Platelet-derived growth factor (PDGF) and PDGF receptor expression and function in folliculostellate pituitary cells.

Abstract:
Homo- and heterodimers of platelet-derived growth factor-A (PDGF-A) and PDGF-B chains are involved through PDGF alpha- and beta-receptors in the growth regulation of multiple normal and tumoural cell types as well as in tumour neovascularization. Since little information is available on the impact of PDGF/PDGF receptors in normal and adenomatous pituitary, we studied the expression and action of this growth factor system in a variety of pituitary tumour cell lines and in rat anterior pituitary cell cultures. By RT-PCR, mRNA expression of PDGF-A and -B chains and of both receptors was found in rat pituitary and mouse folliculostellate TtT/GF pituitary tumour cells. Rat somatotroph MtT-S and mouse corticotroph AtT20 tumor cells expressed only a part of the PDGF/PDGF receptor components whereas mouse gonadotroph alphaT3-1 and rat lactosomatotroph GH3 pituitary tumour cells contained neither PDGF nor PDGF receptors. To further characterize the role of PDGF in TtT/GF cells, the effect of PDGF-AB and -BB on growthand vascular endothelial growth factor-A (VEGF-A) release was studied. Proliferation of TtT/GF cells was weakly but significantly stimulated by PDGF. Both in rat pituitary cell cultures and in TtT/GF cells, PDGF-AB and -BB strongly enhanced VEGF-A secretion. The PI3 kinase inhibitor LY 294002 blocked the increase in VEGF-A.
Western immunoblotting confirmed the participation of key components of the PI3 kinase/Akt signal pathway (PDK1, Akt-Ser476) in PDGF-stimulated VEGF production. Thus the PDGF/PDGF receptor system is expressed in folliculostellate cells and is involved in VEGF regulation. Its role in endocrine pituitary tumour cell lines and pituitary adenomas need to be clarified in future studies.