Full wwPDB X-ray Structure Validation Report ⓘ

Jun 9, 2022 – 01:19 pm BST

PDB ID	:	7R02
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 following versions of software and data (see references ⓘ) were used in the production of this report:

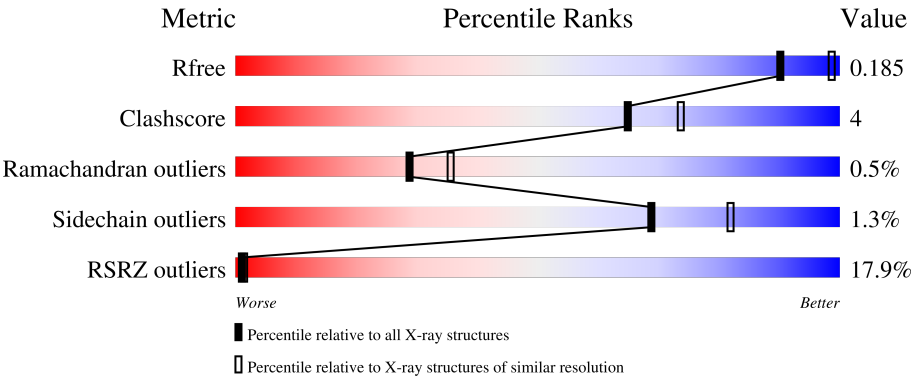
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.28.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0267
CCP4	:	7.1.010 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.28.1

1 Overall quality at a glance (i)

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}	130704	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (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 <=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	16% 89% 9%
1	B	543	20% 87% 11%

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
3	NAG	A	602	-	-	-	X
3	NAG	A	603	-	-	-	X
3	NAG	B	602	-	-	-	X
3	NAG	B	603	-	-	-	X
4	PG0	A	606	-	-	-	X
4	PG0	B	606	-	-	X	-
4	PG0	B	609	-	-	-	X

2 Entry composition

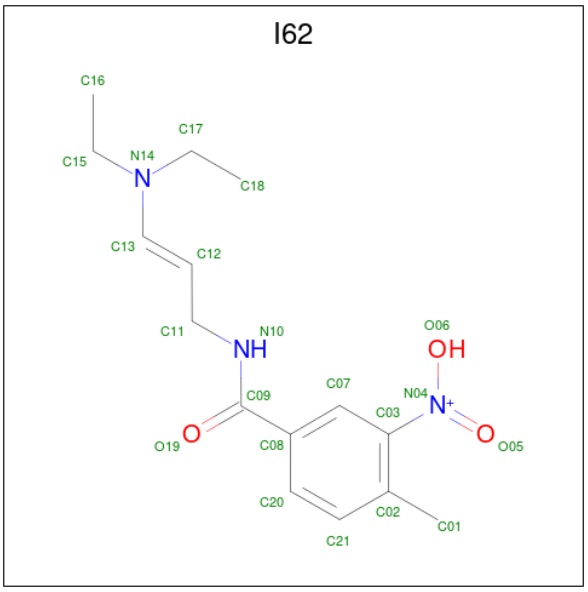
There are 7 unique types of molecules in this entry. The entry contains 9026 atoms, of which 0 are hydrogens and 0 are deuteriums.

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.

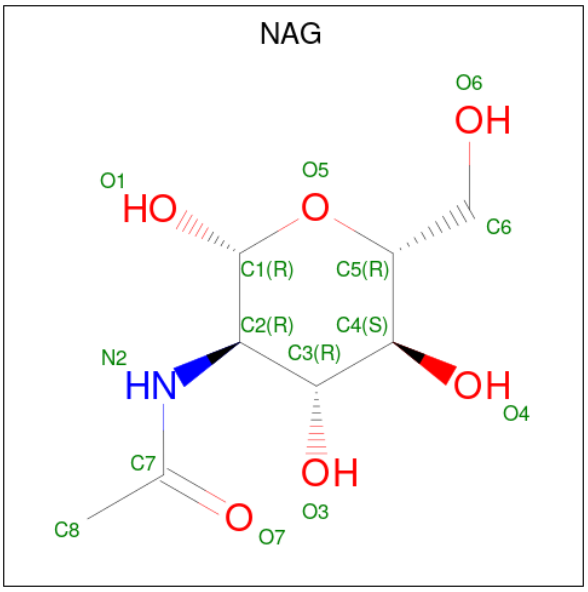
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	537	Total	C	N	O	S	0	6	0
			4237	2717	738	767	15			
1	B	535	Total	C	N	O	S	0	7	0
			4232	2711	740	767	14			

- Molecule 2 is {N}-[({E})-3-(diethylamino)prop-2-enyl]-4-methyl-3-nitro-benzamide (three-letter code: I62) (formula: $C_{15}H_{22}N_3O_3$) (labeled as "Ligand of Interest" by depositor).



