



Full wwPDB X-ray Structure Validation Report ⓘ

Apr 15, 2026 – 12:56 AM UTC

PDB ID : 7R02 / pdb_00007r02
Title : Mus musculus acetylcholinesterase in complex with N-(3-(diethylamino)propyl)-4-methyl-3-nitrobenzamide
Authors : Forsgren, N.; Lindgren, C.; Edvinsson, L.; Linusson, A.; Ekstrom, F.
Deposited on : 2022-02-01
Resolution : 2.30 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

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	:	4-5-2 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

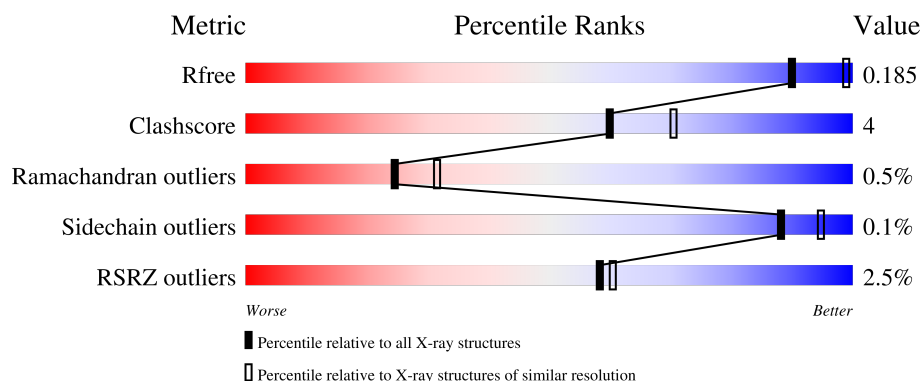
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

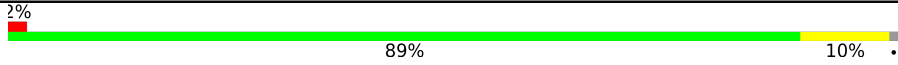
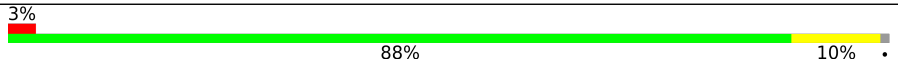
The reported resolution of this entry is 2.30 Å.

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	6319 (2.30-2.30)
Clashscore	190562	6919 (2.30-2.30)
Ramachandran outliers	187476	6854 (2.30-2.30)
Sidechain outliers	187428	6854 (2.30-2.30)
RSRZ outliers	180081	6325 (2.30-2.30)

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 ≥ 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
4	PG0	B	606	-	-	X	-

2 Entry composition [i](#)

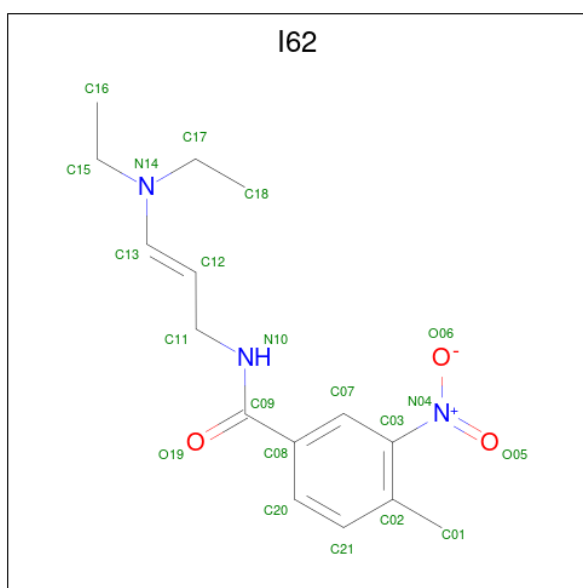
There are 7 unique types of molecules in this entry. The entry contains 9026 atoms, of which 0 are hydrogens and 0 are deuteriums.

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.

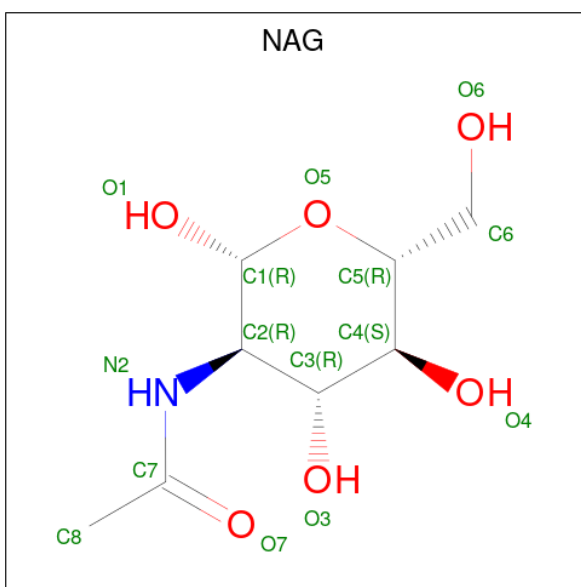
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	537	Total	C	N	O	S	0	6	0
			4237	2717	738	767	15			
1	B	535	Total	C	N	O	S	0	7	0
			4232	2711	740	767	14			

- Molecule 2 is N-[(2E)-3-(diethylamino)prop-2-en-1-yl]-4-methyl-3-nitrobenzamide (CCD ID: I62) (formula: $C_{15}H_{21}N_3O_3$) (labeled as "Ligand of Interest" by depositor).



