYR

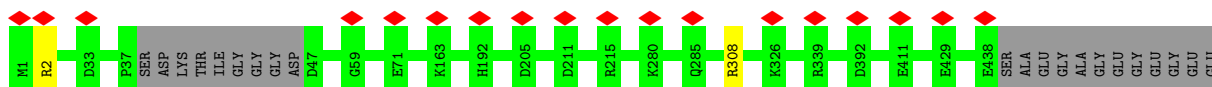
• Molecule 2: Tubulin alpha



• Molecule 2: Tubulin alpha

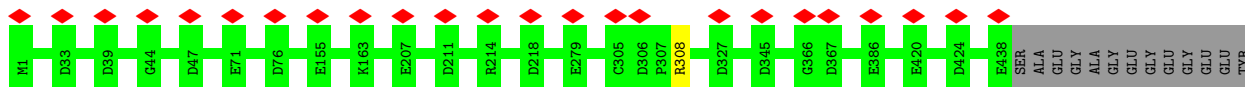


• Molecule 2: Tubulin alpha

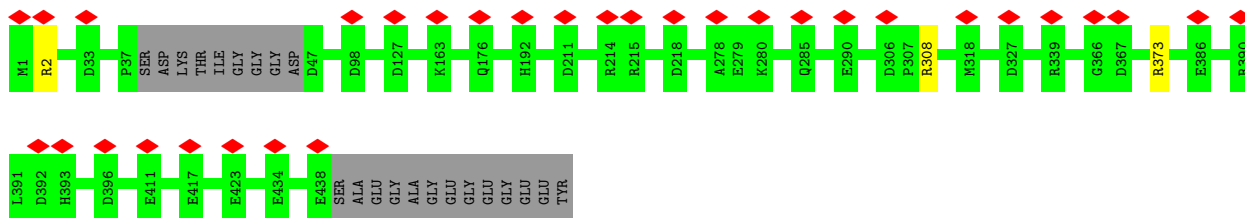


TYR

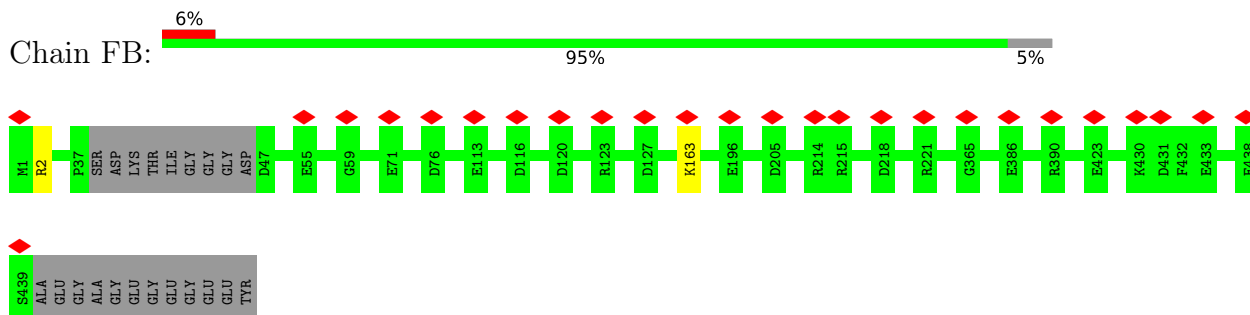
• Molecule 2: Tubulin alpha



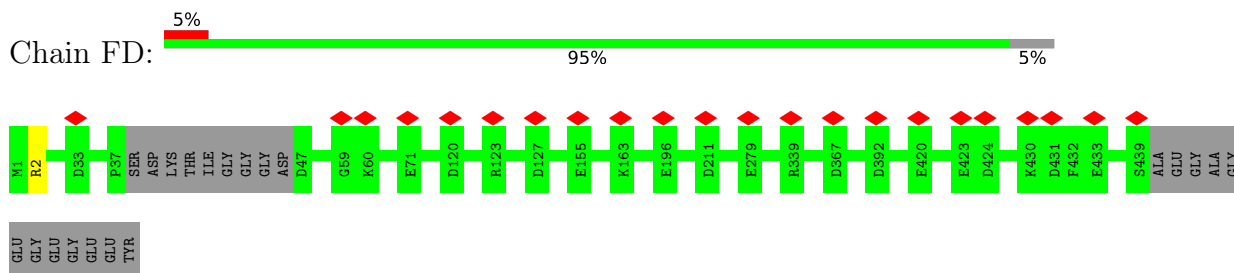
• Molecule 2: Tubulin alpha



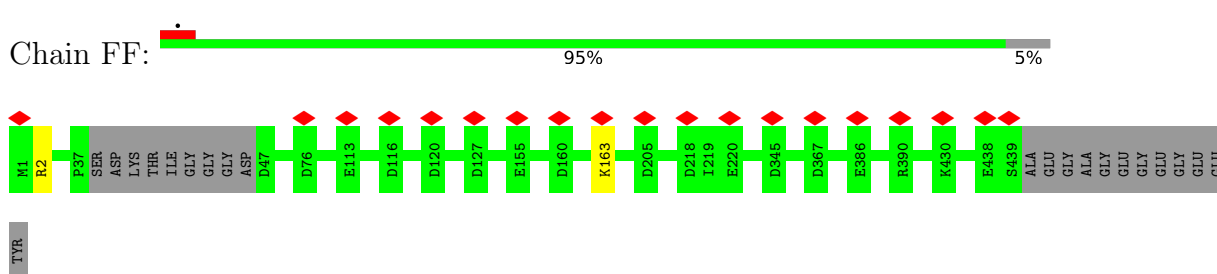
• Molecule 2: Tubulin alpha



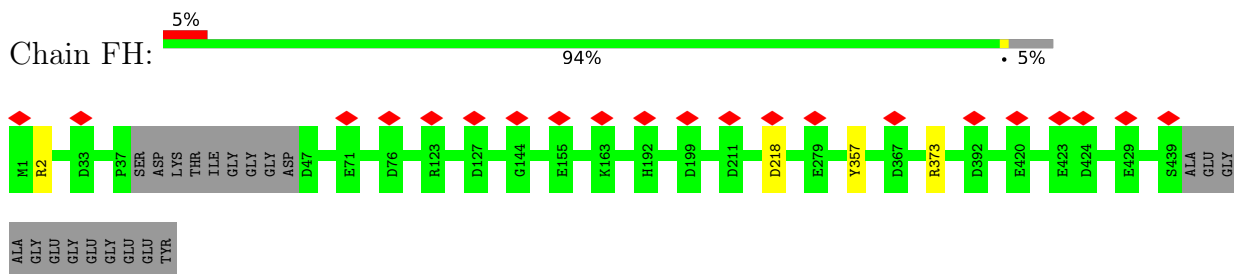
• Molecule 2: Tubulin alpha



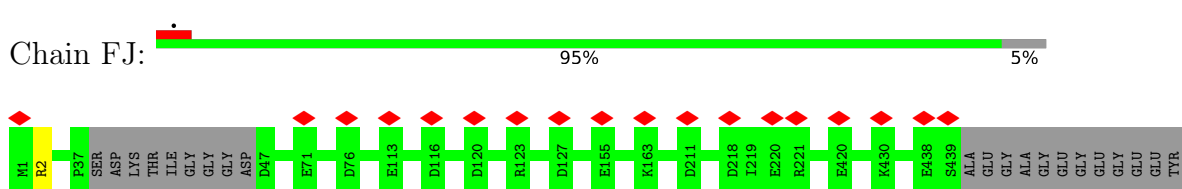
• Molecule 2: Tubulin alpha



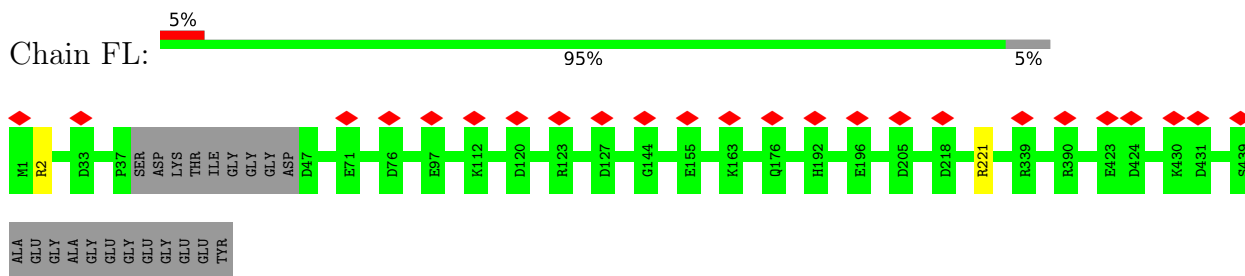
• Molecule 2: Tubulin alpha



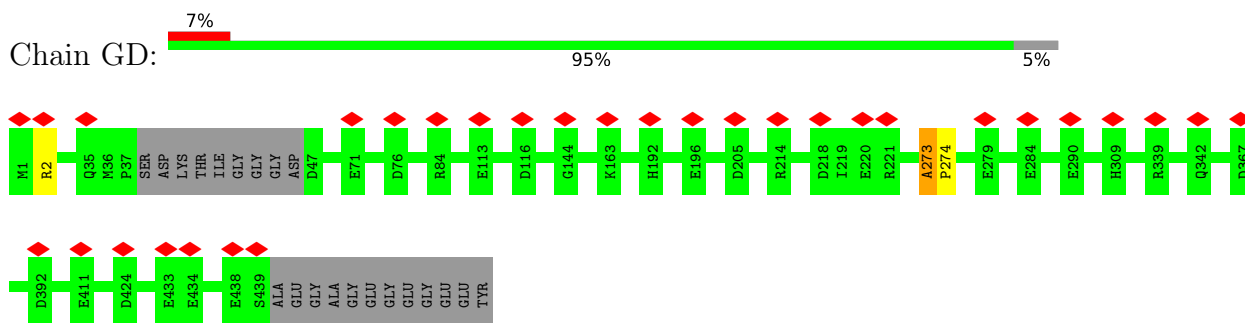
• Molecule 2: Tubulin alpha



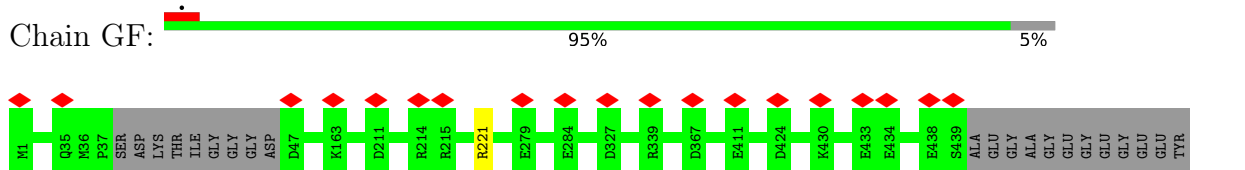
• Molecule 2: Tubulin alpha



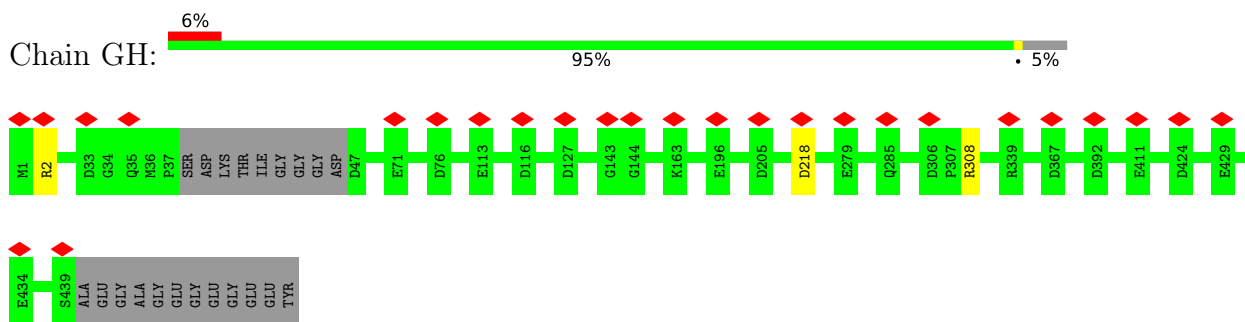
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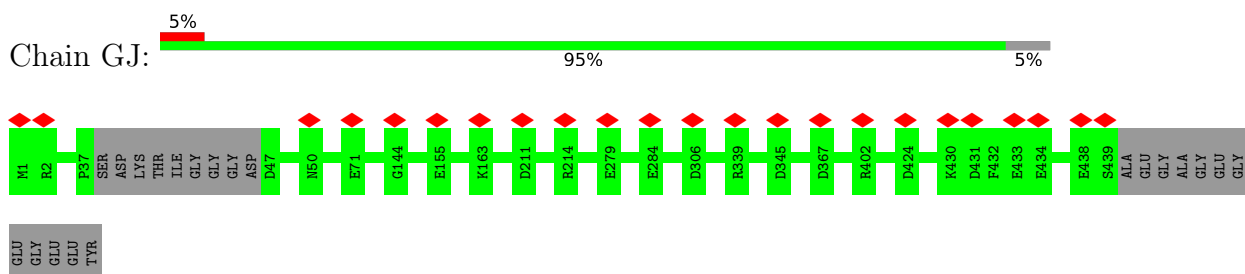
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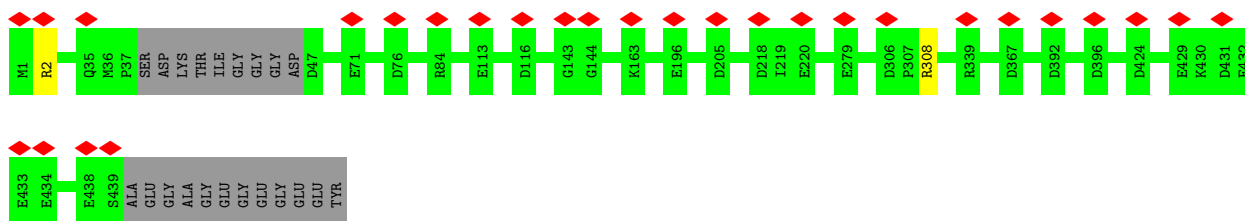
• Molecule 2: Tubulin alpha



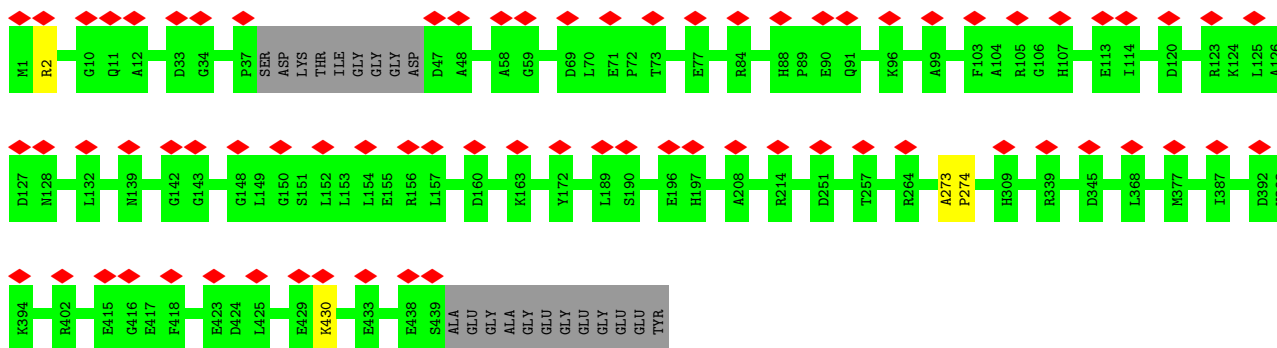
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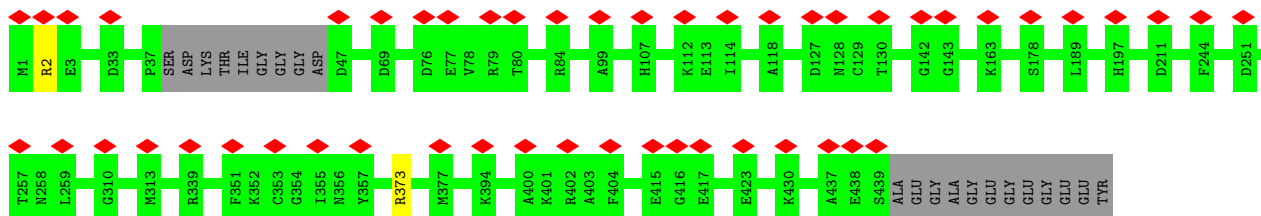
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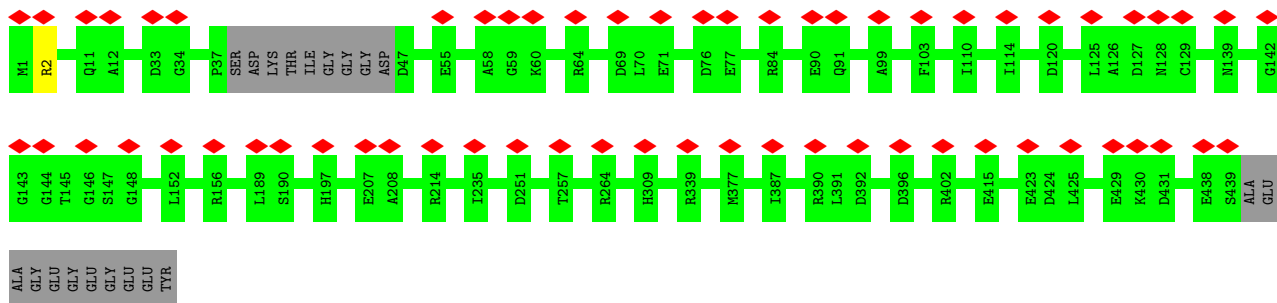
• Molecule 2: Tubulin alpha



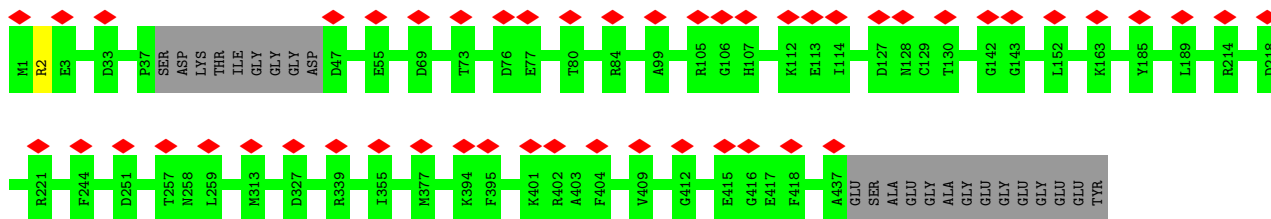
• Molecule 2: Tubulin alpha



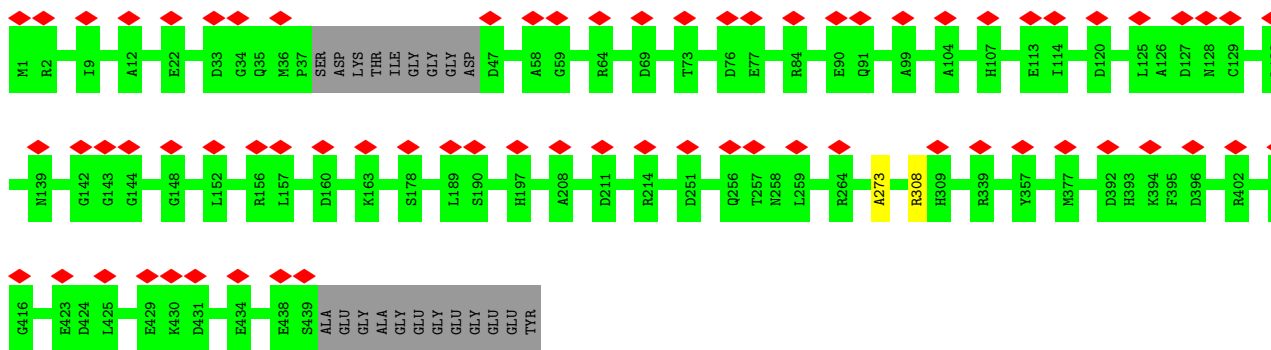
• Molecule 2: Tubulin alpha



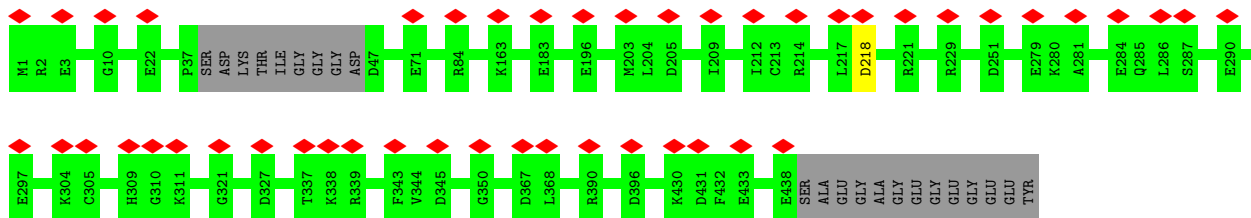
• Molecule 2: Tubulin alpha



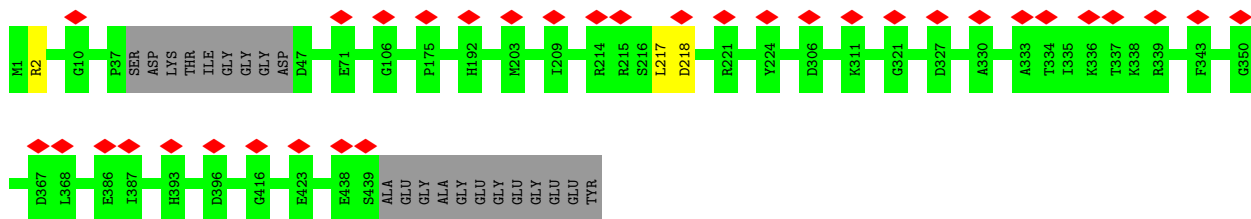
• Molecule 2: Tubulin alpha



• Molecule 2: Tubulin alpha



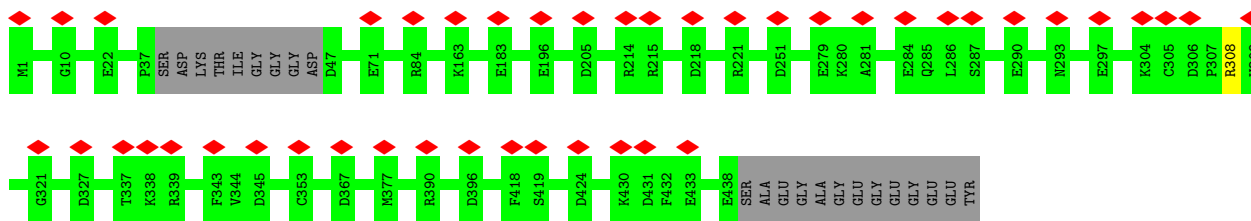
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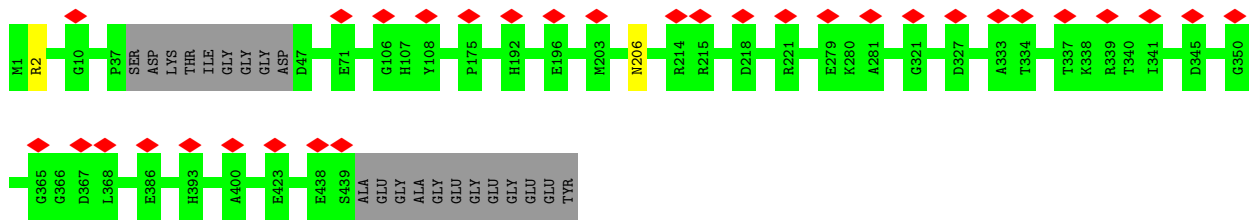
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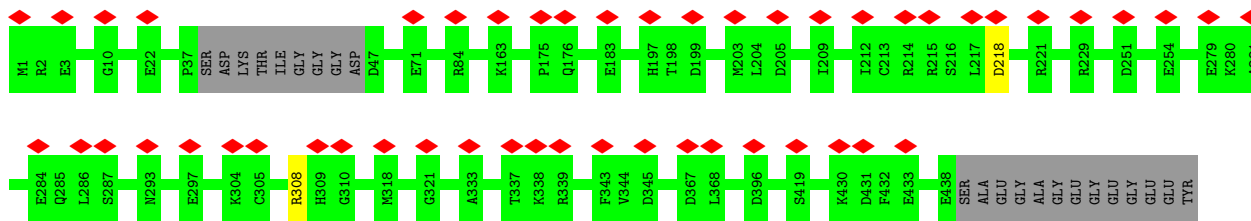




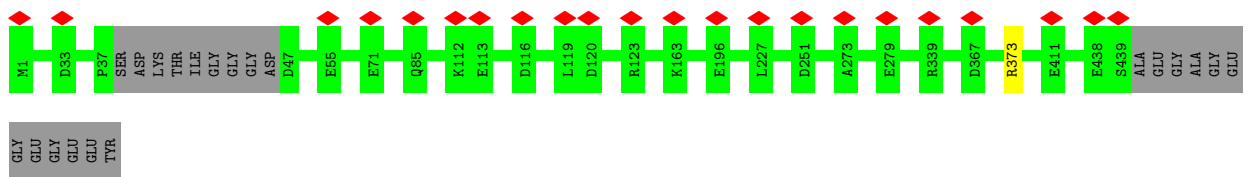
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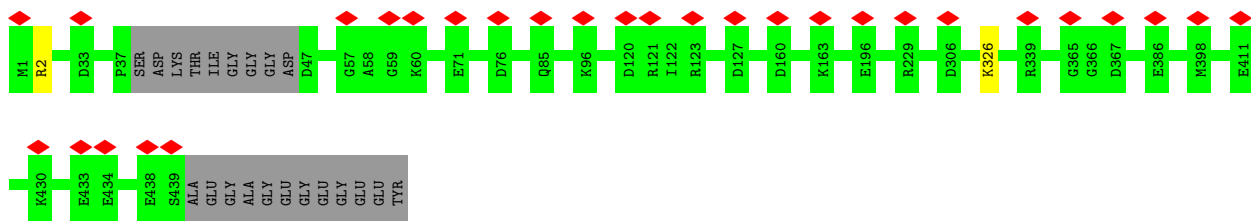
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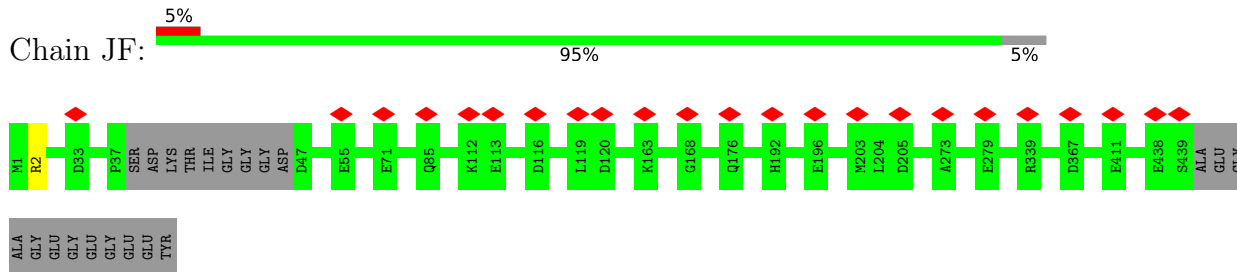
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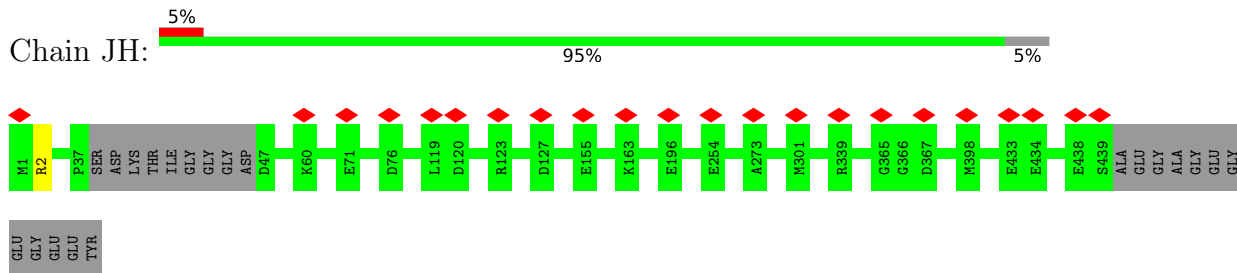
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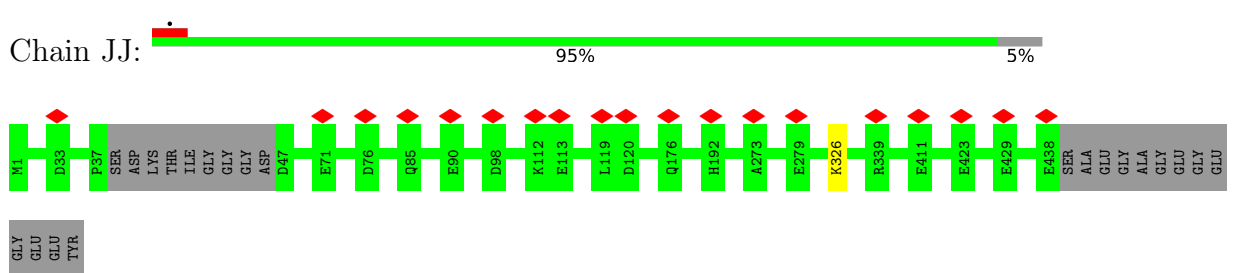
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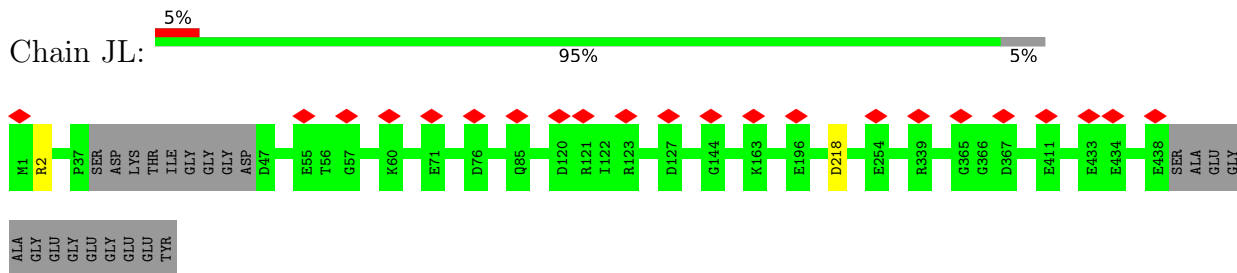
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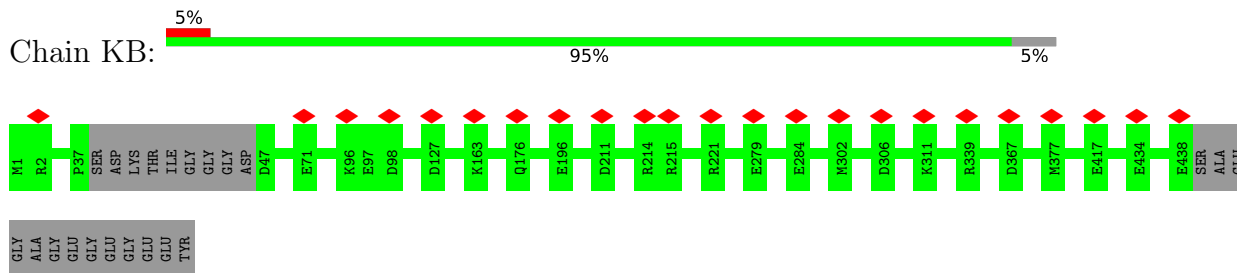
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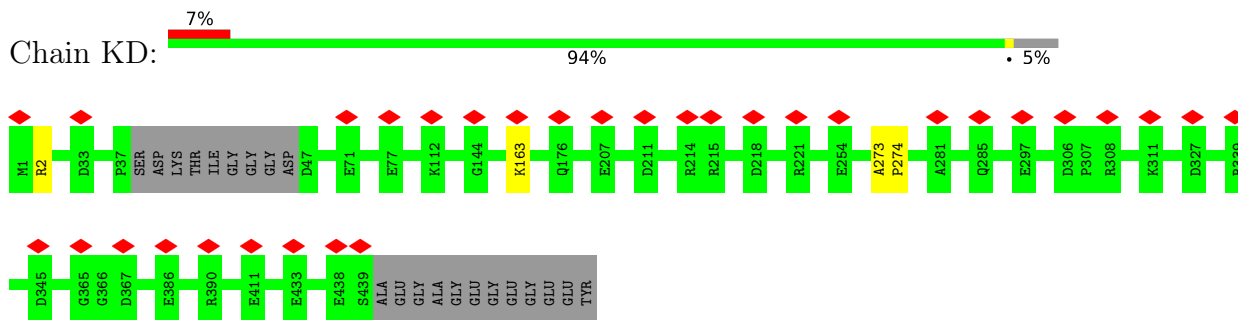
• Molecule 2: Tubulin alpha



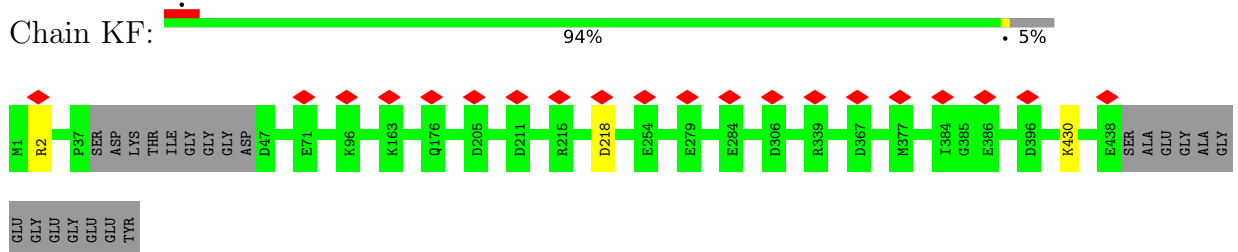
• Molecule 2: Tubulin alpha



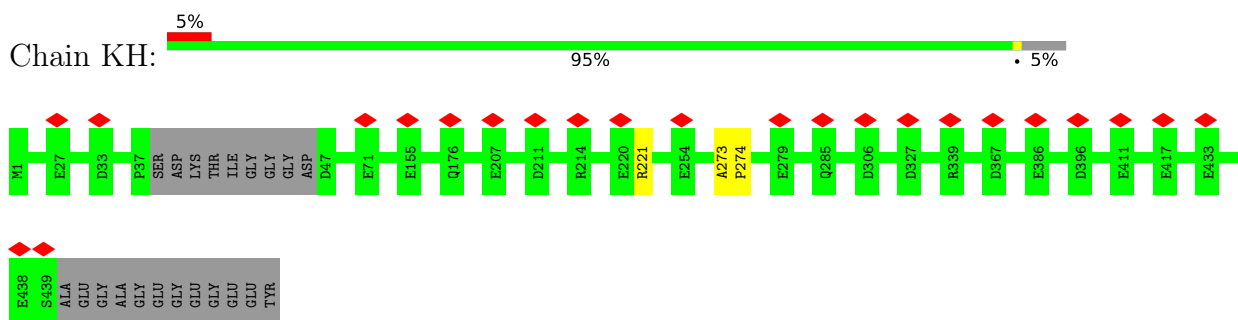
• Molecule 2: Tubulin alpha



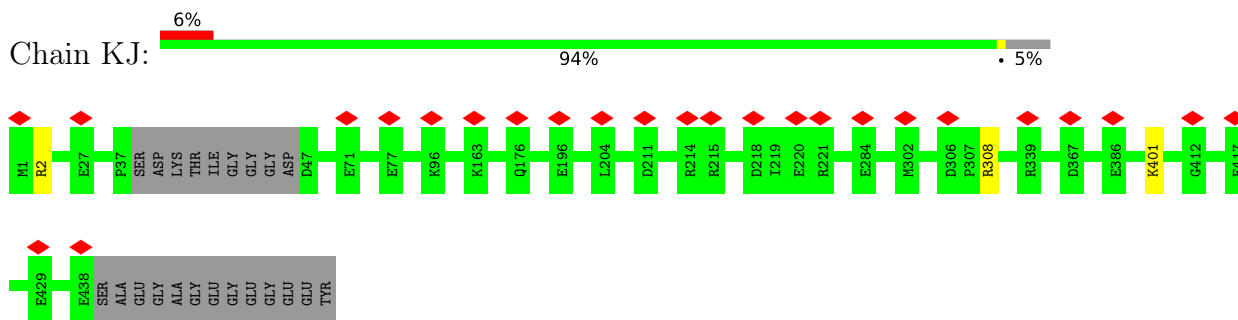
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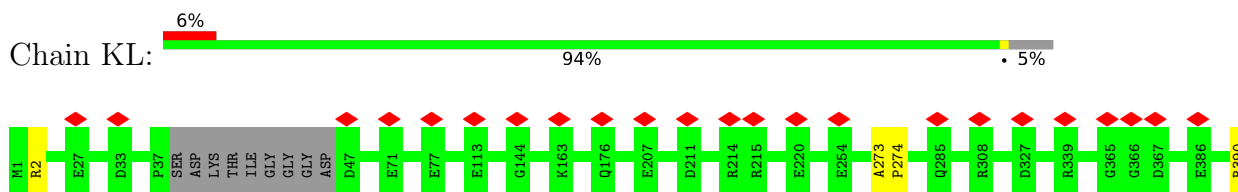
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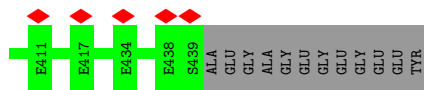


• Molecule 2: Tubulin alpha

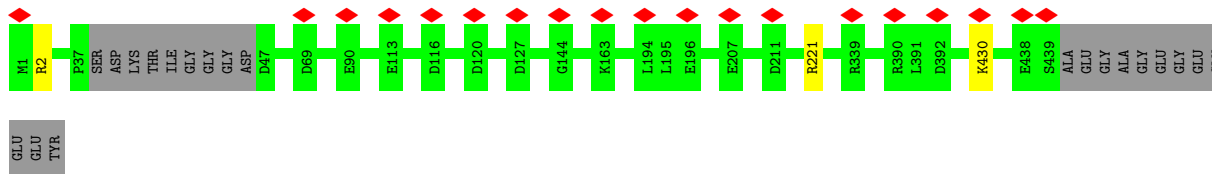


• Molecule 2: Tubulin alpha

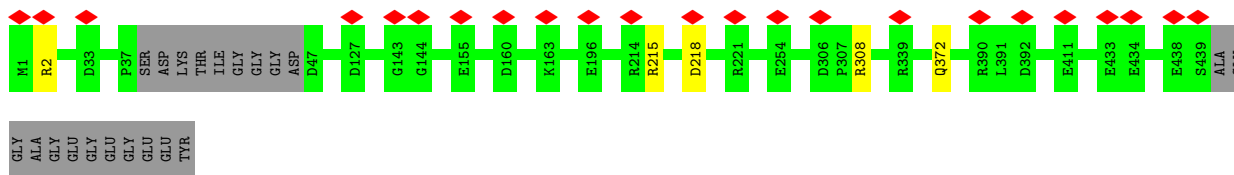




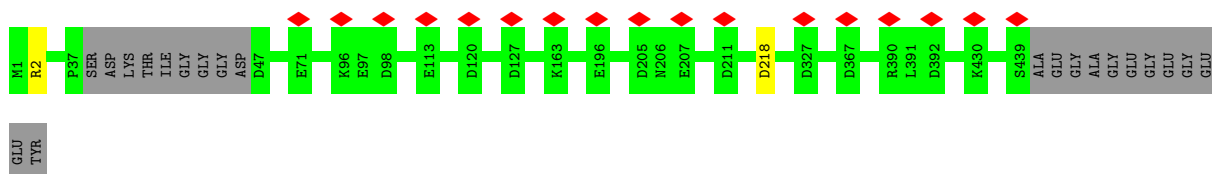
• Molecule 2: Tubulin alpha



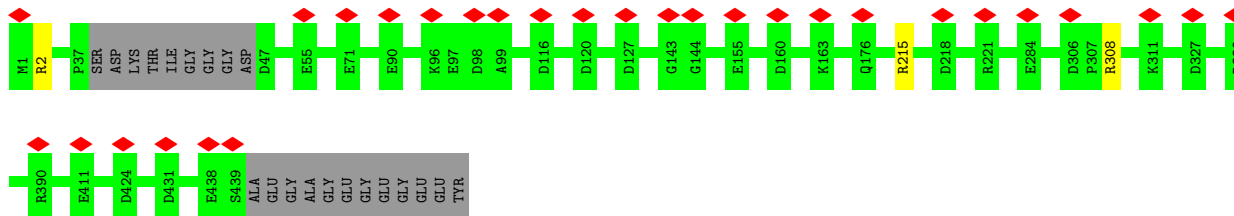
• Molecule 2: Tubulin alpha



• Molecule 2: Tubulin alpha

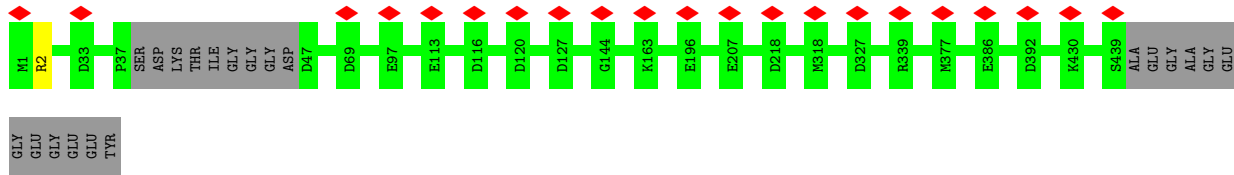


• Molecule 2: Tubulin alpha

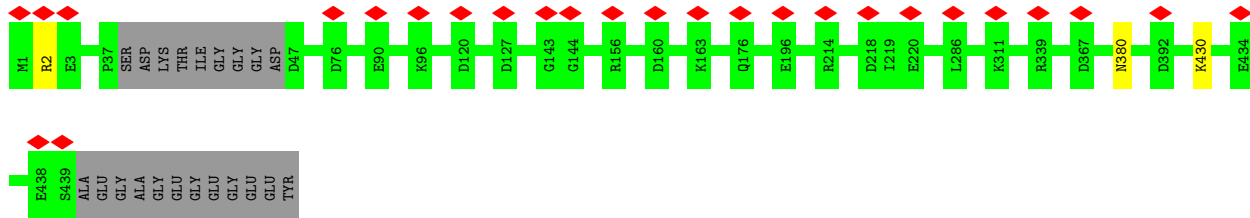


• Molecule 2: Tubulin alpha

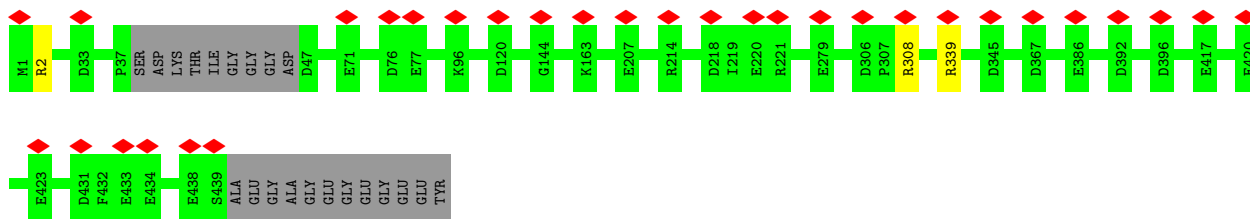




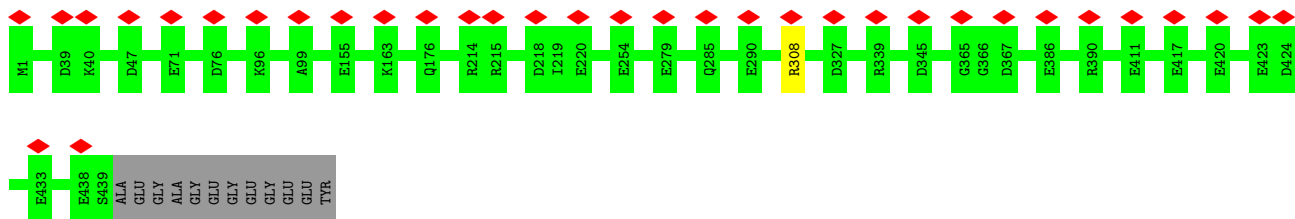
• Molecule 2: Tubulin alpha



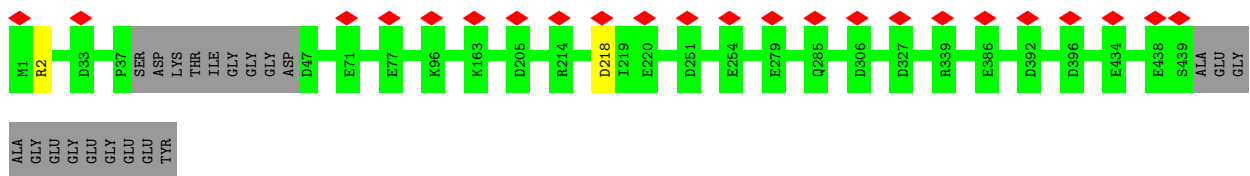
• Molecule 2: Tubulin alpha



• Molecule 2: Tubulin alpha



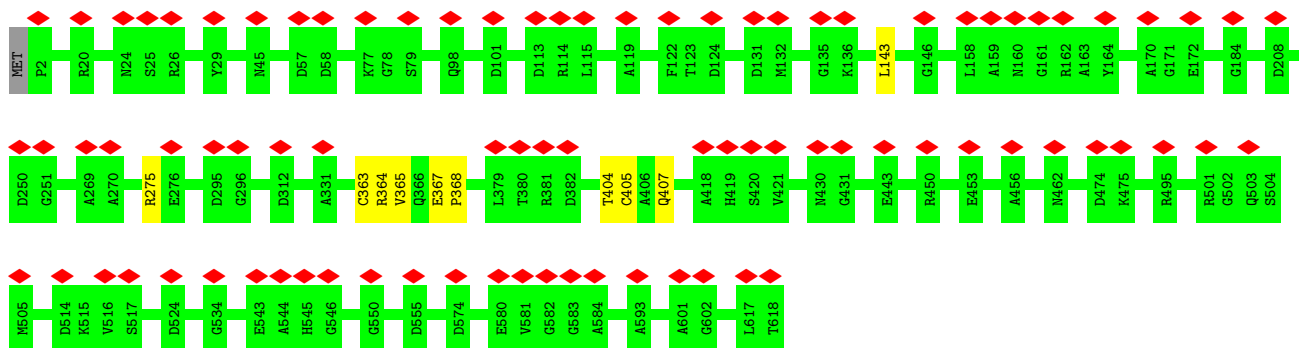
• Molecule 2: Tubulin alpha



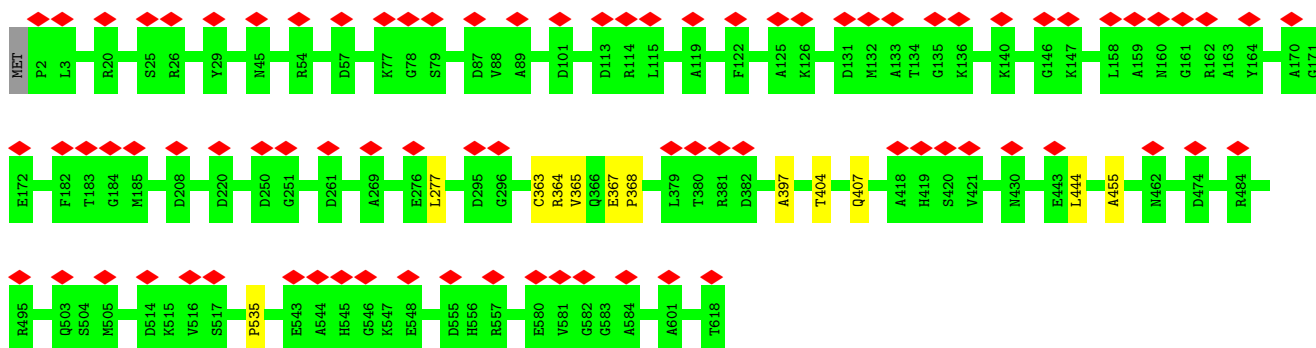


LEU  
VAL  
SER  
VAL  
ALA  
LEU  
LEU  
ASP  
GLY  
SER  
THR  
CYS  
PHE  
TRP  
GLN  
LEU  
THR

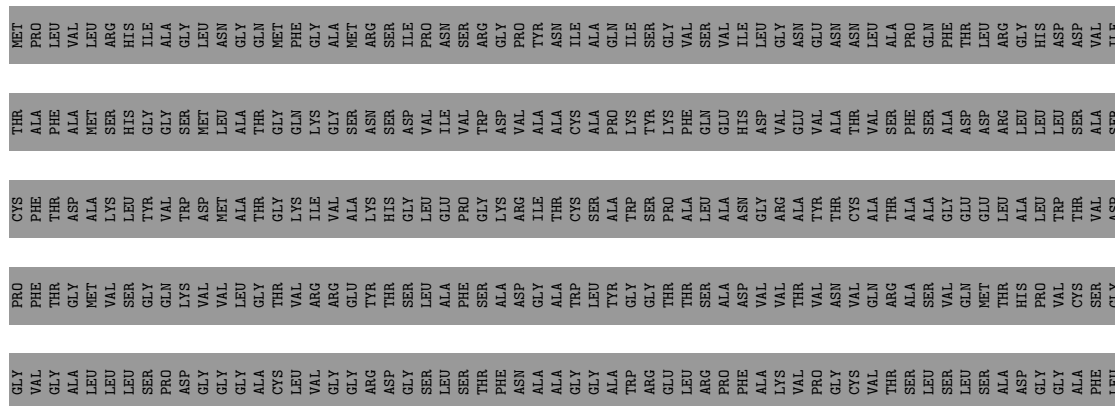
• Molecule 3: Cilia- and flagella-associated protein 20

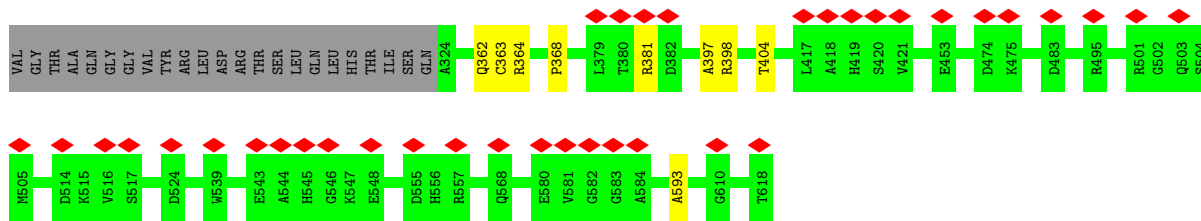


• Molecule 3: Cilia- and flagella-associated protein 20

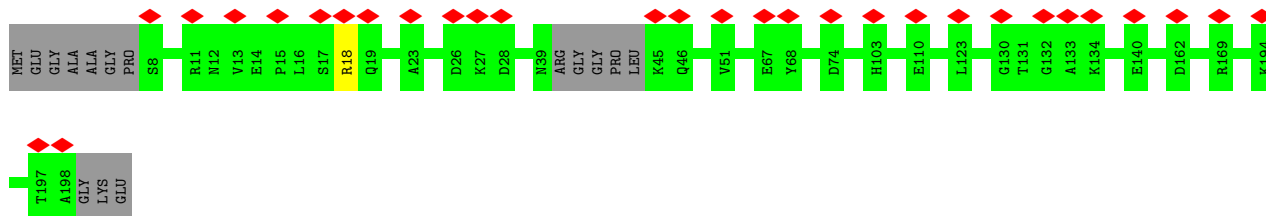
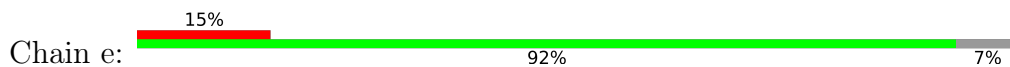


• Molecule 3: Cilia- and flagella-associated protein 20

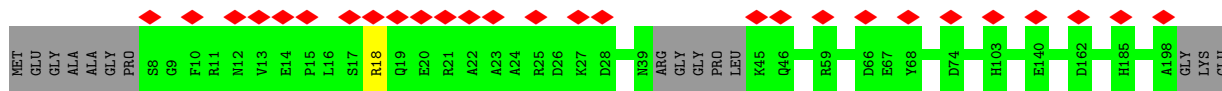
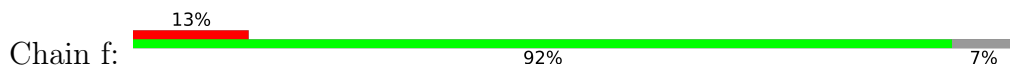




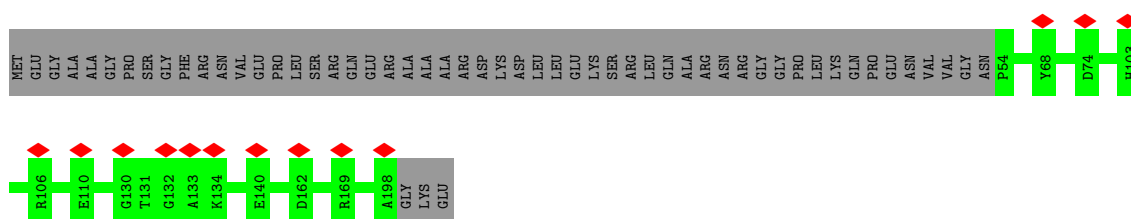
• Molecule 4: Unknown protein



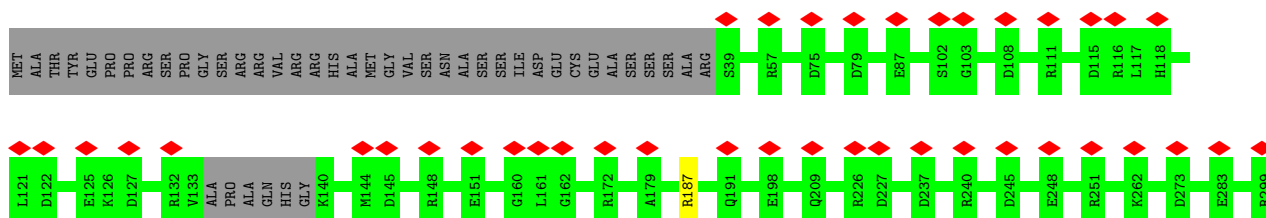
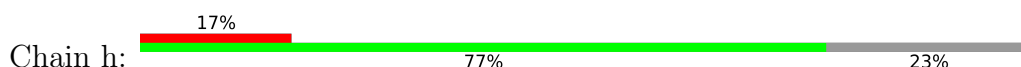
• Molecule 4: Unknown protein



• Molecule 4: Unknown protein



• Molecule 5: Unknown protein

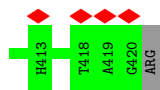




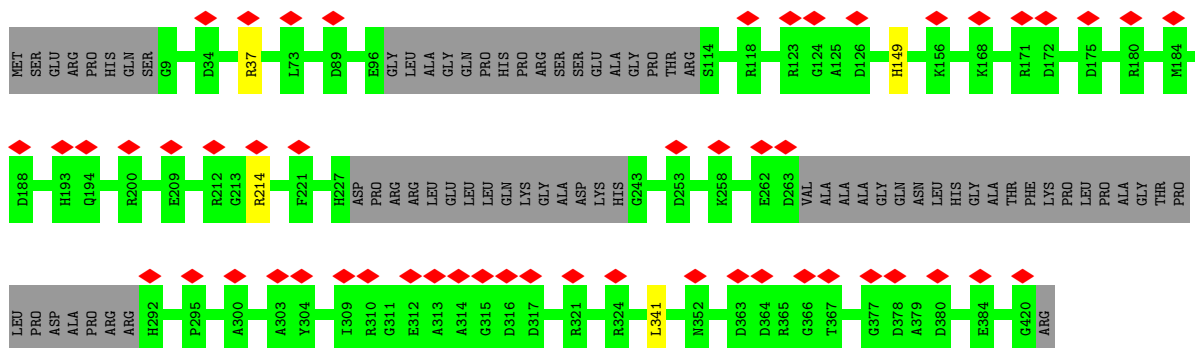
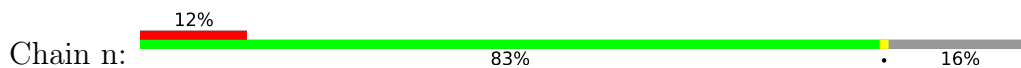




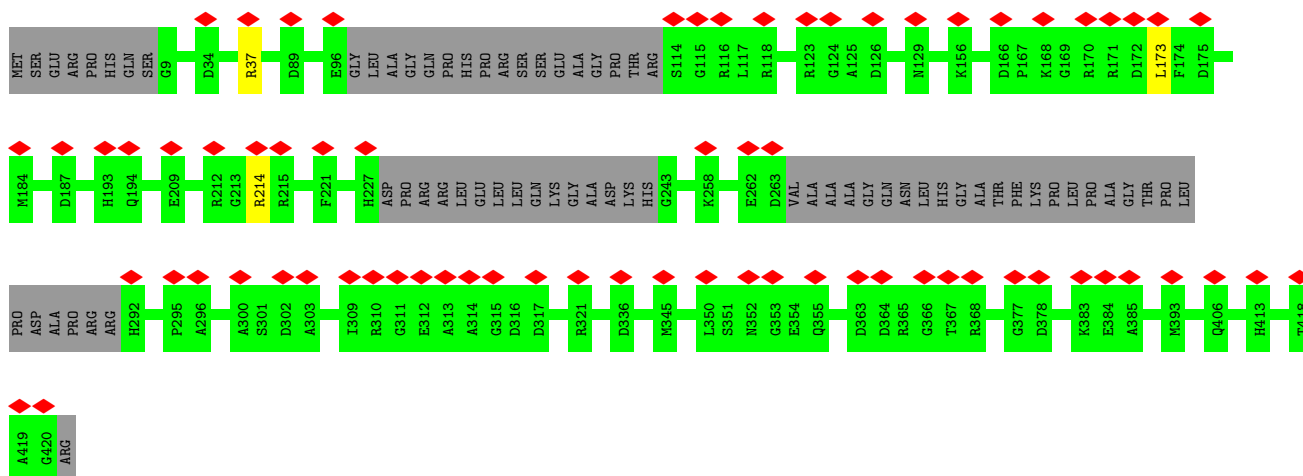
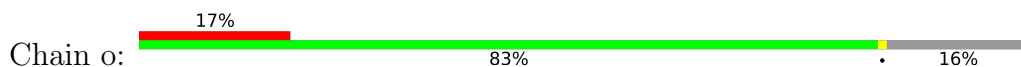




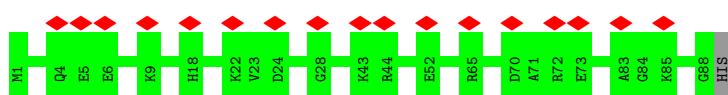
• Molecule 7: FAP65



• Molecule 7: FAP65

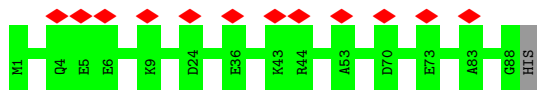


• Molecule 8: FAP70

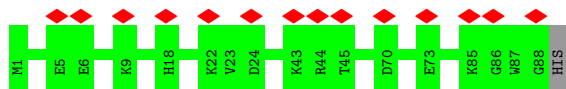


• Molecule 8: FAP70

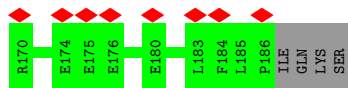
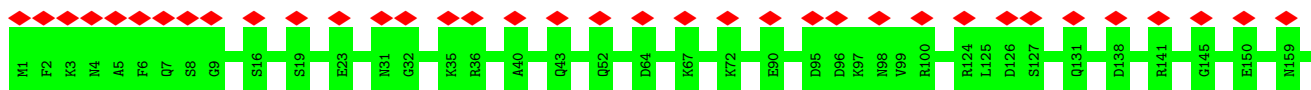




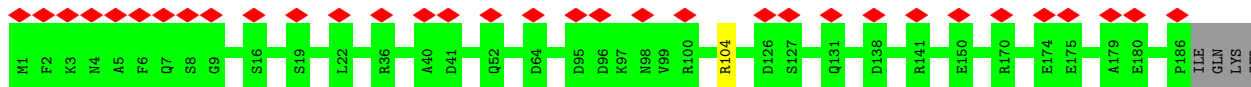
• Molecule 8: FAP70



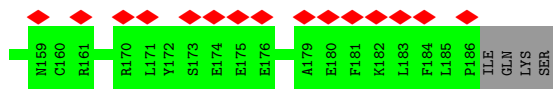
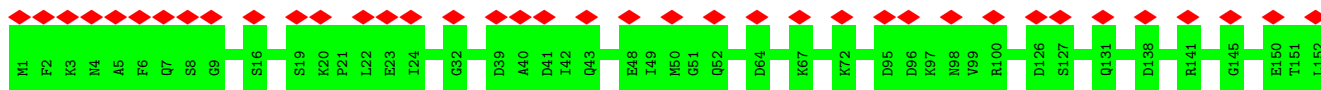
• Molecule 9: FAP147



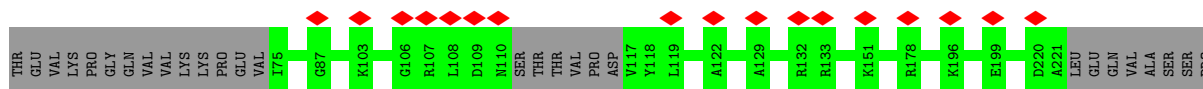
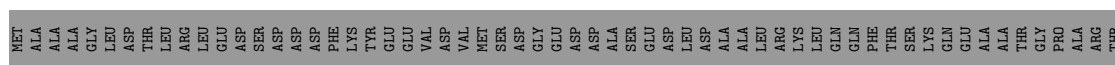
• Molecule 9: FAP147

