Full wwPDB X-ray Structure Validation Report (i)

Jun 24, 2024 – 04:11 PM EDT

PDB ID	:	6FUG
Title	:	Complement factor D in complex with the inhibitor 3-((3-((3-(aminomethyl) phenyl)amino)-1H-pyrazolo[3,4-d]pyrimidin-4-yl)amino)phenol
Authors	:	Mac Sweeney, A.; Ostermann, N.; Vulpetti, A.; Maibaum, J.; Erbel, P.; Lorthiois, E.; Yoon, T.; Randl, S.; Ruedisser, S.
Deposited on	:	2018-02-27
Resolution	:	2.21 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 (i) 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 (i)) were used in the production of this report:

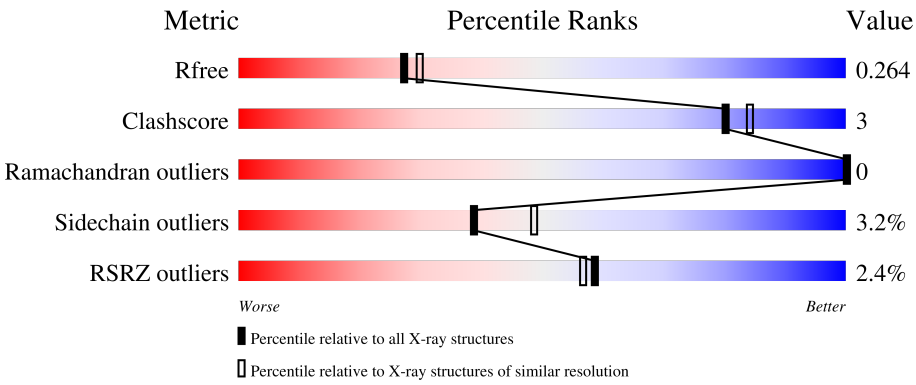
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.37.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

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 2.21 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	5912 (2.24-2.20)
Clashscore	141614	6646 (2.24-2.20)
Ramachandran outliers	138981	6543 (2.24-2.20)
Sidechain outliers	138945	6544 (2.24-2.20)
RSRZ outliers	127900	5797 (2.24-2.20)

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	232	.% 84% 7% • 7%
1	B	232	2% 83% 8% 9%
1	C	232	5% 87% 6% • 6%
1	D	232	.% 87% • • 8%

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Mol	Chain	Length	Quality of chain
1	E	232	3% 84% 7% • 8%
1	F	232	2% 86% 6% 8%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 10121 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 Complement factor D.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	216	1615	1005	301	299	10	0	2	0
1	B	211	1613	1008	295	299	11	0	6	0
1	C	218	1617	1007	297	303	10	0	2	0
1	D	214	1611	1005	297	298	11	0	3	0
1	E	213	1616	1008	299	299	10	0	4	0
1	F	213	1608	1004	296	298	10	0	4	0

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	244	SER	-	expression tag	UNP P00746
A	245	ALA	-	expression tag	UNP P00746
A	246	ALA	-	expression tag	UNP P00746
A	247	ALA	-	expression tag	UNP P00746
B	244	SER	-	expression tag	UNP P00746
B	245	ALA	-	expression tag	UNP P00746
B	246	ALA	-	expression tag	UNP P00746
B	247	ALA	-	expression tag	UNP P00746
C	244	SER	-	expression tag	UNP P00746
C	245	ALA	-	expression tag	UNP P00746
C	246	ALA	-	expression tag	UNP P00746
C	247	ALA	-	expression tag	UNP P00746
D	244	SER	-	expression tag	UNP P00746
D	245	ALA	-	expression tag	UNP P00746
D	246	ALA	-	expression tag	UNP P00746
D	247	ALA	-	expression tag	UNP P00746
E	244	SER	-	expression tag	UNP P00746

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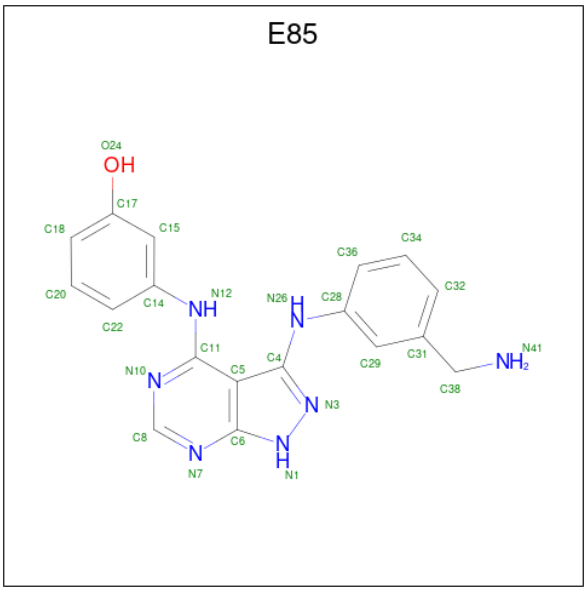
Chain	Residue	Modelled	Actual	Comment	Reference
E	245	ALA	-	expression tag	UNP P00746
E	246	ALA	-	expression tag	UNP P00746
E	247	ALA	-	expression tag	UNP P00746
F	244	SER	-	expression tag	UNP P00746
F	245	ALA	-	expression tag	UNP P00746
F	246	ALA	-	expression tag	UNP P00746
F	247	ALA	-	expression tag	UNP P00746

- Molecule 2 is 3-[[3-[[3-(aminomethyl)phenyl]amino]-1 {H}-pyrazolo[3,4-d]pyrimidin-4-yl]amino]phenol (three-letter code: E85) (formula: $C_{18}H_{17}N_7O$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
2	A	1	26	18	7	1	0	0
			Total	C	N	O		
2	B	1	26	18	7	1	0	0
			Total	C	N	O		
2	C	1	26	18	7	1	0	0
			Total	C	N	O		
2	D	1	26	18	7	1	0	0
			Total	C	N	O		
2	E	1	26	18	7	1	0	0
			Total	C	N	O		
2	F	1	26	18	7	1	0	0

- Molecule 3 is water.

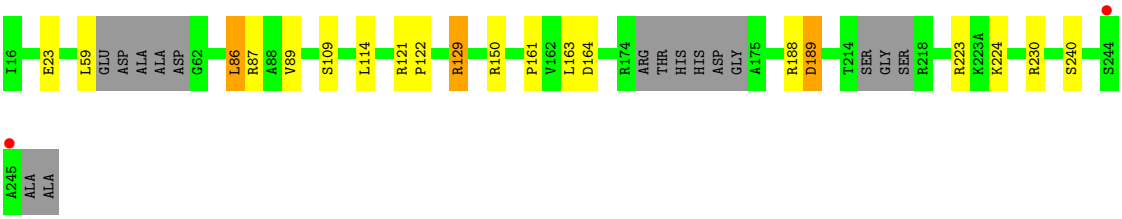
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
3	A	57	57	57	0	0
			Total	O		
3	B	50	50	50	0	0
			Total	O		
3	C	49	49	49	0	0
			Total	O		
3	D	45	45	45	0	0
			Total	O		
3	E	39	39	39	0	0
			Total	O		
3	F	45	45	45	0	0

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.

