



# wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 5, 2026 – 11:14 AM UTC

PDB ID : 7RIP / pdb\_00007rip  
Title : RNA polymerase II elongation complex with hairpin polyamide Py-Im 1, scaffold 1 soaked with CTP  
Authors : Oh, J.; Dervan, P.B.; Wang, D.  
Deposited on : 2021-07-20  
Resolution : 3.30 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4-5-2 with Phenix2.0  
Mogul : 2022.3.0, CSD as543be (2022)  
Xtriage (Phenix) : 2.0  
EDS : 3.0  
Buster-report : wwPDB partial adaption of 1.1.7 (2018)  
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)  
CCP4 : 9.0.010 (Gargrove)  
Density-Fitness : 1.0.12  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.49

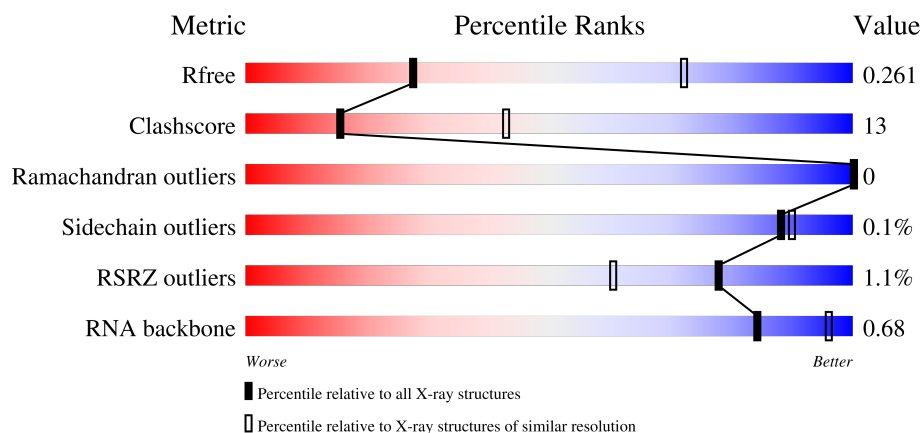
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.30 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	180053	1169 (3.32-3.28)
Clashscore	190562	1209 (3.32-3.28)
Ramachandran outliers	187476	1188 (3.32-3.28)
Sidechain outliers	187428	1187 (3.32-3.28)
RSRZ outliers	180081	1169 (3.32-3.28)
RNA backbone	3983	1048 (3.60-3.00)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . 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	R	10	 70% 30%
2	T	30	 27% 60% 13%
3	N	20	 40% 30% 30%
4	A	1733	 54% 25% 20%

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Mol	Chain	Length	Quality of chain
5	B	1224	<div><div><div></div><div></div><div></div></div><div><div>%</div><div>63%</div><div>29%</div><div>8%</div></div></div>
6	C	318	<div><div><div></div><div></div><div></div></div><div><div></div><div>59%</div><div>24%</div><div>16%</div></div></div>
7	E	215	<div><div><div></div><div></div><div></div></div><div><div>2%</div><div>72%</div><div>27%</div><div>.</div></div></div>
8	F	155	<div><div><div></div><div></div><div></div></div><div><div></div><div>45%</div><div>11%</div><div>45%</div></div></div>
9	H	146	<div><div><div></div><div></div><div></div></div><div><div>%</div><div>62%</div><div>29%</div><div>9%</div></div></div>
10	I	122	<div><div><div></div><div></div><div></div></div><div><div>%</div><div>75%</div><div>21%</div><div>.</div></div></div>
11	J	70	<div><div><div></div><div></div><div></div></div><div><div>%</div><div>56%</div><div>37%</div><div>7%</div></div></div>
12	K	120	<div><div><div></div><div></div><div></div></div><div><div>%</div><div>70%</div><div>25%</div><div>5%</div></div></div>
13	L	70	<div><div><div></div><div></div><div></div></div><div><div>%</div><div>46%</div><div>16%</div><div>39%</div></div></div>

## 2 Entry composition

There are 17 unique types of molecules in this entry. The entry contains 29193 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 RNA chain called RNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	R	10	Total	C	N	O	P	0	0	0
			215	97	43	66	9			

- Molecule 2 is a DNA chain called Template strand DNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	T	26	Total	C	N	O	P	0	0	0
			525	252	84	163	26			

- Molecule 3 is a DNA chain called Non-template strand DNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	N	14	Total	C	N	O	P	0	0	0
			293	138	63	78	14			

