



wwPDB X-ray Structure Validation Summary Report ⓘ

May 15, 2020 – 09:25 pm BST

PDB ID : 5LUQ
Title : Crystal Structure of Human DNA-dependent Protein Kinase Catalytic Subunit (DNA-PKcs)
Authors : Sibanda, B.L.; Chirgadze, D.Y.; Ascher, D.B.; Blundell, T.L.
Deposited on : 2016-09-09
Resolution : 4.30 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
Mogul : 1.8.5 (274361), CSD as541be (2020)
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

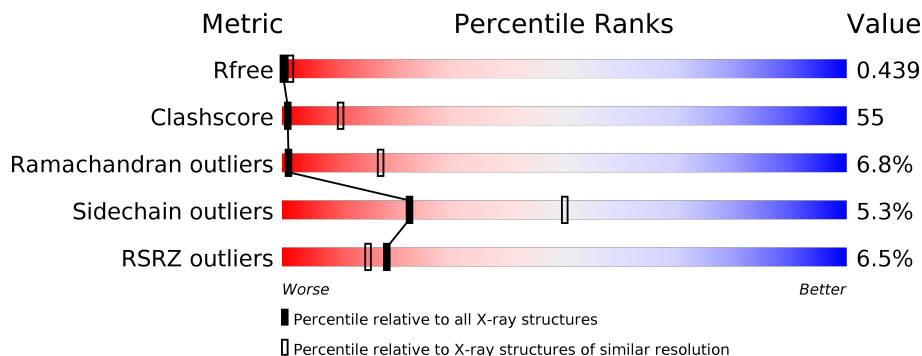
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 4.30 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	1014 (4.80-3.80)
Clashscore	141614	1077 (4.80-3.80)
Ramachandran outliers	138981	1029 (4.80-3.80)
Sidechain outliers	138945	1012 (4.80-3.80)
RSRZ outliers	127900	1075 (4.90-3.70)

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	A	4128	
1	B	4128	
2	K	194	
2	S	194	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 59694 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-dependent protein kinase catalytic subunit,DNA-dependent Protein Kinase Catalytic Subunit,DNA-dependent protein kinase catalytic subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	N	O	S				Se
1	A	3725	29574	18907	5016	5460	81	110	0	0	0
1	B	3725	29574	18907	5016	5460	81	110	0	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MSE	-	expression tag	UNP P78527
A	4128	MSE	-	expression tag	UNP P78527
B	1	MSE	-	expression tag	UNP P78527
B	4128	MSE	-	expression tag	UNP P78527

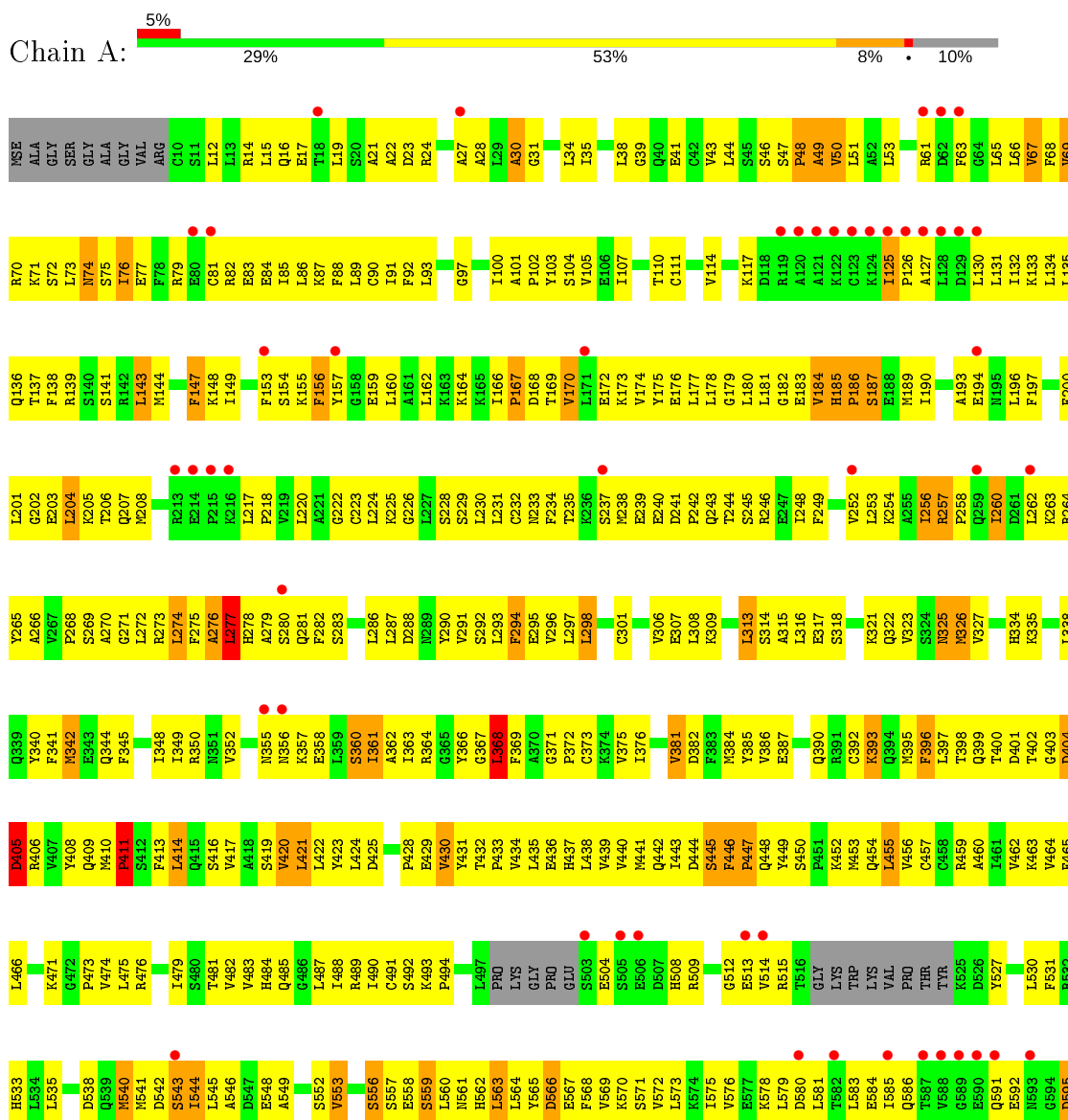
- Molecule 2 is a protein called C-terminal fragment of KU80 (KU80ct194).

