Towards a bypass for neural reconnection

ByAxon
nanotech · health

What is ByAxon

Is a research project funded by the European Union's Horizon 2020 Programme, in the frame of FET-Open actions. ByAxon seeks the development of new nanotechnology-based neural interfaces, with the aim of fabricating an active bypass for the neural reconnection directly at the spinal cord level.

Why

Spinal cord injuries caused by trauma interrupt the neural connections through the spinal cord and have devastating consequences including permanent paralysis. ByAxon intends to explore effective strategies aiding the recovery of the patients. Retinal implants, electrodes for Parkinson and epilepsy treatment and many other applications will benefit as well from these neural interfaces with enhanced resolution and biocompatibility.

How

ByAxon involves a wide range of new technological possibilities, inspired by cutting-edge science and new research practices. In particular ByAxon will investigate two strategies for interfacing directly the neural tissue:

- High resolution magnetic sensors that make use of magnetoresistive half metallic perovskite oxides to detect the neural electrical activity at room temperature.
- Nanowire-coated electrodes for electrical stimulation with minimal tissue disturbance. We will explore the biofunctionalization of the nanowires to achieve minimal contact impedance.

These two strategies will converge in the assembly of a bypass prototype for the artificial transfer of electrical signals locally at the spinal cord, that will be tested *in vitro*.

Aims

Our project aims to demonstrate a new generation of nanostructured sensors and electrodes that will offer a novel way of locally bypassing a spinal cord injury interfacing the spinal cord with low tissue disturbance.

FET

ByAxon is a Future and Emerging Technologies (FET) action, awarded to new ideas for radically new future technologies that pursue a breakthrough scientific and technological target.

Open

ByAxon is part of the Open Research Data Pilot, aiming to make research data accessible with as few restrictions as possible.

Who

ByAxon is an interdisciplinary collaboration across Europe.
Coordinator: IMDEA Nanoscience
Consortium: 5 EU partners
Timeframe: 4 years (January 2017 - December 2020)
Budget: ca. 3 M€
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