



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 28, 2022 – 07:15 pm BST

PDB ID : 7QAK  
Title : Mus Musculus Acetylcholinesterase in complex with 7-[(4-[[benzyl(methyl)amino]methyl}benzyl)oxy]-4-(hydroxymethyl)-2H-chromen-2-one  
Authors : Ekstrom, F.J.; Forsgren, N.  
Deposited on : 2021-11-17  
Resolution : 2.60 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 : 1.8.4, CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.27  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0267  
CCP4 : 7.1.010 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.27

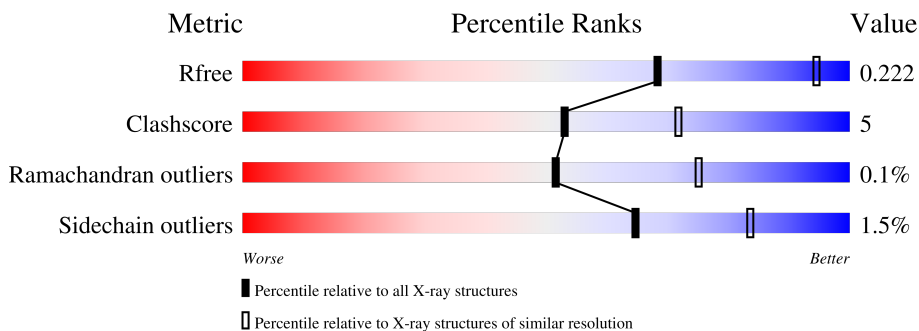
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.60 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	3163 (2.60-2.60)
Clashscore	141614	3518 (2.60-2.60)
Ramachandran outliers	138981	3455 (2.60-2.60)
Sidechain outliers	138945	3455 (2.60-2.60)

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  $\leq 5\%$ .

Mol	Chain	Length	Quality of chain
1	A	543	86% 12% ..
1	B	543	86% 12% .

## 2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 8766 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
			Total	C	N	O	S			
1	A	537	Total 4196	C 2691	N 728	O 763	S 14	0	1	0
1	B	535	Total 4194	C 2692	N 731	O 757	S 14	0	3	0

- Molecule 2 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).

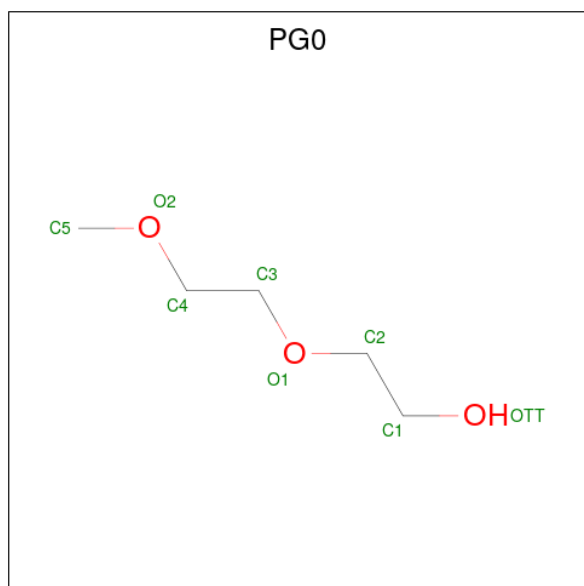


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
2	A	1	Total 14	C 8	N 1	O 5	0	0
2	A	1	Total 14	C 8	N 1	O 5	0	0
2	B	1	Total 14	C 8	N 1	O 5	0	0
2	B	1	Total 14	C 8	N 1	O 5	0	0



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

- Molecule 5 is 2-(2-METHOXYETHOXY)ETHANOL (three-letter code: PG0) (formula: C<sub>5</sub>H<sub>12</sub>O<sub>3</sub>).



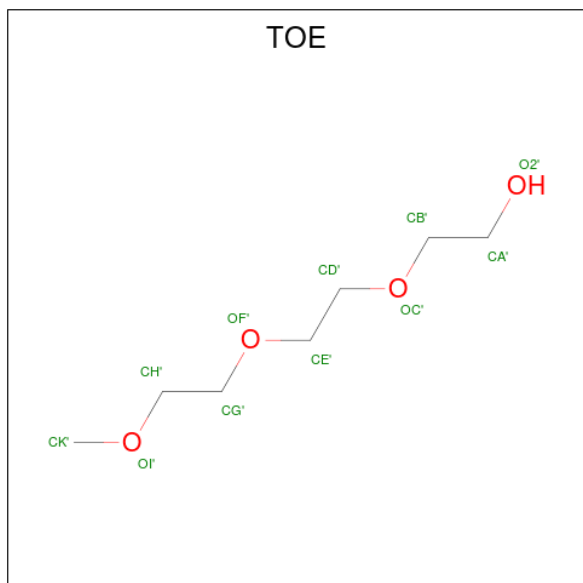
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
5	A	1	8	5	3	0	0
5	A	1	8	5	3	0	0
5	A	1	8	5	3	0	0
5	A	1	8	5	3	0	0
5	A	1	8	5	3	0	0
5	A	1	8	5	3	0	0
5	A	1	8	5	3	0	0
5	A	1	8	5	3	0	0
5	B	1	8	5	3	0	0
5	B	1	8	5	3	0	0