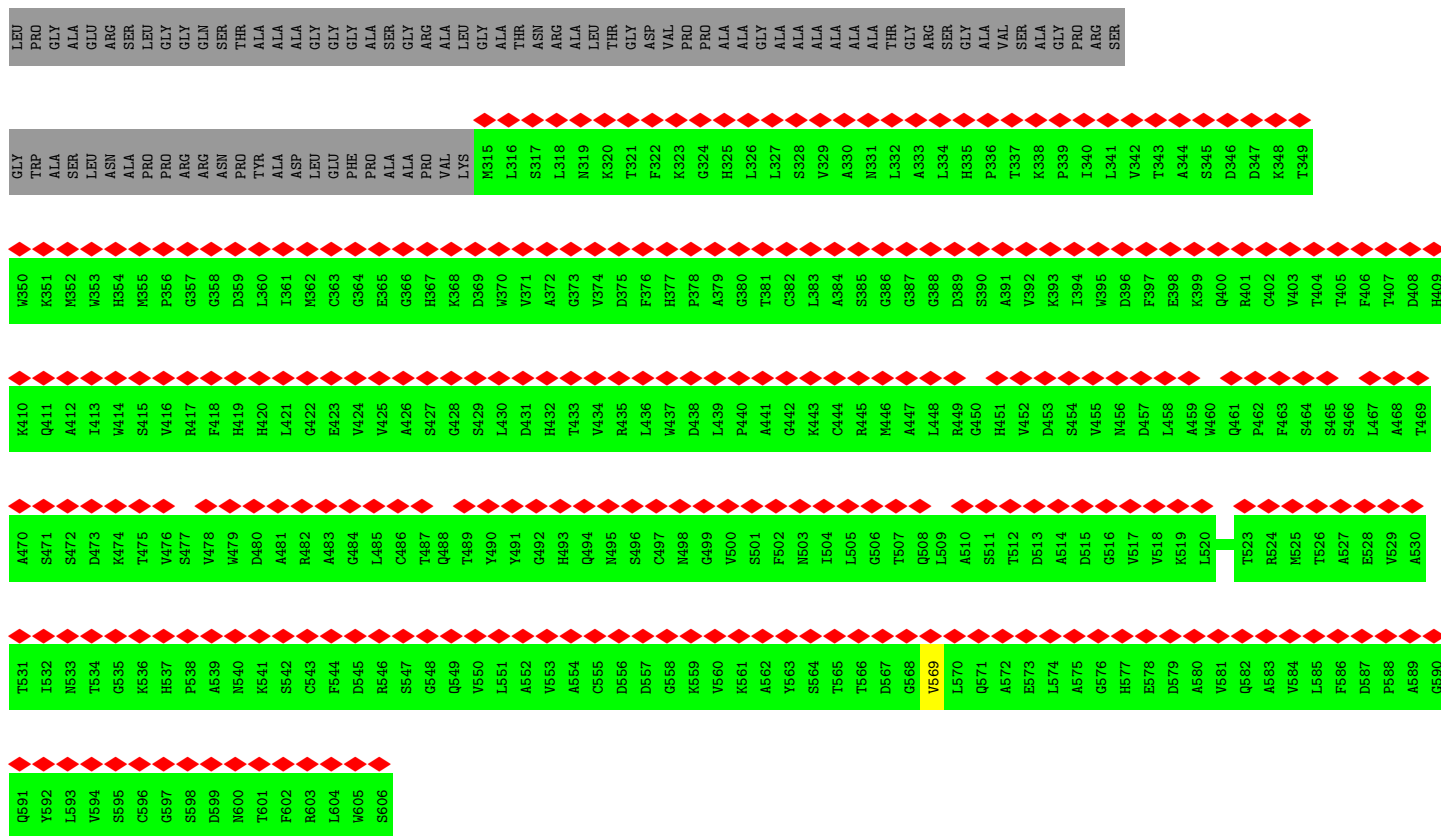


• Molecule 9: FAP147



• Molecule 10: FAP178





• Molecule 10: FAP178









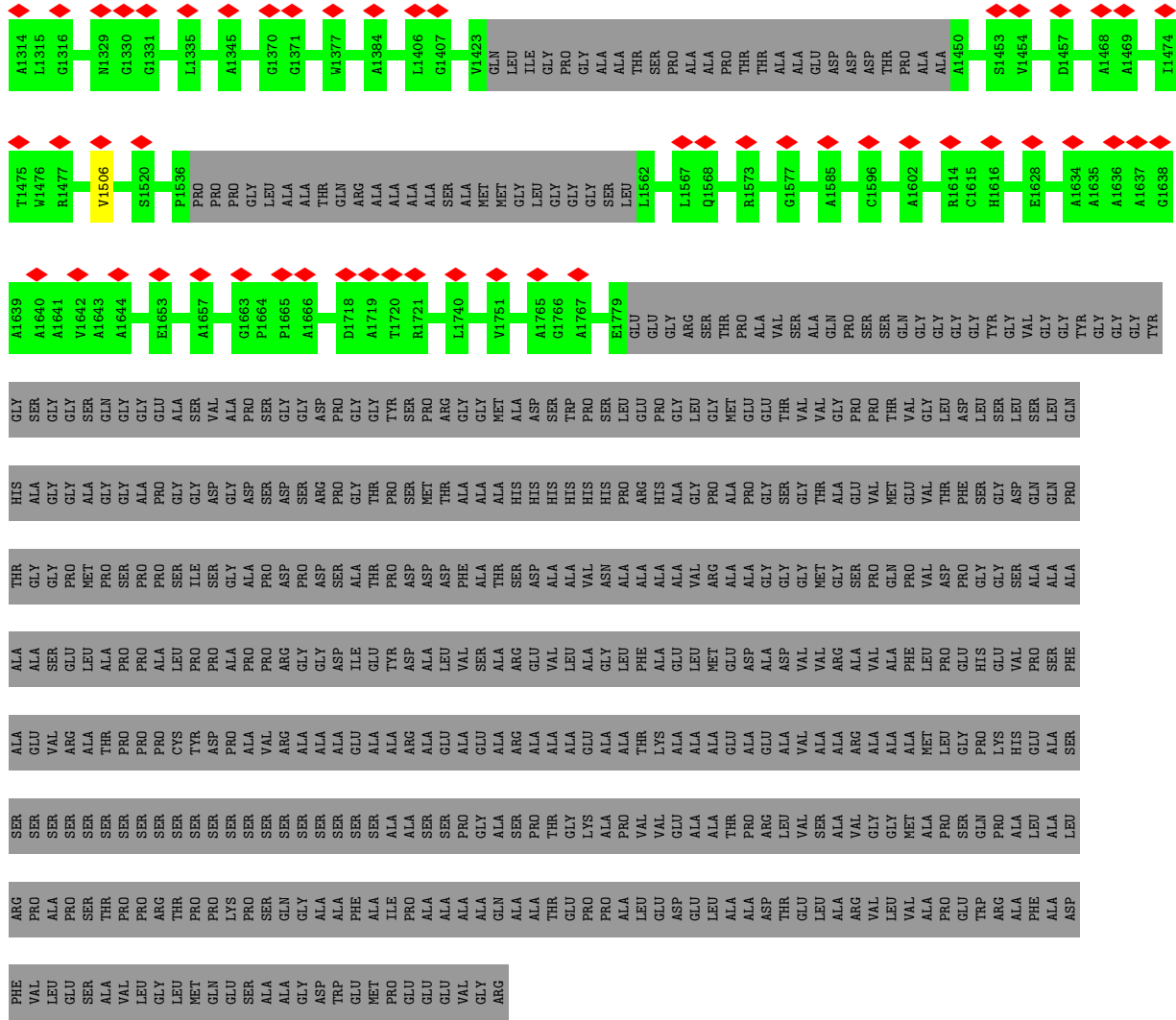




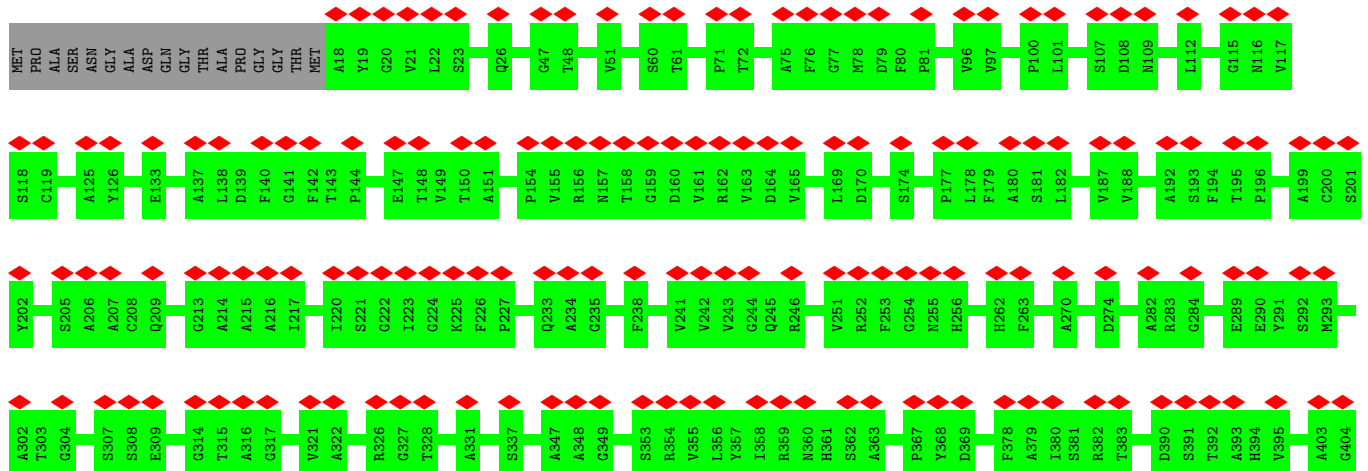


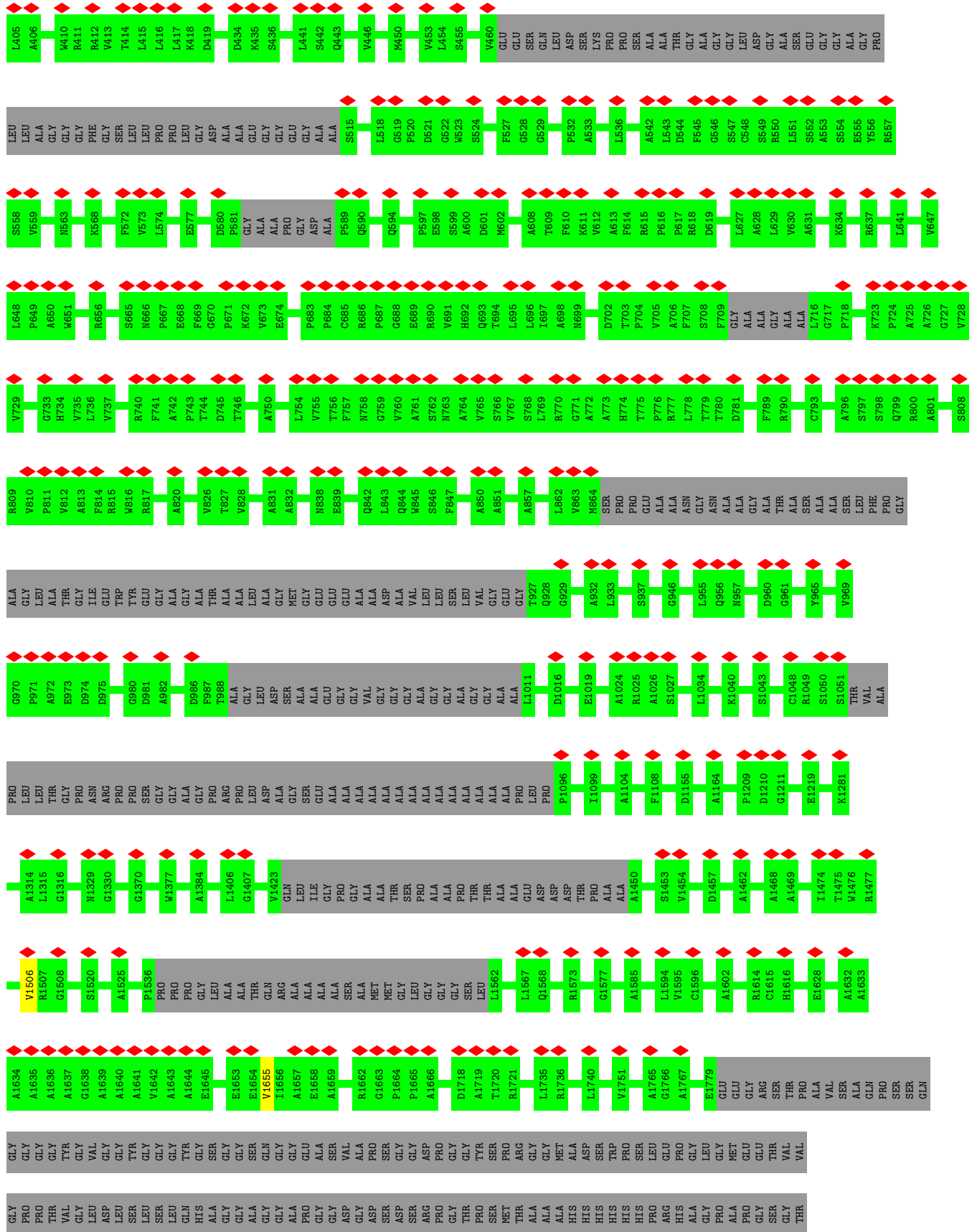






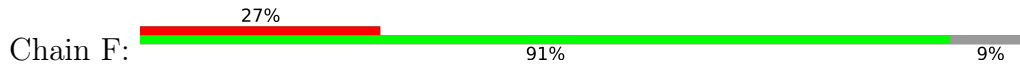
• Molecule 12: Flagellar associated protein





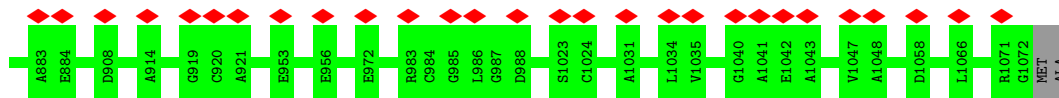
ALA	GLU	VAL	GLY	VAL	THR	PHE	GLY	GLY	ASP	GLN	PRO	THR	ALA	THR	GLY	GLY	GLY	MET	PRO
GLY	SER	PRO	GLN	ALA	VAL	ASP	PRO	GLY	GLY	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	VAL
ARG	ALA	VAL	ALA	PHE	LEU	PRO	HIS	VAL	VAL	GLU	PHE	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA
ALA	ARG	ALA	ALA	ALA	LEU	GLY	PRO	HIS	VAL	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	SER
ALA	VAL	GLY	LEU	VAL	ALA	PRO	TRP	ARG	ALA	PHE	ASP	ALA	ALA	ALA	ALA	ALA	ALA	ALA	LEU
ALA	ARG	VAL	LEU	VAL	ALA	PRO	GLU	ARG	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ARG

● Molecule 13: FAP196

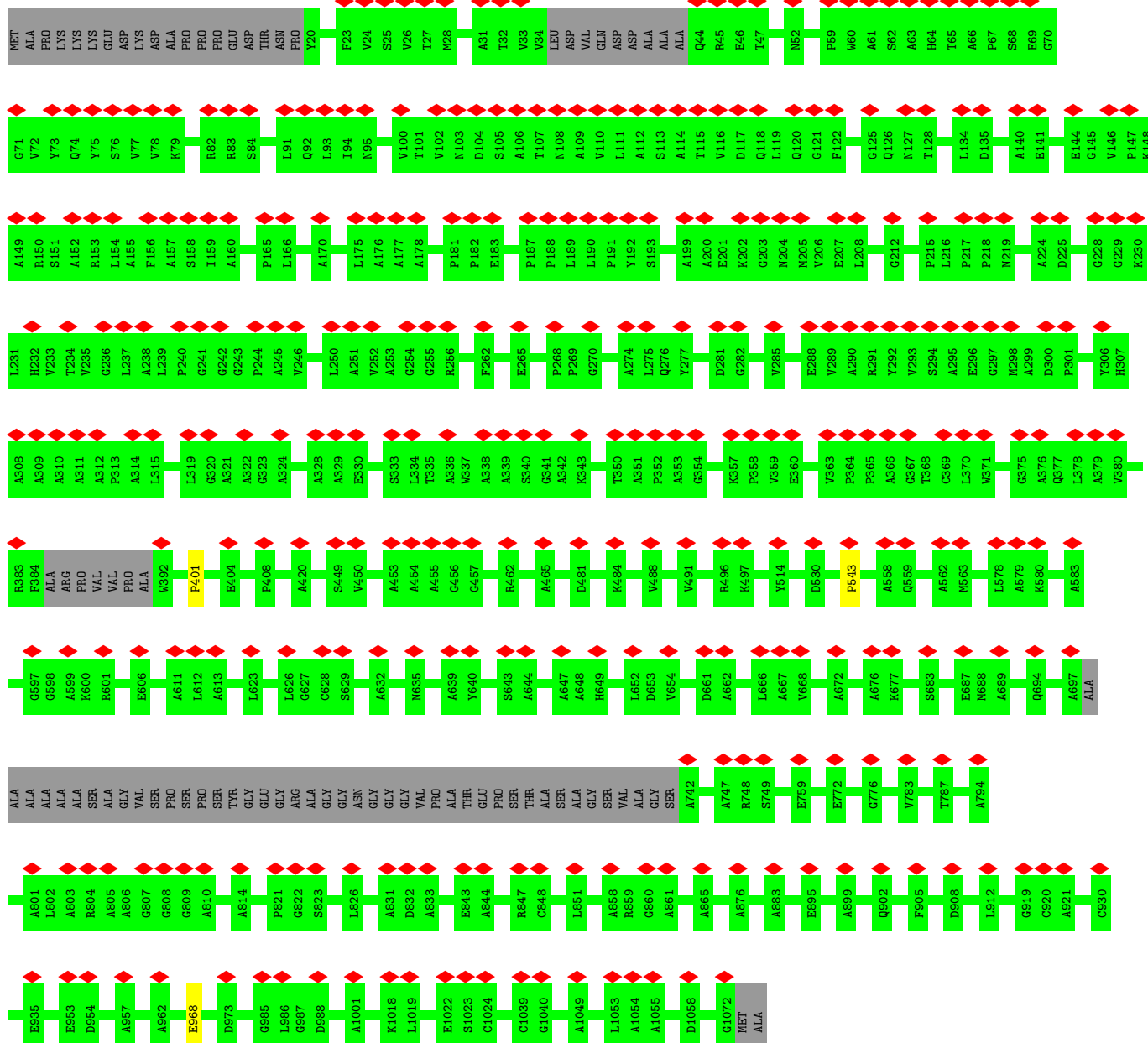
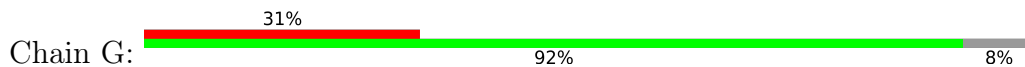


MET	ALA	PRO	LYS	LYS	GLU	ASP	ASP	ASP	ALA	PRO	PRO	GLU	D16	Y20	G21	V22	S30	A31	T32	V33	V34	V37	Q38	ASP	ALA	ALA	ALA	ALA	ALA	GLN	R45	E46	T47	T50	W60	A61	S62	A63	H64	T65	A66	P67	S68	E69	G71	V72	Y73	Q74	V77	K78	
H80	F81	R82	R83	S84	G85	G86	Q87	D88	G89	Q92	N95	G96	V97	L98	T99	V100	T101	D104	T107	N108	A109	V110	T115	V116	D117	F122	A123	I124	G125	Q126	N127	T128	W129	S130	T131	L134	D135	L136	V137	P138	A139	A140	E141	G145	V146	P147	K148	A149	R150	S151	A152
R153	L154	A155	F156	A157	S158	L161	D171	A172	A177	A178	P179	P180	P181	P182	E183	A184	E185	Y192	S193	K202	G203	E207	L208	V209	V210	S211	G212	L213	S214	P215	L216	Q221	A222	A223	A226	G227	G228	G229	K230	V233	T234	V235	G236	P240	G241	G242	G243	P244	A245		
V246	A247	V248	L250	A251	V252	A253	G254	G255	P260	R263	R264	G270	C271	L272	Q273	A274	Y277	A278	L279	E280	D281	G282	V285	V286	L287	E288	V289	A290	R291	Y292	V293	S294	A295	E296	G297	M298	E304	G305	V306	H307	A308	A309	A312	P313	A314	L315	A316	L319	G320		
G323	A324	T325	A328	A329	E330	G331	L332	S333	L334	T335	A339	S340	G341	A342	K343	T344	C345	L346	K355	P356	V359	E360	P365	A366	G367	T368	C369	L370	W371	E372	Q377	L378	A379	V380	F384	ALA	ARG	PRO	VAL	VAL	PRO	ALA	TRP	R393	P399	A441	V442	L443	PRO	PRO	
PRO	ASP	ALA	SER	VAL	ALA	ALA	ALA	ALA	GLY	GLY	ALA	GLU	G461	S496	G499	L525	A533	P543	Q559	L572	K580	Y592	G602	F608	A611	L612	R619	L626	G633	R634	N635	T636	D637	P638	A639	S643	G644	E645	A646	A647	D653										
S658	S659	L660	L666	A667	Y670	R671	A676	A679	E680	L681	A682	E685	Q686	E687	H688	E692	K693	L696	A697	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	VAL	PRO	SER	PRO	PRO	TRP	GLY	GLY	ARG	ALA	GLY	GLY	ASN	GLY	GLY	VAL	PRO	ALA	THR	GLU				
PRO	SER	THR	ALA	SER	ALA	SER	GLY	ALA	SER	A742	A747	A754	E759	S760	A770	A774	G776	L777	R778	H779	R804	A805	A806	G807	G808	G809	A810	A815	E816	A831	D832	A833	G834	E835	S838	E843	A844	A853	K857	G860	A861	T862	D863								

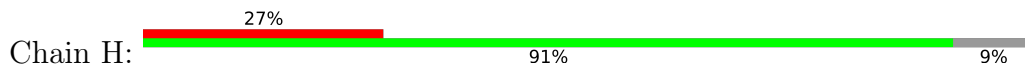


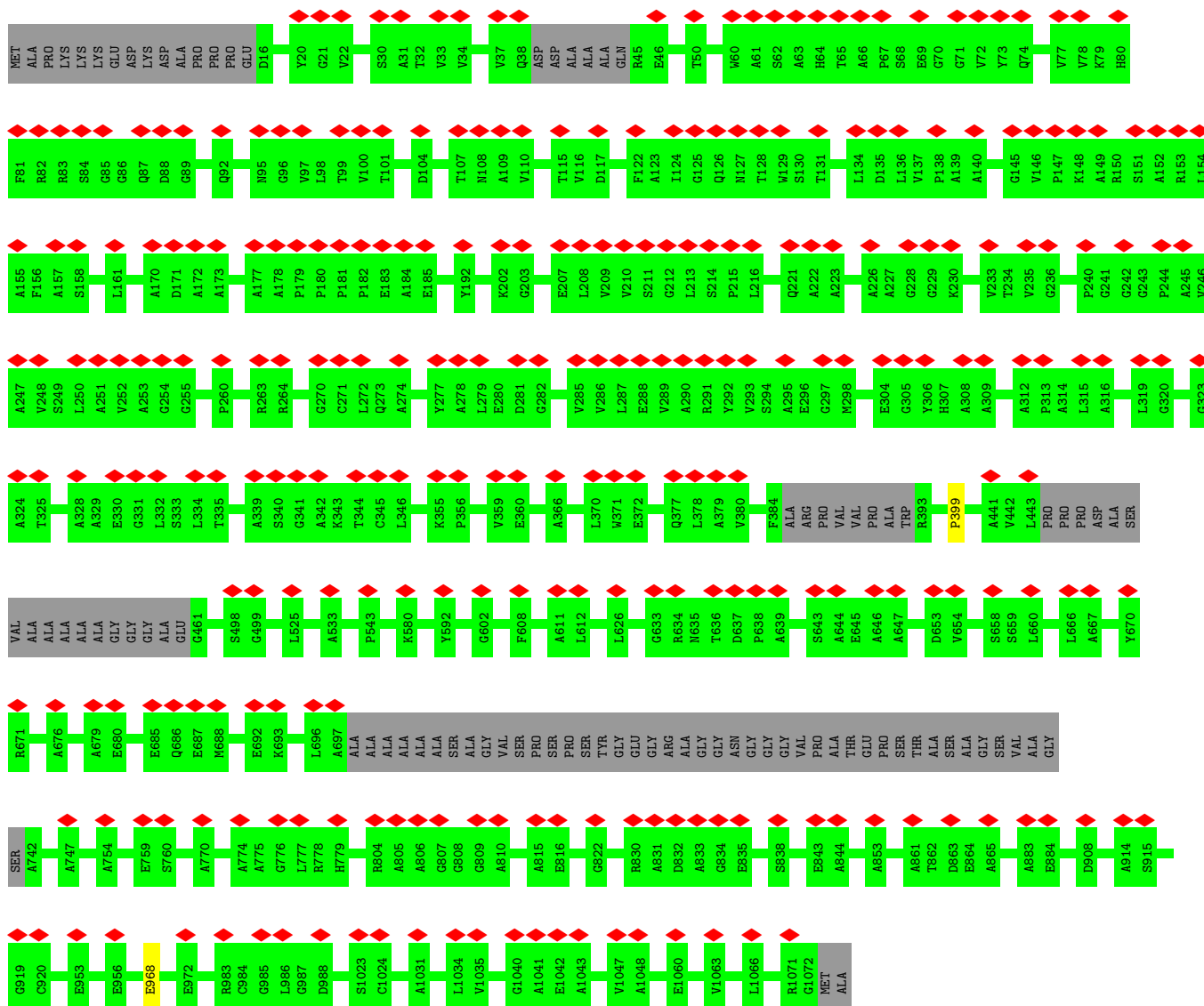


• Molecule 13: FAP196

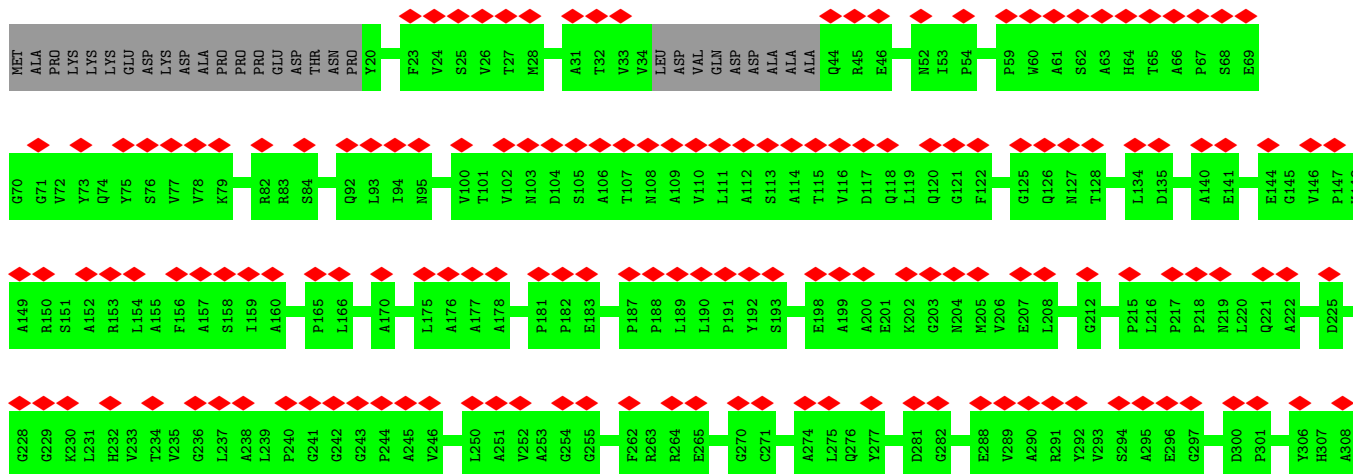
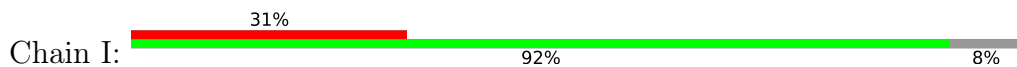


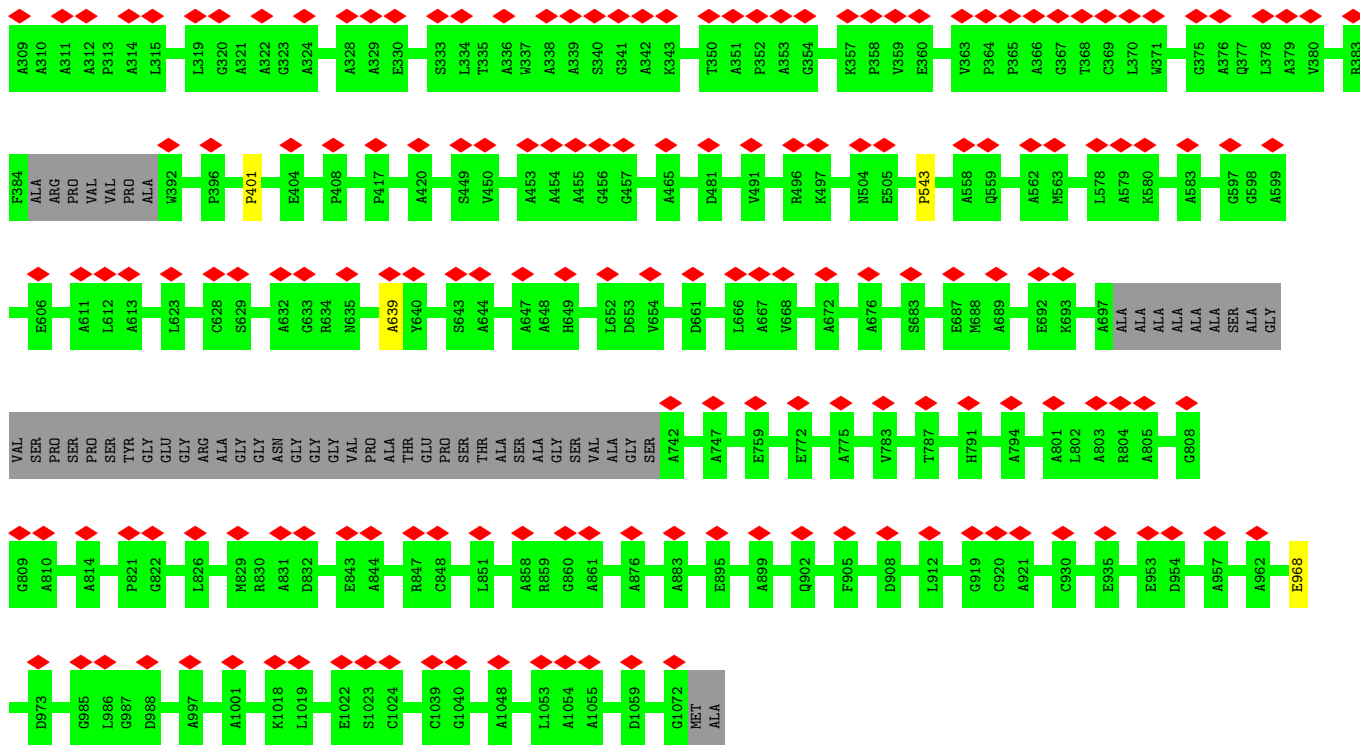
• Molecule 13: FAP196



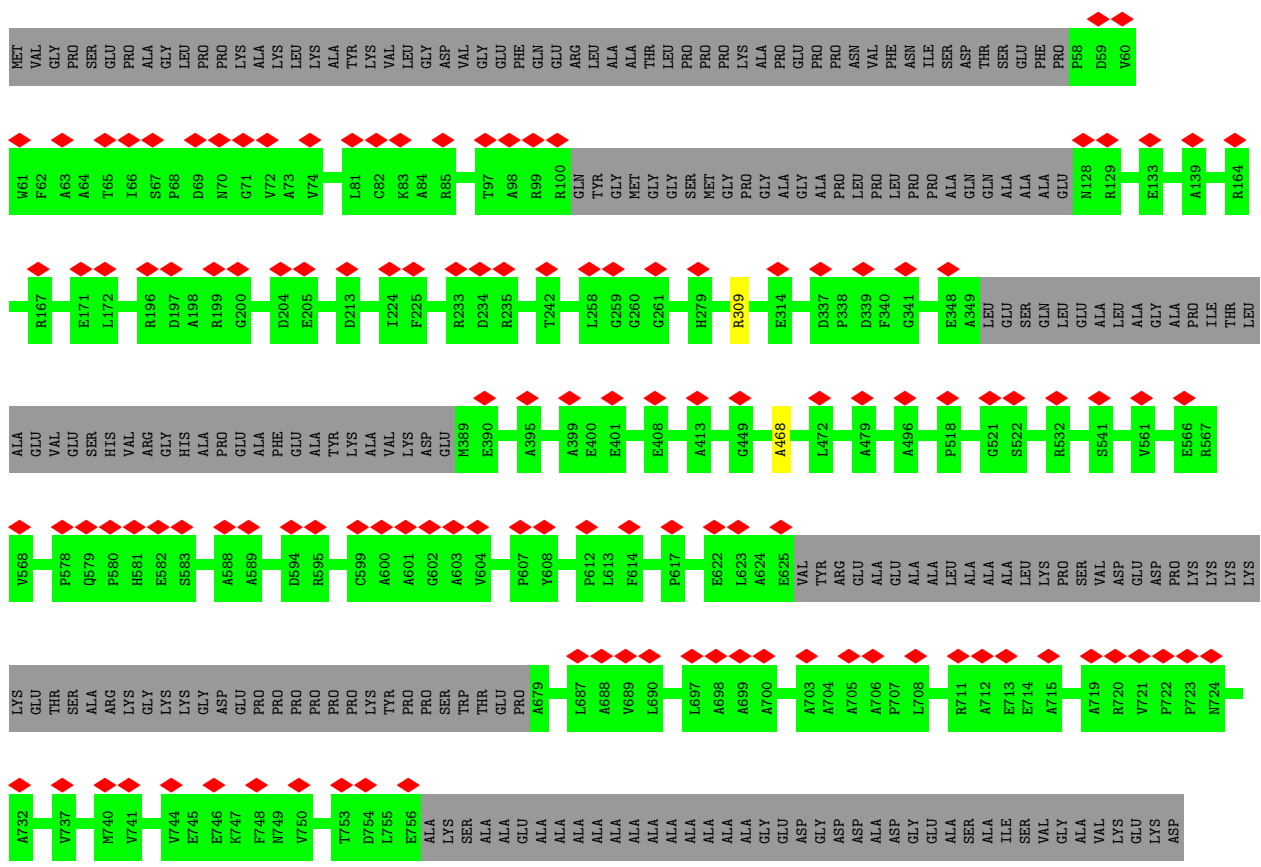


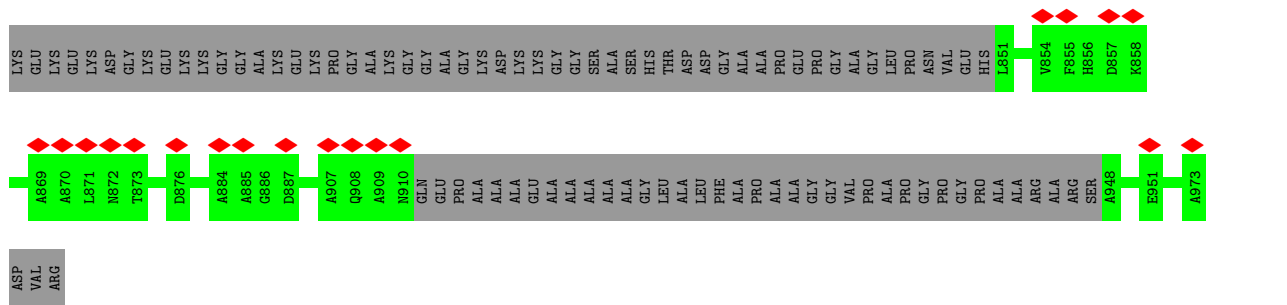
• Molecule 13: FAP196



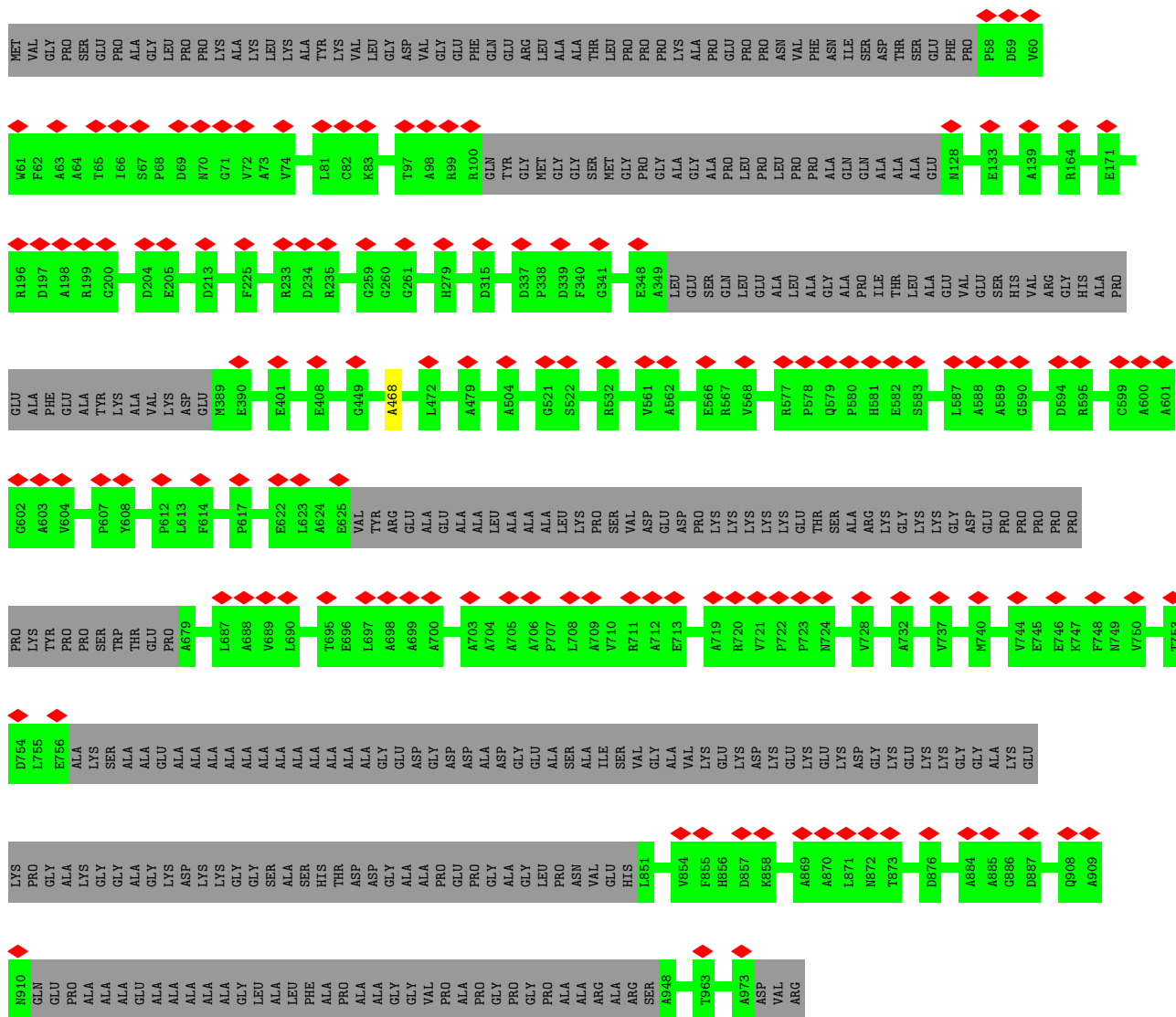


• Molecule 14: FAP213

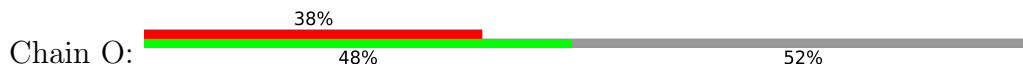




● Molecule 14: FAP213

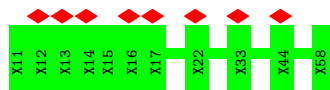


● Molecule 15: FAP225

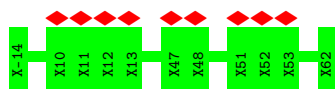




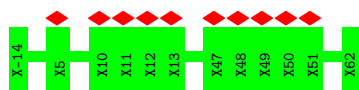




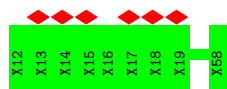
- Molecule 17: FAP388



- Molecule 17: FAP388



- Molecule 18: FAP424



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	104806	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	39.6	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	1.998	Depositor
Minimum map value	0.000	Depositor
Average map value	0.006	Depositor
Map value standard deviation	0.050	Depositor
Recommended contour level	0.2	Depositor
Map size (Å)	711.68, 711.68, 711.68	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.39, 1.39, 1.39	Depositor



## 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: GTP, GDP, MG

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	AA	0.27	0/3453	0.52	1/4673 (0.0%)
1	AC	0.27	0/3444	0.53	1/4661 (0.0%)
1	AE	0.28	0/3453	0.54	1/4673 (0.0%)
1	AG	0.29	0/3453	0.54	1/4673 (0.0%)
1	AI	0.27	0/3453	0.52	0/4673
1	AK	0.26	0/3453	0.52	0/4673
1	BA	0.27	0/3462	0.52	0/4685
1	BC	0.27	0/3428	0.53	0/4639
1	BE	0.28	0/3462	0.52	0/4685
1	BG	0.28	0/3428	0.54	0/4639
1	BI	0.27	0/3462	0.51	0/4685
1	BK	0.27	0/3428	0.53	0/4639
1	CA	0.26	0/3428	0.51	1/4639 (0.0%)
1	CC	0.28	0/3428	0.52	0/4639
1	CE	0.28	0/3428	0.53	1/4639 (0.0%)
1	CG	0.28	0/3428	0.52	0/4639
1	CI	0.27	0/3428	0.53	1/4639 (0.0%)
1	CK	0.27	0/3428	0.52	0/4639
1	DC	0.27	0/3428	0.51	0/4639
1	DE	0.27	0/3428	0.51	0/4639
1	DG	0.29	0/3428	0.51	0/4639
1	DI	0.28	0/3428	0.52	0/4639
1	DK	0.27	0/3428	0.52	0/4639
1	EA	0.27	0/3428	0.51	0/4639
1	EC	0.27	0/3428	0.52	0/4639
1	EE	0.28	0/3428	0.52	0/4639
1	EG	0.29	0/3428	0.53	0/4639
1	EI	0.27	0/3428	0.51	0/4639
1	EK	0.27	0/3428	0.52	0/4639
1	FA	0.27	0/3428	0.52	0/4639
1	FC	0.26	0/3428	0.52	1/4639 (0.0%)
1	FE	0.28	0/3428	0.54	0/4639

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	FG	0.27	0/3428	0.53	1/4639 (0.0%)
1	FI	0.27	0/3428	0.52	0/4639
1	FK	0.27	0/3428	0.53	0/4639
1	GC	0.27	0/3428	0.52	1/4639 (0.0%)
1	GE	0.27	0/3428	0.52	0/4639
1	GG	0.27	0/3428	0.53	0/4639
1	GI	0.28	0/3428	0.52	0/4639
1	GK	0.27	0/3428	0.52	1/4639 (0.0%)
1	GM	0.27	0/3428	0.53	1/4639 (0.0%)
1	HC	0.26	0/3428	0.52	0/4639
1	HE	0.27	0/3428	0.53	1/4639 (0.0%)
1	HG	0.28	0/3428	0.54	0/4639
1	HI	0.26	0/3428	0.54	1/4639 (0.0%)
1	HK	0.26	0/3428	0.53	1/4639 (0.0%)
1	HM	0.26	0/3428	0.54	1/4639 (0.0%)
1	IC	0.26	0/3428	0.52	0/4639
1	IE	0.26	0/3428	0.53	0/4639
1	IG	0.27	0/3428	0.53	0/4639
1	II	0.27	0/3428	0.54	0/4639
1	IK	0.27	0/3428	0.53	0/4639
1	IM	0.27	0/3428	0.52	0/4639
1	JC	0.26	0/3428	0.52	1/4639 (0.0%)
1	JE	0.27	0/3428	0.53	1/4639 (0.0%)
1	JG	0.27	0/3428	0.53	1/4639 (0.0%)
1	JI	0.29	0/3420	0.55	1/4628 (0.0%)
1	JK	0.27	0/3428	0.54	1/4639 (0.0%)
1	JM	0.26	0/3420	0.52	0/4628
1	KC	0.27	0/3428	0.52	0/4639
1	KE	0.28	0/3428	0.54	1/4639 (0.0%)
1	KG	0.28	0/3428	0.53	0/4639
1	KI	0.28	0/3428	0.55	1/4639 (0.0%)
1	KK	0.27	0/3428	0.52	0/4639
1	LC	0.27	0/3428	0.51	0/4639
1	LE	0.27	0/3428	0.53	0/4639
1	LG	0.28	0/3428	0.52	0/4639
1	LI	0.28	0/3428	0.53	0/4639
1	LK	0.26	0/3428	0.52	0/4639
1	MC	0.27	0/3453	0.52	0/4673
1	ME	0.28	0/3428	0.53	0/4639
1	MG	0.29	0/3453	0.52	0/4673
1	MI	0.28	0/3428	0.52	0/4639
1	MK	0.28	0/3453	0.52	0/4673
2	AB	0.27	0/3426	0.53	0/4644

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
2	AD	0.26	0/3426	0.52	0/4644
2	AF	0.28	0/3426	0.53	0/4644
2	AH	0.29	0/3412	0.54	0/4625
2	AJ	0.26	0/3426	0.51	0/4644
2	AL	0.26	0/3412	0.52	0/4625
2	BB	0.26	0/3465	0.53	0/4697
2	BD	0.28	0/3412	0.52	0/4625
2	BF	0.28	0/3465	0.55	0/4697
2	BH	0.28	0/3412	0.53	0/4625
2	BJ	0.27	0/3465	0.53	0/4697
2	BL	0.26	0/3412	0.52	0/4625
2	CB	0.28	0/3406	0.53	0/4617
2	CD	0.28	0/3406	0.53	0/4617
2	CF	0.28	0/3406	0.52	0/4617
2	CH	0.28	0/3406	0.54	0/4617
2	CJ	0.27	0/3412	0.52	0/4625
2	DB	0.28	0/3412	0.54	0/4625
2	DD	0.28	0/3406	0.53	0/4617
2	DF	0.28	0/3412	0.55	0/4625
2	DH	0.28	0/3412	0.52	0/4625
2	DJ	0.27	0/3412	0.52	0/4625
2	DL	0.27	0/3412	0.53	0/4625
2	EB	0.27	0/3465	0.53	0/4697
2	ED	0.27	0/3406	0.53	0/4617
2	EF	0.29	0/3471	0.54	1/4705 (0.0%)
2	EH	0.28	0/3406	0.54	0/4617
2	EJ	0.27	0/3465	0.53	0/4697
2	EL	0.27	0/3406	0.52	0/4617
2	FB	0.27	0/3412	0.52	0/4625
2	FD	0.26	0/3412	0.51	0/4625
2	FF	0.28	0/3412	0.53	0/4625
2	FH	0.29	0/3412	0.56	2/4625 (0.0%)
2	FJ	0.27	0/3412	0.52	0/4625
2	FL	0.26	0/3412	0.52	0/4625
2	GD	0.27	0/3412	0.54	1/4625 (0.0%)
2	GF	0.27	0/3412	0.55	0/4625
2	GH	0.28	0/3412	0.53	1/4625 (0.0%)
2	GJ	0.28	0/3412	0.53	0/4625
2	GL	0.27	0/3412	0.53	0/4625
2	HD	0.27	0/3412	0.54	0/4625
2	HF	0.27	0/3412	0.55	0/4625
2	HH	0.27	0/3412	0.53	0/4625
2	HJ	0.27	0/3397	0.54	0/4605

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
2	HL	0.26	0/3412	0.52	0/4625
2	ID	0.27	0/3406	0.54	1/4617 (0.0%)
2	IF	0.27	0/3412	0.55	2/4625 (0.0%)
2	IH	0.27	0/3406	0.52	0/4617
2	IJ	0.27	0/3412	0.54	0/4625
2	IL	0.27	0/3406	0.54	1/4617 (0.0%)
2	JB	0.26	0/3412	0.54	0/4625
2	JD	0.27	0/3412	0.52	0/4625
2	JF	0.27	0/3412	0.55	0/4625
2	JH	0.28	0/3412	0.52	0/4625
2	JJ	0.27	0/3406	0.53	0/4617
2	JL	0.27	0/3406	0.53	1/4617 (0.0%)
2	KB	0.27	0/3406	0.52	0/4617
2	KD	0.27	0/3412	0.53	0/4625
2	KF	0.28	0/3406	0.54	1/4617 (0.0%)
2	KH	0.28	0/3412	0.54	0/4625
2	KJ	0.27	0/3406	0.53	0/4617
2	KL	0.27	0/3412	0.53	0/4625
2	LB	0.26	0/3412	0.52	0/4625
2	LD	0.27	0/3412	0.53	1/4625 (0.0%)
2	LF	0.28	0/3412	0.54	1/4625 (0.0%)
2	LH	0.27	0/3412	0.54	0/4625
2	LJ	0.27	0/3412	0.53	0/4625
2	LL	0.26	0/3412	0.51	0/4625
2	MB	0.27	0/3412	0.52	0/4625
2	MD	0.27	0/3471	0.51	0/4705
2	MF	0.28	0/3412	0.53	1/4625 (0.0%)
2	MH	0.28	0/3476	0.53	0/4712
2	MJ	0.28	0/3412	0.52	0/4625
2	ML	0.27	0/3476	0.52	0/4712
3	a	0.27	0/2428	0.58	0/3300
3	b	0.28	0/4634	0.61	1/6298 (0.0%)
3	c	0.28	0/4634	0.64	3/6298 (0.0%)
3	d	0.27	0/2228	0.62	0/3026
4	e	0.26	0/1484	0.57	0/1994
4	f	0.27	0/1484	0.54	0/1994
4	g	0.28	0/1154	0.52	0/1553
5	h	0.26	0/4608	0.56	0/6234
5	i	0.27	0/4608	0.58	0/6234
5	j	0.26	0/4608	0.56	0/6234
6	k	0.26	0/3072	0.58	0/4147
6	l	0.27	0/3072	0.58	2/4147 (0.0%)
6	s	0.26	0/2253	0.56	0/3048

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
7	m	0.27	0/2808	0.60	1/3798 (0.0%)
7	n	0.27	0/2808	0.63	1/3798 (0.0%)
7	o	0.26	0/2808	0.60	1/3798 (0.0%)
8	p	0.25	0/714	0.58	0/962
8	q	0.26	0/714	0.58	0/962
8	r	0.25	0/714	0.58	0/962
9	A	0.26	0/1564	0.58	0/2113
9	B	0.26	0/1564	0.57	0/2113
9	C	0.26	0/1564	0.58	0/2113
10	P	0.27	0/2503	0.51	0/3420
10	Q	0.26	0/2498	0.52	1/3413 (0.0%)
10	R	0.27	0/2503	0.53	0/3420
10	S	0.26	0/2498	0.53	1/3413 (0.0%)
10	Z	0.23	0/786	0.47	0/1041
10	aa	0.24	0/1434	0.47	0/1989
10	cc	0.23	0/769	0.48	0/1018
11	T	0.24	0/310	0.33	0/429
11	U	0.24	0/285	0.30	0/394
11	V	0.25	0/331	0.39	0/460
11	W	0.23	0/311	0.34	0/432
12	D	0.26	0/7465	0.45	0/10373
12	E	0.26	0/7465	0.45	0/10373
12	bb	0.27	0/1076	0.57	0/1482
13	F	0.26	0/4827	0.40	0/6703
13	G	0.26	0/4880	0.40	0/6777
13	H	0.26	0/4827	0.40	0/6703
13	I	0.26	0/4880	0.40	0/6777
14	J	0.26	0/3904	0.49	0/5372
14	K	0.26	0/3904	0.49	0/5372
15	L	0.26	0/861	0.47	0/1163
15	M	0.26	0/861	0.47	0/1163
15	N	0.27	0/861	0.47	0/1163
15	O	0.26	0/861	0.48	0/1163
15	X	0.27	0/861	0.47	0/1163
15	Y	0.26	0/861	0.48	0/1163
All	All	0.27	0/625065	0.53	48/848033 (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	DB	0	1
2	DF	0	1
2	GD	0	1
2	HD	0	1
2	HL	0	1
2	KD	0	1
2	KH	0	1
2	KL	0	1
3	c	0	1
3	d	0	1
13	G	0	1
13	H	0	1
13	I	0	1
All	All	0	13

There are no bond length outliers.

The worst 5 of 48 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	o	173	LEU	CA-CB-CG	6.77	130.88	115.30
3	c	277	LEU	CA-CB-CG	6.68	130.68	115.30
7	m	173	LEU	CA-CB-CG	6.59	130.46	115.30
1	CE	284	LEU	CA-CB-CG	6.44	130.10	115.30
1	AG	284	LEU	CA-CB-CG	6.27	129.71	115.30

There are no chirality outliers.

5 of 13 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	DB	401	LYS	Peptide
2	DF	273	ALA	Peptide
2	GD	273	ALA	Peptide
2	HD	273	ALA	Peptide
2	HL	273	ALA	Peptide

## 5.2 Too-close contacts [i](#)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

## 5.3 Torsion angles

### 5.3.1 Protein backbone

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

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	AA	429/443 (97%)	417 (97%)	12 (3%)	0	100	100
1	AC	428/443 (97%)	412 (96%)	16 (4%)	0	100	100
1	AE	429/443 (97%)	414 (96%)	15 (4%)	0	100	100
1	AG	429/443 (97%)	417 (97%)	12 (3%)	0	100	100
1	AI	429/443 (97%)	416 (97%)	13 (3%)	0	100	100
1	AK	429/443 (97%)	415 (97%)	14 (3%)	0	100	100
1	BA	430/443 (97%)	421 (98%)	9 (2%)	0	100	100
1	BC	425/443 (96%)	416 (98%)	9 (2%)	0	100	100
1	BE	430/443 (97%)	417 (97%)	13 (3%)	0	100	100
1	BG	425/443 (96%)	415 (98%)	10 (2%)	0	100	100
1	BI	430/443 (97%)	418 (97%)	12 (3%)	0	100	100
1	BK	425/443 (96%)	411 (97%)	14 (3%)	0	100	100
1	CA	425/443 (96%)	413 (97%)	12 (3%)	0	100	100
1	CC	425/443 (96%)	410 (96%)	15 (4%)	0	100	100
1	CE	425/443 (96%)	416 (98%)	9 (2%)	0	100	100
1	CG	425/443 (96%)	411 (97%)	14 (3%)	0	100	100
1	CI	425/443 (96%)	415 (98%)	10 (2%)	0	100	100
1	CK	425/443 (96%)	410 (96%)	15 (4%)	0	100	100
1	DC	425/443 (96%)	415 (98%)	10 (2%)	0	100	100
1	DE	425/443 (96%)	413 (97%)	12 (3%)	0	100	100
1	DG	425/443 (96%)	415 (98%)	10 (2%)	0	100	100
1	DI	425/443 (96%)	411 (97%)	14 (3%)	0	100	100
1	DK	425/443 (96%)	412 (97%)	13 (3%)	0	100	100
1	EA	425/443 (96%)	413 (97%)	12 (3%)	0	100	100
1	EC	425/443 (96%)	410 (96%)	15 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	EE	425/443 (96%)	409 (96%)	16 (4%)	0	100	100
1	EG	425/443 (96%)	412 (97%)	13 (3%)	0	100	100
1	EI	425/443 (96%)	415 (98%)	10 (2%)	0	100	100
1	EK	425/443 (96%)	413 (97%)	12 (3%)	0	100	100
1	FA	425/443 (96%)	408 (96%)	17 (4%)	0	100	100
1	FC	425/443 (96%)	412 (97%)	13 (3%)	0	100	100
1	FE	425/443 (96%)	408 (96%)	17 (4%)	0	100	100
1	FG	425/443 (96%)	413 (97%)	12 (3%)	0	100	100
1	FI	425/443 (96%)	412 (97%)	13 (3%)	0	100	100
1	FK	425/443 (96%)	407 (96%)	18 (4%)	0	100	100
1	GC	425/443 (96%)	410 (96%)	15 (4%)	0	100	100
1	GE	425/443 (96%)	413 (97%)	12 (3%)	0	100	100
1	GG	425/443 (96%)	411 (97%)	14 (3%)	0	100	100
1	GI	425/443 (96%)	413 (97%)	12 (3%)	0	100	100
1	GK	425/443 (96%)	413 (97%)	12 (3%)	0	100	100
1	GM	425/443 (96%)	409 (96%)	16 (4%)	0	100	100
1	HC	425/443 (96%)	411 (97%)	14 (3%)	0	100	100
1	HE	425/443 (96%)	405 (95%)	20 (5%)	0	100	100
1	HG	425/443 (96%)	408 (96%)	17 (4%)	0	100	100
1	HI	425/443 (96%)	414 (97%)	11 (3%)	0	100	100
1	HK	425/443 (96%)	414 (97%)	11 (3%)	0	100	100
1	HM	425/443 (96%)	407 (96%)	18 (4%)	0	100	100
1	IC	425/443 (96%)	414 (97%)	11 (3%)	0	100	100
1	IE	425/443 (96%)	409 (96%)	16 (4%)	0	100	100
1	IG	425/443 (96%)	414 (97%)	11 (3%)	0	100	100
1	II	425/443 (96%)	411 (97%)	14 (3%)	0	100	100
1	IK	425/443 (96%)	413 (97%)	12 (3%)	0	100	100
1	IM	425/443 (96%)	409 (96%)	16 (4%)	0	100	100
1	JC	425/443 (96%)	409 (96%)	16 (4%)	0	100	100
1	JE	425/443 (96%)	409 (96%)	16 (4%)	0	100	100
1	JG	425/443 (96%)	413 (97%)	12 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	JI	424/443 (96%)	407 (96%)	17 (4%)	0	100	100
1	JK	425/443 (96%)	411 (97%)	14 (3%)	0	100	100
1	JM	424/443 (96%)	412 (97%)	12 (3%)	0	100	100
1	KC	425/443 (96%)	410 (96%)	15 (4%)	0	100	100
1	KE	425/443 (96%)	414 (97%)	11 (3%)	0	100	100
1	KG	425/443 (96%)	413 (97%)	12 (3%)	0	100	100
1	KI	425/443 (96%)	408 (96%)	17 (4%)	0	100	100
1	KK	425/443 (96%)	412 (97%)	13 (3%)	0	100	100
1	LC	425/443 (96%)	414 (97%)	11 (3%)	0	100	100
1	LE	425/443 (96%)	412 (97%)	13 (3%)	0	100	100
1	LG	425/443 (96%)	411 (97%)	14 (3%)	0	100	100
1	LI	425/443 (96%)	414 (97%)	11 (3%)	0	100	100
1	LK	425/443 (96%)	412 (97%)	13 (3%)	0	100	100
1	MC	429/443 (97%)	413 (96%)	16 (4%)	0	100	100
1	ME	425/443 (96%)	406 (96%)	19 (4%)	0	100	100
1	MG	429/443 (97%)	414 (96%)	15 (4%)	0	100	100
1	MI	425/443 (96%)	409 (96%)	16 (4%)	0	100	100
1	MK	429/443 (97%)	418 (97%)	11 (3%)	0	100	100
2	AB	428/451 (95%)	415 (97%)	13 (3%)	0	100	100
2	AD	428/451 (95%)	411 (96%)	17 (4%)	0	100	100
2	AF	428/451 (95%)	413 (96%)	15 (4%)	0	100	100
2	AH	426/451 (94%)	411 (96%)	15 (4%)	0	100	100
2	AJ	428/451 (95%)	418 (98%)	10 (2%)	0	100	100
2	AL	426/451 (94%)	414 (97%)	12 (3%)	0	100	100
2	BB	436/451 (97%)	422 (97%)	14 (3%)	0	100	100
2	BD	426/451 (94%)	412 (97%)	14 (3%)	0	100	100
2	BF	436/451 (97%)	418 (96%)	18 (4%)	0	100	100
2	BH	426/451 (94%)	408 (96%)	18 (4%)	0	100	100
2	BJ	436/451 (97%)	420 (96%)	16 (4%)	0	100	100
2	BL	426/451 (94%)	411 (96%)	15 (4%)	0	100	100
2	CB	425/451 (94%)	409 (96%)	16 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	CD	425/451 (94%)	413 (97%)	12 (3%)	0	100	100
2	CF	425/451 (94%)	411 (97%)	14 (3%)	0	100	100
2	CH	425/451 (94%)	410 (96%)	15 (4%)	0	100	100
2	CJ	426/451 (94%)	412 (97%)	14 (3%)	0	100	100
2	DB	426/451 (94%)	411 (96%)	15 (4%)	0	100	100
2	DD	425/451 (94%)	412 (97%)	13 (3%)	0	100	100
2	DF	426/451 (94%)	408 (96%)	18 (4%)	0	100	100
2	DH	426/451 (94%)	414 (97%)	12 (3%)	0	100	100
2	DJ	426/451 (94%)	412 (97%)	14 (3%)	0	100	100
2	DL	426/451 (94%)	413 (97%)	13 (3%)	0	100	100
2	EB	436/451 (97%)	421 (97%)	15 (3%)	0	100	100
2	ED	425/451 (94%)	407 (96%)	18 (4%)	0	100	100
2	EF	437/451 (97%)	419 (96%)	17 (4%)	1 (0%)	47	78
2	EH	425/451 (94%)	411 (97%)	14 (3%)	0	100	100
2	EJ	436/451 (97%)	420 (96%)	16 (4%)	0	100	100
2	EL	425/451 (94%)	412 (97%)	13 (3%)	0	100	100
2	FB	426/451 (94%)	413 (97%)	13 (3%)	0	100	100
2	FD	426/451 (94%)	406 (95%)	20 (5%)	0	100	100
2	FF	426/451 (94%)	415 (97%)	11 (3%)	0	100	100
2	FH	426/451 (94%)	409 (96%)	17 (4%)	0	100	100
2	FJ	426/451 (94%)	409 (96%)	17 (4%)	0	100	100
2	FL	426/451 (94%)	413 (97%)	13 (3%)	0	100	100
2	GD	426/451 (94%)	411 (96%)	14 (3%)	1 (0%)	47	78
2	GF	426/451 (94%)	407 (96%)	19 (4%)	0	100	100
2	GH	426/451 (94%)	417 (98%)	9 (2%)	0	100	100
2	GJ	426/451 (94%)	409 (96%)	17 (4%)	0	100	100
2	GL	426/451 (94%)	409 (96%)	17 (4%)	0	100	100
2	HD	426/451 (94%)	412 (97%)	13 (3%)	1 (0%)	47	78
2	HF	426/451 (94%)	409 (96%)	17 (4%)	0	100	100
2	HH	426/451 (94%)	409 (96%)	17 (4%)	0	100	100
2	HJ	424/451 (94%)	406 (96%)	18 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	HL	426/451 (94%)	412 (97%)	14 (3%)	0	100	100
2	ID	425/451 (94%)	411 (97%)	14 (3%)	0	100	100
2	IF	426/451 (94%)	415 (97%)	11 (3%)	0	100	100
2	IH	425/451 (94%)	408 (96%)	17 (4%)	0	100	100
2	IJ	426/451 (94%)	410 (96%)	16 (4%)	0	100	100
2	IL	425/451 (94%)	407 (96%)	18 (4%)	0	100	100
2	JB	426/451 (94%)	413 (97%)	13 (3%)	0	100	100
2	JD	426/451 (94%)	411 (96%)	15 (4%)	0	100	100
2	JF	426/451 (94%)	416 (98%)	10 (2%)	0	100	100
2	JH	426/451 (94%)	413 (97%)	13 (3%)	0	100	100
2	JJ	425/451 (94%)	411 (97%)	14 (3%)	0	100	100
2	JL	425/451 (94%)	408 (96%)	17 (4%)	0	100	100
2	KB	425/451 (94%)	410 (96%)	15 (4%)	0	100	100
2	KD	426/451 (94%)	414 (97%)	11 (3%)	1 (0%)	47	78
2	KF	425/451 (94%)	410 (96%)	15 (4%)	0	100	100
2	KH	426/451 (94%)	411 (96%)	14 (3%)	1 (0%)	47	78
2	KJ	425/451 (94%)	406 (96%)	19 (4%)	0	100	100
2	KL	426/451 (94%)	415 (97%)	10 (2%)	1 (0%)	47	78
2	LB	426/451 (94%)	410 (96%)	16 (4%)	0	100	100
2	LD	426/451 (94%)	412 (97%)	14 (3%)	0	100	100
2	LF	426/451 (94%)	412 (97%)	14 (3%)	0	100	100
2	LH	426/451 (94%)	409 (96%)	17 (4%)	0	100	100
2	LJ	426/451 (94%)	412 (97%)	14 (3%)	0	100	100
2	LL	426/451 (94%)	412 (97%)	14 (3%)	0	100	100
2	MB	426/451 (94%)	407 (96%)	19 (4%)	0	100	100
2	MD	437/451 (97%)	422 (97%)	15 (3%)	0	100	100
2	MF	426/451 (94%)	414 (97%)	12 (3%)	0	100	100
2	MH	438/451 (97%)	422 (96%)	16 (4%)	0	100	100
2	MJ	426/451 (94%)	412 (97%)	14 (3%)	0	100	100
2	ML	438/451 (97%)	424 (97%)	14 (3%)	0	100	100
3	a	323/618 (52%)	295 (91%)	28 (9%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	b	615/618 (100%)	558 (91%)	55 (9%)	2 (0%)	41	74
3	c	615/618 (100%)	551 (90%)	62 (10%)	2 (0%)	41	74
3	d	293/618 (47%)	259 (88%)	32 (11%)	2 (1%)	22	59
4	e	182/201 (90%)	172 (94%)	10 (6%)	0	100	100
4	f	182/201 (90%)	170 (93%)	12 (7%)	0	100	100
4	g	143/201 (71%)	134 (94%)	9 (6%)	0	100	100
5	h	575/758 (76%)	549 (96%)	26 (4%)	0	100	100
5	i	575/758 (76%)	547 (95%)	28 (5%)	0	100	100
5	j	575/758 (76%)	546 (95%)	29 (5%)	0	100	100
6	k	380/528 (72%)	355 (93%)	25 (7%)	0	100	100
6	l	380/528 (72%)	357 (94%)	23 (6%)	0	100	100
6	s	279/528 (53%)	267 (96%)	12 (4%)	0	100	100
7	m	344/421 (82%)	319 (93%)	23 (7%)	2 (1%)	25	62
7	n	344/421 (82%)	311 (90%)	32 (9%)	1 (0%)	41	74
7	o	344/421 (82%)	323 (94%)	21 (6%)	0	100	100
8	p	86/89 (97%)	82 (95%)	4 (5%)	0	100	100
8	q	86/89 (97%)	80 (93%)	6 (7%)	0	100	100
8	r	86/89 (97%)	84 (98%)	2 (2%)	0	100	100
9	A	184/190 (97%)	175 (95%)	9 (5%)	0	100	100
9	B	184/190 (97%)	173 (94%)	11 (6%)	0	100	100
9	C	184/190 (97%)	173 (94%)	11 (6%)	0	100	100
10	P	427/606 (70%)	420 (98%)	6 (1%)	1 (0%)	47	78
10	Q	426/606 (70%)	415 (97%)	10 (2%)	1 (0%)	47	78
10	R	427/606 (70%)	418 (98%)	8 (2%)	1 (0%)	47	78
10	S	426/606 (70%)	417 (98%)	8 (2%)	1 (0%)	47	78
10	Z	90/606 (15%)	89 (99%)	1 (1%)	0	100	100
10	aa	290/606 (48%)	283 (98%)	6 (2%)	1 (0%)	41	74
10	cc	87/606 (14%)	87 (100%)	0	0	100	100
11	T	59/93 (63%)	55 (93%)	4 (7%)	0	100	100
11	U	54/93 (58%)	53 (98%)	1 (2%)	0	100	100
11	V	65/93 (70%)	60 (92%)	5 (8%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
11	W	61/93 (66%)	57 (93%)	4 (7%)	0	100	100
12	D	1498/2257 (66%)	1457 (97%)	40 (3%)	1 (0%)	51	83
12	E	1498/2257 (66%)	1459 (97%)	37 (2%)	2 (0%)	51	83
12	bb	171/2257 (8%)	161 (94%)	10 (6%)	0	100	100
13	F	972/1074 (90%)	931 (96%)	40 (4%)	1 (0%)	51	83
13	G	985/1074 (92%)	942 (96%)	41 (4%)	2 (0%)	47	78
13	H	972/1074 (90%)	938 (96%)	33 (3%)	1 (0%)	51	83
13	I	985/1074 (92%)	939 (95%)	43 (4%)	3 (0%)	41	74
14	J	654/976 (67%)	634 (97%)	19 (3%)	1 (0%)	47	78
14	K	654/976 (67%)	633 (97%)	20 (3%)	1 (0%)	47	78
15	L	105/222 (47%)	100 (95%)	5 (5%)	0	100	100
15	M	105/222 (47%)	101 (96%)	4 (4%)	0	100	100
15	N	105/222 (47%)	102 (97%)	3 (3%)	0	100	100
15	O	105/222 (47%)	101 (96%)	4 (4%)	0	100	100
15	X	105/222 (47%)	101 (96%)	4 (4%)	0	100	100
15	Y	105/222 (47%)	101 (96%)	4 (4%)	0	100	100
All	All	81498/94154 (87%)	78546 (96%)	2920 (4%)	32 (0%)	100	100