- Molecule 4 is a protein called DNA-directed RNA polymerase II subunit RPB1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	A	1384	Total	C	N	O	S	0	0	0
			10824	6829	1895	2040	60			

- Molecule 5 is a protein called DNA-directed RNA polymerase II subunit RPB2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	B	1129	Total	C	N	O	S	0	0	0
			8899	5630	1561	1655	53			

- Molecule 6 is a protein called DNA-directed RNA polymerase II subunit RPB3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
6	C	267	Total	C	N	O	S	0	0	0
			2101	1320	349	419	13			

- Molecule 7 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
7	E	212	Total	C	N	O	S	0	0	0
			1731	1100	305	315	11			

- Molecule 8 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
8	F	86	Total	C	N	O	S	0	0	0
			684	437	115	129	3			

- Molecule 9 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
9	H	133	Total	C	N	O	S	0	0	0
			1064	670	179	211	4			

- Molecule 10 is a protein called DNA-directed RNA polymerase II subunit RPB9.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
10	I	118	Total	C	N	O	S	0	0	0
			952	585	173	184	10			

- Molecule 11 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
11	J	65	Total	C	N	O	S	0	0	0
			532	339	93	94	6			

- Molecule 12 is a protein called DNA-directed RNA polymerase II subunit RPB11.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
12	K	114	Total	C	N	O	S	0	0	0
			919	590	156	171	2			

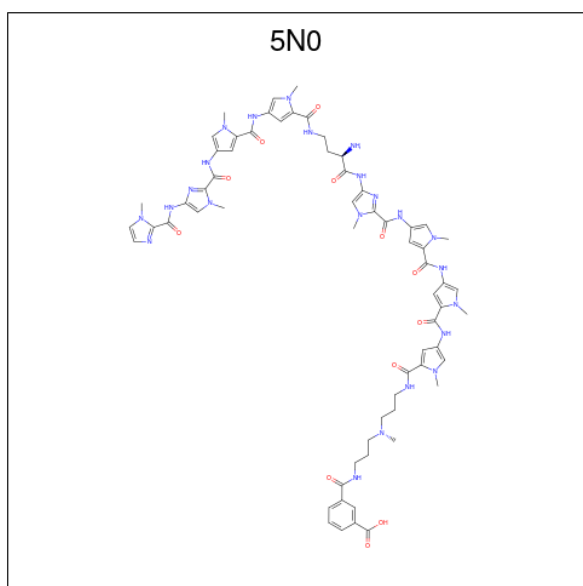
- Molecule 13 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
13	L	43	Total	C	N	O	S	0	0	0
			337	208	66	59	4			

- Molecule 14 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
14	R	1	Total	Mg	0	0
			1	1		

- Molecule 15 is 3-({3-[(3-[(4-[(4-[(2R)-2-amino-4-[(1-methyl-4-[(1-methyl-4-[(1-methyl-4-[(1-methyl-1H-imidazole-2-carbonyl)amino]-1H-imidazole-2-carbonyl]amino)-1H-pyrrole-2-carbonyl]amino)-1H-pyrrole-2-carbonyl]amino]butanoyl}amino)-1-methyl-1H-imidazole-2-carbonyl]amino)-1-methyl-1H-pyrrole-2-carbonyl]amino)-1-methyl-1H-pyrrole-2-carbonyl]amino}propyl)(methyl)amino]propyl}carbamoyl)benzoic acid (CCD ID: 5N0) (formula: C<sub>64</sub>H<sub>75</sub>N<sub>23</sub>O<sub>12</sub>) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
15	T	1	Total	C	N	O	0	0
			99	64	23	12		

- Molecule 16 is ZINC ION (CCD ID: ZN) (formula: Zn).

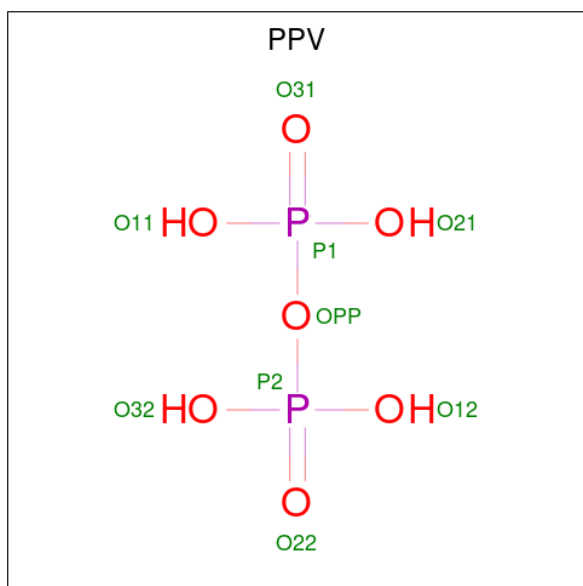
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
16	A	2	Total	Zn	0	0
			2	2		
16	B	1	Total	Zn	0	0
			1	1		
16	C	1	Total	Zn	0	0
			1	1		
16	I	2	Total	Zn	0	0
			2	2		
16	J	1	Total	Zn	0	0
			1	1		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
16	L	1	Total	Zn	0	0
			1	1		

