



wwPDB X-ray Structure Validation Summary Report ⓘ

Aug 27, 2023 – 04:50 AM EDT

PDB ID : 3GTO
Title : Backtracked RNA polymerase II complex with 15mer RNA
Authors : Wang, D.; Bushnell, D.A.; Huang, X.; Westover, K.D.; Levitt, M.; Kornberg, R.D.
Deposited on : 2009-03-27
Resolution : 4.00 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

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
Xtriage (Phenix) : 1.13
EDS : 2.35
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) : 2.35

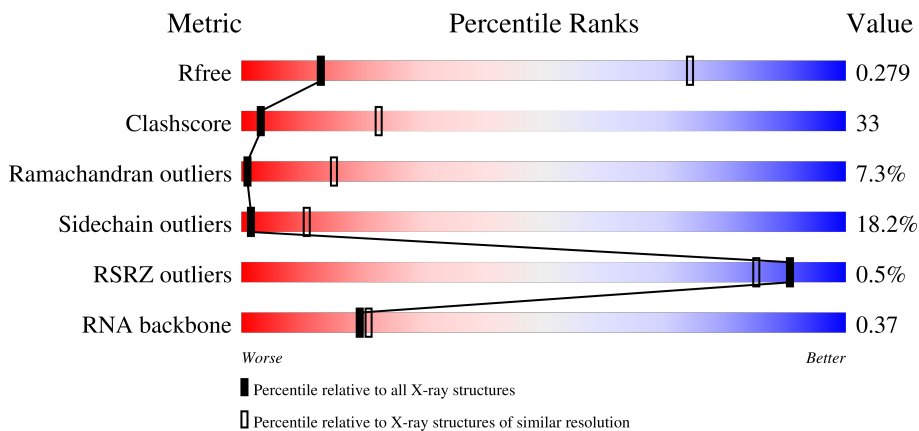
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 4.00 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.



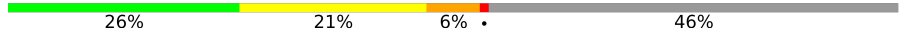
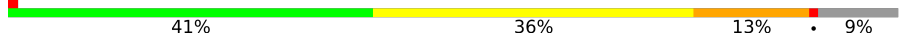

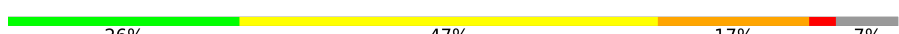
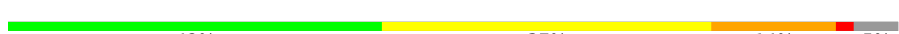

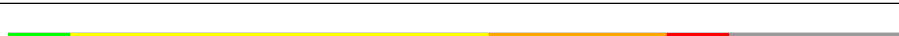
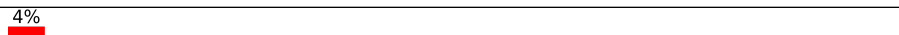
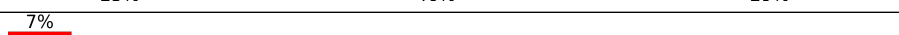
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1087 (4.30-3.70)
Clashscore	141614	1148 (4.30-3.70)
Ramachandran outliers	138981	1108 (4.30-3.70)
Sidechain outliers	138945	1099 (4.30-3.70)
RSRZ outliers	127900	1028 (4.34-3.66)
RNA backbone	3102	1048 (5.00-3.00)

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 ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	1733	 32% 35% 12% • 20%
2	B	1224	 36% 42% 11% • 10%
3	C	318	 34% 39% 9% • 16%
4	E	215	 47% 40% 10% •

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Mol	Chain	Length	Quality of chain
5	F	155	
6	H	146	
7	I	122	
8	J	70	
9	K	120	
10	L	70	
11	R	15	
12	T	28	
13	N	14	

