



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 26, 2024 – 11:26 AM EDT

PDB ID : 8FBU  
Title : Crystal structure of Cryptosporidium parvum N-myristoyltransferase with bound myristoyl-CoA and Compound-2  
Authors : Staker, B.L.; Fenwick, M.K.; Seattle Structural Genomics Center for Infectious Disease (SSGCID)  
Deposited on : 2022-11-30  
Resolution : 2.00 Å(reported)

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

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

---

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

MolProbity	:	4.02b-467
Mogul	:	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	:	9.0.002 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.38.3

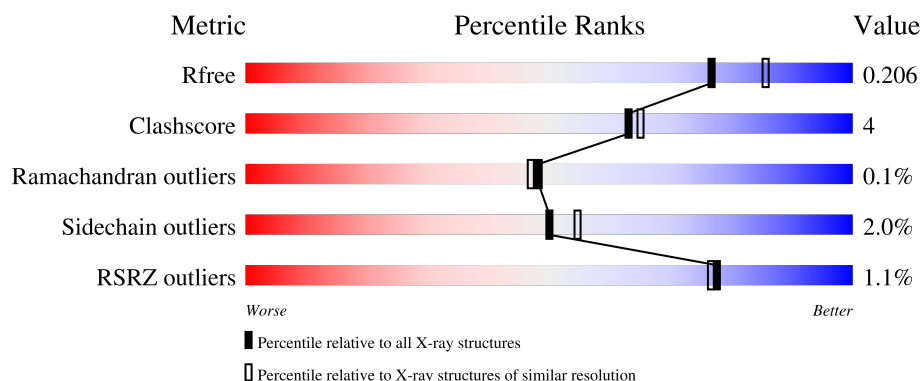
# 1 Overall quality at a glance

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))
$R_{free}$	164625	9409 (2.00-2.00)
Clashscore	180529	10737 (2.00-2.00)
Ramachandran outliers	177936	10628 (2.00-2.00)
Sidechain outliers	177891	10627 (2.00-2.00)
RSRZ outliers	164620	9409 (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  $\geq 3$ , 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	431	
1	B	431	

## 2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 15601 atoms, of which 7479 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.

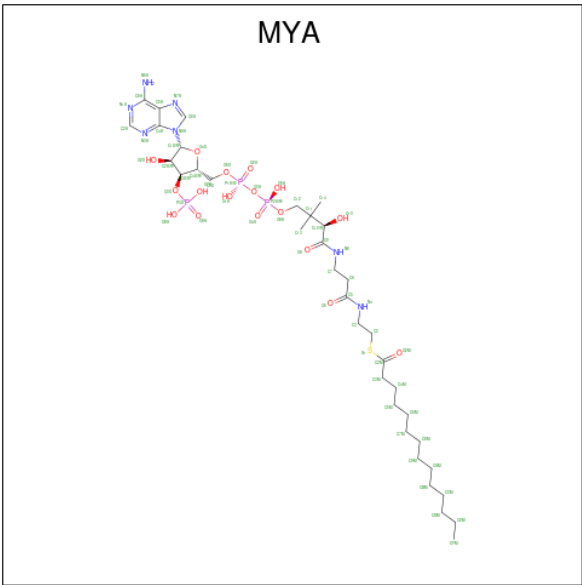
- Molecule 1 is a protein called Glycylpeptide N-tetradecanoyltransferase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	426	Total	C	H	N	O	S	0	24	0
			7361	2377	3666	624	674	20			
1	B	426	Total	C	H	N	O	S	0	19	0
			7188	2329	3570	611	656	22			

There are 8 discrepancies between the modelled and reference sequences:

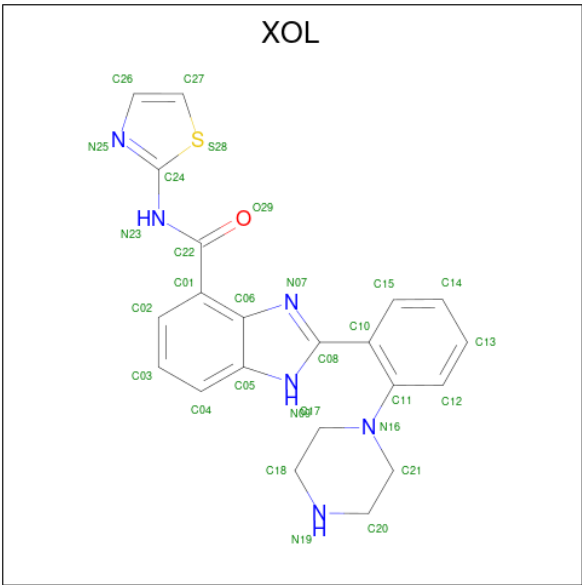
Chain	Residue	Modelled	Actual	Comment	Reference
A	36	GLY	-	expression tag	UNP Q5CV46
A	37	PRO	-	expression tag	UNP Q5CV46
A	38	GLY	-	expression tag	UNP Q5CV46
A	39	SER	-	expression tag	UNP Q5CV46
B	36	GLY	-	expression tag	UNP Q5CV46
B	37	PRO	-	expression tag	UNP Q5CV46
B	38	GLY	-	expression tag	UNP Q5CV46
B	39	SER	-	expression tag	UNP Q5CV46

- Molecule 2 is TETRADECANOYL-COA (three-letter code: MYA) (formula: C<sub>35</sub>H<sub>62</sub>N<sub>7</sub>O<sub>17</sub>P<sub>3</sub>S) (labeled as "Ligand of Interest" by depositor).



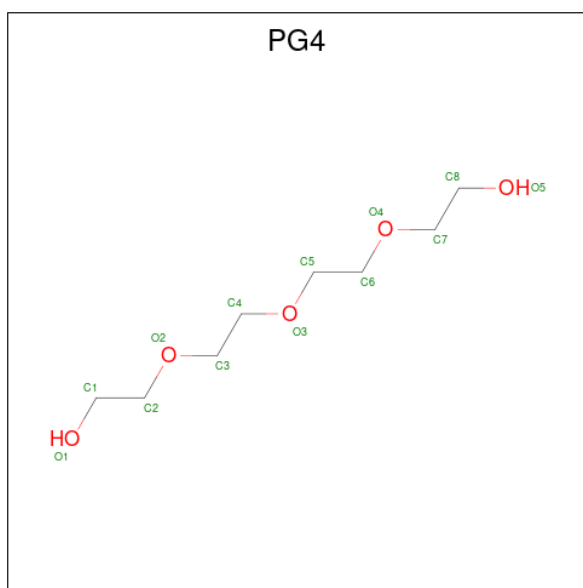
Mol	Chain	Residues	Atoms							ZeroOcc	AltConf
			Total	C	H	N	O	P	S		
2	A	1	121	35	58	7	17	3	1	0	0
2	B	1	121	35	58	7	17	3	1	0	0

- Molecule 3 is (2M)-2-[2-(piperazin-1-yl)phenyl]-N-(1,3-thiazol-2-yl)-1H-benzimidazole-4-carboxamide (three-letter code: XOL) (formula: C<sub>21</sub>H<sub>20</sub>N<sub>6</sub>OS) (labeled as "Ligand of Interest" by depositor).



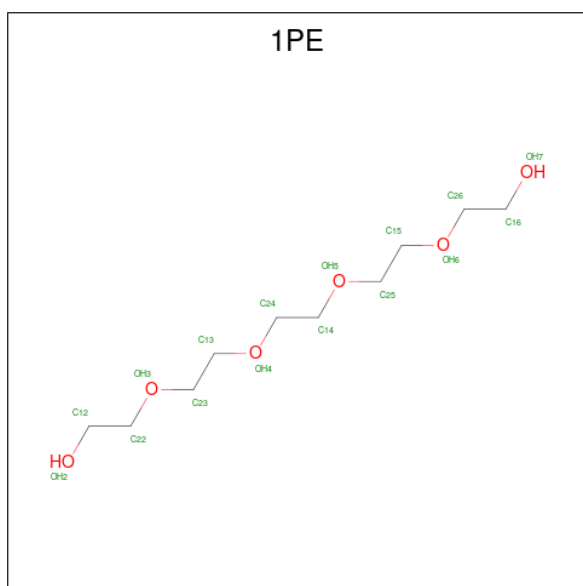
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
			Total	C	H	N	O	S		
3	A	1	50	21	21	6	1	1	0	0

- Molecule 4 is TETRAETHYLENE GLYCOL (three-letter code: PG4) (formula:  $C_8H_{18}O_5$ ).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	H	O	0	0
			31	8	18	5		
4	B	1	Total	C	H	O	0	1
			31	8	18	5		

- Molecule 5 is PENTAETHYLENE GLYCOL (three-letter code: 1PE) (formula:  $C_{10}H_{22}O_6$ ).



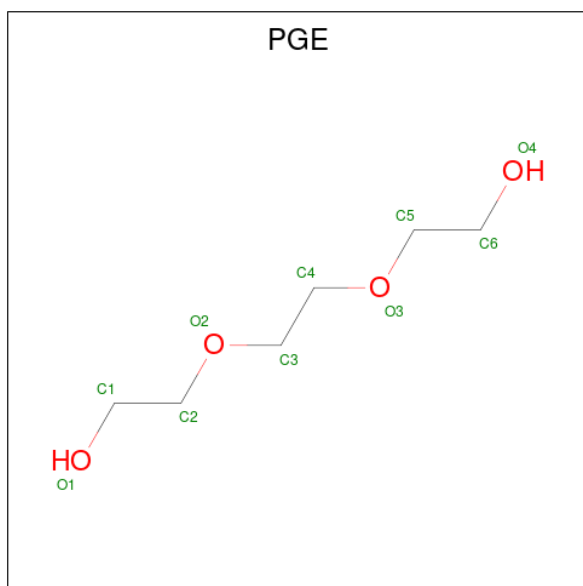
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total	C	H	O	0	0
			38	10	22	6		

*Continued on next page...*

Continued from previous page...

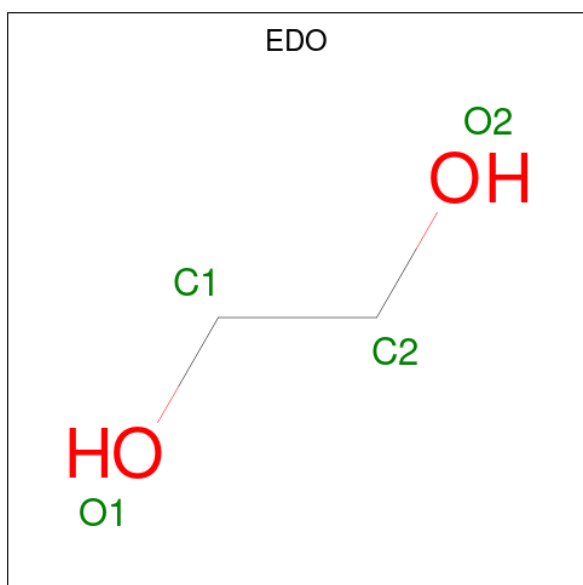
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	B	1	Total	C	H	O	0	0
			38	10	22	6		

- Molecule 6 is TRIETHYLENE GLYCOL (three-letter code: PGE) (formula:  $C_6H_{14}O_4$ ).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	A	1	Total	C	H	O	0	0
			24	6	14	4		

- Molecule 7 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula:  $C_2H_6O_2$ ).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	A	1	Total	C	H	O	0	1
			10	2	6	2		
7	B	1	Total	C	H	O	0	0
			10	2	6	2		

- Molecule 8 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	B	1	Total	Cl	0	0
			1	1		

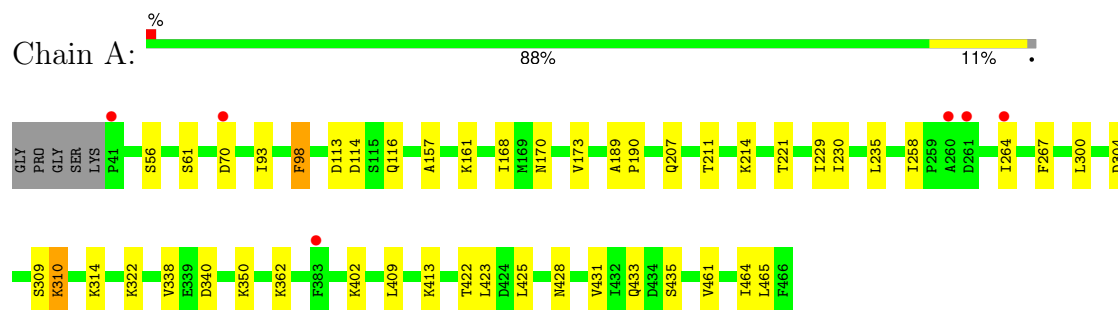
- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	303	Total	O	0	24
			303	303		
9	B	274	Total	O	0	8
			274	274		

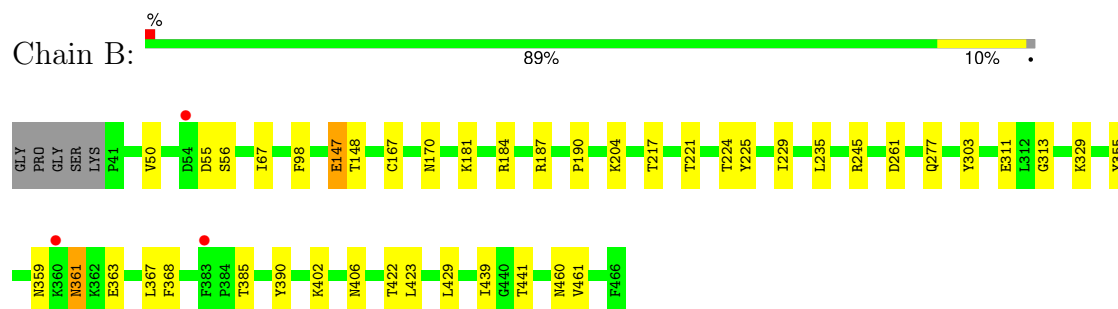
### 3 Residue-property plots [i](#)

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

- Molecule 1: Glycylpeptide N-tetradecanoyltransferase



- Molecule 1: Glycylpeptide N-tetradecanoyltransferase





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	53.78Å 88.23Å 98.06Å 90.00° 97.83° 90.00°	Depositor
Resolution (Å)	35.37 – 2.00 35.37 – 2.00	Depositor EDS
% Data completeness (in resolution range)	95.4 (35.37-2.00) 96.9 (35.37-2.00)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.37 (at 1.98Å)	Xtriage
Refinement program	PHENIX 1.20.1.4487	Depositor
R, $R_{free}$	0.155 , 0.207 0.155 , 0.206	Depositor DCC
$R_{free}$ test set	3019 reflections (4.91%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	26.1	Xtriage
Anisotropy	0.381	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.42 , 55.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	15601	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	37.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.86% 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: XOL, MYA, 1PE, PG4, EDO, PGE, CL

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	0.59	0/3780	0.68	0/5109
1	B	0.60	0/3703	0.68	0/5008
All	All	0.60	0/7483	0.68	0/10117

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	3695	3666	3642	29	0
1	B	3618	3570	3553	28	0
2	A	63	58	57	0	0
2	B	63	58	57	0	0
3	A	29	21	0	0	0
4	A	13	18	18	1	0
4	B	13	18	18	0	0
5	A	16	22	22	0	0
5	B	16	22	22	1	0
6	A	10	14	14	0	0
7	A	4	6	6	0	0

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	B	4	6	6	0	0
8	B	1	0	0	0	0
9	A	303	0	0	6	0
9	B	274	0	0	7	0
All	All	8122	7479	7415	58	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 4.

All (58) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:245:ARG:O	9:B:601:HOH:O	2.07	0.72
1:B:55:ASP:CB	9:B:822:HOH:O	2.38	0.70
1:A:168[A]:ILE:HG23	1:A:300:LEU:HD13	1.76	0.66
1:A:70:ASP:HA	9:A:623:HOH:O	1.97	0.64
1:A:338:VAL:HG23	9:A:809:HOH:O	2.01	0.59
1:A:422[B]:THR:HG22	1:A:423:LEU:O	2.03	0.58
1:B:224[B]:THR:HG23	9:B:621:HOH:O	2.05	0.57
1:A:170:ASN:ND2	1:A:304:ASP:OD2	2.33	0.56
1:B:229:ILE:HG23	1:B:235:LEU:HD12	1.88	0.55
1:B:277[B]:GLN:OE1	1:B:363:GLU:HA	2.08	0.54
1:A:173:VAL:HG13	1:A:465:LEU:HD23	1.92	0.52
1:B:402:LYS:HE3	9:B:861:HOH:O	2.10	0.52
1:A:428:ASN:O	1:A:431[B]:VAL:HG22	2.09	0.52
1:A:173:VAL:CG1	1:A:465:LEU:HD23	2.40	0.52
1:A:413:LYS:NZ	9:A:612:HOH:O	2.42	0.51
4:A:503:PG4:H51	9:A:765:HOH:O	2.11	0.51
1:B:406:ASN:HB2	9:B:625:HOH:O	2.11	0.51
1:B:390:TYR:CE2	5:B:503:1PE:H241	2.47	0.49
1:A:114:ASP:O	1:A:116:GLN:NE2	2.43	0.48
1:B:441:THR:HG23	1:B:441:THR:O	2.15	0.47
1:A:93:ILE:HA	1:A:98:PHE:CD2	2.50	0.47
1:A:229:ILE:HG23	1:A:235:LEU:HD12	1.97	0.46
1:A:258[A]:ILE:HD12	1:A:409:LEU:HD13	1.97	0.45
1:A:113[B]:ASP:OD1	1:A:113[B]:ASP:N	2.47	0.45
1:B:225[B]:TYR:OH	1:B:441:THR:O	2.27	0.45
1:B:167[B]:CYS:SG	1:B:303:TYR:HB2	2.56	0.45
1:B:181:LYS:HA	1:B:184:ARG:HG3	1.98	0.45
1:A:425:LEU:HD12	1:A:464:ILE:HD13	1.99	0.45
1:B:187:ARG:O	1:B:190:PRO:HD2	2.17	0.45

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:221:THR:HG21	1:B:461:VAL:HG21	1.98	0.44
1:B:224[A]:THR:CG2	1:B:439:ILE:HD11	2.48	0.44
1:A:211:THR:CG2	1:A:465:LEU:HD13	2.47	0.44
1:A:189:ALA:HB3	1:A:190:PRO:HD3	2.00	0.44
1:B:359:ASN:OD1	1:B:361:ASN:N	2.51	0.44
1:A:264[A]:ILE:CD1	1:A:267:PHE:HE2	2.31	0.44
1:B:277[B]:GLN:HG3	9:B:818:HOH:O	2.17	0.44
1:B:367:LEU:HD23	1:B:367:LEU:C	2.39	0.44
1:A:425:LEU:CD1	1:A:464:ILE:HD13	2.48	0.43
1:A:211:THR:HG23	1:A:465:LEU:HD13	2.01	0.43
1:B:329:LYS:O	1:B:460[A]:ASN:HA	2.18	0.43
1:B:355:TYR:HB2	1:B:368:PHE:CZ	2.53	0.43
1:B:67:ILE:HD13	1:B:313:GLY:HA3	2.00	0.43
1:B:359:ASN:OD1	1:B:359:ASN:C	2.57	0.43
1:A:157:ALA:HA	1:A:173:VAL:O	2.18	0.43
1:A:431[B]:VAL:O	1:A:435:SER:HB3	2.19	0.42
1:A:161:LYS:NZ	1:A:340:ASP:OD2	2.44	0.42
1:B:50:VAL:HG21	1:B:217:THR:HG21	2.02	0.42
1:A:230:ILE:HG12	1:A:258[B]:ILE:HD11	2.02	0.42
1:B:329:LYS:O	1:B:460[B]:ASN:HA	2.19	0.41
1:B:147:GLU:HG3	1:B:148:THR:HG23	2.02	0.41
1:A:310:LYS:O	1:A:314:LYS:HG3	2.20	0.41
1:A:221:THR:HG21	1:A:461:VAL:HG21	2.02	0.41
1:B:422:THR:HG22	1:B:423:LEU:O	2.21	0.41
1:B:429:LEU:HD23	1:B:429:LEU:HA	1.88	0.41
1:A:207:GLN:HB2	9:A:699:HOH:O	2.22	0.40
1:B:170:ASN:HB3	9:B:765:HOH:O	2.21	0.40
1:A:402:LYS:HA	1:A:431[B]:VAL:HG12	2.04	0.40
1:A:433:GLN:NE2	9:A:606:HOH:O	2.37	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles ⓘ

### 5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all 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	446/431 (104%)	428 (96%)	18 (4%)	0	100	100
1	B	439/431 (102%)	423 (96%)	15 (3%)	1 (0%)	44	42
All	All	885/862 (103%)	851 (96%)	33 (4%)	1 (0%)	48	47

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	56	SER

### 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	416/404 (103%)	405 (97%)	11 (3%)	41	44
1	B	405/404 (100%)	398 (98%)	7 (2%)	56	61
All	All	821/808 (102%)	803 (98%)	18 (2%)	50	51

All (18) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	56	SER
1	A	61[A]	SER
1	A	61[B]	SER
1	A	98	PHE
1	A	214[A]	LYS
1	A	309	SER
1	A	310	LYS
1	A	322	LYS
1	A	350[A]	LYS
1	A	350[B]	LYS
1	A	362	LYS
1	B	98	PHE
1	B	147	GLU
1	B	204	LYS
1	B	261	ASP

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
1	B	311	GLU
1	B	361	ASN
1	B	385	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry ⓘ

Of 11 ligands modelled in this entry, 1 is monoatomic - leaving 10 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	$\# Z  > 2$
7	EDO	A	506[A]	-	3,3,3	0.45	0	2,2,2	0.41	0
4	PG4	B	504[B]	-	12,12,12	0.19	0	11,11,11	0.53	0
7	EDO	B	502	-	3,3,3	0.36	0	2,2,2	0.35	0
4	PG4	A	503	-	12,12,12	0.23	0	11,11,11	0.37	0
2	MYA	B	501	-	59,65,65	2.98	14 (23%)	72,91,91	1.36	9 (12%)
5	1PE	B	503	-	15,15,15	0.27	0	14,14,14	0.44	0
2	MYA	A	501	-	59,65,65	2.94	12 (20%)	72,91,91	1.51	13 (18%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
6	PGE	A	505	-	9,9,9	0.36	0	8,8,8	0.33	0
5	1PE	A	504	-	15,15,15	0.17	0	14,14,14	0.25	0
3	XOL	A	502	-	29,33,33	1.62	5 (17%)	30,46,46	1.14	3 (10%)

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
7	EDO	A	506[A]	-	-	0/1/1/1	-
4	PG4	B	504[B]	-	-	1/10/10/10	-
7	EDO	B	502	-	-	0/1/1/1	-
4	PG4	A	503	-	-	3/10/10/10	-
2	MYA	B	501	-	-	1/60/80/80	0/3/3/3
5	1PE	B	503	-	-	5/13/13/13	-
2	MYA	A	501	-	-	4/60/80/80	0/3/3/3
6	PGE	A	505	-	-	4/7/7/7	-
5	1PE	A	504	-	-	7/13/13/13	-
3	XOL	A	502	-	-	6/14/24/24	0/5/5/5

All (31) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	501	MYA	C2X-C3X	-12.13	1.26	1.53
2	B	501	MYA	C2X-C3X	-11.96	1.26	1.53
2	B	501	MYA	O4X-C1X	11.11	1.55	1.40
2	A	501	MYA	O4X-C1X	10.63	1.54	1.40
2	A	501	MYA	C1X-N9A	-7.86	1.30	1.49
2	B	501	MYA	C1X-N9A	-7.37	1.31	1.49
2	B	501	MYA	O4X-C4X	-6.76	1.30	1.45
2	A	501	MYA	O4X-C4X	-6.35	1.30	1.45
2	B	501	MYA	C9-N8	5.55	1.46	1.33
2	B	501	MYA	C3X-C4X	5.48	1.67	1.52
2	A	501	MYA	C3X-C4X	5.41	1.66	1.52
2	A	501	MYA	C9-N8	4.97	1.45	1.33
2	B	501	MYA	C5-N4	4.86	1.44	1.33
2	A	501	MYA	C5-N4	4.53	1.44	1.33
3	A	502	XOL	C24-N23	3.86	1.43	1.36
2	A	501	MYA	C6A-N6A	3.18	1.45	1.34
2	B	501	MYA	C2M-S1	3.09	1.83	1.76

Continued on next page...

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	502	XOL	C22-N23	2.99	1.44	1.35
2	B	501	MYA	P1A-O3A	2.91	1.62	1.59
2	B	501	MYA	C6A-N6A	2.90	1.44	1.34
3	A	502	XOL	C08-N07	-2.80	1.32	1.35
2	B	501	MYA	O5-C5	-2.68	1.17	1.23
3	A	502	XOL	C10-C11	-2.54	1.37	1.41
2	A	501	MYA	P1A-O3A	2.36	1.62	1.59
2	A	501	MYA	P2A-O3A	2.36	1.62	1.59
2	A	501	MYA	O2X-C2X	2.31	1.48	1.43
3	A	502	XOL	C21-N16	2.17	1.50	1.46
2	B	501	MYA	O2X-C2X	2.16	1.48	1.43
2	B	501	MYA	O9-C9	-2.14	1.19	1.23
2	A	501	MYA	C6-C5	2.13	1.55	1.51
2	B	501	MYA	P3X-O3X	2.02	1.63	1.59

All (25) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	501	MYA	N3A-C2A-N1A	-4.66	122.35	128.67
2	B	501	MYA	C3M-C2M-S1	4.46	118.72	113.40
2	B	501	MYA	N3A-C2A-N1A	-4.38	122.72	128.67
2	B	501	MYA	O2M-C2M-C3M	-3.59	119.83	123.98
2	A	501	MYA	C3X-C2X-C1X	3.42	107.41	99.89
2	A	501	MYA	O6A-C12-C11	-3.33	105.20	110.55
2	A	501	MYA	O4X-C1X-N9A	3.10	112.86	108.75
2	A	501	MYA	C6-C7-N8	-3.07	105.48	112.00
3	A	502	XOL	C21-N16-C17	-2.86	105.13	111.57
2	B	501	MYA	O6A-C12-C11	-2.80	106.05	110.55
2	A	501	MYA	C4A-C5A-N7A	-2.62	106.56	109.34
2	B	501	MYA	P3X-O3X-C3X	-2.59	116.52	123.43
2	A	501	MYA	O3X-C3X-C4X	-2.57	100.98	110.03
2	A	501	MYA	O5-C5-C6	2.55	126.63	122.02
2	B	501	MYA	C2-C3-N4	-2.54	107.12	112.41
2	B	501	MYA	C3X-C2X-C1X	2.43	105.24	99.89
2	A	501	MYA	C2-C3-N4	-2.29	107.64	112.41
2	B	501	MYA	C4M-C3M-C2M	-2.26	107.28	112.27
2	A	501	MYA	O5A-P2A-O3A	-2.25	101.20	107.27
2	B	501	MYA	O4X-C1X-N9A	2.20	111.66	108.75
3	A	502	XOL	C08-N09-C05	2.13	108.00	103.78
2	A	501	MYA	O5X-C5X-C4X	-2.05	102.02	108.99
2	A	501	MYA	C13-C11-C10	2.04	112.24	108.77
3	A	502	XOL	C15-C10-C11	2.02	119.87	117.84

*Continued on next page...*



*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	501	MYA	C13-C11-C12	-2.02	104.89	108.22

There are no chirality outliers.

All (31) torsion outliers are listed below:

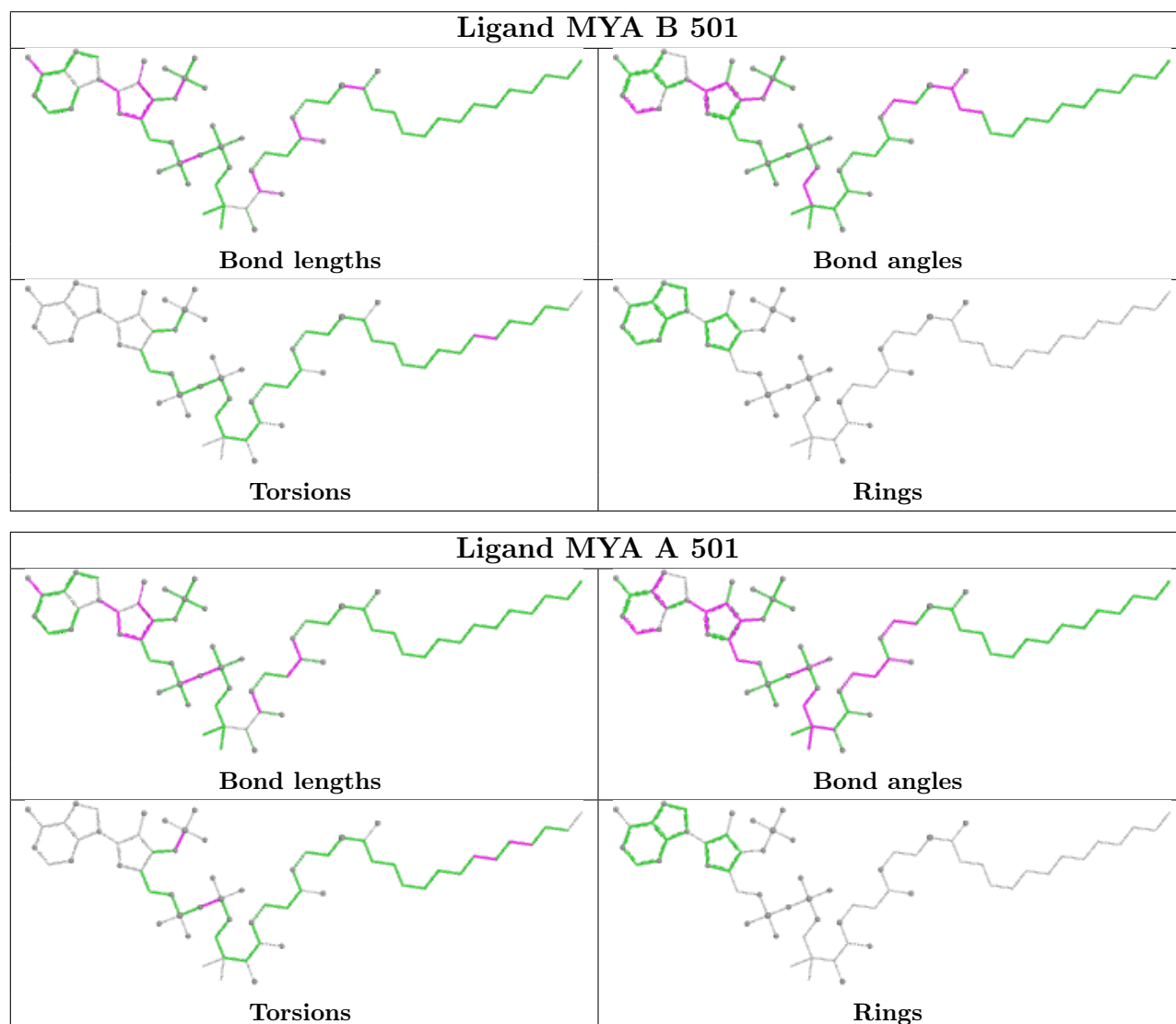
Mol	Chain	Res	Type	Atoms
3	A	502	XOL	N09-C08-C10-C15
5	A	504	1PE	OH5-C14-C24-OH4
5	A	504	1PE	OH4-C13-C23-OH3
5	A	504	1PE	OH7-C16-C26-OH6
6	A	505	PGE	O3-C5-C6-O4
5	B	503	1PE	OH4-C13-C23-OH3
2	A	501	MYA	CAM-CBM-CCM-CDM
4	A	503	PG4	O4-C7-C8-O5
5	B	503	1PE	C13-C23-OH3-C22
6	A	505	PGE	C1-C2-O2-C3
4	B	504[B]	PG4	C1-C2-O2-C3
3	A	502	XOL	N07-C08-C10-C15
5	A	504	1PE	C14-C24-OH4-C13
5	A	504	1PE	C12-C22-OH3-C23
2	A	501	MYA	C8M-C9M-CAM-CBM
5	A	504	1PE	OH2-C12-C22-OH3
6	A	505	PGE	C4-C3-O2-C2
5	B	503	1PE	OH2-C12-C22-OH3
5	A	504	1PE	C16-C26-OH6-C15
5	B	503	1PE	C23-C13-OH4-C24
2	A	501	MYA	C3X-O3X-P3X-O8A
3	A	502	XOL	C02-C01-C22-O29
3	A	502	XOL	C06-C01-C22-O29
6	A	505	PGE	O2-C3-C4-O3
3	A	502	XOL	C02-C01-C22-N23
3	A	502	XOL	C06-C01-C22-N23
4	A	503	PG4	O1-C1-C2-O2
4	A	503	PG4	C8-C7-O4-C6
5	B	503	1PE	OH5-C14-C24-OH4
2	B	501	MYA	C8M-C9M-CAM-CBM
2	A	501	MYA	P1A-O3A-P2A-O5A

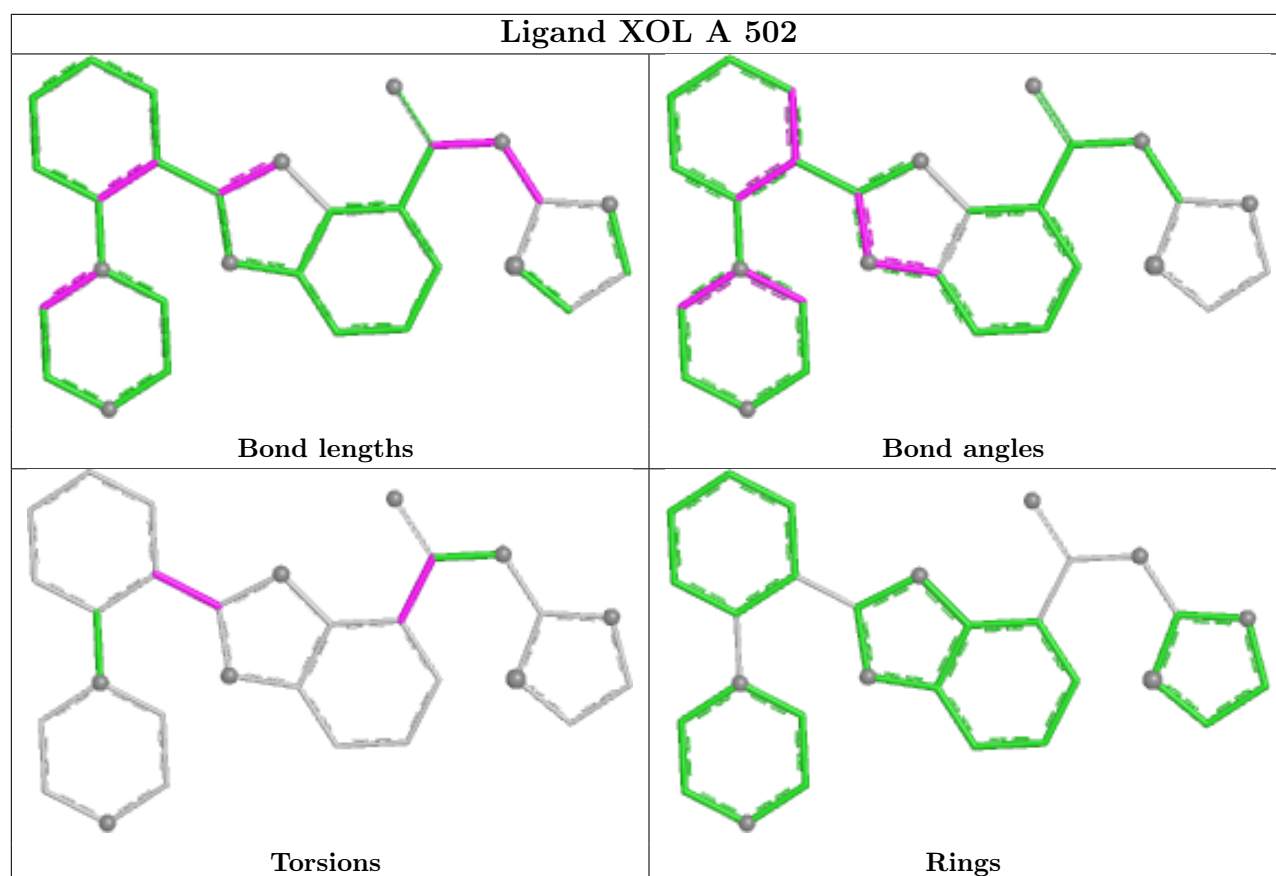
There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	503	PG4	1	0
5	B	503	1PE	1	0

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





## 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

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

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

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ > 2		OWAB(Å <sup>2</sup> )	Q < 0.9
1	A	426/431 (98%)	-0.32	6 (1%)	73 72	12, 33, 65, 93	23 (5%)
1	B	426/431 (98%)	-0.38	3 (0%)	84 83	14, 32, 62, 118	16 (3%)
All	All	852/862 (98%)	-0.35	9 (1%)	77 76	12, 33, 65, 118	39 (4%)

All (9) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	360	LYS	2.9
1	A	260	ALA	2.7
1	A	383	PHE	2.5
1	B	383	PHE	2.5
1	A	261	ASP	2.3
1	A	70	ASP	2.2
1	A	264[A]	ILE	2.1
1	B	54	ASP	2.1
1	A	41	PRO	2.1

### 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 monosaccharides in this entry.

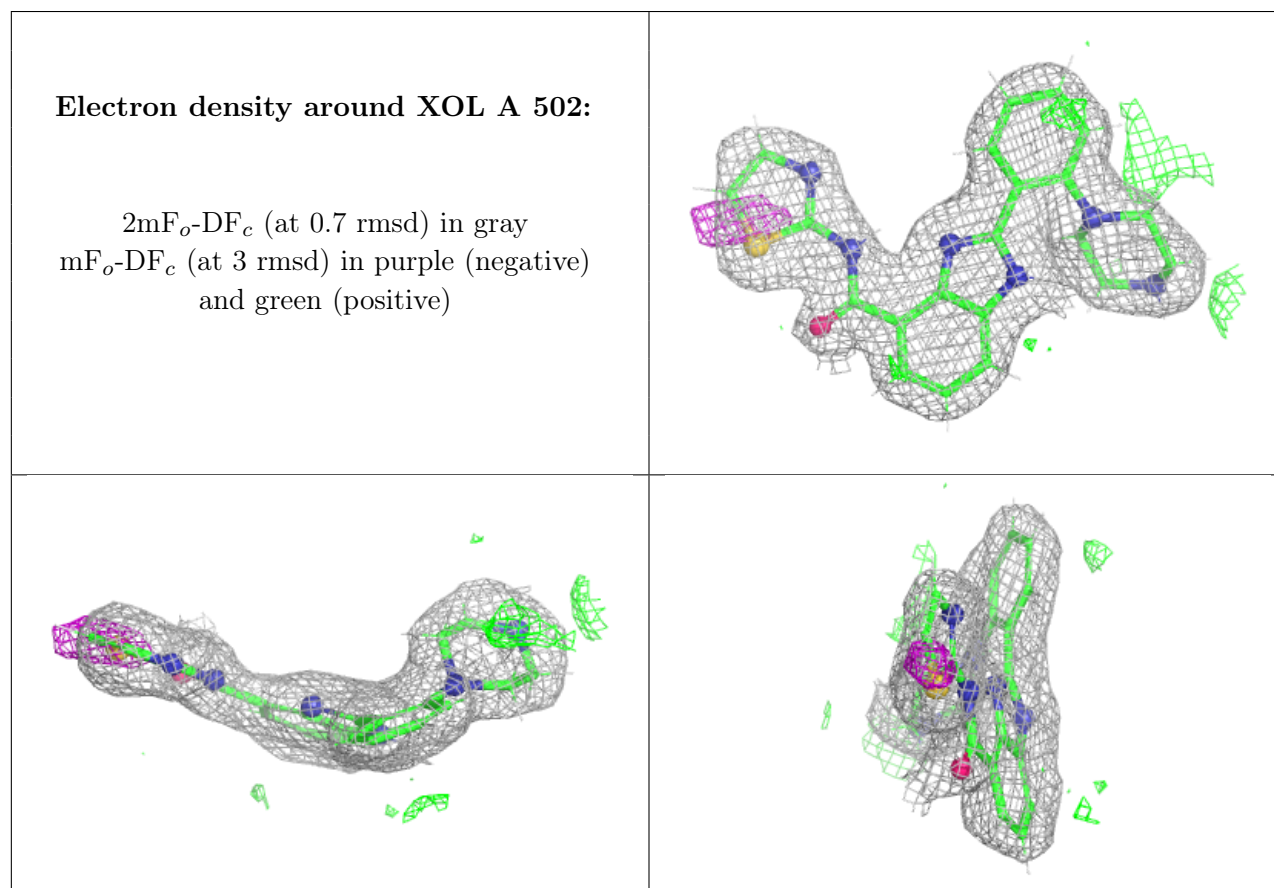
### 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum,

median, 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.

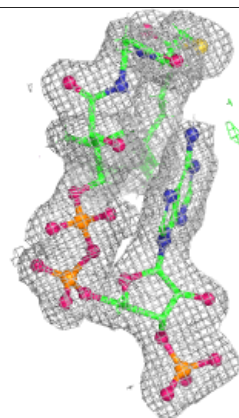
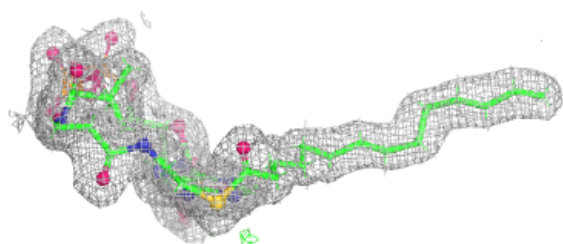
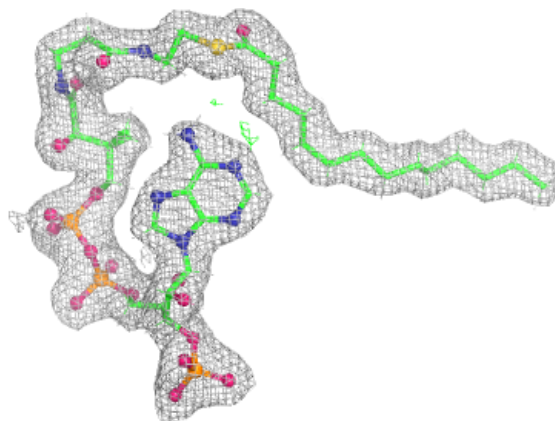
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
5	1PE	B	503	16/16	0.77	0.15	35,52,68,72	0
4	PG4	A	503	13/13	0.79	0.15	46,63,78,81	0
4	PG4	B	504[B]	13/13	0.86	0.12	46,65,81,93	0
6	PGE	A	505	10/10	0.86	0.13	47,62,72,74	0
7	EDO	B	502	4/4	0.88	0.12	33,46,56,57	0
7	EDO	A	506[A]	4/4	0.90	0.15	23,29,41,50	10
5	1PE	A	504	16/16	0.90	0.11	32,52,73,81	0
3	XOL	A	502	29/29	0.95	0.06	24,33,40,42	0
2	MYA	A	501	63/63	0.97	0.05	17,27,38,47	0
2	MYA	B	501	63/63	0.97	0.05	16,26,37,42	0
8	CL	B	505	1/1	0.97	0.15	46,46,46,46	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.

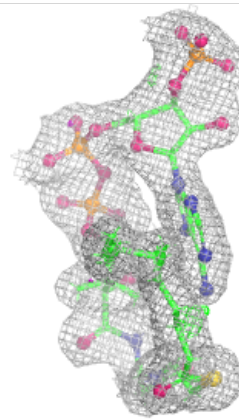
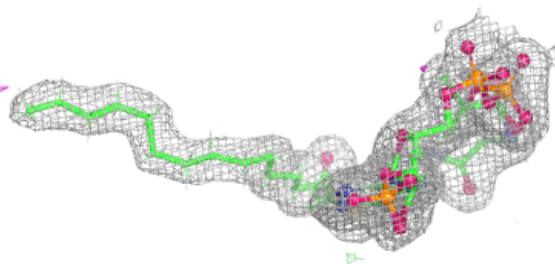
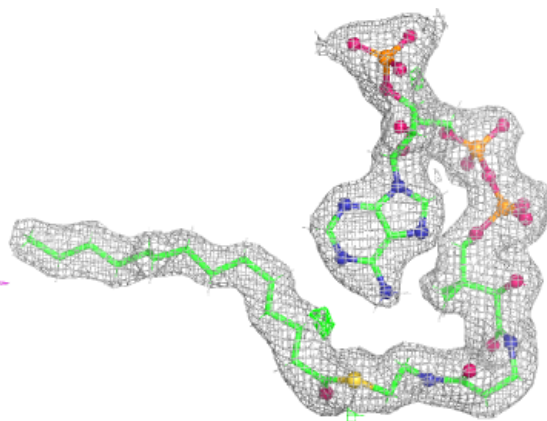


**Electron density around MYA A 501:**

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

**Electron density around MYA B 501:**

$2mF_o-DF_c$  (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.