



wwPDB X-ray Structure Validation Summary Report ⓘ

Aug 26, 2023 – 03:28 PM EDT

PDB ID : 3GTG
Title : Backtracked RNA polymerase II complex with 12mer RNA
Authors : Wang, D.; Bushnell, D.A.; Huang, X.; Westover, K.D.; Levitt, M.; Kornberg, R.D.
Deposited on : 2009-03-27
Resolution : 3.78 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

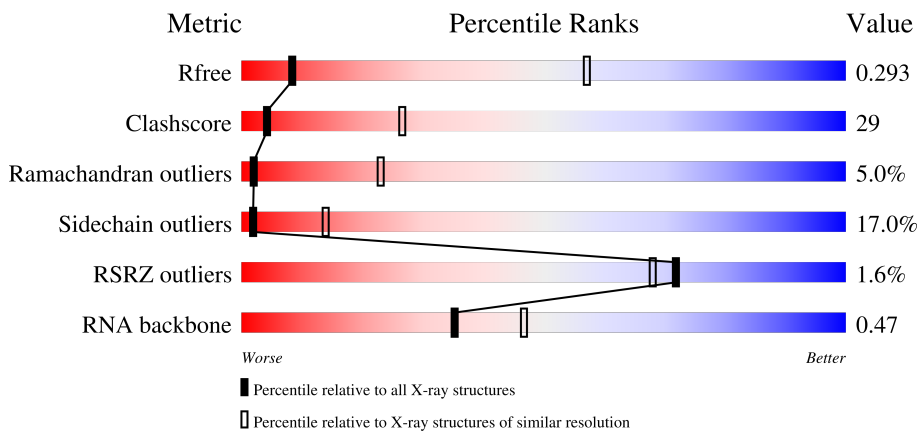
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.78 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.






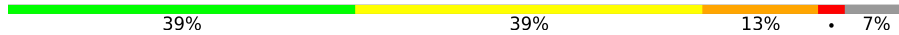


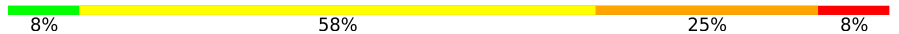
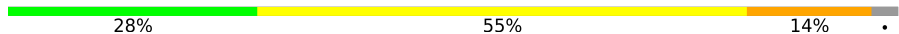

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1038 (3.96-3.60)
Clashscore	141614	1100 (3.96-3.60)
Ramachandran outliers	138981	1062 (3.96-3.60)
Sidechain outliers	138945	1058 (3.96-3.60)
RSRZ outliers	127900	1009 (3.98-3.58)
RNA backbone	3102	1035 (4.52-3.00)

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	 2% 38% 35% 9% 17%
2	B	1224	 2% 41% 42% 10% 6%
3	C	318	 % 36% 37% 11% 15%
4	E	215	 63% 32% 5%

Continued on next page...

Continued from previous page...

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	12	
12	T	29	
13	N	14	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
14	ZN	A	1734	-	-	X	-
14	ZN	B	1307	-	-	X	-
14	ZN	J	101	-	-	X	-

2 Entry composition [i](#)

There are 16 unique types of molecules in this entry. The entry contains 30067 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	1442	11332	7133	1982	2156	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	1153	9167	5794	1604	1713	56	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	271	2135	1344	355	423	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	215	1757	1114	310	322	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	85	684	437	116	128	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	136	1087	684	183	215	5	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*G)-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

