B1. Medical Physiology

Viliam Donič

Department of human physiology, Faculty of Medicine, Safarik University in Košice.

Co-funded by the Erasmus+ Programme of the European Union

PAVOL JOZEF ŠAFÁRIK UNIVERSITY IN KOŠICE
FACULTY OF MEDICINE

ediTec

Subject:	**Physiology 1**		
Study Programme:	**General Medicine**	Study Period:	3rd semester
Evaluation:	Credit	Subject Type:	Compulsory course
Content:	3h. lectures and 4 h. pract. lessons / week		Total 98 hours

Week	Lectures	Practical Lessons
1.	Introduction to physiology. Homeostasis, the body fluids.	**Seminars:** Subject matter of physiology. Principles of the experimental work – observation, experiment, clinical research. History of physiology. **Practical lessons:** Instructions to the practical lessons. Safety in the laboratory – safety instructions for students. The first aid.
2.	The cell, cell membrane, transport of molecules across cell membranes, membrane potentials. Physiology of blood.	**Seminars:** The basic physiological terms and factors influencing physiological functions. Homeostasis. Body fluids: distribution, composition, measurement. Exchange of substances and transport of molecules across cell membranes, membrane potential and action potential. **Practical lessons:** Manners of blood samples taking. Determination of hematocrit value. Erythrocyte sedimentation rate and factors affecting the sedimentation. Determination of haemoglobin value, types of haemoglobin.
3.	Blood cells I. Blood cells II.	**Seminars:** Blood functions and general blood atributes. Blood plasma and its content Red blood cells. White blood cells. **Practical lessons:** Manners of blood samples taking. Determination of the red blood cell count. Determination of the white blood cell count.

Subject:	**Physiology 1**		
Study Programme:	General Medicine	Study Period:	3rd semester
Evaluation:	Credit	Subject Type:	Compulsory course
Content:	3h. lectures and 4 h. pract. lessons / week		Total 98 hours

4.	Blood groups. Hemostasis and its phases. Physiology of respiratory system. Mechanisms of breathing.	**Seminars:** Platelets – morphology, production, account, function. Blood clotting, haemocoagulation factors. Group antigens, blood transfusion. Physiology of immune system **Practical lessons:** Blood smear, differential leukogram, Hynk's number. Determination of the platelet count.
5.	Pulmonary ventilation, parameters determinating ventilation. Exchange and transport of the respiratory gases.	**Seminars:** Meaning and functions of respiratory system. Functional morphology of respiratory system. Ventilation - mechanisms and determinating parameters. Mechanism of breathing **Practical lessons:** Determination of the blood groups. Determination of the Rh-factor. Blood clotting time. Bleeding time. Determination of the prothrombin time. Red blood cell values.
6.	Hypoxia. Hypoxemia. Control of respiration. 1st midterm test: Physiology of blood	**Seminars:** Gas properties. Respiratory gases exchange in lungs. Transport of the respiratory gases by blood. **Practical lessons:** Hering's model of breathing. Muller's test. Valsalva's maneuver . Spirography – Volutest. Voluntary apnoea.

Subject:	**Physiology 1**		
Study Programme:	General Medicine	Study Period:	3rdsemester
Evaluation:	Credit	Subject Type:	Compulsory course
Content:	3h. lectures and 4 h. pract. lessons / week		Total 98 hours

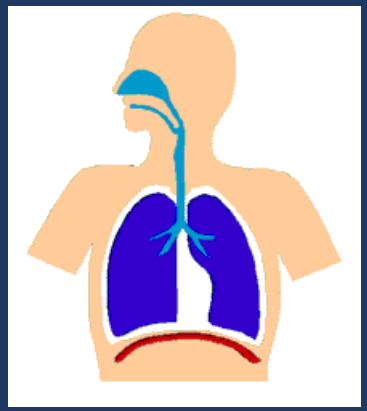
7.	Physiology of the heart, its properties and metabolism of myocardium. Electrophysiology of the heart I.	**Seminars:** Regulation of the respiratory activity (brainstem control of breathing, chemical mechanisms of breathing, reflex reactions, suprapontinne mechanisms). Hypoxia, hyperoxia, hypobaria, hyperbaria. **Practical lessons:** Percussion of the lungs. Auscultation of the lungs. Testing by Eutest. Testing by ventilometer VM1. Computer spirometry.
8.	Electrophysiology of the heart II. The heart cycle. 2nd midterm test: Physiology of the respiratory system	b The basic properties of the myocardium . Excitation and conduction of the heart impulse. Metabolism of the heart. **Practical lessons:** Basics of electrocardiography. Record of ECG.
9.	The heart as a pump – its control mechanism. General haemodynamics.	**Seminars:** The heart contraction. Cardiac cycle. Mechanical and acoustic manifestations of the heart activity, examination methods. **Practical lessons:** Evaluation of ECG.
10.	Peculiarities of the haemodynamics in some organs. Control of the blood volume and blood pressure.	**Seminars:** Control of the heart activity. **Practical lessons:** Percussion of the heart and cardiac auscultation. Phonocardiography. Examination of the arterial pulse.

