



APPETITE AND NUTRITION

PHAR-432











LECTURE: 4

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Definitions

-  Hunger: is an intrinsic feeling of need for food.
-  Appetite: is the desire for specific type of food.
-  Aphagia: means complete loss of appetite.
-  Hyperphagia: means over eating (increased meal size).
-  Orexia: means increased appetite.
-  Satiety: is feeling to stop eating.
-  Food craving: is an intense desire to consume a specific food.
-  Pica: The craving of non- food items as food.
-  Polyphagia: means over eating (increased meals number).
-  Anorexia: means loss of appetite.



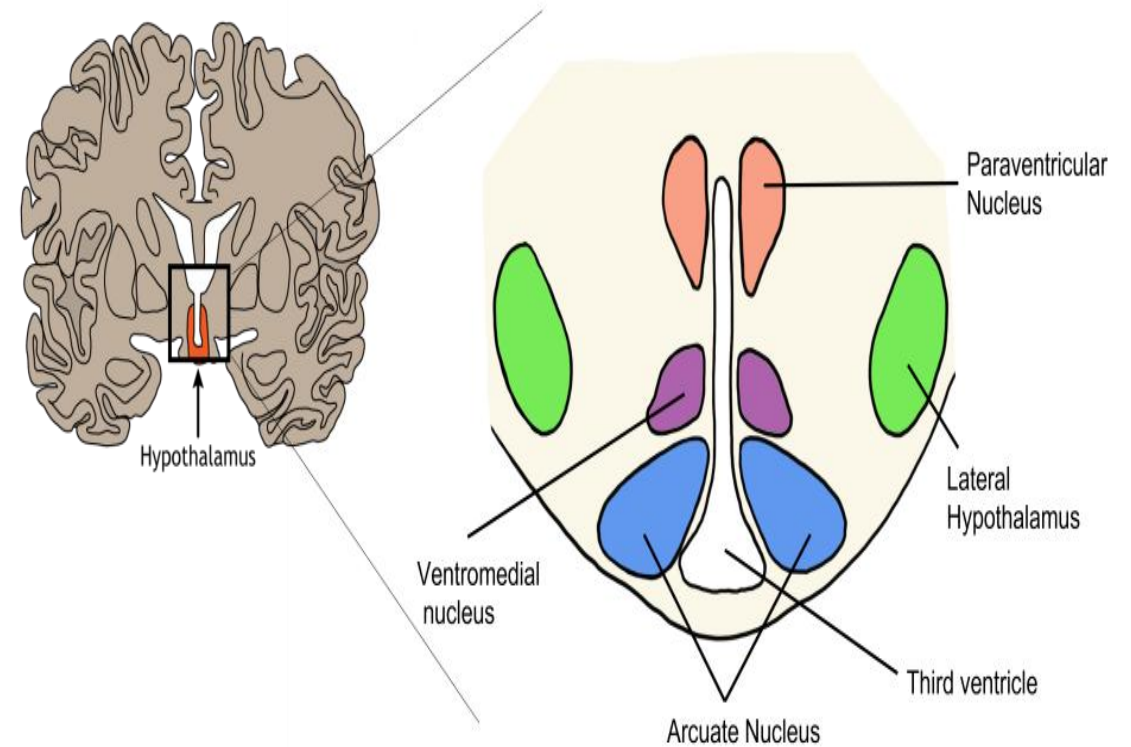
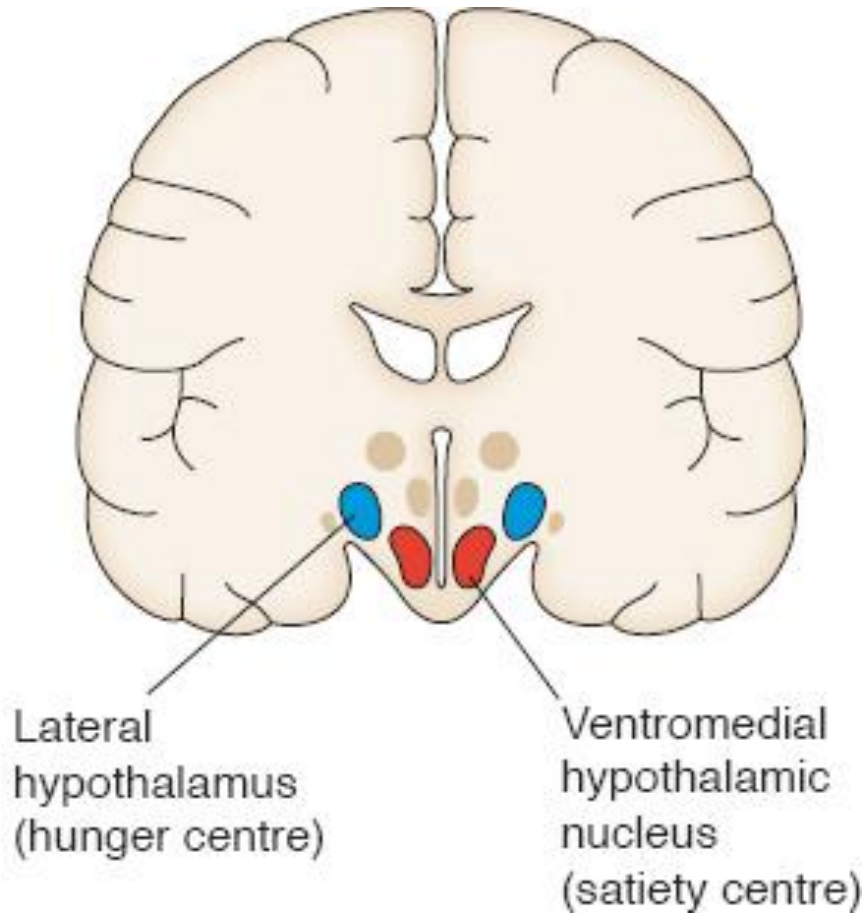
Regulation of appetite