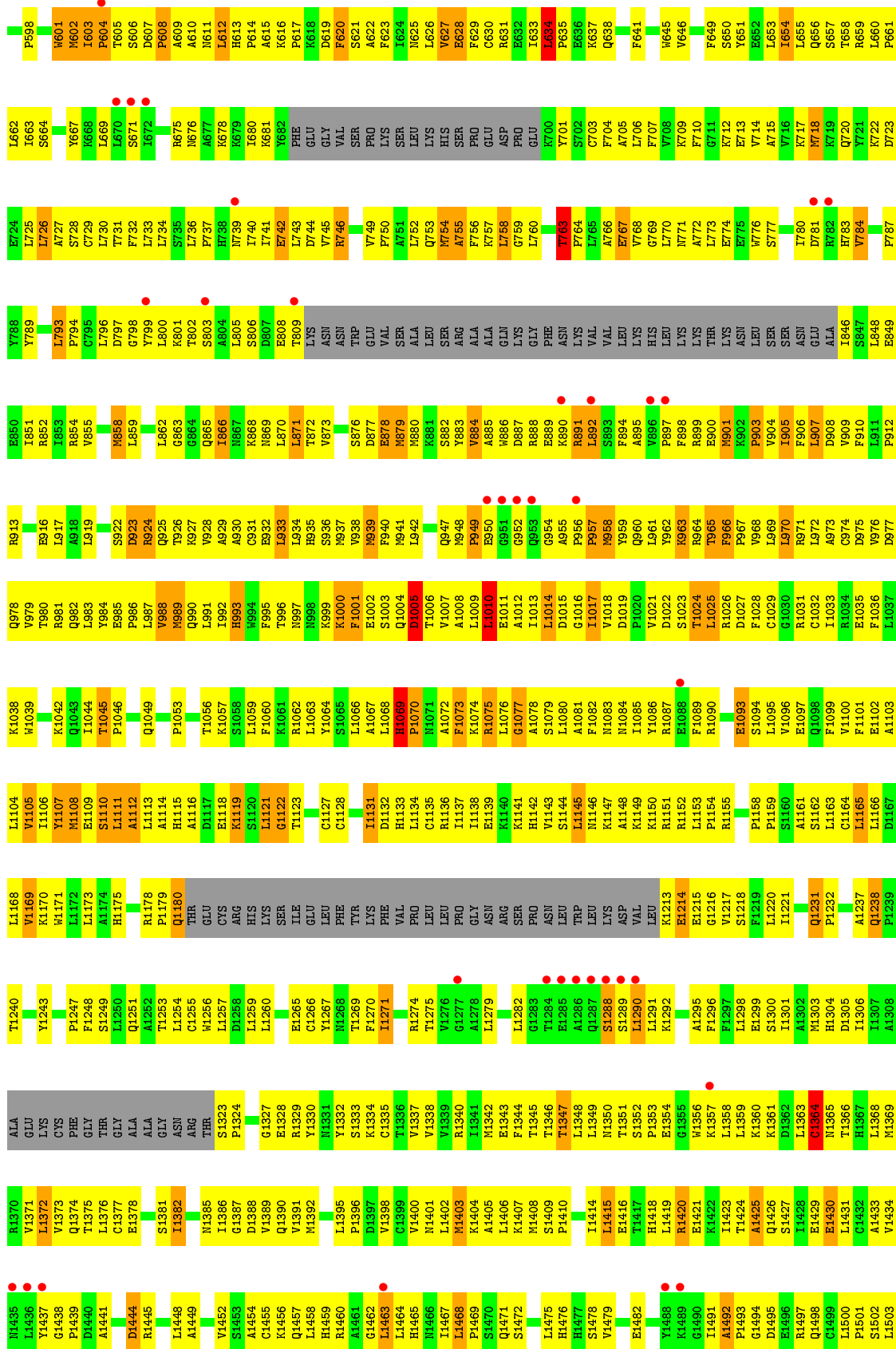
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	Se			
2	K	54	273	164	54	54	1	0	0	0
2	S	54	273	164	54	54	1	0	0	0