2 Entry composition [i](#)

There are 15 unique types of molecules in this entry. The entry contains 29259 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 DNA-directed RNA polymerase II subunit RPB1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	1395	10969	6917	1923	2068	61	0	0	0

- Molecule 2 is a protein called DNA-directed RNA polymerase II subunit RPB2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	1106	8792	5568	1538	1631	55	0	0	0

- Molecule 3 is a protein called DNA-directed RNA polymerase II subunit RPB3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	C	266	2095	1317	348	417	13	0	0	0

- Molecule 4 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	E	214	1752	1111	309	321	11	0	0	0

- Molecule 5 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
5	F	84	679	434	115	127	3	0	0	0

- Molecule 6 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
6	H	133	1068	673	180	211	4	0	0	0

- Molecule 7 is a protein called DNA-directed RNA polymerase II subunit RPB9.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
7	I	119	971	596	179	186	10	0	0	0

- Molecule 8 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC5.

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

- Molecule 9 is a protein called DNA-directed RNA polymerase II subunit RPB11.

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

- Molecule 10 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
10	L	46	363	224	72	63	4	0	0	0

- Molecule 11 is a RNA chain called RNA (5'-R(*AP*UP*CP*GP*AP*GP*AP*GP*GP*AP*UP*GP*CP*AP*C)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
11	R	12	260	117	52	80	11	0	0	0

- Molecule 12 is a DNA chain called DNA (28-MER).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
12	T	28	566	271	104	164	27	0	0	0

- Molecule 13 is a DNA chain called DNA (5'-D(*CP*TP*GP*CP*TP*TP*AP*TP*CP*GP*GP*TP*AP*G)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
13	N	14	284	137	49	85	13	0	0	0

- Molecule 14 is ZINC ION (three-letter code: ZN) (formula: Zn).

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

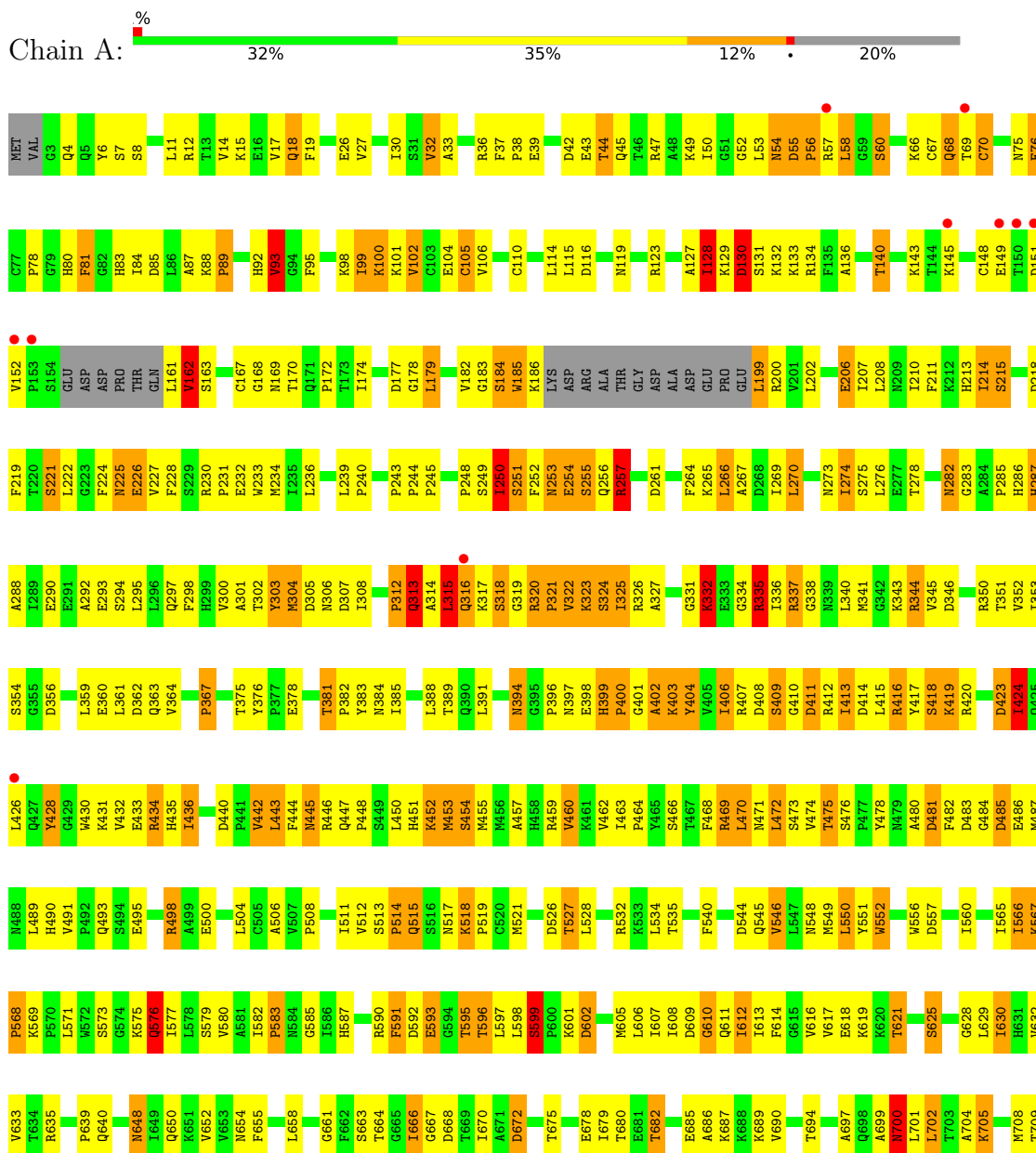
- Molecule 15 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
15	A	1	Total 1	Mg 1	0	0

