



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 15, 2026 – 02:41 AM UTC

PDB ID : 3T8W / pdb_00003t8w
Title : A bestatin-based chemical biology strategy reveals distinct roles for malaria M1- and M17-family aminopeptidases
Authors : McGowan, S.; Klemba, M.; Greebaum, D.C.
Deposited on : 2011-08-01
Resolution : 2.00 Å (reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

MolProbity : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

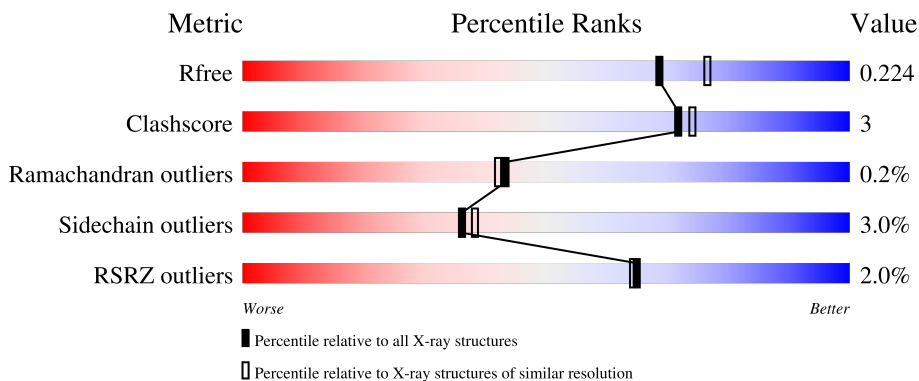
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.00 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	10052 (2.00-2.00)
Clashscore	190562	11152 (2.00-2.00)
Ramachandran outliers	187476	11031 (2.00-2.00)
Sidechain outliers	187428	11029 (2.00-2.00)
RSRZ outliers	180081	10067 (2.00-2.00)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	528	 92% 6%
1	B	528	 89% 8%
1	C	528	 91% 6%
1	D	528	 88% 9%
1	E	528	 88% 8%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	F	528	
1	G	528	
1	H	528	
1	I	528	
1	J	528	
1	K	528	
1	L	528	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	CO3	A	612	-	X	-	-
2	CO3	C	612	-	X	-	-
2	CO3	D	612	-	X	-	-
2	CO3	E	612	-	X	-	-
2	CO3	H	612	-	X	-	-
2	CO3	J	612	-	X	-	-
2	CO3	L	612	-	X	-	-
6	1PE	C	621	-	X	-	-
6	1PE	C	622	-	X	-	-
6	1PE	D	618	-	X	-	-
6	1PE	D	620	-	X	-	-
6	1PE	D	621	-	X	-	-
6	1PE	E	619	-	X	-	-
6	1PE	E	620	-	X	-	-
6	1PE	E	621	-	X	-	-
6	1PE	F	616	-	X	-	-
6	1PE	F	617	-	X	-	-
6	1PE	F	618	-	X	-	-
6	1PE	G	620	-	X	-	-
6	1PE	G	622	-	X	-	-
6	1PE	G	623	-	X	X	-
6	1PE	I	621	-	X	-	-
6	1PE	J	619	-	X	-	-
6	1PE	J	620	-	X	-	-
6	1PE	J	621	-	X	-	-

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
6	1PE	J	622	-	X	-	-
6	1PE	K	617	-	X	-	-
6	1PE	K	618	-	X	-	-
6	1PE	K	619	-	X	-	-
6	1PE	K	620	-	X	-	-
6	1PE	L	617	-	X	-	-
6	1PE	L	618	-	X	-	-
6	1PE	L	619	-	X	-	-
6	1PE	L	620	-	X	-	-

2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 53295 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called M17 leucyl aminopeptidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	519	3973	2550	638	766	19	0	0	0
1	B	517	3916	2515	636	746	19	0	0	0
1	C	516	3942	2533	635	755	19	0	0	0
1	D	514	3928	2529	633	746	20	0	0	0
1	E	509	3900	2512	625	744	19	0	0	0
1	F	511	3847	2473	621	734	19	0	0	0
1	G	517	3978	2553	638	767	20	0	0	0
1	H	518	3927	2521	636	750	20	0	0	0
1	I	518	3955	2543	637	755	20	0	0	0
1	J	514	3925	2527	632	746	20	0	0	0
1	K	509	3897	2509	624	745	19	0	0	0
1	L	511	3844	2469	621	735	19	0	0	0

There are 108 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	152	GLN	ASN	engineered mutation	UNP Q8IL11
A	515	GLN	ASN	engineered mutation	UNP Q8IL11
A	546	GLN	ASN	engineered mutation	UNP Q8IL11
A	606	HIS	-	expression tag	UNP Q8IL11
A	607	HIS	-	expression tag	UNP Q8IL11

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
A	608	HIS	-	expression tag	UNP Q8IL11
A	609	HIS	-	expression tag	UNP Q8IL11
A	610	HIS	-	expression tag	UNP Q8IL11
A	611	HIS	-	expression tag	UNP Q8IL11
B	152	GLN	ASN	engineered mutation	UNP Q8IL11
B	515	GLN	ASN	engineered mutation	UNP Q8IL11
B	546	GLN	ASN	engineered mutation	UNP Q8IL11
B	606	HIS	-	expression tag	UNP Q8IL11
B	607	HIS	-	expression tag	UNP Q8IL11
B	608	HIS	-	expression tag	UNP Q8IL11
B	609	HIS	-	expression tag	UNP Q8IL11
B	610	HIS	-	expression tag	UNP Q8IL11
B	611	HIS	-	expression tag	UNP Q8IL11
C	152	GLN	ASN	engineered mutation	UNP Q8IL11
C	515	GLN	ASN	engineered mutation	UNP Q8IL11
C	546	GLN	ASN	engineered mutation	UNP Q8IL11
C	606	HIS	-	expression tag	UNP Q8IL11
C	607	HIS	-	expression tag	UNP Q8IL11
C	608	HIS	-	expression tag	UNP Q8IL11
C	609	HIS	-	expression tag	UNP Q8IL11
C	610	HIS	-	expression tag	UNP Q8IL11
C	611	HIS	-	expression tag	UNP Q8IL11
D	152	GLN	ASN	engineered mutation	UNP Q8IL11
D	515	GLN	ASN	engineered mutation	UNP Q8IL11
D	546	GLN	ASN	engineered mutation	UNP Q8IL11
D	606	HIS	-	expression tag	UNP Q8IL11
D	607	HIS	-	expression tag	UNP Q8IL11
D	608	HIS	-	expression tag	UNP Q8IL11
D	609	HIS	-	expression tag	UNP Q8IL11
D	610	HIS	-	expression tag	UNP Q8IL11
D	611	HIS	-	expression tag	UNP Q8IL11
E	152	GLN	ASN	engineered mutation	UNP Q8IL11
E	515	GLN	ASN	engineered mutation	UNP Q8IL11
E	546	GLN	ASN	engineered mutation	UNP Q8IL11
E	606	HIS	-	expression tag	UNP Q8IL11
E	607	HIS	-	expression tag	UNP Q8IL11
E	608	HIS	-	expression tag	UNP Q8IL11
E	609	HIS	-	expression tag	UNP Q8IL11
E	610	HIS	-	expression tag	UNP Q8IL11
E	611	HIS	-	expression tag	UNP Q8IL11
F	152	GLN	ASN	engineered mutation	UNP Q8IL11
F	515	GLN	ASN	engineered mutation	UNP Q8IL11

Continued on next page...

Continued from previous page...

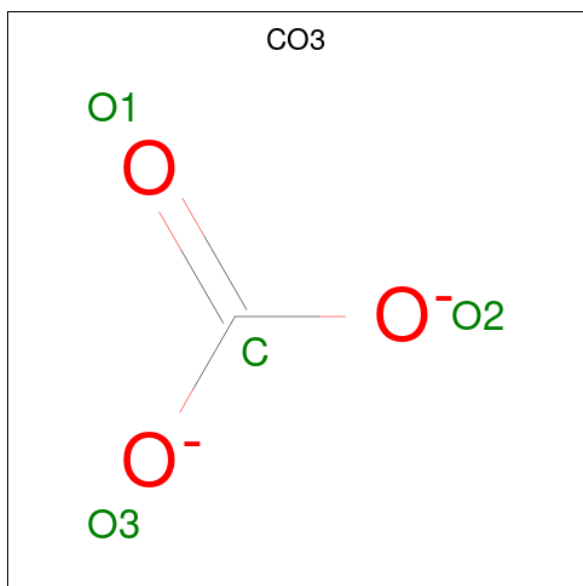
Chain	Residue	Modelled	Actual	Comment	Reference
F	546	GLN	ASN	engineered mutation	UNP Q8IL11
F	606	HIS	-	expression tag	UNP Q8IL11
F	607	HIS	-	expression tag	UNP Q8IL11
F	608	HIS	-	expression tag	UNP Q8IL11
F	609	HIS	-	expression tag	UNP Q8IL11
F	610	HIS	-	expression tag	UNP Q8IL11
F	611	HIS	-	expression tag	UNP Q8IL11
G	152	GLN	ASN	engineered mutation	UNP Q8IL11
G	515	GLN	ASN	engineered mutation	UNP Q8IL11
G	546	GLN	ASN	engineered mutation	UNP Q8IL11
G	606	HIS	-	expression tag	UNP Q8IL11
G	607	HIS	-	expression tag	UNP Q8IL11
G	608	HIS	-	expression tag	UNP Q8IL11
G	609	HIS	-	expression tag	UNP Q8IL11
G	610	HIS	-	expression tag	UNP Q8IL11
G	611	HIS	-	expression tag	UNP Q8IL11
H	152	GLN	ASN	engineered mutation	UNP Q8IL11
H	515	GLN	ASN	engineered mutation	UNP Q8IL11
H	546	GLN	ASN	engineered mutation	UNP Q8IL11
H	606	HIS	-	expression tag	UNP Q8IL11
H	607	HIS	-	expression tag	UNP Q8IL11
H	608	HIS	-	expression tag	UNP Q8IL11
H	609	HIS	-	expression tag	UNP Q8IL11
H	610	HIS	-	expression tag	UNP Q8IL11
H	611	HIS	-	expression tag	UNP Q8IL11
I	152	GLN	ASN	engineered mutation	UNP Q8IL11
I	515	GLN	ASN	engineered mutation	UNP Q8IL11
I	546	GLN	ASN	engineered mutation	UNP Q8IL11
I	606	HIS	-	expression tag	UNP Q8IL11
I	607	HIS	-	expression tag	UNP Q8IL11
I	608	HIS	-	expression tag	UNP Q8IL11
I	609	HIS	-	expression tag	UNP Q8IL11
I	610	HIS	-	expression tag	UNP Q8IL11
I	611	HIS	-	expression tag	UNP Q8IL11
J	152	GLN	ASN	engineered mutation	UNP Q8IL11
J	515	GLN	ASN	engineered mutation	UNP Q8IL11
J	546	GLN	ASN	engineered mutation	UNP Q8IL11
J	606	HIS	-	expression tag	UNP Q8IL11
J	607	HIS	-	expression tag	UNP Q8IL11
J	608	HIS	-	expression tag	UNP Q8IL11
J	609	HIS	-	expression tag	UNP Q8IL11
J	610	HIS	-	expression tag	UNP Q8IL11

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
J	611	HIS	-	expression tag	UNP Q8IL11
K	152	GLN	ASN	engineered mutation	UNP Q8IL11
K	515	GLN	ASN	engineered mutation	UNP Q8IL11
K	546	GLN	ASN	engineered mutation	UNP Q8IL11
K	606	HIS	-	expression tag	UNP Q8IL11
K	607	HIS	-	expression tag	UNP Q8IL11
K	608	HIS	-	expression tag	UNP Q8IL11
K	609	HIS	-	expression tag	UNP Q8IL11
K	610	HIS	-	expression tag	UNP Q8IL11
K	611	HIS	-	expression tag	UNP Q8IL11
L	152	GLN	ASN	engineered mutation	UNP Q8IL11
L	515	GLN	ASN	engineered mutation	UNP Q8IL11
L	546	GLN	ASN	engineered mutation	UNP Q8IL11
L	606	HIS	-	expression tag	UNP Q8IL11
L	607	HIS	-	expression tag	UNP Q8IL11
L	608	HIS	-	expression tag	UNP Q8IL11
L	609	HIS	-	expression tag	UNP Q8IL11
L	610	HIS	-	expression tag	UNP Q8IL11
L	611	HIS	-	expression tag	UNP Q8IL11

- Molecule 2 is CARBONATE ION (CCD ID: CO3) (formula: CO₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			4	1	3		
2	B	1	Total	C	O	0	0
			4	1	3		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	C	1	Total C O 4 1 3	0	0
2	D	1	Total C O 4 1 3	0	0
2	E	1	Total C O 4 1 3	0	0
2	F	1	Total C O 4 1 3	0	0
2	G	1	Total C O 4 1 3	0	0
2	H	1	Total C O 4 1 3	0	0
2	I	1	Total C O 4 1 3	0	0
2	J	1	Total C O 4 1 3	0	0
2	K	1	Total C O 4 1 3	0	0
2	L	1	Total C O 4 1 3	0	0

- Molecule 3 is ZINC ION (CCD ID: ZN) (formula: Zn).

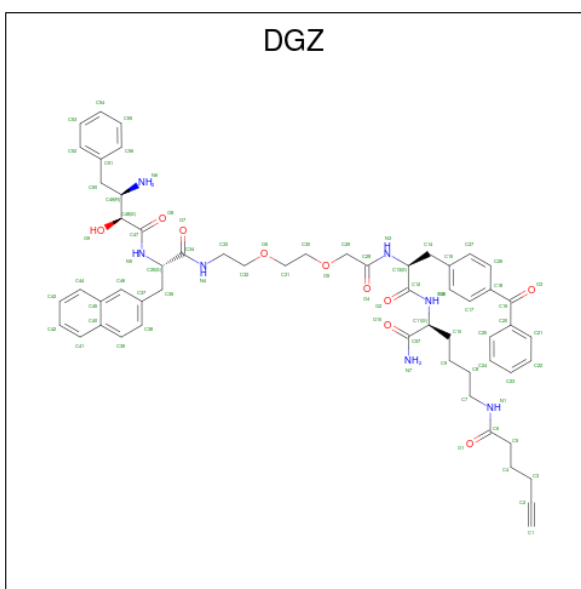
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	2	Total Zn 2 2	0	0
3	B	2	Total Zn 2 2	0	0
3	C	2	Total Zn 2 2	0	0
3	D	2	Total Zn 2 2	0	0
3	E	2	Total Zn 2 2	0	0
3	F	2	Total Zn 2 2	0	0
3	G	2	Total Zn 2 2	0	0
3	H	2	Total Zn 2 2	0	0
3	I	2	Total Zn 2 2	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	J	2	Total	Zn	0	0
			2	2		
3	K	2	Total	Zn	0	0
			2	2		
3	L	2	Total	Zn	0	0
			2	2		

- Molecule 4 is N-((2R,3S,6S,18S,21S)-2-amino-18-(4-benzoylbenzyl)-21-carbamoyl-3-hydroxy-6-(naphthalen-2-ylmethyl)-4,7,16,19-tetraoxo-1-phenyl-11,14-dioxa-5,8,17,20-tetraazapentacosan-25-yl)hex-5-ynamide (CCD ID: DGZ) (formula: C₅₇H₆₇N₇O₁₀).



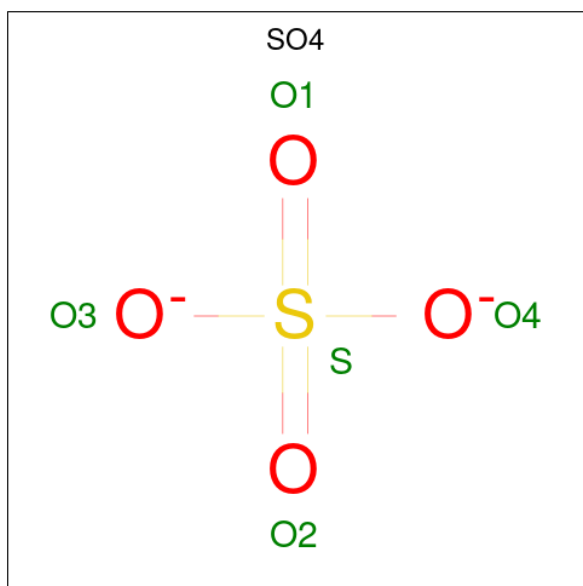
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			74	57	7	10		
4	B	1	Total	C	N	O	0	0
			74	57	7	10		
4	C	1	Total	C	N	O	0	0
			74	57	7	10		
4	D	1	Total	C	N	O	0	0
			74	57	7	10		
4	E	1	Total	C	N	O	0	0
			74	57	7	10		
4	F	1	Total	C	N	O	0	0
			74	57	7	10		
4	G	1	Total	C	N	O	0	0
			74	57	7	10		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	H	1	Total	C	N	O	0	0
			74	57	7	10		
4	I	1	Total	C	N	O	0	0
			74	57	7	10		
4	J	1	Total	C	N	O	0	0
			74	57	7	10		
4	K	1	Total	C	N	O	0	0
			74	57	7	10		
4	L	1	Total	C	N	O	0	0
			74	57	7	10		

- Molecule 5 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	O	S	0	0
			5	4	1		
5	A	1	Total	O	S	0	0
			5	4	1		
5	C	1	Total	O	S	0	0
			5	4	1		
5	C	1	Total	O	S	0	0
			5	4	1		
5	C	1	Total	O	S	0	0
			5	4	1		

Continued on next page...

