



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 6, 2020 – 10:26 AM BST

PDB ID : 4CZ8  
Title : Structure of the sodium proton antiporter PaNhaP from *Pyrococcus abyssi* at pH 8.  
Authors : Woehlert, D.; Kuhlbrandt, W.; Yildiz, O.  
Deposited on : 2014-04-16  
Resolution : 3.15 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.

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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 : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.13.1  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.13.1

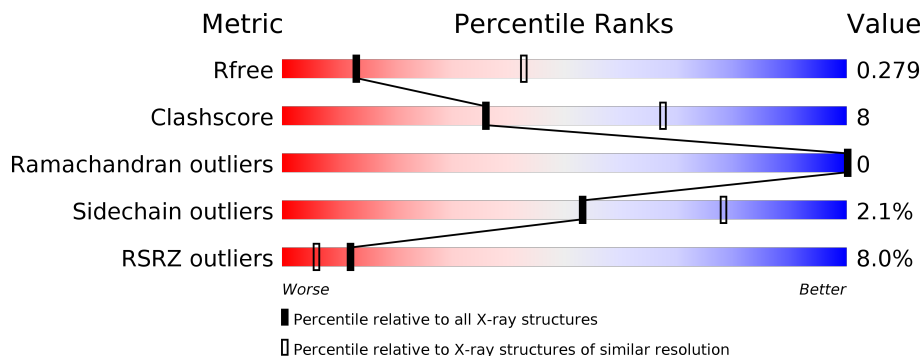
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.15 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	1665 (3.20-3.12)
Clashscore	141614	1804 (3.20-3.12)
Ramachandran outliers	138981	1770 (3.20-3.12)
Sidechain outliers	138945	1769 (3.20-3.12)
RSRZ outliers	127900	1616 (3.20-3.12)

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 on 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	422	
1	B	422	

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	BOG	A	1423	-	-	-	X
4	TAM	A	1425	-	-	-	X
4	TAM	A	1426	-	-	-	X

## 2 Entry composition [i](#)

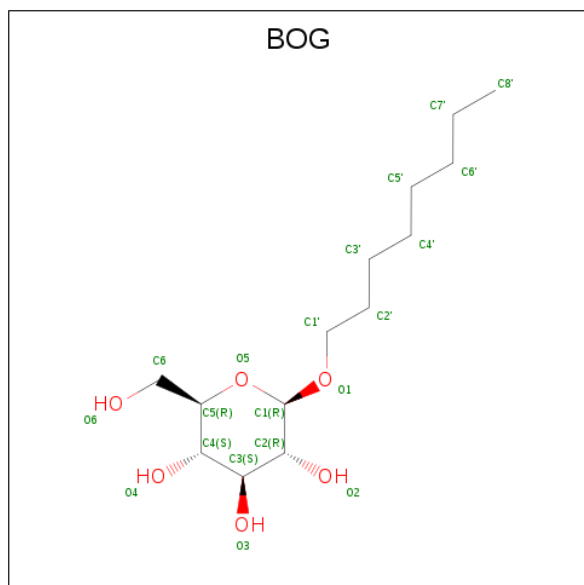
There are 6 unique types of molecules in this entry. The entry contains 6715 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 NA<sup>+</sup>/H<sup>+</sup> ANTIporter, PUTATIVE.

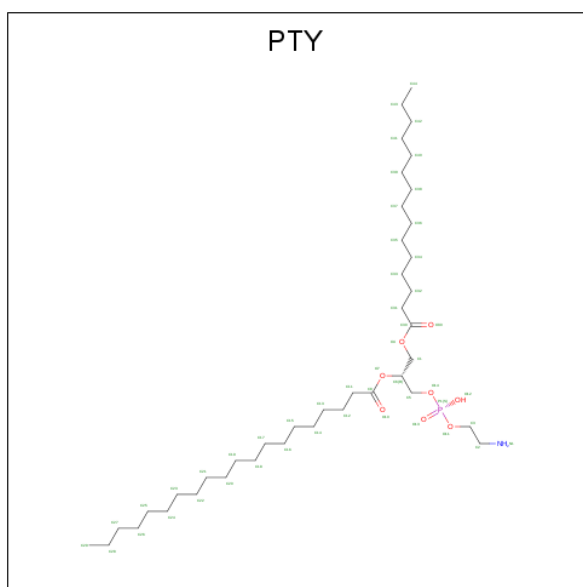
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	Se			
1	A	422	Total 3295	C 2217	N 516	O 555	Se 7	0	0	0
1	B	421	Total 3287	C 2212	N 515	O 554	Se 6	0	0	0

- Molecule 2 is octyl beta-D-glucopyranoside (three-letter code: BOG) (formula: C<sub>14</sub>H<sub>28</sub>O<sub>6</sub>).



