



wwPDB X-ray Structure Validation Summary Report ⓘ

Dec 9, 2023 – 05:36 pm GMT

PDB ID : 2JA5
Title : CPD lesion containing RNA Polymerase II elongation complex A
Authors : Brueckner, F.; Hennecke, U.; Carell, T.; Cramer, P.
Deposited on : 2006-11-23
Resolution : 3.80 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
Mogul : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.36
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) : 2.36

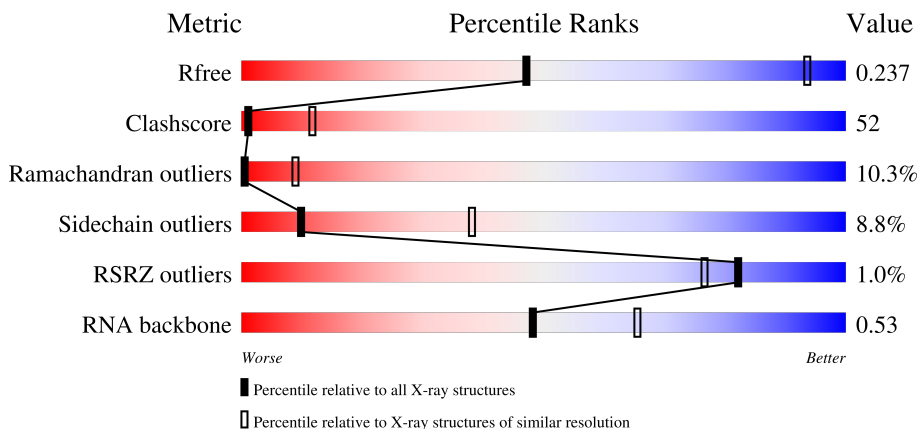
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.80 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.






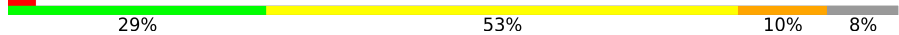
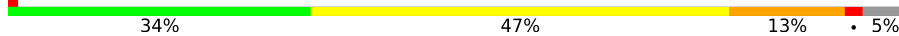
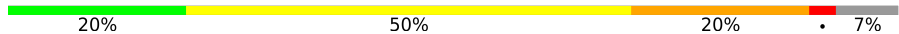
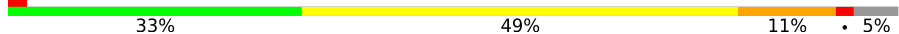
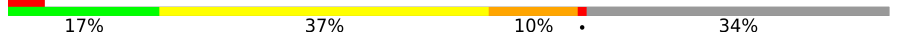
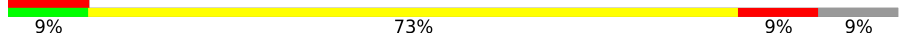

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1212 (4.00-3.60)
Clashscore	141614	1288 (4.00-3.60)
Ramachandran outliers	138981	1243 (4.00-3.60)
Sidechain outliers	138945	1237 (4.00-3.60)
RSRZ outliers	127900	1121 (4.00-3.60)
RNA backbone	3102	1036 (4.60-3.00)

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 ≥ 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	 26% 45% 10% 18%
2	B	1224	 27% 52% 11% 9%
3	C	318	 25% 49% 9% 16%
4	D	221	 25% 41% 12% 20%

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Mol	Chain	Length	Quality of chain
5	E	215	
6	F	155	
7	G	171	
8	H	146	
9	I	122	
10	J	70	
11	K	120	
12	L	70	
13	P	11	
14	T	25	

2 Entry composition [i](#)

There are 16 unique types of molecules in this entry. The entry contains 31660 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	1421	11186	7048	1958	2118	62	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	1115	8866	5614	1553	1644	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	267	2101	1320	349	419	13	0	0	0

- Molecule 4 is a protein called DNA-directed RNA polymerase II subunit RPB4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	D	177	1427	882	256	287	2	0	0	0

- Molecule 5 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			
5	E	214	1752	1111	309	321	11	0	0	0

- Molecule 6 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			
6	F	87	705	451	119	132	3	0	0	0

- Molecule 7 is a protein called DNA-directed RNA polymerase II subunit RPB7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
7	G	171	1340	861	222	249	8	0	0	0

- Molecule 8 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			
8	H	135	1084	683	183	214	4	0	0	0

- Molecule 9 is a protein called DNA-directed RNA polymerase II subunit RPB9.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
9	I	116	944	581	172	181	10	0	0	0

- Molecule 10 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			
10	J	65	532	339	93	94	6	0	0	0

- Molecule 11 is a protein called DNA-directed RNA polymerase II subunit RPB11.