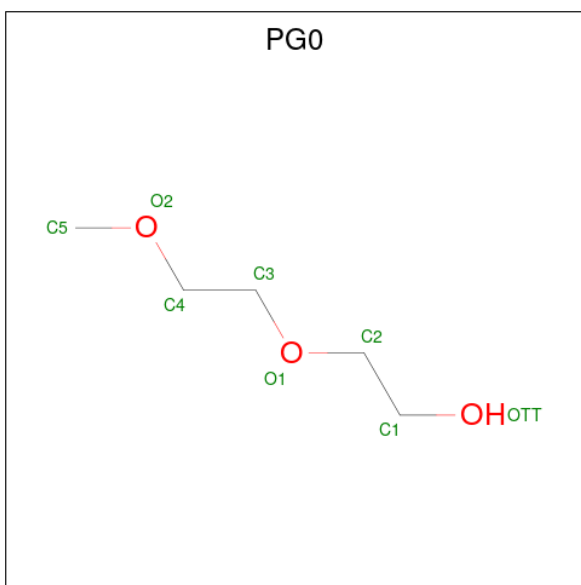
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			21	15	3	3		
2	B	1	Total	C	N	O	0	0
			21	15	3	3		

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



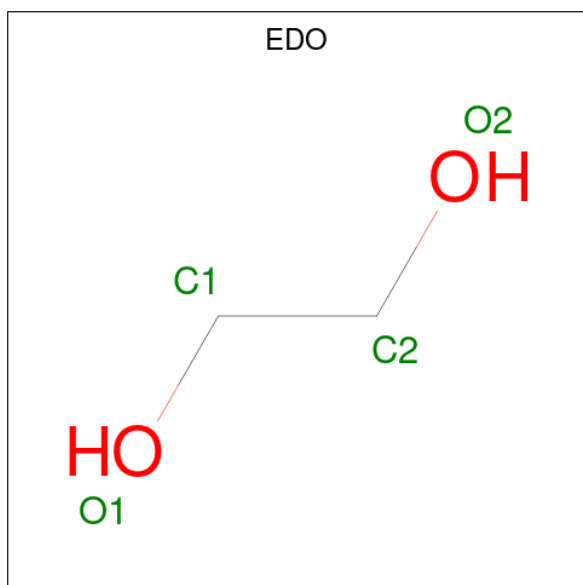
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	B	1	Total	C	N	O	0	0
			14	8	1	5		
3	B	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 4 is 2-(2-METHOXYETHOXY)ETHANOL (CCD ID: PG0) (formula: C₅H₁₂O₃).



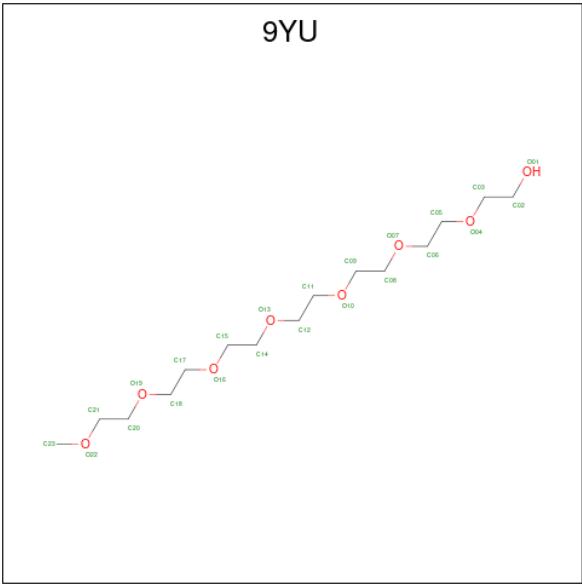
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			8	5	3		
4	A	1	Total	C	O	0	0
			8	5	3		
4	A	1	Total	C	O	0	0
			8	5	3		
4	A	1	Total	C	O	0	0
			8	5	3		
4	B	1	Total	C	O	0	0
			8	5	3		
4	B	1	Total	C	O	0	0
			8	5	3		
4	B	1	Total	C	O	0	0
			8	5	3		
4	B	1	Total	C	O	0	0
			8	5	3		
4	B	1	Total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

- Molecule 5 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: C₂H₆O₂).



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

- Molecule 6 is 2-[2-[2-[2-[2-(2-methoxyethoxy)ethoxy]ethoxy]ethoxy]ethoxy]ethoxy]ethanol (CCD ID: 9YU) (formula: C₁₅H₃₂O₈).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	B	1	Total	C	O	0	0
			23	15	8		

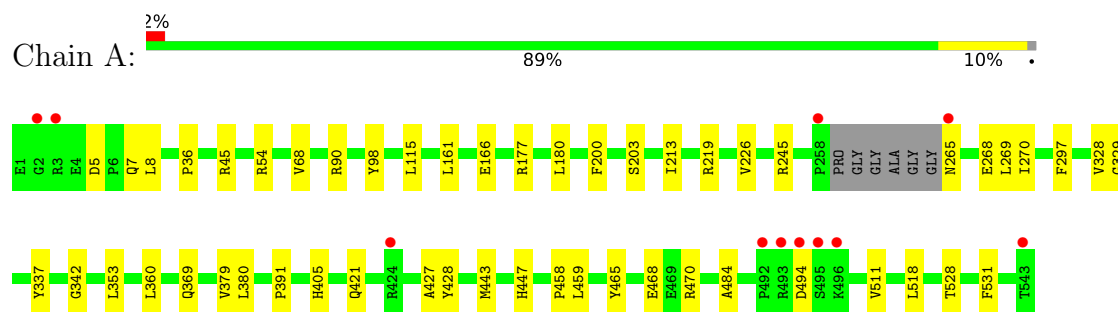
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	191	Total	O	0	0
			191	191		
7	B	155	Total	O	0	0
			155	155		