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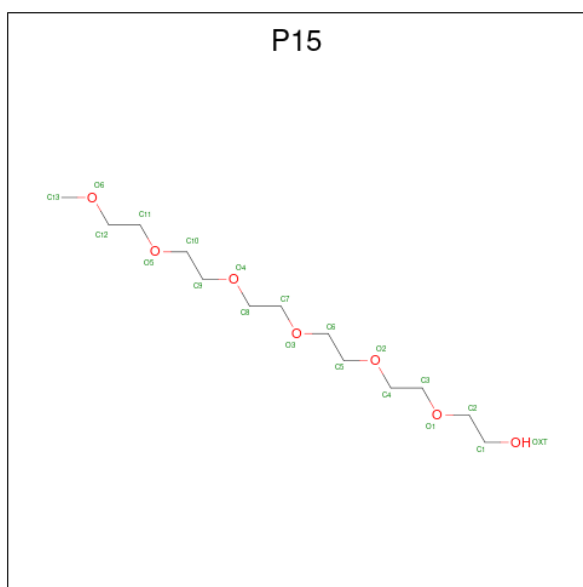
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	B	1	Total	C	O	0	0
			6	4	2		
5	B	1	Total	C	O	0	0
			8	5	3		

- Molecule 6 is 2-[2-(2-METHOXY-ETHOXY)-ETHOXY]-ETHOXYL (three-letter code: TOE) (formula: C<sub>7</sub>H<sub>16</sub>O<sub>4</sub>).



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

- Molecule 7 is 2,5,8,11,14,17-HEXAOXANONADECAN-19-OL (three-letter code: P15) (formula: C<sub>13</sub>H<sub>28</sub>O<sub>7</sub>).



Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	B	1	Total	C O	0	0
			20	13 7		


- Molecule 8 is water.

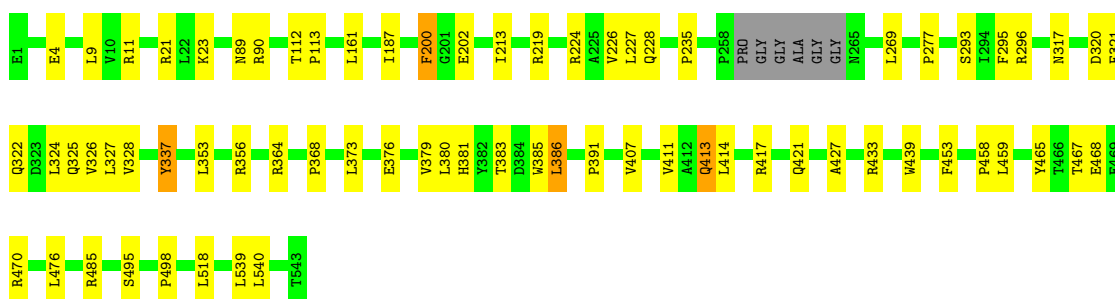
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	77	Total	O	0	0
			77	77		
8	B	52	Total	O	0	0
			52	52		

### 3 Residue-property plots


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. 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. 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

Chain A:  86% 12% ..



- Molecule 1: Acetylcholinesterase

Chain B:  86% 12% .





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	78.45Å 112.71Å 226.70Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.02 – 2.60 49.01 – 2.60	Depositor EDS
% Data completeness (in resolution range)	99.6 (49.02-2.60) 99.9 (49.01-2.60)	Depositor EDS
$R_{merge}$	0.07	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.01 (at 2.61Å)	Xtrriage
Refinement program	PHENIX 1.12_2829, PHENIX 1.12_2829	Depositor
R, $R_{free}$	0.190 , 0.224 0.190 , 0.222	Depositor DCC
$R_{free}$ test set	1247 reflections (1.99%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	58.7	Xtrriage
Anisotropy	0.719	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	(Not available) , (Not available)	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	8766	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	66.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.70% 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: NAG, 5IK, P15, EDO, PG0, TOE

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	0.26	0/4320	0.48	1/5904 (0.0%)
1	B	0.26	0/4319	0.47	1/5902 (0.0%)
All	All	0.26	0/8639	0.47	2/11806 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	350	ASN	CB-CA-C	5.44	121.28	110.40
1	A	386	LEU	CB-CG-CD2	-5.05	102.41	111.00