The hypothalamus, a part of the brain, is the main regulatory organ for the human appetite.

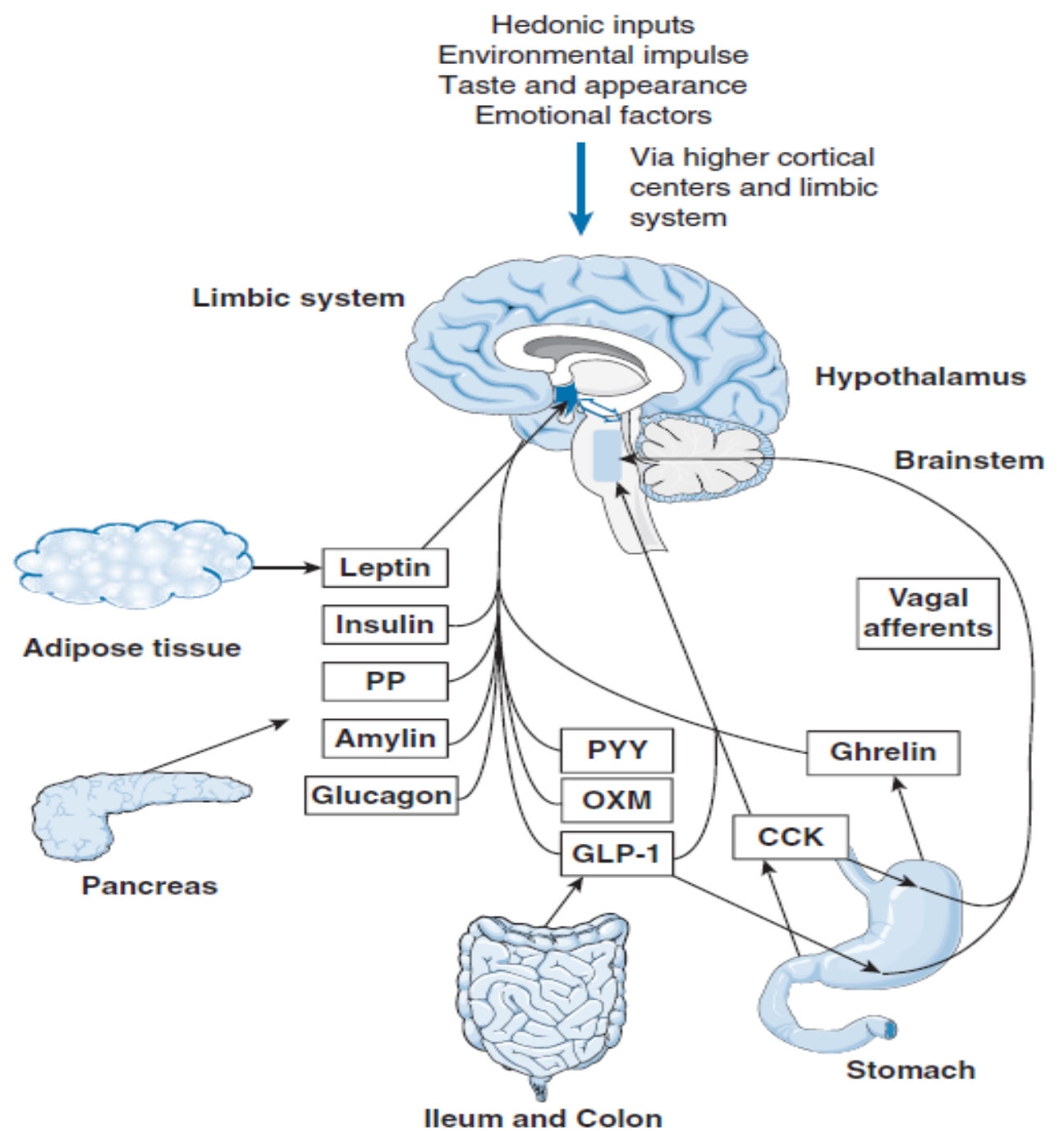
The neurons that regulate appetite appear to be mainly serotonergic.

