



wwPDB X-ray Structure Validation Summary Report ⓘ

May 29, 2020 – 07:39 am BST

PDB ID : 4YM7
Title : RNA polymerase I structure with an alternative dimer hinge
Authors : Kostrewa, D.; Kuhn, C.-D.; Engel, C.; Cramer, P.
Deposited on : 2015-03-06
Resolution : 5.50 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 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 : 2.11
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) : 2.11

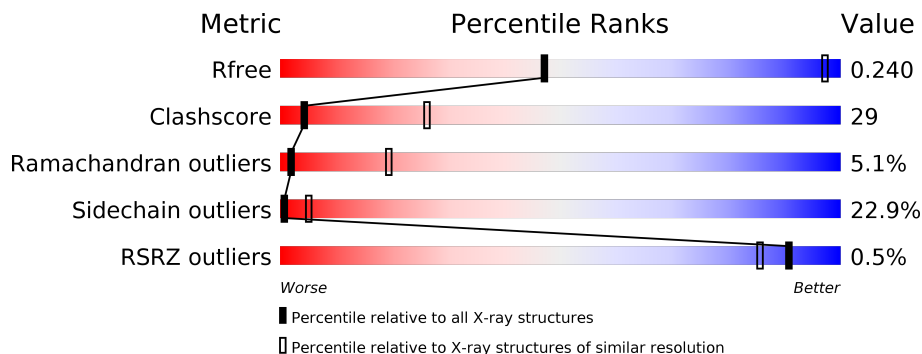
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 5.50 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.




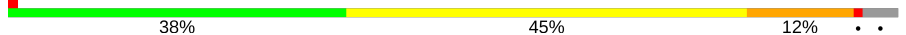

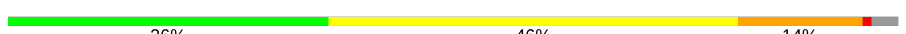
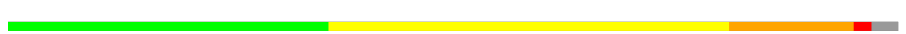

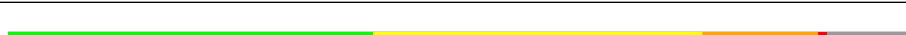
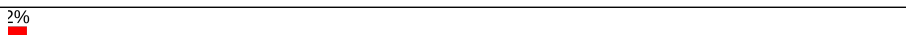
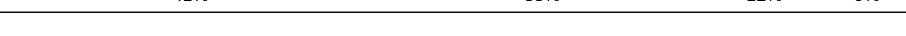


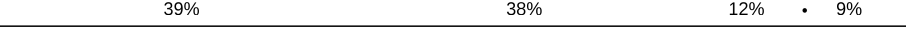








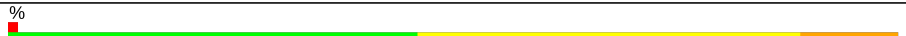
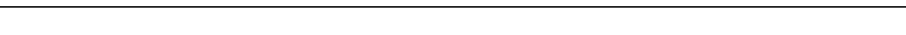
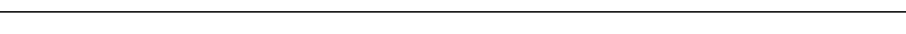
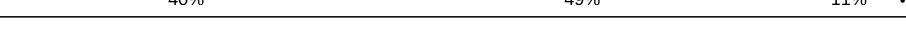
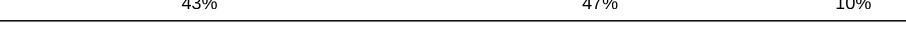
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1019 (7.12-3.82)
Clashscore	141614	1010 (7.10-3.90)
Ramachandran outliers	138981	1014 (7.12-3.82)
Sidechain outliers	138945	1191 (7.20-3.80)
RSRZ outliers	127900	1023 (7.08-3.76)

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 on 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	AA	1664	 %
1	BA	1664	 %
1	CA	1664	
1	DA	1664	
1	EA	1664	
1	FA	1664	




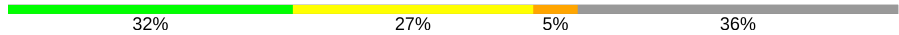
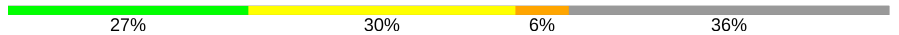




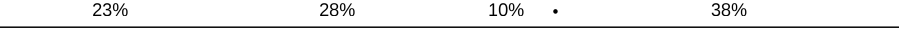

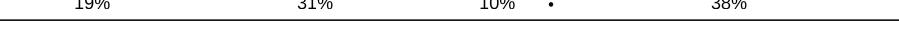
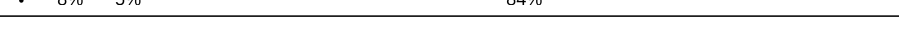





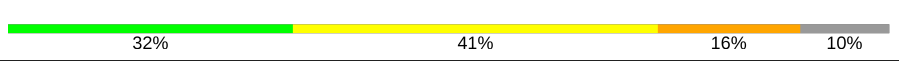
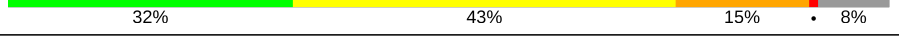
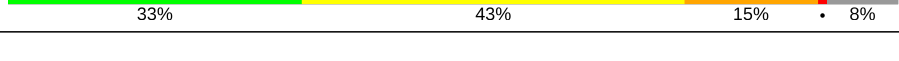
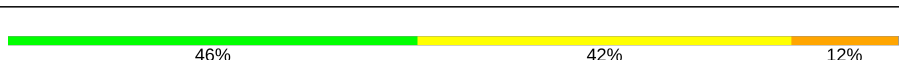
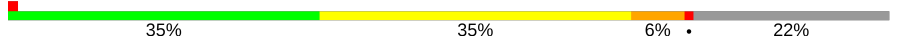


Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
2	AB	1203	
2	BB	1203	
2	CB	1203	
2	DB	1203	
2	EB	1203	
2	FB	1203	
3	AC	335	
3	BC	335	
3	CC	335	
3	DC	335	
3	EC	335	
3	FC	335	
4	AD	137	
4	BD	137	
4	CD	137	
4	DD	137	
4	ED	137	
4	FD	137	
5	AE	215	
5	BE	215	
5	CE	215	
5	DE	215	
5	EE	215	
5	FE	215	
6	AF	155	




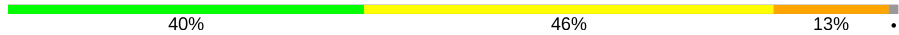
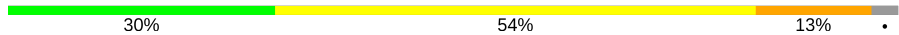
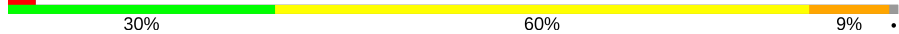
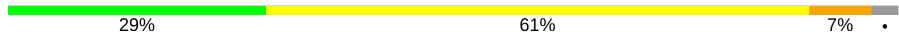
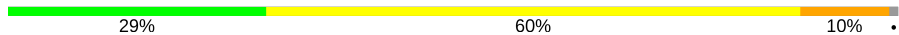
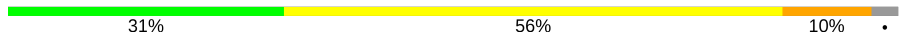
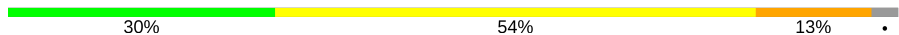
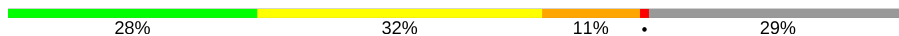
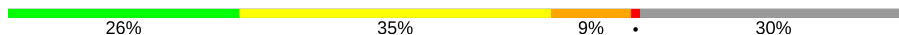
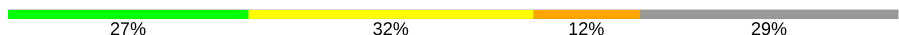












Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
6	BF	155	
6	CF	155	
6	DF	155	
6	EF	155	
6	FF	155	
7	AG	326	
7	AO	326	
7	BG	326	
7	BO	326	
7	CG	326	
7	CO	326	
7	DG	326	
7	DO	326	
7	EG	326	
7	EO	326	
7	FG	326	
7	FO	326	
8	AH	146	
8	BH	146	
8	CH	146	
8	DH	146	
8	EH	146	
8	FH	146	
9	AI	125	
9	BI	125	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
9	CI	125	
9	DI	125	
9	EI	125	
9	FI	125	
10	AJ	70	
10	BJ	70	
10	CJ	70	
10	DJ	70	
10	EJ	70	
10	FJ	70	
11	AK	142	
11	BK	142	
11	CK	142	
11	DK	142	
11	EK	142	
11	FK	142	
12	AL	70	
12	BL	70	
12	CL	70	
12	DL	70	
12	EL	70	
12	FL	70	
13	AM	415	
13	BM	415	
13	CM	415	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
13	DM	415	10% 13% • 74%
13	EM	415	9% 13% • 73%
13	FM	415	9% 12% • • 73%
14	AN	233	% 23% 28% 8% • 39%
14	BN	233	% 24% 30% 6% • 39%
14	CN	233	24% 27% 9% • 39%
14	DN	233	24% 29% 8% • 38%
14	EN	233	23% 30% 7% • 38%
14	FN	233	21% 32% 8% • 38%

2 Entry composition

There are 15 unique types of molecules in this entry. The entry contains 204233 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 I subunit RPA190.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	AA	1484	Total 11703	C 7385	N 2036	O 2220	S 62	0	0	0
1	BA	1462	Total 11540	C 7291	N 2003	O 2184	S 62	0	0	0
1	CA	1483	Total 11695	C 7381	N 2035	O 2217	S 62	0	0	0
1	DA	1483	Total 11697	C 7381	N 2034	O 2220	S 62	0	0	0
1	EA	1484	Total 11706	C 7390	N 2036	O 2218	S 62	0	0	0
1	FA	1484	Total 11709	C 7392	N 2036	O 2219	S 62	0	0	0

- Molecule 2 is a protein called DNA-directed RNA polymerase I subunit RPA135.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	AB	1154	Total 9187	C 5822	N 1606	O 1708	S 51	0	0	0
2	BB	1153	Total 9175	C 5812	N 1603	O 1709	S 51	0	0	0
2	CB	1170	Total 9304	C 5892	N 1629	O 1732	S 51	0	0	0
2	DB	1165	Total 9269	C 5871	N 1622	O 1725	S 51	0	0	0
2	EB	1164	Total 9265	C 5871	N 1619	O 1724	S 51	0	0	0
2	FB	1165	Total 9270	C 5872	N 1622	O 1725	S 51	0	0	0

- Molecule 3 is a protein called DNA-directed RNA polymerases I and III subunit RPAC1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	AC	304	Total	C	N	O	S	0	0	0
			2413	1534	414	457	8			
3	BC	304	Total	C	N	O	S	0	0	0
			2413	1534	414	457	8			
3	CC	304	Total	C	N	O	S	0	0	0
			2413	1534	414	457	8			
3	DC	304	Total	C	N	O	S	0	0	0
			2413	1534	414	457	8			
3	EC	304	Total	C	N	O	S	0	0	0
			2413	1534	414	457	8			
3	FC	304	Total	C	N	O	S	0	0	0
			2413	1534	414	457	8			

- Molecule 4 is a protein called DNA-directed RNA polymerase I subunit RPA14.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	AD	58	Total	C	N	O	0	0	0
			459	289	78	92			
4	BD	58	Total	C	N	O	0	0	0
			459	289	78	92			
4	CD	58	Total	C	N	O	0	0	0
			459	289	78	92			
4	DD	58	Total	C	N	O	0	0	0
			459	289	78	92			
4	ED	58	Total	C	N	O	0	0	0
			459	289	78	92			
4	FD	58	Total	C	N	O	0	0	0
			459	289	78	92			

- Molecule 5 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	AE	215	Total	C	N	O	S	0	0	0
			1760	1116	310	322	12			
5	BE	215	Total	C	N	O	S	0	0	0
			1760	1116	310	322	12			
5	CE	215	Total	C	N	O	S	0	0	0
			1760	1116	310	322	12			
5	DE	215	Total	C	N	O	S	0	0	0
			1760	1116	310	322	12			
5	EE	215	Total	C	N	O	S	0	0	0
			1760	1116	310	322	12			
5	FE	215	Total	C	N	O	S	0	0	0
			1760	1116	310	322	12			

- Molecule 6 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
6	AF	98	Total	C	N	O	S	0	0	0
			807	512	142	150	3			
6	BF	98	Total	C	N	O	S	0	0	0
			807	512	142	150	3			
6	CF	99	Total	C	N	O	S	0	0	0
			816	517	143	153	3			
6	DF	99	Total	C	N	O	S	0	0	0
			816	517	143	153	3			
6	EF	99	Total	C	N	O	S	0	0	0
			816	517	143	153	3			
6	FF	99	Total	C	N	O	S	0	0	0
			816	517	143	153	3			

- Molecule 7 is a protein called DNA-directed RNA polymerase I subunit RPA43.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
7	AG	202	Total	C	N	O	S	0	0	0
			1599	1025	276	293	5			
7	AO	52	Total	C	N	O		0	0	0
			413	253	64	96				
7	BG	195	Total	C	N	O	S	0	0	0
			1539	992	264	278	5			
7	BO	51	Total	C	N	O		0	0	0
			404	248	63	93				
7	CG	202	Total	C	N	O	S	0	0	0
			1599	1025	276	293	5			
7	CO	50	Total	C	N	O		0	0	0
			398	245	62	91				
7	DG	202	Total	C	N	O	S	0	0	0
			1599	1025	276	293	5			
7	DO	52	Total	C	N	O		0	0	0
			413	253	64	96				
7	EG	202	Total	C	N	O	S	0	0	0
			1599	1025	276	293	5			
7	EO	52	Total	C	N	O		0	0	0
			413	253	64	96				
7	FG	202	Total	C	N	O	S	0	0	0
			1599	1025	276	293	5			
7	FO	52	Total	C	N	O		0	0	0
			413	253	64	96				

- Molecule 8 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
8	AH	132	Total	C	N	O	S	0	0	0
			1063	670	180	209	4			
8	BH	131	Total	C	N	O	S	0	0	0
			1052	664	176	208	4			
8	CH	131	Total	C	N	O	S	0	0	0
			1052	664	176	208	4			
8	DH	134	Total	C	N	O	S	0	0	0
			1075	677	182	212	4			
8	EH	134	Total	C	N	O	S	0	0	0
			1075	677	182	212	4			
8	FH	134	Total	C	N	O	S	0	0	0
			1075	677	182	212	4			

- Molecule 9 is a protein called DNA-directed RNA polymerase I subunit RPA12.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
9	AI	124	Total	C	N	O	S	0	0	0
			943	584	160	190	9			
9	BI	97	Total	C	N	O	S	0	0	0
			716	439	120	148	9			
9	CI	124	Total	C	N	O	S	0	0	0
			943	584	160	190	9			
9	DI	124	Total	C	N	O	S	0	0	0
			943	584	160	190	9			
9	EI	117	Total	C	N	O	S	0	0	0
			898	556	152	181	9			
9	FI	124	Total	C	N	O	S	0	0	0
			943	584	160	190	9			

- Molecule 10 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
10	AJ	68	Total	C	N	O	S	0	0	0
			558	356	97	99	6			
10	BJ	69	Total	C	N	O	S	0	0	0
			569	362	101	100	6			
10	CJ	68	Total	C	N	O	S	0	0	0
			558	356	97	99	6			
10	DJ	69	Total	C	N	O	S	0	0	0
			569	362	101	100	6			
10	EJ	68	Total	C	N	O	S	0	0	0
			558	356	97	99	6			
10	FJ	68	Total	C	N	O	S	0	0	0
			558	356	97	99	6			

- Molecule 11 is a protein called DNA-directed RNA polymerases I and III subunit RPAC2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
11	AK	101	Total	C	N	O	S	0	0	0
			793	496	130	162	5			
11	BK	100	Total	C	N	O	S	0	0	0
			786	491	129	161	5			
11	CK	101	Total	C	N	O	S	0	0	0
			793	496	130	162	5			
11	DK	101	Total	C	N	O	S	0	0	0
			793	496	130	162	5			
11	EK	100	Total	C	N	O	S	0	0	0
			786	491	129	161	5			
11	FK	100	Total	C	N	O	S	0	0	0
			786	491	129	161	5			

- Molecule 12 is a protein called DNA-directed RNA polymerases I, II, and III subunit RPABC4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
12	AL	44	Total	C	N	O	S	0	0	0
			352	217	70	61	4			
12	BL	44	Total	C	N	O	S	0	0	0
			352	217	70	61	4			
12	CL	44	Total	C	N	O	S	0	0	0
			352	217	70	61	4			
12	DL	44	Total	C	N	O	S	0	0	0
			352	217	70	61	4			
12	EL	44	Total	C	N	O	S	0	0	0
			352	217	70	61	4			
12	FL	44	Total	C	N	O	S	0	0	0
			352	217	70	61	4			

- Molecule 13 is a protein called DNA-directed RNA polymerase I subunit RPA49.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
13	AM	109	Total	C	N	O	0	0	0
			863	548	143	172			
13	BM	109	Total	C	N	O	0	0	0
			863	548	143	172			
13	CM	109	Total	C	N	O	0	0	0
			863	548	143	172			
13	DM	109	Total	C	N	O	0	0	0
			863	548	143	172			
13	EM	110	Total	C	N	O	0	0	0
			869	551	144	174			

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
13	FM	110	Total	C	N	O	0	0	0
			869	551	144	174			

- Molecule 14 is a protein called DNA-directed RNA polymerase I subunit RPA34.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
14	AN	142	Total	C	N	O	S	0	0	0
			1127	719	183	221	4			
14	BN	143	Total	C	N	O	S	0	0	0
			1130	719	184	223	4			
14	CN	143	Total	C	N	O	S	0	0	0
			1137	728	184	221	4			
14	DN	145	Total	C	N	O	S	0	0	0
			1146	729	186	227	4			
14	EN	144	Total	C	N	O	S	0	0	0
			1140	726	186	224	4			
14	FN	145	Total	C	N	O	S	0	0	0
			1146	729	187	226	4			

- Molecule 15 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
15	BA	2	Total	Zn	0	0
			2	2		
15	CA	2	Total	Zn	0	0
			2	2		
15	AB	1	Total	Zn	0	0
			1	1		
15	BL	1	Total	Zn	0	0
			1	1		
15	EB	1	Total	Zn	0	0
			1	1		
15	BI	2	Total	Zn	0	0
			2	2		
15	BB	1	Total	Zn	0	0
			1	1		
15	AJ	1	Total	Zn	0	0
			1	1		
15	EI	2	Total	Zn	0	0
			2	2		
15	DL	1	Total	Zn	0	0
			1	1		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
15	FL	1	Total 1	Zn 1	0	0
15	AA	2	Total 2	Zn 2	0	0
15	BJ	1	Total 1	Zn 1	0	0
15	FJ	1	Total 1	Zn 1	0	0
15	DI	2	Total 2	Zn 2	0	0
15	EA	2	Total 2	Zn 2	0	0
15	FA	2	Total 2	Zn 2	0	0
15	AI	2	Total 2	Zn 2	0	0
15	CJ	1	Total 1	Zn 1	0	0
15	DA	2	Total 2	Zn 2	0	0
15	FI	2	Total 2	Zn 2	0	0
15	AL	1	Total 1	Zn 1	0	0
15	FB	1	Total 1	Zn 1	0	0
15	EL	1	Total 1	Zn 1	0	0
15	DJ	1	Total 1	Zn 1	0	0
15	CB	1	Total 1	Zn 1	0	0
15	CI	2	Total 2	Zn 2	0	0
15	EJ	1	Total 1	Zn 1	0	0
15	CL	1	Total 1	Zn 1	0	0
15	DB	1	Total 1	Zn 1	0	0

