News Release

Your Contact
gangolf.schrimpf@emdgroup.com
Phone: +49 6151 72-9591

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# Merck KGaA, Darmstadt, Germany and B. Braun Join Forces in the Development of Bioelectronic Devices

- **Innovation Center project of Merck KGaA, Darmstadt, Germany collaborates with B. Braun and its start-up neuroloop GmbH to evaluate feasibility of neurostimulators for targeted treatment of indications with high unmet medical needs**
- **Initial data are expected by the end of 2022**

Darmstadt, Germany, June 29, 2021 – Merck KGaA, Darmstadt, Germany, a leading science and technology company, today announced a collaboration in its new Bioelectronics innovation field with neuroloop GmbH – a B. Braun subsidiary and early-stage start-up company based in Freiburg, Germany. B. Braun SE, Melsungen, Germany, is one of the world's leading manufacturers of medical technology and pharmaceutical products. The collaboration seeks to develop a neurostimulator device that can complement the existing drug therapies of patients with chronic inflammatory diseases. While drug therapies often have broad systemic effects, bioelectronic devices can create localized and specific therapeutic effects by selectively stimulating nerves. The partners plan to adapt neuroloop's neurostimulation platform to enable targeted treatment of chronic inflammatory diseases.

"Bioelectronic devices show great promise in helping to improve therapeutic outcomes and efficiency for patients with chronic inflammatory diseases. By combining our expertise across electronics, medicines and drug delivery with the neurostimulation technologies of B. Braun and neuroloop, we aim to create novel modalities to enhance the quality of care for patients in several chronic diseases,"



Frankfurter Strasse 250
64293 Darmstadt · Germany
Hotline +49 6151 72-5000
www.emdgroup.com

Head of Corporate Media Relations: +49 151 1454 2702
Spokespersons: +49 6151 72 -9591 / -45946 / -55707

# News Release

said Belén Garijo, Chair of the Executive Board and CEO of Merck KGaA, Darmstadt, Germany.

"In line with our company philosophy of "Sharing Expertise", B. Braun has always valued exchange and strong partnerships to move innovative solutions forward. We are pleased to strengthen our innovation power in a dynamic field like functional neurosurgery with Merck KGaA, Darmstadt, Germany and neuroloop. In the healthcare sector in particular, innovations must quickly transform into successful business models. And to be successful, they must demonstrate clear value in the form of improved patient outcomes. The combination of our diverse expertise, experience and market access that our partnership brings will help decisively in this regard," said B. Braun CEO Anna Maria Braun.

neuroloop GmbH will contribute unique technical expertise in selective neurostimulators to the partnership and Merck KGaA, Darmstadt, Germany will add its key capabilities in material science and in vivo pharmacology as well as quality, regulatory and clinical expertise in the field of chronic inflammatory diseases. Initial data are expected to be available by the end of 2022, which will then be used to evaluate a clinical strategy to prove the safety and efficacy in patients. The full development will target approval in major markets, such as the European Union and the United States.

"Identifying the specific disease relevant nerve signal patterns and subsequently modulating these signals via stimulation are major challenges in the field of bioelectronics," added Michael Lauk, CEO of neuroloop. "Together with the strong preclinical and clinical expertise of Merck KGaA, Darmstadt, Germany and our platform, which enables multi-channel selective stimulation, we are well positioned to potentially solve these crucial challenges and offer neurostimulator treatment to patients suffering from chronic inflammatory diseases."

Rather than only providing stimulation, novel bioelectronic devices also have the potential to monitor the disease condition. Combining nerve signals with other accessible physiological datasets can help to create a holistic understanding for disease conditions. neuroloop has developed a platform to stimulate the vagal nerve for the treatment of chronic diseases in connection with autonomous body functions.

# News Release

The core of the platform is a multichannel cuff-electrode based on thin-film technology, which enables selective stimulation of specific fibers within the nerve. The primary focus is not only on high clinical effectiveness, but also on the greatest possible safety, minimal side effects for the patient and simple use for the caregiver.

The joint development agreement with B. Braun and neuroloop represents a milestone in the new Bioelectronics innovation field of Merck KGaA, Darmstadt, Germany, which builds on the company's experience and expertise in its Healthcare and Electronics business sectors. With a holistic approach, the company designs and develops medicines and intelligent devices that provide ongoing care for patients beyond their treatment. Merck KGaA, Darmstadt, Germany has a long-standing legacy in neurology and immunology, which, combined with significant R&D and commercial experience, will help to realize next-generation devices. This collaborative innovation project in the field of bioelectronics is being developed by the Innovation Center of Merck KGaA, Darmstadt, Germany, which aims to launch entirely new businesses and technologies between and beyond the company's current sector scope, bringing together people, technologies, and skills from within Merck KGaA, Darmstadt, Germany and beyond.

B. Braun and neuroloop wish to explore a wide range of indications for the device, thus underlining the platform character of their fully programmable stimulation system to treat various chronic conditions using the same device by changing the software and stimulation pattern.

**Caption for attached illustration:**
neuroloops neurostimulation system consists of a unique, patented and very thin multi-channel cuff electrode that is wrapped around the vagus nerve. The electrode is connected to an implanted pulse generator in the chest area, which is wirelessly charged and programmed. The platform allows for selective stimulation of the vagus nerve and sets new standards for treating chronic diseases associated with autonomous vital functions.

**About B. Braun**
B. Braun is one of the world's leading manufacturers of medical technology and pharmaceutical products, as well as a provider of medical services. Over 64,000 B. Braun employees in 64 countries share their expertise with colleagues and customers every day. The innovations this creates help improve processes in hospitals and medical practices, and increase safety for patients, doctors and nursing staff. In 2020, the Group generated € 7.4 billion in sales.

# News Release

**About neuroloop**
neuroloop GmbH is a spin-off of the University of Freiburg, the Freiburg University Medical Center and B. Braun's surgical division Aesculap AG, who exclusively financed the start-up since its foundation in Dec. 2015. neuroloop develops a platform based on thin-film technology for controllable selective stimulation of the vagus nerve. Our platform sets new standards for treating chronic diseases associated with autonomous vital functions. The stimulation device is currently investigated in a clinical study for treating high blood pressure.

**Innovation Center of Merck KGaA, Darmstadt, Germany**
To complement existing research and development in the three business sectors of Merck KGaA, Darmstadt, Germany, the company's Innovation Center team aims to create new businesses outside of the current R&D scope. It strives to unlock the untapped potential of Merck KGaA, Darmstadt, Germany by leveraging assets and competencies across sectors, generating projects around these assets, and ultimately incubating these ideas into viable new businesses. With Bioelectronics as the latest addition, the Innovation Center of Merck KGaA, Darmstadt, Germany now pursues projects in two innovation fields. In the Clean Meat innovation field – also referred to as cultivated meat – the company focuses on the biotechnology required to produce genuine meat and seafood grown in vitro and aims to become the technology enabler for this emerging industry. Other projects in the Innovation Center include OneZeroMed a 3D printing (laser sintering) solution that will simplify tablet production tremendously, leading to significant cost and time savings during clinical development.



**About Merck KGaA, Darmstadt, Germany**
Merck KGaA, Darmstadt, Germany, a leading science and technology company, operates across healthcare, life science and electronics. Around 58,000 employees work to make a positive difference to millions of people's lives every day by creating more joyful and sustainable ways to live. From advancing gene editing technologies and discovering unique ways to treat the most challenging diseases to enabling the intelligence of devices – the company is everywhere. In 2020, Merck KGaA, Darmstadt, Germany, generated sales of € 17.5 billion in 66 countries.