5 of 32 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	GD	274	PRO
2	HD	274	PRO
2	KD	274	PRO
2	KH	274	PRO
2	KL	274	PRO

### 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 PDB entries followed by that with respect to all EM entries.

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	AA	370/379 (98%)	370 (100%)	0	100	100
1	AC	369/379 (97%)	368 (100%)	1 (0%)	92	96
1	AE	370/379 (98%)	369 (100%)	1 (0%)	92	96
1	AG	370/379 (98%)	369 (100%)	1 (0%)	92	96
1	AI	370/379 (98%)	366 (99%)	4 (1%)	73	85
1	AK	370/379 (98%)	367 (99%)	3 (1%)	81	89
1	BA	371/379 (98%)	371 (100%)	0	100	100
1	BC	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	BE	371/379 (98%)	370 (100%)	1 (0%)	92	96
1	BG	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	BI	371/379 (98%)	370 (100%)	1 (0%)	92	96
1	BK	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	CA	368/379 (97%)	368 (100%)	0	100	100
1	CC	368/379 (97%)	368 (100%)	0	100	100
1	CE	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	CG	368/379 (97%)	366 (100%)	2 (0%)	88	94
1	CI	368/379 (97%)	368 (100%)	0	100	100
1	CK	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	DC	368/379 (97%)	366 (100%)	2 (0%)	88	94
1	DE	368/379 (97%)	366 (100%)	2 (0%)	88	94
1	DG	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	DI	368/379 (97%)	368 (100%)	0	100	100
1	DK	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	EA	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	EC	368/379 (97%)	365 (99%)	3 (1%)	81	89
1	EE	368/379 (97%)	366 (100%)	2 (0%)	88	94
1	EG	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	EI	368/379 (97%)	366 (100%)	2 (0%)	88	94
1	EK	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	FA	368/379 (97%)	368 (100%)	0	100	100
1	FC	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	FE	368/379 (97%)	366 (100%)	2 (0%)	88	94

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	FG	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	FI	368/379 (97%)	368 (100%)	0	100	100
1	FK	368/379 (97%)	368 (100%)	0	100	100
1	GC	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	GE	368/379 (97%)	366 (100%)	2 (0%)	88	94
1	GG	368/379 (97%)	368 (100%)	0	100	100
1	GI	368/379 (97%)	366 (100%)	2 (0%)	88	94
1	GK	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	GM	368/379 (97%)	366 (100%)	2 (0%)	88	94
1	HC	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	HE	368/379 (97%)	365 (99%)	3 (1%)	81	89
1	HG	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	HI	368/379 (97%)	364 (99%)	4 (1%)	73	85
1	HK	368/379 (97%)	368 (100%)	0	100	100
1	HM	368/379 (97%)	365 (99%)	3 (1%)	81	89
1	IC	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	IE	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	IG	368/379 (97%)	366 (100%)	2 (0%)	88	94
1	II	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	IK	368/379 (97%)	365 (99%)	3 (1%)	81	89
1	IM	368/379 (97%)	366 (100%)	2 (0%)	88	94
1	JC	368/379 (97%)	365 (99%)	3 (1%)	81	89
1	JE	368/379 (97%)	366 (100%)	2 (0%)	88	94
1	JG	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	JI	367/379 (97%)	366 (100%)	1 (0%)	92	96
1	JK	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	JM	367/379 (97%)	364 (99%)	3 (1%)	81	89
1	KC	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	KE	368/379 (97%)	366 (100%)	2 (0%)	88	94
1	KG	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	KI	368/379 (97%)	368 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	KK	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	LC	368/379 (97%)	365 (99%)	3 (1%)	81	89
1	LE	368/379 (97%)	366 (100%)	2 (0%)	88	94
1	LG	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	LI	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	LK	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	MC	370/379 (98%)	370 (100%)	0	100	100
1	ME	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	MG	370/379 (98%)	370 (100%)	0	100	100
1	MI	368/379 (97%)	367 (100%)	1 (0%)	92	96
1	MK	370/379 (98%)	370 (100%)	0	100	100
2	AB	363/374 (97%)	363 (100%)	0	100	100
2	AD	364/374 (97%)	363 (100%)	1 (0%)	92	96
2	AF	363/374 (97%)	361 (99%)	2 (1%)	86	93
2	AH	362/374 (97%)	361 (100%)	1 (0%)	92	96
2	AJ	363/374 (97%)	362 (100%)	1 (0%)	92	96
2	AL	362/374 (97%)	359 (99%)	3 (1%)	81	89
2	BB	367/374 (98%)	366 (100%)	1 (0%)	92	96
2	BD	362/374 (97%)	359 (99%)	3 (1%)	81	89
2	BF	367/374 (98%)	367 (100%)	0	100	100
2	BH	362/374 (97%)	360 (99%)	2 (1%)	86	93
2	BJ	367/374 (98%)	366 (100%)	1 (0%)	92	96
2	BL	362/374 (97%)	360 (99%)	2 (1%)	86	93
2	CB	361/374 (96%)	360 (100%)	1 (0%)	92	96
2	CD	361/374 (96%)	359 (99%)	2 (1%)	86	93
2	CF	361/374 (96%)	361 (100%)	0	100	100
2	CH	361/374 (96%)	360 (100%)	1 (0%)	92	96
2	CJ	362/374 (97%)	362 (100%)	0	100	100
2	DB	362/374 (97%)	360 (99%)	2 (1%)	86	93
2	DD	361/374 (96%)	359 (99%)	2 (1%)	86	93
2	DF	362/374 (97%)	361 (100%)	1 (0%)	92	96

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	DH	362/374 (97%)	362 (100%)	0	100	100
2	DJ	362/374 (97%)	359 (99%)	3 (1%)	81	89
2	DL	362/374 (97%)	362 (100%)	0	100	100
2	EB	367/374 (98%)	366 (100%)	1 (0%)	92	96
2	ED	361/374 (96%)	357 (99%)	4 (1%)	73	85
2	EF	368/374 (98%)	367 (100%)	1 (0%)	92	96
2	EH	361/374 (96%)	359 (99%)	2 (1%)	86	93
2	EJ	367/374 (98%)	366 (100%)	1 (0%)	92	96
2	EL	361/374 (96%)	358 (99%)	3 (1%)	81	89
2	FB	362/374 (97%)	360 (99%)	2 (1%)	86	93
2	FD	362/374 (97%)	361 (100%)	1 (0%)	92	96
2	FF	362/374 (97%)	360 (99%)	2 (1%)	86	93
2	FH	362/374 (97%)	360 (99%)	2 (1%)	86	93
2	FJ	362/374 (97%)	361 (100%)	1 (0%)	92	96
2	FL	362/374 (97%)	360 (99%)	2 (1%)	86	93
2	GD	362/374 (97%)	361 (100%)	1 (0%)	92	96
2	GF	362/374 (97%)	361 (100%)	1 (0%)	92	96
2	GH	362/374 (97%)	360 (99%)	2 (1%)	86	93
2	GJ	362/374 (97%)	362 (100%)	0	100	100
2	GL	362/374 (97%)	360 (99%)	2 (1%)	86	93
2	HD	362/374 (97%)	360 (99%)	2 (1%)	86	93
2	HF	362/374 (97%)	360 (99%)	2 (1%)	86	93
2	HH	362/374 (97%)	361 (100%)	1 (0%)	92	96
2	HJ	360/374 (96%)	359 (100%)	1 (0%)	92	96
2	HL	362/374 (97%)	361 (100%)	1 (0%)	92	96
2	ID	361/374 (96%)	361 (100%)	0	100	100
2	IF	362/374 (97%)	361 (100%)	1 (0%)	92	96
2	IH	361/374 (96%)	360 (100%)	1 (0%)	92	96
2	IJ	362/374 (97%)	360 (99%)	2 (1%)	86	93
2	IL	361/374 (96%)	360 (100%)	1 (0%)	92	96
2	JB	362/374 (97%)	361 (100%)	1 (0%)	92	96

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	JD	362/374 (97%)	360 (99%)	2 (1%)	86	93
2	JF	362/374 (97%)	361 (100%)	1 (0%)	92	96
2	JH	362/374 (97%)	361 (100%)	1 (0%)	92	96
2	JJ	361/374 (96%)	360 (100%)	1 (0%)	92	96
2	JL	361/374 (96%)	360 (100%)	1 (0%)	92	96
2	KB	361/374 (96%)	361 (100%)	0	100	100
2	KD	362/374 (97%)	360 (99%)	2 (1%)	86	93
2	KF	361/374 (96%)	359 (99%)	2 (1%)	86	93
2	KH	362/374 (97%)	361 (100%)	1 (0%)	92	96
2	KJ	361/374 (96%)	358 (99%)	3 (1%)	81	89
2	KL	362/374 (97%)	360 (99%)	2 (1%)	86	93
2	LB	362/374 (97%)	359 (99%)	3 (1%)	81	89
2	LD	362/374 (97%)	358 (99%)	4 (1%)	73	85
2	LF	362/374 (97%)	361 (100%)	1 (0%)	92	96
2	LH	362/374 (97%)	359 (99%)	3 (1%)	81	89
2	LJ	362/374 (97%)	361 (100%)	1 (0%)	92	96
2	LL	362/374 (97%)	359 (99%)	3 (1%)	81	89
2	MB	362/374 (97%)	359 (99%)	3 (1%)	81	89
2	MD	368/374 (98%)	367 (100%)	1 (0%)	92	96
2	MF	362/374 (97%)	361 (100%)	1 (0%)	92	96
2	MH	368/374 (98%)	368 (100%)	0	100	100
2	MJ	362/374 (97%)	360 (99%)	2 (1%)	86	93
2	ML	368/374 (98%)	366 (100%)	2 (0%)	88	94
3	a	247/462 (54%)	247 (100%)	0	100	100
3	b	461/462 (100%)	454 (98%)	7 (2%)	65	81
3	c	461/462 (100%)	455 (99%)	6 (1%)	69	83
3	d	216/462 (47%)	210 (97%)	6 (3%)	43	67
4	e	151/159 (95%)	150 (99%)	1 (1%)	84	91
4	f	151/159 (95%)	150 (99%)	1 (1%)	84	91
4	g	116/159 (73%)	116 (100%)	0	100	100
5	h	478/598 (80%)	477 (100%)	1 (0%)	93	97

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
5	i	478/598 (80%)	475 (99%)	3 (1%)	86	93
5	j	478/598 (80%)	477 (100%)	1 (0%)	93	97
6	k	304/410 (74%)	303 (100%)	1 (0%)	92	96
6	l	304/410 (74%)	304 (100%)	0	100	100
6	s	224/410 (55%)	223 (100%)	1 (0%)	91	95
7	m	278/331 (84%)	276 (99%)	2 (1%)	84	91
7	n	278/331 (84%)	276 (99%)	2 (1%)	84	91
7	o	278/331 (84%)	276 (99%)	2 (1%)	84	91
8	p	72/73 (99%)	72 (100%)	0	100	100
8	q	72/73 (99%)	72 (100%)	0	100	100
8	r	72/73 (99%)	72 (100%)	0	100	100
9	A	172/176 (98%)	172 (100%)	0	100	100
9	B	172/176 (98%)	171 (99%)	1 (1%)	86	93
9	C	172/176 (98%)	172 (100%)	0	100	100
10	P	91/482 (19%)	91 (100%)	0	100	100
10	Q	91/482 (19%)	89 (98%)	2 (2%)	52	72
10	R	91/482 (19%)	91 (100%)	0	100	100
10	S	91/482 (19%)	89 (98%)	2 (2%)	52	72
10	Z	80/482 (17%)	80 (100%)	0	100	100
10	cc	79/482 (16%)	78 (99%)	1 (1%)	69	83
12	bb	57/1666 (3%)	57 (100%)	0	100	100
14	J	165/697 (24%)	164 (99%)	1 (1%)	86	93
14	K	165/697 (24%)	165 (100%)	0	100	100
15	L	87/166 (52%)	87 (100%)	0	100	100
15	M	87/166 (52%)	87 (100%)	0	100	100
15	N	87/166 (52%)	87 (100%)	0	100	100
15	O	87/166 (52%)	87 (100%)	0	100	100
15	X	87/166 (52%)	87 (100%)	0	100	100
15	Y	87/166 (52%)	87 (100%)	0	100	100
All	All	61147/69759 (88%)	60901 (100%)	246 (0%)	91	95

5 of 246 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	HI	241	ARG
3	d	381	ARG
2	JD	326	LYS
3	d	363	CYS
7	o	37	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 138 such sidechains are listed below:

Mol	Chain	Res	Type
2	LH	258	ASN
2	LJ	15	GLN
4	f	185	HIS
1	FE	426	GLN
1	FE	347	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 222 ligands modelled in this entry, 74 are monoatomic - leaving 148 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
19	GDP	JC	501	-	24,30,30	0.96	1 (4%)	30,47,47	1.25	4 (13%)
19	GDP	AK	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.23	3 (10%)
19	GDP	LE	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.24	4 (13%)
19	GDP	CC	501	-	24,30,30	0.96	1 (4%)	30,47,47	1.29	4 (13%)
20	GTP	AB	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.64	7 (21%)
20	GTP	MJ	501	21	26,34,34	1.18	2 (7%)	32,54,54	1.61	7 (21%)
20	GTP	DL	501	21	26,34,34	1.20	2 (7%)	32,54,54	1.69	7 (21%)
19	GDP	HM	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.26	4 (13%)
19	GDP	IE	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.30	4 (13%)
20	GTP	MF	501	21	26,34,34	1.20	2 (7%)	32,54,54	1.70	7 (21%)
20	GTP	CF	501	21	26,34,34	1.18	2 (7%)	32,54,54	1.64	7 (21%)
19	GDP	GG	501	-	24,30,30	0.96	1 (4%)	30,47,47	1.29	4 (13%)
19	GDP	MG	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.29	4 (13%)
20	GTP	MH	501	21	26,34,34	1.20	2 (7%)	32,54,54	1.69	7 (21%)
19	GDP	HG	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.29	4 (13%)
19	GDP	FA	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.31	4 (13%)
19	GDP	BG	501	-	24,30,30	0.96	1 (4%)	30,47,47	1.31	5 (16%)
19	GDP	LK	501	-	24,30,30	0.96	1 (4%)	30,47,47	1.28	4 (13%)
20	GTP	HD	501	21	26,34,34	1.14	2 (7%)	32,54,54	1.68	7 (21%)
20	GTP	JF	501	21	26,34,34	1.18	2 (7%)	32,54,54	1.66	8 (25%)
19	GDP	AC	501	-	24,30,30	0.96	1 (4%)	30,47,47	1.26	4 (13%)
19	GDP	IK	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.25	4 (13%)
20	GTP	FJ	501	21	26,34,34	1.18	2 (7%)	32,54,54	1.73	7 (21%)
20	GTP	KH	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.67	7 (21%)
20	GTP	CB	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.67	7 (21%)
19	GDP	JG	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.27	5 (16%)
19	GDP	CA	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.31	4 (13%)
19	GDP	JK	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.35	5 (16%)
20	GTP	HJ	501	21	26,34,34	1.15	2 (7%)	32,54,54	1.71	6 (18%)
19	GDP	FI	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.28	4 (13%)
19	GDP	BK	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.37	4 (13%)
19	GDP	KK	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.30	4 (13%)
20	GTP	EH	501	21	26,34,34	1.18	2 (7%)	32,54,54	1.61	7 (21%)
19	GDP	KE	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.33	4 (13%)
19	GDP	HE	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.25	4 (13%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
19	GDP	DG	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.21	4 (13%)
19	GDP	JM	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.37	4 (13%)
19	GDP	MC	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.30	4 (13%)
20	GTP	FF	501	21	26,34,34	1.19	2 (7%)	32,54,54	1.63	7 (21%)
19	GDP	GK	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.26	4 (13%)
19	GDP	EE	502	-	24,30,30	0.97	1 (4%)	30,47,47	1.23	3 (10%)
20	GTP	DF	501	21	26,34,34	1.20	2 (7%)	32,54,54	1.69	7 (21%)
20	GTP	EJ	501	21	26,34,34	1.16	2 (7%)	32,54,54	1.60	7 (21%)
20	GTP	GJ	501	21	26,34,34	1.16	2 (7%)	32,54,54	1.71	7 (21%)
20	GTP	KJ	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.67	7 (21%)
20	GTP	HL	501	21	26,34,34	1.15	2 (7%)	32,54,54	1.71	7 (21%)
20	GTP	LL	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.61	7 (21%)
20	GTP	DJ	501	21	26,34,34	1.18	2 (7%)	32,54,54	1.71	7 (21%)
19	GDP	AE	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.32	4 (13%)
19	GDP	GM	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.32	4 (13%)
19	GDP	IG	501	-	24,30,30	0.93	1 (4%)	30,47,47	1.25	4 (13%)
19	GDP	LG	501	-	24,30,30	0.93	1 (4%)	30,47,47	1.32	4 (13%)
19	GDP	HC	501	-	24,30,30	0.96	1 (4%)	30,47,47	1.27	4 (13%)
19	GDP	DE	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.38	4 (13%)
20	GTP	LH	501	21	26,34,34	1.18	2 (7%)	32,54,54	1.68	6 (18%)
20	GTP	GD	501	21	26,34,34	1.16	2 (7%)	32,54,54	1.71	7 (21%)
19	GDP	AA	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.34	4 (13%)
19	GDP	DC	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.27	4 (13%)
19	GDP	BI	501	-	24,30,30	0.96	1 (4%)	30,47,47	1.25	4 (13%)
20	GTP	JH	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.58	7 (21%)
20	GTP	KF	501	21	26,34,34	1.19	2 (7%)	32,54,54	1.68	7 (21%)
20	GTP	JJ	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.65	7 (21%)
19	GDP	LI	501	-	24,30,30	0.96	1 (4%)	30,47,47	1.27	4 (13%)
20	GTP	FH	501	21	26,34,34	1.19	2 (7%)	32,54,54	1.68	7 (21%)
19	GDP	IC	501	-	24,30,30	0.96	1 (4%)	30,47,47	1.29	4 (13%)
20	GTP	IJ	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.65	7 (21%)
20	GTP	CJ	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.68	7 (21%)
20	GTP	LF	501	21	26,34,34	1.19	2 (7%)	32,54,54	1.71	7 (21%)
20	GTP	DD	501	21	26,34,34	1.17	1 (3%)	32,54,54	1.63	7 (21%)
20	GTP	JL	501	21	26,34,34	1.18	2 (7%)	32,54,54	1.69	7 (21%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
19	GDP	EK	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.28	4 (13%)
20	GTP	JD	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.59	8 (25%)
20	GTP	KB	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.70	7 (21%)
19	GDP	EG	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.26	4 (13%)
19	GDP	EC	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.28	4 (13%)
19	GDP	DK	501	-	24,30,30	0.93	1 (4%)	30,47,47	1.27	4 (13%)
20	GTP	ID	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.64	7 (21%)
19	GDP	AG	501	-	24,30,30	1.01	1 (4%)	30,47,47	1.21	4 (13%)
20	GTP	BD	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.68	7 (21%)
20	GTP	MB	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.62	7 (21%)
20	GTP	BL	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.65	7 (21%)
19	GDP	II	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.39	5 (16%)
20	GTP	EF	501	21	26,34,34	1.20	2 (7%)	32,54,54	1.60	7 (21%)
20	GTP	MD	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.78	7 (21%)
19	GDP	HI	502	-	24,30,30	0.96	1 (4%)	30,47,47	1.26	4 (13%)
20	GTP	CD	501	21	26,34,34	1.19	2 (7%)	32,54,54	1.69	7 (21%)
20	GTP	BJ	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.69	7 (21%)
20	GTP	KL	501	21	26,34,34	1.16	2 (7%)	32,54,54	1.62	7 (21%)
19	GDP	GE	501	-	24,30,30	0.96	1 (4%)	30,47,47	1.32	4 (13%)
20	GTP	ED	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.65	7 (21%)
19	GDP	AI	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.31	4 (13%)
19	GDP	JI	501	-	24,30,30	0.99	1 (4%)	30,47,47	1.33	4 (13%)
20	GTP	EB	501	21	26,34,34	1.18	2 (7%)	32,54,54	1.63	7 (21%)
19	GDP	LC	501	-	24,30,30	0.97	1 (4%)	30,47,47	1.30	4 (13%)
19	GDP	GC	501	-	24,30,30	0.96	1 (4%)	30,47,47	1.32	4 (13%)
20	GTP	FL	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.67	7 (21%)
20	GTP	LD	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.60	7 (21%)
19	GDP	MI	501	-	24,30,30	0.96	1 (4%)	30,47,47	1.33	4 (13%)
20	GTP	IL	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.65	7 (21%)
20	GTP	AF	501	21	26,34,34	1.18	2 (7%)	32,54,54	1.65	7 (21%)
19	GDP	ME	501	-	24,30,30	0.96	1 (4%)	30,47,47	1.30	4 (13%)
20	GTP	BH	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.68	7 (21%)
19	GDP	CE	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.26	4 (13%)
19	GDP	FK	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.28	4 (13%)
20	GTP	DH	501	21	26,34,34	1.23	1 (3%)	32,54,54	1.78	8 (25%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
19	GDP	CI	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.29	4 (13%)
19	GDP	FC	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.27	4 (13%)
19	GDP	EI	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.29	4 (13%)
19	GDP	BC	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.35	4 (13%)
19	GDP	IM	501	-	24,30,30	0.96	1 (4%)	30,47,47	1.31	4 (13%)
20	GTP	GH	501	21	26,34,34	1.18	2 (7%)	32,54,54	1.71	7 (21%)
20	GTP	ML	501	21	26,34,34	1.18	2 (7%)	32,54,54	1.73	7 (21%)
20	GTP	AJ	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.66	7 (21%)
20	GTP	FB	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.68	7 (21%)
20	GTP	HF	501	21	26,34,34	1.14	2 (7%)	32,54,54	1.67	7 (21%)
19	GDP	DI	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.31	4 (13%)
20	GTP	BF	501	21	26,34,34	1.19	2 (7%)	32,54,54	1.62	7 (21%)
20	GTP	AD	501	21	26,34,34	1.16	2 (7%)	32,54,54	1.66	7 (21%)
20	GTP	HI	501	21	26,34,34	1.16	2 (7%)	32,54,54	1.70	6 (18%)
20	GTP	GF	501	21	26,34,34	1.16	2 (7%)	32,54,54	1.74	6 (18%)
19	GDP	BA	501	-	24,30,30	0.91	1 (4%)	30,47,47	1.26	4 (13%)
20	GTP	IH	501	21	26,34,34	1.19	2 (7%)	32,54,54	1.65	7 (21%)
19	GDP	HK	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.28	4 (13%)
20	GTP	CH	501	21	26,34,34	1.19	2 (7%)	32,54,54	1.71	7 (21%)
20	GTP	EL	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.66	7 (21%)
19	GDP	FE	501	-	24,30,30	0.96	1 (4%)	30,47,47	1.31	4 (13%)
20	GTP	AL	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.65	7 (21%)
19	GDP	BE	501	-	24,30,30	1.00	1 (4%)	30,47,47	1.20	4 (13%)
19	GDP	MK	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.31	4 (13%)
20	GTP	JB	501	21	26,34,34	1.18	2 (7%)	32,54,54	1.66	7 (21%)
20	GTP	KD	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.66	7 (21%)
19	GDP	KC	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.28	4 (13%)
19	GDP	FG	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.22	4 (13%)
19	GDP	GI	501	-	24,30,30	0.99	1 (4%)	30,47,47	1.26	4 (13%)
20	GTP	GL	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.65	7 (21%)
19	GDP	KG	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.30	4 (13%)
20	GTP	FD	501	21	26,34,34	1.18	2 (7%)	32,54,54	1.66	7 (21%)
20	GTP	LJ	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.69	7 (21%)
19	GDP	EA	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.28	4 (13%)
20	GTP	LB	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.67	7 (21%)



Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
19	GDP	KI	502	-	24,30,30	0.94	1 (4%)	30,47,47	1.30	4 (13%)
19	GDP	CK	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.29	4 (13%)
20	GTP	BB	501	21	26,34,34	1.17	2 (7%)	32,54,54	1.64	7 (21%)
20	GTP	IF	501	21	26,34,34	1.20	2 (7%)	32,54,54	1.69	7 (21%)
20	GTP	AH	501	21	26,34,34	1.18	2 (7%)	32,54,54	1.67	7 (21%)
19	GDP	CG	501	-	24,30,30	0.95	1 (4%)	30,47,47	1.15	4 (13%)
20	GTP	DB	501	21	26,34,34	1.18	2 (7%)	32,54,54	1.67	8 (25%)
19	GDP	JE	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.27	4 (13%)

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
19	GDP	JC	501	-	-	1/12/32/32	0/3/3/3
19	GDP	AK	501	-	-	4/12/32/32	0/3/3/3
19	GDP	LE	501	-	-	1/12/32/32	0/3/3/3
19	GDP	CC	501	-	-	5/12/32/32	0/3/3/3
20	GTP	AB	501	21	-	4/18/38/38	0/3/3/3
20	GTP	MJ	501	21	-	4/18/38/38	0/3/3/3
20	GTP	DL	501	21	-	6/18/38/38	0/3/3/3
19	GDP	HM	501	-	-	5/12/32/32	0/3/3/3
19	GDP	IE	501	-	-	3/12/32/32	0/3/3/3
20	GTP	MF	501	21	-	5/18/38/38	0/3/3/3
20	GTP	CF	501	21	-	3/18/38/38	0/3/3/3
19	GDP	GG	501	-	-	0/12/32/32	0/3/3/3
19	GDP	MG	501	-	-	0/12/32/32	0/3/3/3
20	GTP	MH	501	21	-	6/18/38/38	0/3/3/3
19	GDP	HG	501	-	-	1/12/32/32	0/3/3/3
19	GDP	FA	501	-	-	1/12/32/32	0/3/3/3
19	GDP	BG	501	-	-	1/12/32/32	0/3/3/3
19	GDP	LK	501	-	-	0/12/32/32	0/3/3/3
20	GTP	HD	501	21	-	4/18/38/38	0/3/3/3
20	GTP	JF	501	21	-	1/18/38/38	0/3/3/3
19	GDP	AC	501	-	-	0/12/32/32	0/3/3/3
19	GDP	IK	501	-	-	3/12/32/32	0/3/3/3
20	GTP	FJ	501	21	-	4/18/38/38	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
20	GTP	KH	501	21	-	3/18/38/38	0/3/3/3
20	GTP	CB	501	21	-	5/18/38/38	0/3/3/3
19	GDP	JG	501	-	-	5/12/32/32	0/3/3/3
19	GDP	CA	501	-	-	0/12/32/32	0/3/3/3
19	GDP	JK	501	-	-	2/12/32/32	0/3/3/3
20	GTP	HJ	501	21	-	3/18/38/38	0/3/3/3
19	GDP	FI	501	-	-	0/12/32/32	0/3/3/3
19	GDP	BK	501	-	-	4/12/32/32	0/3/3/3
19	GDP	KK	501	-	-	0/12/32/32	0/3/3/3
20	GTP	EH	501	21	-	6/18/38/38	0/3/3/3
19	GDP	KE	501	-	-	7/12/32/32	0/3/3/3
19	GDP	HE	501	-	-	5/12/32/32	0/3/3/3
19	GDP	DG	501	-	-	2/12/32/32	0/3/3/3
19	GDP	JM	501	-	-	0/12/32/32	0/3/3/3
19	GDP	MC	501	-	-	0/12/32/32	0/3/3/3
20	GTP	FF	501	21	-	5/18/38/38	0/3/3/3
19	GDP	GK	501	-	-	0/12/32/32	0/3/3/3
19	GDP	EE	502	-	-	7/12/32/32	0/3/3/3
20	GTP	DF	501	21	-	4/18/38/38	0/3/3/3
20	GTP	EJ	501	21	-	6/18/38/38	0/3/3/3
20	GTP	GJ	501	21	-	6/18/38/38	0/3/3/3
20	GTP	KJ	501	21	-	5/18/38/38	0/3/3/3
20	GTP	HL	501	21	-	5/18/38/38	0/3/3/3
20	GTP	LL	501	21	-	6/18/38/38	0/3/3/3
20	GTP	DJ	501	21	-	5/18/38/38	0/3/3/3
19	GDP	AE	501	-	-	0/12/32/32	0/3/3/3
19	GDP	GM	501	-	-	1/12/32/32	0/3/3/3
19	GDP	IG	501	-	-	0/12/32/32	0/3/3/3
19	GDP	LG	501	-	-	0/12/32/32	0/3/3/3
19	GDP	HC	501	-	-	3/12/32/32	0/3/3/3
19	GDP	DE	501	-	-	2/12/32/32	0/3/3/3
20	GTP	LH	501	21	-	4/18/38/38	0/3/3/3
20	GTP	GD	501	21	-	4/18/38/38	0/3/3/3
19	GDP	AA	501	-	-	0/12/32/32	0/3/3/3
19	GDP	DC	501	-	-	2/12/32/32	0/3/3/3
19	GDP	BI	501	-	-	3/12/32/32	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
20	GTP	JH	501	21	-	6/18/38/38	0/3/3/3
20	GTP	KF	501	21	-	5/18/38/38	0/3/3/3
20	GTP	JJ	501	21	-	6/18/38/38	0/3/3/3
19	GDP	LI	501	-	-	0/12/32/32	0/3/3/3
20	GTP	FH	501	21	-	4/18/38/38	0/3/3/3
19	GDP	IC	501	-	-	5/12/32/32	0/3/3/3
20	GTP	IJ	501	21	-	2/18/38/38	0/3/3/3
20	GTP	CJ	501	21	-	4/18/38/38	0/3/3/3
20	GTP	LF	501	21	-	3/18/38/38	0/3/3/3
20	GTP	DD	501	21	-	8/18/38/38	0/3/3/3
20	GTP	JL	501	21	-	7/18/38/38	0/3/3/3
19	GDP	EK	501	-	-	1/12/32/32	0/3/3/3
20	GTP	JD	501	21	-	4/18/38/38	0/3/3/3
20	GTP	KB	501	21	-	4/18/38/38	0/3/3/3
19	GDP	EG	501	-	-	4/12/32/32	0/3/3/3
19	GDP	EC	501	-	-	1/12/32/32	0/3/3/3
19	GDP	DK	501	-	-	2/12/32/32	0/3/3/3
20	GTP	ID	501	21	-	3/18/38/38	0/3/3/3
19	GDP	AG	501	-	-	0/12/32/32	0/3/3/3
20	GTP	BD	501	21	-	5/18/38/38	0/3/3/3
20	GTP	MB	501	21	-	5/18/38/38	0/3/3/3
20	GTP	BL	501	21	-	4/18/38/38	0/3/3/3
19	GDP	II	501	-	-	7/12/32/32	0/3/3/3
20	GTP	EF	501	21	-	7/18/38/38	0/3/3/3
20	GTP	MD	501	21	-	4/18/38/38	0/3/3/3
19	GDP	HI	502	-	-	3/12/32/32	0/3/3/3
20	GTP	CD	501	21	-	7/18/38/38	0/3/3/3
20	GTP	BJ	501	21	-	2/18/38/38	0/3/3/3
20	GTP	KL	501	21	-	7/18/38/38	0/3/3/3
19	GDP	GE	501	-	-	2/12/32/32	0/3/3/3
20	GTP	ED	501	21	-	3/18/38/38	0/3/3/3
19	GDP	AI	501	-	-	1/12/32/32	0/3/3/3
19	GDP	JI	501	-	-	2/12/32/32	0/3/3/3
20	GTP	EB	501	21	-	4/18/38/38	0/3/3/3
19	GDP	LC	501	-	-	0/12/32/32	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
19	GDP	GC	501	-	-	0/12/32/32	0/3/3/3
20	GTP	FL	501	21	-	4/18/38/38	0/3/3/3
20	GTP	LD	501	21	-	7/18/38/38	0/3/3/3
19	GDP	MI	501	-	-	4/12/32/32	0/3/3/3
20	GTP	IL	501	21	-	6/18/38/38	0/3/3/3
20	GTP	AF	501	21	-	3/18/38/38	0/3/3/3
19	GDP	ME	501	-	-	3/12/32/32	0/3/3/3
20	GTP	BH	501	21	-	5/18/38/38	0/3/3/3
19	GDP	CE	501	-	-	0/12/32/32	0/3/3/3
19	GDP	FK	501	-	-	2/12/32/32	0/3/3/3
20	GTP	DH	501	21	-	7/18/38/38	0/3/3/3
19	GDP	CI	501	-	-	2/12/32/32	0/3/3/3
19	GDP	FC	501	-	-	0/12/32/32	0/3/3/3
19	GDP	EI	501	-	-	0/12/32/32	0/3/3/3
19	GDP	BC	501	-	-	4/12/32/32	0/3/3/3
19	GDP	IM	501	-	-	4/12/32/32	0/3/3/3
20	GTP	GH	501	21	-	6/18/38/38	0/3/3/3
20	GTP	ML	501	21	-	4/18/38/38	0/3/3/3
20	GTP	AJ	501	21	-	6/18/38/38	0/3/3/3
20	GTP	FB	501	21	-	4/18/38/38	0/3/3/3
20	GTP	HF	501	21	-	4/18/38/38	0/3/3/3
19	GDP	DI	501	-	-	2/12/32/32	0/3/3/3
20	GTP	BF	501	21	-	3/18/38/38	0/3/3/3
20	GTP	AD	501	21	-	5/18/38/38	0/3/3/3
20	GTP	HI	501	21	-	3/18/38/38	0/3/3/3
20	GTP	GF	501	21	-	6/18/38/38	0/3/3/3
19	GDP	BA	501	-	-	7/12/32/32	0/3/3/3
20	GTP	IH	501	21	-	5/18/38/38	0/3/3/3
19	GDP	HK	501	-	-	2/12/32/32	0/3/3/3
20	GTP	CH	501	21	-	5/18/38/38	0/3/3/3
20	GTP	EL	501	21	-	5/18/38/38	0/3/3/3
19	GDP	FE	501	-	-	1/12/32/32	0/3/3/3
20	GTP	AL	501	21	-	3/18/38/38	0/3/3/3
19	GDP	BE	501	-	-	2/12/32/32	0/3/3/3
19	GDP	MK	501	-	-	0/12/32/32	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
20	GTP	JB	501	21	-	7/18/38/38	0/3/3/3
20	GTP	KD	501	21	-	5/18/38/38	0/3/3/3
19	GDP	KC	501	-	-	2/12/32/32	0/3/3/3
19	GDP	FG	501	-	-	1/12/32/32	0/3/3/3
19	GDP	GI	501	-	-	2/12/32/32	0/3/3/3
20	GTP	GL	501	21	-	6/18/38/38	0/3/3/3
19	GDP	KG	501	-	-	1/12/32/32	0/3/3/3
20	GTP	FD	501	21	-	3/18/38/38	0/3/3/3
20	GTP	LJ	501	21	-	4/18/38/38	0/3/3/3
19	GDP	EA	501	-	-	6/12/32/32	0/3/3/3
20	GTP	LB	501	21	-	3/18/38/38	0/3/3/3
19	GDP	KI	502	-	-	5/12/32/32	0/3/3/3
19	GDP	CK	501	-	-	6/12/32/32	0/3/3/3
20	GTP	BB	501	21	-	3/18/38/38	0/3/3/3
20	GTP	IF	501	21	-	5/18/38/38	0/3/3/3
20	GTP	AH	501	21	-	7/18/38/38	0/3/3/3
19	GDP	CG	501	-	-	3/12/32/32	0/3/3/3
20	GTP	DB	501	21	-	6/18/38/38	0/3/3/3
19	GDP	JE	501	-	-	4/12/32/32	0/3/3/3

The worst 5 of 220 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
20	DH	501	GTP	C5-C6	-4.39	1.38	1.47
20	IF	501	GTP	C5-C6	-4.32	1.38	1.47
20	AF	501	GTP	C5-C6	-4.30	1.38	1.47
20	FH	501	GTP	C5-C6	-4.29	1.38	1.47
20	EF	501	GTP	C5-C6	-4.27	1.38	1.47

The worst 5 of 816 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
20	DH	501	GTP	PB-O3B-PG	-4.74	116.55	132.83
20	MD	501	GTP	PB-O3B-PG	-4.64	116.91	132.83
20	ML	501	GTP	PB-O3B-PG	-4.63	116.92	132.83
19	DE	501	GDP	PA-O3A-PB	-4.62	116.98	132.83
20	IH	501	GTP	PB-O3B-PG	-4.56	117.17	132.83

There are no chirality outliers.

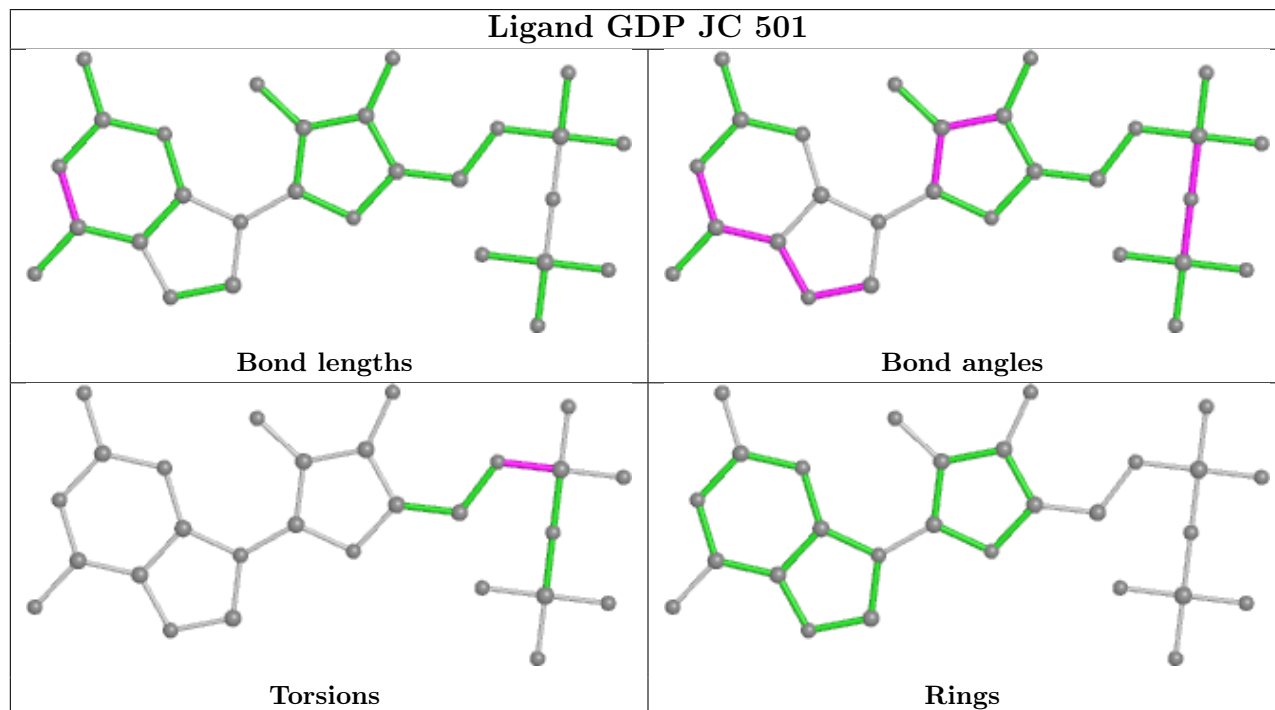
5 of 507 torsion outliers are listed below:

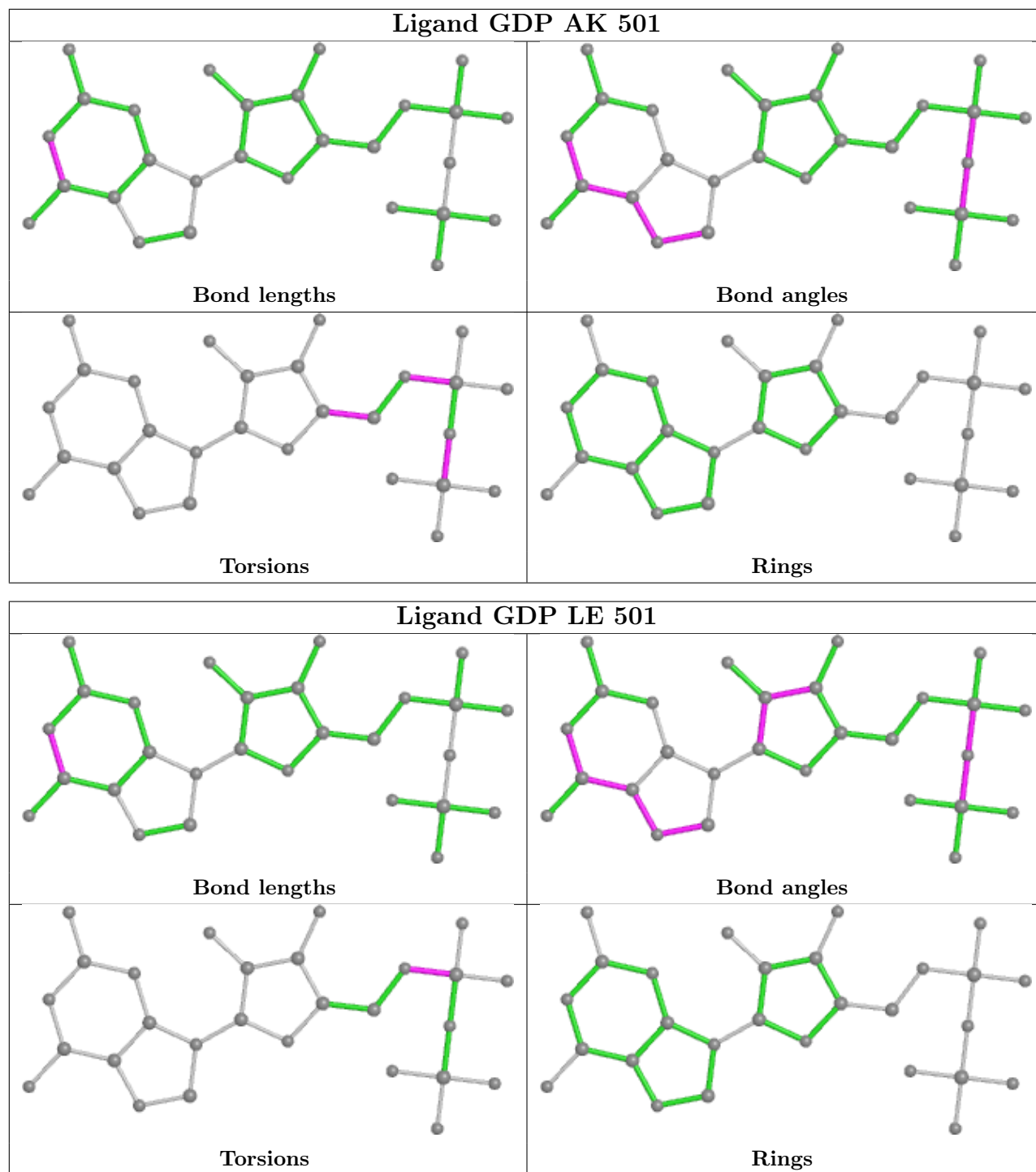
Mol	Chain	Res	Type	Atoms
19	BA	501	GDP	C5'-O5'-PA-O3A
19	BA	501	GDP	C5'-O5'-PA-O2A
19	BA	501	GDP	O4'-C4'-C5'-O5'
19	BA	501	GDP	C3'-C4'-C5'-O5'
19	BC	501	GDP	PA-O3A-PB-O2B

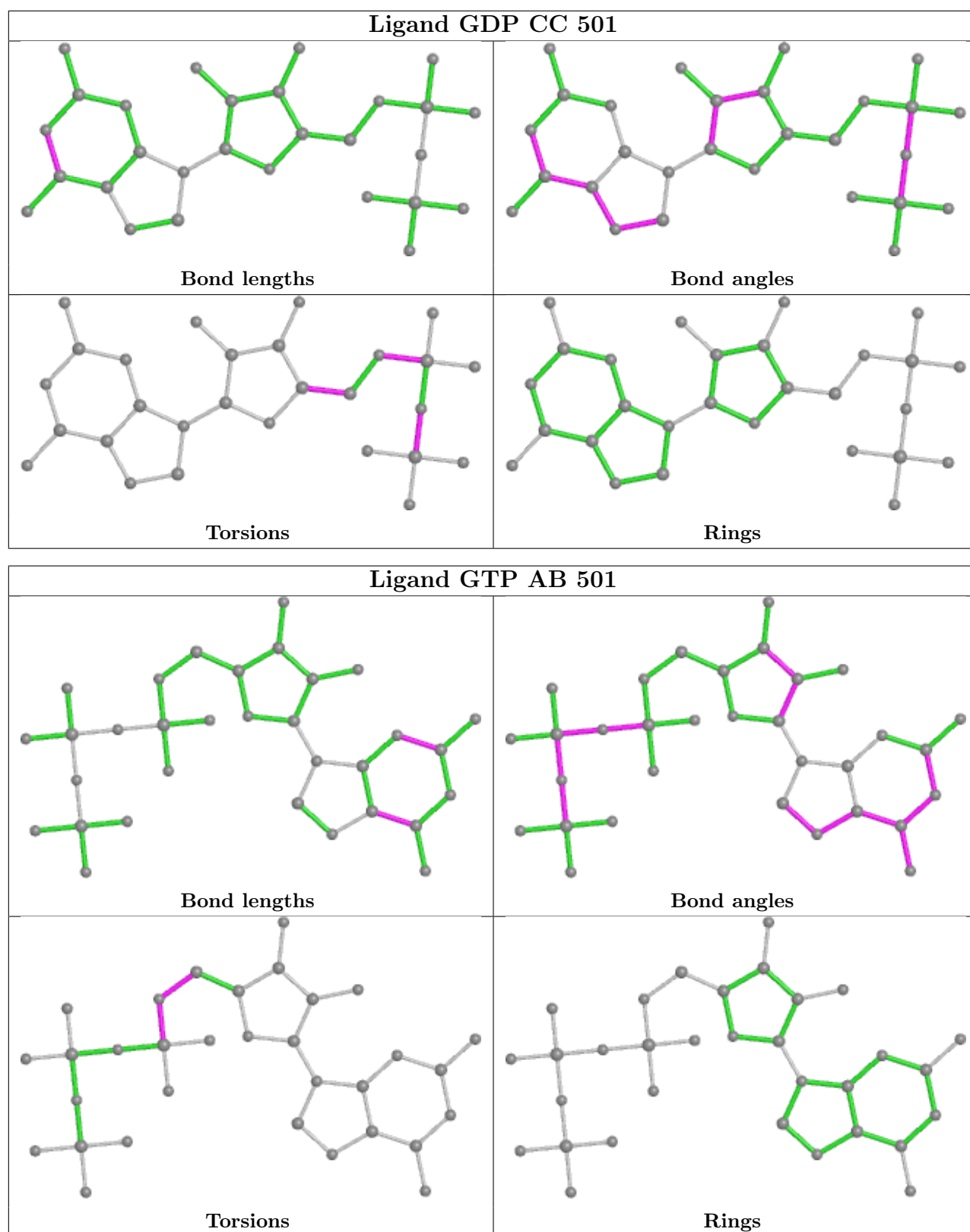
There are no ring outliers.

No monomer is involved in short contacts.

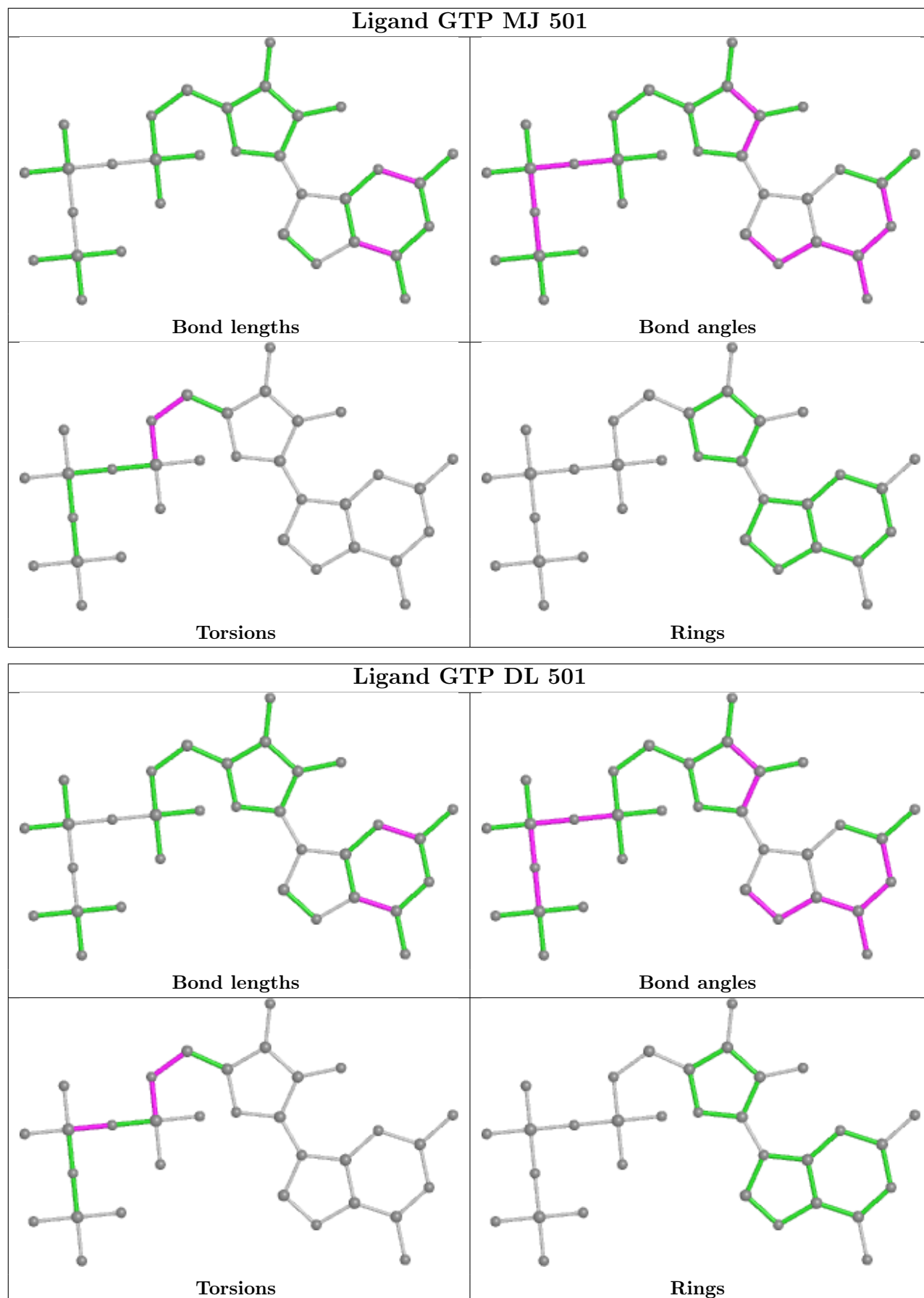
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