N1081	P1082	S1083	A1084	L1085	I1086	E1087	E1092	S1093	A1094	L1095	K1096	Y1097	S1098	T1101	L1102	K1103	Y1104	R1105	H1108	E1111	Q1116	S1117	V1118	K1119	V1123	L1124	A1125	Y1132	L1133	G1134	S1135	V1136	S1137	N1138	F1140	Q1141	L1144	E1145	F1146	F1147	L1148	N1151	L1154	S1158	D1159	G1160	V1161									
I1007	V1011	L1012	T1013	A1014	A1015	S1016	L1017	Y1018	L1019	L1020	A1021	C1022	L1023	T1024	K1025	R1026	L1027	E1028	H1031	V1032	S1033	I1038	L1045	Y1046	Y1047	F1048	M1049	Y1050	D1053	A1054	I1055	D1056	T1057	K1058	E1059	S1061	H1062	M1063	F1068	G1069	L1070	D1071	Y1072	Y1073	Y1074	A1075	L1076	L1077	K1078	L1079	Y1080					
K934	G935	S936	N937	V940	T943	N944	C945	L946	L947	G948	A1021	C1022	L952	R955	R956	V957	P958	Y959	N960	G963	K964	T965	L966	P967	S968	F969	K970	F971	E972	E973	T974	D975	A976	A977	A978	G979	G980	G915	V982	K983	G984	R985	F986	Y987	S988	Q993	H998	Q999	A927	M1000	A1001	G1002	G992	E1004		
A859	D865	K866	D867	E874	L875	L876	K877	R878	L879	T882	D885	M886	R887	R888	S889	L892	D893	T896	S897	S898	V900	I903	T904	S905	Q906	V907	V908	S909	P913	D914	G915	T836	A837	E838	R918	R919	F920	P921	C922	M923	S924	M925	Q926	A927	M928	S931	L932	A933								
S784	Q785	G786	G787	S789	K790	Y791	G792	L793	L794	H795	H796	G797	E804	V805	A806	A807	K808	V809	L810	S811	L812	L813	G814	R815	F817	T818	M819	Y820	I821	T822	A825	M830	D831	D832	L833	L834	L835	T836	A837	E838	G839	W842	R843	S850	H851	D852	T853	G854	R855	E856	L857	A933				
L715	P716	F717	T718	L719	K721	P722	G723	L725	V726	L727	G728	K729	Q730	I731	A732	T733	T734	V735	L736	L737	N738	L739	F740	P741	F742	D743	M744	P745	M748	L749	I750	S751	K752	N753	K754	I755	K756	E757	Y758	W760	N767	D773	G774	G777	C778	G779	I780	L781	D782	K783						
B644	A645	B646	A647	L648	M649	L650	A651	M652	T653	V657	L658	T659	G663	S664	P665	V666	R667	G668	L669	I670	H673	L674	S675	A676	G677	V678	M679	L680	T681	K682	G683	D684	T688	R689	Y692	L696	V697	C699	I700	R701	P702	E703	D704	G705	H706	R709	S710	K711	I712	T714						
K576	V577	Y578	R579	H580	L581	K582	M583	R584	D585	V586	G587	L588	M589	N590	R591	T594	L595	H596	A597	S598	S599	H603	K604	V605	L606	V607	L608	M609	L610	E611	G612	T613	L614	R615	Y618	A619	M620	T621	G622	A623	M625	L561	L562	P563	P564	P499	V500	F501	V568	S569	T570	H571	T572	L573	M574	K575
V611	T612	A613	Y614	N615	I616	L619	R620	Q621	A622	G623	K624	L625	E626	G627	L628	M629	S630	A631	I632	T633	S634	L635	Q636	R637	M638	G639	L640	S641	A642	V643	M644	V645	S646	L647	S648	R649	T649	G496	V497	P498	P499	V500	F501	K504	T428	S429	I430	L431	T432	P433	M434	A435	F437			
P363	P364	T365	R366	L369	P370	S371	K372	L373	G374	E375	E379	M380	S381	Q382	N383	Q384	L385	L386	S387	V388	L390	S393	L394	L395	L396	R397	D398	L399	L403	L406	Q407	R408	D409	R416	R417	V418	I419	R422	L423	M424	M425	A426	F427	V428	T429	I430	L431	Q431	M435	A436	F437					
S440	T441	K442	A443	Q444	GLY	ARG	THR	SER	GLY	K450	I453	V456	K457	Q458	A459	L460	E461	E464	G465	L466	F467	R468	M471	M472	G473	K474	R475	V476	M477	A480	R481	S482	V483	I484	S485	E491	T492	G496	V497	P498	P499	V500	F501	K504	T428	S429	I430	L431	Q431	M435	A436	F437				
L219	F223	L227	L228	K232	C233	D234	F239	F243	K244	K245	D246	G247	F248	T249	K250	F252	E253	T254	ALA	L176	L177	L178	M179	E180	V181	D182	M183	A184	S186	E187	Y188	V189	D190	M191	A192	I193	A194	L197	S198	D199	G200	R201	T202	T203	E204	R205	F208	T211	D214	E215	R216					
ALA	SER	ALA	ASN	ASP	GLU	GLU	GLY	ASN	PRO	THR	THR	THR	ARG	ARG	PRO	LYS	THR	GLY	S312	T313	V314	T315	L316	S317	E318	E319	T323	L324	D325	T326	V327	K330	C333	G334	L335	I336	F339	H340	S341	R342	L346	S346	R347	L348	L349	V350	K351	F355								
ASP	GLU	ALA	ILE	GLU	ASP	ASN	GLU	GLY	GLY	SER	LYS	GLN	R99	SER	S101	C102	I103	H107	T108	A109	L110	K111	E112	V113	E114	V115	C120	K121	Y122	L123	R124	L125	Q126	Y127	E132	S133	L136	D137	E138	L141	GLY	SER	LEU	ASN	ASN	SER	SER	MET	THR	ASP						

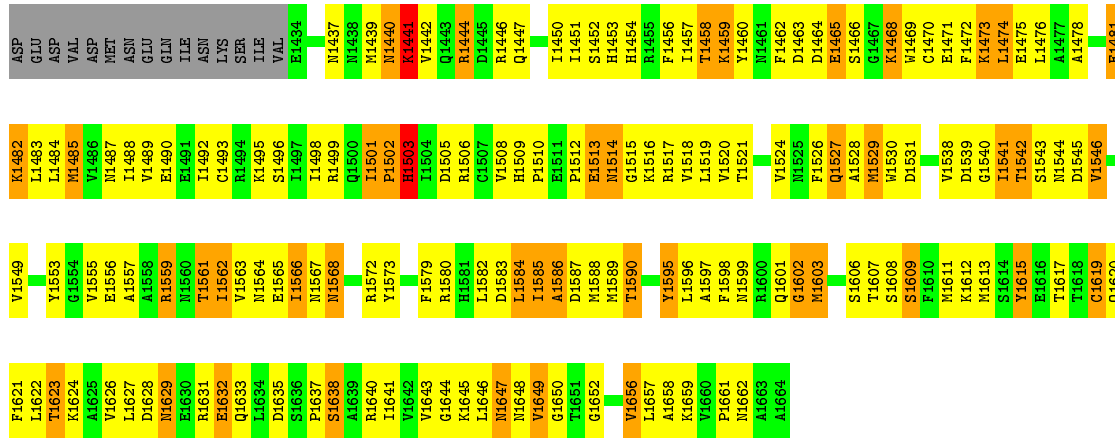
C1619	L1483	V1546	G1644	L1483	GLU	ALA	R1223	V1161	M081	A1010	G885	D667	I793	P724
Q1620	L1484	V1549	L1662	L1484	ASP	A1287	R1224	M162	M1082	A1011	S986	T868	V794	L725
F1621	M1485	V1496	L1622	L1485	VAL	R1288	I1225	E1163	P1082	K1012	S986	P869	V794	L726
T1623	V1496	V1496	L1623	L1486	ASP	R1289	V1226	K1164	S1083	K1013	S986	D872	H798	T727
K1624	M1487	M1487	L1624	L1487	ASN	V1290	M1227	K1165	A1084	T1014	S986	K729	H798	K729
A1625	M1488	M1488	L1625	L1488	LEU	V1291	T1228	K1166	L1085	S1014	S986	K730	H798	K730
V1626	V1489	V1489	L1626	L1489	GLU	H1292	A1229	R1167	I1086	R1015	S986	K731	H798	I732
L1627	E1490	E1490	L1627	L1490	GLN	H1293	T1233	A1168	E1087	S1016	S986	K804	H798	I732
L1628	E1491	E1491	L1628	L1491	ASP	M1294	I1169	A1169	E1092	G1017	S986	K805	H798	I732
M1629	L1492	L1492	L1629	L1492	ASN	R1295	K1234	M1170	R944	L1018	S986	K806	H798	V735
E1630	L1493	L1493	L1630	L1493	ASP	F1296	T1235	K1171	S1093	L1019	S986	K807	H798	V735
R1631	L1494	L1494	L1631	L1494	SER	F1297	M1236	K1172	A1094	L1020	S986	K808	H798	L736
E1632	K1495	K1495	L1632	L1495	GLU	M1237	Q1237	K1173	L1095	R1021	S986	K809	H798	L737
Q1633	S1496	S1496	L1633	L1496	GLN	M1238	M1238	Y1174	K1096	G1022	S986	K810	H798	L737
L1634	I1497	I1497	L1634	L1497	SER	M1300	T1239	M1175	L1086	L1023	S986	K811	H798	M738
D1635	I1498	I1498	L1635	L1498	HIS	L1240	L1240	M1176	L1102	L1023	S986	K812	H798	M738
S1636	M1437	M1437	L1636	L1437	VAL	S1303	P1241	L1176	K1103	T1024	S986	K813	H798	M738
P1637	L1438	L1438	L1637	L1438	LYS	E1304	I1242	S1177	Y1104	K1025	S986	K814	H798	P741
S1638	M1439	M1439	L1638	L1439	THR	E1305	M1243	L1178	R1105	K1026	S986	K815	H798	P742
A1639	M1440	M1440	L1639	L1440	GLY	K1310	M1244	P1181	R1108	L1027	S986	K816	H798	D743
R1640	K1441	K1441	L1640	L1441	LYS	Q1314	D1245	G1182	H1108	E1028	S986	K817	H798	M744
I1641	V1442	V1442	L1641	L1442	ALA	L1313	S1246	E1183	E1111	H1031	S986	K818	H798	P745
G1644	R1443	R1443	L1644	L1443	VAL	Q1314	S1247	A1184	E1111	S1033	S986	K819	H798	M748
K1645	D1444	D1444	L1645	L1444	SER	Q1314	D1248	V1185	E1111	D893	S986	K820	H798	L749
L1646	R1445	R1445	L1646	L1445	THR	I1317	E1249	V1186	Y1114	D893	S986	K821	H798	L749
M1647	R1446	R1446	L1647	L1446	ASP	I1318	Q1250	I1187	Y1114	D893	S986	K822	H798	L749
V1648	Q1447	Q1447	L1648	L1447	GLU	S1318	A1251	I1188	S1117	I1038	S986	K823	H798	L749
F1649	I1450	I1450	L1649	L1450	PRO	D1252	D1252	A1189	V1118	R1039	S986	K824	H798	L749
G1650	E1513	E1513	L1650	L1513	ASP	F1253	F1253	K1191	K1119	T1044	S986	K825	H798	L749
D1655	S1452	S1452	L1655	L1452	ASP	K1323	C1255	M1192	P1122	L045	S986	K826	H798	L749
V1656	K1453	K1453	L1656	L1453	GLU	L1324	K1256	V1193	Y1123	I903	S986	K827	H798	L749
L1657	H1454	H1454	L1657	L1454	ILE	L1325	S1257	G1194	L1124	I904	S986	K828	H798	L749
K1658	R1455	R1455	L1658	L1455	THR	E1326	S1258	I1195	Y1132	Q1047	S986	K829	H798	L749
V1660	I1457	I1457	L1660	L1457	MET	E1332	K1260	S1197	G1134	P1048	S986	K830	H798	L749
P1661	K1458	K1458	L1661	L1458	ARG	I1333	K1261	T1198	L1133	M049	S986	K831	H798	L749
M1662	Y1460	Y1460	L1662	L1460	GLU	K1334	L1262	Q1199	S1135	Y1050	S986	K832	H798	L749
A1663	M1461	M1461	L1663	L1461	ALA	K1335	L1263	L1202	V1136	D1053	S986	K833	H798	L749
A1664	F1462	F1462	L1664	L1462	GLU	Q1336	L1263	L1202	S1137	I1055	S986	K834	H798	L749
D1665	D1463	D1463	L1665	L1463	LYS	R1337	E1265	M1203	E1138	D1056	S986	K835	H798	L749
V1666	D1464	D1464	L1666	L1464	SER	K1338	V1266	T1204	M1139	I1057	S986	K836	H798	L749
K1669	D1465	D1465	L1669	L1465	ASP	P1342	I1267	PHE	F1140	G915	S986	K837	H798	L749
V1680	E1465	E1465	L1680	L1465	ASP	D1343	V1270	HIS	Q1141	K1059	S986	K838	H798	L749
P1681	K1468	K1468	L1681	L1468	GLU	D1344	I1271	ALA	D1142	S1061	S986	K839	H798	L749
M1682	M1469	M1469	L1682	L1469	GLY	I1344	I1272	ALA	K1143	K916	S986	K840	H798	L749
A1684	C1470	C1470	L1684	L1470	GLY	A1347	V1272	GLY	L1144	R919	S986	K841	H798	L749
D1685	E1471	E1471	L1685	L1471	ILE	V1348	E1273	HIS	E1145	F920	S986	K842	H798	L749
V1686	E1472	E1472	L1686	L1472	ASP	P1349	E1274	GLY	S1146	F921	S986	K843	H798	L749
L1687	R1473	R1473	L1687	L1473	SER	ARG	T1275	ALA	F1147	C922	S986	K844	H798	L749
M1688	K1473	K1473	L1688	L1473	ASP	LEU	T1276	ALA	L1148	N923	S986	K845	H798	L749
M1689	L1474	L1474	L1689	L1474	LYS	GLN	GLY	M1214	M1151	S924	S986	K846	H798	L749
F1689	E1475	E1475	L1689	L1475	THR	THR	SER	V1215	H998	Q926	S986	K847	H798	L749
S1689	L1476	L1476	L1689	L1476	SER	THR	THR	T1216	C999	A927	S986	K848	H798	L749
M1611	M1477	M1477	L1611	L1477	ASP	VAL	THR	L1217	M1072	Q926	S986	K849	H798	L749
M1612	I1541	I1541	L1612	L1541	ASP	ALA	THR	L1218	Y1073	M928	S986	K850	H798	L749
M1613	T1542	T1542	L1613	L1542	ASP	ASN	ALA	L1219	L1074	S931	S986	K851	H798	L749
M1614	D1479	D1479	L1614	L1479	SER	GLY	GLY	L1219	A1075	G932	S986	K852	H798	L749
Y1615	T1480	T1480	L1615	L1480	SER	SER	GLY	L1220	L1076	A933	S986	K853	H798	L749
L1616	K1482	K1482	L1616	L1482	SER	SER	GLY	R1221	L1076	A933	S986	K854	H798	L749
T1618	L1482	L1482	L1618	L1482	ASP	SER	ASN	L1222	K1078	K934	S986	K855	H798	L749

