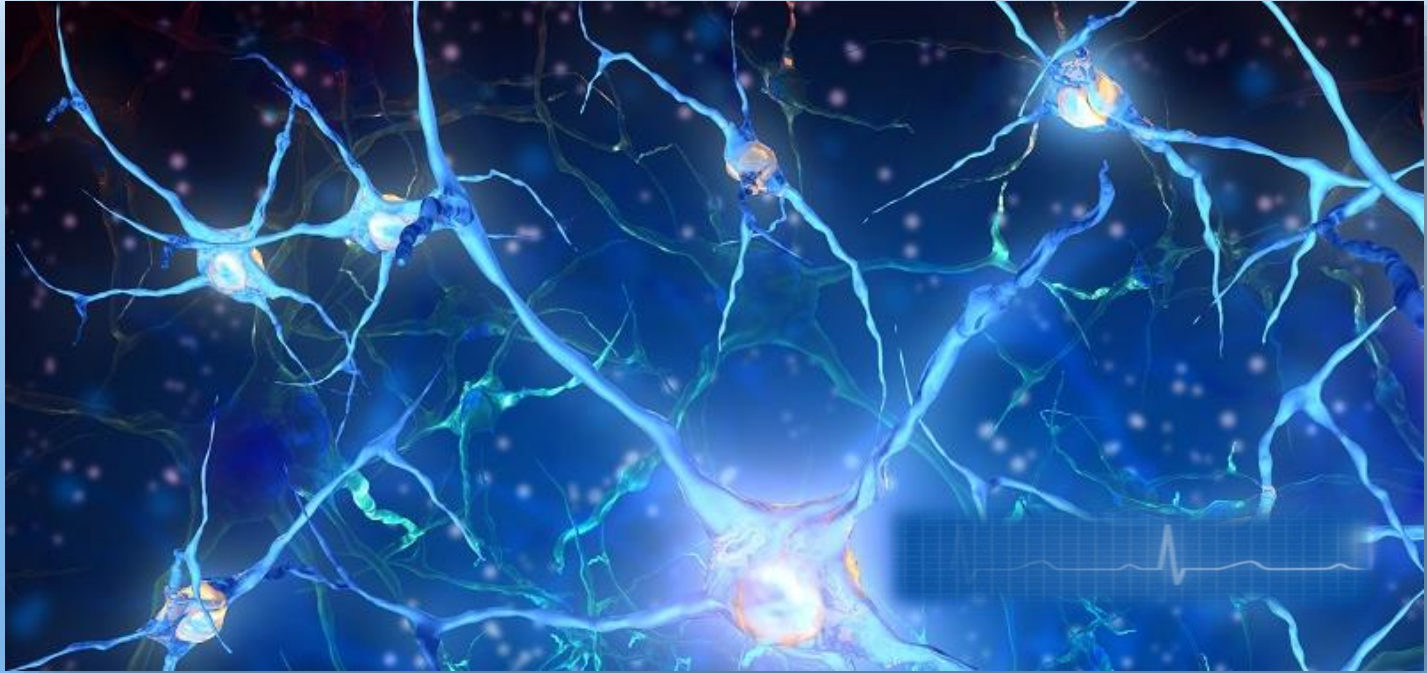# Biophysics in Medicine
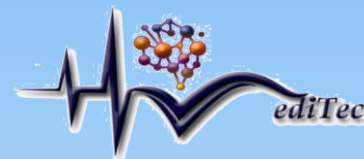