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

- Molecule 12 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			
12	L	46	364	224	72	64	4	0	0	0

- Molecule 13 is a RNA chain called 5'-R(*UP*UP*CP*GP*AP*CP*CP*AP*GP*GP*AP)-3'.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
13	P	10	212	96	41	66	9	0	0	0

- Molecule 14 is a DNA chain called 5'-D(*AP*GP*CP*TP*CP*AP*AP*GP*TP*AP *CP*

TP*TTP*TP*TP*CP*CP*BRUP*GP*GP*TP*CP*AP*TP*T)-3'.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	Br	C	N	O	P			
14	T	11	219	1	106	34	68	10	0	0	0

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

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

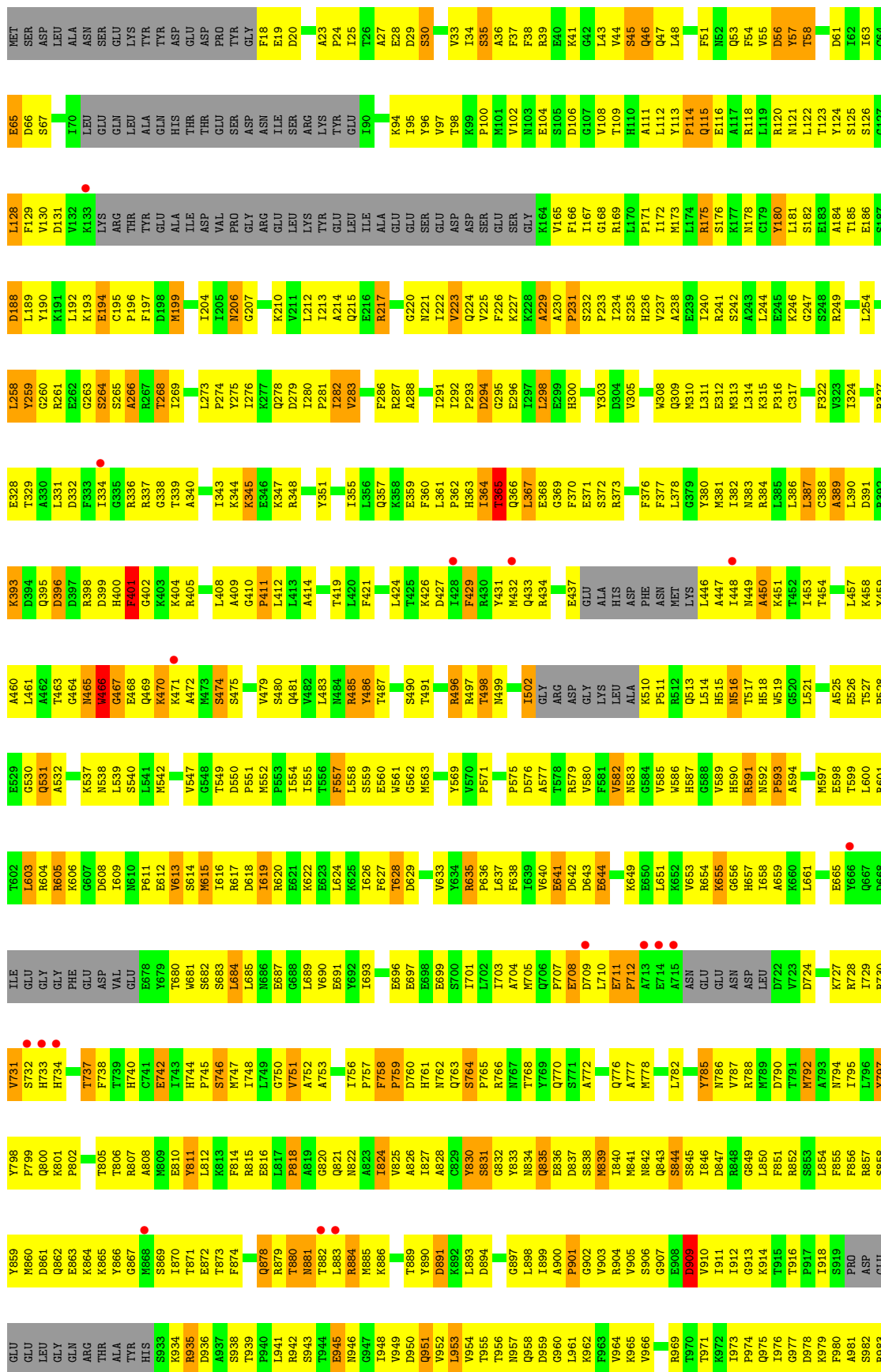
- Molecule 16 is ZINC ION (three-letter code: ZN) (formula: Zn).