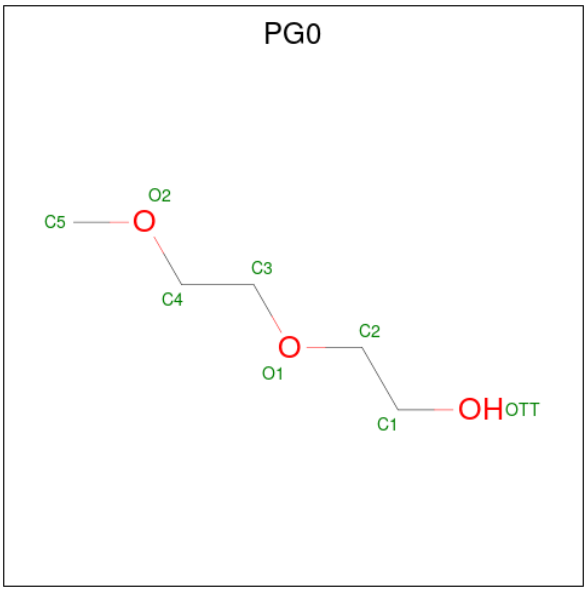
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			21	15	3	3		
2	B	1	Total	C	N	O	0	0
			21	15	3	3		

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



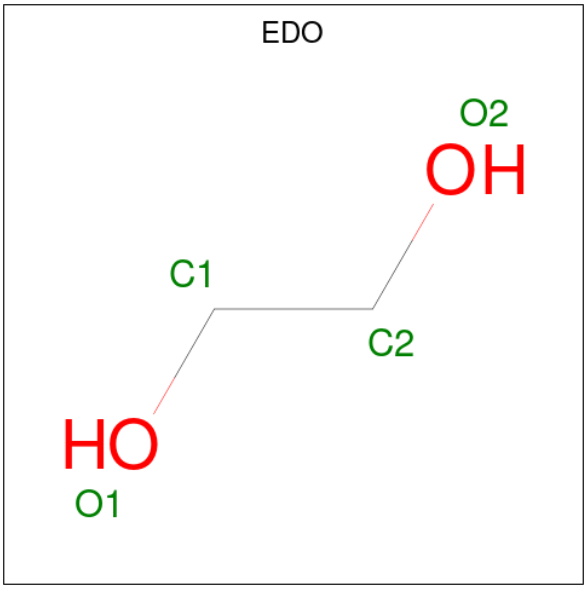
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C N O 14 8 1 5	0	0
3	A	1	Total C N O 14 8 1 5	0	0
3	B	1	Total C N O 14 8 1 5	0	0
3	B	1	Total C N O 14 8 1 5	0	0

- Molecule 4 is 2-(2-METHOXYETHOXY)ETHANOL (three-letter code: PG0) (formula: $C_5H_{12}O_3$).



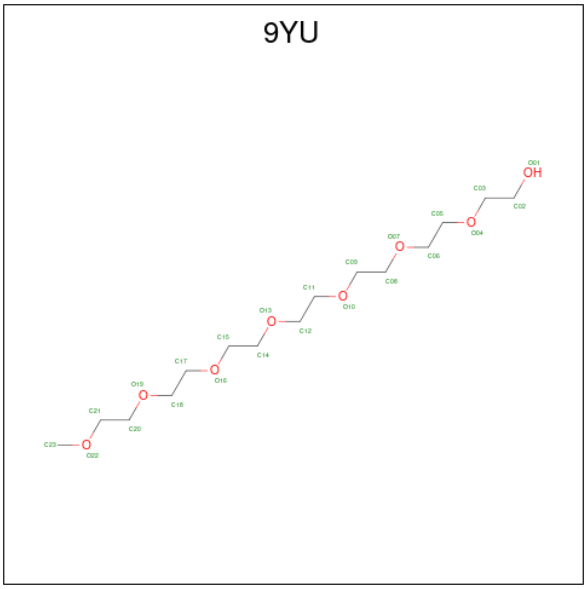
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 8 5 3	0	0
4	A	1	Total C O 8 5 3	0	0
4	A	1	Total C O 8 5 3	0	0
4	A	1	Total C O 8 5 3	0	0
4	A	1	Total C O 8 5 3	0	0
4	B	1	Total C O 8 5 3	0	0
4	B	1	Total C O 8 5 3	0	0
4	B	1	Total C O 8 5 3	0	0
4	B	1	Total C O 8 5 3	0	0
4	B	1	Total C O 8 5 3	0	0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

- Molecule 5 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: $C_2H_6O_2$).



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

- Molecule 6 is 2-[2-[2-[2-[2-[2-[2-(2-methoxyethoxy)ethoxy]ethoxy]ethoxy]ethoxy]ethoxy]ethanol (three-letter code: 9YU) (formula: $C_{15}H_{32}O_8$).



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

- Molecule 7 is water.

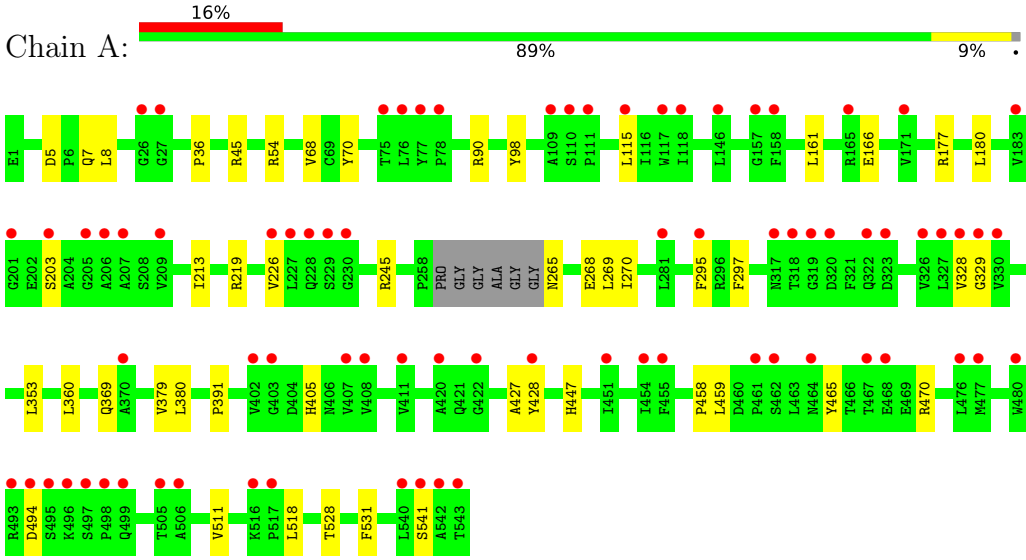
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	191	Total O 191 191	0	0
7	B	155	Total O 155 155	0	0

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.

