



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 08:47 PM UTC

PDB ID : 5EIH / pdb\_00005eih  
Title : mAChE-TZ2/PA5 complex  
Authors : Bourne, Y.; Marchot, P.  
Deposited on : 2015-10-29  
Resolution : 2.70 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>.

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

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

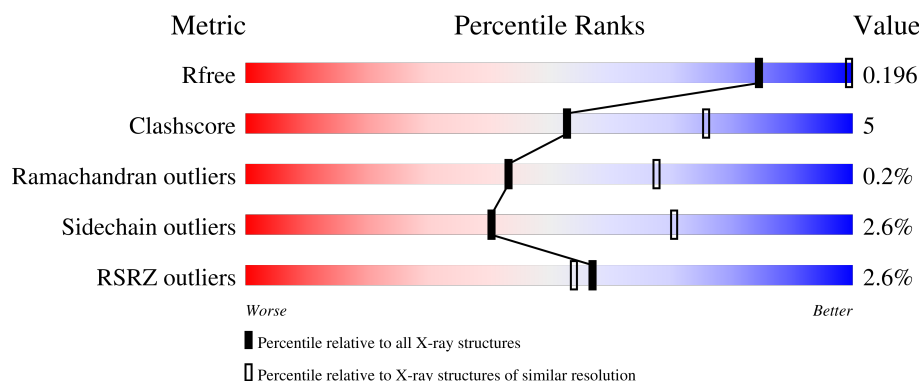
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*



The reported resolution of this entry is 2.70 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	180053	3538 (2.70-2.70)
Clashscore	190562	3843 (2.70-2.70)
Ramachandran outliers	187476	3778 (2.70-2.70)
Sidechain outliers	187428	3778 (2.70-2.70)
RSRZ outliers	180081	3538 (2.70-2.70)

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	543	
1	B	543	

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
5	P6G	B	603	-	X	-	-

## 2 Entry composition [i](#)

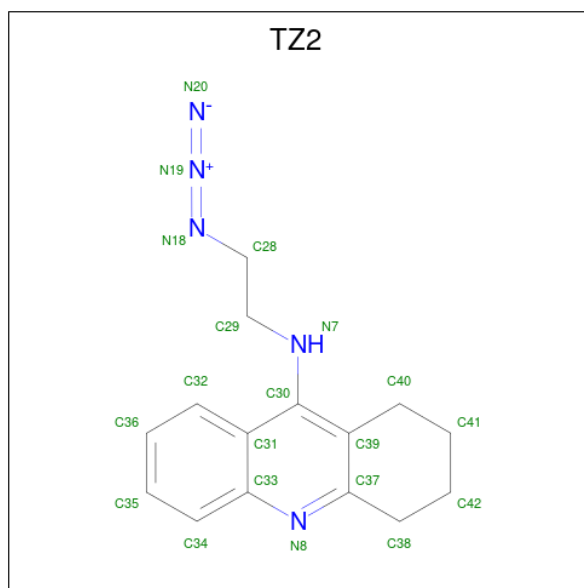
There are 6 unique types of molecules in this entry. The entry contains 8723 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Acetylcholinesterase.

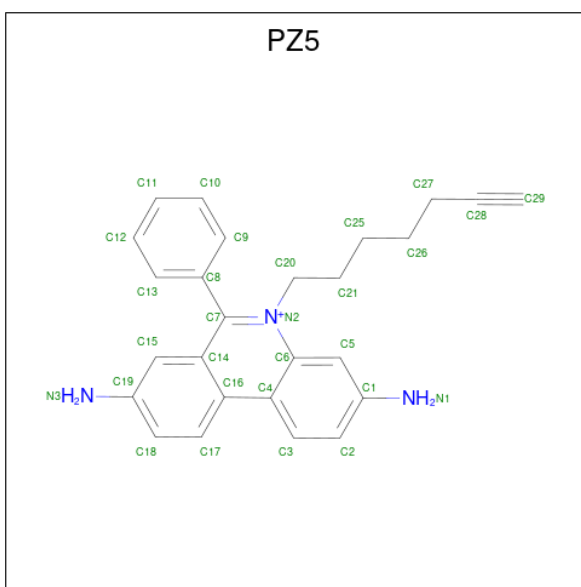
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	538	Total	C	N	O	S	0	4	0
			4221	2709	732	766	14			
1	B	534	Total	C	N	O	S	0	4	0
			4189	2690	722	763	14			

- Molecule 2 is {N}-(2-azidoethyl)-1,2,3,4-tetrahydroacridin-9-amine (CCD ID: TZ2) (formula: C<sub>15</sub>H<sub>17</sub>N<sub>5</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	N	0	0
			20	15	5		
2	B	1	Total	C	N	0	0
			20	15	5		

- Molecule 3 is 5-hept-6-ynyl-6-phenyl-phenanthridin-5-ium-3,8-diamine (CCD ID: PZ5) (formula: C<sub>26</sub>H<sub>26</sub>N<sub>3</sub>).



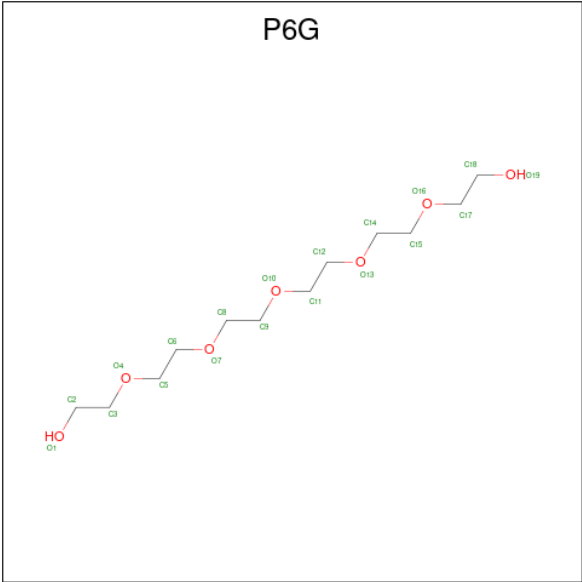
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	N	0	0
			29	26	3		

- Molecule 4 is ACETATE ION (CCD ID: ACT) (formula:  $C_2H_3O_2$ ).