- Molecule 17 is PYROPHOSPHATE (CCD ID: PPV) (formula:  $\text{H}_4\text{O}_7\text{P}_2$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
17	B	1	Total	O	P	0	0
			9	7	2		



- Molecule 1: RNA

DC	DC	DC	DC	T3	C7	T8	C9	T10	G11	G12	T13	C14	A15	T16	G17	A18	G19	C20	C21	T22	C25	G26	A27	T28	DG
----	----	----	----	----	----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----

DG		A4		C8		G15		DG
DT				C9		A16		DG
DC				A10		A17		DG
				G11				

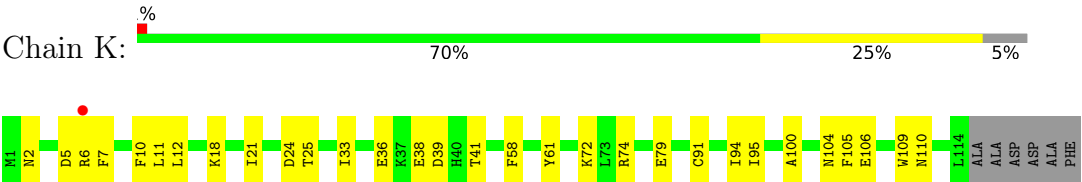
H286	H287	A288	L296	F298	H299	M304	D305	N306	G310	Q311	P312	Q313	K323	S324	R325	R326	A327	R328	L329	K332	R335	I336	M341	R344	T351	V352	I353	P357	N358	L359	S369	T373	L374	E378	V379	V380	N384	R387	L391	H399	A400																
S184	W185	K186	LVS	ASP	ARG	ALA	THR	GLY	ASP	ALA	ASP	GLU	PRO	GLU	L199	L208	K212	H213	D218	L222	P231	M234	L235	L236	T237	C238	L239	P240	P243	P244	P245	V246	R247	P248	S249	ILE	SER	PHE	ASN	GLU	SER	GLN	L262	D268	L269	L276	D385										
F91	A97	K98	I99	K100	K101	V102	E103	E104	G105	C106	C107	M108	H109	G110	G111	K112	L113	E117	E120	L121	M122	R123	Q124	A125	L126	A127	I128	L53	R134	D151	V152	P153	L65	SER	GLU	ASP	ASP	PRO	THR	GLN	L161	V162	S163	R164	C167	G168	Q171	C182									
MET	VAL	G3	Q4	Q5				E16	V17		F22	S23	P24		R28	K34		T40	M41	D42	E43	T44	Q45	T46	R47	A48	K49	I50		N54	D55	P56	R57	L58	G59	S60		R63	O64	L65	K66	C67	Q68	T69	C70		M74	N75	E76		H83	I84	D85	L86	A87		V90



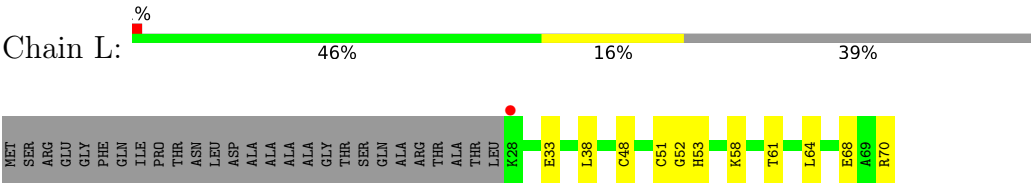








● Molecule 13: DNA-directed RNA polymerases I, II, and III subunit RPABC4



## 4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	168.16Å 223.04Å 193.46Å 90.00° 100.67° 90.00°	Depositor
Resolution (Å)	49.23 – 3.30 49.23 – 3.30	Depositor EDS
% Data completeness (in resolution range)	99.9 (49.23-3.30) 99.8 (49.23-3.30)	Depositor EDS
$R_{merge}$	0.38	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.18 (at 3.33Å)	Xtriage
Refinement program	PHENIX 1.13	Depositor
R, $R_{free}$	0.219 , 0.261 0.220 , 0.261	Depositor DCC
$R_{free}$ test set	2000 reflections (1.85%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	91.0	Xtriage
Anisotropy	0.357	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.29 , 77.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.44$ , $\langle L^2 \rangle = 0.27$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	29193	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	111.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.70% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 5N0, ZN, PPV, MG