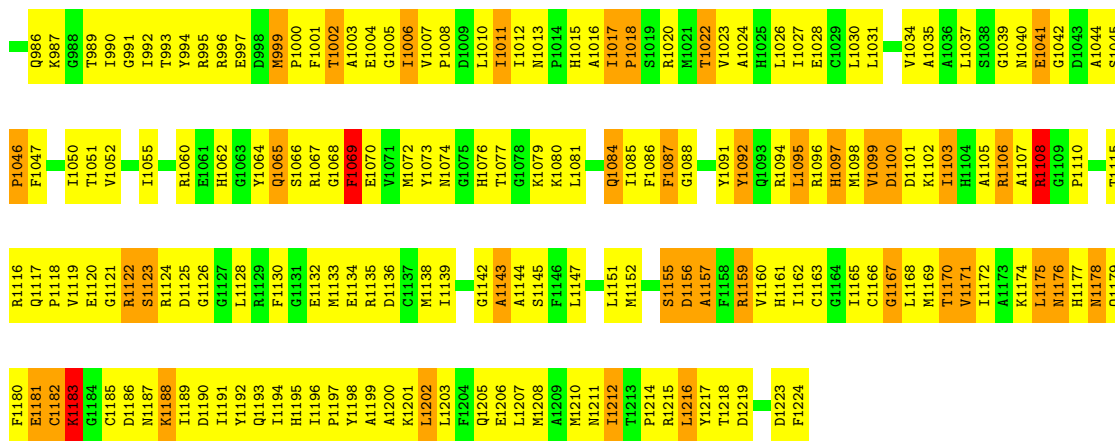
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
16	A	8	Total	Zn	0	0
			8	8		