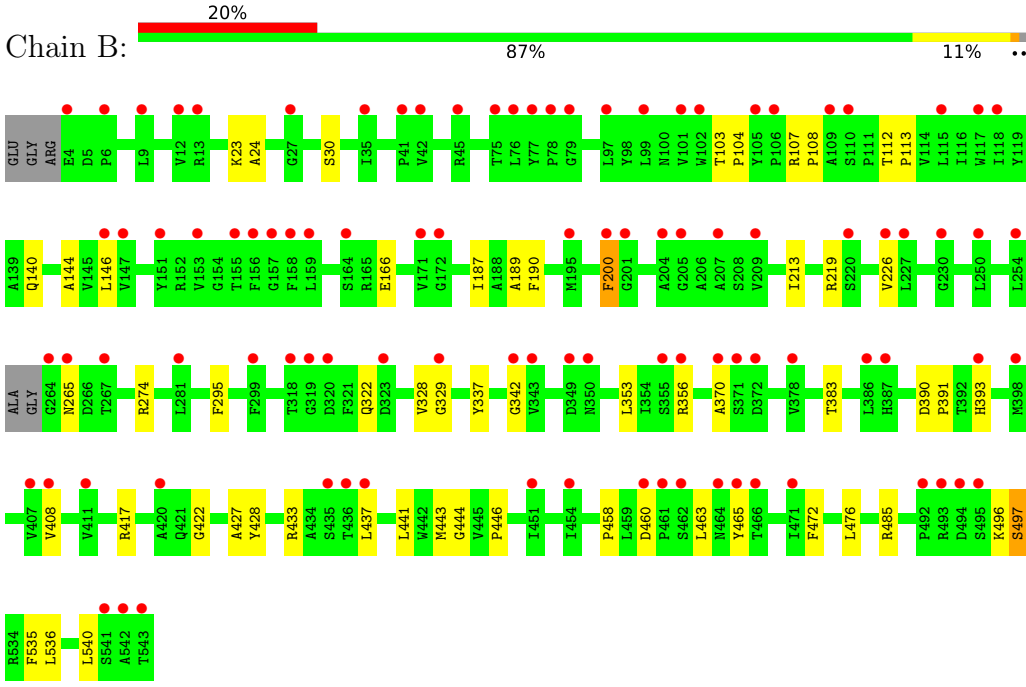
• Molecule 1: Acetylcholinesterase

Chain A:



• Molecule 1: Acetylcholinesterase

Chain B:



4 Data and refinement statistics (i)

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 29.60 – 2.30	Depositor EDS
% Data completeness (in resolution range)	99.7 (28.71-2.30) 99.9 (29.60-2.30)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	5.41 (at 2.31Å)	Xtriage
Refinement program	PHENIX 1.17.1_3660	Depositor
R, R_{free}	0.169 , 0.185 0.169 , 0.185	Depositor DCC
R_{free} test set	1765 reflections (1.98%)	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)	(Not available) , (Not available)	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	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.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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: I62, EDO, NAG, 9YU, PG0

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	0.40	0/4361	0.56	0/5957
1	B	0.38	0/4357	0.55	0/5953
All	All	0.39	0/8718	0.56	0/11910

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

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	27	0
1	B	4232	0	4106	44	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
5	A	4	0	6	1	0
6	B	23	0	0	0	0
7	A	191	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	B	155	0	0	2	0
All	All	9026	0	8410	70	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 (70) 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	0.73
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: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
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

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
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: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: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
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%)	34	42
1	B	538/543 (99%)	522 (97%)	13 (2%)	3 (1%)	25	31
All	All	1077/1086 (99%)	1044 (97%)	28 (3%)	5 (0%)	29	35

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%)	439 (99%)	5 (1%)	73	86
1	B	444/443 (100%)	438 (99%)	6 (1%)	67	81
All	All	888/886 (100%)	877 (99%)	11 (1%)	69	84

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	70	TYR

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Mol	Chain	Res	Type
1	A	200	PHE
1	A	295	PHE
1	A	337	TYR
1	A	541	SER
1	B	23	LYS
1	B	146	LEU
1	B	200	PHE
1	B	295	PHE
1	B	417	ARG
1	B	536	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	421	GLN
1	B	533	ASN

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates

There are no monosaccharides in this entry.