Subject:	**Physiology 1**		
Study Programme:	General Medicine	Study Period:	3rd semester
Evaluation:	Credit	Subject Type:	Compulsory course
Content:	3h. lectures and 4 h. pract. lessons / week		Total 98 hours

11.	Renal physiology. Control mechanisms of homeostatic kidney function I.	**Seminars:** Haemodynamics in the high-pressure system. Haemodynamics in venous and capillary network. Control of the blood volume. Peculiarities the lymphatic system. **Practical lessons:** Measurements of the blood pressure, control mechanisms of blood pressure, Film: Korotkoff sounds. Computer model of the blood pressure.
12.	Control mechanisms of the homeostatic kidney function II. The functions of the gastrointestinal system I.	**Seminars:** Renal physiology. **Practical lessons:** Autonomic reflexes acting on the heart. Model of the blood vessel elasticity. Resistance of blood capillaries
13.	The functions of the gastrointestinal system II. The functions of the gastrointestinal system III. 3rd midterm test: Physiology of the cardiovascular system	**Seminars:** Physiology of the digestion and absorbtion I. **Practical lessons:** Urine examination - density, pH, proteins, glucose. Urine examination - ketone bodies, bile stains, blood, pus. Examination of the native urine sediment.
14.	Control of digestion and absorbtion. Thermoregulation.	**Seminars:** Physiology of the digestion and absorbtion II. Function of the liver **Practical lessons:** Evaluation of the practical lessons. Credits.