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	4196	0	4078	56	0
1	B	4194	0	4079	41	0
2	A	28	0	26	0	0
2	B	28	0	26	1	0
3	A	31	0	0	0	0
3	B	31	0	0	0	0
4	A	4	0	6	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	64	0	96	3	0
5	B	30	0	43	1	0
6	B	11	0	16	0	0
7	B	20	0	28	3	0
8	A	77	0	0	0	0
8	B	52	0	0	1	0
All	All	8766	0	8398	92	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 (92) 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:A:235:PRO:HB2	1:A:296:ARG:NH2	1.43	1.34
1:A:235:PRO:CB	1:A:296:ARG:HH22	1.70	1.05
1:A:235:PRO:HB2	1:A:296:ARG:HH22	0.89	1.04
1:A:386:LEU:HD21	1:B:523:GLY:HA3	1.60	0.83
1:A:385:TRP:H	1:B:527:GLN:HE22	1.28	0.79
1:A:235:PRO:CB	1:A:296:ARG:NH2	2.37	0.75
1:A:459:LEU:HD23	1:A:470:ARG:HG2	1.72	0.69
1:A:381:HIS:HA	7:B:609:P15:H121	1.74	0.69
1:A:385:TRP:H	1:B:527:GLN:NE2	1.90	0.68
1:A:296:ARG:HH11	1:A:296:ARG:HG2	1.59	0.68
1:B:68:VAL:HG21	1:B:88:PRO:HB3	1.77	0.66
1:B:463:LEU:HA	2:B:602:NAG:H82	1.77	0.66
1:A:235:PRO:HB2	1:A:296:ARG:CZ	2.22	0.62
1:B:166:GLU:HB2	1:B:270:ILE:HD13	1.83	0.60
1:A:417:ARG:O	1:A:421:GLN:HG2	2.03	0.59
1:A:227:LEU:HB2	1:A:328:VAL:HG12	1.84	0.58
1:B:68:VAL:HG13	1:B:90:ARG:HB2	1.85	0.58
1:B:294:ILE:HG12	1:B:365:ILE:HG22	1.85	0.58
1:B:162:PRO:O	1:B:245:ARG:NH1	2.37	0.57
1:A:293:SER:HB3	1:A:368:PRO:HG3	1.86	0.56
1:A:498:PRO:HG2	1:A:518:LEU:HB2	1.87	0.56
1:A:296:ARG:HG2	1:A:296:ARG:NH1	2.20	0.56
1:A:373:LEU:HD23	1:A:539:LEU:HD11	1.87	0.55
1:A:224:ARG:HG2	1:A:325:GLN:HB2	1.89	0.55
1:B:513:LEU:HD23	1:B:518:LEU:HD21	1.90	0.54
1:A:381:HIS:CE1	7:B:609:P15:H32	2.44	0.53
1:B:491:ASP:HB3	1:B:494:ASP:HB3	1.91	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:424:ARG:NH1	8:B:704:HOH:O	2.42	0.51
1:B:108:PRO:HG2	1:B:191:GLY:HA3	1.92	0.50
1:A:113:PRO:HG2	1:A:485:ARG:HG2	1.94	0.50
1:A:468:GLU:H	1:A:468:GLU:CD	2.14	0.49
1:B:460:ASP:HB3	1:B:463:LEU:HD12	1.94	0.49
1:B:207:ALA:O	1:B:211:MET:HG3	2.13	0.48
1:A:324:LEU:HG	1:A:326:VAL:HG23	1.95	0.48
1:B:13:ARG:HG2	5:B:607:PG0:H42	1.96	0.48
1:A:386:LEU:HD21	1:B:523:GLY:CA	2.39	0.48
1:B:319:GLY:O	1:B:421:GLN:NE2	2.47	0.48
1:A:467:THR:HG23	1:A:470:ARG:HH12	1.78	0.48
1:A:326:VAL:HG12	1:A:328:VAL:HG13	1.96	0.48
1:A:112:THR:HG23	5:A:611:PG0:H41	1.96	0.48
1:B:328:VAL:O	1:B:427:ALA:HA	2.14	0.48
1:A:407:VAL:O	1:A:411:VAL:HG13	2.13	0.47
1:B:227:LEU:HB2	1:B:328:VAL:HG12	1.97	0.47
1:A:113:PRO:HB2	5:A:611:PG0:H52	1.96	0.47
1:A:364:ARG:HA	1:A:364:ARG:HD2	1.58	0.47
1:A:376:GLU:HG3	1:B:538:LYS:HE3	1.96	0.47
1:B:104:PRO:HG2	1:B:108:PRO:HD3	1.97	0.47
1:A:226:VAL:HG22	1:A:327:LEU:HB3	1.97	0.47
1:A:376:GLU:O	1:A:380:LEU:HD22	2.15	0.46
1:B:376:GLU:O	1:B:380:LEU:HG	2.14	0.46
1:A:219:ARG:HD2	1:A:219:ARG:HA	1.71	0.46
1:A:317:ASN:HA	1:A:417:ARG:HH21	1.80	0.46
1:A:433:ARG:NH2	1:A:439:TRP:O	2.49	0.46
1:B:432:HIS:CE1	1:B:515:LEU:HD11	2.51	0.46
1:B:458:PRO:HA	1:B:465:TYR:CD2	2.51	0.46
1:B:511:VAL:HB	1:B:518:LEU:HD22	1.96	0.46
1:B:200:PHE:HB2	1:B:226:VAL:HB	1.98	0.46
1:A:213:ILE:HD13	1:A:324:LEU:HD21	1.98	0.45
1:A:277:PRO:HA	5:A:608:PG0:H22	1.96	0.45
1:B:384:ASP:HB2	1:B:393[B]:HIS:CE1	2.50	0.45
1:B:472:PHE:HB2	1:B:515:LEU:HD23	1.97	0.45
1:A:321:PHE:HD2	1:A:421:GLN:HB2	1.82	0.45
1:A:21:ARG:HH22	1:A:23:LYS:HE2	1.81	0.45
1:A:4:GLU:HG3	1:A:9:LEU:HD11	2.00	0.44
1:B:46:ARG:HD3	1:B:47:PHE:CZ	2.53	0.44
1:B:200:PHE:CB	1:B:226:VAL:HB	2.48	0.43
1:A:353:LEU:HB3	1:A:391:PRO:HB2	1.99	0.43
1:B:226:VAL:HG22	1:B:327:LEU:HB3	1.99	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:381:HIS:HE1	7:B:609:P15:H32	1.81	0.43
1:A:453:PHE:HB3	1:A:476:LEU:HD12	2.01	0.43
1:B:61:ASP:OD1	1:B:63:THR:HG22	2.19	0.43
1:B:356:ARG:O	1:B:360:LEU:HG	2.19	0.43
1:A:328:VAL:O	1:A:427:ALA:HA	2.18	0.43
1:A:89:ASN:O	1:A:90:ARG:HD2	2.20	0.42
1:A:200:PHE:CB	1:A:226:VAL:HB	2.49	0.42
1:B:202:GLU:HA	1:B:228:GLN:O	2.19	0.42
1:B:257:CYS:HA	1:B:258:PRO:HD3	1.85	0.42
1:A:161:LEU:HD11	1:A:269:LEU:HD23	2.01	0.42
1:A:202:GLU:HA	1:A:228:GLN:O	2.19	0.42
1:A:413:GLN:O	1:A:417:ARG:HG2	2.20	0.42
1:A:540:LEU:HD23	1:A:540:LEU:HA	1.88	0.42
1:A:376:GLU:O	1:A:379:VAL:N	2.53	0.42
1:B:39:GLU:OE1	1:B:54:ARG:HD3	2.21	0.41
1:B:450:GLU:O	1:B:454:ILE:HG13	2.20	0.41
1:B:165:ARG:NH1	1:B:166:GLU:HG3	2.35	0.41
1:A:187:ILE:HD12	1:A:187:ILE:HA	1.93	0.41
1:A:320:ASP:OD2	1:A:322:GLN:HG2	2.21	0.41
1:A:337:TYR:O	1:A:337:TYR:HD1	2.04	0.41
1:B:211:MET:HG2	1:B:232:PRO:HB3	2.02	0.40
1:A:458:PRO:HA	1:A:465:TYR:CD2	2.56	0.40
1:B:29:VAL:HG21	1:B:136:ARG:HB2	2.01	0.40
1:A:356:ARG:NH1	1:A:383:THR:OG1	2.42	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	534/543 (98%)	513 (96%)	20 (4%)	1 (0%)	47 71