3 Residue-property plots [i](#)

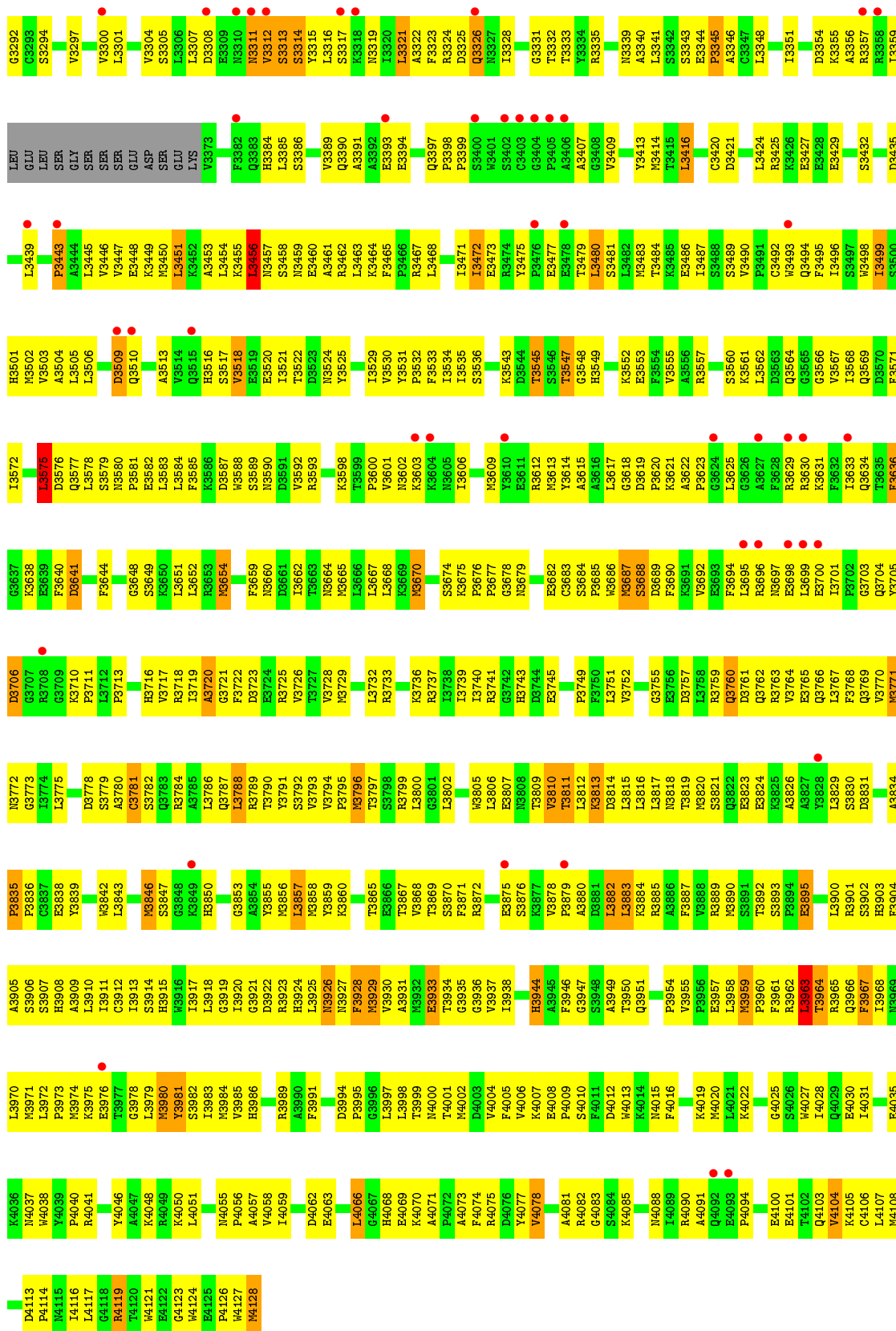
These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are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

- Molecule 1: DNA-dependent protein kinase catalytic subunit, DNA-dependent Protein Kinase Catalytic Subunit, DNA-dependent protein kinase catalytic subunit

