Introduction The hypophysial pars tuberalis (PT) is an important center that conveys photoperiodic information to neuroendocrine circuits involved in the control of seasonally changing body functions, like reproduction, metabolism and behaviour. In mammals, melatonin is used as an endocrine code for the length of the night and controls the production of messenger molecules representing the output from the PT (Fig. 1). These messengers appear to act both retrogradely (to the hypothalamus) and anterogradely (to the pars distalis of the pituitary; PD). A retrograde messenger from the PT is thyreotropin that, in the ependymal cells of the infundibular recess (tanyocytes), regulates the transcription of type 2 and type 3 deiodinases to control the local concentration of triiodothyronine (T3) that subsequently affects gonadotropin releasing hormone (GnRH) secretion (Nakao et al. 2008; Ono et al. 2008). Anterograde messengers from the PT are thought to control the secretion of adenohypophysial hormones, like prolactin, in a photoperiod-dependent manner, but have not yet been identified.

Recently, endocannabinoids have been proposed to function as anterograde messengers since an endocannabinoid system has been found in the PT (Yasuo et al. 2010a, b). In principle, endocannabinoids may act either directly on the endocrine cells of the PD or indirectly via folliculo-stellate (FS) cells that are known to orchestrate adenohypophysial functions in response to various physiological stimuli. In the present study we performed immunocytochemical and biochemical experiments to approach the question whether FS cells can mediate the effect of endocannabinoids in the PD via nitric oxide (NO) or the protein follistatin that is known to fulfill regulatory functions in the pituitary. Experiments were performed with pituitary cryostate sections obtained from hamster or with cells from the murine FS cell line TtT/GF.

Conclusions The presence of CB1 receptors in a subpopulation of hamster folliculo-stellate cells and in the murine folliculo-stellate (FS) cell line TtT/GF supports the idea that FS cells mediate the effects of endocannabinoids to endocrine PD cells. Our data show that apparently endocannabinoids do not act via follistatin. Interestingly, the colocalization of CB1 and NOS in FS cells indicates that NO may be involved in endocannabinoidergic signaling.

References
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