



wwPDB X-ray Structure Validation Summary Report ⓘ

Dec 10, 2023 – 07:04 am GMT

PDB ID : 2JA7
Title : CPD lesion containing RNA Polymerase II elongation complex C
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

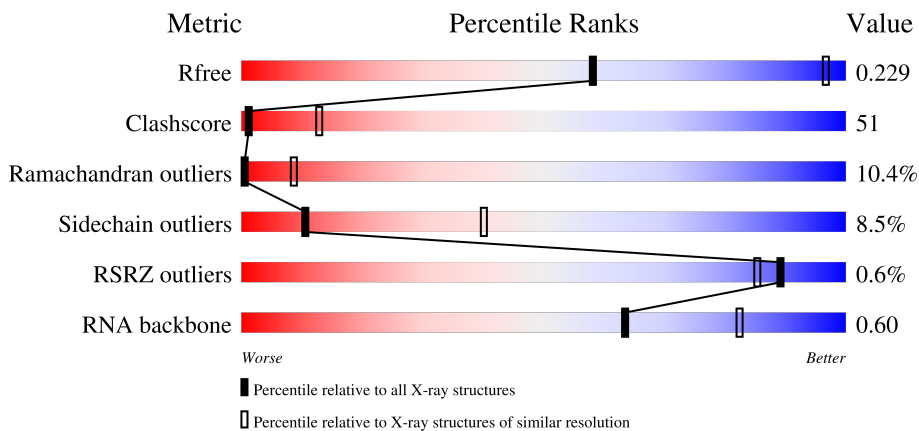
1 Overall quality at a glance

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	1	14	 29% 21% 50%
1	4	14	 29% 21% 50%
2	2	25	 44% 24% 28%
2	5	25	 8% 40% 24% 28%

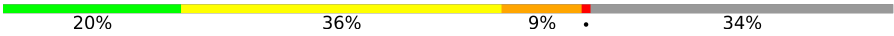
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Mol	Chain	Length	Quality of chain
3	3	11	
3	6	11	
4	A	1733	
4	M	1733	
5	B	1224	
5	N	1224	
6	C	318	
6	O	318	
7	D	221	
7	P	221	
8	E	215	
8	Q	215	
9	F	155	
9	R	155	
10	G	171	
10	S	171	
11	H	146	
11	T	146	
12	I	122	
12	U	122	
13	J	70	
13	V	70	
14	K	120	
14	W	120	
15	L	70	

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Mol	Chain	Length	Quality of chain
15	X	70	 <p>A horizontal bar chart representing the quality of chain. The bar is divided into four segments: a green segment on the left labeled '20%', a yellow segment labeled '36%', a red segment labeled '9%', and a grey segment on the right labeled '34%'. A small black dot is located at the end of the red segment.</p>

2 Entry composition [i](#)

There are 17 unique types of molecules in this entry. The entry contains 63924 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 DNA chain called 5'-D(*TP*AP*AP*GP*TP*AP*CP*TP*TP*GP*AP*GP*CP*T)-3'.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	1	7	Total	C	N	O	P	0	0	0
			141	69	27	39	6			
1	4	7	Total	C	N	O	P	0	0	0
			141	69	27	39	6			

- Molecule 2 is a DNA chain called 5'-D(*AP*GP*CP*TP*CP*AP*AP*GP*TP*AP*CP*TP*TP*TTP*CP*CP*BRUP*GP*GP*TP*CP*AP*TP*T)-3'.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	2	18	Total	Br	C	N	O	P	0	0	0
			380	1	186	60	116	17			
2	5	18	Total	Br	C	N	O	P	0	0	0
			380	1	186	60	116	17			

- Molecule 3 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
3	3	10	Total	C	N	O	P	0	0	0
			212	96	41	66	9			
3	6	10	Total	C	N	O	P	0	0	0
			212	96	41	66	9			

- Molecule 4 is a protein called DNA-DIRECTED RNA POLYMERASE II LARGEST SUB-UNIT.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	A	1421	Total	C	N	O	S	0	0	0
			11186	7048	1958	2118	62			
4	M	1421	Total	C	N	O	S	0	0	0
			11186	7048	1958	2118	62			

- Molecule 5 is a protein called DNA-DIRECTED RNA POLYMERASE II 140 KDA POLYPEPTIDE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
5	B	1115	Total 8866	C 5614	N 1553	O 1644	S 55	0	0	0
5	N	1115	Total 8866	C 5614	N 1553	O 1644	S 55	0	0	0

- Molecule 6 is a protein called DNA-DIRECTED RNA POLYMERASE II 45KDA POLYPEPTIDE.

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

- Molecule 7 is a protein called DNA-DIRECTED RNA POLYMERASE II 32KDA POLYPEPTIDE.

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

- Molecule 8 is a protein called DNA-DIRECTED RNA POLYMERASES I, II, AND III 27 KDA POLYPEPTIDE.

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

- Molecule 9 is a protein called DNA-DIRECTED RNA POLYMERASES I, II, AND III 23 KDA POLYPEPTIDE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
9	F	87	Total 705	C 451	N 119	O 132	S 3	0	0	0
9	R	87	Total 705	C 451	N 119	O 132	S 3	0	0	0

- Molecule 10 is a protein called DNA-DIRECTED RNA POLYMERASE II 19KDA POLYPEPTIDE.

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

- Molecule 11 is a protein called DNA-DIRECTED RNA POLYMERASES I, II, AND III 14.5 KDA POLYPEPTIDE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
11	H	135	Total	C	N	O	S	0	0	0
			1084	683	183	214	4			
11	T	135	Total	C	N	O	S	0	0	0
			1084	683	183	214	4			

- Molecule 12 is a protein called DNA-DIRECTED RNA POLYMERASE II SUBUNIT 9.

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

- Molecule 13 is a protein called DNA-DIRECTED RNA POLYMERASES I/II/III SUBUNIT 10.

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

- Molecule 14 is a protein called DNA-DIRECTED RNA POLYMERASE II 13.6 KDA POLYPEPTIDE.

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

- Molecule 15 is a protein called DNA-DIRECTED RNA POLYMERASES I, II, AND III 7.7

KDA POLYPEPTIDE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
15	L	46	Total	C	N	O	S	0	0	0
			364	224	72	64	4			
15	X	46	Total	C	N	O	S	0	0	0
			364	224	72	64	4			

- Molecule 16 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
16	A	1	Total	Mg	0	0
			1	1		
16	M	1	Total	Mg	0	0
			1	1		


- Molecule 17 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
17	A	2	Total	Zn	0	0
			2	2		
17	B	1	Total	Zn	0	0
			1	1		
17	C	1	Total	Zn	0	0
			1	1		
17	I	2	Total	Zn	0	0
			2	2		
17	J	1	Total	Zn	0	0
			1	1		
17	L	1	Total	Zn	0	0
			1	1		
17	M	2	Total	Zn	0	0
			2	2		
17	N	1	Total	Zn	0	0
			1	1		
17	O	1	Total	Zn	0	0
			1	1		
17	U	2	Total	Zn	0	0
			2	2		
17	V	1	Total	Zn	0	0
			1	1		
17	X	1	Total	Zn	0	0
			1	1		

3 Residue-property plots [i](#)


These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: 5'-D(*TP*AP*AP*GP*TP*AP*CP*TP*TP*GP *AP*GP*CP*T)-3'

Chain 1: 



- Molecule 1: 5'-D(*TP*AP*AP*GP*TP*AP*CP*TP*TP*GP *AP*GP*CP*T)-3'

Chain 4: 




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

Chain 2: 



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

Chain 5: 



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

Chain 3: 