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

- Molecule 5 is HEXAETHYLENE GLYCOL (CCD ID: P6G) (formula:  $C_{12}H_{26}O_7$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	B	1	Total	C	O	0	0
			19	12	7		

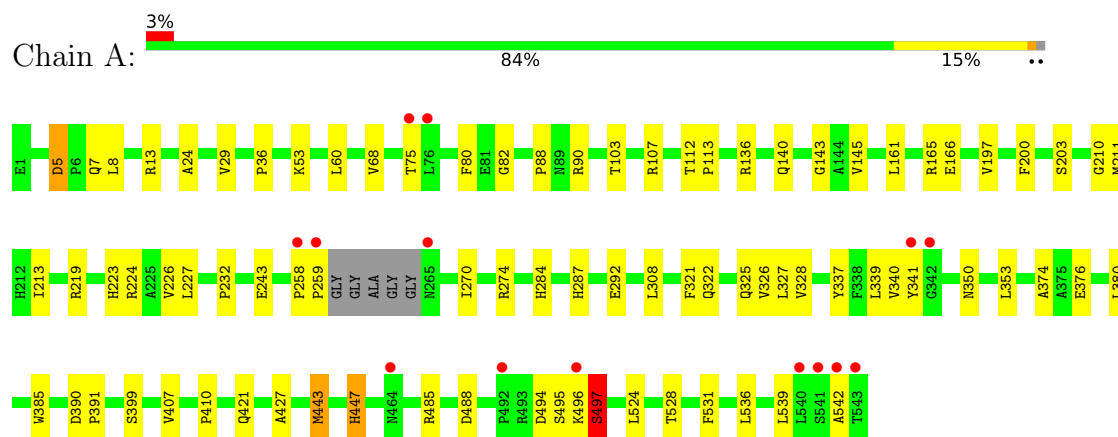
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	127	Total	O	0	0
			127	127		
6	B	90	Total	O	0	0
			90	90		

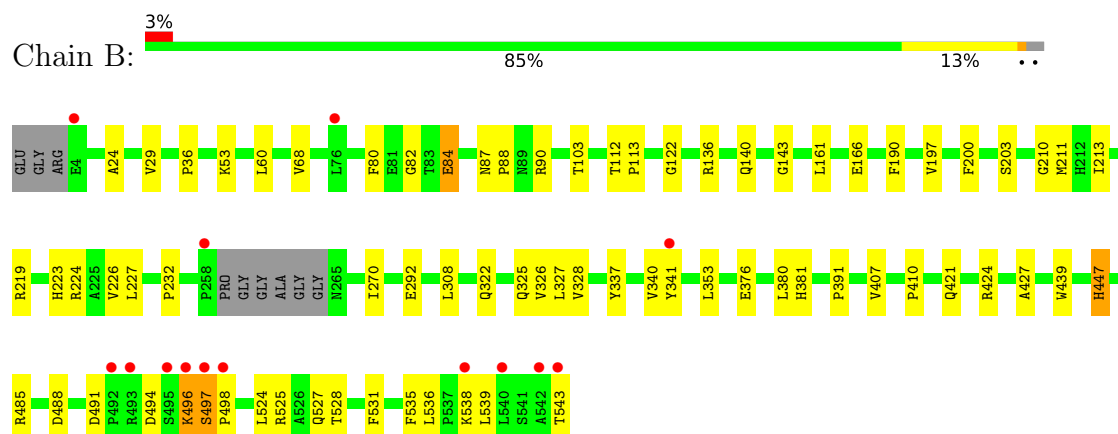
### 3 Residue-property plots [i](#)

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: Acetylcholinesterase



#### • Molecule 1: Acetylcholinesterase



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	79.50Å 112.98Å 226.50Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	46.00 – 2.70 46.00 – 2.70	Depositor EDS
% Data completeness (in resolution range)	99.4 (46.00-2.70) 99.4 (46.00-2.70)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.11	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.20 (at 2.69Å)	Xtriage
Refinement program	BUSTER 2.10.2	Depositor
R, $R_{free}$	0.175 , 0.202 (Not available) , 0.196	Depositor DCC
$R_{free}$ test set	1153 reflections (2.04%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	44.8	Xtriage
Anisotropy	0.778	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 69.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	8723	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	50.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.56% 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

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ACT, PZ5, TZ2, P6G

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	0.85	1/4359 (0.0%)	1.33	19/5957 (0.3%)
1	B	0.81	0/4328	1.22	5/5915 (0.1%)
All	All	0.83	1/8687 (0.0%)	1.28	24/11872 (0.2%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	443	MET	SD-CE	-7.31	1.61	1.79

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	495	SER	N-CA-C	18.05	132.76	111.82
1	A	496	LYS	N-CA-C	-16.41	93.31	113.50
1	A	496	LYS	N-CA-CB	-15.79	87.33	110.53
1	A	542	ALA	N-CA-C	12.58	130.14	111.02
1	A	542	ALA	CB-CA-C	-8.81	98.97	111.65
1	B	200	PHE	CA-CB-CG	6.82	120.62	113.80
1	A	200	PHE	CA-CB-CG	6.80	120.60	113.80
1	A	5	ASP	CA-CB-CG	6.17	118.77	112.60
1	A	495	SER	CB-CA-C	-6.04	99.08	110.67
1	A	497	SER	CA-C-N	-5.79	113.99	119.90
1	A	497	SER	C-N-CA	-5.79	113.99	119.90
1	A	321	PHE	CA-C-N	5.65	128.65	120.79
1	A	321	PHE	C-N-CA	5.65	128.65	120.79
1	A	75	THR	CA-C-N	5.55	128.51	120.79
1	A	75	THR	C-N-CA	5.55	128.51	120.79
1	B	488	ASP	CA-CB-CG	5.41	118.01	112.60
1	A	350	ASN	CA-CB-CG	5.39	117.99	112.60
1	A	165	ARG	CA-C-N	5.30	128.37	120.31

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	165	ARG	C-N-CA	5.30	128.37	120.31
1	B	525	ARG	CA-C-N	5.20	127.56	120.54
1	B	525	ARG	C-N-CA	5.20	127.56	120.54
1	A	243	GLU	CB-CG-CD	5.18	121.41	112.60
1	A	488	ASP	CA-CB-CG	5.10	117.70	112.60
1	B	292	GLU	N-CA-C	-5.03	102.20	109.59

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts ⓘ

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	4221	0	4110	42	0
1	B	4189	0	4073	39	0
2	A	20	0	17	3	0
2	B	20	0	17	2	0
3	A	29	0	26	1	0
4	A	4	0	3	0	0
4	B	4	0	3	1	0
5	B	19	0	24	1	0
6	A	127	0	0	1	0
6	B	90	0	0	0	0
All	All	8723	0	8273	84	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 5.

