



Full wwPDB X-ray Structure Validation Report ⓘ

Dec 15, 2024 – 05:18 PM EST

PDB ID : 6WAA
Title : K. pneumoniae Topoisomerase IV (ParE-ParC) in complex with DNA and compound 34 (7-[(1S,5R)-1-amino-3-azabicyclo[3.1.0]hexan-3-yl]-4-(aminomethyl)-1-cyclopropyl-3,6-difluoro-8-methylquinolin-2(1H)-one)
Authors : Noeske, J.; Shu, W.; Bellamacina, C.
Deposited on : 2020-03-24
Resolution : 3.20 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 : 4.02b-467
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 1.21
EDS : 3.0
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4 : 9.0.004 (Gargrove)
Density-Fitness : 1.0.11
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.40

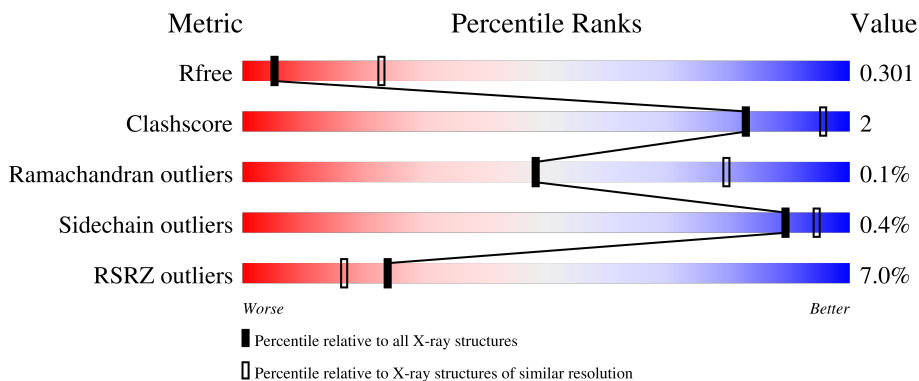
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.20 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}	164625	1370 (3.20-3.20)
Clashscore	180529	1497 (3.20-3.20)
Ramachandran outliers	177936	1479 (3.20-3.20)
Sidechain outliers	177891	1478 (3.20-3.20)
RSRZ outliers	164620	1371 (3.20-3.20)

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 $\leq 5\%$. 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	B	743	
1	D	743	
1	F	743	
1	H	743	

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Mol	Chain	Length	Quality of chain
2	I	11	 82% 18%
2	L	11	 73% 18% 9%
2	M	11	 82% 18%
2	P	11	 82% 18%
3	J	15	 73% 20% 7%
3	K	15	 7% 87% 7% 7%
3	N	15	 80% 20%
3	O	15	 67% 20% 13%

2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 39965 atoms, of which 18474 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 DNA topoisomerase 4 subunit B,DNA topoisomerase (ATP-hydrolyzing) chimera.

Mol	Chain	Residues	Atoms							ZeroOcc	AltConf	Trace
			Total	C	H	N	O	P	S			
1	B	702	10037	3269	4832	929	981	1	25	0	0	0
1	D	637	7767	2655	3494	782	819	1	16	0	0	0
1	F	707	10011	3273	4801	927	984	1	25	0	0	0
1	H	656	8865	2960	4190	830	864	1	20	0	0	0

There are 48 discrepancies between the modelled and reference sequences:

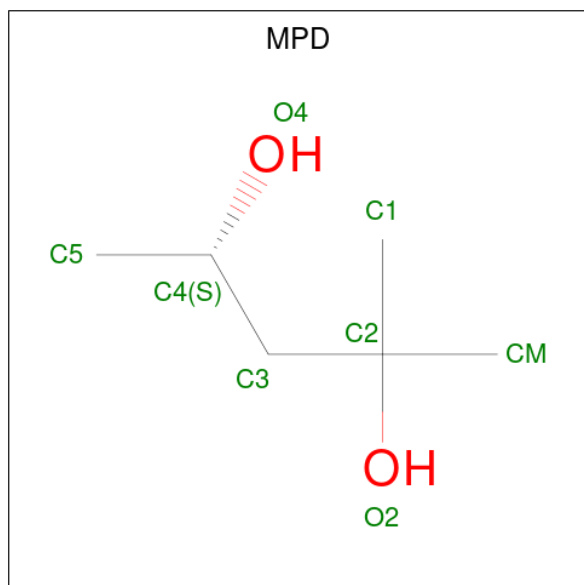
Chain	Residue	Modelled	Actual	Comment	Reference
B	389	MET	-	initiating methionine	UNP A0A377Y395
B	999	GLU	-	linker	UNP A0A377Y395
B	1000	PHE	-	linker	UNP A0A377Y395
B	1255	THR	SER	variant	UNP A0A377XIN8
B	1491	LEU	-	expression tag	UNP A0A377XIN8
B	1492	GLU	-	expression tag	UNP A0A377XIN8
B	1493	HIS	-	expression tag	UNP A0A377XIN8
B	1494	HIS	-	expression tag	UNP A0A377XIN8
B	1495	HIS	-	expression tag	UNP A0A377XIN8
B	1496	HIS	-	expression tag	UNP A0A377XIN8
B	1497	HIS	-	expression tag	UNP A0A377XIN8
B	1498	HIS	-	expression tag	UNP A0A377XIN8
D	389	MET	-	initiating methionine	UNP A0A377Y395
D	999	GLU	-	linker	UNP A0A377Y395
D	1000	PHE	-	linker	UNP A0A377Y395
D	1255	THR	SER	variant	UNP A0A377XIN8
D	1491	LEU	-	expression tag	UNP A0A377XIN8
D	1492	GLU	-	expression tag	UNP A0A377XIN8
D	1493	HIS	-	expression tag	UNP A0A377XIN8
D	1494	HIS	-	expression tag	UNP A0A377XIN8

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CP*GP*TP*AP*A)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
3	J	14	Total	C	H	N	O	P	0	0	0
			426	137	143	55	78	13			
3	K	15	Total	C	H	N	O	P	0	0	0
			471	147	167	60	83	14			
3	N	15	Total	C	H	N	O	P	0	0	0
			471	147	167	60	83	14			
3	O	13	Total	C	H	N	O	P	0	0	0
			406	127	144	50	73	12			

- Molecule 4 is (4S)-2-METHYL-2,4-PENTANEDIOL (three-letter code: MPD) (formula: C₆H₁₄O₂).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	B	1	Total	C	H	O	0	0
			22	6	14	2		
4	B	1	Total	C	H	O	0	0
			22	6	14	2		
4	D	1	Total	C	H	O	0	0
			22	6	14	2		
4	F	1	Total	C	H	O	0	0
			22	6	14	2		
4	H	1	Total	C	H	O	0	0
			22	6	14	2		
4	H	1	Total	C	H	O	0	0
			22	6	14	2		

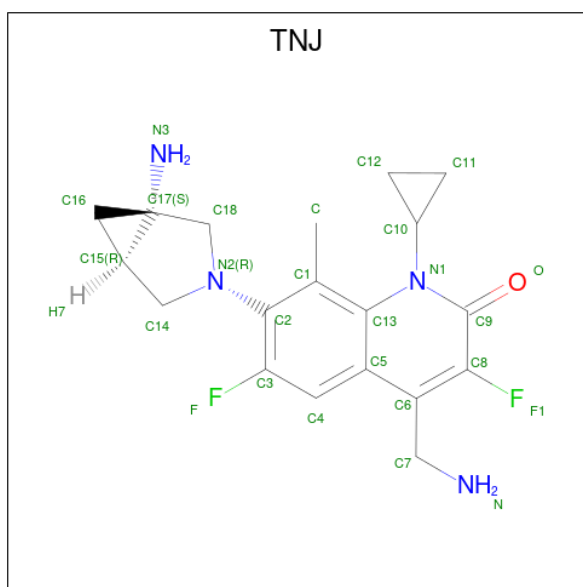
- Molecule 5 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	B	2	Total 2	Mg 2	0	0
5	D	1	Total 1	Mg 1	0	0
5	F	3	Total 3	Mg 3	0	0
5	H	1	Total 1	Mg 1	0	0
5	I	1	Total 1	Mg 1	0	0
5	L	1	Total 1	Mg 1	0	0
5	M	1	Total 1	Mg 1	0	0
5	O	1	Total 1	Mg 1	0	0

- Molecule 6 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	B	1	Total 1	Cl 1	0	0
6	H	1	Total 1	Cl 1	0	0

- Molecule 7 is 7-[(1S,5R)-1-amino-3-azabicyclo[3.1.0]hexan-3-yl]-4-(aminomethyl)-1-cyclopropyl-3,6-difluoro-8-methylquinolin-2(1H)-one (three-letter code: TNJ) (formula: C₁₉H₂₂F₂N₄O).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	F	N	O		
7	J	1	Total	C	F	N	O	0	0
			26	19	2	4	1		
7	J	1	Total	C	F	N	O	0	0
			26	19	2	4	1		
7	N	1	Total	C	F	N	O	0	0
			26	19	2	4	1		
7	N	1	Total	C	F	N	O	0	0
			26	19	2	4	1		