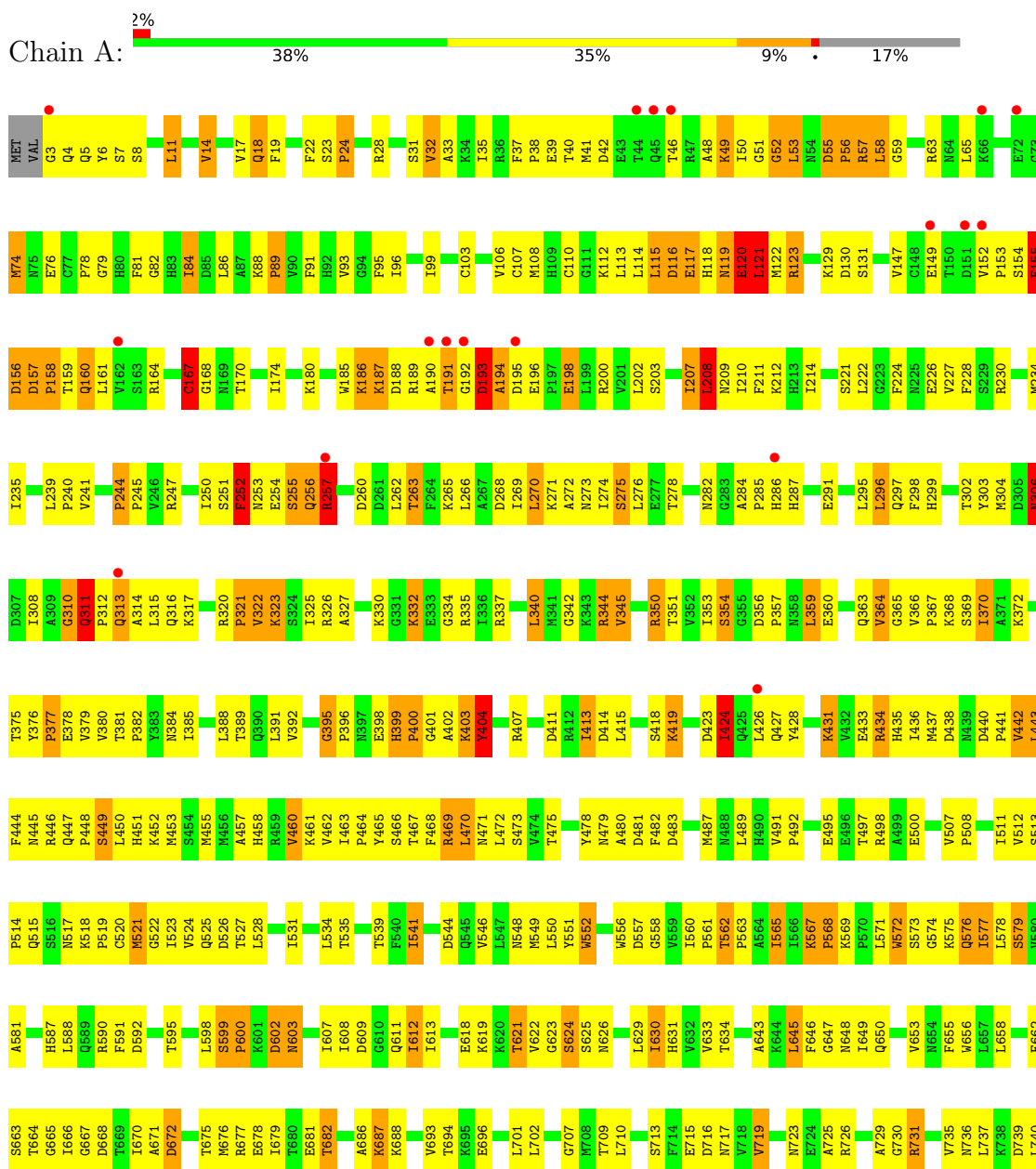
- Molecule 16 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
16	R	1	Total 1	O 1	0	0

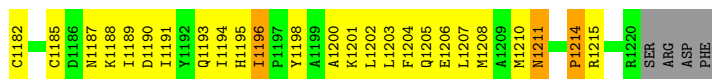
3 Residue-property plots [i](#)

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.

