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Optogenetic Approaches for Muscle Stimulation

New therapies to activate muscles with high temporal and spatial control offer a novel therapeutic approach to a wide range of clinical conditions that include poor muscle activation as a key problem. One such approach is optogenetic muscle activation techniques, which use a light stimulus to activate muscle cells that have had light-sensitive ion channels expressed in them.

Competitive advantage

- First in the world optogenetic approach for Obstructive Sleep Apnoea (OSA)
- Unique direct muscle stimulation optogenetics approach that minimises systemic and off-target effects

Impact

- Optical techniques offer an exciting, new, minimally invasive method for Obstructive Sleep Apnoea, and more broadly for skeletal muscle control. An optogenetic approach to OSA aims to be effective for all patients whilst being comfortable and tolerable.

Successful outcomes

- Optical stimulation of upper airway dilator muscle (genioglossus) in an animal model
- Stimulator proof-of-concept design

Capabilities and facilities

- Electrophysiology
 - Optogenetic electrophysiology experiments
 - Single motor unit recording
- Electronic/Industrial and Mechanical Design
 - Rapid electronic and mechanical prototyping
 - PCB/Schematic design
 - 3D printing
 - Midfield wireless powering for low power implantable stimulators
- Sleep & Respiratory Physiology
 - Neurophysiological techniques to study human upper airway muscle activity function and airway mechanics during wakefulness and sleep
- Imaging

More Information

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