All (84) 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:197:VAL:H	1:B:223:HIS:HD2	1.34	0.75
1:A:197:VAL:H	1:A:223:HIS:HD2	1.33	0.73
1:B:197:VAL:H	1:B:223:HIS:CD2	2.12	0.67
1:A:197:VAL:H	1:A:223:HIS:CD2	2.12	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:292:GLU:HA	3:A:902:PZ5:H4	1.86	0.58
1:B:439:TRP:CZ2	2:B:601:TZ2:H18	2.41	0.56
2:B:601:TZ2:H4	2:B:601:TZ2:H9	1.89	0.55
1:B:36:PRO:HB2	1:B:53:LYS:HD3	1.89	0.55
1:B:224:ARG:HG2	1:B:325:GLN:HB2	1.89	0.54
1:B:84:GLU:HG3	1:B:87:ASN:HD22	1.71	0.53
1:A:36:PRO:HB2	1:A:53:LYS:HD3	1.91	0.53
1:A:68:VAL:HG11	1:A:88:PRO:HB3	1.90	0.53
1:A:407:VAL:HG21	1:A:447[A]:HIS:HE1	1.74	0.53
1:A:494:ASP:CG	1:A:497:SER:HB2	2.34	0.52
1:A:5:ASP:HB3	1:A:8:LEU:HD12	1.90	0.52
1:B:381:HIS:HA	5:B:603:P6G:H31	1.92	0.52
1:A:224:ARG:HG2	1:A:325:GLN:HB2	1.91	0.52
1:B:68:VAL:HG11	1:B:88:PRO:HB3	1.91	0.51
1:B:407:VAL:HG21	1:B:447[A]:HIS:HE1	1.75	0.51
1:A:68:VAL:HG23	1:A:90:ARG:HB2	1.93	0.50
1:B:68:VAL:HG23	1:B:90:ARG:HB2	1.94	0.50
1:B:24:ALA:HB3	1:B:140:GLN:HG3	1.93	0.50
1:B:210:GLY:HA3	1:B:232:PRO:HD3	1.94	0.49
1:A:353:LEU:HB3	1:A:391:PRO:HB2	1.94	0.49
1:A:374:ALA:HA	1:A:539:LEU:HD23	1.95	0.49
1:B:497:SER:HB2	1:B:498:PRO:C	2.37	0.49
1:A:24:ALA:HB3	1:A:140:GLN:HG3	1.93	0.49
1:B:353:LEU:HB3	1:B:391:PRO:HB2	1.94	0.49
1:B:328:VAL:O	1:B:427:ALA:HA	2.13	0.49
1:A:210:GLY:HA3	1:A:232:PRO:HD3	1.96	0.48
1:A:113:PRO:HG2	1:A:485:ARG:HG2	1.96	0.48
1:B:337:TYR:CE1	1:B:341:TYR:CE1	3.02	0.48
1:A:7:GLN:NE2	1:A:107:ARG:H	2.13	0.47
1:B:535:PHE:CE2	1:B:539:LEU:HD22	2.49	0.47
1:A:213:ILE:HA	1:A:219:ARG:HD3	1.96	0.47
1:A:328:VAL:O	1:A:427:ALA:HA	2.15	0.46
1:A:29:VAL:HG21	1:A:136:ARG:HB2	1.98	0.46
1:A:103:THR:HG22	1:A:145:VAL:HG13	1.96	0.46
2:A:901:TZ2:H5	2:A:901:TZ2:C32	2.46	0.46
1:B:491:ASP:HB3	1:B:494:ASP:HB3	1.98	0.46
1:A:211:MET:HG2	1:A:308:LEU:HD21	1.98	0.46
1:B:213:ILE:HA	1:B:219:ARG:HD3	1.98	0.46
1:B:103:THR:HG21	1:B:190:PHE:HB3	1.98	0.45
1:A:340:VAL:HG11	1:A:443:MET:CE	2.47	0.45
1:A:326:VAL:HG12	1:A:328:VAL:HG13	1.97	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:112:THR:HG21	1:B:143:GLY:O	2.17	0.44
1:A:166:GLU:HB2	1:A:270:ILE:HD13	1.99	0.44
2:A:901:TZ2:H5	2:A:901:TZ2:H19	1.99	0.44
1:B:211:MET:HG2	1:B:308:LEU:HD21	1.98	0.44
1:B:326:VAL:HG12	1:B:328:VAL:HG13	2.00	0.44
1:A:227:LEU:HB2	1:A:328:VAL:HG12	2.00	0.44
1:A:258:PRO:HA	1:A:259:PRO:HD3	1.91	0.43
1:A:528:THR:O	1:A:531:PHE:HB3	2.19	0.43
1:B:113:PRO:HG2	1:B:485:ARG:HG2	1.99	0.43
1:A:340:VAL:HG11	1:A:443:MET:HE2	1.99	0.43
1:B:227:LEU:HB2	1:B:328:VAL:HG12	1.99	0.43
1:B:407:VAL:C	1:B:410:PRO:HD2	2.44	0.43
1:A:494:ASP:OD2	1:A:497:SER:HB2	2.19	0.43
1:A:407:VAL:C	1:A:410:PRO:HD2	2.44	0.42
1:A:226:VAL:HG22	1:A:327:LEU:HB3	2.02	0.42
1:B:536:LEU:HD23	1:B:536:LEU:HA	1.86	0.42
1:A:284:HIS:HA	1:A:287:HIS:HD2	1.84	0.42
1:B:226:VAL:HG22	1:B:327:LEU:HB3	2.02	0.42
1:B:528:THR:O	1:B:531:PHE:HB3	2.19	0.42
2:A:901:TZ2:H19	2:A:901:TZ2:C29	2.50	0.42
1:B:166:GLU:HB2	1:B:270:ILE:HD13	2.01	0.42
1:B:211:MET:HG3	1:B:232:PRO:HB3	2.01	0.42
1:A:339:LEU:HD11	1:A:399:SER:HA	2.02	0.42
1:A:385:TRP:HD1	1:B:527:GLN:OE1	2.03	0.41
1:A:80:PHE:CE2	1:A:82:GLY:HA3	2.56	0.41
1:B:353:LEU:HB3	1:B:391:PRO:CB	2.51	0.41
1:A:376:GLU:O	1:A:380:LEU:HG	2.20	0.41
1:B:29:VAL:HG21	1:B:136:ARG:HB2	2.01	0.41
1:B:337:TYR:O	1:B:340:VAL:HG22	2.20	0.41
1:A:337:TYR:O	1:A:340:VAL:HG22	2.21	0.41
1:B:376:GLU:O	1:B:380:LEU:HG	2.21	0.41
1:B:340:VAL:HG23	1:B:341:TYR:CD1	2.56	0.41
1:A:407:VAL:HG21	1:A:447[A]:HIS:CE1	2.56	0.40
1:A:211:MET:HG3	1:A:232:PRO:HB3	2.04	0.40
1:A:390:ASP:HA	1:A:391:PRO:HD3	1.98	0.40
1:B:80:PHE:CE2	1:B:82:GLY:HA3	2.57	0.40
1:A:112:THR:HG21	1:A:143:GLY:O	2.22	0.40
1:A:274:ARG:HD3	6:A:1020:HOH:O	2.21	0.40
1:B:122:GLY:H	4:B:602:ACT:C	2.35	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	538/543 (99%)	520 (97%)	18 (3%)	0	100	100
1	B	534/543 (98%)	515 (96%)	17 (3%)	2 (0%)	30	54
All	All	1072/1086 (99%)	1035 (96%)	35 (3%)	2 (0%)	43	68