● Molecule 1: DNA-directed RNA polymerase I subunit RPA190

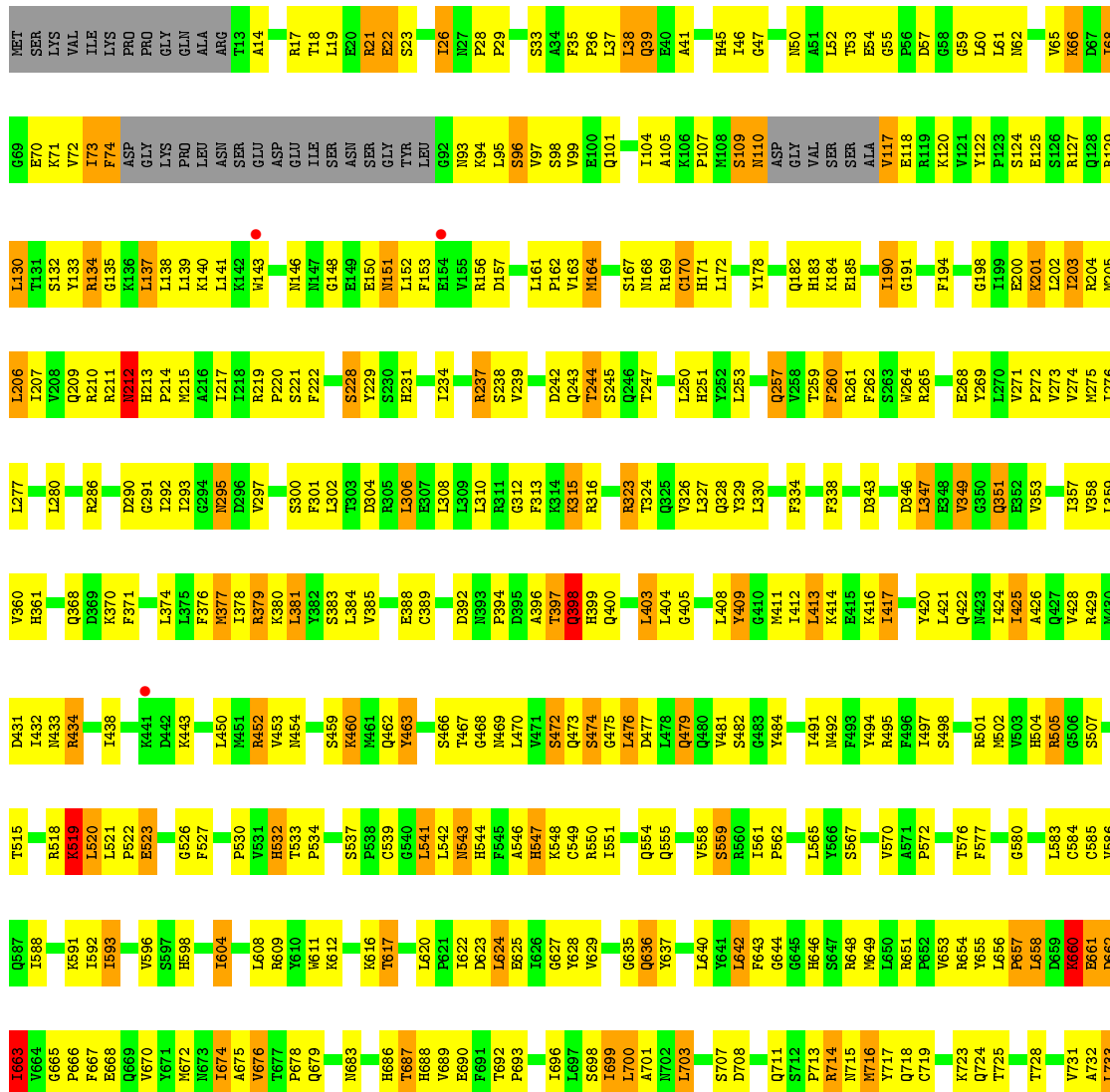


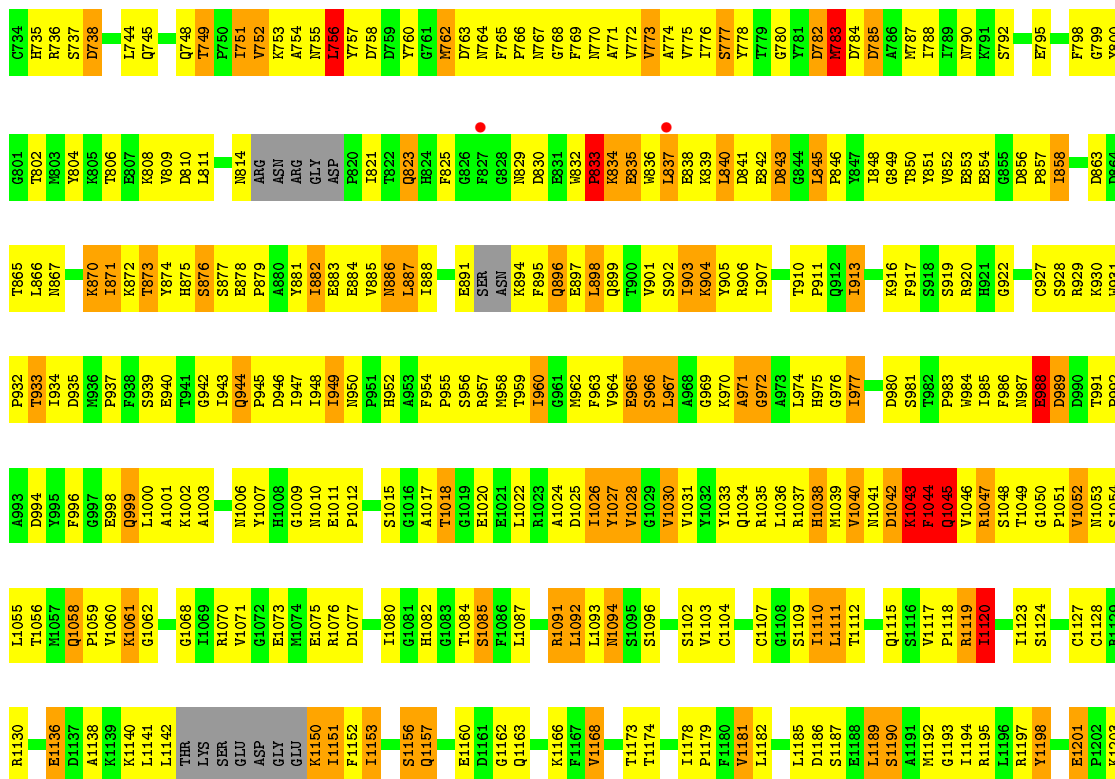
A1001	G832	B856	S784	K711	I642	K576	E509	K442	P364	ALA	A210	SER	G74	W1
G1002	A933	A857	Q785	I712	A643	V577	P810	A443	T365	SER	T211	SER	H75	D2
R1003	K934	A858	I786	W713	R644	Y578	P512	Q444	R366	ALA	T212	MET	Q76	I3
E1004	K935	G862	G787	T714	A645	R579	T512	T447	L369	ASN	N213	TYR	G77	V7
G1005	G935	G863	A788	L715	E646	H580	Y514	P370	P370	ASP	D214	THR	H78	G8
L1006	S936	N863	S789	F716	A647	I581	Y514	S371	L369	ASP	E215	ASP	L81	S9
L1007	N937	L864	K790	P717	L648	K582	N515	K371	K371	GLU	R216	ASP	P82	E10
D1008	V938	D865	K790	P718	R649	N583	I516	GLY	L372	GLU	L219	GLU	V83	E11
T1009	N939	D866	I793	W719	L650	R584	L519	V451	L373	ALA	L219	ILE	Y86	T12
A1010	V794	D867	W794	K720	A651	D585	P452	P452	L373	GLU	F223	GLU	N87	S13
V1011	S941	H795	H795	K721	N652	V586	I453	I453	E375	ASP	F223	ASP	P88	T14
K1012	Q942	H798	H798	P722	T653	V589	V456	V456	E375	GLY	L227	ASP	L89	V14
T1013	I943	E874	W793	W793	V657	N590	K457	K457	N380	ARG	L228	GLU	P90	D15
S1014	N944	L875	P724	P724	N657	N590	K457	K457	S381	ASN	L228	GLU	F90	F16
R1015	C945	L876	L658	W726	T659	R591	Q488	Q488	L385	PRO	F239	GLU	F91	L19
S1016	I946	L876	L658	W726	T659	R591	Q488	Q488	L385	THR	F239	GLU	N92	T20
G1017	I947	R878	V805	T727	G663	T594	G526	L460	L386	THR	F243	MET	N92	K21
G948	G948	L879	A806	G728	S664	L595	P527	L460	S387	ARG	F243	ASP	Q93	A21
Q949	Q949	L879	A807	K729	P685	H596	P528	E461	K388	PRO	R244	GLY	I94	K22
Q1020	Q949	L882	K308	Q730	P685	K597	N529	E464	V389	LYS	K245	GLY	Y95	E23
R1021	I952	D885	W809	I731	V666	A598	N530	Q465	L390	THR	D246	GLY	Y97	L24
C1022	R956	L810	S811	I732	Q688	M600	G532	F467	T391	GLY	F248	SER	R98	S28
L1023	N887	W812	H812	W735	L669	A533	T392	F467	T392	GLY	F248	SER	R99	S28
K1024	L813	L813	L813	W736	L670	G602	A533	F467	T392	GLY	F248	SER	R99	S28
K1025	K388	L814	L814	L736	L670	G602	A533	F467	T392	GLY	F248	SER	R99	S28
Q1026	S889	S889	S889	L736	L670	G602	A533	F467	T392	GLY	F248	SER	R99	S28
L1027	L882	L882	L815	N738	H673	H603	Q535	H470	L395	LYS	K250	LYS	S101	K30
G1029	D893	D893	L816	N738	H673	H603	Q535	H470	L395	LYS	K250	LYS	S101	Q81
V1030	R965	R965	F817	D743	S675	R606	Q537	M472	L396	ILE	E253	ASP	C102	I32
H1031	I966	I966	W818	W744	A676	G473	D398	G473	R397	ILE	E253	ASP	C102	I32
P967	R967	R967	N819	P745	G677	V607	N538	K474	L399	LYS	K256	SER	L100	T36
S968	S968	S968	W820	P745	G677	L608	G541	R475	L403	LYS	K256	SER	L100	T36
F969	F969	F969	N821	N748	V679	P609	G541	R475	L403	LYS	K256	SER	L100	T36
K970	K970	K970	W822	I749	L680	E611	L546	A479	L406	ILE	I261	ILE	L102	I32
P971	P971	P971	A825	S751	T613	T613	G548	A480	L406	ILE	I261	ILE	L102	I32
Y972	Y972	Y972	F826	K752	D684	L614	G548	A480	L406	ILE	I261	ILE	L102	I32
E973	E973	E973	R827	N753	T688	R615	G548	A480	L406	ILE	I261	ILE	L102	I32
T974	T974	T974	C828	K754	T688	R615	G548	A480	L406	ILE	I261	ILE	L102	I32
D975	D975	D975	G829	I755	R689	E611	G548	A480	L406	ILE	I261	ILE	L102	I32
A976	A976	A976	N830	K756	R689	A619	G548	A480	L406	ILE	I261	ILE	L102	I32
Y1050	Y1050	Y1050	D831	N757	Y692	N620	G548	A480	L406	ILE	I261	ILE	L102	I32
S909	S909	S909	D832	E758	Y692	N620	G548	A480	L406	ILE	I261	ILE	L102	I32
G910	G910	G910	L833	Y759	Y692	N620	G548	A480	L406	ILE	I261	ILE	L102	I32
C911	C911	C911	R834	Y760	Y692	N620	G548	A480	L406	ILE	I261	ILE	L102	I32
V912	V912	V912	L835	W763	Y692	N620	G548	A480	L406	ILE	I261	ILE	L102	I32
P913	P913	P913	T836	G763	Y692	N620	G548	A480	L406	ILE	I261	ILE	L102	I32
D914	D914	D914	A837	N767	Y692	N620	G548	A480	L406	ILE	I261	ILE	L102	I32
G915	G915	G915	E838	N767	Y692	N620	G548	A480	L406	ILE	I261	ILE	L102	I32
I1057	I1057	I1057	G839	E768	Y692	N620	G548	A480	L406	ILE	I261	ILE	L102	I32
F986	F986	F986	W916	Y769	Y692	N620	G548	A480	L406	ILE	I261	ILE	L102	I32
N987	N987	N987	R917	Y769	Y692	N620	G548	A480	L406	ILE	I261	ILE	L102	I32
S988	S988	S988	N842	Y769	Y692	N620	G548	A480	L406	ILE	I261	ILE	L102	I32
I918	I918	I918	R843	D773	F702	E632	G548	A480	L406	ILE	I261	ILE	L102	I32
I919	I919	I919	R843	D773	F702	E632	G548	A480	L406	ILE	I261	ILE	L102	I32
F920	F920	F920	S850	G778	G705	M635	G548	A480	L406	ILE	I261	ILE	L102	I32
P921	P921	P921	W851	G778	G705	M635	G548	A480	L406	ILE	I261	ILE	L102	I32
C922	C922	C922	D852	I707	I707	F637	G548	A480	L406	ILE	I261	ILE	L102	I32
N923	N923	N923	L781	I708	I708	P638	G548	A480	L406	ILE	I261	ILE	L102	I32
S924	S924	S924	G854	R709	R709	P638	G548	A480	L406	ILE	I261	ILE	L102	I32
H998	H998	H998	R853	D782	D782	P638	G548	A480	L406	ILE	I261	ILE	L102	I32
C999	C999	C999	G854	R783	R783	P638	G548	A480	L406	ILE	I261	ILE	L102	I32
M1000	M1000	M1000	R855	K783	S710	E641	K575	P508	T441	GLU	P363	GLU	ASU	P73

SER	A1287	I1225	V1461	P1082	I1007	G935	A858	K783	P716	L648	R579	Y534	GLY	L373
SER	R1288	V1226	M1462	S1083	D1008	S936	T862	S784	P717	M649	H580	M515	LYS	G374
ASN	S1289	M1227	A1084	A1084	T1009	N937	T862	S784	T718	L650	K581	I516	VAL	E375
SER	V1290	T1228	K1465	L1085	A1010	N938	M863	V786	T719	A651	K582	I516	PHE	P452
LYS	V1291	A1229	L1086	L1086	V1011	N939	L894	G787	F720	M652	N583	L519	I453	E379
ARG	V1292	A1229	R1467	E1087	K1012	N940	D865	V940	K721	T653	R520	R520	P454	N380
LEU	H1293	I1233	A1468	E1087	S941	S941	K866	S789	P722	D854	D695	Q521	G455	S381
LEU	M1294	K1234	L1469	E1092	Q942	Q942	D867	K790	T723	S685	V586	A522	V456	Q382
GLU	L1295	M1235	M1170	S1093	S1014	S1014	T868	V794	P724	Q656	M590	M523	K457	L385
GLU	L1295	M1235	M1170	S1093	S1014	S1014	T868	V794	P724	Q656	M590	M523	K457	L385
ASP	F1296	P1236	Q1171	A1094	G1017	C945	E874	H795	L725	V657	A459	M525	Q458	L386
ASN	F1297	Q1237	L1095	L1095	G1017	C945	E874	H795	L725	V657	A459	M525	Q458	L386
ASP	D1298	M1238	K1473	K1096	Y1018	L946	L875	L875	T727	T659	R591	G526	L460	S387
GLU	M1299	T1239	Y1474	Y1097	L1019	L947	L876	H798	G728	P627	E461	P627	E461	S387
GLU	Y1302	L1240	M1175	S1098	Q1020	L947	K677	H798	G728	P627	E461	P627	E461	S387
GLN	S1303	P1241	R1176	L1102	R1021	I952	R878	E804	K729	G663	L595	E626	K462	L390
SER	E1304	I1242	S1177	C1022	C1022	I952	R878	E804	K729	G663	L595	E626	K462	L390
HIS	E1304	W1243	L1178	K1103	L1023	R955	R878	V805	Q730	S664	K529	K529	K463	S393
LYS	E1305	M1244	L1178	Y1104	T1024	R955	R878	V805	Q730	S664	K529	K529	K463	S393
LYS	D1245	D1245	G1482	R1105	K1025	V957	I832	A807	T732	V666	A598	P531	G465	L394
THR	V1246	S1246	E1483	H1108	Q1026	P958	D885	K808	L736	R667	A533	A533	F467	L395
LYS	S1247	D1248	V1485	E1111	Q1027	P958	D885	K808	L736	R667	A533	A533	F467	L395
GLN	E1248	D1248	V1485	E1111	Q1027	P958	D885	K808	L736	R667	A533	A533	F467	L395
ALA	Q1314	E1249	G1186	E1111	Q1027	P958	D885	K808	L736	R667	A533	A533	F467	L395
VAL	Q1314	E1249	G1186	E1111	Q1027	P958	D885	K808	L736	R667	A533	A533	F467	L395
SER	S1348	Q1250	T1487	Y1114	H1031	G963	S889	L813	P742	H673	R606	G541	G473	L403
TYR	E1348	A1251	L1488	Y1114	V1032	K964	S889	L813	D743	H673	R606	G541	G473	L403
ASP	F1321	D1252	A1489	S1117	S1033	T965	L882	R815	M744	S675	L608	G541	G474	L406
GLU	I1322	F1253	T1492	V1113	I1038	L966	D893	R816	P745	A676	P609	S545	R475	L406
PRO	H1323	F1254	T1492	V1113	I1038	L966	D893	R816	P745	A676	P609	S545	R475	L406
ASP	L1324	C1255	Q1199	K1119	R1039	P967	T896	F817	M748	G677	M610	L546	R476	Q407
GLU	L1325	K1256	G1494	K1119	R1039	P967	T896	F817	M748	G677	M610	L546	R476	Q407
GLU	L1325	K1256	G1494	K1119	R1039	P967	T896	F817	M748	G677	M610	L546	R476	Q407
ASP	E1326	S1257	E1495	V1123	T1044	K970	S898	Y820	I750	M549	A479	M549	A479	R416
ASP	E1326	S1257	E1495	V1123	T1044	K970	S898	Y820	I750	M549	A479	M549	A479	R416
GLU	S1259	S1259	S1497	L1124	L1045	P196	K899	I821	S751	L644	A480	S550	A480	R417
ILE	I1329	K1260	T1498	A1130	M1049	T974	V909	I903	K753	D684	R615	V551	R481	V418
GLU	V1330	V1261	Q1199	K1131	Q1050	D975	I903	A825	N755	T688	A619	Q552	V482	I419
THR	K1331	L1262	M1200	Y1132	A976	A976	V907	F826	K756	T688	A619	Q552	V482	I419
MET	I1332	L1263	L1201	L1133	D1053	N977	V907	F826	K756	T688	A619	Q552	V482	I419
ARG	S1264	S1264	L1202	G1134	A1054	A978	V908	F826	K756	T688	A619	Q552	V482	I419
GLU	K1334	E1265	M1203	S1135	I1055	G979	S909	M830	E788	Q693	A623	A588	P488	R422
ALA	K1335	V1266	T1204	V1136	D1056	G980	S909	M830	E788	Q693	A623	A588	P488	R422
LYS	K1337	I1267	PHE	S1137	I1057	Y981	V912	D831	W759	Y759	A623	A588	P488	R422
LYS	K1337	I1267	PHE	S1137	I1057	Y981	V912	D831	W759	Y759	A623	A588	P488	R422
SER	R1338	K1269	HIS	E1138	T1058	V982	P913	L833	G761	I696	M625	Q560	T492	V428
SER	R1338	K1269	HIS	E1138	T1058	V982	P913	L833	G761	I696	M625	Q560	T492	V428
ASP	P1342	V1270	ALA	M1139	K1059	K983	D914	R834	K762	V697	A626	L561	G495	T429
ASP	P1342	V1270	ALA	M1139	K1059	K983	D914	R834	K762	V697	A626	L561	G495	T429
GLU	D1343	I1271	GLY	Q1141	E1060	G984	G915	L835	G763	C698	D627	L562	C496	I430
GLY	I1344	T1272	GLY	H1142	S1061	R985	T916	T886	G763	C698	D627	L562	C496	I430
GLY	I1344	T1272	GLY	H1142	S1061	R985	T916	T886	G763	C698	D627	L562	C496	I430
ILE	A1347	E1274	ALA	E1145	F1066	F1066	F1066	H842	F771	E703	M633	N567	F501	Q431
ASP	F1348	T1276	M1214	S1146	F1067	F1067	F1067	H842	F771	E703	M633	N567	F501	Q431
SER	F1349	GLY	V1215	F1147	F1068	Q993	C922	R843	K772	G705	F637	V568	F501	Q431
THR	ARG	THR	V1215	F1147	F1068	Q993	C922	R843	K772	G705	F637	V568	F501	Q431
LYS	LEU	SER	T1216	L1148	M1072	H998	S924	S850	D773	H706	P638	T570	K504	I438
GLU	GLN	ASN	L1217	N1151	Y1073	H998	S924	S850	D773	H706	P638	T570	K504	I438
THR	THR	THR	G1218	N1151	Y1073	H998	S924	S850	D773	H706	P638	T570	K504	I438
ASP	THR	THR	G1218	N1151	Y1073	H998	S924	S850	D773	H706	P638	T570	K504	I438
ASP	THR	THR	G1218	N1151	Y1073	H998	S924	S850	D773	H706	P638	T570	K504	I438
SER	VAL	ALA	P1220	L1154	A1074	G1003	M928	T852	L777	S710	M642	L573	P508	T441
SER	VAL	ALA	P1220	L1154	A1074	G1003	M928	T852	L777	S710	M642	L573	P508	T441
ASP	ALA	GLY	R1221	R1221	L1076	R1003	S931	G894	G778	I712	R644	K575	P510	Q444
ASP	ALA	GLY	R1221	R1221	L1076	R1003	S931	G894	G778	I712	R644	K575	P510	Q444
ASN	L1222	L1222	L1222	S1158	L1077	E1004	G932	R885	L780	V511	A645	K576	T511	T447
ASN	L1222	L1222	L1222	S1158	L1077	E1004	G932	R885	L780	V511	A645	K576	T511	T447
GLU	SER	ALA	E1224	G1160	M1081	L1006	K934	E857	D782	L715	A647	Y578	A513	SER

