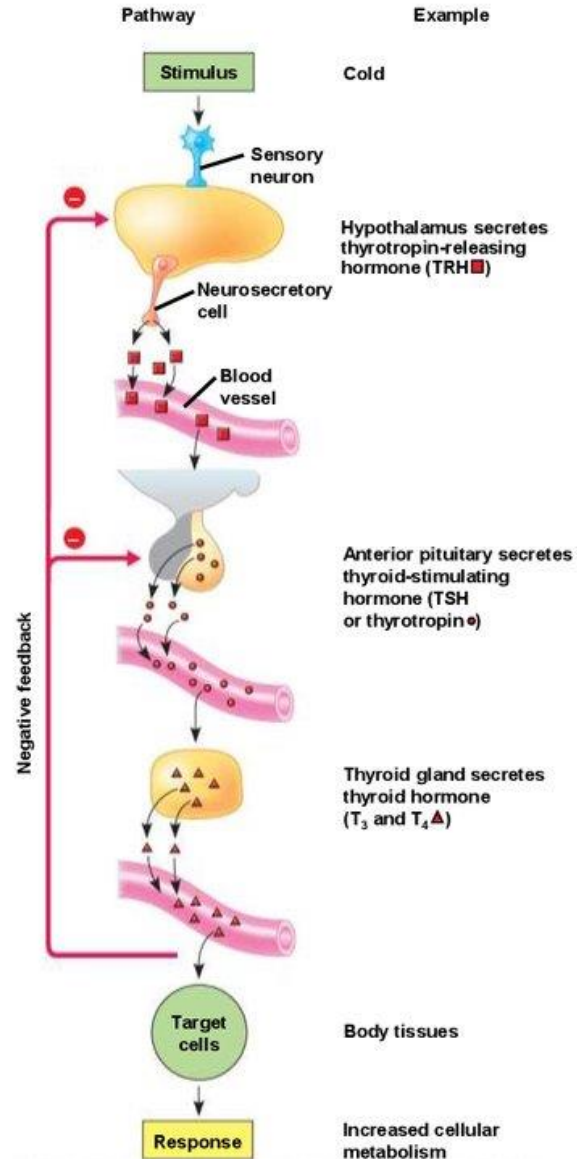


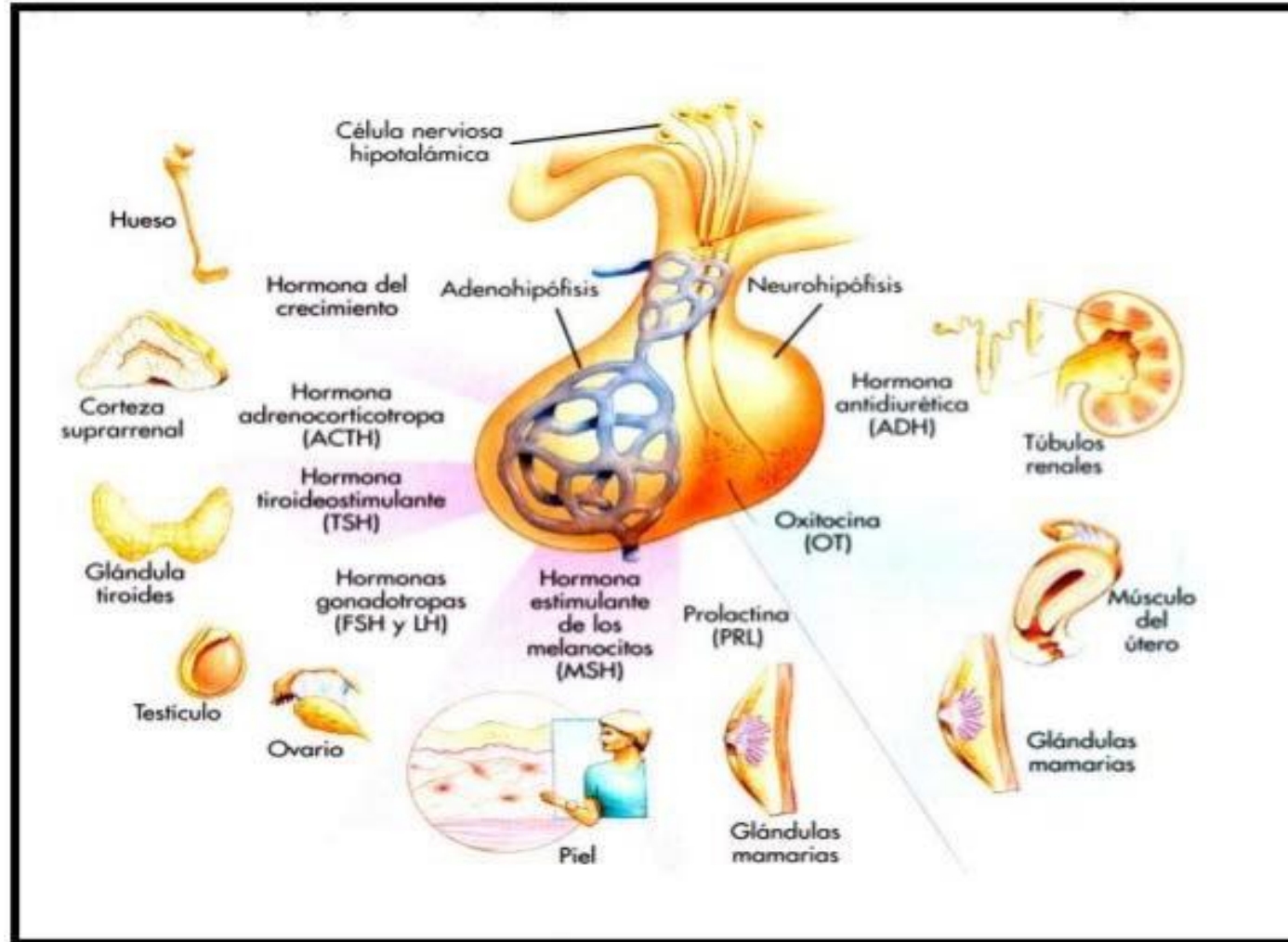
A hormone cascade pathway



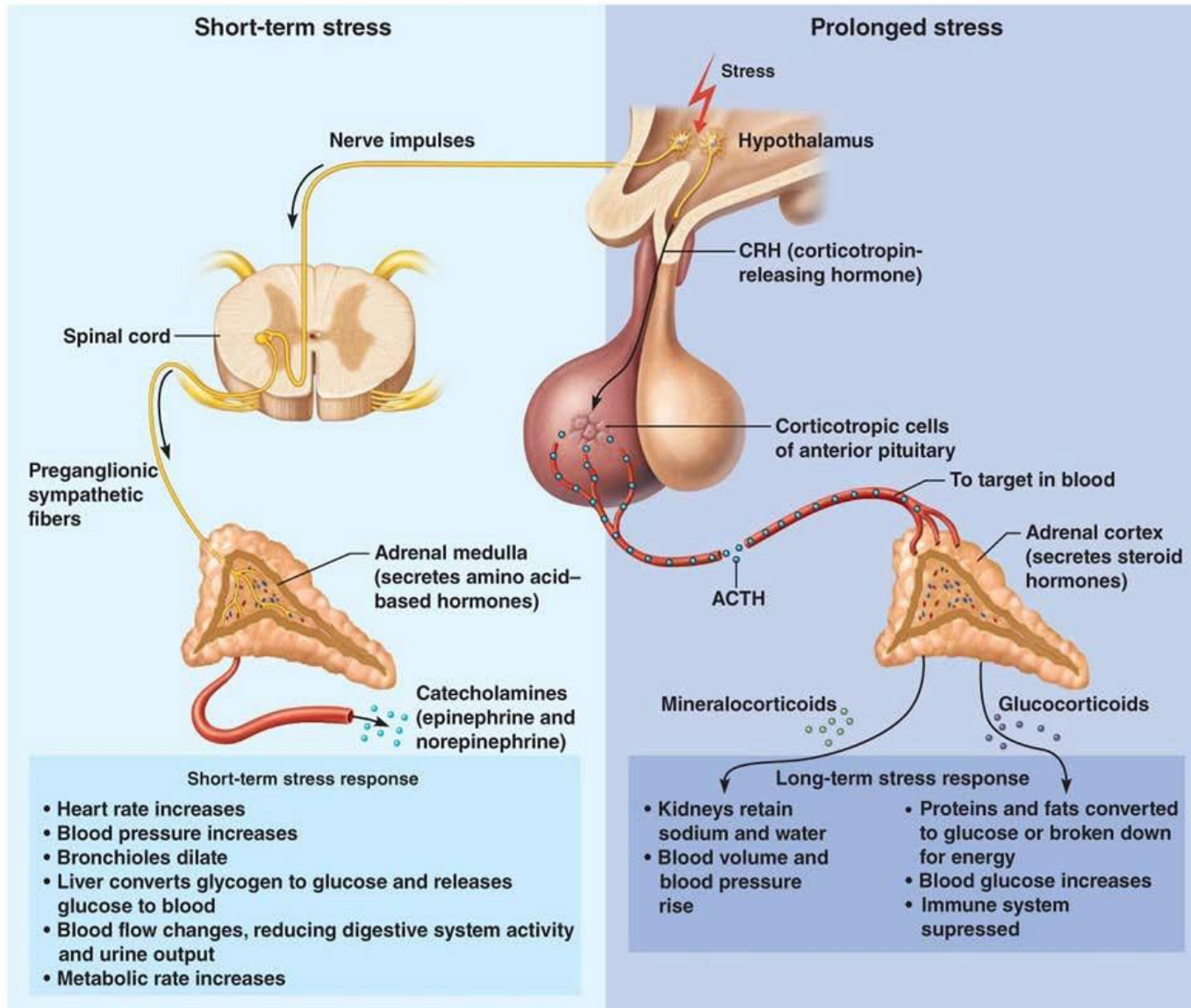
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A coordenação do metabolismo envolve o sistema neuroendócrino



Sinalização adrenérgica integra respostas ao estresse



Epinephrine
norepinephrine
(fasted state)
(stress)

catecholamine hormones, secreted by adrenal medulla and sympathetic nerves. reflects low glucose and fatty acid levels in the blood. These hormones use a family of receptors of two major classes, alpha and beta with several subclasses in each.

PRINCIPAL EFFECTS

- glycogenolysis ↑
- gluconeogenesis ↑
- lipolysis ↑ ↓
- glucagon release ↑
- insulin release ↓

cortisol
(fed state)

glucocorticoid hormones, secreted by the adrenal cortex

PRINCIPAL EFFECTS

- glycogen synthesis ↑
- gluconeogenesis ↑
- proteolysis ↑
- long term effects via protein synthesis



Endocrine Disorders

- Pituitary / Hypothalamus
 - Obesity
 - Pituitary adenoma
 - Hypopituitarism
 - Diabetes insipidus
 - Syndrome of Inappropriate Antidiuretic Hormone (SIADH)
- Adrenal Cortex
 - Cushing's Syndrome
 - ACTH Dependent
 - ACTH Independent
 - Adrenocortical Insufficiency (Addison's Disease)
 - Primary
 - Secondary
- Adrenal Medulla
 - Pheochromocytoma
- Parathyroid
 - Primary Hyperparathyroidism
 - Secondary Hyperparathyroidism
 - Familial (Benign) Hypocalcemic Hypercalcemia
 - Hypercalcemia of Malignancy
 - Hypoparathyroidism
 - Pseudohypoparathyroidism
 - Medullary carcinoma of the thyroid
- Thyroid
 - Hyperthyroidism
 - Hypothyroidism
 - Goiter
 - Thyroid nodules & Neoplasms
 - Subclinical Thyroid disease
- Endocrine Pancreas
 - Type 1 diabetes mellitus
 - Type 2 diabetes mellitus
 - Insulinoma
 - Glucagonoma
 - Somatostatinoma

CLASSIFICATION

Generally the endocrine disorders were classified into three groups:

