

Seminar in Microbiology

Monday, 23th November, 2015

Salle de séminaire E07.3347.a (ex 7172), CMU

11:30 – 12:30

Grégoire COURTINE

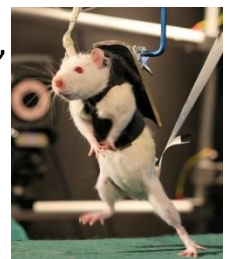
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Neuroprosthetic technologies to improve motor recovery after spinal cord injury

Over the past decade, the team of Courtine developed a pragmatic therapy that restored supraspinal control over refined leg movements after severe spinal cord injury in rodents. The therapy acts over two time windows. Immediately, electrical and chemical neuromodulation of spinal circuits mediate motor control of the paralysed legs. In the long term, will-powered training regimens enabled by electrochemical neuromodulation and robotic assistance promote neuroplasticity of residual connections—an extensive rewiring that re-establishes voluntary movement.

During the talk, Prof. Courtine will describe these developments, and will highlight their current efforts in non-human primates and humans to optimize and translate the interventions into a robust and effective therapy to improve motor recovery in individuals with spinal cord injury.



Key publications:

- Pronounced species divergence in corticospinal tract reorganization and functional recovery after lateralized spinal cord injury favors primates. **Science Translational Medicine 2015**
- Defining ecological strategies in neuroprosthetics. **Neuron 2015**
- Electronic dura mater for long-term multimodal neural interfaces. **Science 2015**
- Muscle spindle feedback directs recovery and circuit reorganization after spinal cord injury. **Cell 2014**
- Restoring voluntary control of locomotion after paralyzing spinal cord injury. **Science 2012**
- Novel robotic interface to evaluate, enable, and train locomotion and balance after neuromotor disorders. **Nature Medicine 2012**