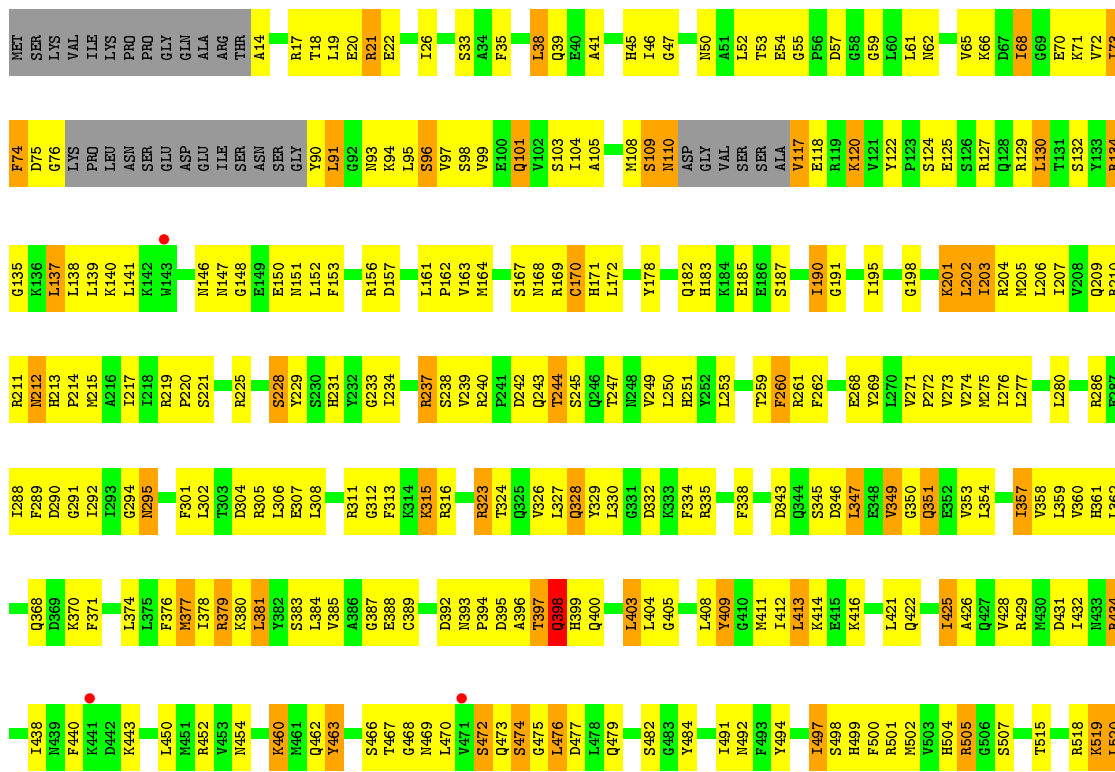


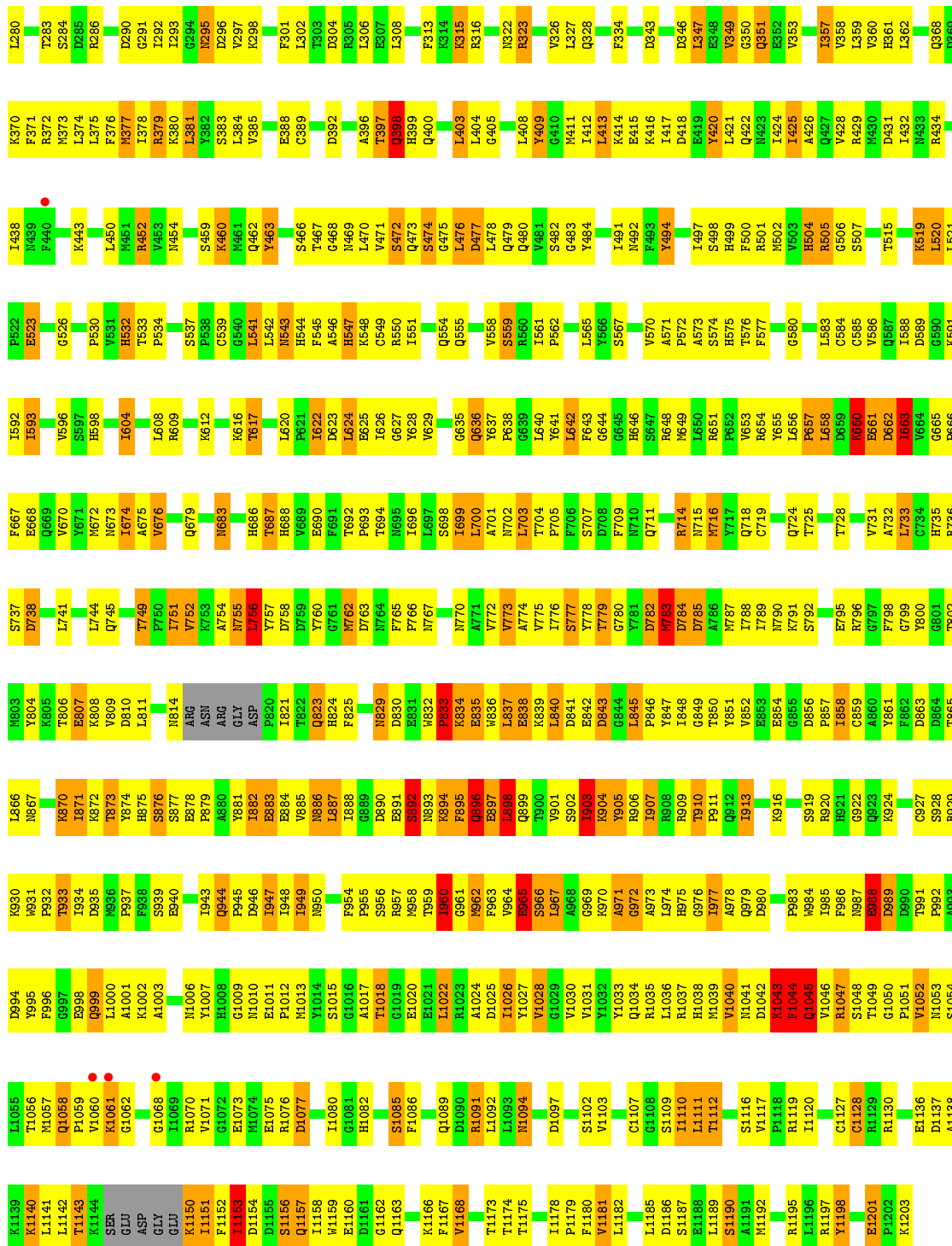
● Molecule 2: DNA-directed RNA polymerase I subunit RPA135





• Molecule 2: DNA-directed RNA polymerase I subunit RPA135





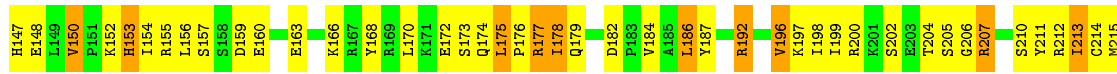
● Molecule 2: DNA-directed RNA polymerase I subunit RPA135



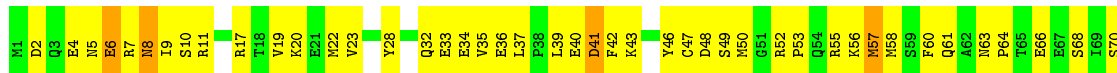
E70	K71	V72	I73	F74	D75	G76	R77	P78	LEU	ASN	SER	GLU	ASP	GLU	ILE	SER	ASN	SER	GLY	Y90	R91	G92	N93	K94	L95	S96	V97	S98	V99	E100	Q101	V102	S103	I104	A105	K106	P107	M108	S109	N110	ASP	GLY	VAL	SER	SER	ALA	V117	E118	R119	K120	V121	P122	G123	S124	E125	S126	R127	Q128	R129	
L130	I131	S132	Y133	R134	G135	K136	L137	L138	L139	K140	L141	S144	V145	R146	N147	G148	E149	M151	F153	D157	L161	P162	V163	M164	S165	Q166	S167	L168	R169	G170	H171	L172	Y178	Q182	R183	K184	E185	I190	G191	F194	I195	V196	N197	G198	I199	E200	K201	Y269	L270	L271	P272									
Y205	L206	L207	V208	Q209	R210	R211	R212	P214	M215	S367	A216	E218	R219	R220	S221	F222	A223	R224	S228	Y229	S230	H231	I234	R237	S238	V239	D242	Q243	Q244	S245	Q246	T247	L250	R251	Y252	L253	Q257	V258	T259	F260	R261	F262	S263	R265	G266	I267	E268	Y269	L270	L271	P272									
V273	V274	M275	L276	L277	L280	R286	D285	G286	D290	G291	L292	M295	D296	V297	S300	F301	L302	T303	D304	R305	L306	E307	L308	L309	L310	R311	G312	F313	R314	N322	R323	V326	L327	Q328	Y329	L330	F334	R337	R339	Q400	E401	Y402	L403	L404	G405	G406	F407	L408	Y409	G410	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504
I357	V358	L359	V360	H361	L362	D365	G366	R367	R368	K370	F371	R372	N373	L374	L375	F376	R377	L378	R379	R380	L381	V382	S383	V384	V385	E388	C389	D392	K315	R316	F394	L470	D395	A396	T397	Q388	G475	Q400	D477	Y402	L403	L404	G405	G406	F407	L408	Y409	G410	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504		
E419	Y420	L421	L422	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S472	Q473	S474	G475	L476	D477	Y478	Q479	S482	G483	Y484	I491	L497	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504					
R505	S507	C584	C585	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S472	Q473	S474	G475	L476	D477	Y478	Q479	S482	G483	Y484	I491	L497	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504					
S505	S507	C584	C585	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S472	Q473	S474	G475	L476	D477	Y478	Q479	S482	G483	Y484	I491	L497	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504					
S505	S507	C584	C585	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S472	Q473	S474	G475	L476	D477	Y478	Q479	S482	G483	Y484	I491	L497	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504					
S505	S507	C584	C585	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S472	Q473	S474	G475	L476	D477	Y478	Q479	S482	G483	Y484	I491	L497	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504					
S505	S507	C584	C585	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S472	Q473	S474	G475	L476	D477	Y478	Q479	S482	G483	Y484	I491	L497	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504					
S505	S507	C584	C585	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S472	Q473	S474	G475	L476	D477	Y478	Q479	S482	G483	Y484	I491	L497	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504					
S505	S507	C584	C585	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S472	Q473	S474	G475	L476	D477	Y478	Q479	S482	G483	Y484	I491	L497	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504					
S505	S507	C584	C585	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S472	Q473	S474	G475	L476	D477	Y478	Q479	S482	G483	Y484	I491	L497	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504					
S505	S507	C584	C585	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S472	Q473	S474	G475	L476	D477	Y478	Q479	S482	G483	Y484	I491	L497	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504					
S505	S507	C584	C585	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S472	Q473	S474	G475	L476	D477	Y478	Q479	S482	G483	Y484	I491	L497	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504					
S505	S507	C584	C585	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S472	Q473	S474	G475	L476	D477	Y478	Q479	S482	G483	Y484	I491	L497	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504					
S505	S507	C584	C585	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S472	Q473	S474	G475	L476	D477	Y478	Q479	S482	G483	Y484	I491	L497	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504					
S505	S507	C584	C585	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S472	Q473	S474	G475	L476	D477	Y478	Q479	S482	G483	Y484	I491	L497	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504					
S505	S507	C584	C585	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S472	Q473	S474	G475	L476	D477	Y478	Q479	S482	G483	Y484	I491	L497	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504					
S505	S507	C584	C585	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S472	Q473	S474	G475	L476	D477	Y478	Q479	S482	G483	Y484	I491	L497	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504					
S505	S507	C584	C585	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S472	Q473	S474	G475	L476	D477	Y478	Q479	S482	G483	Y484	I491	L497	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504					
S505	S507	C584	C585	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S472	Q473	S474	G475	L476	D477	Y478	Q479	S482	G483	Y484	I491	L497	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504					
S505	S507	C584	C585	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S472	Q473	S474	G475	L476	D477	Y478	Q479	S482	G483	Y484	I491	L497	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504					
S505	S507	C584	C585	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S472	Q473	S474	G475	L476	D477	Y478	Q479	S482	G483	Y484	I491	L497	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504					
S505	S507	C584	C585	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S472	Q473	S474	G475	L476	D477	Y478	Q479	S482	G483	Y484	I491	L497	W411	S498	L412	E413	H414	F500	R501	E502	L503	E504					
S505	S507	C584	C585	N423	L424	L425	A426	G427	R428	R429	R430	L431	L432	R433	R434	L438	K443	R452	V453	N454	K460	R461	Q462	Y463	F464	L465	S466	L467	K348	N468	L470	Y471	S47																											



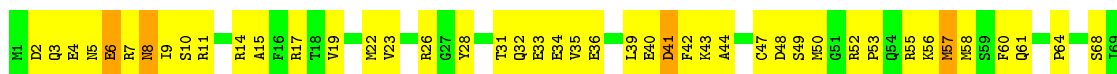
- Molecule 5: DNA-directed RNA polymerases I, II, and III subunit RPABC1



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

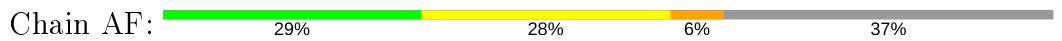


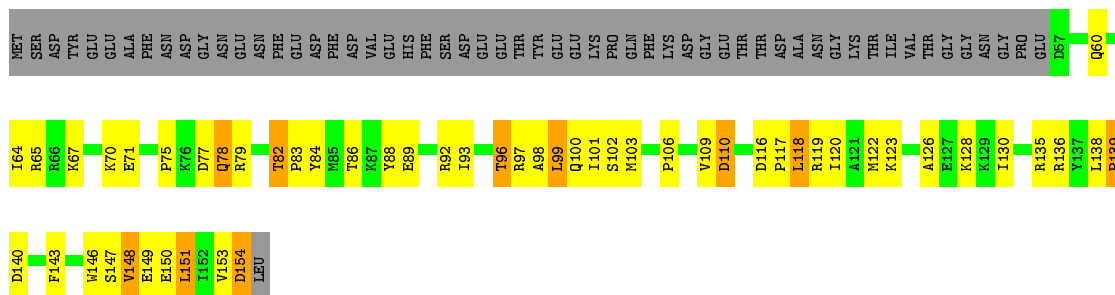
- Molecule 5: DNA-directed RNA polymerases I, II, and III subunit RPABC1



M215

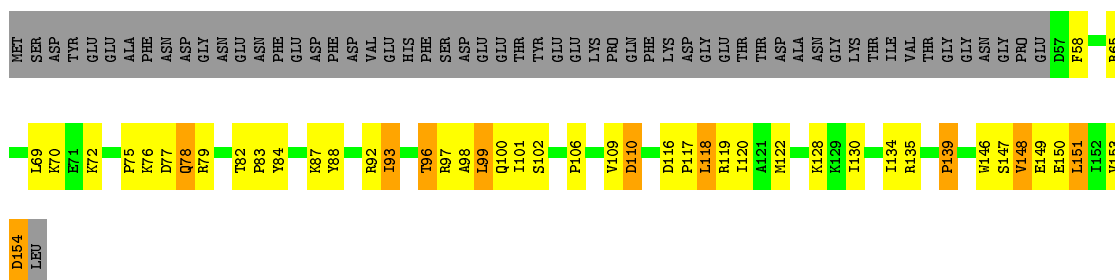
- Molecule 6: DNA-directed RNA polymerases I, II, and III subunit RPABC2





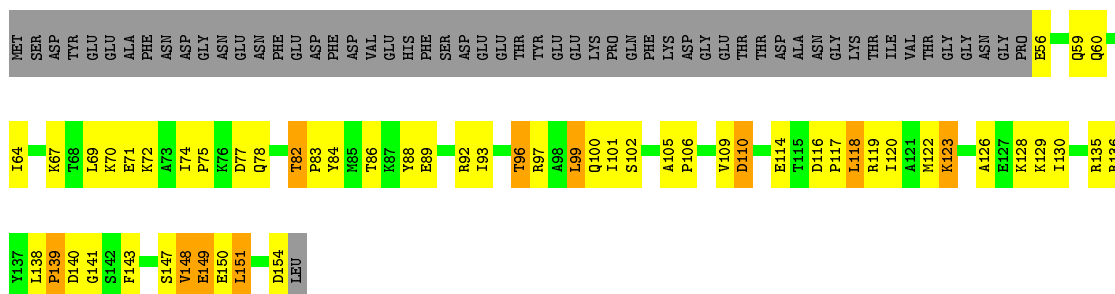
- Molecule 6: DNA-directed RNA polymerases I, II, and III subunit RPABC2

Chain BF: 34% 23% 6% 37%



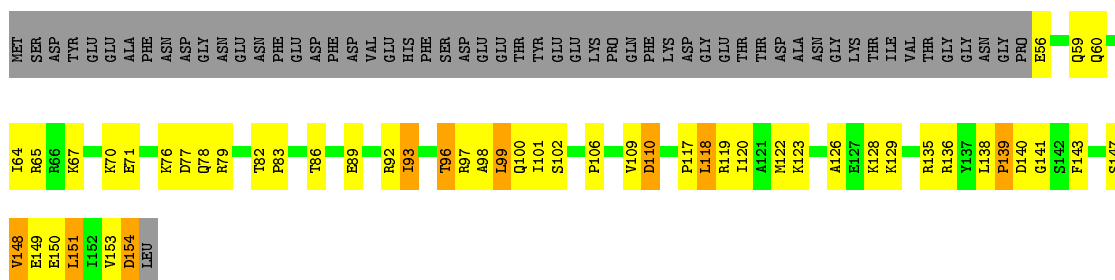
- Molecule 6: DNA-directed RNA polymerases I, II, and III subunit RPABC2

Chain CF: 28% 30% 6% 36%




- Molecule 6: DNA-directed RNA polymerases I, II, and III subunit RPABC2

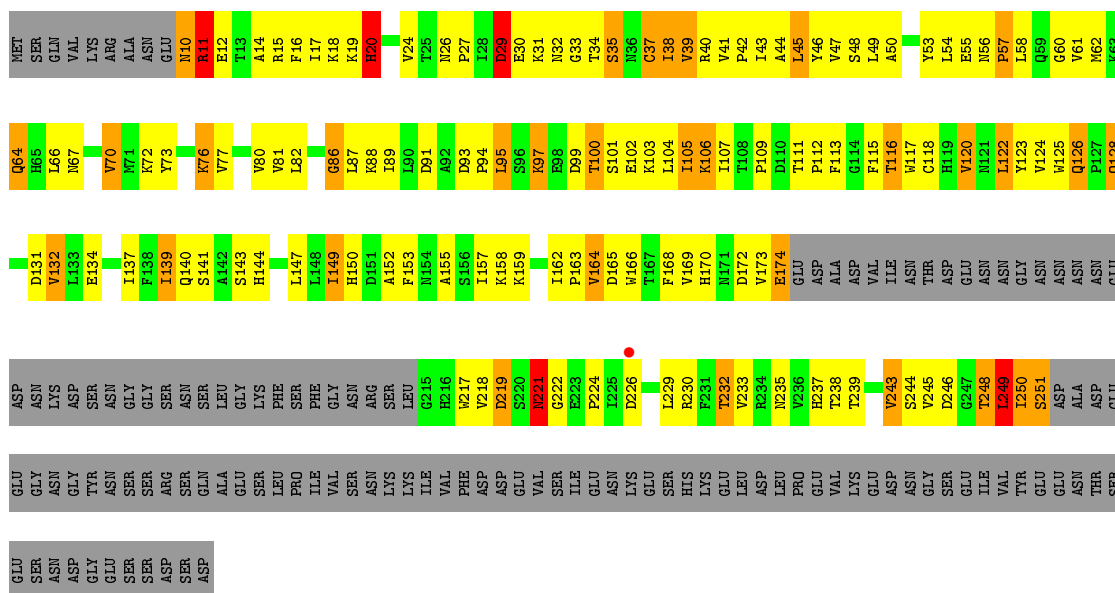
Chain DF: 31% 27% 6% 36%




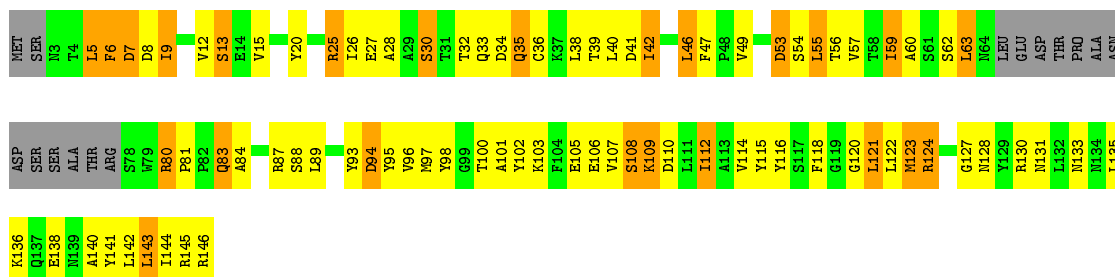
- Molecule 6: DNA-directed RNA polymerases I, II, and III subunit RPABC2

- Molecule 7: DNA-directed RNA polymerase I subunit RPA43

Chain DG: 