Q760	K895	Q968	L1037	M1106	LYS	V1316	L1381	V1443	ALA	TYR	SER
M761	K896	Q969	T1038	V1107	SER	M1317	L1382	M1444	MET	SER	PRO
S762	K899	K1039	T1039	A1108	LEU	T1318	T1384	T1445	ALA	PRO	THR
A763	R898	F970	Q1040	K1109	ASP	V1319	T1385	D1446	GLY	THR	THR
C764	R899	T971	M1110	M1111	ALA	P1320	H1386	E1447	GLY	PRO	PRO
V765	D900	D974	D1043	M1112	GLU	D1323	H1387	E1448	PHE	PRO	THR
G766	R895	H975	M1048	K1112	GLN	P1324	F1388	S1449	THR	THR	THR
Q767	R896	T976	T1049	T1113	SER	P1325	F1389	L1450	ALA	TYR	SER
Q768	R897	S979	Q1052	P1114	PHE	T1325	A1254	V1451	TYR	PRO	PRO
V770	Q898	D980	Q1053	S1115	ASP	R1326	E1255	K1452	GLY	PRO	THR
R774	R840	H906	F1053	L1116	L1187	L1327	E1256	T1453	GLY	THR	THR
I775	R841	T907	L1054	T1117	Q1188	T1328	D1257	M1454	ALA	PRO	ASN
F779	R842	L908	R1055	V1118	H1189	M1329	H1258	P1455	ASP	PRO	THR
V780	K843	D909	S1056	L1119	P1190	M1330	M1259	A1396	TYR	TYR	THR
D781	R844	P910	V1057	L1120	L1191	F1331	L1260	M1397	GLY	TYR	PRO
R782	R845	S911	V1058	L1121	L1192	F1332	K1261	M1398	LYS	PRO	PRO
F786	E846	S912	H1059	G1123	L1193	D1334	E1264	C1400	THR	THR	THR
F787	R847	L913	H1059	P1123	L1197	I1335	M1265	S1401	THR	THR	THR
L784	R848	E914	P1060	H1124	D1198	M1336	T1266	F1402	GLY	PRO	PRO
S788	M849	D992	E1062	D1127	M1202	V1337	M1267	T1403	GLY	TYR	TYR
K789	Y852	L993	V1064	Q1130	K1205	G1340	L1268	T1405	GLY	PRO	PRO
F794	D853	N996	L1067	I1134	D1206	I1341	I1271	V1406	ASP	PRO	THR
E795	R854	L997	Q1070	R1135	L1207	E1342	R1274	E1407	GLY	THR	THR
K797	S859	L929	S1071	I1138	T1208	A1343	L1409	L1409	GLY	PRO	PRO
C798	R860	E932	T1072	I1139	M1209	G1344	F1410	F1410	VAL	PRO	VAL
F799	R861	L929	G1073	T1141	Q1210	R1345	E1411	E1411	THR	TYR	THR
V800	R862	E933	E1074	T1142	Q1211	L1346	A1412	A1412	THR	PRO	PRO
E801	R863	Y933	E1075	K1144	V1212	L1348	G1413	G1413	TYR	PRO	PRO
N802	R864	I1006	I1007	S1145	G1213	L1349	V1282	A1414	GLY	THR	THR
Y804	R866	I1007	Q1078	V1146	E1214	K1350	M1284	S1415	ASN	PRO	PRO
L805	R867	T1077	M1079	I1149	I1215	R1352	R1289	E1416	GLY	PRO	PRO
R806	R868	Q1011	T1080	A1150	Q1217	V1352	K1290	E1417	GLY	TYR	TYR
T809	R869	R1012	L1081	E1151	Q1218	V1355	V1291	D1418	GLY	PRO	PRO
P810	R870	R1013	ASN	I1152	T1219	I1356	P1292	D1419	LEU	PRO	PRO
E812	R871	A1014	THR	Y1153	F1220	D1359	S1293	C1421	VAL	THR	THR
F815	R873	HIS	PHE	Y1154	K1221	Y1362	T1294	G1422	ALA	PRO	ASP
A817	R874	L1016	PHE	D1155	D1222	Y1363	G1295	V1424	LEU	PRO	GLU
M818	R875	F1017	ALA	D1156	L1224	M1364	G1296	S1425	ASP	TYR	THR
G819	R876	F1018	GLY	D1157	F1225	Y1365	E1297	E1426	VAL	PRO	VAL
G820	R877	F1019	VAL	P1158	V1226	R1366	Y1298	M427	LYS	PRO	LYS
E822	R878	C1019	ALA	R1159	I1227	H1367	V1299	I1428	ASP	THR	THR
G823	R879	L1021	ALA	T1161	W1228	A1368	E1303	I1429	GLY	TYR	TYR
L824	R881	L1022	SER	V1162	D1233	M1369	W1304	L1430	LEU	PRO	PRO
I825	R882	A1027	K1092	E1163	L1236	L1370	V1305	Q1432	MET	PRO	PRO
D826	R883	T1028	K1093	I1164	I1237	L1371	V1306	M433	PHE	THR	THR
T827	R884	R1029	V1094	E1165	I1238	D1372	L1307	A1434	SER	PRO	PRO
R890	R885	R1030	T1095	D1166	I1239	V1373	E1307	A1434	PRO	PRO	PRO
	R886	R1031	S1096	D1167	C1240	M1374	L1308	P1435	ALA	TYR	TYR
	R887	L1032	G1098	I1170	C1241	M1375	D1309	T1436	VAL	TYR	THR
	R888	Q1033	P1099	Q1171	R1241	V1376	G1310	G1437	ASP	PRO	PRO
	R889	R1100	R1100	F1174	V1242	T1377	V1311	T1438	GLY	PRO	THR
	R891	Y1034	L1101	L1175	V1243	Q1378	L1313	A1440	GLY	PRO	PRO
	R892	Y1035	K1102	L1176	P1245	G1380	E1315	D1442	ASP	PRO	TYR
	R893	R1036									