Continued from previous page...

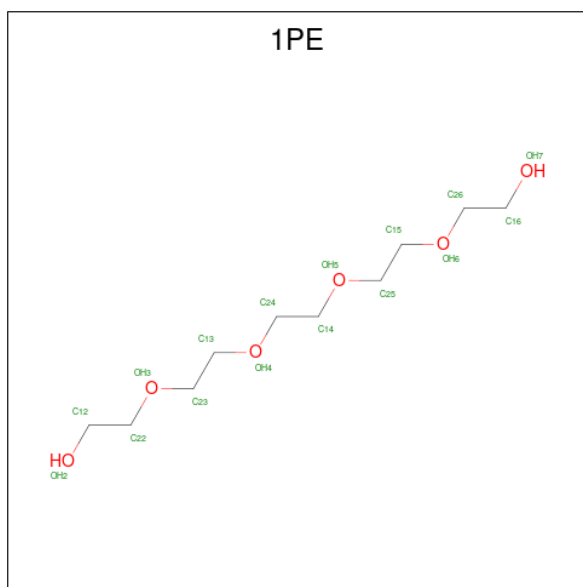
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	C	1	Total	O	S	0	0
			5	4	1		
5	D	1	Total	O	S	0	0
			5	4	1		
5	D	1	Total	O	S	0	0
			5	4	1		
5	E	1	Total	O	S	0	0
			5	4	1		
5	E	1	Total	O	S	0	0
			5	4	1		
5	E	1	Total	O	S	0	0
			5	4	1		
5	G	1	Total	O	S	0	0
			5	4	1		
5	G	1	Total	O	S	0	0
			5	4	1		
5	G	1	Total	O	S	0	0
			5	4	1		
5	G	1	Total	O	S	0	0
			5	4	1		
5	H	1	Total	O	S	0	0
			5	4	1		
5	H	1	Total	O	S	0	0
			5	4	1		
5	H	1	Total	O	S	0	0
			5	4	1		
5	I	1	Total	O	S	0	0
			5	4	1		
5	I	1	Total	O	S	0	0
			5	4	1		
5	I	1	Total	O	S	0	0
			5	4	1		
5	I	1	Total	O	S	0	0
			5	4	1		
5	I	1	Total	O	S	0	0
			5	4	1		
5	J	1	Total	O	S	0	0
			5	4	1		
5	J	1	Total	O	S	0	0
			5	4	1		
5	J	1	Total	O	S	0	0
			5	4	1		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	K	1	Total O S 5 4 1	0	0
5	L	1	Total O S 5 4 1	0	0

- Molecule 6 is PENTAETHYLENE GLYCOL (CCD ID: 1PE) (formula: C₁₀H₂₂O₆).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total C O 9 6 3	0	0
6	A	1	Total C O 7 4 3	0	0
6	C	1	Total C O 12 8 4	0	0
6	C	1	Total C O 9 6 3	0	0
6	D	1	Total C O 10 7 3	0	0
6	D	1	Total C O 8 5 3	0	0
6	D	1	Total C O 11 8 3	0	0
6	D	1	Total C O 5 3 2	0	0
6	E	1	Total C O 12 8 4	0	0

Continued on next page...

Continued from previous page...

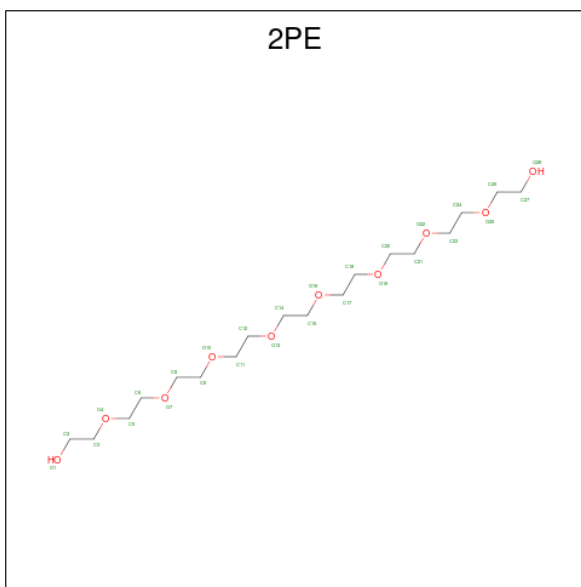
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	E	1	Total	C	O	0	0
			10	6	4		
6	E	1	Total	C	O	0	0
			8	5	3		
6	F	1	Total	C	O	0	0
			10	6	4		
6	F	1	Total	C	O	0	0
			10	6	4		
6	F	1	Total	C	O	0	0
			10	6	4		
6	G	1	Total	C	O	0	0
			9	6	3		
6	G	1	Total	C	O	0	0
			6	4	2		
6	G	1	Total	C	O	0	0
			6	4	2		
6	G	1	Total	C	O	0	0
			15	10	5		
6	I	1	Total	C	O	0	0
			12	8	4		
6	I	1	Total	C	O	0	0
			10	7	3		
6	I	1	Total	C	O	0	0
			5	3	2		
6	J	1	Total	C	O	0	0
			11	7	4		
6	J	1	Total	C	O	0	0
			10	6	4		
6	J	1	Total	C	O	0	0
			11	8	3		
6	J	1	Total	C	O	0	0
			9	6	3		
6	K	1	Total	C	O	0	0
			8	5	3		
6	K	1	Total	C	O	0	0
			12	8	4		
6	K	1	Total	C	O	0	0
			11	7	4		
6	K	1	Total	C	O	0	0
			6	4	2		
6	L	1	Total	C	O	0	0
			10	6	4		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	L	1	Total	C	O	0	0
			12	8	4		
6	L	1	Total	C	O	0	0
			7	4	3		
6	L	1	Total	C	O	0	0
			11	7	4		

- Molecule 7 is NONAETHYLENE GLYCOL (CCD ID: 2PE) (formula: $C_{18}H_{38}O_{10}$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	B	1	Total	C	O	0	0
			26	17	9		
7	H	1	Total	C	O	0	0
			25	16	9		

- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	421	Total	O	0	0
			421	421		
8	B	351	Total	O	0	0
			351	351		
8	C	431	Total	O	0	0
			431	431		
8	D	424	Total	O	0	0
			424	424		

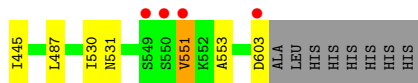
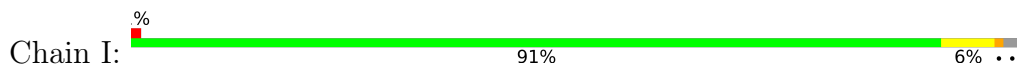
Continued on next page...

Continued from previous page...

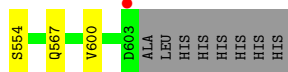
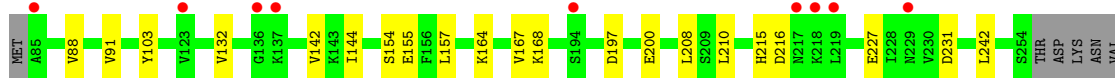
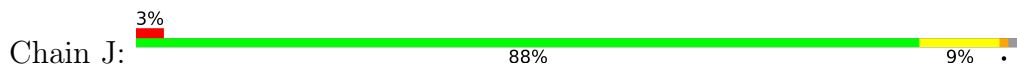
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	E	445	Total 445	O 445	0	0
8	F	364	Total 364	O 364	0	0
8	G	431	Total 431	O 431	0	0
8	H	334	Total 334	O 334	0	0
8	I	391	Total 391	O 391	0	0
8	J	406	Total 406	O 406	0	0
8	K	408	Total 408	O 408	0	0
8	L	389	Total 389	O 389	0	0



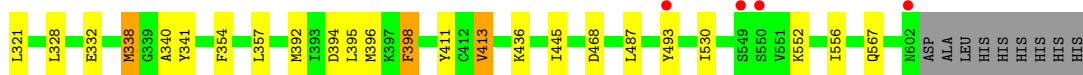
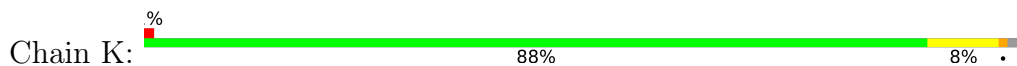
• Molecule 1: M17 leucyl aminopeptidase



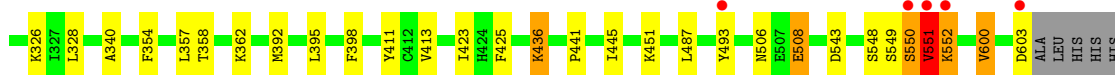
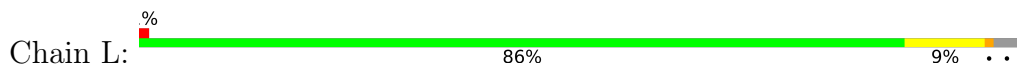
• Molecule 1: M17 leucyl aminopeptidase



• Molecule 1: M17 leucyl aminopeptidase



• Molecule 1: M17 leucyl aminopeptidase



HIS
HIS
HIS

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	173.75Å 177.06Å 231.22Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	81.32 – 2.00 81.32 – 2.00	Depositor EDS
% Data completeness (in resolution range)	(Not available) (81.32-2.00) 100.0 (81.32-2.00)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.16 (at 2.00Å)	Xtrriage
Refinement program	BUSTER 2.8.0	Depositor
R, R_{free}	0.164 , 0.200 0.184 , 0.224	Depositor DCC
R_{free} test set	23988 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	15.0	Xtrriage
Anisotropy	0.434	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 55.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.29$	Xtrriage
Estimated twinning fraction	0.000 for k,h,-l	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	53295	wwPDB-VP
Average B, all atoms (Å ²)	20.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 45.29 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.3495e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

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

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, CO3, 1PE, 2PE, SO4, DGZ

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.81	0/4051	1.14	9/5498 (0.2%)
1	B	0.81	1/3993 (0.0%)	1.20	17/5424 (0.3%)
1	C	0.81	0/4019	1.13	7/5453 (0.1%)
1	D	0.85	3/4005 (0.1%)	1.14	6/5431 (0.1%)
1	E	0.82	2/3976 (0.1%)	1.13	5/5391 (0.1%)
1	F	0.81	1/3924 (0.0%)	1.19	11/5336 (0.2%)
1	G	0.79	0/4054	1.13	7/5494 (0.1%)
1	H	0.82	3/4005 (0.1%)	1.17	9/5440 (0.2%)
1	I	0.81	0/4033	1.14	11/5473 (0.2%)
1	J	0.82	2/4002 (0.0%)	1.14	8/5428 (0.1%)
1	K	0.82	1/3973 (0.0%)	1.13	7/5389 (0.1%)
1	L	0.82	1/3921 (0.0%)	1.18	13/5332 (0.2%)
All	All	0.82	14/47956 (0.0%)	1.15	110/65089 (0.2%)

The worst 5 of 14 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	547	ILE	C-N	-13.36	1.15	1.33
1	K	338	MET	SD-CE	-9.05	1.56	1.79
1	H	549	SER	C-N	8.75	1.45	1.33
1	E	338	MET	SD-CE	-8.49	1.58	1.79
1	J	338	MET	SD-CE	-7.54	1.60	1.79

The worst 5 of 110 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	550	SER	CA-C-N	8.08	136.24	121.70
1	A	550	SER	C-N-CA	8.08	136.24	121.70
1	B	471	VAL	N-CA-CB	7.90	121.29	110.54
1	G	257	LYS	CA-C-N	7.61	135.40	121.70
1	G	257	LYS	C-N-CA	7.61	135.40	121.70

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3973	0	3875	15	0
1	B	3916	0	3799	27	0
1	C	3942	0	3849	17	0
1	D	3928	0	3856	27	0
1	E	3900	0	3831	24	0
1	F	3847	0	3710	35	0
1	G	3978	0	3903	19	0
1	H	3927	0	3812	27	0
1	I	3955	0	3877	17	0
1	J	3925	0	3848	33	0
1	K	3897	0	3817	20	0
1	L	3844	0	3687	30	0
2	A	4	0	0	0	0
2	B	4	0	0	0	0
2	C	4	0	0	0	0
2	D	4	0	0	0	0
2	E	4	0	0	0	0
2	F	4	0	0	1	0
2	G	4	0	0	0	0
2	H	4	0	0	0	0
2	I	4	0	0	0	0
2	J	4	0	0	1	0
2	K	4	0	0	0	0
2	L	4	0	0	0	0
3	A	2	0	0	0	0
3	B	2	0	0	0	0
3	C	2	0	0	0	0
3	D	2	0	0	0	0
3	E	2	0	0	0	0
3	F	2	0	0	0	0
3	G	2	0	0	0	0
3	H	2	0	0	0	0
3	I	2	0	0	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	J	2	0	0	0	0
3	K	2	0	0	0	0
3	L	2	0	0	0	0
4	A	74	0	66	11	0
4	B	74	0	66	9	0
4	C	74	0	66	5	0
4	D	74	0	66	3	0
4	E	74	0	66	5	0
4	F	74	0	66	8	0
4	G	74	0	66	5	0
4	H	74	0	66	7	0
4	I	74	0	66	4	0
4	J	74	0	66	5	0
4	K	74	0	66	5	0
4	L	74	0	66	7	0
5	A	10	0	0	0	0
5	C	25	0	0	0	0
5	D	10	0	0	0	0
5	E	15	0	0	0	0
5	G	20	0	0	1	0
5	H	15	0	0	0	0
5	I	25	0	0	1	0
5	J	15	0	0	0	0
5	K	5	0	0	0	0
5	L	5	0	0	0	0
6	A	16	0	18	0	0
6	C	21	0	24	2	0
6	D	34	0	35	3	0
6	E	30	0	34	1	0
6	F	30	0	39	7	0
6	G	36	0	39	8	0
6	I	27	0	28	5	0
6	J	41	0	48	13	0
6	K	37	0	38	1	0
6	L	40	0	48	9	0
7	B	26	0	33	0	0
7	H	25	0	33	2	0
8	A	421	0	0	1	0
8	B	351	0	0	3	0
8	C	431	0	0	2	0
8	D	424	0	0	2	0
8	E	445	0	0	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
8	F	364	0	0	3	0
8	G	431	0	0	3	0
8	H	334	0	0	4	0
8	I	391	0	0	1	0
8	J	406	0	0	0	0
8	K	408	0	0	1	0
8	L	389	0	0	3	0
All	All	53295	0	47073	311	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

The worst 5 of 311 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:G:623:1PE:C26	6:G:623:1PE:C16	1.76	1.64
6:F:618:1PE:C26	6:F:618:1PE:C16	1.74	1.60
6:L:620:1PE:C16	6:L:620:1PE:C26	1.75	1.55
6:G:623:1PE:OH4	6:G:623:1PE:C13	1.63	1.47
1:H:550:SER:OG	1:H:552:LYS:CD	1.80	1.29

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	517/528 (98%)	501 (97%)	15 (3%)	1 (0%)	43 42
1	B	513/528 (97%)	499 (97%)	12 (2%)	2 (0%)	30 27
1	C	512/528 (97%)	501 (98%)	11 (2%)	0	100 100
1	D	510/528 (97%)	502 (98%)	8 (2%)	0	100 100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	E	503/528 (95%)	494 (98%)	9 (2%)	0	100	100
1	F	507/528 (96%)	494 (97%)	10 (2%)	3 (1%)	21	17
1	G	511/528 (97%)	501 (98%)	10 (2%)	0	100	100
1	H	516/528 (98%)	501 (97%)	13 (2%)	2 (0%)	30	27
1	I	516/528 (98%)	502 (97%)	13 (2%)	1 (0%)	43	42
1	J	510/528 (97%)	501 (98%)	9 (2%)	0	100	100
1	K	503/528 (95%)	495 (98%)	8 (2%)	0	100	100
1	L	507/528 (96%)	494 (97%)	10 (2%)	3 (1%)	21	17
All	All	6125/6336 (97%)	5985 (98%)	128 (2%)	12 (0%)	43	42

