

AGC GROUP

AKT Family

Akt1
Akt2_ps
DDB0220670

MAST Family

DDB0220701
DDB0216386
DDB0220700
DDB0185113
DDB0229452

NDR Family

NdrA
NdrB
NdrC
NdrD
DDB0231558
DDB0216387

PKD1 Family

Pdk1A
Pdk1B

PKA Family

PKA
pk4
DDB0185224

SGK Family

pk2
DDB0220702

Unique kinases in the AGC Group

pk3

CAMK GROUP

CAMK1 Family

MLCK-A
DDB0216385
DDB0216309
pXi
DDB0216308
DDB0229351
DDB0216307
DDB0216312

CAMKL Family, AMPK Subfamily

Snf1

CAMKL Family, BRSK Subfamily

DDB0229364

CAMKL Family, LKB Subfamily

Lkb1

CAMKL Family, MARK Subfamily

MARK-A
MARK-B
MARK-C

CAMKL Family, QIK Subfamily

DDB0231454

Unique kinase in the CAMKL Family

DDB0219986

RAD53 Family

FHAK1
FHAK2
FHAK3
FHAK4
FHAK5

CK1 GROUP

CK1 Family

CK1, C2dup

TTBK Family

DDB0216336

CMGC GROUP

CDK Family, CDC2 Subfamily

Cdc2

CDK Family, CDK5 Subfamily

Cdk5

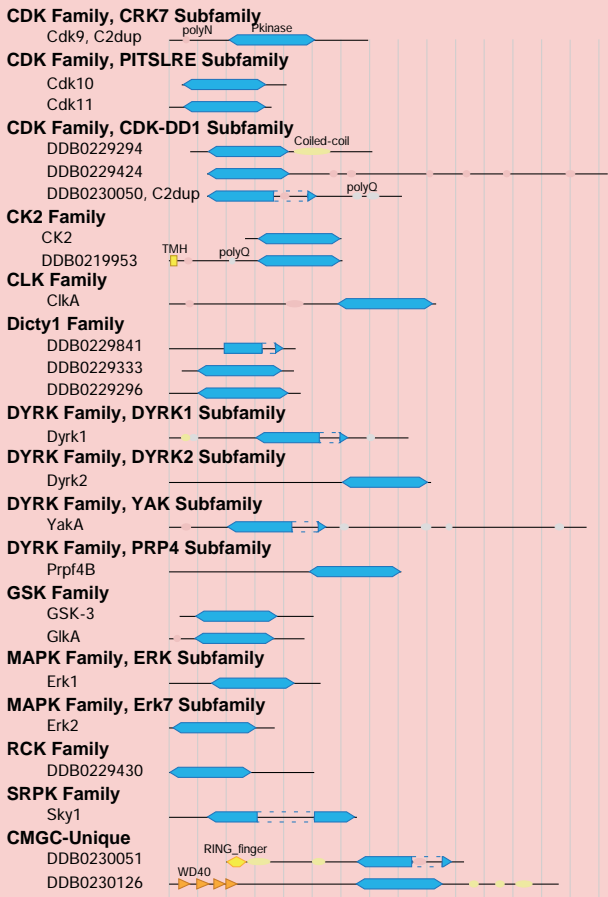
CDK Family, CDK7 Subfamily

Cdk7

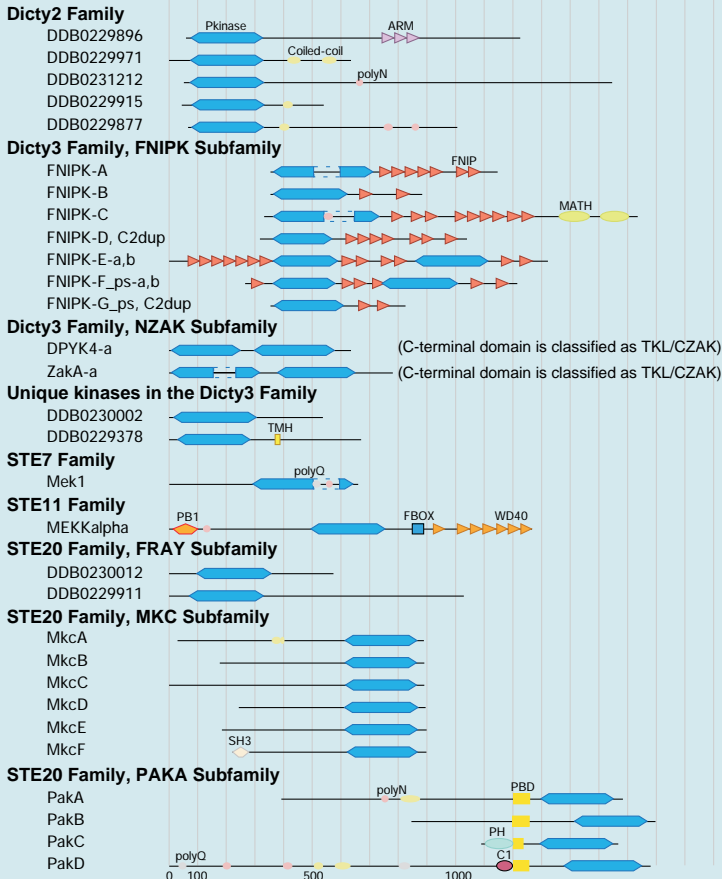
CDK Family, CDK8 Subfamily

Cdk8

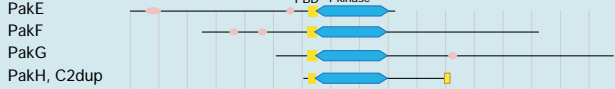
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STE GROUP