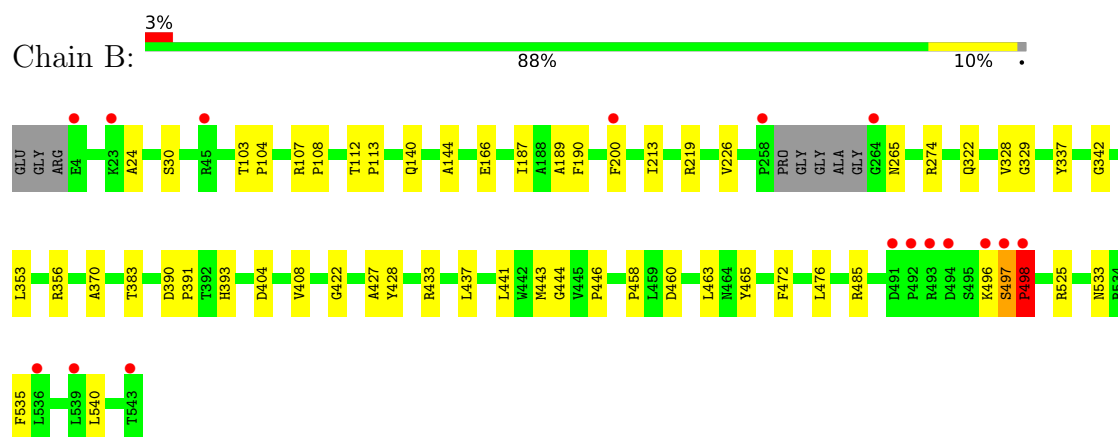
3 Residue-property plots

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 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, α , β , γ	78.85Å 111.11Å 227.23Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	28.71 – 2.30 28.71 – 2.30	Depositor EDS
% Data completeness (in resolution range)	99.7 (28.71-2.30) 99.8 (28.71-2.30)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	5.41 (at 2.31Å)	Xtriage
Refinement program	PHENIX 1.17.1 _3660	Depositor
R, R_{free}	0.169 , 0.185 0.170 , 0.185	Depositor DCC
R_{free} test set	1765 reflections (1.76%)	wwPDB-VP
Wilson B-factor (Å ²)	41.1	Xtriage
Anisotropy	0.785	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 52.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	9026	wwPDB-VP
Average B, all atoms (Å ²)	53.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.65% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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: PG0, 9YU, NAG, I62, EDO

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	0.33	0/4361	0.51	0/5957
1	B	0.31	0/4357	0.51	1/5953 (0.0%)
All	All	0.32	0/8718	0.51	1/11910 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	498	PRO	N-CA-C	-6.49	99.10	112.47

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	4237	0	4119	29	0
1	B	4232	0	4106	45	0
2	A	21	0	0	1	0
2	B	21	0	0	0	0
3	A	28	0	26	0	0
3	B	28	0	26	1	0
4	A	40	0	60	0	0
4	B	46	0	67	7	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	4	0	6	1	0
6	B	23	0	0	0	0
7	A	191	0	0	1	0
7	B	155	0	0	2	0
All	All	9026	0	8410	73	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 (73) 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:496:LYS:C	1:B:498:PRO:HD3	2.08	0.78
1:B:485:ARG:HH11	4:B:606:PG0:H31	1.58	0.69
1:B:265:ASN:ND2	7:B:701:HOH:O	2.27	0.68
1:B:30:SER:HB2	1:B:103[B]:THR:HG22	1.75	0.67
1:B:353:LEU:HB3	1:B:391:PRO:HB2	1.77	0.65
1:B:113:PRO:HG2	1:B:485:ARG:HG2	1.80	0.62
1:B:200:PHE:HB2	1:B:226:VAL:HB	1.85	0.58
1:A:353:LEU:HB3	1:A:391:PRO:HB2	1.86	0.57
1:B:104:PRO:HG2	1:B:108:PRO:HG3	1.87	0.57
1:A:7:GLN:HB3	7:A:833:HOH:O	2.05	0.56
1:B:390:ASP:OD2	1:B:393[A]:HIS:ND1	2.37	0.55
1:A:380:LEU:HD23	1:B:535:PHE:HB2	1.88	0.54
1:A:337:TYR:HA	1:A:443[B]:MET:HE3	1.89	0.54
1:B:112:THR:HG23	4:B:606:PG0:H42	1.90	0.54
1:B:356[A]:ARG:NH1	1:B:383:THR:OG1	2.40	0.53
1:A:161:LEU:HD11	1:A:269:LEU:HD22	1.91	0.53
1:B:458:PRO:HA	1:B:465:TYR:CD2	2.44	0.52
1:B:460:ASP:HB3	1:B:463:LEU:HD12	1.93	0.51
1:B:144:ALA:HA	4:B:606:PG0:H53	1.93	0.50
1:B:404:ASP:OD1	1:B:525[A]:ARG:NH2	2.45	0.50
1:B:533:ASN:ND2	7:B:704:HOH:O	2.45	0.50
1:B:496:LYS:O	1:B:498:PRO:HD3	2.13	0.49
1:B:463:LEU:HA	3:B:603:NAG:H82	1.95	0.48
1:A:45[B]:ARG:NH2	1:A:54:ARG:HH22	2.12	0.48
1:A:68:VAL:HG23	1:A:90[B]:ARG:HB2	1.96	0.48
1:B:485:ARG:HD3	4:B:606:PG0:H31	1.94	0.48
1:A:45[B]:ARG:HH22	1:A:54:ARG:HH22	1.60	0.48
1:A:459:LEU:HD12	1:A:470:ARG:HG2	1.96	0.48
1:B:337:TYR:HA	1:B:443:MET:CE	2.44	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:203:SER:HB2	1:A:447:HIS:NE2	2.30	0.47
1:B:189:ALA:HB2	4:B:608:PG0:H42	1.97	0.47
1:B:328:VAL:O	1:B:427:ALA:HA	2.15	0.47
1:A:328:VAL:O	1:A:427:ALA:HA	2.15	0.46
1:B:107:ARG:HE	1:B:107:ARG:HB2	1.61	0.46
1:B:213:ILE:O	1:B:219:ARG:HD3	2.15	0.46
1:B:322:GLN:HG3	1:B:422:GLY:HA3	1.98	0.46
1:A:265:ASN:ND2	1:A:268:GLU:HG3	2.31	0.46
1:B:200:PHE:CB	1:B:226:VAL:HB	2.45	0.46
1:B:166:GLU:HB3	1:B:274[B]:ARG:NH2	2.32	0.45
1:A:213:ILE:HA	1:A:219:ARG:HD3	1.99	0.45
1:B:329:GLY:HA3	1:B:428:TYR:CZ	2.51	0.45
1:A:36:PRO:HB3	1:A:98:TYR:CE1	2.53	0.44
1:B:370:ALA:HA	1:B:540:LEU:HD21	1.99	0.44
1:A:245:ARG:NH1	5:A:609:EDO:H22	2.32	0.44
1:B:408:VAL:HG11	1:B:525[B]:ARG:HG3	2.00	0.44
1:B:497:SER:N	1:B:498:PRO:HD3	2.33	0.44
1:A:166:GLU:HB2	1:A:270:ILE:HD13	1.99	0.43
1:B:472:PHE:CZ	1:B:476:LEU:HD11	2.53	0.43
1:A:177:ARG:HA	1:A:180[B]:LEU:HD22	2.01	0.43
1:A:458:PRO:HA	1:A:465:TYR:CD2	2.53	0.43
1:B:24:ALA:HB3	1:B:140:GLN:HG3	2.00	0.43
1:A:360:LEU:HD22	1:A:379:VAL:HG21	2.01	0.42
1:A:369:GLN:HE22	1:A:405:HIS:CE1	2.37	0.42
1:B:187:ILE:HD12	1:B:187:ILE:HA	1.87	0.42
1:B:433:ARG:CZ	1:B:441:LEU:HD23	2.50	0.42
1:A:161:LEU:HD12	1:A:270:ILE:HD11	2.01	0.42
1:B:329:GLY:HA3	1:B:428:TYR:CE2	2.55	0.42
1:B:433:ARG:CZ	1:B:437:LEU:HD23	2.50	0.42
1:A:329:GLY:HA3	1:A:428:TYR:CZ	2.54	0.42
1:B:444:GLY:O	1:B:446:PRO:HD3	2.20	0.42
1:A:468:GLU:H	1:A:468:GLU:CD	2.28	0.41
1:A:297:PHE:HA	2:A:601:I62:O05	2.20	0.41
1:A:5:ASP:HB3	1:A:8:LEU:HD12	2.02	0.41
1:B:337:TYR:HA	1:B:443:MET:HE2	2.01	0.41
1:B:408:VAL:HG11	1:B:525[A]:ARG:HD2	2.02	0.41
1:B:103[A]:THR:HG21	1:B:190:PHE:HB3	2.02	0.41
1:A:200:PHE:CB	1:A:226:VAL:HB	2.51	0.41
1:A:528:THR:O	1:A:531:PHE:HB3	2.20	0.41
1:A:115:LEU:HD21	1:A:484:ALA:HB2	2.02	0.41
1:B:441:LEU:HD23	1:B:441:LEU:HA	1.94	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:113:PRO:HB2	4:B:606:PG0:H52	2.03	0.40
1:B:113:PRO:CD	4:B:606:PG0:H11	2.51	0.40
1:A:511:VAL:HB	1:A:518:LEU:HD22	2.04	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	539/543 (99%)	522 (97%)	15 (3%)	2 (0%)	30	38
1	B	538/543 (99%)	522 (97%)	13 (2%)	3 (1%)	21	27
All	All	1077/1086 (99%)	1044 (97%)	28 (3%)	5 (0%)	24	31