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	497	SER
1	B	496	LYS

### 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	445/443 (100%)	433 (97%)	12 (3%)	39	69
1	B	443/443 (100%)	430 (97%)	13 (3%)	37	67
All	All	888/886 (100%)	863 (97%)	25 (3%)	40	68

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	13	ARG
1	A	60	LEU
1	A	161	LEU
1	A	203	SER

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Mol	Chain	Res	Type
1	A	322	GLN
1	A	341	TYR
1	A	421	GLN
1	A	447[A]	HIS
1	A	447[B]	HIS
1	A	497	SER
1	A	524	LEU
1	A	536	LEU
1	B	60	LEU
1	B	84	GLU
1	B	161	LEU
1	B	203	SER
1	B	322	GLN
1	B	421	GLN
1	B	424	ARG
1	B	447[A]	HIS
1	B	447[B]	HIS
1	B	496	LYS
1	B	524	LEU
1	B	538	LYS
1	B	543	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	7	GLN
1	A	223	HIS
1	A	265	ASN
1	A	287	HIS
1	A	317	ASN
1	B	16	GLN
1	B	223	HIS
1	B	284	HIS
1	B	317	ASN
1	B	499	GLN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

6 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$
2	TZ2	B	601	-	22,22,22	2.75	6 (27%)	25,29,29	1.77	2 (8%)
3	PZ5	A	902	-	30,32,32	1.98	5 (16%)	39,44,44	1.56	3 (7%)
5	P6G	B	603	-	18,18,18	1.77	5 (27%)	17,17,17	2.05	9 (52%)
4	ACT	B	602	-	3,3,3	0.95	0	3,3,3	1.48	1 (33%)
4	ACT	A	903	-	3,3,3	0.87	0	3,3,3	1.71	1 (33%)
2	TZ2	A	901	-	22,22,22	2.55	6 (27%)	25,29,29	1.73	3 (12%)

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
5	P6G	B	603	-	-	8/16/16/16	-
2	TZ2	A	901	-	-	1/6/13/13	0/3/3/3
2	TZ2	B	601	-	-	1/6/13/13	0/3/3/3
3	PZ5	A	902	-	-	1/10/11/11	0/4/4/4

All (22) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	601	TZ2	C30-C39	7.22	1.51	1.39
2	B	601	TZ2	C39-C37	6.71	1.51	1.40
2	A	901	TZ2	C39-C37	6.32	1.50	1.40
3	A	902	PZ5	C4-C6	5.44	1.51	1.41
3	A	902	PZ5	C14-C16	5.19	1.50	1.42
2	A	901	TZ2	C30-C39	5.14	1.47	1.39
2	B	601	TZ2	C31-C33	4.68	1.49	1.42
2	A	901	TZ2	C31-C33	4.55	1.49	1.42
2	B	601	TZ2	N20-N19	4.39	1.32	1.23
3	A	902	PZ5	C7-C14	4.37	1.51	1.43
2	A	901	TZ2	N20-N19	4.29	1.31	1.23
2	A	901	TZ2	C30-C31	3.98	1.50	1.43
3	A	902	PZ5	C28-C29	3.57	1.28	1.18
2	A	901	TZ2	C37-N8	3.26	1.36	1.32
2	B	601	TZ2	C30-C31	3.22	1.48	1.43
5	B	603	P6G	C3-C2	-3.02	1.33	1.49
5	B	603	P6G	C6-C5	-2.98	1.34	1.49
5	B	603	P6G	C12-C11	-2.89	1.34	1.49
5	B	603	P6G	C17-C18	-2.83	1.34	1.49
5	B	603	P6G	C15-C14	-2.77	1.35	1.49
2	B	601	TZ2	C37-N8	2.77	1.35	1.32
3	A	902	PZ5	C8-C7	2.42	1.51	1.49

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	902	PZ5	C4-C6-N2	7.46	123.28	118.46
2	B	601	TZ2	C37-N8-C33	5.82	124.56	117.67
2	A	901	TZ2	C37-N8-C33	5.15	123.76	117.67
2	B	601	TZ2	C39-C37-N8	-4.61	120.40	123.66
2	A	901	TZ2	C42-C38-C37	-4.14	107.04	113.48
2	A	901	TZ2	C39-C37-N8	-3.80	120.97	123.66
5	B	603	P6G	O13-C12-C11	3.06	124.28	110.35
3	A	902	PZ5	C8-C7-N2	2.91	122.30	119.30
5	B	603	P6G	O7-C6-C5	2.66	122.46	110.35
5	B	603	P6G	O13-C14-C15	2.65	122.41	110.35
5	B	603	P6G	O10-C11-C12	2.60	122.18	110.35
5	B	603	P6G	O4-C3-C2	2.53	121.27	110.11
5	B	603	P6G	O16-C15-C14	2.53	121.89	110.35
5	B	603	P6G	O4-C5-C6	2.52	121.83	110.35
4	A	903	ACT	OXT-C-O	-2.25	113.68	122.03
3	A	902	PZ5	C3-C4-C6	2.17	120.60	117.78
5	B	603	P6G	O16-C17-C18	2.16	119.62	110.11

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	603	P6G	C17-O16-C15	2.12	122.54	113.26
4	B	602	ACT	OXT-C-O	-2.02	114.55	122.03

There are no chirality outliers.