STE20 Family, PAKL Subfamily



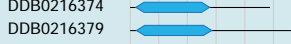
STE20 Family, MST Subfamily



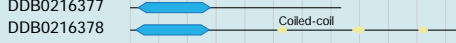
STE20 Family, YSK Subfamily



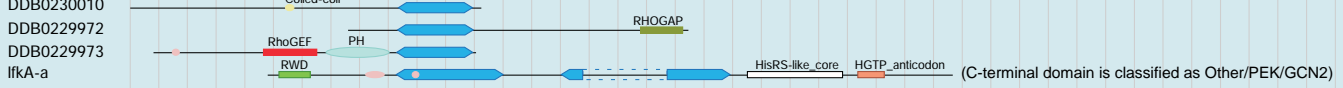
STE20 Family, STE20-DD1 Subfamily



STE20 Family, Unique Kinases

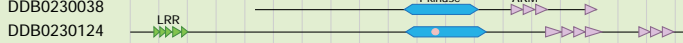


Unique kinases in the STE Group

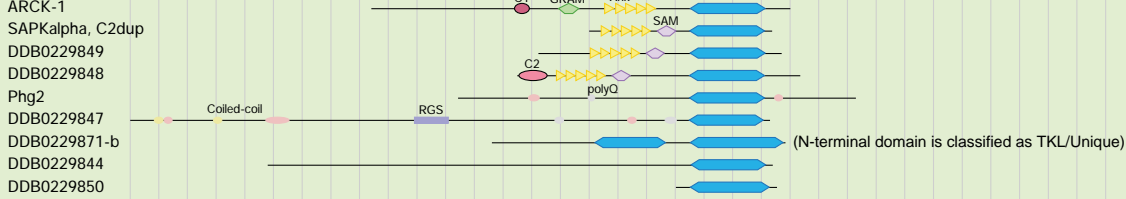


TKL GROUP

ARMK Family



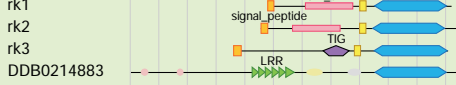
ARK Family



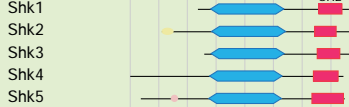
CZAK Family



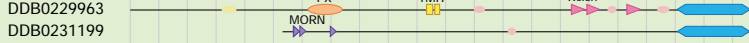
Dicty4 Family, DRK Subfamily



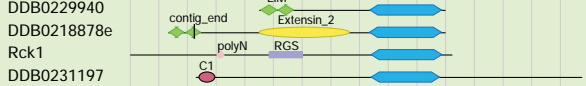
Dicty4 Family, SHK Subfamily



Unique kinases in the Dicty4 Family