5 of 12 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	552	LYS
1	H	552	LYS
1	I	551	VAL
1	L	550	SER
1	F	550	SER

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	421/455 (92%)	412 (98%)	9 (2%)	47	52
1	B	410/455 (90%)	398 (97%)	12 (3%)	37	40
1	C	417/455 (92%)	407 (98%)	10 (2%)	43	47
1	D	415/455 (91%)	401 (97%)	14 (3%)	32	33
1	E	415/455 (91%)	403 (97%)	12 (3%)	37	40
1	F	400/455 (88%)	380 (95%)	20 (5%)	22	20
1	G	426/455 (94%)	416 (98%)	10 (2%)	44	49
1	H	412/455 (90%)	398 (97%)	14 (3%)	32	33

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	I	420/455 (92%)	408 (97%)	12 (3%)	37	40
1	J	414/455 (91%)	402 (97%)	12 (3%)	37	40
1	K	414/455 (91%)	404 (98%)	10 (2%)	43	47
1	L	397/455 (87%)	383 (96%)	14 (4%)	32	32
All	All	4961/5460 (91%)	4812 (97%)	149 (3%)	36	38

5 of 149 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	J	164	LYS
1	L	358	THR
1	J	216	ASP
1	K	395	LEU
1	E	169	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 54 such sidechains are listed below:

Mol	Chain	Res	Type
1	F	149	ASN
1	H	515	GLN
1	L	104	ASN
1	F	567	GLN
1	H	258	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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 112 ligands modelled in this entry, 24 are monoatomic - leaving 88 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
2	CO3	C	612	-	3,3,3	4.20	2 (66%)	2,3,3	6.64	2 (100%)
6	1PE	K	617	-	7,7,15	2.43	3 (42%)	6,6,14	2.63	3 (50%)
5	SO4	J	616	-	4,4,4	0.86	0	6,6,6	0.27	0
2	CO3	J	612	-	3,3,3	5.05	1 (33%)	2,3,3	6.71	2 (100%)
4	DGZ	C	615	3	78,78,78	0.91	1 (1%)	98,101,101	2.00	3 (3%)
2	CO3	H	612	-	3,3,3	1.80	1 (33%)	2,3,3	5.94	2 (100%)
4	DGZ	E	615	3	78,78,78	0.89	1 (1%)	98,101,101	1.99	2 (2%)
2	CO3	I	612	-	3,3,3	4.48	1 (33%)	2,3,3	5.78	1 (50%)
5	SO4	I	617	-	4,4,4	0.84	0	6,6,6	0.28	0
6	1PE	E	620	-	9,9,15	2.23	4 (44%)	8,8,14	2.98	6 (75%)
6	1PE	J	622	-	8,8,15	2.38	3 (37%)	7,7,14	2.94	3 (42%)
6	1PE	L	617	-	9,9,15	2.27	4 (44%)	8,8,14	1.84	3 (37%)
6	1PE	G	621	-	5,5,15	1.65	1 (20%)	4,4,14	2.98	2 (50%)
2	CO3	B	612	-	3,3,3	1.53	0	2,3,3	8.34	2 (100%)
7	2PE	B	616	-	25,25,27	0.95	0	24,24,26	0.56	0
6	1PE	J	621	-	10,10,15	2.30	5 (50%)	9,9,14	2.69	3 (33%)
5	SO4	C	619	-	4,4,4	0.79	0	6,6,6	0.32	0
2	CO3	D	612	-	3,3,3	3.92	2 (66%)	2,3,3	5.69	1 (50%)
6	1PE	C	621	-	11,11,15	2.28	4 (36%)	10,10,14	3.05	5 (50%)
5	SO4	H	617	-	4,4,4	0.32	0	6,6,6	0.13	0
6	1PE	L	618	-	11,11,15	2.22	4 (36%)	10,10,14	3.31	6 (60%)
6	1PE	I	623	-	4,4,15	1.72	1 (25%)	3,3,14	1.00	0
2	CO3	F	612	-	3,3,3	3.96	1 (33%)	2,3,3	5.19	1 (50%)
5	SO4	G	616	-	4,4,4	0.29	0	6,6,6	0.19	0
6	1PE	K	619	-	10,10,15	2.71	5 (50%)	9,9,14	2.60	5 (55%)
5	SO4	E	616	-	4,4,4	0.22	0	6,6,6	0.17	0
4	DGZ	F	615	3	78,78,78	0.94	1 (1%)	98,101,101	2.03	2 (2%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	SO4	J	618	-	4,4,4	0.42	0	6,6,6	0.22	0
5	SO4	C	620	-	4,4,4	0.48	0	6,6,6	0.16	0
5	SO4	G	617	-	4,4,4	0.83	0	6,6,6	0.43	0
6	1PE	K	620	-	5,5,15	2.13	1 (20%)	4,4,14	1.96	2 (50%)
5	SO4	I	618	-	4,4,4	0.78	0	6,6,6	0.27	0
6	1PE	I	622	-	9,9,15	2.32	4 (44%)	8,8,14	2.29	3 (37%)
6	1PE	J	620	-	9,9,15	2.80	5 (55%)	8,8,14	3.11	4 (50%)
5	SO4	L	616	-	4,4,4	0.69	0	6,6,6	0.36	0
2	CO3	L	612	-	3,3,3	4.39	2 (66%)	2,3,3	4.71	1 (50%)
6	1PE	F	618	-	9,9,15	3.08	5 (55%)	8,8,14	3.23	4 (50%)
6	1PE	E	621	-	7,7,15	2.23	3 (42%)	6,6,14	2.74	4 (66%)
6	1PE	D	618	-	9,9,15	2.25	3 (33%)	8,8,14	3.06	4 (50%)
5	SO4	A	616	-	4,4,4	0.31	0	6,6,6	0.20	0
6	1PE	A	618	-	8,8,15	2.07	2 (25%)	7,7,14	3.08	3 (42%)
5	SO4	G	619	-	4,4,4	0.88	0	6,6,6	0.25	0
5	SO4	D	617	-	4,4,4	0.49	0	6,6,6	0.38	0
6	1PE	F	617	-	9,9,15	2.62	4 (44%)	8,8,14	2.96	5 (62%)
6	1PE	L	620	-	10,10,15	3.15	5 (50%)	9,9,14	2.73	5 (55%)
5	SO4	C	616	-	4,4,4	0.36	0	6,6,6	0.57	0
5	SO4	J	617	-	4,4,4	0.18	0	6,6,6	0.19	0
6	1PE	G	622	-	5,5,15	1.63	1 (20%)	4,4,14	3.09	2 (50%)
2	CO3	A	612	-	3,3,3	1.88	2 (66%)	2,3,3	8.54	2 (100%)
2	CO3	G	612	-	3,3,3	1.46	0	2,3,3	5.69	2 (100%)
4	DGZ	D	615	3	78,78,78	0.90	1 (1%)	98,101,101	2.04	3 (3%)
4	DGZ	H	615	3	78,78,78	0.92	1 (1%)	98,101,101	1.91	2 (2%)
4	DGZ	B	615	3	78,78,78	0.90	1 (1%)	98,101,101	2.03	2 (2%)
5	SO4	D	616	-	4,4,4	0.19	0	6,6,6	0.07	0
5	SO4	I	616	-	4,4,4	0.46	0	6,6,6	0.13	0
4	DGZ	K	615	3	78,78,78	0.91	1 (1%)	98,101,101	2.04	2 (2%)
4	DGZ	A	615	3	78,78,78	0.92	1 (1%)	98,101,101	1.99	3 (3%)
4	DGZ	G	615	3	78,78,78	0.88	1 (1%)	98,101,101	1.99	3 (3%)
4	DGZ	J	615	3	78,78,78	0.91	1 (1%)	98,101,101	2.01	4 (4%)
6	1PE	G	620	-	8,8,15	2.20	4 (50%)	7,7,14	2.58	4 (57%)
6	1PE	D	621	-	4,4,15	2.92	4 (100%)	3,3,14	1.89	1 (33%)
6	1PE	G	623	-	14,14,15	3.20	7 (50%)	13,13,14	3.39	7 (53%)
6	1PE	D	619	-	7,7,15	2.31	2 (28%)	6,6,14	2.30	3 (50%)
5	SO4	I	620	-	4,4,4	0.97	0	6,6,6	0.31	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	SO4	H	618	-	4,4,4	0.99	0	6,6,6	0.32	0
5	SO4	I	619	-	4,4,4	0.35	0	6,6,6	0.12	0
6	1PE	F	616	-	9,9,15	2.57	5 (55%)	8,8,14	2.93	4 (50%)
5	SO4	C	618	-	4,4,4	0.20	0	6,6,6	0.17	0
6	1PE	E	619	-	11,11,15	2.45	4 (36%)	10,10,14	3.09	6 (60%)
6	1PE	L	619	-	6,6,15	1.88	1 (16%)	5,5,14	2.23	2 (40%)
5	SO4	E	617	-	4,4,4	0.47	0	6,6,6	0.13	0
5	SO4	G	618	-	4,4,4	0.24	0	6,6,6	0.21	0
6	1PE	D	620	-	10,10,15	2.27	5 (50%)	9,9,14	2.84	4 (44%)
6	1PE	A	619	-	6,6,15	1.68	1 (16%)	5,5,14	2.34	2 (40%)
5	SO4	H	616	-	4,4,4	0.17	0	6,6,6	0.35	0
6	1PE	C	622	-	8,8,15	2.44	3 (37%)	7,7,14	3.14	3 (42%)
5	SO4	E	618	-	4,4,4	0.84	0	6,6,6	0.32	0
4	DGZ	I	615	3	78,78,78	0.92	1 (1%)	98,101,101	2.03	3 (3%)
6	1PE	I	621	-	11,11,15	2.39	4 (36%)	10,10,14	2.99	5 (50%)
5	SO4	A	617	-	4,4,4	0.61	0	6,6,6	0.21	0
6	1PE	J	619	-	10,10,15	2.57	5 (50%)	9,9,14	2.14	5 (55%)
5	SO4	C	617	-	4,4,4	0.34	0	6,6,6	0.09	0
4	DGZ	L	615	3	78,78,78	0.91	1 (1%)	98,101,101	2.01	3 (3%)
7	2PE	H	619	-	24,24,27	0.75	0	23,23,26	0.67	0
5	SO4	K	616	-	4,4,4	0.33	0	6,6,6	0.18	0
6	1PE	K	618	-	11,11,15	2.16	4 (36%)	10,10,14	3.04	4 (40%)
2	CO3	K	612	-	3,3,3	0.79	0	2,3,3	12.63	2 (100%)
2	CO3	E	612	-	3,3,3	1.70	1 (33%)	2,3,3	6.65	2 (100%)

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
4	DGZ	J	615	3	-	14/75/76/76	0/5/5/5
6	1PE	K	619	-	-	3/8/8/13	-
6	1PE	G	620	-	-	3/6/6/13	-
4	DGZ	F	615	3	-	20/75/76/76	0/5/5/5
6	1PE	F	617	-	-	4/7/7/13	-
6	1PE	K	617	-	-	3/5/5/13	-
6	1PE	D	621	-	-	2/2/2/13	-

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	1PE	G	623	-	-	7/12/12/13	-
6	1PE	E	621	-	-	2/5/5/13	-
6	1PE	D	619	-	-	1/5/5/13	-
6	1PE	L	620	-	-	5/8/8/13	-
4	DGZ	C	615	3	-	20/75/76/76	0/5/5/5
4	DGZ	E	615	3	-	21/75/76/76	0/5/5/5
6	1PE	F	616	-	-	6/7/7/13	-
6	1PE	K	620	-	-	3/3/3/13	-
6	1PE	E	619	-	-	5/9/9/13	-
6	1PE	L	619	-	-	3/4/4/13	-
4	DGZ	G	615	3	-	21/75/76/76	0/5/5/5
6	1PE	E	620	-	-	2/7/7/13	-
6	1PE	G	622	-	-	3/3/3/13	-
6	1PE	K	618	-	-	6/9/9/13	-
6	1PE	J	622	-	-	5/6/6/13	-
6	1PE	D	620	-	-	4/8/8/13	-
6	1PE	G	621	-	-	1/3/3/13	-
6	1PE	L	617	-	-	4/7/7/13	-
4	DGZ	D	615	3	-	11/75/76/76	0/5/5/5
6	1PE	A	619	-	-	1/4/4/13	-
4	DGZ	H	615	3	-	19/75/76/76	0/5/5/5
6	1PE	I	622	-	-	2/7/7/13	-
7	2PE	B	616	-	-	9/23/23/25	-
6	1PE	C	622	-	-	4/6/6/13	-
6	1PE	J	621	-	-	4/8/8/13	-
6	1PE	J	620	-	-	6/7/7/13	-
4	DGZ	I	615	3	-	19/75/76/76	0/5/5/5
6	1PE	I	621	-	-	4/9/9/13	-
6	1PE	J	619	-	-	6/8/8/13	-
4	DGZ	B	615	3	-	14/75/76/76	0/5/5/5
4	DGZ	L	615	3	-	17/75/76/76	0/5/5/5
7	2PE	H	619	-	-	13/22/22/25	-
6	1PE	C	621	-	-	5/9/9/13	-
4	DGZ	K	615	3	-	21/75/76/76	0/5/5/5
4	DGZ	A	615	3	-	25/75/76/76	0/5/5/5

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	1PE	F	618	-	-	4/7/7/13	-
6	1PE	D	618	-	-	4/7/7/13	-
6	1PE	L	618	-	-	5/9/9/13	-
6	1PE	I	623	-	-	1/2/2/13	-
6	1PE	A	618	-	-	0/6/6/13	-

The worst 5 of 141 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	J	612	CO3	O1-C	8.48	1.54	1.25
2	I	612	CO3	O1-C	7.61	1.51	1.25
2	L	612	CO3	O1-C	7.33	1.51	1.25
2	C	612	CO3	O1-C	6.66	1.48	1.25
2	F	612	CO3	O1-C	6.59	1.48	1.25

The worst 5 of 174 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	615	DGZ	C3-C2-C1	-18.24	119.55	177.02
4	F	615	DGZ	C3-C2-C1	-18.21	119.64	177.02
4	D	615	DGZ	C3-C2-C1	-18.15	119.86	177.02
4	I	615	DGZ	C3-C2-C1	-18.09	120.03	177.02
4	E	615	DGZ	C3-C2-C1	-18.07	120.11	177.02

There are no chirality outliers.

5 of 362 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	615	DGZ	N5-C47-C48-O9
4	A	615	DGZ	C48-C49-C50-C51
4	B	615	DGZ	N5-C47-C48-O9
4	B	615	DGZ	C47-C48-C49-N6
4	B	615	DGZ	C48-C49-C50-C51

There are no ring outliers.