All (11) torsion outliers are listed below:

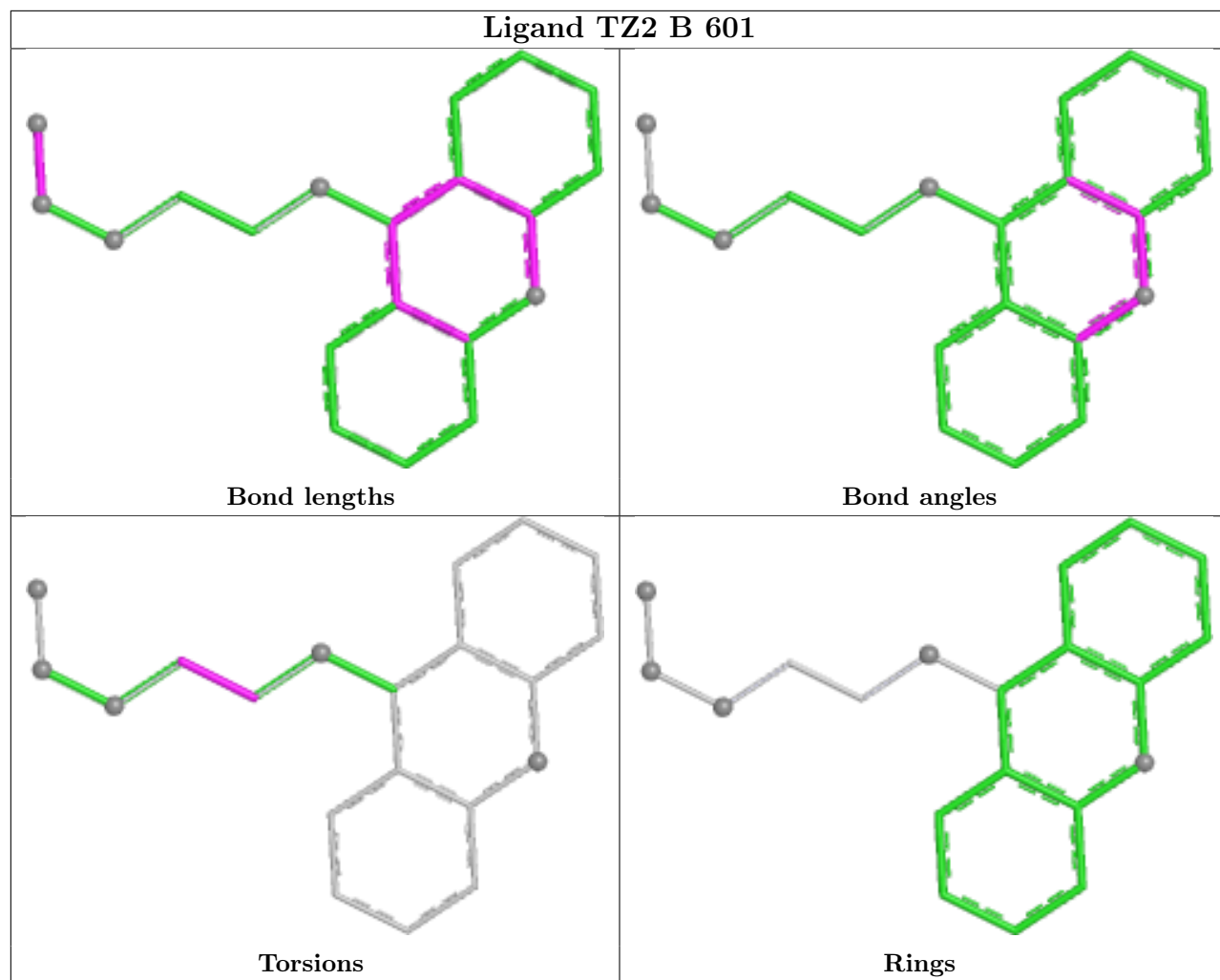
Mol	Chain	Res	Type	Atoms
2	B	601	TZ2	N18-C28-C29-N7
5	B	603	P6G	O4-C5-C6-O7
5	B	603	P6G	O10-C11-C12-O13
5	B	603	P6G	O13-C14-C15-O16
2	A	901	TZ2	C31-C30-N7-C29
5	B	603	P6G	O7-C8-C9-O10
5	B	603	P6G	C14-C15-O16-C17
5	B	603	P6G	C6-C5-O4-C3
5	B	603	P6G	C12-C11-O10-C9
3	A	902	PZ5	C20-C21-C25-C26
5	B	603	P6G	C8-C9-O10-C11

There are no ring outliers.

