



# wwPDB X-ray Structure Validation Summary Report ⓘ

Nov 13, 2024 – 09:19 AM EST

PDB ID : 4JTC  
Title : Crystal structure of Kv1.2-2.1 paddle chimera channel in complex with Charyb-dotoxin in Cs<sup>+</sup>  
Authors : Banerjee, A.; Lee, A.; Campbell, E.; MacKinnon, R.  
Deposited on : 2013-03-23  
Resolution : 2.56 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](mailto:validation@mail.wwpdb.org)

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

MolProbity : 4.02b-467  
Mogul : 2022.3.0, CSD as543be (2022)  
Xtriage (Phenix) : 1.20.1  
EDS : 3.0  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
CCP4 : 9.0.003 (Gargrove)  
Density-Fitness : 1.0.11  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.39

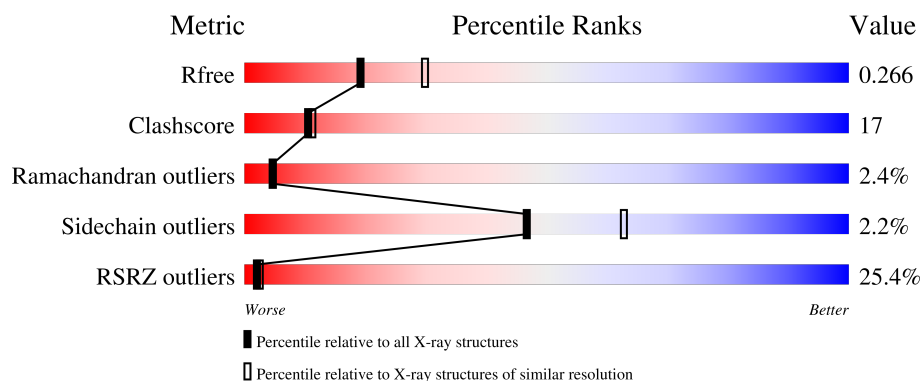
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.56 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))
$R_{free}$	164625	1685 (2.58-2.54)
Clashscore	180529	1779 (2.58-2.54)
Ramachandran outliers	177936	1766 (2.58-2.54)
Sidechain outliers	177891	1766 (2.58-2.54)
RSRZ outliers	164620	1685 (2.58-2.54)

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

Mol	Chain	Length	Quality of chain
1	A	333	<div> <div>3%</div> <div>79%</div> <div>17%</div> <div>..</div> </div>
1	G	333	<div> <div>5%</div> <div>78%</div> <div>19%</div> <div>..</div> </div>
2	B	514	<div> <div>17%</div> <div>48%</div> <div>25%</div> <div>25%</div> </div>
2	H	514	<div> <div>42%</div> <div>37%</div> <div>31%</div> <div>29%</div> </div>
3	Y	37	<div> <div>97%</div> <div>59%</div> <div>38%</div> <div>.</div> </div>

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
6	PGW	B	504	-	-	-	X
6	PGW	B	506	-	-	-	X
6	PGW	B	508	-	-	-	X
6	PGW	B	512	-	-	-	X
6	PGW	B	517	-	-	-	X
6	PGW	B	519	-	-	-	X
6	PGW	H	504	-	-	-	X

## 2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 11770 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 Voltage-gated potassium channel subunit beta-2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	326	Total	C	N	O	S	0	0	0
			2556	1627	443	470	16			
1	G	326	Total	C	N	O	S	0	0	0
			2556	1627	443	470	16			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	35	MET	-	expression tag	UNP P62483
G	35	MET	-	expression tag	UNP P62483

- Molecule 2 is a protein called Potassium voltage-gated channel subfamily A member 2, Potassium voltage-gated channel subfamily B member 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	386	Total	C	N	O	S	0	0	0
			3088	2022	504	548	14			
2	H	363	Total	C	N	O	S	0	0	0
			2959	1950	478	518	13			

There are 48 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-18	MET	-	expression tag	UNP P63142
B	-17	ALA	-	expression tag	UNP P63142
B	-16	HIS	-	expression tag	UNP P63142
B	-15	HIS	-	expression tag	UNP P63142
B	-14	HIS	-	expression tag	UNP P63142
B	-13	HIS	-	expression tag	UNP P63142
B	-12	HIS	-	expression tag	UNP P63142
B	-11	HIS	-	expression tag	UNP P63142
B	-10	HIS	-	expression tag	UNP P63142

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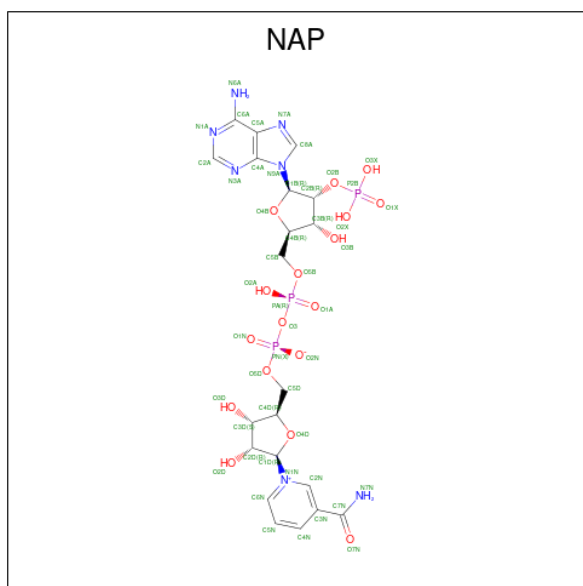
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Chain	Residue	Modelled	Actual	Comment	Reference
B	-9	HIS	-	expression tag	UNP P63142
B	-8	HIS	-	expression tag	UNP P63142
B	-7	HIS	-	expression tag	UNP P63142
B	-6	GLY	-	expression tag	UNP P63142
B	-5	LEU	-	expression tag	UNP P63142
B	-4	VAL	-	expression tag	UNP P63142
B	-3	PRO	-	expression tag	UNP P63142
B	-2	ARG	-	expression tag	UNP P63142
B	-1	GLY	-	expression tag	UNP P63142
B	0	SER	-	expression tag	UNP P63142
B	31	SER	CYS	engineered mutation	UNP P63142
B	32	SER	CYS	engineered mutation	UNP P63142
B	207	GLN	ASN	engineered mutation	UNP P63142
B	431	SER	CYS	engineered mutation	UNP P63142
B	478	SER	CYS	engineered mutation	UNP P63142
H	-18	MET	-	expression tag	UNP P63142
H	-17	ALA	-	expression tag	UNP P63142
H	-16	HIS	-	expression tag	UNP P63142
H	-15	HIS	-	expression tag	UNP P63142
H	-14	HIS	-	expression tag	UNP P63142
H	-13	HIS	-	expression tag	UNP P63142
H	-12	HIS	-	expression tag	UNP P63142
H	-11	HIS	-	expression tag	UNP P63142
H	-10	HIS	-	expression tag	UNP P63142
H	-9	HIS	-	expression tag	UNP P63142
H	-8	HIS	-	expression tag	UNP P63142
H	-7	HIS	-	expression tag	UNP P63142
H	-6	GLY	-	expression tag	UNP P63142
H	-5	LEU	-	expression tag	UNP P63142
H	-4	VAL	-	expression tag	UNP P63142
H	-3	PRO	-	expression tag	UNP P63142
H	-2	ARG	-	expression tag	UNP P63142
H	-1	GLY	-	expression tag	UNP P63142
H	0	SER	-	expression tag	UNP P63142
H	31	SER	CYS	engineered mutation	UNP P63142
H	32	SER	CYS	engineered mutation	UNP P63142
H	207	GLN	ASN	engineered mutation	UNP P63142
H	431	SER	CYS	engineered mutation	UNP P63142
H	478	SER	CYS	engineered mutation	UNP P63142

- Molecule 3 is a protein called Potassium channel toxin alpha-KTx 1.1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	Y	37	Total	C	N	O	S	0	0	0
			295	176	57	55	7			

- Molecule 4 is NADP NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (three-letter code: NAP) (formula:  $C_{21}H_{28}N_7O_{17}P_3$ ).

