

GTX Medical SA

EPFL Innovation Park

1015 Lausanne

Founded 2014

65 employees



SWISS MEDTECH

Every year some 250,000 people fall victim to a spinal cord injury. Of those, 53% suffer paraplegia (paralysis from the waist down). This motivated Professor Grégoire Courtine from the Federal Institute of Technology in Lausanne (EPFL), together with Professor Jocelyne Bloch from the Lausanne University Hospital (CHUV) to develop a high-precision technique for stimulating the spinal cord. After just a few months of training, patients are now able to control leg muscles that had previously been paralysed even without electrical stimulation. Thus the spin-off GTX Medical was born.

A world first: walking again thanks to TESS therapy!



The brain – the control centre

How does it work? The brain controls the limbs and internal processes such as breathing, circulation and digestion via the spinal cord. If the spinal cord is injured, the transfer of information no longer works, or only works in part. This leads to paralysis of the legs and arms, the degree of which depends on the extent of the damage. The concept developed by Professor Grégoire

Courtine at EPFL is based on a targeted neurostimulator implant with real-time motion feedback, combined with training tools that absorb the weight of the body. The technology therefore has the potential to partially restore spinal cord function and thus improve the rehabilitation of patients. The scientists at GTX Medical call this technology Targeted Epidural Spinal Stimulation (TESS). The treatment facilitates the reorganisation of neural pathways and

repairs the connection between the brain, spine and lower extremities, potentially improving other symptoms that are also connected with spinal injuries. The team at GTX Medical consists of specialists working in the fields of engineering, neuroscience, finance, product R&D, clinical testing, regulatory affairs and marketing. They cooperate closely with the academic founders and the 40 or so researchers and clinicians based at EPFL and CHUV.



Left to right: Hendrik Lambert, Vincent Delattre, Anne Watrin

Exploring new areas of application

GTX Medical SA is located at High Tech Campus Eindhoven (Netherlands) and at EPFL (Lausanne). World-class research is being done at both locations and is being integrated into the development of new products. Their research activities are giving rise to the new treatment, Go-2 epidural spinal stimulation (TESS), which is based on the research conducted by Professor Courtine together with Professor Jocelyne Bloch at CHUV. They demonstrated in articles that have been published in Nature and Nature Neuroscience that the delivery of electrical stimulation targeting the individual roots of the spinal cord amplifies the residual commands from the brain, which enables people with severe spinal cord injuries to regain control over specific leg muscles. Com-

bined with an intensive rehabilitation programme, this enables voluntary control of paralysed leg muscles.

To implement its findings in the clinical environment, the GTX Medical team is supporting various clinical trials in hospitals across Europe. GTX Medical will conduct validation tests with the newly developed complete Go-2 system in a multi-centre trial with the aim of obtaining regulatory approvals such as the CE mark for Europe. Submissions and negotiations with national health authorities and insurers are being initiated so that the treatment receives health insurance cover. In the research sector GTX Medical will of course remain closely linked with EPFL and its Center for Neuroprosthetic (CNP), as Professor Grégoire Courtine is responsible for the spinal re-

pair area of the International Paraplegic Foundation (IPF) at this Center and at EPFL's Brain Mind Institute. He is also Chief Science Officer at GTX Medical SA, which spearheaded the development of the neurostimulator implants.

United we are strong!

The results obtained to date are impressive. Initial "first-in-man" (FIM) test implants have been trialed in carefully selected subjects who had sustained spinal injuries as long as 14 years ago. Following implantation of the chip, participants began the training and rehabilitation process under close medical supervision. The study evaluated after five months yielded promising results, which were published in Nature and Nature Neuroscience on 21 October 2018: one more milestone to motivate the GTX team to build on the successes they have already achieved.

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