

Cyclin-dependent kinases: a family portrait

by Malumbres et al.

Supplementary Figures and Table

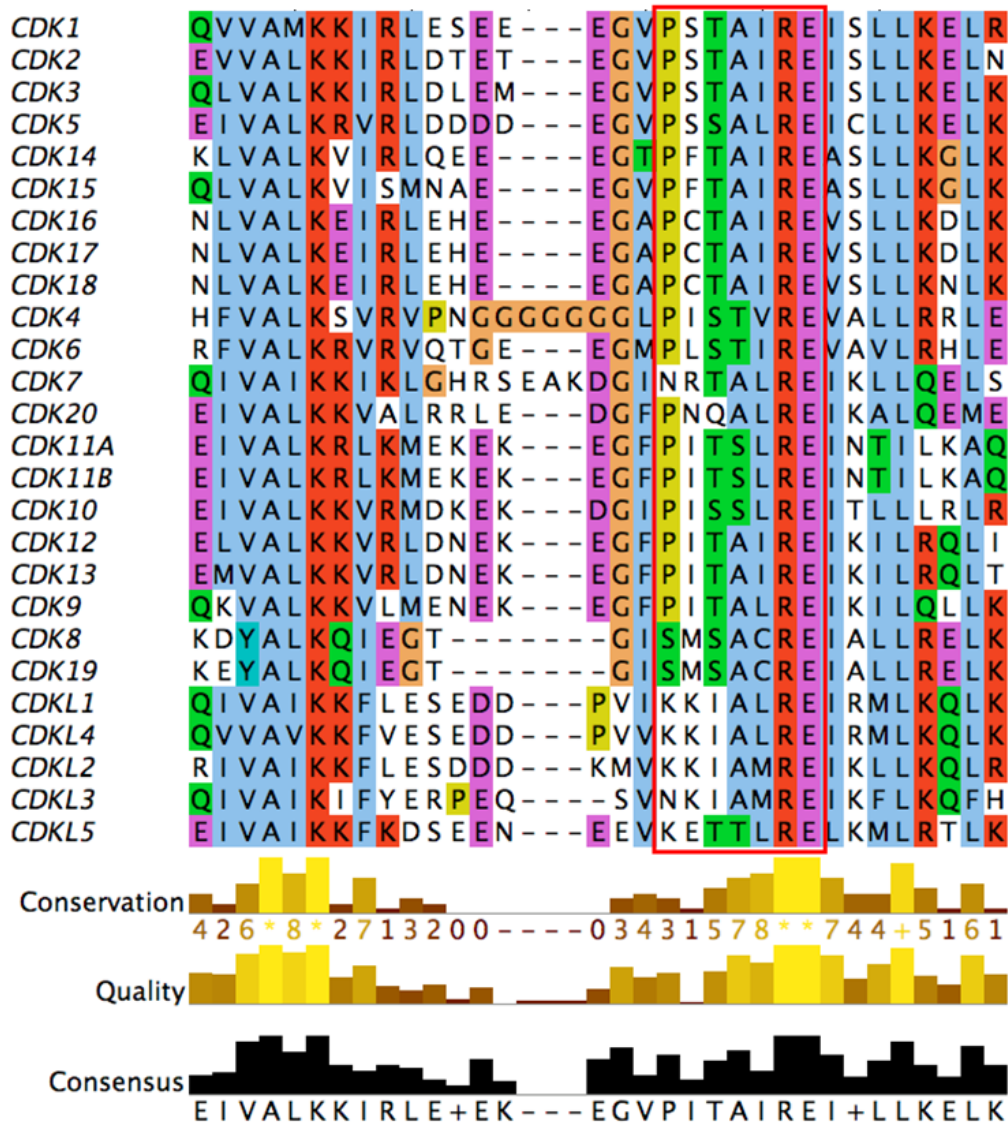


Figure S1. Predicted Cyclin-binding elements in CDK and CDKL proteins. Protein sequences were aligned with Clustal2. The predicted Cyclin-binding domain is indicated by a red box.