Imrich Géci

Department of Medical and Clinical Biophysics - DMCB
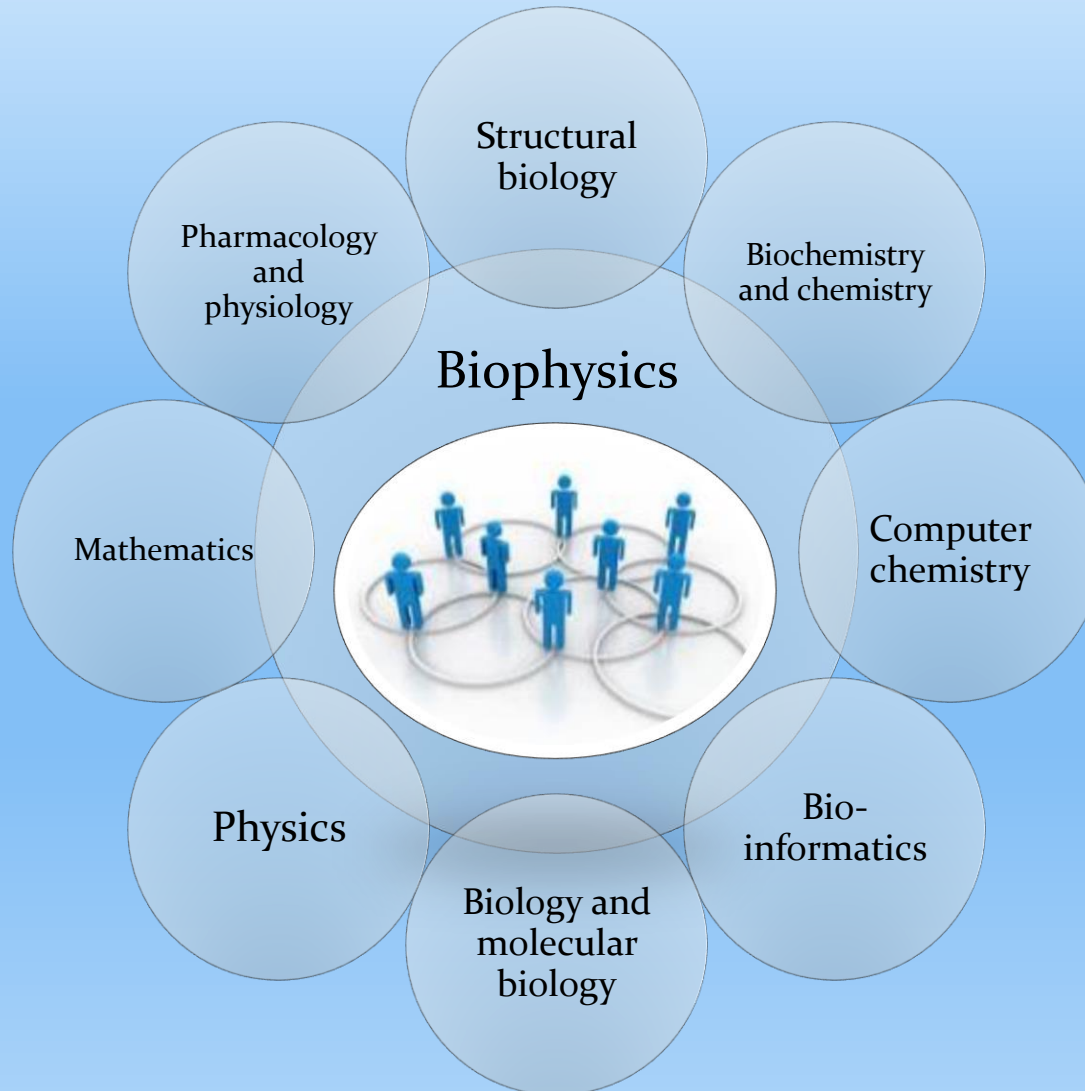Faculty of Medicine, **Pavol Jozef Šafárik University in Košice**

# **Medical Biophysics**

- Principles and laws of the physics to study biological processes for the purpose of medical application

# Medical Biophysics



Biophysics

- Structural biology
- Pharmacology and physiology
- Biochemistry and chemistry
- Mathematics
- Computer chemistry
- Physics
- Bio-informatics
- Biology and molecular biology

# Historical Timeline of DMCB

DEPARTMENT
OF MEDICAL
PHYSICS
(1949)

DEPARTMENT OF
MEDICAL PHYSICS,
RADIOLOGY AND
NUCLEAR MEDICINE
(1971)

DEPARTMENT OF
PHYSIOLOGY AND
MEDICAL PHYSICS
(1975)

DEPARTMENT OF
MEDICAL BIOPHYSICS
(1991)