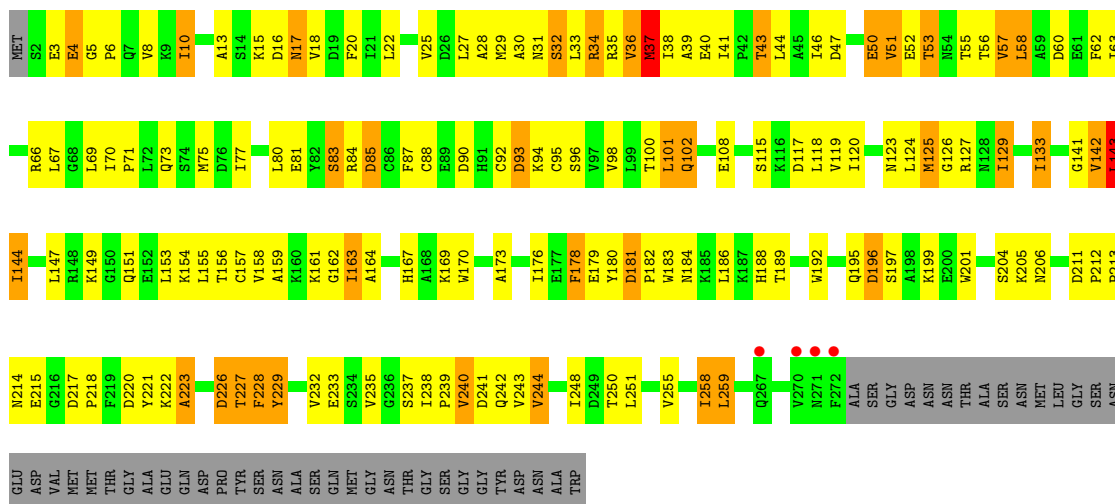
- Molecule 1: DNA-directed RNA polymerase II subunit RPB1