37 monomers are involved in 124 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	K	617	1PE	1	0
2	J	612	CO3	1	0

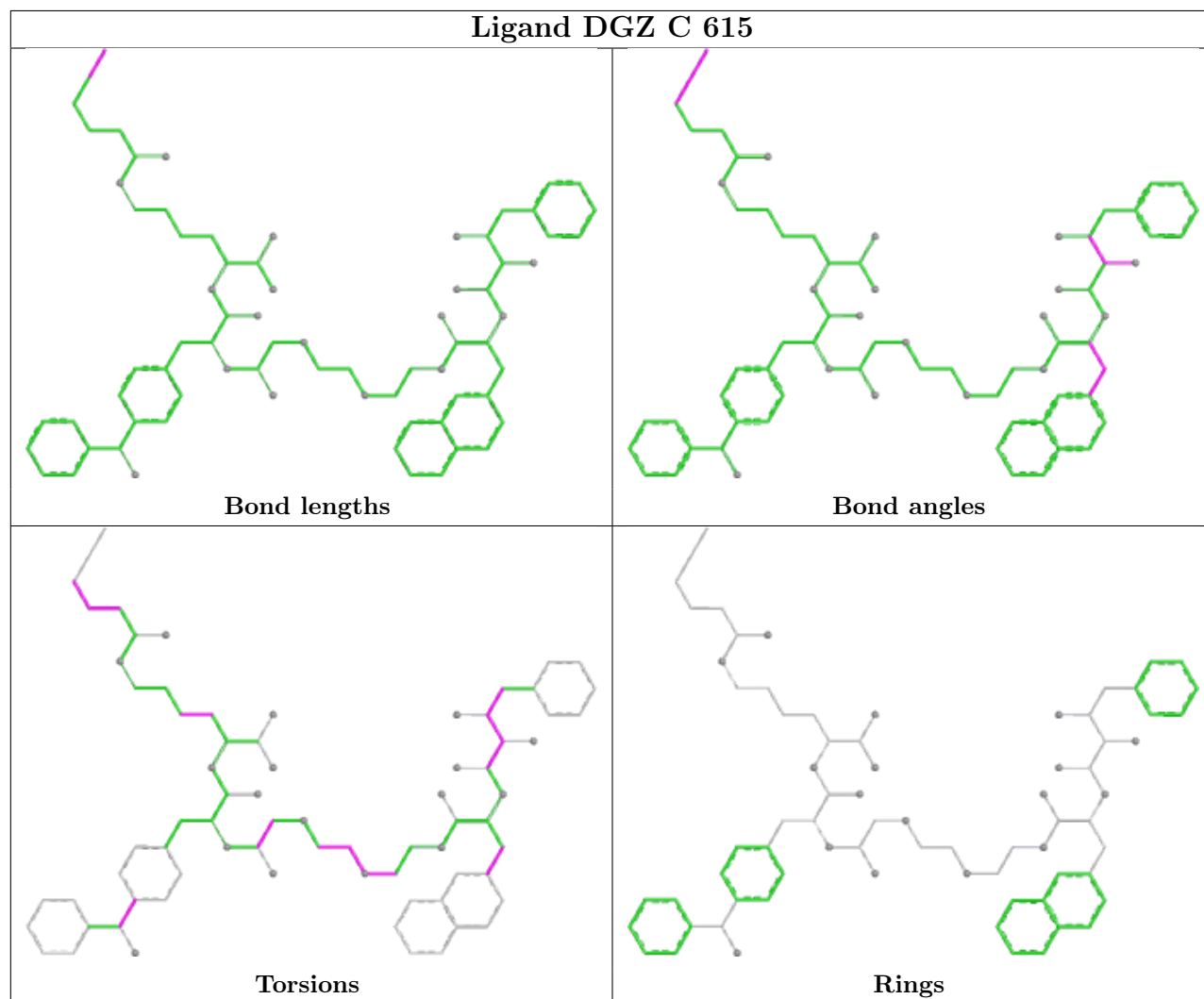
Continued on next page...

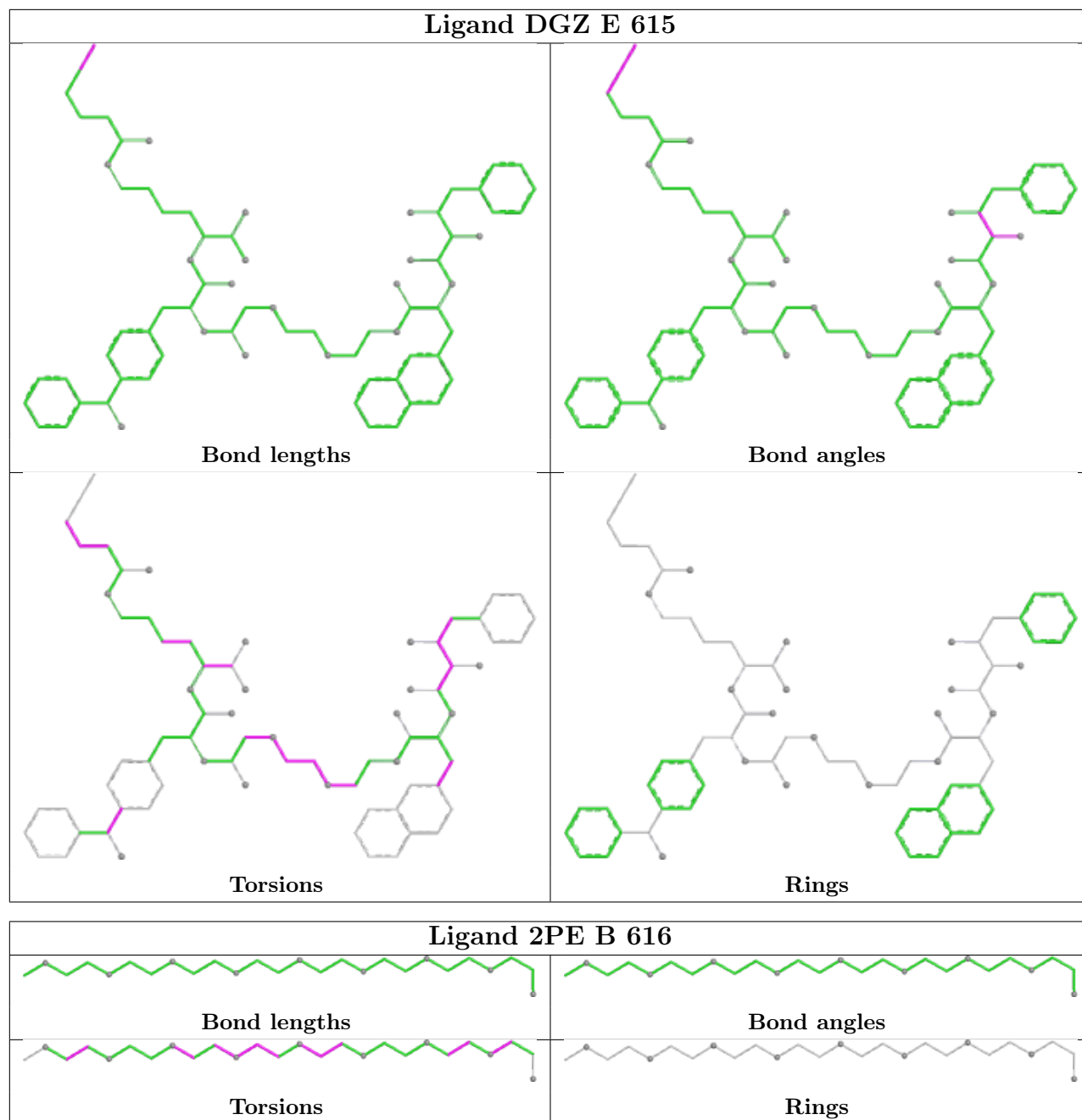
Continued from previous page...

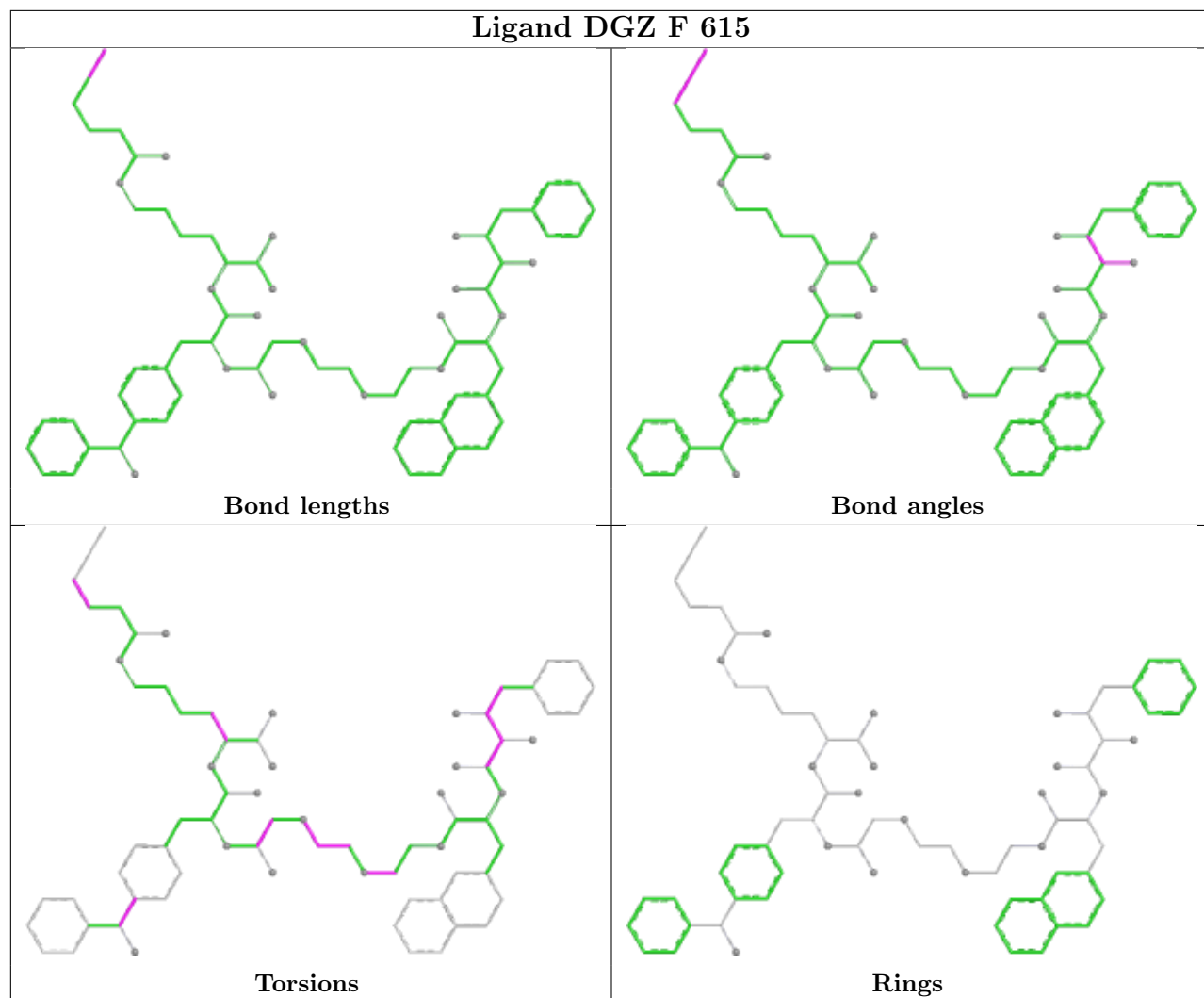
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	615	DGZ	5	0
4	E	615	DGZ	5	0
6	J	622	1PE	3	0
6	L	617	1PE	2	0
6	J	621	1PE	3	0
6	C	621	1PE	1	0
6	L	618	1PE	3	0
6	I	623	1PE	4	0
2	F	612	CO3	1	0
4	F	615	DGZ	8	0
5	I	618	SO4	1	0
6	J	620	1PE	6	0
6	F	618	1PE	4	0
6	D	618	1PE	1	0
5	G	619	SO4	1	0
6	F	617	1PE	3	0
6	L	620	1PE	3	0
6	G	622	1PE	1	0
4	D	615	DGZ	3	0
4	H	615	DGZ	7	0
4	B	615	DGZ	9	0
4	K	615	DGZ	5	0
4	A	615	DGZ	11	0
4	G	615	DGZ	5	0
4	J	615	DGZ	5	0
6	G	623	1PE	7	0
6	E	619	1PE	1	0
6	L	619	1PE	1	0
6	D	620	1PE	2	0
6	C	622	1PE	1	0
4	I	615	DGZ	4	0
6	I	621	1PE	1	0
6	J	619	1PE	1	0
4	L	615	DGZ	7	0
7	H	619	2PE	2	0

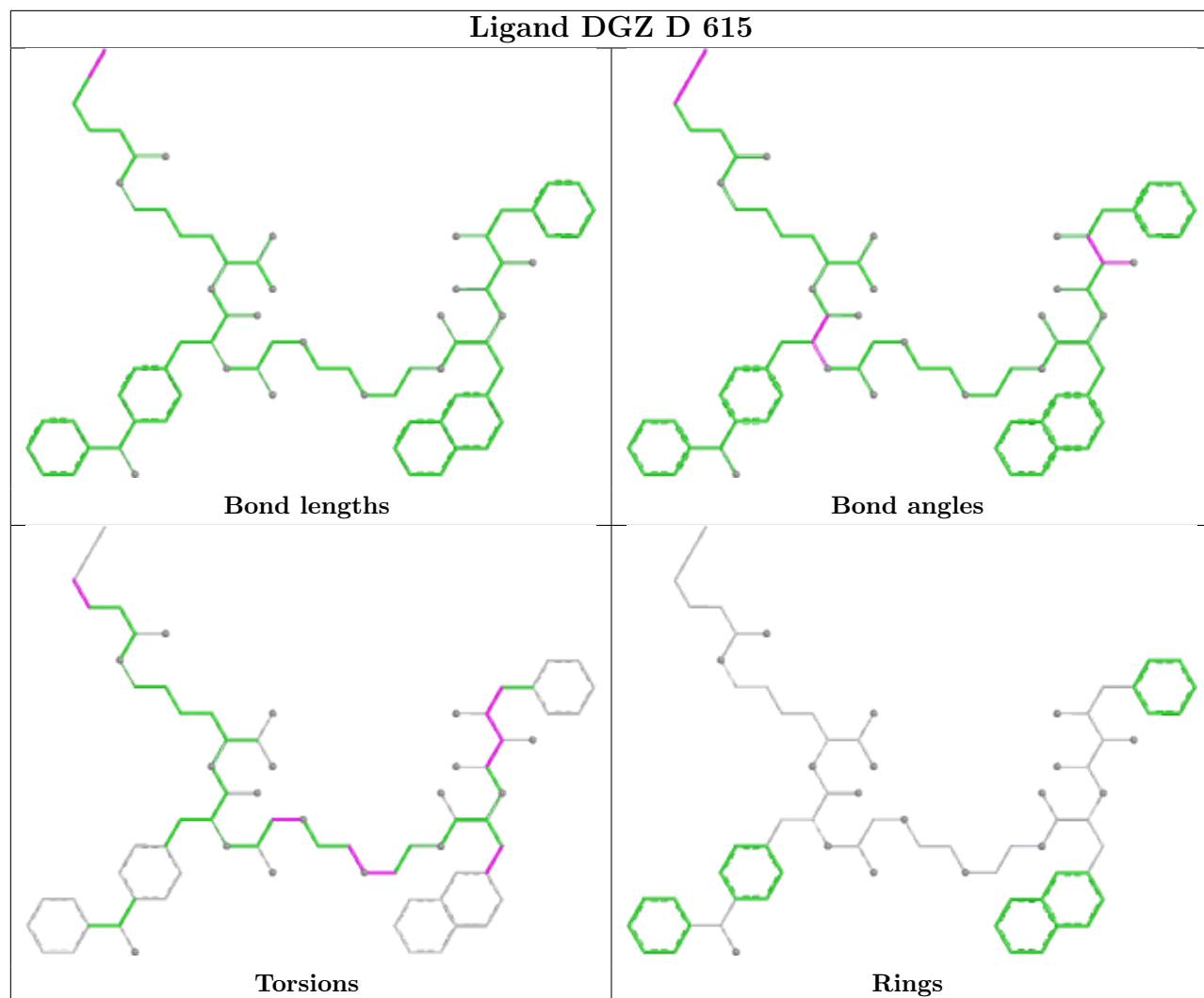
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring

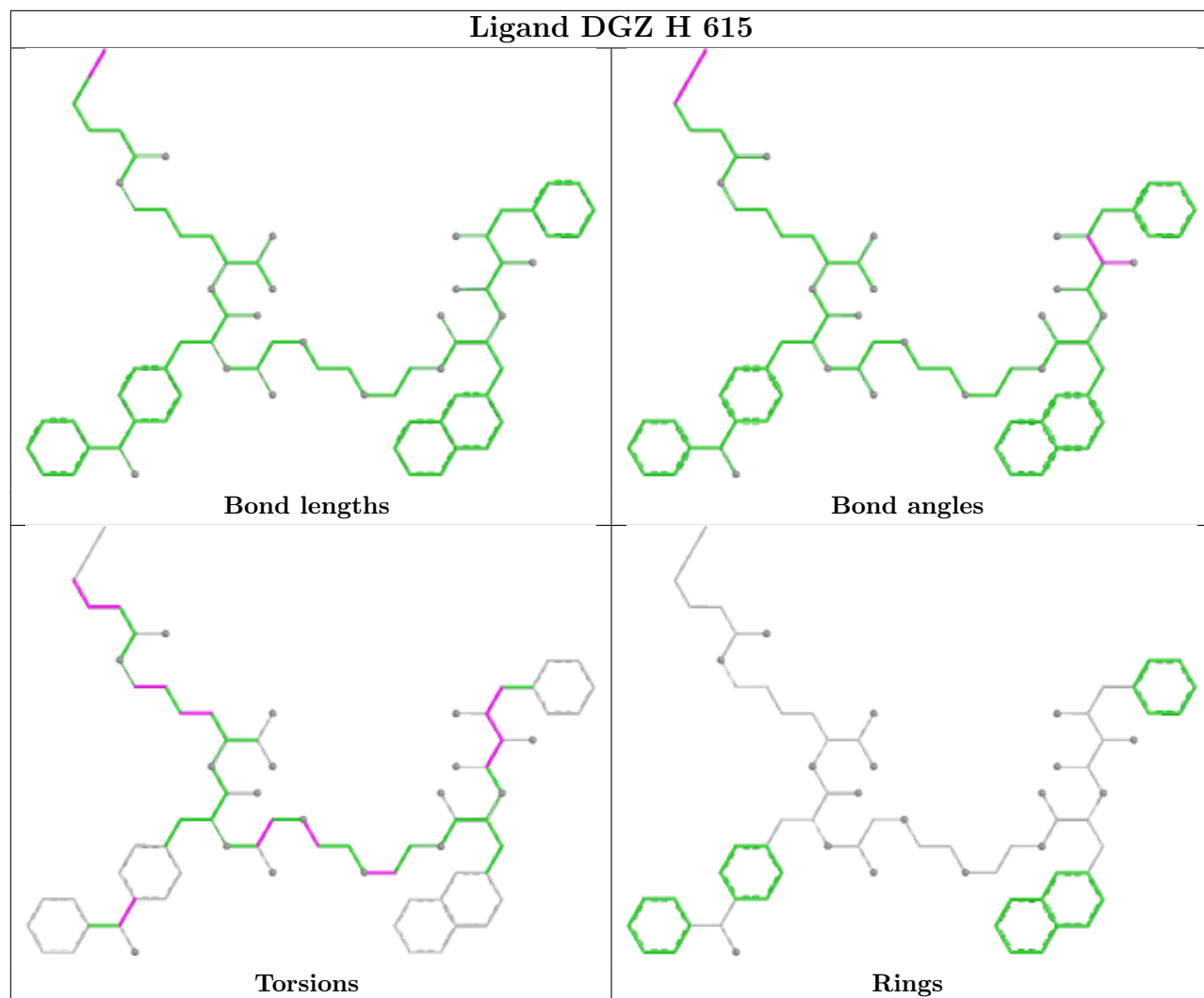
in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers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