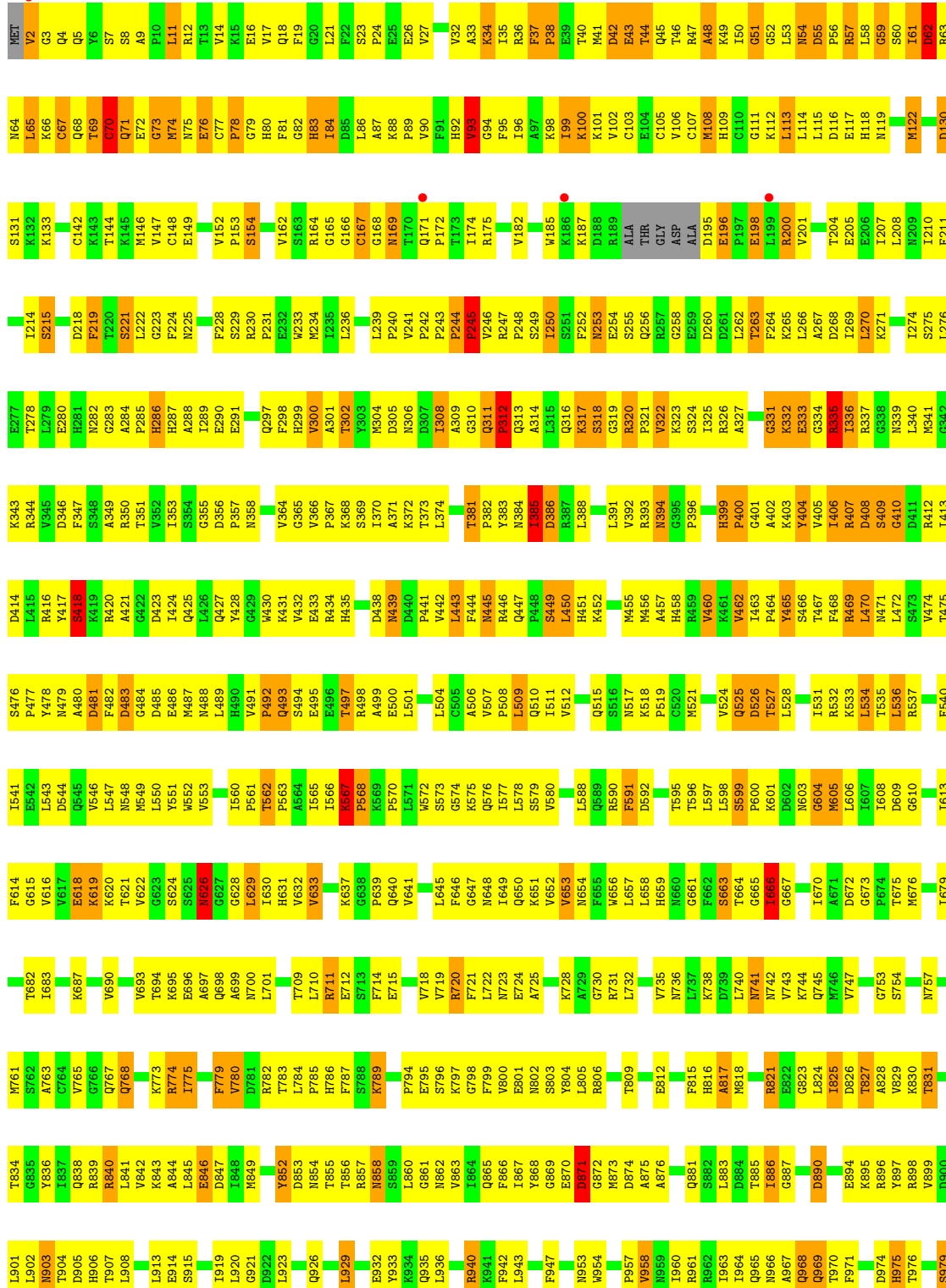


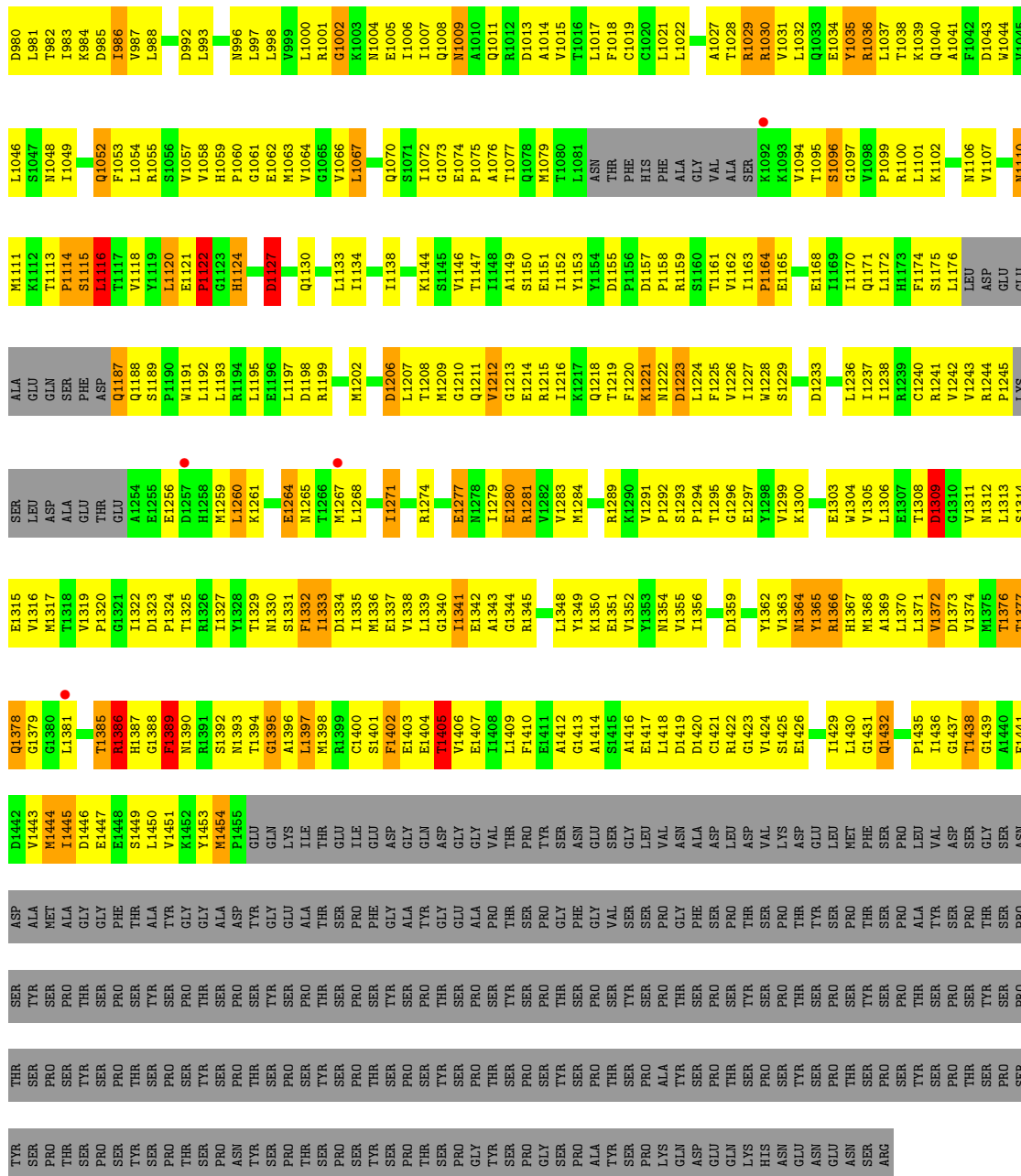
- Molecule 3: 5'-R(*UP*UP*CP*GP*AP*CP*CP*AP*GP*GP*AP)-3'

Chain 6: 