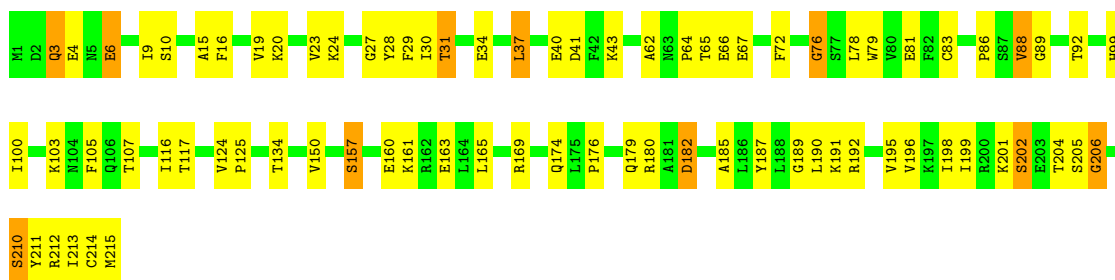
V1113	S1032	V905	A838	S764	I693	L603	C523	N383	V303	N221	PRU	I70
L1114	K1033	S906	C829	P766	D694	R604	P524	R384	D304	GLY	GLY	L71
T1115	L1037	G907	Y830	R766	A695	R604	A525	A460	V305	ARG	ARG	E72
Q1116	L1037	G974	S831	N767	A695	I609	E525	L386	N306	L386	LEU	Q73
P1117	L1037	Q975	S832	T768	E698	E612	T527	A462	D307	LEU	LEU	A74
P1118	S1045	G977	Y833	Y769	I701	E912	P528	T463	K308	LEU	LEU	A75
V1119	P1046	D978	N834	G770	I701	R617	E529	G464	O309	TYR	TYR	Q76
E1120	F1047	K979	Q835	S771	L702	D818	G550	M465	K310	GLU	GLU	H77
G1121	T1048	R980	E836	A772	I703	D818	Q531	M466	L311	LEU	LEU	T78
T1051	F1047	T915	D837	M773	Q706	R620	A532	G467	P231	ILE	ILE	T79
S1123	T1051	A981	S838	G774	Q706	R620	C533	E468	S232	ALA	ALA	E80
R1124	T1051	R983	M839	K775	D709	E821	K537	D469	V237	GLU	GLU	R83
D1125	G1054	I918	I840	Q776	L710	E823	N538	K471	A236	SER	SER	I84
G1126	I1055	S919	M841	A777	E711	L624	L539	A472	E239	GLU	GLU	S85
F1130	R1060	Q986	M842	M778	E711	L624	L539	A472	E239	GLU	GLU	S86
G1131	R1060	K987	M842	M778	E711	L624	L539	A472	E239	GLU	GLU	S87
E1132	Y1064	G988	Q843	Q843	A713	K625	M542	S474	V323	ASP	ASP	K87
M1133	Y1064	T989	R844	R780	E714	E626	S543	S475	G402	ASP	ASP	K87
I1135	Q1065	I990	S845	F781	A715	T628	C544	R476	L244	SER	SER	Y88
M1138	E1070	G991	G849	T783	N716	V633	I545	A477	E245	GLU	GLU	E89
I1139	E1070	I992	L850	R784	E717	Y634	I545	A477	E245	SER	SER	E89
G1142	V1077	I992	F851	Y785	E717	Y634	I545	A477	E245	GLY	GLY	S91
S1145	G1078	M999	R857	M792	R728	V640	I554	G478	F333	K164	K164	I95
F1146	K1079	P1000	R857	A793	I729	Y634	I555	V479	I334	I167	I167	Y96
L1147	K1080	F1001	M650	N794	R730	R635	I555	S480	G335	G247	G247	I95
K1148	L1081	T1002	D861	I795	R731	P636	T549	Q481	G335	S248	S248	Y96
E1149	M1082	A1093	Q862	R796	S732	L637	D550	V482	R337	I251	I251	K99
R1150	A1083	P940	E863	Y797	H733	F638	P551	L483	G336	S252	S252	K99
L1151	F1084	L941	R864	Y798	H733	V640	I554	M484	T339	T253	T253	P100
M1152	F1085	R942	K865	Q799	T736	K649	Y569	T492	A340	L254	L254	M101
E1153	F1087	S943	R865	P999	T736	E650	V570	S493	F417	M173	M173	V102
A1154	G1088	R846	S869	K801	T739	E650	Y569	H494	R348	L174	L174	V102
D1155	P1089	G947	L870	P862	H740	E653	Q573	R497	I349	R267	R267	R175
D1156	P1089	G947	T871	L803	C741	R654	Q573	R497	I349	T268	T268	S176
A1157	T1090	I1011	E872	L803	E742	R654	S574	T498	K353	L181	L181	V108
F1158	Y1091	D950	R873	T806	I743	G655	P575	T498	D354	S264	S264	L112
R1159	Y1092	Q951	R874	R807	H744	G656	D576	M499	I355	R267	R267	L112
V1160	Q1093	P1014	E875	R807	H744	G656	D576	M499	I355	P274	P274	Y113
H1161	R1094	L1015	E875	A868	P745	I658	A577	I502	L356	Y275	Y275	P114
I1162	L1095	A1016	Q878	M809	S746	I658	A577	I502	Q357	M199	M199	Q115
C1163	R1096	T955	R879	E810	M747	G671	F581	GLY	L361	Y202	Y202	L122
G1164	H1097	T956	R880	Y811	I748	V676	V582	ARG	F362	F203	F203	L122
I1165	M1098	N957	T880	L812	I748	E677	G584	ASP	H363	I204	I204	L122
C1166	M1098	N957	T882	L812	V751	E678	V585	GLY	I364	I206	I206	S126
G1167	V1099	D959	L883	L817	A753	Y679	V585	LEU	T365	G207	G207	G127
L1168	H1103	G960	R886	F818	S754	T680	V589	M443	F370	S208	S208	V130
I1172	A1104	L961	K886	A819	S754	W881	H590	M444	F370	E209	E209	V130
A1105	R1106	K962	L893	G820	I756	W881	H590	K445	L289	R210	R210	R134
A1107	A1107	F963	L893	G821	I756	S882	R591	K446	G290	V211	V211	ARG
L1175	R1108	L1027	L898	R822	F758	S883	N592	A447	P293	THR	THR	ARG
N1176	G1109	E1028	I899	A823	P759	L684	V596	T517	D294	TYR	TYR	THR
P1110	P1110	R957	A900	I824	D760	L689	M597	M449	F377	L213	L213	TYR
M1117	M1117	C1029	P901	W825	H761	V690	L600	M519	Y380	A214	A214	GLU
Q1119	Q1119	L1030	P901	A826	N762	E691	L600	G520	K381	Q215	Q215	ALA
L1031	L1031	L1031	L1031	I827	Q763	Y692	L600	V522	I382	I297	I297	ALA
										T301	T301	ILE
										C302	C302	ASP
												VAL