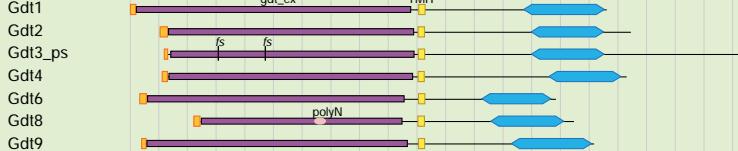
Dicty5 Family



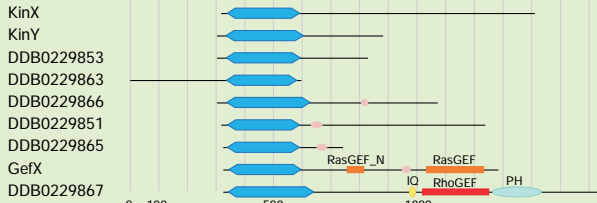
DPYK Family



Gdt Family



LISK Family, LISK-DD1 Subfamily



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MLK Family, HH498 Subfamily

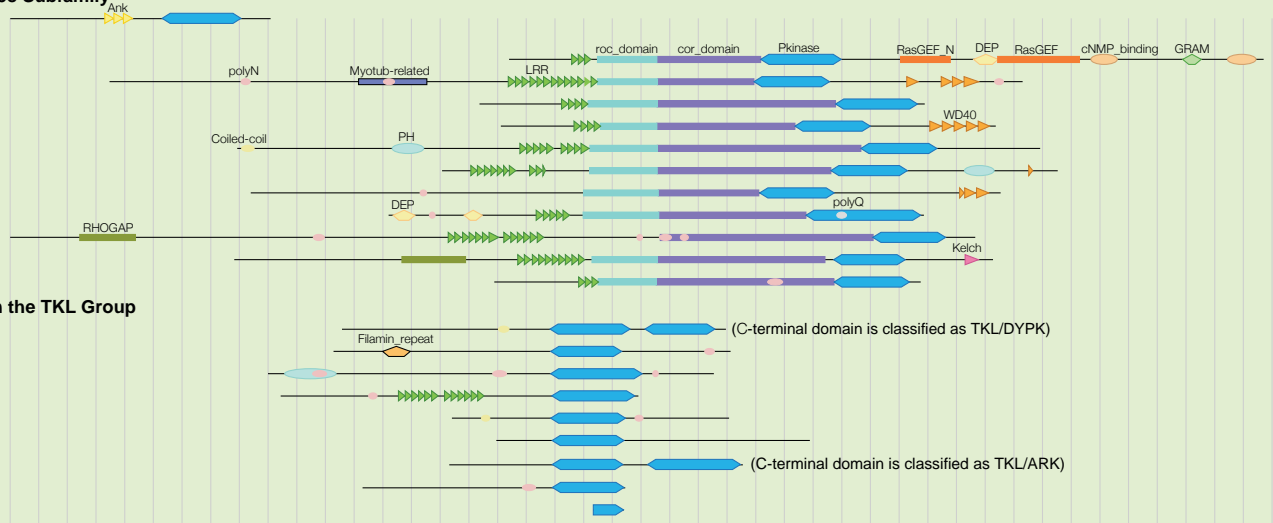
DDB0230019

ROCO Family

GbpC
pats1
qkgA, C2dup
Roco4
Roco5
Roco6
Roco7
Roco8
Roco9
Roco10
Roco11

Unique kinases in the TKL Group

DPYK3-a
DDB0229956
DDB0229957
DDB0220138
DDB0220436
DDB0230133
DDB0229871-a
DDB0229955
DDB0230119ps



OTHER GROUP

AUR Family

Aurora

BUB Family

Bub1

BUD32 Family

Bud32

CAMKK Family, Meta Subfamily

DDB0220010

CDC7 Family

Cdc7

Dicty6 Family

DDB0231196
DDB0229339
DDB0204413ps

Dicty7 Family

DDB0231195
DDB0229335