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	494	ASP
1	B	498	PRO
1	A	342	GLY
1	B	342	GLY
1	B	497	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	444/443 (100%)	443 (100%)	1 (0%)	87	94
1	B	444/443 (100%)	444 (100%)	0	100	100
All	All	888/886 (100%)	887 (100%)	1 (0%)	88	95

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	421	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	474	GLN
1	A	509	GLN
1	B	284	HIS
1	B	387	HIS
1	B	421	GLN
1	B	533	ASN

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

19 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	PG0	A	607	-	7,7,7	0.56	0	6,6,6	0.88	0
6	9YU	B	610	-	22,22,22	0.65	0	21,21,21	0.95	0
4	PG0	A	608	-	7,7,7	0.60	0	6,6,6	0.86	0
5	EDO	A	609	-	3,3,3	0.47	0	2,2,2	0.30	0
2	I62	B	601	-	21,21,21	2.62	4 (19%)	22,27,27	1.83	3 (13%)
4	PG0	B	604	-	7,7,7	0.57	0	6,6,6	0.86	0
4	PG0	B	607	-	7,7,7	0.61	0	6,6,6	0.83	0
4	PG0	B	608	-	7,7,7	0.53	0	6,6,6	0.69	0
2	I62	A	601	-	21,21,21	2.62	4 (19%)	22,27,27	1.72	2 (9%)
3	NAG	A	602	1	14,14,15	0.64	0	17,19,21	0.62	1 (5%)
4	PG0	A	604	-	7,7,7	0.58	0	6,6,6	0.83	0
4	PG0	B	606	-	7,7,7	0.63	0	6,6,6	1.02	0
3	NAG	B	603	1	14,14,15	0.36	0	17,19,21	0.71	1 (5%)
3	NAG	A	603	1	14,14,15	0.53	0	17,19,21	0.56	0
4	PG0	B	609	-	5,5,7	0.55	0	4,4,6	0.78	0
4	PG0	B	605	-	7,7,7	0.62	0	6,6,6	0.95	0
3	NAG	B	602	1	14,14,15	0.87	1 (7%)	17,19,21	0.61	1 (5%)
4	PG0	A	605	-	7,7,7	0.54	0	6,6,6	0.92	0
4	PG0	A	606	-	7,7,7	0.60	0	6,6,6	0.79	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
4	PG0	A	607	-	-	4/5/5/5	-
6	9YU	B	610	-	-	11/20/20/20	-
4	PG0	A	608	-	-	1/5/5/5	-
5	EDO	A	609	-	-	0/1/1/1	-
2	I62	B	601	-	-	9/17/19/19	0/1/1/1
4	PG0	B	604	-	-	5/5/5/5	-
4	PG0	B	607	-	-	3/5/5/5	-
4	PG0	B	608	-	-	3/5/5/5	-
2	I62	A	601	-	-	4/17/19/19	0/1/1/1
3	NAG	A	602	1	-	2/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	PG0	A	604	-	-	3/5/5/5	-
4	PG0	B	606	-	-	4/5/5/5	-
3	NAG	B	603	1	-	2/6/23/26	0/1/1/1
3	NAG	A	603	1	-	2/6/23/26	0/1/1/1
4	PG0	B	609	-	-	0/3/3/5	-
4	PG0	B	605	-	-	1/5/5/5	-
3	NAG	B	602	1	-	2/6/23/26	0/1/1/1
4	PG0	A	605	-	-	3/5/5/5	-
4	PG0	A	606	-	-	4/5/5/5	-