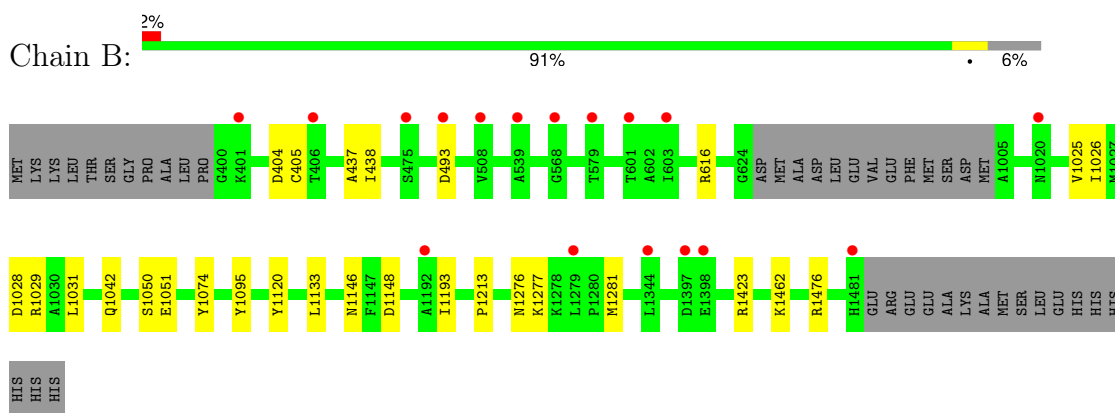
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	B	1	Total	O	0	0
			1	1		
8	D	3	Total	O	0	0
			3	3		
8	F	4	Total	O	0	0
			4	4		
8	H	1	Total	O	0	0
			1	1		
8	N	1	Total	O	0	0
			1	1		

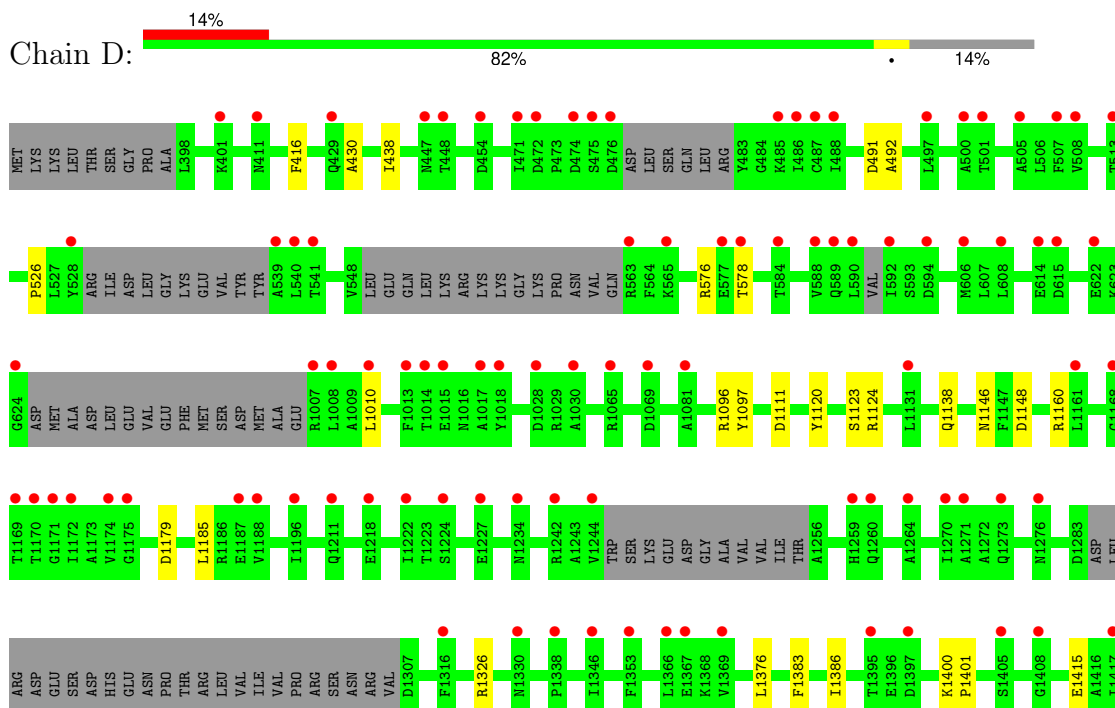
3 Residue-property plots [i](#)

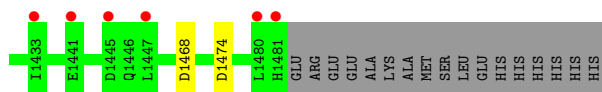
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: DNA topoisomerase 4 subunit B,DNA topoisomerase (ATP-hydrolyzing) chimera

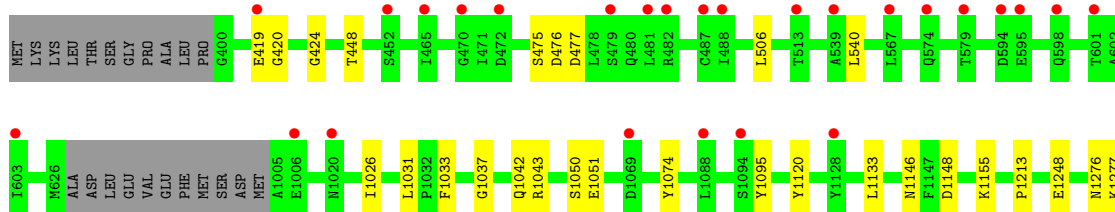
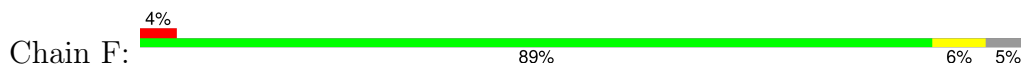


- Molecule 1: DNA topoisomerase 4 subunit B,DNA topoisomerase (ATP-hydrolyzing) chimera

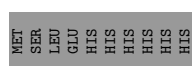
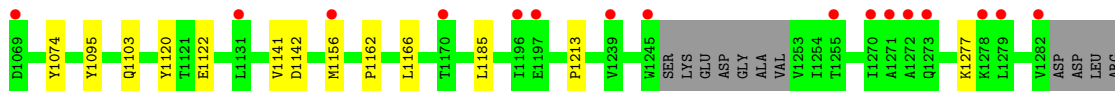
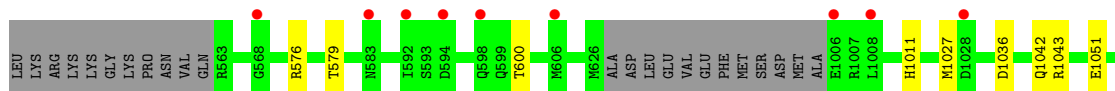
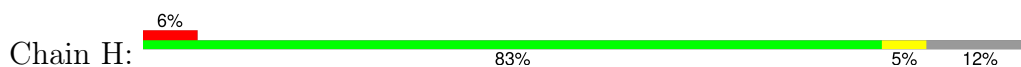




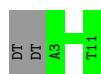
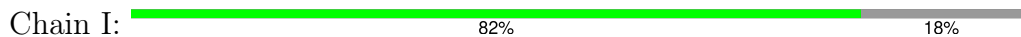
• Molecule 1: DNA topoisomerase 4 subunit B,DNA topoisomerase (ATP-hydrolyzing) chimera



• Molecule 1: DNA topoisomerase 4 subunit B,DNA topoisomerase (ATP-hydrolyzing) chimera



• Molecule 2: DNA (5'-D(*TP*TP*AP*CP*GP*TP*TP*GP*TP*AP*T)-3')

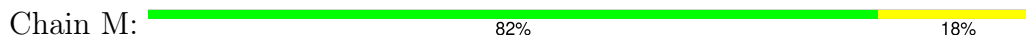


• Molecule 2: DNA (5'-D(*TP*TP*AP*CP*GP*TP*TP*GP*TP*AP*T)-3')

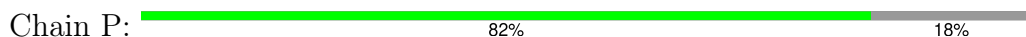




- Molecule 2: DNA (5'-D(*TP*TP*AP*CP*GP*TP*TP*GP*TP*AP*T)-3')



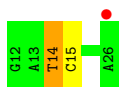
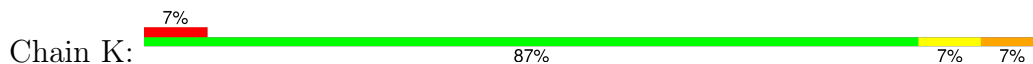
- Molecule 2: DNA (5'-D(*TP*TP*AP*CP*GP*TP*TP*GP*TP*AP*T)-3')