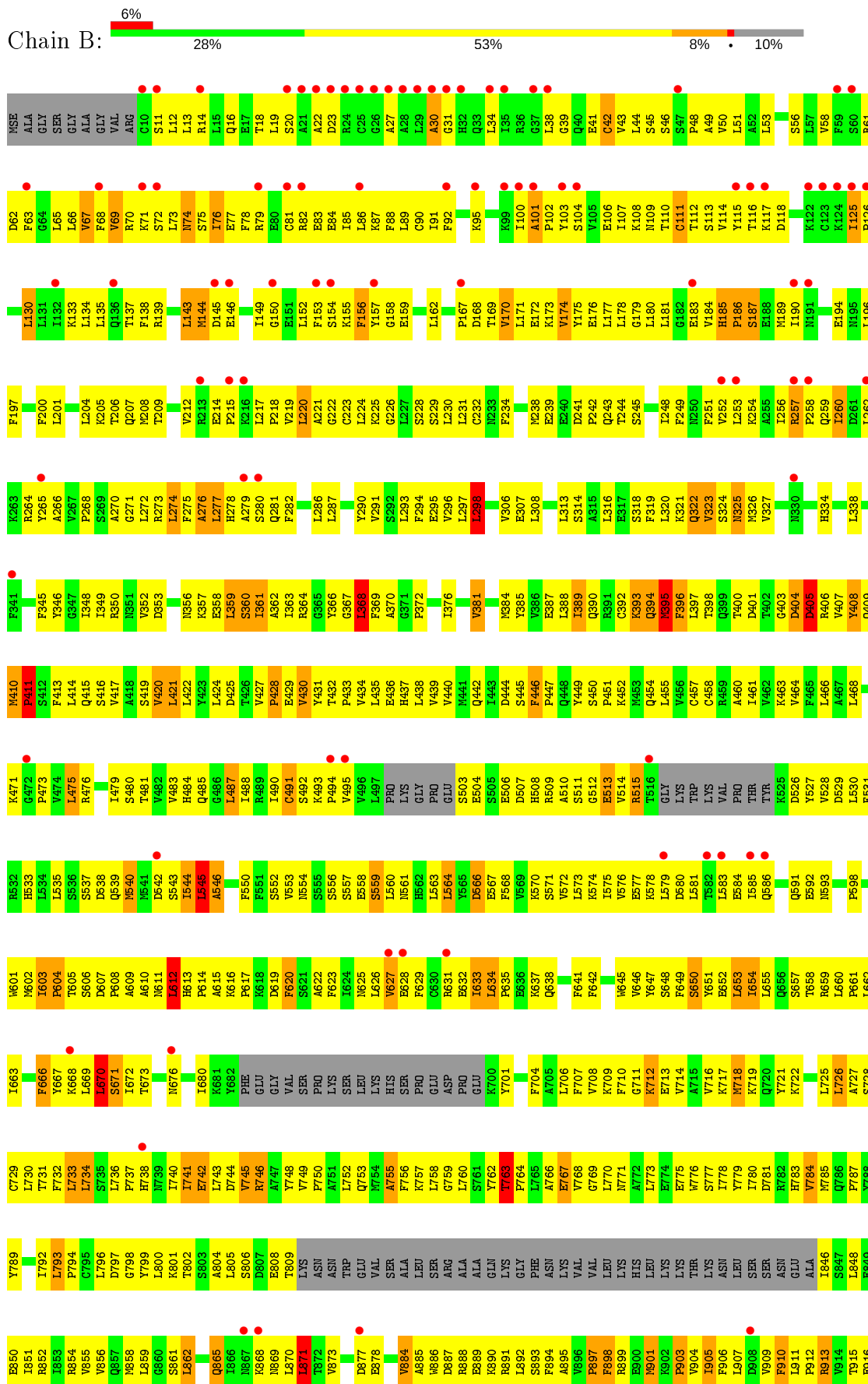




V2272	V2210	E2209	L2140	Q2071	I2007	Y1945	V1879	S1818	Q1754	Q1691	D1630	I1567	D1504
G2273	V2211	V2210	N2141	R2072	R2008	M1946	M1880	F1819	S1755	A1692	S1631	M1568	L1505
Q2275	A2212	E2010	R2143	P2074	K2009	C1947	S1881	V1820	P1756	V1693	W1633	T1569	C1507
L2276	N2213	R2014	L2144	Z2075	A2011	A1948	R1883	R1822	L1758	T1694	D1821	E1570	K1503
G2276	R2214	E2013	F2145	V2076	R2012	I1949	L1884	SER	L1758	L1696	K1635	L1572	Q1509
I2279	L2216	E2014	L2146	H2077	E2013	S1950	P1885	LEU	E1760	P1697	D1636	K1573	L1510
V2280	L2216	A2014	A2147	D2078	A2014	V1951	K1886	LEU	M1762	F1698	S1637	L1574	A1511
N2281	K2148	D2079	K2148	D2079	A2015	I1952	K1887	THR	T1763	F1699	P1638	G1512	G1513
A2282	I2151	V2080	I2151	V2080	N2016	C1953	D1888	LEU	GLU	S1700	L1639	D1576	L1575
N2283	N2152	G2017	E2082	G2017	G2017	C1954	H1890	LEU	VAL	S1701	L1639	D1576	L1577
H2284	T2153	D2018	L2083	D2018	D2018	V1955	H1890	TRP	L1702	L1702	T1641	D1576	L1577
V2285	E2154	E2084	E2084	E2084	G2021	M1956	A1891	HIS	T1703	T1703	K1642	A1578	
F2286	E2155	M2085	E2155	M2085	P2022	E1958	S1894	SER	S1706	S1706	M1643	L1582	E1516
H2287	V2156	S2023	D2086	S2023	P2022	L1959	L1895	LEU	ARG	A1644	A1644	M1583	A1518
Y2288	F2157	E2087	E2087	E2087	Y2024	K1960	M1896	LEU	GLU	V1645	V1645	A1520	A1520
D2289	K2227	L2088	K2227	L2088	Y2024	F1961	I1897	ASP	GLN	L1646	L1646	S1585	F1521
P2290	A2161	N2089	A2161	N2089	S2027	Y1962	E1907	LEU	HIS	L1648	L1648	G1522	G1522