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	534/543 (98%)	512 (96%)	22 (4%)	0	100	100
All	All	1068/1086 (98%)	1025 (96%)	42 (4%)	1 (0%)	51	75

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	495	SER

### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	441/443 (100%)	435 (99%)	6 (1%)	67	85
1	B	440/443 (99%)	433 (98%)	7 (2%)	62	82
All	All	881/886 (99%)	868 (98%)	13 (2%)	65	83

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	11	ARG
1	A	200	PHE
1	A	295	PHE
1	A	337	TYR
1	A	413	GLN
1	A	414	LEU
1	B	48	MET
1	B	105	TYR
1	B	200	PHE
1	B	253	ARG
1	B	295	PHE
1	B	337	TYR
1	B	525	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	527	GLN

### 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](#)

21 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
5	PG0	A	609	-	7,7,7	0.62	0	6,6,6	0.72	0
2	NAG	B	602	1	14,14,15	0.22	0	17,19,21	0.57	0
2	NAG	B	601	1	14,14,15	1.17	1 (7%)	17,19,21	1.64	1 (5%)
5	PG0	A	610	-	7,7,7	0.63	0	6,6,6	0.70	0
5	PG0	A	605	-	7,7,7	0.63	0	6,6,6	0.70	0
5	PG0	B	606	-	5,5,7	0.54	0	4,4,6	0.76	0
5	PG0	A	606	-	7,7,7	0.63	0	6,6,6	0.74	0
3	5IK	A	603	-	32,34,34	1.43	5 (15%)	42,46,46	1.56	10 (23%)
5	PG0	A	607	-	7,7,7	0.62	0	6,6,6	0.82	0
3	5IK	B	603	-	32,34,34	1.36	4 (12%)	42,46,46	1.55	11 (26%)
6	TOE	B	608	-	10,10,10	0.66	0	9,9,9	0.75	0
5	PG0	B	605	-	7,7,7	0.62	0	6,6,6	0.82	0
2	NAG	A	602	1	14,14,15	0.32	0	17,19,21	0.72	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	PG0	A	608	-	7,7,7	0.64	0	6,6,6	0.74	0
2	NAG	A	601	1	14,14,15	0.46	0	17,19,21	0.79	1 (5%)
5	PG0	A	611	-	7,7,7	0.64	0	6,6,6	0.71	0
7	P15	B	609	-	19,19,19	0.56	0	18,18,18	0.86	0
4	EDO	A	604	-	3,3,3	0.45	0	2,2,2	0.35	0
5	PG0	B	607	-	7,7,7	0.59	0	6,6,6	0.78	0
5	PG0	B	604	-	7,7,7	0.65	0	6,6,6	0.75	0
5	PG0	A	612	-	7,7,7	0.64	0	6,6,6	0.77	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
5	PG0	A	609	-	-	1/5/5/5	-
2	NAG	B	602	1	-	0/6/23/26	0/1/1/1
2	NAG	B	601	1	-	2/6/23/26	0/1/1/1
5	PG0	A	610	-	-	4/5/5/5	-
5	PG0	A	605	-	-	3/5/5/5	-
5	PG0	B	606	-	-	1/3/3/5	-
5	PG0	A	606	-	-	2/5/5/5	-
3	5IK	A	603	-	-	1/15/15/15	0/4/4/4
5	PG0	A	607	-	-	2/5/5/5	-
3	5IK	B	603	-	-	1/15/15/15	0/4/4/4
6	TOE	B	608	-	-	6/8/8/8	-
5	PG0	B	605	-	-	2/5/5/5	-
2	NAG	A	602	1	-	2/6/23/26	0/1/1/1
5	PG0	A	608	-	-	2/5/5/5	-
2	NAG	A	601	1	-	2/6/23/26	0/1/1/1
5	PG0	A	611	-	-	3/5/5/5	-
7	P15	B	609	-	-	8/17/17/17	-
4	EDO	A	604	-	-	0/1/1/1	-
5	PG0	B	607	-	-	2/5/5/5	-
5	PG0	B	604	-	-	5/5/5/5	-
5	PG0	A	612	-	-	4/5/5/5	-

All (10) bond length outliers are listed below:



Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	603	5IK	CAO-CBB	4.59	1.46	1.37
3	B	603	5IK	CAO-CBB	4.52	1.46	1.37
2	B	601	NAG	C1-C2	3.85	1.58	1.52
3	A	603	5IK	CAO-CBA	-2.46	1.35	1.39
3	B	603	5IK	CAO-CBA	-2.45	1.35	1.39
3	A	603	5IK	CAT-NBE	2.26	1.52	1.47
3	B	603	5IK	CBA-CBD	2.23	1.47	1.42
3	A	603	5IK	CAP-CBC	2.21	1.42	1.37
3	B	603	5IK	CAT-NBE	2.08	1.52	1.47
3	A	603	5IK	CBA-CBD	2.01	1.47	1.42