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	601	I62	C13-C12	6.20	1.50	1.32
2	B	601	I62	C13-C12	6.19	1.50	1.32
2	B	601	I62	O05-N04	6.09	1.33	1.22
2	A	601	I62	C09-N10	5.80	1.46	1.33
2	A	601	I62	O05-N04	5.78	1.32	1.22
2	B	601	I62	C09-N10	5.62	1.46	1.33
2	A	601	I62	C13-N14	4.95	1.50	1.34
2	B	601	I62	C13-N14	4.87	1.50	1.34
3	B	602	NAG	O5-C1	2.70	1.48	1.43

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	601	I62	C17-N14-C13	-6.33	108.83	120.84
2	A	601	I62	C17-N14-C13	-5.46	110.48	120.84
2	A	601	I62	C15-N14-C13	-3.51	114.18	120.84
2	B	601	I62	C15-N14-C13	-2.96	115.22	120.84
2	B	601	I62	C11-N10-C09	-2.28	118.33	122.12
3	B	603	NAG	C1-O5-C5	2.24	115.19	112.19
3	A	602	NAG	C1-O5-C5	2.11	115.01	112.19
3	B	602	NAG	C1-O5-C5	2.00	114.87	112.19

There are no chirality outliers.

All (63) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	601	I62	C12-C13-N14-C17

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Mol	Chain	Res	Type	Atoms
2	A	601	I62	C16-C15-N14-C13
2	A	601	I62	C18-C17-N14-C13
2	B	601	I62	C02-C03-N04-O05
2	B	601	I62	C07-C03-N04-O05
2	B	601	I62	C11-C12-C13-N14
2	B	601	I62	C12-C13-N14-C17
2	B	601	I62	C16-C15-N14-C13
6	B	610	9YU	C02-C03-O04-C05
3	A	602	NAG	O5-C5-C6-O6
3	B	602	NAG	O5-C5-C6-O6
4	A	606	PG0	O1-C3-C4-O2
4	B	608	PG0	O1-C3-C4-O2
4	B	607	PG0	O1-C3-C4-O2
4	B	604	PG0	O1-C3-C4-O2
3	B	602	NAG	C4-C5-C6-O6
3	A	602	NAG	C4-C5-C6-O6
6	B	610	9YU	O13-C14-C15-O16
3	A	603	NAG	C4-C5-C6-O6
6	B	610	9YU	O10-C11-C12-O13
6	B	610	9YU	O04-C05-C06-O07
4	A	604	PG0	OTT-C1-C2-O1
4	A	606	PG0	OTT-C1-C2-O1
4	B	606	PG0	OTT-C1-C2-O1
4	B	606	PG0	O1-C3-C4-O2
3	A	603	NAG	O5-C5-C6-O6
3	B	603	NAG	C4-C5-C6-O6
2	B	601	I62	C18-C17-N14-C13
4	A	604	PG0	O1-C3-C4-O2
4	A	608	PG0	OTT-C1-C2-O1
2	A	601	I62	C16-C15-N14-C17
4	B	608	PG0	OTT-C1-C2-O1
3	B	603	NAG	O5-C5-C6-O6
4	A	606	PG0	C4-C3-O1-C2
4	B	605	PG0	OTT-C1-C2-O1
6	B	610	9YU	C14-C15-O16-C17
4	B	607	PG0	C1-C2-O1-C3
6	B	610	9YU	C15-C14-O13-C12
4	B	608	PG0	C4-C3-O1-C2
4	A	607	PG0	C1-C2-O1-C3
4	B	604	PG0	C1-C2-O1-C3
4	B	606	PG0	C1-C2-O1-C3
4	A	604	PG0	C4-C3-O1-C2

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Mol	Chain	Res	Type	Atoms
4	A	605	PG0	C4-C3-O1-C2
2	B	601	I62	N10-C11-C12-C13
4	B	607	PG0	OTT-C1-C2-O1
4	A	607	PG0	C4-C3-O1-C2
2	B	601	I62	C18-C17-N14-C15
4	B	606	PG0	C3-C4-O2-C5
4	A	607	PG0	O1-C3-C4-O2
6	B	610	9YU	C06-C05-O04-C03
4	A	605	PG0	C3-C4-O2-C5
2	B	601	I62	C16-C15-N14-C17
4	B	604	PG0	OTT-C1-C2-O1
4	B	604	PG0	C3-C4-O2-C5
4	B	604	PG0	C4-C3-O1-C2
4	A	605	PG0	O1-C3-C4-O2
6	B	610	9YU	C20-C21-O22-C23
6	B	610	9YU	O16-C17-C18-O19
4	A	606	PG0	C3-C4-O2-C5
4	A	607	PG0	OTT-C1-C2-O1
6	B	610	9YU	O19-C20-C21-O22
6	B	610	9YU	C18-C17-O16-C15