Dicty8 Family

DDB0216331
DDB0229344

Dicty9 Family

DDB0231281-a,b
DDB0219988-a,b
DDB0230037-a,b

Dicty10 Family

DDB0204911e
DDB0230125
DDB0231304ps
DDB0204909ps
DDB0187322ps

Haspin Family

DDB0231182

IKS Family

IksA

IRE Family

IreA
IriA
IriB, C2dup
IriC
IriD
IriE
IriF, C2dup

NAK Family

DDB0229350
DDB0216373
DDB0229347

NEK Family

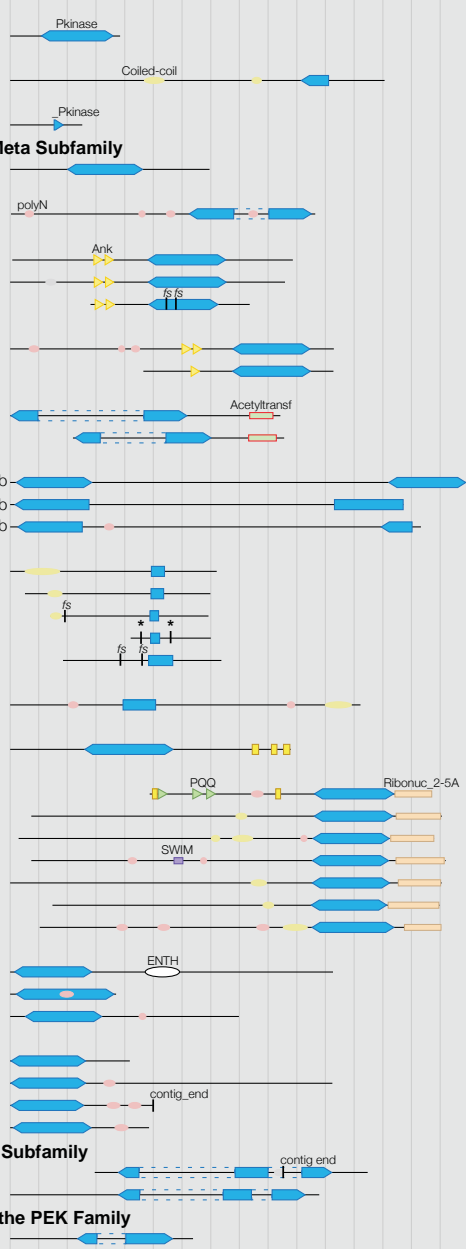
Nek2
Nek3
Nek4
DDB0229345

PEK Family, PEK Subfamily

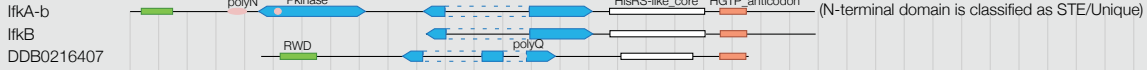
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Unique kinase in the PEK Family

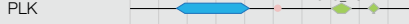
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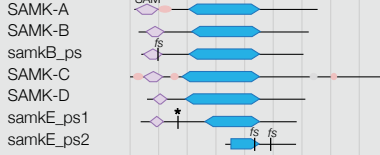
PEK Family, GCN2 Subfamily