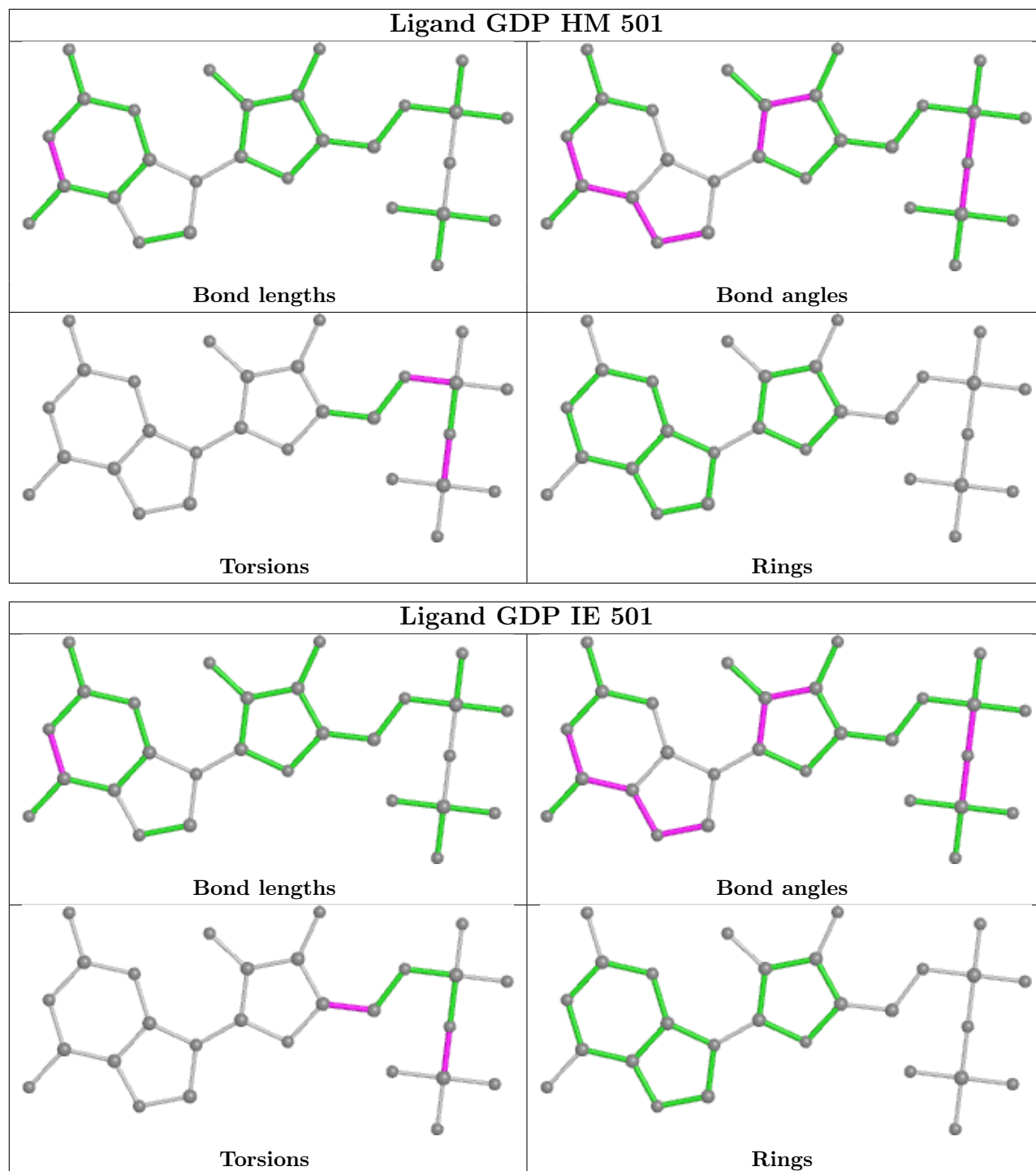


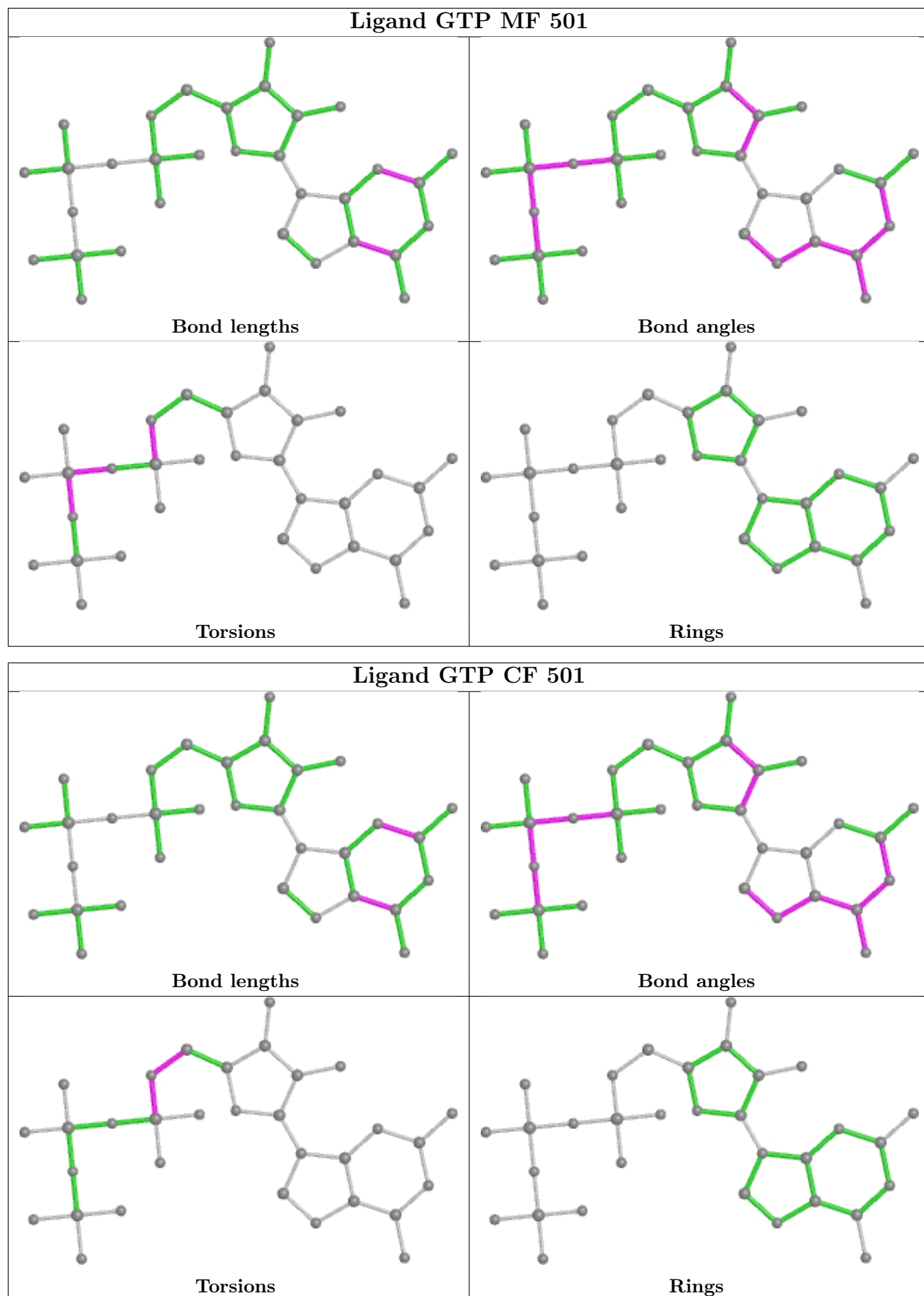


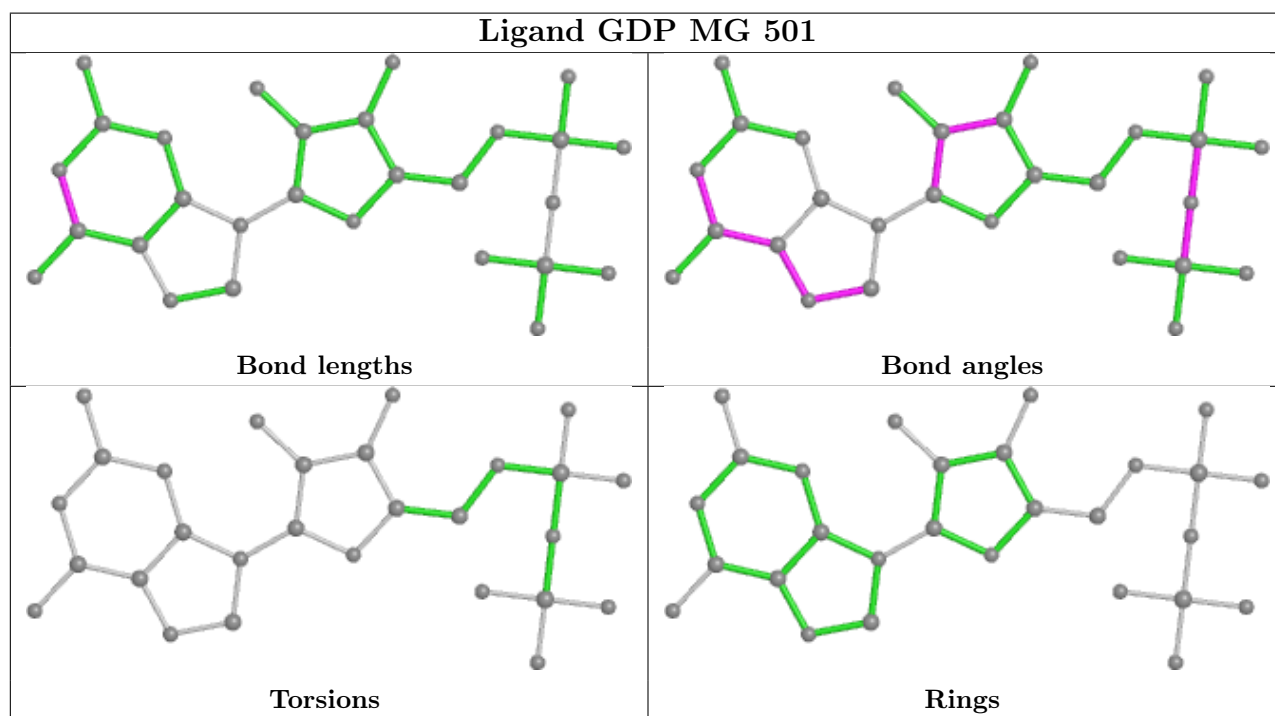
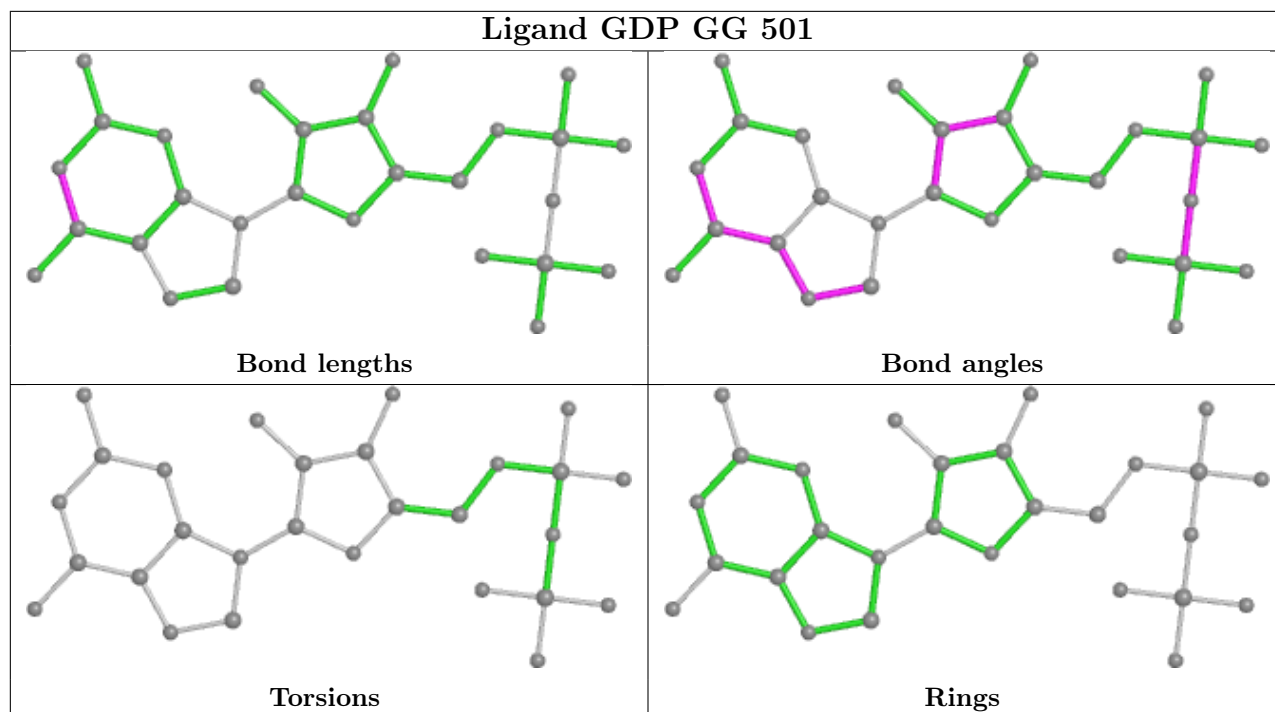


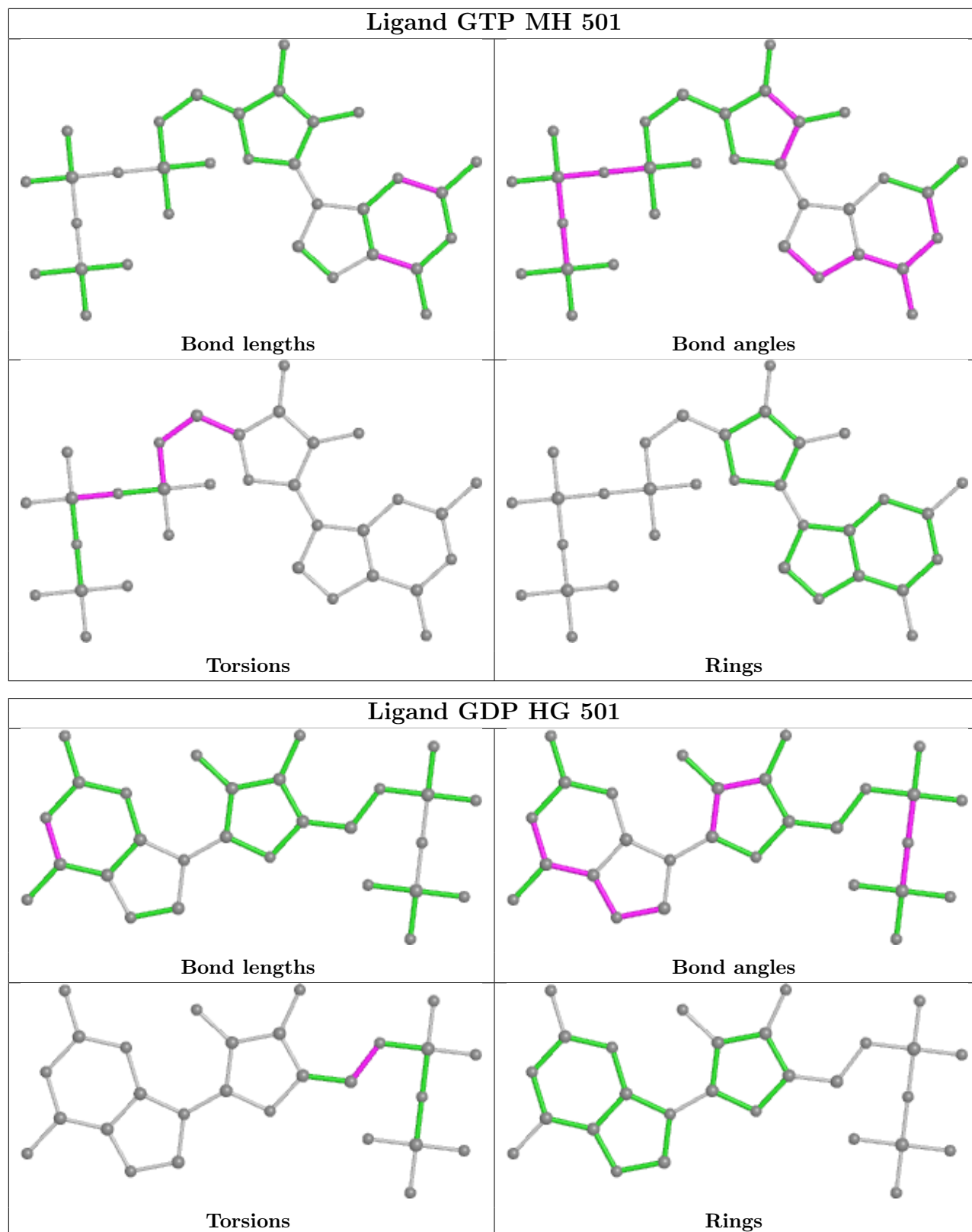


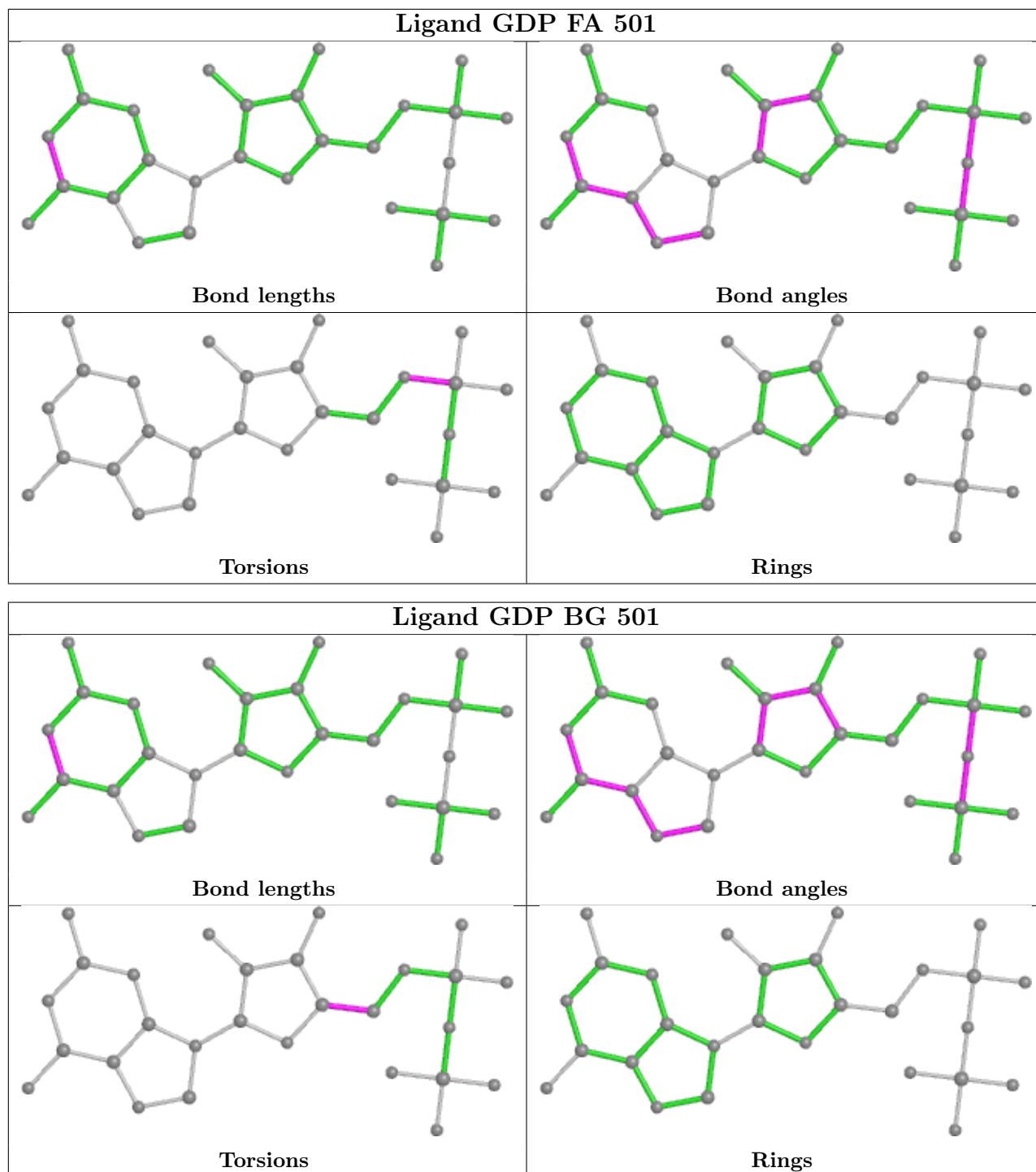


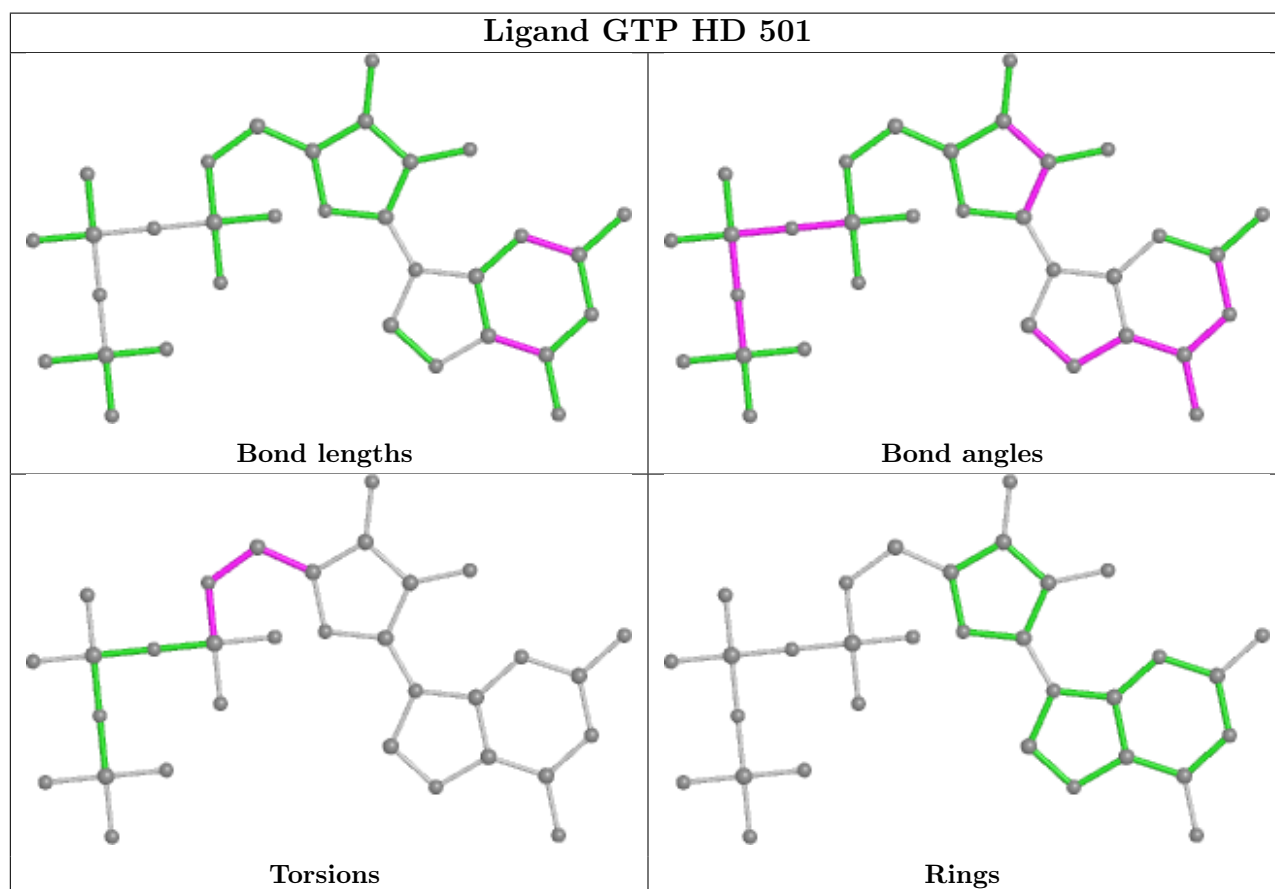
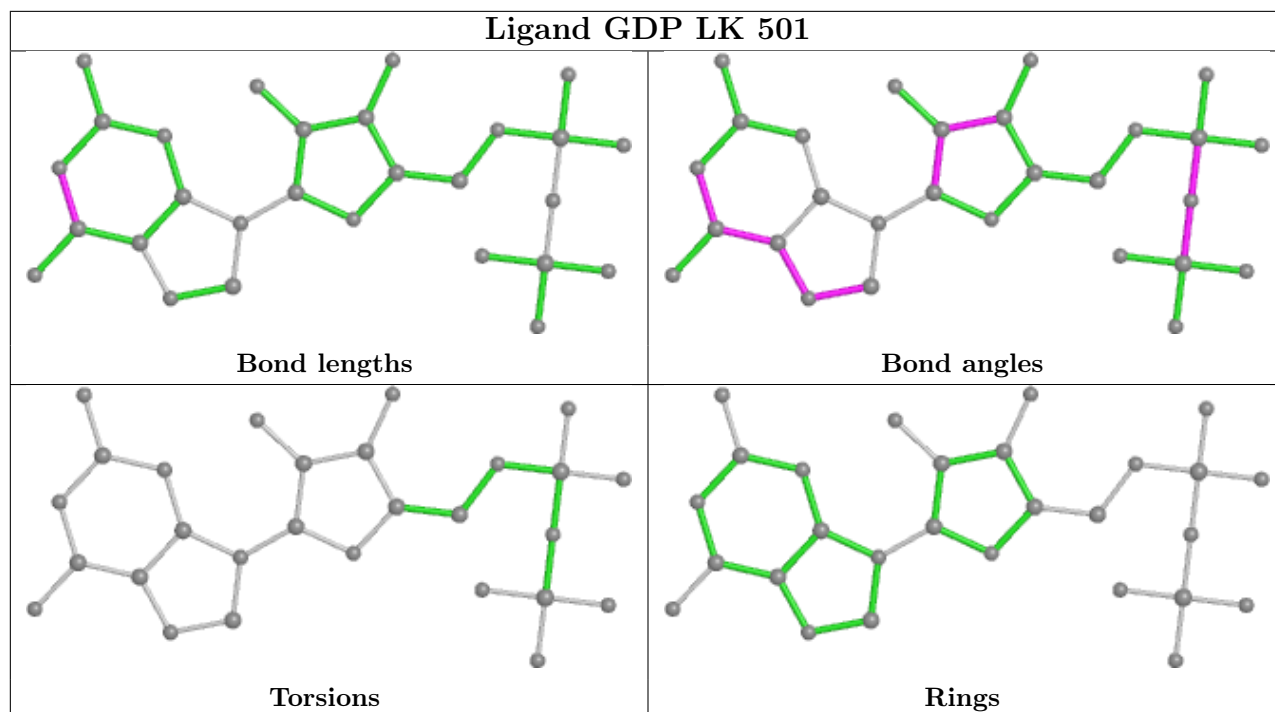


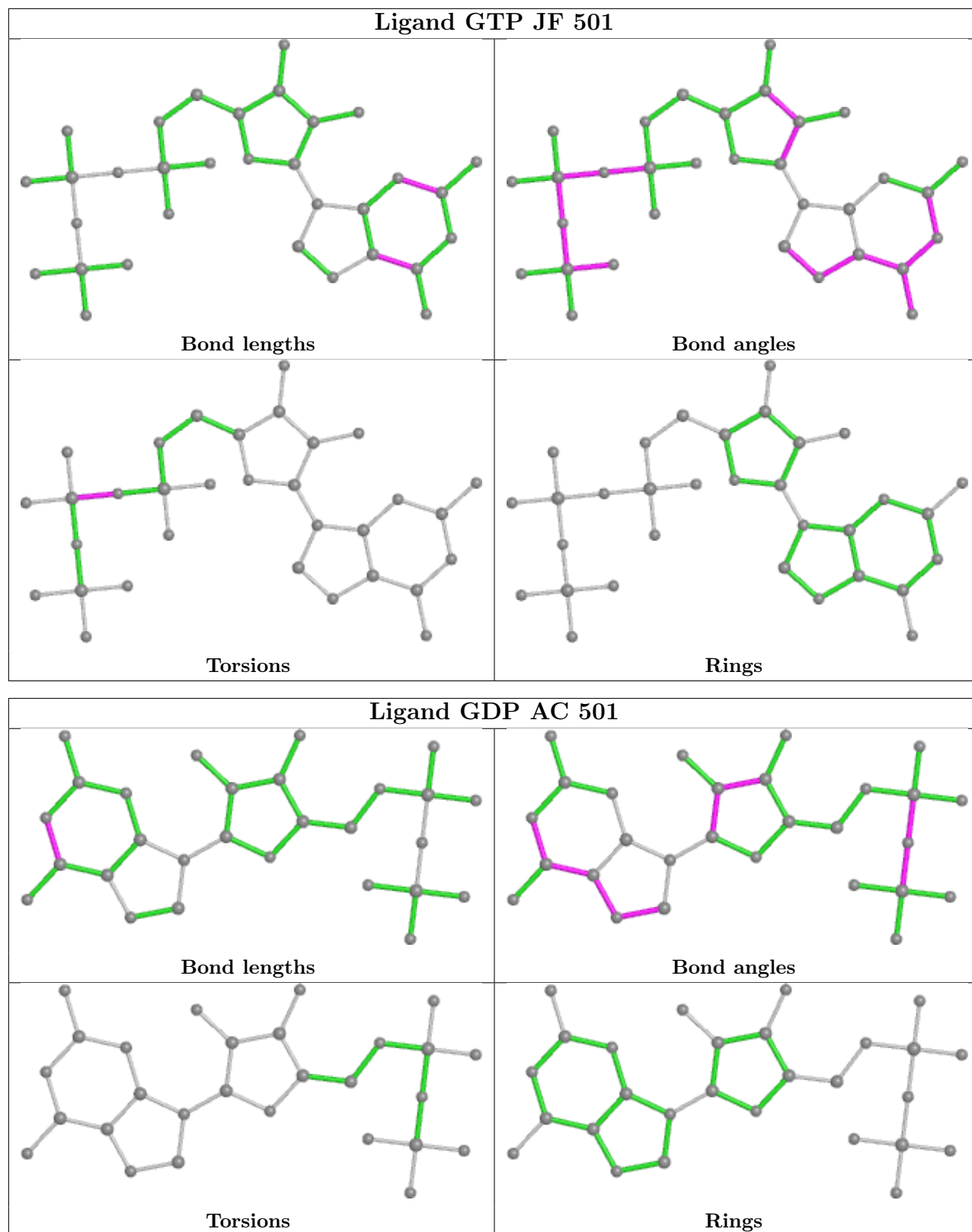




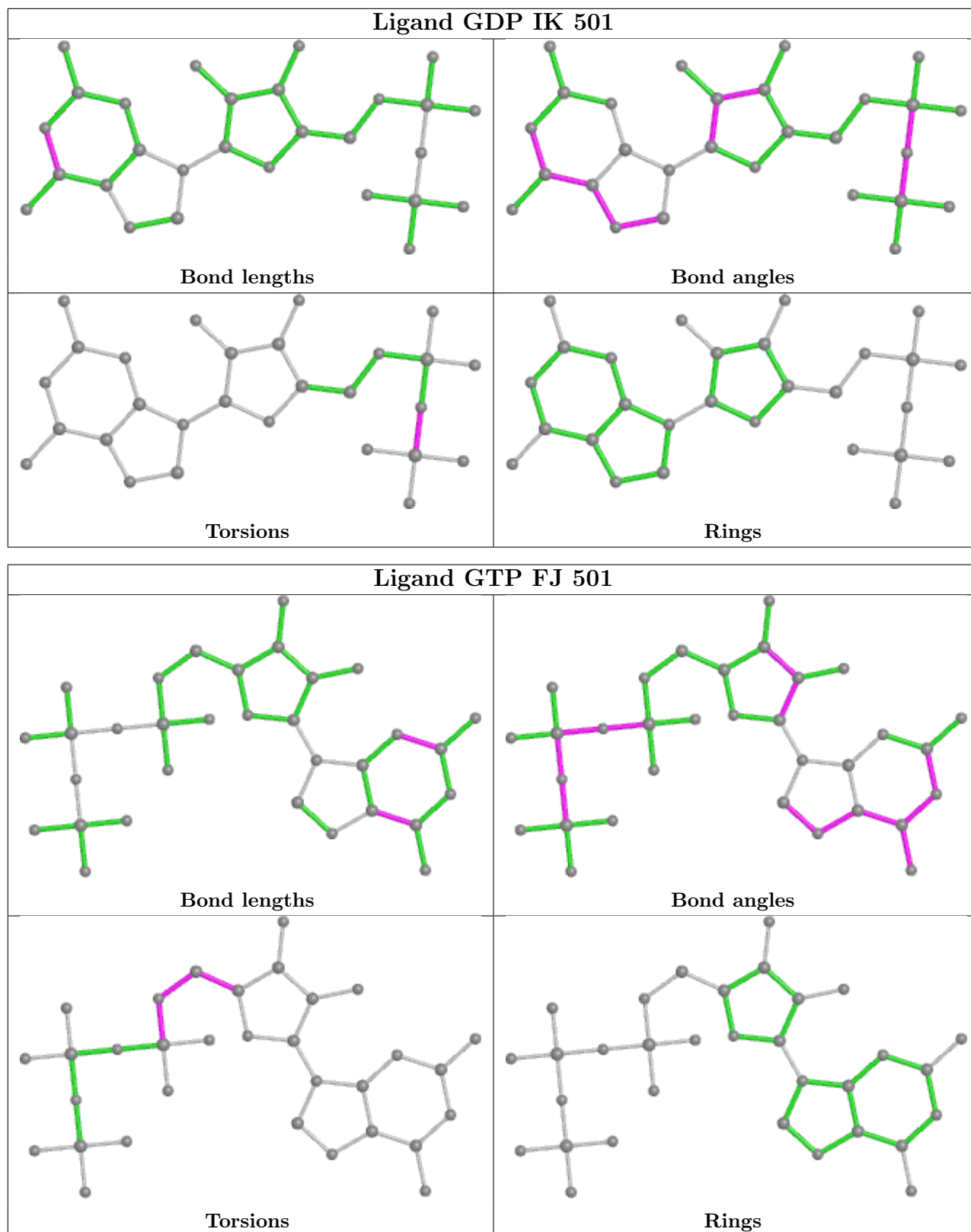


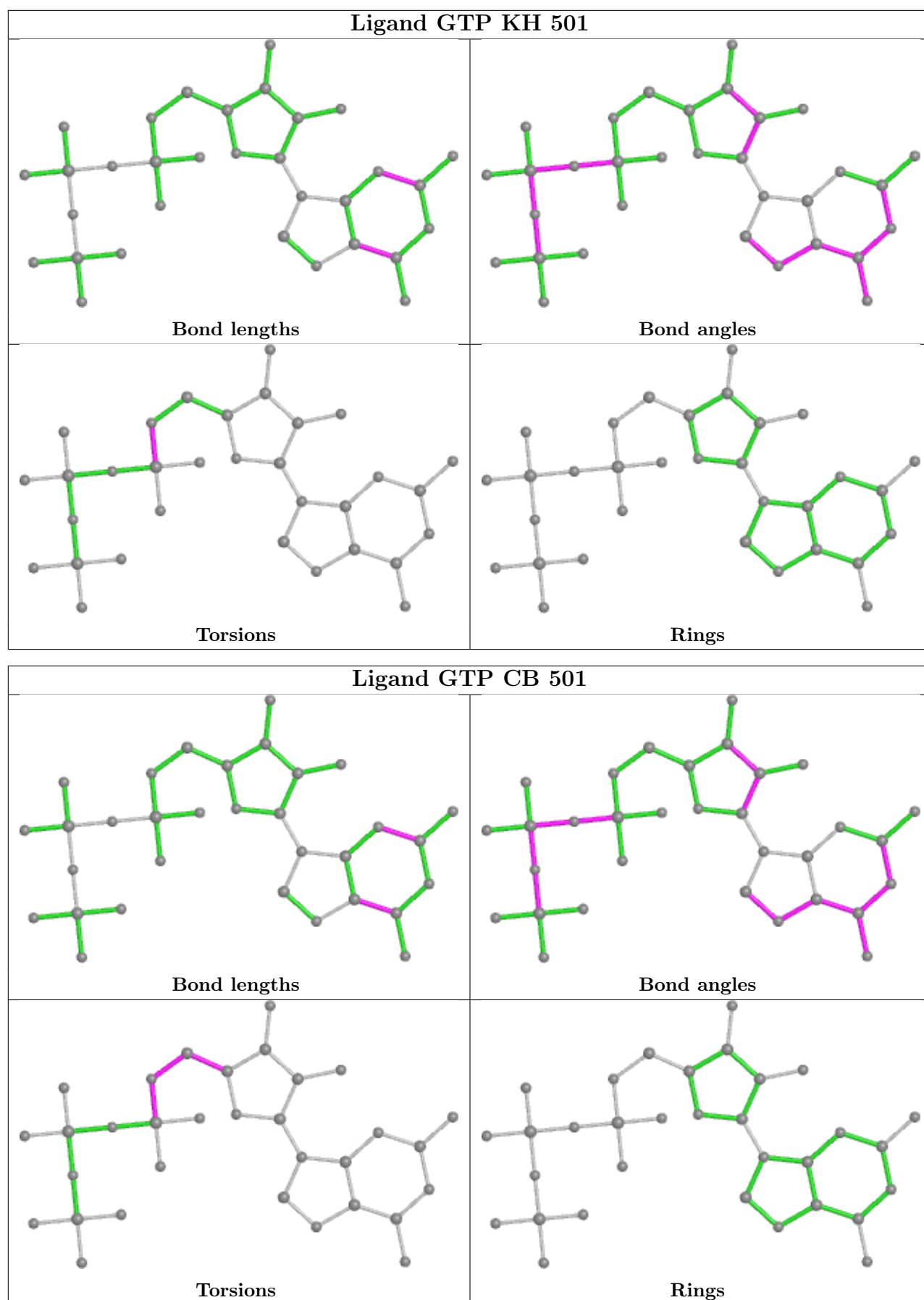


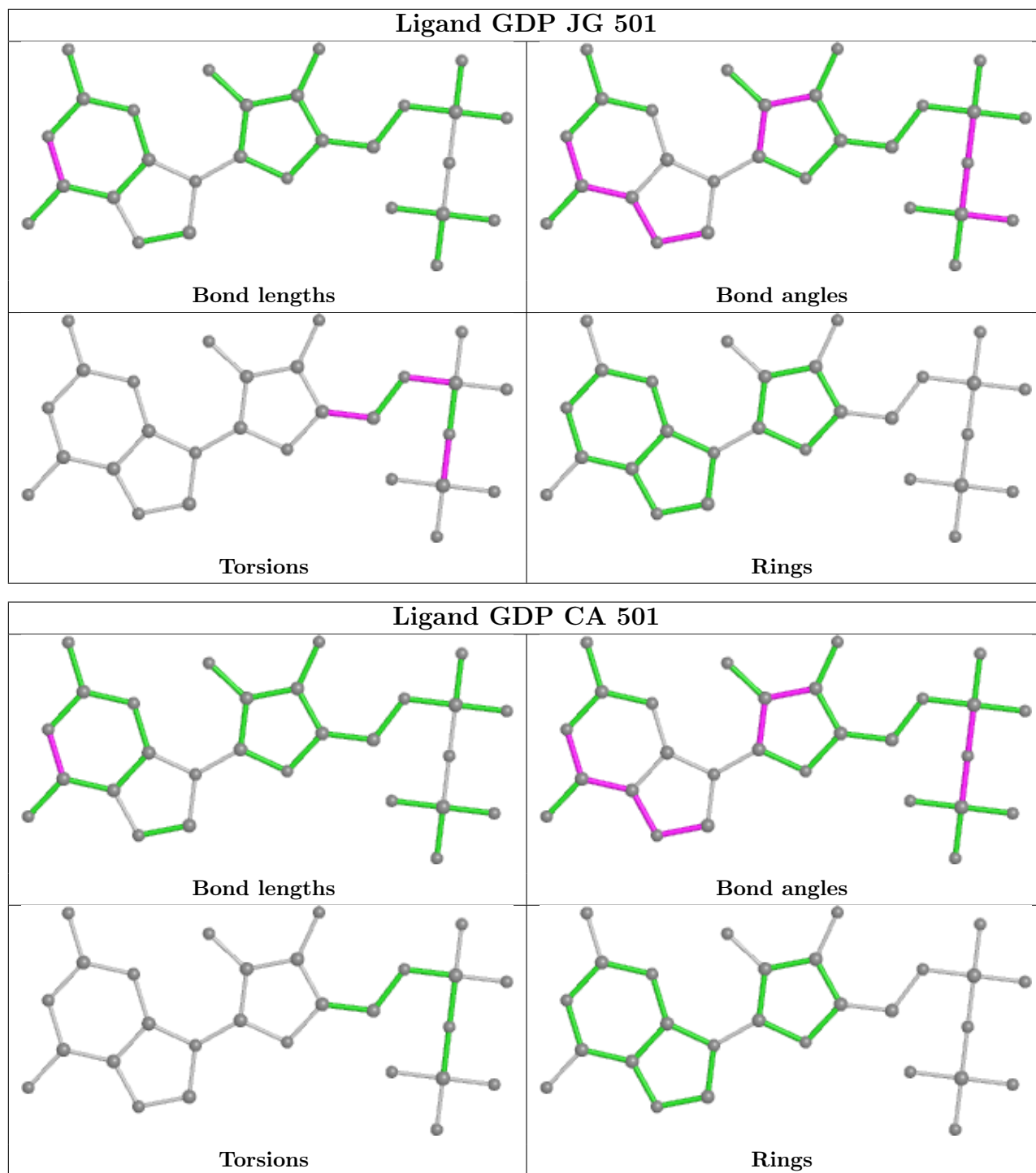


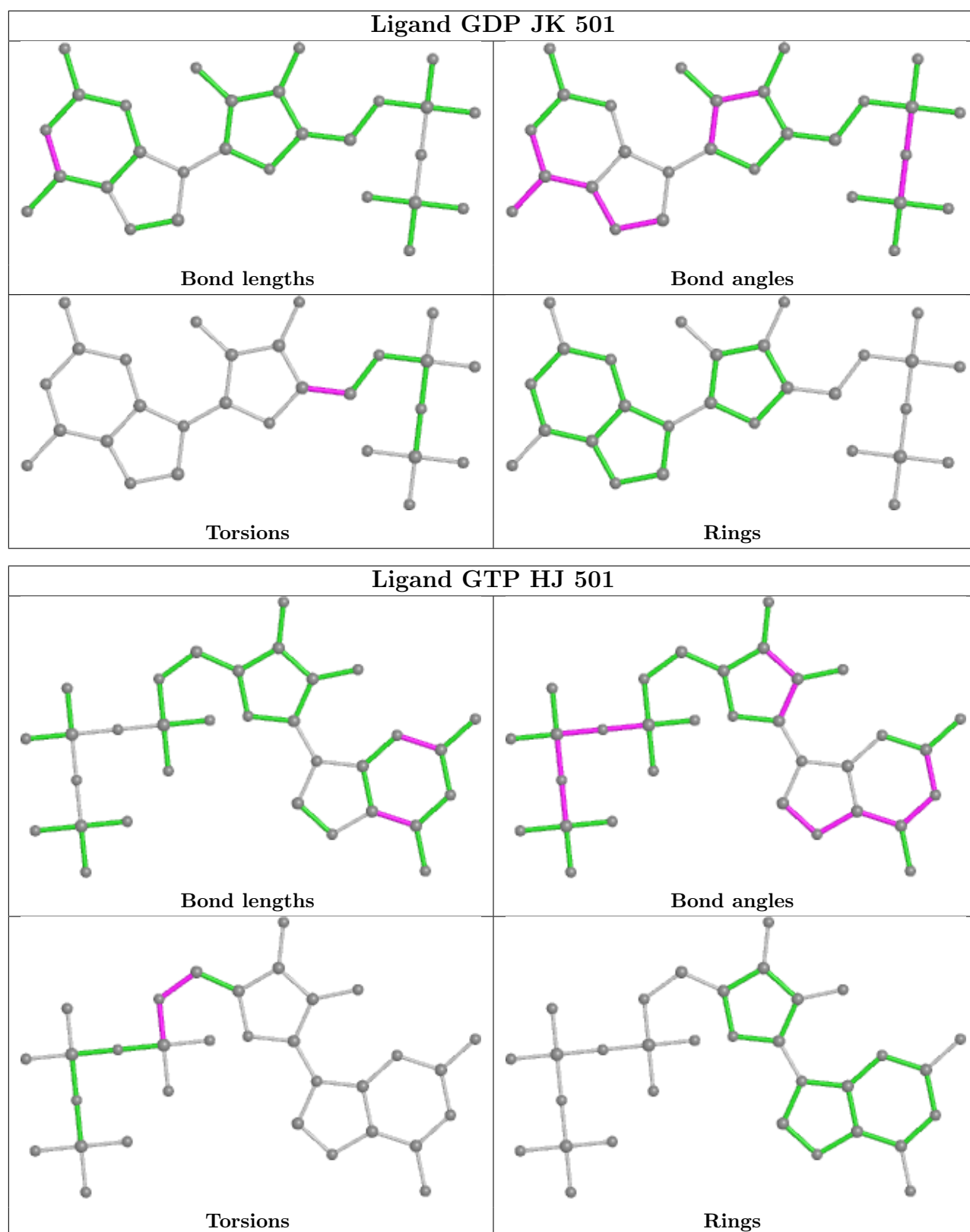


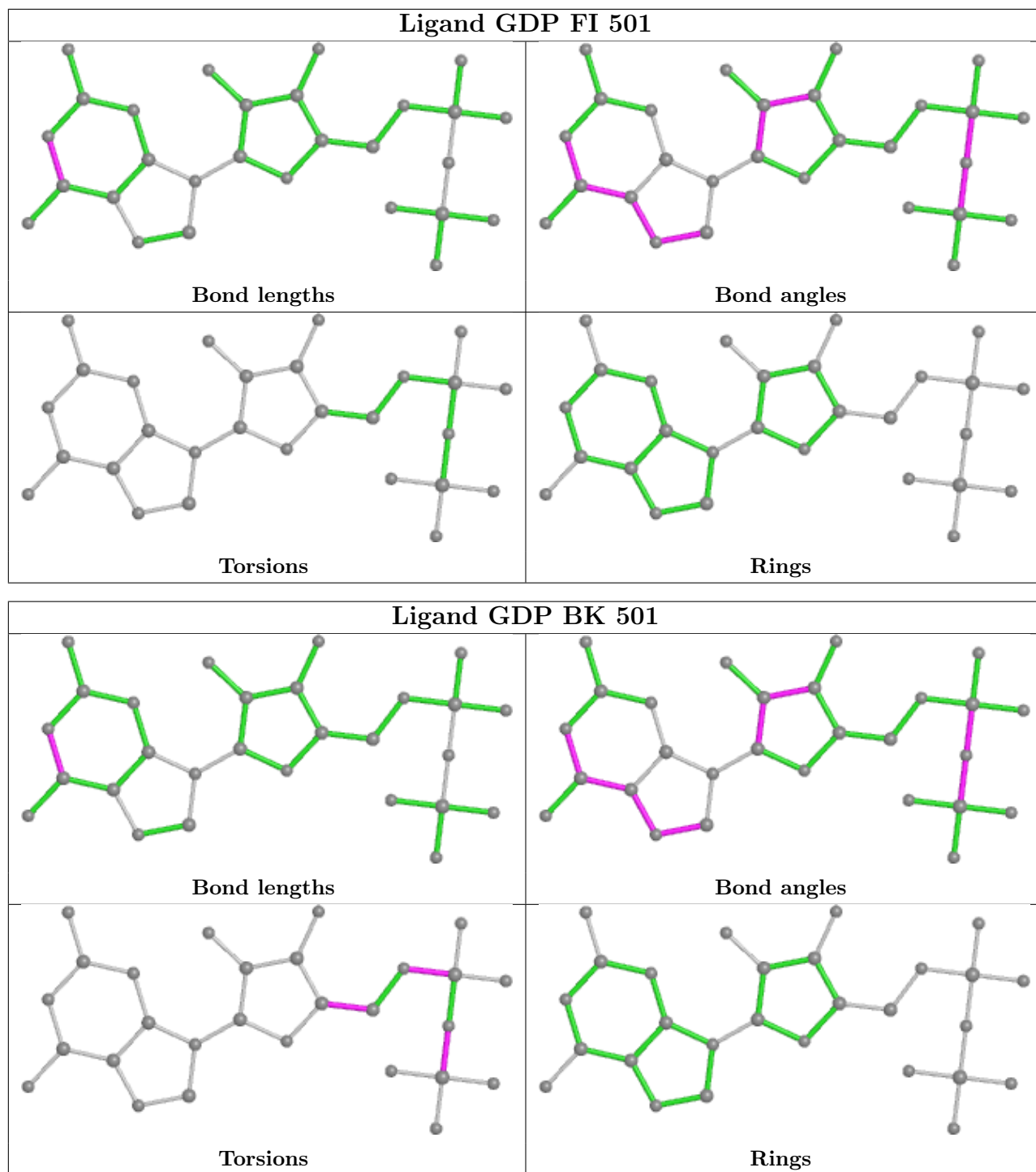


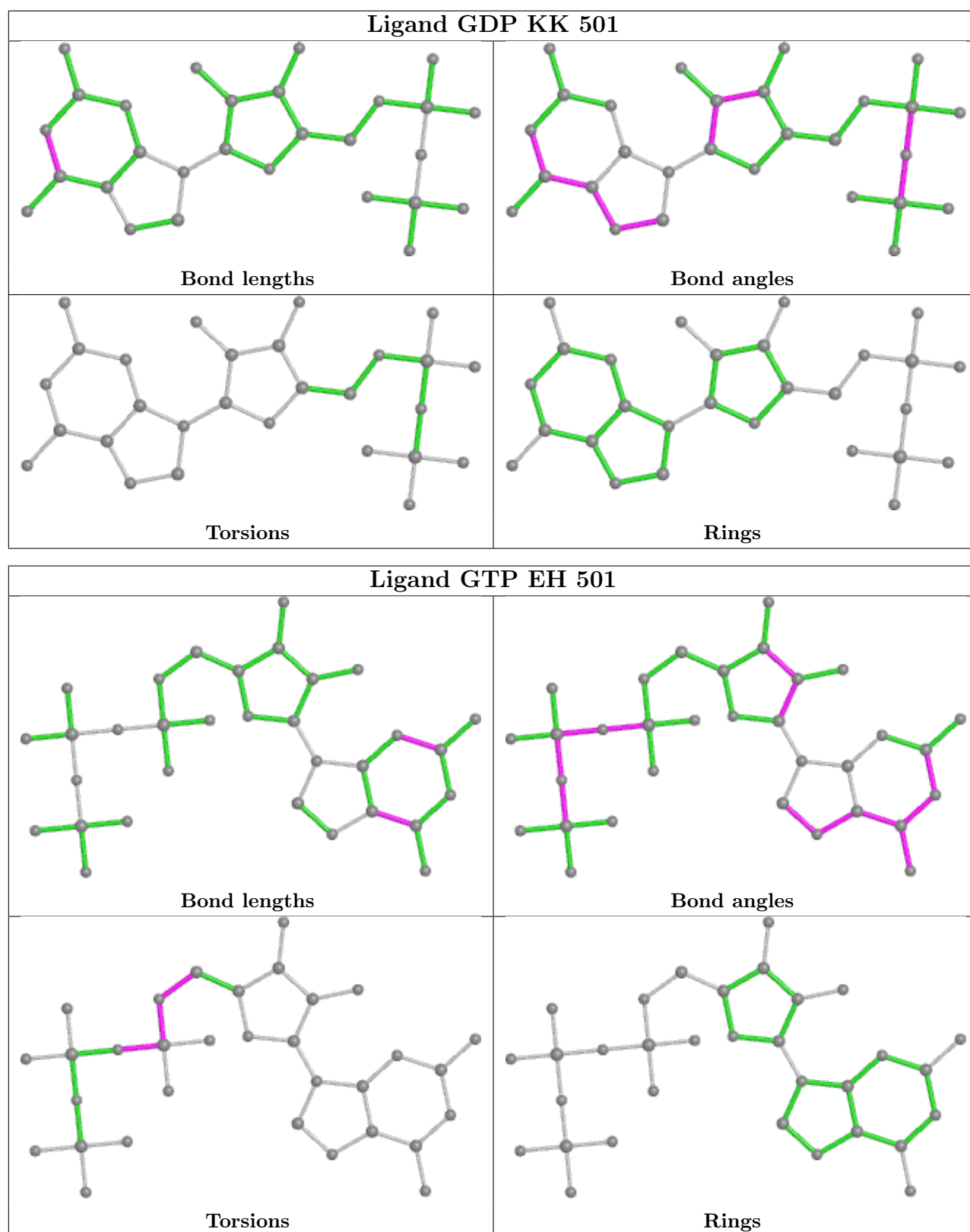


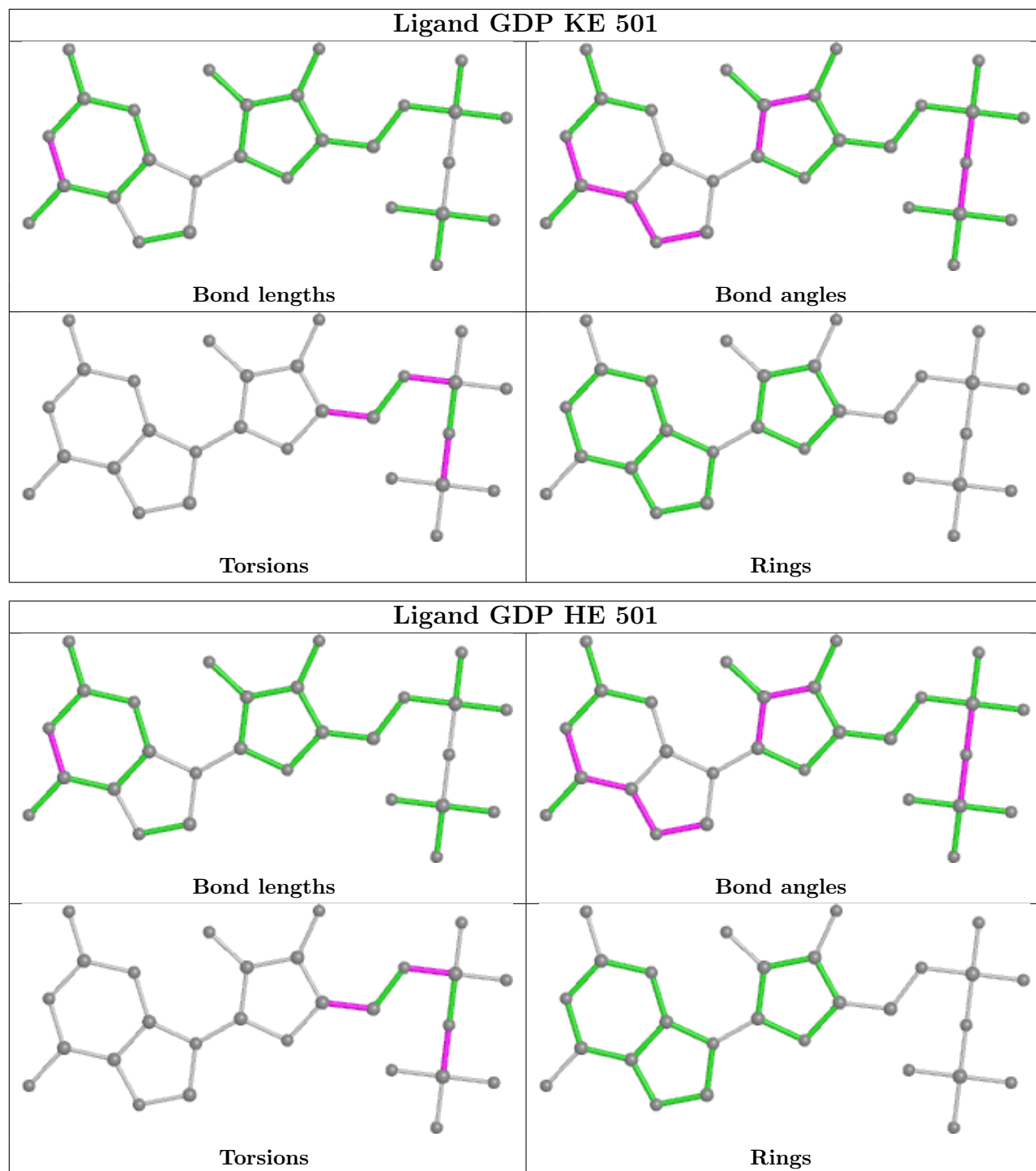


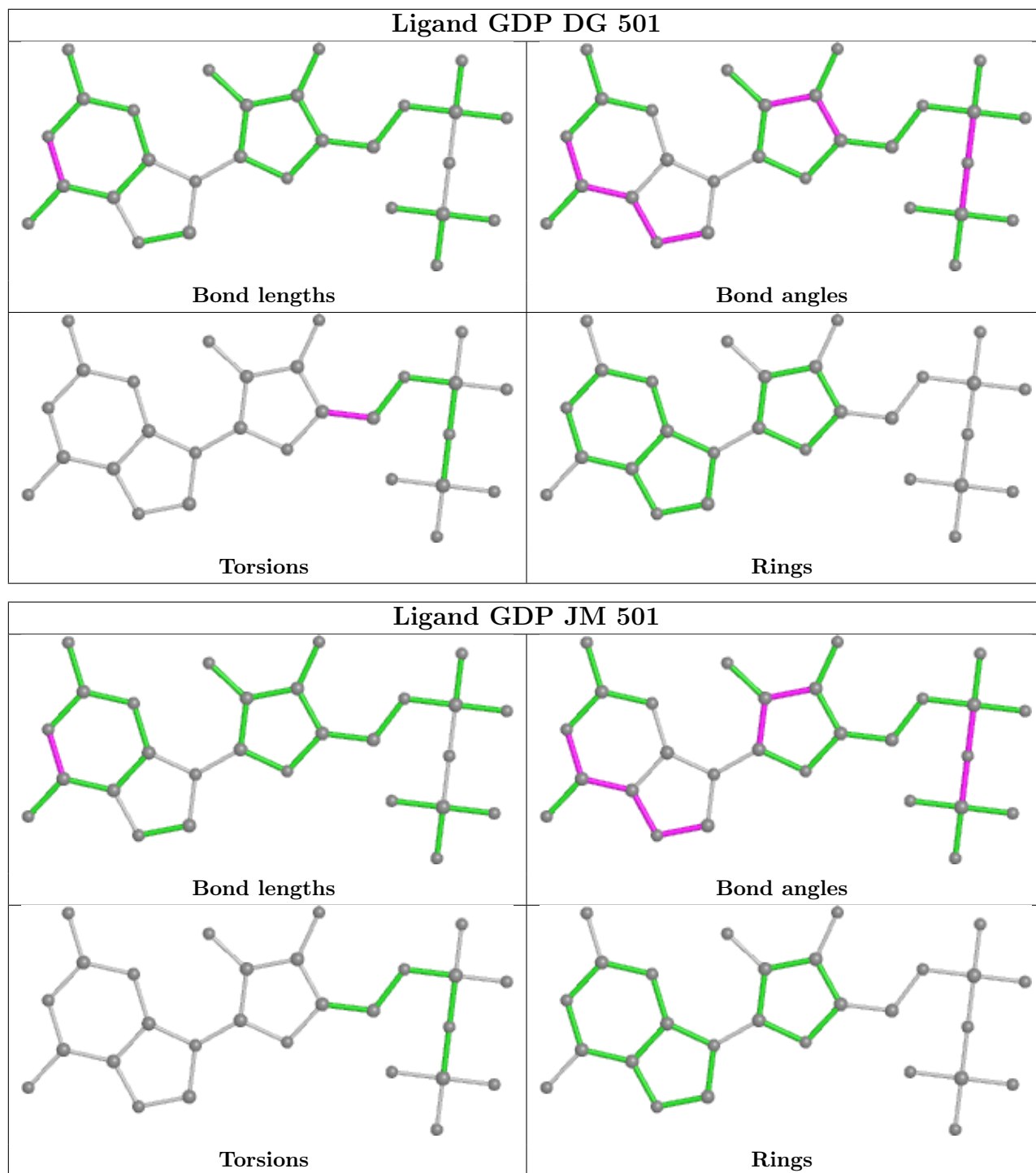




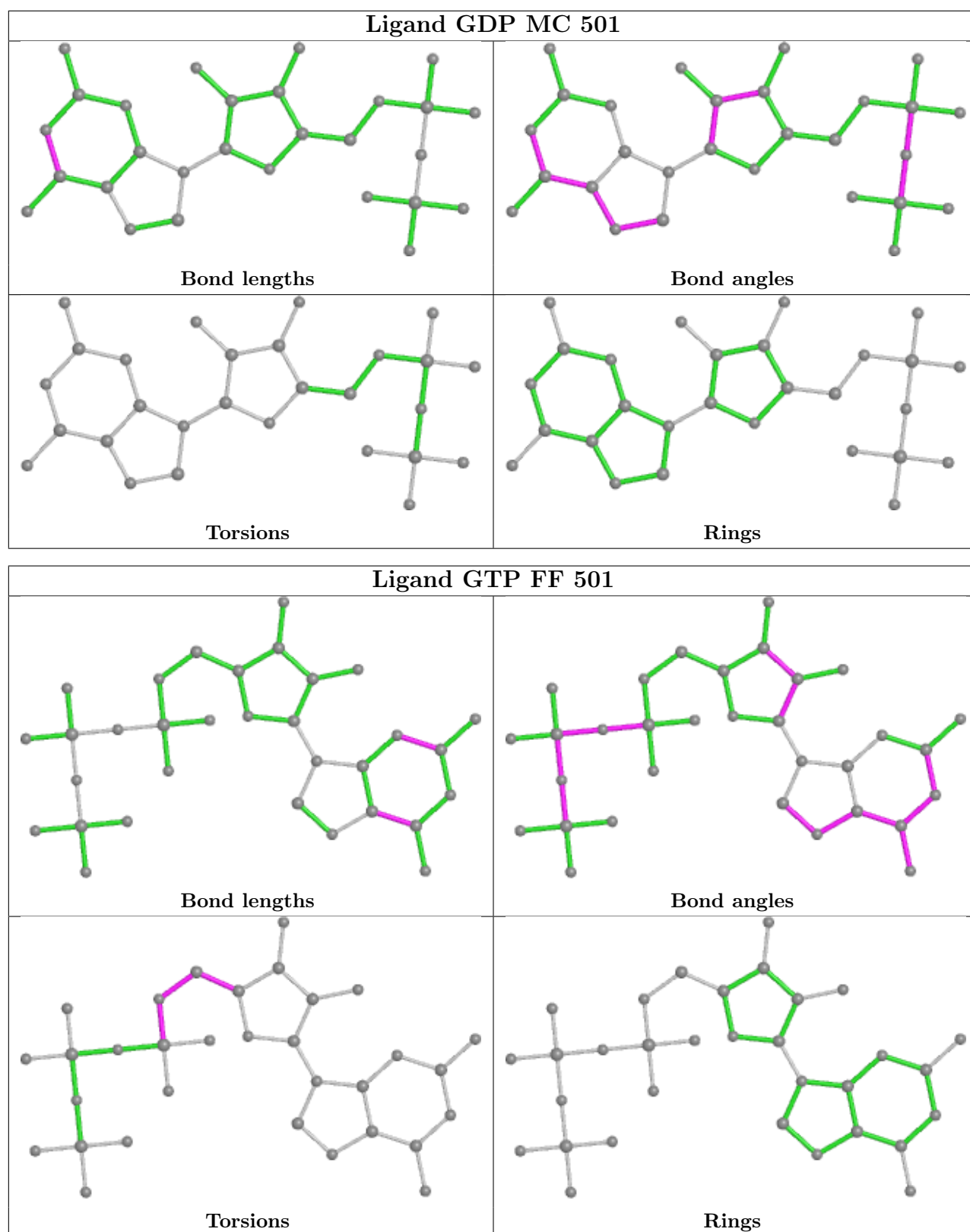


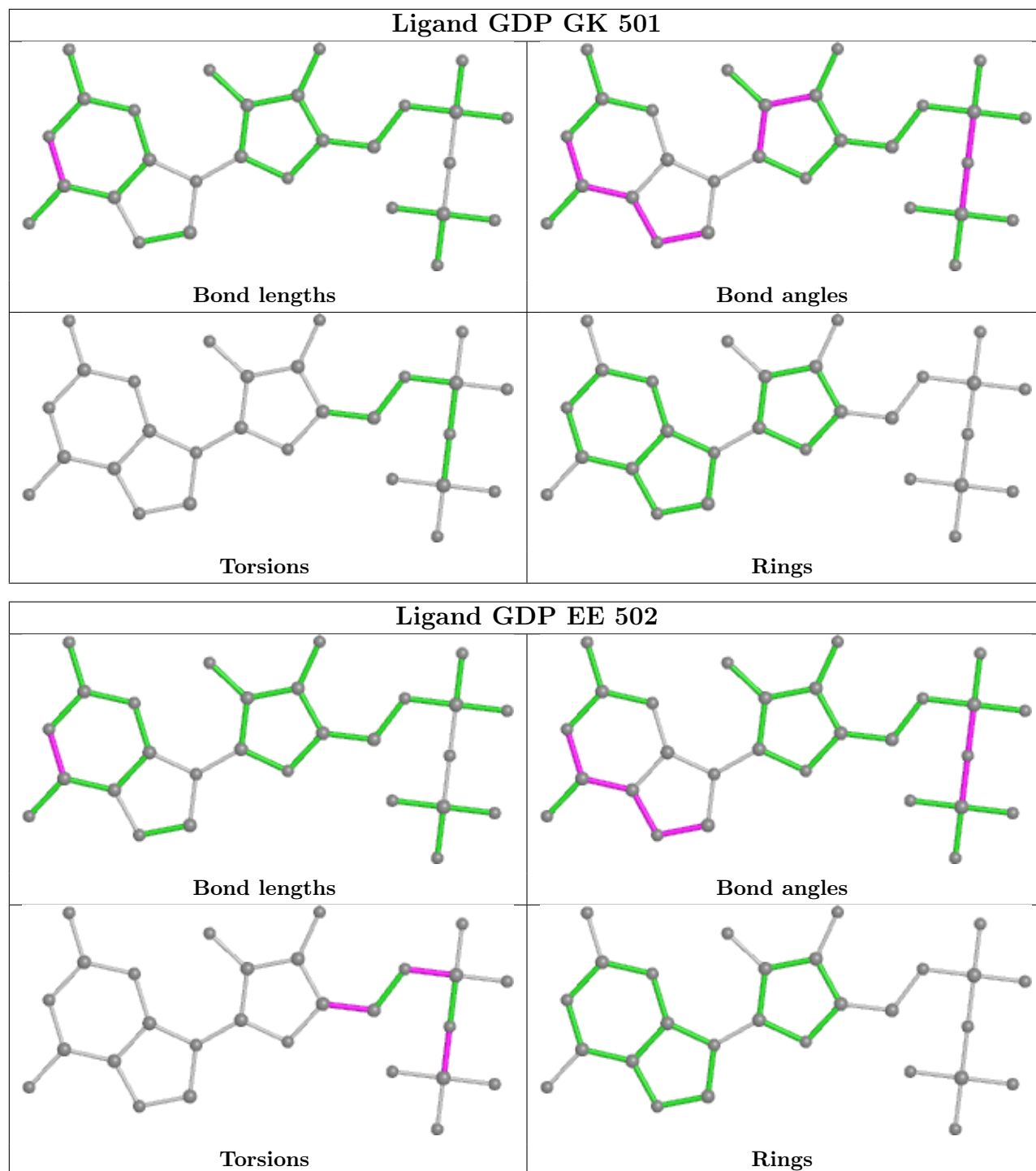


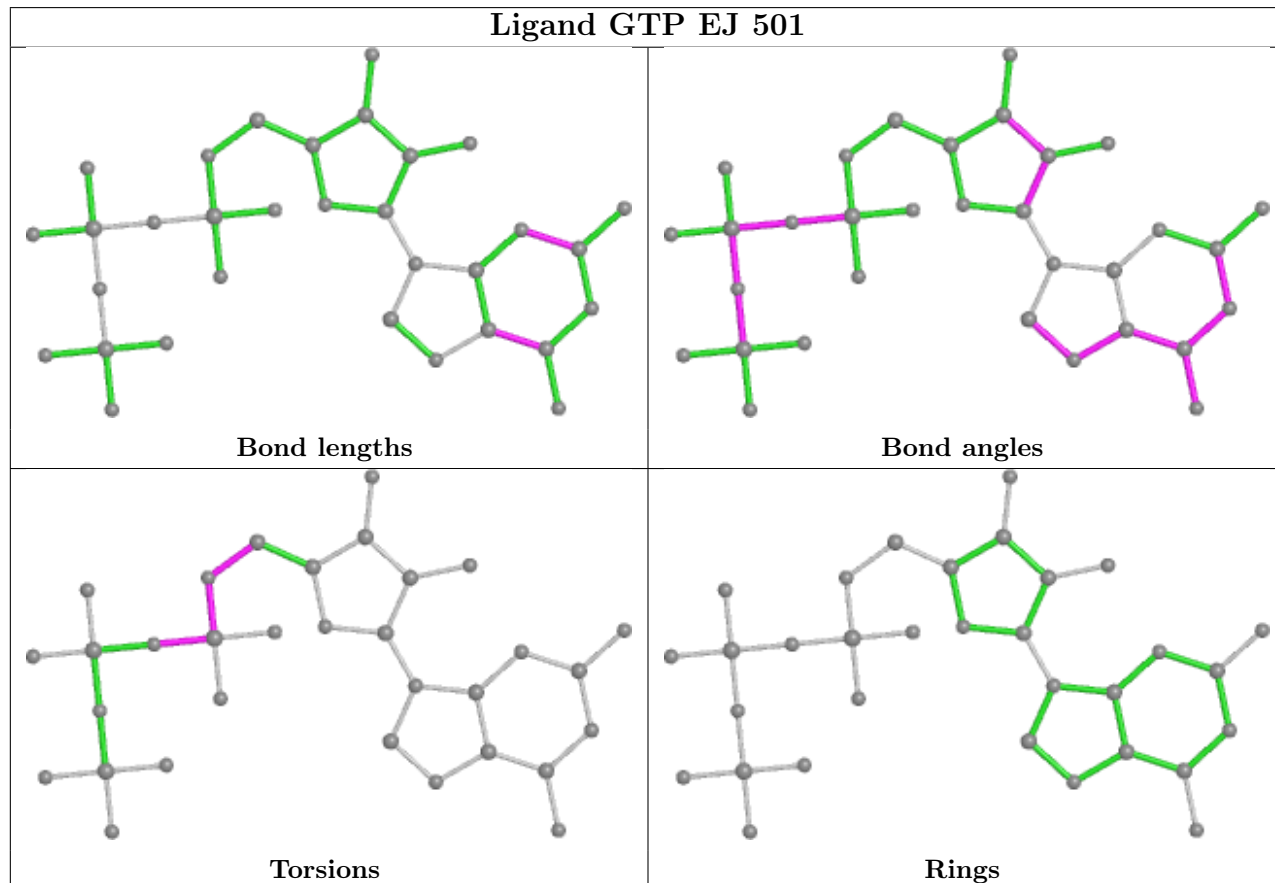
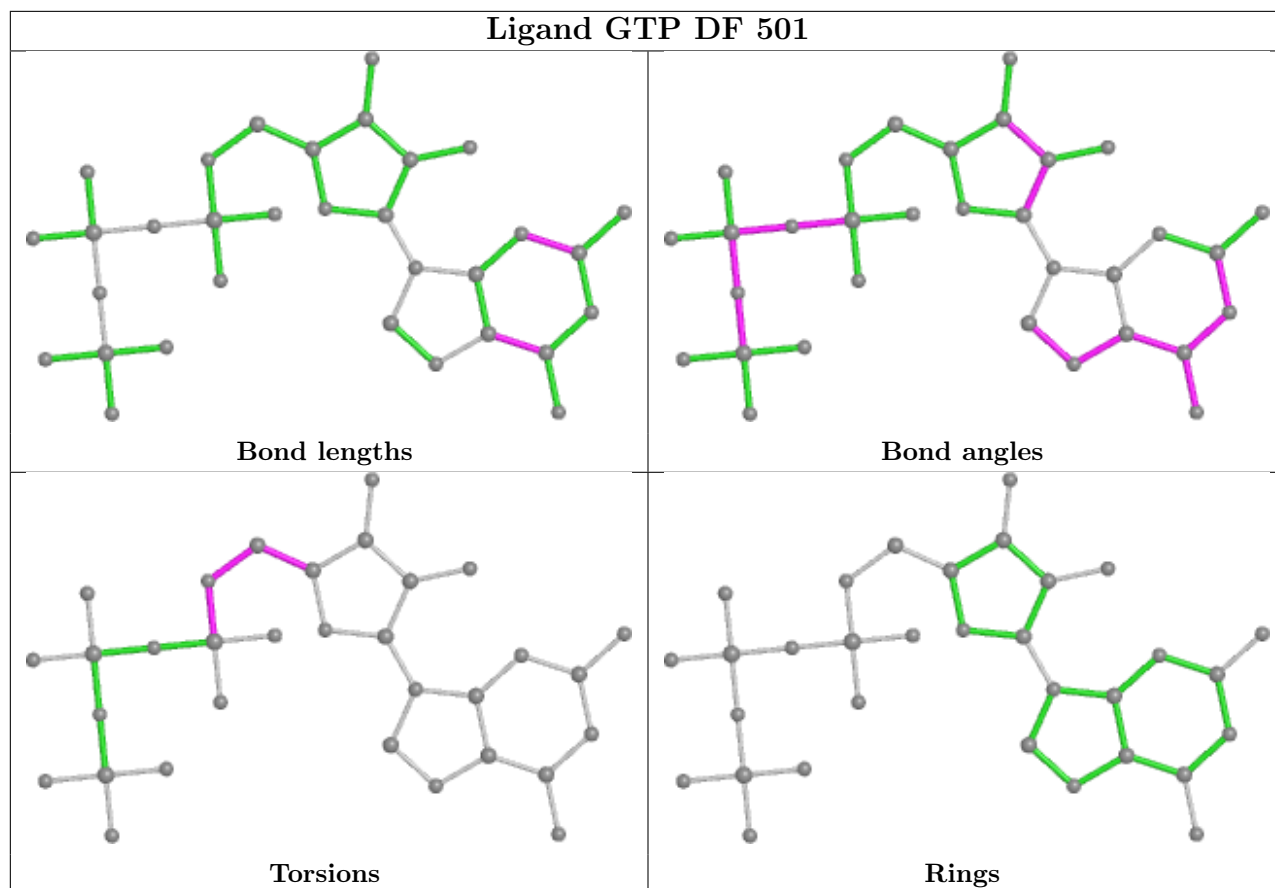