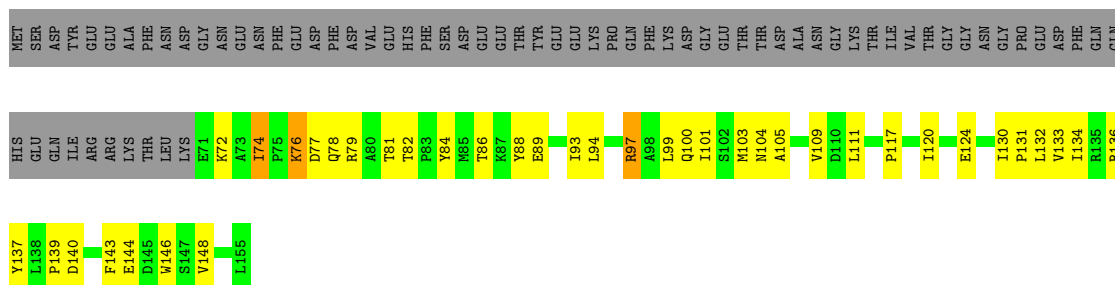
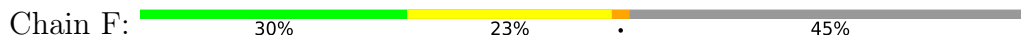
- Molecule 3: DNA-directed RNA polymerase II subunit RPB3



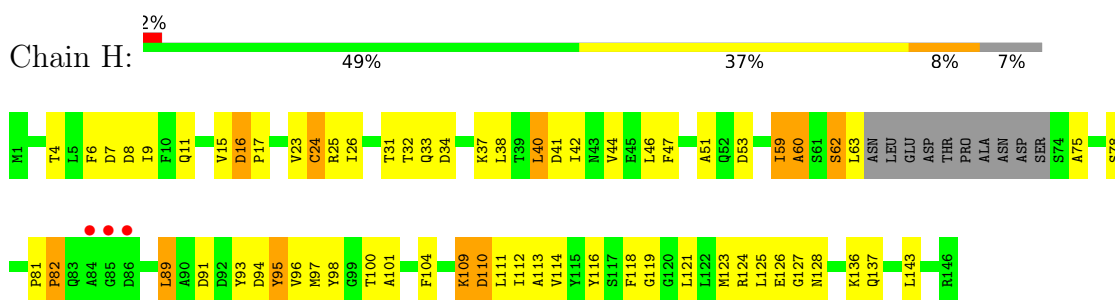
- Molecule 4: DNA-directed RNA polymerases I, II, and III subunit RPABC1



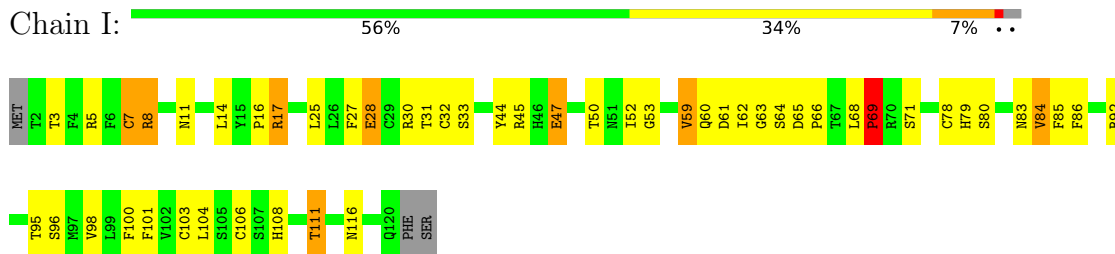
- Molecule 5: DNA-directed RNA polymerases I, II, and III subunit RPABC2