Q2291	K2162	R2090	K2162	R2090	L2028	Q1963	G1908	ARG	VAL	R1711	R1648	V1587	L1524
C2292	R2163	H2091	R2163	H2091	L2028	Q1964	G1908	ARG	MSE	R1712	L1649	D1588	C1525
G2293	E2092	E2092	L2164	E2092	Y2030	F1965	I1905	VAL	GLU	L1714	K1653	T1590	ARG
L2294	L2165	C2093	L2165	C2093	L2031	L1966	K1913	ASP	GLU	E1745	K1652	K1591	LEU
H2295	S2166	M2094	S2166	M2094	A2032	F1967	E1907	SER	LEU	Q1746	L1653	M1592	VAL
N2296	F2167	A2095	F2167	A2095	D2033	S1968	G1908	THR	PHE	L1747	L1654	V1593	VAL
S2297	L2168	P2096	L2168	P2096	S2034	E1969	G1908	ILE	GLN	I1718	L1655	S1594	SER
E2298	L2169	L2097	L2169	L2097	T2035	K1970	M1909	VAL	SER	V1719	S1658	L1597	LEU
I2299	Q2170	S2098	Q2170	S2098	L2036	P1971	E1910	VAL	SER	A1720	VAL	L1597	LEU
Q2301	L2171	A2099	L2171	A2099	S2037	P1971	L1911	ASP	PHE	H1721	SER	M1598	LEU
A2302	N2176	L2100	N2176	L2100	E2038	L1975	T1912	ALA	ARG	F1722	ASN	M1599	ASN
L2303	N2177	L2100	N2177	L2100	E2039	I1977	K1913	ILE	ARG	P1723	PHE	M1600	PRO
V2304	E2182	R2105	E2182	R2105	M2040	F1978	L1914	ASP	ILE	M1724	ASN	L1601	ALA
N2305	Y2184	R2106	Y2184	R2106	S2041	L1978	L1914	VAL	ALA	Q1725	THR	D1602	VAL
C2244	Y2185	R2106	Y2185	R2106	Q2042	E1979	K1917	LEU	R1787	R1787	Q1603	LEU	LEU
K2246	V2186	P2111	V2186	P2111	F2045	M1980	L1918	LYS	R1788	R1788	HIS	S1604	SER
D2247	V2187	Q2112	V2187	Q2112	S2046	I1982	G1919	ARG	G1789	G1789	GLY	F1605	THR
C2248	E2188	G2113	E2188	G2113	T2047	L1984	Y1920	PHE	T1793	T1793	PHE	E1607	ALA
S2250	I2189	E2114	I2189	E2114	G2048	K1985	A1922	THR	L1797	L1797	GLU	R1608	SER