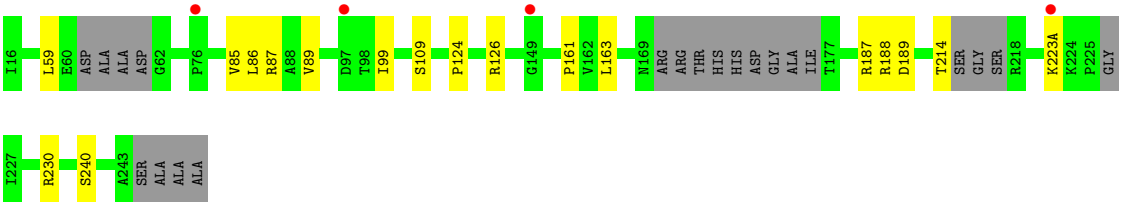
• Molecule 1: Complement factor D

Chain A:



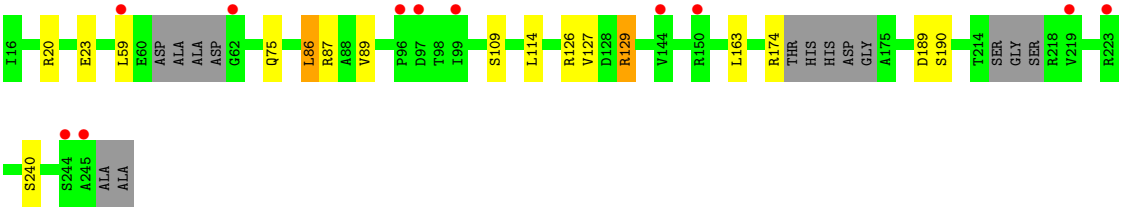
• Molecule 1: Complement factor D

Chain B:



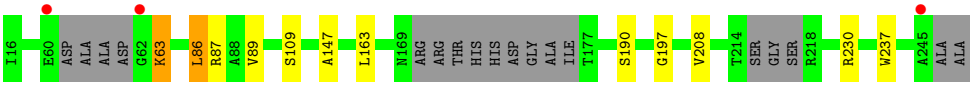
• Molecule 1: Complement factor D

Chain C:



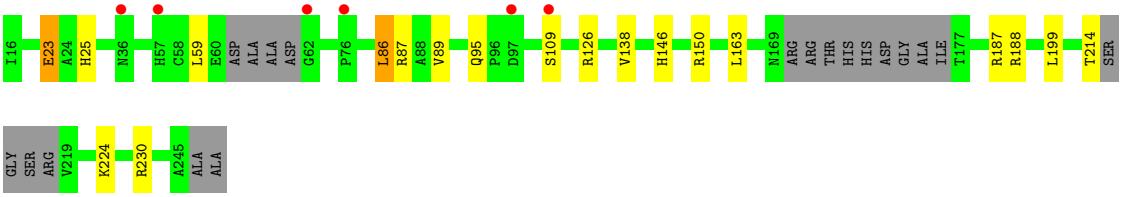
• Molecule 1: Complement factor D

Chain D:



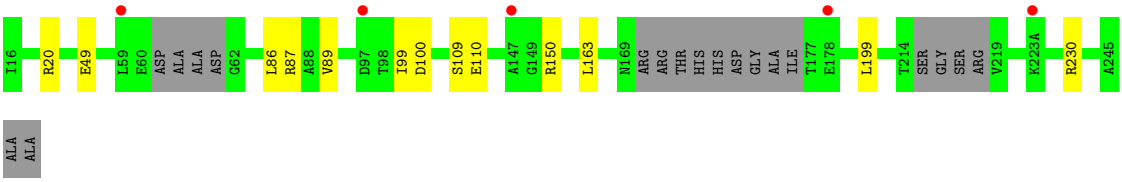
- Molecule 1: Complement factor D

Chain E:



- Molecule 1: Complement factor D

Chain F:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	66.52Å 68.48Å 73.38Å 95.21° 116.70° 102.43°	Depositor
Resolution (Å)	46.11 – 2.21 46.11 – 2.21	Depositor EDS
% Data completeness (in resolution range)	94.6 (46.11-2.21) 94.6 (46.11-2.21)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.70 (at 2.20Å)	Xtriage
Refinement program	REFMAC 5.8.0189	Depositor
R, R_{free}	0.221 , 0.259 0.225 , 0.264	Depositor DCC
R_{free} test set	2617 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	35.8	Xtriage
Anisotropy	0.032	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 44.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.47$, $< L^2 > = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	10121	wwPDB-VP
Average B, all atoms (Å^2)	43.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 21.27 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 7.2723e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: E85

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	0.64	0/1648	0.83	4/2242 (0.2%)
1	B	0.62	0/1651	0.80	5/2245 (0.2%)
1	C	0.63	0/1650	0.83	1/2247 (0.0%)
1	D	0.60	0/1644	0.82	1/2236 (0.0%)
1	E	0.63	0/1652	0.83	2/2247 (0.1%)
1	F	0.61	0/1644	0.86	7/2237 (0.3%)
All	All	0.62	0/9889	0.83	20/13454 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	C	0	1

There are no bond length outliers.

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	E	230	ARG	NE-CZ-NH2	-7.56	116.52	120.30
1	F	100	ASP	CB-CG-OD1	-6.95	112.05	118.30
1	B	187	ARG	NE-CZ-NH2	6.23	123.42	120.30
1	A	230	ARG	NE-CZ-NH2	-5.51	117.55	120.30
1	D	230	ARG	NE-CZ-NH1	5.49	123.05	120.30
1	F	199[A]	LEU	CB-CG-CD2	-5.49	101.67	111.00
1	F	199[B]	LEU	CB-CG-CD2	-5.49	101.67	111.00
1	F	100	ASP	CB-CG-OD2	5.49	123.24	118.30
1	B	188	ARG	NE-CZ-NH1	5.45	123.03	120.30
1	B	230	ARG	NE-CZ-NH1	5.39	122.99	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	126	ARG	NE-CZ-NH2	-5.38	117.61	120.30
1	C	126	ARG	NE-CZ-NH1	5.31	122.96	120.30
1	A	189	ASP	CB-CG-OD1	5.31	123.08	118.30
1	F	230	ARG	NE-CZ-NH2	-5.20	117.70	120.30
1	F	150	ARG	NE-CZ-NH1	5.18	122.89	120.30
1	A	230	ARG	NE-CZ-NH1	5.15	122.88	120.30
1	E	23	GLU	CA-CB-CG	5.09	124.59	113.40
1	A	150	ARG	NE-CZ-NH2	-5.04	117.78	120.30
1	F	230	ARG	NE-CZ-NH1	5.03	122.81	120.30
1	B	189	ASP	CB-CG-OD1	5.02	122.81	118.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	C	174	ARG	Peptide

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	1615	0	1602	11	0
1	B	1613	0	1605	8	0
1	C	1617	0	1588	10	0
1	D	1611	0	1600	10	0
1	E	1616	0	1616	12	0
1	F	1608	0	1600	5	0
2	A	26	0	0	2	0
2	B	26	0	0	0	0
2	C	26	0	0	3	0
2	D	26	0	0	2	0
2	E	26	0	0	1	0
2	F	26	0	0	2	0
3	A	57	0	0	2	0
3	B	50	0	0	2	0
3	C	49	0	0	1	0
3	D	45	0	0	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	E	39	0	0	6	0
3	F	45	0	0	3	0
All	All	10121	0	9611	52	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 3.