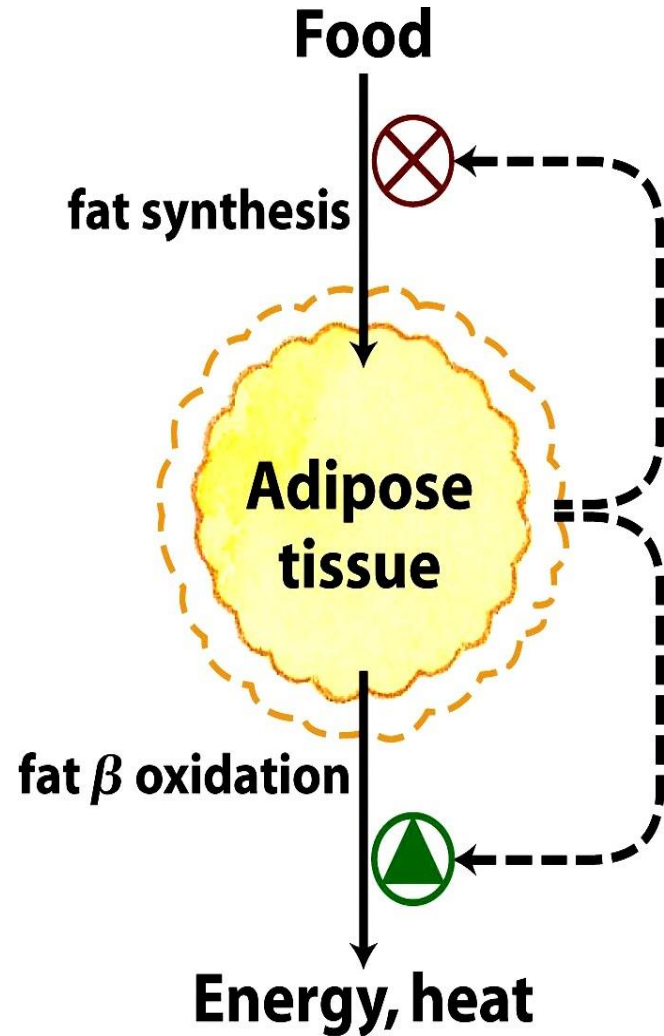
- Endocrine gland hypo secretion which leads to hormone deficiency
- Endocrine gland hyper secretion which leads to excess of hormone
- Tumors of endocrine glands

CAUSES OF ENDOCRINE DISORDERS

- Injuries to endocrine glands
- Congenital hypothyroidism
- Infections
- Tumors of an endocrine glands
- Inability in secretion of hormones
- Problems related to endocrine feedback system
- Other diseases



Teoria lipostática



Como o organismo mantém o controle do tecido adiposo?

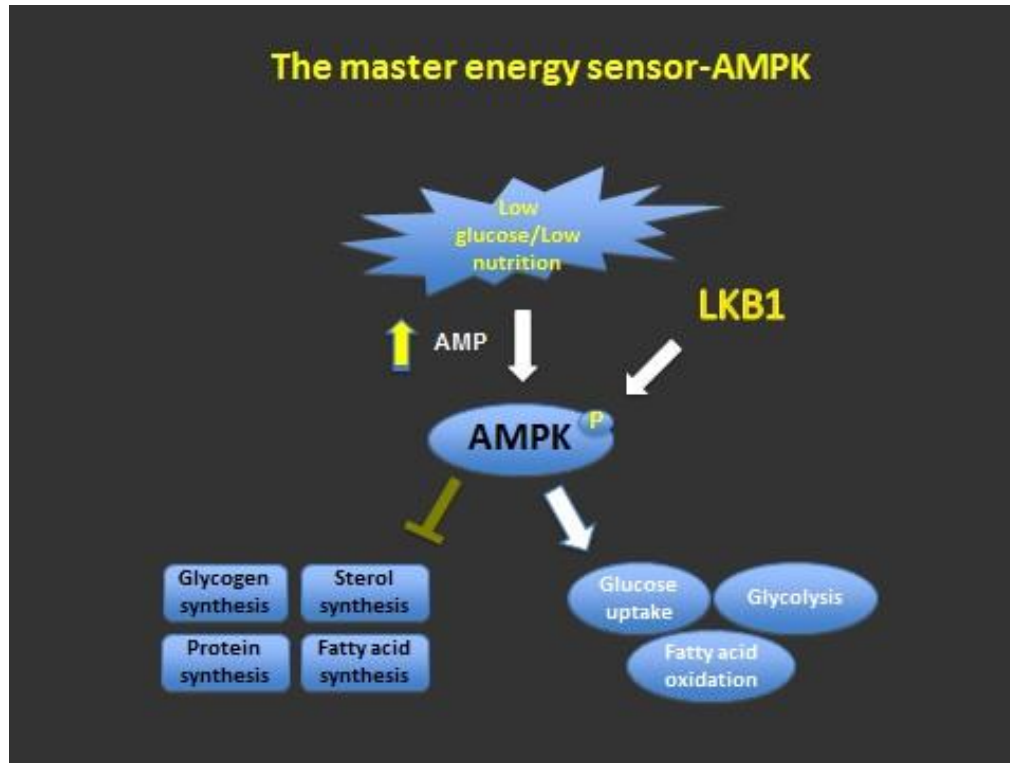


<https://youtu.be/EVkFPeP5sFI>



Proteína quinase dependente de AMP (AMPK)

