

Kinase Phosphatase Database

The Kinase-Phosphatase database is a list of all protein kinases and protein phosphatases organized with their substrates. Phosphorylation and dephosphorylation of proteins mediate signal transduction events that control a multitude of cellular processes. Phosphorylation and dephosphorylation are regulated by kinases and phosphatases, respectively. Protein kinases phosphorylate a substrate by transferring a phosphate group from ATP to the substrate. Phosphorylation is primarily directed onto serine, threonine and tyrosine amino acid residues of the substrate protein. The phosphorylation of the substrate often causes it to be activated, but in some cases may also deactivate the substrate. In order to create a balance of phosphorylation, protein phosphatases remove the phosphates from those substrates which have been phosphorylated.

This database allows one to search by kinases, phosphatases or by the substrates. The kinases and phosphatases are arranged so that you can view common substrates among them. Some of these kinases and phosphatases are extremely specific, potentially phosphorylating or dephosphorylating only a few target proteins, while others are able to act broadly on many proteins. This database was developed to give researchers a better understanding of the patterns of phosphorylation and dephosphorylation within the cell.

Kinase	Substrates	Phosphatase
481. RIPK2 (Receptor-Interacting Serine/Threonine Kinase-2)	CARD15(NM_002162)	Unknown
482. Unknown	Phosphoproteins	PTPDC1 (Protein Tyrosine Phosphatase Domain Containing-1)
483. Unknown	Phosphoproteins	PPP3CC (Protein Phosphatase-3 (Formerly 2B)-Catalytic Subunit-Gamma Isoform)
484. Unknown	Phosphoproteins	PPP3B (Protein Phosphatase-2B-Catalytic Subunit-Alpha Isoform)
485. ANKRD3 (Ankyrin Repeat Domain-3)	PKC-Delta(NM_005254)	Unknown
486. Unknown	L-Phosphoserine	PSPH (Phosphoserine Phosphatase)
487. eIF2AK3 (Eukaryotic Translation Initiation Factor-2-Alpha Kinase-3)	eIF2Alpha(NM_004094)	PPP1R15A (Protein Phosphatase-1-Regulatory (Inhibitor) Subunit-15A)
488. PPKR (Protein Kinase-Interferon-Inducible Double Stranded RNA Dependent)	eIF2Alpha(NM_004094)	Unknown
489. Unknown	LAR Family of Transmembrane PTPs	PPF1-Alpha2 (Protein Phosphatase Related Polypeptide-Inter-2)
490. Unknown	LAR Family of Transmembrane PTPs	PPF1-Alpha3 (Protein Phosphatase Related Polypeptide-Inter-3)
491. Unknown	LAR Family of Transmembrane PTPs	PPF1-Alpha4 (Protein Phosphatase Related Polypeptide-Inter-4)
492. Unknown	Pyruvate	PSTPIP (Protein/Phosphatase-Interacting)
493. MAP3K10 (Mitogen-Activated Protein Kinase Kinase-10)	MAP3K(NM_002750)	Unknown
494. MAP3K11 (Mitogen-Activated Protein Kinase Kinase-11)	MAP3K(NM_002750)	Unknown
495. MAP3K13 (Mitogen-Activated Protein Kinase Kinase-13)	MAP3K(NM_002750)	Unknown
496. Unknown	PTEN	PTEN (Phosphatase Homolog)
497. Unknown	FAK(NM_153831)	PTEN (Phosphatase Homolog)
499. Unknown	Mxi2(NM_002750)	PPM1Alpha (Protein Magnesium-Dependent Phosphatase)
499. Unknown	XTP (Xanthosine 5'-Triphosphate)	ITPA (Inosine Triphosphatase)
500. Unknown	PKA	PPP1R1B (Protein Regulatory Subunit-1)
501. MAP3K11 (Mitogen-Activated Protein Kinase Kinase-11)	I-KappaBk-Alpha(NM_001278)	Unknown
502. TTK	CDK2(NM_001798)	PPM1Beta (Protein Magnesium-Dependent Phosphatase)
503. CDK7 (Cell Division Protein Kinase-7)	CDK2(NM_001798)	Unknown

Kinases and Phosphatase displayed together and arranged by overlapping substrates.