Respiratory Physiology

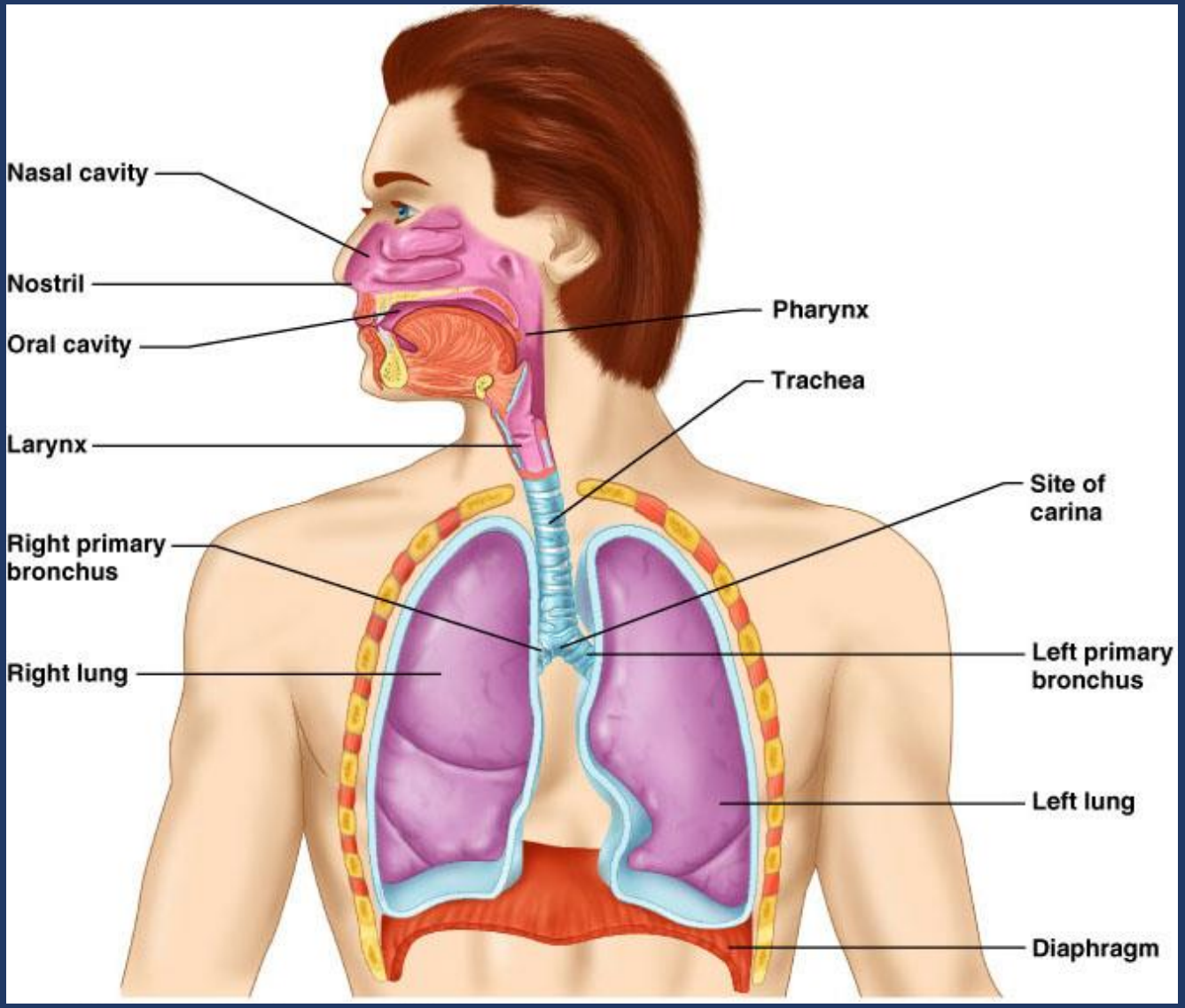
Ventilation



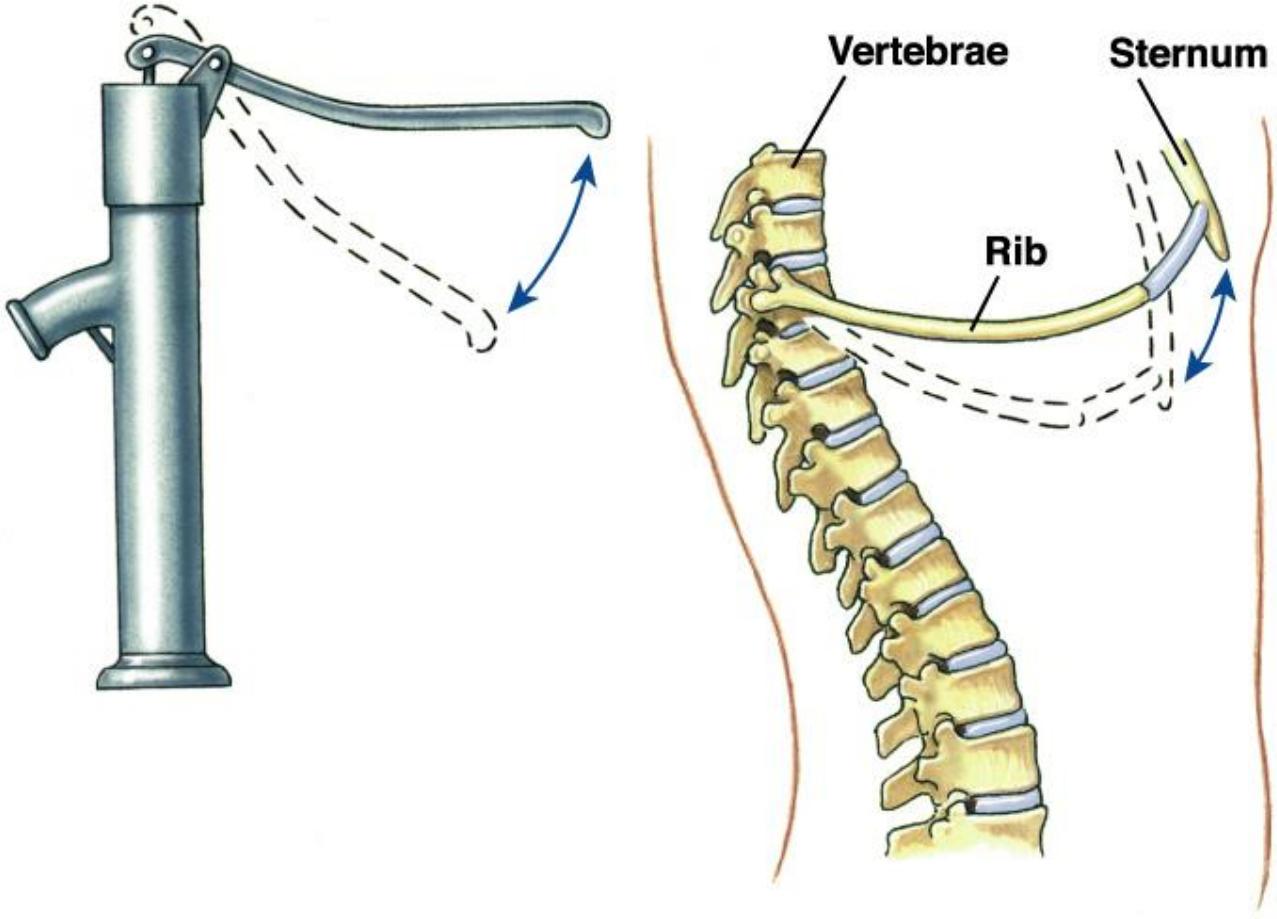
Prof. MUDr. Viliam DONIČ, CSc

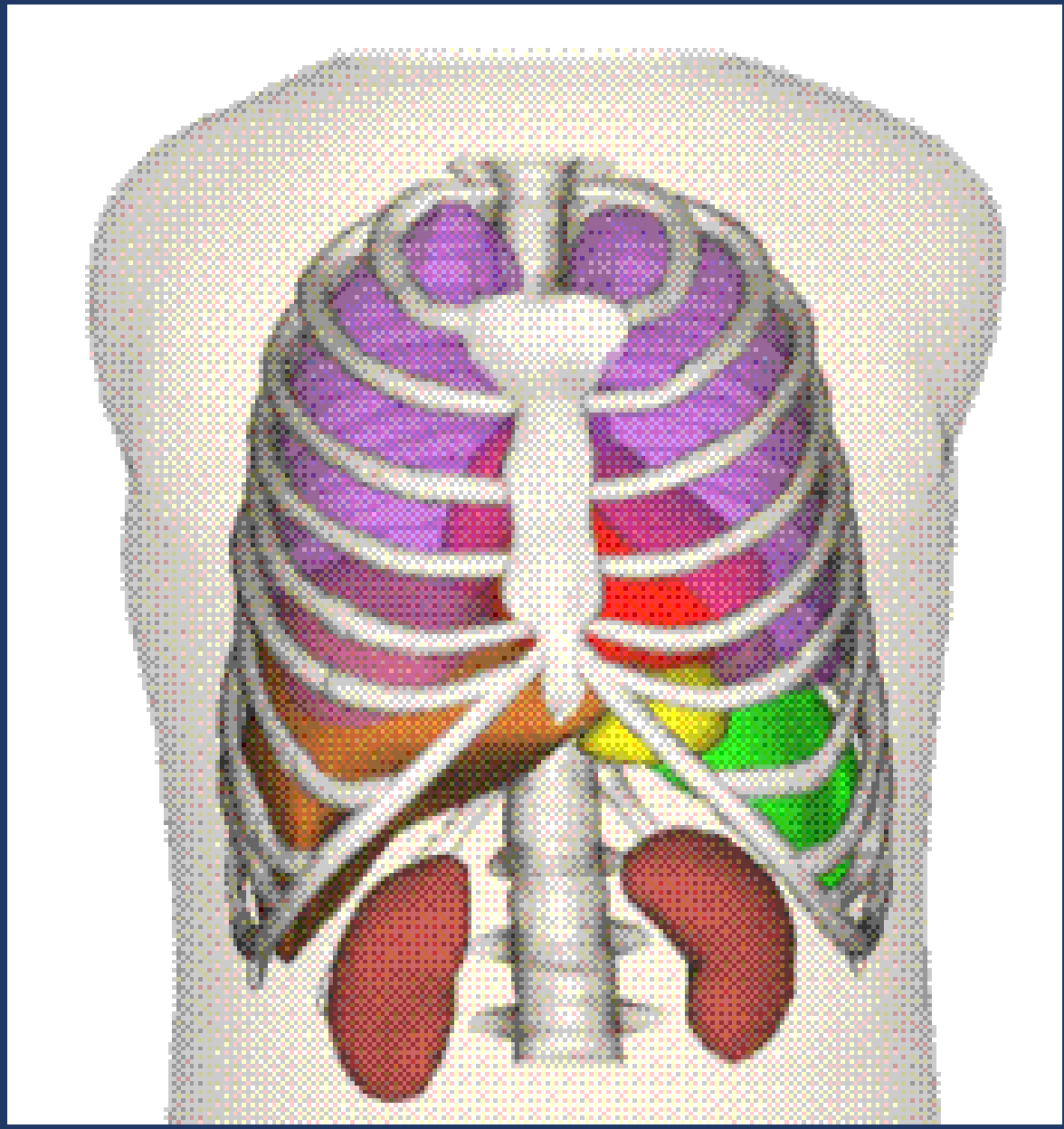