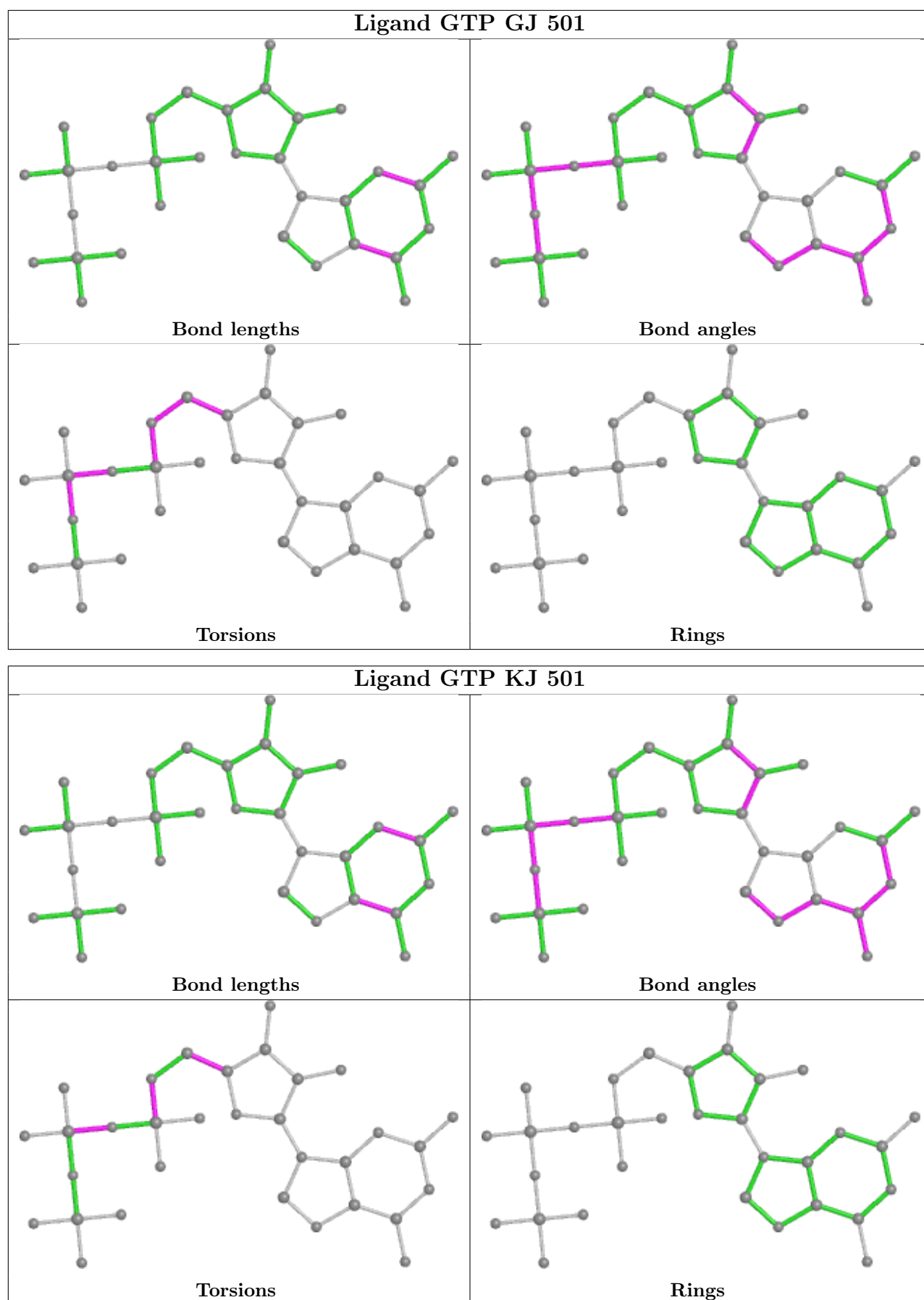


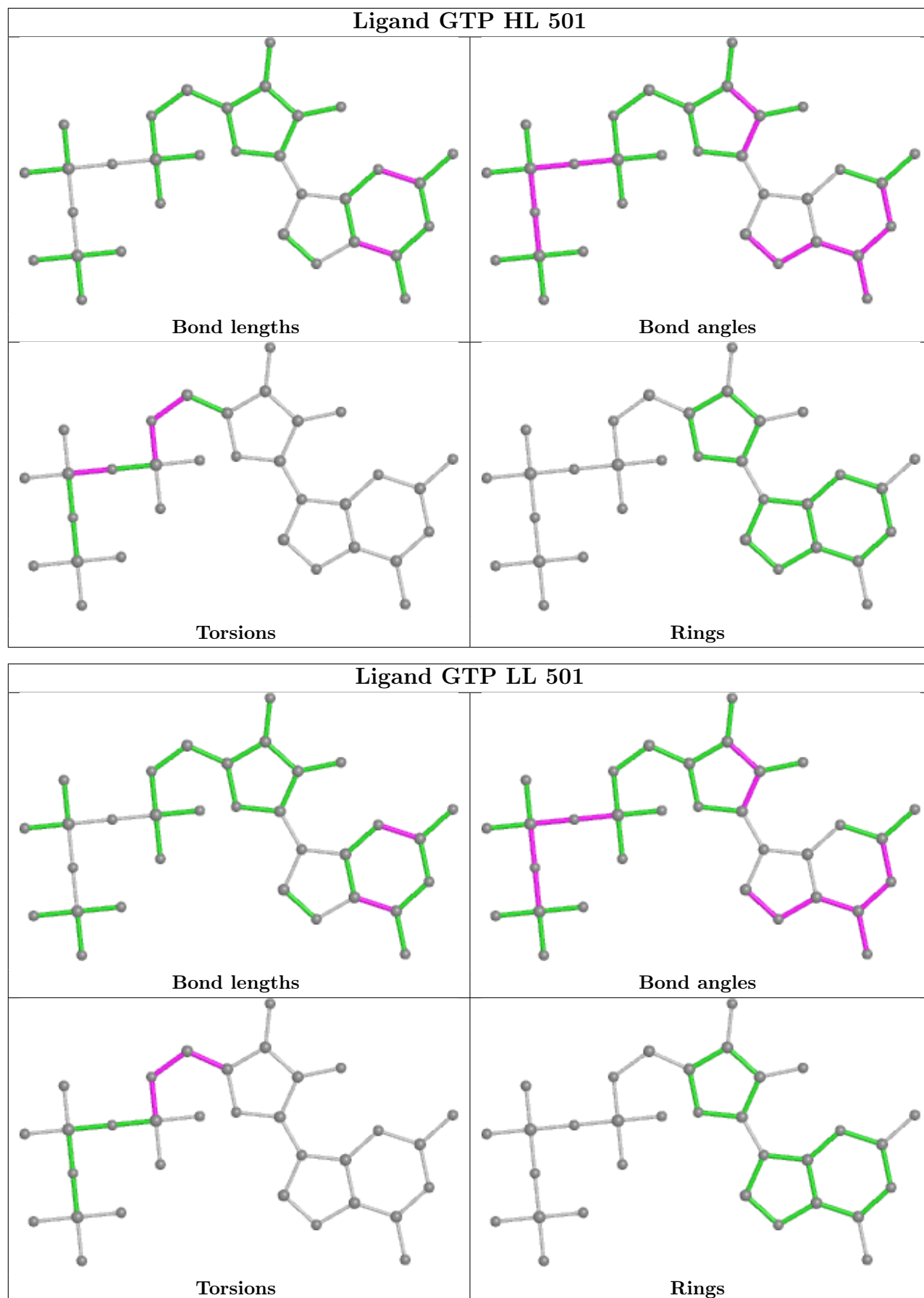


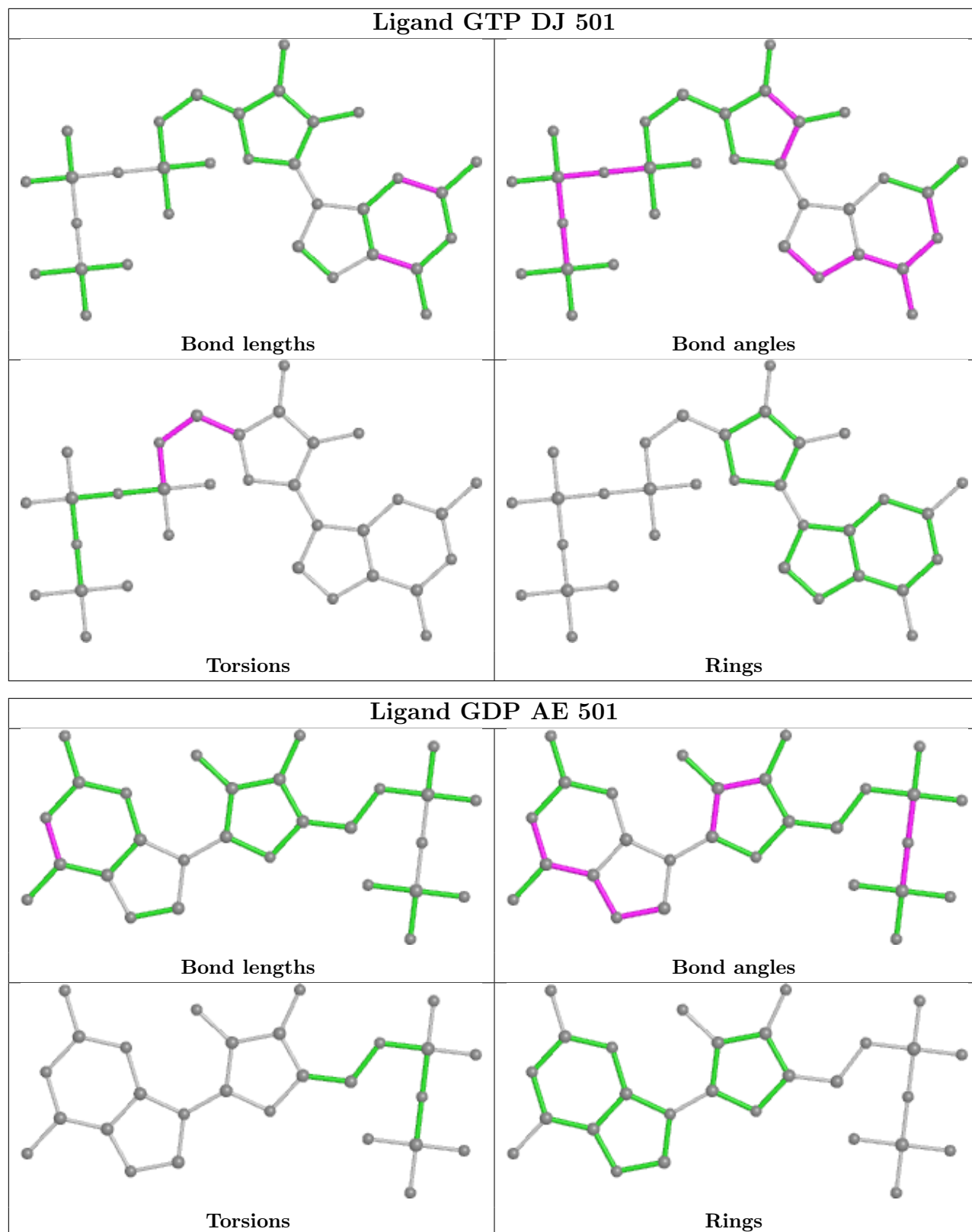


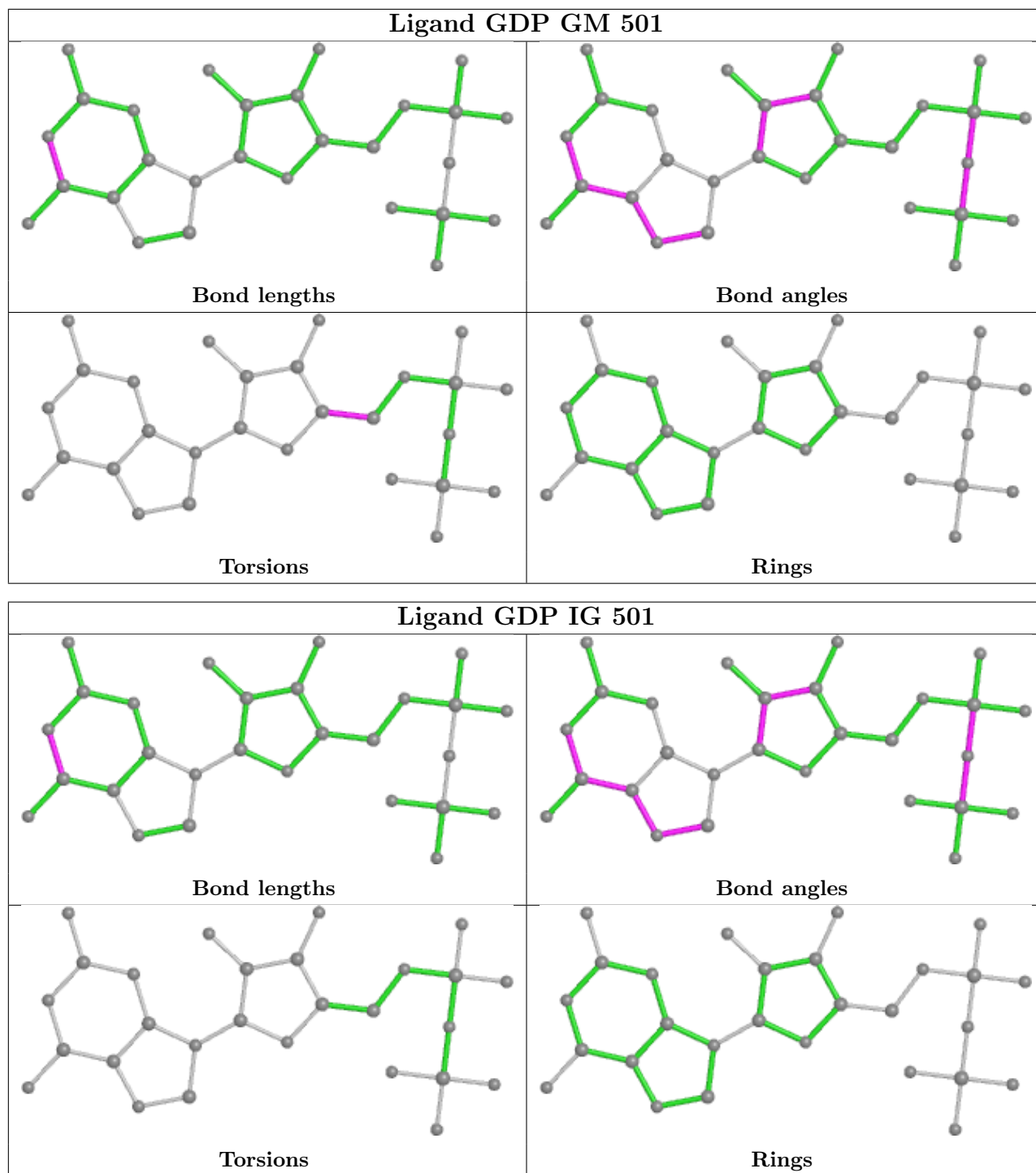


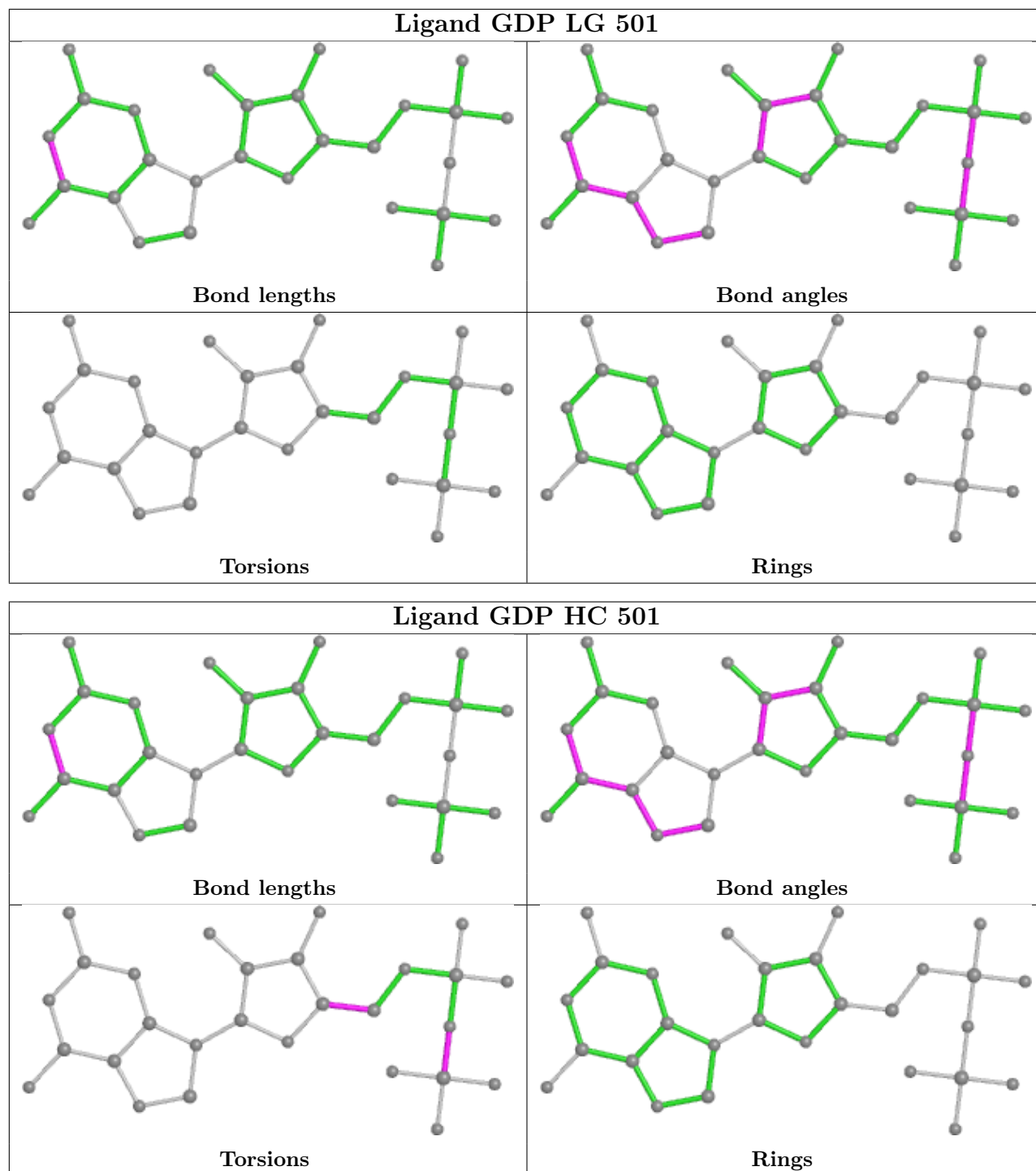




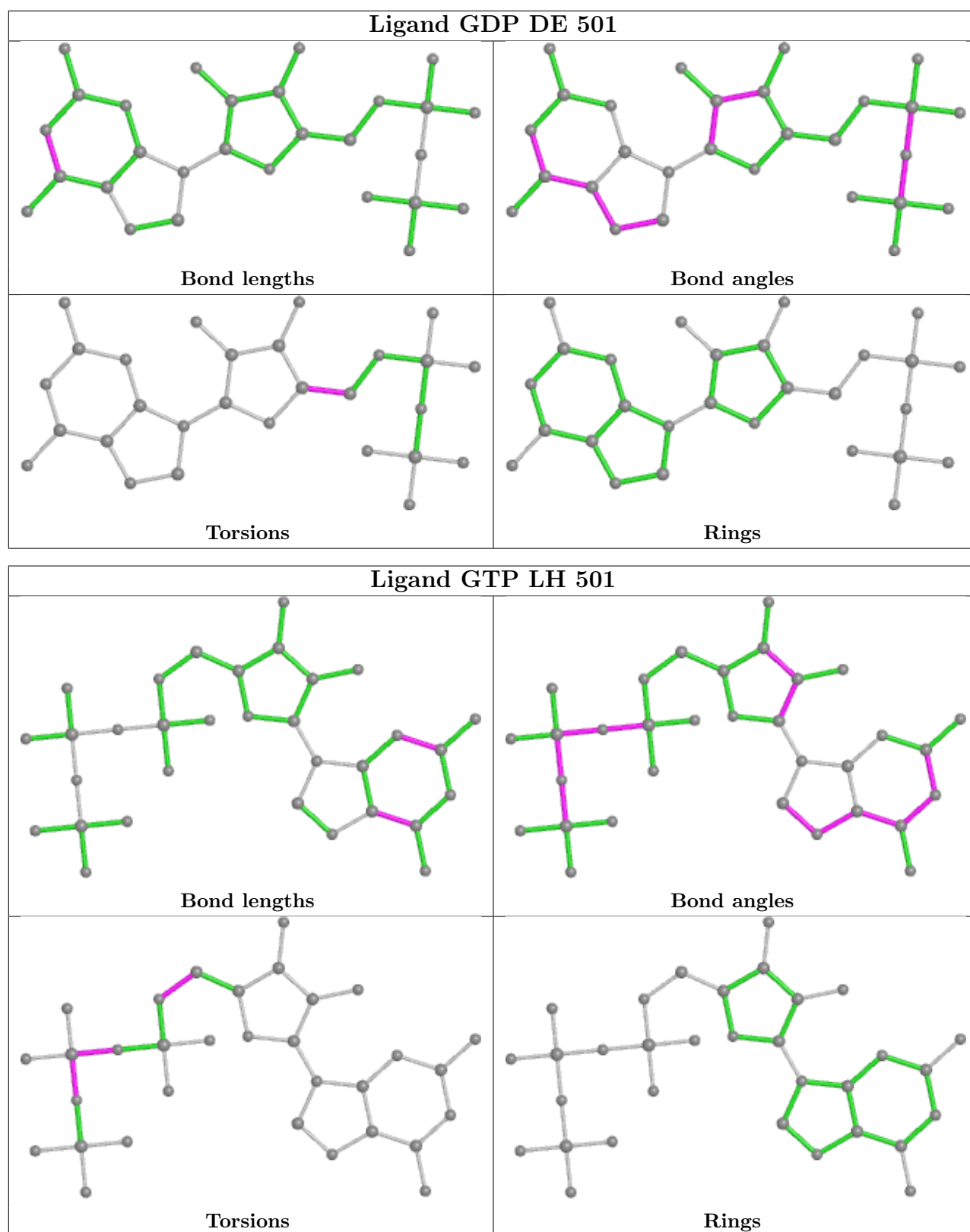


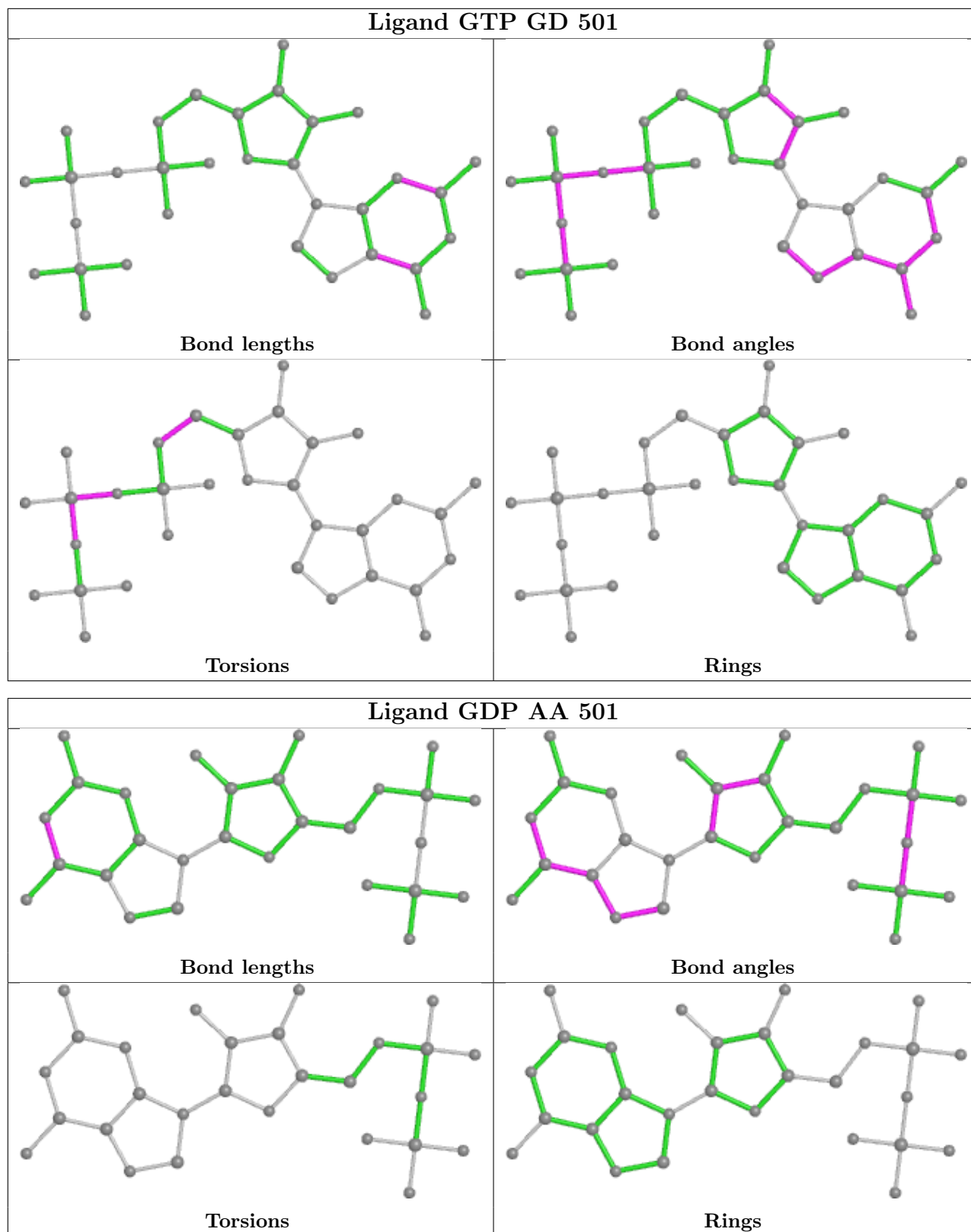


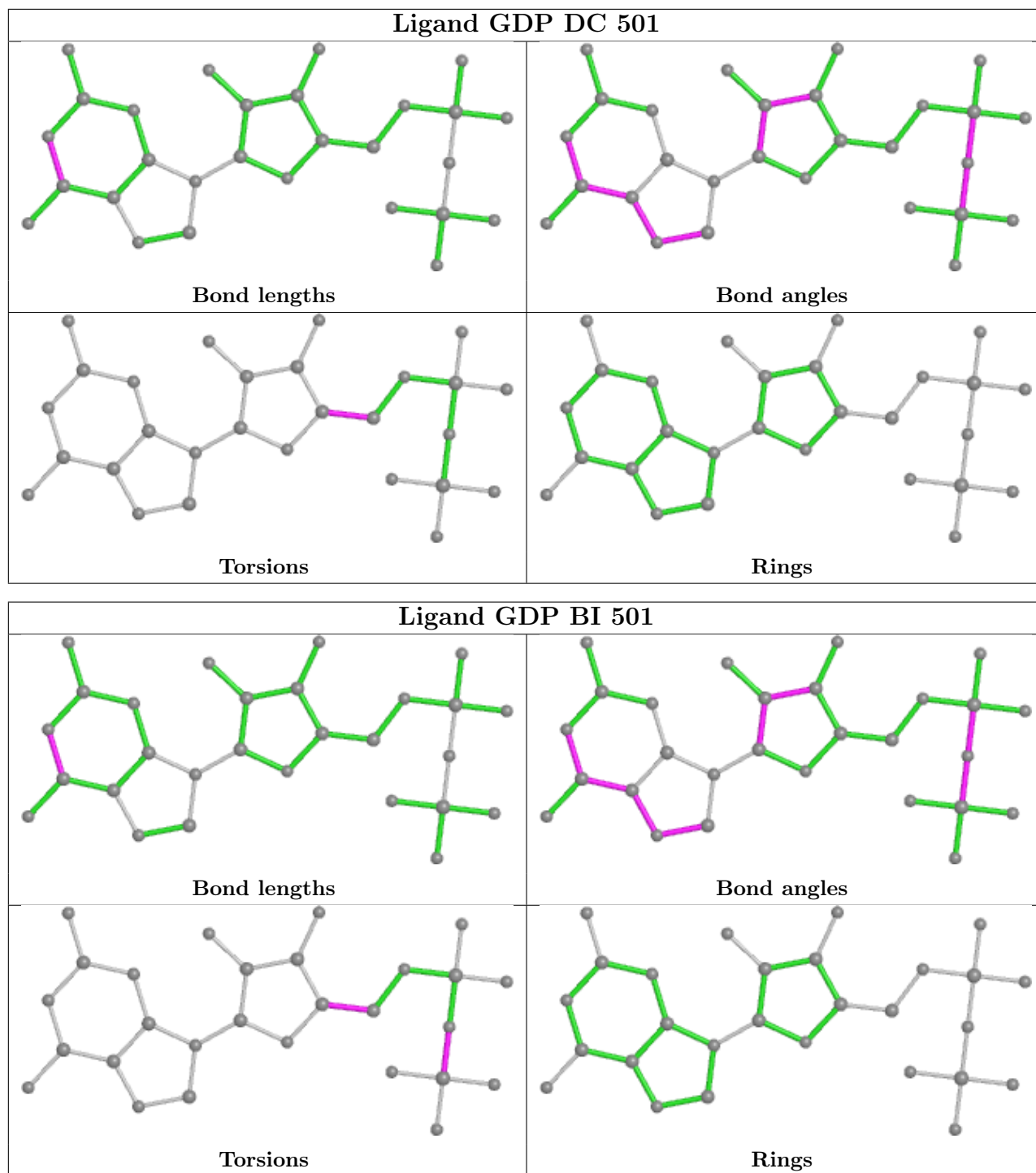


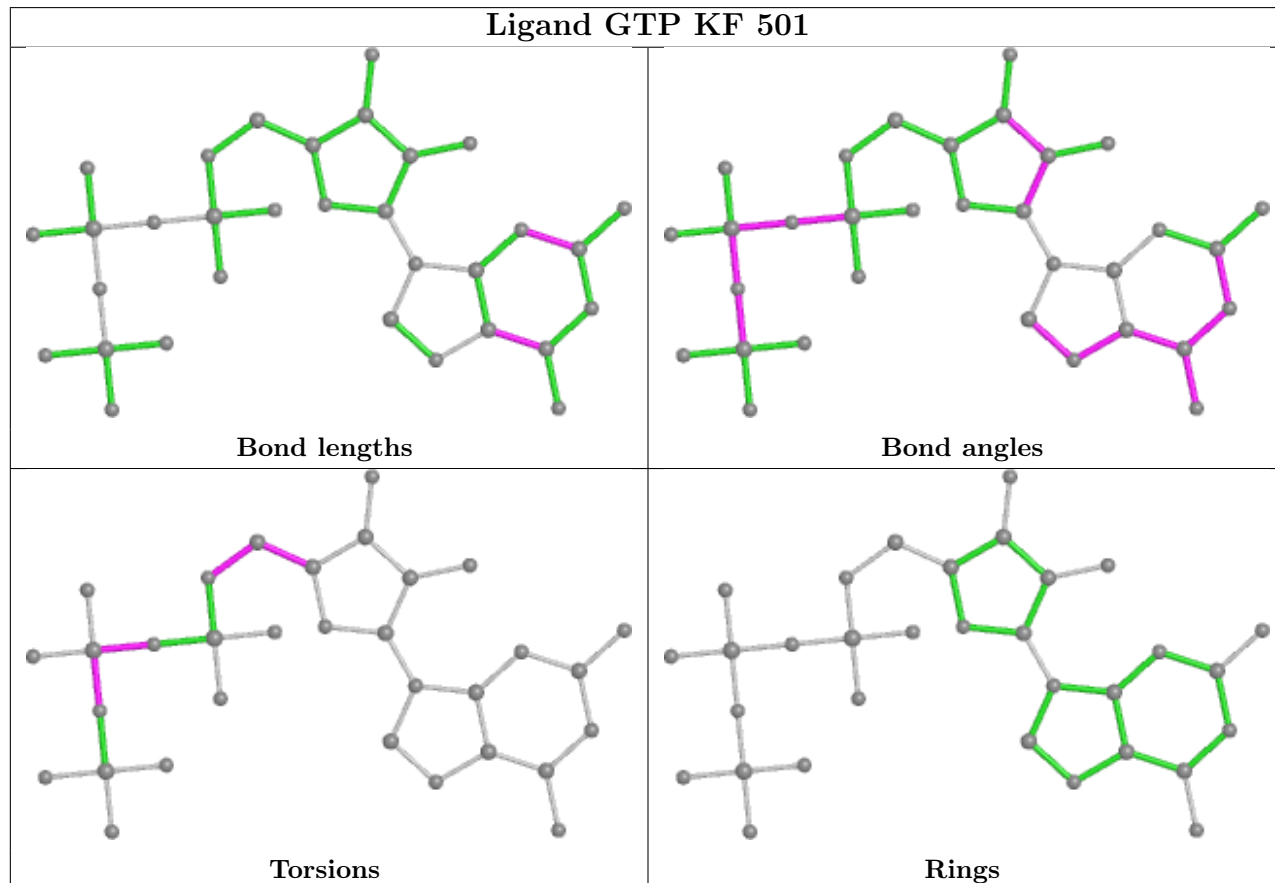
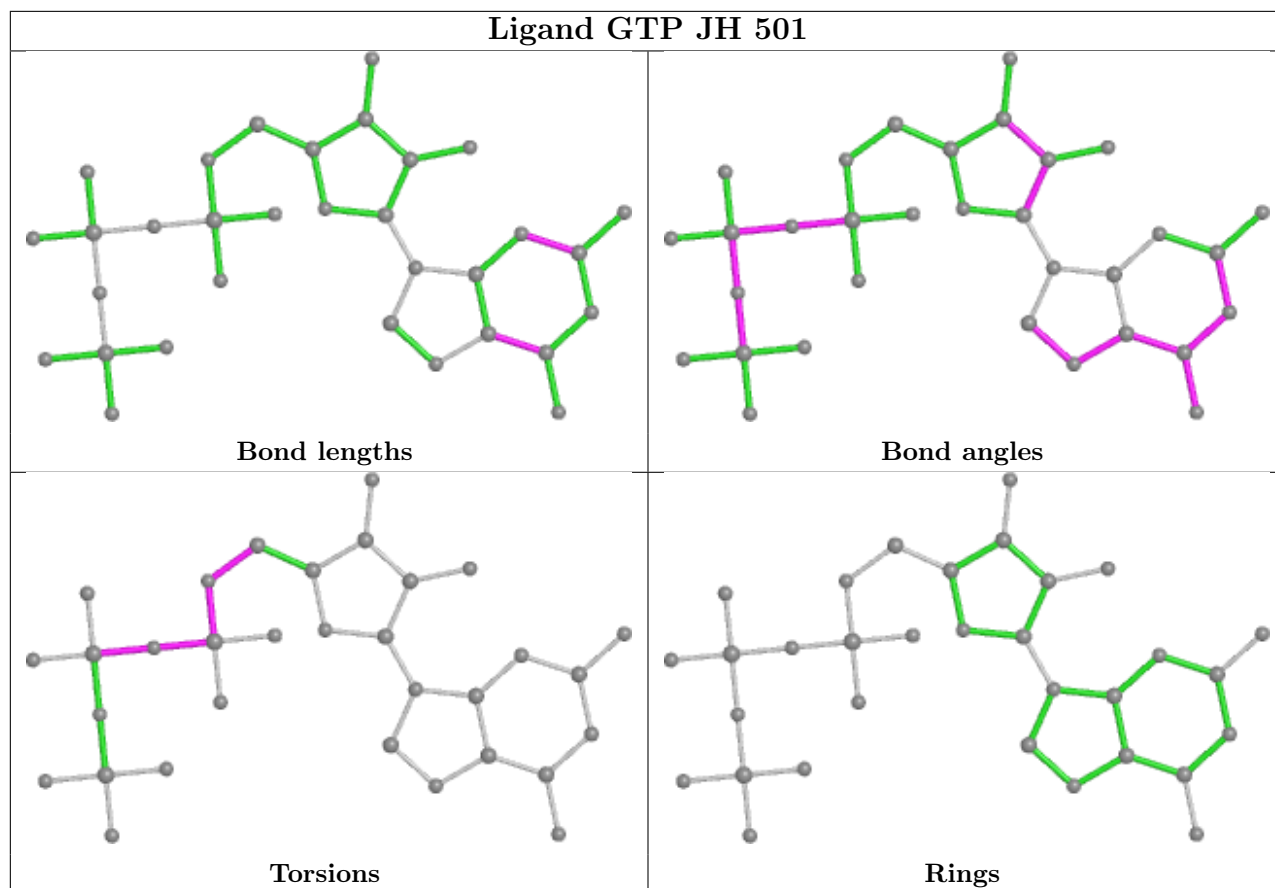


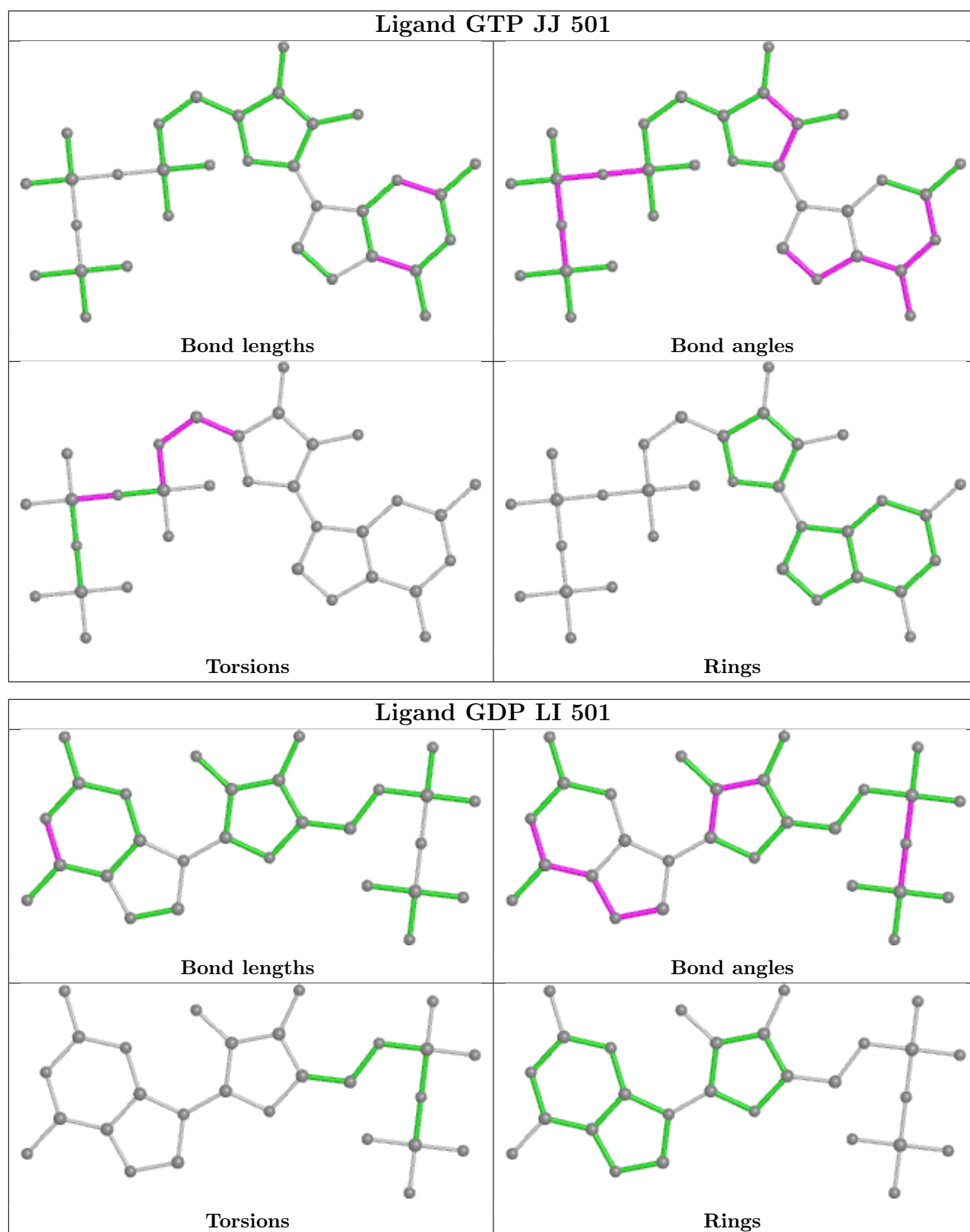


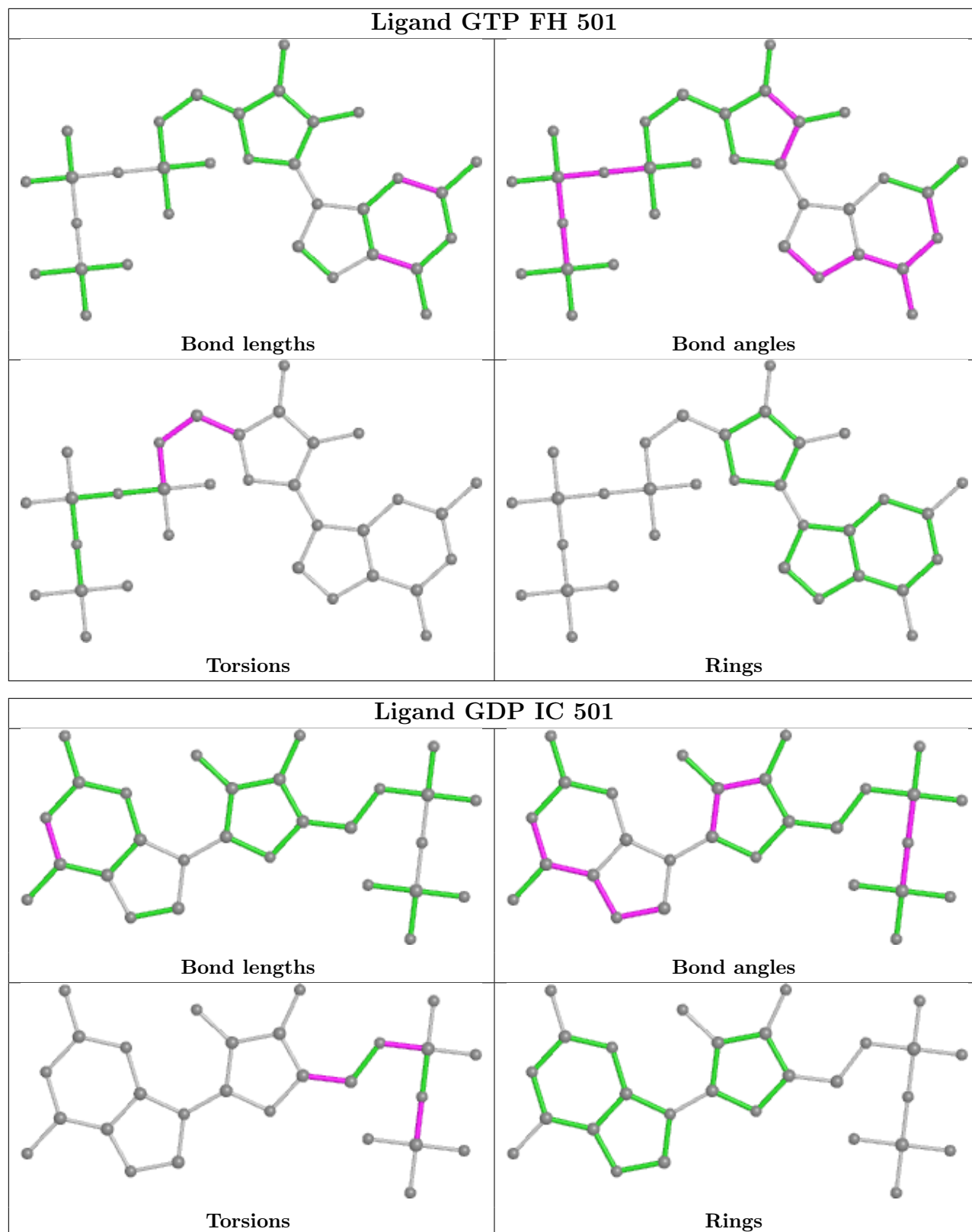


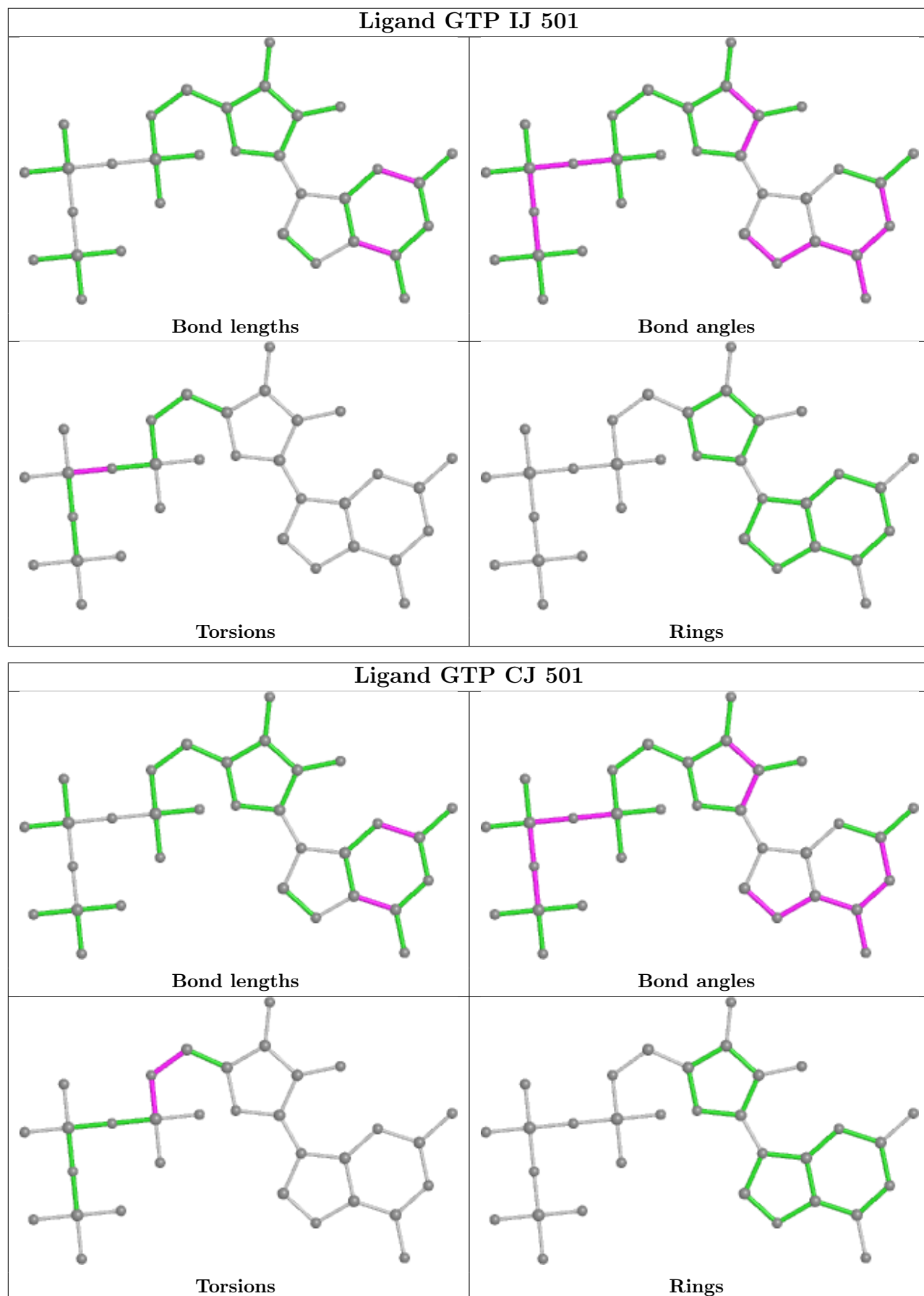


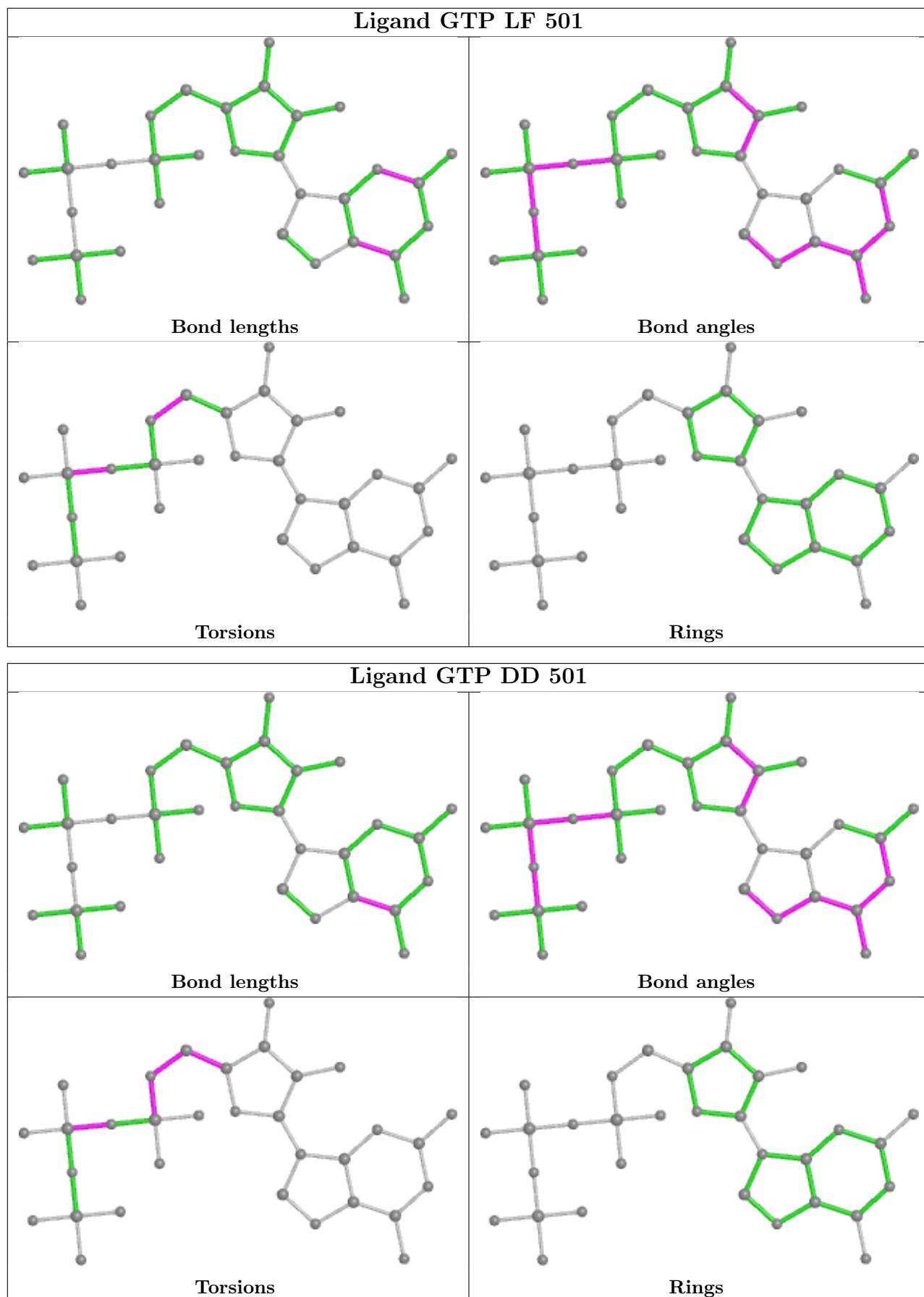




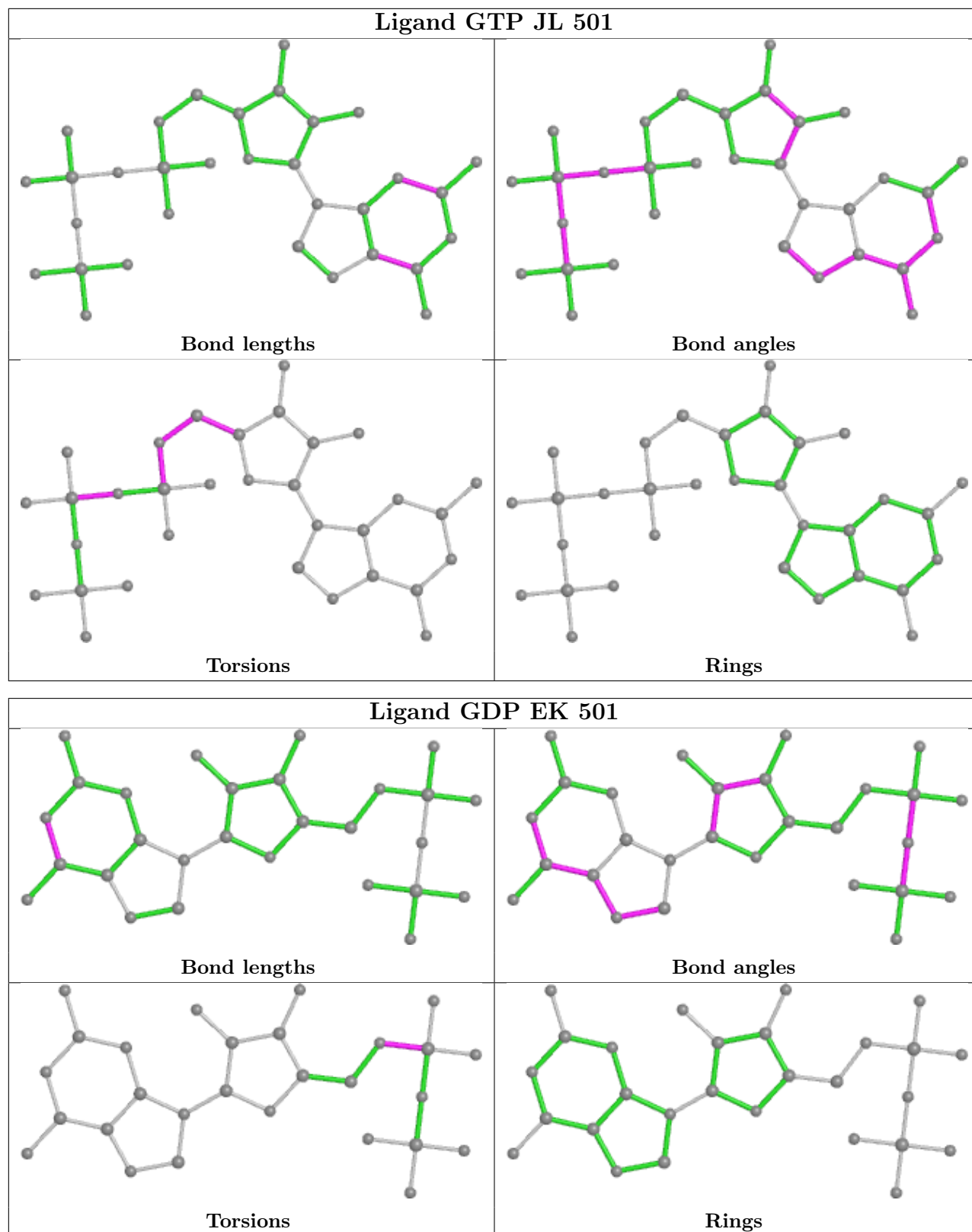


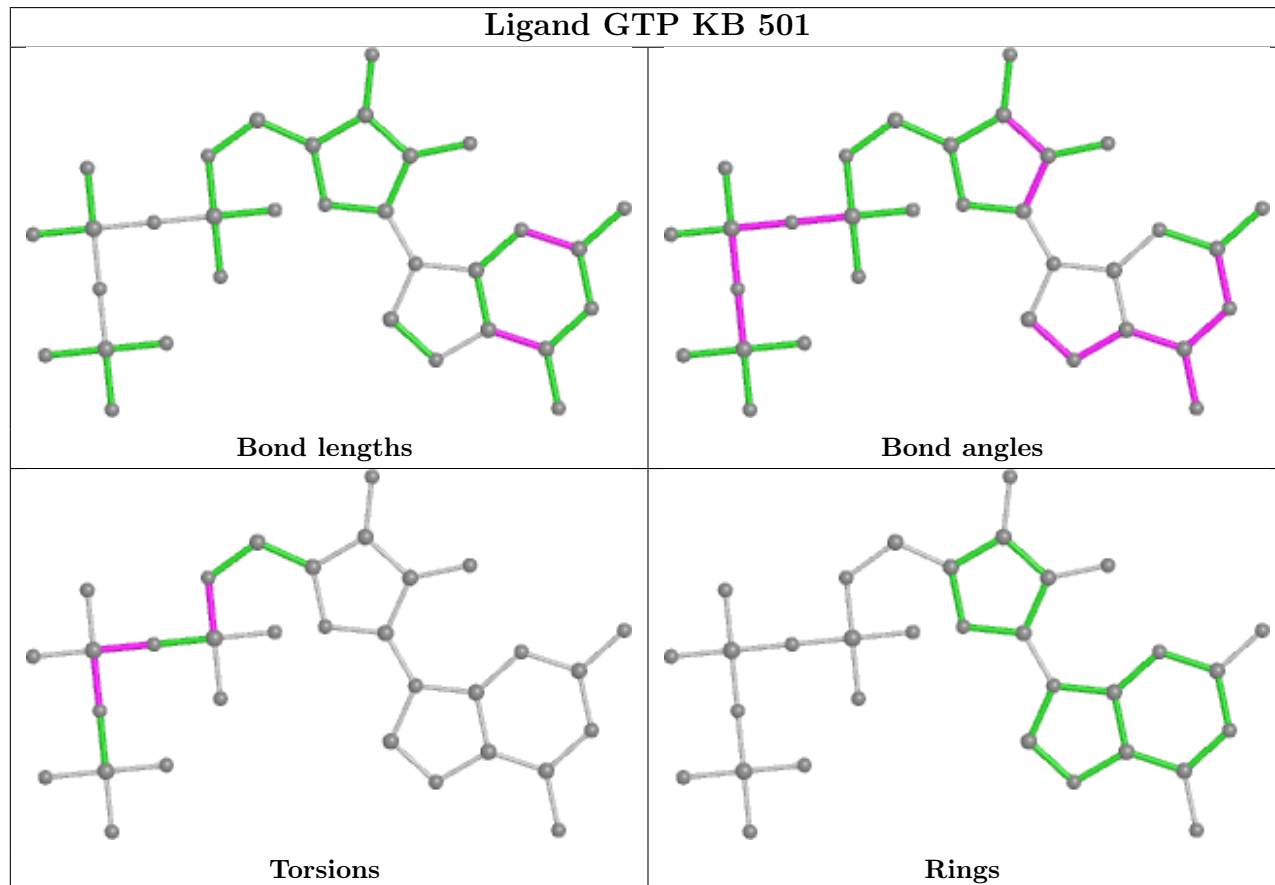
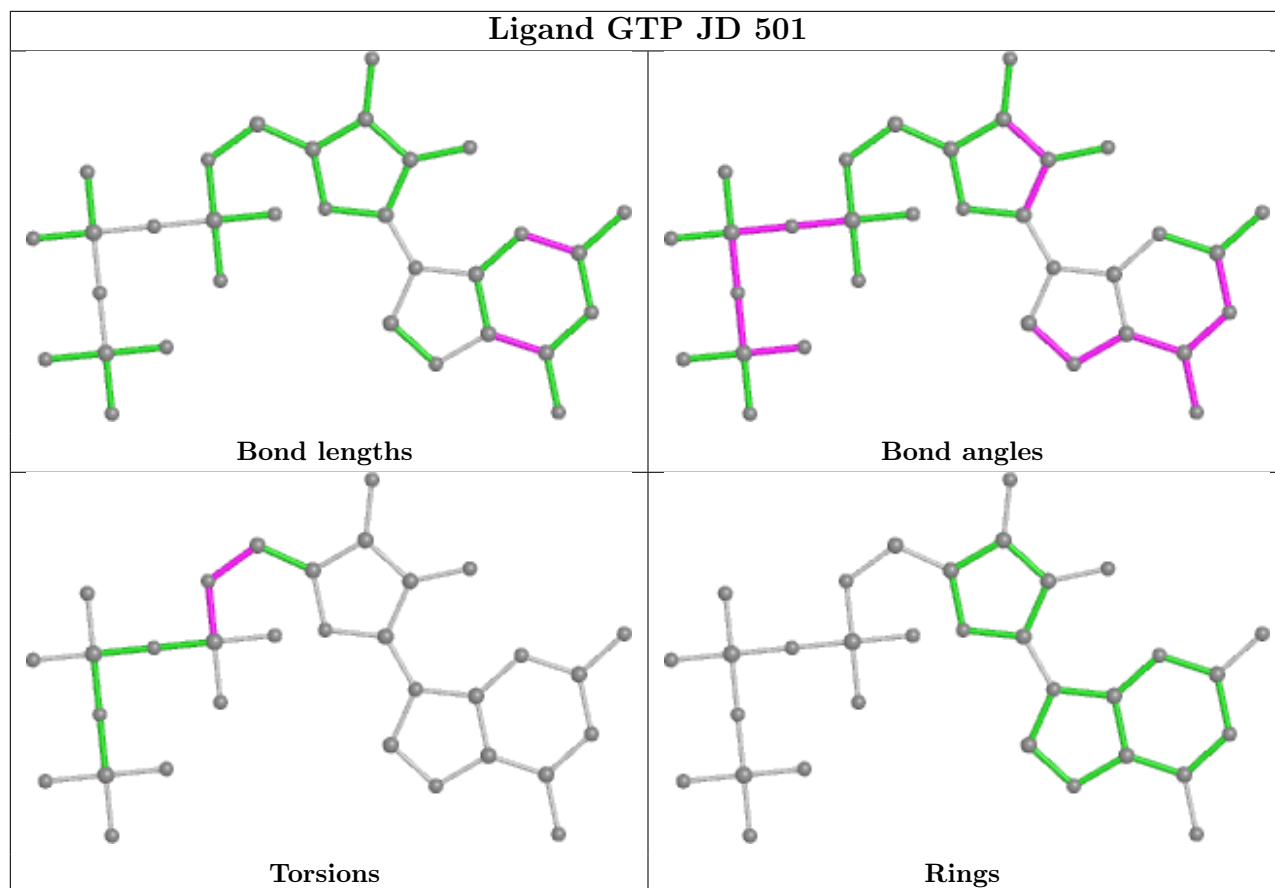