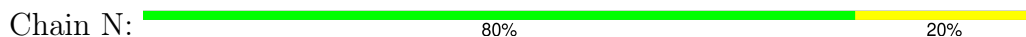
- Molecule 3: DNA (5'-D(*GP*AP*TP*CP*AP*TP*AP*CP*AP*AP*CP*GP*TP*AP*A)-3')



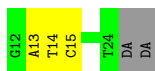
- Molecule 3: DNA (5'-D(*GP*AP*TP*CP*AP*TP*AP*CP*AP*AP*CP*GP*TP*AP*A)-3')



- Molecule 3: DNA (5'-D(*GP*AP*TP*CP*AP*TP*AP*CP*AP*AP*CP*GP*TP*AP*A)-3')



- Molecule 3: DNA (5'-D(*GP*AP*TP*CP*AP*TP*AP*CP*AP*AP*CP*GP*TP*AP*A)-3')



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	94.59Å 157.48Å 144.06Å 90.00° 94.93° 90.00°	Depositor
Resolution (Å)	82.08 – 3.20 82.08 – 3.20	Depositor EDS
% Data completeness (in resolution range)	99.5 (82.08-3.20) 99.5 (82.08-3.20)	Depositor EDS
R_{merge}	0.26	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.17 (at 3.19Å)	Xtrriage
Refinement program	PHENIX 1.17.1_3660	Depositor
R, R_{free}	0.274 , 0.301 0.274 , 0.301	Depositor DCC
R_{free} test set	3280 reflections (4.73%)	wwPDB-VP
Wilson B-factor (Å ²)	79.1	Xtrriage
Anisotropy	0.439	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 79.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.28$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.88	EDS
Total number of atoms	39965	wwPDB-VP
Average B, all atoms (Å ²)	94.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 10.60% 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: MG, CL, PTR, TNJ, MPD

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	B	0.23	0/5276	0.40	0/7167
1	D	0.23	0/4325	0.39	0/5910
1	F	0.24	0/5282	0.40	0/7177
1	H	0.23	0/4739	0.40	0/6451
2	I	0.62	0/206	1.07	0/316
2	L	0.57	0/228	1.11	0/350
2	M	0.51	0/250	1.11	0/384
2	P	0.52	0/206	1.02	0/316
3	J	0.61	0/318	0.90	0/489
3	K	0.53	0/342	0.90	1/526 (0.2%)
3	N	0.50	0/342	0.88	0/526
3	O	0.53	0/294	0.89	0/452
All	All	0.28	0/21808	0.50	1/30064 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	K	14	DT	P-O3'-C3'	5.63	126.46	119.70

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	B	5205	4832	4848	13	0
1	D	4273	3494	3503	17	0
1	F	5210	4801	4801	25	0
1	H	4675	4190	4190	25	0
2	I	185	104	104	0	0
2	L	205	116	116	1	0
2	M	225	128	128	1	0
2	P	185	104	104	0	0
3	J	283	143	156	4	0
3	K	304	167	167	2	0
3	N	304	167	167	2	0
3	O	262	144	145	2	0
4	B	16	28	28	1	0
4	D	8	14	14	0	0
4	F	8	14	14	0	0
4	H	16	28	28	2	0
5	B	2	0	0	0	0
5	D	1	0	0	0	0
5	F	3	0	0	0	0
5	H	1	0	0	0	0
5	I	1	0	0	0	0
5	L	1	0	0	0	0
5	M	1	0	0	0	0
5	O	1	0	0	0	0
6	B	1	0	0	0	0
6	H	1	0	0	0	0
7	J	52	0	0	0	0
7	N	52	0	0	1	0
8	B	1	0	0	0	0
8	D	3	0	0	1	0
8	F	4	0	0	0	0
8	H	1	0	0	0	0
8	N	1	0	0	1	0
All	All	21491	18474	18513	87	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 2.

All (87) 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:F:1043:ARG:NH1	1:F:1155:LYS:O	2.15	0.80

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1146:ASN:ND2	1:B:1148:ASP:OD1	2.15	0.79
1:H:1036:ASP:OD2	1:H:1043:ARG:NH1	2.20	0.74
1:H:489:LEU:HD22	1:H:579:THR:HG21	1.70	0.73
1:F:1419:GLU:OE2	1:H:1423:ARG:NH2	2.22	0.72
1:B:1026:ILE:HG23	1:B:1031:LEU:HD22	1.71	0.71
1:F:1146:ASN:ND2	1:F:1148:ASP:OD1	2.24	0.71
1:D:1138:GLN:NE2	8:D:1601:HOH:O	2.25	0.70
1:F:1248:GLU:OE2	1:F:1296:ARG:NH2	2.25	0.69
1:B:1042:GLN:NE2	1:B:1095:TYR:OH	2.27	0.68
1:F:1031:LEU:HD23	1:F:1338:PRO:HB3	1.77	0.67
3:J:24:DT:H2''	3:J:25:DA:O5'	1.93	0.67
1:D:1146:ASN:ND2	1:D:1148:ASP:OD1	2.28	0.66
1:F:1480:LEU:O	1:F:1482:GLU:N	2.35	0.60
1:H:1103:GLN:NE2	1:H:1122:GLU:OE2	2.34	0.60
1:D:1179:ASP:OD2	1:D:1326:ARG:NE	2.35	0.59
1:F:1051:GLU:OE1	1:F:1074:TYR:OH	2.20	0.59
1:H:1213:PRO:O	1:H:1476:ARG:NH2	2.37	0.58
1:D:1111:ASP:OD1	1:D:1111:ASP:N	2.39	0.56
1:H:1315:LEU:O	1:H:1319:THR:HG22	2.05	0.56
1:B:437:ALA:C	1:B:438:ILE:HD12	2.26	0.55
1:H:1372:ARG:NH1	4:H:1502:MPD:O4	2.37	0.55
1:F:1026:ILE:HG23	1:F:1031:LEU:HD22	1.89	0.55
1:F:1423:ARG:NH1	1:H:1419:GLU:OE2	2.40	0.54
1:H:1051:GLU:OE1	1:H:1074:TYR:OH	2.25	0.54
1:F:1484:GLU:OE1	1:F:1484:GLU:N	2.40	0.54
3:K:14:DT:H2''	3:K:15:DC:O5'	2.08	0.52
1:H:600:THR:HG22	1:H:1011:HIS:HB3	1.91	0.51
1:H:1141:VAL:HG13	1:H:1156:MET:HG2	1.91	0.51
1:F:476:ASP:OD1	1:F:477:ASP:N	2.43	0.50
3:K:14:DT:C2'	3:K:15:DC:O5'	2.60	0.50
1:B:1193:ILE:HG23	1:B:1462:LYS:HG3	1.93	0.50
1:D:526:PRO:HD3	1:D:578:THR:HG23	1.93	0.50
1:H:1309:GLU:N	1:H:1309:GLU:OE1	2.45	0.50
1:F:419:GLU:O	1:F:419:GLU:HG2	2.12	0.49
1:F:1415:GLU:OE1	1:H:1423:ARG:NH1	2.45	0.49
1:D:430:ALA:HB1	1:D:576:ARG:HB2	1.94	0.49
1:D:1097:TYR:OH	1:D:1185:LEU:N	2.45	0.49
1:H:1141:VAL:HG12	1:H:1142:ASP:O	2.12	0.49
1:H:1372:ARG:NH2	4:H:1502:MPD:O2	2.44	0.48
1:F:1042:GLN:NE2	1:F:1095:TYR:OH	2.46	0.48
1:H:1042:GLN:NE2	1:H:1095:TYR:OH	2.47	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:1162:PRO:O	1:H:1166:LEU:HD12	2.15	0.47
4:B:1501:MPD:H32	3:J:24:DT:H4'	1.95	0.47
1:F:1376:LEU:HD22	1:F:1433:ILE:HG23	1.97	0.47
1:B:1213:PRO:O	1:B:1476:ARG:NH2	2.47	0.46
1:F:1050:SER:HB2	1:F:1133:LEU:HD13	1.97	0.46
1:H:418:VAL:HG21	1:H:424:GLY:HA2	1.97	0.46
3:O:14:DT:H2''	3:O:15:DC:O5'	2.16	0.46
1:D:1160:ARG:NH1	1:D:1468:ASP:OD1	2.49	0.46
1:F:1341:LYS:NZ	1:F:1349:GLU:OE1	2.46	0.45
1:D:1383:PHE:HA	1:D:1386:ILE:HG23	1.98	0.45
1:D:1400:LYS:HB3	1:D:1401:PRO:HD3	1.99	0.45
1:F:420:GLY:O	1:F:424:GLY:N	2.44	0.45
1:D:416:PHE:HB2	1:D:438:ILE:HD13	2.00	0.44
1:D:1010:LEU:C	1:D:1010:LEU:HD23	2.38	0.44
1:F:1390:ILE:HD13	1:H:1390:ILE:HD13	2.00	0.44
3:J:24:DT:H2'	3:J:25:DA:C8	2.52	0.44
3:N:13:DA:H2''	3:N:14:DT:O5'	2.17	0.44
1:B:1050:SER:HB3	1:B:1133:LEU:HD13	2.00	0.43
1:F:1213:PRO:O	1:F:1476:ARG:NH2	2.51	0.43
1:D:1096:ARG:NH2	1:D:1474:ASP:OD2	2.50	0.43
3:N:19:DC:N4	8:N:201:HOH:O	2.52	0.43
1:F:448:THR:HG21	1:F:506:LEU:HD13	2.00	0.43
1:D:491:ASP:OD1	1:D:492:ALA:N	2.49	0.43
1:H:1027:MET:HA	1:H:1332:ILE:HD11	2.00	0.43
1:B:616:ARG:NH1	3:J:20:DA:OP1	2.50	0.43
1:H:1315:LEU:HD13	1:H:1321:LEU:HD12	2.01	0.43
1:F:1276:ASN:O	1:F:1277:LYS:CB	2.67	0.42
2:L:3:DA:H4'	2:L:4:DC:OP1	2.20	0.42
1:B:404:ASP:OD1	1:B:405:CYS:N	2.52	0.42
1:B:1025:VAL:O	1:B:1029:ARG:HB2	2.20	0.42
1:H:1374:HIS:O	1:H:1413:GLN:NE2	2.50	0.42
1:B:1276:ASN:O	1:B:1277:LYS:CB	2.67	0.41
1:D:1376:LEU:O	1:D:1376:LEU:HD23	2.20	0.41
1:H:430:ALA:HB1	1:H:576:ARG:HB2	2.02	0.41
1:F:540:LEU:HD12	1:F:540:LEU:H	1.84	0.41
1:B:1051:GLU:OE1	1:B:1074:TYR:OH	2.34	0.41
1:B:1423:ARG:NH2	1:D:1415:GLU:OE1	2.54	0.41
1:H:1166:LEU:HD21	1:H:1185:LEU:HG	2.03	0.41
2:M:2:DT:H2'	2:M:3:DA:C8	2.56	0.41
7:N:102:TNJ:C10	7:N:102:TNJ:C	2.98	0.41
1:D:1123:SER:OG	1:D:1124:ARG:N	2.53	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:475:SER:O	1:H:476:ASP:CB	2.68	0.40
1:F:1033:PHE:O	1:F:1037:GLY:N	2.53	0.40
1:F:1444:ARG:NH1	1:F:1445:ASP:OD1	2.52	0.40
3:O:13:DA:H2''	3:O:14:DT:H5'	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	B	697/743 (94%)	679 (97%)	18 (3%)	0	100	100
1	D	620/743 (83%)	604 (97%)	16 (3%)	0	100	100
1	F	702/743 (94%)	679 (97%)	21 (3%)	2 (0%)	37	69
1	H	641/743 (86%)	623 (97%)	18 (3%)	0	100	100
All	All	2660/2972 (90%)	2585 (97%)	73 (3%)	2 (0%)	48	80