3 Residue-property plots [i](#)

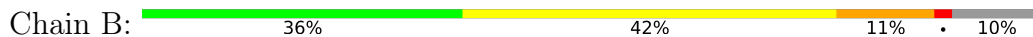
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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.

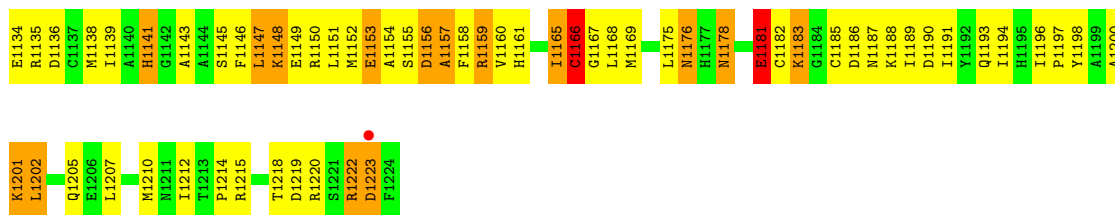
- Molecule 1: DNA-directed RNA polymerase II subunit RPB1



SER	PRO	THR	THR	GLY	G1437	L1370	G1296	H1140	G1070	Q094	G0921	S859	Y792	L710
PRO	SER	SER	SER	SER	Tl438	L1371	E1297	H1144	S1071	E996	D922	L860	S793	R711
THR	PRO	THR	THR	ASN	F1441	V1372	Y1298	K1144	I1072	N996	L923	G861	S794	E712
PRO	THR	THR	THR	ASP	M1444	D1373	K1299	S1146	G1073	N997	K924	G862	S795	S713
THR	PRO	THR	THR	ALA	M1375	M1228	K1300	V1146	E1074	L998	L925	G863	S796	F714
SER	PRO	THR	THR	MET	M1445	M1231	E1301	E1151	M1079	G1002	Q926	G864	S797	F714
THR	THR	THR	THR	ASP	I1445	M1232	E1306	E1154	T1080	K1003	Q927	G865	R720	R720
PRO	THR	THR	THR	GLY	G1379	M1235	E1307	Y1154	T1081	M1004	L928	F866	V800	F721
PRO	THR	THR	THR	GLY	G1380	L1236	T1308	D1156	A1081	E1005	L929	I867	E801	L722
PRO	THR	THR	THR	VAL	V1384	I1237	T1309	P1156	ASN	E1006	D930	G868	N802	K728
PRO	THR	THR	THR	VAL	L1313	I1238	M1312	P1157	THR	I1007	Q931	G869	S803	K728
PRO	THR	THR	THR	LYS	L1314	R1239	S1314	P1158	PHE	I1007	E870	G870	S804	A729
PRO	THR	THR	THR	GLY	E1315	C1240	E1315	R1159	HIS	Q1011	M873	G871	R806	R731
PRO	THR	THR	THR	TYR	V1316	R1241	S1160	T1161	ALA	V1015	D874	G872	G807	L732
PRO	THR	THR	THR	TYR	V1316	V1242	E1316	I1162	VAL	V1016	A875	G873	L808	L736
PRO	THR	THR	THR	ASP	V1319	V1243	I1163	I1163	ALA	L1017	H877	G874	T809	L737
PRO	THR	THR	THR	ASP	P1320	ARG	P1164	I1164	SER	F1018	I878	G875	P810	L740
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PRO	THR	THR	THR	ASP	L1172	LYS	L1172	L1172	K1093	C1020	K880	G877	F813	M741
PRO	THR	THR	THR	GLY	H1173	LEU	L1173	H1173	V1094	L1021	K881	G878	F814	M741
PRO	THR	THR	THR	THR	L1176	LEU	L1176	L1176	V1095	L1022	S882	G879	F815	V743
PRO	THR	THR	THR	THR	ASP	THR	ASP	ASP	T1095	L1022	S883	G880	F816	K744
PRO	THR	THR	THR	THR	GLY	THR	ASP	ASP	V1098	S1024	L883	G881	H816	K744
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	P1099	R1025	D884	G882	A817	Q745
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	R1100	R1029	D949	G883	M818	M746
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	L1101	R1030	G950	G884	R821	S751
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	K1102	V1031	E951	G885	E822	K752
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	E1103	W954	W954	G886	G753	G753
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	I1104	P955	P955	G887	S754	S754
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	L1105	L956	L956	G888	F755	F755
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	M1106	P957	P957	G889	I756	I756