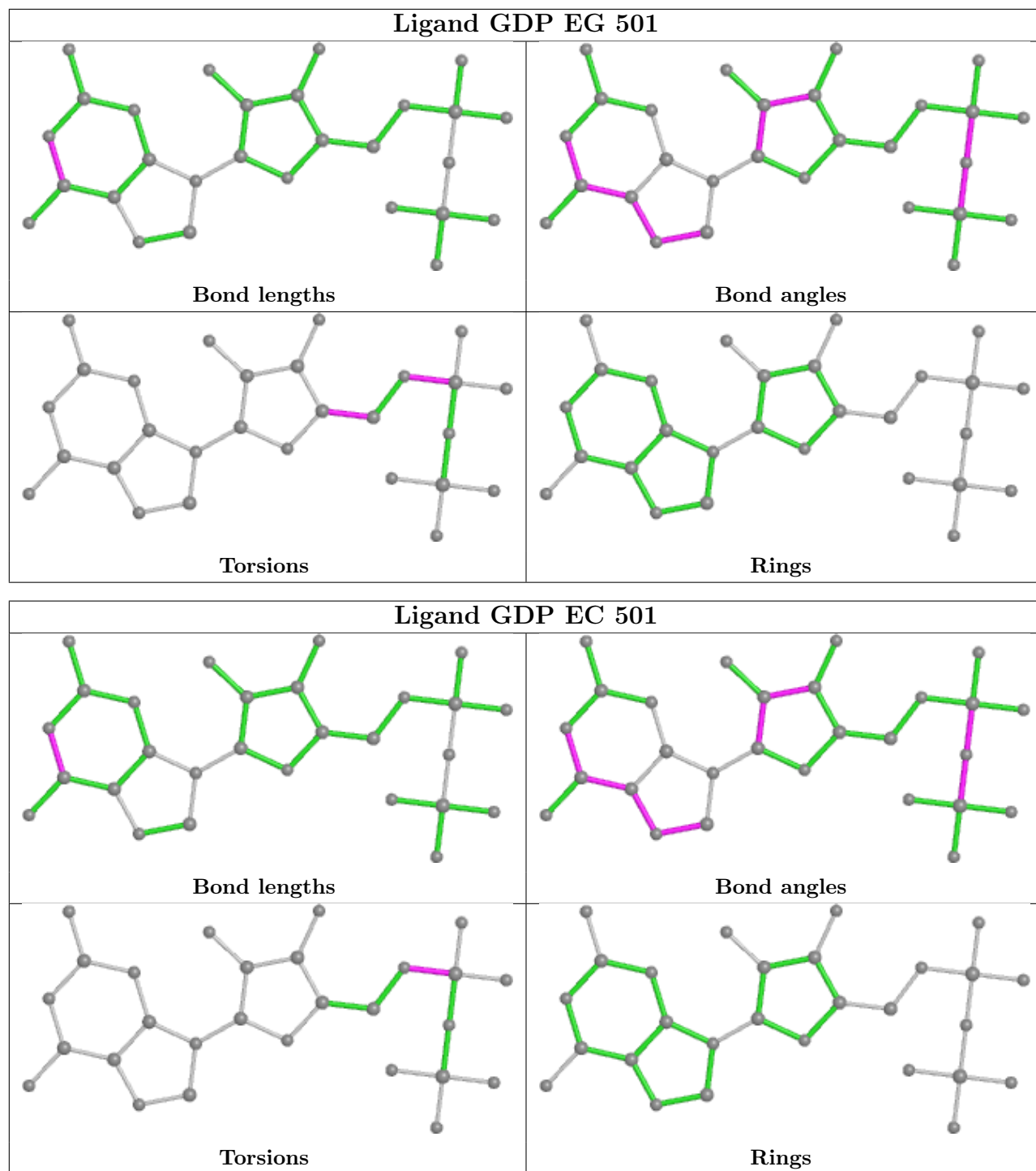


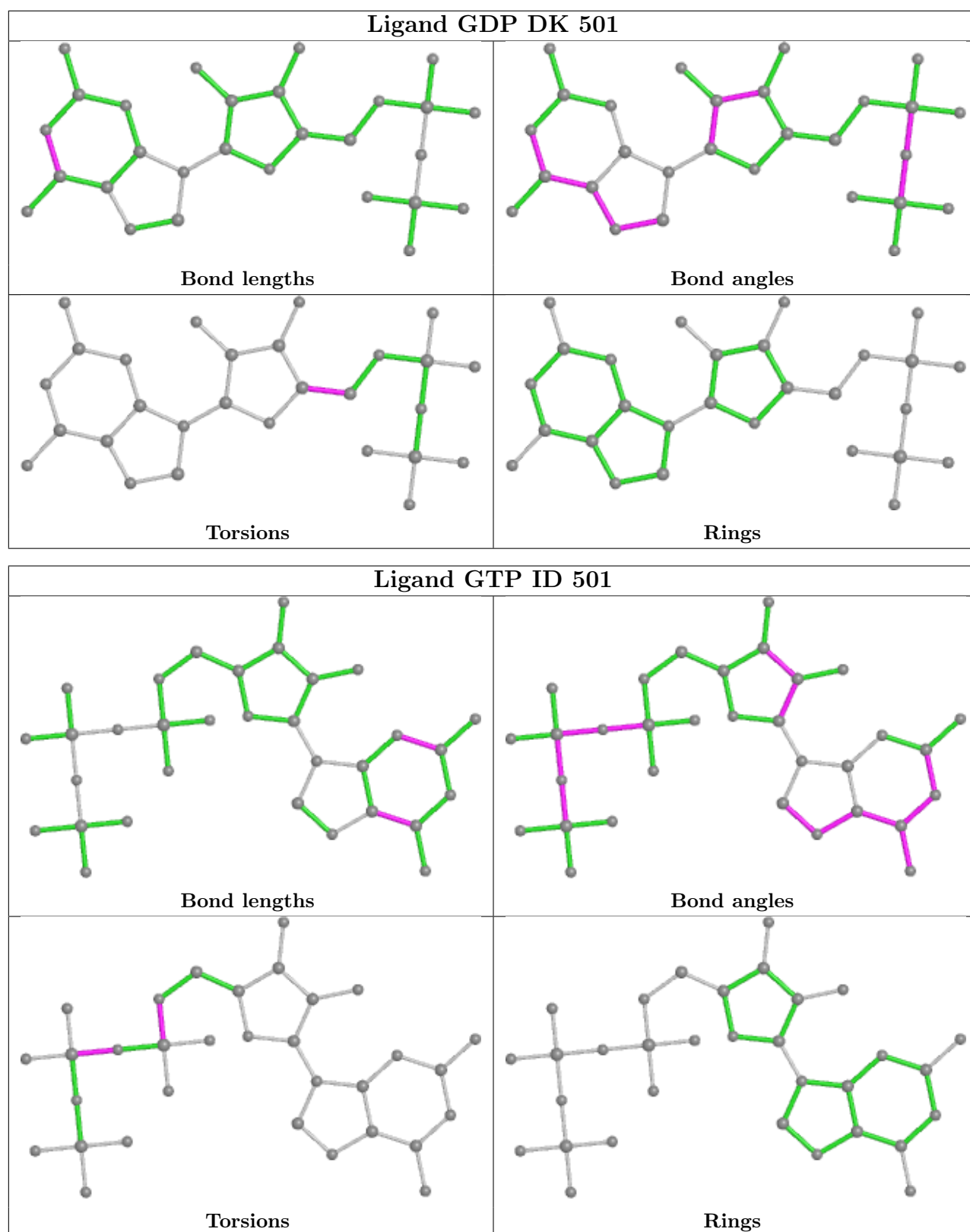


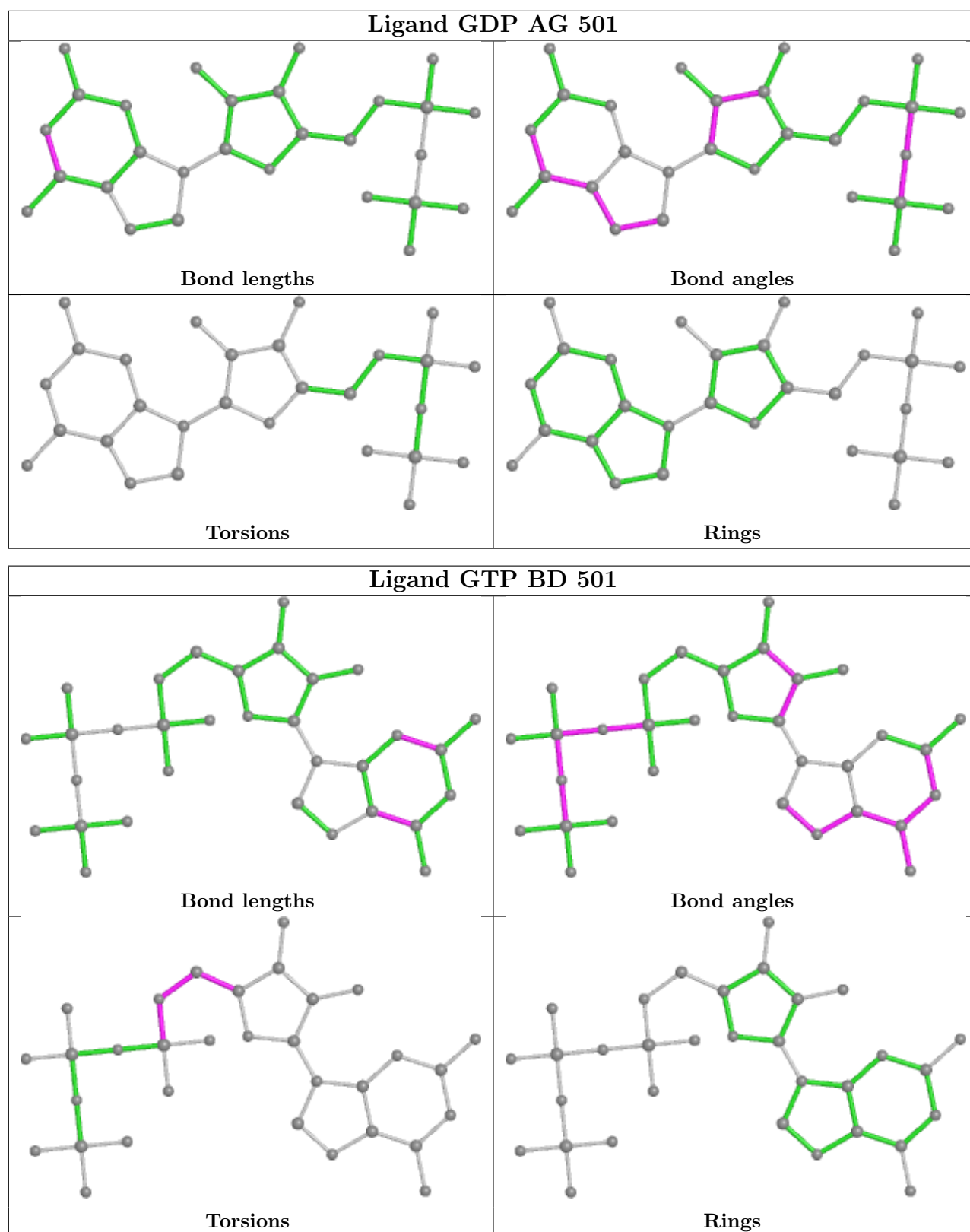


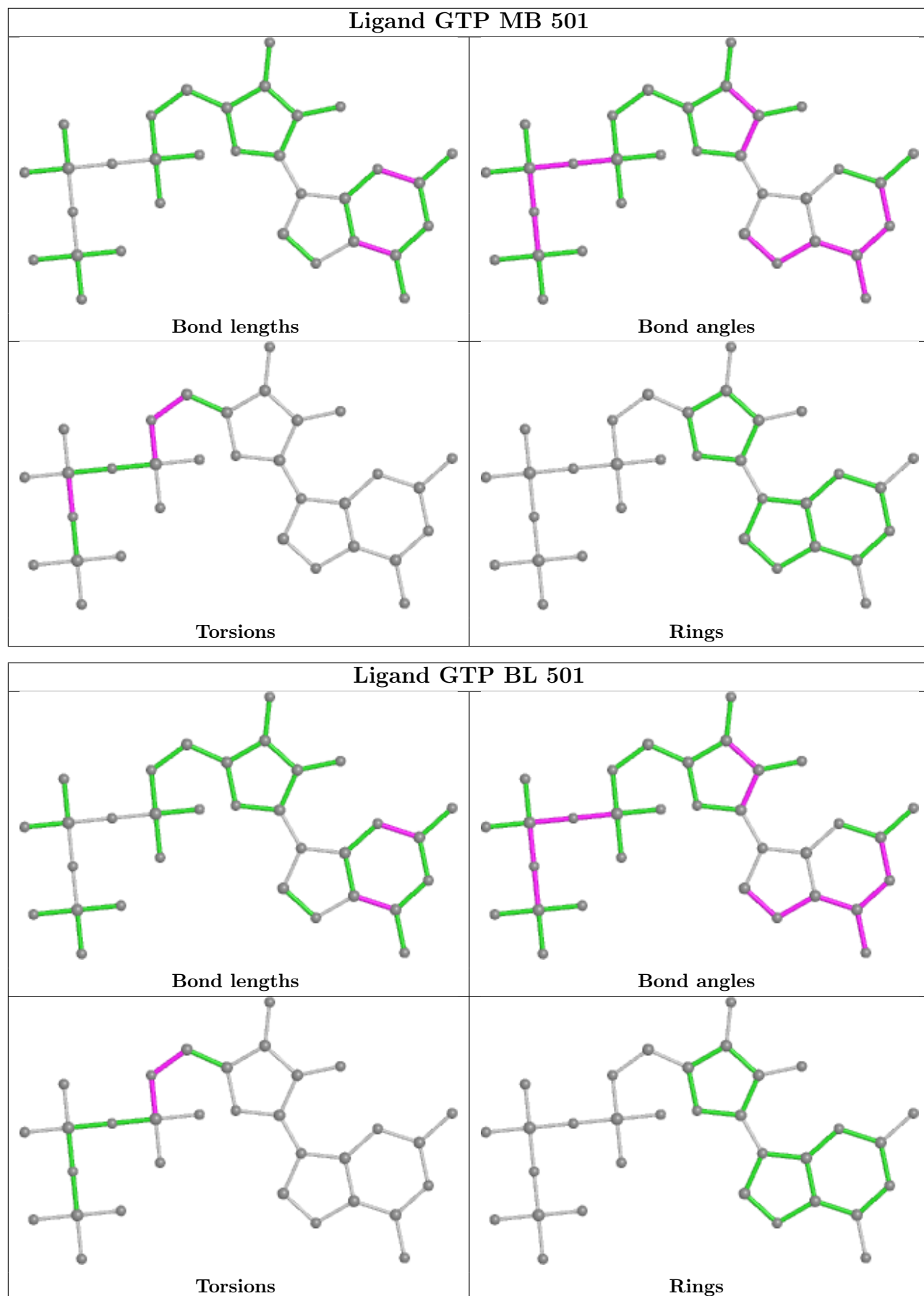


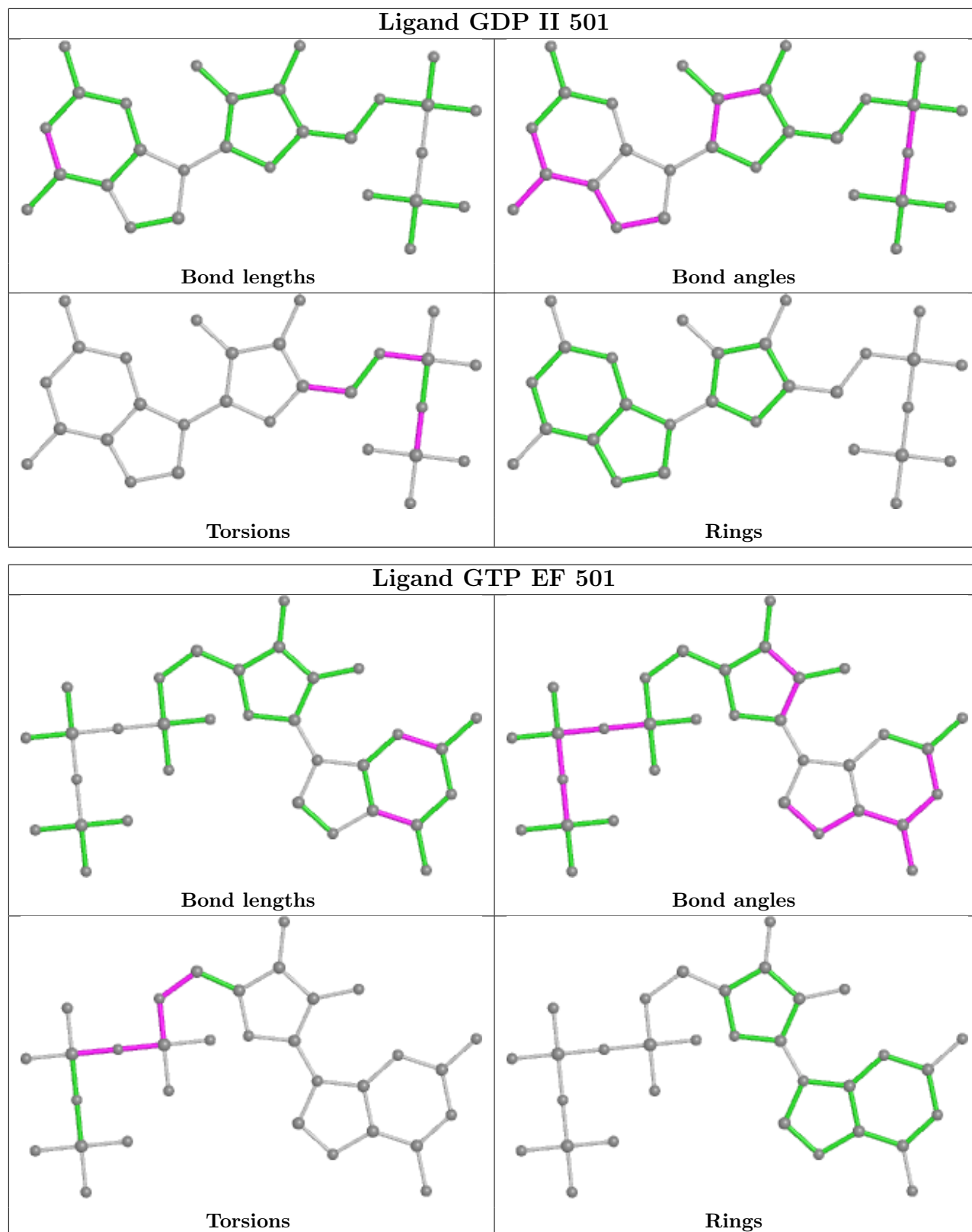


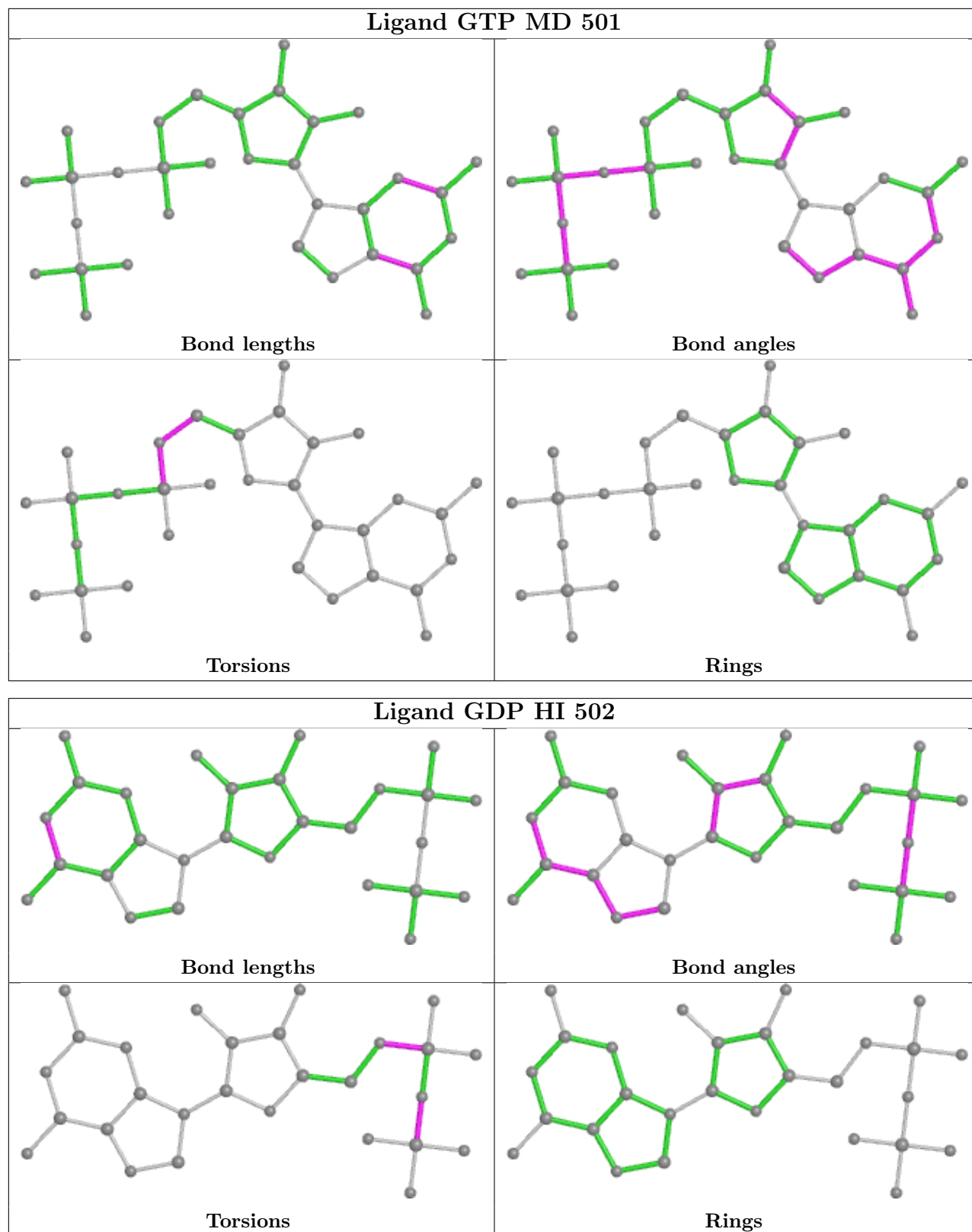




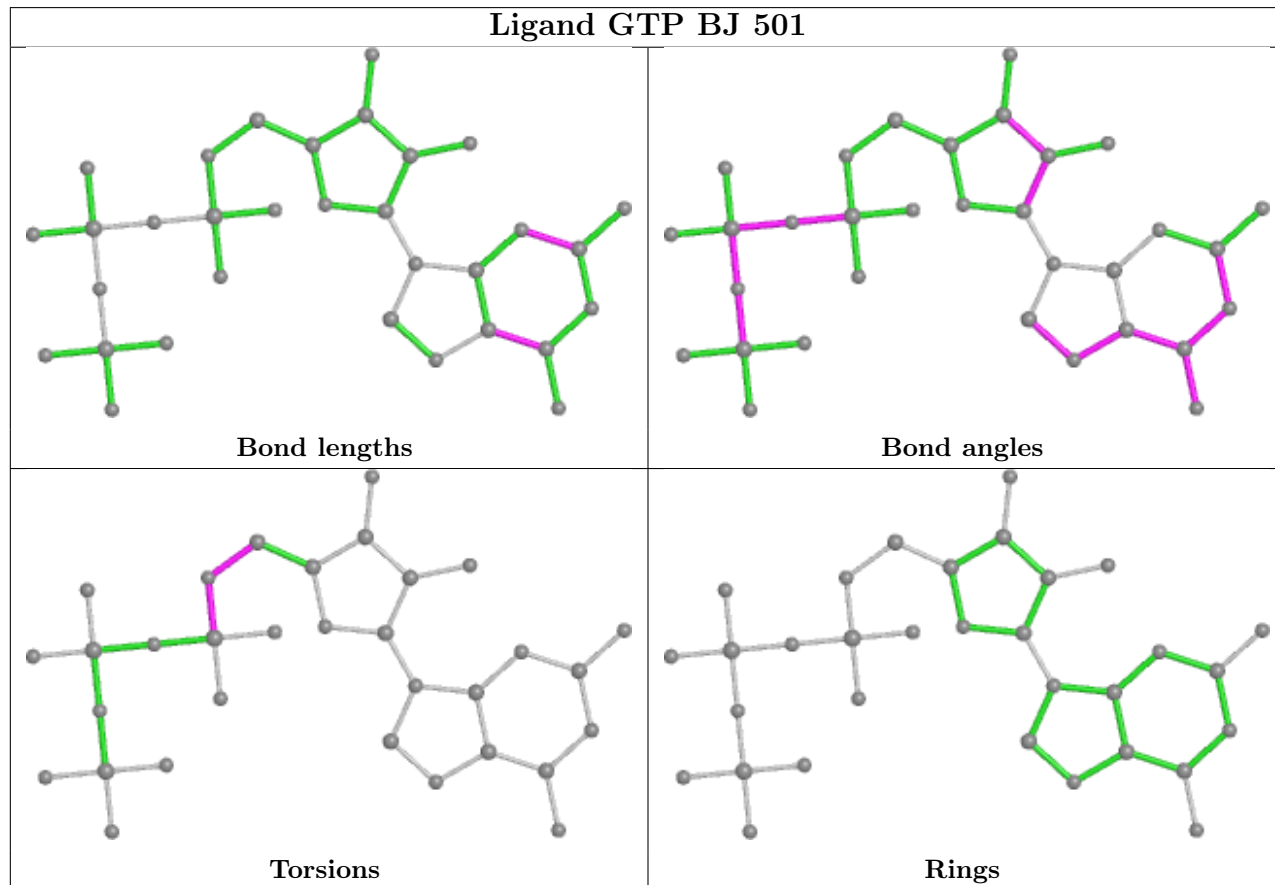
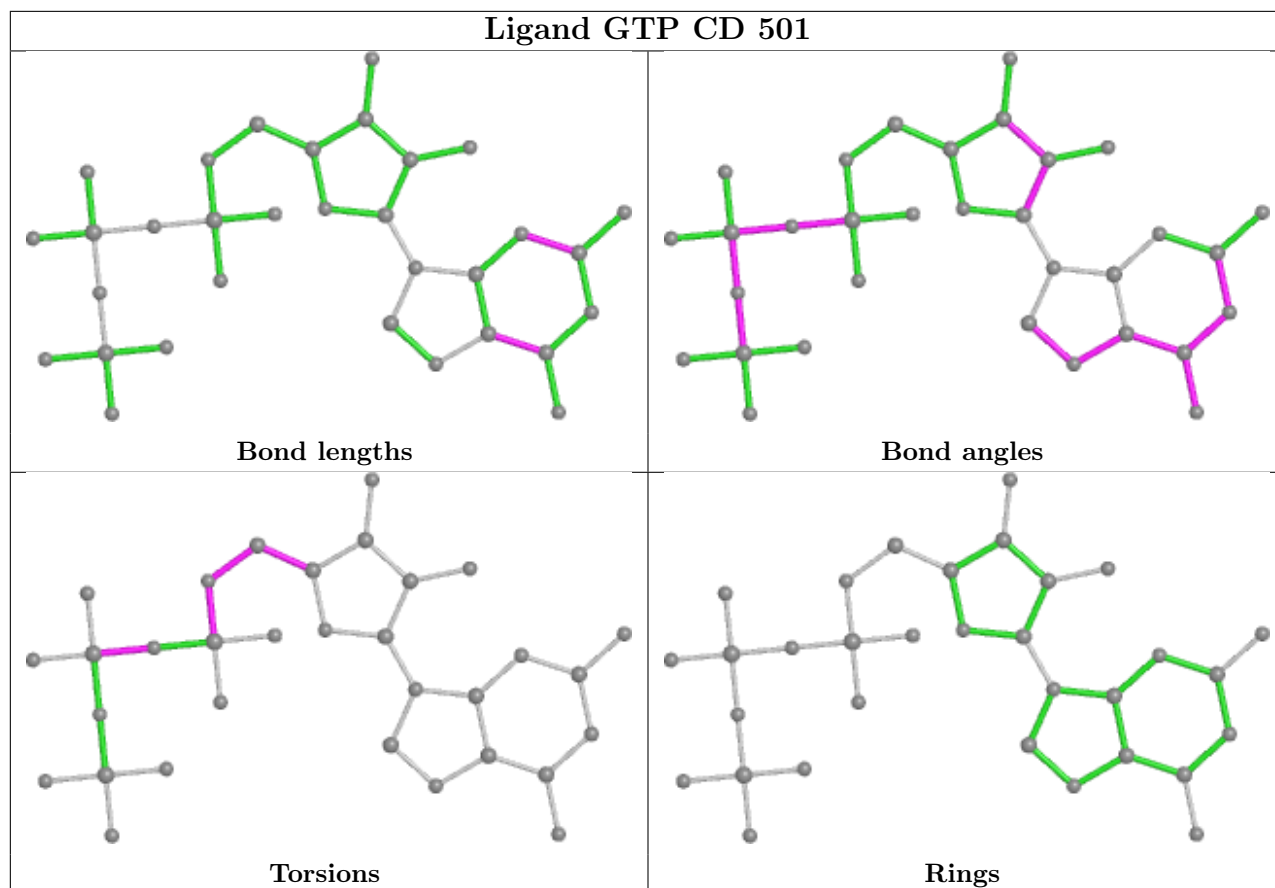


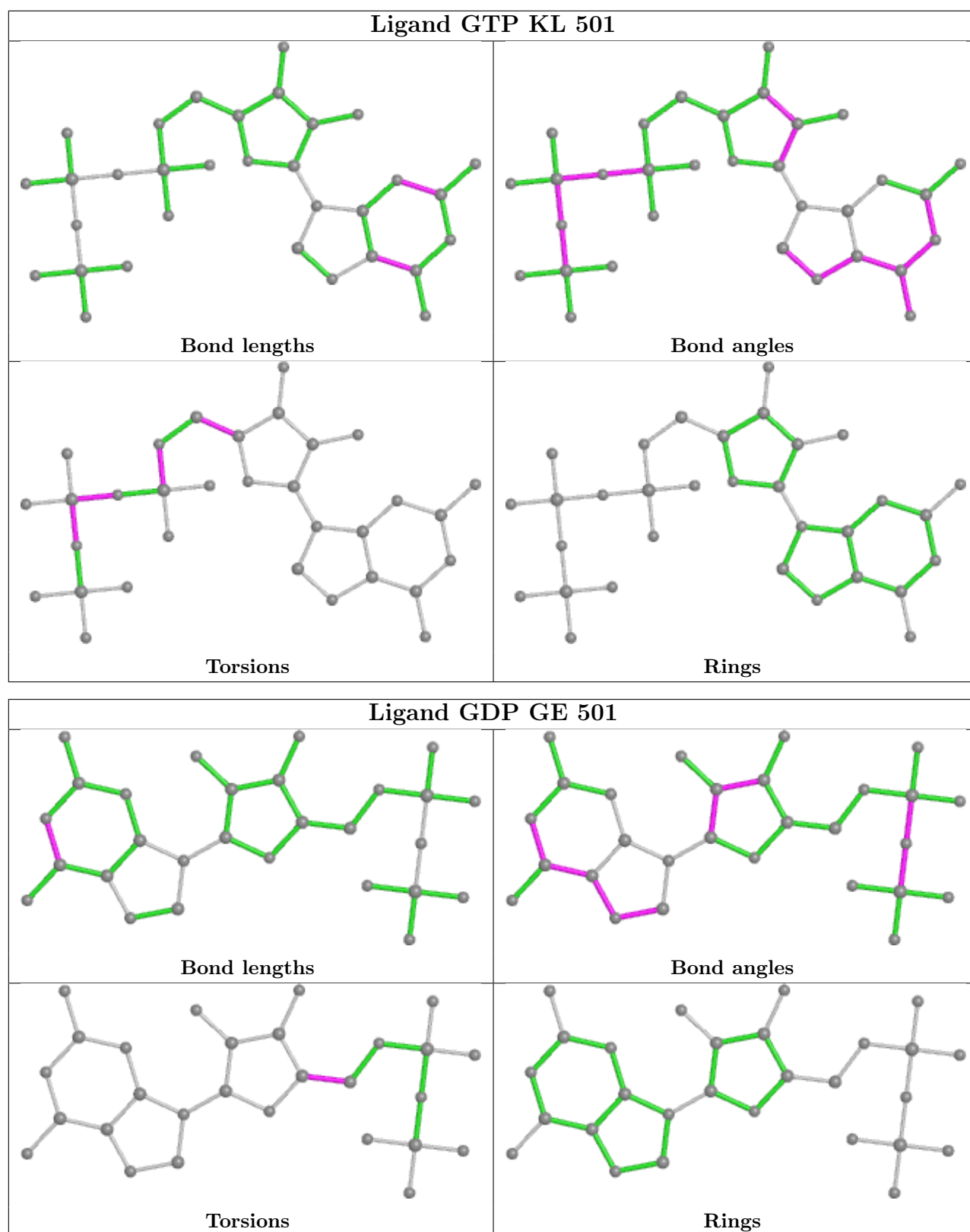


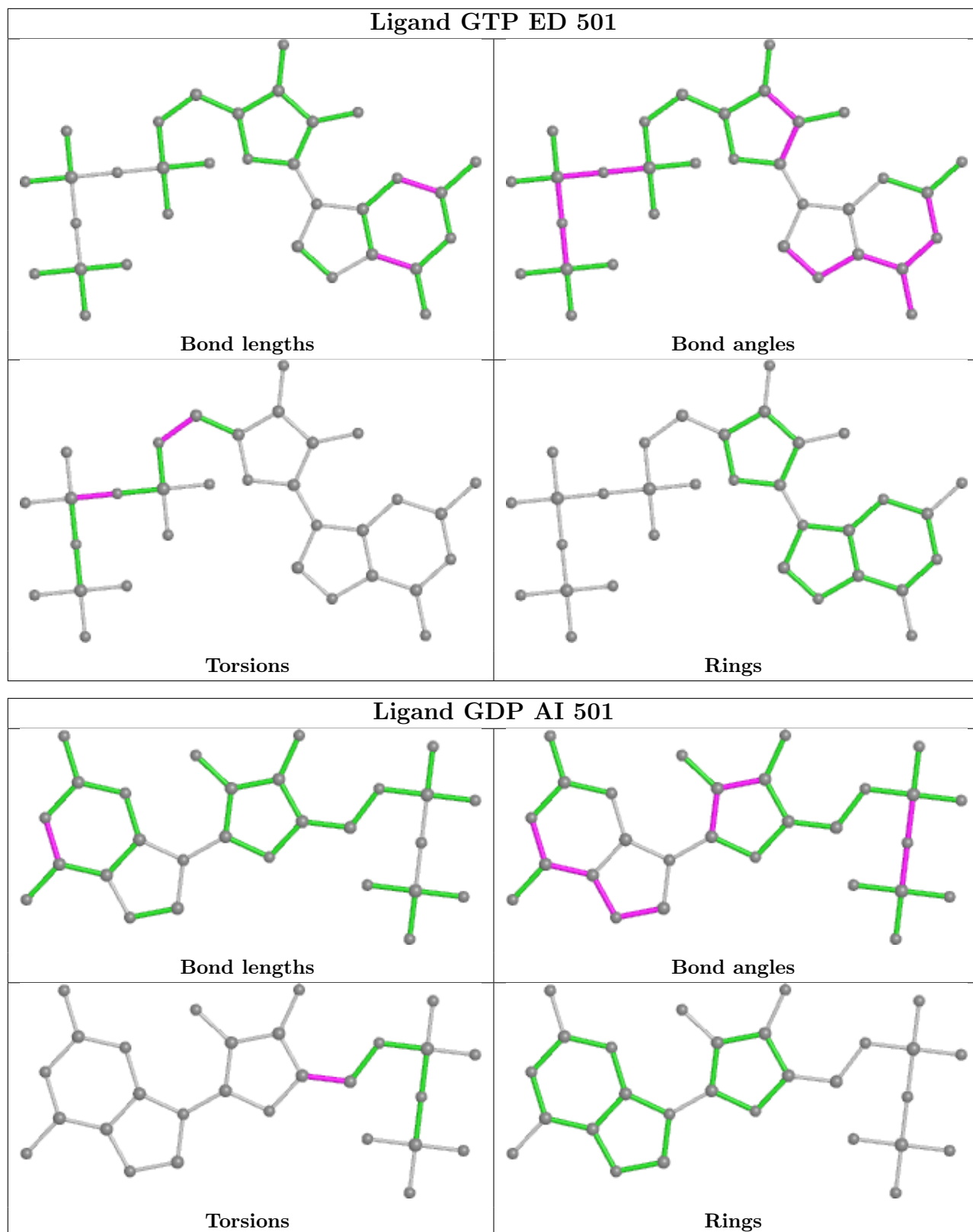


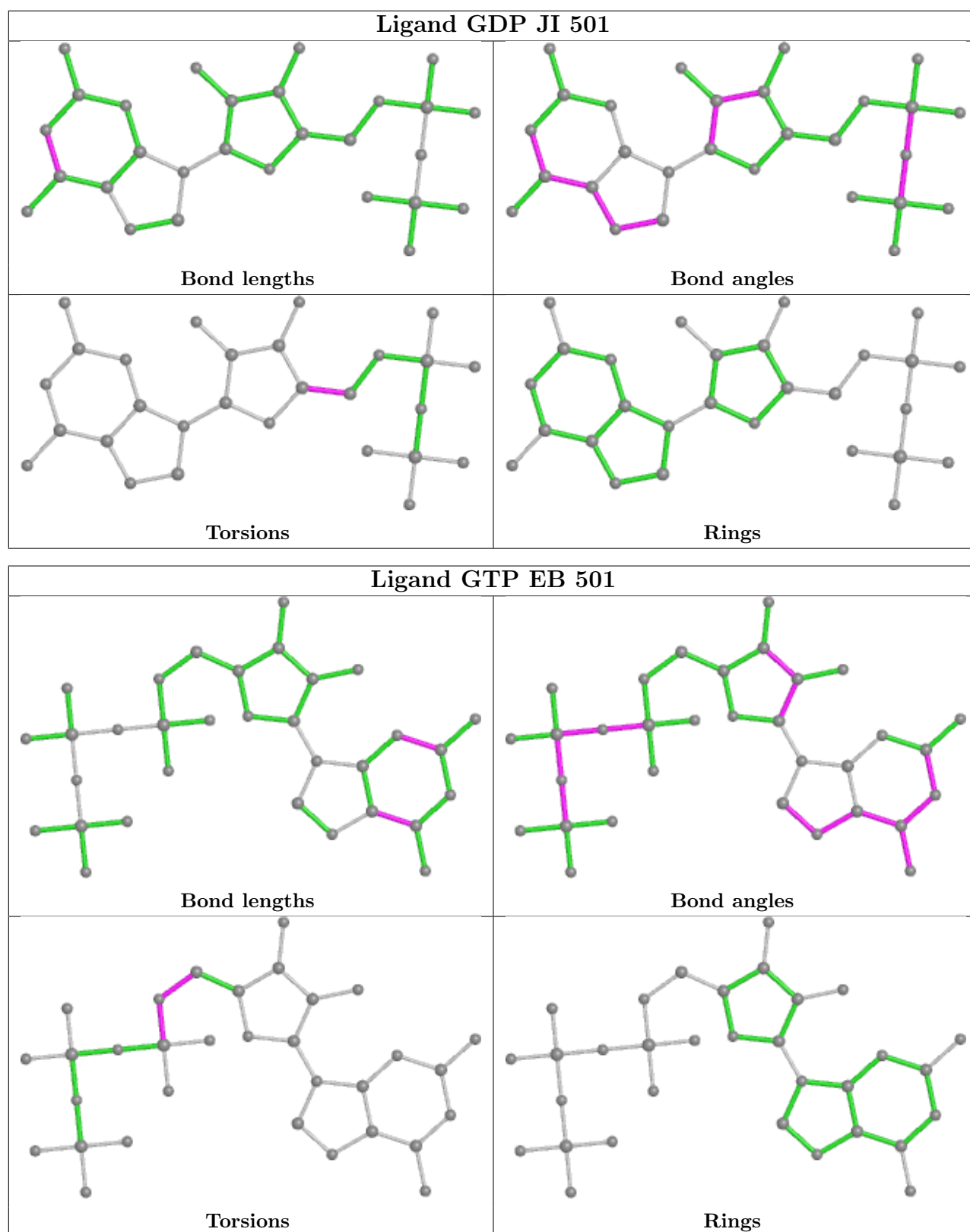


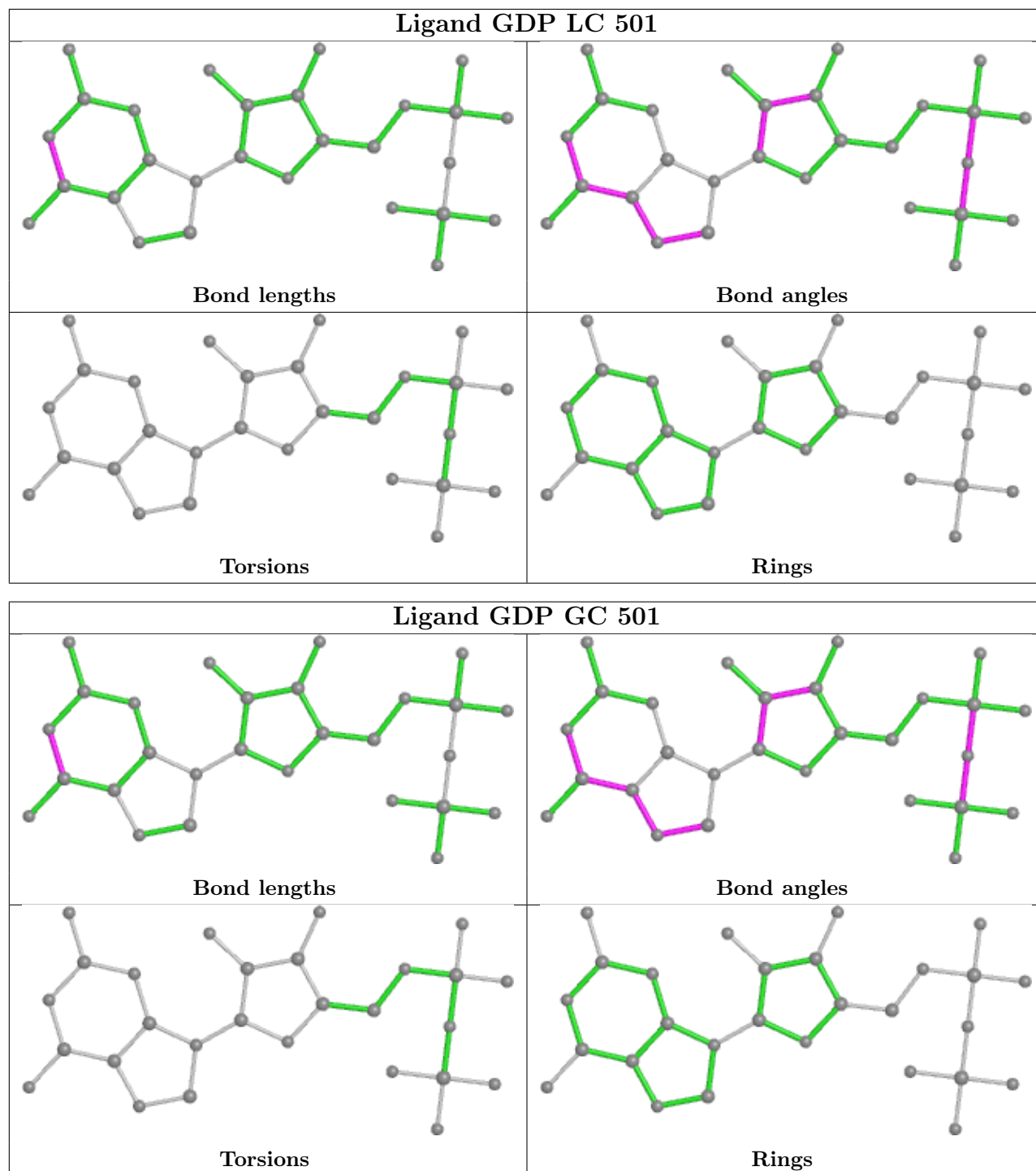


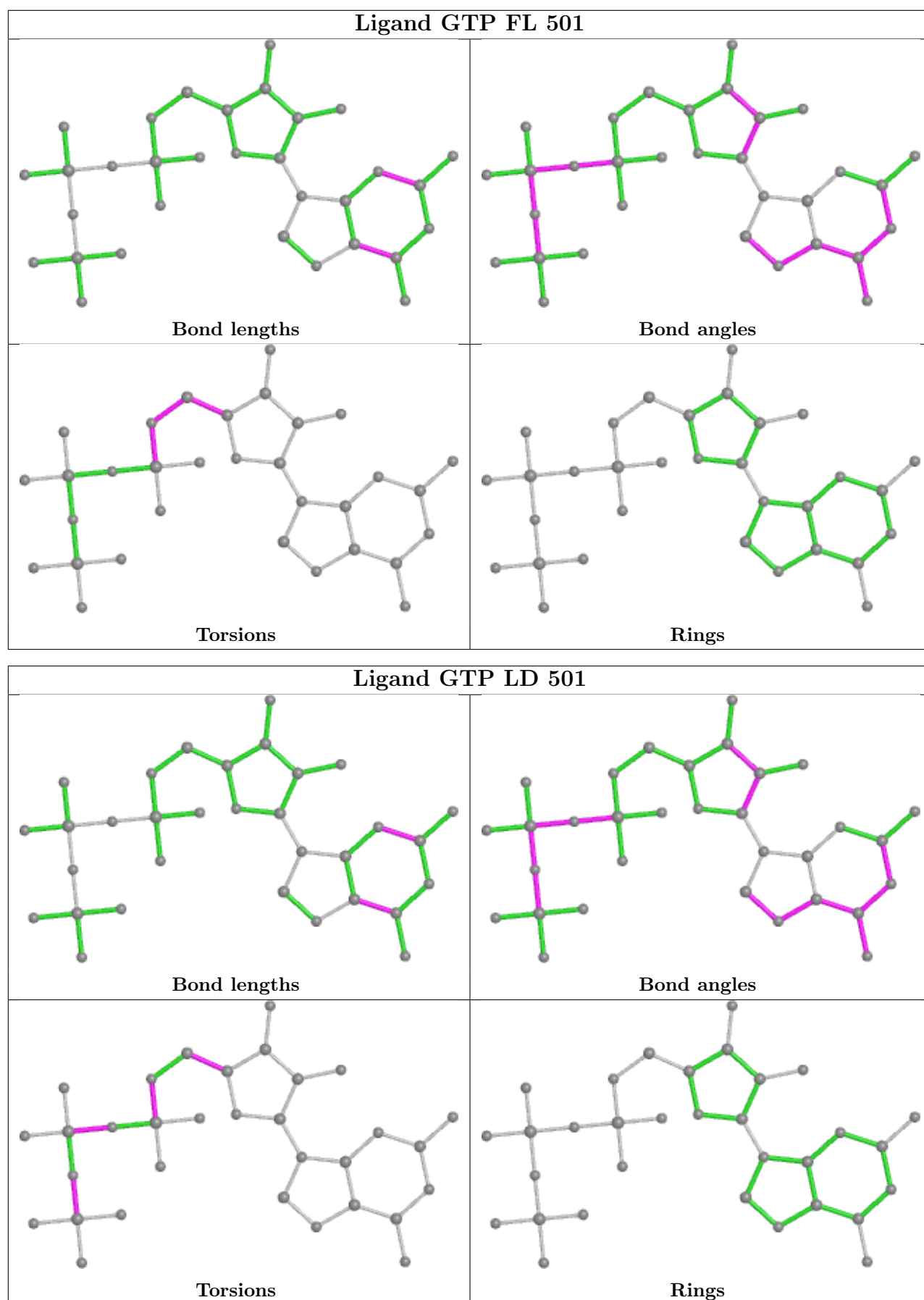


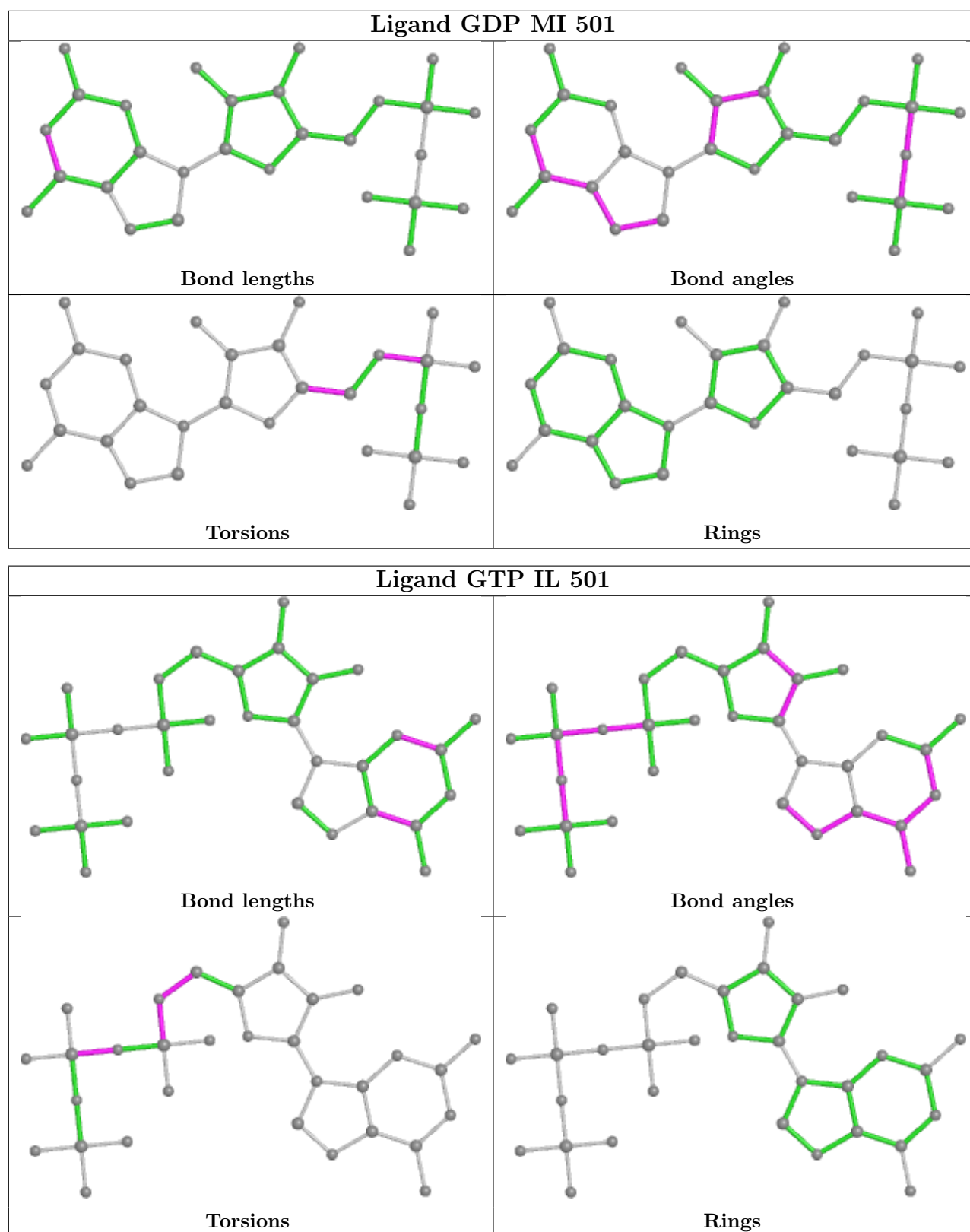


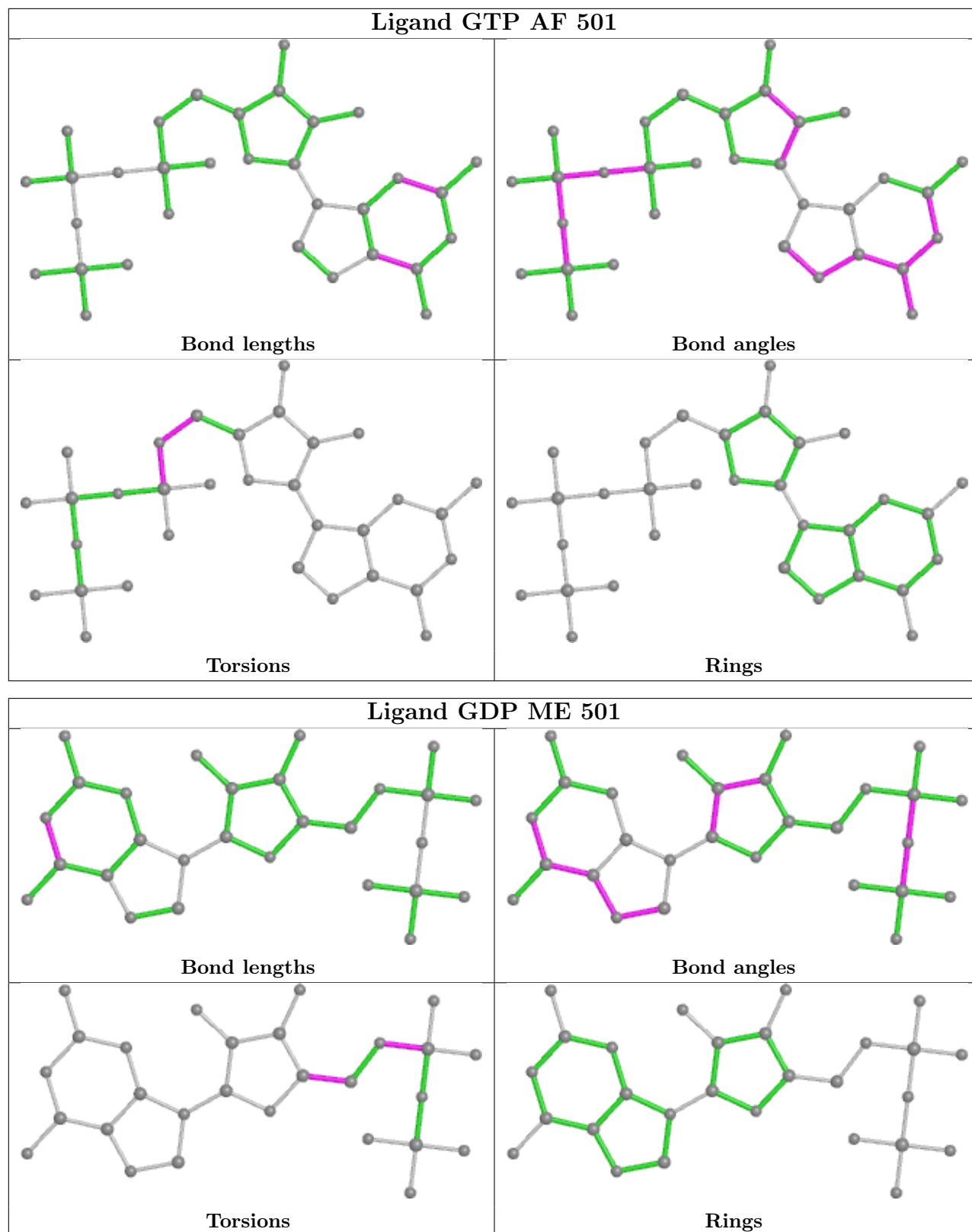




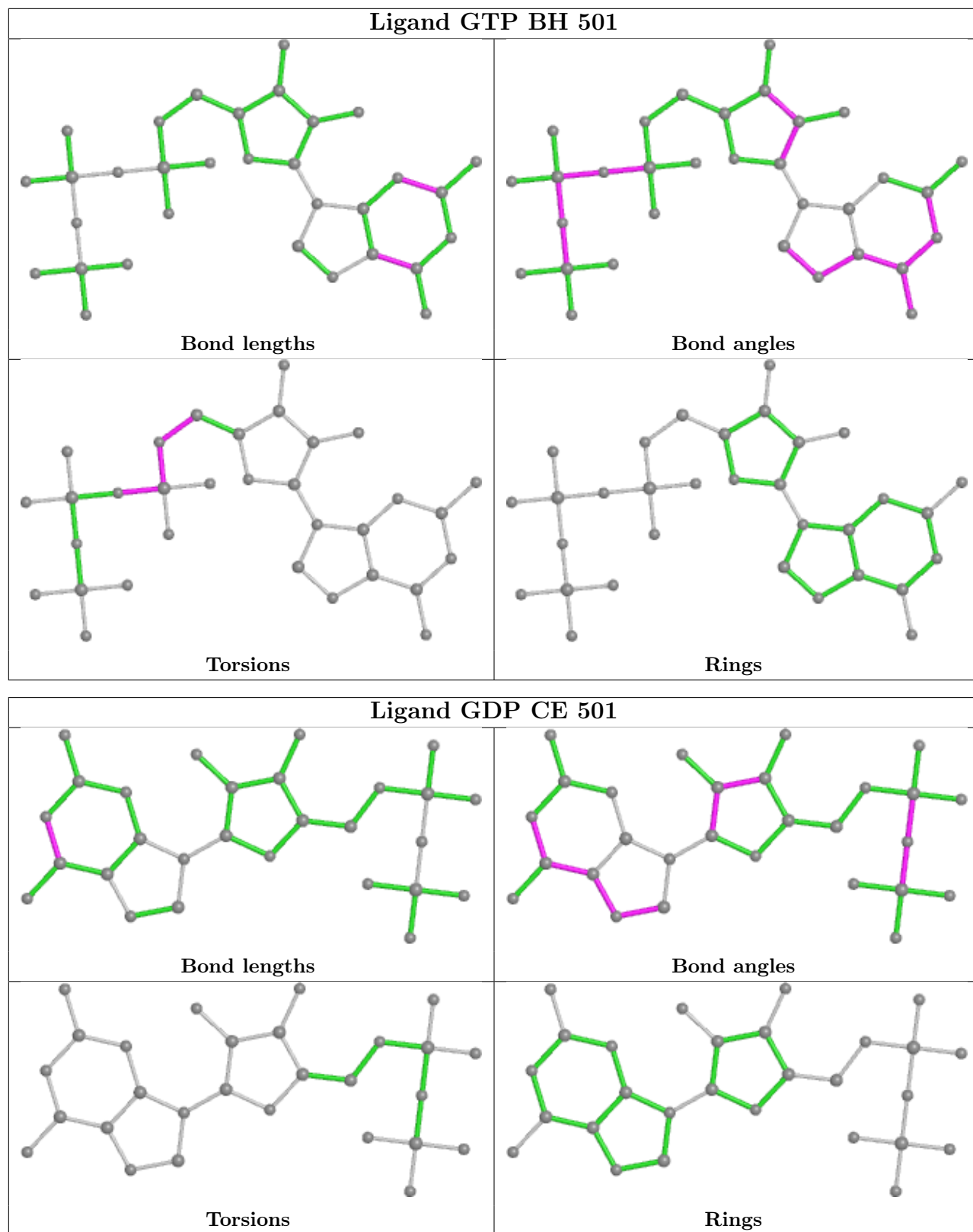


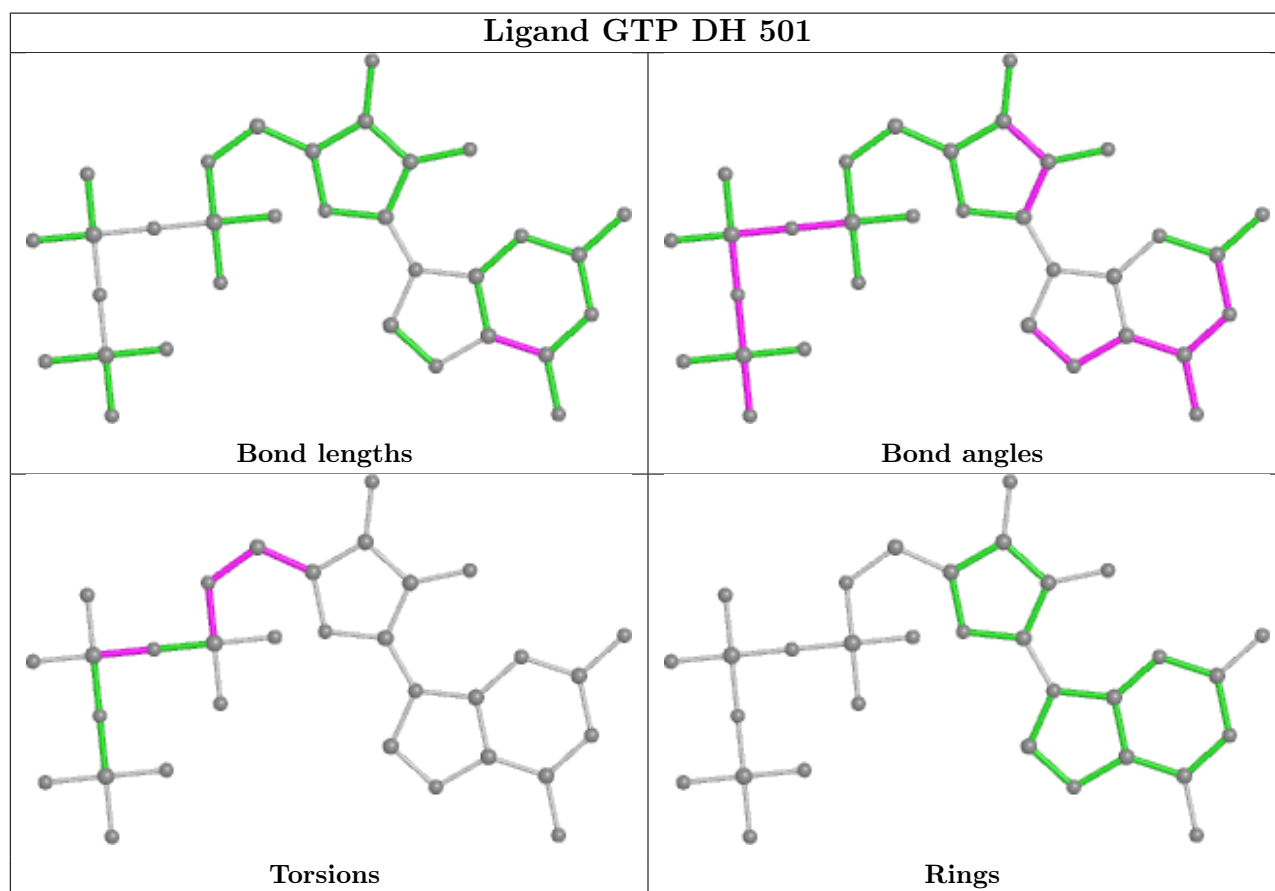
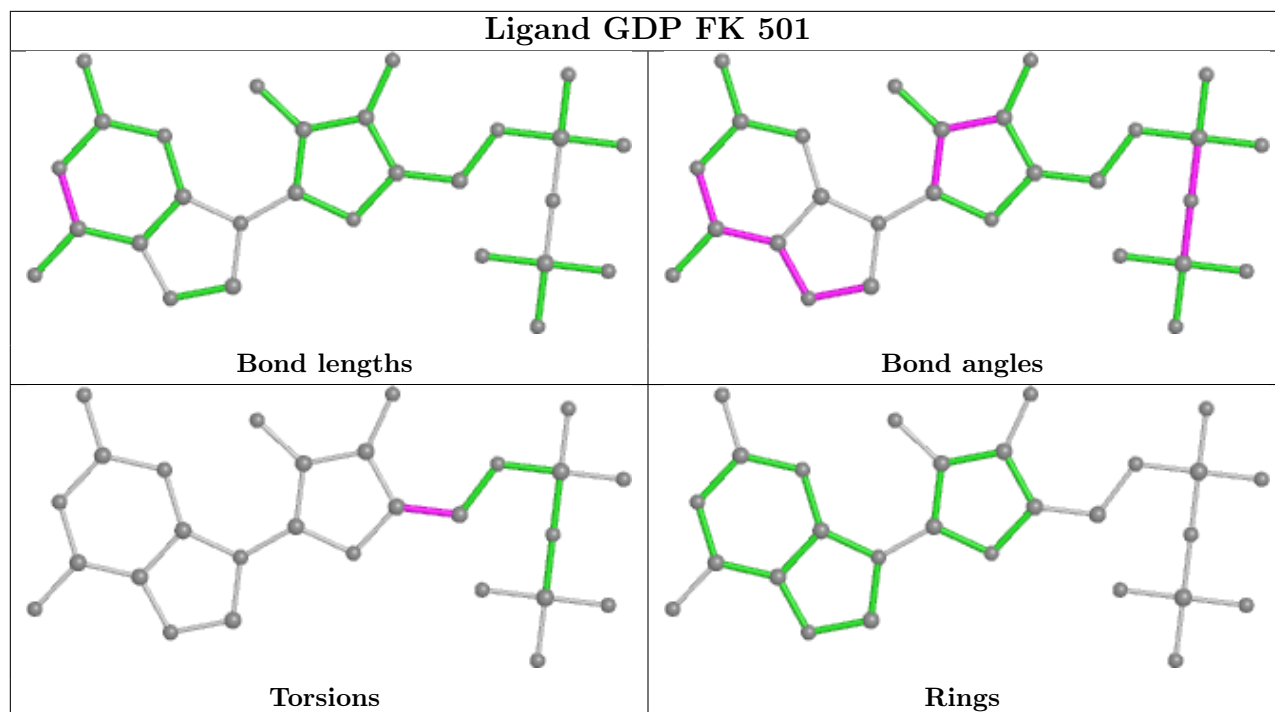