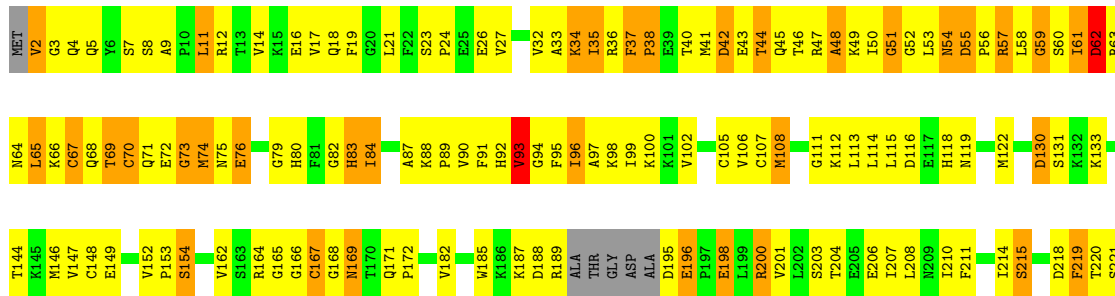


● Molecule 4: DNA-DIRECTED RNA POLYMERASE II LARGEST SUBUNIT



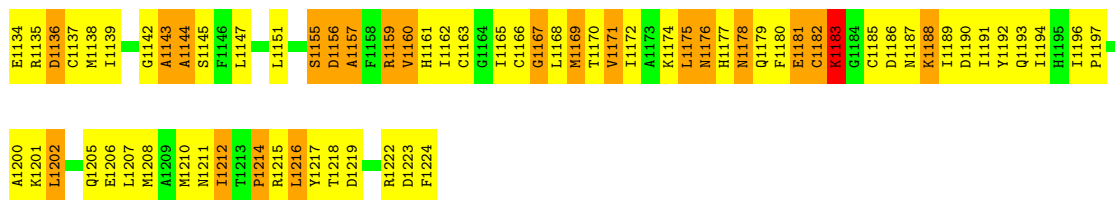


● Molecule 4: DNA-DIRECTED RNA POLYMERASE II LARGEST SUBUNIT



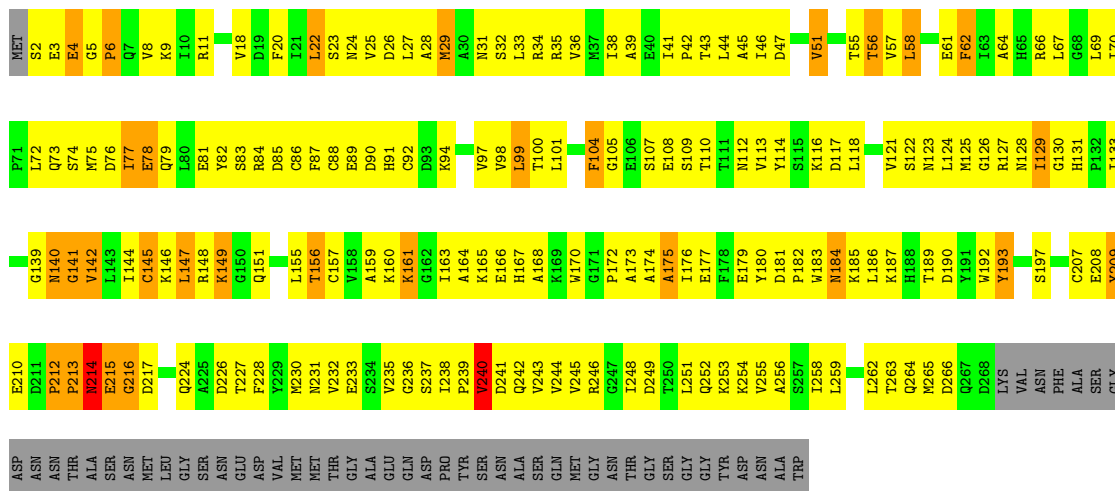
L1176	L1106	T976	Q900	W655	V690	E618	L547	F482	A421	R350	A284	L222
LEU	V1107	S979	L901	G766	T694	K619	M548	D483	G422	T351	P285	G223
ASP	M1110	D980	L902	Q767	T694	G484	M549	G484	D423	V352	H286	F224
GLU	M1111	R981	R903	Q768	K695	T621	M550	D485	I424	I353	H287	M225
GLU	M1112	L982	D904	Q769	E696	G622	Y551	E486	Q425	G354	A288	E226
ALA	N1048	T982	T905	K774	A697	G623	W552	G355	L426	S355	L289	V227
GLU	I1049	I983	K843	L775	Q698	S624	W553	M488	Q427	D356	E290	F228
GLU	P1114	K984	A644	L775	A699	S625	T560	L489	Y428	P357	E291	S229
SER	S1115	D985	L845	F779	N700	M626	T561	H490	G429	N358	R230	R230
PHE	L1116	E986	L913	W780	L701	K629	P662	V491	W430	D362	Q297	P231
ASP	Q1052	D987	L913	D781	T709	T630	T662	V491	K431	D362	F298	E232
ASP	Q1187	D987	E914	R732	T709	T630	T663	Q493	K431	D362	F299	W233
Q1188	Q1188	L988	L710	W783	H631	H631	A564	Q493	V432	Q363	H299	W233
Q1189	Q1189	D982	L784	L784	V632	V632	E564	E433	R434	V364	V300	M234
P1190	P1190	L993	W852	F785	V633	V633	E566	E434	H435	G865	A301	I285
G1123	G1123	N996	D853	H786	W633	W633	E566	E435	H435	G866	T302	L236
H1124	H1124	L997	N854	F787	F714	F714	P668	Q439	D438	K368	Y303	P240
R1194	R1194	L998	T985	W788	E715	E636	P669	E500	M439	M305	M304	P240
R1195	R1195	L998	T985	K789	E715	E636	P570	E500	D440	I370	N306	V241
E1196	E1196	R1001	W718	W718	W718	P639	L571	L504	V441	A371	D367	P242
L1197	L1197	G1002	W719	Q640	Q640	Q640	W572	G505	V442	K372	I308	P243
L1198	L1198	K1003	R720	E795	E795	E795	S573	A506	L443	A309	A309	P244
R1199	R1199	K1004	F721	S796	S796	S796	G574	V507	F444	T381	G310	P245
M1202	M1202	E1005	W722	K797	K797	K797	G574	P508	N445	P382	Q311	V246
D1206	D1206	E1006	W723	G798	G798	G798	Q576	L509	R446	Y383	Q312	R247
L1207	L1207	I1007	E724	F799	F799	F799	W577	Q510	Q447	N384	Q313	P248
L1208	L1208	Q1008	W725	W800	W800	W800	L578	F511	P448	I386	A314	S249
M1209	M1209	Q1009	R726	E801	E801	E801	W579	W512	G449	D386	L315	I250
G1210	G1210	N1009	K728	E802	E802	E802	F580	S513	L450	R387	Q316	S251
G1211	G1211	E1010	W729	S803	S803	S803	W580	S513	L450	R387	Q317	P252
Q1212	Q1212	A1011	G730	Y804	Y804	Y804	E586	Q515	H451	L388	K317	P252
I1213	I1213	Q1012	R731	L805	L805	L805	W587	Q515	K452	S318	G318	N253
E1214	E1214	R1013	W732	P854	P854	P854	W588	Q521	M453	L391	G319	E254
E1215	E1215	L1014	L735	W656	W656	W656	Q589	M518	S494	V392	R320	E254
E1216	E1216	Q1015	W736	L657	L657	L657	F591	K393	M455	R393	P321	E256
ASN	THR	T1016	K737	L658	L658	L658	F591	M520	M456	N394	P322	R257
THR	PHE	L1017	L738	G661	G661	G661	D592	G522	H458	G323	K324	G258
PHE	HIS	F1018	W739	F662	F662	F662	T595	M521	V460	H399	I325	E259
PHE	HIS	C1019	L740	S663	S663	S663	I523	G522	V460	H399	I325	D260
ALA	ALA	L1020	N741	T664	T664	T664	I523	G522	K461	P400	R335	D261
ALA	ALA	R1023	W742	T664	T664	T664	Q625	I523	K461	P400	R335	D261
ALA	ALA	S1024	V743	L666	L666	L666	L598	D526	V462	G401	G331	T263
GLY	GLY	R1025	K744	G667	G667	G667	L606	T527	I463	A402	G332	F264
VAL	VAL	L1026	Q745	T670	T670	T670	P600	L528	P464	K403	E333	K265
ALA	ALA	L1027	Q745	T670	T670	T670	K601	L528	S466	Y404	E333	L266
SER	SER	T1028	W747	A671	A671	A671	D602	I406	T467	V405	G334	A267
SER	SER	T1029	G753	D672	D672	D672	N603	I406	F468	I406	R335	D268
K1092	K1092	R1030	F754	L674	L674	L674	G604	R407	R468	R407	R336	I269
V1094	V1094	V1031	F755	T675	T675	T675	M605	D408	L470	D408	R337	L270
T1095	T1095	L1032	W756	T675	T675	T675	L606	S409	N471	S409	G338	K271
S1096	S1096	L1033	I756	T675	T675	T675	T687	G410	L472	G410	N339	L274
G1097	G1097	Q1034	W757	T675	T675	T675	D609	R412	S473	R412	M341	L340
V1098	V1098	Y1035	T758	T679	T679	T679	D538	R412	S473	R412	M341	L340
P1099	P1099	F971	Q760	T682	T682	T682	I413	D414	V474	D414	G342	L276
R1100	R1100	H972	W761	A684	A684	A684	G610	L415	T475	L415	K343	L276
H1173	H1173	L1037	T831	T683	T683	T683	E542	R416	S476	R416	R344	L278
L1101	L1101	L1038	T834	A684	A684	A684	I613	Y417	P477	P477	V345	L279
K1039	K1039	T834	G835	W836	W836	W836	F614	Y417	Y478	Y478	D346	E280
H1175	H1175	W836	G835	W836	W836	W836	W616	S418	N479	N479	F347	H281
S1175	S1175	E764	E764	E764	E764	E764	V616	A460	K419	K419	S348	N262
		C764	C764	C764	C764	C764	V617	V546	A460	A460	S348	G283

