MUNI
PHARM

ORGANIZATION OF LESSONS
WORK SAFETY
ETHICAL ASPECTS OF WORK WITH LABORATORY ANIMALS
EXPERIMENTAL PROJECT APPROVAL PROCESS
PATHOPHYSIOLOGY TERMS

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New Drug Development

- modification of already used structures
- searching for the new effects of already used drugs
- searching for the new substances with biological activity

Preclinical Testing of Drugs

- toxicological screening — RISK
- pharmacodynamic screening — EFFECTIVITY
- pharmacokinetic screening — DESTINY IN THE ORGANISM

- CLINICAL EVALUATION (after the administration to human)
  - *in silico* – modeling by PC programs
  - *in vitro* – testing of tissue/cell cultures
  - *in vivo* – testing on a living organism

Preclinical Testing on Animals

TOXICOLOGICAL SCREENING

- acute toxicity (LD_{50})
- chronic toxicity (several months)
- reproductive toxicity (teratogenicity, fetotoxicity)
- mutagenicity, carcinogenicity
- immunotoxicity
- local irritant effects on skin

Preclinical Testing on Animals

PHARMACODYNAMIC SCREENING

- using the pathological models (models of the disease)
- relation between dose and its effect or dose and its toxicity
- biochemical parameters
- necroptic examination
- histopathological examination

Preclinical Testing on Animals

PHARMACOKINETIC STUDIES

- absorption
  - the process of a substance entering the blood circulation
- distribution
  - the dispersion of substances throughout the fluids and tissues
- biotransformation (metabolism)
  - transformation of parent compounds into daughter metabolites (active or inactive ones)
- elimination
  - the removal of the substances from the body

Animal Experiments

- first mentions in Corpus Hippocraticum (400 B.C.)
- Claudius Galenus – experiments on pigs and primates (2. cent. A.D.)
- renaissance – A. Vesalius, W. Harvey, M. Malphigi (16., 17. cent.)
- J. Bentham – first movement against animal experiments (1789)
- C. Bernard – introduction into the experimental medicine (19. cent.)
- at the beginning of 20. cent. established first breeding stations (rat, mouse, guinea-pig, rabbit)
- after the WWII manipulations with pathogens (SPF) and genes of the experimental animals

Animal Experiments

- an irreplaceable part of biomedical studies
- necessary to preserve the legal standards and rules

3 „R“ Conception

- REPLACEMENT
  - replacement of experimental animals, if it is possible regarding the results of the experiment
- REDUCTION
  - reduction of a number of animals by means of the appropriate experimental scheme
- REFINEMENT
  - decrease or even exclusion of painful and stressful procedures during the experiment

Legal Standards

§ 17 of the law No. 276/1992

- doctors, veterinary doctors and other persons with academic biological education are entitled to manage and control the animal experimental studies, if they have become acquainted with the methods of breeding of experimental animals and standards for the working with them and have been awarded the certificate by the appropriate organisaton for animal welfare

Expert committee for animal protection and welfare

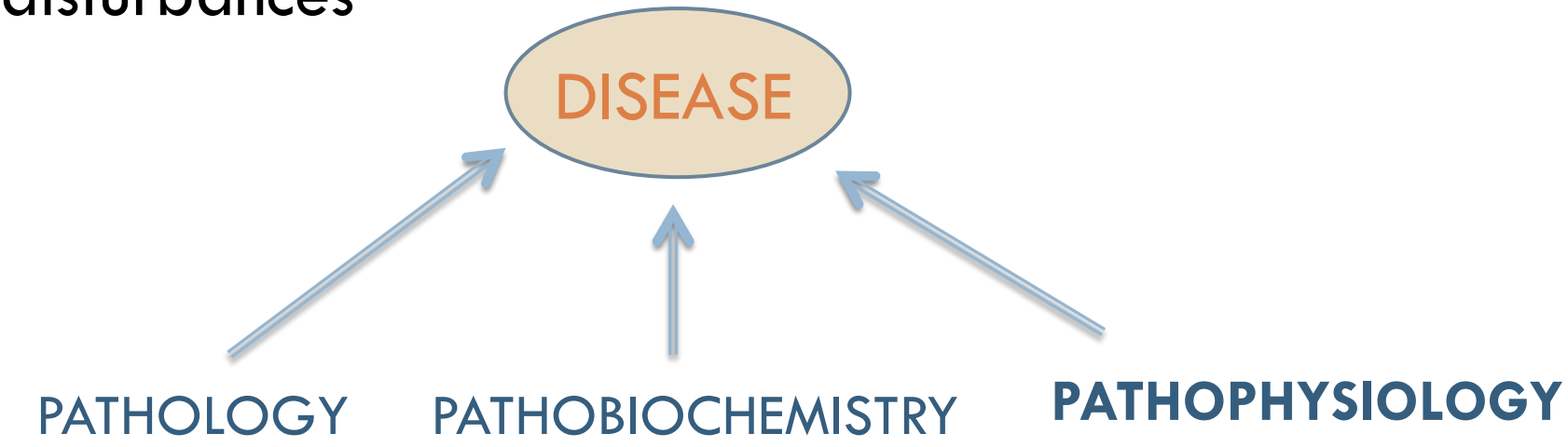
- experimental studies approval, keeping records about activities