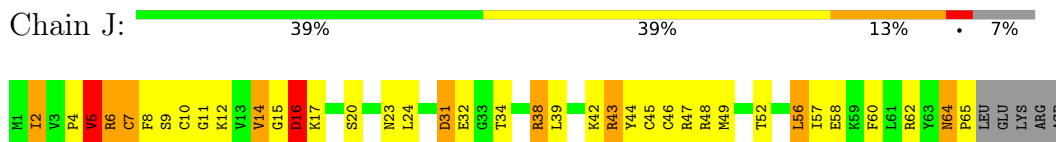
- Molecule 6: DNA-directed RNA polymerases I, II, and III subunit RPABC3



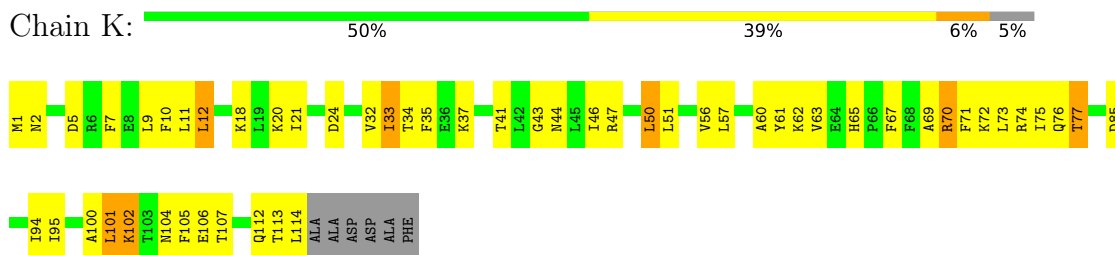
- Molecule 7: DNA-directed RNA polymerase II subunit RPB9



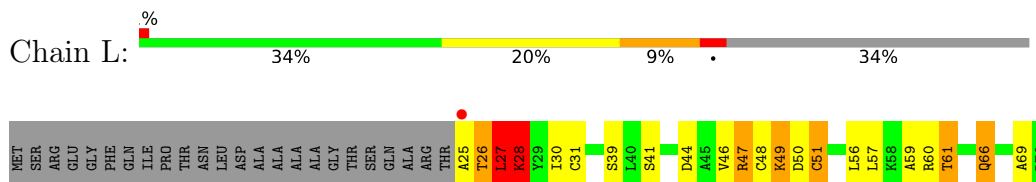
- Molecule 8: DNA-directed RNA polymerases I, II, and III subunit RPABC5



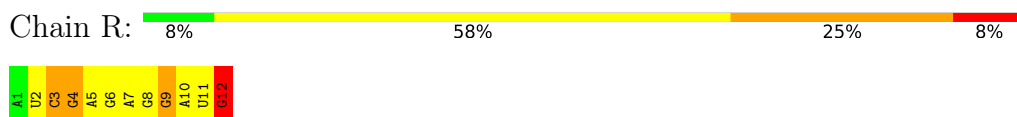
- Molecule 9: DNA-directed RNA polymerase II subunit RPB11



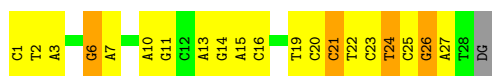
- Molecule 10: DNA-directed RNA polymerases I, II, and III subunit RPABC4



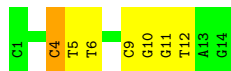
- Molecule 11: RNA (5'-R(*AP*UP*CP*GP*AP*GP*AP*GP*GP*AP*UP*G)-3')



● Molecule 12: DNA (28-MER)