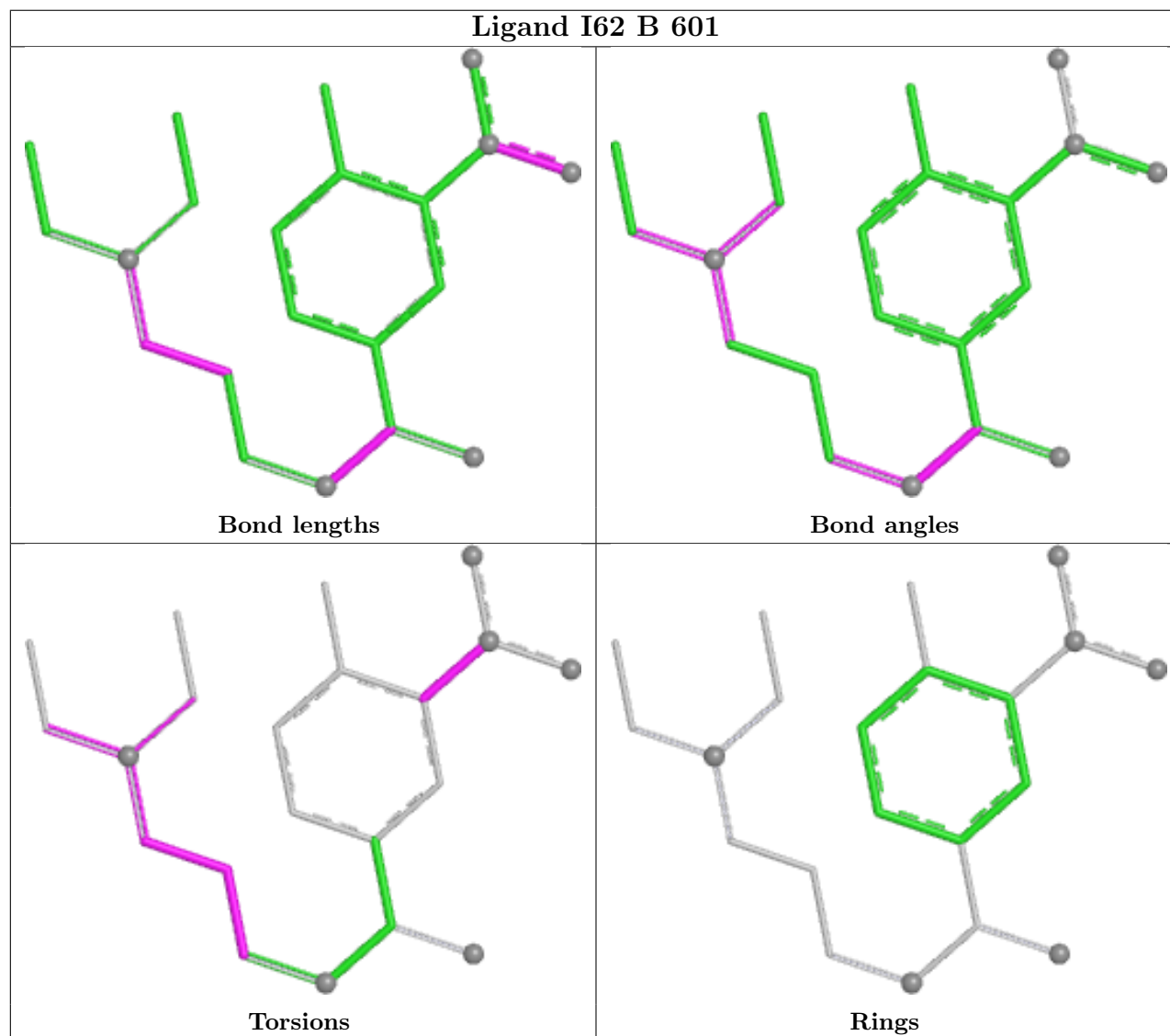
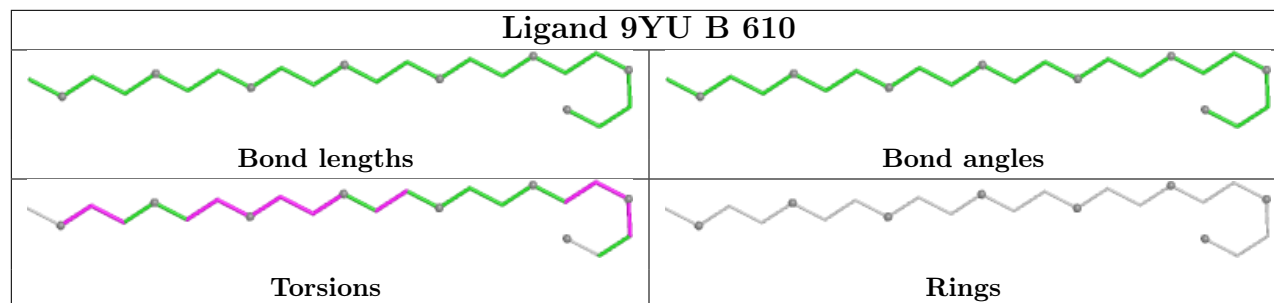
There are no ring outliers.