R1067	G1068	F1069	E1070	V1071	F1072	Y1073	M1074	T1077	G1078	K1079	K1080	L1081	Q1084	F1085	F1086	F1087	G1088	Y1091	Y1092	Q1093	R1094	L1095	R1096	H1097	M1098	V1099	D1100	D1101	K1102	I1103	R1106	A1107	R1108	G1109	P1110	M1111	Q1112	T1115	R1116	Q1117	G1121	R1122	S1123	R1124	D1125	G1126	G1127	L1128	L1129	H1062	F1130	G1131	Q1065	M1133	R864	R865	Y866	S869	T870	S871	E872	R873	F874	R877	S878	R879	R880	M881	T882	L883	R884	D891	L892	L893	D894	G897	L898	L899	A900	F963	G964	K965	V966	R969	T970	T971	K972	V973	P974	Q975	Q976	K977	D978	K979	F980	A981	S982	R983	H984	R987	G988	T989	L990	L991	H1062	G1063	I992	T993	Y994	Q1065	S1066	R863	R864	R865	R866	R867	R868	R869	R870	R871	R872	R873	R874	R875	R876	R877	R878	R879	R880	R881	R882	R883	R884	R885	R886	R887	R888	R889	R890	R891	R892	R893	R894	R895	R896	R897	R898	R899	R900	R901	R902	R903	R904	R905	R906	R907	R908	R909	R910	R911	R912	R913	R914	R915	R916	R917	R918	R919	R920	R921	R922	R923	R924	R925	R926	R927	Y830	S831	G832	Y833	Q834	Q835	S838	M839	L840	M841	M842	Q843	S844	S845	L846	D847	R848	G849	L850	F851	R852	S853	L854	F855	F856	R857	G858	L859	M860	D861	Q862	R863	R864	R865	R866	R867	R868	R869	R870	R871	R872	R873	R874	R875	R876	R877	R878	R879	R880	R881	R882	R883	R884	R885	R886	R887	R888	R889	R890	R891	R892	R893	R894	R895	R896	R897	R898	R899	R900	R901	R902	R903	R904	R905	R906	R907	R908	R909	R910	R911	R912	R913	R914	R915	R916	R917	R918	R919	R920	R921	R922	R923	R924	R925	R926	R927	R928	R929	R930	R931	R932	R933	R934	R935	R936	R937	R938	R939	R940	R941	R942	R943	R944	R945	R946	R947	R948	R949	R950	R951	R952	R953	R954	R955	R956	R957	R958	R959	R960	R961	R962	R963	R964	R965	R966	R967	R968	R969	R970	R971	R972	R973	R974	R975	R976	R977	R978	R979	R980	R981	R982	R983	R984	R985	R986	R987	R988	R989	R990	R991	R992	R993	R994	R995	R996	R997	R998	R999	R1000	R1001	R1002	R1003	R1004	R1005	R1006	R1007	R1008	R1009	R1010	R1011	R1012	R1013	R1014	R1015	R1016	R1017	R1018	R1019	R1020	R1021	R1022	R1023	R1024	R1025	R1026	R1027	R1028	R1029	R1030	R1031	R1032	R1033	V1034	A1035	A1036	L1037	S1038	G1039	N1040	E1041	A1044	S1045	F1047	T1050	T1051	V1052	G988	R1060	L1128	L1129	F1130	G1131	Q1065	M1133	R863	R864	R865	R866	R867	R868	R869	R870	R871	R872	R873	R874	R875	R876	R877	R878	R879	R880	R881	R882	R883	R884	R885	R886	R887	R888	R889	R890	R891	R892	R893	R894	R895	R896	R897	R898	R899	R900	R901	R902	R903	R904	R905	R906	R907	R908	R909	R910	R911	R912	R913	R914	R915	R916	R917	R918	R919	R920	R921	R922	R923	R924	R925	R926	R927	R928	R929	R930	R931	R932	R933	R934	R935	R936	R937	R938	R939	R940	R941	R942	R943	R944	R945	R946	R947	R948	R949	R950	R951	R952	R953	R954	R955	R956	R957	R958	R959	R960	R961	R962	R963	R964	R965	R966	R967	R968	R969	R970	R971	R972	R973	R974	R975	R976	R977	R978	R979	R980	R981	R982	R983	R984	R985	R986	R987	R988	R989	R990	R991	R992	R993	R994	R995	R996	R997	R998	R999	R1000	R1001	R1002	R1003	R1004	R1005	R1006	R1007	R1008	R1009	R1010	R1011	R1012	R1013	R1014	R1015	R1016	R1017	R1018	R1019	R1020	R1021	R1022	R1023	R1024	R1025	R1026	R1027	R1028	R1029	R1030	R1031	R1032	R1033	R1034	R1035	R1036	R1037	R1038	R1039	R1040	R1041	R1042	R1043	R1044	R1045	R1046	R1047	R1048	R1049	R1050	R1051	R1052	R1053	R1054	R1055	R1056	R1057	R1058	R1059	R1060	R1061	R1062	R1063	R1064	R1065	R1066	R1067	R1068	R1069	R1070	R1071	R1072	R1073	R1074	R1075	R1076	R1077	R1078	R1079	R1080	R1081	R1082	R1083	R1084	R1085	R1086	R1087	R1088	R1089	R1090	R1091	R1092	R1093	R1094	R1095	R1096	R1097	R1098	R1099	R1100	R1101	R1102	R1103	R1104	R1105	R1106	R1107	R1108	R1109	R1110	R1111	R1112	R1113	R1114	R1115	R1116	R1117	R1118	R1119	R1120	R1121	R1122	R1123	R1124	R1125	R1126	R1127	R1128	R1129	R1130	R1131	R1132	R1133	R1134	R1135	R1136	R1137	R1138	R1139	R1140	R1141	R1142	R1143	R1144	R1145	R1146	R1147	R1148	R1149	R1150	R1151	R1152	R1153	R1154	R1155	R1156	R1157	R1158	R1159	R1160	R1161	R1162	R1163	R1164	R1165	R1166	R1167	R1168	R1169	R1170	R1171	R1172	R1173	R1174	R1175	R1176	R1177	R1178	R1179	R1180	R1181	R1182	R1183	R1184	R1185	R1186	R1187	R1188	R1189	R1190	R1191	R1192	R1193	R1194	R1195	R1196	R1197	R1198	R1199	R1200	R1201	R1202	R1203	R1204	R1205	R1206	R1207	R1208	R1209	R1210	R1211	R1212	R1213	R1214	R1215	R1216	R1217	R1218	R1219	R1220	R1221	R1222	R1223	R1224	R1225	R1226	R1227	R1228	R1229	R1230	R1231	R1232	R1233	R1234	R1235	R1236	R1237	R1238	R1239	R1240	R1241	R1242	R1243	R1244	R1245	R1246	R1247	R1248	R1249	R1250	R1251	R1252	R1253	R1254	R1255	R1256	R1257	R1258	R1259	R1260	R1261	R1262	R1263	R1264	R1265	R1266	R1267	R1268	R1269	R1270	R1271	R1272	R1273	R1274	R1275	R1276	R1277	R1278	R1279	R1280	R1281	R1282	R1283	R1284	R1285	R1286	R1287	R1288	R1289	R1290	R1291	R1292	R1293	R1294	R1295	R1296	R1297	R1298	R1299	R1300	R1301	R1302	R1303	R1304	R1305	R1306	R1307	R1308	R1309	R1310	R1311	R1312	R1313	R1314	R1315	R1316	R1317	R1318	R1319	R1320	R1321	R1322	R1323	R1324	R1325	R1326	R1327	R1328	R1329	R1330	R1331	R1332	R1333	R1334	R1335	R1336	R1337	R1338	R1339	R1340	R1341	R1342	R1343	R1344	R1345	R1346	R1347	R1348	R1349	R1350	R1351	R1352	R1353	R1354	R1355	R1356	R1357	R1358	R1359	R1360	R1361	R1362	R1363	R1364	R1365	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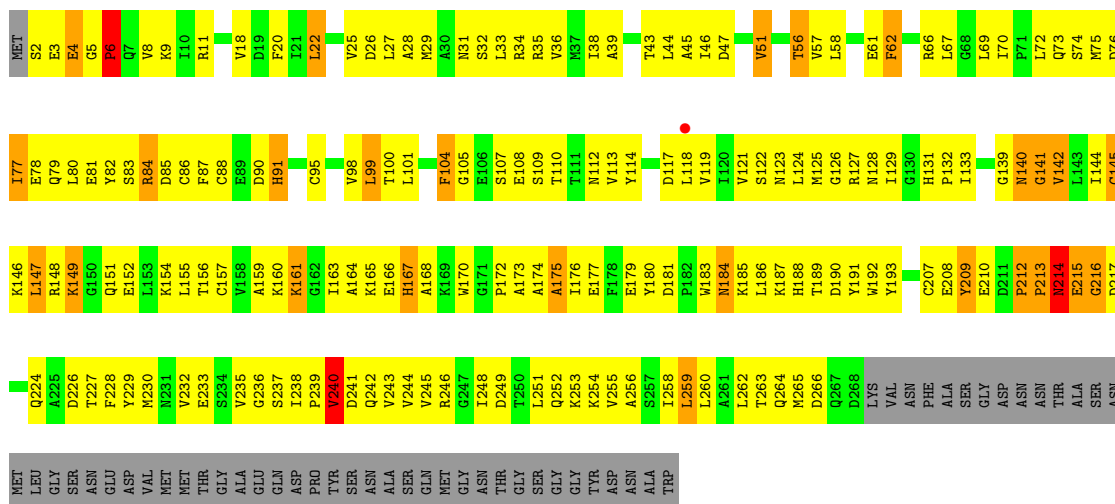
• Molecule 6: DNA-DIRECTED RNA POLYMERASE II 45KDA POLYPEPTIDE

Chain C: 26% 48% 9% 16%



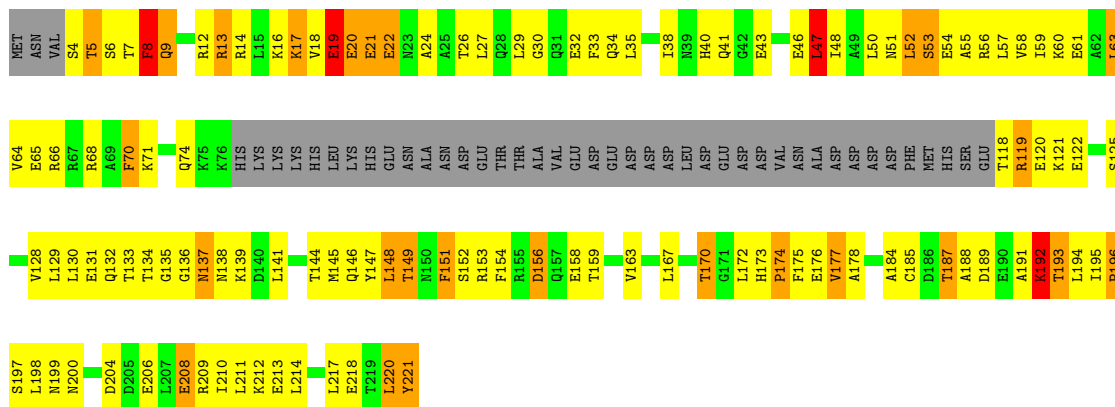
• Molecule 6: DNA-DIRECTED RNA POLYMERASE II 45KDA POLYPEPTIDE