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	V1107	R1036	R1036	G890	R829	R829
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PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	M1111	R1037	R1037	G892	T831	T831
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	Q1187	A1041	A1041	G893	A832	A759
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	Q1188	V1045	V1045	G894	G833	Q760
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	S1115	V1045	V1045	G895	T834	C764
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	L1116	M1048	M1048	G896	R834	V765
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	T1117	I1049	I1049	G897	Y836	G766
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	V1118	E1050	E1050	G898	I837	G767
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	Y1119	A1050	A1050	G899	Q838	Q768
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	L1120	F1053	F1053	G900	R839	R839
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PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	D1127	V1058	V1058	G903	R842	R774
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	Q1128	H1059	H1059	G904	K843	K843
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	E1129	F1060	F1060	G905	A844	A844
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	Q1130	G1061	G1061	G906	L845	L845
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	K1132	E1062	E1062	G907	E846	D761
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PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	L1134	V1064	V1064	G909	L848	T783
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	A1135	G1065	G1065	G910	D849	D849
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	I1138	V1066	V1066	G911	L849	L849
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	E1139	L1067	L1067	G912	L849	L849
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	M1202	A1069	A1069	G913	E846	D761
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	R1215	E1069	E1069	G914	R849	R783
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	I1216	M1063	M1063	G915	L849	L784
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	Q1217	V1063	V1063	G916	D853	L784
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	T1218	G1065	G1065	G917	P785	P785
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	T1219	V1066	V1066	G918	H853	H786
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	F1220	L1067	L1067	G919	T855	F787
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	K1221	A1068	A1068	G920	R856	S788
PRO	THR	THR	THR	THR	THR	THR	ASP	ASP	M1222	E1068	E1068	G921	R857	S788
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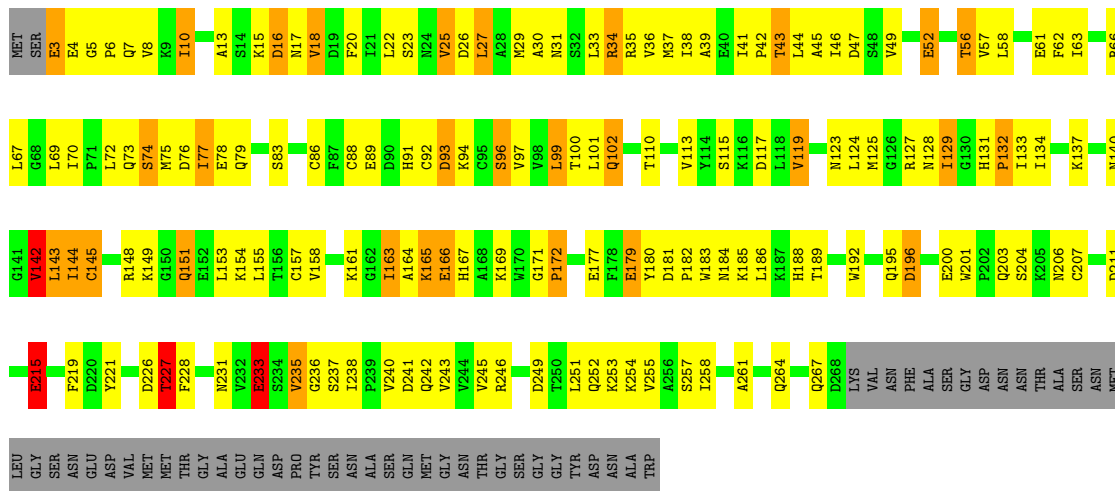
• Molecule 2: DNA-directed RNA polymerase II subunit RPB2