PLK Family



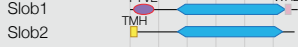
SAMK Family



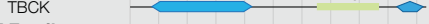
SCY1 Family



SLOB Family



TBCK Family



TTK Family



ULK Family



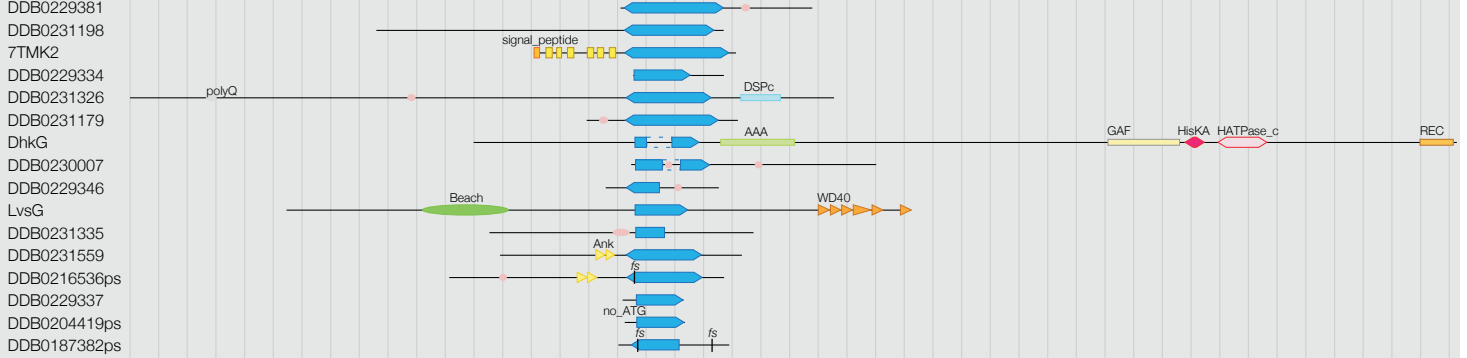
VPS15 Family



WEE Family



Unique kinases

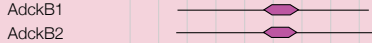


ATYPICAL GROUP

ABC1 Family, ABC1-A Subfamily



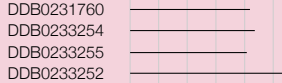
ABC1 Family, ABC1-B Subfamily



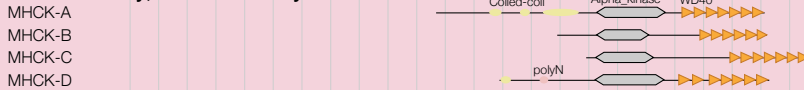
ABC1 Family, ABC1-C Subfamily



AFK Family



Alpha Kinase Family, MHCK Subfamily



Alpha Kinase Family, Unique Kinases

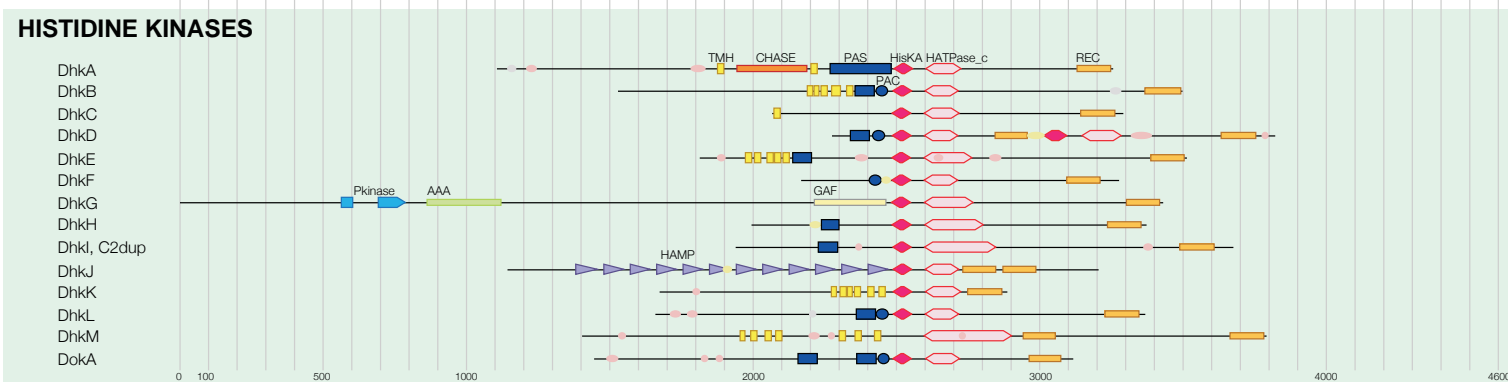
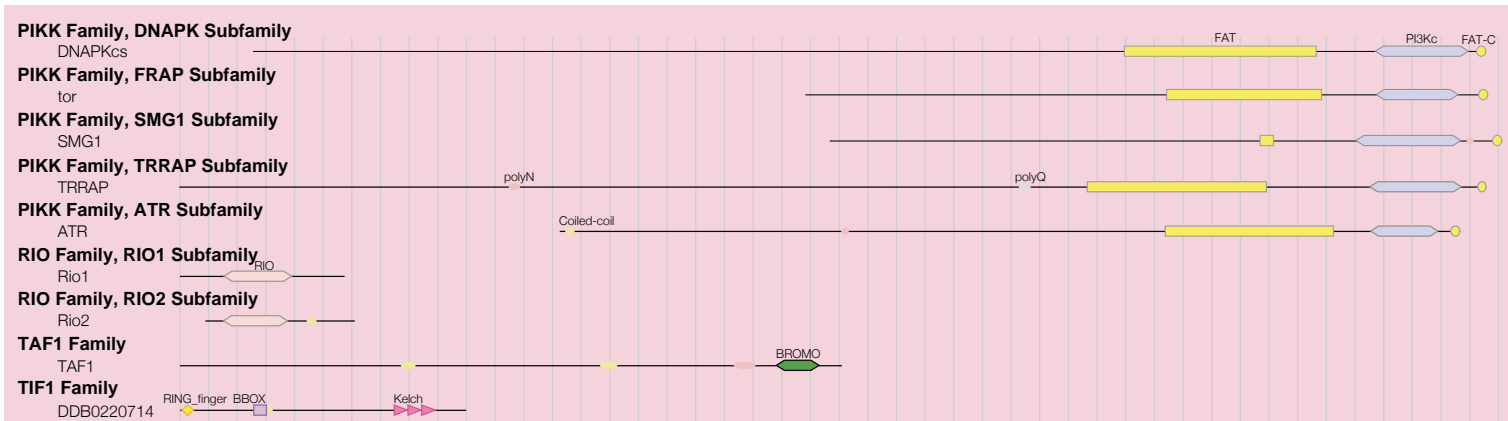


BRD Family













G11 Family









LEGEND











KINASE CATALYTIC DOMAINS

	Pkinase Eukaryotic protein kinase (ePK) catalytic domain. Members phosphorylate serine/threonine and/or tyrosine.
	Pkinase_C Domain found downstream of many ePK domains from the AGC Group.
	ADF Actin Depolymerization Factor. Severs actin filaments and binds to actin monomers.
	ABC1 Named for ABC1 from yeast, and is unrelated to the ABC transporter proteins.
	PI3Kc Phosphoinositide 3-kinase isoforms include lipid kinases and protein kinases.
	Alpha_kinase A novel protein kinase catalytic domain with a related structure, but no sequence homology, to ePKs.
	RIO Domain found in eukaryotes and prokaryotes that is related to ePKs.
	BROMO May be involved in protein-protein interactions in transcriptional activation complexes.
	HATPase_c Domain found in several ATP-binding proteins, including histidine kinases.
	HisKA Dimerisation and phosphoacceptor domain of histidine kinases.









EXTRACELLULAR DOMAINS

	CHASE Domain found in the extracellular portion of receptor-like proteins and is predicted to be a ligand binding domain.
	gdt_ex Extracellular domain found in <i>Dictyostelium</i> GDT proteins.
	drk_ex Extracellular domain found in two <i>Dictyostelium</i> protein kinases.
	TIG Domain found in cell surface receptors such as Met and Ron, as well as in intracellular transcription factors, where it is involved in DNA binding.













