Hypothalamic neurons

Hypothalamic neurons orchestrate many essential physiological and behavioral processes via secreted neuropeptides, and are relevant to human diseases such as obesity, narcolepsy and infertility. Merkle et al. report the differentiation of human pluripotent stem cells into many of the major types of neuropeptidergic hypothalamic neurons, including those producing pro-opiolemelanocortin, agouti-related peptide, hypocretin/orexin, melanin-concentrating hormone, oxytocin, arginine vasopressin, corticotropin-releasing hormone (CRH) or thyrotropin-releasing hormone. Hypothalamic neurons can be generated using a 'self-patterning' strategy that yields a broad array of cell types, or via a more reproducible directed differentiation approach. Stem cell-derived human hypothalamic neurons share characteristic morphological properties and gene expression patterns with their counterparts in vivo, and are able to integrate into the mouse brain. These neurons could form the basis of cellular models, chemical screens or cellular therapies to study and treat common human diseases [1)]

1)
Merkle FT, Maroof A, Wataya T, Sasai Y, Studer L, Eggan K, Schier AF. Generation of neuropeptidergic hypothalamic neurons from human pluripotent stem cells. Development. 2015 Feb 15;142(4):633-43. doi: 10.1242/dev.117978. PubMed PMID: 25670790.

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