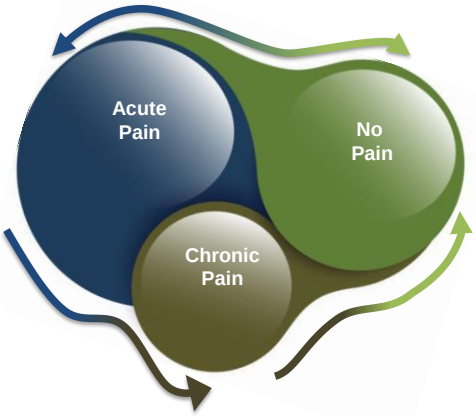
ANNUAL REPORT (2015) FOR CENTER FOR NEUROPLASTICITY AND PAIN (CNAP)

ANNUAL HIGHLIGHTS IN CNAP

CNAP studies how pain modifies parts of the central nervous system. Neuroplasticity describes the potential of the nervous system to reorganise by creating new neural functions as an adaptation to changing conditions. When an injury results in acute pain, the nervous system undergoes an adaptive neuroplastic response resulting in increased sensitivity. After some time, the pain-induced neuroplasticity is normalised as the injury heals. In some cases, such neuroplastic processes fail to normalise during convalescence, and acute pain may develop into chronic pain with hypersensitivity. Understanding basic characteristics of such pain neuroplasticity in humans and how it can be modulated is the research focus of CNAP.



Translation from one pain condition to another may be driven by pain neuroplasticity

CNAP applies a biomedical engineering approach where new advanced pain provocation and probing platforms will be discovered and applied to reveal novel aspects of the human pain neuroplasticity. When needed for improving the human models, a translation between in-vivo animal and human experimentation will be implemented. This will lead to experimental human models describing the novel dynamic properties of pain neuroplasticity in humans. These models will be exploited to identify methods for modulation of the neuroplasticity in the human pain system with the hope of identifying new ways to modify pain.

In 2015, the primary CNAP investigators and affiliated staff together with newly hired Ph.D.-students have been working to define challenging scientific questions to be explored within the objectives of CNAP. A series of short and long-term projects have been initiated to study novel modalities for provoking pain neuroplasticity, new ways to assess the pain neuroplasticity at spinal and brain levels, and approaches to modulate the induced pain neuroplasticity. This work includes biomedical technologies for selective provocation of the pain system (e.g., advanced electrical stimulation electrodes and light stimulation), probing novel plasticity in the brain, and modulating the pain plasticity by neurostimulation, providing neurofeedback, or using perceptual illusions via augmented reality. Work has started to implement two basic animal models for further understanding the human findings. The highlights of 2015 also include the CNAP inaugural event where the leadership of the Danish National Research Foundation and Aalborg University officially opened the centre.

Chair of the Danish National Research Foundation, Professor Liselotte Højgaard, and Rector Per Michael Johansen, Aalborg University, were actively involved during the opening of CNAP.