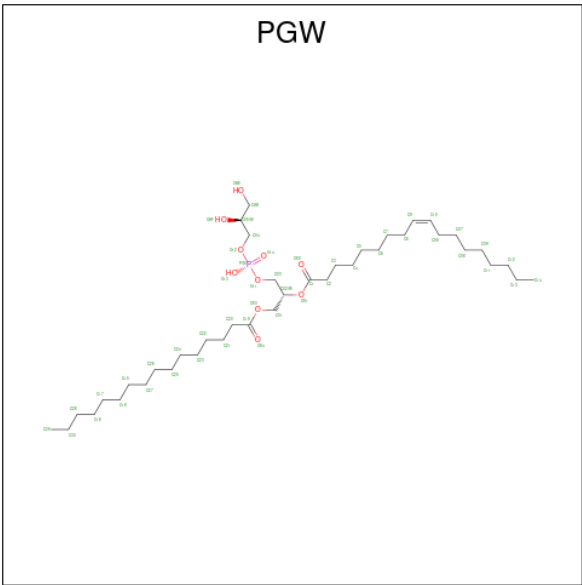


Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	N	O	P	0	0
			48	21	7	17	3		
4	G	1	Total	C	N	O	P	0	0
			48	21	7	17	3		

- Molecule 5 is CESIUM ION (three-letter code: CS) (formula: Cs).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	B	4	Total	Cs	0	0
			4	4		
5	H	4	Total	Cs	0	0
			4	4		

- Molecule 6 is (1R)-2-{[(S)-{[(2S)-2,3-dihydroxypropyl]oxy}(hydroxy)phosphoryl]oxy}-1-[(hexadecanoyloxy)methyl]ethyl (9Z)-octadec-9-enoate (three-letter code: PGW) (formula:  $C_{40}H_{77}O_{10}P$ ).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	B	1	Total	C	O			
			22	17	5	0	0	
6	B	1	Total	C				
			9	9		0	0	
6	B	1	Total	C				
			9	9		0	0	
6	B	1	Total	C				
			9	9		0	0	
6	B	1	Total	C				
			9	9		0	0	
6	B	1	Total	C				
			9	9		0	0	
6	B	1	Total	C				
			9	9		0	0	
6	B	1	Total	C				
			7	7		0	0	
6	B	1	Total	C				
			9	9		0	0	
6	B	1	Total	C				
			8	8		0	0	
6	B	1	Total	C	O	P		
			23	14	8	1	0	
6	B	1	Total	C				
			8	8			0	
6	B	1	Total	C	O	P		
			36	25	10	1	0	
6	B	1	Total	C				
			7	7			0	

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	B	1	Total	C		0	0
			8	8			
6	B	1	Total	C		0	0
			8	8			
6	H	1	Total	C	O	0	0
			22	17	5		





ASP	TYR	MET	GLU	ILE	GLN	GLU	GLY	VAL	ASN	ASN	SER	ASN	GLU	ASP	PHE	ARG	GLU	GLU	ASN	LEU	LYS	THR	ALA	ASN	SER	THR	LEU	ALA	ASN	THR	ASN	TYR	VAL	ASN	ILE	THR	LYS	MET	LEU	THR	ASP	VAL
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● Molecule 3: Potassium channel toxin alpha-KTx 1.1



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 4 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	145.43Å 145.43Å 285.59Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	50.00 – 2.56 50.00 – 2.56	Depositor EDS
% Data completeness (in resolution range)	91.9 (50.00-2.56) 91.9 (50.00-2.56)	Depositor EDS
$R_{merge}$	0.13	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	0.00 (at 2.54Å)	Xtriage
Refinement program	CNS	Depositor
R, $R_{free}$	0.237 , 0.262 0.238 , 0.266	Depositor DCC
$R_{free}$ test set	4652 reflections (4.71%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	42.3	Xtriage
Anisotropy	0.231	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 56.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.91	EDS
Total number of atoms	11770	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	71.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.66% of the height of the origin peak. No significant pseudotranslation is detected.*

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

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

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: PCA, PGW, NAP, CS

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	0.42	0/2608	0.61	0/3524
1	G	0.39	0/2608	0.60	0/3524
2	B	0.37	0/3169	0.55	0/4292
2	H	0.33	0/3036	0.50	0/4114
3	Y	0.26	0/292	0.46	0/389
All	All	0.38	0/11713	0.56	0/15843

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

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

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2556	0	2582	44	0
1	G	2556	0	2582	46	0
2	B	3088	0	3034	118	0
2	H	2959	0	2956	161	0
3	Y	295	0	282	10	0
4	A	48	0	25	11	0
4	G	48	0	25	12	0
5	B	4	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	H	4	0	0	0	0
6	B	190	0	251	18	0
6	H	22	0	25	7	0
All	All	11770	0	11762	391	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 17.

The worst 5 of 391 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)
2:B:400:LEU:HB2	2:B:401:PRO:HD3	1.43	1.00
1:G:55:GLY:HA3	4:G:1001:NAP:O3D	1.68	0.93
2:H:213:GLN:HE21	2:H:215:SER:HB3	1.31	0.91
2:H:146:GLN:HB3	2:H:243:ALA:HA	1.51	0.90
1:A:55:GLY:HA3	4:A:1001:NAP:O3D	1.73	0.89

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	324/333 (97%)	308 (95%)	14 (4%)	2 (1%)	22	29
1	G	324/333 (97%)	313 (97%)	10 (3%)	1 (0%)	37	45
2	B	384/514 (75%)	344 (90%)	27 (7%)	13 (3%)	3	2
2	H	357/514 (70%)	280 (78%)	60 (17%)	17 (5%)	2	1
3	Y	35/37 (95%)	17 (49%)	17 (49%)	1 (3%)	3	3
All	All	1424/1731 (82%)	1262 (89%)	128 (9%)	34 (2%)	5	5

5 of 34 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	132	TYR
2	B	133	ILE
2	B	134	LYS
2	B	135	GLU
2	B	137	GLU

### 5.3.2 Protein sidechains ⓘ

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	273/280 (98%)	267 (98%)	6 (2%)	47	63
1	G	273/280 (98%)	266 (97%)	7 (3%)	41	56
2	B	332/459 (72%)	325 (98%)	7 (2%)	48	64
2	H	324/459 (71%)	319 (98%)	5 (2%)	60	75
3	Y	35/35 (100%)	33 (94%)	2 (6%)	17	23
All	All	1237/1513 (82%)	1210 (98%)	27 (2%)	47	63

5 of 27 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	G	75	LEU
1	G	214	GLN
2	H	350	ARG
1	G	212	CYS
1	G	271	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 23 such sidechains are listed below:

Mol	Chain	Res	Type
1	G	37	GLN
1	G	333	ASN
1	G	178	ASN
2	H	53	GLN
1	A	338	GLN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

1 non-standard protein/DNA/RNA residue is modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
3	PCA	Y	1	3	7,8,9	0.62	0	9,10,12	0.99	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	PCA	Y	1	3	-	0/0/11/13	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry

Of 27 ligands modelled in this entry, 8 are monoatomic - leaving 19 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
6	PGW	B	505	-	8,8,50	0.36	0	7,7,56	0.52	0
6	PGW	B	517	-	6,6,50	0.37	0	5,5,56	0.43	0
4	NAP	G	1001	-	46,52,52	2.70	9 (19%)	61,80,80	2.58	16 (26%)
6	PGW	B	512	-	8,8,50	0.36	0	7,7,56	0.52	0
6	PGW	B	504	-	21,21,50	0.61	0	23,23,56	1.24	3 (13%)
6	PGW	B	507	-	8,8,50	0.36	0	7,7,56	0.55	0
6	PGW	B	506	-	8,8,50	0.36	0	7,7,56	0.50	0
6	PGW	B	519	-	7,7,50	0.36	0	6,6,56	0.50	0
6	PGW	B	510	-	8,8,50	0.36	0	7,7,56	0.53	0
6	PGW	B	518	-	7,7,50	0.36	0	6,6,56	0.51	0
6	PGW	B	513	-	7,7,50	0.37	0	6,6,56	0.51	0
6	PGW	B	515	-	7,7,50	0.36	0	6,6,56	0.50	0
6	PGW	H	504	-	21,21,50	0.61	0	23,23,56	1.29	3 (13%)
4	NAP	A	1001	-	46,52,52	3.01	8 (17%)	61,80,80	2.57	16 (26%)
6	PGW	B	514	-	22,22,50	0.80	0	25,27,56	1.26	4 (16%)
6	PGW	B	516	-	35,35,50	0.66	0	38,41,56	0.91	2 (5%)
6	PGW	B	508	-	8,8,50	0.36	0	7,7,56	0.53	0
6	PGW	B	509	-	8,8,50	0.36	0	7,7,56	0.53	0
6	PGW	B	511	-	6,6,50	0.37	0	5,5,56	0.47	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	PGW	B	505	-	-	0/6/6/55	-
6	PGW	B	517	-	-	0/4/4/55	-
4	NAP	G	1001	-	-	4/31/67/67	0/5/5/5
6	PGW	B	512	-	-	0/6/6/55	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	PGW	B	504	-	-	1/23/23/55	-
6	PGW	B	507	-	-	0/6/6/55	-
6	PGW	B	506	-	-	0/6/6/55	-
6	PGW	B	519	-	-	0/5/5/55	-
6	PGW	B	510	-	-	0/6/6/55	-
6	PGW	B	518	-	-	0/5/5/55	-
6	PGW	B	513	-	-	0/5/5/55	-
6	PGW	B	515	-	-	0/5/5/55	-
6	PGW	H	504	-	-	1/23/23/55	-
4	NAP	A	1001	-	-	4/31/67/67	0/5/5/5
6	PGW	B	514	-	-	9/24/24/55	-
6	PGW	B	516	-	-	9/40/40/55	-
6	PGW	B	508	-	-	0/6/6/55	-
6	PGW	B	509	-	-	0/6/6/55	-
6	PGW	B	511	-	-	0/4/4/55	-

The worst 5 of 17 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	1001	NAP	PN-O3	15.70	1.76	1.59
4	G	1001	NAP	PN-O3	13.80	1.74	1.59
4	A	1001	NAP	PA-O3	6.45	1.66	1.59
4	A	1001	NAP	O4B-C1B	6.40	1.49	1.40
4	G	1001	NAP	O4B-C1B	6.35	1.49	1.40

The worst 5 of 44 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	G	1001	NAP	O3-PA-O1A	-11.38	76.46	110.70
4	A	1001	NAP	O3-PA-O1A	-10.93	77.84	110.70
4	A	1001	NAP	O4B-C1B-N9A	8.00	119.35	108.75
4	G	1001	NAP	O4B-C1B-N9A	7.86	119.17	108.75
4	A	1001	NAP	O2A-PA-O3	-6.58	89.48	107.27

There are no chirality outliers.

5 of 28 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	1001	NAP	C5B-O5B-PA-O1A
4	G	1001	NAP	C5B-O5B-PA-O1A
6	B	514	PGW	C02-C03-O11-P

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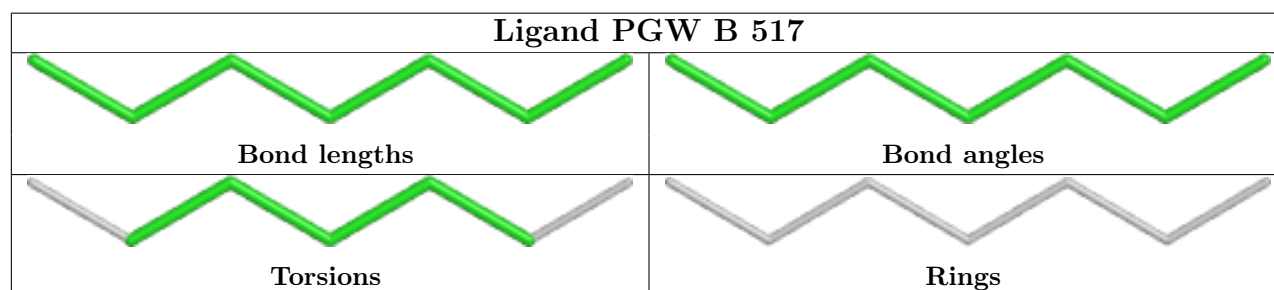
Mol	Chain	Res	Type	Atoms
4	G	1001	NAP	C1B-C2B-O2B-P2B
4	A	1001	NAP	C1B-C2B-O2B-P2B

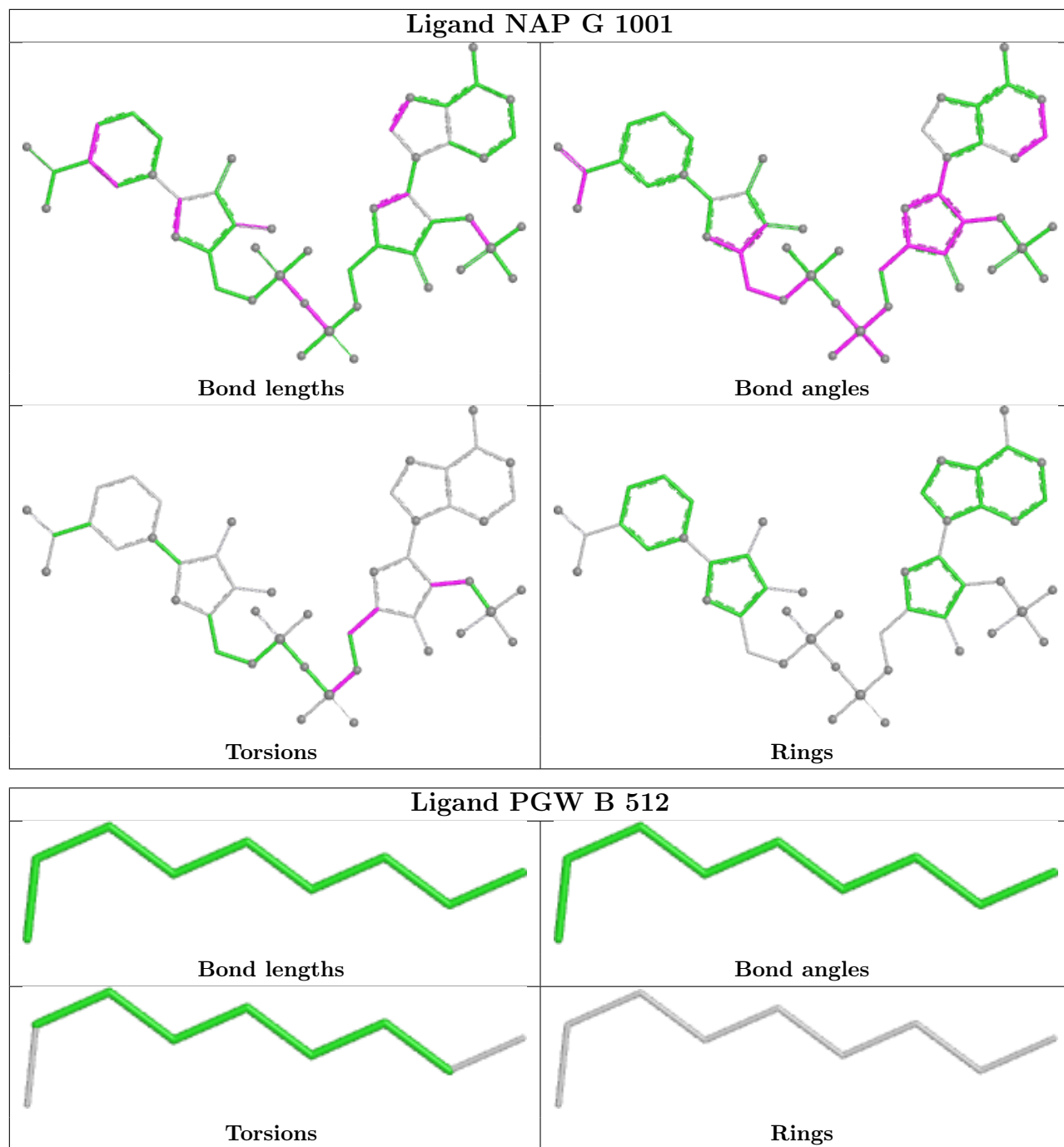
There are no ring outliers.