Department of Physiology, LF UPJS

Respiratory System

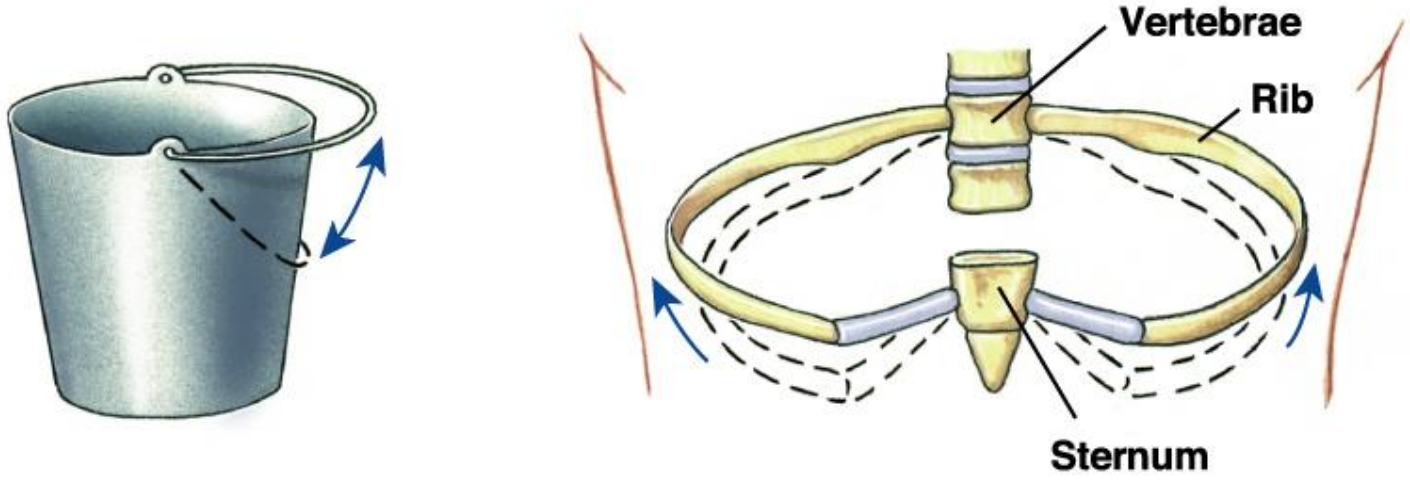


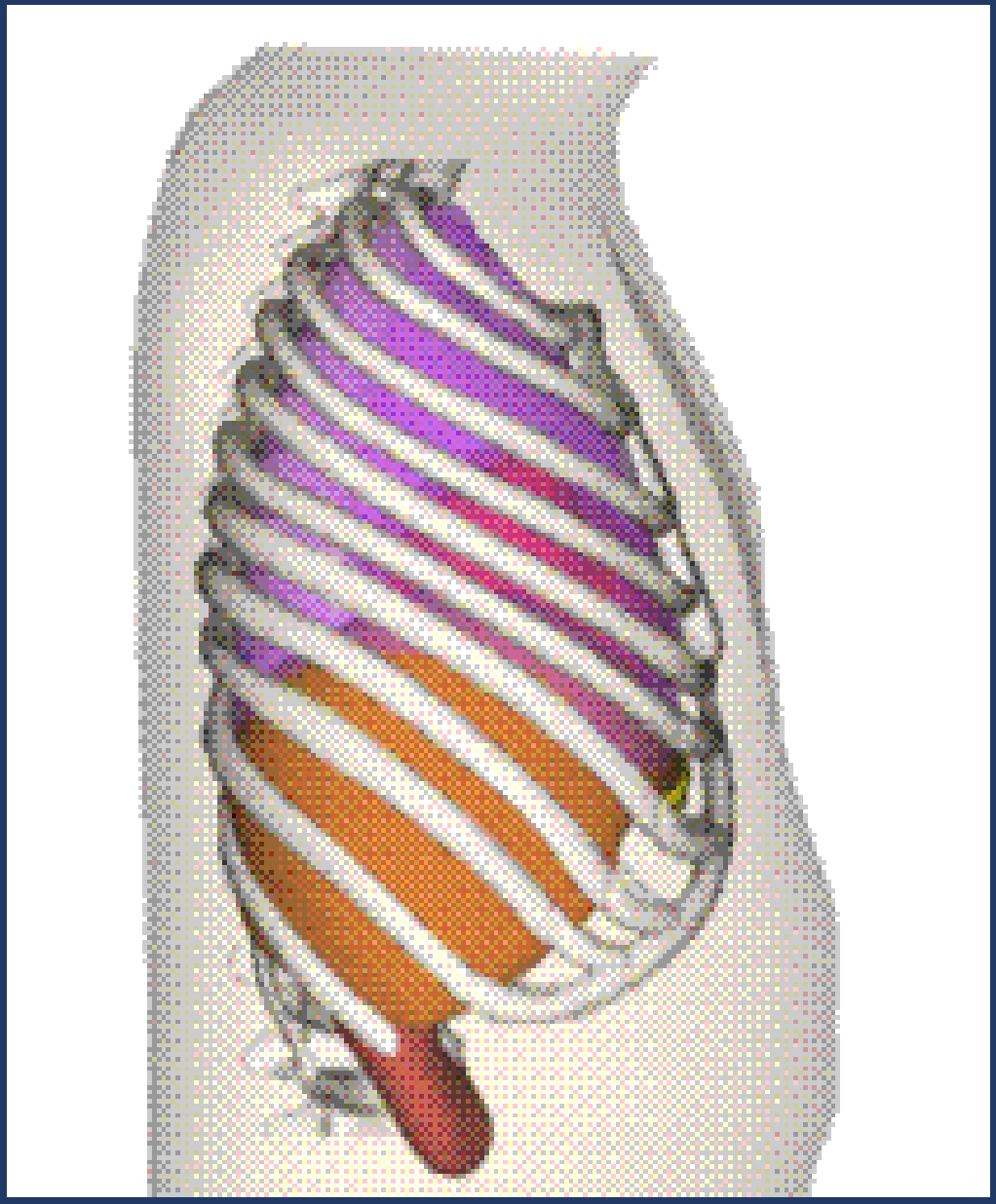
"Pump handle" motion increases anterior-posterior dimension of rib cage



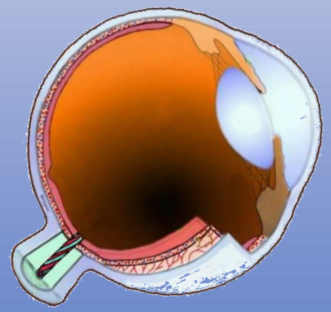


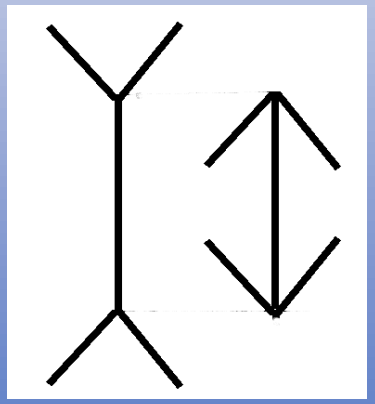
"Bucket handle" motion increases lateral dimension of rib cage