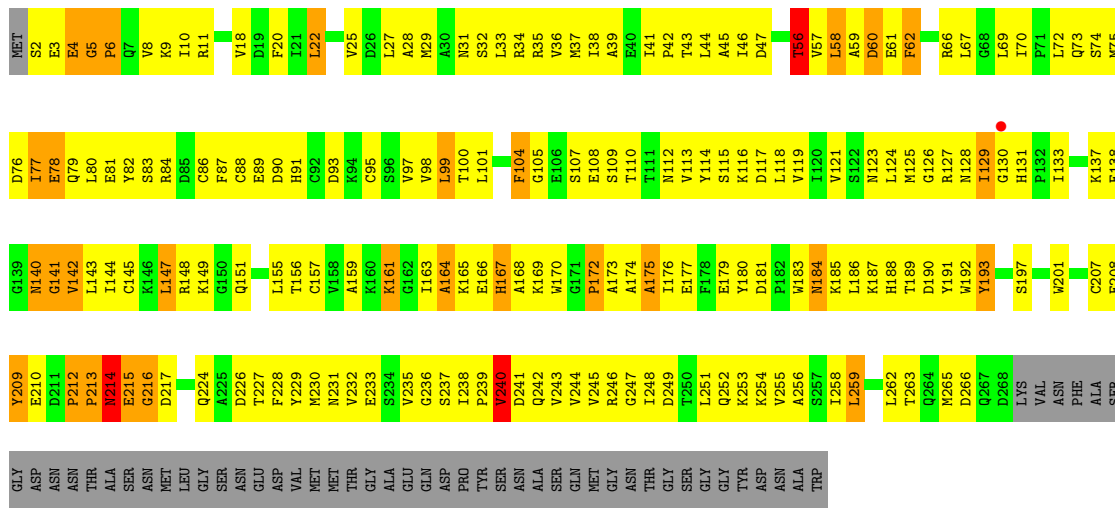
● Molecule 2: DNA-directed RNA polymerase II subunit RPB2



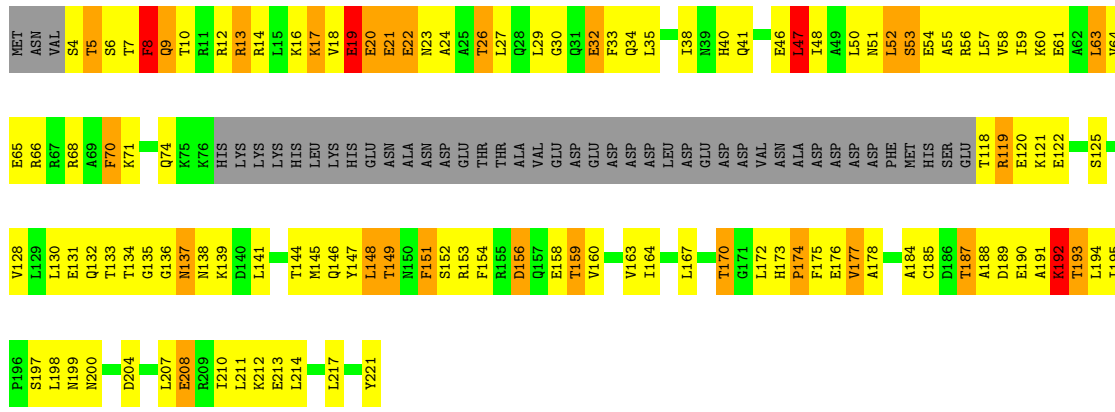
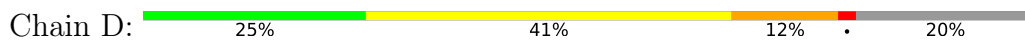




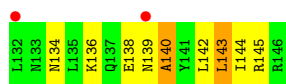
• Molecule 3: DNA-directed RNA polymerase II subunit RPB3