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	601	NAG	C1-O5-C5	6.09	120.45	112.19
3	B	603	5IK	CAM-CAZ-CAP	-3.80	115.71	120.81
3	A	603	5IK	CAM-CAZ-CAP	-3.78	115.73	120.81
3	A	603	5IK	CAI-CAW-CAJ	-3.02	113.41	118.17
3	B	603	5IK	CAI-CAW-CAJ	-2.91	113.59	118.17
2	A	601	NAG	C1-O5-C5	2.67	115.81	112.19
3	A	603	5IK	CBA-CBD-CBC	2.56	120.07	117.82
3	A	603	5IK	OAU-CAR-CAW	2.54	116.78	109.16
3	A	603	5IK	CAT-NBE-CAS	2.52	115.55	110.97
3	B	603	5IK	CAN-CBD-CBC	-2.47	113.65	116.50
3	B	603	5IK	CAN-CBD-CBA	2.42	126.56	122.55
3	B	603	5IK	OAU-CAR-CAW	2.40	116.37	109.16
3	A	603	5IK	CAK-CAY-CAL	-2.40	114.39	118.17
3	A	603	5IK	CAN-CBD-CBC	-2.28	113.87	116.50
3	B	603	5IK	CBA-CBD-CBC	2.23	119.78	117.82
3	B	603	5IK	OAC-CAQ-CBA	-2.23	110.10	112.82
3	B	603	5IK	CAK-CAY-CAL	-2.22	114.67	118.17
3	B	603	5IK	CAT-NBE-CAS	2.20	114.97	110.97
3	A	603	5IK	CAN-CBD-CBA	2.11	126.05	122.55
3	A	603	5IK	OAC-CAQ-CBA	-2.10	110.26	112.82
3	B	603	5IK	CAR-OAU-CAZ	2.09	122.81	117.65
3	A	603	5IK	CAR-OAU-CAZ	2.06	122.75	117.65
3	B	603	5IK	CAZ-CAP-CBC	2.03	121.42	119.13

There are no chirality outliers.

All (53) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	602	NAG	O5-C5-C6-O6

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Mol	Chain	Res	Type	Atoms
5	A	605	PG0	O1-C3-C4-O2
5	A	611	PG0	O1-C3-C4-O2
5	A	608	PG0	O1-C3-C4-O2
5	B	605	PG0	O1-C3-C4-O2
2	B	601	NAG	O5-C5-C6-O6
5	B	604	PG0	O1-C3-C4-O2
5	A	612	PG0	O1-C3-C4-O2
2	A	602	NAG	C4-C5-C6-O6
5	A	606	PG0	O1-C3-C4-O2
7	B	609	P15	O5-C10-C9-O4
5	A	610	PG0	O1-C3-C4-O2
2	B	601	NAG	C4-C5-C6-O6
7	B	609	P15	O1-C3-C4-O2
5	A	607	PG0	OTT-C1-C2-O1
5	A	607	PG0	O1-C3-C4-O2
5	A	609	PG0	O1-C3-C4-O2
7	B	609	P15	O5-C11-C12-O6
5	A	605	PG0	OTT-C1-C2-O1
5	A	606	PG0	OTT-C1-C2-O1
5	A	608	PG0	OTT-C1-C2-O1
5	A	611	PG0	OTT-C1-C2-O1
5	B	604	PG0	OTT-C1-C2-O1
6	B	608	TOE	OC'-CD'-CE'-OF'
5	A	610	PG0	OTT-C1-C2-O1
7	B	609	P15	C6-C5-O2-C4
5	A	610	PG0	C4-C3-O1-C2
5	B	604	PG0	C1-C2-O1-C3
6	B	608	TOE	CE'-CD'-OC'-CB'
6	B	608	TOE	CH'-CG'-OF'-CE'
5	B	604	PG0	C4-C3-O1-C2
6	B	608	TOE	O2'-CA'-CB'-OC'
5	B	604	PG0	C3-C4-O2-C5
5	A	610	PG0	C3-C4-O2-C5
6	B	608	TOE	CA'-CB'-OC'-CD'
2	A	601	NAG	C4-C5-C6-O6
2	A	601	NAG	O5-C5-C6-O6
5	A	612	PG0	C4-C3-O1-C2
5	A	611	PG0	C1-C2-O1-C3
5	A	605	PG0	C4-C3-O1-C2
6	B	608	TOE	OF'-CG'-CH'-OI'
5	B	607	PG0	C4-C3-O1-C2
7	B	609	P15	O3-C7-C8-O4