Vision

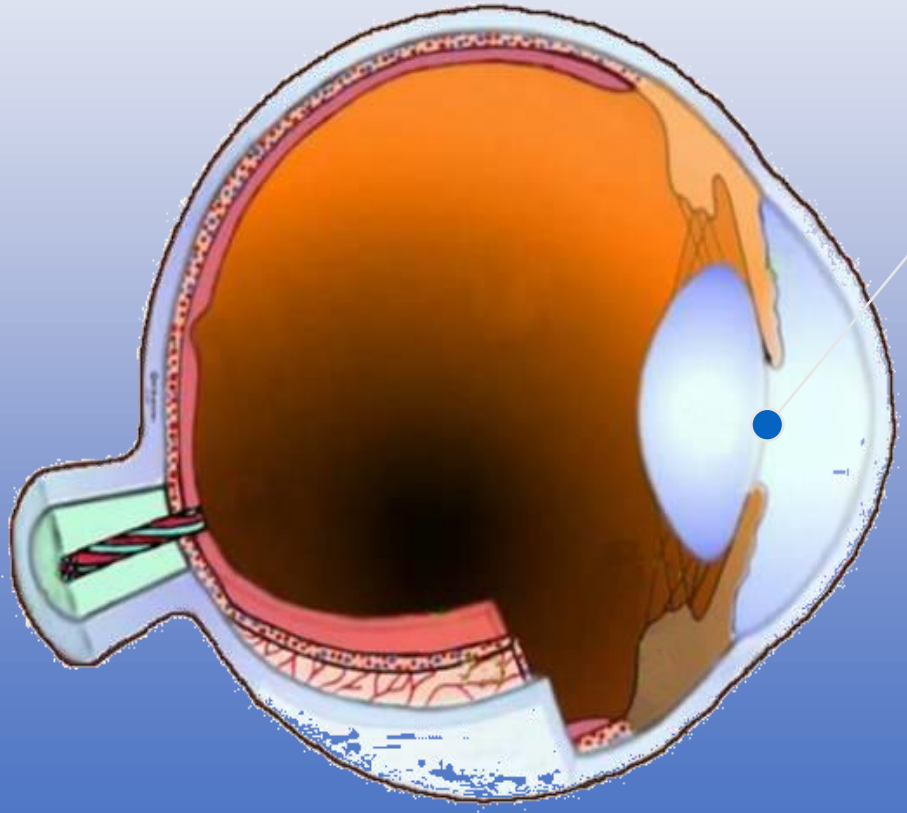




Department of human physiology

prof. MUDr. Viliam DONIČ, CSc.

Priemer zrenice je regulovaný autonómnym nervovým systémom.



Pupilla (*zrenica*)

- otvor obkrúžený dúhovkou
- regulácia množstva svetla dopadajúceho na sietnicu (úmerné 2.mocnine priemeru 1,5 mm až 8 mm), teda množstvo svetla sa môže zmeniť cca 30x
- hĺbka ostrosti významne závisí od priemeru pupily

7 hearts

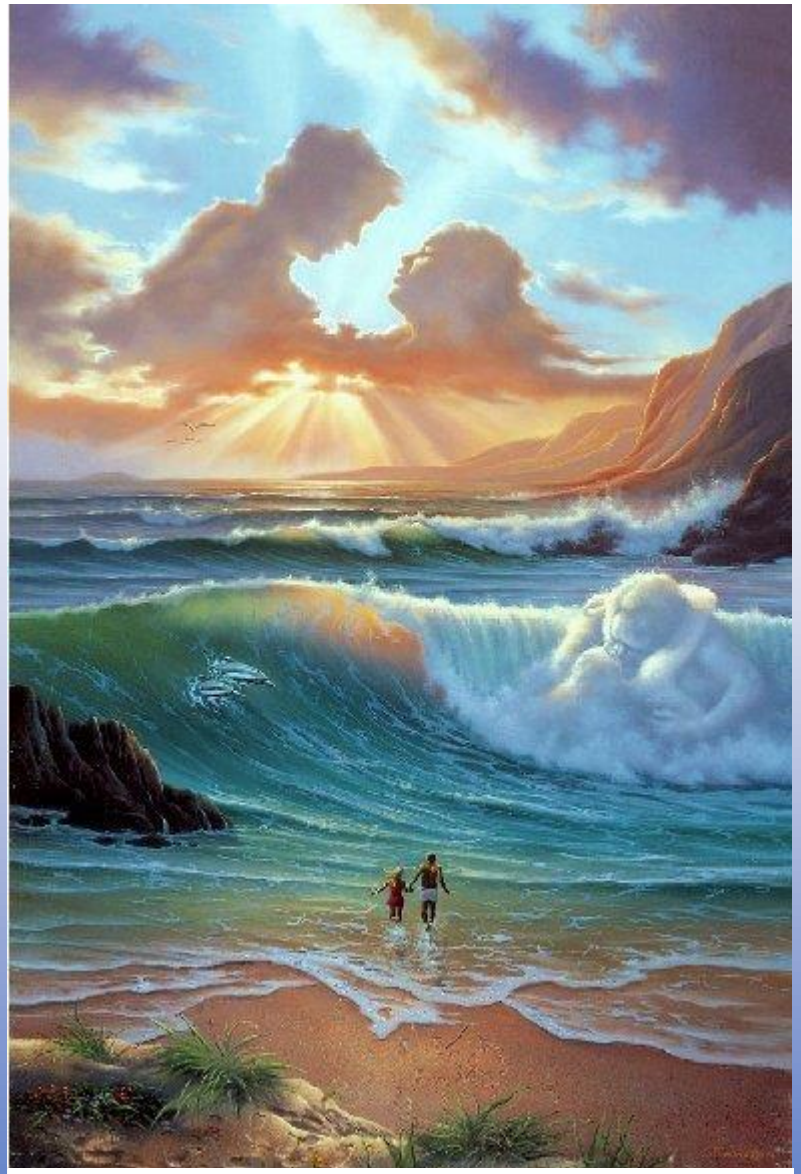
7 horses

The birds spell the word LOVE

house in the waterfall.

