

PIM serine/threonine kinases in the pathogenesis and therapy of hematologic malignancies and solid cancers

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Citation: Brault L, Gasser C, Bracher F, Huber K, Knapp S, and Schwaller J. PIM serine/threonine kinases in the pathogenesis and therapy of hematologic malignancies and solid cancers. *Haematologica* 2010;95:1004-1015. doi:10.3324/haematol.2009.017079

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Online Supplementary Table S1.

Proposed cellular substrates of PIM serine/threonine kinases

| Protein* | OMIM* | Full name | Alternative name(s) | Function | Recognition motif | Target residue(s) | Method(s) | Reference(s) |
|------------------------|--------|--|-----------------------|---------------------------------|-----------------------------|-------------------|--|--------------|
| ABC2 | 603756 | ATP-binding cassette, sub-family G, member 2 | ABCP, BCRP, MRX | xenobiotic transporter protein | KKKKITY | T362 | Y2H | 1 |
| AKT1S1 | 610221 | AKT1 substrate proline-rich | PRAS40 | cell signaling | RPRLNNTSDFQ | T246 | in vitro kinase assay | 2 |
| API5 | 609774 | Apoptosis inhibitor 5 | AC11 | protein assembly, cell survival | n.d. | n.d. [PIM2] | motif-hypothesis | 3 |
| BAD | 603167 | Bcl2-antagonist of cell death | BCL2L8 | cell survival | RSRHSSY...RGRSRSA...ELRRWSD | S75, S99, S118 | GST-pulldown | 4-7 |
| CBX3 | 604477 | Chromobox protein homolog 3 | HP1γ | chromatin regulation | KRKSLDSESDSKS | S83(?) | Y2H | 8 |
| CDC25A | 116947 | Cell division cycle 25A | - | cell cycle control | n.d. | S116 (?) | GST-pull down | 9 |
| CDC25C | 157680 | Cell division cycle 25C | - | cell cycle control | n.d. | n.d. | GST-pulldown | 10 |
| CDKN1A | 116899 | Cyclin-dependent kinase inhibitor 1A | CIP1, WAF1, p21, | cell cycle regulation | RKRRQTSM | T145 | motif-hypothesis | 11 |
| CDKN1B | 600778 | Cyclin-dependent kinase inhibitor 1B | KIP1, p27 | cell cycle regulation | RKRPAT...LRRRQT | T157, T195 | pull-down/motif hypothesis | 12 |
| CXCR4 | 162643 | Chemokine, CXC motif, receptor 4 | NPY3R, FUSIN | cell signaling | RGGHSS | S339 | motif hypothesis/in vitro kinase assay | 13 |
| EBNA2 COACTIVATOR p100 | 602181 | EBNA coactivator p100 | SND1, p100 | transcriptional regulator | n.d. | n.d. | Y2H | 14 |
| EIF4B | 603928 | Eukaryotic translation initiation factor 4B | - | protein translation | ERHPSWR | S408 [PIM2] | motif-hypothesis | 3 |
| EIF4EBP1 | 602223 | Eukaryotic translation initiation factor 4E-binding protein 1 | 4EBP1 | translation | n.d. | S65? [PIM2] | Immunoblot | 6 |
| FOXO3A | 602681 | Forkhead box O3A | FKHRL1, FOXO3 | transcriptional regulator | RPRSCT...RRRAVS, | T32, S253 | pull-down/motif hypothesis | 12 |
| HIST3H3 | 602820 | Histone H3 | H3FT, H3T | nucleosome | QTARKST | S10 | GST-pulldown | 15 |
| KSHV-LANA1 | - | Kaposi's sarcoma-associated herpesvirus latency-associated nuclear antigen | - | virus protein | RLRRLSS | S205 and/or S206 | GST-pulldown | 16 |
| MAP3K5 | 602448 | Mitogen-activated protein kinase kinase kinase 5 | ASK1 | cell signaling | ATRGRGSSVGG | S83 | motif hypothesis/in vitro kinase assay | 17 |
| MARK3 | 602678 | MAP/microtubule affinity-regulating kinase 3 | CTAK1 | cell cycle regulation | n.d. | T70? | Y2H | 18 |
| MDM2 | 164785 | Mouse double minute 2 homolog | HDM2 | E3 ubiquitin ligase | RRRAIS...RKRHKS... | S166, S186 | motif hypothesis/in vitro kinase assay | 19 |
| MYB | 189990 | v-myb myeloblastosis viral oncogene homolog | MYV | transcriptional activator | n.d. | n.d. | GST-pull down | 20 |
| MYC | 190080 | v-myc avian myelocytomatosis viral oncogene homolog | - | transcriptional regulator | AKRAKLDSCR | S329 | GST-pulldown/motif hypothesis | 21 |
| NFATC1 | 600489 | Nuclear factor of activated T cells, cytoplasmic, calcineurin-dependent 1 | NFATC, NFAT2 | transcriptional activator | n.d. | n.d. | GST-pull down | 22 |
| NUMA | 164009 | Nuclear mitotic apparatus protein 1 | - | cell division | QRKRVSL | S1991 | motif-hypothesis | 23 |
| PTPRO | 600579 | Protein tyrosine phosphatase, receptor type, O | GLEPP1, PTPU2 | signaling, tumor suppressor? | KRRKITN | T915 | motif-hypothesis | 24 |
| REL-A/p65 | 164014 | V-rel avian reticuloendotheliosis viral oncogene homolog A | REL, NFKB-65 | transcriptional regulator | QLRRPDSREL | S276 | expression cloning/in vitro kinase assay | 25 |
| RP9 | 607331 | Retinitis pigmentosa 9, autosomal dominant | PAP1 | splicing factor | KHKAKSSE | S204, S206 | Y2H | 26 |
| RPS19 | 603474 | Ribosomal protein S19 (Blackfan-Diamond anemia) | - | structural ribosome subunit | n.d. | n.d. | Y2H | 27 |
| RUNX1 | 151385 | Runt-related transcription factor 1 | AML1, CBFA2, PEBP2AB | transcriptional regulator | n.d. | n.d. | Y2H | 28 |
| RUNX3 | 600210 | Runt-related transcription factor 3 | AML2, CBFA3, PEBP2AC | transcriptional regulator | n.d. | n.d. | Y2H | 28 |
| SOCS1 | 603597 | Suppressor of cytokine signaling 1 | SSI1, CIS1, JAB, TIP3 | cell signaling | n.d. | n.d. | Y2H/GST-pull down | 29, 30 |
| SOCS3 | 604176 | Suppressor of cytokine signaling 3 | SSI3, CIS3 | n.d. | n.d. | n.d. | Y2H | 29, 30 |
| SNX6 | 606098 | Sorting nexin-2 | TFAF2, | cell transport | n.d. | n.d. | Y2H | 31 |

(* , www.ncbi.nlm.nih.gov/omim/)