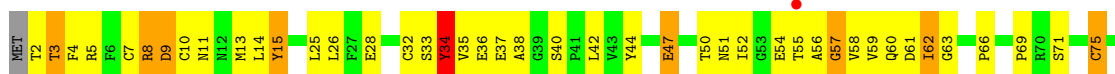
• Molecule 4: DNA-directed RNA polymerase II subunit RPB4



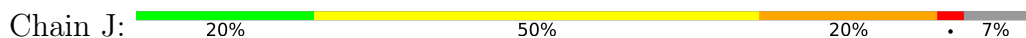
• Molecule 5: DNA-directed RNA polymerases I, II, and III subunit RPABC1



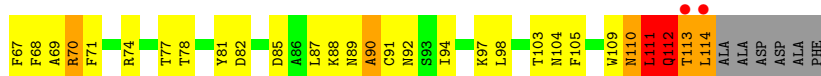
- Molecule 9: DNA-directed RNA polymerase II subunit RPB9



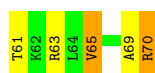
- Molecule 10: DNA-directed RNA polymerases I, II, and III subunit RPABC5



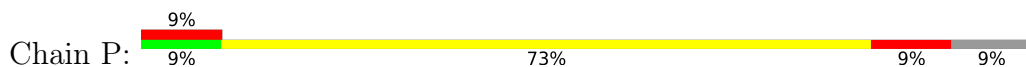
- Molecule 11: DNA-directed RNA polymerase II subunit RPB11

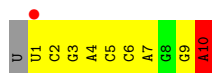


- Molecule 12: DNA-directed RNA polymerases I, II, and III subunit RPABC4



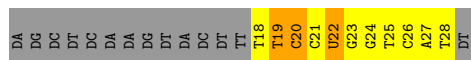
- Molecule 13: 5'-R(*UP*UP*CP*GP*AP*CP*CP*AP*GP*GP*AP)-3'





- Molecule 14: 5'-D(*AP*GP*CP*TP*CP*AP*AP*GP*TP*AP *CP*TP*TTP*TP*TP*CP*CP *BRUP*GP*GP*TP*CP*AP*TP*T)-3'

Chain T: 32% 12% 56%



4 Data and refinement statistics i

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	222.21Å 392.21Å 284.03Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	50.00 – 3.80 48.98 – 3.80	Depositor EDS
% Data completeness (in resolution range)	97.4 (50.00-3.80) 99.0 (48.98-3.80)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.79 (at 3.77Å)	Xtrriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.270 , 0.280 0.217 , 0.237	Depositor DCC
R_{free} test set	4681 reflections (1.98%)	wwPDB-VP
Wilson B-factor (Å ²)	99.7	Xtrriage
Anisotropy	0.551	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.26 , 70.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.45$, $\langle L^2 \rangle = 0.28$	Xtrriage
Estimated twinning fraction	0.024 for 1/2*h-1/2*k,-3/2*h-1/2*k,-l 0.027 for 1/2*h+1/2*k,3/2*h-1/2*k,-l	Xtrriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	31660	wwPDB-VP
Average B, all atoms (Å ²)	87.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.95% 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: ZN, MG, BRU

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	0.48	0/11385	0.73	1/15393 (0.0%)
2	B	0.46	0/9037	0.71	2/12181 (0.0%)
3	C	0.48	0/2138	0.72	0/2896
4	D	0.43	0/1437	0.68	1/1925 (0.1%)
5	E	0.43	0/1788	0.63	0/2406
6	F	0.55	0/716	0.77	0/964
7	G	0.48	0/1368	0.73	0/1844
8	H	0.40	0/1102	0.67	0/1492
9	I	0.41	0/962	0.68	0/1295
10	J	0.50	0/541	0.79	1/727 (0.1%)
11	K	0.90	6/937 (0.6%)	1.02	11/1265 (0.9%)
12	L	0.44	0/366	0.70	0/485
13	P	1.13	1/237 (0.4%)	1.22	2/368 (0.5%)
14	T	1.05	0/220	1.33	0/335
All	All	0.50	7/32234 (0.0%)	0.74	18/43576 (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
1	A	0	1
2	B	0	1
14	T	0	2
All	All	0	4

