

A method for selectively blocking nerve fibers during neurostimulation treatment using kilohertz frequency electrical signals

Unmet Need

In the past three decades implanted neurostimulation devices have become widely adopted driven largely by their ability to treat a range of clinical conditions with a “drug-free” solution. The \$6.6 billion dollar market is poised for consistent growth, with a compound annual growth rate of 6.9% projected between 2021 and 2026. Devices utilizing kilohertz frequency (KHF) waveforms are an emerging new technology in this field that have demonstrated in preclinical studies the ability to treat a wide range of disorders, including diabetes, heart failure, and bladder control. However, the ability to target nerve fibers to block during treatment selectively has impeded the safe clinical application of this promising technology. There is a need for technologies that enable improved safety and efficacy of devices utilizing KHF waveforms through better control.

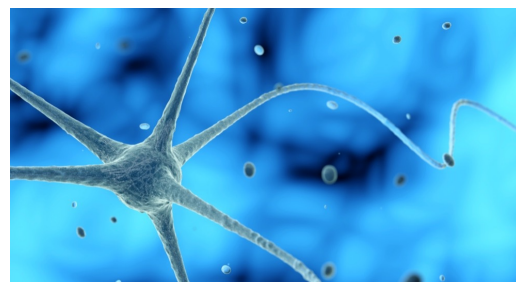
Technology

Duke inventors have reported a method for selectively blocking nerve fibers using kilohertz frequency electrical signals. This is intended to be used with implanted devices that can treat a variety of clinical conditions. Specifically, this is a hybrid waveform and method for kilohertz frequency nerve block that produces selective block of nerve fibers based on fiber diameter. It achieves unidirectional block of fibers which allows action potentials to propagate from a selected direction while preventing propagation from the opposite direction. The inventors have demonstrated this technology by selectively blocking smaller nerve fibers in anesthetized rats.

Advantages

- Offers better control over devices using KHF electrical signals
- Improves safety associated with using KHF
- Could expand treatment opportunities for neurostimulation devices

Duke
LICENSING
& VENTURES



Duke File (IDF)

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Links

- [From the lab of Dr. Warren Grill](#)

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Publications

- [Non-monotonic kilohertz frequency neural block thresholds arise from amplitude- and frequency-dependent charge imbalance \(Scientific Reports, 2021\)](#)