Chain O: 28% 47% 8% 16%

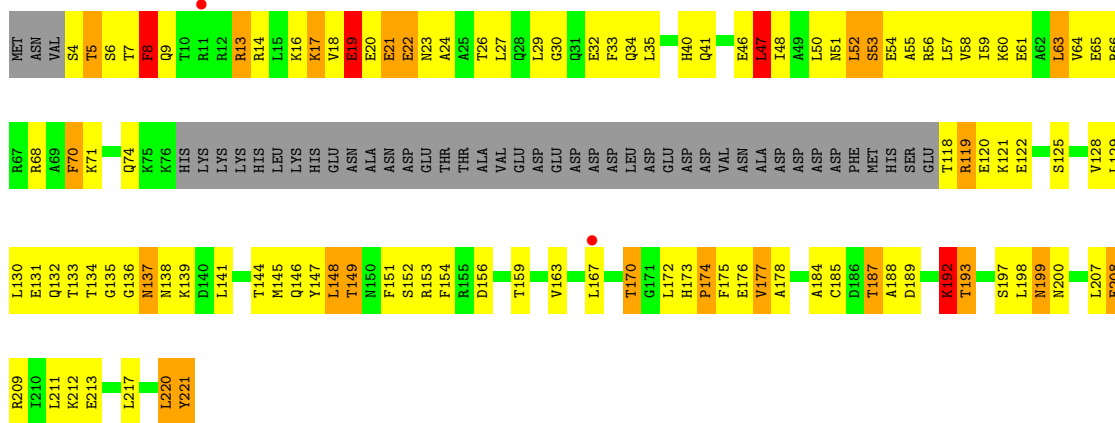


• Molecule 7: DNA-DIRECTED RNA POLYMERASE II 32KDA POLYPEPTIDE

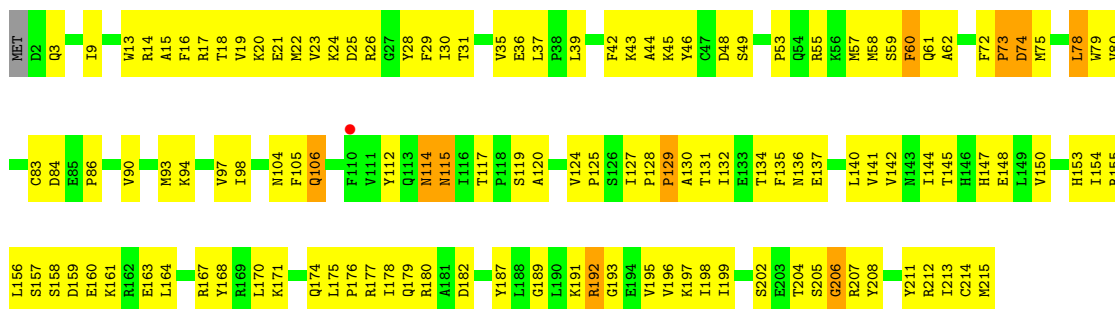
Chain D: 25% 42% 12% 20%



• Molecule 7: DNA-DIRECTED RNA POLYMERASE II 32KDA POLYPEPTIDE

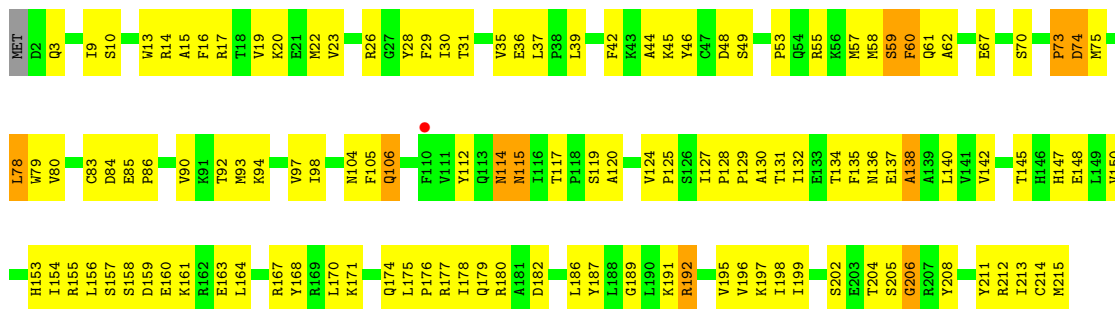


• Molecule 8: DNA-DIRECTED RNA POLYMERASES I, II, AND III 27 KDA POLYPEPTIDE



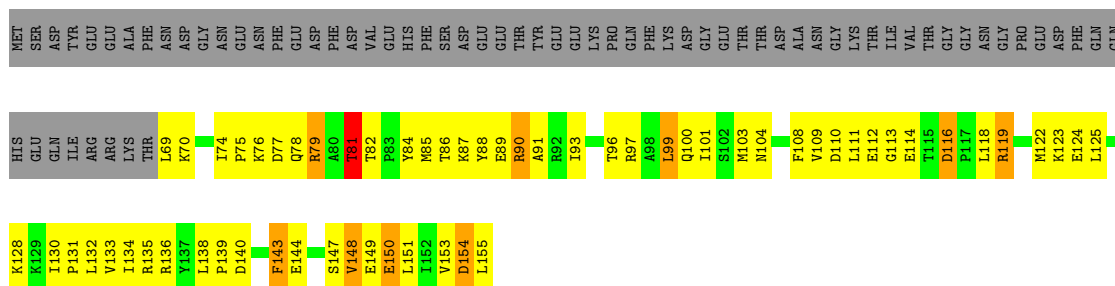
• Molecule 8: DNA-DIRECTED RNA POLYMERASES I, II, AND III 27 KDA POLYPEPTIDE





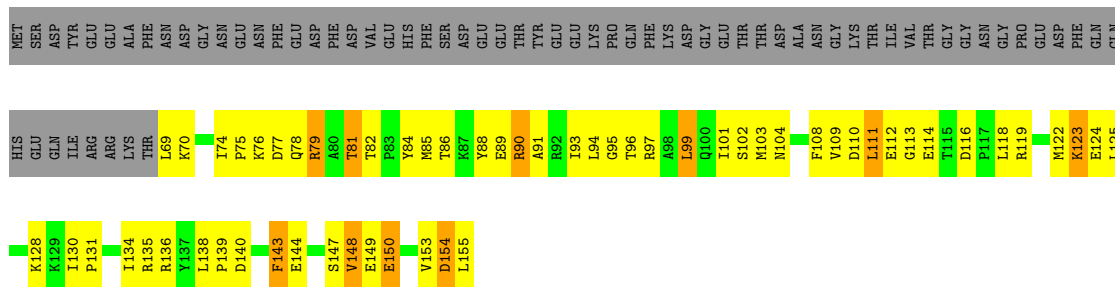
- Molecule 9: DNA-DIRECTED RNA POLYMERASES I, II, AND III 23 KDA POLYPEPTIDE