All (52) 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:E:138[B]:VAL:HG22	1:E:199[B]:LEU:HD12	1.41	1.01
1:E:138[B]:VAL:CG2	1:E:199[B]:LEU:HD12	2.06	0.85
1:E:188:ARG:NH1	3:E:401:HOH:O	2.24	0.69
1:B:214:THR:HG22	3:B:408:HOH:O	1.96	0.66
1:A:114:LEU:HD12	1:C:129:ARG:HD2	1.80	0.62
1:E:95:GLN:HG2	3:E:436:HOH:O	2.00	0.61
1:C:75:GLN:HE22	1:D:237:TRP:HD1	1.47	0.59
1:A:188:ARG:NH1	1:B:85:VAL:O	2.35	0.59
1:B:86:LEU:HD13	1:B:109:SER:HA	1.84	0.59
1:F:20:ARG:NH1	3:F:402:HOH:O	2.37	0.58
1:F:109:SER:HB2	3:F:439:HOH:O	2.07	0.54
1:A:164:ASP:HB2	3:A:410:HOH:O	2.08	0.53
1:F:87:ARG:HD2	1:F:89:VAL:HG22	1.91	0.53
1:B:124:PRO:HG3	1:D:208:VAL:CG2	2.39	0.52
1:C:109:SER:HB2	3:C:429:HOH:O	2.09	0.52
1:B:124:PRO:HG3	1:D:208:VAL:HG21	1.92	0.51
2:D:301:E85:C22	2:D:301:E85:N10	2.71	0.51
1:E:146:HIS:HD2	3:E:403:HOH:O	1.95	0.49
1:E:87:ARG:HD2	1:E:89:VAL:HG22	1.94	0.48
1:D:147:ALA:HB1	3:D:410:HOH:O	2.13	0.48
1:C:87:ARG:HD2	1:C:89:VAL:HG22	1.96	0.47
1:B:87:ARG:HD2	1:B:89:VAL:HG22	1.95	0.47
1:B:161:PRO:HB2	3:B:402:HOH:O	2.14	0.47
2:C:301:E85:N3	2:C:301:E85:C36	2.77	0.47
1:A:121:ARG:HG2	3:A:450:HOH:O	2.15	0.46
1:E:138[B]:VAL:HG22	1:E:199[B]:LEU:CD1	2.30	0.46
1:F:110:GLU:HG2	3:F:439:HOH:O	2.16	0.46
1:A:87:ARG:HD2	1:A:89:VAL:HG22	1.97	0.46
1:D:87:ARG:HD2	1:D:89:VAL:HG22	1.98	0.46
1:E:146:HIS:CD2	3:E:403:HOH:O	2.69	0.46
1:E:214:THR:HG22	3:E:428:HOH:O	2.16	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:25:HIS:HA	3:E:421:HOH:O	2.17	0.45
1:A:122:PRO:HG2	1:C:127:VAL:HG21	1.98	0.44
1:D:63:LYS:O	1:D:63:LYS:HG3	2.17	0.44
2:A:301:E85:N10	2:A:301:E85:C22	2.80	0.44
1:A:189:ASP:OD2	2:A:301:E85:N41	2.51	0.44
1:C:86:LEU:HD13	1:C:109:SER:HA	2.01	0.43
1:A:129:ARG:HD2	1:C:114:LEU:HD12	2.01	0.42
1:E:86:LEU:HD13	1:E:109:SER:HA	2.02	0.42
1:E:126:ARG:NE	1:F:49:GLU:OE1	2.46	0.42
1:A:86:LEU:HD13	1:A:109[B]:SER:HA	2.02	0.41
1:D:197:GLY:HA3	3:D:420:HOH:O	2.20	0.41
1:A:86:LEU:HD13	1:A:109[A]:SER:HA	2.02	0.41
1:C:75:GLN:NE2	1:D:237:TRP:CD1	2.70	0.41
1:C:190:SER:O	2:C:301:E85:N41	2.53	0.41
1:A:161:PRO:HG3	1:B:87:ARG:HG3	2.01	0.41
1:C:189:ASP:OD2	2:C:301:E85:N41	2.54	0.41
1:D:190:SER:O	2:D:301:E85:N41	2.55	0.40
1:D:86:LEU:HD13	1:D:109:SER:HA	2.03	0.40
2:F:301:E85:N10	2:F:301:E85:C15	2.83	0.40
2:F:301:E85:N3	2:F:301:E85:C36	2.85	0.40
2:E:301:E85:N10	2:E:301:E85:C22	2.85	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	210/232 (90%)	206 (98%)	4 (2%)	0	100	100
1	B	207/232 (89%)	203 (98%)	4 (2%)	0	100	100
1	C	212/232 (91%)	209 (99%)	3 (1%)	0	100	100
1	D	209/232 (90%)	205 (98%)	4 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	E	209/232 (90%)	206 (99%)	3 (1%)	0	100	100
1	F	209/232 (90%)	206 (99%)	3 (1%)	0	100	100
All	All	1256/1392 (90%)	1235 (98%)	21 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	172/183 (94%)	163 (95%)	9 (5%)	23	27
1	B	175/183 (96%)	169 (97%)	6 (3%)	37	46
1	C	171/183 (93%)	163 (95%)	8 (5%)	26	31
1	D	173/183 (94%)	170 (98%)	3 (2%)	60	73
1	E	175/183 (96%)	168 (96%)	7 (4%)	31	38
1	F	173/183 (94%)	170 (98%)	3 (2%)	60	73
All	All	1039/1098 (95%)	1003 (96%)	36 (4%)	39	44

All (36) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	23	GLU
1	A	59	LEU
1	A	86	LEU
1	A	129	ARG
1	A	163	LEU
1	A	223	ARG
1	A	224	LYS
1	A	240[A]	SER
1	A	240[B]	SER
1	B	59	LEU
1	B	99	ILE
1	B	163	LEU

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Mol	Chain	Res	Type
1	B	223(A)	LYS
1	B	240[A]	SER
1	B	240[B]	SER
1	C	20	ARG
1	C	23	GLU
1	C	59	LEU
1	C	86	LEU
1	C	129	ARG
1	C	163	LEU
1	C	240[A]	SER
1	C	240[B]	SER
1	D	63	LYS
1	D	86	LEU
1	D	163	LEU
1	E	23	GLU
1	E	59	LEU
1	E	86	LEU
1	E	150	ARG
1	E	163	LEU
1	E	187	ARG
1	E	224	LYS
1	F	86	LEU
1	F	99	ILE
1	F	163	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	75	GLN
1	D	75	GLN
1	D	186	ASN
1	F	75	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)

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	E85	E	301	-	28,29,29	1.02	1 (3%)	29,40,40	2.67	9 (31%)
2	E85	F	301	-	28,29,29	1.21	3 (10%)	29,40,40	2.50	6 (20%)
2	E85	C	301	-	28,29,29	1.13	2 (7%)	29,40,40	2.37	6 (20%)
2	E85	A	301	-	28,29,29	1.06	2 (7%)	29,40,40	2.09	5 (17%)
2	E85	D	301	-	28,29,29	1.19	3 (10%)	29,40,40	2.47	8 (27%)
2	E85	B	301	-	28,29,29	1.23	5 (17%)	29,40,40	2.43	7 (24%)

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
2	E85	E	301	-	-	1/8/10/10	0/4/4/4
2	E85	F	301	-	-	2/8/10/10	0/4/4/4
2	E85	C	301	-	-	1/8/10/10	0/4/4/4
2	E85	A	301	-	-	1/8/10/10	0/4/4/4
2	E85	D	301	-	-	4/8/10/10	0/4/4/4
2	E85	B	301	-	-	1/8/10/10	0/4/4/4

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	301	E85	C11-C5	-3.71	1.39	1.44
2	D	301	E85	C11-C5	-3.36	1.40	1.44

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	301	E85	C11-C5	-3.23	1.40	1.44
2	F	301	E85	C4-N26	3.03	1.40	1.36
2	A	301	E85	C11-C5	-2.98	1.40	1.44
2	B	301	E85	C11-C5	-2.79	1.41	1.44
2	D	301	E85	C22-C14	2.75	1.43	1.39
2	B	301	E85	C36-C28	2.54	1.43	1.39
2	F	301	E85	C11-N10	2.29	1.37	1.34
2	B	301	E85	C11-N10	2.27	1.37	1.34
2	A	301	E85	C11-N10	2.22	1.37	1.34
2	E	301	E85	C11-N10	2.21	1.37	1.34
2	C	301	E85	C11-N10	2.17	1.37	1.34
2	B	301	E85	C8-N7	2.16	1.35	1.32
2	B	301	E85	C22-C14	2.12	1.42	1.39
2	D	301	E85	C36-C28	2.02	1.42	1.39

All (41) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	E	301	E85	C8-N10-C11	8.92	124.24	116.59
2	F	301	E85	C8-N10-C11	8.45	123.84	116.59
2	D	301	E85	C8-N10-C11	8.08	123.52	116.59
2	C	301	E85	C8-N10-C11	7.87	123.34	116.59
2	B	301	E85	C8-N10-C11	7.73	123.22	116.59
2	A	301	E85	C8-N10-C11	6.92	122.53	116.59
2	E	301	E85	C5-C11-N10	-6.27	116.18	121.35
2	D	301	E85	N7-C8-N10	-5.90	119.46	128.68
2	B	301	E85	N7-C8-N10	-5.80	119.61	128.68
2	C	301	E85	N7-C8-N10	-5.52	120.05	128.68
2	F	301	E85	N7-C8-N10	-5.40	120.25	128.68
2	F	301	E85	C5-C11-N10	-5.21	117.06	121.35
2	E	301	E85	N7-C8-N10	-5.07	120.75	128.68
2	C	301	E85	C5-C11-N10	-4.87	117.34	121.35
2	A	301	E85	N7-C8-N10	-4.74	121.27	128.68
2	B	301	E85	C5-C11-N10	-4.37	117.75	121.35
2	A	301	E85	C5-C11-N10	-4.07	117.99	121.35
2	D	301	E85	C5-C11-N10	-4.01	118.05	121.35
2	E	301	E85	C5-C11-N12	3.45	123.54	119.72
2	D	301	E85	C5-C11-N12	3.37	123.44	119.72
2	E	301	E85	C36-C28-C29	-3.19	115.87	119.65
2	B	301	E85	C8-N7-C6	3.13	120.79	113.45
2	F	301	E85	C14-N12-C11	-3.09	120.20	128.26
2	D	301	E85	C8-N7-C6	3.06	120.61	113.45