Chain T:  28% 55% 14%

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

Chain N:  50% 43% 7%

4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	170.96Å 223.00Å 195.41Å 90.00° 102.28° 90.00°	Depositor
Resolution (Å)	50.00 – 3.78 42.41 – 3.79	Depositor EDS
% Data completeness (in resolution range)	95.4 (50.00-3.78) 95.5 (42.41-3.79)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.47 (at 3.76Å)	Xtrriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.253 , 0.300 0.254 , 0.293	Depositor DCC
R_{free} test set	3441 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å ²)	108.9	Xtrriage
Anisotropy	0.100	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.25 , 78.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.44$, $\langle L^2 \rangle = 0.27$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	30067	wwPDB-VP
Average B, all atoms (Å ²)	143.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.53% 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	0.53	0/11536	0.76	14/15605 (0.1%)
2	B	0.60	0/9347	0.79	15/12609 (0.1%)
3	C	0.63	0/2174	0.76	1/2946 (0.0%)
4	E	0.47	0/1793	0.64	1/2413 (0.0%)
5	F	0.47	0/696	0.74	1/940 (0.1%)
6	H	0.47	0/1105	0.79	2/1495 (0.1%)
7	I	0.53	0/989	0.72	0/1331
8	J	0.67	0/541	0.91	2/727 (0.3%)
9	K	0.65	0/937	0.71	1/1265 (0.1%)
10	L	0.58	0/365	0.90	2/485 (0.4%)
11	R	0.95	0/292	1.67	5/455 (1.1%)
12	T	0.96	1/634 (0.2%)	1.67	13/975 (1.3%)
13	N	0.91	0/317	1.53	4/488 (0.8%)
All	All	0.58	1/30726 (0.0%)	0.82	61/41734 (0.1%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
12	T	23	DC	C1'-N1	5.72	1.56	1.49

The worst 5 of 61 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	H	59	ILE	CB-CA-C	-9.58	92.45	111.60
12	T	24	DT	O4'-C1'-N1	9.42	114.59	108.00
1	A	885	THR	N-CA-CB	-9.25	92.73	110.30
2	B	974	PRO	N-CA-C	-9.20	88.18	112.10
12	T	25	DC	O4'-C1'-N1	9.20	114.44	108.00

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	A	11332	0	11392	764	1
2	B	9167	0	9178	660	0
3	C	2135	0	2090	155	1
4	E	1757	0	1781	55	0
5	F	684	0	703	27	0
6	H	1087	0	1062	46	0
7	I	971	0	929	30	0
8	J	532	0	545	55	0
9	K	919	0	929	57	0
10	L	363	0	387	24	0
11	R	260	0	132	22	0
12	T	566	0	316	15	0
13	N	284	0	161	3	0
14	A	2	0	0	3	0
14	B	1	0	0	2	0
14	C	1	0	0	0	0
14	I	2	0	0	0	0
14	J	1	0	0	2	0
14	L	1	0	0	0	0
15	A	1	0	0	0	0
16	R	1	0	0	0	0
All	All	30067	0	29605	1752	1

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 29.

The worst 5 of 1752 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	1.52	1.43
2:B:439:ALA:CB	2:B:440:HIS:HA	1.41	1.42
1:A:399:HIS:CD2	1:A:400:PRO:HD3	1.62	1.34

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1081:LEU:CD2	1:A:1082:ASN:H	1.47	1.27
2:B:439:ALA:HB3	2:B:440:HIS:CA	1.66	1.24

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:418:SER:OG	3:C:87:PHE:O[2_555]	2.17	0.03

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	1438/1733 (83%)	1054 (73%)	303 (21%)	81 (6%)	2	21
2	B	1145/1224 (94%)	855 (75%)	231 (20%)	59 (5%)	2	22
3	C	269/318 (85%)	207 (77%)	48 (18%)	14 (5%)	2	22
4	E	213/215 (99%)	175 (82%)	33 (16%)	5 (2%)	6	38
5	F	83/155 (54%)	66 (80%)	14 (17%)	3 (4%)	3	30
6	H	132/146 (90%)	104 (79%)	22 (17%)	6 (4%)	2	24
7	I	117/122 (96%)	84 (72%)	29 (25%)	4 (3%)	3	31
8	J	63/70 (90%)	48 (76%)	12 (19%)	3 (5%)	2	23
9	K	112/120 (93%)	86 (77%)	24 (21%)	2 (2%)	8	42
10	L	44/70 (63%)	31 (70%)	9 (20%)	4 (9%)	1	11
All	All	3616/4173 (87%)	2710 (75%)	725 (20%)	181 (5%)	2	23

