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Urokinase Receptor: from Regulation of Proteolysis to Directed Axon Growth and Nerve Regeneration. Mechanisms of Interaction with Membrane Ligands and Intracellular Signaling

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The urokinase-type plasminogen activator was first described in the mid-20th century as a serine protease that converts plasminogen into active plasmin, which leads to degradation of fibrin in vessels and remodeling of the extracel-

lular matrix in tissues. The proteolytic cascade plays an important role in normal and pathological tissue remodeling: wound healing, trophoblast invasion, mammary gland involution, inflammation, tumor invasion and metastasis. At one time, B. Degryse justifiably called the urokinase system “one of most fascinating and challenging molecular system”. In 1985, studies of plasminogen activators received a new impulse: a urokinase binding receptor was found on the cell surface, further study of which greatly contributed to our understanding of the functioning of this system. Today, the unique functions of the urokinase receptor go beyond the framework of proteolysis mediated by binding to urokinase. The review summarizes relevant literature data, as well as the results of our own research on the role of the urokinase receptor as a protein that can interact with a wide range of membrane partners and affect their function in processes that mediate directed axon growth and nerve regeneration.

Keywords: urokinase system, urokinase receptor, nerve regeneration, axon growth, integrins, chemokine receptors, growth factor receptors