Laboratory Animals

- laboratory mouse
- laboratory rat
- guinea pig
- hamster
- rabbit
- pig
- fish
- amphibians
- reptiles
- primates

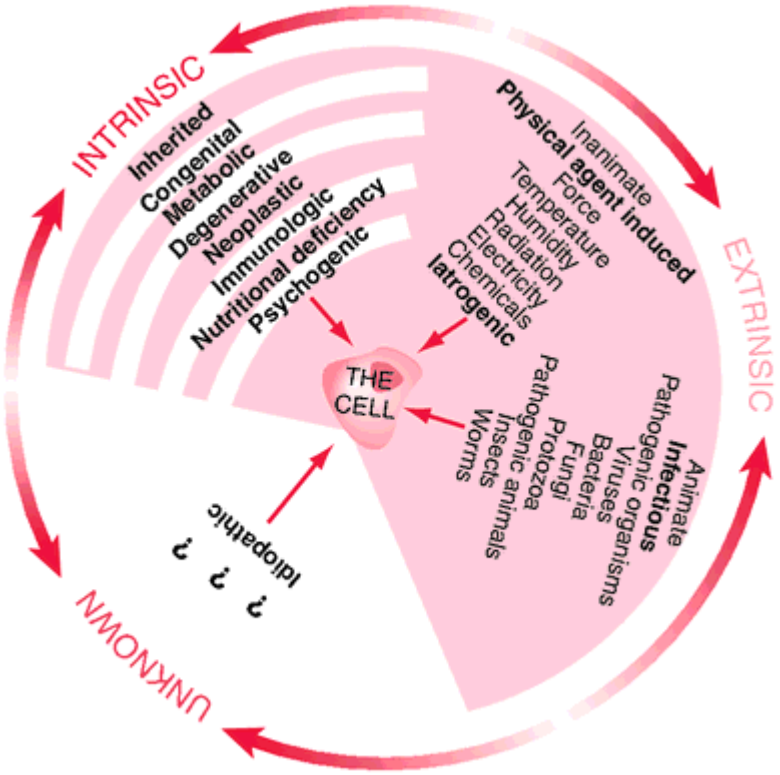
Pathophysiology

- the study of the biological and physical manifestations of disease as they correlate with the underlying abnormalities and physiologic disturbances



Etiology

- the study of all factors that may be involved in the development of a disease, including the susceptibility of the patient, the nature of the disease agent, and the way in which the patient's body is invaded by the agent



Pathogenesis

- the source or cause of the disease or morbid condition
- the course of an illness from its initial manifestation through its critical development

- infection
- inflammation
- malignancy

General Pathophysiology

HEALTH AND DISEASE

- definition of health and disease
- pathogenic factors (physical, chemical and biological) and response of organism (adaptation, dysadaptation)
- types and degrees of disease
- death (clinical, cerebral)

General Pathophysiology

REACTION ON DAMAGE OF TISSUE INTEGRITY AND INFECTION

- non-specific (innate) immunity
- specific (acquired) immunity

GROWTH AND PROLIFERATION

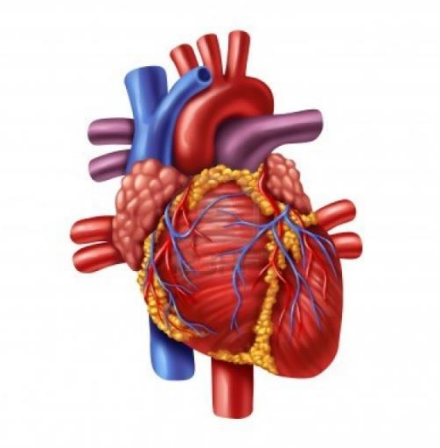
- wound healing
- malignant proliferation (tumour growth)

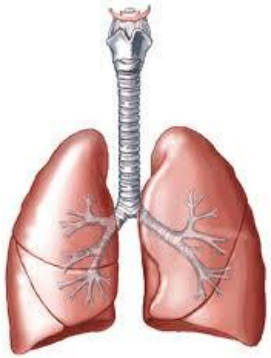
GENETIC FACTORS

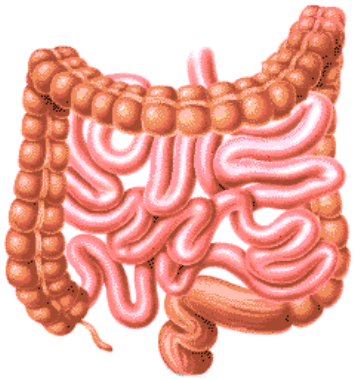
- monogenic diseases
- polygenic diseases

Special Pathophysiology

- pathophysiology of special organs and organ systems







Disease

- contradiction to health

- feeling of bad health as a result of subjective and/or objective somato-psychical derangement, as a result of disturbances in harmonic cooperation of individual functional parts and subsystems of an organism

Stages of Disease Development

- acute
  - develops quickly/lasts a short time
- subacute
  - in between acute and chronic
- chronic
  - develops slowly/lasts a long time
- latent
  - the causative agent remains inactive for a period of time and then becomes active

Stages of Disease Development

- incubation period
- prodromal period
- illness
- period of decline
- period of convalescence