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Overexpression of p21-activated kinase 1 in prostate cancer cells is regulated by the mTOR signaling pathway

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Prostate cancer (PCa) is the most common malignant tumor without clinical symptoms at an early stage in men. However, its etiology and pathogenesis remain unclear. P21-activated kinase-1 (*PAK1*) is a member of a family of serine/threonine kinases highly conserved throughout evolution. It has been shown that *PAK1* is involved in cancer cell growth, invasion and metastasis, but little is known about *PAK1* expression in patients with PCa. In this study, a total of 73 patients with PCa and 40 patients with benign prostate hyperplasia (BPH) who were treated in our hospital were analyzed retrospectively. The expression of *PAK1* in PCs and BPH tissues was determined by immunohistochemistry and Western blot. *PAK1* protein expression was significantly increased in patients with PCa compared to patients with BPH (PCa vs. BPH, $P < 0.05$). *PAK1* expression was associated with PSA. The level of *PAK1* expression was higher in DU145 and PC-3 cells than those in LNCaP and RWPE-1 cells. Furthermore, mTOR inhibitor Rapamycin inhibited cell proliferation, while mTOR activator MYH1485 promoted proliferation, in a dose-dependent manner in DU145, LNCaP and RWPE-1 cells and changed the expression level of *PAK1* expression. These data indicate the involvement of the mTOR-mediated pathway in the regulation of *PAK1*. Knockdown of *PAK1* significantly inhibited DU145 cell proliferation, migration and invasion and PCa xenograft growth ability in nude mice. In conclusion, this study demonstrated that *PAK1* is up-regulated in human PCa and mediated by the mTOR signaling pathway. *PAK1* may be a PCa marker and therapeutic target.

Biography

Gang Chen has completed his PhD from Fudan University, China. He has been working as a Clinician and Researcher in the field of bladder and prostatic cancers. He is a President of the Jinshan Hospital of Fudan University and serves as a Professor, Mentor of doctoral students and the Director of the Department of Urology. He has published more than 40 papers in reputed journals and has been serving as an Editorial Board Member of *Chinese Journal of Medicine*.

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