Interaction between tau and secretagogin in insulinoma cells

Magdalena Maj[1], *Aysegül Ilhan*[1], *Johannes Attems*[2], *Ludwig Wagner*[1]

[1]Medical University of Vienna, Department of Medicine III, [2]Otto Wagner Hospital, Vienna, Austria. E-mail: majkama83@gmail.com

There is evidence from epidemiological data that Alzheimer's disease is associated with type 2 diabetes. Motivated by results from another research group (Miklossy et al. 1999) who found that a similar tauopathy occurs in pancreatic β-cells such as in brains of Alzheimer's patients, we evaluated tau protein expression in the rat insulinoma cell lines Rin-5F and INS-1E as well as in human insulinomas. In order to investigate this subject we demonstrated in the rodent insulinoma cell lines presence of all six tau isoforms at high quantity. Hyperphosphorylation is detected in neuronal tauopathies. In pancreatic β-cells phosporylation of cellular proteins is tightly controlled and regulated by intracellular calcium spikes. In this direction we investigated the interaction of the recently cloned neuron- and neuroendocrine-specific calcium sensor protein secretagogin (SCGN) with tau proteins. Using SCGN-GST pull down assays and insulinoma cell lysates we demonstrated a specific interaction of one tau isoform with SCGN. This interaction is most probably calcium dependent as inclusion of EDTA in the cell lysate buffer abrogated this complex formation. Immunological data suggest that tau isoform 5 a four-repeat variant represents the SCGN interaction partner. In addition, we demonstrated presence of not only tau but also SCGN in the Sarkosyl-insoluble pellets of Rin-5F cell lysate.

In conclusion, these data might suggest that SCGN is involved in regulating the calcium spike mediated molecular tau dynamics of tubule stabilization in β-cells.

Miklossy J., Taddei K., Martins R., Escher G., Kraftsik R., Pillevuit O., Lepori D., Campiche M. (1999): Alzheimer disease: curly fibers and tangles in organs other than brain. J. Neuropathol. Exp. Neurol. 58: 803-814