5.6 Ligand geometry

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	606	-	7,7,7	0.59	0	6,6,6	0.78	0
3	NAG	A	602	1	14,14,15	0.62	0	17,19,21	0.61	1 (5%)
6	9YU	B	610	-	22,22,22	0.64	0	21,21,21	0.96	0
4	PG0	A	607	-	7,7,7	0.55	0	6,6,6	0.87	0
4	PG0	B	608	-	7,7,7	0.51	0	6,6,6	0.67	0
4	PG0	A	608	-	7,7,7	0.59	0	6,6,6	0.85	0
2	I62	A	601	-	20,21,21	2.64	4 (20%)	22,27,27	2.04	2 (9%)
5	EDO	A	609	-	3,3,3	0.50	0	2,2,2	0.25	0
4	PG0	A	605	-	7,7,7	0.53	0	6,6,6	0.91	0
4	PG0	B	605	-	7,7,7	0.61	0	6,6,6	0.94	0
4	PG0	B	606	-	7,7,7	0.61	0	6,6,6	1.01	0
4	PG0	B	604	-	7,7,7	0.55	0	6,6,6	0.85	0
4	PG0	B	607	-	7,7,7	0.59	0	6,6,6	0.82	0
3	NAG	B	603	1	14,14,15	0.36	0	17,19,21	0.69	1 (5%)
2	I62	B	601	-	20,21,21	2.63	4 (20%)	22,27,27	2.18	3 (13%)
4	PG0	B	609	-	5,5,7	0.53	0	4,4,6	0.75	0
4	PG0	A	604	-	7,7,7	0.56	0	6,6,6	0.82	0
3	NAG	A	603	1	14,14,15	0.52	0	17,19,21	0.54	0
3	NAG	B	602	1	14,14,15	0.88	1 (7%)	17,19,21	0.60	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	606	-	-	4/5/5/5	-
3	NAG	A	602	1	-	2/6/23/26	0/1/1/1
6	9YU	B	610	-	-	11/20/20/20	-
4	PG0	A	607	-	-	4/5/5/5	-
4	PG0	B	608	-	-	3/5/5/5	-
4	PG0	A	608	-	-	1/5/5/5	-
2	I62	A	601	-	-	4/17/19/19	0/1/1/1
5	EDO	A	609	-	-	0/1/1/1	-
4	PG0	A	605	-	-	3/5/5/5	-
4	PG0	B	605	-	-	1/5/5/5	-
4	PG0	B	606	-	-	4/5/5/5	-
4	PG0	B	604	-	-	5/5/5/5	-
4	PG0	B	607	-	-	3/5/5/5	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	B	603	1	-	2/6/23/26	0/1/1/1
2	I62	B	601	-	-	9/17/19/19	0/1/1/1
4	PG0	B	609	-	-	0/3/3/5	-
4	PG0	A	604	-	-	3/5/5/5	-
3	NAG	A	603	1	-	2/6/23/26	0/1/1/1
3	NAG	B	602	1	-	2/6/23/26	0/1/1/1

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	601	I62	O05-N04	6.19	1.33	1.22
2	A	601	I62	O05-N04	5.87	1.32	1.22
2	A	601	I62	C09-N10	5.81	1.46	1.33
2	B	601	I62	C09-N10	5.64	1.46	1.33
2	A	601	I62	C13-C12	5.53	1.50	1.32
2	B	601	I62	C13-C12	5.53	1.50	1.32
2	A	601	I62	C13-N14	5.37	1.50	1.33
2	B	601	I62	C13-N14	5.29	1.50	1.33
3	B	602	NAG	O5-C1	2.83	1.48	1.43

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	601	I62	C17-N14-C13	-8.08	108.83	121.12
2	A	601	I62	C17-N14-C13	-7.00	110.48	121.12
2	A	601	I62	C15-N14-C13	-4.57	114.18	121.12
2	B	601	I62	C15-N14-C13	-3.88	115.22	121.12
3	B	603	NAG	C1-O5-C5	2.22	115.19	112.19
2	B	601	I62	C11-N10-C09	-2.18	118.33	121.94
3	A	602	NAG	C1-O5-C5	2.08	115.01	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
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

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

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

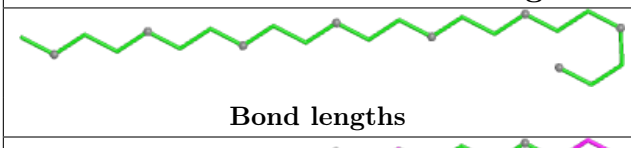
There are no ring outliers.

5 monomers are involved in 10 short contacts:

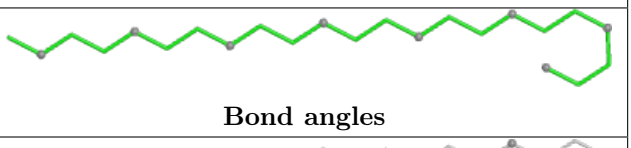
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	608	PG0	1	0
2	A	601	I62	1	0
5	A	609	EDO	1	0
4	B	606	PG0	6	0
3	B	603	NAG	1	0

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 then 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.

