Portable Eye-Brain Pupillometric Diagnostic Device (PEBDI)

Development status

Clinical trials

IP protection status

No patent or other IPR protection has been filed to date. The details of the project including the core idea have not yet been published or publicly disclosed.

Partnering strategy

Collaboration, investment, licensing

Institution

National Institute of Mental Health

Vlastník

National Institute of Mental Health, Czech Republic

Challenge

Simple measurement of complex pupillary biosignals by means of dynamic pupillometry may represent a proxy for brain function dynamics otherwise detectable solely by fMRI. Thus, pocket-sized low-cost devices like pupillometers might provide insight into the brain function and potentially allow for detection of relapse predictors or other changes in the clinical state. In this respect, bedside PEBDI measurement might replace expensive examinations based on extremely sophisticated fMRI infrastructure. The main advantage of the device in question lies in longitudinal, diagnostic and remote patient monitoring. Our device can be delivered directly to patient's home for long-term monitoring and wireless data centralization.

Description

Dynamic pupillometry is a method to measure a pupillary response to light stimuli or spontaneous pupillary activity (pupillary hippus). Both these phenomena have been linked to cognitive load (Piquado, 2010), vegetative tone (Turnbull, 2017), circadian regulation (Münch, 2012), or low-frequency components of brain activity (Yellin 2015). As such, the method represents an opportunity for non-invasive monitoring of various neurophysiological parameters and potentially the clinical state of patients suffering from various neurological and psychiatric disorders. In general, pupillary dynamics represents a set of easily accessible and measurable biosignals. These physiological functions are governed by central generators and may therefore directly reflect disruptions or major changes in the function of the central nervous system.

Commercial opportunity

To the best of our knowledge, no portable device used for unassisted pupillary home-monitoring in neurological or psychiatric disorders exists to date. Thus, the main advantage is the potential generation of a brand-new market. The innovative application of long-term

monitoring in psychiatry could generate novel approaches to monitor the disease state, disease progression or recovery. Moreover, e-health solutions in psychiatry are very scarce despite the current trends towards decentralized care in the home environment.