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	F	1481	HIS
1	F	475	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	B	482/639 (75%)	479 (99%)	3 (1%)	84	92
1	D	314/639 (49%)	314 (100%)	0	100	100
1	F	472/639 (74%)	470 (100%)	2 (0%)	89	94
1	H	391/639 (61%)	390 (100%)	1 (0%)	91	96
All	All	1659/2556 (65%)	1653 (100%)	6 (0%)	89	94

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	493	ASP
1	B	1028	ASP
1	B	1281	MET
1	F	1423	ARG
1	F	1459	ASN
1	H	1277	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

4 non-standard protein/DNA/RNA residues 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	$\# Z > 2$
1	PTR	B	1120	3,1	15,16,17	1.26	1 (6%)	17,22,24	0.63	0
1	PTR	D	1120	3,1	15,16,17	1.24	1 (6%)	17,22,24	0.61	0
1	PTR	F	1120	1	15,16,17	1.35	1 (6%)	17,22,24	0.50	0
1	PTR	H	1120	3,1	15,16,17	1.36	1 (6%)	17,22,24	0.56	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
1	PTR	B	1120	3,1	-	1/10/11/13	0/1/1/1
1	PTR	D	1120	3,1	-	1/10/11/13	0/1/1/1
1	PTR	F	1120	1	-	0/10/11/13	0/1/1/1
1	PTR	H	1120	3,1	-	1/10/11/13	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	1120	PTR	OH-CZ	-4.60	1.30	1.40
1	H	1120	PTR	OH-CZ	-4.52	1.30	1.40
1	F	1120	PTR	OH-CZ	-4.51	1.30	1.40
1	D	1120	PTR	OH-CZ	-4.45	1.30	1.40

There are no bond angle outliers.

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	B	1120	PTR	CZ-OH-P-O2P
1	D	1120	PTR	CZ-OH-P-O2P
1	H	1120	PTR	CZ-OH-P-O2P

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 23 ligands modelled in this entry, 13 are monoatomic - leaving 10 for Mogul analysis.

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	MPD	H	1502	-	7,7,7	0.30	0	9,10,10	0.38	0
4	MPD	F	1501	-	7,7,7	0.33	0	9,10,10	0.26	0
4	MPD	B	1501	-	7,7,7	0.32	0	9,10,10	0.30	0
4	MPD	H	1501	-	7,7,7	0.29	0	9,10,10	0.28	0
7	TNJ	J	101	-	27,30,30	1.10	2 (7%)	30,49,49	1.28	2 (6%)
7	TNJ	N	102	-	27,30,30	1.12	2 (7%)	30,49,49	1.43	2 (6%)
7	TNJ	N	101	-	27,30,30	1.11	1 (3%)	30,49,49	1.22	3 (10%)
4	MPD	B	1502	-	7,7,7	0.33	0	9,10,10	0.18	0
7	TNJ	J	102	-	27,30,30	1.17	2 (7%)	30,49,49	1.49	2 (6%)
4	MPD	D	1501	-	7,7,7	0.33	0	9,10,10	0.20	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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	MPD	H	1502	-	-	0/5/5/5	-
4	MPD	F	1501	-	-	0/5/5/5	-
4	MPD	B	1501	-	-	0/5/5/5	-
4	MPD	H	1501	-	-	0/5/5/5	-
7	TNJ	J	101	-	-	2/8/29/29	0/5/5/5
7	TNJ	N	102	-	-	2/8/29/29	0/5/5/5
7	TNJ	N	101	-	-	4/8/29/29	0/5/5/5
4	MPD	B	1502	-	-	0/5/5/5	-
7	TNJ	J	102	-	-	3/8/29/29	0/5/5/5
4	MPD	D	1501	-	-	0/5/5/5	-

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	J	102	TNJ	C14-N2	2.63	1.50	1.46
7	N	102	TNJ	C14-N2	2.52	1.50	1.46
7	J	101	TNJ	C14-N2	2.36	1.50	1.46
7	N	101	TNJ	C14-N2	2.28	1.50	1.46
7	J	102	TNJ	C18-N2	2.21	1.50	1.46

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	J	101	TNJ	C18-N2	2.08	1.49	1.46
7	N	102	TNJ	C18-N2	2.08	1.49	1.46

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	J	102	TNJ	C14-N2-C2	-4.99	115.59	123.36
7	N	102	TNJ	C14-N2-C2	-4.42	116.47	123.36
7	J	101	TNJ	C14-N2-C2	-3.94	117.23	123.36
7	N	101	TNJ	C14-N2-C2	-3.48	117.94	123.36
7	N	102	TNJ	C-C1-C2	-3.38	114.61	121.20
7	J	102	TNJ	C-C1-C2	-3.26	114.85	121.20
7	J	101	TNJ	C-C1-C2	-2.87	115.60	121.20
7	N	101	TNJ	C-C1-C2	-2.45	116.43	121.20
7	N	101	TNJ	C13-N1-C9	-2.40	120.15	122.34

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	J	101	TNJ	C3-C2-N2-C18
7	J	102	TNJ	C3-C2-N2-C18
7	N	101	TNJ	C3-C2-N2-C18
7	N	102	TNJ	C3-C2-N2-C18
7	N	101	TNJ	C11-C10-N1-C13
7	N	101	TNJ	C12-C10-N1-C13
7	J	101	TNJ	C3-C2-N2-C14
7	J	102	TNJ	C3-C2-N2-C14
7	N	102	TNJ	C3-C2-N2-C14
7	J	102	TNJ	C1-C2-N2-C14
7	N	101	TNJ	C3-C2-N2-C14