1949     1973     1986     2012

DEPARTMENT OF SKIN AND
VENEREAL DISEASE, RADIOLOGY
AND NUCLEAR MEDICINE AND
MEDICAL PHYSICS

DEPARTMENT OF
MEDICAL BIOLOGY
AND BIOPHYSICS

(2012)
DEPARTMENT
OF MEDICAL
AND CLINICAL
BIOPHYSICS

# Department of Medical and Clinical Biophysics

- Teaching gradually transformed in its development with main focus on medical instrumentation
- Innovative medical technology
- Exact approach to the knowledge of Biosystems
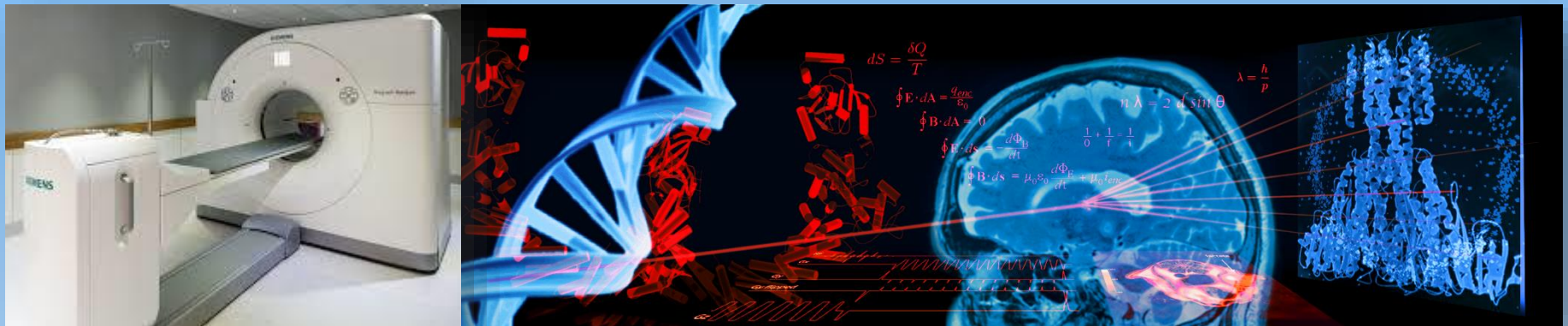
# Teaching at DMCB - Objectives

- Access

  basic physics of processes in human body on molecular, atomic and subatomic level

  physical principles of diagnostic and therapeutic devices and their effect in human body

  theoretical and practical knowledge to understand pathological phenomena in the human body after the interaction with different kinds of radiation