Chain F: 17% 33% 6% 44%



- Molecule 9: DNA-DIRECTED RNA POLYMERASES I, II, AND III 23 KDA POLYPEPTIDE

Chain R: 18% 32% 6% 44%

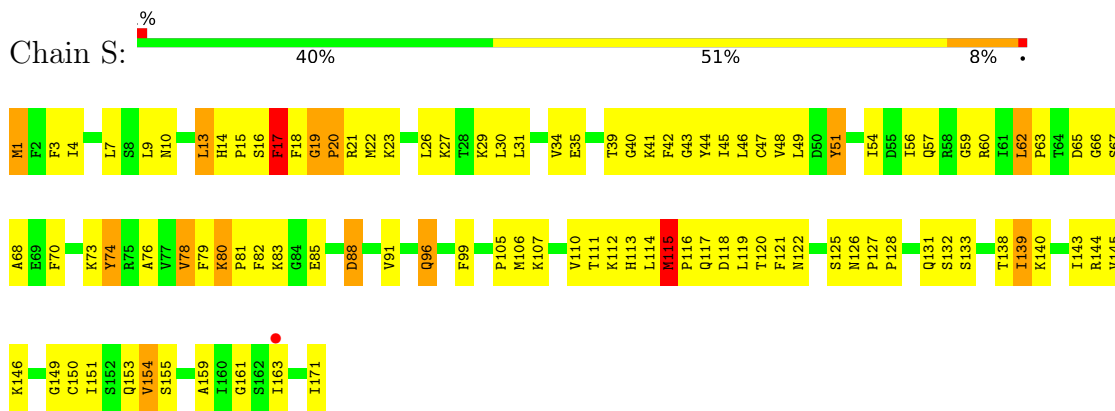


- Molecule 10: DNA-DIRECTED RNA POLYMERASE II 19KDA POLYPEPTIDE

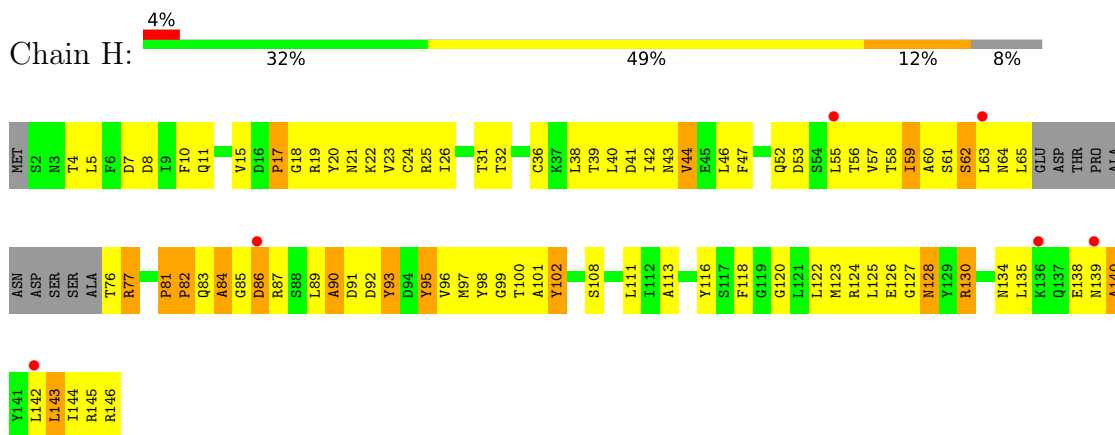
Chain G: 39% 55% 5%



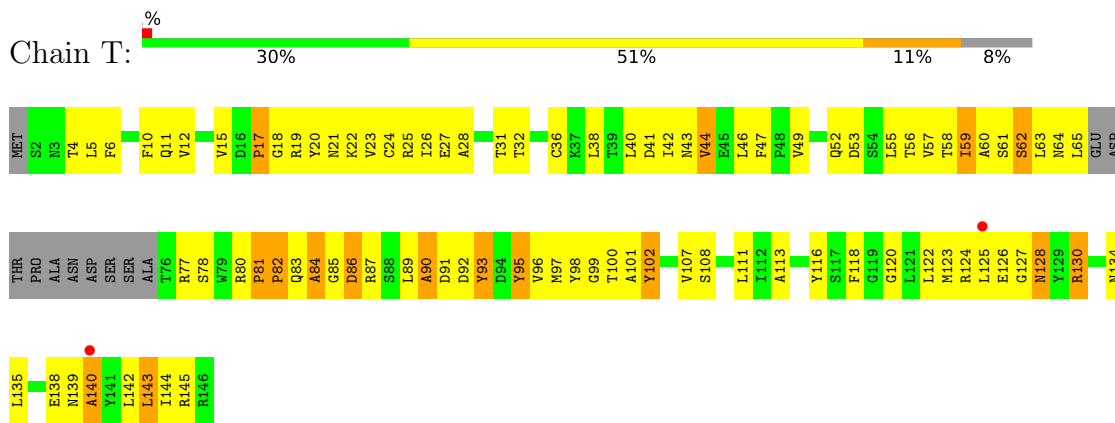
• Molecule 10: DNA-DIRECTED RNA POLYMERASE II 19KDA POLYPEPTIDE



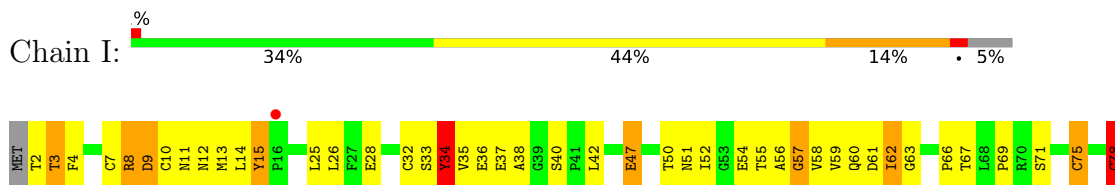
• Molecule 11: DNA-DIRECTED RNA POLYMERASES I, II, AND III 14.5 KDA POLYPEPTIDE



• Molecule 11: DNA-DIRECTED RNA POLYMERASES I, II, AND III 14.5 KDA POLYPEPTIDE

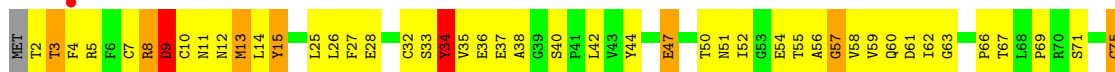


• Molecule 12: DNA-DIRECTED RNA POLYMERASE II SUBUNIT 9

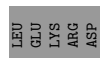
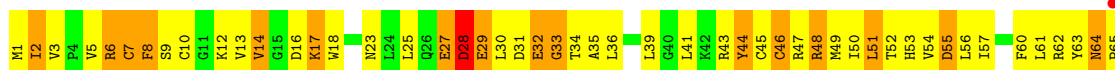
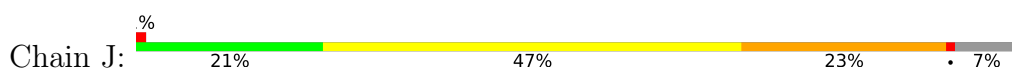




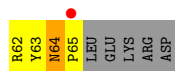
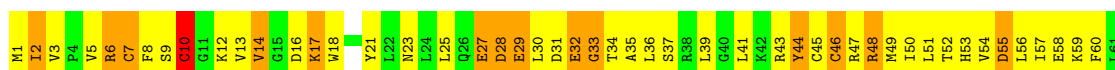
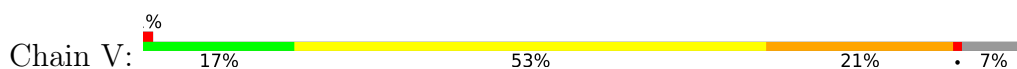
- Molecule 12: DNA-DIRECTED RNA POLYMERASE II SUBUNIT 9



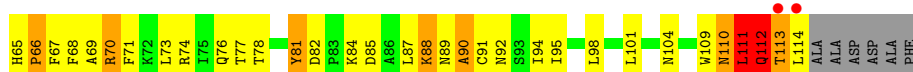
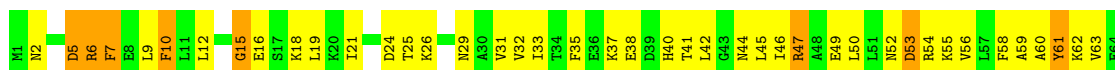
- Molecule 13: DNA-DIRECTED RNA POLYMERASES I/II/III SUBUNIT 10



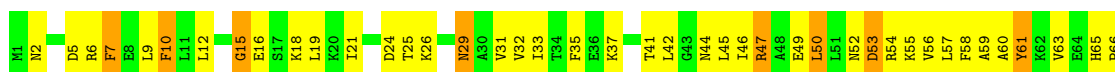
- Molecule 13: DNA-DIRECTED RNA POLYMERASES I/II/III SUBUNIT 10



- Molecule 14: DNA-DIRECTED RNA POLYMERASE II 13.6 KDA POLYPEPTIDE

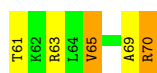
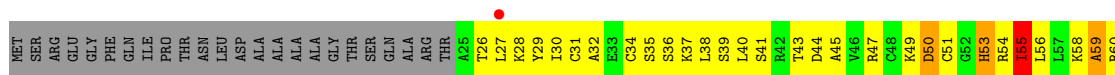
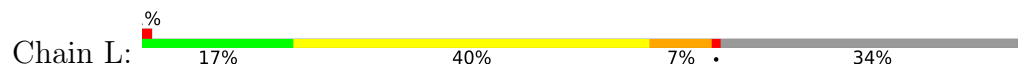


- Molecule 14: DNA-DIRECTED RNA POLYMERASE II 13.6 KDA POLYPEPTIDE

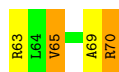
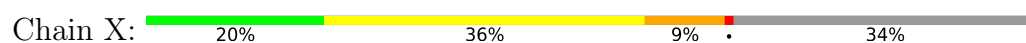