5 of 181 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	56	PRO
1	A	115	LEU
1	A	116	ASP
1	A	117	GLU
1	A	119	ASN

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	1258/1520 (83%)	1041 (83%)	217 (17%)	2	13
2	B	1000/1061 (94%)	822 (82%)	178 (18%)	2	12
3	C	238/274 (87%)	188 (79%)	50 (21%)	1	7
4	E	196/197 (100%)	174 (89%)	22 (11%)	6	29
5	F	74/137 (54%)	66 (89%)	8 (11%)	6	30
6	H	119/128 (93%)	107 (90%)	12 (10%)	7	32
7	I	113/116 (97%)	96 (85%)	17 (15%)	3	18
8	J	60/65 (92%)	48 (80%)	12 (20%)	1	8
9	K	99/102 (97%)	81 (82%)	18 (18%)	1	11
10	L	40/57 (70%)	31 (78%)	9 (22%)	1	6
All	All	3197/3657 (87%)	2654 (83%)	543 (17%)	2	14

5 of 543 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	E	196	VAL
6	H	16	ASP
4	E	182	ASP
9	K	20	LYS
1	A	1291	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 78 such sidechains are listed below:

Mol	Chain	Res	Type
2	B	1195	HIS
4	E	113	GLN
3	C	73	GLN
3	C	188	HIS
9	K	65	HIS

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
11	R	11/12 (91%)	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	1442/1733 (83%)	-0.28	30 (2%) 63 59	72, 131, 247, 370	0
2	B	1153/1224 (94%)	-0.23	21 (1%) 68 65	71, 114, 240, 374	0
3	C	271/318 (85%)	-0.42	4 (1%) 73 70	80, 106, 165, 306	0
4	E	215/215 (100%)	-0.33	0 100 100	106, 165, 276, 316	0
5	F	85/155 (54%)	-0.33	0 100 100	107, 137, 170, 200	0
6	H	136/146 (93%)	-0.14	3 (2%) 62 57	126, 169, 276, 299	0
7	I	119/122 (97%)	-0.34	0 100 100	109, 150, 180, 237	0
8	J	65/70 (92%)	-0.51	0 100 100	80, 94, 135, 153	0
9	K	114/120 (95%)	-0.46	0 100 100	83, 112, 136, 139	0
10	L	46/70 (65%)	-0.18	1 (2%) 62 57	99, 175, 228, 246	0
11	R	12/12 (100%)	-0.54	0 100 100	104, 119, 182, 208	0
12	T	28/29 (96%)	-0.10	0 100 100	102, 222, 413, 422	0
13	N	14/14 (100%)	-0.13	0 100 100	270, 329, 352, 379	0
All	All	3700/4228 (87%)	-0.28	59 (1%) 72 68	71, 128, 251, 422	0

The worst 5 of 59 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1250	ALA	6.4
2	B	882	THR	6.0
1	A	1249	ASP	5.4
1	A	44	THR	5.3
2	B	441	ASP	4.8

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

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

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
14	ZN	J	101	1/1	0.75	0.16	218,218,218,218	0
14	ZN	B	1307	1/1	0.90	0.03	163,163,163,163	0
14	ZN	A	1734	1/1	0.92	0.04	232,232,232,232	0
14	ZN	L	105	1/1	0.94	0.10	155,155,155,155	0
14	ZN	A	1735	1/1	0.97	0.08	136,136,136,136	0
14	ZN	I	204	1/1	0.98	0.06	125,125,125,125	0
14	ZN	I	203	1/1	0.99	0.09	103,103,103,103	0
14	ZN	C	319	1/1	0.99	0.11	118,118,118,118	0
15	MG	A	1736	1/1	0.99	0.14	113,113,113,113	0

6.5 Other polymers [i](#)

There are no such residues in this entry.