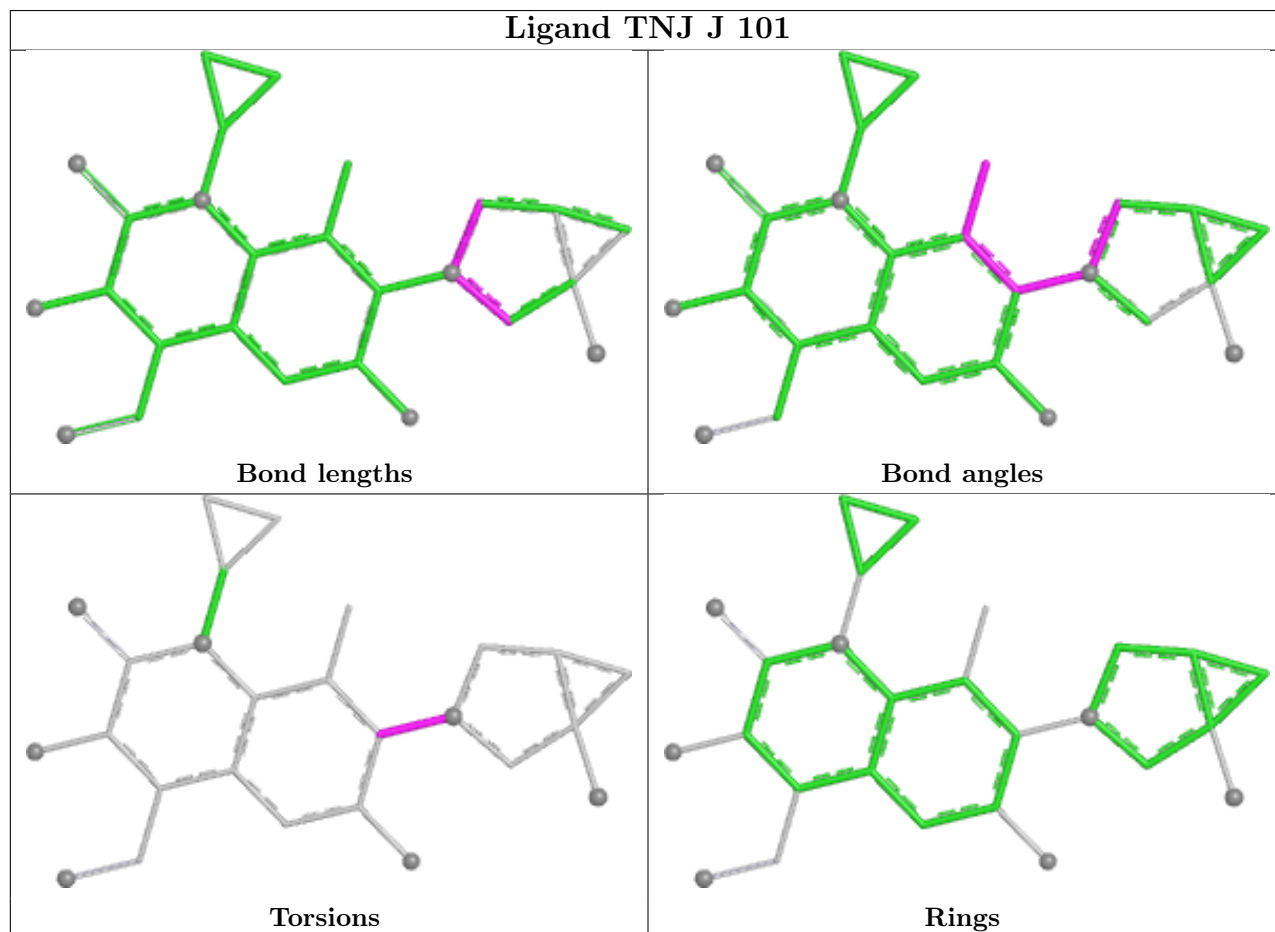
There are no ring outliers.

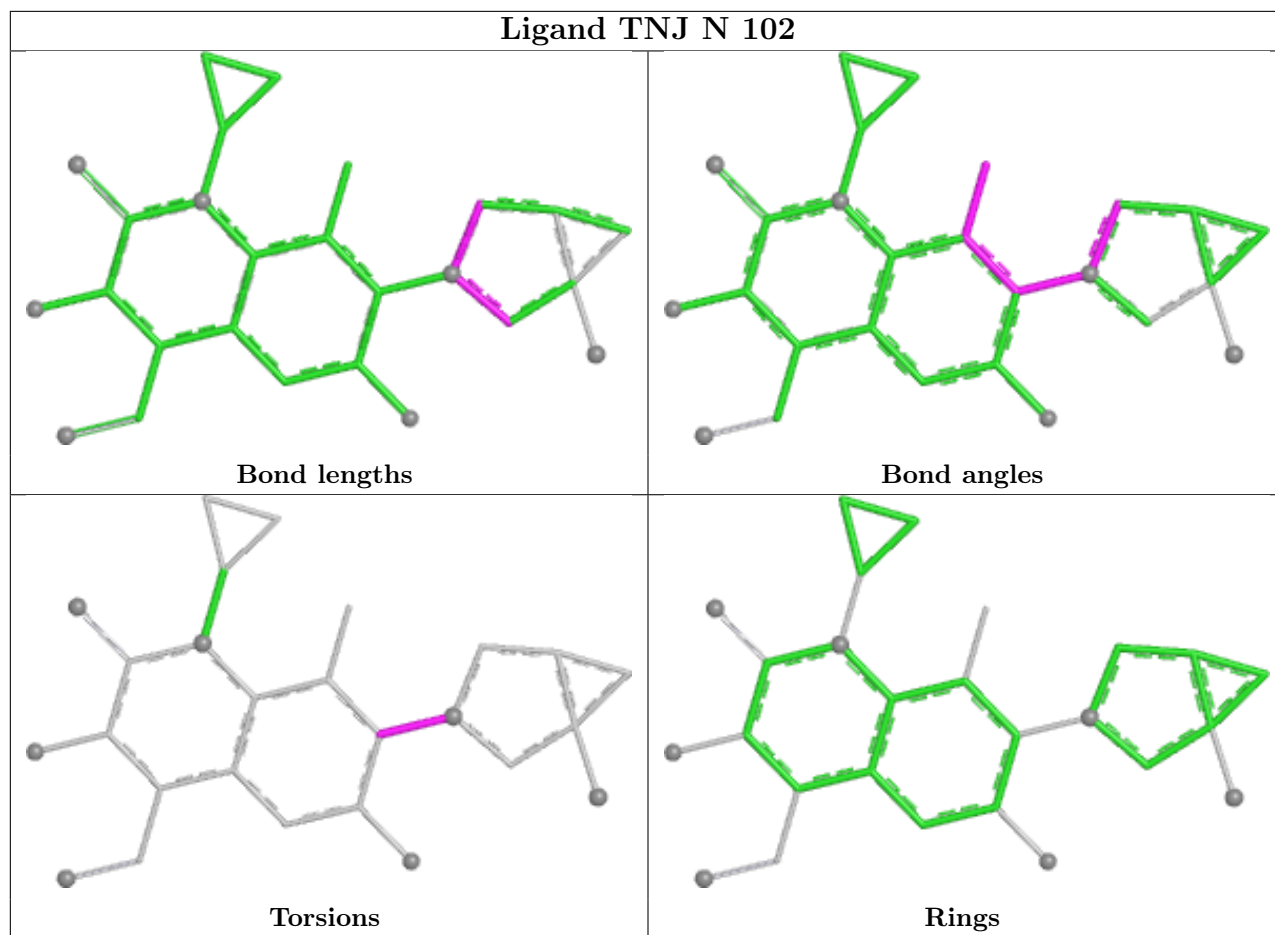
3 monomers are involved in 4 short contacts:

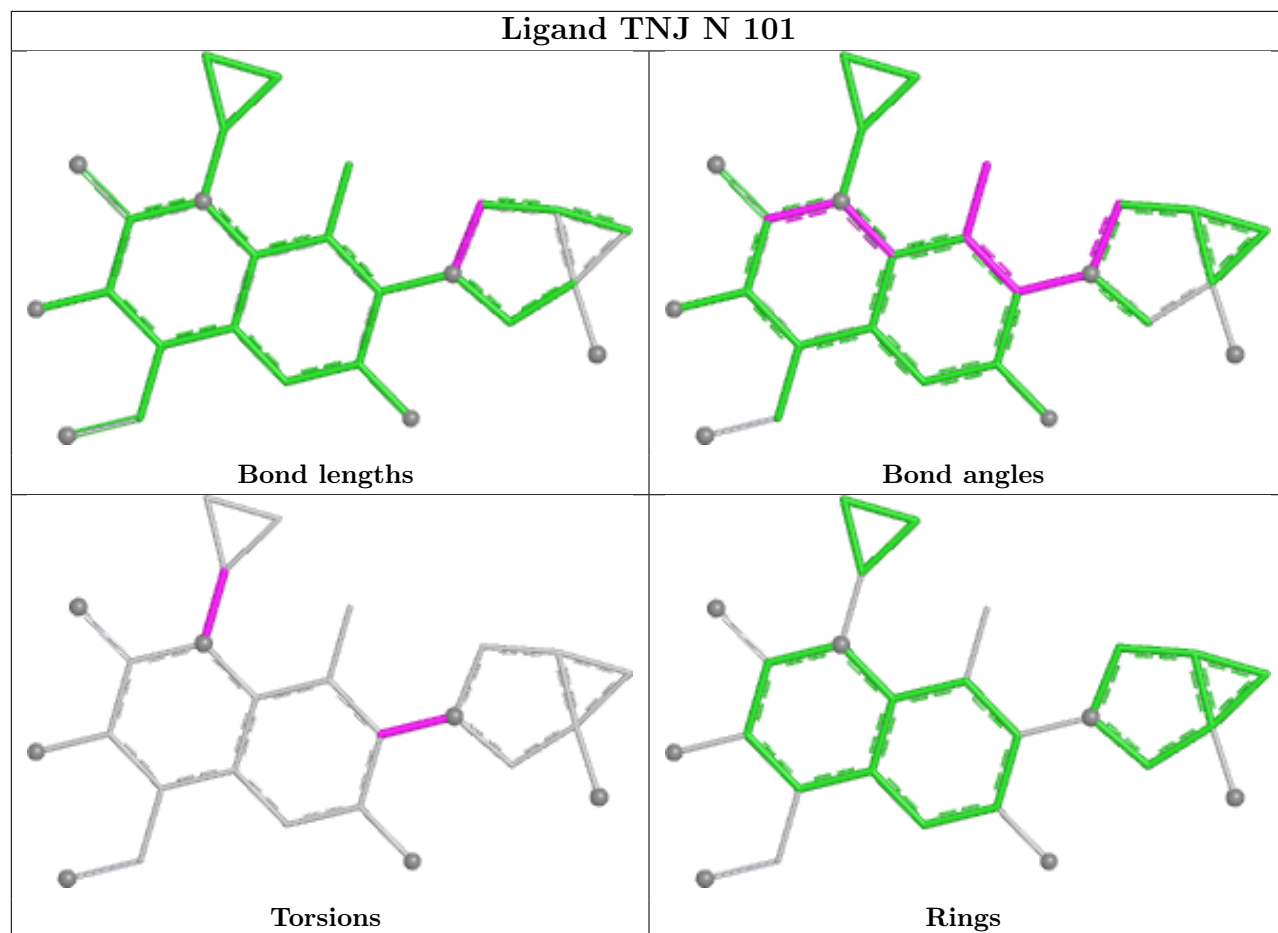
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	H	1502	MPD	2	0
4	B	1501	MPD	1	0
7	N	102	TNJ	1	0

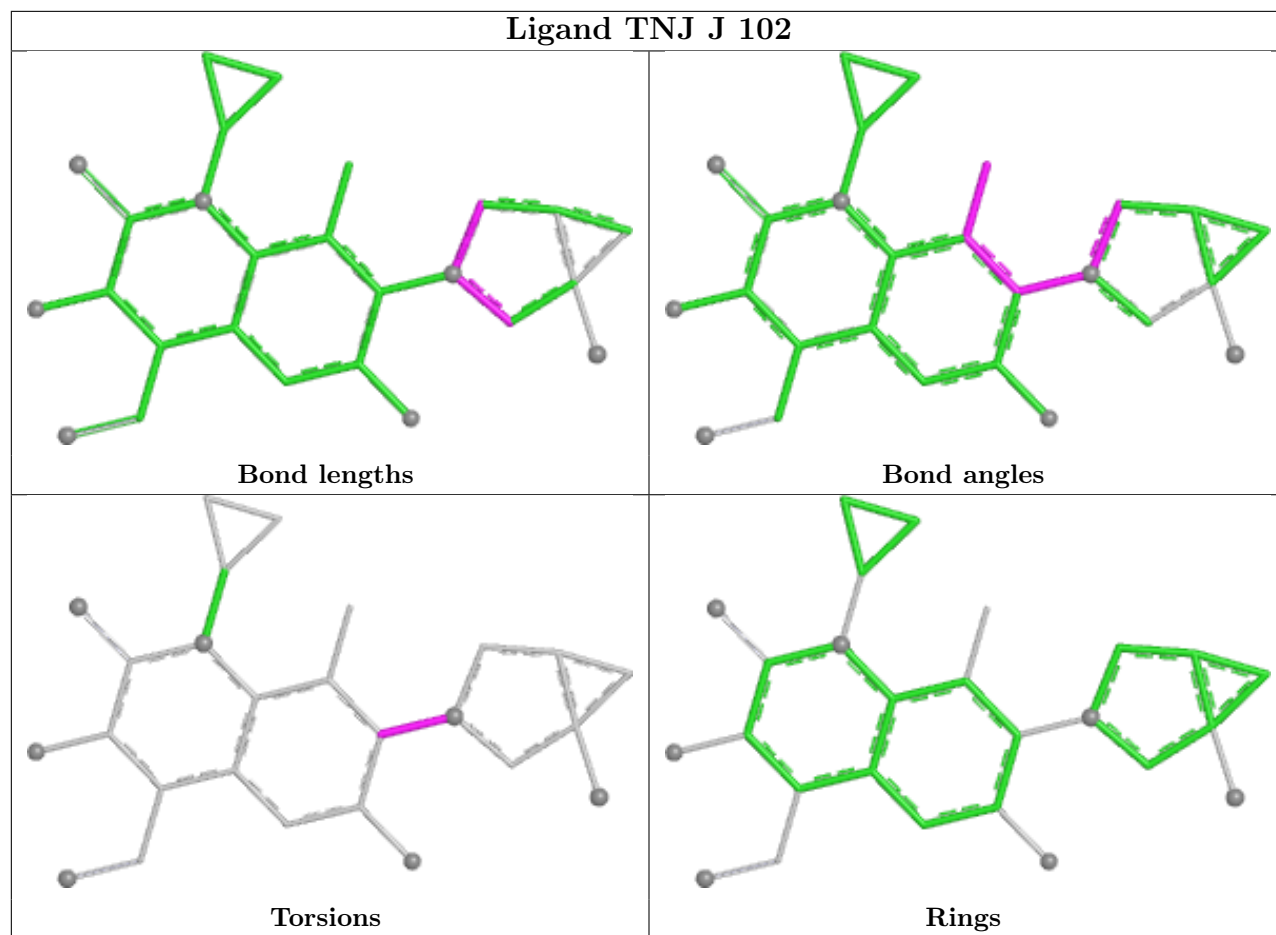
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths,

bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.









5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data i

6.1 Protein, DNA and RNA chains i

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	B	701/743 (94%)	0.36	17 (2%) 59 44	36, 71, 120, 148	0
1	D	636/743 (85%)	1.18	101 (15%) 6 4	74, 133, 173, 201	0
1	F	706/743 (95%)	0.37	28 (3%) 43 29	38, 70, 125, 154	0
1	H	655/743 (88%)	0.64	48 (7%) 22 16	48, 102, 156, 189	0
2	I	9/11 (81%)	0.30	0 100 100	59, 65, 137, 156	0
2	L	10/11 (90%)	0.72	0 100 100	105, 134, 221, 248	0
2	M	11/11 (100%)	0.19	0 100 100	52, 62, 114, 135	0
2	P	9/11 (81%)	0.24	0 100 100	83, 102, 155, 183	0
3	J	14/15 (93%)	0.30	0 100 100	62, 94, 114, 120	0
3	K	15/15 (100%)	1.01	1 (6%) 25 17	104, 128, 248, 251	0
3	N	15/15 (100%)	0.42	0 100 100	61, 78, 117, 124	0
3	O	13/15 (86%)	0.59	0 100 100	98, 112, 190, 212	0
All	All	2794/3076 (90%)	0.62	195 (6%) 24 17	36, 92, 157, 251	0

All (195) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	592	ILE	6.1
1	D	1408	GLY	4.7
1	D	1397	ASP	4.5
1	D	1316	PHE	4.4
1	D	1015	GLU	4.2
1	D	577	GLU	4.2
1	F	539	ALA	4.0
1	F	601	THR	4.0
1	D	528	TYR	3.9
1	D	1276	ASN	3.9
1	D	1174	VAL	3.9