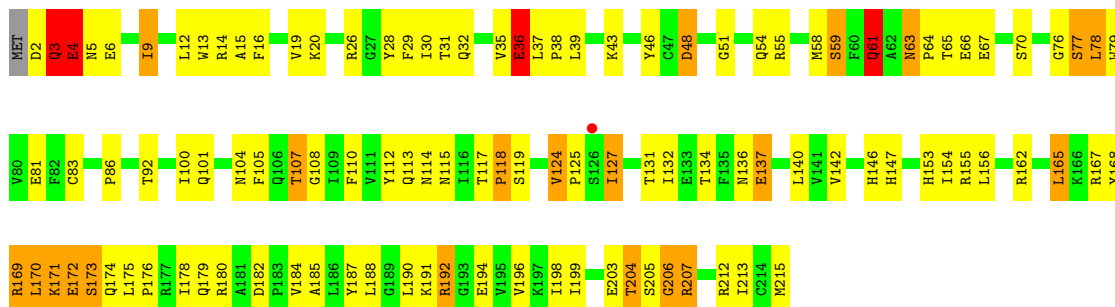
• Molecule 3: DNA-directed RNA polymerase II subunit RPB3

Chain C: 34% 39% 9% 16%



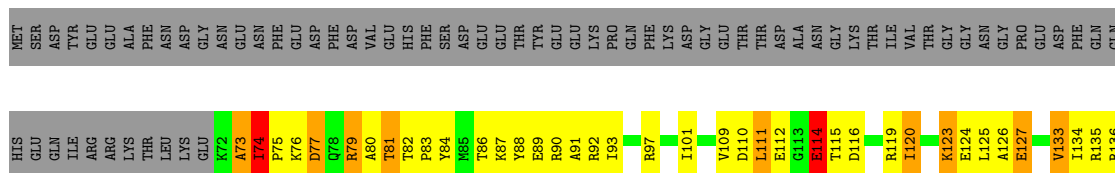
• Molecule 4: DNA-directed RNA polymerases I, II, and III subunit RPABC1

