

StartUp Stories – Marc Mausch, founder of Earlytrace UG

Possibility of breast cancer screening with a simple blood test in the future

(Stuttgart/Tübingen) – Physicist Marc Mausch has set up the company Earlytrace in Tübingen to pursue a completely new idea for the early detection of breast cancer. As an adjunct to mammograms, breast ultrasounds and biopsies, he aims to use artificial intelligence to help identify parameters that should mean tumours can be predicted based on a simple blood test in the future. Mausch's story is just one of many successful StartUp Stories in the STERN BioRegion.

Breast cancer is the most common form of cancer in women. According to the Robert Koch Institute (RKI), over 70,000 women are diagnosed with this malignant disease every year in Germany alone. The sooner it is detected and treated, the better the chances of recovery. To optimise the success of treatment, screening is designed to detect tumours at the earliest possible stage. The best-known screening methods besides palpation are mammary sonography (breast ultrasound scans) and, above all, mammography (breast X-rays). Marc Mausch, a physicist based in Tübingen, is now adopting a new approach to an old idea through his company Earlytrace. He believes a simple blood test should be sufficient to detect the disease even earlier than has so far been possible.

The idea – how did the startup come about?

It may not have been written in the stars, but it was fate that led to Mausch attending a lecture at the University of Tübingen in January 2024. “The idea put forward by the lecturer was that biodata in the blood can be used as a basis for ascertaining whether a person will develop a disease such as cancer in the near future,” he explains. Mausch's previous work had always involved data analysis in the broadest sense, and the lecture was the trigger for a business idea. Mausch is a member of the Methods in Medical

Informatics research group in the University of Tübingen's Faculty of Medicine. "I was working on data analysis relating to long COVID, for instance, but also to cancer. Besides research, my work also focused on infrastructure, data quality and data hosting – so all the associated IT topics," he says.

Mausch is by no means a nerd who does nothing but look at figures on his computer, though. He is already a successful company founder. www.arztkonsultation.de became the first digital service provider for virtual medical consultations in 2013 and is still a successful market player. Mausch left the company after a few years, however, as he was convinced that the link between IT and medicine would present him with further exciting challenges. "I moved into research to identify innovative topics in this field, but I was also always looking for ways of turning new ideas into commercially viable undertakings," he reveals. And the idea he came up with was developing an alternative or adjunct to the existing screening methods for early breast cancer detection. Mausch's idea impressed the AI Incubator 2024 judging panel of the Cyber Valley research network in Baden-Württemberg. Besides quite literally making a name for itself, Earlytrace also won the people's choice award. "That was the start of the Earlytrace story. We put together a team and started systematically analysing all the available data," Mausch continues.

The need – who benefits from the idea?

Earlytrace is aiming to offer women pain-free breast cancer screening without any side-effects – as an adjunct or alternative to well-established methods. A screening programme has been in place in Germany for over 20 years now, and it is recommended that women between the ages of 50 and 75 have a mammogram every two years. Studies show that the benefits of screening significantly outweigh the associated radiation risk. According to the RKI, the relative five-year survival rate for breast cancer patients is currently over 80 percent. In other words, more than 80 out of every 100 patients are still alive five years after being diagnosed. Radiation exposure aside, however, squeezing the breast tissue to obtain a better image makes a mammogram an unpleasant experience for many women. "A simple blood test that provides reliable indications of possible breast cancer can give these women a genuine alternative, which is a big relief for them," Mausch explains. He also emphasises that Earlytrace does not produce an actual diagnosis. "What we provide are indications –

patterns for doctors to evaluate. In other words, women with particular blood test results often also have breast cancer. It's totally up to the doctors to decide how to proceed," he adds. They would then recommend a mammogram or a biopsy, for example.

Looking a little further ahead, Mausch would even like to be able to predict that a patient is highly likely to develop breast cancer – even before a tumour has actually formed. The Earlytrace method is already designed to indicate at a very early stage – long before a tumour can be felt – whether breast cancer might develop. Unlike a mammogram, though, the blood test is unable to identify where in the breast the tumour is located. Mausch therefore sees his solution as an adjunct to a mammogram or ultrasound scan – for tests between routine mammograms, for instance.

The USP – what is the innovation?

"Earlytrace isn't one single ingenious idea – many different little elements are involved. Although none of them are groundbreaking on their own, they collectively have the potential to become a major innovation in diagnostics," Mausch explains. One of these elements is analysing raw data from the blood sample with the help of artificial intelligence. Another is the entire IT infrastructure for interpreting the data to be given to doctors, who normally have no specialist IT training themselves. The plan is for doctors to send their patients' blood samples to the usual laboratories. These laboratories will use a special interface – another innovative element – to make available the processed data, which the doctors can then access. One possible conclusion could be as follows: "This patient's blood test results indicate changes that point to a 97 percent probability of breast cancer." In such a case, treatment at a very early stage would significantly improve the likelihood of survival.

It sounds obvious and straightforward. In actual fact, though, it's the result of extensive research work. "A raised cholesterol level is immediately obvious from a blood test, but with complex diseases such as cancer, things aren't that simple," insists Mausch. "Instead of one single value, there are numerous values that affect each other. To give you an example, value A is dangerous, but only between 60 and 80, and only if value B is below 10 percent. However, if value B is above 30 percent and, at the same time, value C is below 10, value A is suddenly dangerous if it's above 120. So it's all highly

complex,” Mausch continues. To enable doctors to interpret such unwieldy data comprising hundreds of parameters, Earlytrace uses AI to create simple new parameters – another innovative element. These new parameters are then easier to interpret in terms of the probability of breast cancer. “There are countless biomarkers, based on which nature provides us with hidden information that we can’t initially decipher. However, we can interpret this information if we can break it down into two or three different dimensions. And then we can understand it,” says Mausch.

Milestones – what’s next?

The Earlytrace team is currently still in the middle of the data analysis phase. “We’ve identified a variety of highly promising data. Once we’re satisfied with the metrics, we’ll publish a scientific paper,” Mausch announces. The fledgling company remains his secondary focus, at least for the time being. His primary occupation is his academic work at the university, which naturally also relates to the analysis of medical data. Once the above-mentioned paper has been published, Mausch will focus more on building up the IT infrastructure – the interfaces between clinical practice and the laboratory.

Earlytrace is currently made up of a two-strong team and is still privately financed. “After we won the Cyber Valley AI Incubator 2024 people’s choice award, there were quite a few interested parties who wanted to help with our future financing,” reports Mausch. “But we won’t be able to make any promises in terms of timeframes until we’ve finalised our scientific paper, and that naturally puts off potential investors,” he adds. Mausch admits that he was initially more upbeat about data analysis. “In Germany, it’s difficult to get hold of the necessary data for medical research. My background is in physics, where I focused on stars and pulsars, and where data was always openly accessible to everyone,” he points out. In the STERN BioRegion, however, Mausch is confident that he will find the connections that will enable him to once again reach for the stars.

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Link to the technology transfer page

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BioRegio STERN Management GmbH promotes economic development in the life sciences industry, helping to strengthen the region as a business location by supporting innovations and start-up companies in the public interest. It is the main point of contact for company founders and entrepreneurs in the Stuttgart and Neckar-Alb regions, including the cities of Tübingen and Reutlingen. The STERN BioRegion is one of the largest and most successful bioregions in Germany. Its unique selling points include a mix of biotech and medtech companies that is outstanding in Germany and regional clusters in the fields of automation technology and mechanical and plant engineering.

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