Principal regulador de vias catabólicas



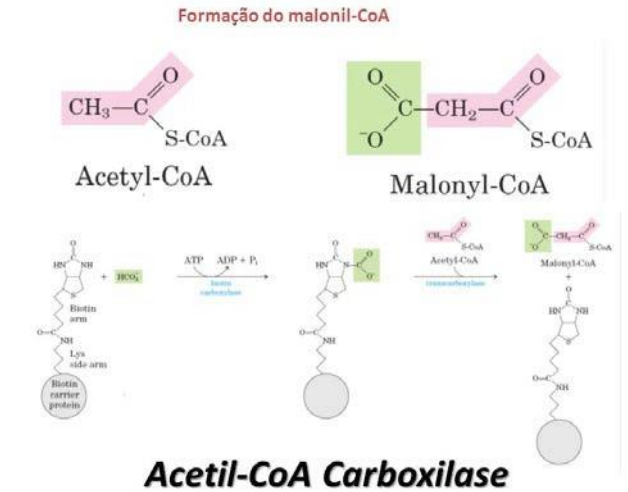
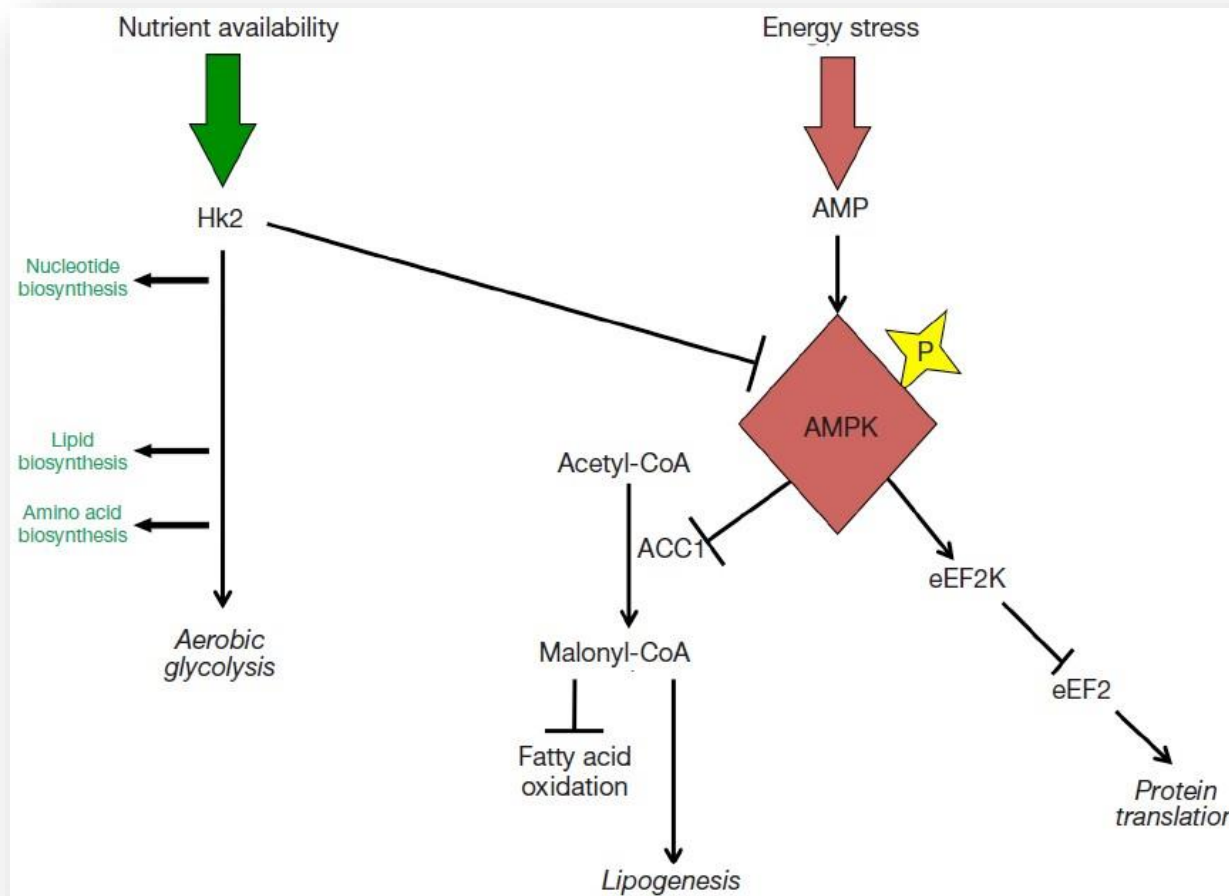
AMPK ativa vias metabólicas que geram ATP.

Inibe as vias de biosíntese de forma a poupar ATP para processos vitais.