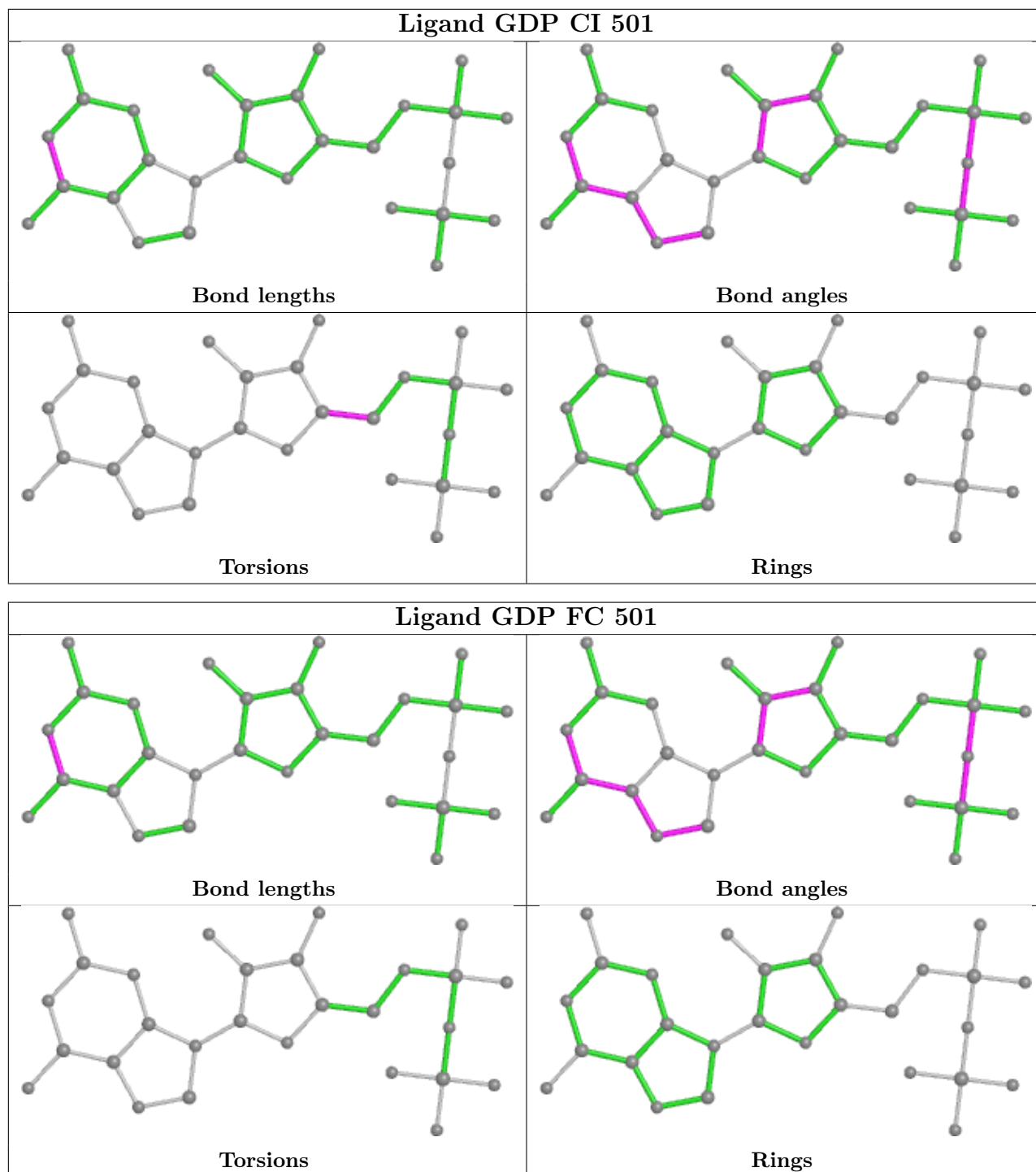


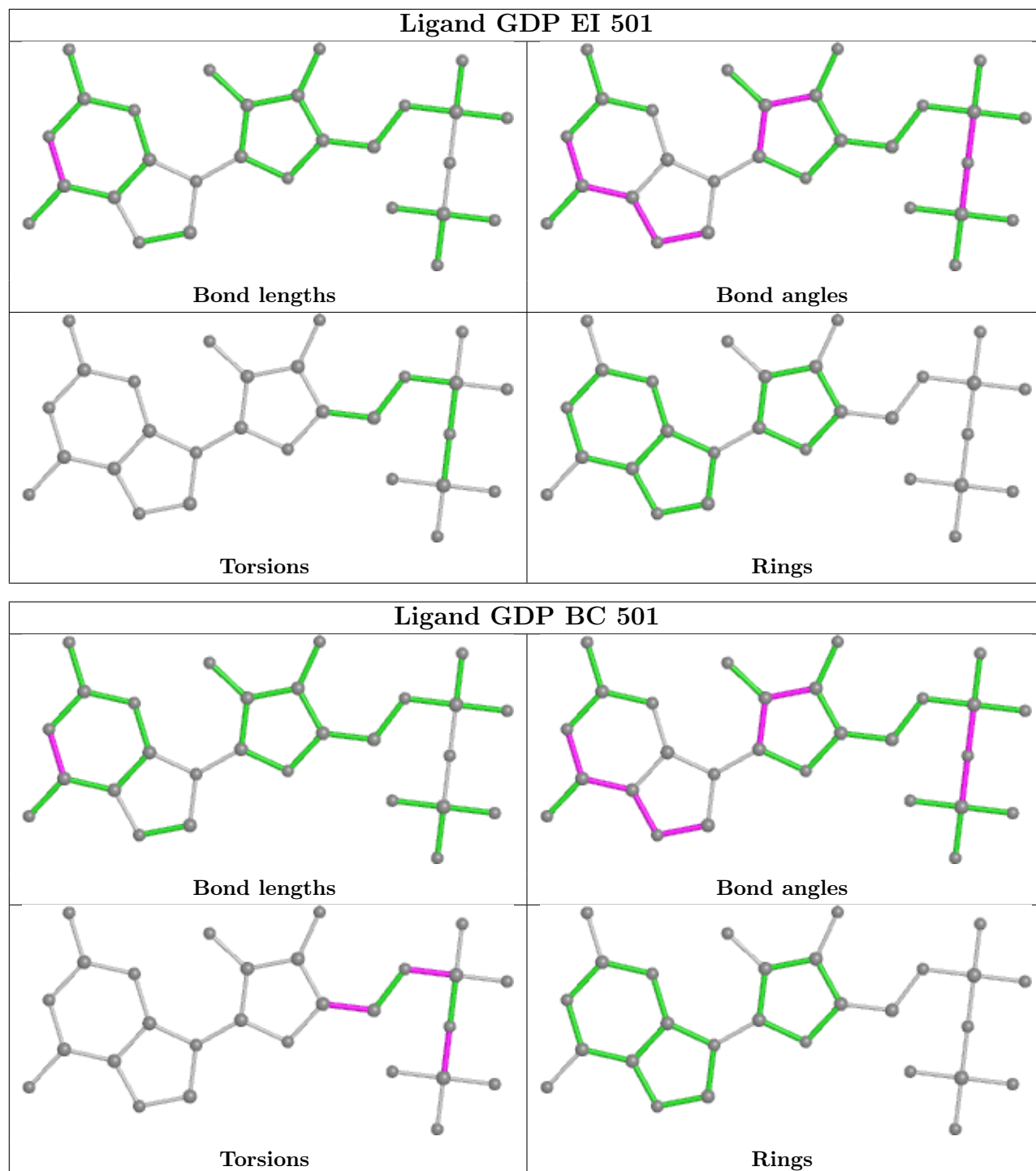


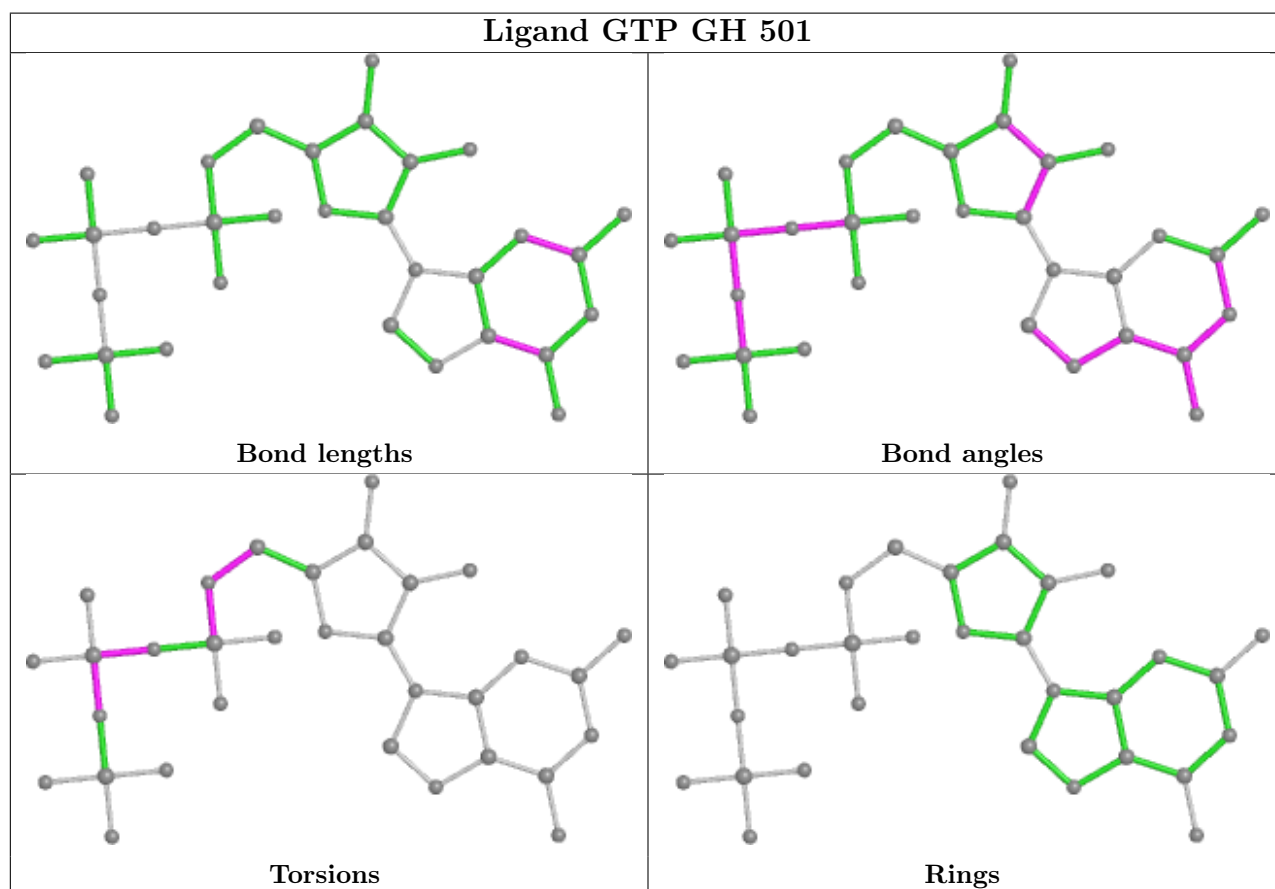
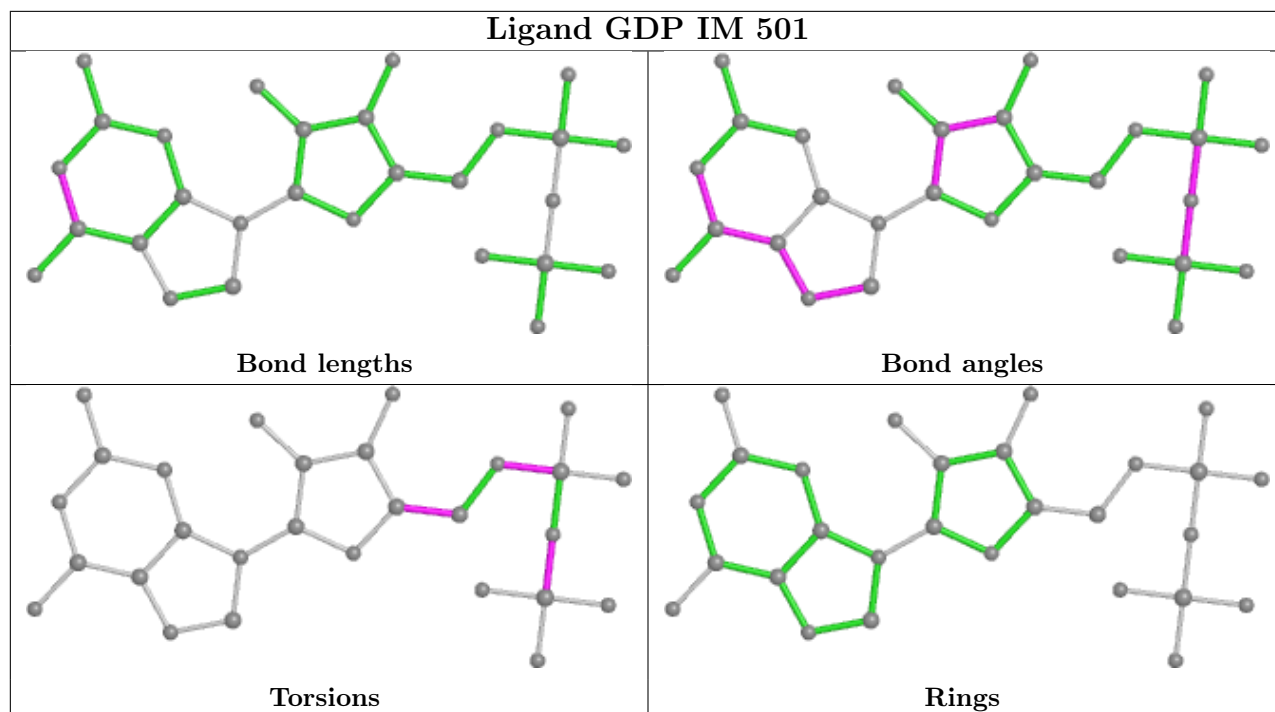