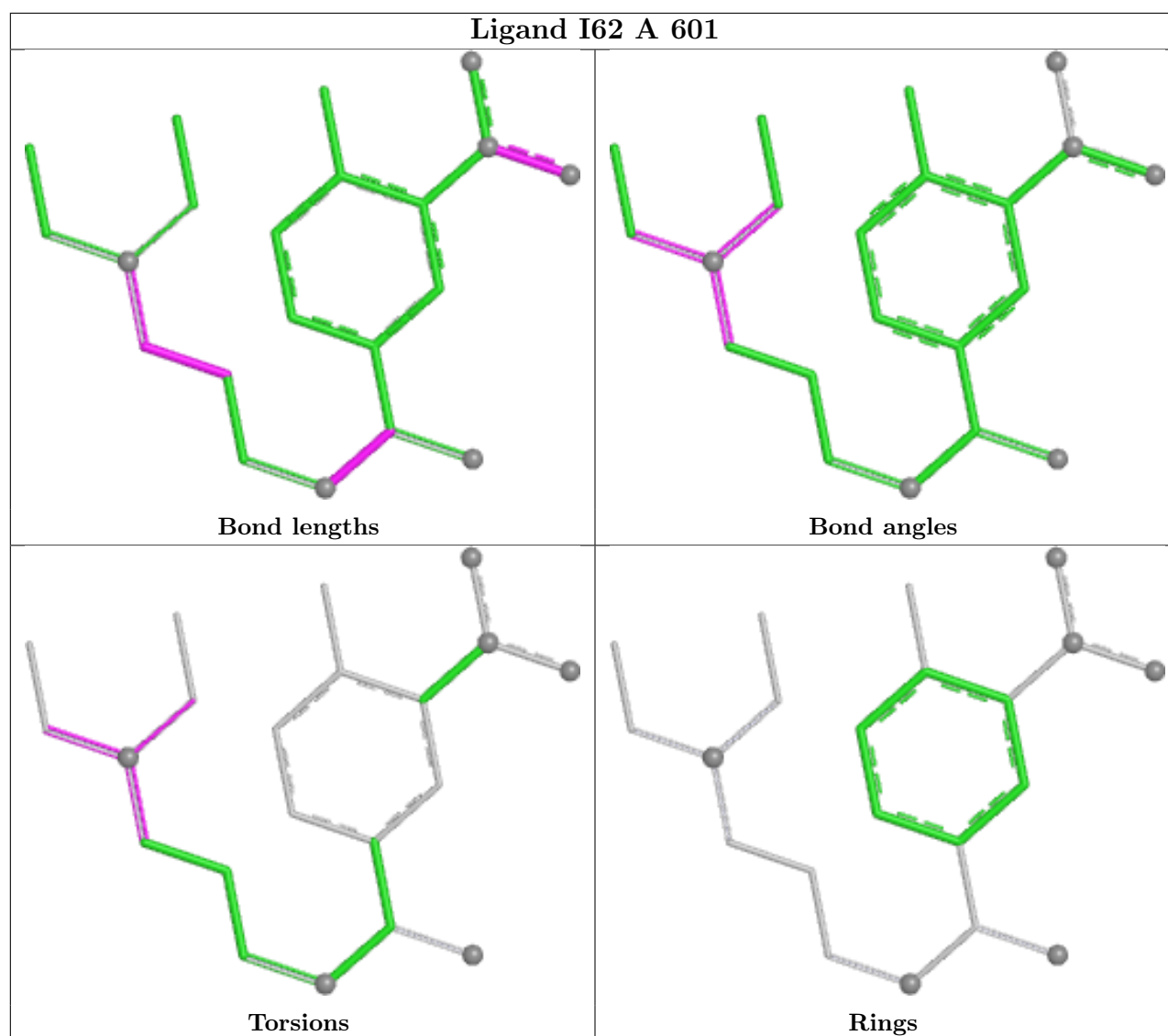
5 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	609	EDO	1	0
4	B	608	PG0	1	0
2	A	601	I62	1	0
4	B	606	PG0	6	0
3	B	603	NAG	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

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, 95th 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 ²)	Q<0.9
1	A	537/543 (98%)	-0.15	11 (2%) 65 66	21, 47, 76, 152	6 (1%)
1	B	535/543 (98%)	-0.04	16 (2%) 52 54	24, 52, 81, 117	7 (1%)
All	All	1072/1086 (98%)	-0.10	27 (2%) 58 60	21, 49, 79, 152	13 (1%)

All (27) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	498	PRO	7.9
1	B	258	PRO	7.2
1	A	258	PRO	6.2
1	B	543	THR	4.8
1	B	496	LYS	4.7
1	A	3	ARG	3.8
1	B	497	SER	3.7
1	A	496	LYS	3.6
1	B	494	ASP	3.2
1	A	495	SER	3.0
1	B	493	ARG	3.0
1	B	4	GLU	2.9
1	A	492	PRO	2.9
1	A	493	ARG	2.9
1	A	494	ASP	2.7
1	B	264	GLY	2.5
1	B	200	PHE	2.5
1	B	45[A]	ARG	2.4
1	A	543	THR	2.3
1	B	492	PRO	2.2
1	B	536	LEU	2.2
1	B	539	LEU	2.2
1	A	265	ASN	2.1
1	A	2	GLY	2.1

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Mol	Chain	Res	Type	RSRZ
1	B	491	ASP	2.1
1	A	424[A]	ARG	2.0
1	B	23	LYS	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](#)

