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Neurostim tech that helps paralyzed learn to walk grabs €26m series A

by Tina Tan

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G-Therapeutics is a spin-off from Switzerland's Ecole Polytechnique Fédérale de Lausanne (EPFL). Its technology stems from 15 years of research by the company's chief scientific officer, Grégoire Courtine, who is the current International Paraplegic Foundation Chair in Spinal Cord Repair and a leading authority in neurostimulation for spinal cord injury (SCI) patients, and his collaboration with colleagues at EPFL and at the University Hospital of Vaud.

"What Professor Courtine has done is unravel the mechanisms of walking. He's discovered where exactly to stimulate the different muscle groups responsible for stretching and bending the left and right legs, and how to apply this combination of neurostimulation and physiotherapy to get SCI patients to move again," said Sjaak Deckers, CEO of G-Therapeutics.

The firm currently has a research prototype of its system, which comprises a paddle stimulation lead that is implanted epidurally in the spinal cord and an external controller that communicates with sensors in the patient's shoe, allowing for real-time motion feedback. This closed loop system is able to use this feedback to stimulate the right muscle at the right moment to get the desired movement from the limb.

Over 4-5 months of intensive, intent-driven therapy, the patient would first achieve move in their limb mainly involuntarily through stimulation but then regain muscle strength and – more importantly, learn to control these muscles again voluntarily through the brain.

“Professor Courtine has demonstrated quite extensively in animal studies is that due to this intensive rehabilitation training, you make use of the neuroplasticity of the brain and of the spinal cord to get massive remodeling of the neurons both in the motor cortex and below the lesion,” Deckers told *Clinica*. “So we help the brain to help itself, using the regenerative powers of the brain to develop a therapy that can generate anatomical changes.”

The technology has undergone preclinical testing on mice, rats and monkeys, as well as on one human case study. G-Therapeutics is now planning a pilot study involving a limited number of patients and to iron out aspects like the protocol for the rehab therapy. At the same time, the firm will be working to complete product development so that the technology is in a commercializable form that can then be used in multicenter studies, the data of which will be used to get CE marking.

Clinical trials will be conducted in Lausanne, Switzerland, where Courtine and his team are based, while hard- and software development of the implantable neurostimulation system, as well as general management of the company, will be based at Eindhoven, the Netherlands, where Deckers is. The Dutch town is also where Philips’ R&D center is based and in that environment, it is hoped that G-Therapeutics will attract the right talent.

The CEO estimates that it would take 5 or 6 years to take the technology through the multicenter study and get CE marking. He acknowledged though that the upcoming changes in EU medtech regulations create an uncertainty about the new clinical trial requirements for a high-risk implantable device like G-Therapeutics’. If everything goes as plan, the company could be able to stretch the €26m series A that it raised, together with the €10m deferred, risk-bearing “innovation loan” from the Dutch government, very close to the point of CE-marking. “Otherwise, we’ll apply for additional subsidies to get as far as we can,” said Deckers.

Neurostim A Hot Space

G-Therapeutics’ series A round was co-led by four well-known names in the European life sciences investment circle: Life Sciences Partners, INKEF Capital, Gimv and Wellington Partners.

Dutch VC Gimv contributed €6m of the total funds and Patrick Van Beneden, a partner at the firm, told *Clinica* that it was a combination of factors that made G-Therapeutics an attractive investment.

The first is that the start-up is in a space where there have been a number of early exits over the last few years. One example is Sapiens Steering Brain Stimulation, which was acquired by Medtronic in [August 2014](#) even before it got CE-mark, said Van Beneden. The second factor is the people leading the company. CEO Deckers was formerly head of Sapiens, the company aforementioned, while the vice-president of clinical affairs at G-Therapeutics had held the same

role at Endosense, a Swiss heart-sensing company which was bought by St Jude Medical in [August 2013](#). “Gimv was an investor in Endosense and we knew the people there well.”

Then there was the science, which Van Beneden described as being “quite exceptional” when the investor went to Switzerland to see Courtine’s work. “Lastly, we were not the only ones to see the potential of the technology. There were other investors and being able to be a syndicate of four strong investors [in this round] was a strong element in our decision take on this investment,” said Van Beneden.

G-Therapeutics is Gimv’s first neurostimulation investment and Van Beneden indicated that the VC is considering other similar companies to bet their money on. He added that Gimv is looking to up the number of medtech investments in its portfolio generally.

“In the medtech space, we were an investor in Endosense and we are a big shareholder in [transcatheter heart valve company] Jenavalve. We are now an investor in G-Therapeutics and in the coming months we will consider other investments in medtech. It’s an area where quite a number of investors have left this space, certainly in the US. But with the correction in the biotech market, that might change now.”