Except for Queen Elisabeth II, there is something more on this (real !) banknote. Hint : it's a word, and it's pretty large. It's hidden but pretty obious once you know it.

Turn your head to the right, you can read the word SEX in the palm trees.



You can discover a few couples kissing in the air and in the sea.

Look closely to the center of the rose and you will see a couple kissing. Also pay attention to the wooden frame around the picture. It's impossible to construct !

BEFORE 6 BEERS

AFTER 6 BEERS

What is hidden in this picture ?

The rocks look like a naked woman.

Subject:	**Sleep Medicine**		
Study Programme:	**General Medicine**	Study Period:	10th semester
Evaluation:	Exam	Subject Type:	Compulsory Elec.
Content:	1 hour pract.lessons / week		Total 14 hours

Week	**Practical Lessons**
1.	Sleep and wakefulness, stages of sleep, EEG findings, neurological disorders of sleep: insomnia, hypersomnia, narcolepsy, parasomnia, restless leg syndrome etc.
3.	Control of breathing (neural, chemical), recording of different parameters, EEG, EMG, VT, ECG, BMI, BP, acoustic signal, body position etc. Various types of SDB. Demonstration of evaluation of polysomnographic records.
5.	Epidemiology, pathogenesis of sleep disordered breathing (SDB), predisposition factors, metabolic complications, diabetes 1,2 type. Their diagnostic and therapy.
7.	Cardiovascular and other complications of untreated SPDs. Their diagnostic, prevention and therapy.

Subject:	Sleep Medicine		
Study Programme:	General Medicine	Study Period:	10th semester
Evaluation:	Exam	Subject Type:	Compulsory Elec.
Content:	1 hour pract.lessons / week		Total 14 hours

9.	Various methods of therapy of SDB (CPAP, medicaments, UPPP etc.). Methods of prophylaxis.
11.	Visit to sleep laboratory during whole-night, polysomnographic recording in patients (control and therapeutic nights).
13.	Problematic topics and questions from sleep medicine.Written test on Sleep medicine – signing of credits.