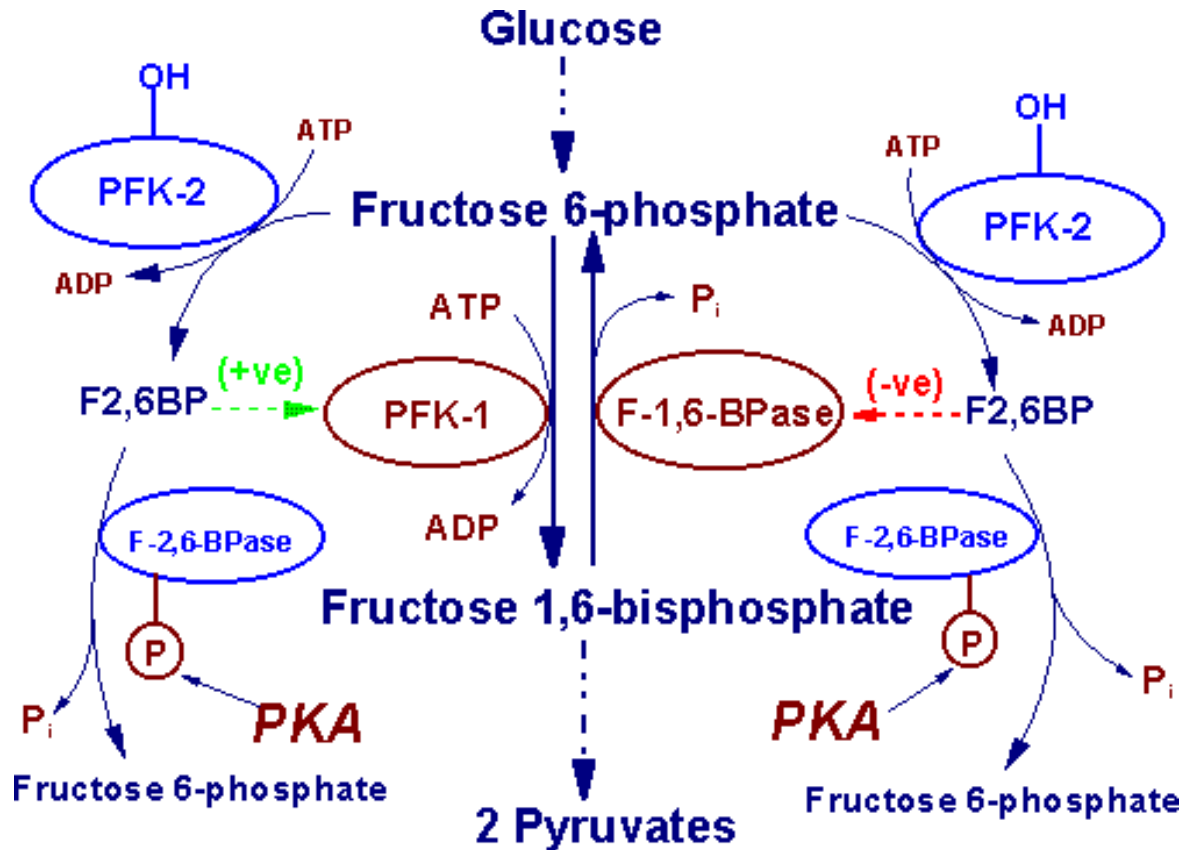
Metabolismo de lipídeos

Fosforilação e inibição da Acetil-CoA carboxilase inibe a lipogênese

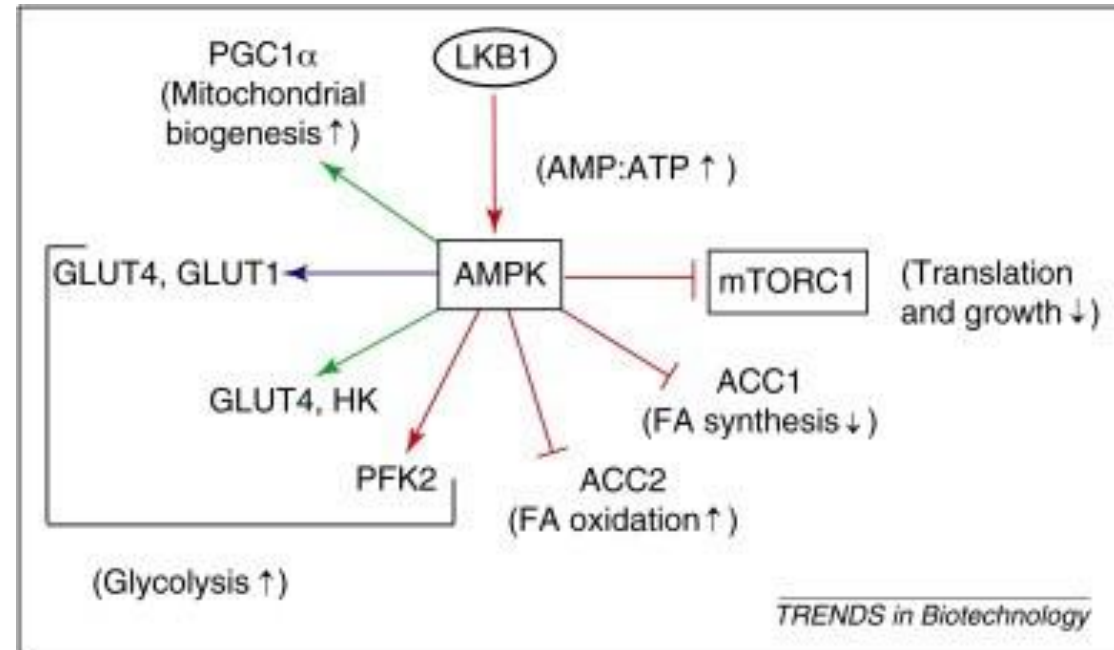


Metabolismo de carboidratos

Ativa a PFK-2 e a formação de F2,6BP que ativa a PFK1 (glicólise).

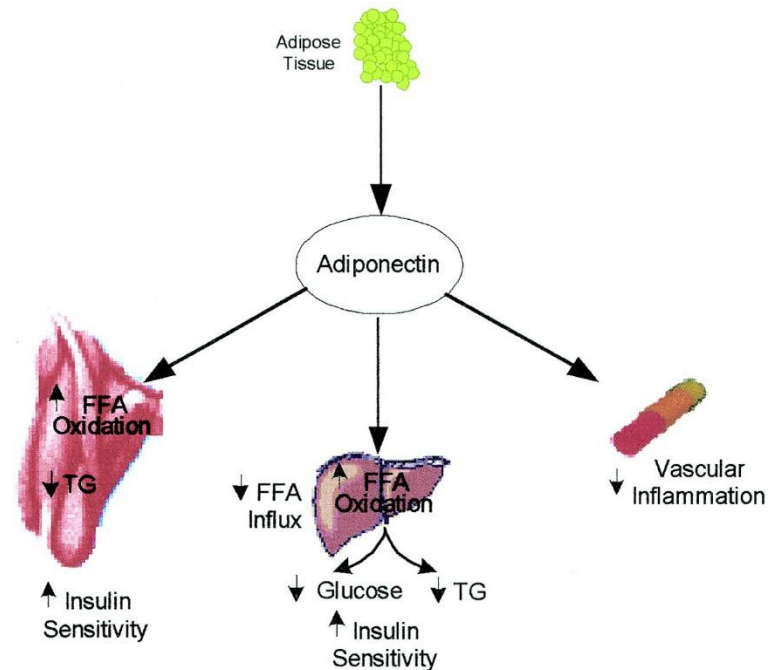
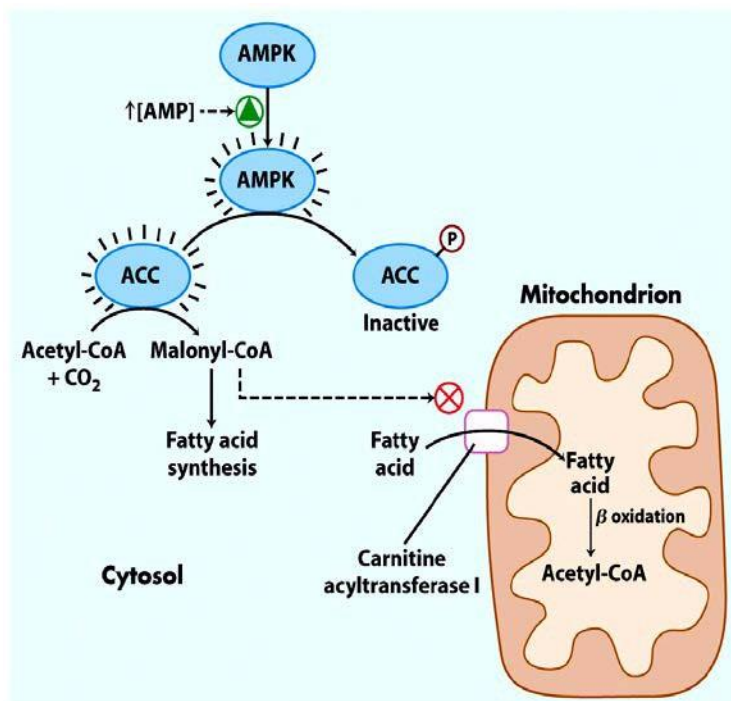


