**3rd semester projects medis/medicin (10 ECTS)**

The project is for module 3.4a) Muscle function or 3.4b) nerve function:

Project title: Nerve excitability testing protocol to identify neural bursting activity

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Background: Oxaliplatin is a chemotherapy treatment of cancer. One of the side effects of the therapy is peripheral neuropathy. All patients develop a transient state of neuropathy, but for some patients the neuropathy becomes chronic. The probability of developing chronic neuropathy is increasing with higher dosages of Oxaliplatin, reducing the success rate of the treatment. In our collaboration with Aarhus University, we had the opportunity to analyze the excitability data of nerves from patients treated with Oxaliplatin. In that project, we focused on the excitability of large non-pain fibers, and the results indicated that the fibers became excited multiple times when they were activated only once. This behavior is called bursting, and we would like to investigate whether this also occurs in pain fibers. It is challenging to study the excitability in pain fibers in isolation through electrical stimulation, because the large non-pain fibers have a lower activation threshold with conventional electrodes. Our research group has developed the perception threshold tracking technique (PTT) to indirectly measure the excitability of pain fibers. A pin electrode is placed on the skin surface of the subjects to activate the pain fibers preferentially. When a small current is applied through the electrode, a high electrical density is generated in the superficial layers of the skin where the pain fibers terminate. The electrode will therefore preferentially activate pain fibers as opposed to non-pain fibers, which terminate in deeper skin layers.

It is however difficult to study bursting with the PTT technique, since it can only detect the perception threshold and it is challenging for the subject to perceive whether the fibers are excited multiple times. By computational modeling, a novel electrical stimulation protocol has been derived from targeting the underlying mechanisms which generate the bursting activity.

Aim of Project: The aim is to evaluate a new protocol to study neural burst by electrical stimulation.

Applied methods: Cutaneous electrical stimulation, which means that a small electrical current will be applied on the skin to activate nerve fibers.

Number of groups that can be assigned to this project: 1