The worst 5 of 7 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
11	K	112	GLN	CA-C	9.87	1.78	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
11	K	113	THR	N-CA	9.16	1.64	1.46
11	K	112	GLN	CB-CG	9.05	1.76	1.52
11	K	112	GLN	N-CA	8.12	1.62	1.46
11	K	112	GLN	CG-CD	6.57	1.66	1.51

The worst 5 of 18 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
11	K	113	THR	N-CA-C	9.53	136.74	111.00
13	P	1	U	N1-C1'-C2'	9.37	126.18	114.00
11	K	112	GLN	N-CA-C	8.61	134.26	111.00
11	K	114	LEU	CB-CG-CD1	8.38	125.24	111.00
11	K	114	LEU	N-CA-C	7.93	132.41	111.00

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	303	TYR	Sidechain
2	B	486	TYR	Sidechain
14	T	19	DT	Sidechain
14	T	20	DC	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	A	11186	0	11266	1286	0
2	B	8866	0	8898	1020	0
3	C	2101	0	2055	267	0
4	D	1427	0	1451	141	0
5	E	1752	0	1776	127	0
6	F	705	0	730	84	0
7	G	1340	0	1357	161	0
8	H	1084	0	1057	123	0
9	I	944	0	899	101	0
10	J	532	0	542	98	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
11	K	919	0	929	109	0
12	L	364	0	386	43	0
13	P	212	0	109	20	0
14	T	219	0	125	31	0
15	A	1	0	0	0	0
16	A	8	0	0	0	0
All	All	31660	0	31580	3314	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 52.

The worst 5 of 3314 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)
11:K:112:GLN:CB	11:K:112:GLN:CG	1.77	1.62
11:K:112:GLN:C	11:K:112:GLN:CA	1.78	1.51
2:B:343:ILE:HG23	2:B:347:LYS:HB2	1.18	1.17
2:B:273:LEU:HB2	2:B:276:ILE:HD12	1.26	1.17
1:A:1445:ILE:H	1:A:1445:ILE:HD12	1.12	1.15

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	1410/1733 (81%)	975 (69%)	289 (20%)	146 (10%)	0 9
2	B	1096/1224 (90%)	781 (71%)	200 (18%)	115 (10%)	0 8
3	C	264/318 (83%)	171 (65%)	65 (25%)	28 (11%)	0 8
4	D	173/221 (78%)	124 (72%)	31 (18%)	18 (10%)	0 9
5	E	212/215 (99%)	154 (73%)	44 (21%)	14 (7%)	1 19

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
6	F	84/155 (54%)	69 (82%)	11 (13%)	4 (5%)	2	24
7	G	169/171 (99%)	131 (78%)	28 (17%)	10 (6%)	1	21
8	H	131/146 (90%)	82 (63%)	32 (24%)	17 (13%)	0	5
9	I	114/122 (93%)	80 (70%)	23 (20%)	11 (10%)	0	10
10	J	63/70 (90%)	37 (59%)	12 (19%)	14 (22%)	0	1
11	K	112/120 (93%)	85 (76%)	16 (14%)	11 (10%)	0	10
12	L	44/70 (63%)	18 (41%)	17 (39%)	9 (20%)	0	2
All	All	3872/4565 (85%)	2707 (70%)	768 (20%)	397 (10%)	0	9

5 of 397 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	44	THR
1	A	48	ALA
1	A	57	ARG
1	A	62	ASP
1	A	65	LEU

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	1244/1520 (82%)	1129 (91%)	115 (9%)	9	35
2	B	967/1061 (91%)	884 (91%)	83 (9%)	10	40
3	C	235/274 (86%)	214 (91%)	21 (9%)	9	38
4	D	159/200 (80%)	135 (85%)	24 (15%)	3	18
5	E	196/197 (100%)	192 (98%)	4 (2%)	55	75
6	F	77/137 (56%)	69 (90%)	8 (10%)	7	30
7	G	152/152 (100%)	141 (93%)	11 (7%)	14	45
8	H	119/128 (93%)	113 (95%)	6 (5%)	24	55
9	I	110/116 (95%)	98 (89%)	12 (11%)	6	29