The hypothalamus senses external stimuli mainly through a number of hormones such as leptin, ghrelin, PYY 3-36, orexin and cholecystokinin; all modify the hypothalamic response. They are produced by the digestive tract and by adipose tissue.

Hypothalamus



An overview of the control of food intake and appetite



Neuronal circuits

- **The Orexigenic pathway**
- **Orexigenic** neurons stimulate appetite
- The feeding or **orexigenic** system contains
 - Neuropeptide Y (NPY)
 - Agouti-related protein(AgRP)
 - Melanin concentrating hormone (MCH) and
 - Other hormones and neuronsthat signal to **increase food intake (stimulate appetite).**



Neuropeptide Y (NPY)

Key Functions of NPY in Appetite Regulation:

- NPY is the most powerful central stimulant of appetite, with a preference for carbohydrates
- NPY is released during fasting or starvation, promoting energy conservation and reducing metabolic rate to prevent fat loss.
- Ghrelin activates NPY neurons to signal hunger, while leptin reduces NPY production to stop appetite.
- High-stress conditions can trigger NPY release, linking emotional states to increased food consumption.
- **Obesity:** Because NPY increases hunger and fat storage, its regulation is a target for treating obesity.



Agouti-Related Peptide (AgRP)

- Agouti-Related Peptide (AgRP) is a potent, hunger-stimulating neuropeptide, that drives food intake and reduces energy expenditure.
- It acts as a competitive inhibitor of melanocortin receptors MC3-R and MC4-R, which are crucial for reducing appetite.
- AgRP neurons are vital for maintaining long-term energy balance and body weight.
- Stimulate the release of ACTH and cortisol.