- Molecule 15: DNA-DIRECTED RNA POLYMERASES I, II, AND III 7.7 KDA POLYPEPTIDE



- Molecule 15: DNA-DIRECTED RNA POLYMERASES I, II, AND III 7.7 KDA POLYPEPTIDE



4 Data and refinement statistics i

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	394.36Å 221.86Å 283.11Å 90.00° 90.56° 90.00°	Depositor
Resolution (Å)	50.00 – 3.80 48.96 – 3.80	Depositor EDS
% Data completeness (in resolution range)	98.1 (50.00-3.80) 96.7 (48.96-3.80)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.76 (at 3.77Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.257 , 0.275 0.216 , 0.229	Depositor DCC
R_{free} test set	9042 reflections (1.95%)	wwPDB-VP
Wilson B-factor (Å ²)	116.2	Xtriage
Anisotropy	0.457	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.27 , 51.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.45$, $\langle L^2 \rangle = 0.28$	Xtriage
Estimated twinning fraction	0.024 for -1/2*h-3/2*k,-1/2*h+1/2*k,-l 0.024 for -1/2*h+3/2*k,1/2*h+1/2*k,-l 0.024 for 1/2*h-3/2*k,-1/2*h-1/2*k,-l 0.020 for 1/2*h+3/2*k,1/2*h-1/2*k,-l 0.308 for -h,-k,l	Xtriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	63924	wwPDB-VP
Average B, all atoms (Å ²)	104.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.93% 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: BRU, TT, ZN, 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	1	1.37	0/158	1.57	3/242 (1.2%)
1	4	1.35	0/158	1.58	3/242 (1.2%)
2	2	1.47	1/357 (0.3%)	1.42	3/544 (0.6%)
2	5	1.46	1/357 (0.3%)	1.40	4/544 (0.7%)
3	3	1.55	4/237 (1.7%)	2.20	8/368 (2.2%)
3	6	1.59	4/237 (1.7%)	2.10	8/368 (2.2%)
4	A	0.48	0/11385	0.73	2/15393 (0.0%)
4	M	0.48	0/11385	0.73	2/15393 (0.0%)
5	B	0.47	0/9037	0.70	3/12181 (0.0%)
5	N	0.46	0/9037	0.70	2/12181 (0.0%)
6	C	0.48	0/2138	0.71	0/2896
6	O	0.50	0/2138	0.71	0/2896
7	D	0.44	0/1437	0.67	0/1925
7	P	0.46	0/1437	0.68	0/1925
8	E	0.43	0/1788	0.63	0/2406
8	Q	0.43	0/1788	0.63	0/2406
9	F	0.55	0/716	0.77	0/964
9	R	0.55	0/716	0.75	0/964
10	G	0.52	0/1368	0.74	0/1844
10	S	0.52	0/1368	0.74	0/1844
11	H	0.40	0/1102	0.65	0/1492
11	T	0.40	0/1102	0.65	0/1492
12	I	0.39	0/962	0.69	0/1295
12	U	0.41	0/962	0.69	0/1295
13	J	0.49	0/541	0.77	0/727
13	V	0.52	0/541	0.79	1/727 (0.1%)
14	K	0.92	6/937 (0.6%)	1.00	11/1265 (0.9%)
14	W	0.93	6/937 (0.6%)	0.99	11/1265 (0.9%)
15	L	0.43	0/366	0.71	0/485
15	X	0.45	0/366	0.72	0/485
All	All	0.53	22/65058 (0.0%)	0.76	61/88054 (0.1%)

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
2	2	0	2
2	5	0	1
5	B	0	1
5	N	0	1
All	All	0	5

The worst 5 of 22 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
14	W	112	GLN	CA-C	10.22	1.79	1.52
14	K	112	GLN	CA-C	10.06	1.79	1.52
14	W	113	THR	N-CA	9.11	1.64	1.46
14	K	113	THR	N-CA	9.06	1.64	1.46
14	W	112	GLN	N-CA	8.71	1.63	1.46

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	3	2	C	OP2-P-O3'	-22.50	55.69	105.20
3	3	3	G	O5'-P-OP2	22.31	137.47	110.70
3	6	3	G	O5'-P-OP2	21.67	136.70	110.70
3	6	2	C	OP2-P-O3'	-20.00	61.20	105.20
14	W	113	THR	N-CA-C	9.88	137.68	111.00

There are no chirality outliers.

All (5) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	2	20	DC	Sidechain
2	2	26	DC	Sidechain
2	5	20	DC	Sidechain
5	B	486	TYR	Sidechain
5	N	486	TYR	Sidechain

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	1	141	0	81	11	0
1	4	141	0	81	12	0
2	2	380	0	218	36	0
2	5	380	0	218	33	0
3	3	212	0	110	14	0
3	6	212	0	110	10	0
4	A	11186	0	11266	1277	0
4	M	11186	0	11266	1263	0
5	B	8866	0	8898	968	0
5	N	8866	0	8898	1006	0
6	C	2101	0	2055	256	0
6	O	2101	0	2055	237	0
7	D	1427	0	1451	142	0
7	P	1427	0	1451	144	0
8	E	1752	0	1776	131	0
8	Q	1752	0	1776	124	0
9	F	705	0	730	82	0
9	R	705	0	730	80	0
10	G	1340	0	1357	154	0
10	S	1340	0	1357	164	0
11	H	1084	0	1057	122	0
11	T	1084	0	1057	122	0
12	I	944	0	899	112	0
12	U	944	0	899	113	0
13	J	532	0	542	98	0
13	V	532	0	542	110	0
14	K	919	0	929	113	0
14	W	919	0	929	99	0
15	L	364	0	386	41	0
15	X	364	0	386	41	0
16	A	1	0	0	0	0
16	M	1	0	0	0	0
17	A	2	0	0	0	0
17	B	1	0	0	0	0
17	C	1	0	0	0	0
17	I	2	0	0	0	0
17	J	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
17	L	1	0	0	0	0
17	M	2	0	0	0	0
17	N	1	0	0	0	0
17	O	1	0	0	0	0
17	U	2	0	0	0	0
17	V	1	0	0	0	0
17	X	1	0	0	0	0
All	All	63924	0	63510	6519	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 51.

The worst 5 of 6519 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)
14:W:112:GLN:CB	14:W:112:GLN:CG	1.76	1.59
14:K:112:GLN:CB	14:K:112:GLN:CG	1.75	1.56
14:K:112:GLN:C	14:K:112:GLN:CA	1.79	1.49
14:W:112:GLN:CA	14:W:112:GLN:C	1.79	1.47
4:A:855:THR:HG21	4:A:857:ARG:HE	1.09	1.18

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	1410/1733 (81%)	968 (69%)	288 (20%)	154 (11%)	0 8
4	M	1410/1733 (81%)	964 (68%)	291 (21%)	155 (11%)	0 8
5	B	1096/1224 (90%)	762 (70%)	222 (20%)	112 (10%)	0 9
5	N	1096/1224 (90%)	765 (70%)	217 (20%)	114 (10%)	0 9

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
6	C	264/318 (83%)	172 (65%)	64 (24%)	28 (11%)	0	8
6	O	264/318 (83%)	171 (65%)	63 (24%)	30 (11%)	0	7
7	D	173/221 (78%)	125 (72%)	27 (16%)	21 (12%)	0	6
7	P	173/221 (78%)	124 (72%)	32 (18%)	17 (10%)	0	10
8	E	212/215 (99%)	155 (73%)	42 (20%)	15 (7%)	1	17
8	Q	212/215 (99%)	156 (74%)	42 (20%)	14 (7%)	1	19
9	F	84/155 (54%)	67 (80%)	11 (13%)	6 (7%)	1	17
9	R	84/155 (54%)	67 (80%)	12 (14%)	5 (6%)	1	20
10	G	169/171 (99%)	125 (74%)	37 (22%)	7 (4%)	3	27
10	S	169/171 (99%)	132 (78%)	28 (17%)	9 (5%)	2	23
11	H	131/146 (90%)	87 (66%)	27 (21%)	17 (13%)	0	5
11	T	131/146 (90%)	83 (63%)	30 (23%)	18 (14%)	0	4
12	I	114/122 (93%)	83 (73%)	19 (17%)	12 (10%)	0	8
12	U	114/122 (93%)	81 (71%)	22 (19%)	11 (10%)	0	10
13	J	63/70 (90%)	35 (56%)	14 (22%)	14 (22%)	0	1
13	V	63/70 (90%)	36 (57%)	15 (24%)	12 (19%)	0	2
14	K	112/120 (93%)	86 (77%)	14 (12%)	12 (11%)	0	8
14	W	112/120 (93%)	86 (77%)	17 (15%)	9 (8%)	1	14
15	L	44/70 (63%)	16 (36%)	21 (48%)	7 (16%)	0	3
15	X	44/70 (63%)	17 (39%)	19 (43%)	8 (18%)	0	2
All	All	7744/9130 (85%)	5363 (69%)	1574 (20%)	807 (10%)	0	9

5 of 807 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	A	44	THR
4	A	48	ALA
4	A	57	ARG
4	A	62	ASP
4	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	
4	A	1244/1520 (82%)	1138 (92%)	106 (8%)	10	40
4	M	1244/1520 (82%)	1142 (92%)	102 (8%)	11	40
5	B	967/1061 (91%)	888 (92%)	79 (8%)	11	40
5	N	967/1061 (91%)	886 (92%)	81 (8%)	11	40
6	C	235/274 (86%)	216 (92%)	19 (8%)	11	41
6	O	235/274 (86%)	215 (92%)	20 (8%)	10	40
7	D	159/200 (80%)	136 (86%)	23 (14%)	3	19
7	P	159/200 (80%)	138 (87%)	21 (13%)	4	22
8	E	196/197 (100%)	191 (97%)	5 (3%)	46	69
8	Q	196/197 (100%)	191 (97%)	5 (3%)	46	69
9	F	77/137 (56%)	68 (88%)	9 (12%)	5	27
9	R	77/137 (56%)	69 (90%)	8 (10%)	7	30
10	G	152/152 (100%)	141 (93%)	11 (7%)	14	45
10	S	152/152 (100%)	140 (92%)	12 (8%)	12	42
11	H	119/128 (93%)	112 (94%)	7 (6%)	19	51
11	T	119/128 (93%)	112 (94%)	7 (6%)	19	51
12	I	110/116 (95%)	96 (87%)	14 (13%)	4	23
12	U	110/116 (95%)	95 (86%)	15 (14%)	3	22
13	J	60/65 (92%)	53 (88%)	7 (12%)	5	27
13	V	60/65 (92%)	54 (90%)	6 (10%)	7	32
14	K	99/102 (97%)	89 (90%)	10 (10%)	7	32
14	W	99/102 (97%)	88 (89%)	11 (11%)	6	29
15	L	40/57 (70%)	36 (90%)	4 (10%)	7	32
15	X	40/57 (70%)	36 (90%)	4 (10%)	7	32
All	All	6916/8018 (86%)	6330 (92%)	586 (8%)	10	40