P2252	V2190	E2115	V2190	E2115	V2049	R1986	F1923	L1858	E1799	E1799	V1671	ASN	GLN
Y2253	A2191	D2116	A2191	D2116	Q2050	R1987	T1924	M1859	S1800	F1736	F1672	SER	GLN
R2264	T2192	R2120	T2192	R2120	Y2052	Y1988	M1926	E1860	V1801	M1737	T1674	LYS	GLN
L2265	L2194	D2121	L2194	D2121	S2053	F1990	M1927	S1861	Y1802	H1736	Y1675	HIS	G1543
I2266	S2195	L2122	S2195	L2122	Y2054	P1991	A1928	D1864	E1803	Y1739	I1676	GLY	S1549
F2257	W2196	L2122	W2196	L2122	S2055	E1992	G1929	T1865	M1804	V1740	S1677	GLY	I1550
E2258	T2197	W2125	T2197	W2125	S2056	E1993	M1931	Q1866	F1805	D1741	A1677	LEU	I1551
K2259	G2198	Q2057	G2198	Q2057	Q2057	M1989	M1932	I1867	R1806	G1742	L1678	LYS	H1552
F2260	L2199	P2059	L2199	P2059	D2058	F1990	Q1932	T1868	K1807	M1743	L1679	LEU	F1553
S2261	A2200	R2069	A2200	R2069	P2059	P1997	L1933	K1869	D1808	K1744	A1680	ALA	S1554
G2262	T2201	R2061	T2201	R2061	P2061	M1998	L1934	K1870	D1809	K1744	D1681	THR	H1555
D2264	T2203	G2134	T2203	G2134	P2065	E1999	E1935	M1871	F1810	F1746	T1682	THR	Y1558
G2267	W2204	W2135	G2267	W2135	R2066	R2000	R1936	G1872	P1810	F1746	K1683	ILE	F1559
V2268	V2205	P2136	V2205	P2136	A2067	K2001	R1937	L1873	R1811	L1747	L1684	LEU	F1560
N2270	P2206	I2137	P2206	I2137	R2068	K2002	R1938	Y1874	S1813	A1749	L1686	GLN	Y1560
S2271	R2207	L2138	R2207	L2138	R2069	K2003	L1939	K1875	F1814	L1750	H1687	HIS	F1563
		D2208		D2208	I2005	Y2004	H1940	I1876	R1815	L1752	L1688	LYS	S1564
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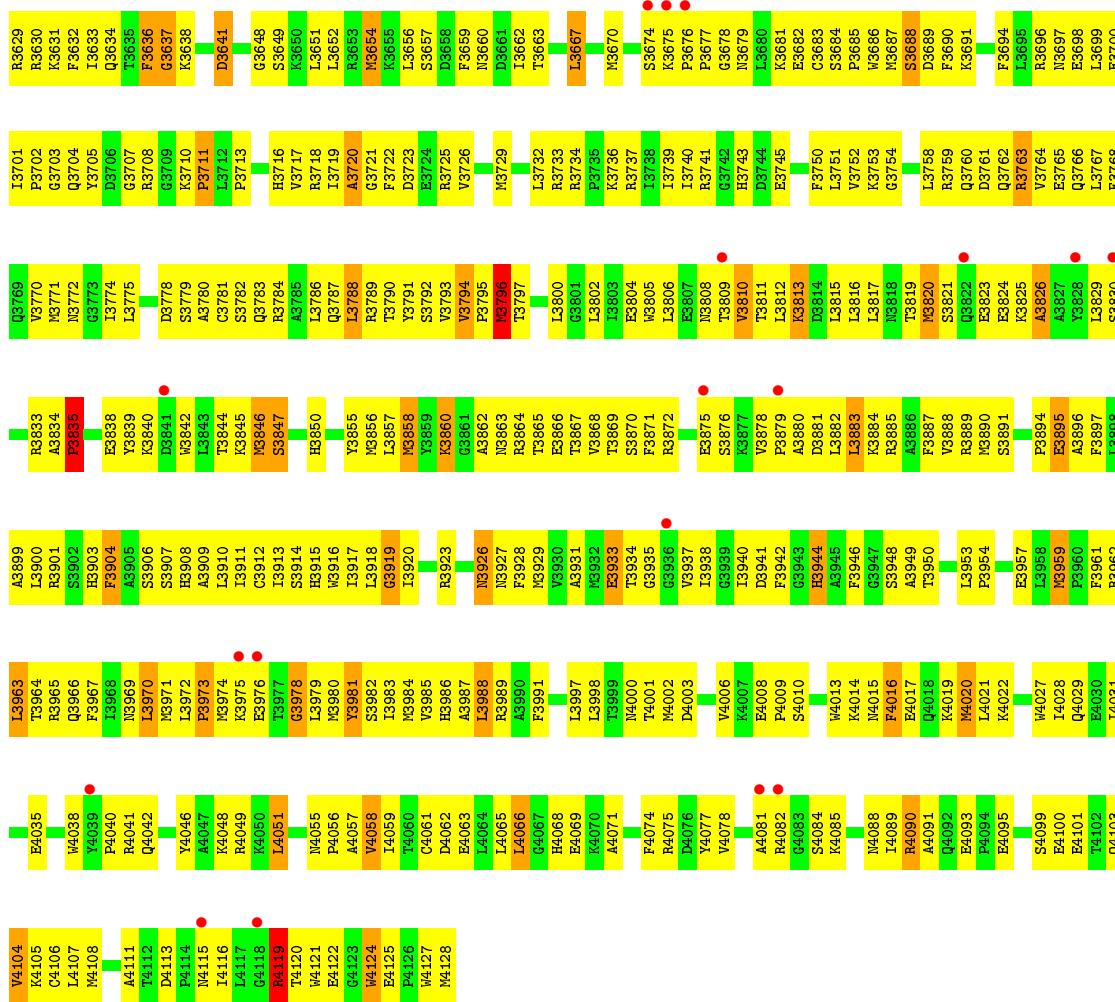