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	R	0.18	0/241	0.30	0/375
2	T	0.30	0/584	0.51	0/898
3	N	0.18	0/331	0.33	0/509
4	A	0.24	2/11016 (0.0%)	0.63	12/14902 (0.1%)
5	B	0.21	0/9071	0.44	0/12242
6	C	0.29	1/2139 (0.0%)	0.78	5/2899 (0.2%)
7	E	0.19	0/1767	0.40	0/2378
8	F	0.18	0/696	0.38	0/943
9	H	0.19	0/1082	0.46	0/1466
10	I	0.18	0/970	0.41	0/1308
11	J	0.21	0/541	0.46	0/727
12	K	0.23	0/937	0.44	0/1265
13	L	0.21	0/339	0.47	0/450
All	All	0.23	3/29714 (0.0%)	0.54	17/40362 (0.0%)

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
4	A	0	2
6	C	0	2
All	All	0	4

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	1004	ASN	N-CA	6.44	1.54	1.46
4	A	1004	ASN	CA-CB	-5.28	1.43	1.53
6	C	131	HIS	N-CA	5.25	1.53	1.46

The worst 5 of 17 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	64	ASN	CB-CG-OD1	29.59	179.97	120.80
6	C	131	HIS	CB-CG-CD2	-26.12	97.24	131.20
4	A	64	ASN	CB-CG-ND2	-24.65	79.42	116.40
4	A	64	ASN	OD1-CG-ND2	-22.01	100.59	122.60
6	C	131	HIS	N-CA-CB	-14.06	85.34	110.37

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
4	A	1004	ASN	Sidechain
4	A	124	GLN	Sidechain
6	C	130	GLY	Peptide
6	C	131	HIS	Sidechain

## 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	R	215	0	111	2	0
2	T	525	0	297	22	0
3	N	293	0	156	5	0
4	A	10824	0	10869	341	0
5	B	8899	0	8854	270	0
6	C	2101	0	2056	63	0
7	E	1731	0	1758	36	0
8	F	684	0	692	14	0
9	H	1064	0	1029	36	0
10	I	952	0	897	18	0
11	J	532	0	542	22	0
12	K	919	0	929	34	0
13	L	337	0	352	8	0
14	R	1	0	0	0	0
15	T	99	0	0	2	0
16	A	2	0	0	0	0
16	B	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
16	C	1	0	0	0	0
16	I	2	0	0	0	0
16	J	1	0	0	0	0
16	L	1	0	0	0	0
17	B	9	0	0	0	0
All	All	29193	0	28542	771	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 13.

The worst 5 of 771 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)
4:A:1329:THR:HG22	4:A:1331:SER:H	1.09	1.14
4:A:1003:LYS:C	4:A:1004:ASN:HD22	1.58	1.09
4:A:446:ARG:NH1	4:A:447:GLN:O	1.88	1.06
5:B:218:SER:OG	5:B:241:ARG:NH2	1.94	1.00
5:B:345:LYS:HG2	5:B:348:ARG:HH12	1.27	1.00

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	
4	A	1370/1733 (79%)	1290 (94%)	80 (6%)	0	100	100
5	B	1111/1224 (91%)	1057 (95%)	54 (5%)	0	100	100
6	C	265/318 (83%)	253 (96%)	12 (4%)	0	100	100
7	E	210/215 (98%)	198 (94%)	12 (6%)	0	100	100
8	F	84/155 (54%)	81 (96%)	3 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
9	H	129/146 (88%)	119 (92%)	10 (8%)	0	100	100
10	I	116/122 (95%)	112 (97%)	4 (3%)	0	100	100
11	J	63/70 (90%)	62 (98%)	1 (2%)	0	100	100
12	K	112/120 (93%)	107 (96%)	5 (4%)	0	100	100
13	L	41/70 (59%)	41 (100%)	0	0	100	100
All	All	3501/4173 (84%)	3320 (95%)	181 (5%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains ⓘ