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Mol	Chain	Res	Type	RSRZ
1	B	1481	HIS	3.8
1	H	530	ILE	3.8
1	D	1211	GLN	3.8
1	D	590	LEU	3.8
1	D	476	ASP	3.7
1	D	1188	VAL	3.7
1	D	1017	ALA	3.6
1	D	1481	HIS	3.6
1	D	487	CYS	3.6
1	H	492	ALA	3.6
1	D	1010	LEU	3.6
1	D	1447	LEU	3.5
1	B	1397	ASP	3.4
1	H	446	LEU	3.4
1	D	1014	THR	3.4
1	D	1405	SER	3.4
1	D	1330	ASN	3.3
1	H	454	ASP	3.3
1	D	507	PHE	3.2
1	F	598	GLN	3.2
1	D	1187	GLU	3.2
1	D	1013	PHE	3.2
1	D	1008	LEU	3.2
1	D	1170	THR	3.2
1	F	594	ASP	3.2
1	D	471	ILE	3.2
1	D	1346	ILE	3.1
1	D	1028	ASP	3.1
1	H	1271	ALA	3.1
1	D	1244	VAL	3.1
1	H	592	ILE	3.1
1	H	1282	VAL	3.0
1	D	475	SER	3.0
1	D	486	ILE	3.0
1	D	1227	GLU	3.0
1	D	1224	SER	3.0
1	F	1006	GLU	2.9
1	H	1197	GLU	2.9
1	B	475	SER	2.9
1	F	1088	LEU	2.9
1	H	594	ASP	2.9
1	H	1320	ASP	2.9

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Mol	Chain	Res	Type	RSRZ
1	H	411	ASN	2.9
1	H	568	GLY	2.9
1	D	606	MET	2.9
1	H	486	ILE	2.8
1	H	1292	GLU	2.8
1	D	411	ASN	2.8
1	F	482	ARG	2.8
1	D	1218	GLU	2.8
1	D	1069	ASP	2.8
1	H	1028	ASP	2.8
1	D	448	THR	2.8
1	D	540	LEU	2.7
1	D	1175	GLY	2.7
1	D	594	ASP	2.7
1	H	1239	VAL	2.7
1	B	601	THR	2.7
1	D	1264	ALA	2.7
1	F	1020	ASN	2.7
1	F	513	THR	2.7
1	D	1260	GLN	2.7
1	H	537	TYR	2.7
1	F	567	LEU	2.6
1	D	1273	GLN	2.6
1	B	493	ASP	2.6
1	F	481	LEU	2.6
1	D	584	THR	2.6
1	F	574	GLN	2.6
1	H	1273	GLN	2.6
1	D	1172	ILE	2.6
1	H	497	LEU	2.6
1	D	615	ASP	2.6
1	D	501	THR	2.6
1	H	1278	LYS	2.6
1	D	1417	ILE	2.6
1	B	508	VAL	2.6
1	F	479	SER	2.6
1	D	1171	GLY	2.5
1	F	579	THR	2.5
1	H	1297	LEU	2.5
1	B	568	GLY	2.5
1	F	452	SER	2.5
1	H	448	THR	2.5

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Mol	Chain	Res	Type	RSRZ
1	D	472	ASP	2.5
1	H	1290	ASP	2.5
1	B	401	LYS	2.5
1	B	1344	LEU	2.5
1	B	406	THR	2.5
1	D	454	ASP	2.5
1	D	1018	TYR	2.5
1	D	1161	LEU	2.4
1	D	1242	ARG	2.4
1	H	583	ASN	2.4
1	F	603	ILE	2.4
1	F	1069	ASP	2.4
1	D	513	THR	2.4
1	H	598	GLN	2.4
1	D	1007	ARG	2.4
1	H	1131	LEU	2.4
1	H	1293	ASN	2.4
1	H	1481	HIS	2.4
1	F	470	GLY	2.4
1	D	500	ALA	2.4
1	F	1128	TYR	2.3
1	D	1065	ARG	2.3
1	D	485	LYS	2.3
1	H	1279	LEU	2.3
1	D	447	ASN	2.3
1	H	1069	ASP	2.3
1	F	465	ILE	2.3
1	D	614	GLU	2.3
1	D	1234	ASN	2.3
1	D	1441	GLU	2.3
1	H	1156	MET	2.3
1	H	1470	ASP	2.3
1	D	1030	ALA	2.3
1	H	1006	GLU	2.3
1	D	474	ASP	2.3
1	D	1445	ASP	2.3
1	H	477	ASP	2.3
1	B	539	ALA	2.3
1	D	508	VAL	2.3
1	D	1366	LEU	2.3
1	F	472	ASP	2.2
1	D	541	THR	2.2

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Mol	Chain	Res	Type	RSRZ
1	D	578	THR	2.2
1	H	1359	ARG	2.2
1	D	401	LYS	2.2
1	D	505	ALA	2.2
3	K	26	DA	2.2
1	B	1398	GLU	2.2
1	D	488	ILE	2.2
1	D	1259	HIS	2.2
1	F	1094	SER	2.2
1	H	1255	THR	2.2
1	D	429	GLN	2.2
1	D	1081	ALA	2.2
1	D	1433	ILE	2.2
1	D	565	LYS	2.2
1	D	1169	THR	2.2
1	D	539	ALA	2.2
1	F	488	ILE	2.2
1	D	588	VAL	2.2
1	B	1192	ALA	2.2
1	D	1270	ILE	2.2
1	D	1367	GLU	2.2
1	D	1353	PHE	2.2
1	D	1196	ILE	2.1
1	H	487	CYS	2.1
1	F	595	GLU	2.1
1	H	1430	GLU	2.1
1	H	1245	TRP	2.1
1	D	1131	LEU	2.1
1	D	1271	ALA	2.1
1	D	1395	THR	2.1
1	H	1272	ALA	2.1
1	D	589	GLN	2.1
1	H	409	ASP	2.1
1	H	474	ASP	2.1
1	D	563	ARG	2.1
1	F	419	GLU	2.1
1	D	608	LEU	2.1
1	H	1170	THR	2.1
1	D	1480	LEU	2.1
1	F	487	CYS	2.1
1	D	622	GLU	2.1
1	H	1196	ILE	2.1

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Mol	Chain	Res	Type	RSRZ
1	H	1270	ILE	2.1
1	B	579	THR	2.1
1	B	1279	LEU	2.1
1	D	1338	PRO	2.1
1	D	1222	ILE	2.0
1	D	1168	GLY	2.0
1	H	1008	LEU	2.0
1	D	1369	VAL	2.0
1	F	1282	VAL	2.0
1	B	603	ILE	2.0
1	F	1310	GLN	2.0
1	D	497	LEU	2.0
1	H	1465	LEU	2.0
1	B	1020	ASN	2.0
1	H	606	MET	2.0
1	D	624	GLY	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [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
1	PTR	D	1120	16/17	0.86	0.13	77,84,89,91	0
1	PTR	H	1120	16/17	0.89	0.13	68,77,82,85	0
1	PTR	B	1120	16/17	0.90	0.12	55,83,86,88	0
1	PTR	F	1120	16/17	0.91	0.12	57,76,78,79	0

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

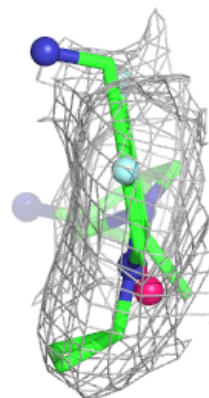
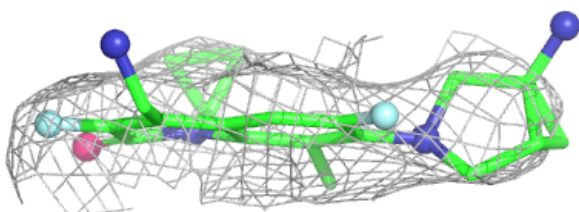
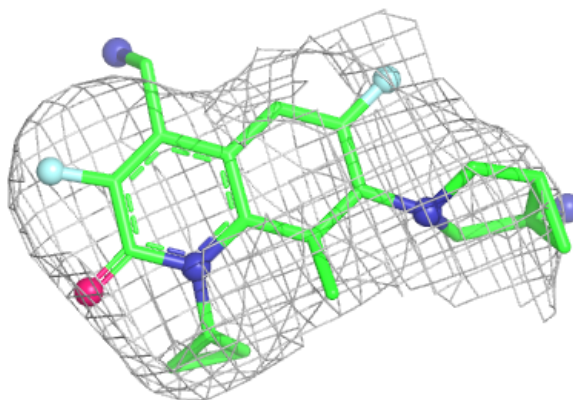
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
5	MG	H	1503	1/1	0.49	0.26	84,84,84,84	0
4	MPD	H	1502	8/8	0.58	0.23	12,12,69,69	0
4	MPD	B	1501	8/8	0.63	0.17	78,87,92,92	0
5	MG	D	1502	1/1	0.68	0.33	87,87,87,87	0
4	MPD	D	1501	8/8	0.78	0.24	82,85,93,96	0
5	MG	F	1503	1/1	0.79	0.26	64,64,64,64	0
5	MG	B	1504	1/1	0.80	0.25	71,71,71,71	0
4	MPD	F	1501	8/8	0.81	0.16	51,61,68,71	0
4	MPD	B	1502	8/8	0.81	0.16	12,12,76,76	0
5	MG	L	101	1/1	0.82	0.33	82,82,82,82	0
7	TNJ	J	102	26/26	0.82	0.17	121,122,122,123	0
4	MPD	H	1501	8/8	0.84	0.18	48,61,86,89	0
5	MG	F	1502	1/1	0.84	0.23	29,29,29,29	0
7	TNJ	J	101	26/26	0.85	0.15	72,77,83,83	0
7	TNJ	N	101	26/26	0.86	0.15	92,98,107,109	0
7	TNJ	N	102	26/26	0.88	0.14	74,78,84,86	0
5	MG	F	1504	1/1	0.89	0.26	30,30,30,30	0
5	MG	O	101	1/1	0.92	0.22	66,66,66,66	0
6	CL	B	1505	1/1	0.92	0.06	64,64,64,64	0
5	MG	I	101	1/1	0.93	0.29	39,39,39,39	0
5	MG	M	101	1/1	0.93	0.27	34,34,34,34	0
6	CL	H	1504	1/1	0.96	0.09	62,62,62,62	0
5	MG	B	1503	1/1	0.97	0.22	35,35,35,35	0