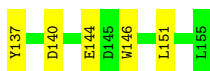
Chain E: 47% 40% 10%



• Molecule 5: DNA-directed RNA polymerases I, II, and III subunit RPABC2

Chain F: 26% 21% 6% 46%





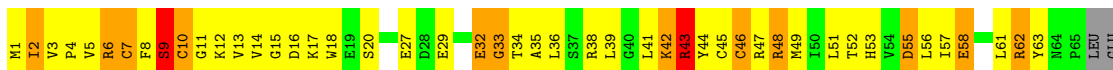
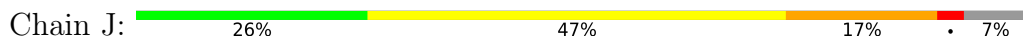
- Molecule 6: DNA-directed RNA polymerases I, II, and III subunit RPABC3



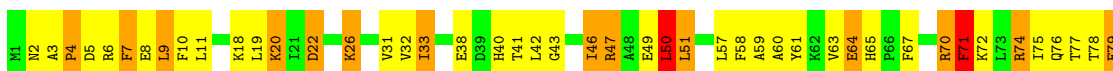
- Molecule 7: DNA-directed RNA polymerase II subunit RPB9



- Molecule 8: DNA-directed RNA polymerases I, II, and III subunit RPABC5



- Molecule 9: DNA-directed RNA polymerase II subunit RPB11

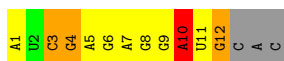
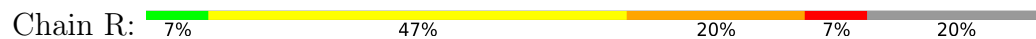


- Molecule 10: DNA-directed RNA polymerases I, II, and III subunit RPABC4





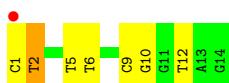
- Molecule 11: RNA (5'-R(*AP*UP*CP*GP*AP*GP*AP*GP*GP*AP*UP*GP*CP*AP*C)-3')



- Molecule 12: DNA (28-MER)



- Molecule 13: DNA (5'-D(*CP*TP*GP*CP*TP*TP*AP*TP*CP*GP*GP*TP*AP*G)-3')



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	170.85Å 222.80Å 194.98Å 90.00° 101.98° 90.00°	Depositor
Resolution (Å)	50.00 – 4.00 49.45 – 4.00	Depositor EDS
% Data completeness (in resolution range)	93.6 (50.00-4.00) 93.6 (49.45-4.00)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.52 (at 4.00Å)	Xtrriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.269 , 0.290 0.264 , 0.279	Depositor DCC
R_{free} test set	2847 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å ²)	109.1	Xtrriage
Anisotropy	0.101	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.24 , 66.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.41$, $\langle L^2 \rangle = 0.24$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.88	EDS
Total number of atoms	29259	wwPDB-VP
Average B, all atoms (Å ²)	125.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.71% 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, ZN

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	1.02	43/11163 (0.4%)	0.81	10/15091 (0.1%)
2	B	1.13	48/8963 (0.5%)	0.88	19/12086 (0.2%)
3	C	1.16	11/2133 (0.5%)	0.84	0/2891
4	E	1.12	9/1788 (0.5%)	0.80	3/2406 (0.1%)
5	F	1.14	3/691 (0.4%)	0.87	0/933
6	H	1.01	3/1086 (0.3%)	0.84	0/1470
7	I	1.26	9/989 (0.9%)	0.95	5/1331 (0.4%)
8	J	1.28	9/541 (1.7%)	0.97	3/727 (0.4%)
9	K	1.08	3/937 (0.3%)	0.80	1/1265 (0.1%)
10	L	1.09	0/365	0.93	0/485
11	R	1.25	1/292 (0.3%)	1.79	5/455 (1.1%)
12	T	1.39	1/634 (0.2%)	1.90	22/975 (2.3%)
13	N	1.83	8/317 (2.5%)	1.67	6/488 (1.2%)
All	All	1.11	148/29899 (0.5%)	0.91	74/40603 (0.2%)