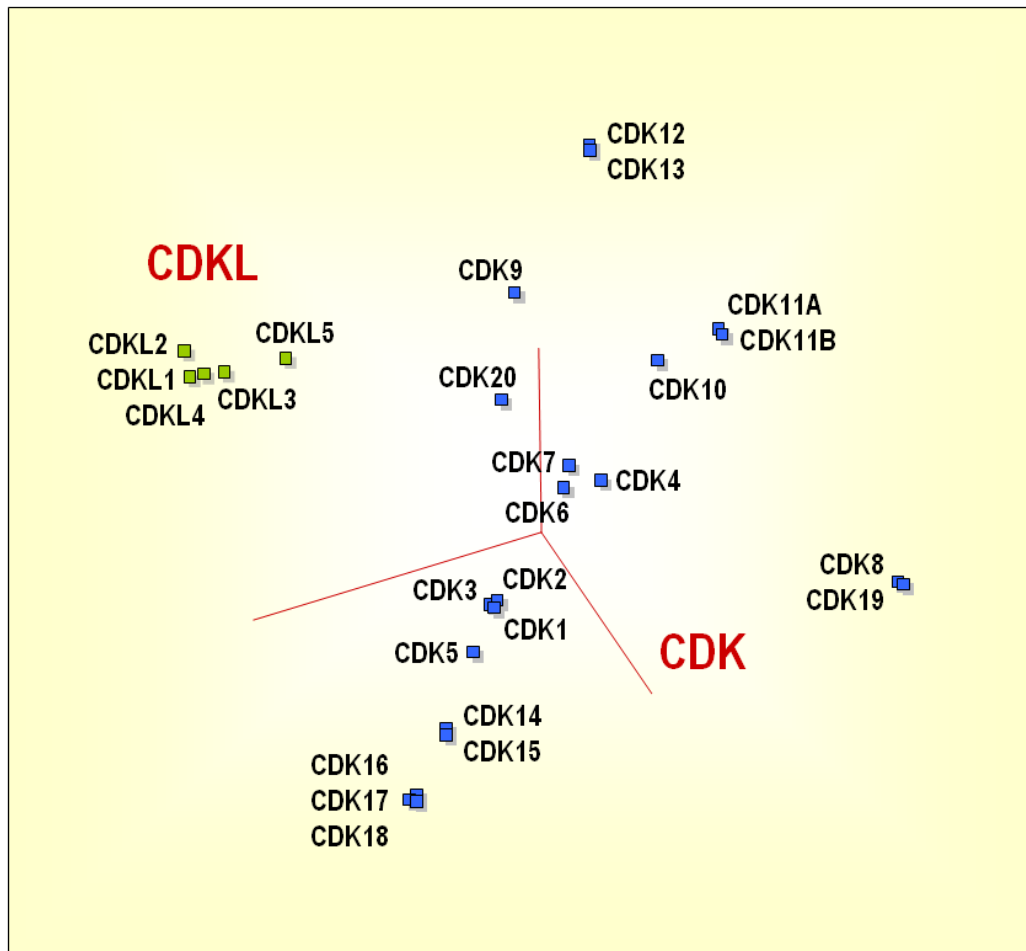


Figure S2. A family portrait of the CDK and CDKL families. The kinase domain of these proteins was processed using principal component analysis. The three major components of sequence divergence are indicated by the red lines. This analysis separates the CDKL family (green boxes) from CDK proteins (blue boxes). In addition, it suggests a multidirectional evolution of CDK proteins where CDK1-3 map to the center of the space and different clusters emerge in different directions. Thus, CDK5 and CDK14-CDK18 proteins cluster in one direction with CDK5 being the most conserved member. CDKs that regulate transcription at different levels (either by regulating pRb, RNAPolIII or splicing) cluster in the opposite direction, revealing a wide diversity in their evolutionary trends.

Table S1. CDK and CDKL family members*

Symbol	Other Symbols†	Cyclin-binding element	Cyclin and Cyclin-like partners	Human locus	Hs.aa	Hs.Ensembl	Hs. Acc..	Mm.Acc.	Cellular process	Mutations
CDK family										
CDK1	Cdc2	PSTAIRE	A1, A2, B1, B2, (B3), D- E-	10q21.2	297	ENSG00000170312	P06493	P11440	Cell cycle: mitosis (S-phase)	N.D.
CDK2		PSTAIRE	A1, A2, B1, B3, D, E1, E2, Cables1, SpdYA, SpdYC	12q13.2	298	ENSG00000123374	P24941	P97377	Cell cycle: S, G2, meiosis	P45L glioblastoma multiforme
CDK3		PSTAIRE	A1, A2, E1, E2, C, Cables1	17q25.1	305	ENSG00000108504	Q00526	Q80YP0	Cell cycle: G1/S unclear	S106N glioma
CDK4	PSK-J3	PISTVRE	D1, D2, D3	12q14.1	303	ENSG00000135446	P11802	P30285	Cell cycle: G1	R24C, R24H, N41S melanoma
CDK5	TPKII	PSSALRE	p35, p39 (D-, E and G-type cyclins), Cables1	7q36.1	292	ENSG00000164885	Q00535	P49615	Neuron biology; Cell Cycle?	N.D.
CDK6	PLSTIRE	PLSTIRE	D1, D2, D3	7q21.2	326	ENSG00000105810	Q00534	Q64261	Cell Cycle: G1	P199L melanoma
CDK7	CAK, MO15, STK1	NRTALRE	H	5q13.2	346	ENSG00000134058	P50613	Q03147	CDK activating kinase; transcription	N.D.
CDK8	K35	SMSACRE	C, (K)	13q12.13	464	ENSG00000132964	P49336	Q8R3L8	Transcription	R424C intestine tumor; D189N lung tumor
CDK9	PITALRE, CDC2L4, C-2K	PITALRE	K, T1, T2	9q34.11	372	ENSG00000136807	P50750	Q99J95	Transcription	N.D.
CDK10	PISSLRE	PISSLRE		16q24.3	360	ENSG00000185324	Q15131	Q3UMM4	Transcription, Cell Cycle: G2/M	N.D.
CDK11A	CDC2L2, CDC2L3, PITSLREB, p58GTA, CDK11	PITSLRE	D3 (p58 isoform); L1, L2 (p110 isoform)	1p36.33	780 (p110 isoform)	ENSG00000008128	Q9UQ88	P24788	Transcription, splicing (p119 isoform); Cell cycle: centriole biology and cytokinesis (p58 isoform)	N.D.