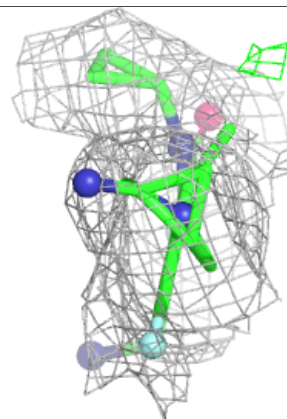
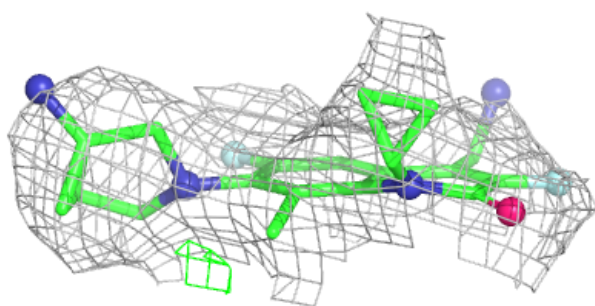
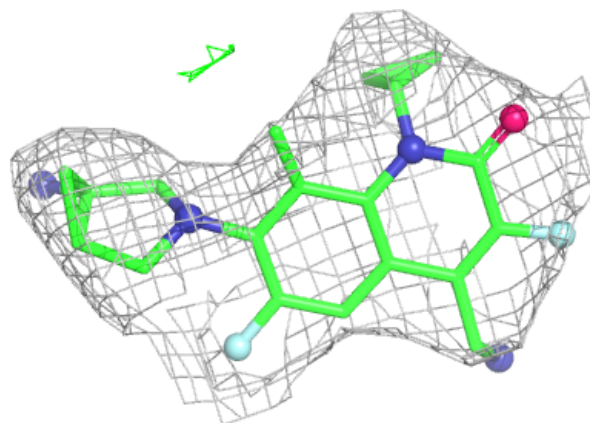
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around TNJ J 102:

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

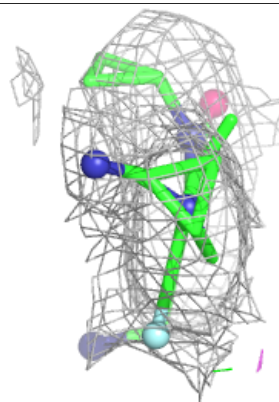
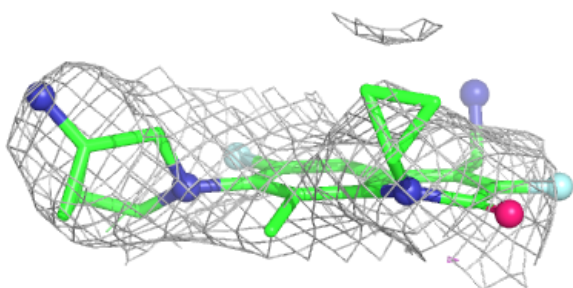
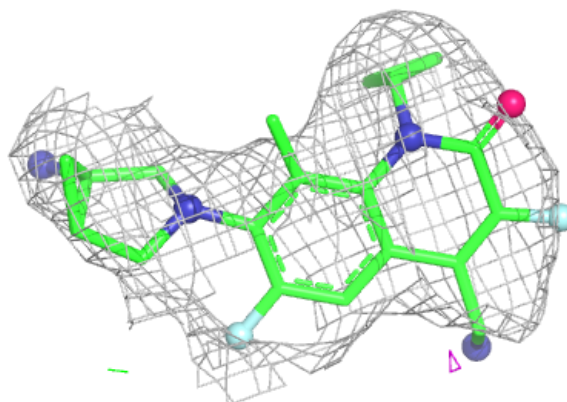
**Electron density around TNJ J 101:**

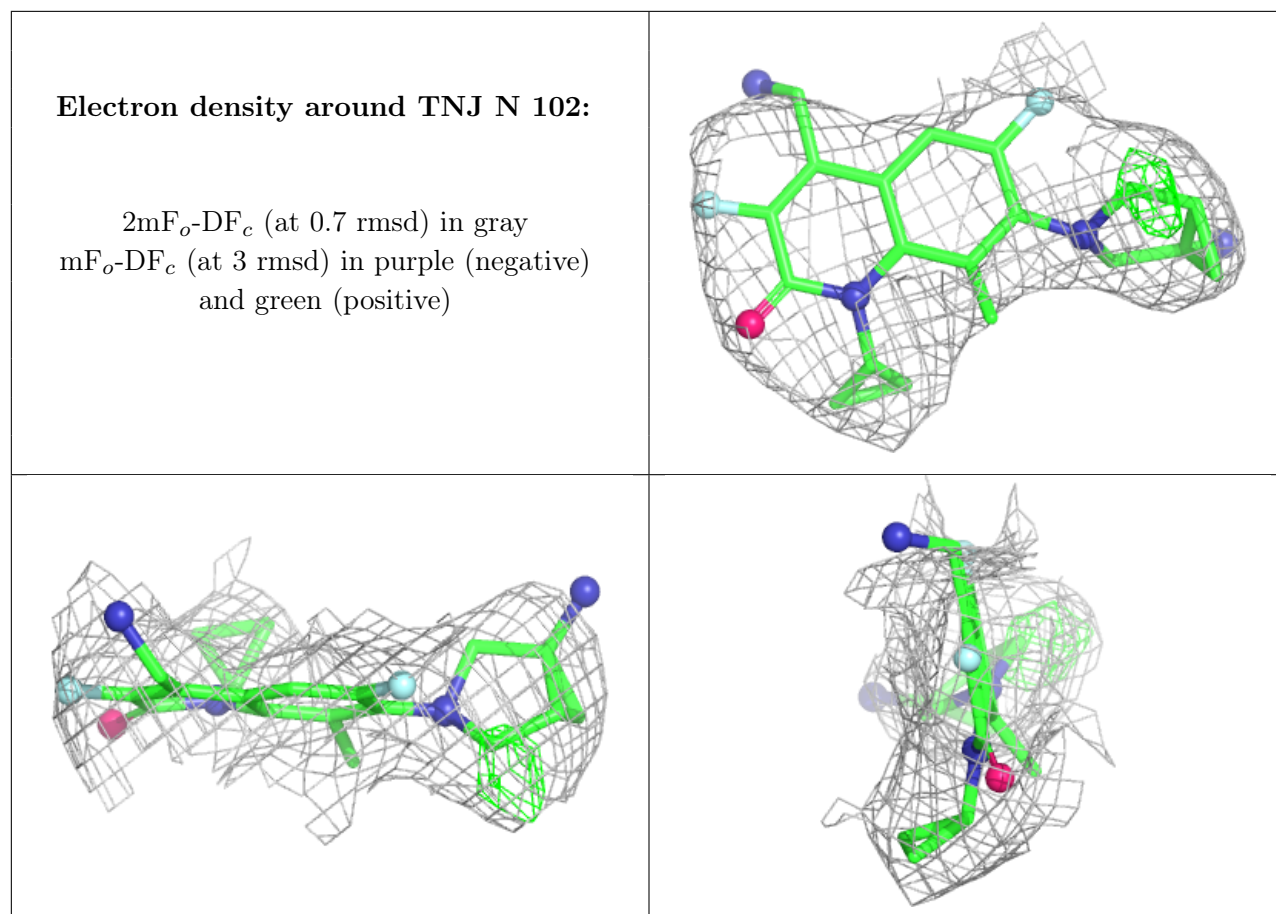
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around TNJ N 101:

$2mF_o-DF_c$ (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.