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	D	301	E85	C14-N12-C11	-3.01	120.43	128.26
2	F	301	E85	C36-C28-C29	-2.88	116.24	119.65
2	B	301	E85	C36-C28-C29	-2.75	116.39	119.65
2	A	301	E85	C5-C11-N12	2.70	122.70	119.72
2	E	301	E85	C22-C14-C15	-2.68	116.48	119.65
2	C	301	E85	C8-N7-C6	2.67	119.70	113.45
2	B	301	E85	C36-C28-N26	2.59	129.33	120.64
2	A	301	E85	C8-N7-C6	2.55	119.42	113.45
2	F	301	E85	C8-N7-C6	2.53	119.39	113.45
2	E	301	E85	C14-C15-C17	2.46	121.94	119.67
2	B	301	E85	C28-C29-C31	2.30	124.05	120.85
2	E	301	E85	C8-N7-C6	2.29	118.82	113.45
2	D	301	E85	C22-C14-C15	-2.26	116.97	119.65
2	E	301	E85	C36-C28-N26	2.24	128.13	120.64
2	C	301	E85	C22-C14-N12	2.21	128.06	120.64
2	D	301	E85	C36-C28-C29	-2.11	117.15	119.65
2	C	301	E85	C14-C15-C17	2.07	121.58	119.67

There are no chirality outliers.

All (10) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	D	301	E85	C5-C11-N12-C14
2	D	301	E85	N10-C11-N12-C14
2	F	301	E85	C5-C11-N12-C14
2	F	301	E85	N10-C11-N12-C14
2	B	301	E85	C5-C11-N12-C14
2	E	301	E85	C5-C11-N12-C14
2	A	301	E85	C5-C11-N12-C14
2	C	301	E85	C32-C31-C38-N41
2	D	301	E85	C32-C31-C38-N41
2	D	301	E85	C29-C31-C38-N41

There are no ring outliers.

5 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	E	301	E85	1	0
2	F	301	E85	2	0
2	C	301	E85	3	0
2	A	301	E85	2	0

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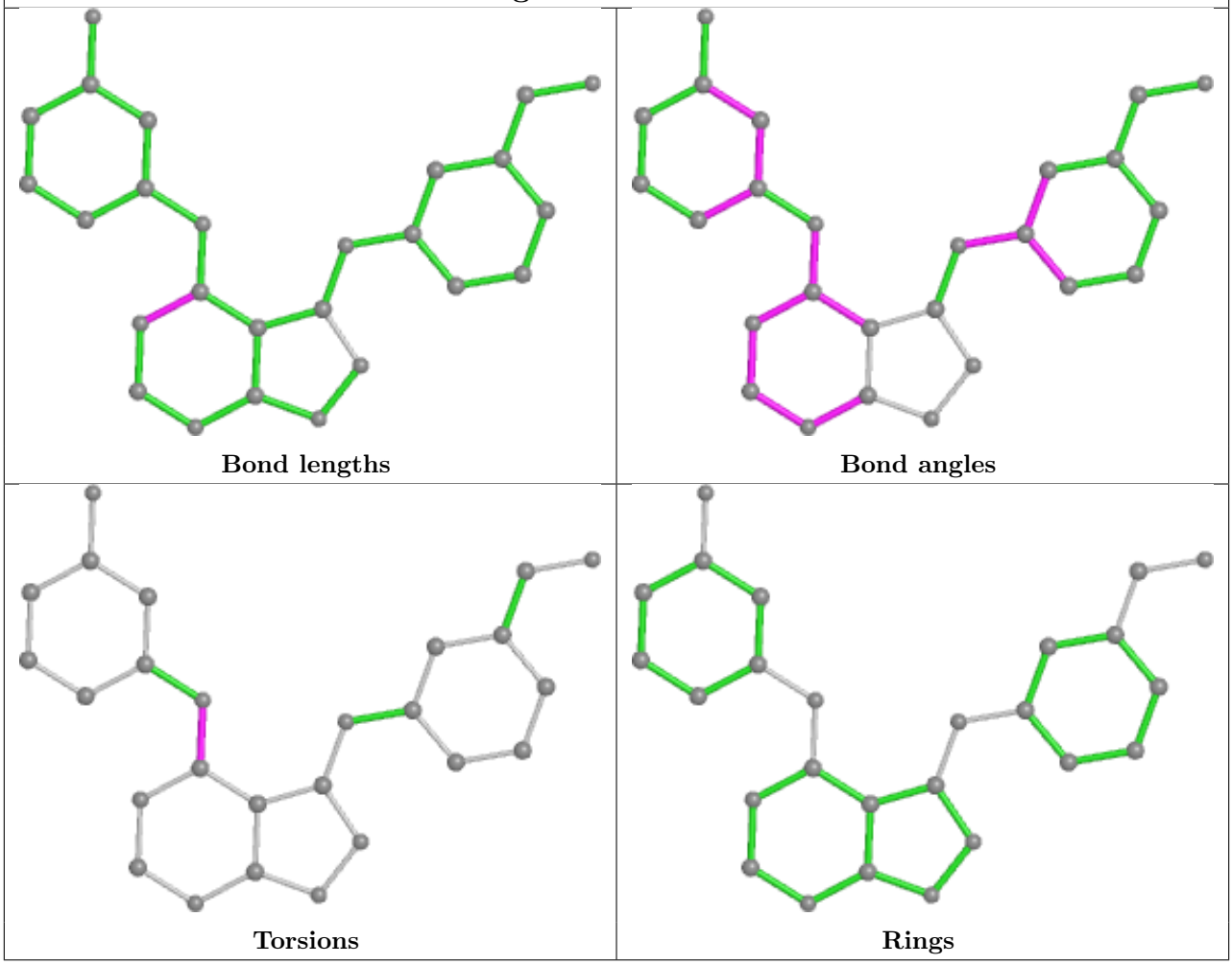
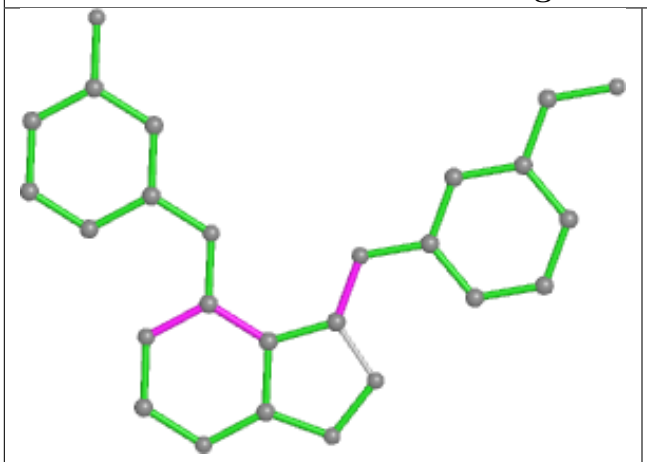
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	301	E85	2	0