Neuronal circuits

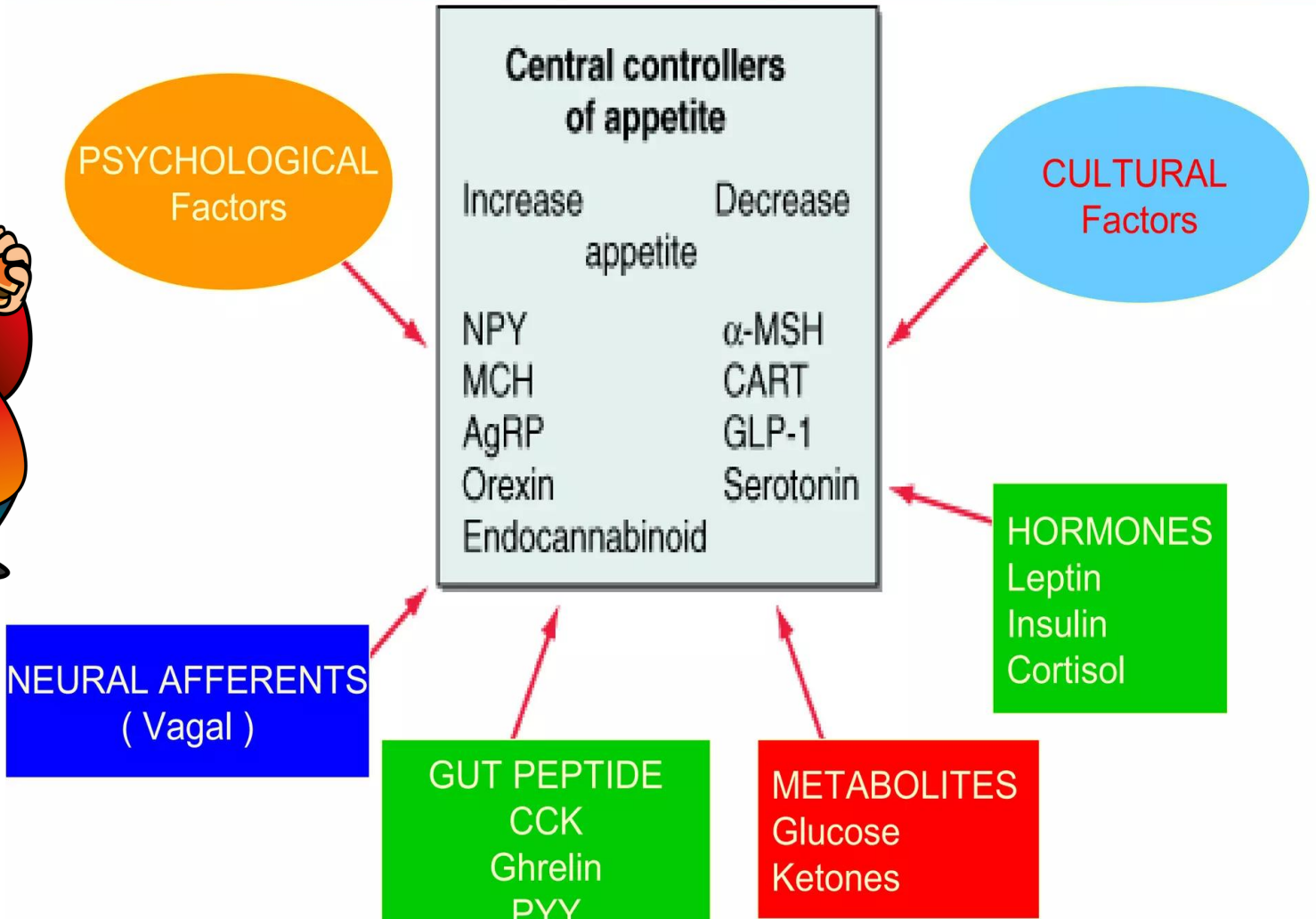
- The Anorectic Pathways
- Anorexigenic neurons promote satiety
- **Proopiomelanocortin (POMC)**: is a prohormone that gives rise to several biologically active peptides include α -MSH, β -MSH, γ -MSH and ACTH. **They directly inhibit the intake of food.** Deficiencies cause **early-onset obesity** and **adrenal insufficiency**.
- **Brain-derived neurotrophic factor (BDNF)** is a crucial regulator of energy homeostasis that suppresses appetite and reduces food intake, Low BDNF levels are linked to hyperphagia, obesity, and metabolic syndrome.



The Factors That Regulate Appetite Through Effects On Central Neural Circuit



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