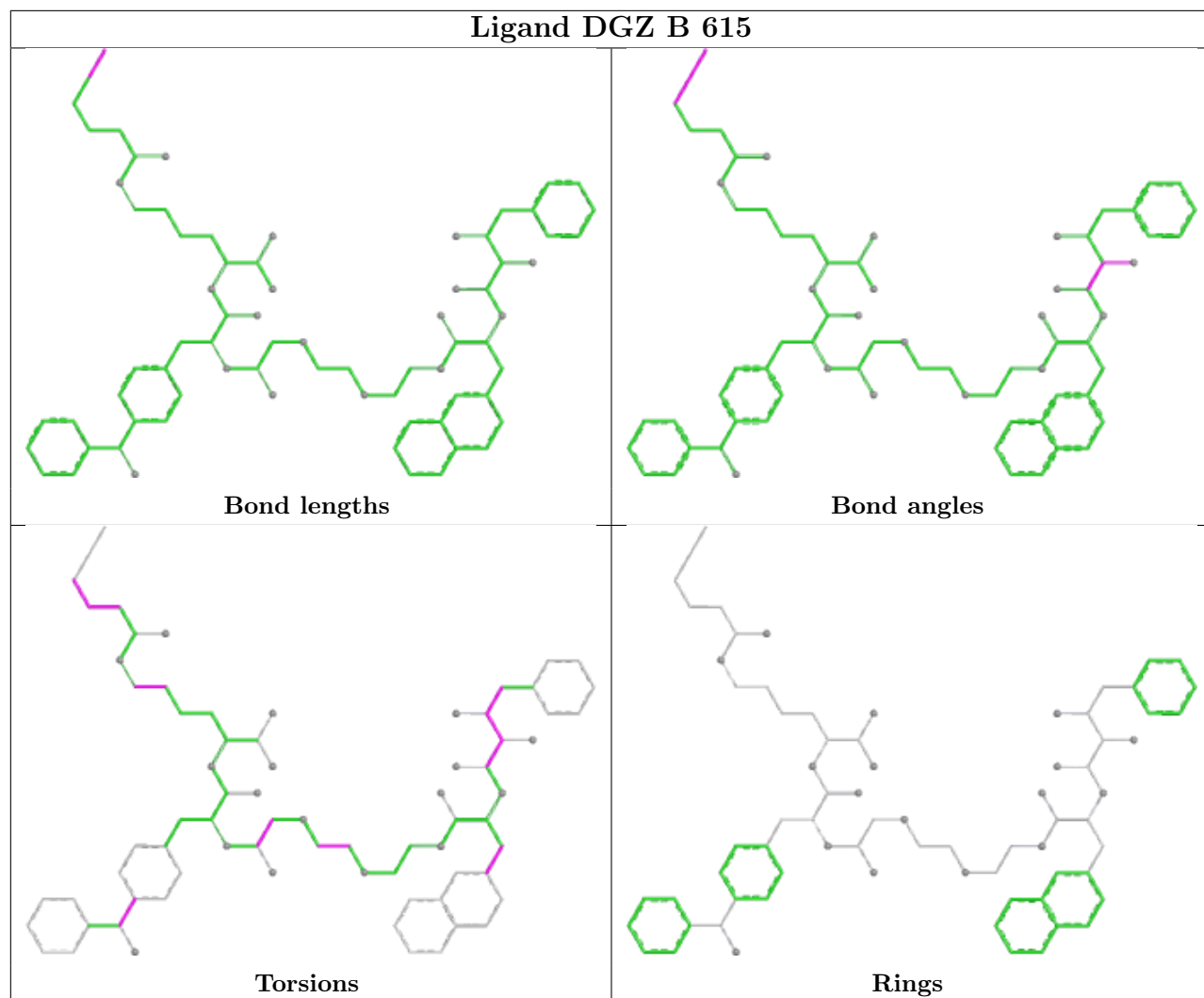


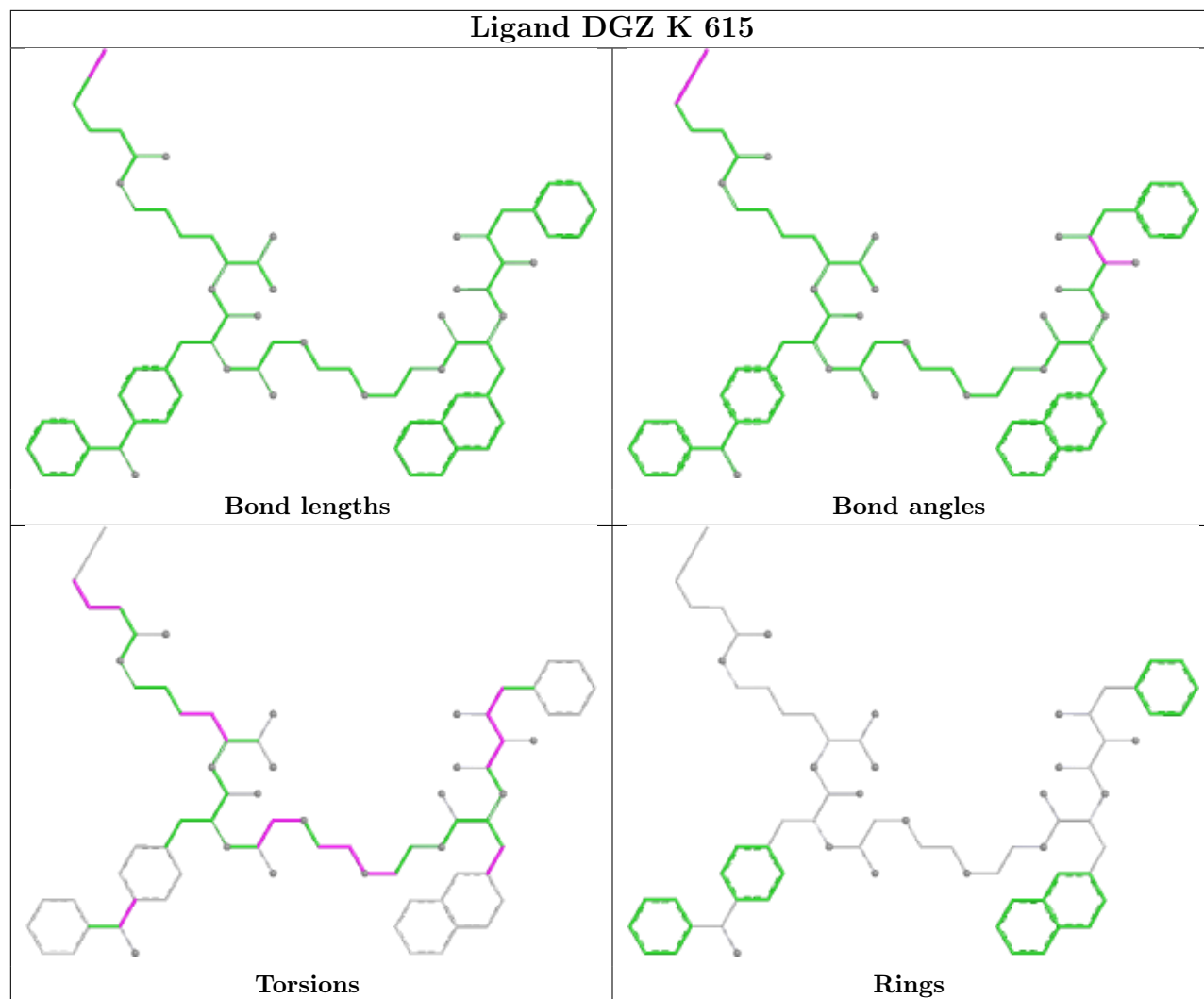


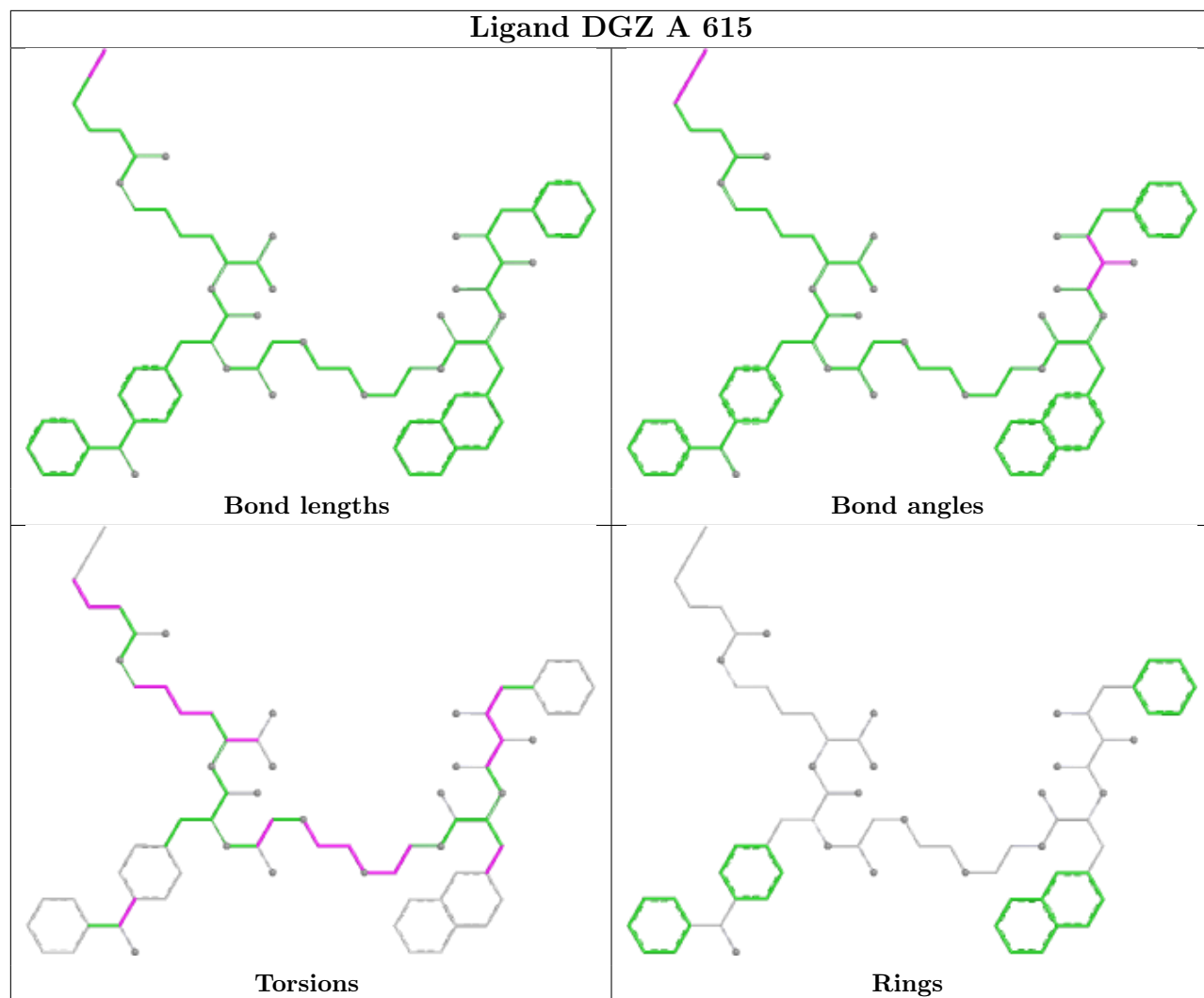


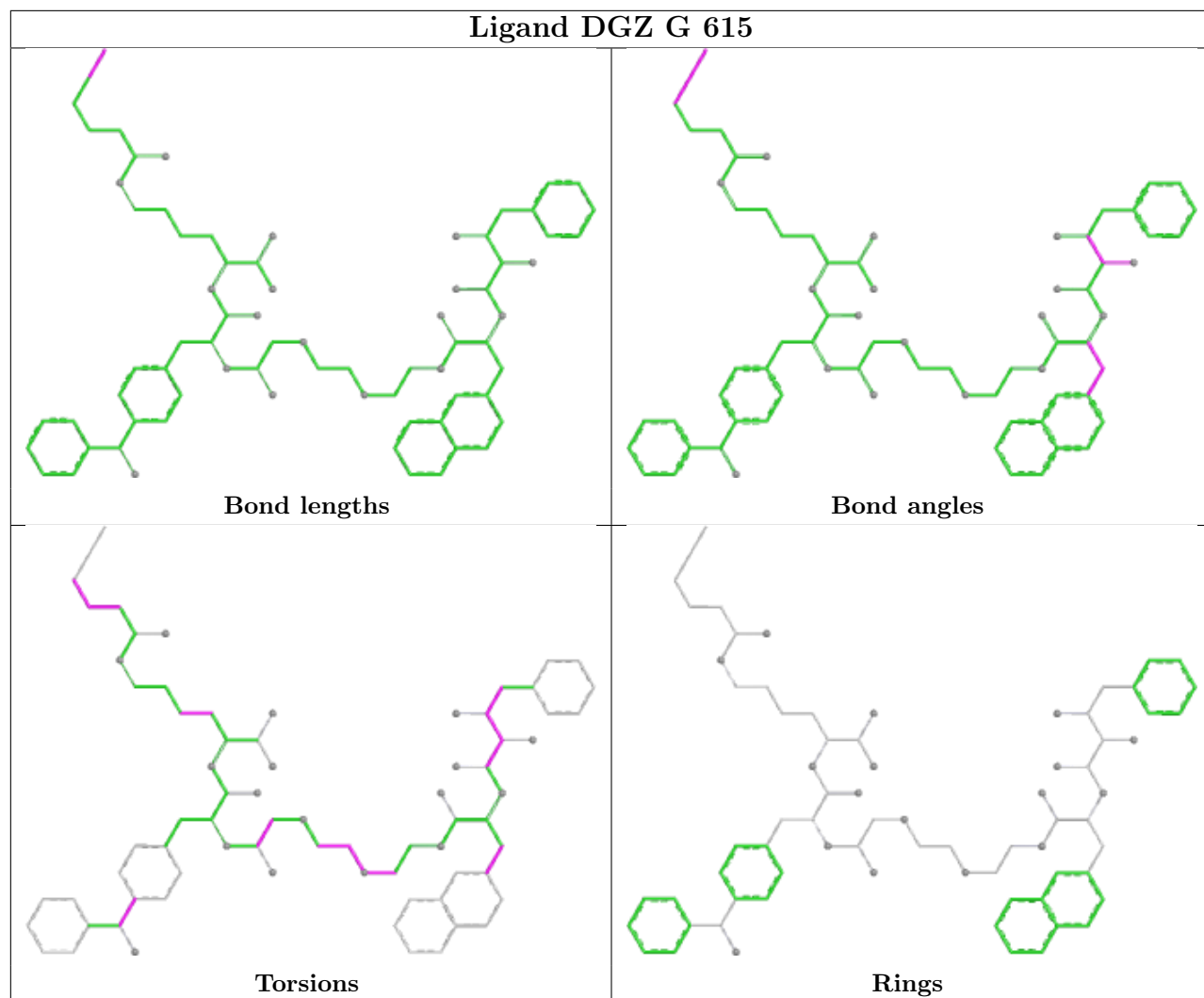


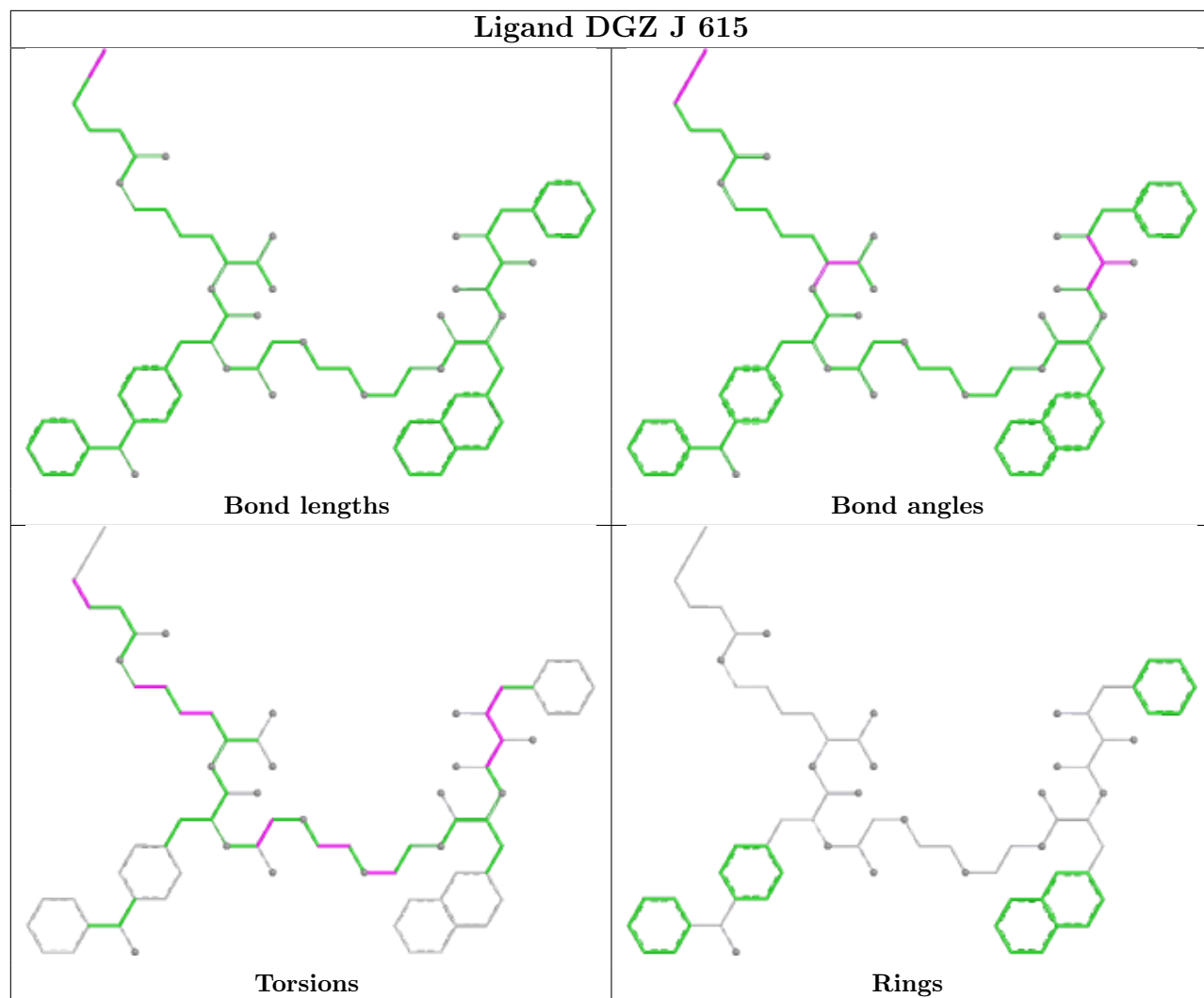


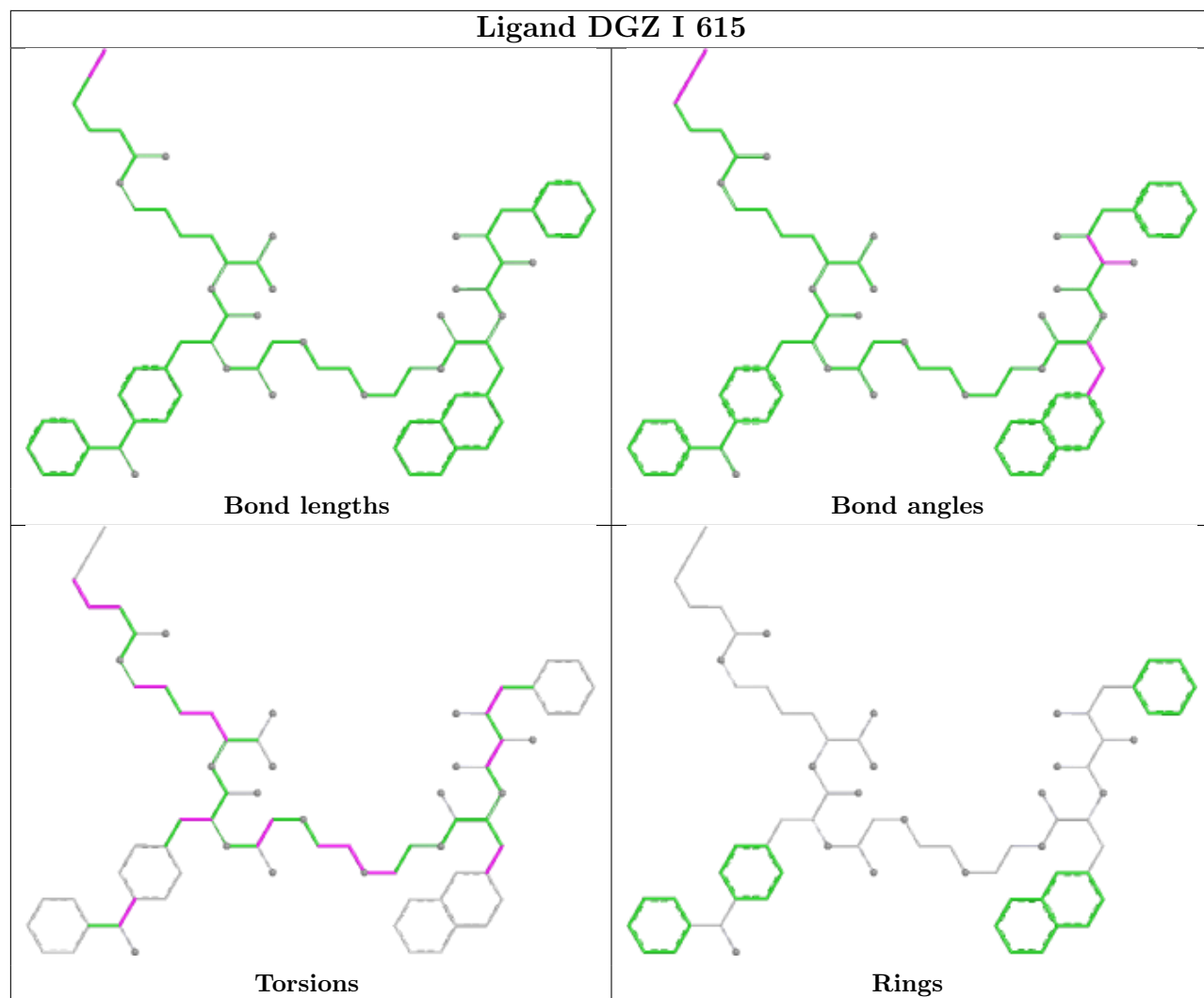


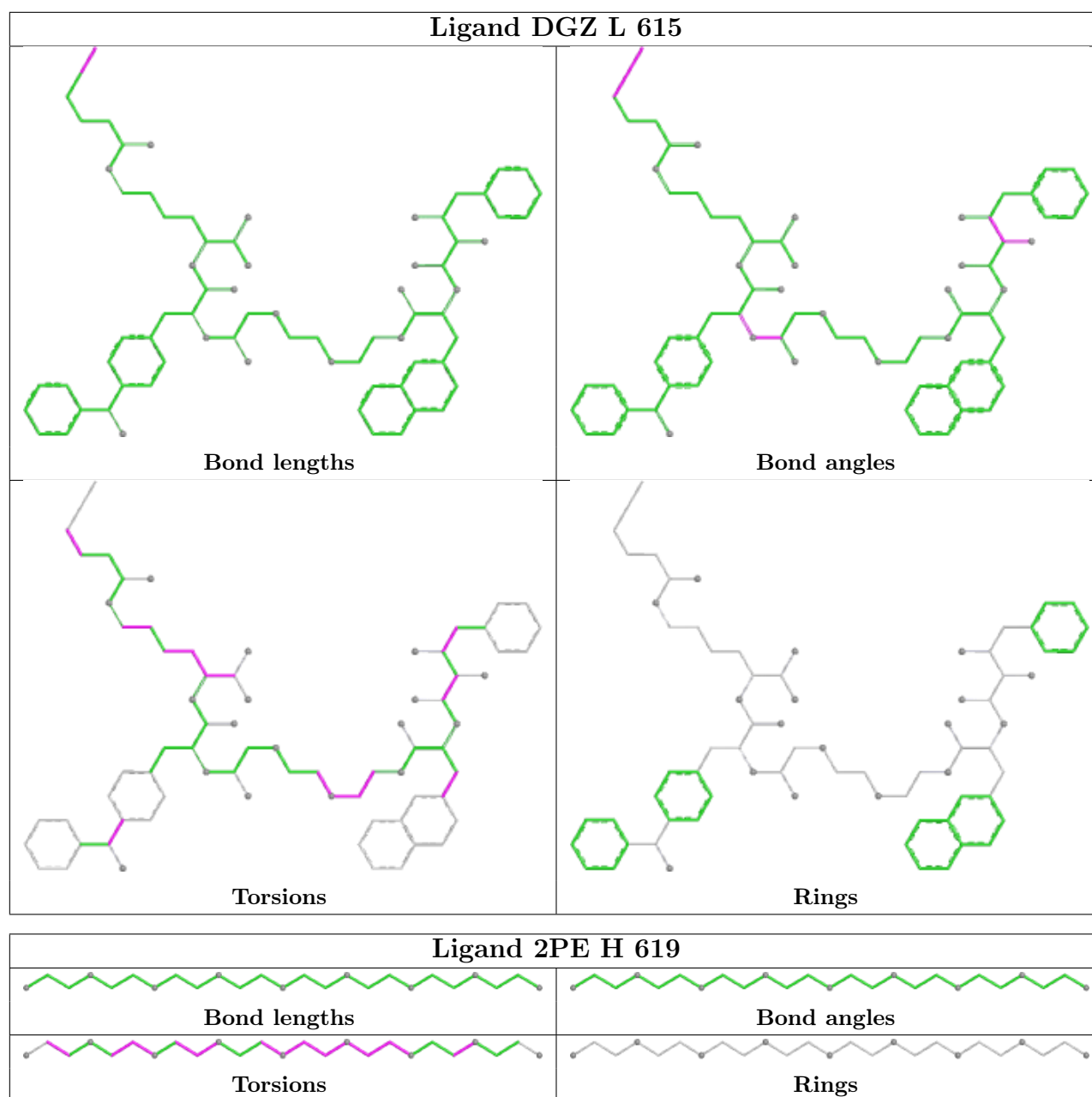












5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

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

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	D	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	D	547:ILE	C	548:SER	N	1.15

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	519/528 (98%)	-0.46	7 (1%) 75 74	5, 15, 35, 70	0
1	B	517/528 (97%)	-0.20	19 (3%) 45 44	5, 17, 46, 73	1 (0%)
1	C	516/528 (97%)	-0.44	5 (0%) 79 79	5, 15, 39, 76	0
1	D	514/528 (97%)	-0.46	14 (2%) 56 55	6, 14, 35, 80	0
1	E	509/528 (96%)	-0.57	5 (0%) 79 79	7, 14, 30, 48	0
1	F	511/528 (96%)	-0.29	12 (2%) 61 60	6, 18, 40, 71	0
1	G	517/528 (97%)	-0.50	7 (1%) 73 73	6, 14, 36, 61	0
1	H	518/528 (98%)	-0.20	18 (3%) 47 46	6, 18, 46, 68	1 (0%)
1	I	518/528 (98%)	-0.42	5 (0%) 79 79	5, 16, 39, 81	0
1	J	514/528 (97%)	-0.44	15 (2%) 53 52	7, 15, 37, 82	0
1	K	509/528 (96%)	-0.54	7 (1%) 73 73	7, 14, 32, 47	0
1	L	511/528 (96%)	-0.42	7 (1%) 73 73	6, 16, 37, 64	0
All	All	6173/6336 (97%)	-0.41	121 (1%) 65 64	5, 15, 39, 82	2 (0%)

The worst 5 of 121 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	H	551	VAL	6.9
1	D	603	ASP	6.8
1	F	551	VAL	6.6
1	L	550	SER	6.5
1	F	138	GLU	5.8

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

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
5	SO4	C	617	5/5	0.63	0.21	95,99,100,101	0
6	1PE	D	621	5/16	0.63	0.28	26,28,34,37	0
6	1PE	J	622	9/16	0.66	0.25	45,50,55,55	0
5	SO4	I	618	5/5	0.72	0.22	57,61,62,63	0
5	SO4	K	616	5/5	0.74	0.18	72,76,78,79	0
6	1PE	D	619	8/16	0.75	0.21	52,53,54,55	0
5	SO4	G	618	5/5	0.76	0.20	74,77,80,80	0
6	1PE	G	623	15/16	0.77	0.20	42,48,57,58	0
2	CO3	F	612	4/4	0.77	0.18	9,11,13,15	0
2	CO3	I	612	4/4	0.78	0.18	10,11,12,14	0
6	1PE	J	621	11/16	0.78	0.18	38,38,41,43	0
5	SO4	A	617	5/5	0.78	0.17	54,55,59,59	0
2	CO3	G	612	4/4	0.79	0.17	4,9,10,12	0
2	CO3	L	612	4/4	0.79	0.15	9,10,12,14	0
7	2PE	B	616	26/28	0.79	0.18	42,48,56,57	0
5	SO4	I	616	5/5	0.80	0.18	75,80,80,80	0
6	1PE	F	617	10/16	0.80	0.17	46,50,52,52	0
6	1PE	L	618	12/16	0.80	0.15	25,35,48,48	0
5	SO4	C	619	5/5	0.80	0.31	48,51,54,54	0