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

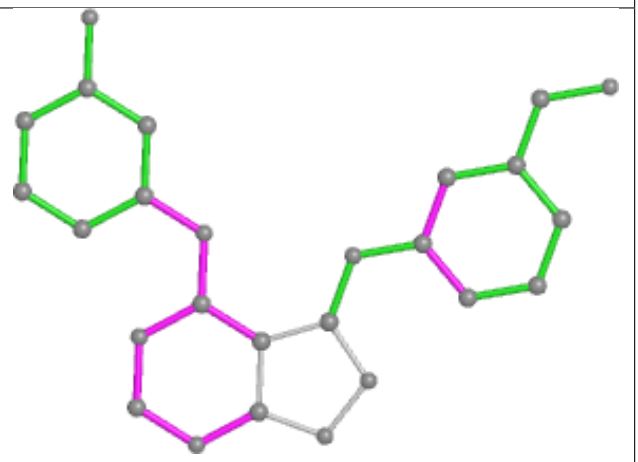
Ligand E85 E 301



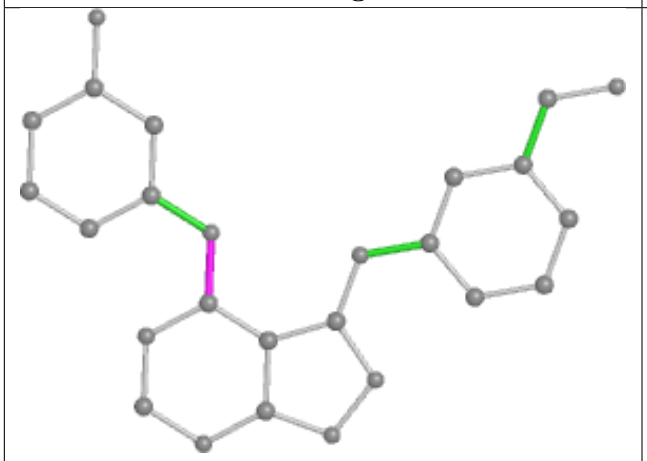
Ligand E85 F 301



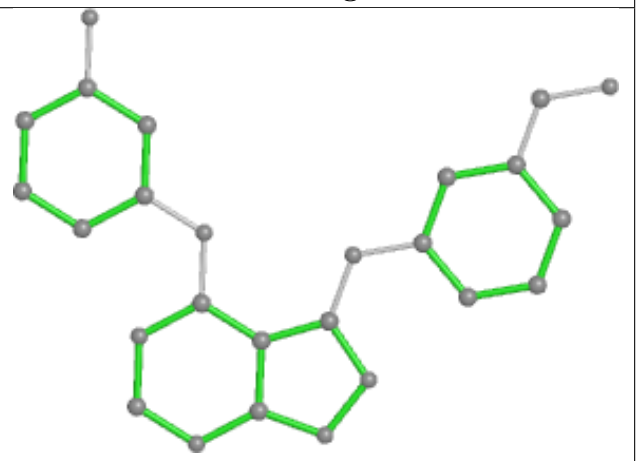
Bond lengths



Bond angles

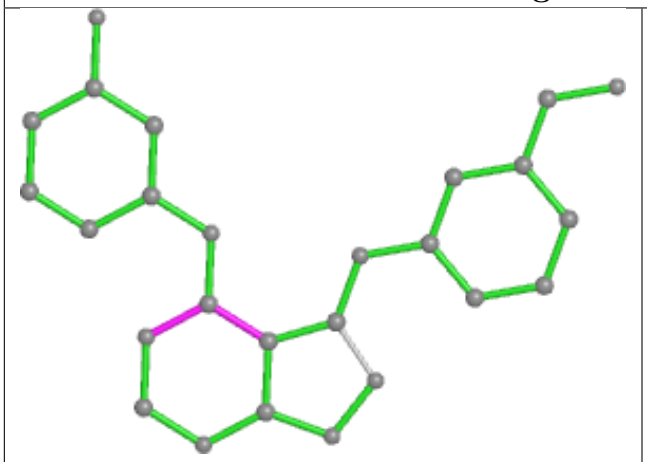


Torsions



Rings

Ligand E85 C 301



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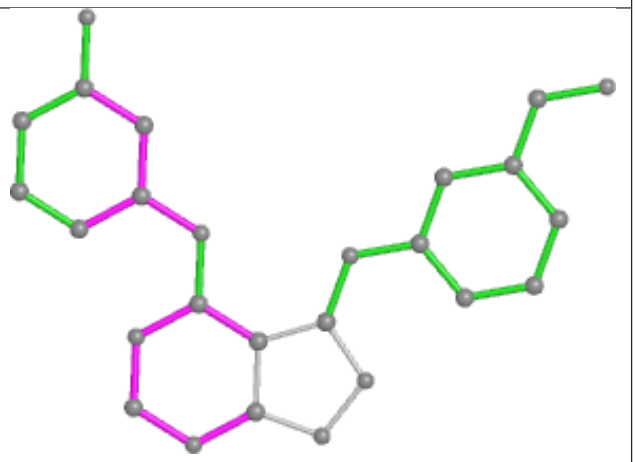
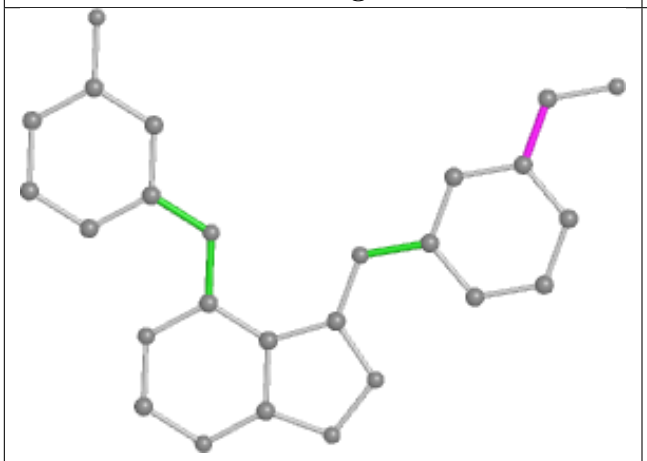


Bond angles



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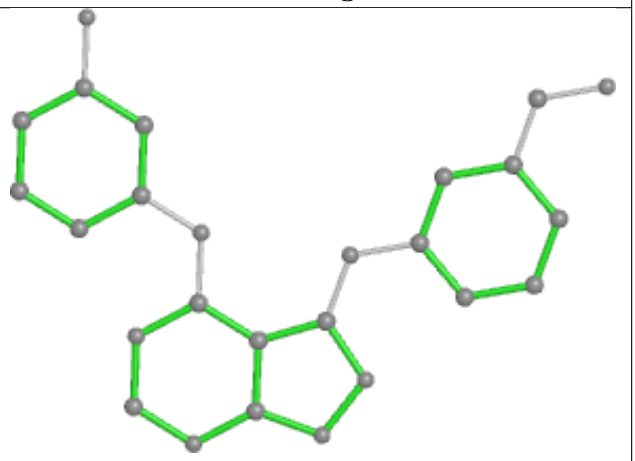
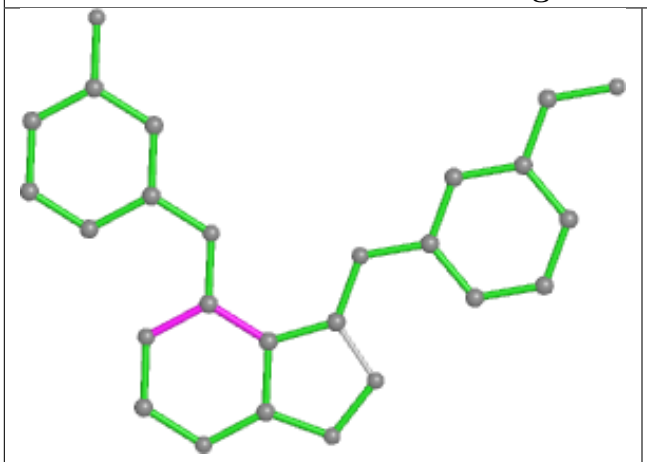


