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SpineRepair RTD 2014

FNSNF

Neurotechnologies for electrical and chemical neuromodulation of spinal circuits in rodents and non-human primates

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NEUWalk

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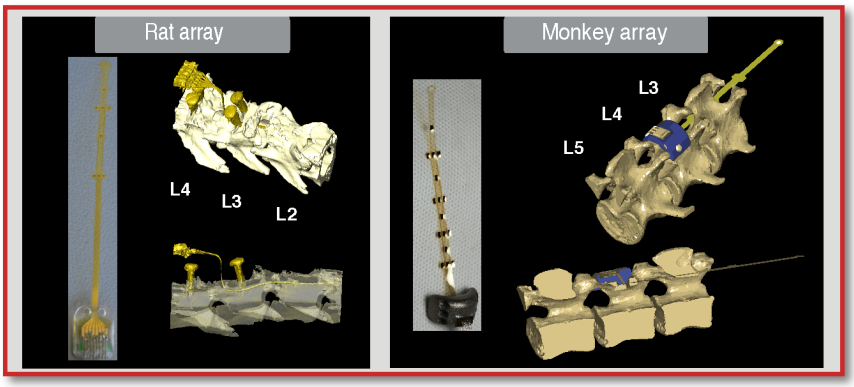
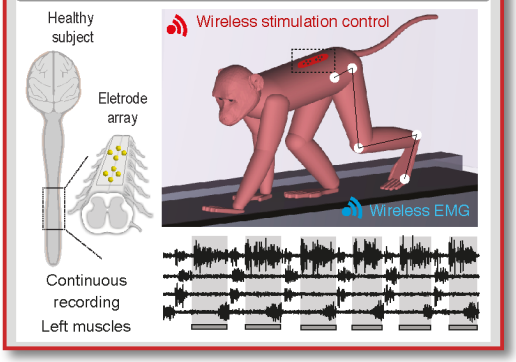
Continuous epidural electric stimulation (EES) applied on the dorsal aspect of lumbosacral sagments facilitates locomotion after spinal cord injury. Here, we show that closed-loop control of EES over specific locations and with distinct timing based on realtime kinematic feedback significantly improves locomotor peformance.

Flexible multi-electrode array technology implanted chronically for electrical spinal cord stimulation

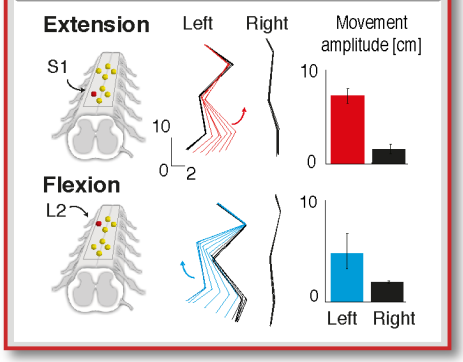


Effect of lateralized stimulation on the induction of leg movements in non-human primates

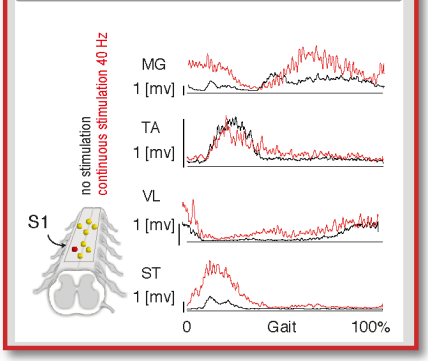
Non-human primate platform



Leg kinematic after single pulse stimulation

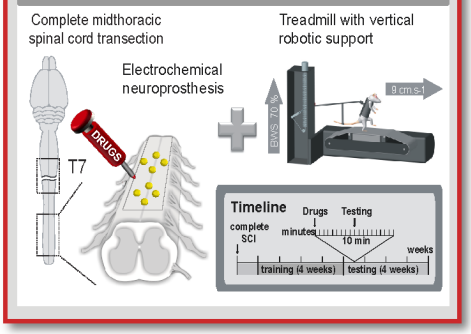


EMG modulation during walking

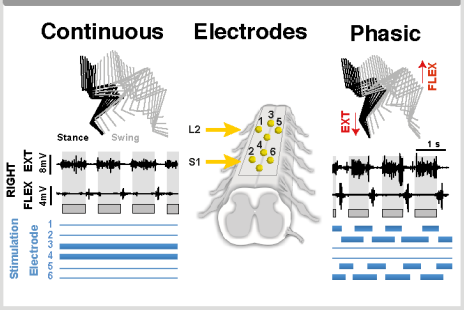


Effect on walking with realtime control of spational stimulation patterns in rat with complete spinal cord injury

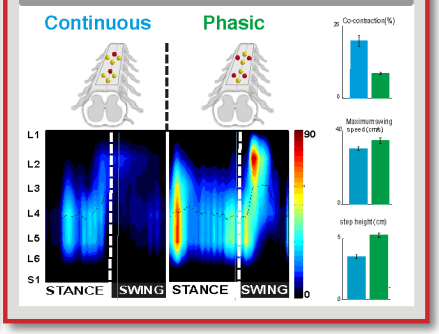
Rat platform



Kinematic dependent stimulation (Phasic)



Modulation of motoneuron activity



We developed multi-electrode arrays that provide the ability to stimulate lumbosacral segments at specific locations, and at distinct times in rats and non-human primates. This advanced technology and closed-loop control algorithms establish the framework to develop translational EES protocols that will be tested in human patients.

Acknowledgement

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References

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