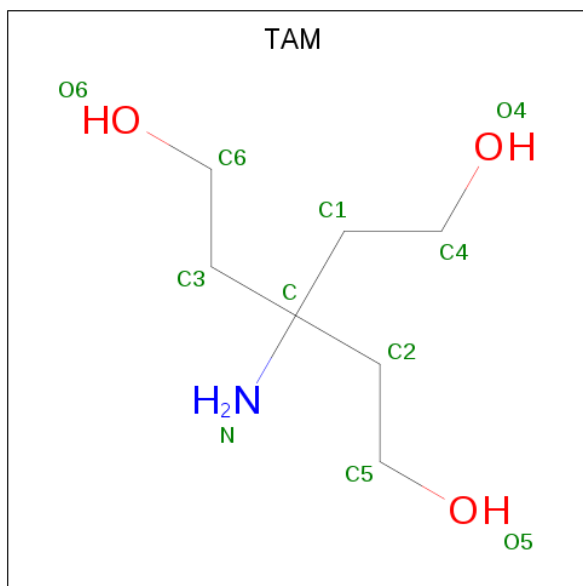
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
2	A	1	Total 20	C 14	O 6	0	0

- Molecule 3 is PHOSPHATIDYLETHANOLAMINE (three-letter code: PTY) (formula: C<sub>40</sub>H<sub>80</sub>NO<sub>8</sub>P).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
3	A	1	50	40	1	8	1	0	0

- Molecule 4 is TRIS(HYDROXYETHYL)AMINOMETHANE (three-letter code: TAM) (formula:  $C_7H_{17}NO_3$ ).



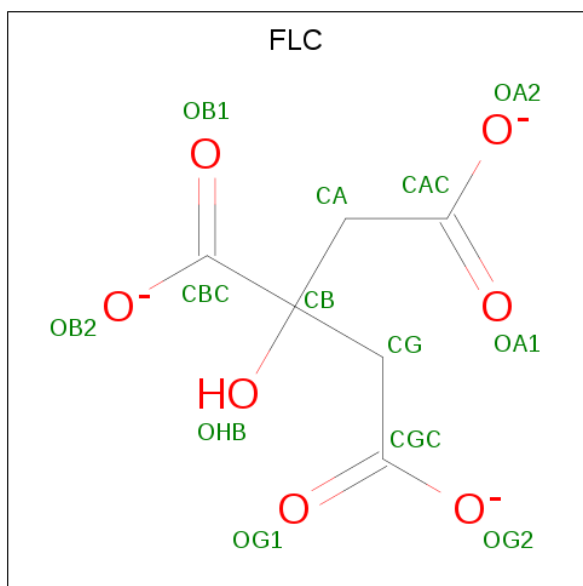
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
4	A	1	11	7	1	3	0	0
4	A	1	11	7	1	3	0	0

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	
4	B	1	Total	C	N	O	0	0
			11	7	1	3		

- Molecule 5 is CITRATE ANION (three-letter code: FLC) (formula:  $C_6H_5O_7$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	B	1	Total	C	O	0	0
			13	6	7		
5	B	1	Total	C	O	0	0
			13	6	7		

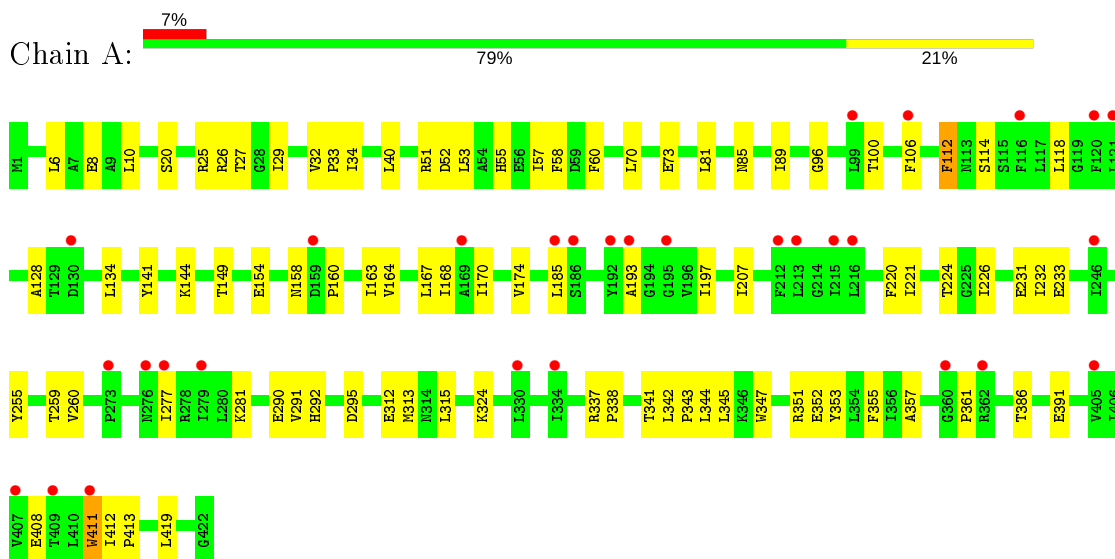
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	2	Total	O	0	0
			2	2		
6	B	2	Total	O	0	0
			2	2		

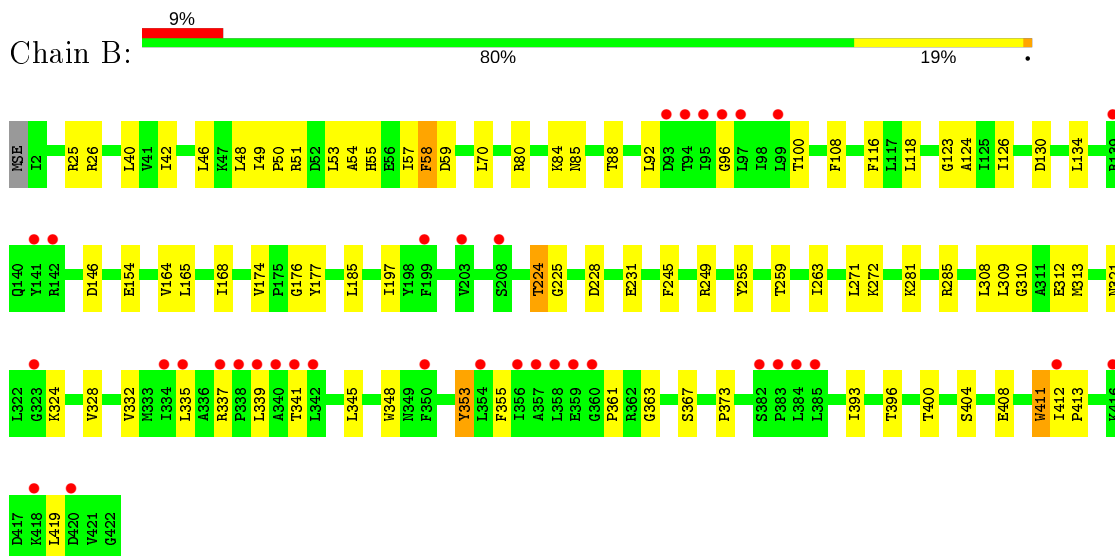
### 3 Residue-property plots [i](#)

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: NA<sup>+</sup>/H<sup>+</sup> ANTIPTORTER, PUTATIVE



- Molecule 1: NA<sup>+</sup>/H<sup>+</sup> ANTIPTORTER, PUTATIVE



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	54.49Å 107.94Å 107.93Å 90.00° 95.19° 90.00°	Depositor
Resolution (Å)	48.49 – 3.15 48.49 – 3.15	Depositor EDS
% Data completeness (in resolution range)	96.7 (48.49-3.15) 97.6 (48.49-3.15)	Depositor EDS
$R_{merge}$	0.03	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.88 (at 3.12Å)	Xtrriage
Refinement program		Depositor
R, $R_{free}$	0.239 , 0.276 0.255 , 0.279	Depositor DCC
$R_{free}$ test set	1088 reflections (5.15%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	121.2	Xtrriage
Anisotropy	0.585	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.28 , 98.5	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.89	EDS
Total number of atoms	6715	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	133.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.38% 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: TAM, FLC, PTY, BOG

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	0.24	0/3362	0.42	0/4564
1	B	0.24	0/3354	0.42	0/4554
All	All	0.24	0/6716	0.42	0/9118

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	3295	0	3534	59	0
1	B	3287	0	3522	52	0
2	A	20	0	28	2	0
3	A	50	0	79	2	0
4	A	22	0	34	5	0
4	B	11	0	17	3	0
5	B	26	0	10	1	0
6	A	2	0	0	0	0
6	B	2	0	0	0	0
All	All	6715	0	7224	112	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 8.

All (112) 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:51:ARG:NH1	1:B:312:GLU:O	2.24	0.71
1:A:160:PRO:HG3	1:A:259:THR:HG21	1.73	0.70
1:B:174:VAL:HG12	1:B:176:GLY:H	1.58	0.69
1:A:6:LEU:HD13	1:A:53:LEU:HD11	1.78	0.65
1:A:221:ILE:HG23	1:A:226:ILE:HB	1.79	0.65
1:A:144:LYS:NZ	1:A:352:GLU:OE2	2.29	0.65
3:A:1424:PTY:H211	3:A:1424:PTY:H271	1.80	0.63
1:A:8:GLU:OE2	1:B:249:ARG:NH1	2.32	0.62
1:B:134:LEU:HD11	1:B:361:PRO:HD3	1.82	0.61
1:A:141:TYR:HE2	1:A:413:PRO:HB3	1.65	0.61
1:A:26:ARG:NH2	1:B:225:GLY:O	2.34	0.61
1:B:321:ASN:HA	1:B:324:LYS:HE3	1.84	0.60
1:A:185:LEU:HD23	1:A:197:ILE:HG23	1.83	0.60
1:B:355:PHE:HB2	1:B:419:LEU:HD13	1.84	0.59
1:A:338:PRO:O	1:A:353:TYR:OH	2.21	0.58
1:A:224:THR:HG23	1:A:226:ILE:HG13	1.86	0.57
1:A:163:ILE:O	1:A:167:LEU:N	2.37	0.57
1:A:10:LEU:HD21	1:A:57:ILE:HD12	1.86	0.56
1:A:337:ARG:O	1:A:341:THR:OG1	2.14	0.56
1:A:128:ALA:HA	1:A:158:ASN:HB3	1.86	0.56
1:A:26:ARG:NH2	1:B:224:THR:O	2.33	0.56
1:A:20:SER:HB3	1:A:34:ILE:HG22	1.87	0.56
1:A:342:LEU:N	1:A:343:PRO:HD2	2.21	0.56
1:A:26:ARG:NH1	1:B:231:GLU:OE2	2.40	0.55
1:B:185:LEU:HD23	1:B:197:ILE:HG23	1.89	0.55
1:B:123:GLY:HA2	1:B:126:ILE:HG22	1.87	0.54
1:B:310:GLY:HA2	1:B:313:MSE:HE3	1.89	0.54
1:B:88:THR:HG1	1:B:348:TRP:HE1	1.55	0.54
1:A:81:LEU:HB3	1:A:149:THR:HG21	1.90	0.53
1:A:112:PHE:HD2	1:A:324:LYS:HD3	1.74	0.53
1:B:54:ALA:O	1:B:58:PHE:HB2	2.08	0.53
1:A:207:ILE:HA	1:A:260:VAL:HG21	1.91	0.53
1:B:337:ARG:O	1:B:341:THR:OG1	2.19	0.53
1:A:292:HIS:HB2	2:A:1423:BOG:H3'2	1.91	0.52
1:A:351:ARG:HB3	1:A:419:LEU:HB2	1.92	0.52
1:B:408:GLU:OE1	1:B:411:TRP:NE1	2.43	0.52
1:A:55:HIS:ND1	1:A:312:GLU:OE2	2.42	0.52
1:A:25:ARG:NH1	1:B:228:ASP:OD2	2.42	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:B:1425:TAM:O5	4:B:1425:TAM:N	2.41	0.51
1:B:70:LEU:HD12	1:B:255:TYR:HB3	1.92	0.51
1:A:70:LEU:HD12	1:A:255:TYR:HB3	1.93	0.51
1:A:53:LEU:O	1:A:57:ILE:HG12	2.11	0.51
1:B:309:LEU:HD22	1:B:367:SER:HB3	1.91	0.51
1:A:141:TYR:CE2	1:A:413:PRO:HB3	2.47	0.50
5:B:1424:FLC:OHB	5:B:1424:FLC:OA2	2.27	0.50
1:B:55:HIS:ND1	1:B:312:GLU:OE2	2.40	0.49
1:A:51:ARG:NH2	1:A:391:GLU:OE2	2.38	0.49
1:B:59:ASP:O	4:B:1425:TAM:O5	2.31	0.49
1:A:295:ASP:OD1	4:A:1425:TAM:O6	2.19	0.48
1:B:228:ASP:OD1	1:B:228:ASP:N	2.41	0.48
1:B:335:LEU:O	1:B:339:LEU:HB2	2.14	0.48
1:A:164:VAL:O	1:A:168:ILE:HG12	2.14	0.48
1:B:396:THR:O	1:B:400:THR:HG22	2.13	0.47
4:A:1425:TAM:O6	4:A:1425:TAM:N	2.48	0.47
1:B:57:ILE:HG22	1:B:308:LEU:HD11	1.97	0.47
2:A:1423:BOG:O6	2:A:1423:BOG:O4	2.28	0.47
1:B:42:ILE:HD12	1:B:49:ILE:HD12	1.97	0.46
1:B:412:ILE:HG23	1:B:413:PRO:HD3	1.97	0.46
1:B:92:LEU:HB3	1:B:154:GLU:HG3	1.96	0.46
4:A:1425:TAM:H41	4:A:1425:TAM:H21	1.40	0.46
1:A:338:PRO:HB3	1:A:357:ALA:HB1	1.98	0.46
1:A:315:LEU:H	1:A:315:LEU:HD22	1.81	0.46
1:B:40:LEU:HD11	1:B:313:MSE:SE	2.66	0.45
1:B:404:SER:O	1:B:408:GLU:HG2	2.17	0.45
1:A:96:GLY:O	1:A:100:THR:OG1	2.25	0.45
1:B:124:ALA:HB1	1:B:165:LEU:HB3	1.99	0.45
1:B:130:ASP:HB3	1:B:363:GLY:HA3	1.98	0.44
1:B:46:LEU:HB3	1:B:48:LEU:HG	1.98	0.44
1:B:408:GLU:HA	1:B:411:TRP:CD1	2.52	0.44
1:A:233:GLU:HG3	1:A:290:GLU:HA	1.99	0.44
1:A:220:PHE:O	1:A:224:THR:HG22	2.17	0.44
1:B:50:PRO:HG2	1:B:53:LEU:HB3	1.99	0.44
1:A:85:ASN:O	1:A:89:ILE:HG12	2.18	0.43
4:B:1425:TAM:H62	4:B:1425:TAM:H11	1.67	0.43
1:B:164:VAL:O	1:B:168:ILE:HG12	2.19	0.43
1:B:373:PRO:HG3	1:B:393:ILE:HG21	2.01	0.43
1:A:277:ILE:O	1:A:281:LYS:HG2	2.19	0.43
1:B:361:PRO:HB3	1:B:408:GLU:HG3	2.01	0.43
1:A:32:VAL:HB	1:A:33:PRO:HD3	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:345:LEU:HD23	1:B:353:TYR:CD2	2.53	0.43
1:A:60:PHE:CD2	3:A:1424:PTY:H111	2.54	0.43
1:A:408:GLU:HA	1:A:411:TRP:NE1	2.34	0.43
1:A:70:LEU:HB3	1:A:259:THR:HG22	2.00	0.43
1:B:272:LYS:HA	1:B:272:LYS:HD3	1.76	0.43
1:B:245:PHE:O	1:B:249:ARG:HB2	2.19	0.42
1:A:291:VAL:O	1:A:295:ASP:HB2	2.20	0.42
1:B:324:LYS:O	1:B:328:VAL:HG23	2.19	0.42
1:A:70:LEU:HB3	1:A:259:THR:CG2	2.50	0.42
1:A:224:THR:O	1:B:26:ARG:NH2	2.41	0.42
1:A:40:LEU:HD13	1:A:313:MSE:HE3	2.02	0.42
1:B:281:LYS:O	1:B:285:ARG:HG2	2.19	0.42
1:A:114:SER:HB2	1:A:118:LEU:HD12	2.01	0.42
1:B:259:THR:O	1:B:263:ILE:HG13	2.20	0.42
1:A:27:THR:HB	1:A:29:ILE:HG13	2.01	0.42
1:B:85:ASN:ND2	1:B:146:ASP:OD1	2.53	0.42
4:A:1426:TAM:H42	4:A:1426:TAM:H21	1.56	0.41
1:A:170:ILE:O	1:A:174:VAL:HG22	2.19	0.41
1:A:408:GLU:HA	1:A:411:TRP:CD1	2.55	0.41
1:A:412:ILE:HG23	1:A:413:PRO:HD3	2.02	0.41
1:B:108:PHE:HE2	1:B:118:LEU:HD22	1.86	0.41
1:B:328:VAL:O	1:B:332:VAL:HG13	2.21	0.41
1:A:193:ALA:O	1:A:197:ILE:HG22	2.21	0.41
1:A:344:LEU:HA	1:A:344:LEU:HD12	1.83	0.41
1:A:231:GLU:OE2	1:B:25:ARG:HD2	2.21	0.41
1:A:232:ILE:HG13	1:A:290:GLU:HB2	2.03	0.41
1:A:355:PHE:HB2	1:A:419:LEU:HD22	2.03	0.41
1:A:134:LEU:HD11	1:A:361:PRO:HD3	2.02	0.41
1:A:73:GLU:HG2	4:A:1425:TAM:H52	2.03	0.40
1:A:154:GLU:CD	1:A:337:ARG:HH22	2.25	0.40
1:B:165:LEU:HD23	1:B:165:LEU:HA	1.92	0.40
1:B:80:ARG:O	1:B:84:LYS:HG2	2.22	0.40
1:B:96:GLY:O	1:B:100:THR:OG1	2.32	0.40

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	420/422 (100%)	398 (95%)	22 (5%)	0	100	100
1	B	419/422 (99%)	395 (94%)	24 (6%)	0	100	100
All	All	839/844 (99%)	793 (94%)	46 (6%)	0	100	100

There are no Ramachandran outliers to report.

### 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	359/352 (102%)	351 (98%)	8 (2%)	52	77
1	B	358/352 (102%)	351 (98%)	7 (2%)	55	79
All	All	717/704 (102%)	702 (98%)	15 (2%)	53	78

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	52	ASP
1	A	58	PHE
1	A	106	PHE
1	A	112	PHE
1	A	345	LEU
1	A	347	TRP
1	A	386	THR
1	A	411	TRP

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Mol	Chain	Res	Type
1	B	58	PHE
1	B	116	PHE
1	B	177	TYR
1	B	224	THR
1	B	271	LEU
1	B	353	TYR
1	B	411	TRP

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

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

### 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

### 5.6 Ligand geometry [i](#)

7 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	TAM	B	1425	-	7,10,10	1.27	1 (14%)	9,12,12	0.56	0
3	PTY	A	1424	-	49,49,49	1.01	3 (6%)	52,54,54	1.05	2 (3%)
4	TAM	A	1426	-	7,10,10	1.25	0	9,12,12	0.54	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	TAM	A	1425	-	7,10,10	1.27	1 (14%)	9,12,12	0.54	0
5	FLC	B	1424	-	3,12,12	1.97	2 (66%)	3,17,17	2.66	2 (66%)
2	BOG	A	1423	-	20,20,20	0.49	0	25,25,25	0.79	1 (4%)
5	FLC	B	1423	-	3,12,12	1.88	2 (66%)	3,17,17	2.42	2 (66%)

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	TAM	B	1425	-	-	3/12/12/12	-
3	PTY	A	1424	-	-	22/53/53/53	-
4	TAM	A	1426	-	-	6/12/12/12	-
4	TAM	A	1425	-	-	7/12/12/12	-
5	FLC	B	1424	-	-	3/6/16/16	-
2	BOG	A	1423	-	-	8/11/31/31	0/1/1/1
5	FLC	B	1423	-	-	4/6/16/16	-

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1424	PTY	O4-C30	3.71	1.44	1.33
3	A	1424	PTY	O7-C8	3.20	1.43	1.34
5	B	1424	FLC	CG-CB	-2.24	1.51	1.54
5	B	1424	FLC	CA-CB	-2.23	1.51	1.54
3	A	1424	PTY	O7-C6	-2.22	1.41	1.46
4	A	1425	TAM	C1-C4	-2.11	1.47	1.52
5	B	1423	FLC	CG-CB	-2.11	1.51	1.54
5	B	1423	FLC	CA-CB	-2.09	1.51	1.54
4	B	1425	TAM	C1-C4	-2.05	1.48	1.52

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	1424	PTY	O7-C8-C11	3.60	119.26	111.50
5	B	1424	FLC	CB-CG-CGC	-3.38	109.57	114.98
5	B	1424	FLC	CB-CA-CAC	-3.12	109.99	114.98
5	B	1423	FLC	CB-CG-CGC	-2.98	110.22	114.98

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	1423	FLC	CB-CA-CAC	-2.94	110.28	114.98
3	A	1424	PTY	O4-C30-C31	2.47	119.66	111.91
2	A	1423	BOG	C1-O5-C5	-2.04	109.68	113.69

There are no chirality outliers.

All (53) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	B	1425	TAM	C3-C-C1-C4
4	B	1425	TAM	N-C-C1-C4
3	A	1424	PTY	N1-C2-C3-O11
3	A	1424	PTY	C5-O14-P1-O11
3	A	1424	PTY	C5-O14-P1-O13
4	A	1426	TAM	C3-C-C1-C4
4	A	1426	TAM	N-C-C1-C4
4	A	1426	TAM	C1-C-C2-C5
4	A	1426	TAM	C3-C-C2-C5
4	A	1426	TAM	N-C-C2-C5
4	A	1425	TAM	C3-C-C1-C4
4	A	1425	TAM	N-C-C1-C4
4	A	1425	TAM	C1-C-C2-C5
4	A	1425	TAM	N-C-C2-C5
2	A	1423	BOG	C2-C1-O1-C1'
2	A	1423	BOG	O5-C1-O1-C1'
5	B	1423	FLC	CAC-CA-CB-CBC
2	A	1423	BOG	O5-C5-C6-O6
5	B	1424	FLC	CAC-CA-CB-CG
3	A	1424	PTY	O4-C1-C6-O7
3	A	1424	PTY	C15-C16-C17-C18
3	A	1424	PTY	C13-C14-C15-C16
3	A	1424	PTY	C21-C22-C23-C24
3	A	1424	PTY	C40-C41-C42-C43
4	A	1426	TAM	C2-C-C1-C4
4	A	1425	TAM	C2-C-C1-C4
4	A	1425	TAM	C3-C-C2-C5
3	A	1424	PTY	O4-C1-C6-C5
3	A	1424	PTY	C24-C25-C26-C27
4	A	1425	TAM	C-C2-C5-O5
5	B	1424	FLC	CAC-CA-CB-OHB
5	B	1423	FLC	CAC-CA-CB-CG
5	B	1423	FLC	CAC-CA-CB-OHB
2	A	1423	BOG	C1'-C2'-C3'-C4'

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Mol	Chain	Res	Type	Atoms
3	A	1424	PTY	C18-C19-C20-C21
3	A	1424	PTY	C14-C15-C16-C17
2	A	1423	BOG	C3'-C4'-C5'-C6'
3	A	1424	PTY	C36-C37-C38-C39
5	B	1424	FLC	CAC-CA-CB-CBC
5	B	1423	FLC	CBC-CB-CG-CGC
3	A	1424	PTY	C26-C27-C28-C29
3	A	1424	PTY	C41-C42-C43-C44
3	A	1424	PTY	C31-C32-C33-C34
3	A	1424	PTY	C3-O11-P1-O14
3	A	1424	PTY	C39-C40-C41-C42
2	A	1423	BOG	C4-C5-C6-O6
3	A	1424	PTY	C16-C17-C18-C19
4	B	1425	TAM	C2-C-C1-C4
2	A	1423	BOG	C2'-C3'-C4'-C5'
3	A	1424	PTY	C11-C12-C13-C14
2	A	1423	BOG	O1-C1'-C2'-C3'
3	A	1424	PTY	C2-C3-O11-P1
3	A	1424	PTY	O4-C30-C31-C32

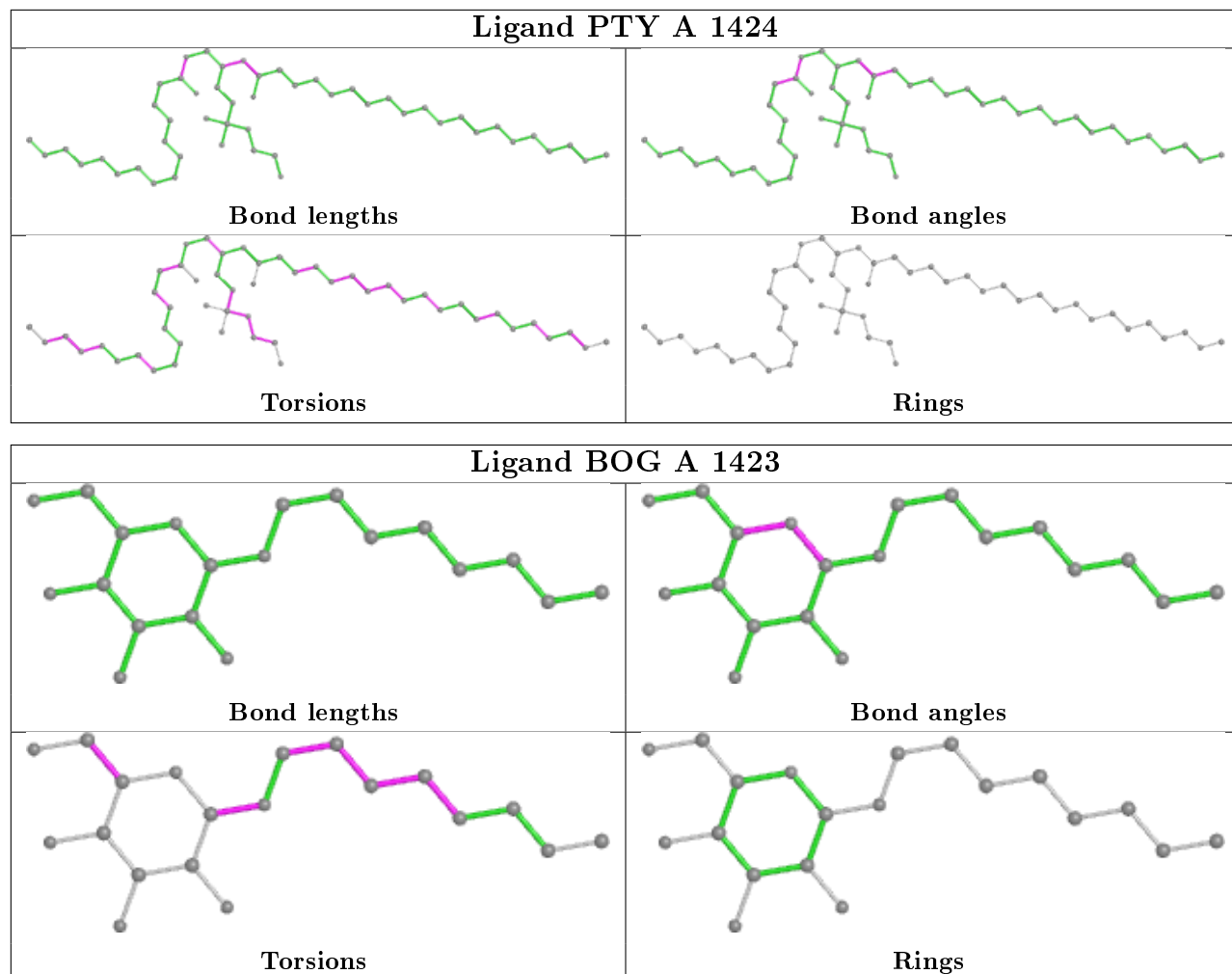
There are no ring outliers.

6 monomers are involved in 13 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	1425	TAM	3	0
3	A	1424	PTY	2	0
4	A	1426	TAM	1	0
4	A	1425	TAM	4	0
5	B	1424	FLC	1	0
2	A	1423	BOG	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](#)

There are no chain breaks in this entry.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

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	415/422 (98%)	0.22	30 (7%) 15   8	80, 131, 175, 200	0
1	B	415/422 (98%)	0.28	36 (8%) 10   5	75, 128, 175, 203	0
All	All	830/844 (98%)	0.25	66 (7%) 12   6	75, 130, 175, 203	0

All (66) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	192	TYR	6.5
1	B	358	LEU	5.7
1	B	93	ASP	5.5
1	B	354	LEU	5.1
1	B	99	LEU	4.7
1	A	277	ILE	4.4
1	B	420	ASP	4.3
1	B	335	LEU	4.0
1	B	350	PHE	3.8
1	B	385	LEU	3.7
1	B	356	ILE	3.7
1	B	323	GLY	3.6
1	B	334	ILE	3.6
1	B	97	LEU	3.6
1	B	94	THR	3.5
1	B	95	ILE	3.4
1	B	139	ARG	3.3
1	A	216	LEU	3.3
1	B	340	ALA	3.2
1	A	411	TRP	3.2
1	B	342	LEU	2.9
1	B	383	PRO	2.9
1	B	412	ILE	2.9
1	A	273	PRO	2.8

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	B	418	LYS	2.8
1	A	195	GLY	2.7
1	A	193	ALA	2.7
1	B	382	SER	2.7
1	B	360	GLY	2.7
1	B	337	ARG	2.7
1	A	407	VAL	2.6
1	B	384	LEU	2.6
1	A	276	ASN	2.6
1	A	116	PHE	2.5
1	B	96	GLY	2.5
1	B	141	TYR	2.5
1	B	338	PRO	2.5
1	A	330	LEU	2.5
1	A	130	ASP	2.5
1	A	159	ASP	2.5
1	A	215	ILE	2.5
1	A	212	PHE	2.4
1	A	185	LEU	2.4
1	A	362	ARG	2.4
1	B	341	THR	2.4
1	A	99	LEU	2.4
1	A	334	ILE	2.4
1	B	339	LEU	2.4
1	A	405	VAL	2.3
1	A	106	PHE	2.3
1	A	279	ILE	2.2
1	A	409	THR	2.2
1	A	213	LEU	2.2
1	B	208	SER	2.2
1	B	357	ALA	2.2
1	A	169	ALA	2.2
1	B	359	GLU	2.2
1	B	199	PHE	2.2
1	A	246	ILE	2.1
1	A	120	PHE	2.1
1	B	203	VAL	2.1
1	A	186	SER	2.1
1	B	416	LYS	2.1
1	A	360	GLY	2.1
1	B	142	ARG	2.0
1	A	121	LEU	2.0

## 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](#)

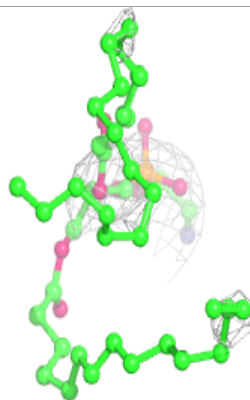
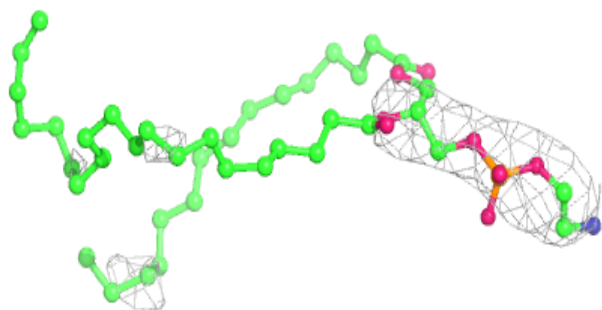
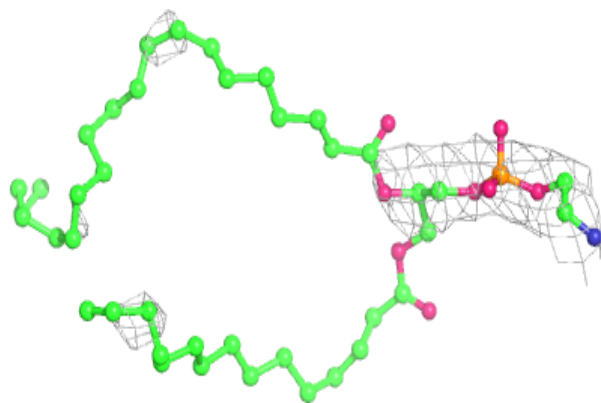
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
5	FLC	B	1424	13/13	0.52	0.29	157,192,200,200	0
4	TAM	A	1426	11/11	0.61	0.79	121,144,158,164	0
5	FLC	B	1423	13/13	0.64	0.31	124,162,182,182	0
3	PTY	A	1424	50/50	0.74	0.39	98,135,170,200	0
4	TAM	A	1425	11/11	0.74	0.42	93,116,137,139	0
2	BOG	A	1423	20/20	0.80	0.41	109,158,199,203	0
4	TAM	B	1425	11/11	0.84	0.26	120,136,142,148	0

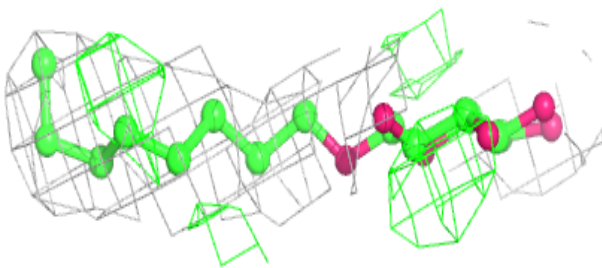
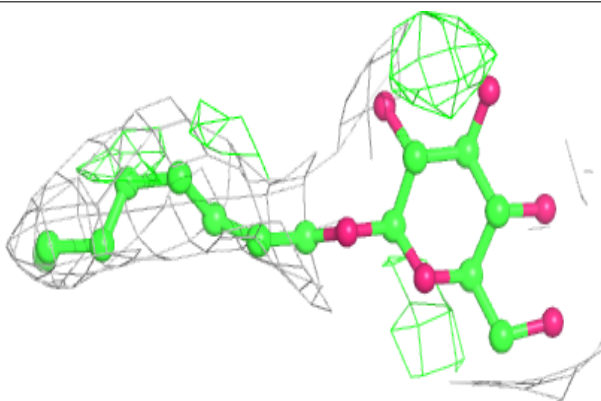
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

**Electron density around PTY A 1424:**

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

**Electron density around BOG A 1423:**

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



## 6.5 Other polymers

There are no such residues in this entry.