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**Hypothalamic appetite control**

The arcuate nucleus

NPY (Stanley et al 1984) and AgRP (Rossi et al 1998) stimulate food intake.

Αlpha-MSH decreases food intake.

When fasted:

* NPY and Agrp expression are upregulated.
* POMC is down-regulated.
* Feel hunger and drive to eat

When satiated:

* NPY and Agrp expression are down-regulated.
* POMC is upregulated.
* Feel sated, no drive to eat

Current evidence demonstrates that POMC is critical to energy homeostasis in rodents and humans (POMC and MC4R KOs/mutations are obese).

Current evidence demonstrates the NPY/AgRP *neuron* is critical to energy homeostasis in rodents (post-embryonic neuronal KOs Bewick et al 2005, Luquet et al 2005, Gropp et al 2005) but no human evidence.



The paraventricular nucleus

* Integrates autonomic responses with endocrine system.
* Expresses Y1, Y5, MC3, MC4 receptors.
* Neuromedin U binds to the NMU2R in the PVN, reduces appetite via CRH.
* Corticotrophin releasing hormone binds to CRH2R and reduces appetite in the PVN.

The lateral hypothalamus

* Expresses two major orexigenic neuropeptides: the orexins and melanocortin-concentrating hormone.



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