Rings

Ligand E85 A 301



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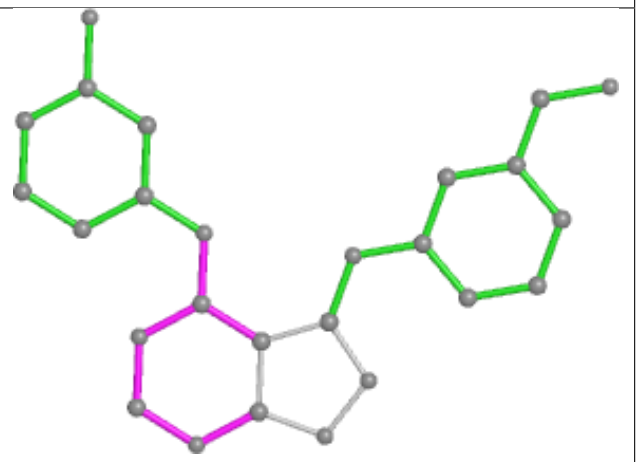
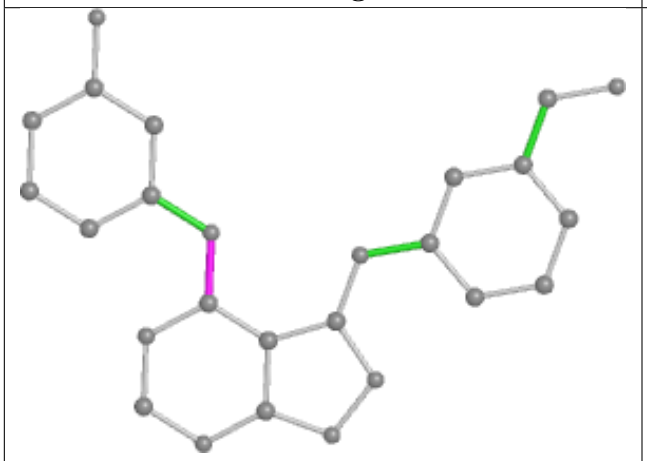
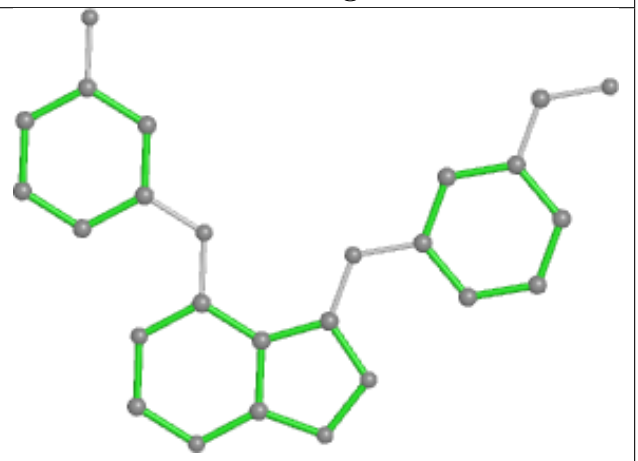


Bond angles

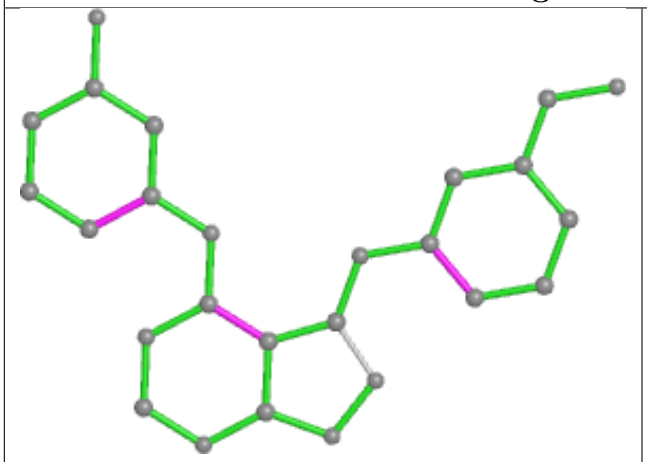


Torsions

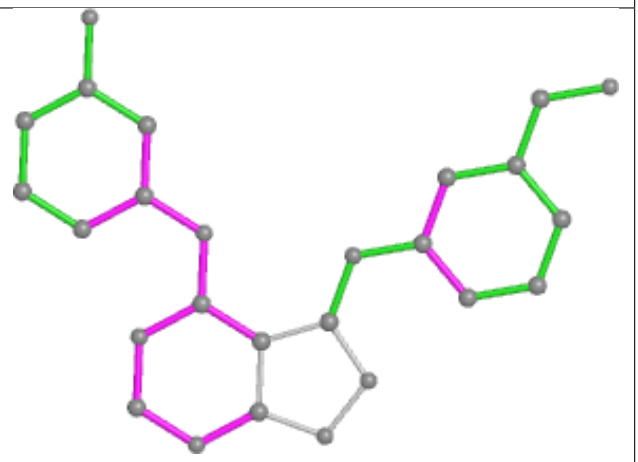


Rings

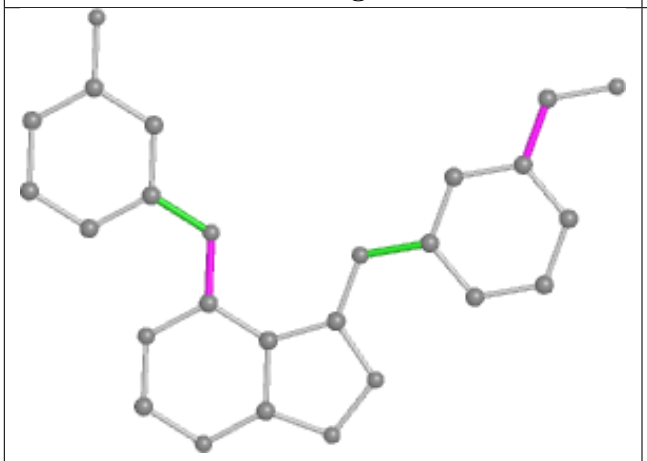
Ligand E85 D 301



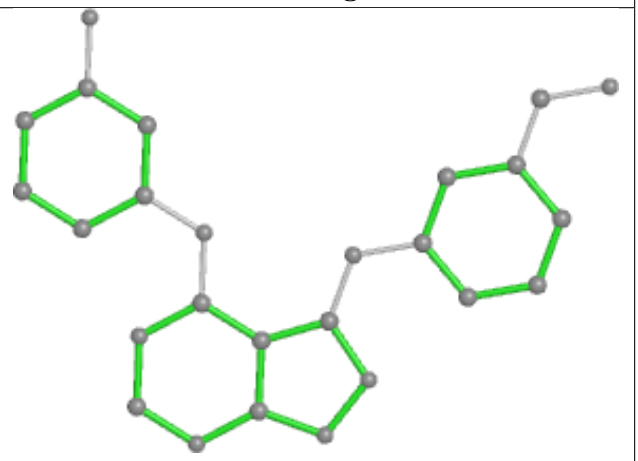
Bond lengths



Bond angles

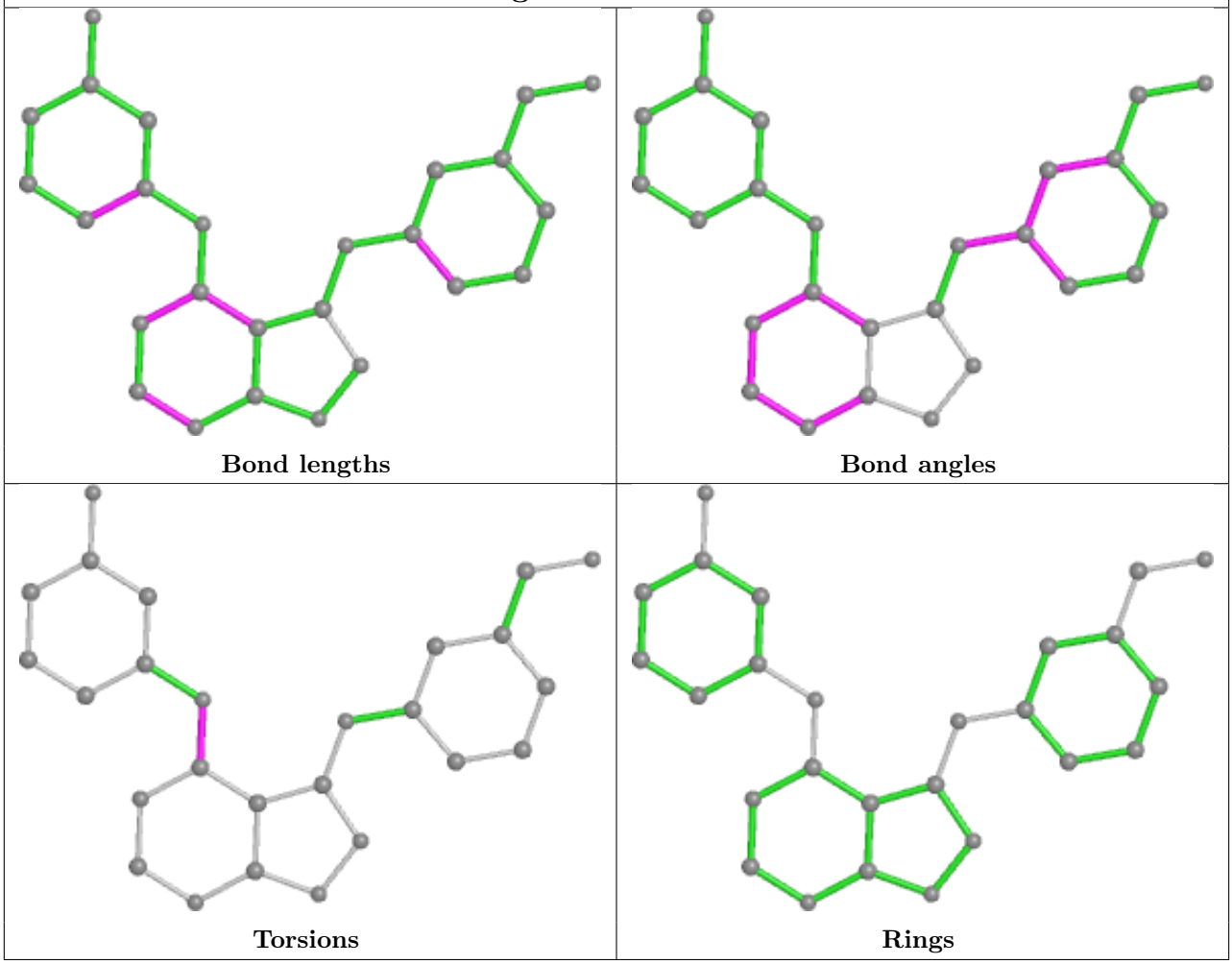


Torsions



Rings

Ligand E85 B 301



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	C	1
1	A	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	C	169:ASN	C	173:ARG	N	4.85

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Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	169:ASN	C	174:ARG	N	3.91

6 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

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	216/232 (93%)	-0.33	2 (0%)	84	83	18, 33, 54, 80	0
1	B	211/232 (90%)	-0.13	4 (1%)	66	65	19, 38, 70, 85	0
1	C	218/232 (93%)	0.02	11 (5%)	28	27	25, 45, 70, 133	0
1	D	214/232 (92%)	-0.04	3 (1%)	75	73	23, 40, 65, 87	0
1	E	213/232 (91%)	-0.04	6 (2%)	53	51	21, 43, 75, 100	0
1	F	213/232 (91%)	0.07	5 (2%)	60	58	20, 45, 75, 103	0
All	All	1285/1392 (92%)	-0.08	31 (2%)	59	57	18, 40, 70, 133	0

All (31) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	97	ASP	8.8
1	B	97	ASP	4.2
1	F	97	ASP	3.8
1	C	244	SER	3.7
1	E	97	ASP	3.5
1	D	245	ALA	3.4
1	C	96	PRO	3.4
1	B	76	PRO	3.1
1	F	59	LEU	3.0
1	D	60	GLU	3.0
1	D	62	GLY	3.0
1	E	62	GLY	2.9
1	C	62	GLY	2.8
1	B	223(A)	LYS	2.8
1	C	150	ARG	2.7
1	E	36	ASN	2.7
1	C	245	ALA	2.6
1	F	147	ALA	2.6
1	E	57	HIS	2.5

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Mol	Chain	Res	Type	RSRZ
1	C	99	ILE	2.3
1	F	223(A)	LYS	2.3
1	C	144	VAL	2.3
1	C	223	ARG	2.2
1	B	149	GLY	2.2
1	E	76	PRO	2.2
1	C	219	VAL	2.2
1	A	245	ALA	2.2
1	F	178	GLU	2.1
1	A	244	SER	2.1
1	C	59	LEU	2.1
1	E	109	SER	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)

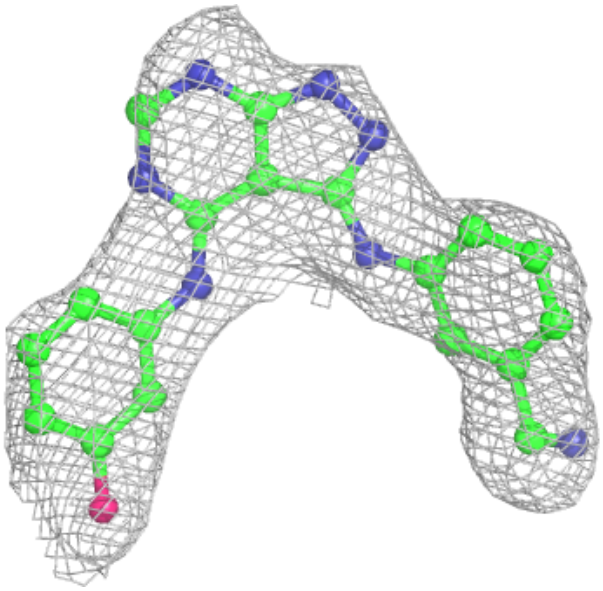
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

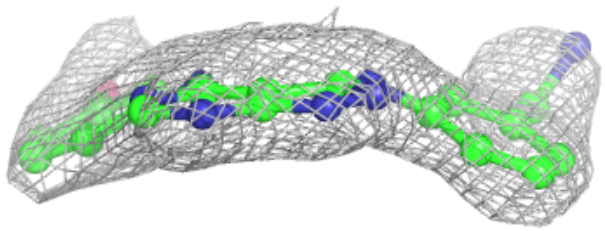
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	E85	E	301	26/26	0.87	0.17	44,52,61,63	0
2	E85	B	301	26/26	0.90	0.12	44,54,59,62	0
2	E85	F	301	26/26	0.90	0.16	36,48,61,65	0
2	E85	C	301	26/26	0.91	0.16	50,55,61,67	0
2	E85	D	301	26/26	0.92	0.16	42,52,65,69	0
2	E85	A	301	26/26	0.95	0.14	26,31,45,46	0

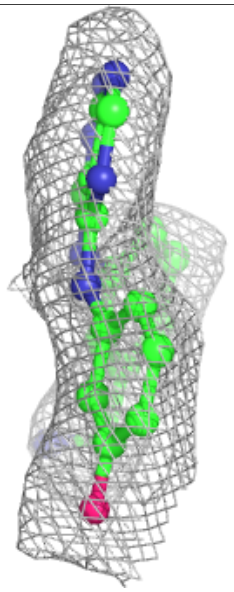
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around E85 E 301:

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

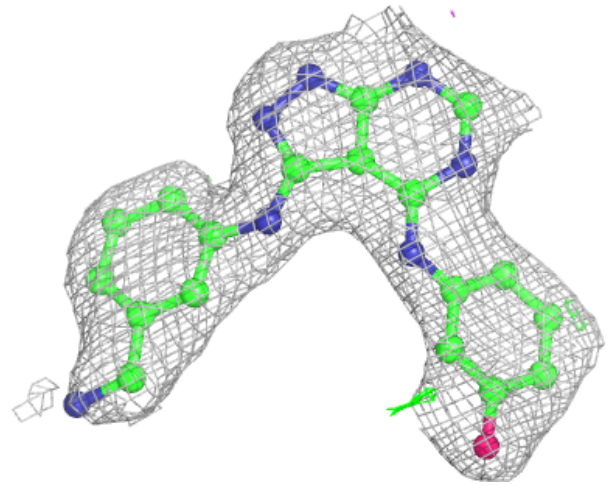


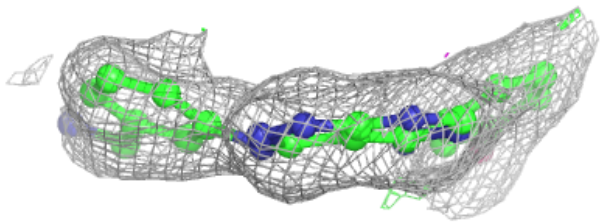


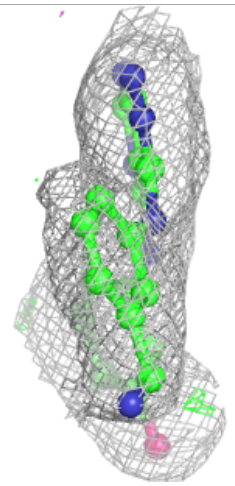


Electron density around E85 B 301:

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

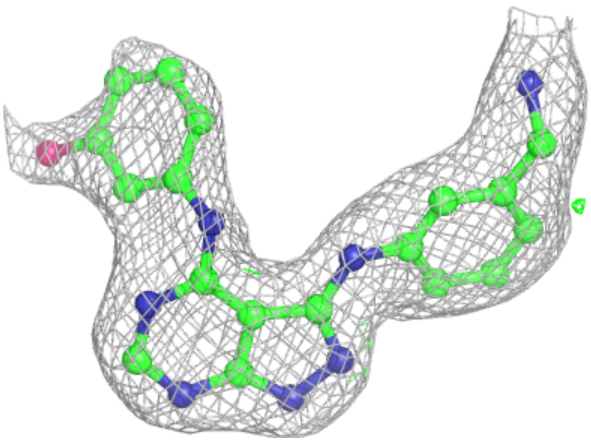


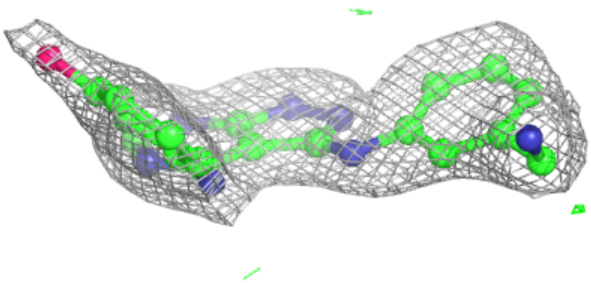


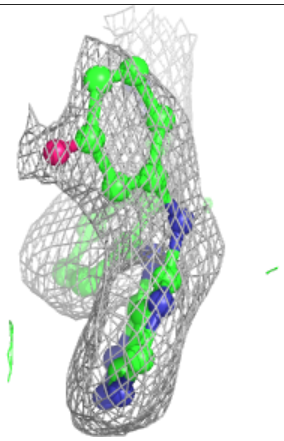


Electron density around E85 F 301:

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

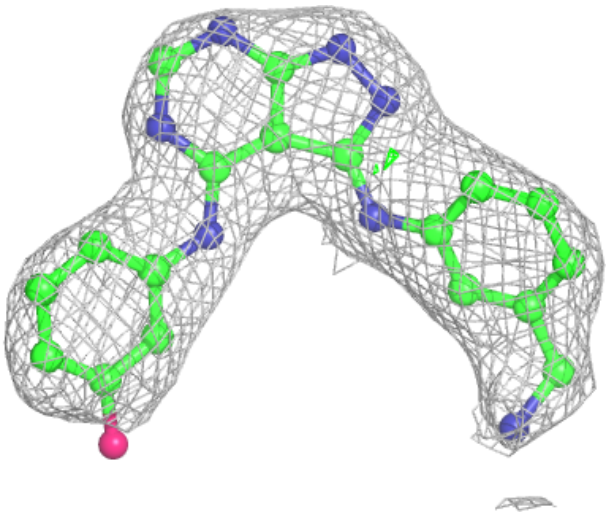


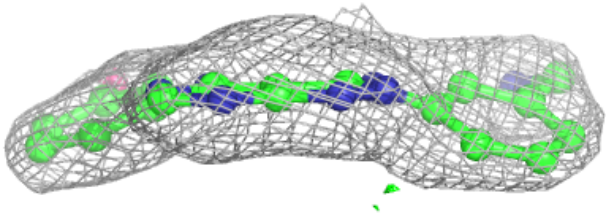


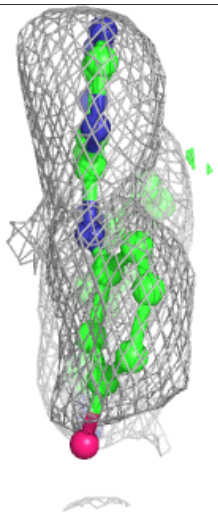


Electron density around E85 C 301:

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







Electron density around E85 D 301:

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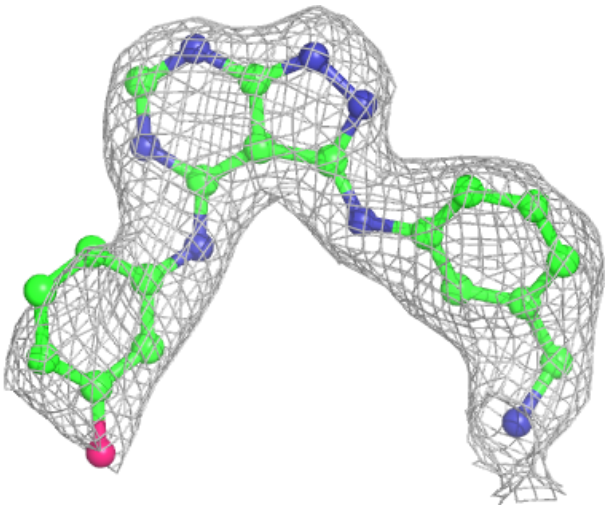
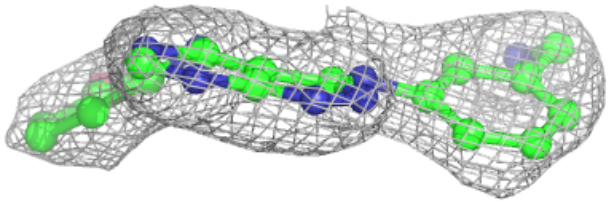
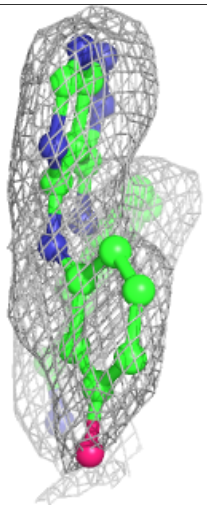
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

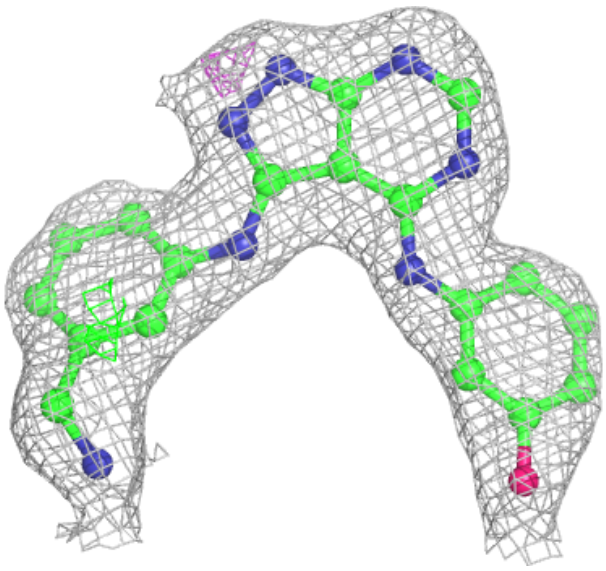


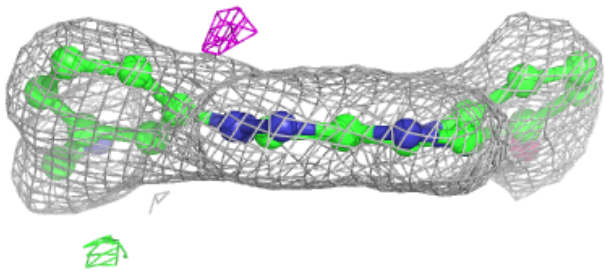


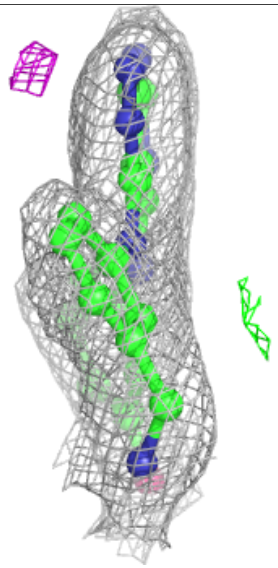


Electron density around E85 A 301:

$2mF_o$-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.