M. Javed Abbas M.D. ©



Adiponectina

- Peptídeo liberado pelo tecido adiposo
- Defeito de produção = sintomas metabólicos semelhantes à DM II
- Obesos tem menor taxa de adiponectina sérica (TNF α inibe)
- Ativa a fosforilação de Acetil-CoA carboxilase inibe a lipogênese







ob/ob mouse
67 g



ob/ob mouse
+ Leptin
35 g





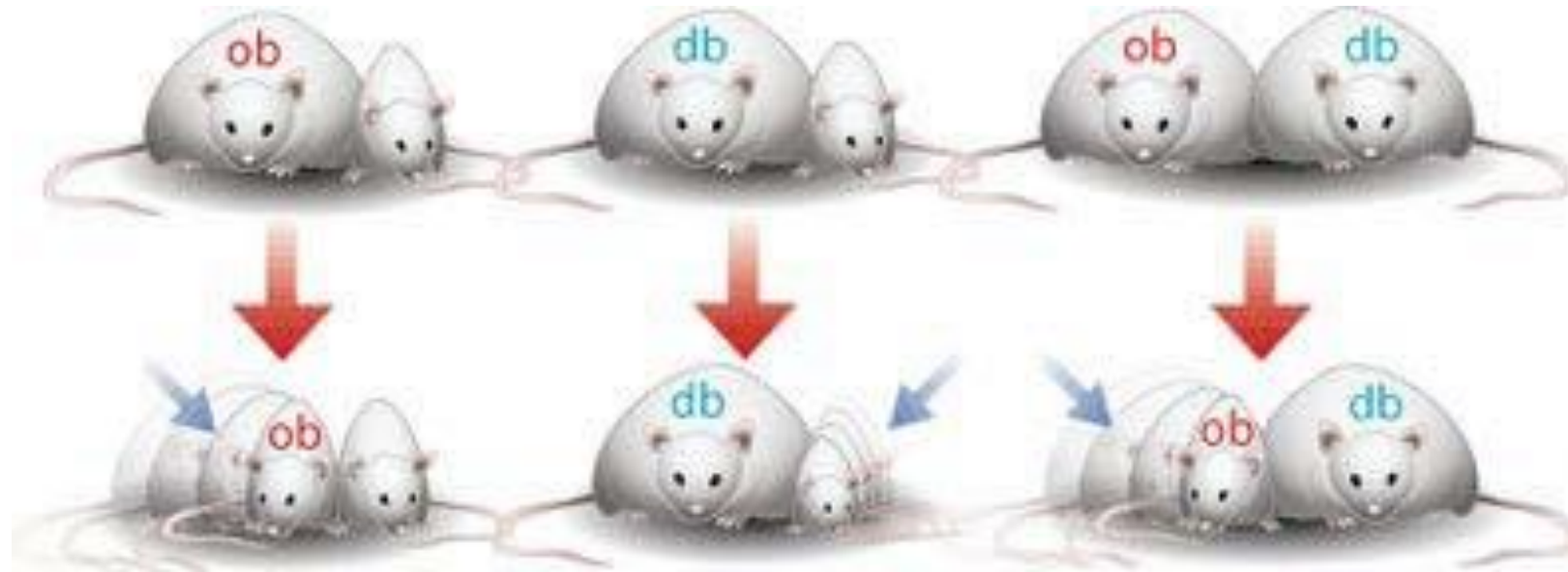
$+/+$

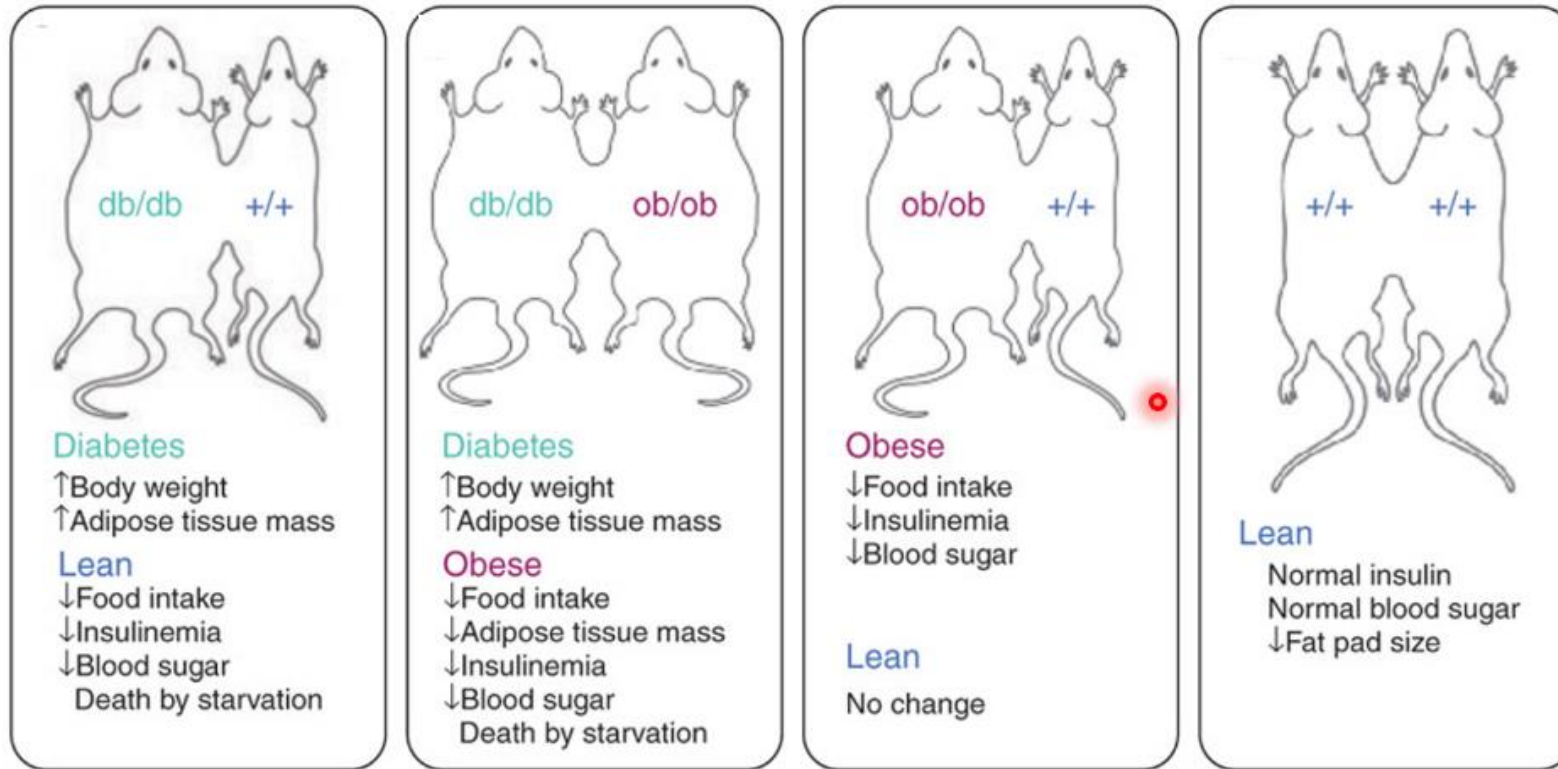
db/db

Hummel, K.P., Dickie, M.M. & Coleman, D.L. Diabetes, a new mutation in the mouse. *Science* 153, 1127– 1128 (1966).



