

R&D Funding  
Life Sciences



Nominated for the CTI Swiss Medtech Award 2017

## Boosting the immune system in cancer patients



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**Personalised medicine to fight cancer: Geneva University Hospitals and the private biotech company MaxiVAX aim to boost the immune system in cancer patients to fight their own tumour cells with a new vaccine. The CTI provided support in two different project phases.**

Even 20 years ago, when professor Nicolas Mach was working as an oncologist at Harvard Medical School, it was known that immune system boosters optimise the vaccine-based treatment of tumours. The only question was how to deliver the booster to the patients most effectively. For a long time the problem seemed impossible to resolve, until a few years ago when Nicolas Mach decided to try delivering the booster using capsules loaded with genetically engineered cells. Professor Patrick Aebischer, who was president of the EPFL until 2016, developed this technique in the 1990s to treat Parkinson's disease. Nicolas Mach, who meanwhile worked at the Geneva University Hospitals group (HUG), founded the biotech start-up MaxiVAX SA in 2005, and applied the technique.

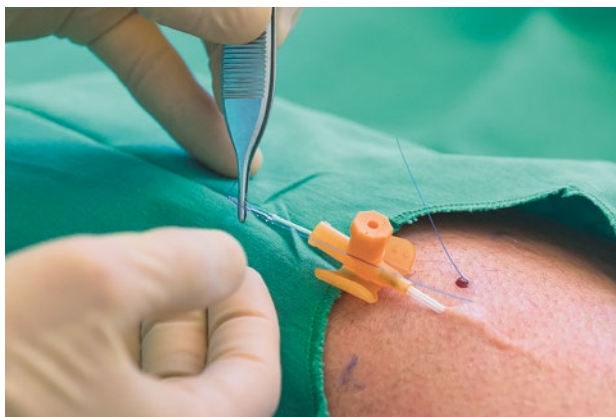
### **Capsules continuously strengthen the immune system**

A first CTI project, involving the development of two biological agents to produce a vaccine, was set up. Human cells were genetically engineered to produce the potent immune

system booster (GM-CSF). The cells were loaded into a small biocompatible hollow fibre capsule, which when placed under the patient's skin allows continuous delivery of GM-CSF, thus strengthening the immune system. The agents were produced at HUG and certified externally for clinical use. In addition, the patient's cancer cells were isolated, irradiated and delivered by subcutaneous injection to provide vaccine antigens.

A phase I clinical trial was conducted as part of a second CTI project. The study involved 15 patients with various types of solid tumor at an advanced stage, whose disease





continued to progress despite treatment with therapies available at the time. The vaccination was repeated six times over a period of eight weeks.

The results published in 2016 show that the therapy is safe, well-tolerated and effective, particularly in patients with a fairly robust immune system. MaxiVAX is now collaborating with the Swiss Group for Clinical Cancer Research (SAKK) to conduct a phase II clinical trial with the vaccine MVX-ONCO-1 in 40 patients with head and neck cancer in

**“MVX-ONCO-1 is personalised medicine and has the potential to fight all types of cancer.”**

Dr Dimitri Goundis, CEO of MaxiVAX

four or five hospitals in Switzerland. MaxiVAX was able to secure research grants of CHF 540,000 for the clinical trial from various non-profit organisations that support cancer research.

### **A vaccine with huge potential**

“MVX-ONCO-1 is personalised medicine and has the potential to fight all types of cancer,” says Dr Dimitri Goundis, CEO of MaxiVAX. The company now has three objectives. First, the phase II clinical trial will focus on determining how much longer patients with head and neck cancer treated with MVX-ONCO-1 survive beyond the current standard. Second, MaxiVAX is exploring the option of combination therapies with the latest immune-oncology products from big pharmaceutical companies, with the aim of assessing potential synergies in the treatment of cancer. Finally, the company is investigating the effect of MVX-ONCO-1 in the treatment of patients with Chordoma, a rare type of cancer for which there is no currently approved treatment.

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 **CTI – Start-up and Entrepreneurship,  
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The CTI is the Confederation's innovation promotion agency. It provides consultancy and networking services and financial resources to help turn scientific research into economic results. Making the Swiss economy strong. In 2018 the CTI will become Innosuisse – the Swiss Agency for Innovation Promotion. However, the task of promoting science-based innovation in the interests of business and society remains.

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