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	
4	A	1193/1520 (78%)	1190 (100%)	3 (0%)	86	86
5	B	958/1061 (90%)	957 (100%)	1 (0%)	88	90
6	C	235/274 (86%)	235 (100%)	0	100	100
7	E	193/197 (98%)	193 (100%)	0	100	100
8	F	73/137 (53%)	73 (100%)	0	100	100
9	H	116/128 (91%)	116 (100%)	0	100	100
10	I	110/116 (95%)	110 (100%)	0	100	100
11	J	60/65 (92%)	60 (100%)	0	100	100
12	K	99/102 (97%)	99 (100%)	0	100	100
13	L	37/57 (65%)	37 (100%)	0	100	100
All	All	3074/3657 (84%)	3070 (100%)	4 (0%)	88	90

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	A	64	ASN
4	A	702	LEU

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Mol	Chain	Res	Type
4	A	764	CYS
5	B	1180	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 24 such sidechains are listed below:

Mol	Chain	Res	Type
5	B	1040	ASN
7	E	114	ASN
5	B	1195	HIS
7	E	146	HIS
4	A	966	ASN

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	R	9/10 (90%)	1 (11%)	0

All (1) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	R	10	C

There are no RNA pucker outliers to report.

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

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

## 5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 11 ligands modelled in this entry, 9 are monoatomic - leaving 2 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
17	PPV	B	1301	-	6,8,8	0.77	0	12,13,13	1.02	0
15	5N0	T	101	-	100,107,107	2.81	51 (51%)	115,153,153	1.93	27 (23%)

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
17	PPV	B	1301	-	-	0/6/6/6	-
15	5N0	T	101	-	-	16/92/92/92	0/9/9/9

The worst 5 of 51 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
15	T	101	5N0	C49-N23	8.40	1.47	1.33
15	T	101	5N0	C22-N10	8.14	1.47	1.33
15	T	101	5N0	C56-N25	6.14	1.47	1.33
15	T	101	5N0	C26-N14	6.14	1.47	1.36
15	T	101	5N0	C9-N3	5.74	1.48	1.39

The worst 5 of 27 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
15	T	101	5N0	C16-C11-N7	5.44	128.68	122.78
15	T	101	5N0	N1-C4-N2	-5.21	108.46	111.40
15	T	101	5N0	C29-N15-C30	5.10	109.25	104.64
15	T	101	5N0	C9-N4-C6	4.85	109.03	104.64
15	T	101	5N0	C22-C17-N9	4.83	128.01	122.78

There are no chirality outliers.

5 of 16 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
15	T	101	5N0	C23-C24-C25-C26

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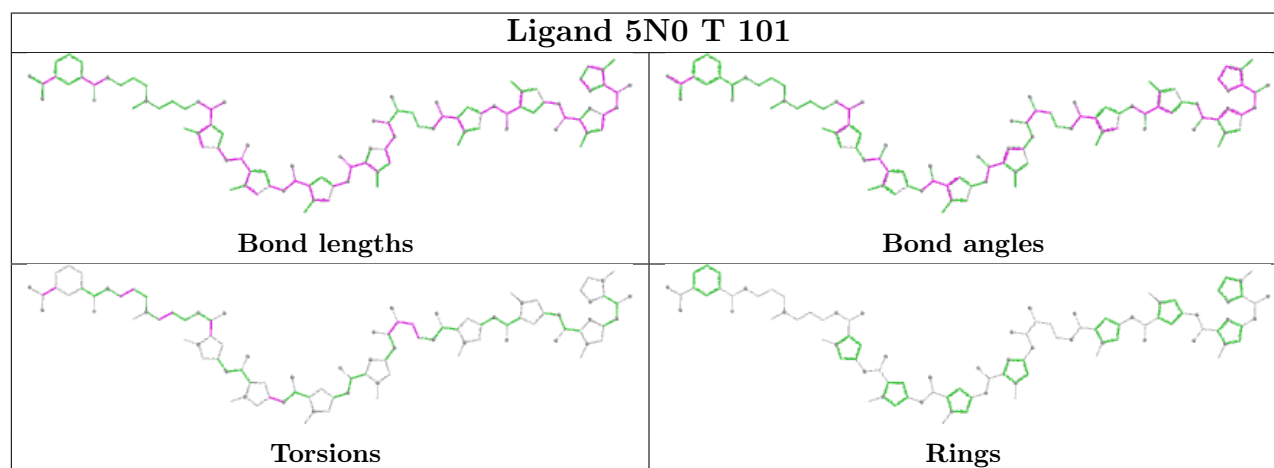
Mol	Chain	Res	Type	Atoms
15	T	101	5N0	N22-C44-C49-N23
15	T	101	5N0	C58-C59-C63-O12
15	T	101	5N0	C60-C59-C63-O12
15	T	101	5N0	C60-C59-C63-O11