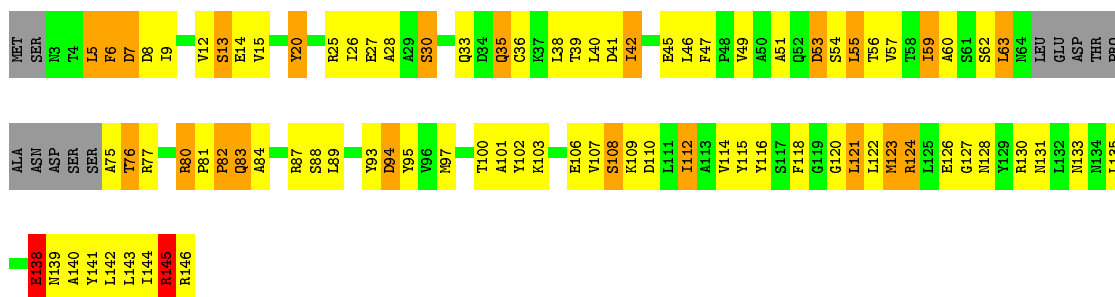


Chain CH: 

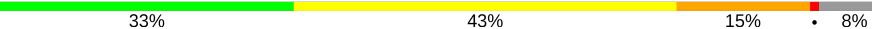


- Molecule 8: DNA-directed RNA polymerases I, II, and III subunit RPABC3

Chain DH: 




- Molecule 8: DNA-directed RNA polymerases I, II, and III subunit RPABC3

Chain EH: 

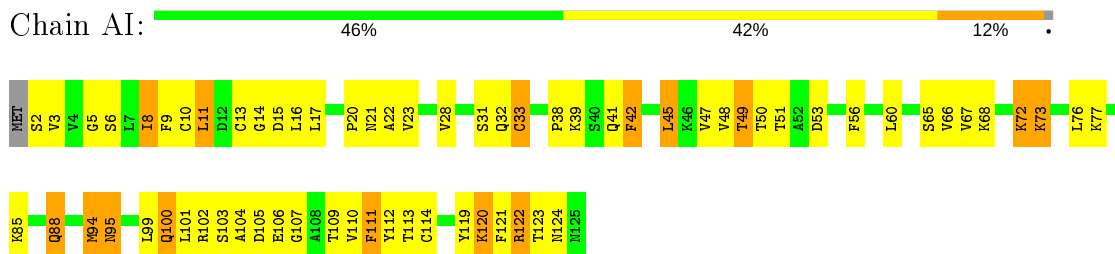


- Molecule 8: DNA-directed RNA polymerases I, II, and III subunit RPABC3

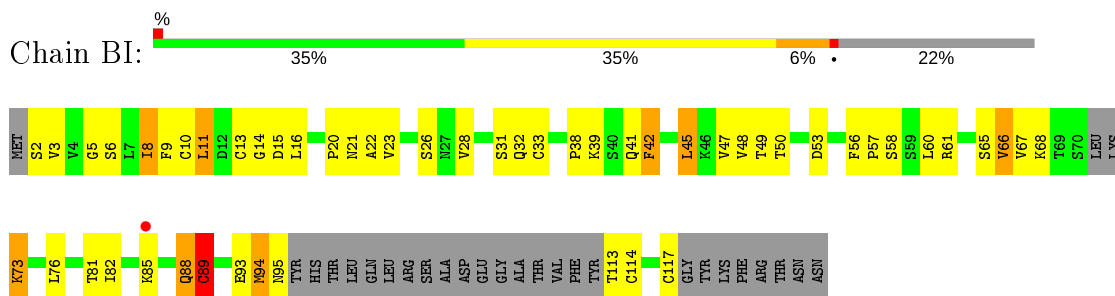
Chain FH: 



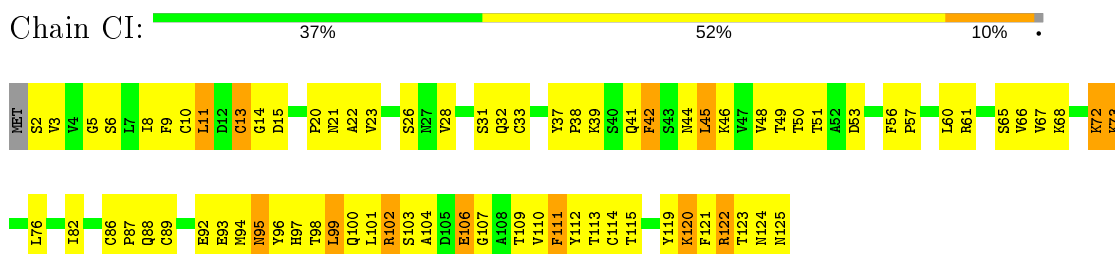
• Molecule 9: DNA-directed RNA polymerase I subunit RPA12



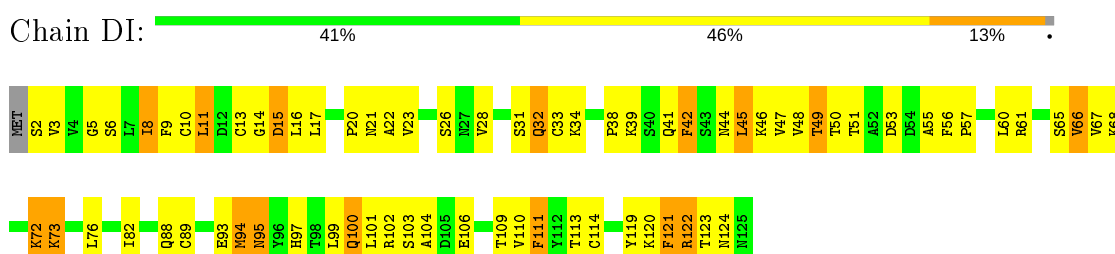
• Molecule 9: DNA-directed RNA polymerase I subunit RPA12



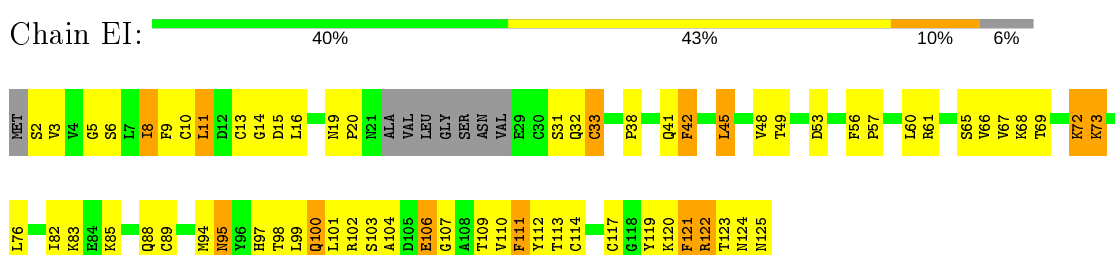
• Molecule 9: DNA-directed RNA polymerase I subunit RPA12



• Molecule 9: DNA-directed RNA polymerase I subunit RPA12

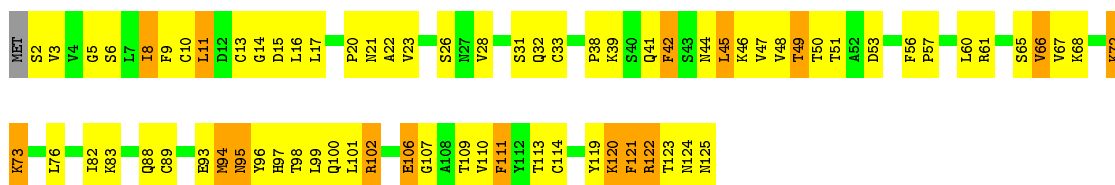


• Molecule 9: DNA-directed RNA polymerase I subunit RPA12



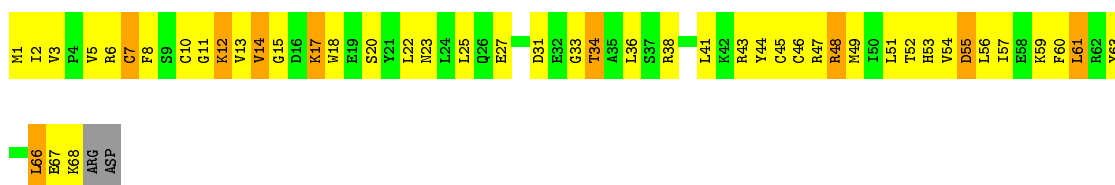
- Molecule 9: DNA-directed RNA polymerase I subunit RPA12

Chain FI: 



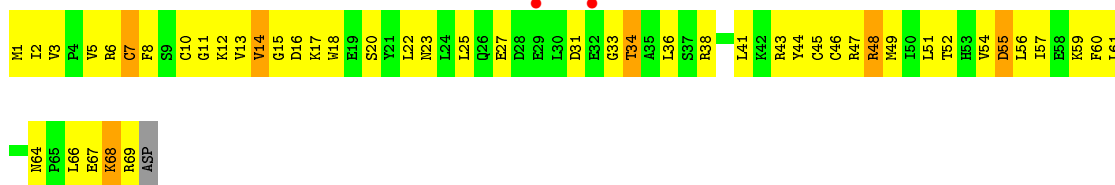
- Molecule 10: DNA-directed RNA polymerases I, II, and III subunit RPABC5

Chain AJ: 




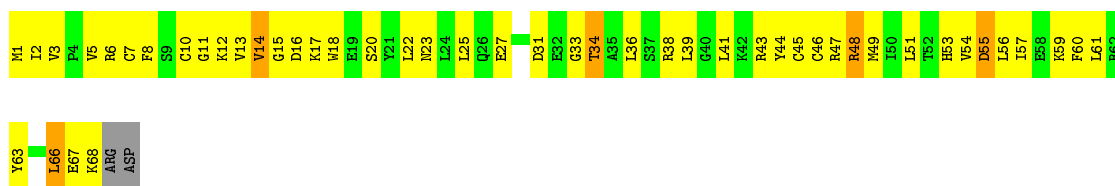
- Molecule 10: DNA-directed RNA polymerases I, II, and III subunit RPABC5

Chain BJ: 

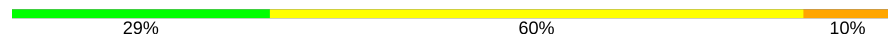


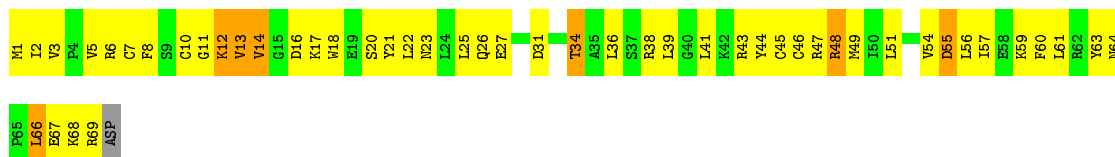
- Molecule 10: DNA-directed RNA polymerases I, II, and III subunit RPABC5

Chain CJ: 

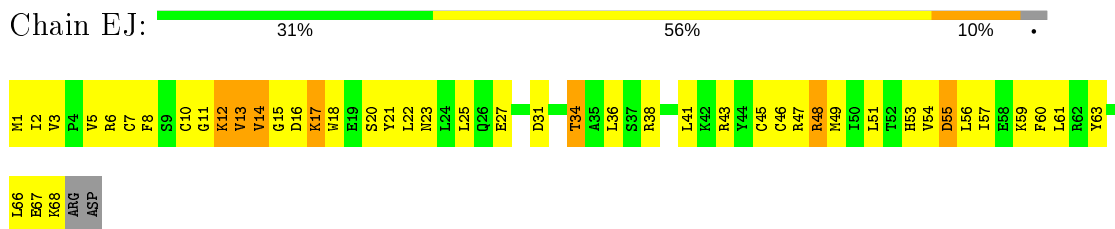


- Molecule 10: DNA-directed RNA polymerases I, II, and III subunit RPABC5

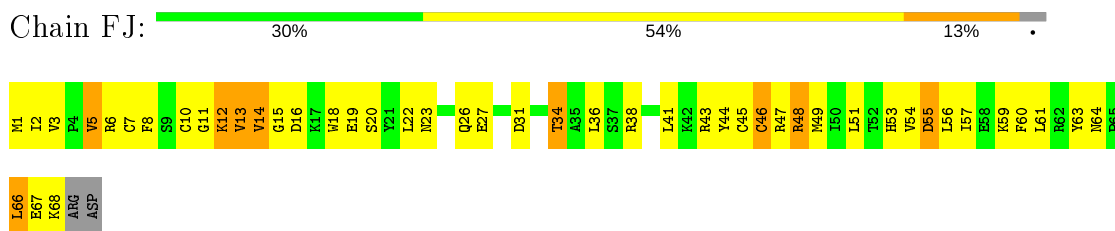
Chain DJ: 



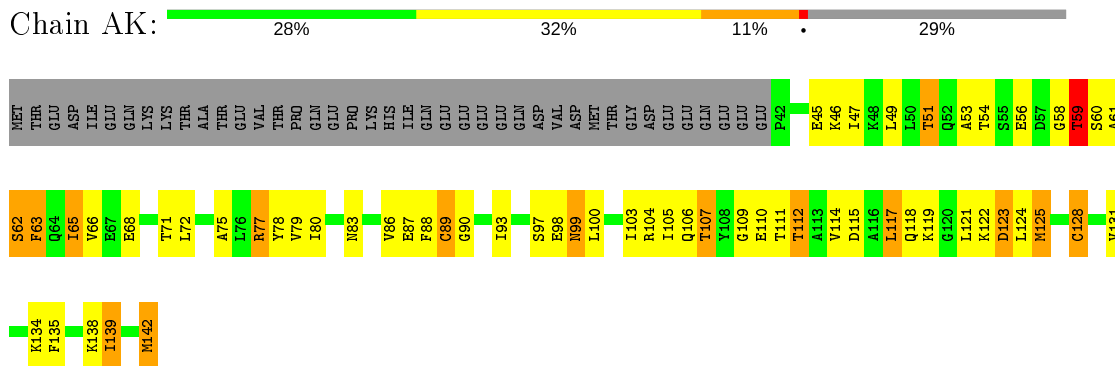
- Molecule 10: DNA-directed RNA polymerases I, II, and III subunit RPABC5



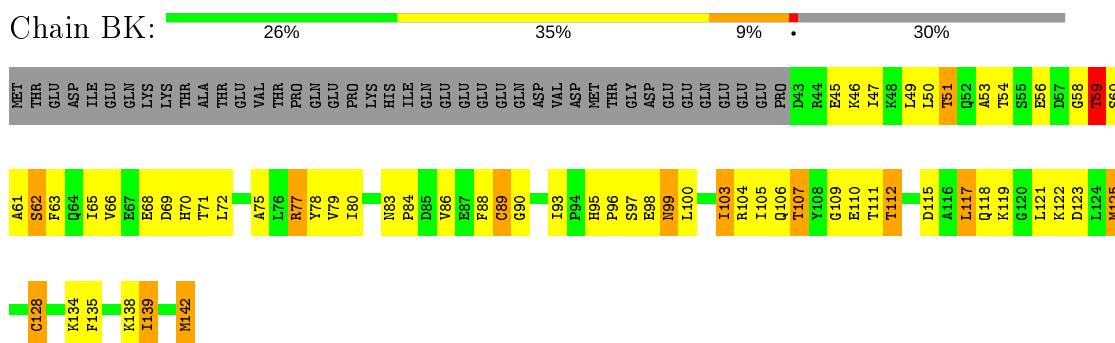
- Molecule 10: DNA-directed RNA polymerases I, II, and III subunit RPABC5



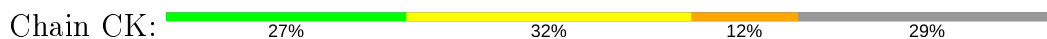
- Molecule 11: DNA-directed RNA polymerases I and III subunit RPAC2

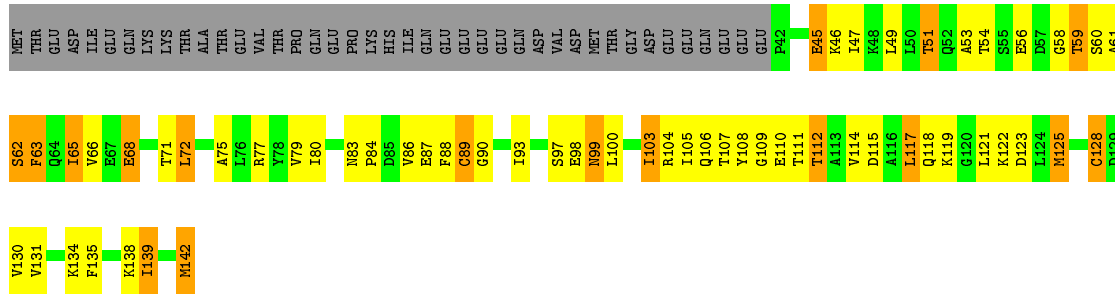


- Molecule 11: DNA-directed RNA polymerases I and III subunit RPAC2



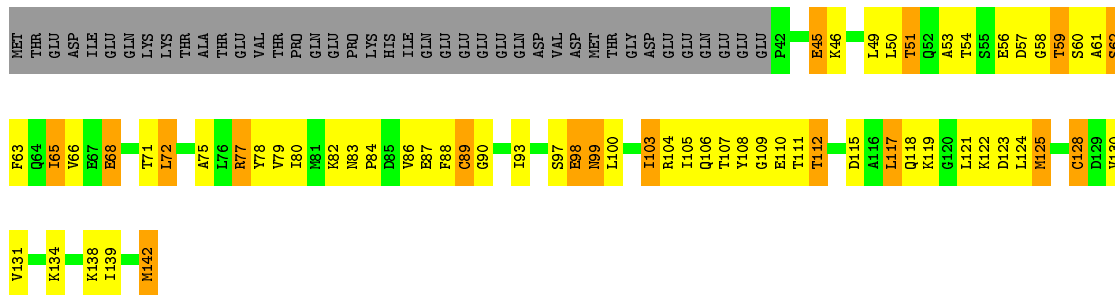
- Molecule 11: DNA-directed RNA polymerases I and III subunit RPAC2





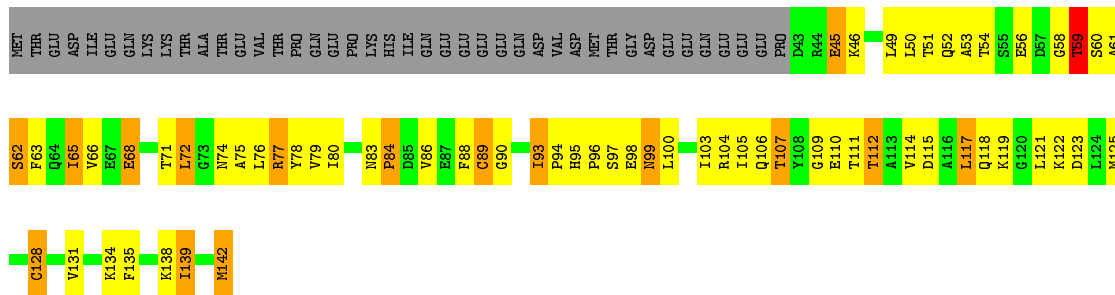
- Molecule 11: DNA-directed RNA polymerases I and III subunit RPAC2

Chain DK: 26% 33% 12% 29%



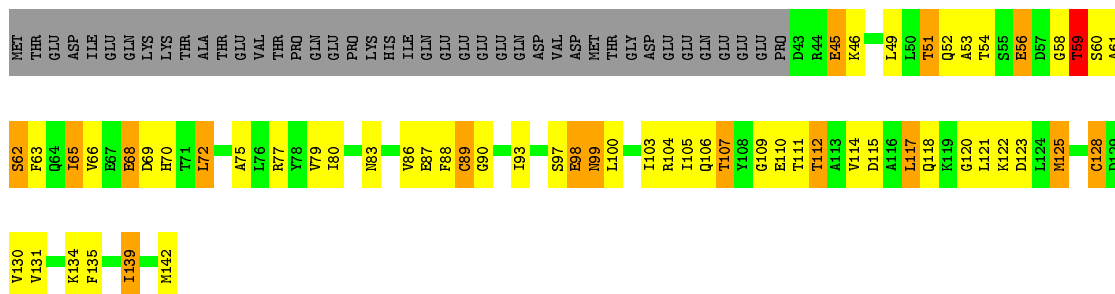
- Molecule 11: DNA-directed RNA polymerases I and III subunit RPAC2