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
3	C	0	1
6	H	0	1
7	I	0	1
All	All	0	3

The worst 5 of 148 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	574	SER	CB-OG	12.89	1.59	1.42
4	E	137	GLU	CD-OE1	11.71	1.38	1.25

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	I	54	GLU	CD-OE1	11.17	1.38	1.25
1	A	1426	GLU	CD-OE1	10.61	1.37	1.25
2	B	598	GLU	CD-OE2	10.45	1.37	1.25

The worst 5 of 74 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
12	T	16	DC	O4'-C4'-C3'	-10.87	99.48	106.00
1	A	1173	HIS	N-CA-C	9.95	137.86	111.00
1	A	1172	LEU	N-CA-C	9.54	136.75	111.00
12	T	16	DC	O4'-C1'-N1	8.87	114.21	108.00
12	T	27	DA	O4'-C4'-C3'	-8.83	100.70	106.00

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	C	172	PRO	Peptide
6	H	136	LYS	Peptide
7	I	77	LYS	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	10969	0	11071	924	0
2	B	8792	0	8824	632	0
3	C	2095	0	2052	131	0
4	E	1752	0	1776	91	0
5	F	679	0	701	45	0
6	H	1068	0	1040	64	0
7	I	971	0	928	46	0
8	J	532	0	544	65	0
9	K	919	0	929	64	0
10	L	363	0	387	21	0
11	R	260	0	132	15	0
12	T	566	0	316	21	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
13	N	284	0	161	5	0
14	A	2	0	0	0	0
14	B	1	0	0	0	0
14	C	1	0	0	1	0
14	I	2	0	0	0	0
14	J	1	0	0	0	0
14	L	1	0	0	1	0
15	A	1	0	0	0	0
All	All	29259	0	28861	1940	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 33.

The worst 5 of 1940 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:A:399:HIS:CG	1:A:400:PRO:HD3	1.44	1.48
1:A:315:LEU:HB2	1:A:316:GLN:C	1.39	1.43
1:A:315:LEU:HB2	1:A:316:GLN:CA	1.51	1.38
1:A:256:GLN:CA	1:A:257:ARG:HB3	1.59	1.30
1:A:1111:MET:CG	1:A:1114:PRO:HG3	1.64	1.27

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	1383/1733 (80%)	1038 (75%)	233 (17%)	112 (8%)	1	13
2	B	1088/1224 (89%)	822 (76%)	188 (17%)	78 (7%)	1	16
3	C	264/318 (83%)	209 (79%)	48 (18%)	7 (3%)	5	34

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	E	212/215 (99%)	162 (76%)	39 (18%)	11 (5%)	2	21
5	F	82/155 (53%)	65 (79%)	13 (16%)	4 (5%)	2	22
6	H	129/146 (88%)	97 (75%)	21 (16%)	11 (8%)	1	12
7	I	117/122 (96%)	83 (71%)	25 (21%)	9 (8%)	1	14
8	J	63/70 (90%)	45 (71%)	14 (22%)	4 (6%)	1	18
9	K	112/120 (93%)	89 (80%)	16 (14%)	7 (6%)	1	18
10	L	44/70 (63%)	24 (54%)	9 (20%)	11 (25%)	0	1
All	All	3494/4173 (84%)	2634 (75%)	606 (17%)	254 (7%)	1	15