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
15	T	101	5N0	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 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 ⓘ

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 [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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	R	10/10 (100%)	-0.33	0 100 100	87, 103, 157, 163	0
2	T	26/30 (86%)	0.32	0 100 100	89, 211, 242, 259	0
3	N	14/20 (70%)	0.19	0 100 100	213, 220, 241, 246	0
4	A	1384/1733 (79%)	-0.04	14 (1%) 79 63	51, 105, 187, 235	0
5	B	1129/1224 (92%)	-0.05	15 (1%) 75 56	50, 88, 153, 189	0
6	C	267/318 (83%)	-0.23	1 (0%) 88 79	59, 88, 128, 156	0
7	E	212/215 (98%)	0.12	4 (1%) 66 48	81, 149, 216, 230	0
8	F	86/155 (55%)	-0.29	0 100 100	74, 107, 153, 189	0
9	H	133/146 (91%)	0.06	1 (0%) 82 68	97, 138, 173, 195	0
10	I	118/122 (96%)	-0.09	1 (0%) 82 68	71, 109, 146, 171	0
11	J	65/70 (92%)	-0.26	1 (1%) 72 53	55, 81, 123, 141	0
12	K	114/120 (95%)	-0.29	1 (0%) 81 65	67, 96, 128, 146	0
13	L	43/70 (61%)	0.32	1 (2%) 61 42	67, 143, 191, 209	0
All	All	3601/4233 (85%)	-0.05	39 (1%) 78 60	50, 101, 182, 259	0

The worst 5 of 39 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
5	B	714	GLU	4.4
9	H	63	LEU	3.7
5	B	446	LEU	3.7
4	A	104	GLU	3.6
4	A	161	LEU	3.5

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

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

### 6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

### 6.4 Ligands [i](#)

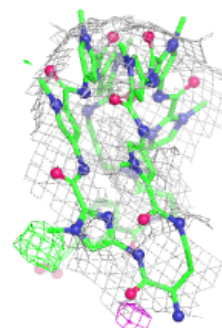
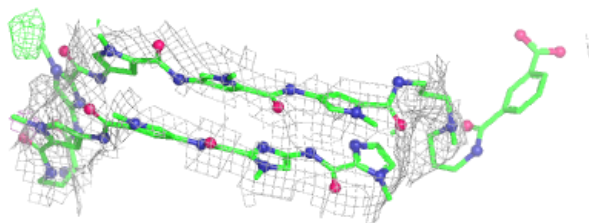
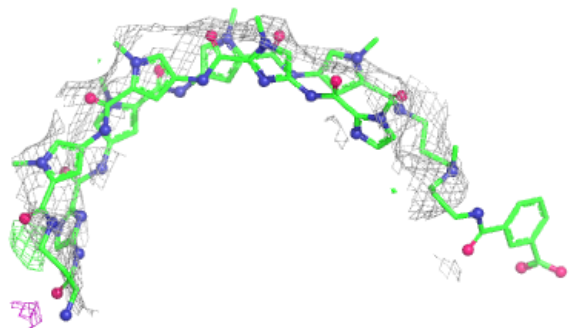
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
17	PPV	B	1301	9/9	0.37	0.14	175,175,175,175	0
15	5N0	T	101	99/99	0.75	0.12	184,225,251,258	0
16	ZN	A	1801	1/1	0.95	0.10	246,246,246,246	0
14	MG	R	2001	1/1	0.95	0.06	106,106,106,106	0
16	ZN	L	101	1/1	0.97	0.07	164,164,164,164	0
16	ZN	B	1302	1/1	0.98	0.04	184,184,184,184	0
16	ZN	I	202	1/1	0.99	0.04	93,93,93,93	0
16	ZN	J	101	1/1	0.99	0.04	77,77,77,77	0
16	ZN	A	1802	1/1	0.99	0.03	153,153,153,153	0
16	ZN	C	401	1/1	0.99	0.03	82,82,82,82	0
16	ZN	I	201	1/1	1.00	0.03	97,97,97,97	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 5N0 T 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.