DOMAINS INVOLVED IN G-PROTEIN SIGNALING

	ARFGAP Putative zinc fingers with GTPase activating proteins (GAPs) towards the small GTPase Arf.
	RHOGAP GTPase activator proteins towards Rho/Rac/Cdc42-like small GTPases.
	TBC Thought to be a GTPase activator of Rab-like small GTPases.
	RasGEF_N Found N-terminal to the RasGEF domain in several exchange factors for Ras-like small GTPase.
	RasGEF Guanine nucleotide exchange factor for Ras-like small GTPases.
	RhoGEF Guanine nucleotide exchange factor for Rho/Rac/Cdc42-like GTPases.
	RGS Regulator of G Protein Signalling. Promotes GTP hydrolysis by the alpha subunit of heterotrimeric G proteins.
	roc_domain Ras-like domain of complex proteins.
	cor_domain Domain found C-terminal of roc_domain.
	PBD Domain that binds Cdc42p- and/or Rho-like small GTPases.






SECOND-MESSENGER-BINDING DOMAINS

	CaM-binding? Putative Ca ²⁺ /calmodulin binding domain.
	IQ Ca ²⁺ -independent calmodulin binding domain.
	cNMP_binding cAMP or cGMP binding site.
	PH Pleckstrin Homology. Binds inositol phosphates, and various proteins.
	PX Phox domain. Phosphoinositide-binding modules with varying lipid-binding specificities.
	FYVE Fab1, YOTB/ZK632.12, Vac1, and EEA1. Zn ²⁺ -binding; binds PtdIns(3)P.
	C1 Zn ²⁺ -binding domain that may bind to molecules such as diacylglycerol and phorbol esters.
	C2 Ca ²⁺ -binding motifs that appears to bind phospholipids, inositol polyphosphates, and intracellular proteins.








REPEATED DOMAINS

	Ank Ankyrin repeats are usually involved in protein-protein interactions.
	ARM Armadillo repeats mediate protein-protein interactions.
	PQQ Domain found in several enzymes which utilise pyrrolo-quinoline quinone as a prosthetic group. Function is unknown.
	Calpain_III The function of domain III of calpains is unknown.
	WD40 Named for their ~40 aa length, and because they often terminate in a WD dipeptide. Mediate protein-protein interactions, including to Gβ and myosin II.
	FNIP Named after the pattern of conserved residues. Found only <i>Dictyostelium</i> .
	HAMP Named for four of the proteins it is found in: histidine kinases, adenylyl cyclases, methyl binding proteins and phosphatases.
	Kelch Named after the protein in which it was first identified. Its function is unknown.
	LIM Named after Lin-11 Isl-1 Mec-3. Binds two Zn ²⁺ ; mediates protein-protein interactions.
	LRR Leucine-rich repeats provide a versatile structural framework for the formation of protein-protein interactions.
	MORN "Membrane Occupation and Recognition Nexus". Function is unknown.
	RCC1 Repeated domain found in regulator of chromosome condensation (RCC). Binds to chromatin and acts as a guanine-nucleotide dissociation stimulator for Ran.



STRUCTURAL MOTIFS

	polyN Regions at least 19 aa in length that are at least 90% asparagine.
	polyQ Regions at least 19 aa in length that are at least 90% glutamine.
	Coiled-coil Regions predicted to dimerize by forming parallel alpha-helices.
	signal_peptide
	TMH Transmembrane helix.














OTHER CATALYTIC DOMAINS

	AAA ATPase family associated with various activities. Often found in proteins with chaperone-like functions.
	Acetyltransf Gcn2-related N-acetyltransferase. A superfamily that includes histone acetylases and other acetyltransferase enzymes.
	HECT Homologous to the E6-AP Carboxyl Terminus. E3 ubiquitin-protein ligase.
	tRNA-synt_2b tRNA synthetase class II core domain. tRNA synthetases catalyse the attachment of an amino acid to its cognate tRNA.
	Myotub-related Domain in myotubularin-related proteins. Myotubularin is a lipid phosphatase that dephosphorylates PtdIns(3)P and PtdIns(3,5)P ₂ .
	DSPc Dual-specificity (Ser/Thr and Tyr) protein phosphatases.
	Ribonuc_2-5A An endoribonuclease that cleaves an intron from Hac1 mRNA in humans, which causing it to be more efficiently translated.