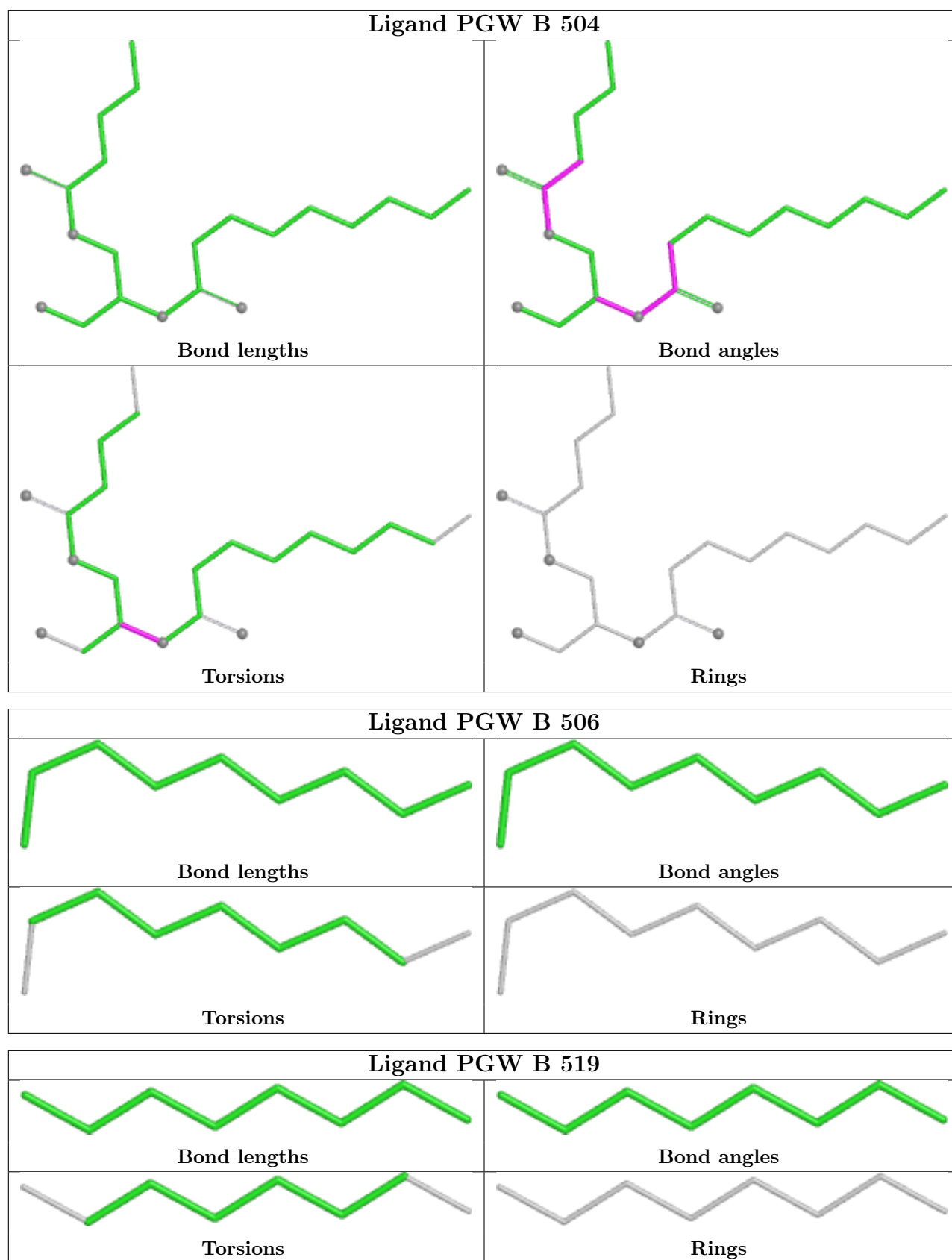
10 monomers are involved in 48 short contacts:

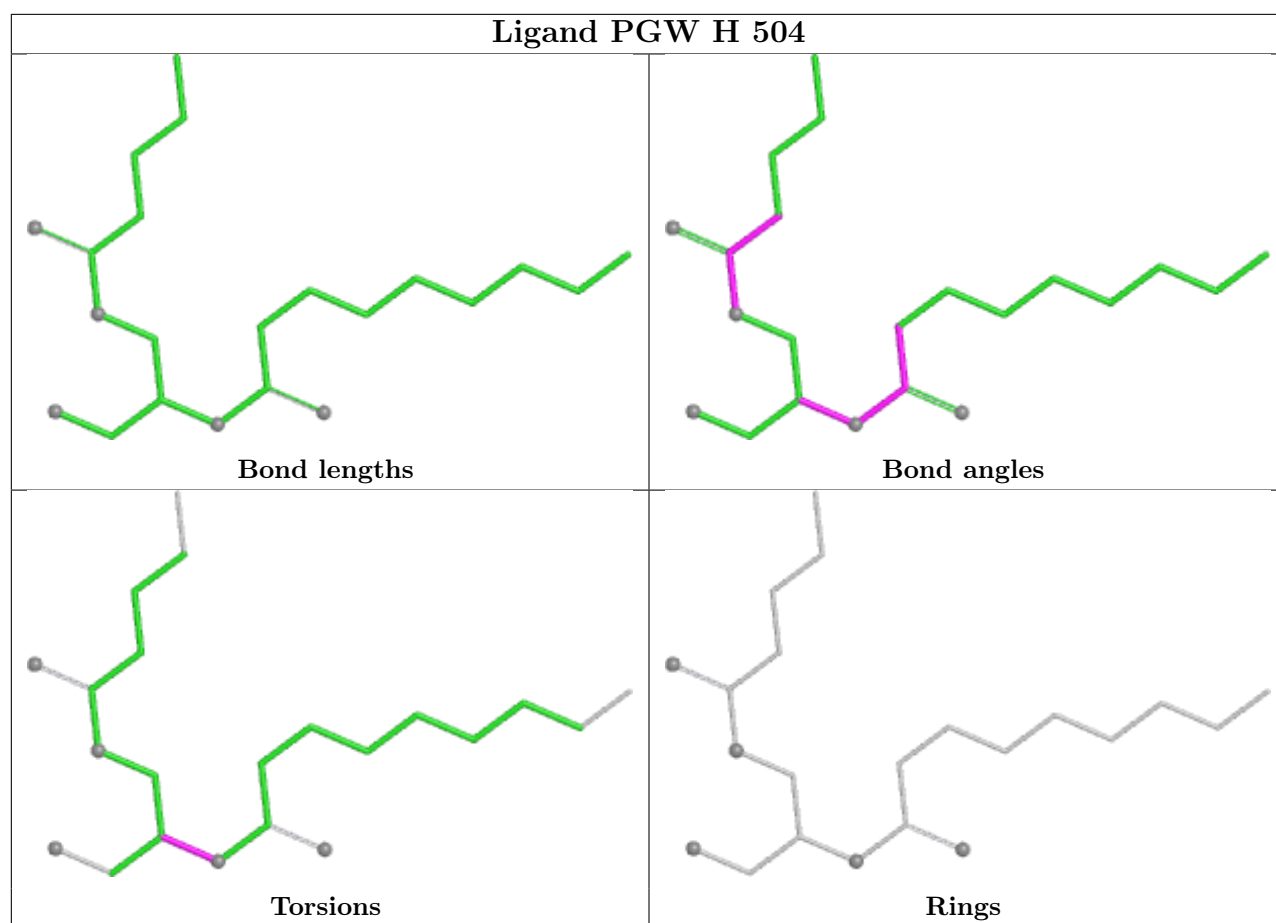
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	G	1001	NAP	12	0
6	B	512	PGW	2	0
6	B	504	PGW	3	0
6	B	510	PGW	3	0
6	B	513	PGW	1	0
6	B	515	PGW	3	0
6	H	504	PGW	7	0
4	A	1001	NAP	11	0
6	B	514	PGW	1	0
6	B	516	PGW	8	0

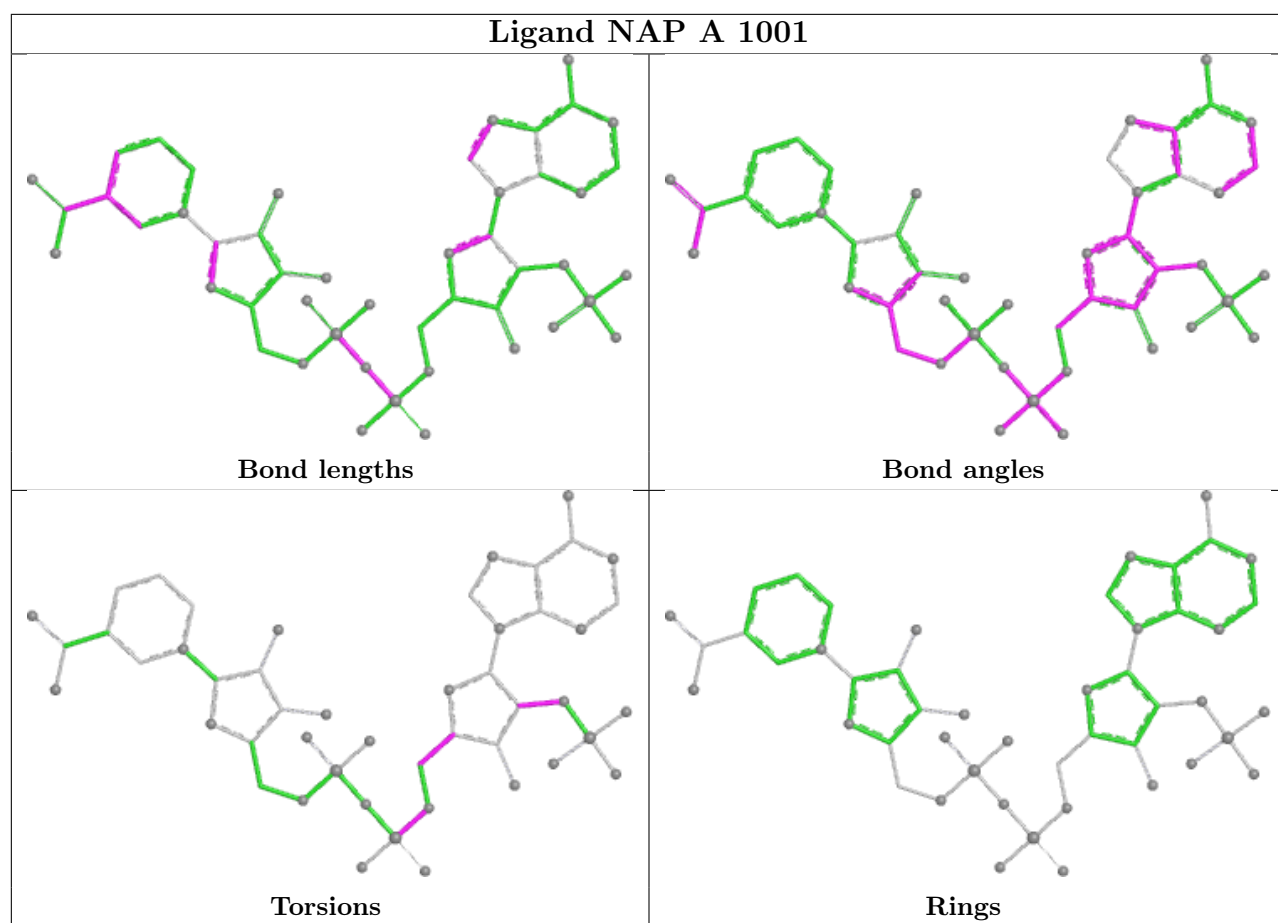
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

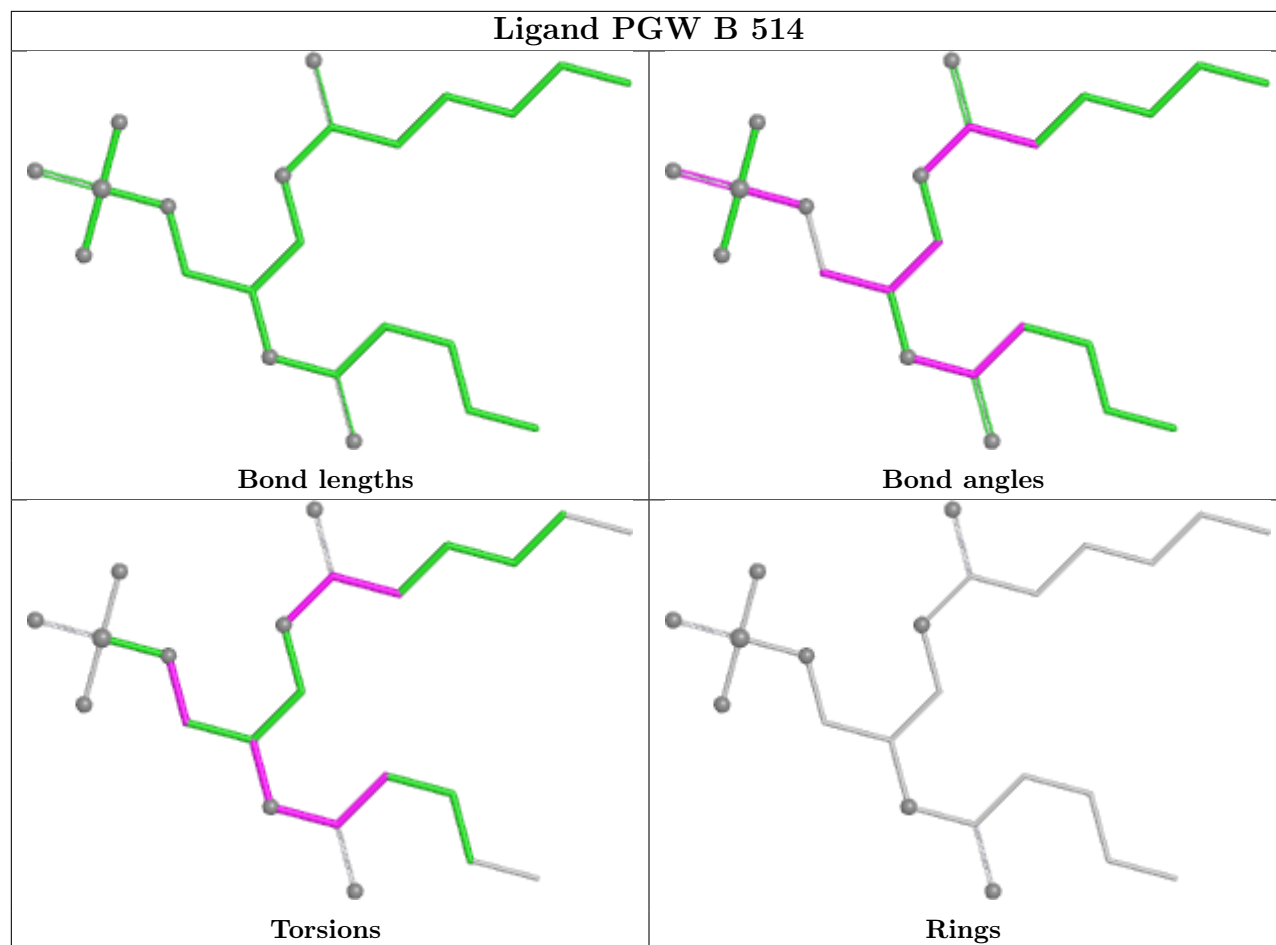


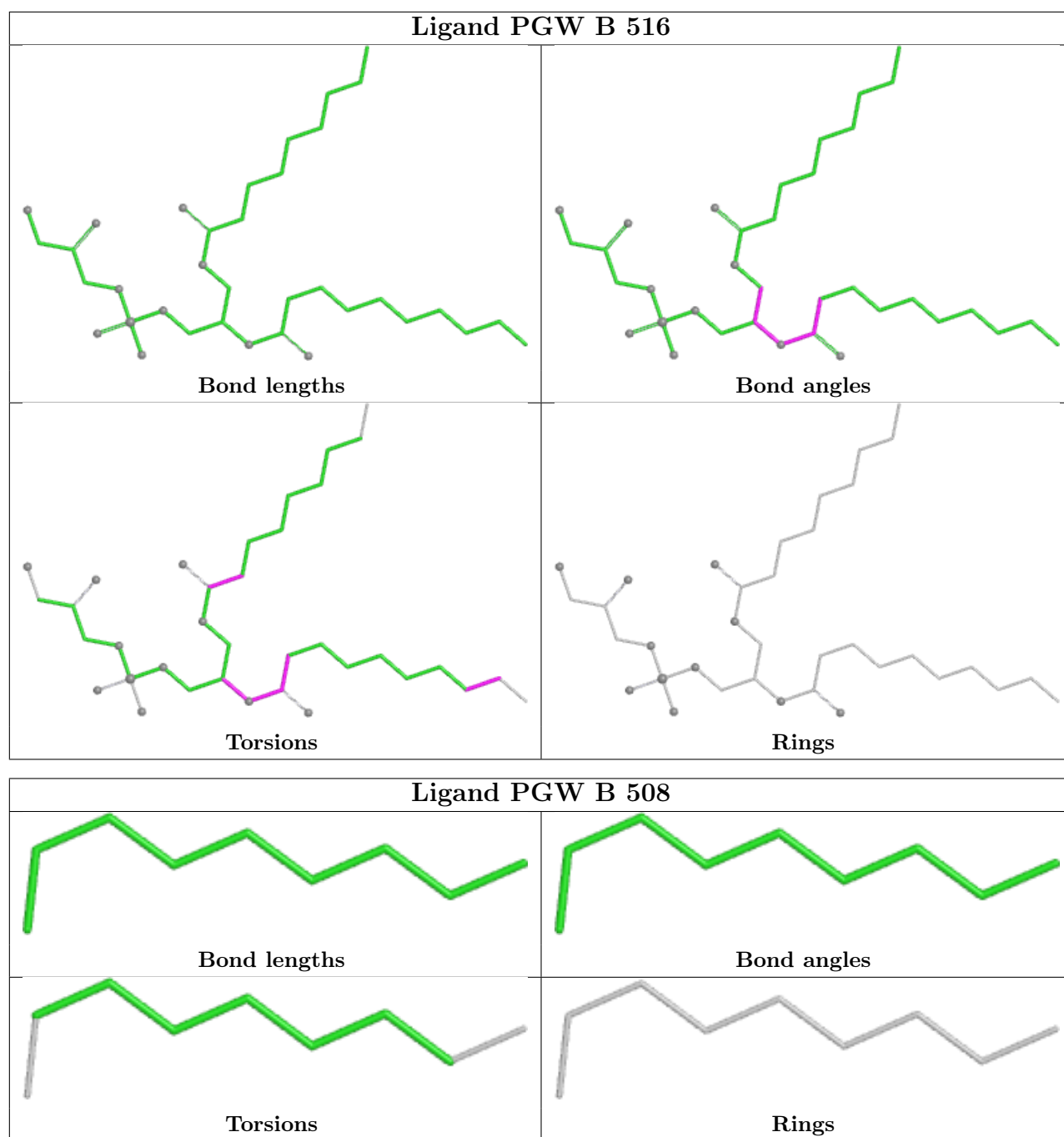












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

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

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

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	326/333 (97%)	-0.14	11 (3%) 48 53	17, 33, 60, 83	0
1	G	326/333 (97%)	0.04	16 (4%) 36 40	21, 39, 72, 96	0
2	B	386/514 (75%)	1.14	85 (22%) 3 4	25, 66, 110, 125	0
2	H	363/514 (70%)	2.74	217 (59%) 0 0	38, 115, 185, 204	0
3	Y	36/37 (97%)	11.96	36 (100%) 0 0	25, 27, 31, 31	36 (100%)
All	All	1437/1731 (83%)	1.28	365 (25%) 2 2	17, 53, 176, 204	36 (2%)

The worst 5 of 365 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	Y	15	SER	28.5
3	Y	20	LEU	26.0
3	Y	18	GLN	24.3
3	Y	4	ASN	18.8
3	Y	22	ASN	18.8

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

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
3	PCA	Y	1	8/9	0.66	0.36	125,126,126,126	8

### 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 6.4 Ligands ⓘ

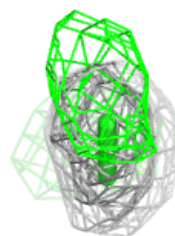
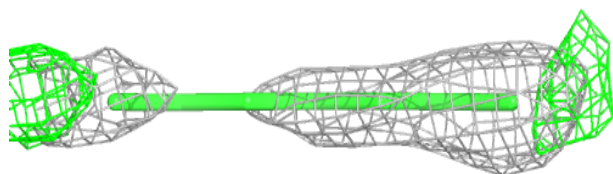
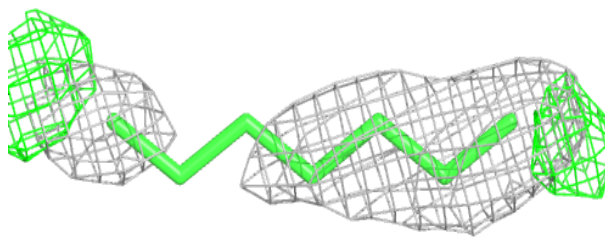
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
6	PGW	B	517	7/51	0.62	0.41	63,66,68,69	0
6	PGW	B	512	9/51	0.63	0.71	126,128,128,128	0
6	PGW	B	504	22/51	0.64	0.47	85,102,113,114	0
6	PGW	H	504	22/51	0.65	0.51	142,147,149,149	0
6	PGW	B	506	9/51	0.67	0.51	87,90,91,91	0
6	PGW	B	516	36/51	0.74	0.33	107,125,141,141	0
6	PGW	B	519	8/51	0.75	0.50	97,99,100,100	0
6	PGW	B	514	23/51	0.75	0.31	109,119,123,124	0
6	PGW	B	513	8/51	0.78	0.35	74,78,79,79	0
6	PGW	B	508	9/51	0.79	0.43	100,102,102,102	0
6	PGW	B	505	9/51	0.79	0.39	79,82,84,85	0
6	PGW	B	515	8/51	0.81	0.41	81,87,91,91	0
6	PGW	B	518	8/51	0.82	0.48	102,105,107,107	0
6	PGW	B	511	7/51	0.83	0.27	70,73,73,73	0
6	PGW	B	507	9/51	0.83	0.37	94,96,98,98	0
6	PGW	B	509	9/51	0.84	0.34	82,86,89,89	0
6	PGW	B	510	9/51	0.85	0.40	106,107,109,109	0
5	CS	B	502	1/1	0.86	0.08	43,43,43,43	1
5	CS	H	503	1/1	0.91	0.10	75,75,75,75	1
5	CS	B	503	1/1	0.92	0.32	101,101,101,101	1
4	NAP	G	1001	48/48	0.93	0.12	25,39,51,51	0
5	CS	B	501	1/1	0.93	0.08	45,45,45,45	1
4	NAP	A	1001	48/48	0.95	0.10	23,33,43,47	0
5	CS	H	505	1/1	0.96	0.17	126,126,126,126	1
5	CS	H	501	1/1	0.97	0.07	85,85,85,85	1
5	CS	H	502	1/1	0.98	0.07	74,74,74,74	1
5	CS	B	520	1/1	0.99	0.07	61,61,61,61	1

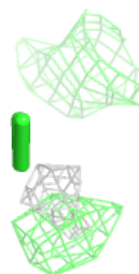
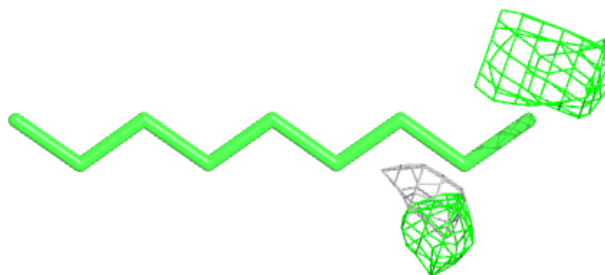
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

**Electron density around PGW B 517:**

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

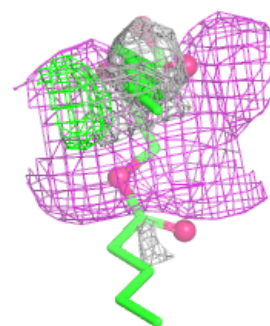
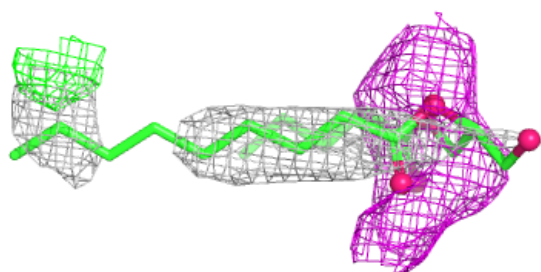
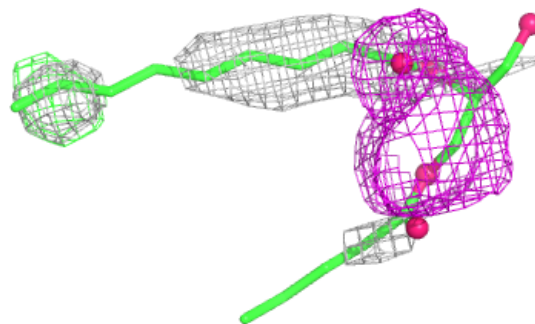
**Electron density around PGW B 512:**

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



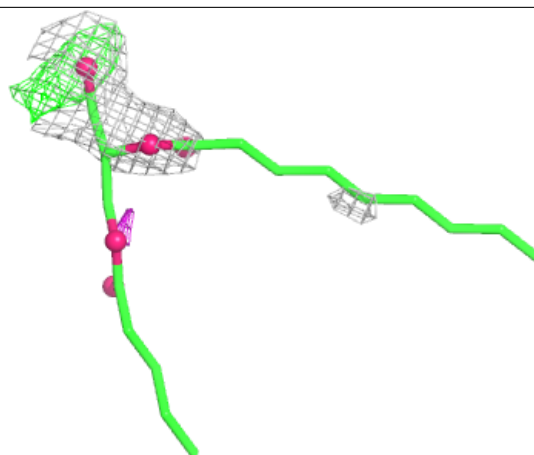
**Electron density around PGW B 504:**

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

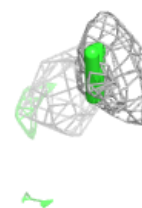
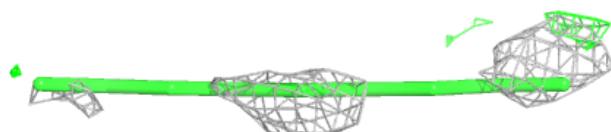
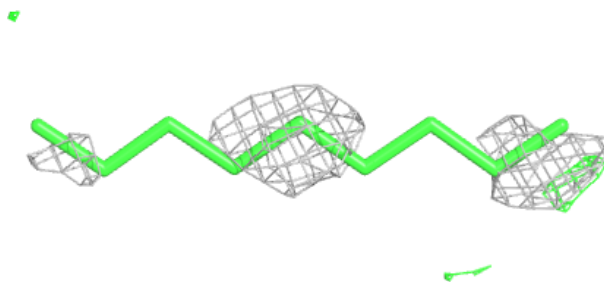


**Electron density around PGW H 504:**

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

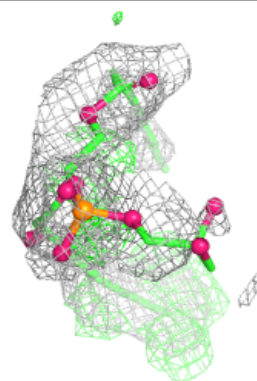
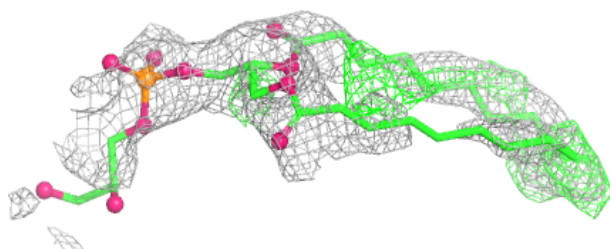
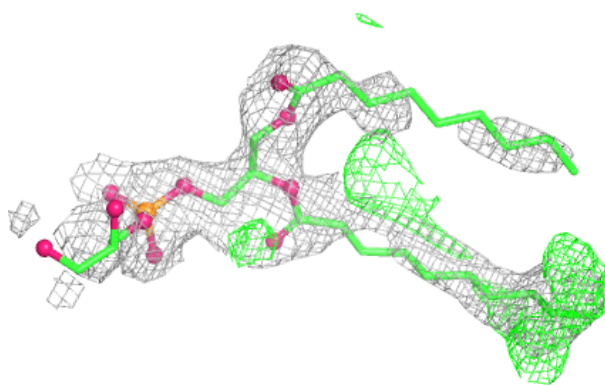
**Electron density around PGW B 506:**