Supplementary Information to "Cyclin-dependent kinases: a family portrait"

CDK11B	CDC2L1, PITSLREA, PK58, CLK-1, p58GTA, CDK11	PITSLRE	D3 (p58 isoform); L1, L2 (p110 isoform)	1p36.33	795 (p110 isoform)	ENSG00000189229	P21127		Transcription, splicing (p119 isoform); Cell cycle: centriole biology and cytokinesis (p58 isoform)	N.D.
CDK12	CRKRS, CRK7, CD2L7, KIAA0904	PITAIRE	L1, L2	17q12	1490	ENSG00000167258	Q9NYV4	Q14AX6	Transcription: RNA splicing	N.D.
CDK13	CDC2L5, CHED, KIAA1791	PITAIRE	L1, L2	7p14.1	1512	ENSG00000065883	Q14004	Q69ZA1	Transcription: RNA splicing, blood cell development, cell cycle?	N.D.
CDK14	PFTK1, PFTAIRE-1, KIAA0834	PFTAIRE	D3, Y (J. Chen, personal communication)	7q21.13	469	ENSG00000058091	O94921	O35495	Meiosis?; neuron biology?	M414I ovary carcinoma
CDK15	PFTK2, PFTAIRE-2, ALS2CR7	PFTAIRE		2q33.1	384	ENSG00000138395	Q96Q40	Q3V3A1		K42E kidney tumor, E225D breast cancer
CDK16	PCTK1, PCTAIRE-1, CRK5	PCTAIRE	p35, Cables1	Xp11.3	496	ENSG00000102225	Q00536	Q04735	Meiosis, others?	N.D.
CDK17	PCTK2, PCTAIRE-2	PCTAIRE	Cables1	12q23.1	523	ENSG00000059758	Q00537	Q8K0D0	Neuron biology?	N.D.
CDK18	PCTK3, PCTAIRE-3	PCTAIRE	K	1q32.1	472	ENSG00000117266	Q07002	Q04899		N.D.
CDK19	CDC2L6, CDKL8, KIAA1028, CDK11	SMSACRE	C (see Uniprot database)	6q21	502	ENSG00000155111	Q9BWU1	Q8BWD8	Transcription	G175S melanoma
CDK20	CCRK, CDCH, CAKp42	PNQALRE		9q22.1	346	ENSG00000156345	Q8IZL9	Q9JHU3	Cell cycle?	N.D.
CDKL family										
CDKL1	p42 KKIALRE	KKIALRE		14q22.1	357	ENSG00000100490	Q00532	Q8CEQ0		N.D.
CDKL2	p56 KKIAMRE	KKIAMRE		4q21.1	493	ENSG00000138769	Q92772	Q9QUK0		L98I, R149Q ovary; S474* breast tumors
CDKL3	NKIAMRE	NKIAMRE		5q31.1	592	ENSG00000006837	Q8IVW4	Q8BLF2		E389* breast tumors
CDKL4	KKIALRE	KKIALRE		2p22.1	315	ENSG00000205111	Q5MAI5	Q3TZA2		N.D.

CDKL5	STK9	KETTLRE	Xp22.13	1030	ENSG00000008086	O76039	Q3UTQ8	Neuron biology	A374T melanoma, P574Q ovary tumor; N386H colon cancer; C152F & R175S Rett syndrome; P180L and translocated in X-linked infantile spasm syndrome
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* Human protein sequences were taken from Uniprot (<http://www.uniprot.org/>). Cancer associated mutations were taken from the COSMIC database (<http://www.sanger.ac.uk/genetics/CGP/cosmic/>). N.D., not detected.

† The previous HGNC Symbol is shown in bold when different from the proposed nomenclature.

