

## **Phenotypic characterization of mice with exaggerated and missing LH/hCG action**

Ilpo Huhtaniemi<sup>1,2</sup>, Petteri Ahtiainen<sup>1</sup>, Susana Rulli<sup>3</sup>, Tomi Pakarainen<sup>1</sup>, Fu-Ping Zhang<sup>4</sup> and Matti Poutanen<sup>1</sup>

<sup>1</sup>Department of Physiology, University of Turku, 20520 Turku, Finland; <sup>2</sup>Institute of Reproductive and Developmental Biology, Hammersmith Campus, Imperial College London, Du Cane Road, London W12 0NN, UK; <sup>3</sup>Institute of Biology and Experimental Medicine-CONICET, Vuelta de Obligado 2490 (1428), Buenos Aires, Argentina; and <sup>4</sup>Department of Physiology, Biomedicum Helsinki, University of Helsinki, 00014 Helsinki, Finland.

Numerous genetically modified mouse models have been developed recently for the study of pituitary-gonadal function. Knockout models exist now for GnRH, LH, FSH and their receptors. They offer in most cases good phenocopies of respective mutations observed in humans, and allow experimental studies on the molecular pathogenesis of deficient GnRH or gonadotropin action. In addition, there are now multiple transgenic mouse models overexpressing LH, hCG and FSH, which make it possible to assess the pathophysiological consequences of chronically elevated gonadotropin levels. The purpose of this presentation is to review some of our recent findings on transgenic mice expressing high levels of hCG as well as on an LHR knockout mouse, totally devoid of LH action. The rather expected gonadal hyper- and hypofunction phenotypes of these two models reconfirm our previous knowledge about the physiological functions of LH/hCG. In addition, several unexpected findings were made, including the induction of multiple gonadal and extragonadal tumors due to chronically elevated LH/hCG action. The LHR knockout model clarified to what extent gonadal function is possible in the total absence of LHR activation, and what role extragonadal LHR expression has in mouse reproductive functions.