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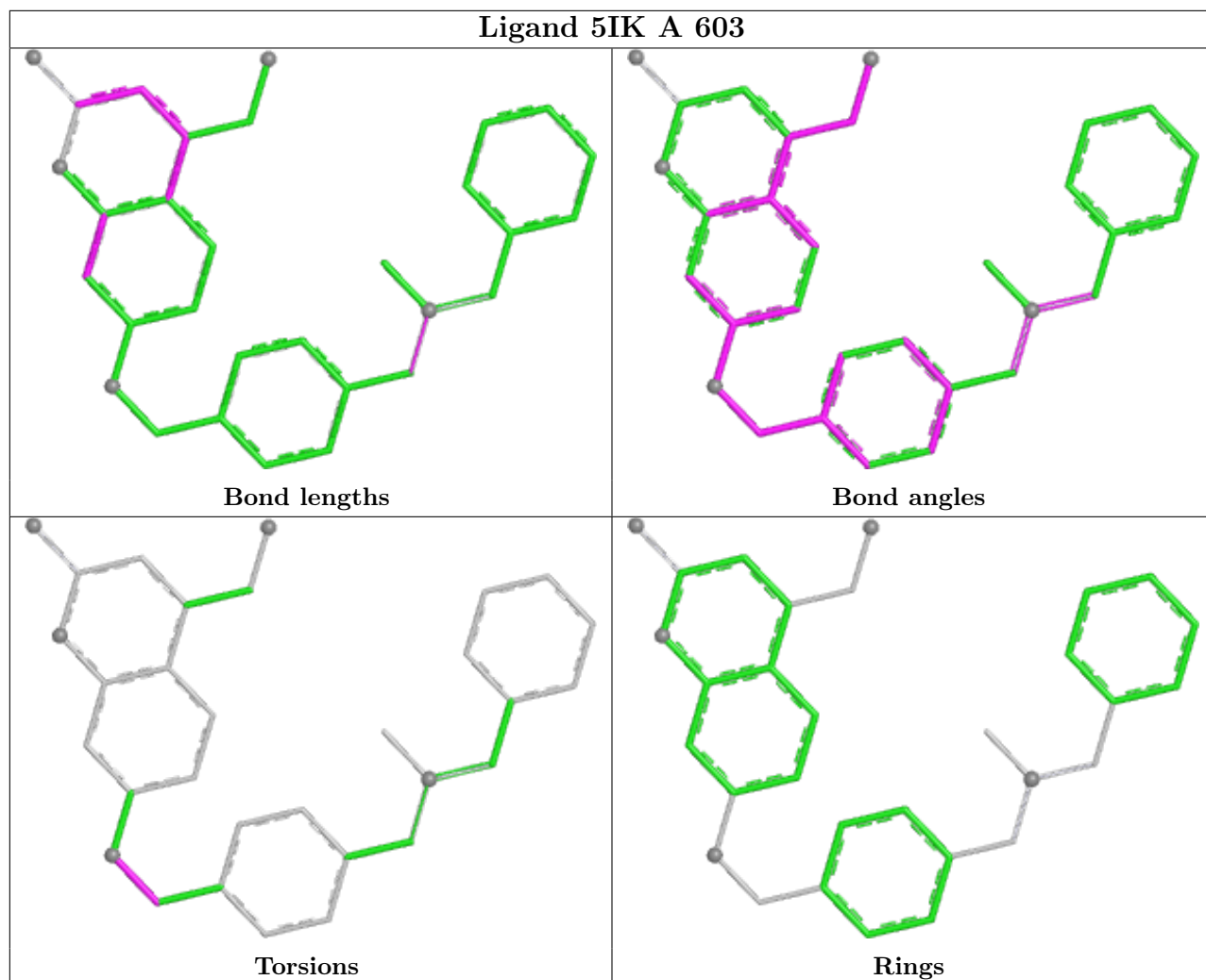
Mol	Chain	Res	Type	Atoms
7	B	609	P15	C10-C9-O4-C8
5	A	612	PG0	C1-C2-O1-C3
5	B	605	PG0	OTT-C1-C2-O1
5	B	607	PG0	O1-C3-C4-O2
5	B	606	PG0	O1-C3-C4-O2
7	B	609	P15	C8-C7-O3-C6
3	B	603	5IK	CAW-CAR-OAU-CAZ
3	A	603	5IK	CAW-CAR-OAU-CAZ
5	A	612	PG0	C3-C4-O2-C5
7	B	609	P15	O2-C5-C6-O3

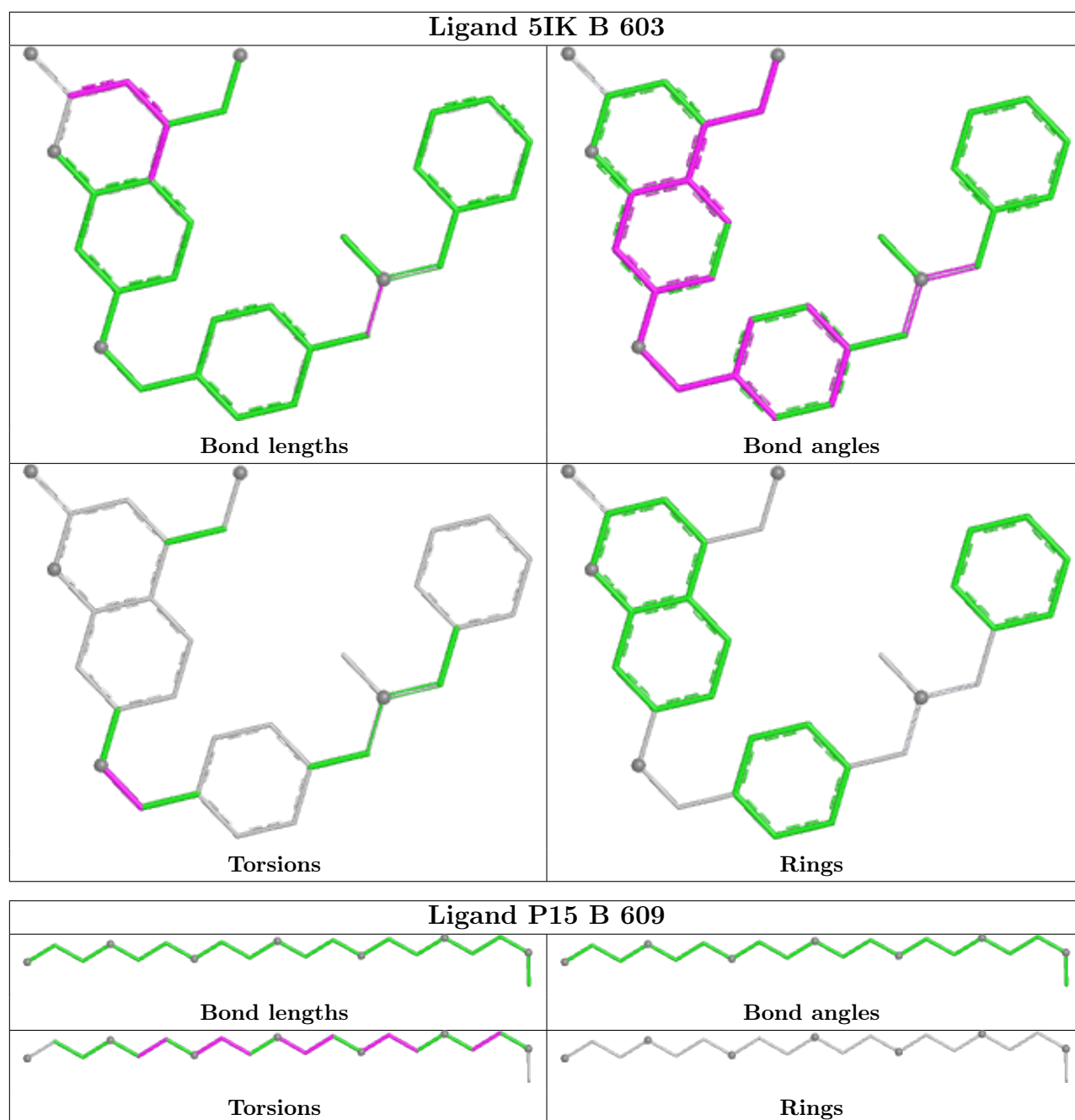
There are no ring outliers.