6	1PE	D	620	11/16	0.81	0.17	35,39,46,48	0
7	2PE	H	619	25/28	0.81	0.16	40,44,55,57	0
6	1PE	E	619	12/16	0.82	0.16	40,42,46,47	0
5	SO4	E	617	5/5	0.82	0.15	73,78,79,79	0
5	SO4	I	619	5/5	0.82	0.18	90,94,95,96	0
5	SO4	J	617	5/5	0.82	0.16	77,81,82,83	0
5	SO4	C	618	5/5	0.82	0.19	100,104,104,106	0
5	SO4	H	617	5/5	0.82	0.17	80,84,86,86	0
5	SO4	H	618	5/5	0.82	0.24	45,47,50,52	0
2	CO3	D	612	4/4	0.82	0.17	10,12,15,15	0
6	1PE	F	616	10/16	0.83	0.14	29,32,40,41	0
2	CO3	J	612	4/4	0.83	0.13	11,11,13,14	0
6	1PE	C	621	12/16	0.83	0.14	42,44,47,48	0

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	CO3	H	612	4/4	0.83	0.16	5,11,12,14	0
5	SO4	D	616	5/5	0.84	0.16	73,78,78,80	0
6	1PE	K	619	11/16	0.84	0.15	25,39,44,44	0
5	SO4	G	616	5/5	0.84	0.17	75,79,81,81	0
5	SO4	E	616	5/5	0.84	0.18	90,94,95,96	0
5	SO4	G	619	5/5	0.84	0.30	45,49,50,52	0
2	CO3	E	612	4/4	0.85	0.17	6,13,14,16	0
6	1PE	A	619	7/16	0.85	0.14	43,44,48,51	0
6	1PE	L	620	11/16	0.85	0.13	39,42,45,45	0
5	SO4	C	620	5/5	0.85	0.14	52,56,58,58	0
5	SO4	J	618	5/5	0.85	0.14	57,60,62,62	0
6	1PE	C	622	9/16	0.86	0.14	27,29,35,40	0
5	SO4	G	617	5/5	0.86	0.22	36,40,41,42	0
6	1PE	I	621	12/16	0.86	0.12	35,37,40,43	0
6	1PE	K	620	6/16	0.86	0.14	30,31,32,33	0
6	1PE	G	620	9/16	0.87	0.13	24,26,31,31	0
5	SO4	E	618	5/5	0.87	0.17	52,55,59,59	0
6	1PE	K	617	8/16	0.87	0.12	32,37,42,43	0
6	1PE	K	618	12/16	0.87	0.13	25,31,40,40	0
6	1PE	F	618	10/16	0.87	0.13	36,40,44,44	0
5	SO4	A	616	5/5	0.88	0.13	62,67,67,67	0
6	1PE	J	620	10/16	0.88	0.11	27,35,41,41	0
2	CO3	A	612	4/4	0.89	0.12	12,12,14,15	0
2	CO3	K	612	4/4	0.89	0.13	10,10,10,11	0
6	1PE	L	619	7/16	0.89	0.12	30,32,35,35	0
4	DGZ	B	615	74/74	0.90	0.16	9,37,133,171	0
6	1PE	A	618	9/16	0.90	0.11	23,24,26,29	0
6	1PE	D	618	10/16	0.90	0.13	30,34,40,40	0
6	1PE	G	622	6/16	0.90	0.14	30,30,30,32	0
6	1PE	E	620	10/16	0.90	0.11	26,27,35,41	0
2	CO3	B	612	4/4	0.90	0.10	14,14,15,15	0
5	SO4	L	616	5/5	0.91	0.26	41,43,48,48	0
4	DGZ	I	615	74/74	0.91	0.17	5,42,189,216	0
4	DGZ	K	615	74/74	0.91	0.17	7,41,147,213	0
4	DGZ	A	615	74/74	0.91	0.16	5,38,181,208	0
5	SO4	I	617	5/5	0.91	0.21	43,46,49,49	0
2	CO3	C	612	4/4	0.91	0.12	12,12,13,15	0
4	DGZ	C	615	74/74	0.91	0.16	10,38,182,231	0
4	DGZ	E	615	74/74	0.91	0.17	10,41,146,207	0
4	DGZ	G	615	74/74	0.91	0.17	6,36,151,232	0
4	DGZ	H	615	74/74	0.91	0.17	4,38,142,180	0
6	1PE	L	617	10/16	0.92	0.10	17,27,36,40	0

Continued on next page...