5 of 586 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
5	N	1095	LEU
14	W	25	THR

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Mol	Chain	Res	Type
5	N	1216	LEU
5	N	1087	PHE
8	Q	78	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 149 such sidechains are listed below:

Mol	Chain	Res	Type
5	N	984	HIS
12	U	89	GLN
5	N	1076	HIS
7	P	40	HIS
5	B	1179	GLN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
3	3	9/11 (81%)	1 (11%)	0
3	6	9/11 (81%)	1 (11%)	0
All	All	18/22 (81%)	2 (11%)	0

All (2) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
3	3	3	G
3	6	3	G

There are no RNA pucker outliers to report.

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

4 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	BRU	5	22	3,2	18,21,22	0.39	0	26,30,33	1.21	3 (11%)
2	TT	5	18	2	40,43,44	4.60	7 (17%)	59,69,72	2.09	13 (22%)
2	TT	2	18	2	40,43,44	4.61	8 (20%)	59,69,72	2.09	12 (20%)
2	BRU	2	22	3,2	18,21,22	0.39	0	26,30,33	1.13	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
2	BRU	5	22	3,2	-	2/7/21/22	0/2/2/2
2	TT	5	18	2	-	10/18/105/106	0/5/6/6
2	TT	2	18	2	-	10/18/105/106	0/5/6/6
2	BRU	2	22	3,2	-	2/7/21/22	0/2/2/2

The worst 5 of 15 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	5	18	TT	C5-C6	-20.59	1.31	1.55
2	2	18	TT	C5-C6	-20.44	1.31	1.55
2	2	18	TT	C5T-C6T	-19.00	1.33	1.55
2	5	18	TT	C5T-C6T	-18.67	1.33	1.55
2	2	18	TT	C6-N1	-4.25	1.39	1.46

The worst 5 of 30 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	5	18	TT	C5T-C5-C6	7.53	97.75	88.38
2	2	18	TT	C5T-C5-C6	7.05	97.15	88.38
2	2	18	TT	C5-C6-N1	6.27	124.39	115.61
2	5	18	TT	C5-C6-C6T	-6.13	79.23	89.28
2	5	18	TT	C5-C6-N1	5.95	123.95	115.61

There are no chirality outliers.

5 of 24 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	2	18	TT	O4R-C4R-C5R-O5R
2	2	18	TT	C3R-C4R-C5R-O5R

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Mol	Chain	Res	Type	Atoms
2	5	18	TT	C3R-C4R-C5R-O5R
2	5	18	TT	O4R-C4R-C5R-O5R
2	2	18	TT	O4'-C4'-C5'-O5'

There are no ring outliers.

4 monomers are involved in 15 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	5	22	BRU	3	0
2	5	18	TT	4	0
2	2	18	TT	4	0
2	2	22	BRU	4	0

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 18 ligands modelled in this entry, 18 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
5	B	2
5	N	2
6	O	1
6	C	1
9	F	1
9	R	1
4	M	1
4	A	1

The worst 5 of 10 chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	O	2:SER	C	3:GLU	N	4.13
1	C	2:SER	C	3:GLU	N	4.09
1	B	18:PHE	C	19:GLU	N	3.79
1	N	18:PHE	C	19:GLU	N	3.71
1	F	69:LEU	C	70:LYS	N	3.56

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	1	7/14 (50%)	-0.74	0 100 100	123, 130, 149, 149	0
1	4	7/14 (50%)	-0.68	0 100 100	120, 128, 147, 148	0
2	2	16/25 (64%)	-0.67	0 100 100	84, 130, 151, 155	0
2	5	16/25 (64%)	-0.57	0 100 100	87, 132, 150, 153	0
3	3	10/11 (90%)	-0.48	0 100 100	95, 100, 152, 155	0
3	6	10/11 (90%)	-0.44	0 100 100	95, 102, 153, 156	0
4	A	1421/1733 (81%)	-0.09	8 (0%) 89 85	22, 88, 163, 200	0
4	M	1421/1733 (81%)	-0.07	5 (0%) 92 89	20, 88, 163, 200	0
5	B	1115/1224 (91%)	-0.04	8 (0%) 87 83	24, 101, 175, 200	0
5	N	1115/1224 (91%)	-0.03	7 (0%) 89 85	23, 101, 174, 200	0
6	C	267/318 (83%)	-0.14	0 100 100	49, 88, 147, 173	0
6	O	267/318 (83%)	-0.07	1 (0%) 92 89	52, 87, 148, 170	0
7	D	177/221 (80%)	-0.06	0 100 100	72, 121, 166, 183	0
7	P	177/221 (80%)	-0.06	2 (1%) 80 74	71, 124, 166, 182	0
8	E	214/215 (99%)	-0.15	1 (0%) 91 87	60, 145, 193, 197	0
8	Q	214/215 (99%)	-0.14	1 (0%) 91 87	58, 145, 194, 197	0
9	F	87/155 (56%)	-0.07	0 100 100	31, 62, 108, 140	0
9	R	87/155 (56%)	-0.05	0 100 100	31, 63, 109, 138	0
10	G	171/171 (100%)	-0.10	0 100 100	64, 91, 136, 146	0
10	S	171/171 (100%)	-0.07	1 (0%) 89 85	65, 92, 136, 143	0
11	H	135/146 (92%)	-0.03	6 (4%) 34 29	101, 145, 182, 192	0
11	T	135/146 (92%)	0.00	2 (1%) 73 66	99, 146, 181, 191	0
12	I	116/122 (95%)	-0.10	1 (0%) 84 79	82, 139, 170, 195	0
12	U	116/122 (95%)	-0.14	1 (0%) 84 79	81, 138, 170, 194	0

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Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
13	J	65/70 (92%)	-0.14	1 (1%) 73 66	52, 83, 128, 133	0
13	V	65/70 (92%)	-0.10	1 (1%) 73 66	46, 81, 130, 136	0
14	K	114/120 (95%)	-0.00	2 (1%) 68 61	48, 92, 120, 170	0
14	W	114/120 (95%)	-0.05	2 (1%) 68 61	47, 92, 118, 167	0
15	L	46/70 (65%)	0.06	1 (2%) 62 54	86, 155, 179, 186	0
15	X	46/70 (65%)	0.06	0 100 100	84, 156, 179, 185	0
All	All	7922/9230 (85%)	-0.07	51 (0%) 89 85	20, 99, 173, 200	0

The worst 5 of 51 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
14	K	114	LEU	8.6
14	K	113	THR	8.0
14	W	114	LEU	6.6
14	W	113	THR	6.2
4	M	1092	LYS	5.7

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
2	BRU	2	22	20/21	0.90	0.17	69,76,80,84	0
2	BRU	5	22	20/21	0.92	0.14	77,84,87,89	0
2	TT	2	18	38/39	0.94	0.21	93,106,123,125	0
2	TT	5	18	38/39	0.94	0.16	95,108,126,127	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
17	ZN	B	2457	1/1	0.97	0.28	53,53,53,53	0
17	ZN	I	2457	1/1	0.97	0.24	199,199,199,199	0
17	ZN	L	2457	1/1	0.98	0.24	116,116,116,116	0
17	ZN	M	2457	1/1	0.98	0.27	87,87,87,87	0
17	ZN	U	2458	1/1	0.98	0.19	178,178,178,178	0
17	ZN	X	2457	1/1	0.98	0.25	120,120,120,120	0
17	ZN	I	2458	1/1	0.99	0.29	94,94,94,94	0
17	ZN	J	2457	1/1	0.99	0.25	70,70,70,70	0
17	ZN	A	2471	1/1	0.99	0.24	90,90,90,90	0
16	MG	A	2457	1/1	0.99	0.19	50,50,50,50	0
17	ZN	M	2458	1/1	0.99	0.24	51,51,51,51	0
17	ZN	O	2457	1/1	0.99	0.30	39,39,39,39	0
17	ZN	U	2457	1/1	0.99	0.30	91,91,91,91	0
17	ZN	C	2457	1/1	0.99	0.30	48,48,48,48	0
17	ZN	V	2457	1/1	0.99	0.24	67,67,67,67	0
16	MG	M	2459	1/1	0.99	0.24	34,34,34,34	0
17	ZN	N	2457	1/1	1.00	0.28	54,54,54,54	0
17	ZN	A	2472	1/1	1.00	0.22	52,52,52,52	0

6.5 Other polymers [\(i\)](#)

There are no such residues in this entry.