• Molecule 1: DNA-dependent protein kinase catalytic subunit, DNA-dependent Protein Kinase Catalytic Subunit, DNA-dependent protein kinase catalytic subunit



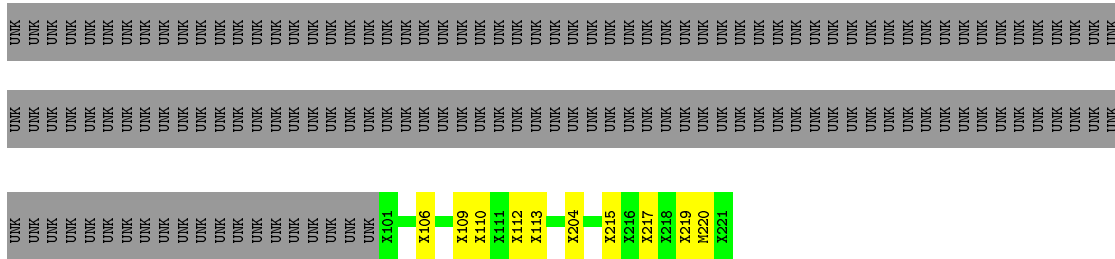
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L1500	P1501	S1502	L1503	D1504	L1505	S1506	P1507	L1508	K1509	L1510	A1511	S1512	G1513	L1514	A1515	A1516	L1517	A1518	L1519	L1520	L1521	C1522	E1523	ARG	LEU	VAL	SER	LEU	LEU	LEU	ASN	PRO	ALA	VAL	VAL	LEU	SER	GLY	SER	SER	GLY	SER	GLN	G1548	S1549	V1550	GLN	L1551	H1552	F1553	S1554	H1555	G1556	E1557	L1558	LEU	L1559	ALA	F1560	S1561	L1562	F1563	
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UNK	L2537	S2466	L2402	G2273	L2211	F2145	D2073	R2008	G1947	S1882	R1822	L1752
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UNK	L2539	R2470	R2405	Q2275	M2213	A2147	T2075	E2010	I1949	L1884	LEU	Q1754
UNK	A2541	R2471	E2406	L2276	R2214	K2148	V2076	L1885	P1885	S1850	LEU	S1755
UNK	L2542	Q2472	E2407	L2277	L2215	L2149	H2077	R2013	THR	D1887	THR	P1756
UNK	L2543	R2473	K2408	G2278	L2216	V2150	D2078	E2014	LEU	D1888	LEU	M1757
UNK	S2544	R2474	L2409	I2279	L2219	T2151	D2079	A2014	LEU	D1888	LEU	L1758
MSE	L2545	R2475	E2410	V2280	M2220	N2152	V2080	E2015	TRP	V1889	TRP	L1758
UNK	L2546	R2476	L2411	M2281	M2220	T2153	N2016	N2016	HIS	H1890	HIS	L1760
UNK	S2547	L2477	Y2412	A2282	K2221	E2154	E2082	G2017	CYS	H1891	CYS	L1761
UNK	L2548	R2478	F2413	N2283	H2222	R2155	L2083	M1957	SER	A1891	SER	M1762
UNK	L2549	R2479	F2413	D2284	F2223	V2156	E2084	L1958	LEU	S1894	LEU	T1763
UNK	L2550	Q2351	K2416	L2285	F2224	F2157	E2085	L1959	ASP	S1894	ASP	T1763
UNK	E2551	H2352		P2286	H2225	K2158	D2086	K1960	ALA	I1896	ALA	VAL
UNK	H2552	H2352		P2287	P2226	F2159	E2087	F1961	LEU	I1897	LEU	VAL
UNK	H2553	Q2353	F2420	D2288	K2227	Y2160	L2088	Y1962	ARG	Q1898	ARG	CYS
UNK	F2554	M2354	V2421	D2289	R2228	A2161	N2089	G1963	PHE	V1899	PHE	GLY
UNK	L2555	T2355	Q2422	R2290	A2229	K2162	R2090	S2027	ARG	F1900	ARG	GLU
UNK	L2556	K2356	Q2423	Q2291	F2230	H2163	H2091	F1965	PHE	S1903	PHE	GLN
UNK	S2556	E2357	Q2423	C2292	E2092	W2164	E2092	L1966	SER	C1904	SER	GLN
UNK	L2557	D2358	R2425	G2293	C2093	I2165	E2093	F1967	THR	S1904	THR	HIS
UNK	A2558	R2359	R2426	G2293	M2094	S2166	L2031	E1968	ILE	T1906	ILE	VAL
UNK	T2559	F2360	R2426	Q2295	N2234	F2167	A2095	A2032	VAL	M1907	VAL	MSE
UNK	M2560	I2361	R2427	L2168	L2235	L2168	P2096	A2032	VAL	E1907	VAL	GLU
UNK	L2562	V2362	E2430	Q2170	E2236	L2169	L2097	K1971	ASP	G1908	ASP	GLU
UNK	L2563	C2363		L2171	E2237	Q2171	T2098	E1972	ALA	M1909	ALA	LEU
UNK	E2564	M2365	R2433	F2300	I2238	L2171	A2099	K1973	ILE	E1910	ILE	PHE
UNK	L2565	M2366	L2434	Q2301	K2239	S2174	N1974	N1974	ASP	E1910	ASP	PHE
UNK	L2566	V2367	C2435	A2302	L2240	S2174	V2101	L1975	VAL	T1912	VAL	SER
UNK	S2567	R2368	L2436	L2303	R2241	E2175	K2102	L1976	LEU	K1913	LEU	SER
UNK	L2568	T2369	D2437	V2304	V2242	N2176	H2103	I1977	LYS	T1914	LYS	PHE
UNK	L2506	K2369	D2437		E2243	N2177	M2104	F1978	SER	L1915	SER	ARG
UNK	L2507	S2370	F2371	M2307	R2244			E1979	ARG	I1916	ARG	ARG
UNK	Q2508	F2372	Y2440	S2308	W2245	I2182	P2110	F2043	ILE	K1917	ILE	ALA
UNK	G2509	P2373	L2441	F2309	W2246	Y2183	P2111	F2044	ALA	L1918	ALA	ALA
UNK	L2510	P2374	M2442	R2310	D2247	Y2184	Q2112	F2046		L1919		R1787
UNK	L2511	L2374	M2443	R2311	C2248	M2185	Q2112	T2047		L1920		
UNK	L2514	A2375	M2444	Y2312	L2249	V2186	D2116	G2043		M1859		
UNK	G2515	D2376	F2444	E2313	S2250	V2187		V2049		E1860		
UNK	L2516	F2377	L2446	E2314	Y2253	E2188	P2119	Q2050		F1923		
UNK	Q2517	R2378	L2446	V2315	R2254	L2189	R2120	S2051		T1924		
UNK	Q2518	M2379	P2448	A2317	L2255	V2190	D2121	Y2052		E1925		
UNK	L2520	V2382	E2450	A2318	L2256	L2193	L2122	S2053		M1927		
UNK	L2521	F2384	L2451	A2319	F2257	L2194	W2125	Y2054		A1928		
UNK	R2522	L2385	R2452	E2320	E2258	S2195	M2126	P2059		E1930		
UNK	L2523	L2386	E2453	E2321	K2259	K2217	K2127	M1931		T1868		
UNK	L2524	P2387	L2454	V2322	F2260	F2196	F2128	Q1932		Q1807		
UNK	L2525	K2388	L2455	L2323	S2261	L2199	L2129	L1933		D1808		
UNK	S2526	F2389	M2456	G2324	G2262	A2200	A2062	L1934		P1870		
UNK	H2527	H2390	V2458	L2325	K2263	T2201	M1998	G1929		M1871		
UNK	R2530	Q2391	V2458	I2326	D2264	F2202	E1999	E1999		G1872		
UNK	L2531	L2396	E2460	L2327	P2265	T2203	R2065	R1937		Y1873		
UNK	P2532	L2397	F2461	R2328	G2204	G2204	R2066	R1938		Y1874		
UNK	S2533	L2398	V2462	R2329	S2267	V2205	R2067	R2001		K1875		
UNK	L2534	E2399	H2464	S2330	K2268	P2206	R2068	K2003		I1876		
UNK	L2535	L2398	R2464	E2332	D2269	K2267	R2069	Y2004		L1877		
UNK	L2536	L2400	P2465	R2333	M2270	D2209	E2070	Z2005		D1878		
UNK	L2536	P2465	P2465	K2334	S2271	E2209	R2072	I2007		Y1879		



• Molecule 2: C-terminal fragment of KU80 (KU80ct194)