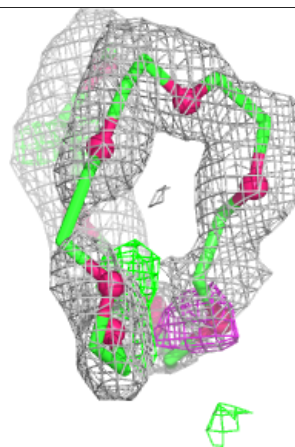
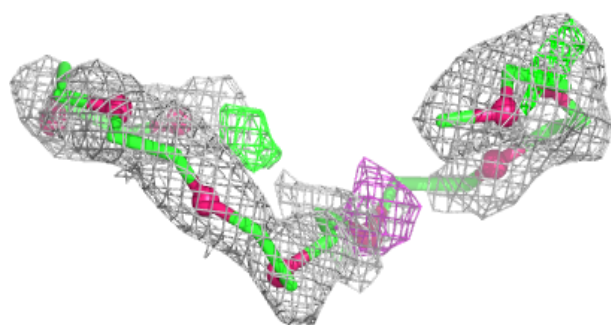
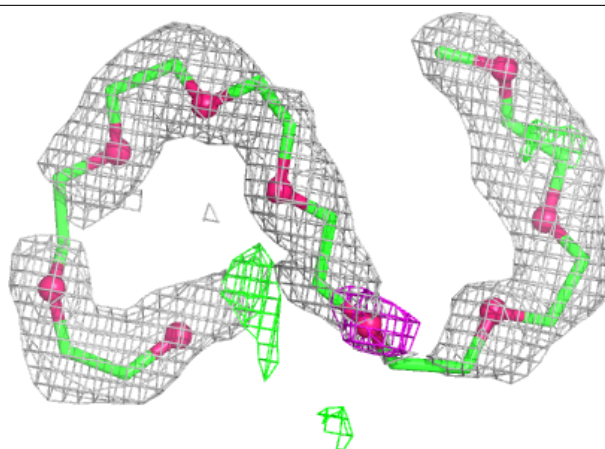
Continued from previous page...

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
6	1PE	E	621	8/16	0.92	0.11	31,34,36,37	0
4	DGZ	J	615	74/74	0.92	0.17	8,34,179,236	0
5	SO4	I	620	5/5	0.92	0.20	39,41,44,47	0
4	DGZ	F	615	74/74	0.92	0.14	8,35,127,202	0
4	DGZ	D	615	74/74	0.92	0.15	7,34,121,208	0
6	1PE	J	619	11/16	0.93	0.10	19,23,34,38	0
6	1PE	G	621	6/16	0.93	0.09	25,25,27,32	0
4	DGZ	L	615	74/74	0.94	0.14	7,33,109,190	0
6	1PE	I	623	5/16	0.94	0.08	14,14,16,18	0
6	1PE	I	622	10/16	0.95	0.07	21,23,34,35	0
3	ZN	C	614	1/1	0.99	0.07	25,25,25,25	0
3	ZN	F	614	1/1	0.99	0.06	27,27,27,27	0
3	ZN	I	614	1/1	0.99	0.08	27,27,27,27	0
3	ZN	K	614	1/1	0.99	0.09	29,29,29,29	0
5	SO4	D	617	5/5	0.99	0.04	12,13,14,17	0
5	SO4	J	616	5/5	0.99	0.04	14,14,17,17	0
5	SO4	H	616	5/5	0.99	0.04	12,12,14,14	0
5	SO4	C	616	5/5	0.99	0.03	9,9,10,12	0
3	ZN	L	613	1/1	0.99	0.07	27,27,27,27	0
3	ZN	A	613	1/1	1.00	0.08	26,26,26,26	0
3	ZN	D	613	1/1	1.00	0.01	16,16,16,16	0
3	ZN	D	614	1/1	1.00	0.07	29,29,29,29	0
3	ZN	E	613	1/1	1.00	0.01	18,18,18,18	0
3	ZN	E	614	1/1	1.00	0.10	28,28,28,28	0
3	ZN	F	613	1/1	1.00	0.01	17,17,17,17	0
3	ZN	A	614	1/1	1.00	0.02	17,17,17,17	0
3	ZN	G	613	1/1	1.00	0.01	16,16,16,16	0
3	ZN	G	614	1/1	1.00	0.06	27,27,27,27	0
3	ZN	H	613	1/1	1.00	0.01	19,19,19,19	0
3	ZN	H	614	1/1	1.00	0.07	29,29,29,29	0
3	ZN	I	613	1/1	1.00	0.02	17,17,17,17	0
3	ZN	B	613	1/1	1.00	0.08	26,26,26,26	0
3	ZN	J	613	1/1	1.00	0.02	19,19,19,19	0
3	ZN	J	614	1/1	1.00	0.09	24,24,24,24	0
3	ZN	K	613	1/1	1.00	0.01	18,18,18,18	0
3	ZN	B	614	1/1	1.00	0.02	16,16,16,16	0
3	ZN	C	613	1/1	1.00	0.01	17,17,17,17	0
3	ZN	L	614	1/1	1.00	0.01	17,17,17,17	0

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

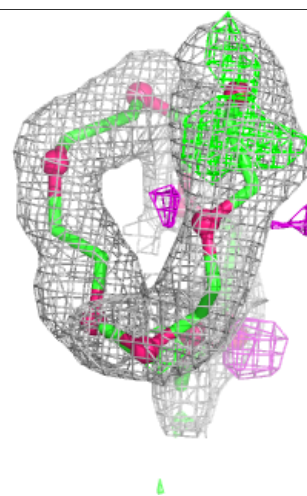
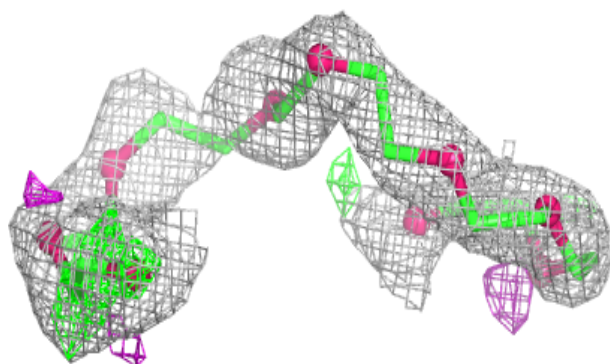
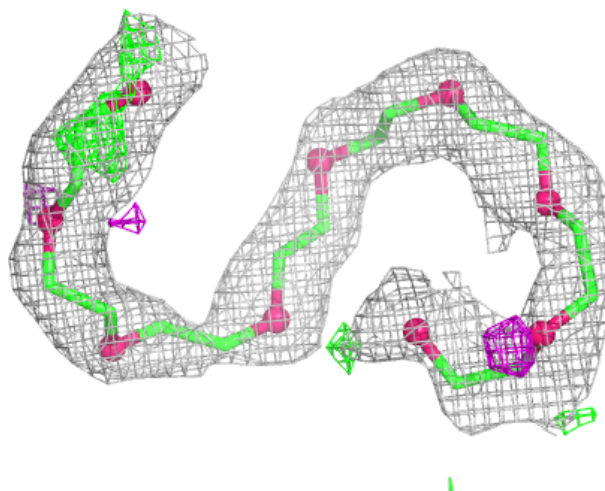
Electron density around 2PE B 616:

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



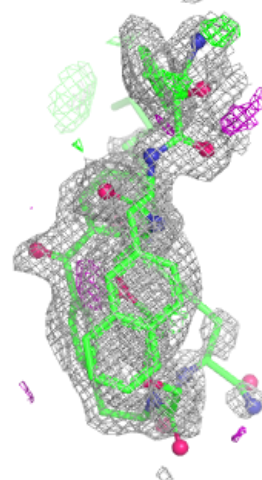
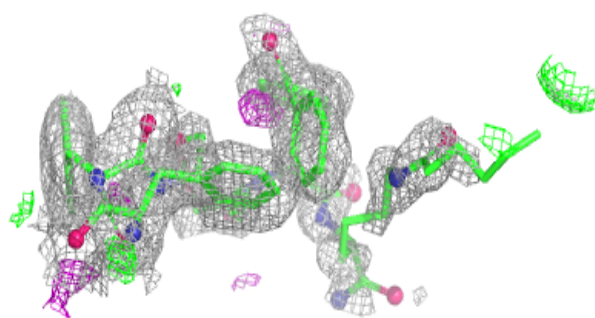
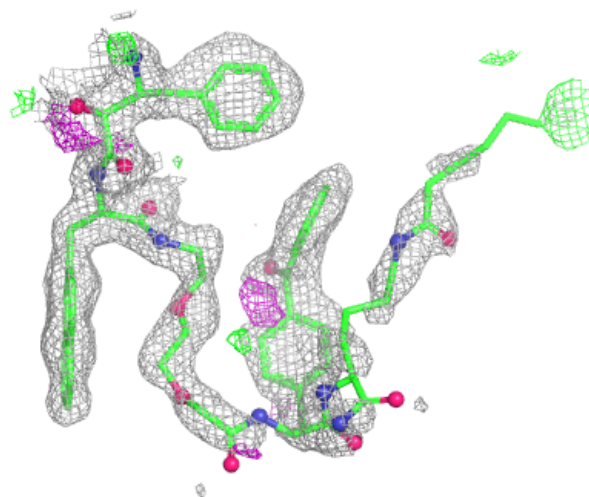
Electron density around 2PE H 619:

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



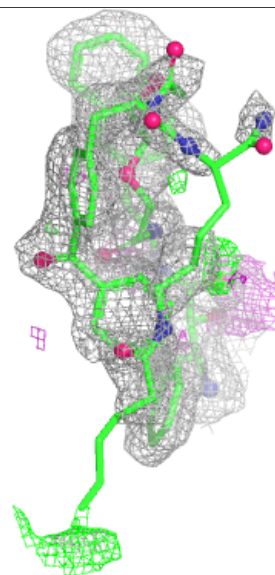
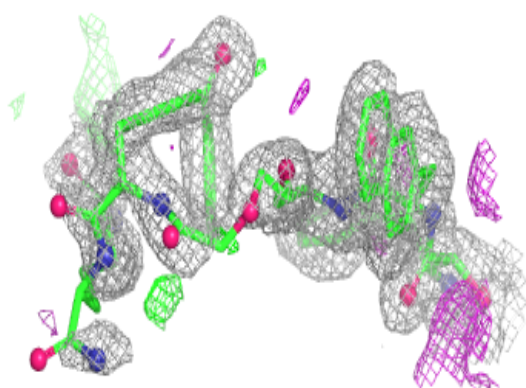
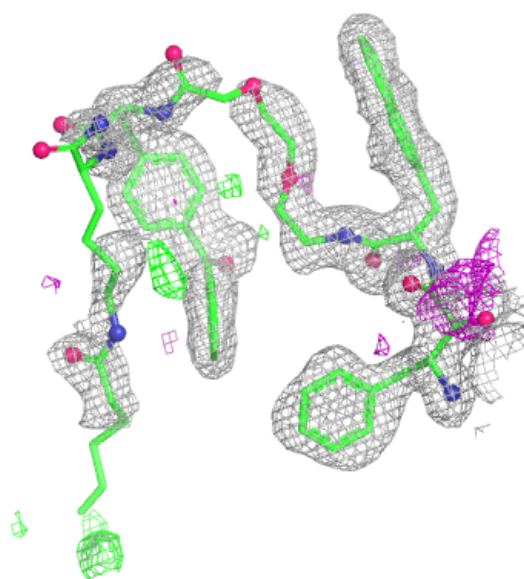
Electron density around DGZ B 615:

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



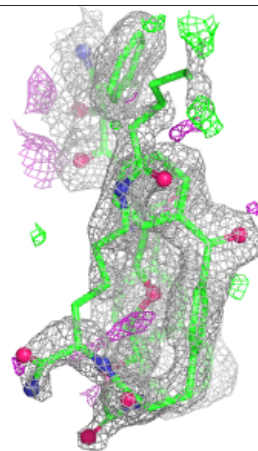
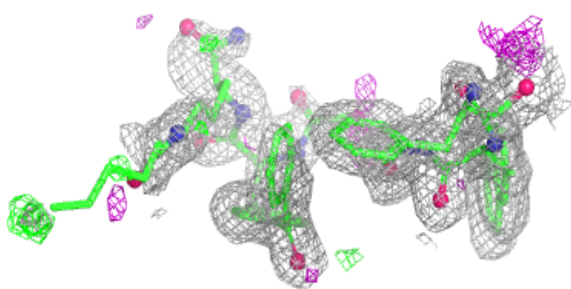
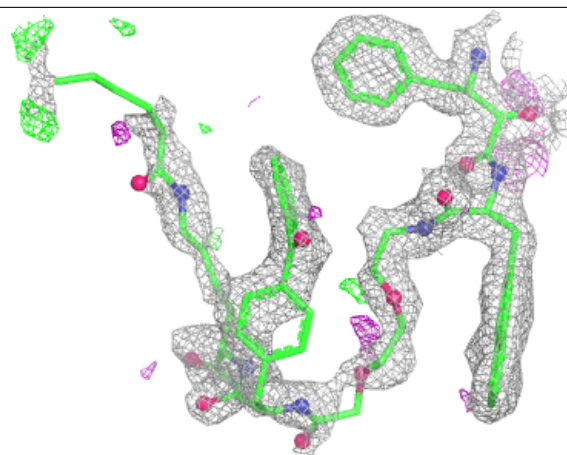
Electron density around DGZ I 615:

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



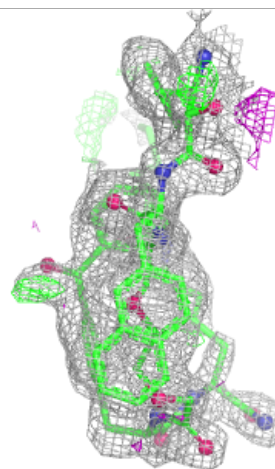
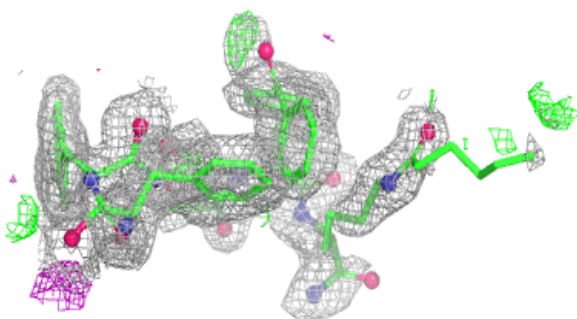
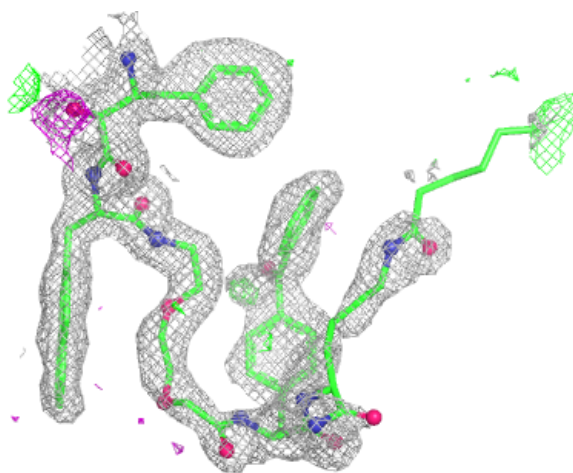
Electron density around DGZ K 615:

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



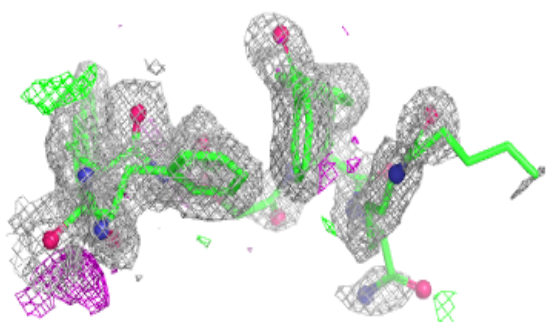
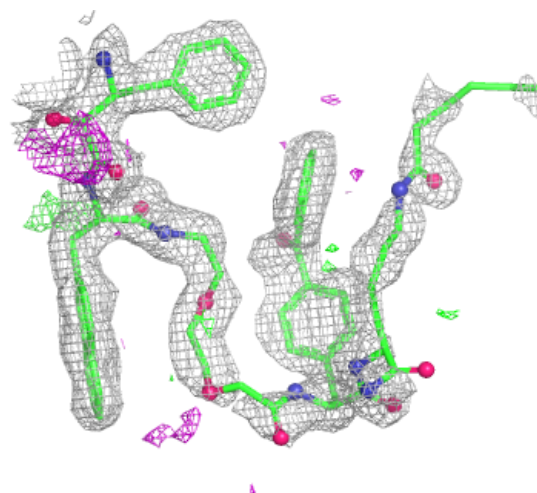
Electron density around DGZ A 615:

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



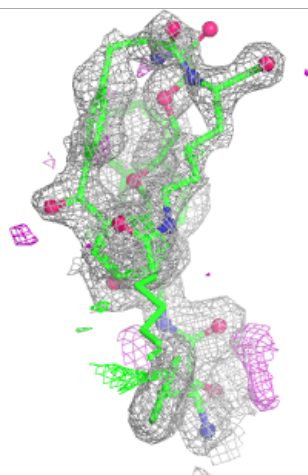
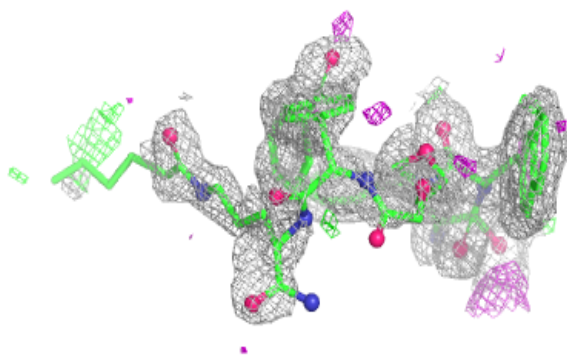
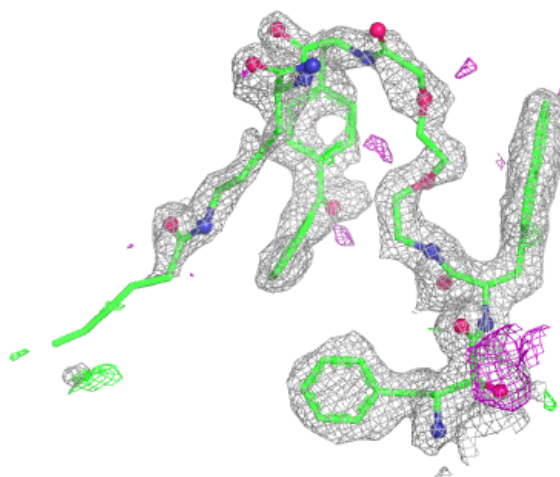
Electron density around DGZ C 615:

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



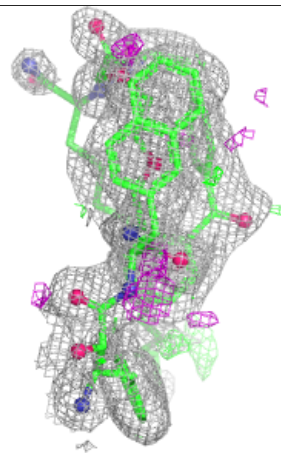
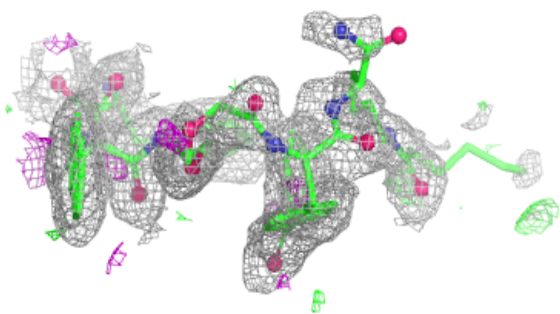
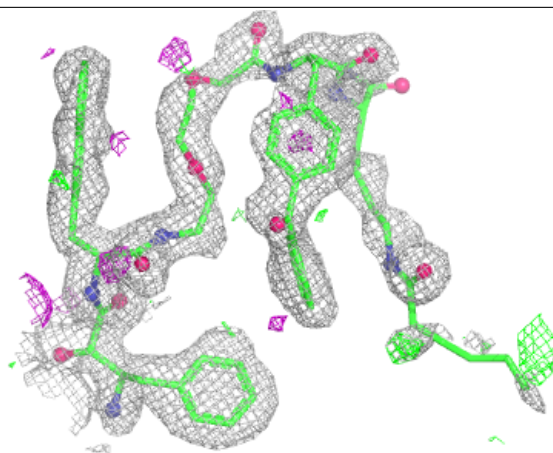
Electron density around DGZ E 615:

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



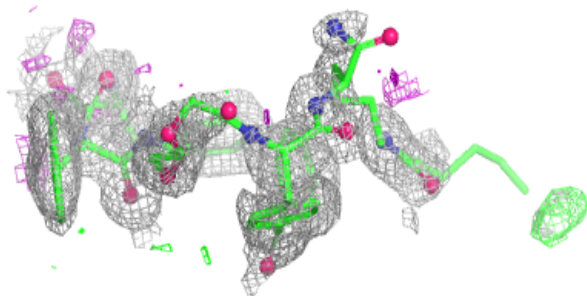
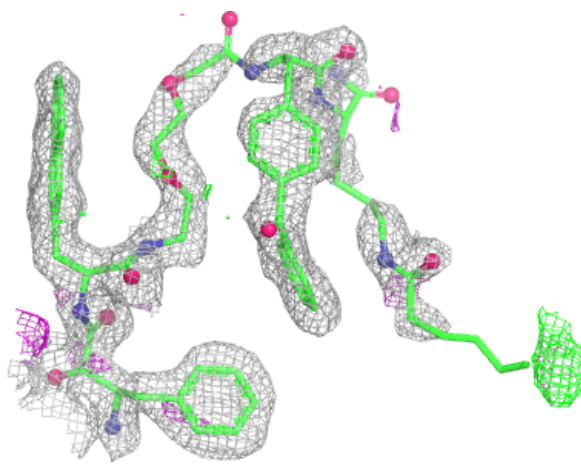
Electron density around DGZ G 615:

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



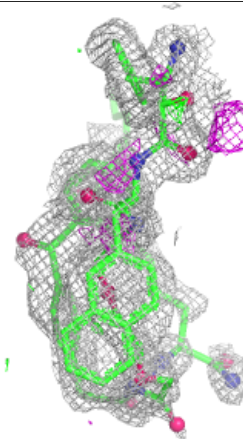
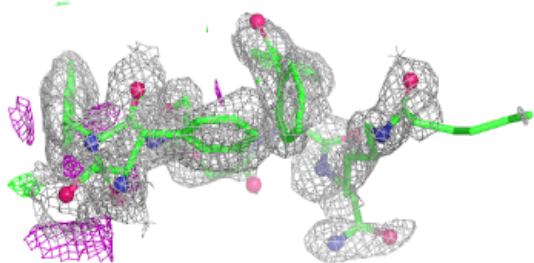
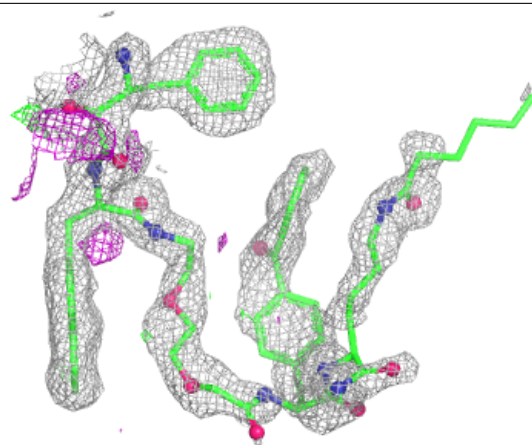
Electron density around DGZ H 615:

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



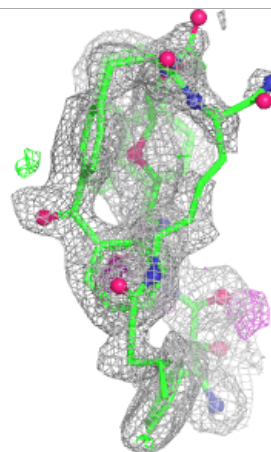
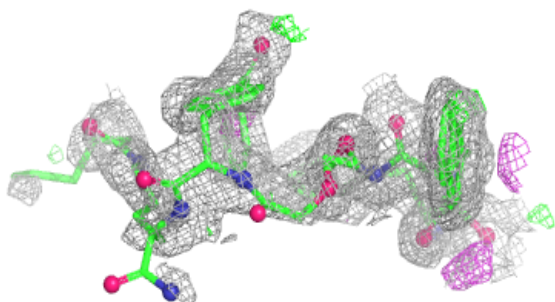
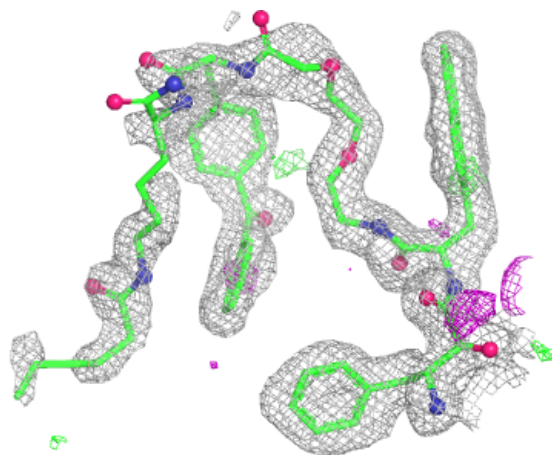
Electron density around DGZ J 615:

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



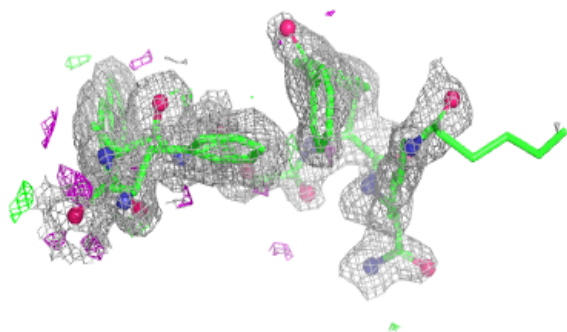
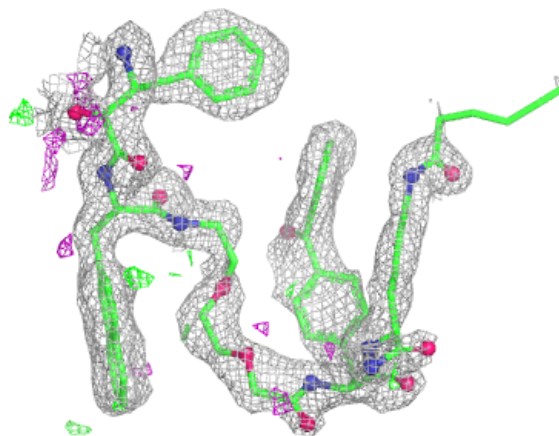
Electron density around DGZ F 615:

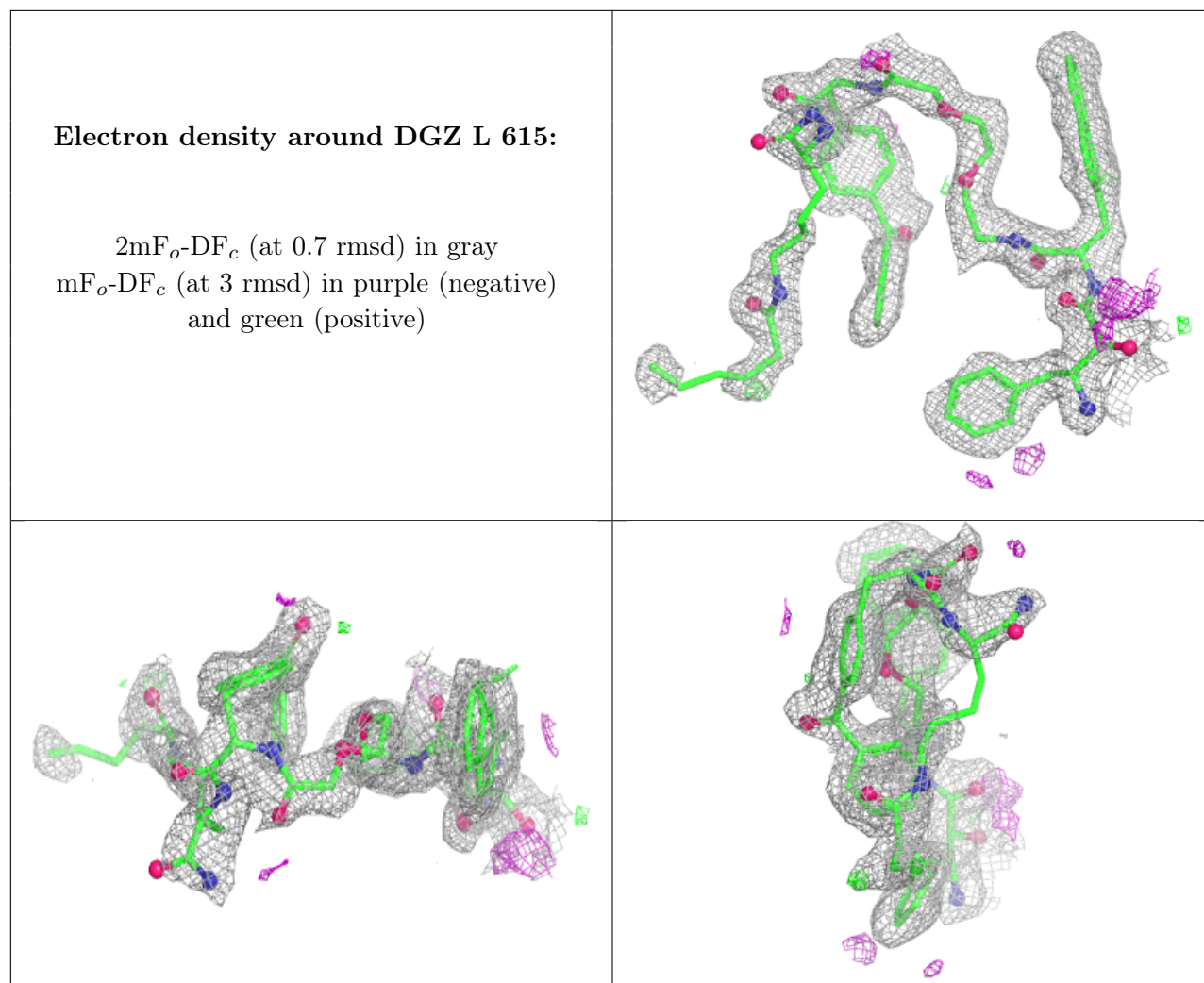
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around DGZ D 615:

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





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

There are no such residues in this entry.