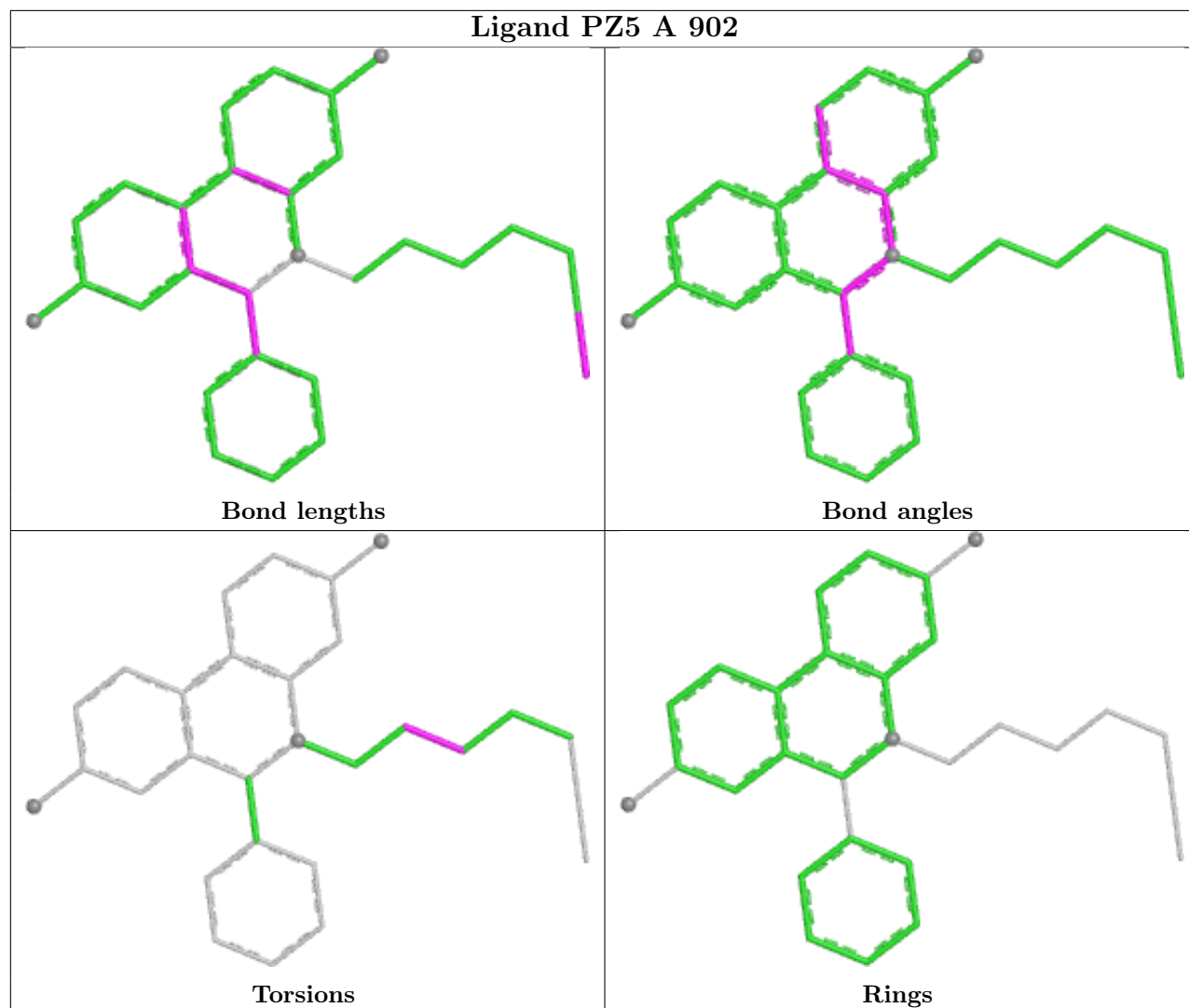
5 monomers are involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	601	TZ2	2	0
3	A	902	PZ5	1	0
5	B	603	P6G	1	0
4	B	602	ACT	1	0
2	A	901	TZ2	3	0

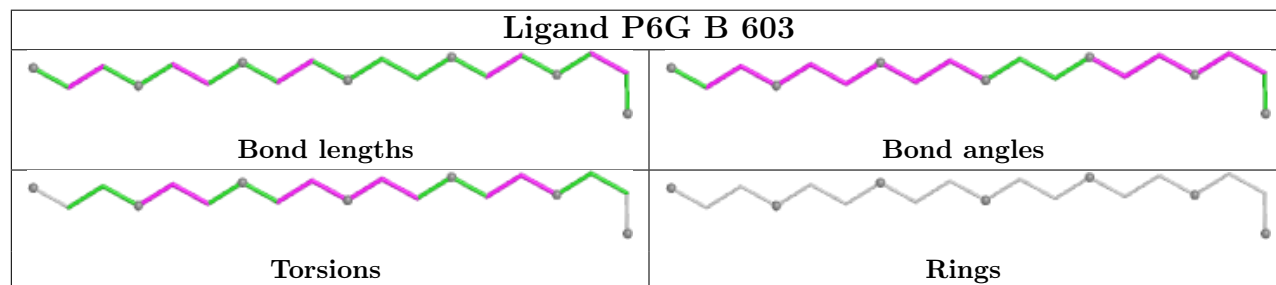
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