Como explicar esses resultados de parabiose?





Coleman, D.L. & Hummel, K.P. Effects of parabiosis of normal with genetically diabetic mice. *Am. J. Physiol.* 217, 1298–1304 (1969).



Leptina - Solução para Obesidade?



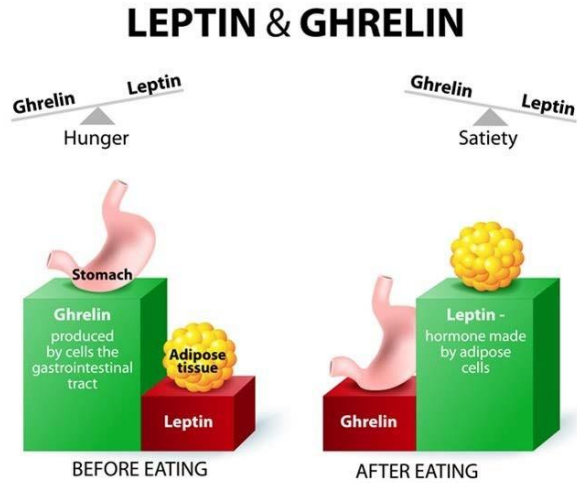
- Maioria dos humanos obesos tem excesso de leptina
- Tratamento com leptina não reduz massa corporal
- Defeitos demonstrados em receptores (DB) e sinais de resposta



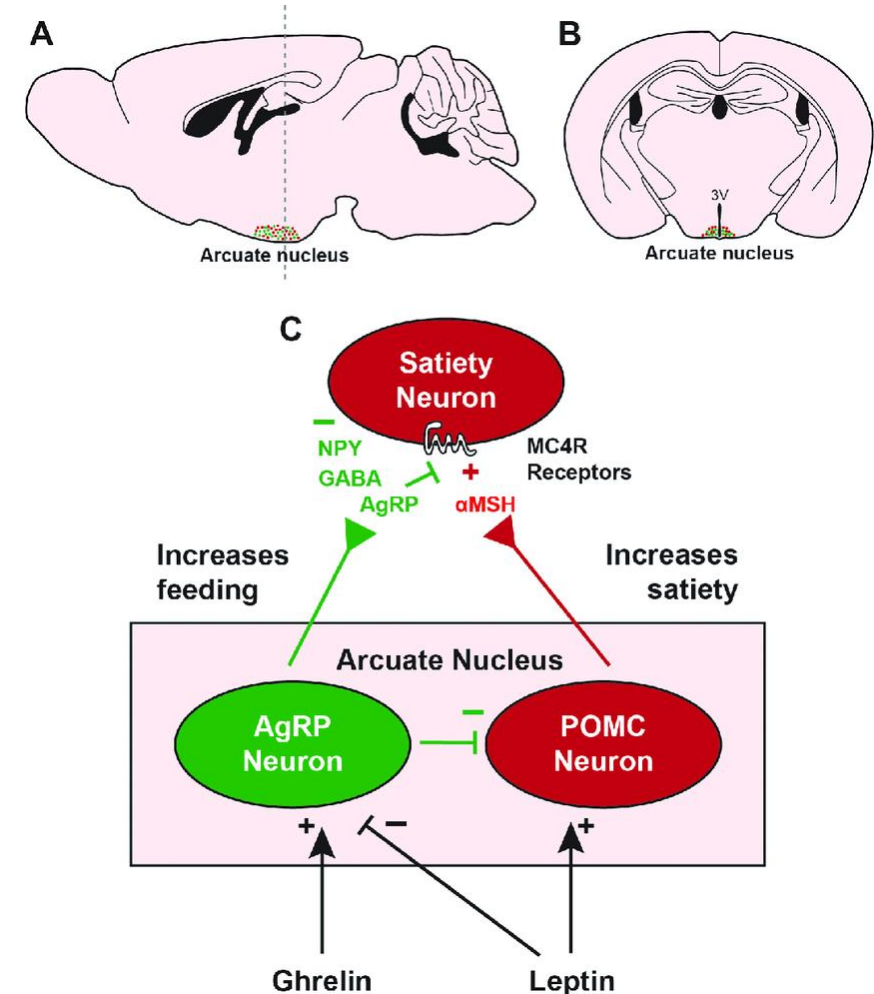
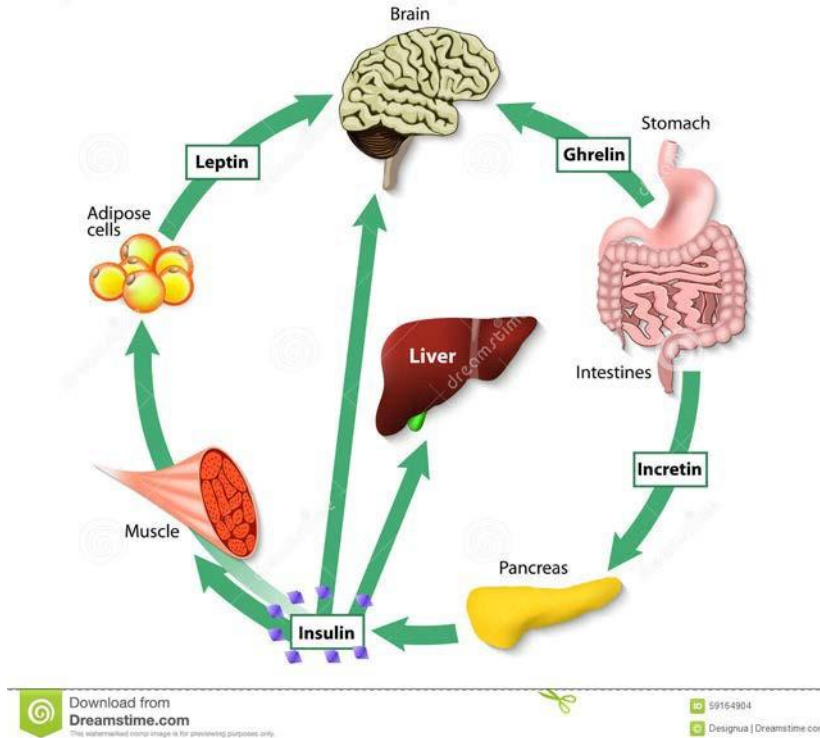
<https://youtu.be/oN3woHJ7ZDY>