# Teaching at DMCB

- Doctor study

**General Medicine**

**Medical Biophysics**

Teaching: 4/3, ECTS points: 7

**Clinical Biophysics**

Teaching: 0/1, ECTS points: 2
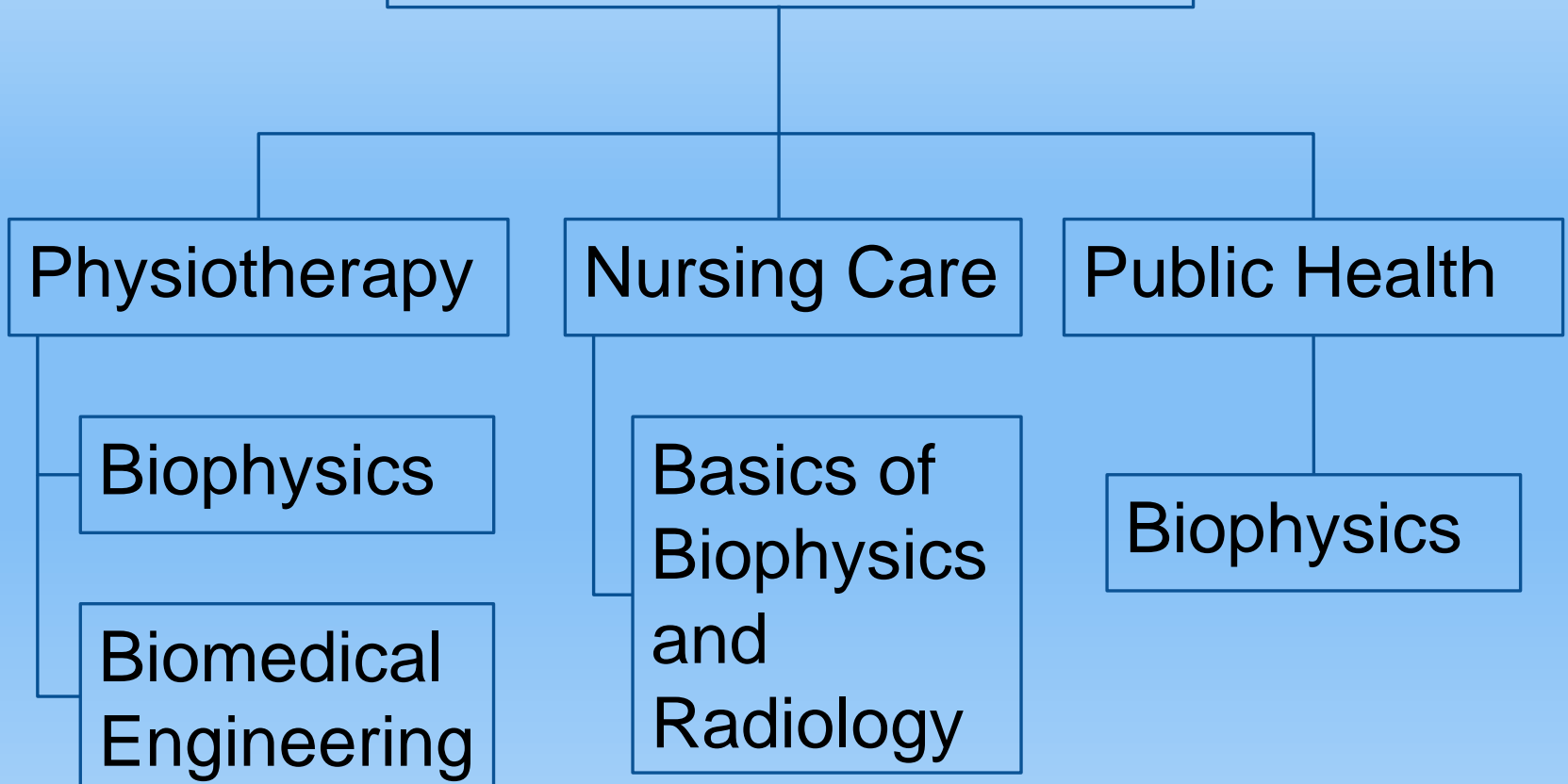
**Dental Medicine**

**Medical Biophysics for Dental Medicine**

Teaching: 2/2, ECTS points: 3

# Teaching at DMCB

- Bachelor study (slovak)

Physiotherapy

Nursing Care

Public Health

Biophysics

Biomedical Engineering
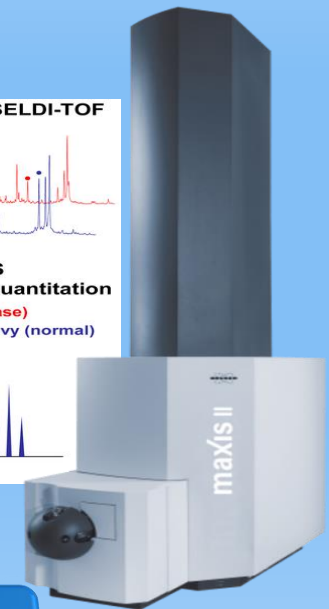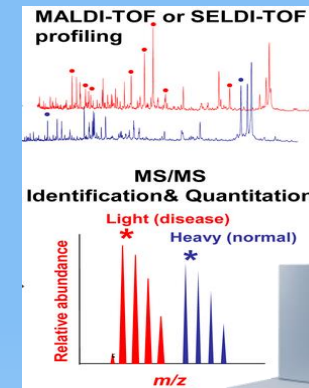
Basics of Biophysics and Radiology

Biophysics

# Practical exercises on Medical Biophysics

# **Research at DMCB**

- Leading edge research in clinical proteomics – study on protein structure for early disease detection