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

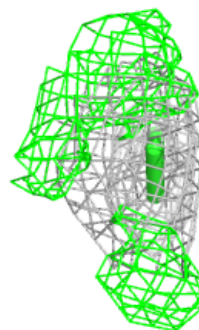
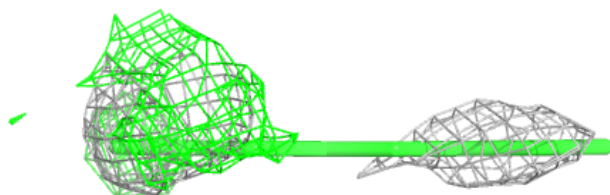
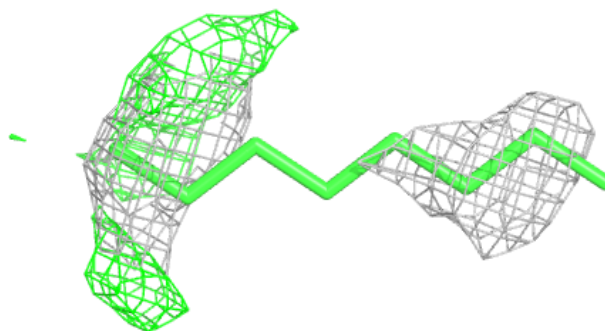


**Electron density around PGW B 516:**

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

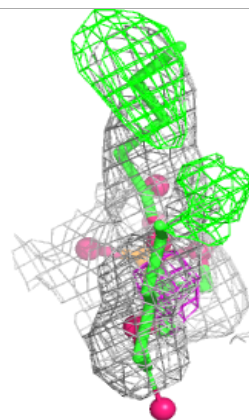
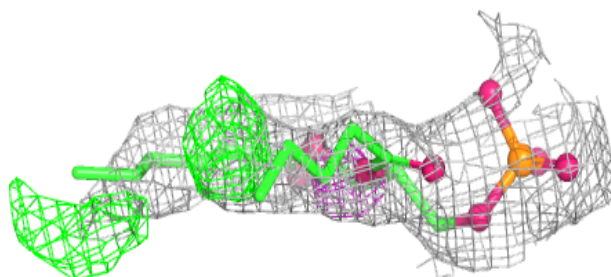
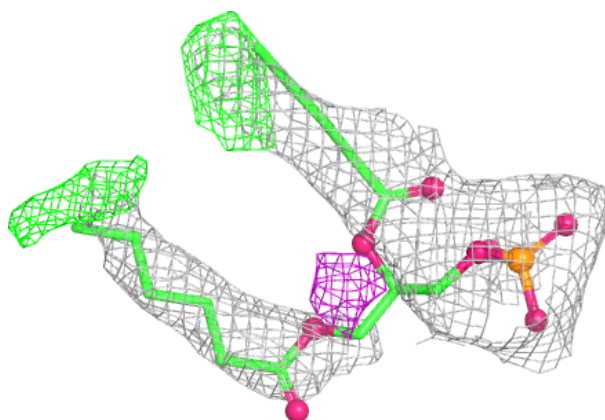
**Electron density around PGW B 519:**

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



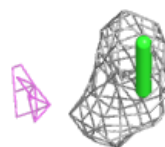
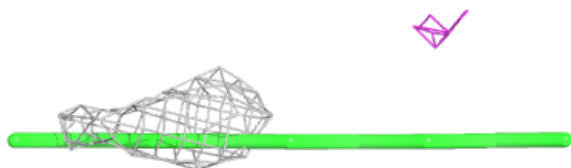
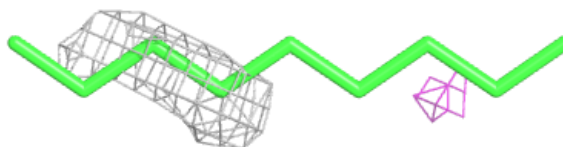
**Electron density around PGW B 514:**

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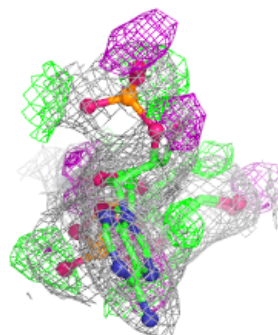
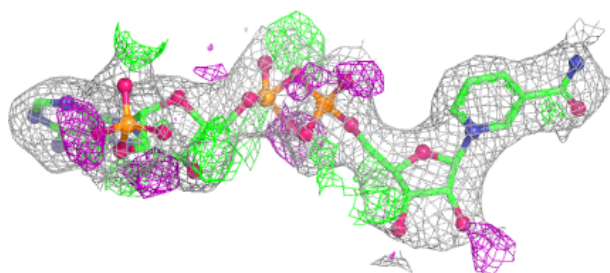
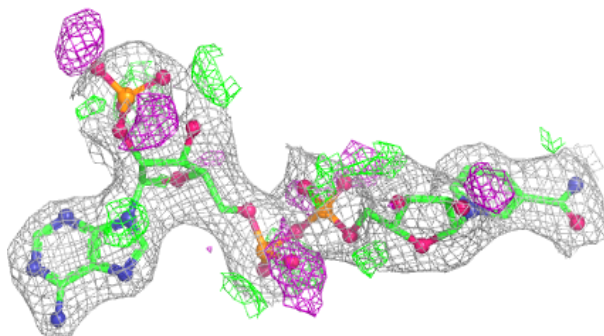


**Electron density around PGW B 508:**

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

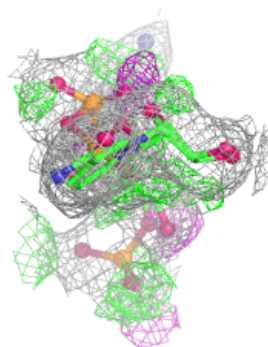
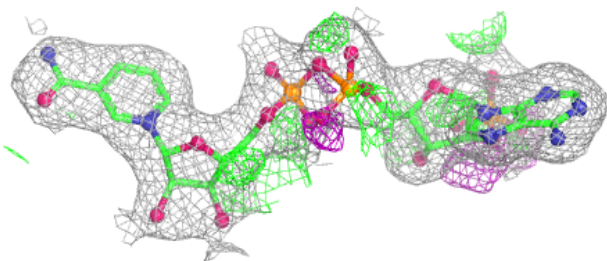
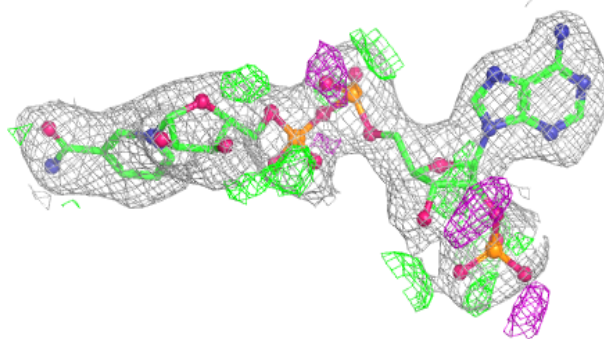
**Electron density around NAP G 1001:**

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



**Electron density around NAP A 1001:**

$2mF_o-DF_c$  (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.