PHOSPHOAMINO ACID-BINDING DOMAINS

	SH2 Src homology 2. Binds phosphotyrosine-containing polypeptides
	FHA Forkhead-associated. Binds phosphopeptides. Highest specificity for phosphothreonine, but also recognises phosphotyrosine.

















DOMAINS MEDIATING PROTEIN-PROTEIN INTERACTIONS

	BTB BR-C, ttk and bab. Mediates homomeric, and in some instances heteromeric, dimerization.
	FBOX A motif found in cyclin-F. Serves as a link between a target protein and a ubiquitin-conjugating enzyme.
	Filamin_repeat These form a rod-like structure in filamin, which is an actin-binding protein.
	SH3 Src homology 3. Binds to target proteins through sequences containing proline and hydrophobic amino acids.
	PB1 Phox and Bem1p domain. This is present in many eukaryotic cytoplasmic signalling proteins. Forms heterodimers.
	mob_binding Binding site for Mob1. NDR Family kinases are activated by Mob1 binding.
	Rhodanese Rhodanese is a sulfuryltransferase with two Rhodanese domains. Inactive versions are found in dual specificity phosphatases and ubiquitin hydrolases.
	RING_finger A specialised type of Zn-finger. It probably mediates protein-protein interactions and probably has E3 ubiquitin-protein ligase activity.
	DEP dishevelled, Egl-10, and pleckstrinproteins. Unknown function.
	SAM Sterile Alpha Motif. Form homo- and hetero-oligomers. Also bind to non-SAM domain-containing proteins with a low affinity constant, and appear to bind RNA.
	SARAH Sav/Rassf/Hpo - 3 classes of eukaryotic tumour suppressors that it is found in. Mediates homodimerization.
	WH2 Wiskott Aldrich syndrome homology region 2. Mediates actin-binding.
	POLO_BOX Found in Polo kinases. Mediates interaction with multiple proteins, some of which are substrates.

OTHER FUNCTIONS

	HGTP_anticonodon Found in Histidyl, Glycyl, Threonyl and Prolyl tRNA synthetases. It is probably the anticodon binding domain.
	PAC Occurs C-terminal to a subset of PAS motifs, and is proposed to contribute to the PAS domain fold.
	PAS Found in Per, Arnt, Sim. Mediate protein-protein interactions, dimerization, and sensory functions such as detecting light and redox.
	REC Receiver domain. Contains a phosphoacceptor site that is phosphorylated by histidine kinases.

UNKNOWN FUNCTION

	BBOX Zn finger. Found in transcription factors, ribonucleoproteins and proto-oncogenes, but no function is clearly assigned to this domain.
	SWIM Zn-finger.
	Beach Found in the BEIGE and CHS protein. The function is unknown. Usually followed by WD repeats.
	RWD Found in proteins containing Ring finger and WD40 repeat domains.
	Extensin_2 Homologous hydroxyproline-rich glycoproteins (HRGPs) found in the plant extracellular matrix.
	ENTH Epsin N-terminal homology. Found in proteins involved in endocytosis and cytoskeletal machinery. May bind PtdIns(4,5)P ₂ and PtdIns(1,4,5)P ₃ .
	FAT FRAP, ATM and TRRAP. Present in the PIK-related protein kinases.
	FAT-C Found at the C-terminal end of the PIK-related protein kinases.
	GAF Found in phytochromes and cGMP phosphodiesterases (PDEs). In PDEs, it forms an allosteric cGMP binding site.
	KA1 Found in the C-terminal extremity of kinases in the MARK subfamily.
	GRAM Found in glucosyltransferases, myotubularins and other putative membrane-associated proteins.
	HEAT_REPEAT Found in Huntingtin, EF3, PP2A regulatory subunit, and yeast TOR1. Related to armadillo repeats.
	MATH Meprip And TRAF-Homology. TRAFs are intracellular proteins, and mepripins are extracellular.
	UBA Ubiquitin associated domain. Found in several proteins having connections to the ubiquitination pathway.
	SPRY Found in SpIA and Ryanodine Receptor.
	vwa von Willebrand factor type A. VWA domains in extracellular eukaryotic proteins mediate adhesion. Their function in intracellular proteins is unknown.