Chain EK: 24% 35% 11% 30%



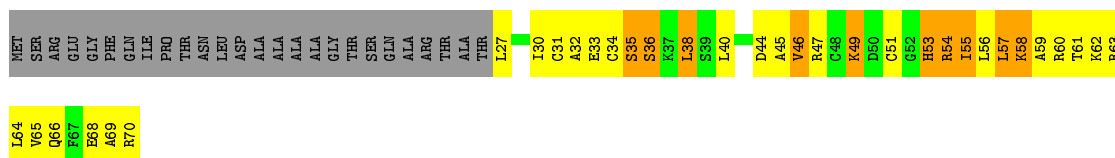
- Molecule 11: DNA-directed RNA polymerases I and III subunit RPAC2

Chain FK: 28% 30% 11% 30%



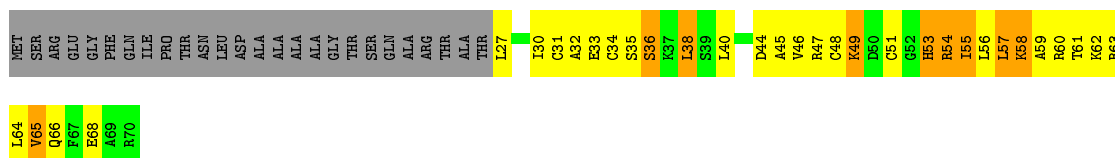
- Molecule 12: DNA-directed RNA polymerases I, II, and III subunit RPABC4

Chain AL:



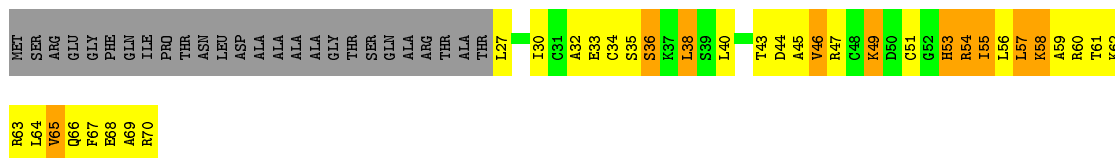
- Molecule 12: DNA-directed RNA polymerases I, II, and III subunit RPABC4

Chain BL:



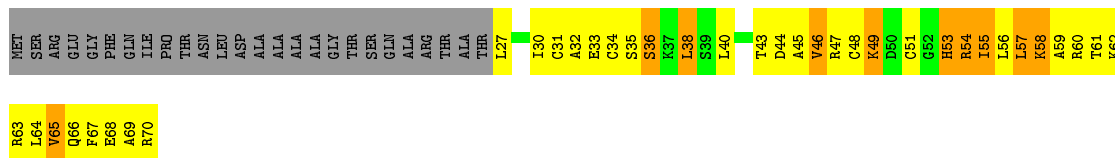
- Molecule 12: DNA-directed RNA polymerases I, II, and III subunit RPABC4

Chain CL:



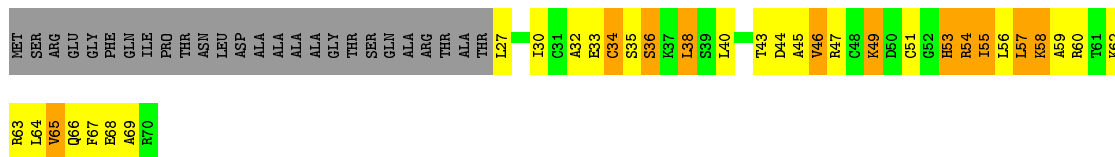
- Molecule 12: DNA-directed RNA polymerases I, II, and III subunit RPABC4

Chain DL:



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

Chain EL:

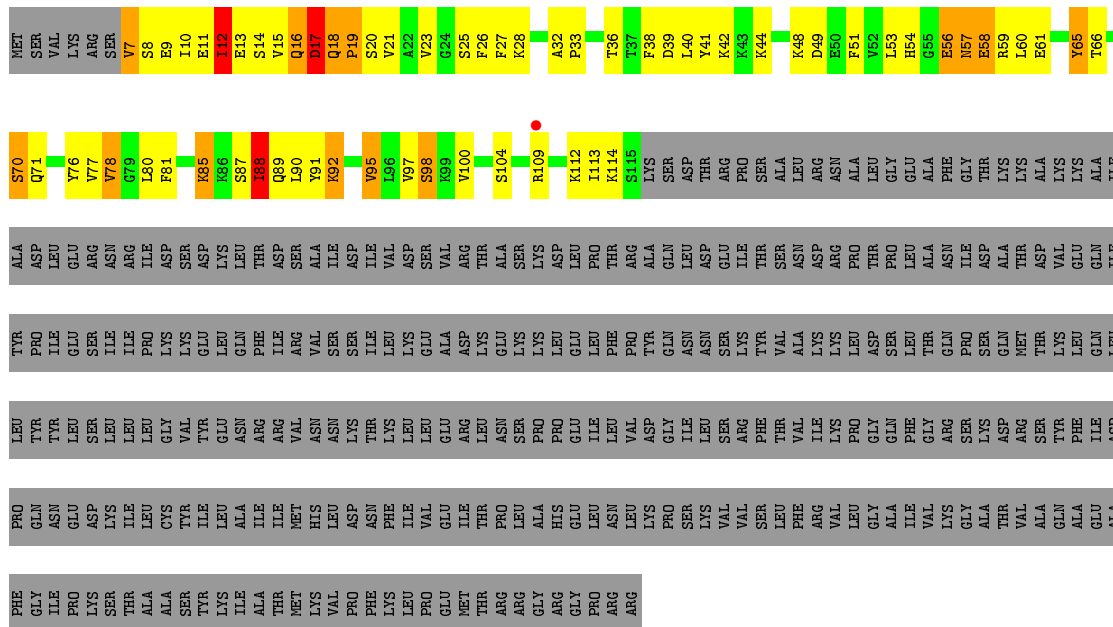


- Molecule 12: DNA-directed RNA polymerases I, II, and III subunit RPABC4

Chain FL:

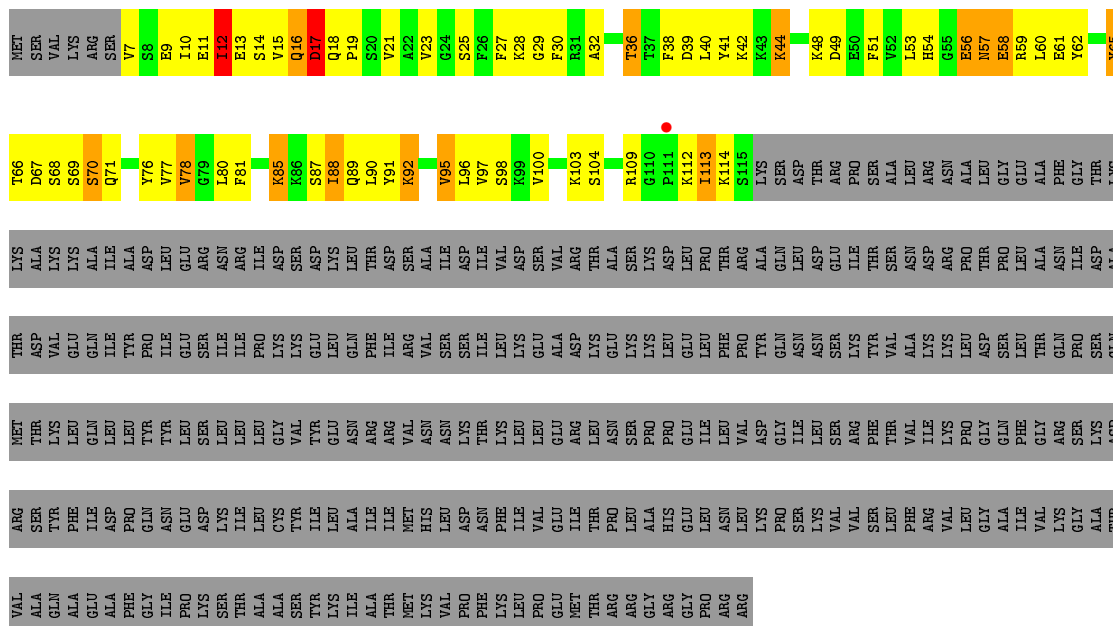
- Molecule 13: DNA-directed RNA polymerase I subunit RPA49

Chain CM:  11% 12% . . 74%



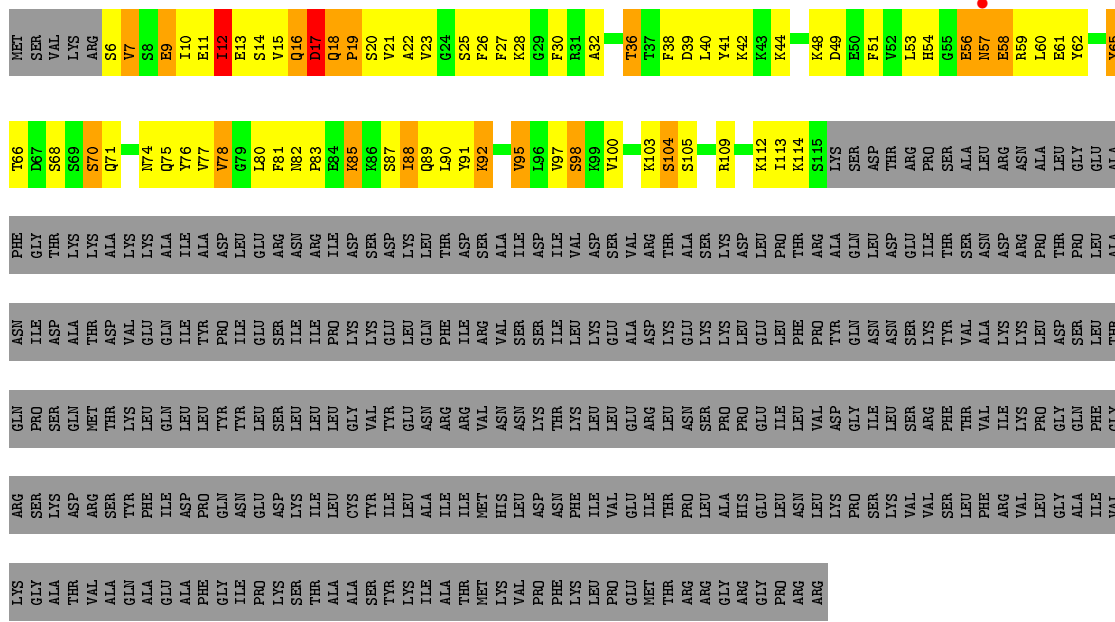
- Molecule 13: DNA-directed RNA polymerase I subunit RPA49

Chain DM:  10% 13% . 74%

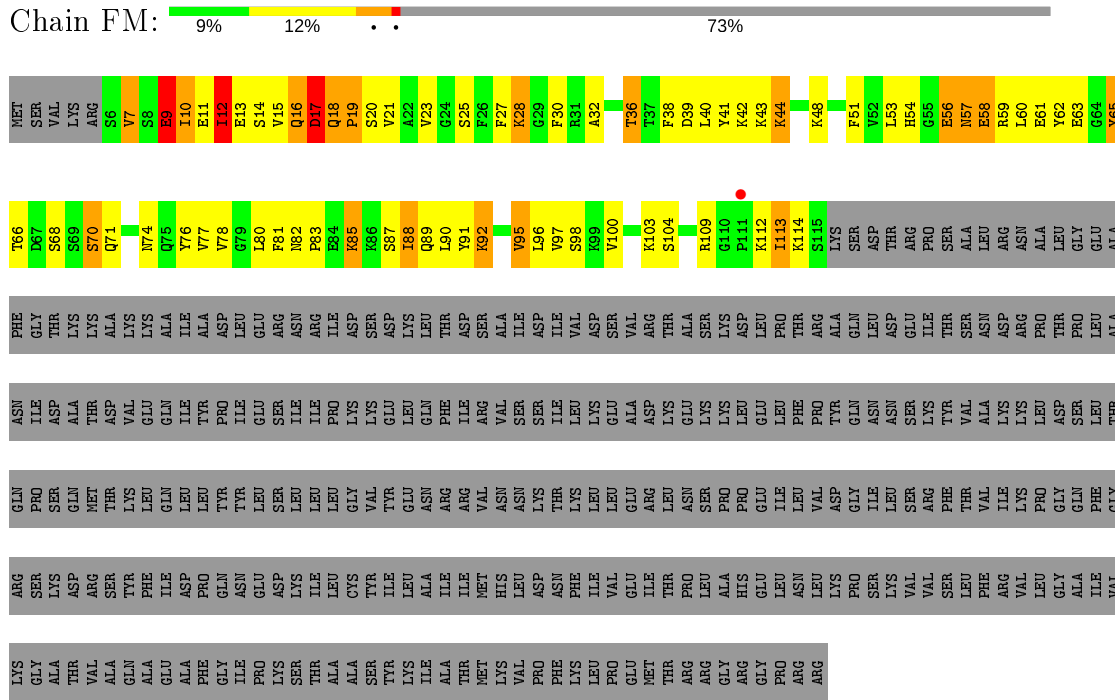


- Molecule 13: DNA-directed RNA polymerase I subunit RPA49

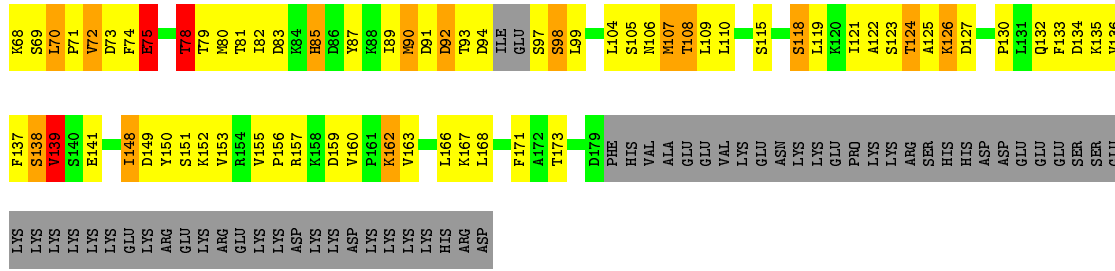
Chain EM:  9% 13% . 73%



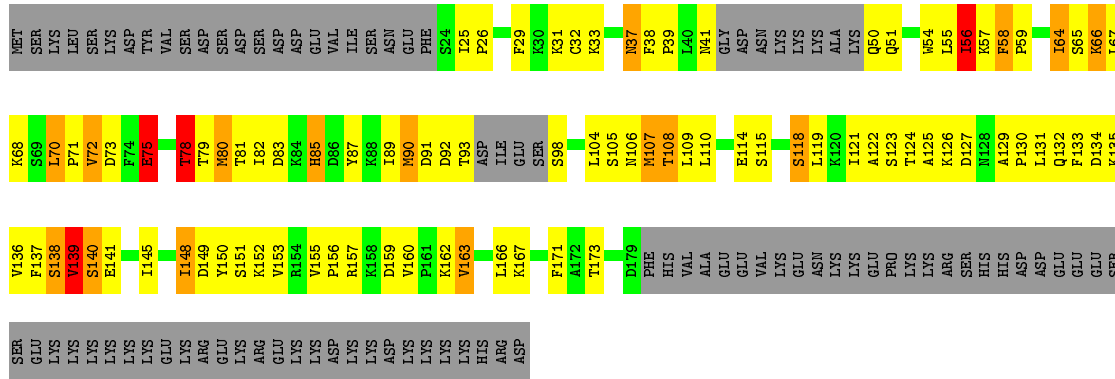
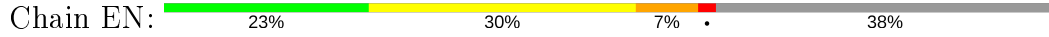
• Molecule 13: DNA-directed RNA polymerase I subunit RPA49



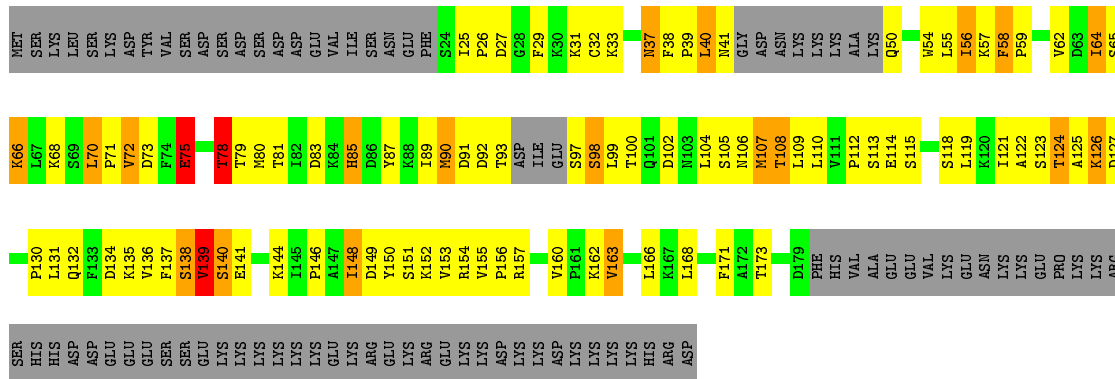
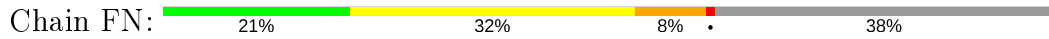
• Molecule 14: DNA-directed RNA polymerase I subunit RPA34



• Molecule 14: DNA-directed RNA polymerase I subunit RPA34



• Molecule 14: DNA-directed RNA polymerase I subunit RPA34



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	619.48Å 306.62Å 251.78Å 90.00° 97.50° 90.00°	Depositor
Resolution (Å)	49.69 – 5.50 49.69 – 5.50	Depositor EDS
% Data completeness (in resolution range)	99.1 (49.69-5.50) 99.1 (49.69-5.50)	Depositor EDS
R_{merge}	0.22	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.77 (at 5.39Å)	Xtrriage
Refinement program	PHENIX	Depositor
R, R_{free}	0.196 , 0.235 0.200 , 0.240	Depositor DCC
R_{free} test set	1987 reflections (1.33%)	wwPDB-VP
Wilson B-factor (Å ²)	117.0	Xtrriage
Anisotropy	0.698	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.28 , 213.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.34$, $\langle L^2 \rangle = 0.17$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.89	EDS
Total number of atoms	204233	wwPDB-VP
Average B, all atoms (Å ²)	195.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.15% 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

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	AA	0.61	0/11916	0.69	0/16097
1	BA	0.53	0/11752	0.66	0/15875
1	CA	0.66	2/11908 (0.0%)	0.72	0/16086
1	DA	0.67	2/11910 (0.0%)	0.72	0/16090
1	EA	0.68	3/11919 (0.0%)	0.74	2/16099 (0.0%)
1	FA	0.69	2/11923 (0.0%)	0.73	0/16106
2	AB	0.60	0/9389	0.70	0/12685
2	BB	0.57	1/9377 (0.0%)	0.69	0/12671
2	CB	0.70	7/9509 (0.1%)	0.75	1/12847 (0.0%)
2	DB	0.69	4/9474 (0.0%)	0.75	2/12802 (0.0%)
2	EB	0.70	2/9470 (0.0%)	0.75	1/12796 (0.0%)
2	FB	0.70	1/9475 (0.0%)	0.75	1/12802 (0.0%)
3	AC	0.61	0/2465	0.70	0/3342
3	BC	0.53	0/2465	0.66	0/3342
3	CC	0.68	0/2465	0.73	0/3342
3	DC	0.67	0/2465	0.72	0/3342
3	EC	0.73	0/2465	0.76	0/3342
3	FC	0.70	0/2465	0.73	0/3342
4	AD	0.58	0/465	0.69	0/630
4	BD	0.52	0/465	0.68	0/630
4	CD	0.69	0/465	0.76	0/630
4	DD	0.64	0/465	0.75	0/630
4	ED	0.67	0/465	0.74	0/630
4	FD	0.71	0/465	0.78	0/630
5	AE	0.54	0/1796	0.66	0/2416
5	BE	0.49	0/1796	0.64	0/2416
5	CE	0.60	0/1796	0.71	2/2416 (0.1%)
5	DE	0.60	0/1796	0.72	2/2416 (0.1%)
5	EE	0.59	0/1796	0.69	0/2416
5	FE	0.64	0/1796	0.71	0/2416
6	AF	0.56	0/821	0.64	0/1106
6	BF	0.50	0/821	0.59	0/1106