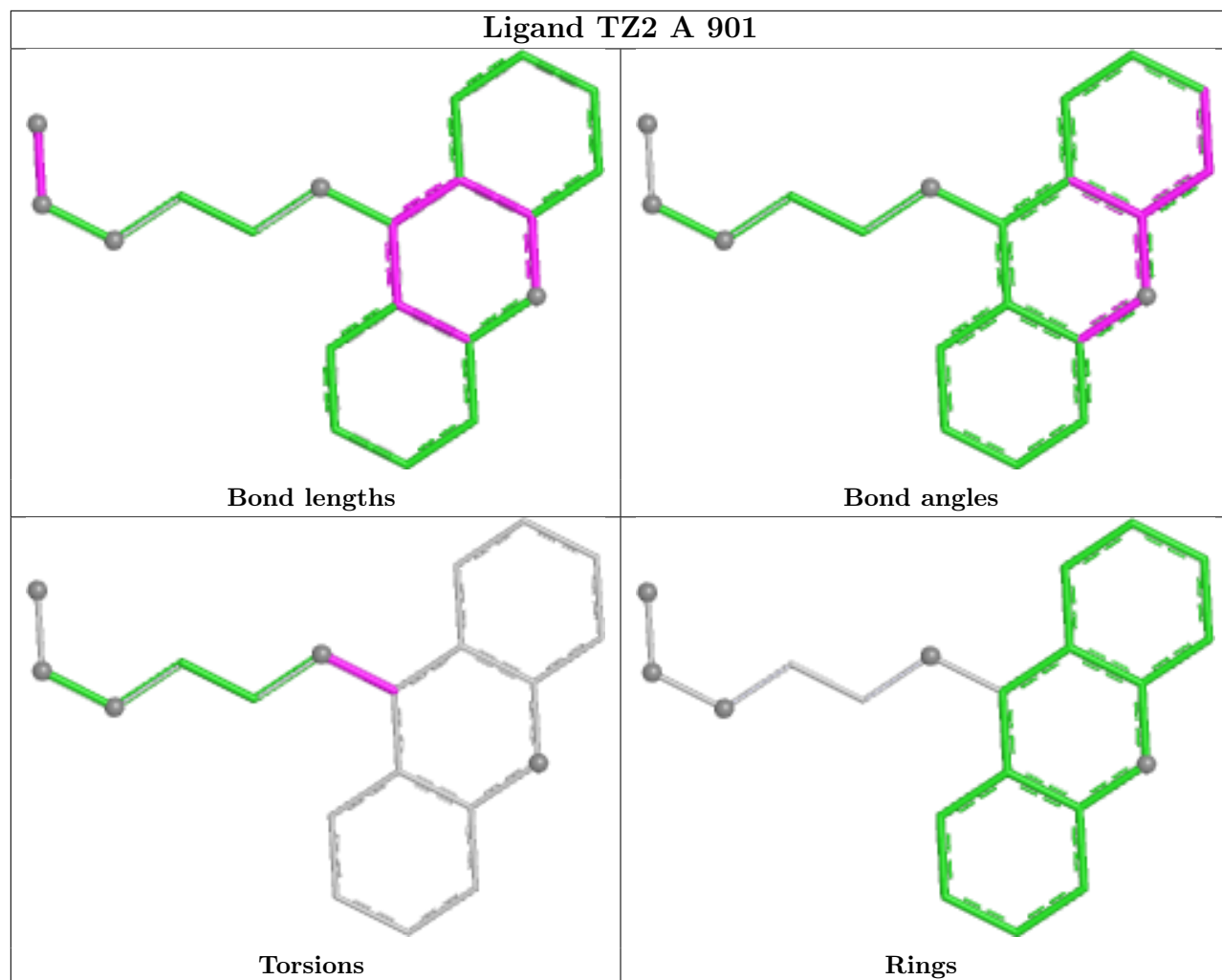


## Ligand PZ5 A 902



## Ligand P6G B 603





## 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	538/543 (99%)	-0.32	14 (2%) 57 54	21, 44, 76, 124	4 (0%)
1	B	534/543 (98%)	-0.24	14 (2%) 57 54	27, 50, 81, 132	4 (0%)
All	All	1072/1086 (98%)	-0.28	28 (2%) 57 54	21, 47, 80, 132	8 (0%)

All (28) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	543	THR	7.8
1	B	258	PRO	6.0
1	A	259	PRO	4.9
1	A	341	TYR	4.8
1	B	542	ALA	4.8
1	B	543	THR	4.5
1	A	540	LEU	4.1
1	B	496	LYS	4.1
1	A	258	PRO	4.1
1	B	492	PRO	4.0
1	B	341	TYR	3.7
1	B	495	SER	3.6
1	B	493	ARG	3.5
1	A	542	ALA	3.3
1	B	76	LEU	3.3
1	B	540	LEU	3.1
1	B	498	PRO	2.7
1	B	538	LYS	2.6
1	B	497	SER	2.6
1	A	541	SER	2.3
1	A	76	LEU	2.3
1	B	4	GLU	2.2
1	A	464	ASN	2.1
1	A	75	THR	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	265	ASN	2.1
1	A	496	LYS	2.0
1	A	492	PRO	2.0
1	A	342	GLY	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 oligosaccharides in this entry.

## 6.4 Ligands [i](#)

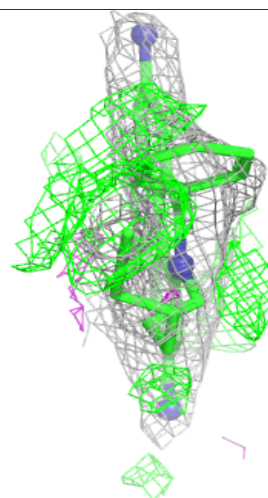
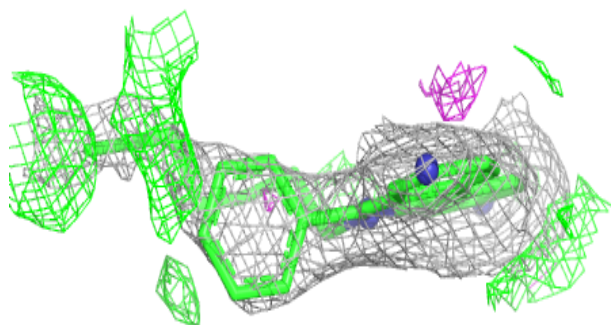
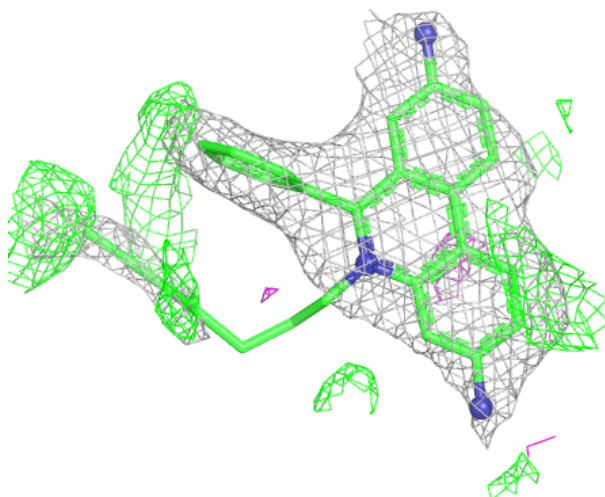
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 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
3	PZ5	A	902	29/29	0.73	0.29	92,96,100,100	0
5	P6G	B	603	19/19	0.88	0.17	65,71,75,75	0
4	ACT	B	602	4/4	0.95	0.20	55,56,58,62	0
2	TZ2	B	601	20/20	0.95	0.11	44,48,71,74	0
2	TZ2	A	901	20/20	0.96	0.09	34,40,59,62	0
4	ACT	A	903	4/4	0.97	0.12	47,50,52,56	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.