Chain K: 23% 5% 72%



• Molecule 2: C-terminal fragment of KU80 (KU80ct194)

Chain S: 23% 5% 72%





4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	169.12Å 132.64Å 296.59Å 90.00° 105.53° 90.00°	Depositor
Resolution (Å)	49.92 – 4.30 49.92 – 4.30	Depositor EDS
% Data completeness (in resolution range)	97.8 (49.92-4.30) 97.6 (49.92-4.30)	Depositor EDS
R_{merge}	0.16	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.33 (at 4.29Å)	Xtrriage
Refinement program	PHENIX (1.10_2155: ???)	Depositor
R, R_{free}	0.386 , 0.437 0.388 , 0.439	Depositor DCC
R_{free} test set	2009 reflections (2.32%)	wwPDB-VP
Wilson B-factor (Å ²)	184.6	Xtrriage
Anisotropy	0.337	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.29 , 188.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	0.019 for h,-k,-h-l	Xtrriage
F_o, F_c correlation	0.83	EDS
Total number of atoms	59694	wwPDB-VP
Average B, all atoms (Å ²)	253.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.76% 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](#)

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.45	3/29743 (0.0%)	0.77	47/40014 (0.1%)
1	B	0.46	6/29743 (0.0%)	0.77	49/40014 (0.1%)
2	K	0.22	0/7	0.50	0/7
2	S	0.45	0/7	0.34	0/7
All	All	0.46	9/59500 (0.0%)	0.77	96/80042 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	8
1	B	0	6
All	All	0	14

The worst 5 of 9 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1069	HIS	C-N	-9.65	1.16	1.34
1	B	3794	VAL	C-N	-8.26	1.18	1.34
1	B	1069	HIS	C-N	7.70	1.48	1.34
1	B	4124	TRP	CB-CG	-6.16	1.39	1.50
1	A	601	TRP	CB-CG	-5.75	1.40	1.50

The worst 5 of 96 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	726	LEU	CA-CB-CG	-10.22	91.80	115.30
1	B	3456	LEU	CA-CB-CG	9.67	137.54	115.30
1	B	1009	LEU	CB-CG-CD1	-9.35	95.11	111.00
1	A	3456	LEU	CA-CB-CG	9.33	136.75	115.30
1	B	726	LEU	CA-CB-CG	-9.12	94.32	115.30

There are no chirality outliers.

5 of 14 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1323	SER	Peptide
1	A	2283	ASN	Peptide
1	A	2372	PRO	Peptide
1	A	411	PRO	Peptide
1	A	634	LEU	Peptide

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	29574	0	29642	3223	0
1	B	29574	0	29642	3283	0
2	K	273	0	70	9	0
2	S	273	0	73	8	0
All	All	59694	0	59427	6514	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 55.

The worst 5 of 6514 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:2183:HIS:O	1:B:2187:VAL:HB	1.30	1.31
1:B:662:LEU:O	1:B:666:PHE:HB2	1.28	1.30
1:A:3521:ILE:O	1:A:3525:TYR:HB2	1.32	1.28
1:B:3683:CYS:SG	1:B:3736:LYS:NZ	2.12	1.23
1:B:2167:PRO:O	1:B:2171:LEU:HB2	1.39	1.18

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	3631/4128 (88%)	2664 (73%)	724 (20%)	243 (7%)	1	18
1	B	3631/4128 (88%)	2657 (73%)	723 (20%)	251 (7%)	1	17
2	K	1/194 (0%)	1 (100%)	0	0	100	100
2	S	1/194 (0%)	1 (100%)	0	0	100	100
All	All	7264/8644 (84%)	5323 (73%)	1447 (20%)	494 (7%)	1	17

5 of 494 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	49	ALA
1	A	76	ILE
1	A	147	PHE
1	A	167	PRO
1	A	184	VAL

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	3259/3384 (96%)	3089 (95%)	170 (5%)	23	50
1	B	3259/3384 (96%)	3084 (95%)	175 (5%)	22	50
2	K	-	1 (100%)	0	100	100
2	S	-	1 (100%)	0	100	100
All	All	6520/6768 (96%)	6175 (95%)	345 (5%)	22	50

5 of 345 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	3893	SER
1	B	559	SER
1	B	3636	PHE
1	A	3929	MSE
1	B	274	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 68 such sidechains are listed below:

Mol	Chain	Res	Type
1	A	3524	ASN
1	B	442	GLN
1	B	3524	ASN
1	A	3762	GLN
1	A	4068	HIS

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](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	B	1
1	A	1
2	K	1
2	S	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	K	133:UNK	C	201:UNK	N	46.74
1	S	133:UNK	C	201:UNK	N	41.40
1	B	3794:VAL	C	3795:PRO	N	1.18
1	A	1069:HIS	C	1070:PRO	N	1.15

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled '#RSRZ > 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q < 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	3551/4128 (86%)	0.25	220 (6%) 20 17	83, 248, 332, 443	0
1	B	3551/4128 (86%)	0.30	240 (6%) 17 14	117, 251, 358, 507	0
2	K	0/194	-	-	-	-
2	S	0/194	-	-	-	-
All	All	7102/8644 (82%)	0.28	460 (6%) 18 15	83, 249, 343, 507	0

The worst 5 of 460 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	122	LYS	12.8
1	B	31	GLY	9.6
1	B	1355	GLY	9.6
1	B	145	ASP	9.1
1	A	126	PRO	8.7

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](#)

There are no ligands in this entry.

6.5 Other polymers

There are no such residues in this entry.