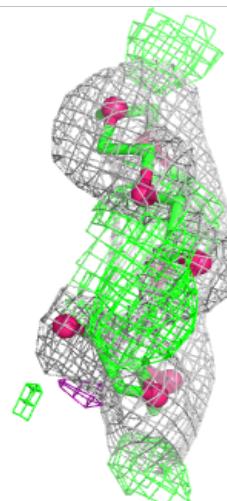
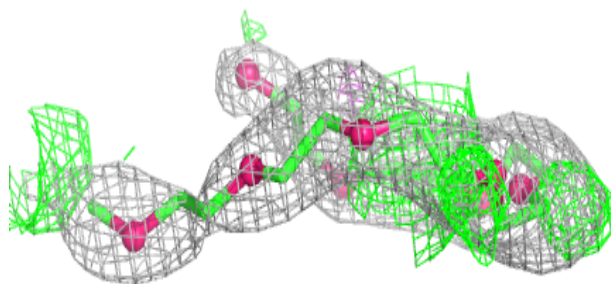
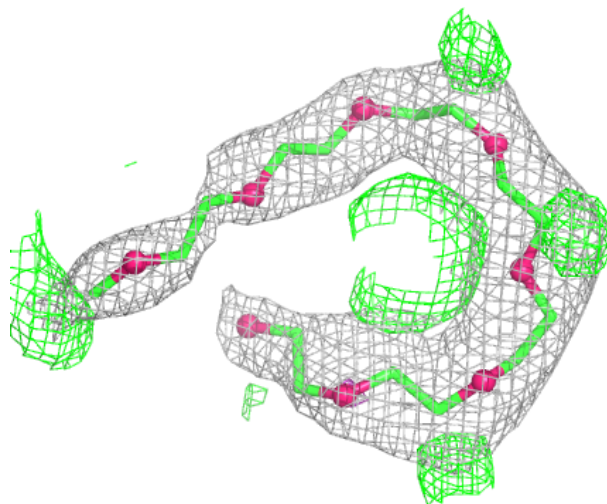
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	NAG	B	603	14/15	0.35	0.22	98,111,117,119	0
3	NAG	B	602	14/15	0.46	0.27	87,100,104,106	0
3	NAG	A	603	14/15	0.63	0.17	85,99,110,111	0
3	NAG	A	602	14/15	0.69	0.19	70,88,96,101	0
4	PG0	B	608	8/8	0.71	0.23	76,80,82,83	0
4	PG0	A	606	8/8	0.74	0.22	82,94,95,95	0
4	PG0	A	605	8/8	0.74	0.26	70,77,83,86	0
4	PG0	B	606	8/8	0.75	0.26	76,85,94,94	0
4	PG0	B	609	6/8	0.75	0.34	90,92,98,99	0
4	PG0	B	605	8/8	0.79	0.22	73,79,89,90	0
4	PG0	B	607	8/8	0.79	0.21	81,86,87,89	0
5	EDO	A	609	4/4	0.79	0.22	100,102,102,102	0
4	PG0	B	604	8/8	0.84	0.18	76,79,85,86	0
4	PG0	A	607	8/8	0.85	0.21	72,79,92,92	0
4	PG0	A	608	8/8	0.86	0.22	71,79,87,89	0
6	9YU	B	610	23/23	0.86	0.20	51,79,87,91	0
4	PG0	A	604	8/8	0.87	0.16	67,76,91,95	0
2	I62	B	601	21/21	0.88	0.20	52,66,83,89	0
2	I62	A	601	21/21	0.92	0.15	42,55,63,70	21

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.

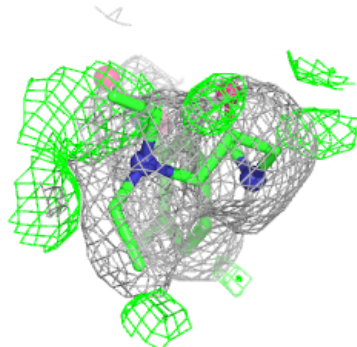
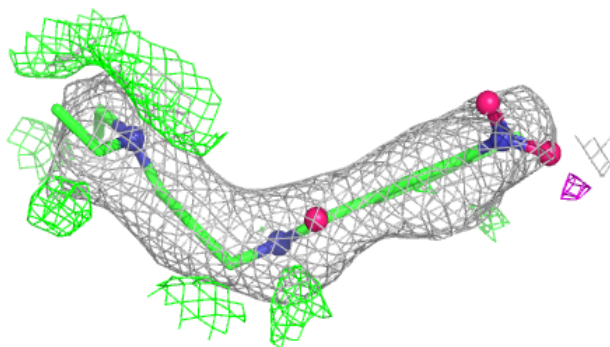
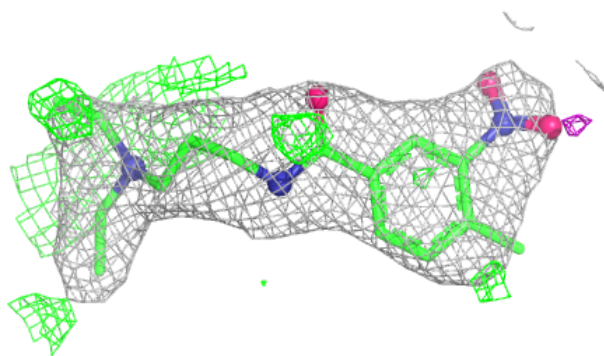
Electron density around 9YU B 610:

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

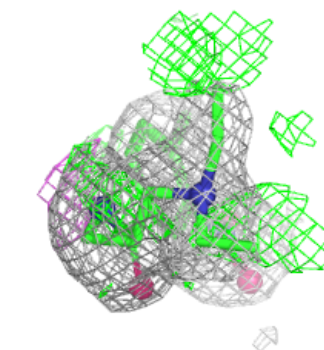
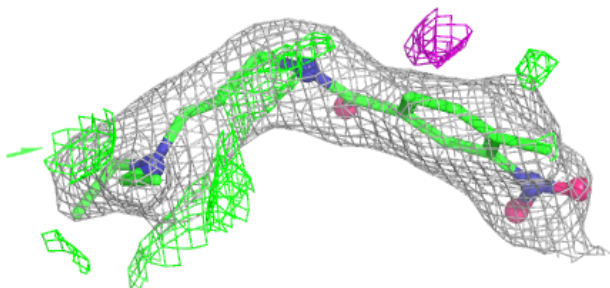
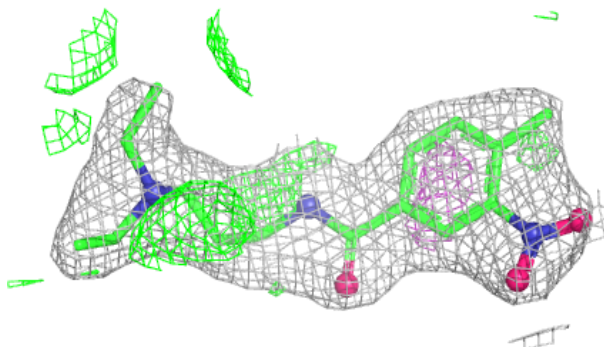


Electron density around I62 B 601:

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

**Electron density around I62 A 601:**

$2mF_o-DF_c$ (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.