



Corso di Laurea	Corso di Laurea Magistrale in Odontoiatria e Protesi Dentaria
Polo didattico di:	Verona
Anno accademico	2016-2017
Nome del Corso	Human Physiology
CFU del Corso	9
Equivalenti a ore	72
Coordinatore	Prof. Giuseppe Busetto

PROGRAMMA DIDATTICO

Obiettivi del corso

- 1) Understanding the function organs on the base of the physiology of their cells.
- 2) Understanding how the physiology of different organs integrates into coordinated body functions.
- 3) Physicochemical bases of the physiology of cells, organs, systems and body.
- 4) Most important physiological parameters in health.

Programma in forma sintetica

- 1) Cellular physiology and biophysics.
The internal environment and its homeostasis. The structure of the membrane. Movement of molecules across cell membranes. Resting membrane potential, generator potentials, action potential.
- 2) The muscle.
The skeletal muscle: Structural and molecular basis of contraction; the neuromuscular synapse; excitation-contraction coupling; mechanics of isometric, isotonic, single twitch and tetanic contractions; energy metabolism of skeletal muscle; types of skeletal muscle fibers; motor units; control of muscle tension; effects of training and of muscle disuse.
The smooth muscle: structure and classification; molecular basis of contraction.
- 3) The nervous system.
Functional anatomy of neurons. Excitatory and inhibitory synapses. Spatial and temporal summation of synaptic potentials. Short- and long-term synaptic plasticity. Afferent and efferent systems. Autonomic system.
Sensory systems: types of receptors and their activation: the generator potential; sensory unit; sensory receptive field; types of afferent fibers; sensory information processing; the somatic sensitivity;; pain; taste; olfaction.
Motor systems: spinal reflexes; descending pathways and the control of muscle tone, movements, posture.
- 4) Circulation.
The heart: functional anatomy; origin of heart beat; cardiac actions potentials; ionic bases of rhythmical self-excitation; excitation-contraction coupling; sequence of myocardial excitation; electrocardiogram; mechanical events of cardiac cycle; cardiac output; control of heart rate and stroke volume.
The vascular system: pressure, flow and resistance; arterial blood pressure and flow; arterioles, local control of flow; capillary blood velocity; exchanges of nutrients and metabolic end products; bulk flow across capillaries; determinants of venous pressure.
Regulation of systemic arterial pressure. Hemorrhage. Upright posture. Exercise. Congestive heart failure.
- 5) Respiration.
Exchange of air between atmosphere and alveoli: pressures; phases of alveolar ventilation; lung volumes and capacitances.
Exchange and transport of gases in the body: pressure gradients of oxygen and carbon dioxide within the body; properties and behavior of gases; hemoglobin and the transport of oxygen; transport of carbon dioxide. Control of respiration. Respiration during exercise. Hypoxia.



- 6) The kidney.
Functional anatomy. Glomerular filtration. Tubular reabsorption. Tubular secretion. Clearance. Regulation of water and sodium balance. Regulation of extracellular osmolarity and pH. Control of potassium and calcium. Micturition.
- 7) Nutrition, metabolism endocrinology.
Functional anatomy of gastrointestinal system. Motility and secretion along the gastrointestinal system. Digestion and absorption of food.
Metabolism in basal condition and during exercise. Control of body temperature.
Function of endocrine glands: hypophysis, thyroid, parathyroid glands, adrenal glands, pancreas, gonads.
- 8) The mouth.
Somatosensory perception. Tooth pain. Taste. Chewing. Secretion of saliva. Swallowing.

Programma in forma estesa

- 1) Cellular physiology and biophysics.
The internal environment and its homeostasis. The structure of the membrane. Movement of molecules across cell membranes. Resting membrane potential, generator potentials, action potential.
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The smooth muscle: structure and classification; molecular basis of contraction.
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Sensory systems: types of receptors and their activation: the generator potential; sensory unit; sensory receptive field; types of afferent fibers; sensory information processing; the somatic sensitivity;; pain; taste; olfaction.
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The heart: functional anatomy; origin of heart beat; cardiac actions potentials; ionic bases of rhythmical self-excitation; excitation-contraction coupling; sequence of myocardial excitation; electrocardiogram; mechanical events of cardiac cycle; cardiac output; control of heart rate and stroke volume.
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8) The mouth.

Somatosensory perception. Tooth pain. Taste. Chewing. Secretion of saliva. Swallowing.

Modalità d'esame: oral

Testi consigliati:

- Vander, Fisiologia, Ambrosiana, 2011 (13th english edition, Mc Graw Hill 2014)
- Berne-Levy, Fisiologia, Ambrosiana, sesta edizione, 2010 (6th edition, Elsevier, 2009)
- Guyton e Hall, Fisiologia Medica, Edra, 2012
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Ricevimento studenti: Every day by appointment

Riferimenti del docente: ☎ fax e-mail giuseppe.busetto@univr.it