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
6	CF	0.66	0/830	0.68	0/1118
6	DF	0.64	0/830	0.68	0/1118
6	EF	0.66	0/830	0.68	0/1118
6	FF	0.65	0/830	0.68	0/1118
7	AG	0.59	0/1637	0.72	1/2226 (0.0%)
7	AO	0.83	0/417	0.78	0/562
7	BG	0.52	0/1577	0.67	0/2145
7	BO	0.84	0/408	0.78	0/550
7	CG	0.68	0/1637	0.76	1/2226 (0.0%)
7	CO	1.02	3/402 (0.7%)	0.93	0/542
7	DG	0.66	0/1637	0.77	1/2226 (0.0%)
7	DO	0.95	0/417	0.91	0/562
7	EG	0.65	0/1637	0.73	2/2226 (0.1%)
7	EO	0.94	0/417	0.86	0/562
7	FG	0.70	0/1637	0.79	2/2226 (0.1%)
7	FO	0.97	2/417 (0.5%)	0.90	0/562
8	AH	0.70	0/1081	0.72	0/1463
8	BH	0.52	0/1070	0.63	0/1449
8	CH	0.70	0/1070	0.72	0/1449
8	DH	0.71	0/1093	0.71	0/1480
8	EH	0.73	1/1093 (0.1%)	0.75	0/1480
8	FH	0.78	0/1093	0.78	0/1480
9	AI	0.69	0/956	0.73	0/1288
9	BI	0.61	1/721 (0.1%)	0.66	0/969
9	CI	0.72	2/956 (0.2%)	0.75	1/1288 (0.1%)
9	DI	0.71	0/956	0.73	0/1288
9	EI	0.83	1/910 (0.1%)	0.77	0/1223
9	FI	0.81	2/956 (0.2%)	0.75	0/1288
10	AJ	0.60	0/567	0.64	0/761
10	BJ	0.59	0/578	0.65	0/775
10	CJ	0.72	0/567	0.69	0/761
10	DJ	0.64	0/578	0.67	0/775
10	EJ	0.74	0/567	0.71	0/761
10	FJ	0.71	1/567 (0.2%)	0.70	0/761
11	AK	0.64	0/804	0.69	0/1083
11	BK	0.50	0/796	0.63	0/1072
11	CK	0.69	0/804	0.70	0/1083
11	DK	0.64	0/804	0.69	0/1083
11	EK	0.68	0/796	0.71	0/1072
11	FK	0.66	0/796	0.70	0/1072
12	AL	0.71	0/354	0.74	0/468
12	BL	0.64	1/354 (0.3%)	0.71	0/468
12	CL	0.77	0/354	0.79	0/468

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
12	DL	0.71	1/354 (0.3%)	0.77	0/468
12	EL	0.83	1/354 (0.3%)	0.85	0/468
12	FL	0.72	0/354	0.75	0/468
13	AM	0.68	0/879	0.73	0/1180
13	BM	0.66	0/879	0.73	0/1180
13	CM	0.77	0/879	0.76	0/1180
13	DM	0.75	0/879	0.75	0/1180
13	EM	0.78	2/885 (0.2%)	0.78	0/1188
13	FM	0.79	1/885 (0.1%)	0.79	0/1188
14	AN	0.68	0/1148	0.76	1/1546 (0.1%)
14	BN	0.64	0/1151	0.77	1/1552 (0.1%)
14	CN	0.76	0/1159	0.82	1/1563 (0.1%)
14	DN	0.73	0/1167	0.82	0/1574
14	EN	0.78	0/1161	0.82	1/1566 (0.1%)
14	FN	0.76	1/1167 (0.1%)	0.82	0/1574
All	All	0.66	44/208122 (0.0%)	0.72	23/281066 (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	EA	0	1

The worst 5 of 44 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	FO	294	GLU	CB-CG	7.84	1.67	1.52
1	EA	65	CYS	CB-SG	-7.74	1.69	1.82
9	EI	33	CYS	CB-SG	-7.71	1.69	1.82
1	EA	75	HIS	CA-CB	-7.70	1.37	1.53
7	FO	294	GLU	CG-CD	6.88	1.62	1.51

The worst 5 of 23 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	FG	11	ARG	NE-CZ-NH1	9.99	125.30	120.30
7	DG	11	ARG	NE-CZ-NH1	9.12	124.86	120.30
1	EA	75	HIS	CG-ND1-CE1	9.08	120.91	108.20
7	CG	11	ARG	NE-CZ-NH1	8.63	124.62	120.30
7	AG	11	ARG	NE-CZ-NH1	8.54	124.57	120.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	EA	75	HIS	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	AA	11703	0	11787	744	0
1	BA	11540	0	11624	709	0
1	CA	11695	0	11780	785	0
1	DA	11697	0	11775	791	0
1	EA	11706	0	11788	781	0
1	FA	11709	0	11790	792	0
2	AB	9187	0	9100	594	0
2	BB	9175	0	9074	571	0
2	CB	9304	0	9216	623	0
2	DB	9269	0	9175	644	0
2	EB	9265	0	9179	642	0
2	FB	9270	0	9180	644	0
3	AC	2413	0	2404	153	0
3	BC	2413	0	2404	145	0
3	CC	2413	0	2404	172	0
3	DC	2413	0	2404	170	0
3	EC	2413	0	2404	160	0
3	FC	2413	0	2404	161	0
4	AD	459	0	462	25	0
4	BD	459	0	462	32	0
4	CD	459	0	462	26	0
4	DD	459	0	462	26	0
4	ED	459	0	462	29	0
4	FD	459	0	462	32	0
5	AE	1760	0	1788	79	0
5	BE	1760	0	1788	84	0
5	CE	1760	0	1788	83	0
5	DE	1760	0	1788	98	0
5	EE	1760	0	1788	83	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	FE	1760	0	1788	101	0
6	AF	807	0	827	43	0
6	BF	807	0	827	43	0
6	CF	816	0	833	40	0
6	DF	816	0	833	37	0
6	EF	816	0	833	42	0
6	FF	816	0	833	39	0
7	AG	1599	0	1602	112	0
7	AO	413	0	389	47	0
7	BG	1539	0	1552	106	0
7	BO	404	0	383	47	0
7	CG	1599	0	1602	101	0
7	CO	398	0	378	42	0
7	DG	1599	0	1602	115	0
7	DO	413	0	389	34	0
7	EG	1599	0	1602	116	0
7	EO	413	0	389	47	0
7	FG	1599	0	1602	112	0
7	FO	413	0	389	38	0
8	AH	1063	0	1034	58	0
8	BH	1052	0	1021	59	0
8	CH	1052	0	1021	70	0
8	DH	1075	0	1046	72	0
8	EH	1075	0	1046	63	0
8	FH	1075	0	1046	63	0
9	AI	943	0	929	62	0
9	BI	716	0	709	37	0
9	CI	943	0	929	63	0
9	DI	943	0	929	64	0
9	EI	898	0	880	54	0
9	FI	943	0	929	65	0
10	AJ	558	0	572	42	0
10	BJ	569	0	585	37	0
10	CJ	558	0	572	43	0
10	DJ	569	0	585	39	0
10	EJ	558	0	572	35	0
10	FJ	558	0	572	39	0
11	AK	793	0	790	41	0
11	BK	786	0	782	42	0
11	CK	793	0	790	46	0
11	DK	793	0	790	50	0
11	EK	786	0	782	46	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
11	FK	786	0	782	45	0
12	AL	352	0	374	48	0
12	BL	352	0	374	25	0
12	CL	352	0	374	42	0
12	DL	352	0	374	42	0
12	EL	352	0	374	34	0
12	FL	352	0	374	45	0
13	AM	863	0	864	59	0
13	BM	863	0	864	77	0
13	CM	863	0	864	61	0
13	DM	863	0	864	58	0
13	EM	869	0	869	67	0
13	FM	869	0	869	71	0
14	AN	1127	0	1133	85	0
14	BN	1130	0	1138	79	0
14	CN	1137	0	1148	84	0
14	DN	1146	0	1153	78	0
14	EN	1140	0	1150	77	0
14	FN	1146	0	1155	78	0
15	AA	2	0	0	0	0
15	AB	1	0	0	0	0
15	AI	2	0	0	0	0
15	AJ	1	0	0	0	0
15	AL	1	0	0	0	0
15	BA	2	0	0	0	0
15	BB	1	0	0	0	0
15	BI	2	0	0	0	0
15	BJ	1	0	0	0	0
15	BL	1	0	0	0	0
15	CA	2	0	0	0	0
15	CB	1	0	0	0	0
15	CI	2	0	0	0	0
15	CJ	1	0	0	0	0
15	CL	1	0	0	0	0
15	DA	2	0	0	0	0
15	DB	1	0	0	0	0
15	DI	2	0	0	0	0
15	DJ	1	0	0	0	0
15	DL	1	0	0	0	0
15	EA	2	0	0	0	0
15	EB	1	0	0	0	0
15	EI	2	0	0	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
15	EJ	1	0	0	0	0
15	EL	1	0	0	0	0
15	FA	2	0	0	0	0
15	FB	1	0	0	0	0
15	FI	2	0	0	0	0
15	FJ	1	0	0	0	0
15	FL	1	0	0	0	0
All	All	204233	0	204265	11918	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 29.

The worst 5 of 11918 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)
7:FG:11:ARG:HG2	7:FG:11:ARG:HH11	1.10	1.15
7:DG:11:ARG:HH11	7:DG:11:ARG:HG3	1.13	1.11
7:AG:11:ARG:HG3	7:AG:11:ARG:HH11	1.14	1.10
7:EG:11:ARG:HH11	7:EG:11:ARG:HG2	1.13	1.10
7:CG:11:ARG:HG3	7:CG:11:ARG:HH11	1.11	1.08

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	AA	1470/1664 (88%)	1124 (76%)	276 (19%)	70 (5%)	2 21
1	BA	1448/1664 (87%)	1124 (78%)	259 (18%)	65 (4%)	2 22
1	CA	1469/1664 (88%)	1131 (77%)	268 (18%)	70 (5%)	2 21
1	DA	1469/1664 (88%)	1138 (78%)	263 (18%)	68 (5%)	2 21

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	EA	1468/1664 (88%)	1127 (77%)	272 (18%)	69 (5%)	2	21
1	FA	1470/1664 (88%)	1127 (77%)	274 (19%)	69 (5%)	2	21
2	AB	1142/1203 (95%)	926 (81%)	158 (14%)	58 (5%)	2	19
2	BB	1141/1203 (95%)	923 (81%)	164 (14%)	54 (5%)	2	21
2	CB	1160/1203 (96%)	921 (79%)	171 (15%)	68 (6%)	1	17
2	DB	1155/1203 (96%)	923 (80%)	172 (15%)	60 (5%)	2	19
2	EB	1154/1203 (96%)	928 (80%)	165 (14%)	61 (5%)	2	19
2	FB	1155/1203 (96%)	925 (80%)	165 (14%)	65 (6%)	2	18
3	AC	302/335 (90%)	231 (76%)	53 (18%)	18 (6%)	1	16
3	BC	302/335 (90%)	232 (77%)	53 (18%)	17 (6%)	2	18
3	CC	302/335 (90%)	234 (78%)	52 (17%)	16 (5%)	2	19
3	DC	302/335 (90%)	233 (77%)	51 (17%)	18 (6%)	1	16
3	EC	302/335 (90%)	233 (77%)	52 (17%)	17 (6%)	2	18
3	FC	302/335 (90%)	233 (77%)	51 (17%)	18 (6%)	1	16
4	AD	54/137 (39%)	49 (91%)	5 (9%)	0	100	100
4	BD	54/137 (39%)	50 (93%)	4 (7%)	0	100	100
4	CD	54/137 (39%)	49 (91%)	5 (9%)	0	100	100
4	DD	54/137 (39%)	50 (93%)	4 (7%)	0	100	100
4	ED	54/137 (39%)	50 (93%)	3 (6%)	1 (2%)	8	38
4	FD	54/137 (39%)	49 (91%)	4 (7%)	1 (2%)	8	38
5	AE	213/215 (99%)	176 (83%)	31 (15%)	6 (3%)	5	30
5	BE	213/215 (99%)	174 (82%)	32 (15%)	7 (3%)	4	26
5	CE	213/215 (99%)	174 (82%)	33 (16%)	6 (3%)	5	30
5	DE	213/215 (99%)	176 (83%)	31 (15%)	6 (3%)	5	30
5	EE	213/215 (99%)	175 (82%)	32 (15%)	6 (3%)	5	30
5	FE	213/215 (99%)	174 (82%)	33 (16%)	6 (3%)	5	30
6	AF	96/155 (62%)	85 (88%)	10 (10%)	1 (1%)	15	53
6	BF	96/155 (62%)	87 (91%)	8 (8%)	1 (1%)	15	53
6	CF	97/155 (63%)	87 (90%)	9 (9%)	1 (1%)	15	53
6	DF	97/155 (63%)	85 (88%)	11 (11%)	1 (1%)	15	53
6	EF	97/155 (63%)	88 (91%)	8 (8%)	1 (1%)	15	53

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
6	FF	97/155 (63%)	88 (91%)	7 (7%)	2 (2%)	7	36
7	AG	198/326 (61%)	143 (72%)	40 (20%)	15 (8%)	1	13
7	AO	50/326 (15%)	31 (62%)	11 (22%)	8 (16%)	0	3
7	BG	191/326 (59%)	139 (73%)	37 (19%)	15 (8%)	1	12
7	BO	49/326 (15%)	33 (67%)	11 (22%)	5 (10%)	0	8
7	CG	198/326 (61%)	145 (73%)	38 (19%)	15 (8%)	1	13
7	CO	48/326 (15%)	32 (67%)	10 (21%)	6 (12%)	0	5
7	DG	198/326 (61%)	142 (72%)	38 (19%)	18 (9%)	1	11
7	DO	50/326 (15%)	31 (62%)	12 (24%)	7 (14%)	0	4
7	EG	198/326 (61%)	144 (73%)	40 (20%)	14 (7%)	1	14
7	EO	50/326 (15%)	30 (60%)	13 (26%)	7 (14%)	0	4
7	FG	198/326 (61%)	141 (71%)	40 (20%)	17 (9%)	1	11
7	FO	50/326 (15%)	34 (68%)	13 (26%)	3 (6%)	1	16
8	AH	128/146 (88%)	106 (83%)	19 (15%)	3 (2%)	6	34
8	BH	127/146 (87%)	105 (83%)	17 (13%)	5 (4%)	3	23
8	CH	127/146 (87%)	106 (84%)	18 (14%)	3 (2%)	6	33
8	DH	130/146 (89%)	104 (80%)	20 (15%)	6 (5%)	2	21
8	EH	130/146 (89%)	106 (82%)	17 (13%)	7 (5%)	2	19
8	FH	130/146 (89%)	106 (82%)	19 (15%)	5 (4%)	3	24
9	AI	122/125 (98%)	91 (75%)	28 (23%)	3 (2%)	5	32
9	BI	91/125 (73%)	70 (77%)	19 (21%)	2 (2%)	6	35
9	CI	122/125 (98%)	93 (76%)	25 (20%)	4 (3%)	4	26
9	DI	122/125 (98%)	93 (76%)	26 (21%)	3 (2%)	5	32
9	EI	113/125 (90%)	85 (75%)	25 (22%)	3 (3%)	5	31
9	FI	122/125 (98%)	92 (75%)	25 (20%)	5 (4%)	3	22
10	AJ	66/70 (94%)	45 (68%)	16 (24%)	5 (8%)	1	13
10	BJ	67/70 (96%)	45 (67%)	18 (27%)	4 (6%)	1	16
10	CJ	66/70 (94%)	47 (71%)	15 (23%)	4 (6%)	1	16
10	DJ	67/70 (96%)	47 (70%)	16 (24%)	4 (6%)	1	16
10	EJ	66/70 (94%)	47 (71%)	15 (23%)	4 (6%)	1	16
10	FJ	66/70 (94%)	47 (71%)	16 (24%)	3 (4%)	2	22

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
11	AK	99/142 (70%)	79 (80%)	17 (17%)	3 (3%)	4	28
11	BK	98/142 (69%)	80 (82%)	15 (15%)	3 (3%)	4	27
11	CK	99/142 (70%)	85 (86%)	11 (11%)	3 (3%)	4	28
11	DK	99/142 (70%)	81 (82%)	14 (14%)	4 (4%)	3	23
11	EK	98/142 (69%)	80 (82%)	14 (14%)	4 (4%)	3	22
11	FK	98/142 (69%)	82 (84%)	13 (13%)	3 (3%)	4	27
12	AL	42/70 (60%)	34 (81%)	5 (12%)	3 (7%)	1	14
12	BL	42/70 (60%)	33 (79%)	6 (14%)	3 (7%)	1	14
12	CL	42/70 (60%)	33 (79%)	6 (14%)	3 (7%)	1	14
12	DL	42/70 (60%)	33 (79%)	6 (14%)	3 (7%)	1	14
12	EL	42/70 (60%)	33 (79%)	6 (14%)	3 (7%)	1	14
12	FL	42/70 (60%)	34 (81%)	5 (12%)	3 (7%)	1	14
13	AM	107/415 (26%)	81 (76%)	17 (16%)	9 (8%)	1	11
13	BM	107/415 (26%)	81 (76%)	17 (16%)	9 (8%)	1	11
13	CM	107/415 (26%)	79 (74%)	19 (18%)	9 (8%)	1	11
13	DM	107/415 (26%)	82 (77%)	15 (14%)	10 (9%)	0	10
13	EM	108/415 (26%)	80 (74%)	18 (17%)	10 (9%)	0	10
13	FM	108/415 (26%)	80 (74%)	18 (17%)	10 (9%)	0	10
14	AN	136/233 (58%)	106 (78%)	17 (12%)	13 (10%)	0	9
14	BN	137/233 (59%)	110 (80%)	16 (12%)	11 (8%)	1	12
14	CN	137/233 (59%)	109 (80%)	17 (12%)	11 (8%)	1	12
14	DN	139/233 (60%)	112 (81%)	16 (12%)	11 (8%)	1	12
14	EN	138/233 (59%)	111 (80%)	15 (11%)	12 (9%)	1	11
14	FN	139/233 (60%)	112 (81%)	15 (11%)	12 (9%)	1	11
All	All	25348/33372 (76%)	19889 (78%)	4164 (16%)	1295 (5%)	2	19

5 of 1295 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	AA	39	ASP
1	AA	547	ILE
1	AA	551	VAL
1	AA	710	SER
1	AA	851	VAL