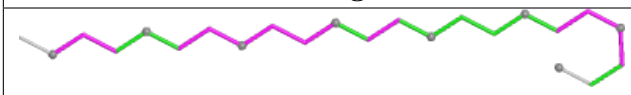
Ligand 9YU B 610



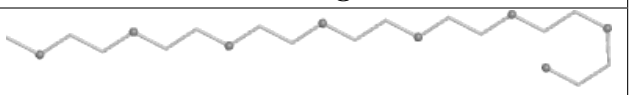
Bond lengths



Bond angles

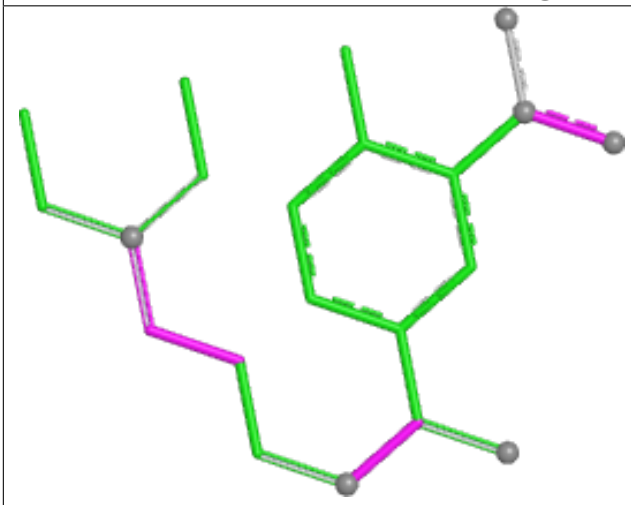


Torsions

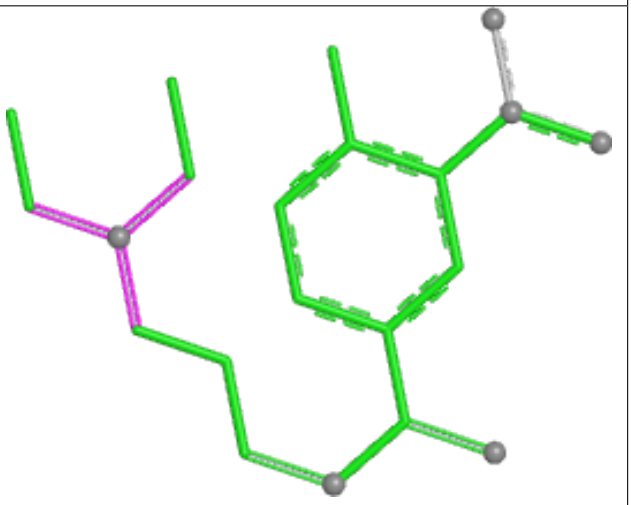


Rings

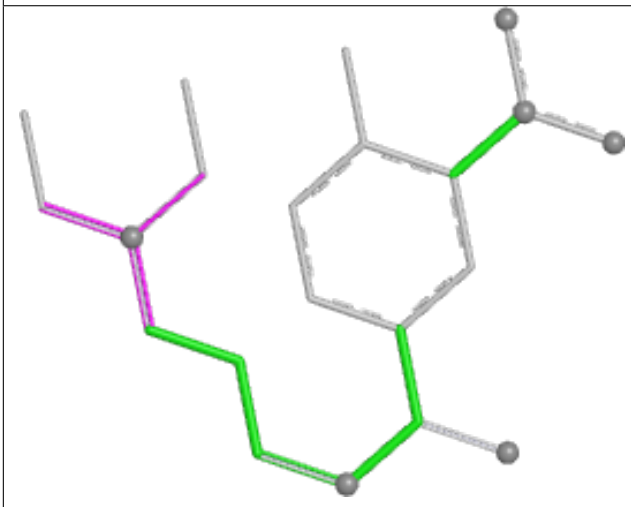
Ligand I62 A 601



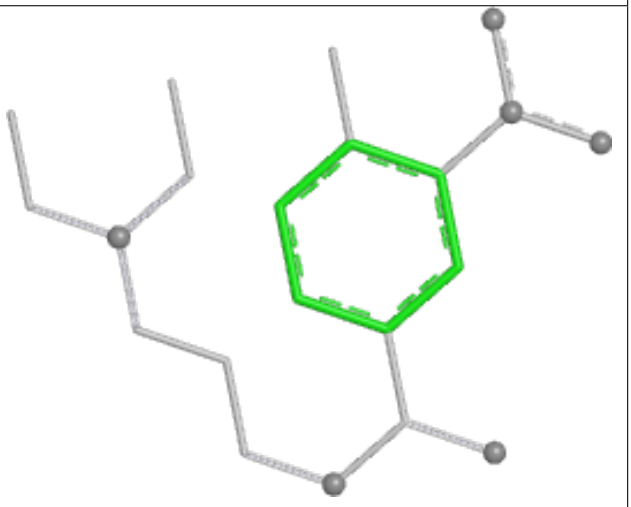
Bond lengths



Bond angles

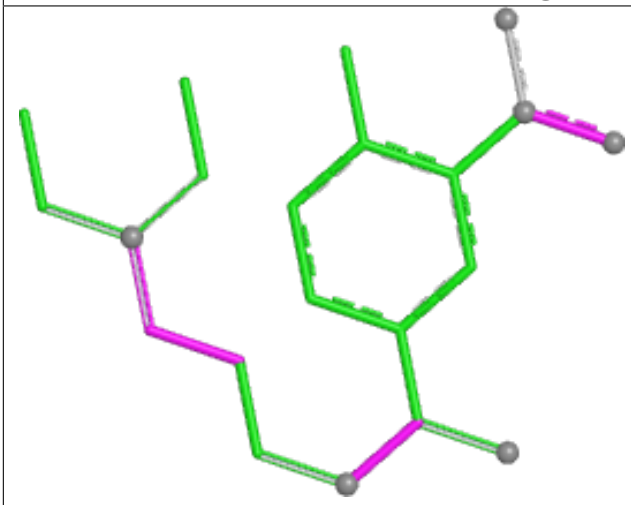


Torsions

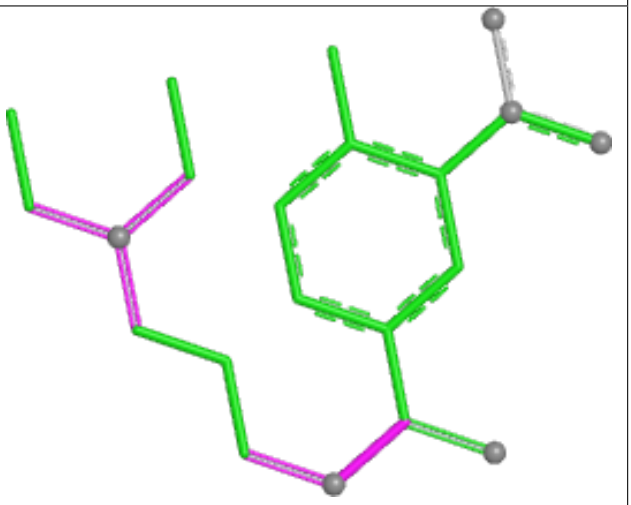


Rings

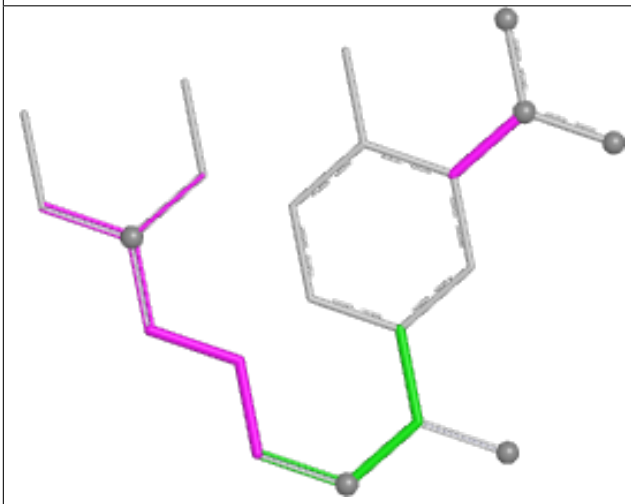
Ligand I62 B 601



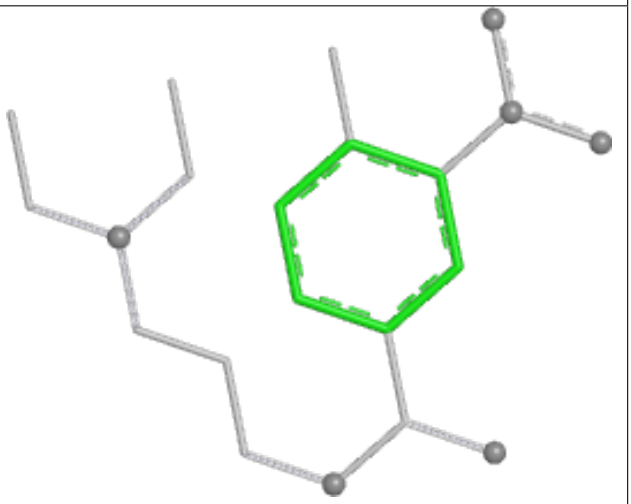
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

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^{th} 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%)	1.03	85 (15%)	2	2	32, 47, 76, 152	0
1	B	535/543 (98%)	1.18	107 (20%)	1	1	35, 52, 81, 117	0
All	All	1072/1086 (98%)	1.11	192 (17%)	1	1	32, 50, 79, 152	0

All (192) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	543	THR	10.0
1	A	495	SER	9.3
1	A	542	ALA	8.3
1	B	542	ALA	7.6
1	B	109	ALA	5.8
