Signal transduction by the Ca^{2+}-sensing receptor in *Xenopus* melanotropes

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Pituitary cells secrete hormones in a receptor-regulated manner, often via action potential-driven extracellular calcium influx followed by intracellular calcium-dependent exocytosis. Small changes in the extracellular calcium concentration affect the level of growth hormone, prolactin and adrenocorticotropic hormone secretion from somatotropes, lactotropes and AtT-20 tumor cells, respectively. The effects of extracellular calcium on hormone secretion from these pituitary cells might be mediated by the extracellular calcium-sensing receptor (CaR). The CaR is a G protein-coupled receptor and was first cloned and characterized in the bovine parathyroid gland. This receptor plays a major role in the maintenance of the extracellular calcium concentration in extracellular body fluids. Although expression of the CaR has been shown in anterior pituitary cells, the intracellular signaling mechanism and the physiological role of this receptor in these endocrine cells is unclear. In order to better understand the functioning of pituitary cells, we have investigated the presence and action of the CaR in the melanotrope cell of the South-African clawed toad *Xenopus laevis*. We demonstrate that the CaR is expressed and functional in melanotropes, as shown by PCR and *in situ* hybridisation. The CaR activator L-phenylalanine (L-Phe) dose-dependently stimulates secretion from these cells. Furthermore, L-Phe evokes action potential firing and increases intracellular calcium levels, a process dependent on extracellular calcium. We also investigated the possible involvement of various intracellular signaling pathways in melanotrope CaR signaling (protein kinase A, protein kinase C, phosphatidyl inositol-3 kinase and phospholipases).

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Speaker in session 16