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
10	J	60/65 (92%)	53 (88%)	7 (12%)	5	27
11	K	99/102 (97%)	89 (90%)	10 (10%)	7	32
12	L	40/57 (70%)	36 (90%)	4 (10%)	7	32
All	All	3458/4009 (86%)	3153 (91%)	305 (9%)	10	38

5 of 305 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	D	148	LEU
10	J	10	CYS
4	D	187	THR
7	G	80	LYS
11	K	114	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 79 such sidechains are listed below:

Mol	Chain	Res	Type
3	C	167	HIS
7	G	122	ASN
3	C	252	GLN
5	E	101	GLN
10	J	64	ASN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
13	P	9/11 (81%)	1 (11%)	0

All (1) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
13	P	10	A

There are no RNA pucker outliers to report.

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

1 non-standard protein/DNA/RNA residue is 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	$\# Z > 2$
14	BRU	T	22	14,13	18,21,22	0.65	0	26,30,33	1.21	2 (7%)

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
14	BRU	T	22	14,13	-	0/7/21/22	0/2/2/2

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
14	T	22	BRU	C6-C5-C4	-3.27	117.36	120.67
14	T	22	BRU	BR-C5-C4	2.69	121.15	118.03

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
14	T	22	BRU	3	0

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](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
2	B	2
3	C	1
6	F	1
1	A	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	C	2:SER	C	3:GLU	N	4.08
1	B	18:PHE	C	19:GLU	N	3.80
1	F	69:LEU	C	70:LYS	N	3.44
1	A	1175:SER	C	1176:LEU	N	3.41
1	B	337:ARG	C	338:GLY	N	2.62

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	1421/1733 (81%)	-0.34	10 (0%) 87 83	12, 73, 146, 189	0
2	B	1115/1224 (91%)	-0.25	17 (1%) 73 66	12, 83, 154, 191	0
3	C	267/318 (83%)	-0.39	1 (0%) 92 89	30, 69, 125, 150	0
4	D	177/221 (80%)	-0.18	0 100 100	53, 104, 144, 162	0
5	E	214/215 (99%)	-0.19	1 (0%) 91 87	45, 126, 174, 178	0
6	F	87/155 (56%)	-0.54	0 100 100	17, 49, 91, 119	0
7	G	171/171 (100%)	-0.26	1 (0%) 89 85	53, 77, 115, 126	0
8	H	135/146 (92%)	0.20	4 (2%) 50 40	87, 128, 162, 171	0
9	I	116/122 (95%)	-0.05	1 (0%) 84 79	68, 122, 151, 173	0
10	J	65/70 (92%)	-0.63	0 100 100	35, 66, 109, 118	0
11	K	114/120 (95%)	-0.33	2 (1%) 68 61	33, 73, 102, 140	0
12	L	46/70 (65%)	0.33	3 (6%) 18 14	69, 141, 161, 169	0
13	P	10/11 (90%)	-0.05	1 (10%) 7 6	71, 85, 160, 163	0
14	T	10/25 (40%)	-0.36	0 100 100	72, 96, 137, 158	0
All	All	3948/4601 (85%)	-0.27	41 (1%) 82 76	12, 82, 154, 191	0

The worst 5 of 41 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
11	K	114	LEU	6.4
11	K	113	THR	6.4
2	B	882	THR	5.4
2	B	471	LYS	3.8
8	H	139	ASN	3.6

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
14	BRU	T	22	20/21	0.87	0.18	59,61,68,69	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(Å ²)	Q<0.9
16	ZN	A	2461	1/1	0.98	0.08	163,163,163,163	0
16	ZN	A	2464	1/1	0.98	0.07	82,82,82,82	0
16	ZN	A	2459	1/1	0.99	0.04	115,115,115,115	0
16	ZN	A	2462	1/1	0.99	0.07	23,23,23,23	0
16	ZN	A	2463	1/1	0.99	0.13	42,42,42,42	0
16	ZN	A	2460	1/1	0.99	0.14	69,69,69,69	0
16	ZN	A	2465	1/1	0.99	0.07	31,31,31,31	0
16	ZN	A	2458	1/1	1.00	0.14	51,51,51,51	0
15	MG	A	2457	1/1	1.00	0.15	21,21,21,21	0

6.5 Other polymers [i](#)

There are no such residues in this entry.