

Healthcare industry BW

Biotech start-up from Frickenhausen develops chewing gum as test system for bacteria

A medical connoisseur – the tongue as a sensor for infections

People seeing the doctor normally take their gum out of their mouth first, but if a start-up company from the STERN BioRegion has its way, chewing gum could become part of the diagnostic process and patients will need to exercise their jaws before receiving treatment. The team at 3a-diagnostics GmbH from Frickenhausen is developing a gum that can be used both in doctors' surgeries and at home as a quick and easy diagnostic aid. The sensor in this case is the human tongue. If bacteria are present – due to an inflammation of the teeth or tonsils, for instance – chewing produces a bitter taste and the doctor can quickly initiate the appropriate treatment. This in-body "test system" is thought to be the only one of its kind anywhere in the world to date.

"Trained staff and equipment with corresponding software are still required for many point-of-care tests on patients, so we were looking for a really easy way of spotting bacterial infections," explains 3a-diagnostics GmbH co-founder Dr. Heinrich Jehle. The team of chemists and pharmacists came up with a simple and effective sensor that everyone always has with them – the tongue. Highly sensitive, it is able to detect the tiniest quantities of small organic molecules.

The chewing gum acts as a carrier incorporating a thin, soluble film with a specific peptide chain comprising amino acids and a bitter substance. Virtually everyone recognises a bitter taste as a warning signal. The chain surrounds this substance, making it large enough not to be tasted initially, as the tongue can only perceive very small molecules. When disease-specific enzymes of a bacterial inflammation are present in saliva, they separate the peptide chain from the bitter substance, which means it can be tasted. If no bacteria are present, the taste remains neutral. A different chain isolates the specific enzyme for each pathogen, which means a number of chewing gums, each with a different peptide chain, need to be developed for various diseases. The launch of the chewing gums to diagnose peri-implantitis – inflammations caused by tooth implants – is scheduled for 2021 and will be closely followed by variants for periodontitis. Other developments in the pipeline are aimed at *Streptococcus pyogenes*, a commonly occurring bacteria that can cause conditions such as suppurative tonsillitis.

In the event of a potential bacterial infection, this means there would be no need for a swab test by the practice nurse. Patients could start simply by chewing the appropriate gum for the disease they are suspected of having. In addition to being very easy to use absolutely anywhere, the new



Dr. Heinrich Jehle, 3a-diagnostic GmbH
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detection method is also extremely fast. The result is available in just two minutes, helping the doctor to decide what treatment to prescribe. "The product is above all intended as a complement to the existing tests, to be used for pre-screening or low-threshold monitoring," continues Dr. Jehle. After being given a tooth implant, for example, a patient could use chewing gum to identify infections at a very early stage – long before a suppurative inflammation leads to serious complications.

It is envisaged that the product will be available from pharmacies without prescription – once all the classification issues have been clarified. In the IVD (in vitro diagnostics) solutions used to date, a sample is taken from the patient that is then analysed in an external device. Because the chewing gum works as a test system within the human body, however, the licensing authorities are provisionally classifying it as a medical device. "As far as I know, we're the first ones worldwide to apply for a licence, so it's also completely new terrain for the Medical Devices Regulation," presumes Dr.

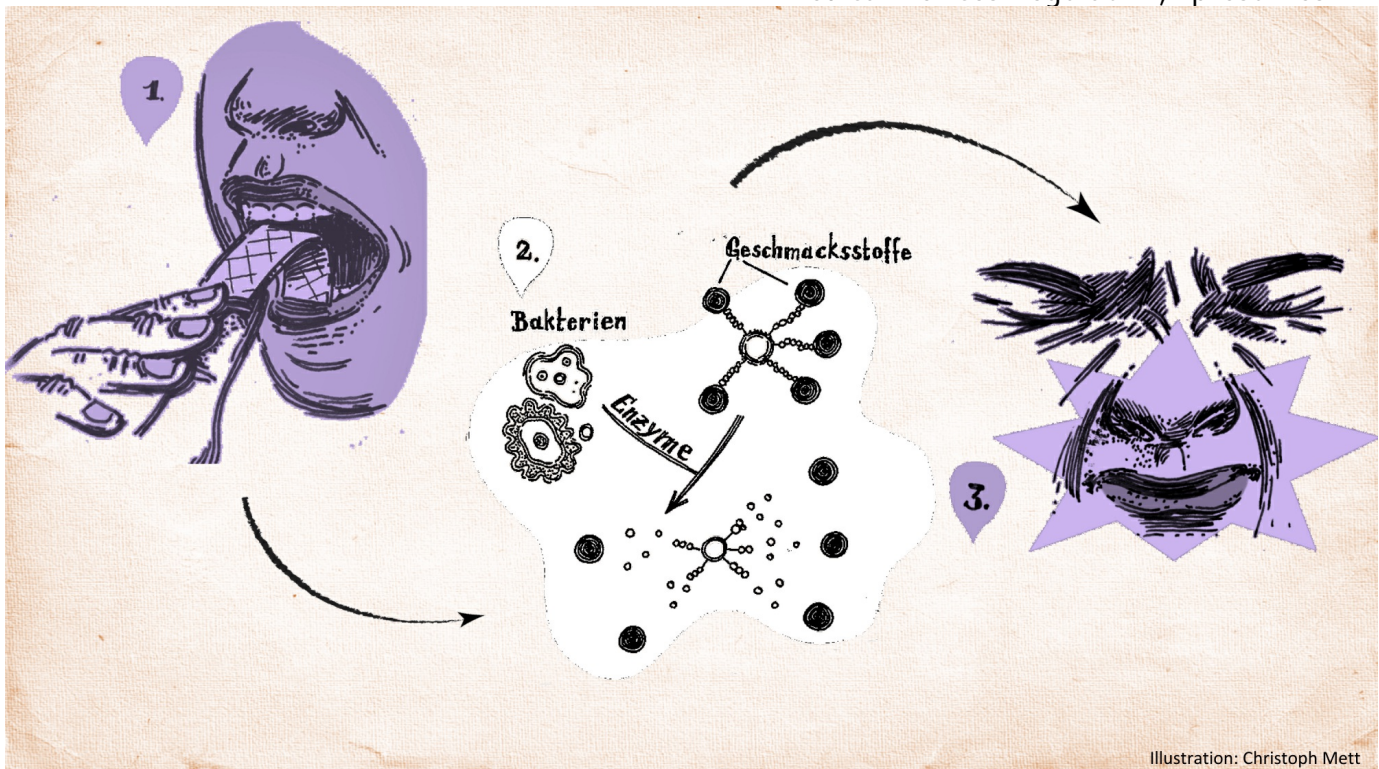


Illustration: Christoph Mett

Illustration der Diagnose per Kaugummi
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In early 2020, the 51-year-old will be moving into new premises at the Sirius Business Park in Frickenhausen with four of his colleagues. Thanks in part to funding from the L-Bank and bwcon "Start-up BW Pre-Seed" programme and support from BioRegio STERN Management GmbH, the biotech company's team is gearing up to have appropriate certified suppliers manufacture the product on a large scale. Following the filing of patent applications between 2013 and the present day, the protected technology is now set to reach market maturity with the help of these partners.

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Further information

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