- Bioinformatics – data analysis
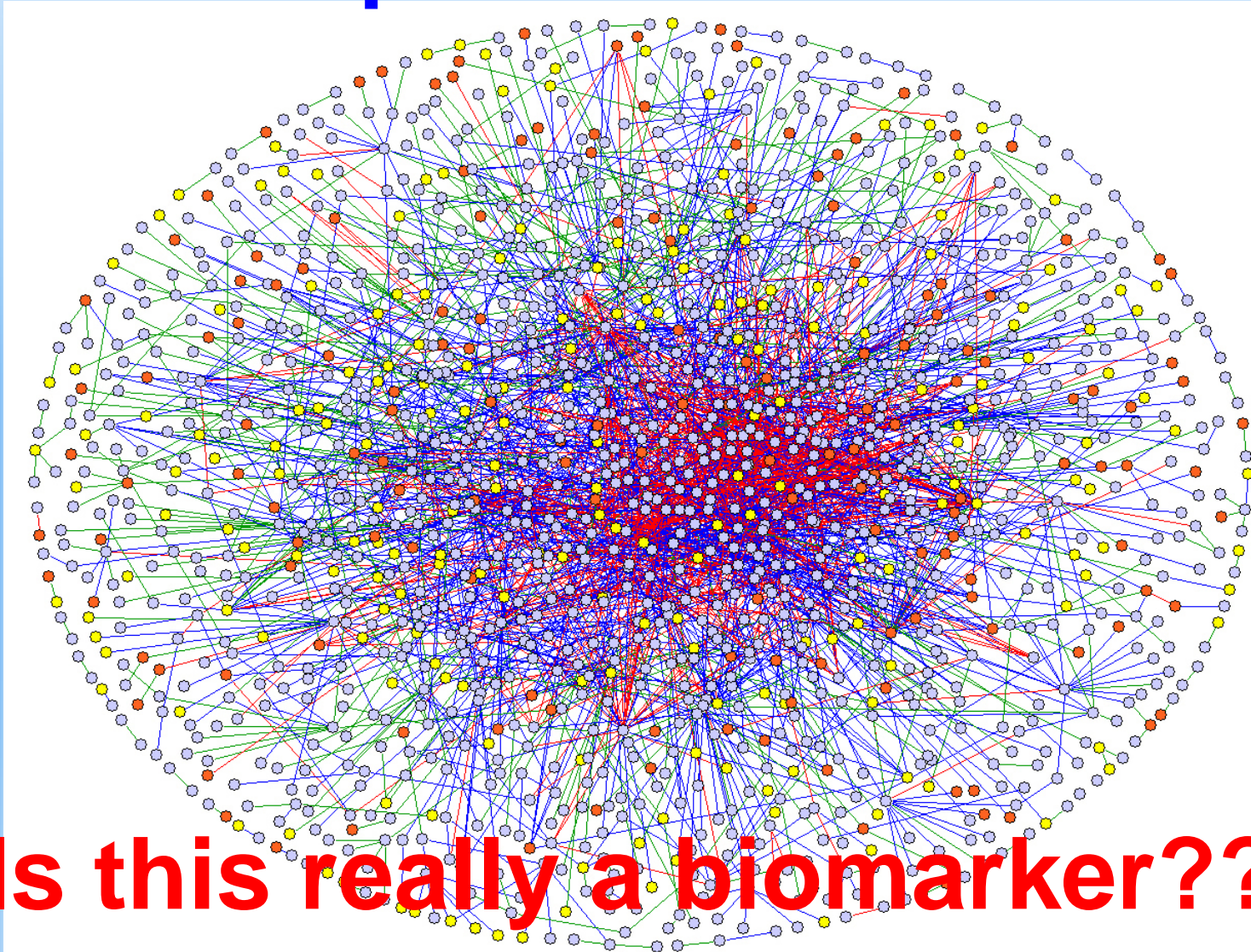
- Protein-protein interactions

# Proteine-proteine Interactions



## Is this really a biomarker??

# Instrumentation at DMCB

# **Research grants at DMCB**

- Research Centre for innovative therapeutic approaches in Molecular Medicine, ITMS 26220220163

- Research Center for Applied Biomedical Diagnostics, ITMS 26220220143

- Centre of Excellence for Research on determinants of health, with a focus on group of marginalized and immunocompromised people (CEMIO), ITMS 26220120058

- Centre of Excellence for electromagnetic fields in medicine (CEEPM), ITMS 26220120067

- Probiotic microorganisms and bioactive substances of natural origin for a healthier population in Slovakia, ITMS 2620220220104



Európska únia
Európsky fond regionálneho rozvoja

Operačný program
VÝSKUM a VÝVOJ

Agentúra
Ministerstva školstva, vedy, výskumu a športu SR
pre štrukturálne fondy EÚ

Podporujeme výskumné aktivity na Slovensku/
Projekt je spolufinancovaný zo zdrojov EÚ.

MINISTRY
OF EDUCATION, SCIENCE,
RESEARCH AND SPORT
OF THE SLOVAK REPUBLIC