SLEEP LABORATORY

UPJŠ LF, KOŠICE

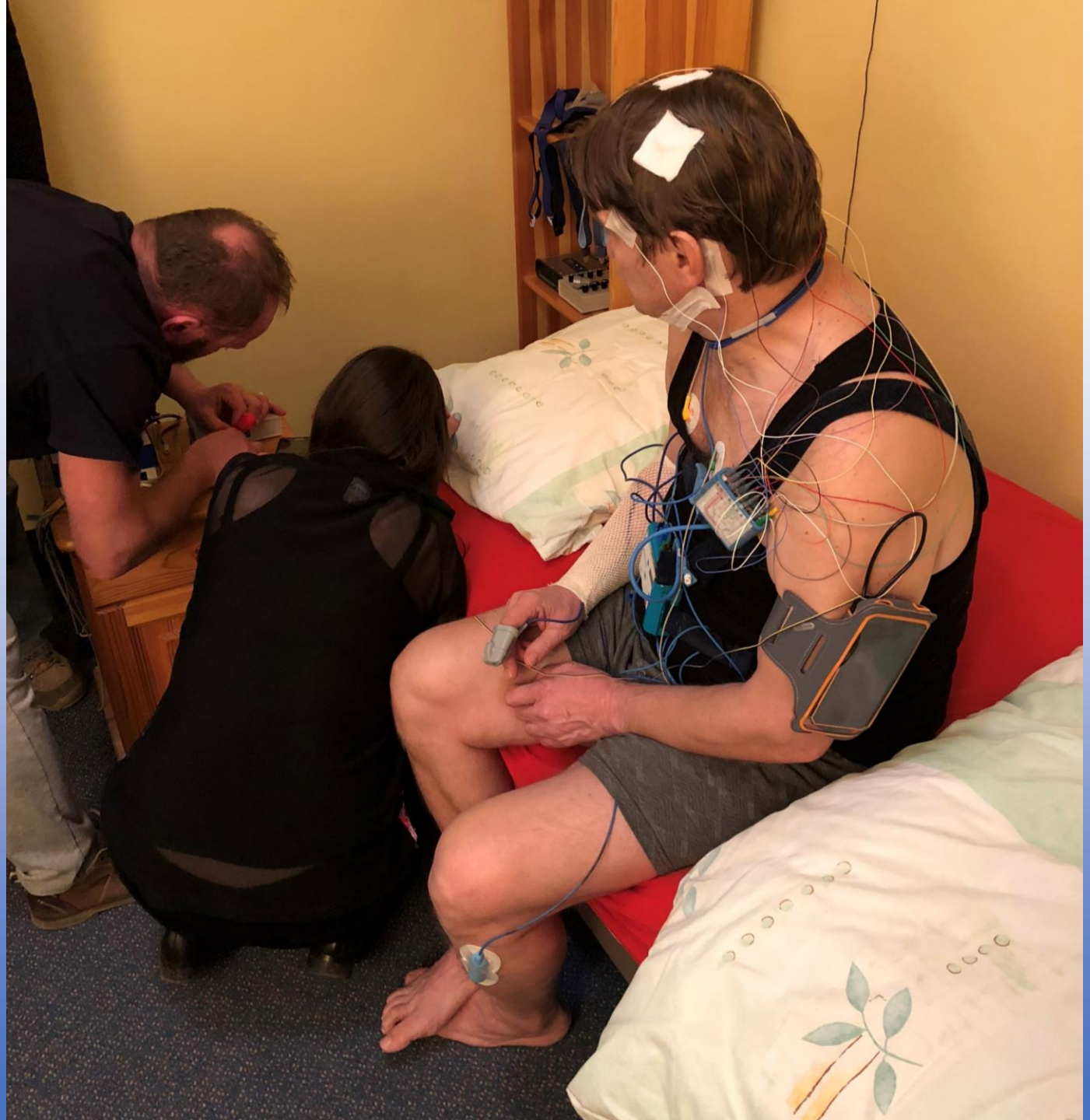

2010/05/13

Polysomnography with CPAP

-simultaneous recording
-more physiological
-parameters during sleep

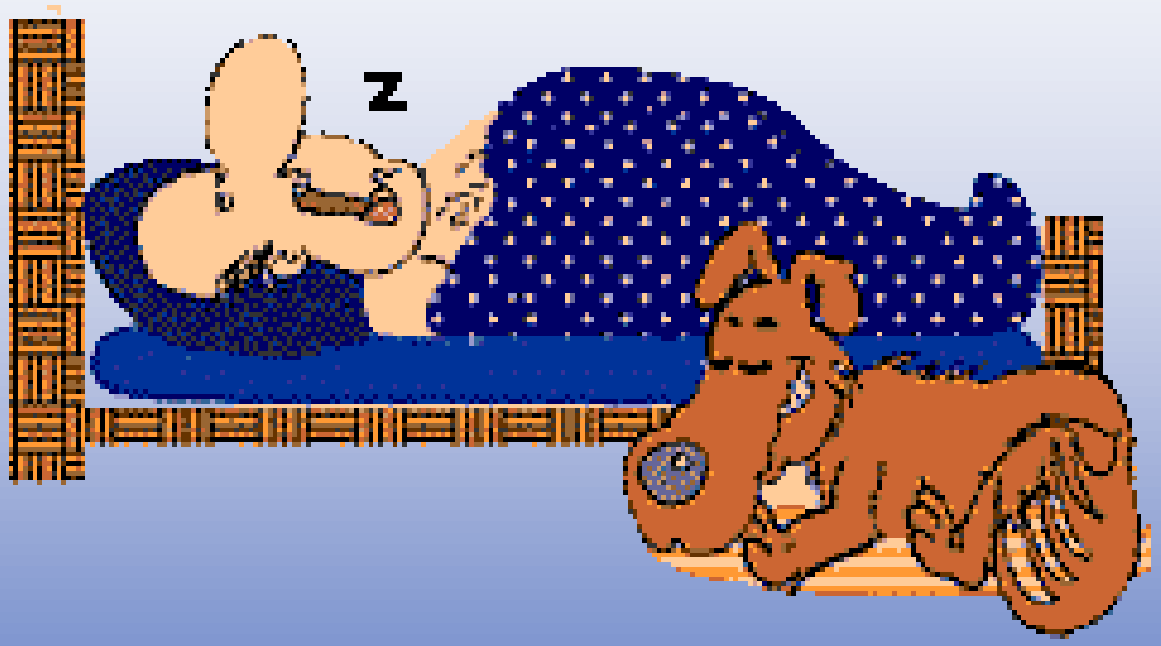
+CGMS sensor

Sleep laboratory Medical Faculty UPJŠ, KOŠICE



Laboratórny systém EAS prvej generácie

Diagnostic methods




Rogō
Systém elektronického testovania
Vitajte v systéme elektronického testovania
V prípade záujmu o vytvorenie účtu kontaktujte správcu.
Stránka, na ktorú sa pokúšate vstúpiť, vyžaduje overenie. Prihláste sa, prosím, pomocou svojho používateľského mena a hesla:
Používateľské meno
Heslo
Slovenčina
Prihlásiť
Rogō 6.5.5

Testing by ROGO

Breathing TEST - 8.11.2018

Logo

1. Acclimatization to low pO_2:

   - ○ angiogenesis is more inhibited in the tissues
   - ○ hematocrit rises
   - ○ blood volume remains stable
   - ◉ kidneys compensate respiratory acidosis

   (1 Hodnotenie)

2. The total surface of the rerspiratory membrane:

   - ○ is about 70 square meters in healthy adult subjects
   - ○ is about 5 square meters in healthy adult subjects
   - ○ s about 35 square meters in healthy adult subjects
   - ○ is about 1 square meter in healthy adult subjects

   (1 Hodnotenie)

3. Alveolar (intrapulmonary) pressure:

   - ○ it is negative during expirium
   - ○ it is the pressure in trachea and large bronchi
   - ○ during expiration it rises to about 1 centimeter of water
   - ○ it is measured directly

   (1 Hodnotenie)

4. Alveolar radius, pressure in alveolus, surfacetension (La Placelaw):

   - ○ the bigger the alveolus, the greater the alveolar pressure caused by the surface tension
   - ○ the pressure decrease in alveolus, double its surface tension
   - ○ the smaller the alveolus, the greater the alveolar pressure caused by the surface tensio
   - ○ surface tension in the alveolus is directly proportional to the radius of the alveolus