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	AA	1310/1465 (89%)	1024 (78%)	286 (22%)	1	6
1	BA	1290/1465 (88%)	1012 (78%)	278 (22%)	1	6
1	CA	1308/1465 (89%)	1020 (78%)	288 (22%)	1	6
1	DA	1309/1465 (89%)	1019 (78%)	290 (22%)	1	6
1	EA	1309/1465 (89%)	1025 (78%)	284 (22%)	1	6
1	FA	1309/1465 (89%)	1019 (78%)	290 (22%)	1	6
2	AB	1012/1053 (96%)	780 (77%)	232 (23%)	1	5
2	BB	1010/1053 (96%)	783 (78%)	227 (22%)	1	6
2	CB	1024/1053 (97%)	778 (76%)	246 (24%)	0	4
2	DB	1020/1053 (97%)	784 (77%)	236 (23%)	1	5
2	EB	1021/1053 (97%)	782 (77%)	239 (23%)	1	5
2	FB	1021/1053 (97%)	780 (76%)	241 (24%)	1	5
3	AC	268/296 (90%)	217 (81%)	51 (19%)	1	9
3	BC	268/296 (90%)	217 (81%)	51 (19%)	1	9
3	CC	268/296 (90%)	216 (81%)	52 (19%)	1	9
3	DC	268/296 (90%)	217 (81%)	51 (19%)	1	9
3	EC	268/296 (90%)	216 (81%)	52 (19%)	1	9
3	FC	268/296 (90%)	218 (81%)	50 (19%)	1	9
4	AD	55/116 (47%)	47 (86%)	8 (14%)	3	16
4	BD	55/116 (47%)	46 (84%)	9 (16%)	2	13
4	CD	55/116 (47%)	47 (86%)	8 (14%)	3	16
4	DD	55/116 (47%)	46 (84%)	9 (16%)	2	13
4	ED	55/116 (47%)	47 (86%)	8 (14%)	3	16
4	FD	55/116 (47%)	47 (86%)	8 (14%)	3	16
5	AE	197/197 (100%)	158 (80%)	39 (20%)	1	8
5	BE	197/197 (100%)	159 (81%)	38 (19%)	1	9

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
5	CE	197/197 (100%)	157 (80%)	40 (20%)	1	7
5	DE	197/197 (100%)	157 (80%)	40 (20%)	1	7
5	EE	197/197 (100%)	157 (80%)	40 (20%)	1	7
5	FE	197/197 (100%)	156 (79%)	41 (21%)	1	7
6	AF	88/137 (64%)	75 (85%)	13 (15%)	3	16
6	BF	88/137 (64%)	75 (85%)	13 (15%)	3	16
6	CF	89/137 (65%)	73 (82%)	16 (18%)	1	10
6	DF	89/137 (65%)	74 (83%)	15 (17%)	2	12
6	EF	89/137 (65%)	75 (84%)	14 (16%)	2	14
6	FF	89/137 (65%)	73 (82%)	16 (18%)	1	10
7	AG	180/291 (62%)	131 (73%)	49 (27%)	0	3
7	AO	50/291 (17%)	29 (58%)	21 (42%)	0	0
7	BG	173/291 (60%)	128 (74%)	45 (26%)	0	3
7	BO	49/291 (17%)	33 (67%)	16 (33%)	0	2
7	CG	180/291 (62%)	131 (73%)	49 (27%)	0	3
7	CO	48/291 (16%)	35 (73%)	13 (27%)	0	3
7	DG	180/291 (62%)	132 (73%)	48 (27%)	0	3
7	DO	50/291 (17%)	32 (64%)	18 (36%)	0	1
7	EG	180/291 (62%)	133 (74%)	47 (26%)	0	3
7	EO	50/291 (17%)	33 (66%)	17 (34%)	0	1
7	FG	180/291 (62%)	130 (72%)	50 (28%)	0	3
7	FO	50/291 (17%)	36 (72%)	14 (28%)	0	3
8	AH	116/128 (91%)	86 (74%)	30 (26%)	0	4
8	BH	115/128 (90%)	87 (76%)	28 (24%)	0	4
8	CH	115/128 (90%)	84 (73%)	31 (27%)	0	3
8	DH	117/128 (91%)	86 (74%)	31 (26%)	0	3
8	EH	117/128 (91%)	84 (72%)	33 (28%)	0	3
8	FH	117/128 (91%)	85 (73%)	32 (27%)	0	3
9	AI	109/110 (99%)	84 (77%)	25 (23%)	1	5
9	BI	86/110 (78%)	67 (78%)	19 (22%)	1	6
9	CI	109/110 (99%)	83 (76%)	26 (24%)	0	4

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
9	DI	109/110 (99%)	81 (74%)	28 (26%)	0	4
9	EI	104/110 (94%)	79 (76%)	25 (24%)	0	4
9	FI	109/110 (99%)	80 (73%)	29 (27%)	0	3
10	AJ	63/65 (97%)	47 (75%)	16 (25%)	0	4
10	BJ	64/65 (98%)	49 (77%)	15 (23%)	1	5
10	CJ	63/65 (97%)	49 (78%)	14 (22%)	1	6
10	DJ	64/65 (98%)	49 (77%)	15 (23%)	1	5
10	EJ	63/65 (97%)	50 (79%)	13 (21%)	1	7
10	FJ	63/65 (97%)	49 (78%)	14 (22%)	1	6
11	AK	91/130 (70%)	66 (72%)	25 (28%)	0	3
11	BK	90/130 (69%)	66 (73%)	24 (27%)	0	3
11	CK	91/130 (70%)	67 (74%)	24 (26%)	0	3
11	DK	91/130 (70%)	66 (72%)	25 (28%)	0	3
11	EK	90/130 (69%)	66 (73%)	24 (27%)	0	3
11	FK	90/130 (69%)	65 (72%)	25 (28%)	0	3
12	AL	39/57 (68%)	27 (69%)	12 (31%)	0	2
12	BL	39/57 (68%)	27 (69%)	12 (31%)	0	2
12	CL	39/57 (68%)	27 (69%)	12 (31%)	0	2
12	DL	39/57 (68%)	27 (69%)	12 (31%)	0	2
12	EL	39/57 (68%)	27 (69%)	12 (31%)	0	2
12	FL	39/57 (68%)	27 (69%)	12 (31%)	0	2
13	AM	99/371 (27%)	73 (74%)	26 (26%)	0	3
13	BM	99/371 (27%)	74 (75%)	25 (25%)	0	4
13	CM	99/371 (27%)	74 (75%)	25 (25%)	0	4
13	DM	99/371 (27%)	74 (75%)	25 (25%)	0	4
13	EM	100/371 (27%)	73 (73%)	27 (27%)	0	3
13	FM	100/371 (27%)	75 (75%)	25 (25%)	0	4
14	AN	132/220 (60%)	96 (73%)	36 (27%)	0	3
14	BN	133/220 (60%)	98 (74%)	35 (26%)	0	3
14	CN	133/220 (60%)	95 (71%)	38 (29%)	0	2
14	DN	135/220 (61%)	97 (72%)	38 (28%)	0	3

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
14	EN	134/220 (61%)	97 (72%)	37 (28%)	0	3
14	FN	135/220 (61%)	99 (73%)	36 (27%)	0	3
All	All	22843/29562 (77%)	17621 (77%)	5222 (23%)	1	5

5 of 5222 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
7	CG	37	CYS
2	DB	306	LEU
2	FB	1034	GLN
8	CH	133	ASN
1	DA	506	THR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 426 such sidechains are listed below:

Mol	Chain	Res	Type
9	CI	124	ASN
2	DB	893	ASN
2	FB	896	GLN
13	CM	57	ASN
1	DA	1299	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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 carbohydrates in this entry.

5.6 Ligand geometry [i](#)

Of 42 ligands modelled in this entry, 42 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
1	EA	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	EA	1261:VAL	C	1262:LEU	N	2.28

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	AA	1484/1664 (89%)	-0.15	10 (0%) 87 82	174, 197, 249, 308	0
1	BA	1462/1664 (87%)	0.05	18 (1%) 79 70	242, 262, 287, 314	0
1	CA	1483/1664 (89%)	-0.24	7 (0%) 91 85	143, 164, 201, 253	0
1	DA	1483/1664 (89%)	-0.25	3 (0%) 95 93	147, 170, 215, 278	0
1	EA	1484/1664 (89%)	-0.24	4 (0%) 94 90	149, 171, 207, 250	0
1	FA	1484/1664 (89%)	-0.28	2 (0%) 95 94	142, 160, 203, 262	0
2	AB	1154/1203 (95%)	-0.17	5 (0%) 92 87	179, 212, 250, 276	0
2	BB	1153/1203 (95%)	-0.09	9 (0%) 86 79	233, 245, 265, 279	0
2	CB	1170/1203 (97%)	-0.28	4 (0%) 94 90	144, 169, 196, 227	0
2	DB	1165/1203 (96%)	-0.22	2 (0%) 95 93	148, 169, 191, 223	0
2	EB	1164/1203 (96%)	-0.33	0 100 100	148, 162, 188, 225	0
2	FB	1165/1203 (96%)	-0.26	1 (0%) 95 94	142, 164, 191, 213	0
3	AC	304/335 (90%)	-0.07	0 100 100	190, 209, 237, 253	0
3	BC	304/335 (90%)	0.20	7 (2%) 60 52	248, 278, 311, 332	0
3	CC	304/335 (90%)	-0.19	0 100 100	162, 175, 191, 207	0
3	DC	304/335 (90%)	-0.14	2 (0%) 87 82	167, 182, 197, 206	0
3	EC	304/335 (90%)	-0.24	0 100 100	158, 173, 190, 203	0
3	FC	304/335 (90%)	-0.21	0 100 100	154, 170, 187, 198	0
4	AD	58/137 (42%)	-0.03	1 (1%) 70 61	207, 243, 266, 270	0
4	BD	58/137 (42%)	0.44	3 (5%) 27 26	262, 281, 301, 303	0
4	CD	58/137 (42%)	-0.24	1 (1%) 70 61	171, 184, 195, 200	0
4	DD	58/137 (42%)	-0.18	1 (1%) 70 61	177, 190, 204, 207	0
4	ED	58/137 (42%)	-0.28	1 (1%) 70 61	185, 202, 214, 215	0
4	FD	58/137 (42%)	-0.26	1 (1%) 70 61	162, 186, 211, 212	0

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
5	AE	215/215 (100%)	-0.42	1 (0%) 91 85	186, 214, 234, 243	0
5	BE	215/215 (100%)	0.05	2 (0%) 84 77	255, 281, 296, 307	0
5	CE	215/215 (100%)	-0.52	0 100 100	152, 178, 194, 206	0
5	DE	215/215 (100%)	-0.37	0 100 100	156, 187, 209, 222	0
5	EE	215/215 (100%)	-0.38	0 100 100	158, 189, 211, 228	0
5	FE	215/215 (100%)	-0.43	0 100 100	149, 179, 199, 212	0
6	AF	98/155 (63%)	-0.37	0 100 100	181, 190, 240, 243	0
6	BF	98/155 (63%)	-0.09	0 100 100	251, 265, 299, 302	0
6	CF	99/155 (63%)	-0.36	0 100 100	148, 157, 185, 188	0
6	DF	99/155 (63%)	-0.36	0 100 100	152, 162, 201, 207	0
6	EF	99/155 (63%)	-0.44	0 100 100	154, 168, 211, 214	0
6	FF	99/155 (63%)	-0.34	0 100 100	144, 152, 209, 213	0
7	AG	202/326 (61%)	-0.02	2 (0%) 82 75	199, 249, 286, 305	0
7	AO	52/326 (15%)	0.16	1 (1%) 66 58	209, 235, 287, 294	0
7	BG	195/326 (59%)	0.42	9 (4%) 32 29	259, 290, 311, 319	0
7	BO	51/326 (15%)	0.00	1 (1%) 65 57	244, 259, 301, 312	0
7	CG	202/326 (61%)	-0.30	0 100 100	171, 186, 215, 221	0
7	CO	50/326 (15%)	-0.05	1 (2%) 65 57	159, 187, 235, 247	0
7	DG	202/326 (61%)	-0.00	1 (0%) 91 85	165, 205, 241, 251	0
7	DO	52/326 (15%)	0.03	1 (1%) 66 58	167, 197, 258, 276	0
7	EG	202/326 (61%)	-0.07	1 (0%) 91 85	181, 209, 227, 234	0
7	EO	52/326 (15%)	-0.24	0 100 100	168, 190, 233, 246	0
7	FG	202/326 (61%)	-0.01	0 100 100	158, 197, 226, 232	0
7	FO	52/326 (15%)	-0.25	0 100 100	163, 191, 241, 257	0
8	AH	132/146 (90%)	-0.28	0 100 100	180, 190, 197, 206	0
8	BH	131/146 (89%)	0.46	1 (0%) 86 79	282, 313, 328, 335	0
8	CH	131/146 (89%)	-0.16	0 100 100	162, 175, 183, 187	0
8	DH	134/146 (91%)	-0.25	0 100 100	167, 182, 196, 231	0
8	EH	134/146 (91%)	-0.21	0 100 100	164, 185, 201, 209	0
8	FH	134/146 (91%)	-0.18	0 100 100	151, 162, 173, 203	0
9	AI	124/125 (99%)	0.08	0 100 100	189, 209, 254, 260	0

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
9	BI	97/125 (77%)	0.22	1 (1%) 82 75	254, 264, 300, 307	0
9	CI	124/125 (99%)	-0.09	0 100 100	162, 179, 201, 206	0
9	DI	124/125 (99%)	-0.04	0 100 100	166, 187, 207, 214	0
9	EI	117/125 (93%)	-0.16	0 100 100	160, 177, 203, 235	0
9	FI	124/125 (99%)	-0.19	0 100 100	159, 181, 203, 211	0
10	AJ	68/70 (97%)	-0.24	0 100 100	194, 209, 227, 240	0
10	BJ	69/70 (98%)	0.01	2 (2%) 51 43	245, 263, 275, 279	0
10	CJ	68/70 (97%)	-0.31	0 100 100	162, 172, 183, 195	0
10	DJ	69/70 (98%)	-0.33	0 100 100	164, 174, 184, 191	0
10	EJ	68/70 (97%)	-0.42	0 100 100	155, 165, 177, 180	0
10	FJ	68/70 (97%)	-0.38	0 100 100	155, 165, 179, 186	0
11	AK	101/142 (71%)	-0.10	0 100 100	186, 193, 213, 221	0
11	BK	100/142 (70%)	0.03	0 100 100	259, 288, 305, 311	0
11	CK	101/142 (71%)	-0.23	0 100 100	157, 168, 182, 190	0
11	DK	101/142 (71%)	-0.36	0 100 100	161, 175, 190, 197	0
11	EK	100/142 (70%)	-0.38	0 100 100	154, 168, 182, 190	0
11	FK	100/142 (70%)	-0.41	0 100 100	150, 159, 174, 180	0
12	AL	44/70 (62%)	-0.04	0 100 100	201, 238, 253, 256	0
12	BL	44/70 (62%)	-0.08	0 100 100	241, 248, 255, 256	0
12	CL	44/70 (62%)	-0.28	0 100 100	163, 184, 192, 193	0
12	DL	44/70 (62%)	-0.17	0 100 100	167, 184, 191, 195	0
12	EL	44/70 (62%)	-0.40	0 100 100	158, 176, 188, 191	0
12	FL	44/70 (62%)	-0.28	0 100 100	159, 183, 193, 196	0
13	AM	109/415 (26%)	0.15	1 (0%) 84 77	228, 248, 259, 263	0
13	BM	109/415 (26%)	0.26	1 (0%) 84 77	247, 257, 278, 284	0
13	CM	109/415 (26%)	-0.12	1 (0%) 84 77	181, 196, 202, 205	0
13	DM	109/415 (26%)	0.09	1 (0%) 84 77	181, 197, 211, 218	0
13	EM	110/415 (26%)	-0.07	1 (0%) 84 77	173, 189, 198, 203	0
13	FM	110/415 (26%)	0.01	1 (0%) 84 77	177, 191, 198, 200	0
14	AN	142/233 (60%)	0.15	2 (1%) 75 66	194, 234, 266, 270	0
14	BN	143/233 (61%)	0.29	3 (2%) 63 55	254, 266, 283, 297	0

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
14	CN	143/233 (61%)	-0.24	0 100 100	166, 187, 208, 219	0
14	DN	145/233 (62%)	-0.22	0 100 100	167, 197, 213, 220	0
14	EN	144/233 (61%)	-0.35	0 100 100	160, 184, 203, 214	0
14	FN	145/233 (62%)	-0.27	0 100 100	157, 184, 204, 214	0
All	All	25720/33372 (77%)	-0.18	117 (0%) 91 85	142, 184, 273, 335	0

The worst 5 of 117 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
4	BD	12	THR	6.7
3	BC	184	VAL	3.6
1	BA	634	ASN	3.6
2	BB	441	LYS	3.5
3	BC	108	VAL	3.5

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

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

6.3 Carbohydrates [i](#)

There are no carbohydrates 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
15	ZN	DI	3002	1/1	0.85	0.10	195,195,195,195	0
15	ZN	BJ	3001	1/1	0.88	0.15	267,267,267,267	0
15	ZN	BI	3002	1/1	0.90	0.31	311,311,311,311	0
15	ZN	BA	3002	1/1	0.91	0.16	283,283,283,283	0
15	ZN	AI	3001	1/1	0.92	0.05	247,247,247,247	0
15	ZN	FA	3002	1/1	0.93	0.12	202,202,202,202	0
15	ZN	AJ	3001	1/1	0.93	0.25	197,197,197,197	0

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
15	ZN	EA	3002	1/1	0.94	0.10	215,215,215,215	0
15	ZN	BA	3001	1/1	0.94	0.11	248,248,248,248	0
15	ZN	AI	3002	1/1	0.95	0.10	213,213,213,213	0
15	ZN	CA	3001	1/1	0.96	0.09	168,168,168,168	0
15	ZN	EI	3002	1/1	0.96	0.06	198,198,198,198	0
15	ZN	CA	3002	1/1	0.96	0.11	205,205,205,205	0
15	ZN	AA	3001	1/1	0.96	0.07	222,222,222,222	0
15	ZN	EB	3001	1/1	0.97	0.16	169,169,169,169	0
15	ZN	CI	3001	1/1	0.97	0.07	194,194,194,194	0
15	ZN	DB	3001	1/1	0.97	0.18	172,172,172,172	0
15	ZN	EI	3001	1/1	0.97	0.08	187,187,187,187	0
15	ZN	CI	3002	1/1	0.97	0.11	195,195,195,195	0
15	ZN	EL	3001	1/1	0.97	0.09	176,176,176,176	0
15	ZN	BL	3001	1/1	0.97	0.07	245,245,245,245	0
15	ZN	DA	3002	1/1	0.97	0.08	211,211,211,211	0
15	ZN	AA	3002	1/1	0.97	0.10	262,262,262,262	0
15	ZN	FB	3001	1/1	0.97	0.19	163,163,163,163	0
15	ZN	AB	3001	1/1	0.97	0.13	214,214,214,214	0
15	ZN	FL	3001	1/1	0.97	0.10	184,184,184,184	0
15	ZN	FI	3001	1/1	0.97	0.09	189,189,189,189	0
15	ZN	DJ	3001	1/1	0.98	0.22	167,167,167,167	0
15	ZN	FA	3001	1/1	0.98	0.12	178,178,178,178	0
15	ZN	DA	3001	1/1	0.98	0.11	177,177,177,177	0
15	ZN	CL	3001	1/1	0.98	0.07	185,185,185,185	0
15	ZN	BI	3001	1/1	0.98	0.09	257,257,257,257	0
15	ZN	EA	3001	1/1	0.98	0.16	171,171,171,171	0
15	ZN	FI	3002	1/1	0.98	0.07	190,190,190,190	0
15	ZN	BB	3001	1/1	0.98	0.17	252,252,252,252	0
15	ZN	AL	3001	1/1	0.98	0.05	241,241,241,241	0
15	ZN	DL	3001	1/1	0.99	0.07	184,184,184,184	0
15	ZN	FJ	3001	1/1	0.99	0.15	157,157,157,157	0
15	ZN	CB	3001	1/1	0.99	0.13	167,167,167,167	0
15	ZN	EJ	3001	1/1	0.99	0.20	159,159,159,159	0
15	ZN	CJ	3001	1/1	0.99	0.25	164,164,164,164	0
15	ZN	DI	3001	1/1	1.00	0.10	195,195,195,195	0

6.5 Other polymers

There are no such residues in this entry.