1	B	27	GLY	5.7
1	A	543	THR	5.4
1	A	496	LYS	5.4
1	B	461	PRO	5.3
1	B	492	PRO	5.3
1	B	264	GLY	5.2
1	B	106	PRO	5.1
1	A	317	ASN	4.8
1	A	492	PRO	4.7
1	A	497	SER	4.5
1	A	454	ILE	4.4
1	B	318	THR	4.3
1	A	320	ASP	4.3
1	A	226	VAL	4.2
1	A	494	ASP	4.2
1	B	13	ARG	4.2
1	B	146	LEU	4.2
1	B	541	SER	4.1
1	A	491	ASP	4.1

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Mol	Chain	Res	Type	RSRZ
1	A	541	SER	4.0
1	B	6	PRO	4.0
1	B	41	PRO	3.9
1	B	323	ASP	3.9
1	B	466	THR	3.7
1	A	110	SER	3.7
1	B	349	ASP	3.7
1	A	318	THR	3.7
1	A	146	LEU	3.6
1	B	258	PRO	3.6
1	B	200	PHE	3.6
1	A	493	ARG	3.5
1	A	206	ALA	3.5
1	B	464	ASN	3.5
1	B	78	PRO	3.4
1	B	342	GLY	3.4
1	B	387	HIS	3.4
1	A	411	VAL	3.3
1	A	323	ASP	3.3
1	A	408	VAL	3.3
1	B	451	ILE	3.3
1	B	110	SER	3.3
1	A	27	GLY	3.2
1	B	76	LEU	3.2
1	A	78	PRO	3.2
1	B	355	SER	3.2
1	B	386	LEU	3.2
1	B	118	ILE	3.2
1	B	195	MET	3.2
1	A	451	ILE	3.2
1	B	320	ASP	3.2
1	B	99	LEU	3.1
1	B	138	LEU	3.1
1	B	498	PRO	3.1
1	B	265	ASN	3.1
1	B	97	LEU	3.1
1	A	230	GLY	3.1
1	B	402	VAL	3.0
1	A	422	GLY	3.0
1	A	328	VAL	3.0
1	A	327	LEU	3.0
1	A	26	GLY	3.0

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Mol	Chain	Res	Type	RSRZ
1	B	420	ALA	2.9
1	A	201	GLY	2.9
1	A	455	PHE	2.9
1	A	407	VAL	2.9
1	A	402	VAL	2.9
1	A	540	LEU	2.9
1	B	204	ALA	2.9
1	A	498	PRO	2.9
1	A	468	GLU	2.9
1	B	158	PHE	2.9
1	A	195	MET	2.9
1	B	436	THR	2.8
1	A	467	THR	2.8
1	B	465	TYR	2.8
1	B	437	LEU	2.8
1	A	476	LEU	2.8
1	A	109	ALA	2.8
1	A	115	LEU	2.8
1	A	228	GLN	2.8
1	B	77	TYR	2.7
1	A	329	GLY	2.7
1	B	157	GLY	2.7
1	A	322	GLN	2.7
1	B	171	VAL	2.7
1	B	494	ASP	2.7
1	A	462	SER	2.7
1	A	205	GLY	2.7
1	A	370	ALA	2.7
1	B	151	TYR	2.7
1	A	326	VAL	2.7
1	B	117	TRP	2.7
1	A	227	LEU	2.6
1	B	495	SER	2.6
1	B	230	GLY	2.6
1	A	76	LEU	2.6
1	A	118	ILE	2.6
1	B	267	THR	2.6
1	B	350	ASN	2.6
1	B	9	LEU	2.6
1	A	516	LYS	2.6
1	A	75	THR	2.5
1	A	461	PRO	2.5

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Mol	Chain	Res	Type	RSRZ
1	A	420	ALA	2.5
1	A	200	PHE	2.5
1	B	120	GLY	2.5
1	A	111	PRO	2.5
1	A	209	VAL	2.5
1	B	462	SER	2.5
1	B	4	GLU	2.5
1	A	342	GLY	2.5
1	A	199	LEU	2.5
1	B	102	TRP	2.4
1	B	147	VAL	2.4
1	B	408	VAL	2.4
1	A	517	PRO	2.4
1	A	403	GLY	2.4
1	B	155	THR	2.4
1	B	226	VAL	2.4
1	A	229	SER	2.4
1	A	207	ALA	2.4
1	A	77	TYR	2.4
1	B	471	ILE	2.4
1	B	115	LEU	2.4
1	B	227	LEU	2.4
1	B	172	GLY	2.4
1	B	220	SER	2.4
1	A	480	TRP	2.4
1	B	319	GLY	2.4
1	B	209	VAL	2.4
1	B	329	GLY	2.3
1	B	12	VAL	2.3
1	B	299	PHE	2.3
1	B	372	ASP	2.3
1	B	79	GLY	2.3
1	A	499	GLN	2.3
1	B	281	LEU	2.3
1	B	378	VAL	2.3
1	A	203	SER	2.3
1	B	399	SER	2.3
1	B	156	PHE	2.3
1	B	411	VAL	2.3
1	A	428	TYR	2.3
1	B	45[A]	ARG	2.3
1	A	330	VAL	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	164	SER	2.3
1	B	371	SER	2.3
1	B	254	LEU	2.2
1	B	201	GLY	2.2
1	A	343	VAL	2.2
1	B	407	VAL	2.2
1	B	105	TYR	2.2
1	B	398	MET	2.2
1	A	477	MET	2.2
1	B	42	VAL	2.2
1	B	435	SER	2.2
1	B	356[A]	ARG	2.2
1	B	460	ASP	2.2
1	A	506	ALA	2.2
1	B	207	ALA	2.2
1	A	344	PRO	2.2
1	B	493	ARG	2.2
1	A	117	TRP	2.2
1	A	281	LEU	2.2
1	B	35	ILE	2.1
1	A	464	ASN	2.1
1	B	135	GLY	2.1
1	A	183	VAL	2.1
1	B	454	ILE	2.1
1	A	157	GLY	2.1
1	B	205	GLY	2.1
1	A	171	VAL	2.1
1	A	295	PHE	2.1
1	B	250	LEU	2.1
1	B	403	GLY	2.1
1	A	505	THR	2.1
1	B	75	THR	2.1
1	A	319	GLY	2.1
1	B	159	LEU	2.1
1	B	393[A]	HIS	2.1
1	A	158	PHE	2.1
1	B	525[A]	ARG	2.1
1	B	101	VAL	2.1
1	B	153	VAL	2.1
1	A	165	ARG	2.0
1	B	343	VAL	2.0
1	B	370	ALA	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)

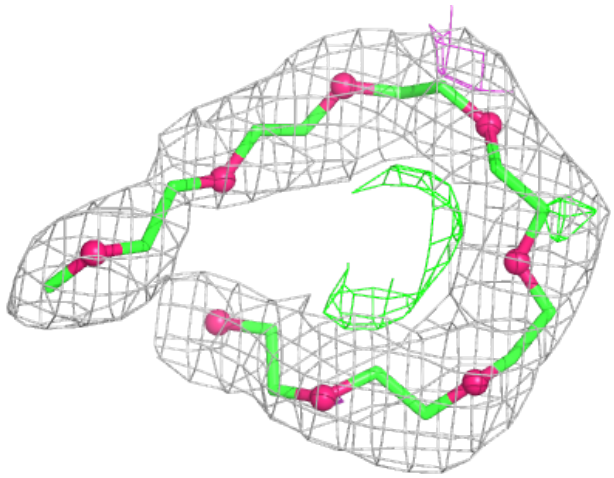
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