5 monomers are involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	602	NAG	1	0
5	A	608	PG0	1	0
5	A	611	PG0	2	0
7	B	609	P15	3	0
5	B	607	PG0	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](#)

Unable to reproduce the depositors R factor - this section is therefore empty.

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

Unable to reproduce the depositors R factor - this section is therefore empty.

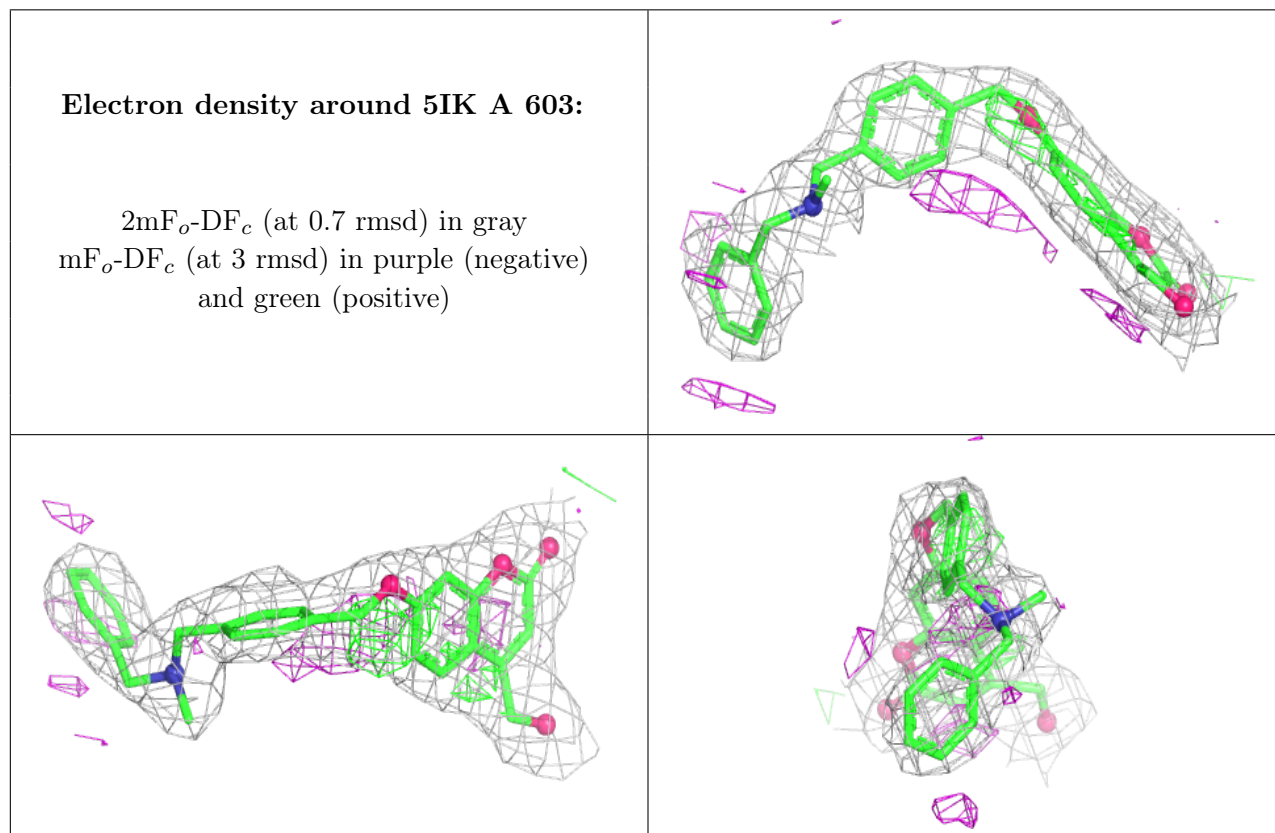
### 6.3 Carbohydrates [i](#)

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.4 Ligands [i](#)

