Màster Biomedicina

Programa de l'assignatura

Nom de l'assignatura: Molecular, cellular and physiopathological basis of obesity

Crèdits: 3 ECTS

Coordinador: Francesc Villarroya

Subject areas:

The obesity epidemic. (2h + 1)

Clinical manifestations of obesity.

Geographic, age and gender influences.

Quantitative and qualitative indicators of obesity.

Genetics of obesity. Multifactorial obesity versus monogenic obesity.

Complications of obesity. Diabetes and metabolic complications. Concepts of lipotoxicity and adipose expandability.. Other complications: obesity and cardiovascular function, obesity and cancer. Obesity and psychological disorders.

SEMINAR: OBESITY AND CANCER

Cellular and molecular basis of energy expenditure (3h)

Physicochemical principles of energy balance. Physiological processes leading to energy expenditure.. Adaptive thermogenesis.

Biochemistry of energy expenditure. Futile cycles.

Mitochondrial function. Mitochondrial uncoupling as a mechanism for adaptive thermogenesis.

Adipobiology I (3h +1)

Anatomy and histology of adipose tissue

Adipocyte differentiation

Endocrine function of white adipose tissue and white adipocyte: adipokines and citokines released by adipose tissue. Local adipose inflammation and obesity.

SEMINAR: ADIPOSE TISSUE AS SOURCE FOR TISSUE REPAIR AND TISSUE REGENERATION THERAPIES.. STEM CELLS IN ADIPOSE TISSUE.

Adipobiology II (3h +1)

The brown adipocyte. Metabolic function.

Differentiation of brown versus white adipocytes. Trans-differentiation. "Brite / beige" adipocytes

Master molecular actors in the control of development and activity of brown adipose tissue.

SEMINAR: THE RENAISSANCE OF BROWN ADIPOSE TISSUE IN HUMANS

Adipobiology III. Experimental approaches to adipose tissue and obesity. (3h +1)

Experiments in humans: possibilities and limitations

Animal models of obesity and and gene modification models for the study of obesity and adipobiology.

Cellular models of adipocyte differentiation.

SEMINAR: LIPODYSTROPHY AND ADIPOSE TISSUE

Neuro-endocrinology of feeding behavior (4h +1)

General schemes: neuro-anatomical control of hunger / satiety: afferent signals and neural sites of reception and integration of peripheral signals.

Orexigenic neuropeptides: odentity and action. Neuropeptide Y. Orexin.

Anorexigenic neuropeptides: identity and action. Melanocortin system. "Agouti" system

The endocannabinoid system in feeding behavior.

Peripheral signals of gastrointestinal origin with central actions (ghrelin, cholecystokinin, PYY ..)

SEMINAR: ANOREXIA VERSUS OBESITY: PARADOXICAL SIMILARITIES IN FEEDING BEHAVIOR DISORDERS.

Bibliography

Reviews in journals:

International Journal of Obesity (www.nature.com/ijo/)

Obesity (http://www.obesity.org/publications/obesity-journal.htm)

Obesity reviews (http://onlinelibrary.wiley.com/journal/10.1111/ 28ISSN%% 291467-789X)

Cell Metabolism (www.cell.com/cell-metabolism/)

Endocrinology (http://endo.endojournals.org/)

In Nature Reviews Endocrinology (http://www.nature.com/nrendo/index.html)