

10th International Conference and Exhibition on

BIOSENSORS & BIOELECTRONICS

September 21-22, 2018 | Dallas, USA

Sensory neurons cultured on microelectrode arrays as label-free, non-invasive biosensors for novel analgesic discovery

Bryan J Black

University of Texas, USA

The tolerance, abuse and potential exacerbation of symptoms associated with classical chronic pain medications (e.g., opioids) create an urgent need for alternative therapeutics. Phenotypic screening may provide an alternative or complementary approach to traditional molecular target-based drug discovery. Profiling of cellular phenotypes enables quantification of physiologically relevant traits central to a disease pathology without prior identification of a specific molecular target. For complex disorders such as chronic pain, which involves many molecular targets, this approach may help to identify novel treatments. Sensory neurons, termed nociceptors, are central to the development and maintenance of chronic pain, may be cultured from primary tissues and undergo changes in membrane excitability and activity consistent with chronic pain. Importantly, these changes manifest as alterations in firing rate and pattern of readily quantifiable signals (i.e., all-or-nothing action potentials) that can be recorded from substrate integrate microelectrode arrays (MEAs). Here, the review of current application space of MEAs as biosensors for toxicology and pharmacology will be done. Next, review of the bioelectrical behavior of DRG neurons, signaling complexity chronic pain and the limitations and advantages of various sensory neuron models. Finally, the use of MEAs in assays for bioelectrical behavior as well as emerging efforts to leverage microfabrication, microfluidics and 3D culture paradigms for assay development will be described.

Biography

Bryan J Black currently serves as a Research Scientist in the Department of Bioengineering at the University of Texas at Dallas and as an Advisor at Qualia Labs, Inc. In 2014, he was graduated from the University of Texas in Arlington with a PhD in Physics and Applied Physics. His research interests include the development and application of novel in vitro and in vivo neural interfaces to address fundamental questions of neural network connectivity and plasticity as a well inflammatory response.

Bryan.Black@utdallas.edu

Notes: