



EVROPSKÁ UNIE
Evropské strukturální a investiční fondy
Operační program Výzkum, vývoj a vzdělávání



Simulation of the ECG

Název studijního předmětu	Biophysical modeling in cardiology
Vedoucí cvičení/experimentu	<i>Ksenia Sedova</i>

Anotace cvičení/experimentu:

The expression of the electric activity of the heart in the ECG waveforms is complex. The understanding of this relation can be facilitated by using an interactive tool that enables the students to introduce changes in the electrical activity of the heart and to observe the effect on the ECG.

In first part of the exercise students will go through the basic functionality of the system and try to:

- Adjust initial display and configuration settings
- View heart potentials
- View activation time map
- View transmembrane potentials
- View dipole vector loops
- View Frank ECG
- Observe body surface potentials

In the second part of the exercise the students will receive practical task focused on utilization of the functionality of ECGSIM, e.g.

- Analysis of activation and repolarization maps
- Description and interpretation of AP duration and activation recovery interval
- Altering tissue characteristics

Writing a lab report is an essential part of completing the laboratory exercise.

Cíle cvičení/experimentu:

The purpose of the exercise is to understand relationships between characteristics of the heart tissue and the resulting measurable features of the electrograms and electrocardiograms.

Popis použitých zařízení/přístrojů:

1. Powerful workstations
2. ECGSIM - interactive simulation tool. ECGSIM allows students to see the electrical activation of the heart in a number of different forms, as a sequence of color maps of membrane potential, heart potential, and body surface potential and then summarized as a map of activation time or repolarization time. It also allows to see the dipole vector as a function of time. The program allows the user to adjust features such as cell resting potential or action potential duration and amplitude from a selected region on the inner or outer surfaces of the heart.