

Navigating pituitary structure and function - defining a roadmap for hormone secretion

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The secretion of peptide hormone by the pituitary gland is obligatory for controlling a wide-range of downstream physiological processes. To achieve this, endocrine cells must respond co-ordinately to hypothalamic input to release defined pulses of hormone into the bloodstream. The organ context is clearly essential for proper hormone release since enzymatically dispersed cells mount attenuated responses to secretagogue. Yet, scant attention has been paid to whether endocrine cell populations are organized at the tissue level within the pituitary. Recently, using transgenic animals allied to sophisticated *in situ* imaging techniques, we have shown that endocrine cells are homotypically organized into three-dimensional networks. In addition, using multicellular calcium imaging combined with online/real-time measures of hormone secretion, we have demonstrated that these networks play a crucial role in hormone release by integrating hypothalamic signals at the population level. As such, it is anticipated that perturbation of endocrine network function may underlie hormone deficits associated with pituitary dysfunction.