5 of 254 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	42	ASP
1	A	54	ASN
1	A	55	ASP
1	A	56	PRO
1	A	93	VAL

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	1218/1520 (80%)	987 (81%)	231 (19%)	1	9
2	B	960/1061 (90%)	790 (82%)	170 (18%)	2	12
3	C	234/274 (85%)	188 (80%)	46 (20%)	1	8
4	E	196/197 (100%)	164 (84%)	32 (16%)	2	15
5	F	74/137 (54%)	63 (85%)	11 (15%)	3	17
6	H	117/128 (91%)	97 (83%)	20 (17%)	2	13
7	I	113/116 (97%)	95 (84%)	18 (16%)	2	16
8	J	60/65 (92%)	48 (80%)	12 (20%)	1	8
9	K	99/102 (97%)	81 (82%)	18 (18%)	1	11

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
10	L	40/57 (70%)	31 (78%)	9 (22%)	1 6
All	All	3111/3657 (85%)	2544 (82%)	567 (18%)	1 11

5 of 567 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	E	107	THR
4	E	192	ARG
4	E	104	ASN
7	I	50	THR
1	A	1235	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 84 such sidechains are listed below:

Mol	Chain	Res	Type
2	B	1211	ASN
6	H	11	GLN
3	C	73	GLN
3	C	203	GLN
7	I	11	ASN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
11	R	11/15 (73%)	3 (27%)	0

All (3) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
11	R	4	G
11	R	10	A
11	R	12	G

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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 9 ligands modelled in this entry, 9 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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	A	1395/1733 (80%)	-0.37	11 (0%) 86 79	76, 116, 186, 214	0
2	B	1106/1224 (90%)	-0.40	2 (0%) 95 93	72, 109, 156, 180	0
3	C	266/318 (83%)	-0.53	0 100 100	83, 106, 145, 154	0
4	E	214/215 (99%)	-0.44	1 (0%) 91 85	104, 151, 192, 196	0
5	F	84/155 (54%)	-0.50	0 100 100	99, 123, 142, 147	0
6	H	133/146 (91%)	-0.25	1 (0%) 86 79	123, 143, 165, 167	0
7	I	119/122 (97%)	-0.47	0 100 100	113, 132, 150, 160	0
8	J	65/70 (92%)	-0.64	0 100 100	77, 94, 126, 131	0
9	K	114/120 (95%)	-0.49	0 100 100	87, 108, 124, 131	0
10	L	46/70 (65%)	-0.26	0 100 100	100, 161, 179, 181	0
11	R	12/15 (80%)	0.10	0 100 100	100, 128, 185, 192	0
12	T	28/28 (100%)	-0.15	1 (3%) 42 34	102, 210, 322, 325	0
13	N	14/14 (100%)	0.23	1 (7%) 16 13	287, 311, 317, 318	0
All	All	3596/4230 (85%)	-0.40	17 (0%) 91 85	72, 116, 181, 325	0

The worst 5 of 17 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	149	GLU	5.0
1	A	1176	LEU	4.3
1	A	150	THR	3.7
1	A	153	PRO	3.0
1	A	316	GLN	2.9

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(\AA^2)	Q<0.9
15	MG	A	1736	1/1	0.80	0.15	92,92,92,92	0
14	ZN	A	1734	1/1	0.90	0.05	212,212,212,212	0
14	ZN	A	1735	1/1	0.97	0.07	155,155,155,155	0
14	ZN	L	105	1/1	0.98	0.05	169,169,169,169	0
14	ZN	I	204	1/1	0.99	0.05	131,131,131,131	0
14	ZN	J	101	1/1	0.99	0.12	93,93,93,93	0
14	ZN	B	1307	1/1	0.99	0.07	158,158,158,158	0
14	ZN	I	203	1/1	0.99	0.05	123,123,123,123	0
14	ZN	C	319	1/1	1.00	0.05	97,97,97,97	0

6.5 Other polymers [i](#)

There are no such residues in this entry.