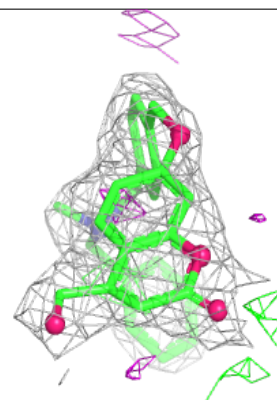
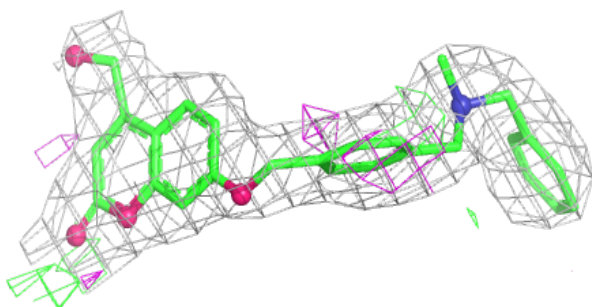
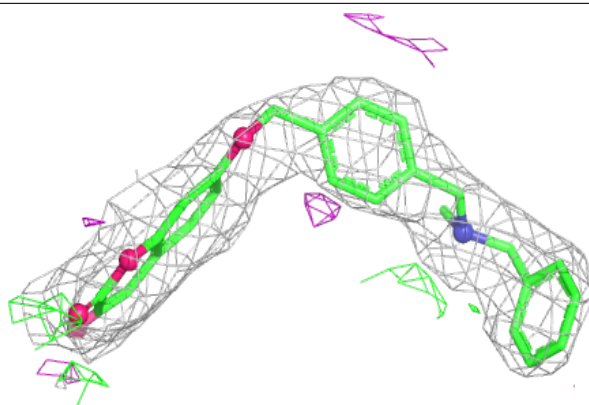
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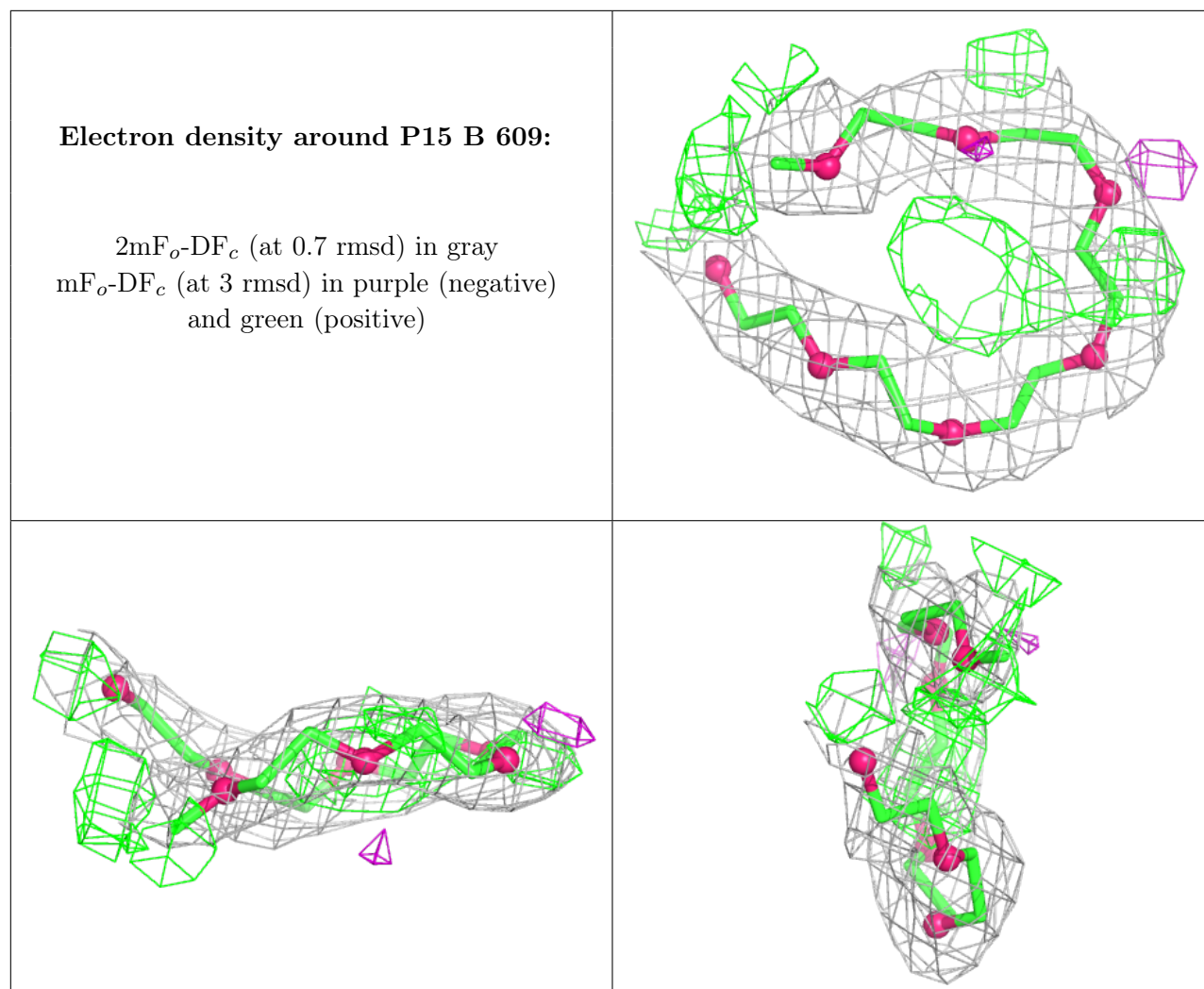
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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



**Electron density around 5IK 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)





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

Unable to reproduce the depositors R factor - this section is therefore empty.