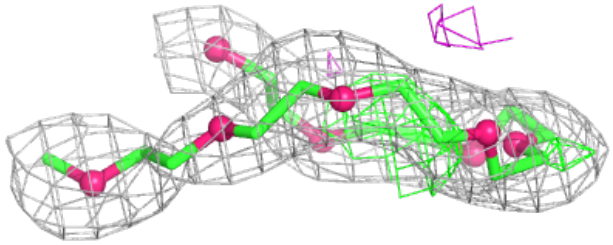
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
5	EDO	A	609	4/4	0.34	0.35	100,102,102,102	0
4	PG0	B	608	8/8	0.35	0.31	76,80,82,83	0
3	NAG	B	602	14/15	0.38	0.49	87,100,104,106	0
3	NAG	B	603	14/15	0.42	0.60	98,111,117,119	0
3	NAG	A	602	14/15	0.49	0.44	70,88,96,101	0
3	NAG	A	603	14/15	0.61	0.51	85,99,110,111	0
4	PG0	B	604	8/8	0.63	0.29	76,79,85,86	0
4	PG0	B	605	8/8	0.66	0.25	73,79,89,90	0
4	PG0	A	606	8/8	0.68	0.42	82,94,95,95	0
4	PG0	B	606	8/8	0.68	0.27	76,85,94,94	0
4	PG0	B	607	8/8	0.69	0.24	81,86,87,89	0
4	PG0	A	608	8/8	0.76	0.17	71,79,87,89	0
4	PG0	B	609	6/8	0.77	0.51	90,92,98,99	0
4	PG0	A	607	8/8	0.78	0.21	72,79,92,92	0
4	PG0	A	605	8/8	0.81	0.22	70,77,83,86	0
6	9YU	B	610	23/23	0.82	0.33	51,79,87,91	0
4	PG0	A	604	8/8	0.84	0.34	67,76,91,95	0
2	I62	B	601	21/21	0.87	0.29	52,66,83,89	0
2	I62	A	601	21/21	0.87	0.27	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:

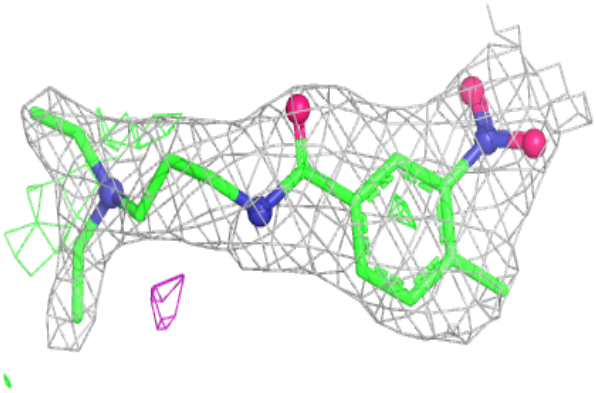
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

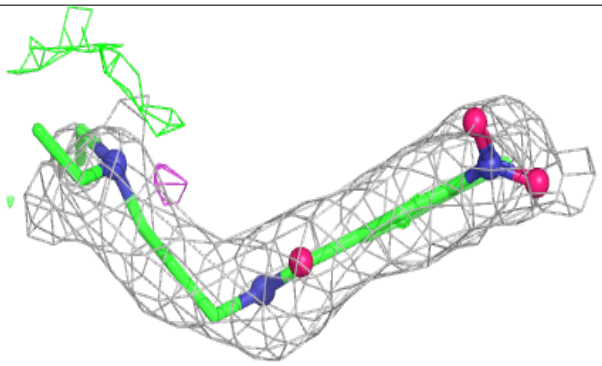


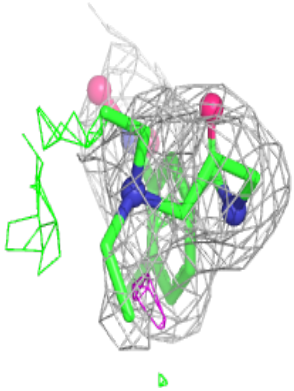


Electron density around I62 B 601:

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

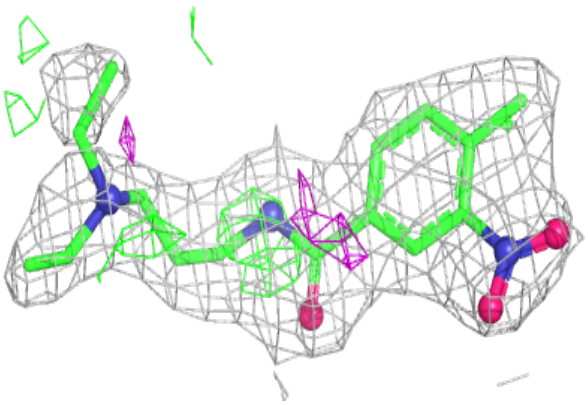


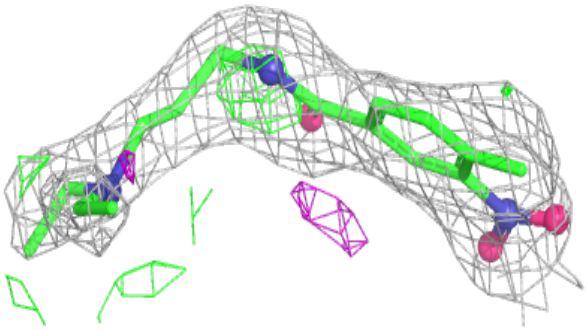


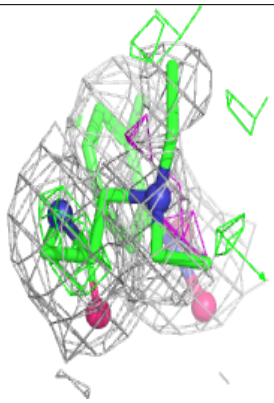


Electron density around I62 A 601:

$2mF_o$-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.