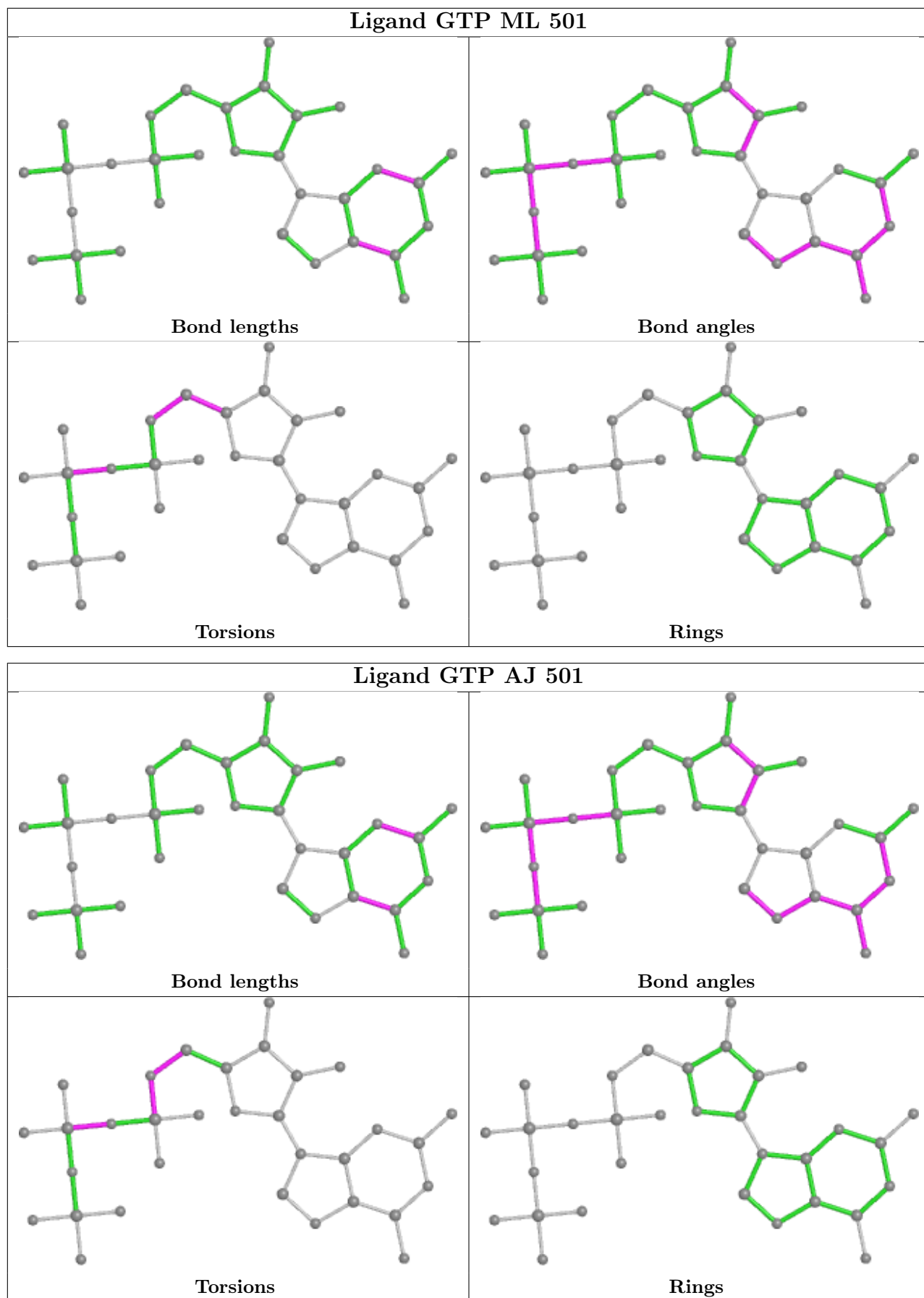


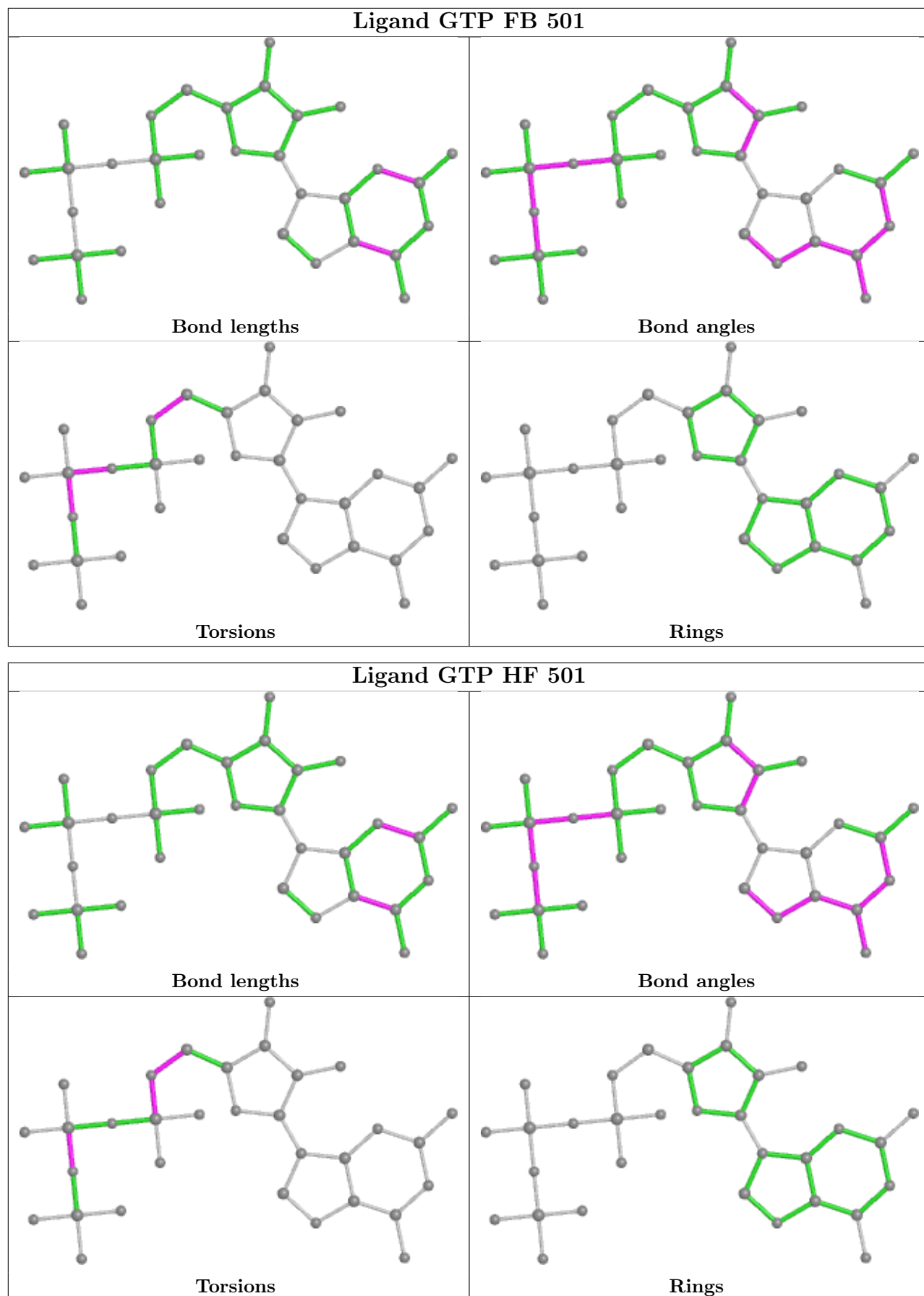


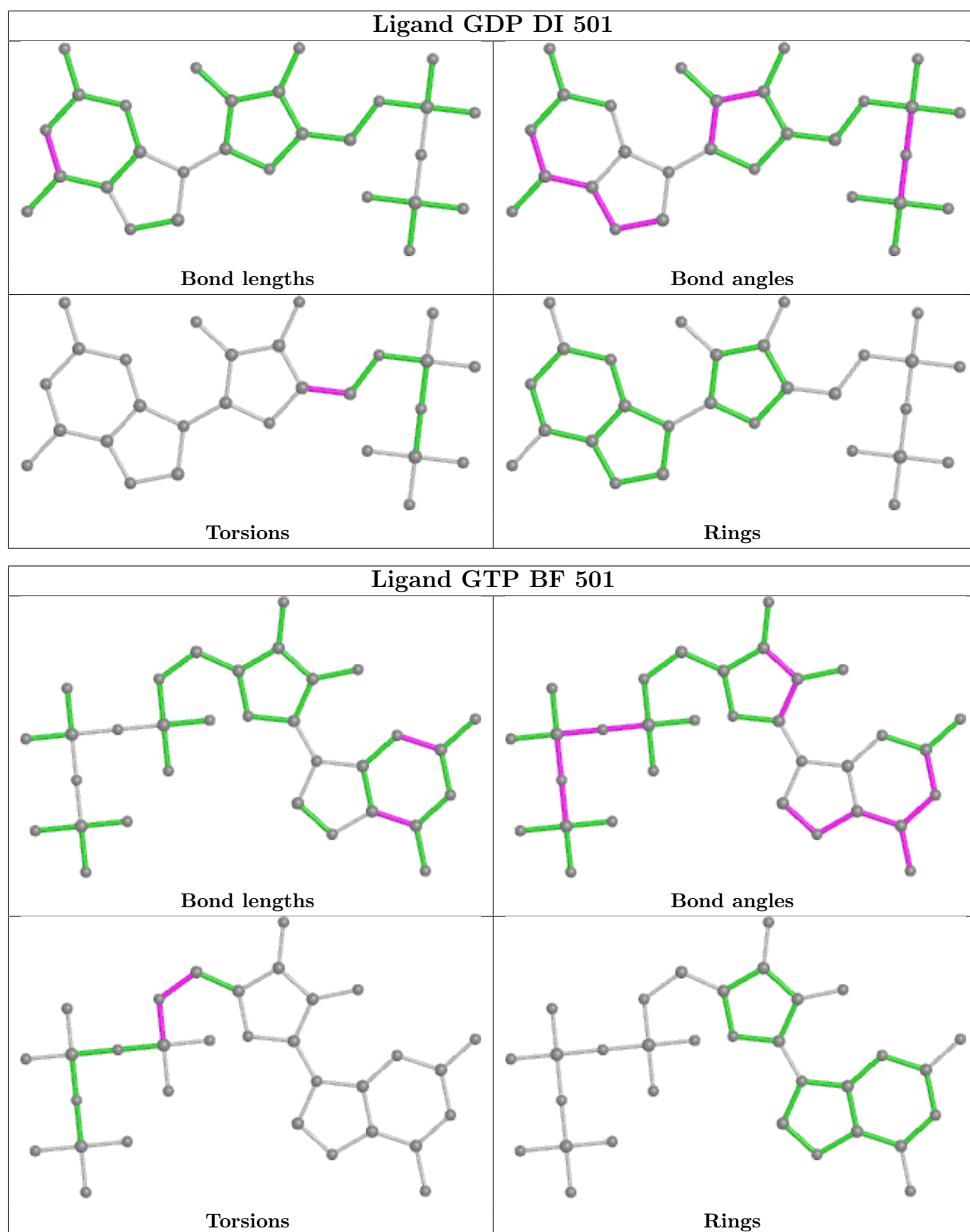




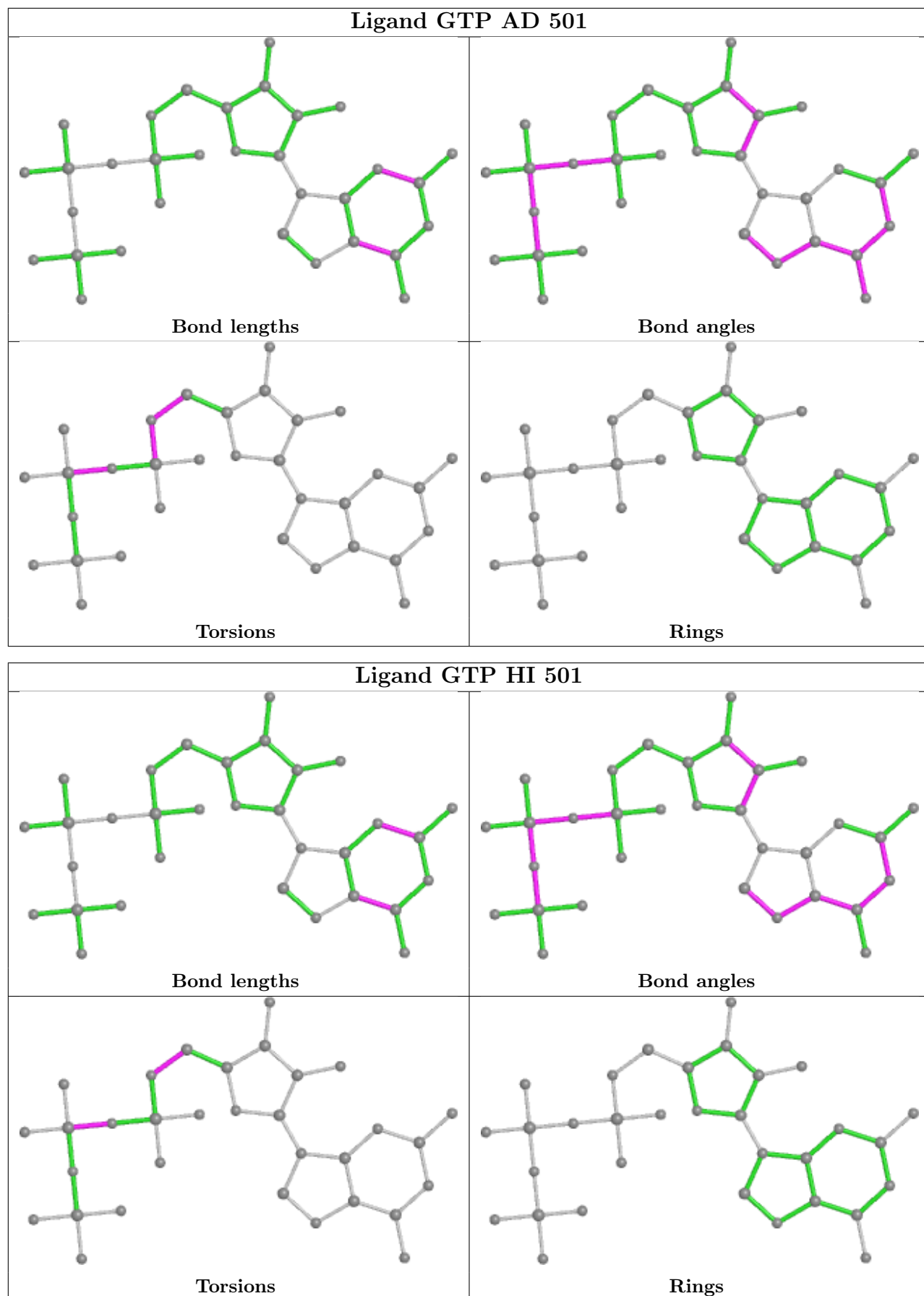


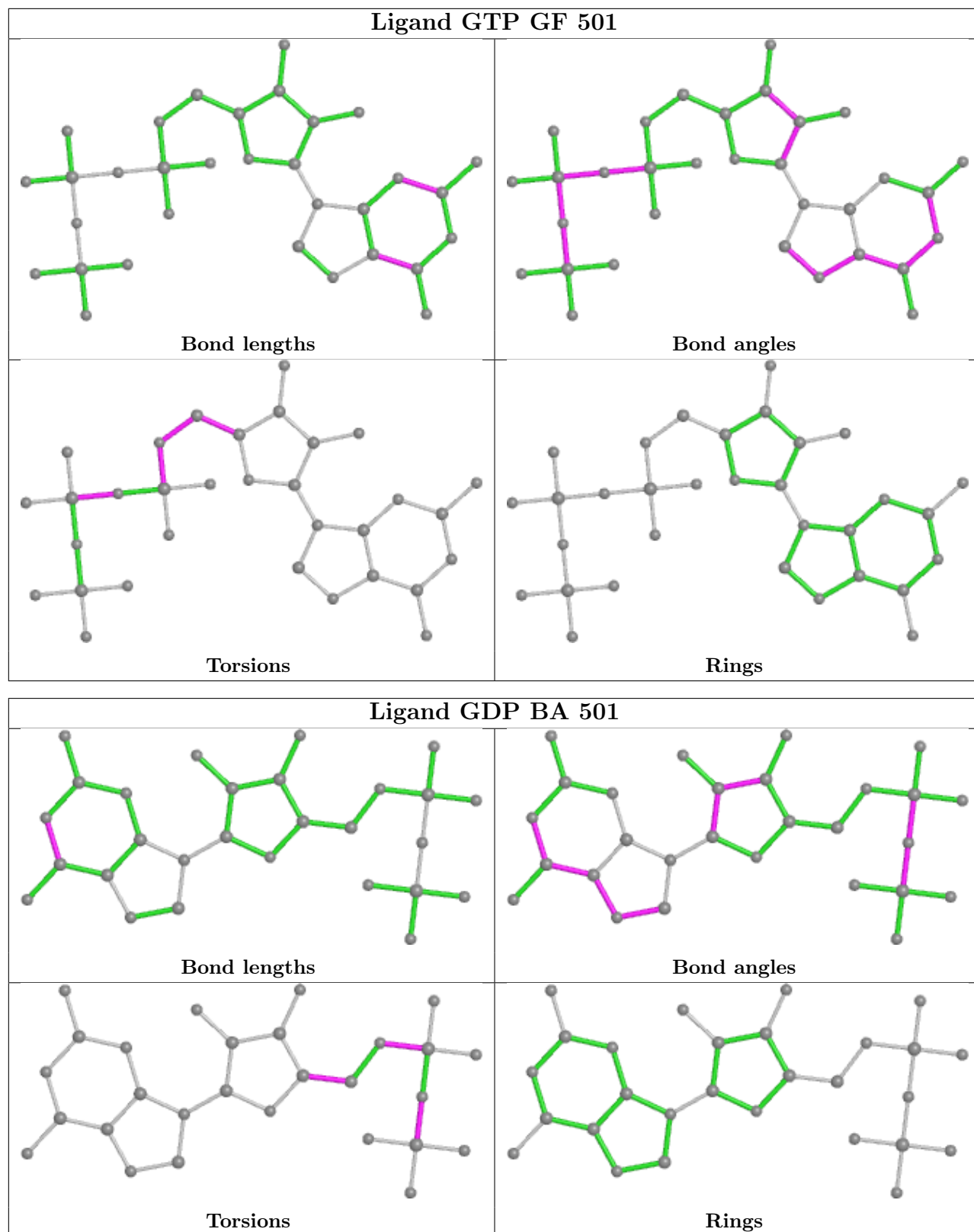


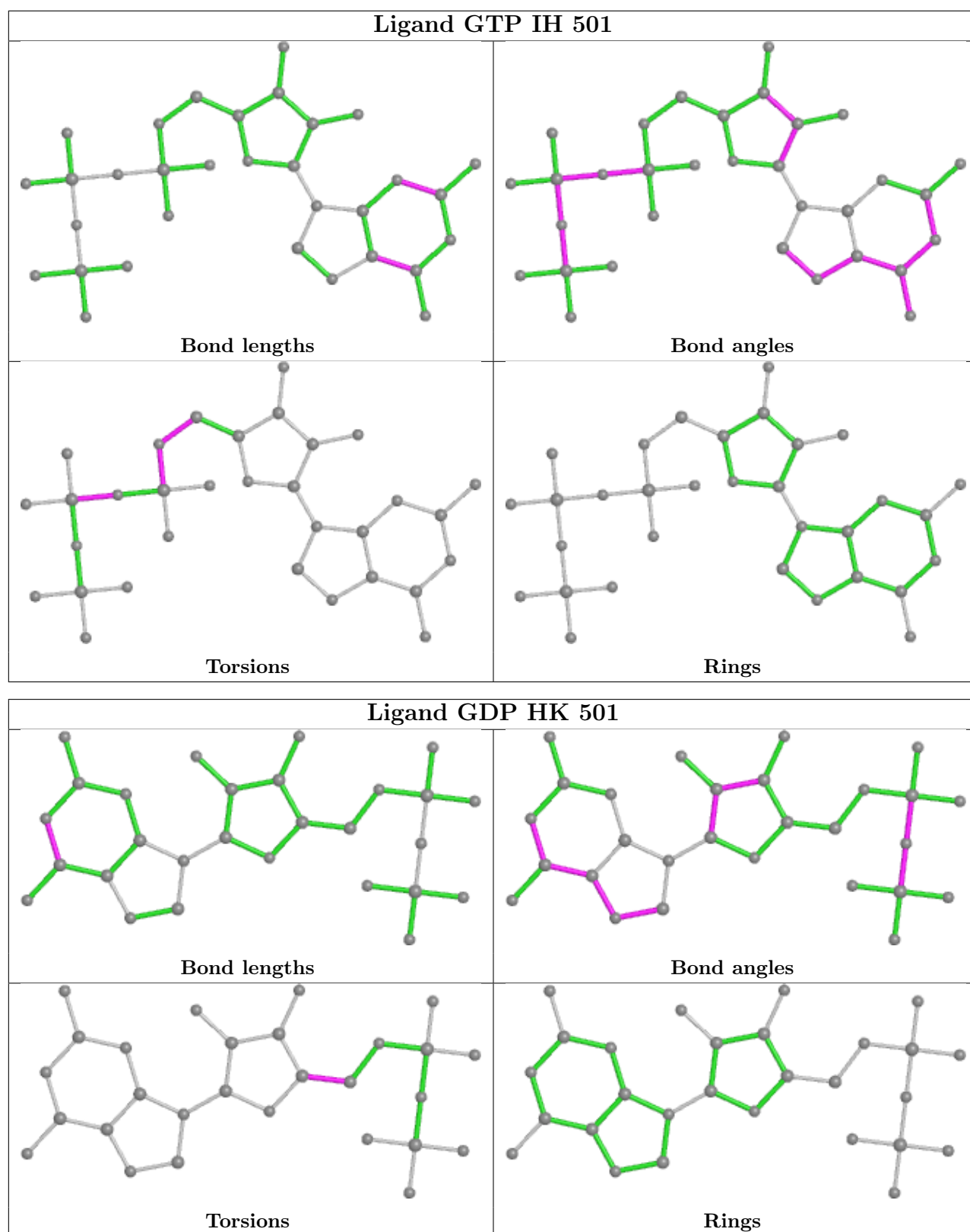


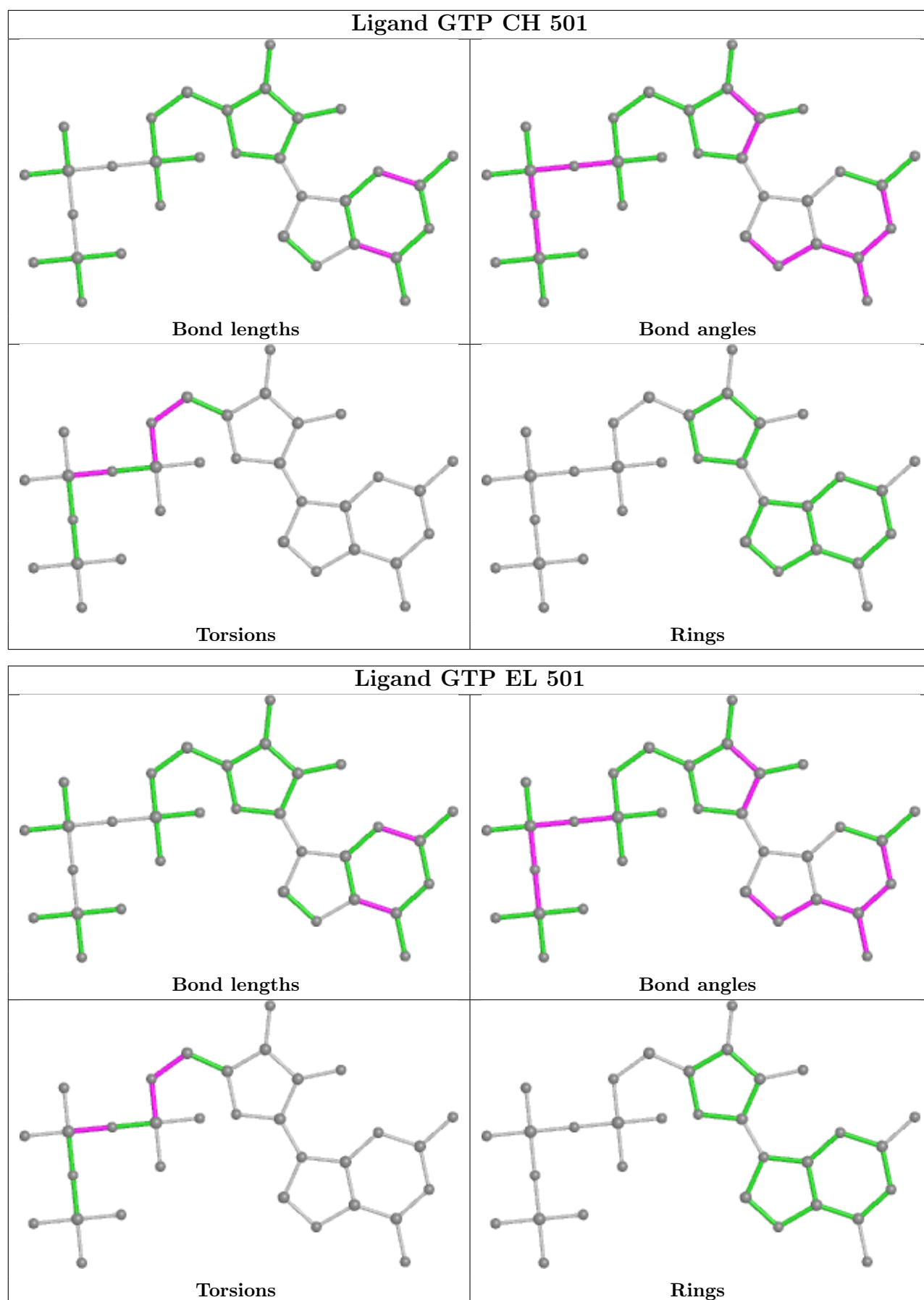


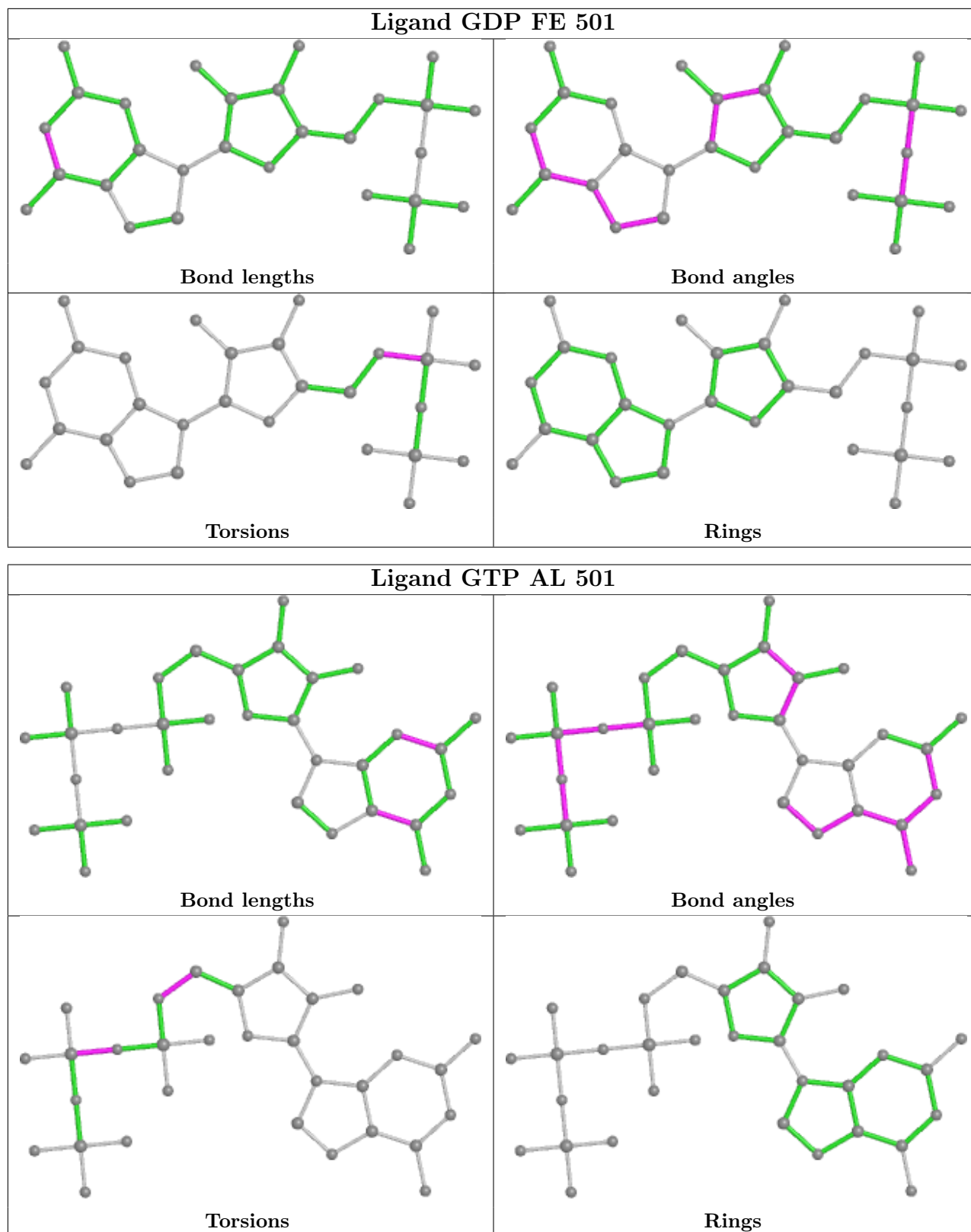


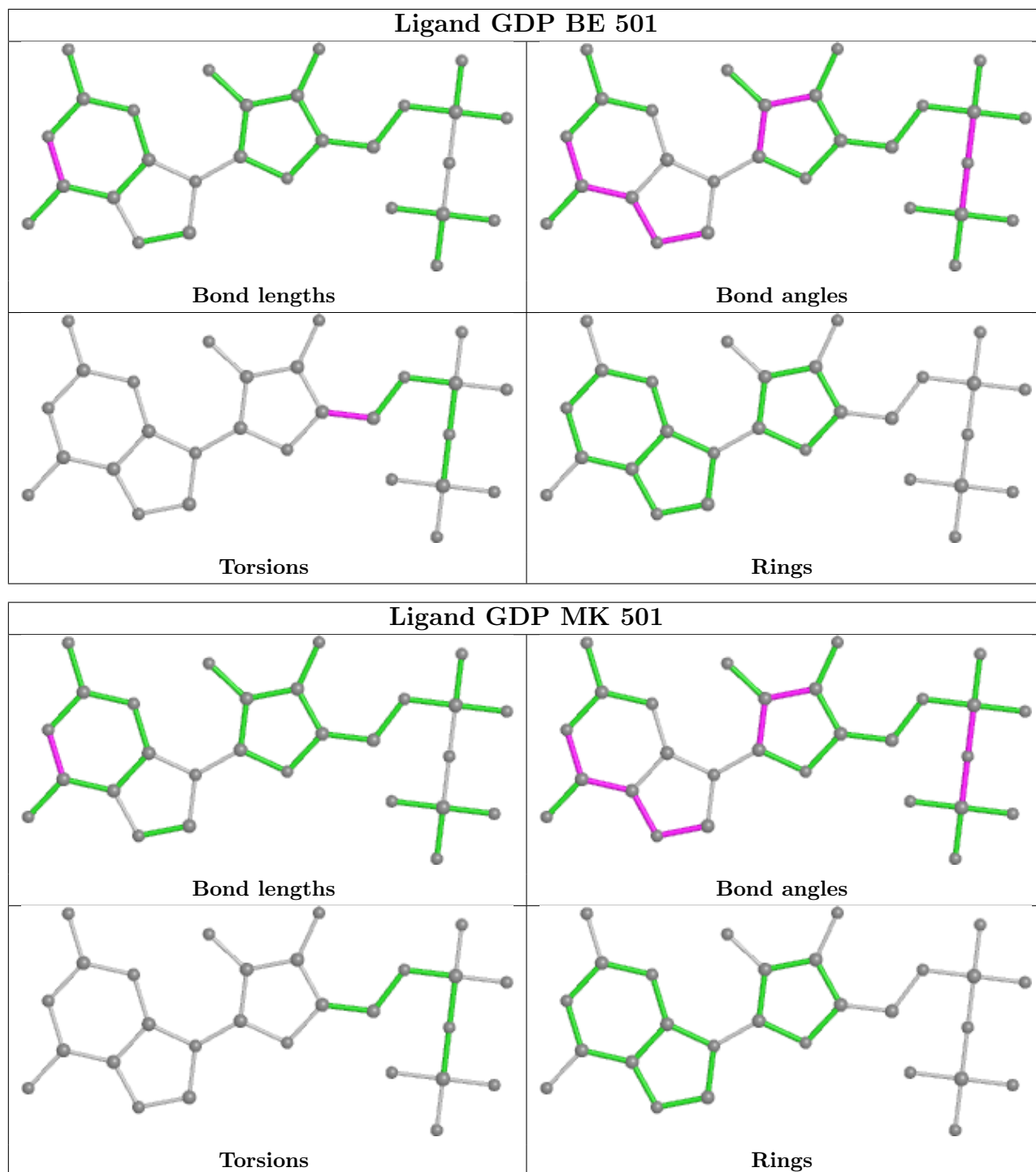


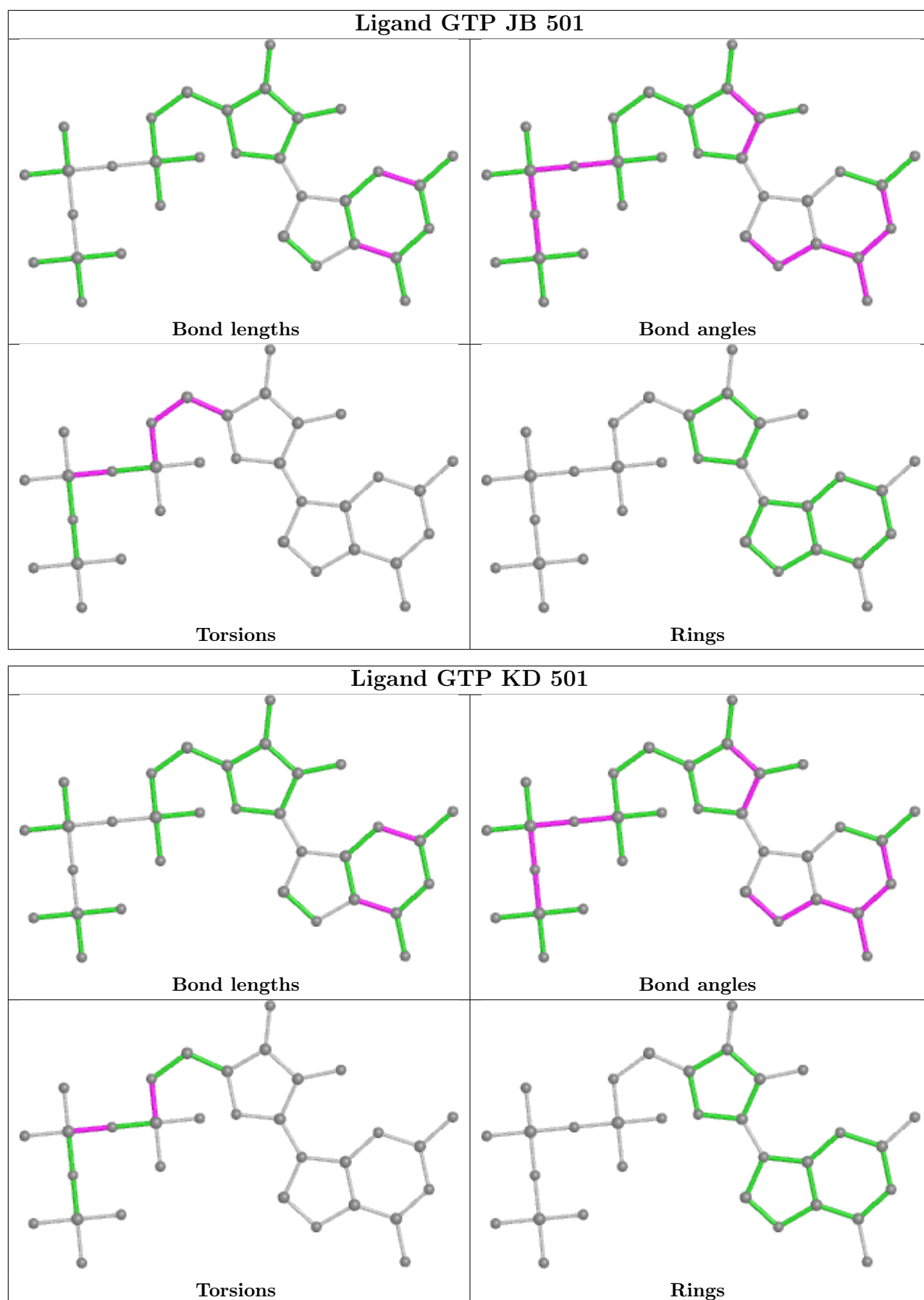


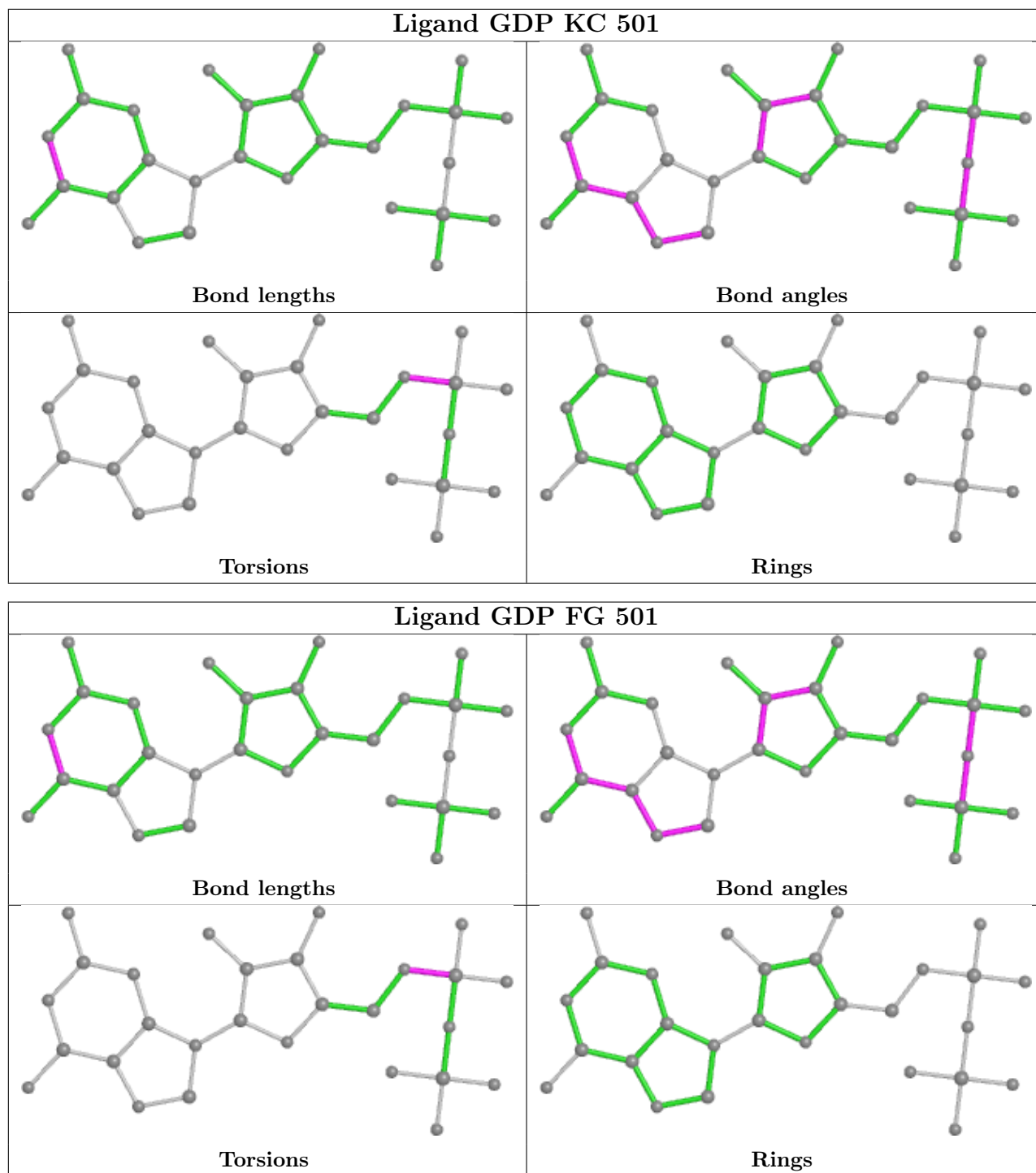




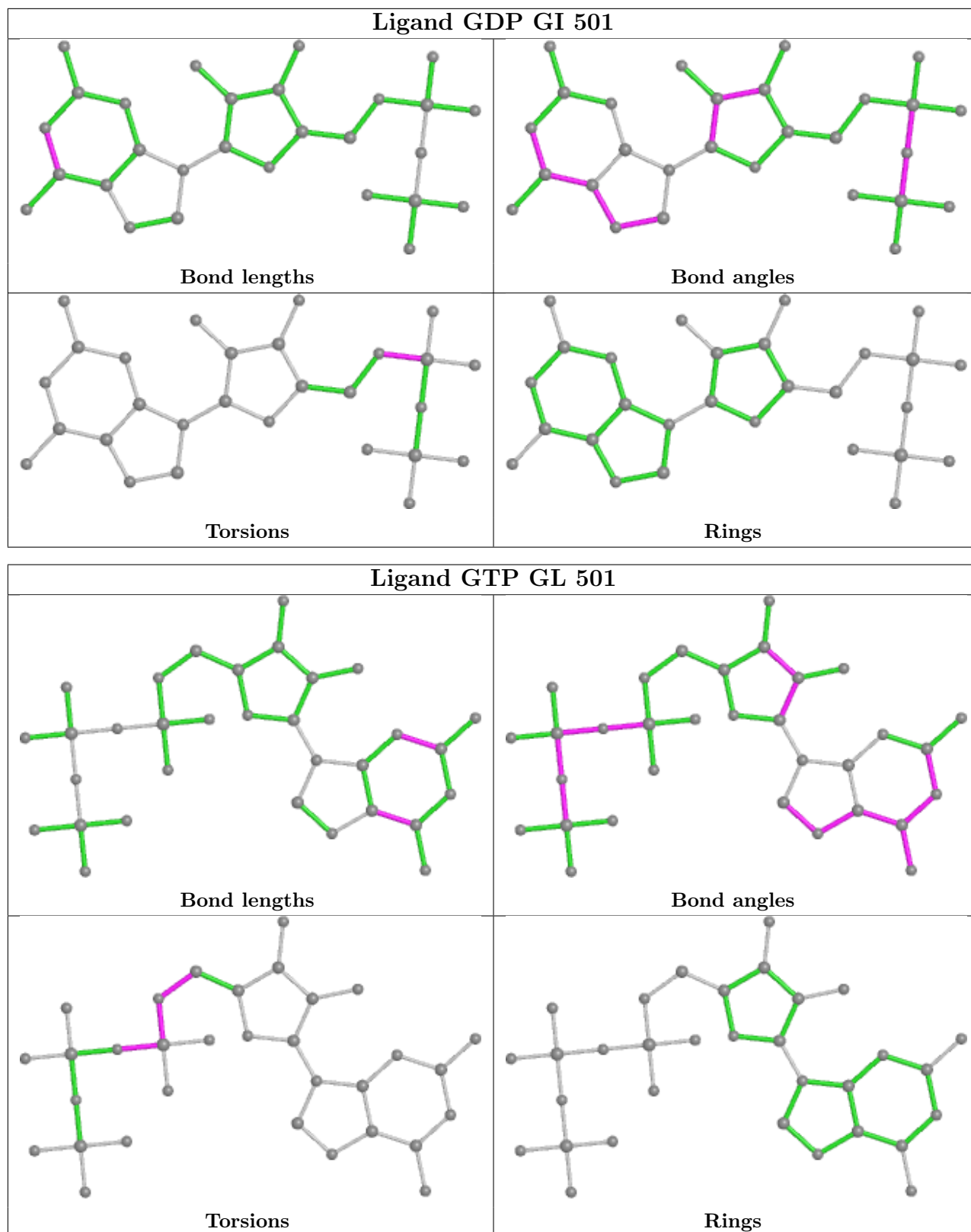


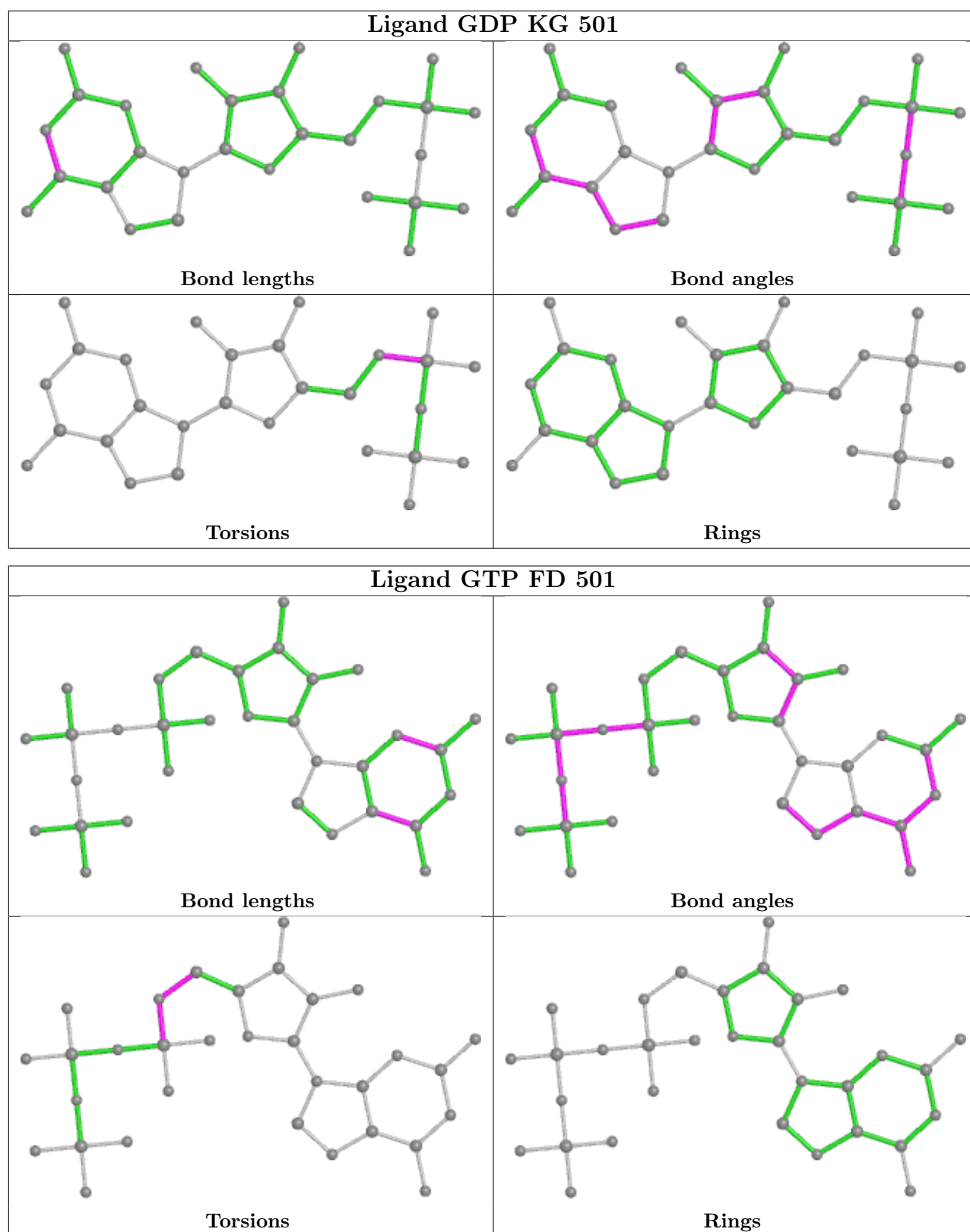


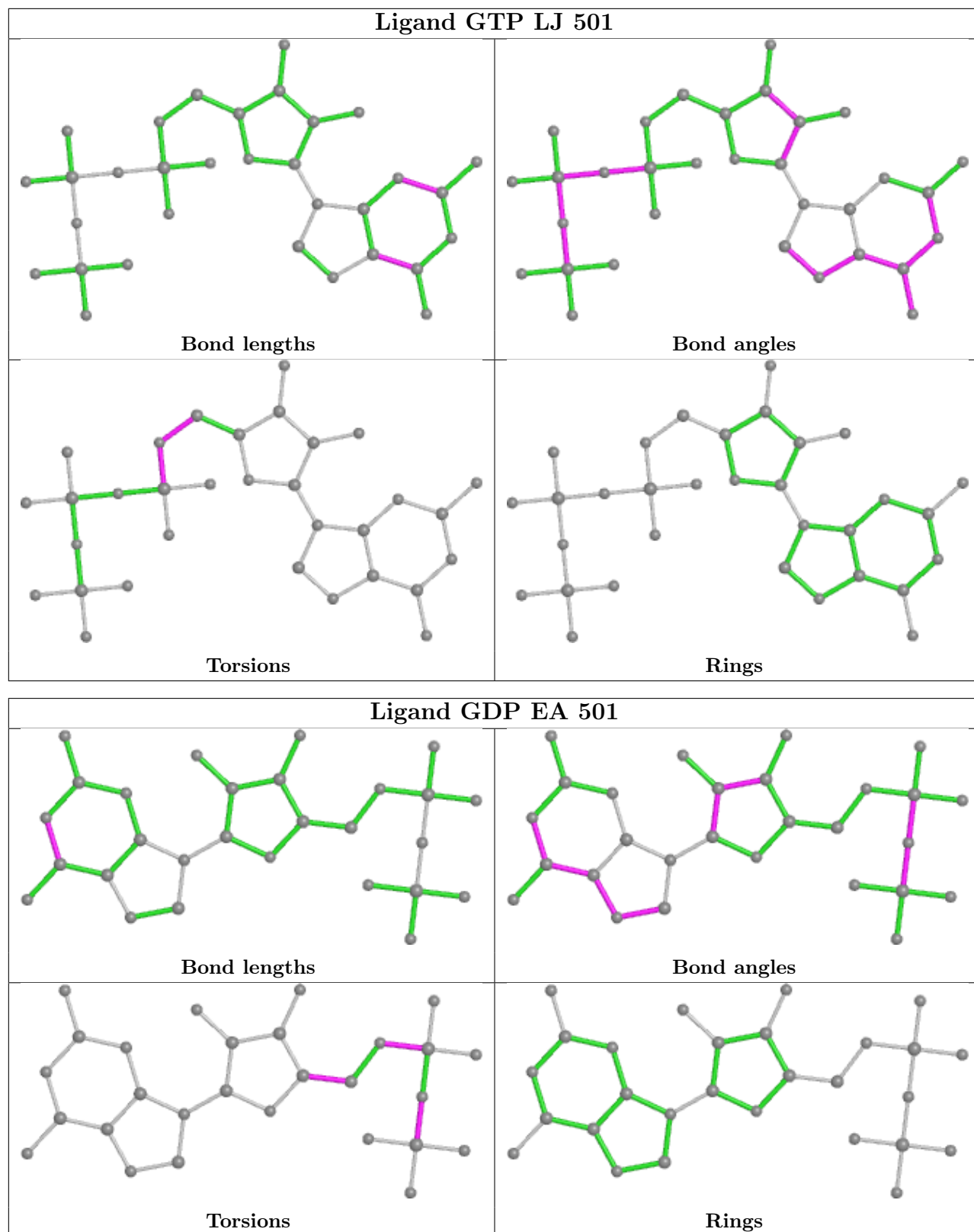


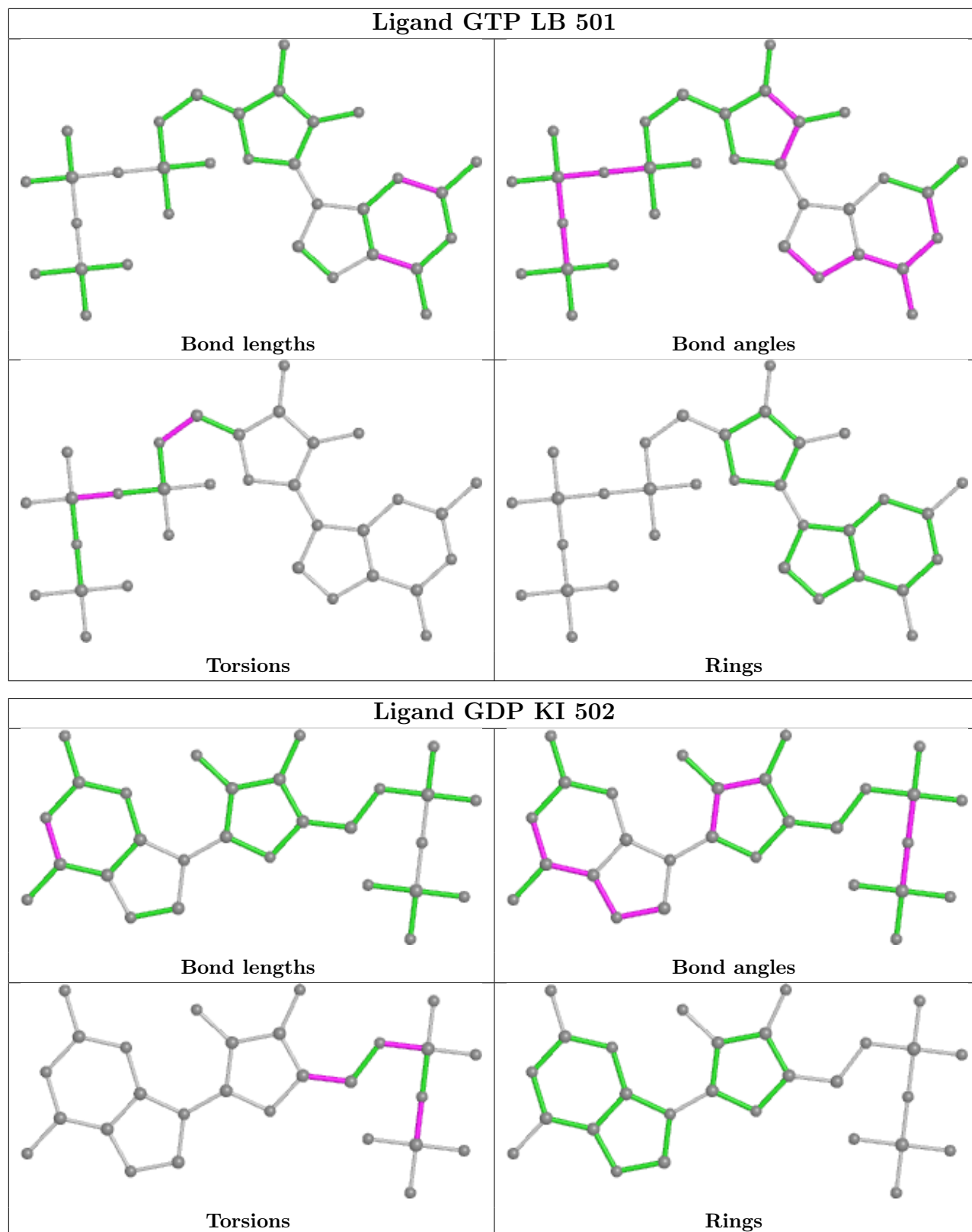


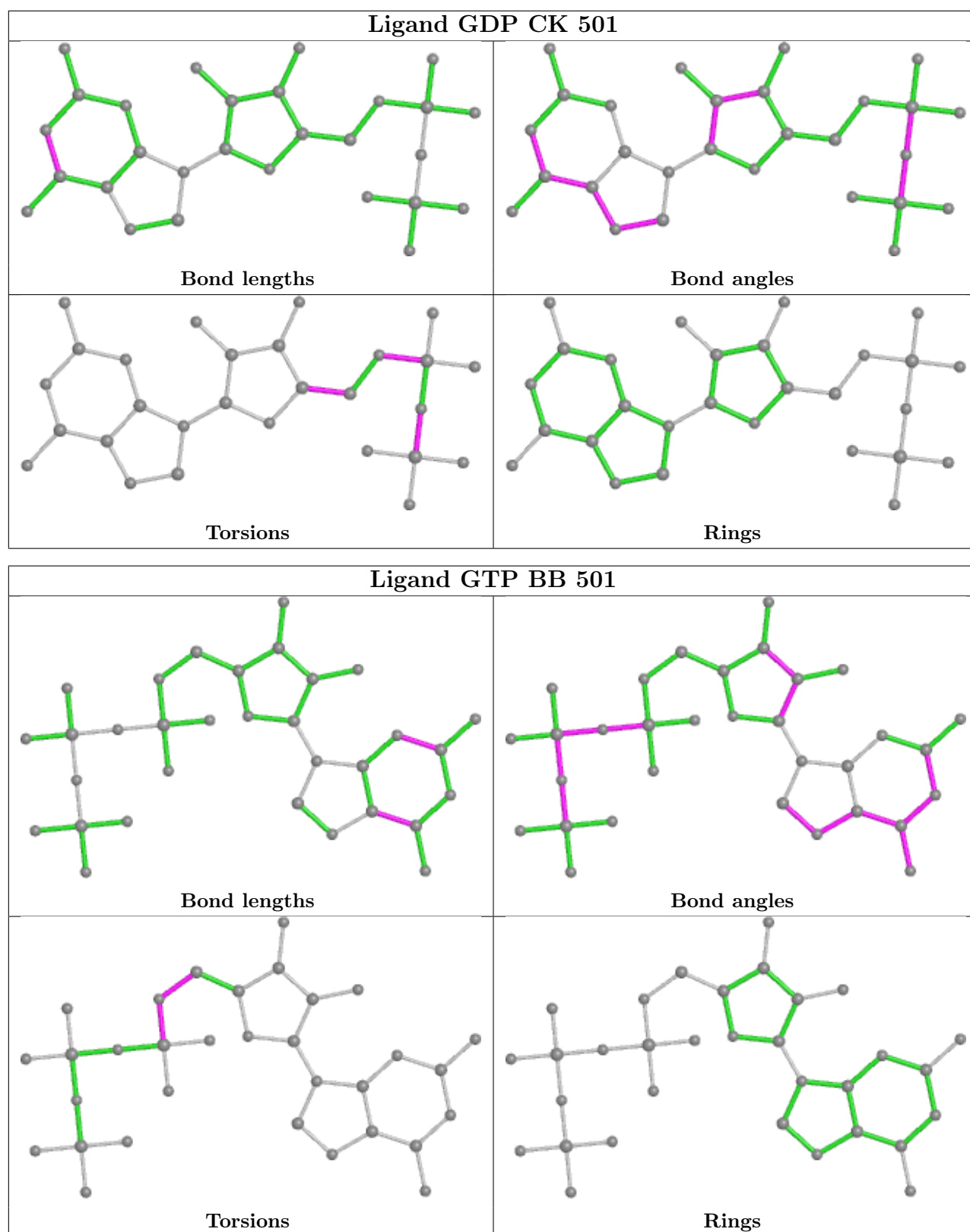


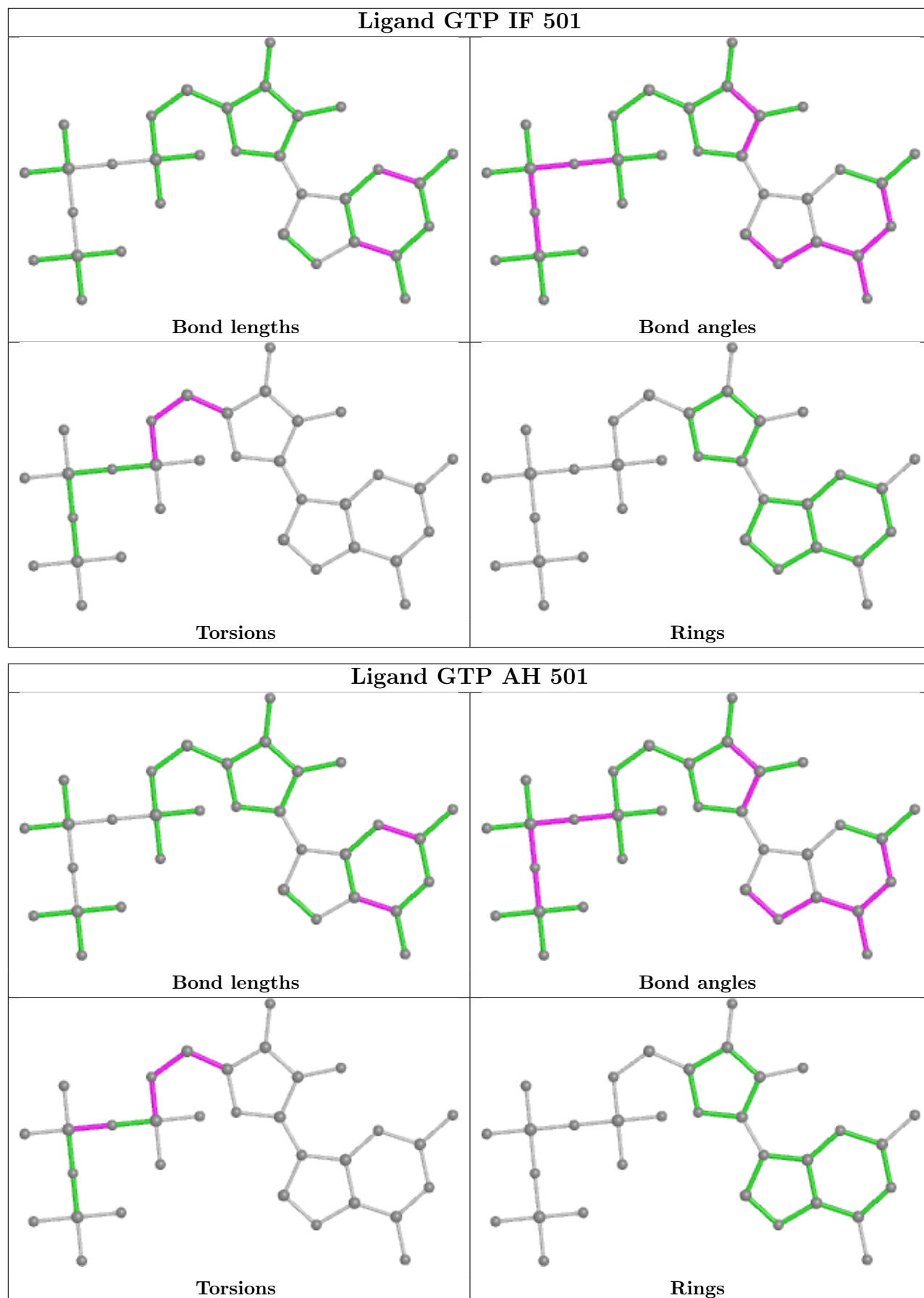


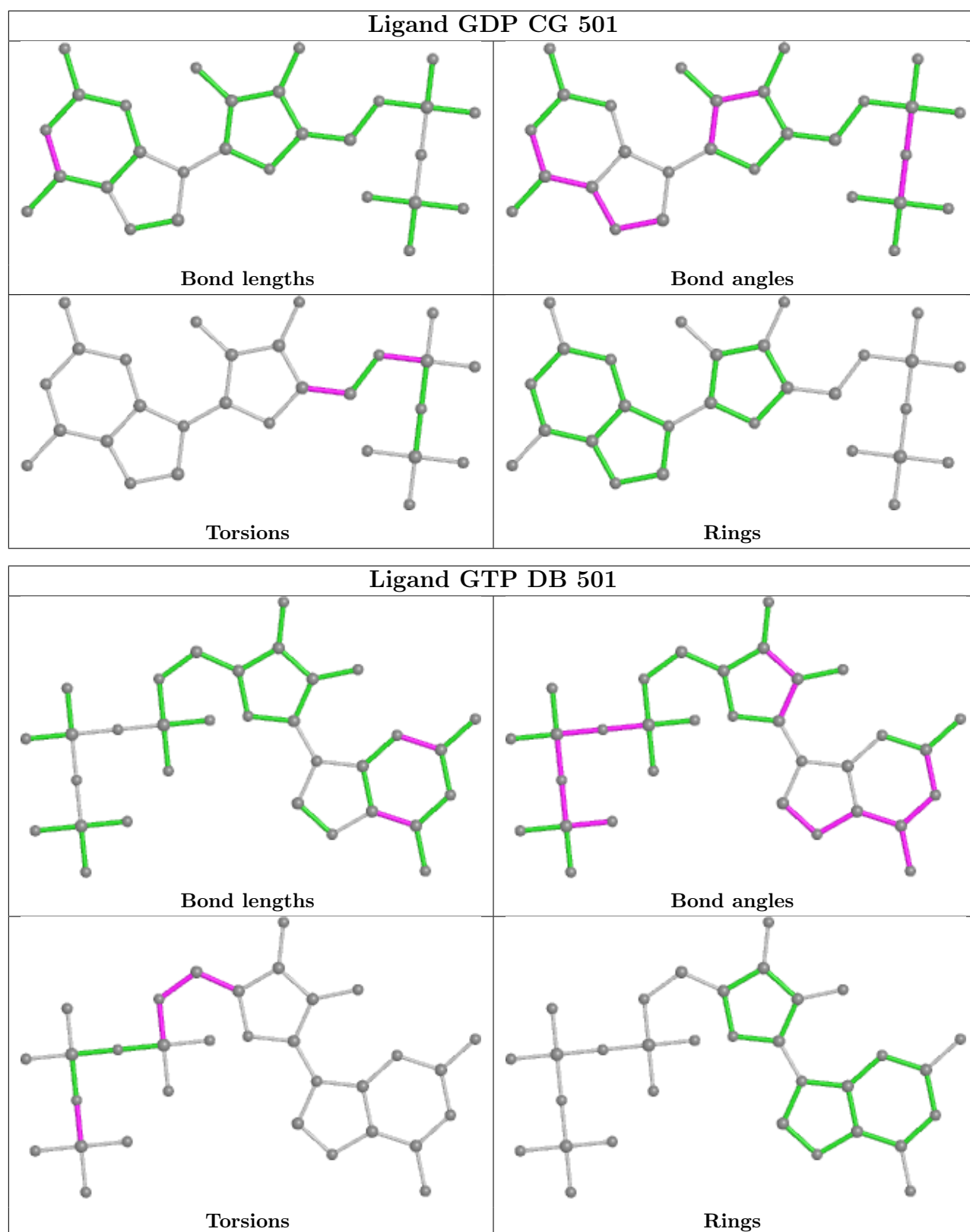


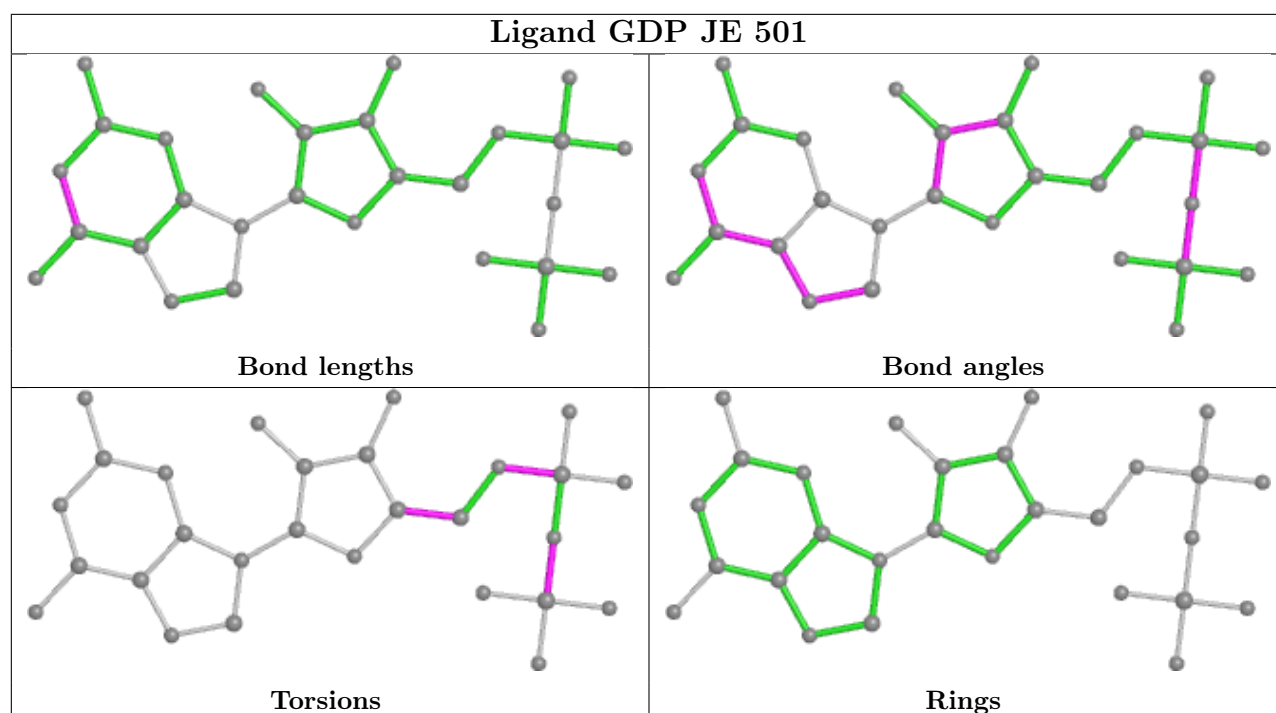












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.



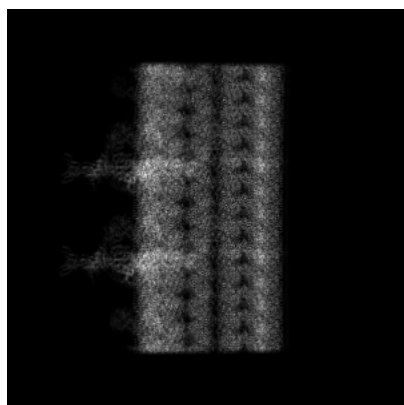
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-25361. These allow visual inspection of the internal detail of the map and identification of artifacts.

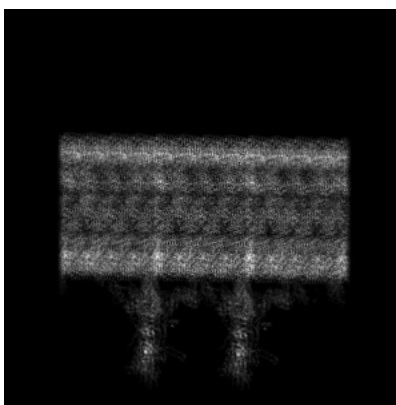
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections [i](#)

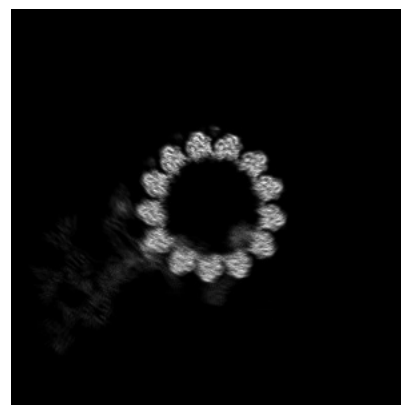
#### 6.1.1 Primary map



X



Y



Z

The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

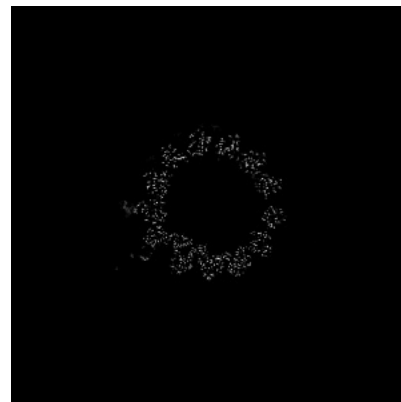
#### 6.2.1 Primary map



X Index: 256



Y Index: 256



Z Index: 256

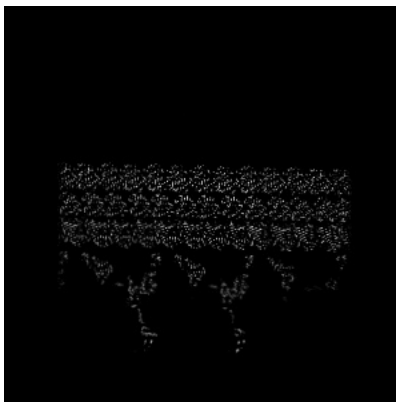
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

### 6.3.1 Primary map



X Index: 324



Y Index: 187

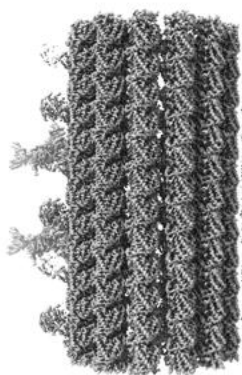


Z Index: 195

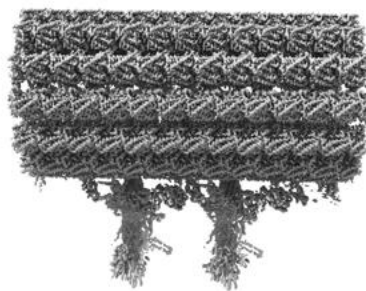
The images above show the largest variance slices of the map in three orthogonal directions.

## 6.4 Orthogonal surface views [i](#)

### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.2. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

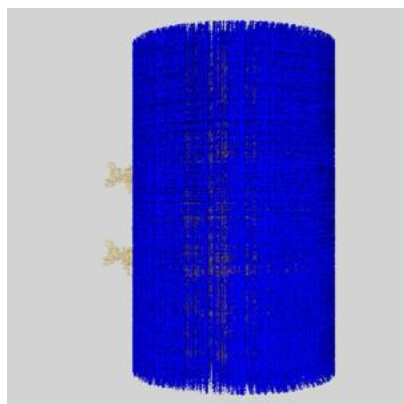
## 6.5 Mask visualisation [i](#)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

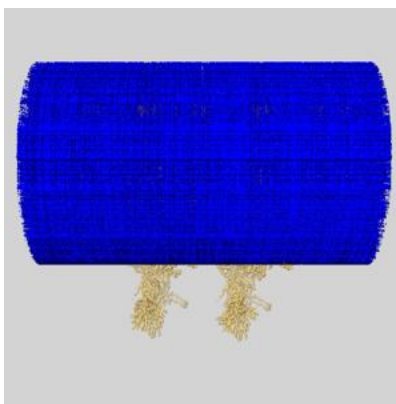
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

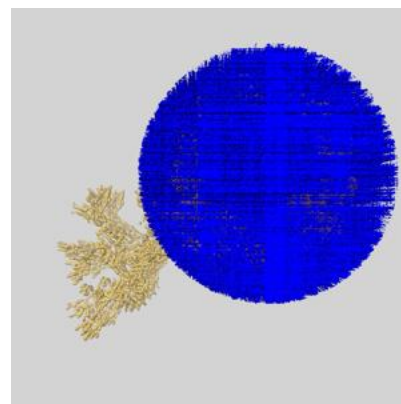
### 6.5.1 emd\_25361\_msk\_1.map [i](#)



X



Y

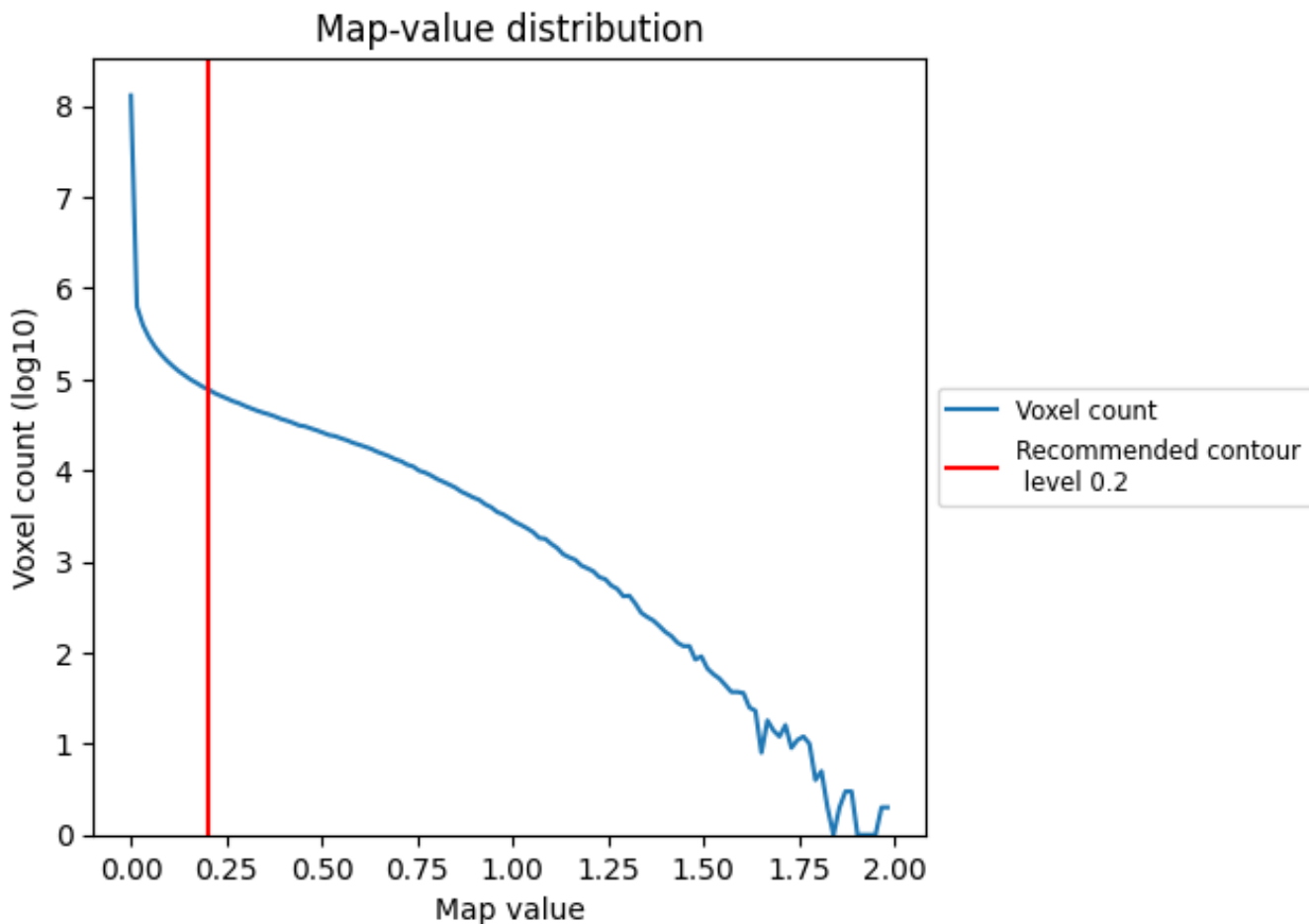


Z

## 7 Map analysis [i](#)

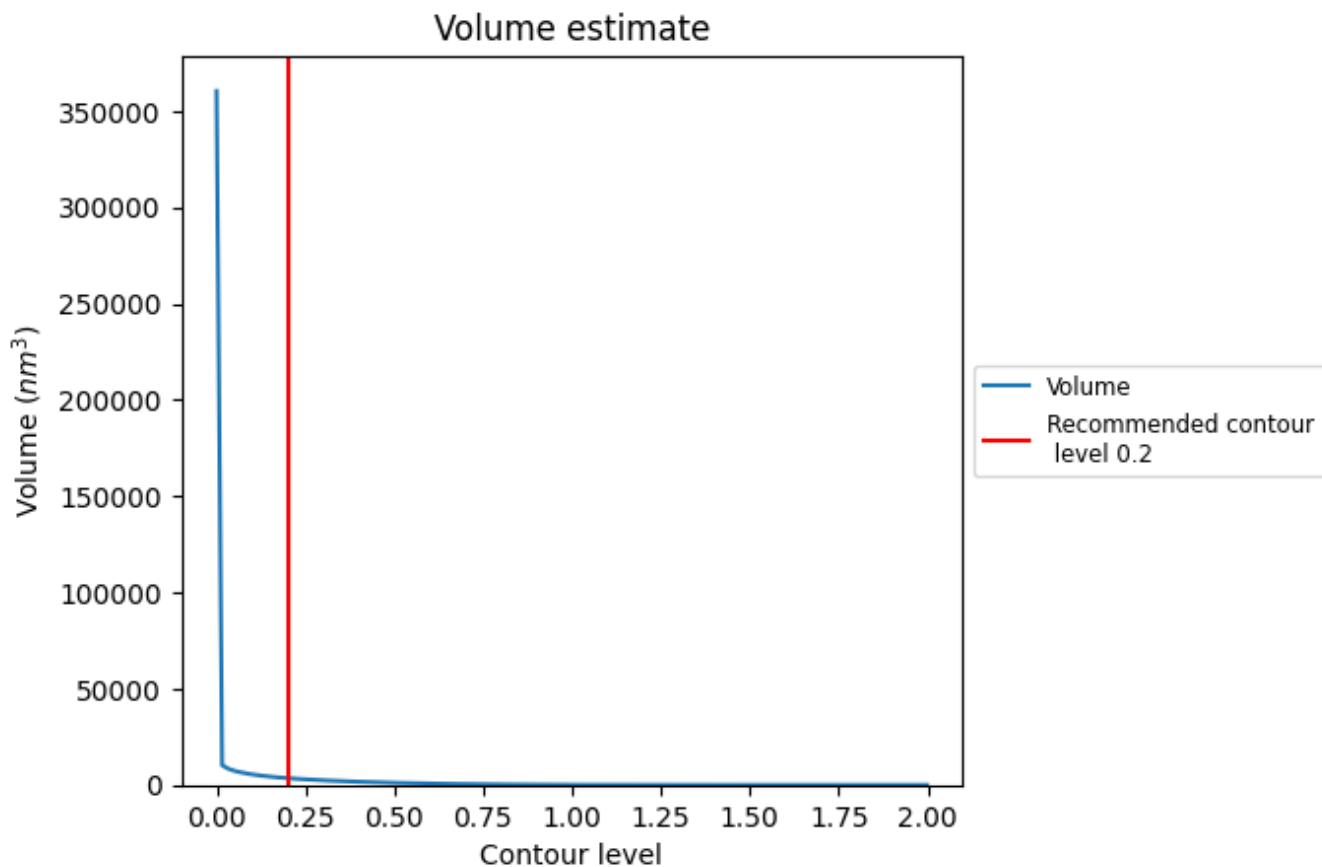
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

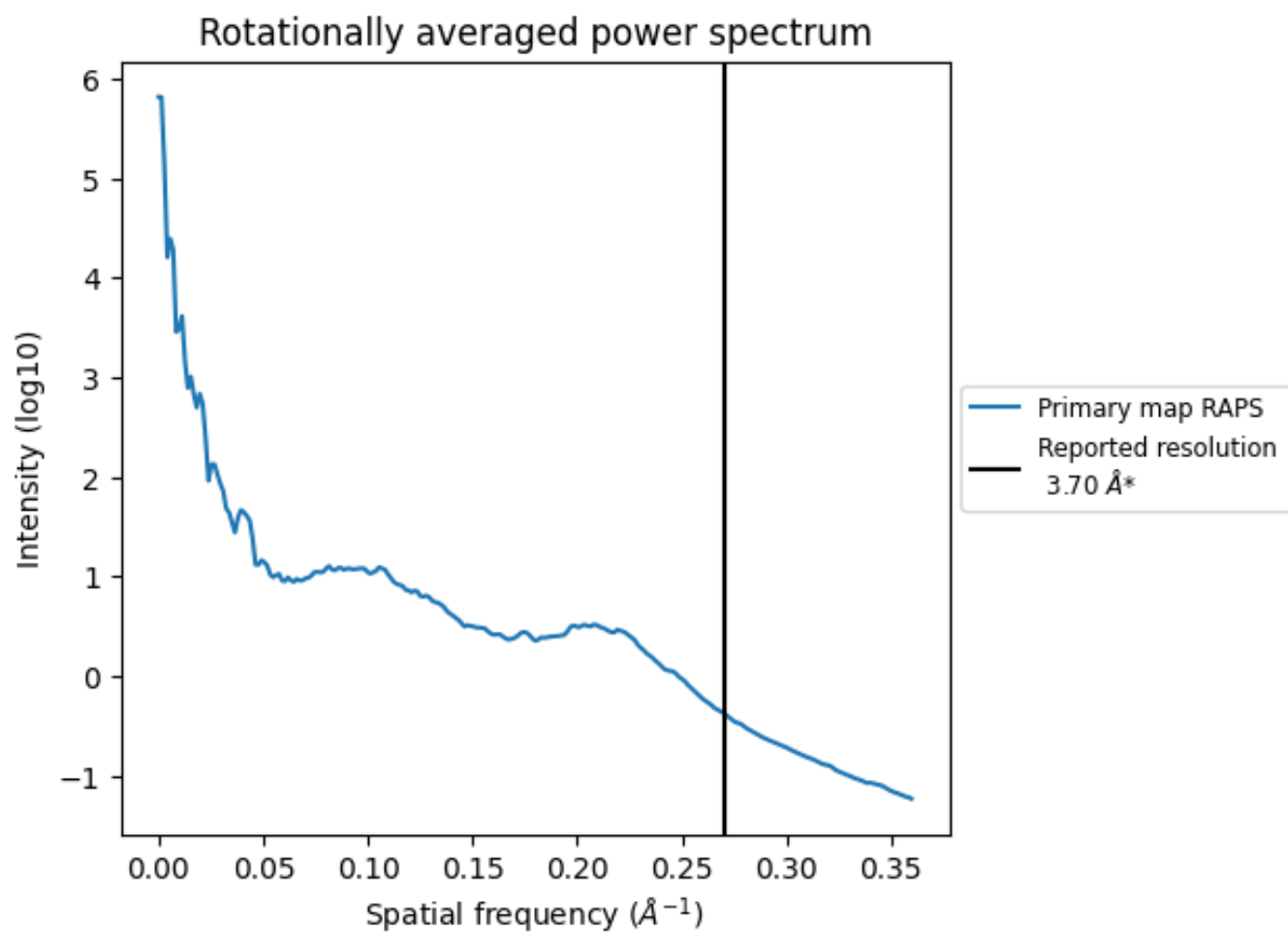
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 3525  $\text{nm}^3$ ; this corresponds to an approximate mass of 3184 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

### 7.3 Rotationally averaged power spectrum i

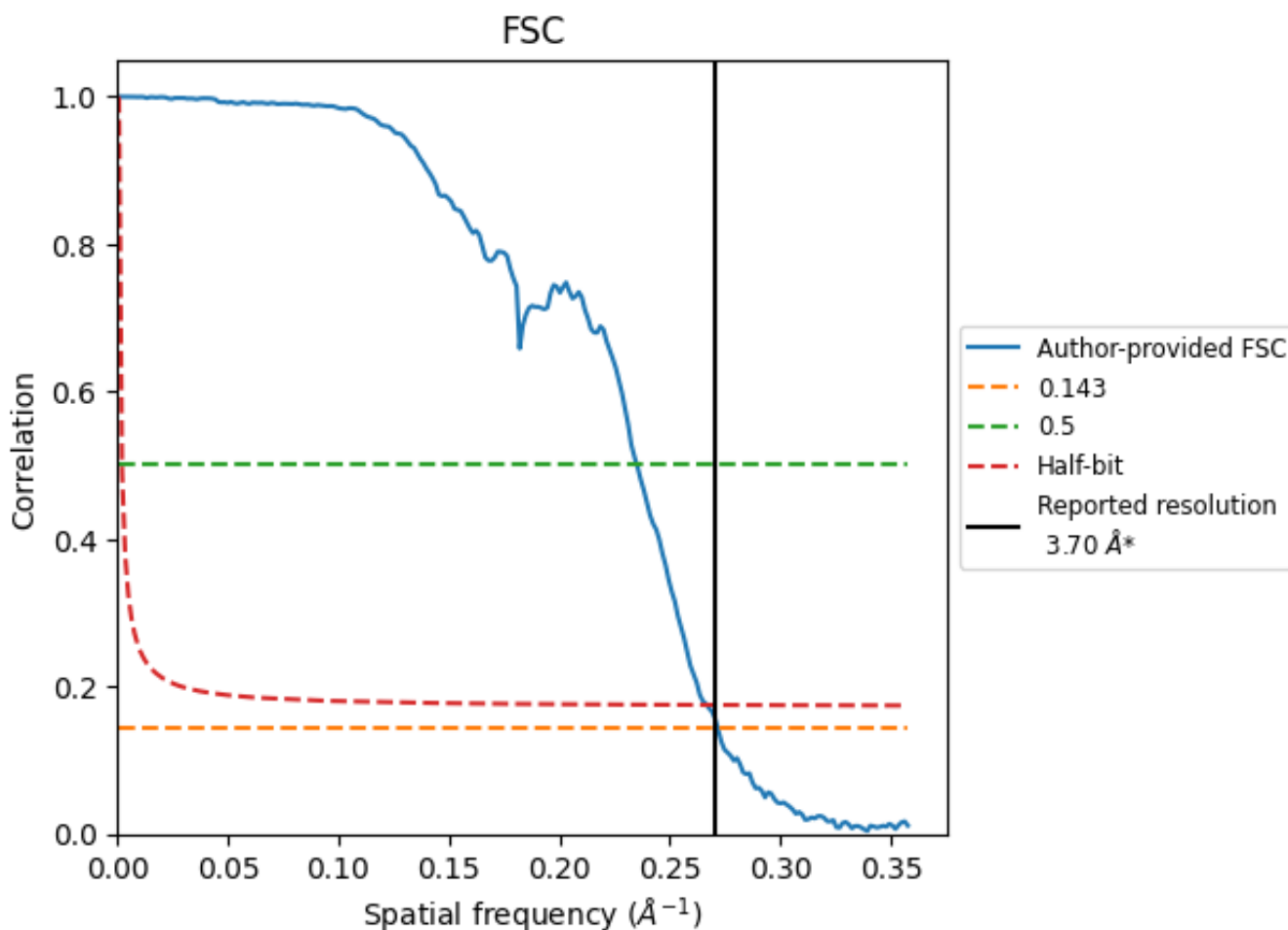


\*Reported resolution corresponds to spatial frequency of 0.270 Å<sup>-1</sup>

## 8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

### 8.1 FSC [i](#)



\*Reported resolution corresponds to spatial frequency of 0.270 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.70	-	-
Author-provided FSC curve	3.68	4.26	3.75
Unmasked-calculated*	-	-	-

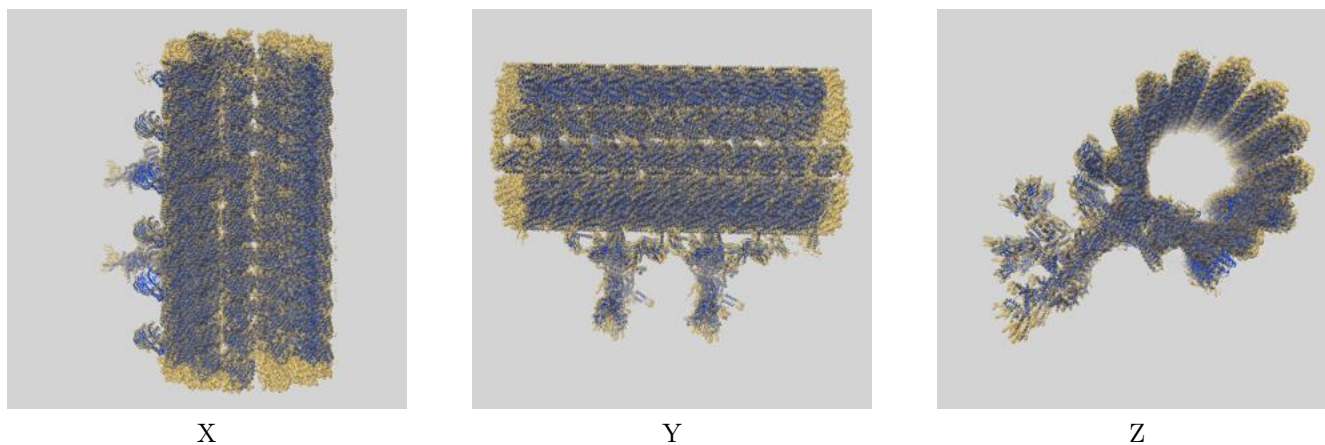
\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.



## 9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-25361 and PDB model 7SOM. Per-residue inclusion information can be found in section [3](#) on page [34](#).

### 9.1 Map-model overlay [i](#)

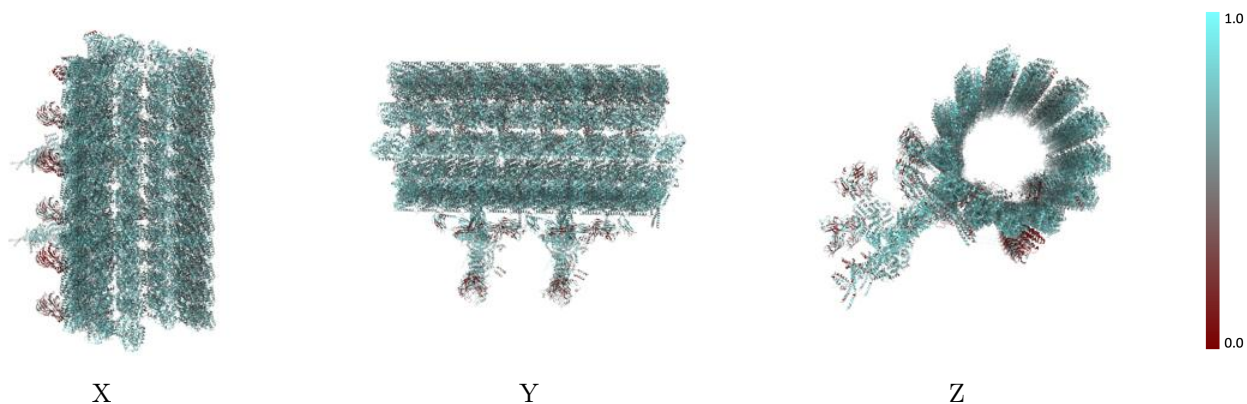


The images above show the 3D surface view of the map at the recommended contour level 0.2 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 9.2 Q-score mapped to coordinate model [i](#)

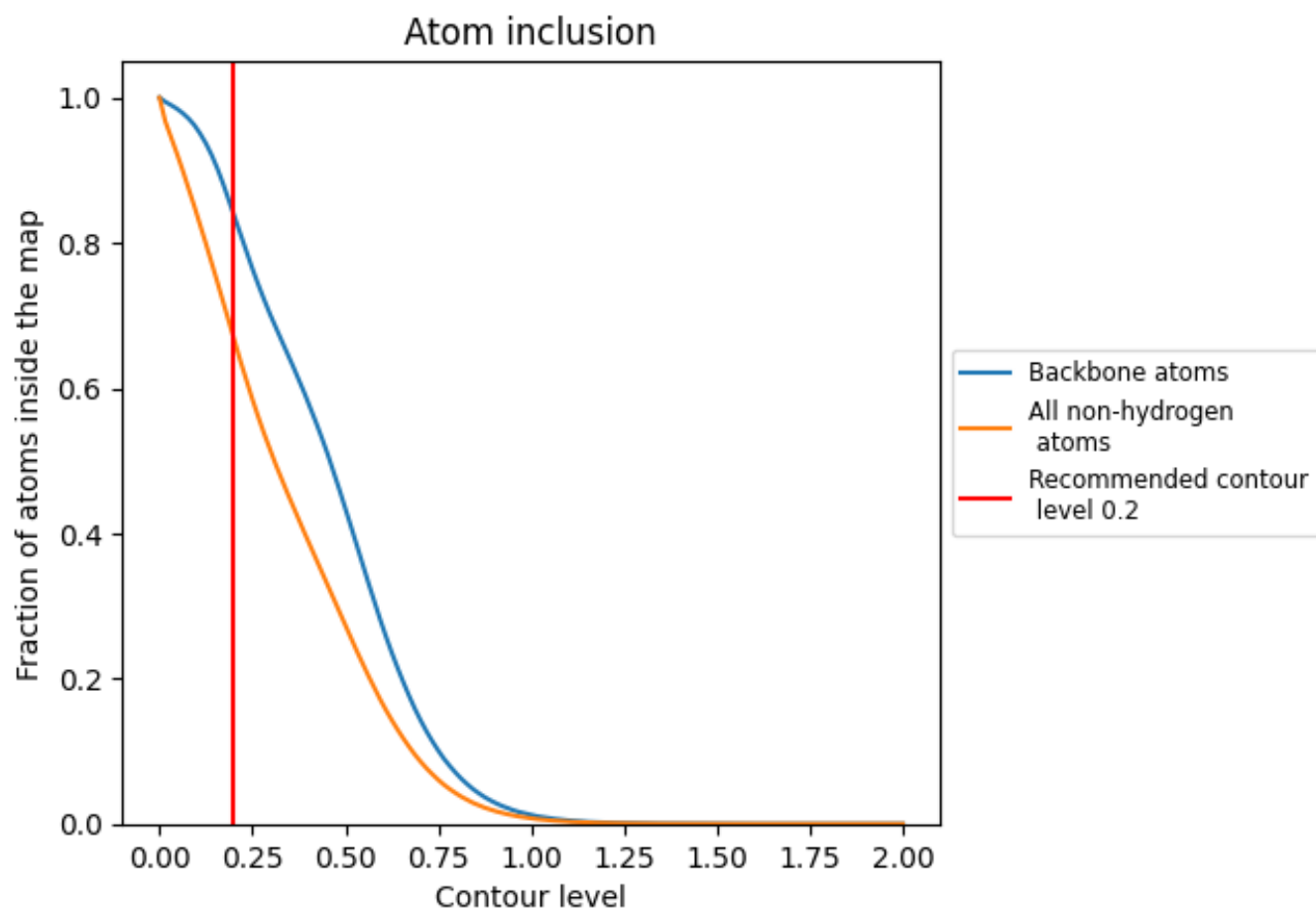
This section was not generated.

## 9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.2).

## 9.4 Atom inclusion [i](#)



At the recommended contour level, 84% of all backbone atoms, 67% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary











































The table lists the average atom inclusion at the recommended contour level (0.2) and Q-score for the entire model and for each chain.

Chain	Atom inclusion
All	0.6678
A	0.5375
A1	0.7083
A2	0.7558
A3	0.6894
A4	0.7558
AA	0.7111
AB	0.6973
AC	0.7073
AD	0.6910
AE	0.7458
AF	0.7096
AG	0.7180
AH	0.7166
AI	0.7324
AJ	0.6910
AK	0.7078
AL	0.7045
B	0.5724
BA	0.6860
BB	0.6853
BC	0.7138
BD	0.7178
BE	0.6913
BF	0.6948
BG	0.7156
BH	0.7274
BI	0.6758
BJ	0.6799
BK	0.7035
BL	0.6825
C	0.5094
CA	0.7168
CB	0.7158
CC	0.7267













































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Chain	Atom inclusion
CD	 0.7451
CE	 0.7273
CF	 0.7242
CG	 0.7352
CH	 0.7511
CI	 0.7096
CJ	 0.7021
CK	 0.7171
D	 0.6240
DB	 0.7136
DC	 0.7077
DD	 0.7127
DE	 0.7306
DF	 0.7238
DG	 0.7147
DH	 0.7163
DI	 0.7309
DJ	 0.7187
DK	 0.6993
DL	 0.7060
E	 0.6193
EA	 0.6710
EB	 0.6897
EC	 0.6743
ED	 0.6821
EE	 0.7232
EF	 0.6989
EG	 0.6857
EH	 0.7037
EI	 0.7144
EJ	 0.6877
EK	 0.6809
EL	 0.6885
F	 0.6240
FA	 0.6924
FB	 0.6903
FC	 0.6791
FD	 0.7000
FE	 0.7144
FF	 0.7054
FG	 0.6984
FH	 0.7181











































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Chain	Atom inclusion
FI	 0.7102
FJ	 0.7039
FK	 0.6927
FL	 0.6988
G	 0.5952
GC	 0.6891
GD	 0.6852
GE	 0.6803
GF	 0.6954
GG	 0.6918
GH	 0.6915
GI	 0.6936
GJ	 0.6985
GK	 0.6779
GL	 0.6900
GM	 0.6803
H	 0.6258
HC	 0.6110
HD	 0.6100
HE	 0.5893
HF	 0.6550
HG	 0.6294
HH	 0.6333
HI	 0.6213
HJ	 0.6495
HK	 0.6020
HL	 0.6067
HM	 0.6098
I	 0.5913
IC	 0.6261
ID	 0.6474
IE	 0.6297
IF	 0.6852
IG	 0.6490
IH	 0.6610
II	 0.6412
IJ	 0.6810
IK	 0.6324
IL	 0.6507
IM	 0.6360
J	 0.6386
JB	 0.6994









































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Chain	Atom inclusion
JC	 0.6743
JD	 0.6794
JE	 0.6945
JF	 0.7166
JG	 0.6933
JH	 0.6982
JI	 0.7043
JJ	 0.7100
JK	 0.6848
JL	 0.6901
JM	 0.6898
K	 0.6514
KB	 0.6991
KC	 0.6927
KD	 0.6819
KE	 0.6948
KF	 0.6988
KG	 0.7008
KH	 0.6893
KI	 0.7078
KJ	 0.6894
KK	 0.6894
KL	 0.6816
L	 0.3188
LB	 0.7063
LC	 0.6921
LD	 0.6882
LE	 0.7285
LF	 0.7111
LG	 0.6975
LH	 0.6885
LI	 0.7174
LJ	 0.6936
LK	 0.6770
LL	 0.6927
M	 0.1770
MB	 0.6924
MC	 0.6899
MD	 0.6947
ME	 0.7105
MF	 0.7027
MG	 0.6980

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Chain	Atom inclusion
MH	 0.7014
MI	 0.7105
MJ	 0.6985
MK	 0.6902
ML	 0.6999
N	 0.3600
O	 0.2145
P	 0.3024
Q	 0.4587
R	 0.2877
S	 0.4957
T	 0.5321
U	 0.5679
V	 0.4639
W	 0.5577
X	 0.3152
Y	 0.1564
Z	 0.5674
a	 0.5901
aa	 0.3150
b	 0.6279
bb	 0.5450
c	 0.6250
cc	 0.5792
d	 0.6322
e	 0.5813
f	 0.5939
g	 0.6199
h	 0.5586
i	 0.6135
j	 0.5771
k	 0.5839
l	 0.5839
m	 0.5989
n	 0.6231
o	 0.5962
p	 0.5841
q	 0.6150
r	 0.6018
s	 0.5728