Controle neural do apetite



APPETITE & HUNGER (hormones)



AGRP (Agouti-related peptide)

NPY- (Neuro peptide Y)

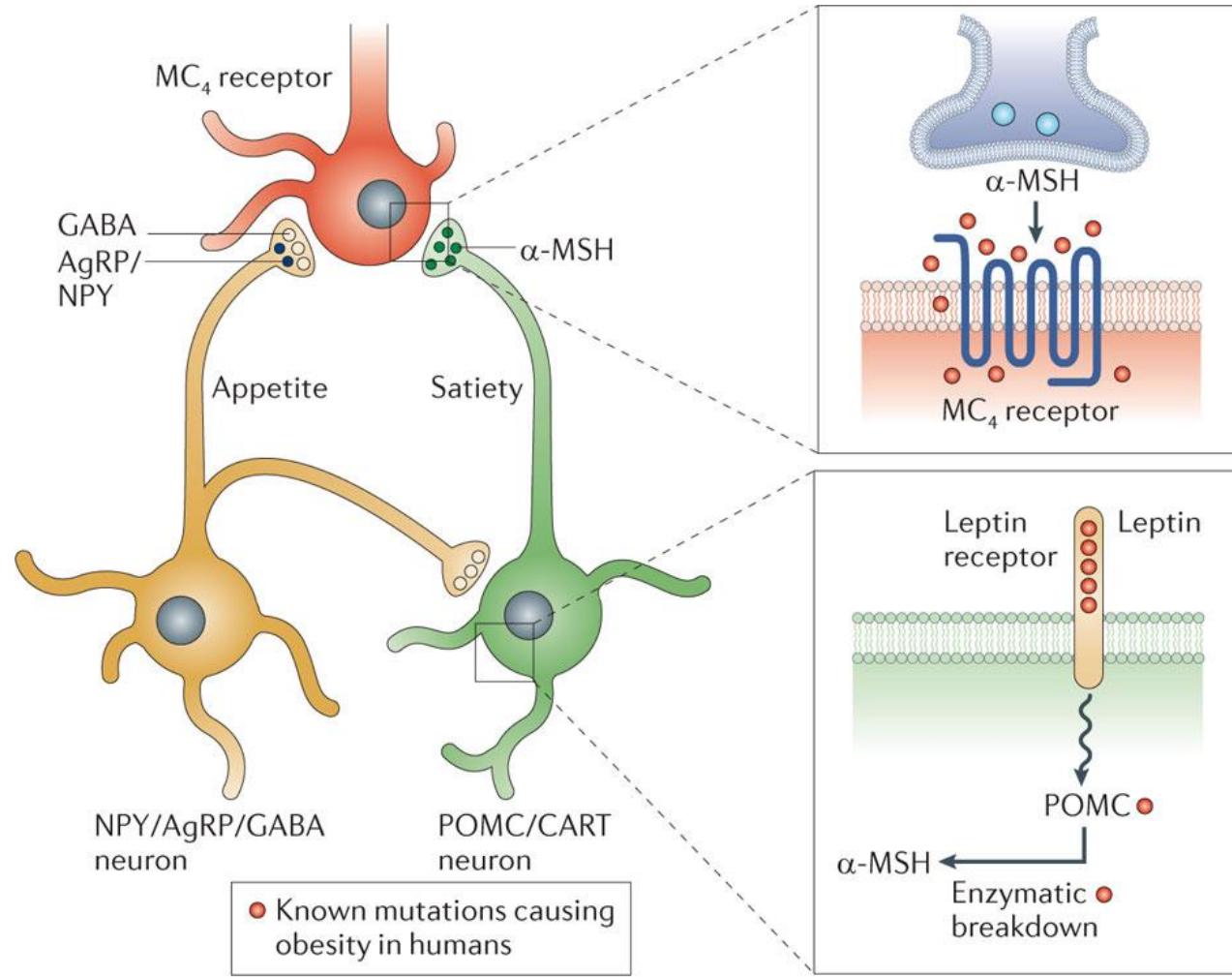
POMC/ CART (pro-opiomelanocortina) α MSH (melanocyte stimulating hormone)

CART (Cocaine and amphetamine-regulated transcript)

(α MSH e CART inibidores do apetite e estimulantes de gasto de energia)



Controle neural do apetite



Circuitos identificados por optogenética