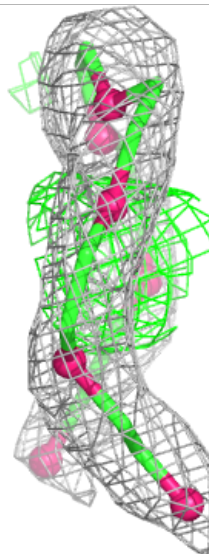
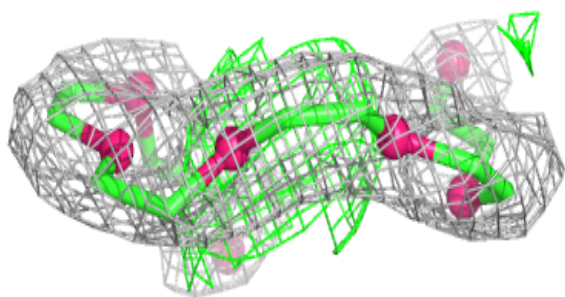
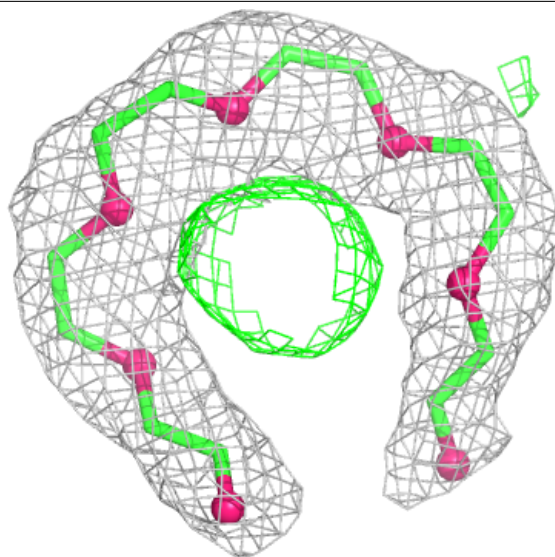
**Electron density around PZ5 A 902:**

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



**Electron density around P6G B 603:**

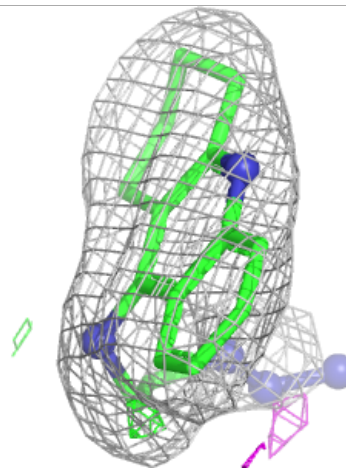
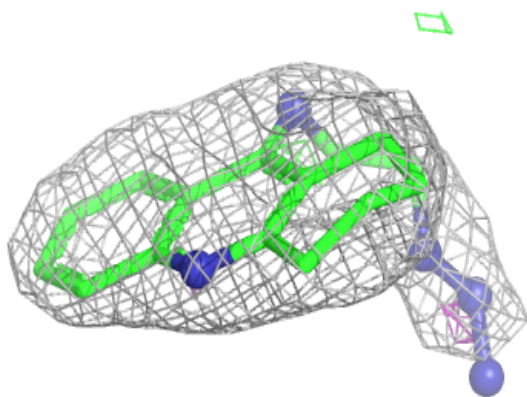
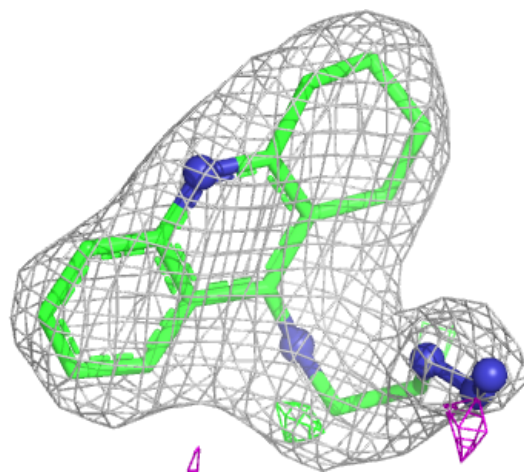
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





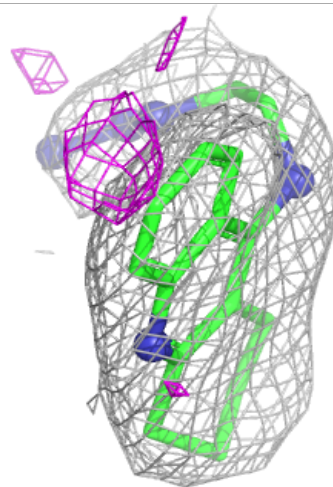
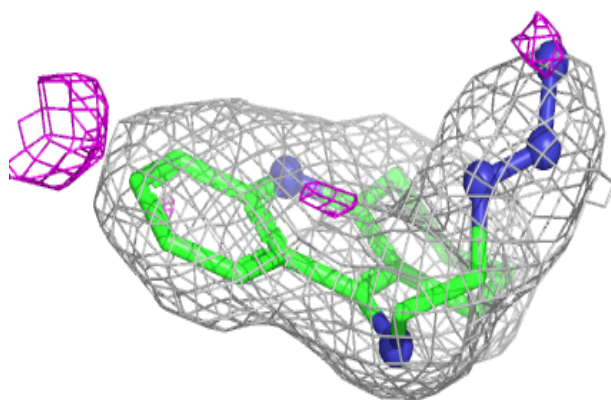
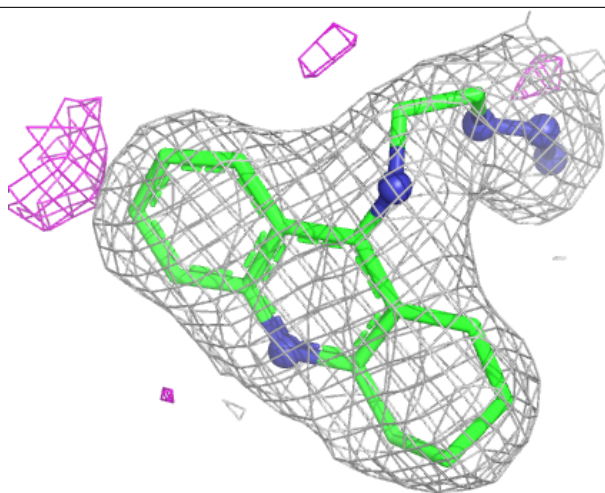
**Electron density around TZ2 B 601:**

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



**Electron density around TZ2 A 901:**

$2mF_o-DF_c$  (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.