Name	Gen Bank No.	Substrates	Mechanism
6. Abl1 (v-Abl Abelson Murine Leukemia Viral Oncogene Homolog-1)	NM_005157	* TP73(NM_005427) * RIN1(NM_004292) * PSTPIP1(NM_003979)	It is implicated in processes of cell differentiation, cell division, cell adhesion and cell stress response. It also promotes cell cycle arrest by blocking the G2/S transition in a TFS3 dependent way.
7. Abl2 (v-Abl Abelson Murine Leukemia Viral Oncogene Homolog-2)	NM_005158	* Tyrosine kinases	It provides intracellular signals in the cells and regulates actin cytoskeletal structure.
8. ACK1 (Activated CDC42-Associated Kinase-1)	NM_005791	* Tyrosine kinases	Binds CDC42Hs in its GTP-bound form and inhibits both the intrinsic and GAP (GTPase-Activating Protein)-stimulated GTPase activity of CDC42Hs.
9. ACVR1 (Activin-A Receptor Type-1)	NM_001105	* TGF-Beta1 (NM_000600) * TGF-Beta2 (NM_002239) * BMP6(NM_001200)	Actin is involved in the regulation of
10. ACVR1B (Activin-A Receptor Type-1B)	NM_004302	* MADH2(NM_005911) * MADH4(NM_005359) * FOXH1(NM_003923)	AC1
11. ACVR2 (Activin-A Receptor Type-II)	NM_001616	* MADH2(NM_005911) * MADH4(NM_003923) * FOXH1(NM_003923)	It is
12. ACVR2B (Activin-A Receptor Type-IIb)	NM_001106	* MADH2(NM_005911) * MADH4(NM_003923) * FOXH1(NM_003923)	It is
13. ACVR1L (Activin-A Receptor Type-II Like Kinase-1)	NM_000020	* LXR-Beta(NM_007121) * Endoglin(NM_000119) * SMAD5(NM_005393) * SMAD7(NM_005904) * ID1(NM_002165) * ID2(NM_002166) * STAT1(NM_007315)	It is
14. ADCY3 (Adenylate Cyclase-3)	NM_004026	* ATP	It is
15. ADCY6 (Adenylate Cyclase-6)	NM_015870	* ATP	It is
16. ADCY7 (Adenylate Cyclase-7)	NM_001114	* ATP	It is
17. ADCY8 (Adenylate Cyclase-8)	NM_001115	* ATP	It is

Just the Kinase listing with substrate and the mechanism of action.

Name	Gen Bank No.	Substrates	Mechanism
1. ACP1 (Acid Phosphatase-1)	NM_177554	Protein Tyrosine Phosphate Orthophosphoric Monoesters STAT5A(NM_002152) STAT5B(NM_012448) Arylphosphates acylphosphates	ACP1 functions as an acid phosphatase and a protein tyrosine phosphatase by hydrolyzing protein tyrosine phosphatase to protein tyrosine and orthophosphate. It hydrolyzes Orthophosphoric Monoesters to alcohol and orthophosphate. It dephosphorylates STAT5A and STAT5B in DAMI megakaryocytic cells. It acts on low-mol wt Aryl Phosphates and natural and synthetic Aryl Phosphates.
2. ACP2 (Acid Phosphatase-2)	NM_001610	Orthophosphoric Monoesters	It hydrolyzes Orthophosphoric Monoesters to alcohol and phosphate
3. ACP3 (Acid Phosphatase-3)	NM_001099	Orthophosphoric Monoesters	It catalyzes the conversion of Orthophosphoric Monoester to alcohol and orthophosphate.
4. ACP4 (Acid Phosphatase-4)	NM_080791	Orthophosphoric acid Esters	It is capable of hydrolyzing Orthophosphoric Acid Esters in an acid medium to alcohol and phosphate.
5. AcyM (Acylphosphatase-Muscle Type Isozyme)	NM_138448	Acylphosphates Nucleoside Diphosphates Nucleoside Triphosphates Aryl Phosphate Monoesters Polynucleotides pHPP Ca2+-ATPase Mg2+-ATPase	AcyM catalyzes the hydrolysis of the carboxyl-phosphate bond of Acylphosphates. It displays hydrolytic activity on nucleoside Di- and Triphosphates, Aryl Phosphate Monoesters, and Polynucleotides. It is able to catalyze phosphotransfer from pHPP (p-Hydroxyphenyl Phosphate) to glyceral, as well as the inorganic phosphate-(H2)18O oxygen exchange reaction in the absence of carboxylic acids or phenols. AcyM hydrolyzes the phosphoenzyme intermediate of different membrane pumps, particularly the Ca2+/Mg2+-ATPase from sarcoplasmic reticulum of skeletal muscle.
6. AcyP1 (Acylphosphatase-Erythrocyte)	NM_001107	Acylphosphates Nucleoside Diphosphates Nucleoside Triphosphates Aryl Phosphate Monoesters Polynucleotides pHPP	AcyP1 catalyzes the hydrolysis of the carboxyl-phosphate bond of Acylphosphates. It displays hydrolytic activity on nucleoside Di- and Triphosphates, Aryl Phosphate Monoesters, and Polynucleotides. It is able to catalyze phosphotransfer from pHPP (p-Hydroxyphenyl Phosphate) to glyceral, as well as the inorganic phosphate-(H2)18O oxygen exchange reaction in the absence of carboxylic acids or phenols.
7. CamKII (Calcium/Calmodulin-Dependent Protein Kinase)	NM_014634	CaMKII(NM_172173)	It specifically dephosphorylates the phospho-Thr-286 in autophosphorylated CamKII substrate and thus deactivates the CamKII.

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