

Press release  
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Since the late 19th century, physicians such as Robert Koch have been using blood cultures to detect pathogens. The germs are propagated in a culture medium so they can be identified. This method is still the gold standard for identifying pathogens in blood and other body fluids. Even a state-of-the-art laboratory usually takes from two days to several weeks to identify a limited set of pathogens. Moreover, all too often blood cultures no longer produce any results after an initial treatment with antibiotics. Patients for whom conventional blood analysis has reached its limits need new, leading-edge diagnostic methods. This group includes patients suffering from leukaemia (blood cancer) and people with a weakened immune system or with viral or fungal diseases, as well as patients following head and hip surgery.

Dr Philip Stevens believes it is time to revolutionise pathogen diagnostics. In 2017, together with two molecular biologists and a Founding Angel, the then 28-year-old bioinformatician founded Noscendo GmbH. “We set out to bring microbiology into the 21st century. Genomics and information technology are now so advanced that entirely new, software-based methods for identifying pathogens are possible. This can save many lives”, says Stevens, now CEO of Noscendo.

What that means is demonstrated by the DISQVER® analysis platform, developed by Noscendo and approved in 2019. The platform identifies more than 16,000 microbes including 1,500 described pathogens (bacteria, DNA viruses, fungi and parasites) within 24 hours. DISQVER examines the cell-free DNA in the patient’s blood sample using next-generation sequencing, a new, exceptionally fast method for DNA analysis. Noscendo’s bioinformatics algorithms then compare this information against an extensive clinical genome database. A report detailing all the germs detectable in the blood is provided within a few hours. Analysis of other body fluids such as liquor (cerebrospinal fluid), lung lavage and synovial fluid is also possible.

Three application examples show what impact this can have on patient treatment:

- According to the Jena Sepsis Foundation, in Germany alone around 75,000 people die of sepsis each year. Sometimes these patients spend weeks in the intensive care unit because the medical professionals have no indication of what pathogen is causing the critical condition. Some germs cannot be identified using conventional blood cultures – because they are too sensitive, or the volume of pathogens in the blood is too small, for instance. Rather than appropriate, targeted treatment, the only option is administration of broad-spectrum antibiotics. It is not uncommon for multiple organ failure to occur, resulting in the death of the patient. DISQVER offers the possibility of reliably identifying more than 1,500 different pathogens within a short period of time – even during or after antibiotic treatment. This information enables medical professionals to initiate more targeted countermeasures that significantly increase the patient’s chances of survival.
- Another area is haematopoietic malignancies (haematological oncology). If the body’s immune system is shut down – for a stem cell donation, for instance – patients are especially vulnerable to infections. The body can then become diseased due to pathogens that are not dangerous for healthy people – such as *Rhizopus stolonifer*, also known as black bread mould. DISQVER can even detect rare pathogens where there is no initial suspicion, so that assistance can be provided rapidly.

- Software-based pathogen identification with DISQVER provides information not only about the type of germ, but also how well-developed it is. If the DISQVER analyses of two different body fluids from a sick person are compared, this provides an indication of the location of the infection – such as whether the lungs or the brain is affected. Using the current standard approaches, this has hitherto been possible only in the rare cases in which cultures provide positive results.

The fact that Noscendo is not simply another among the scores of start-ups in the healthcare sector is evidenced by the presence of James Rothman, winner of the Nobel Prize in Medicine, as a member of the company's Strategic and Scientific Advisory Board. In addition, well-known clinical groups such as the university hospitals in Bonn and Mainz cooperate with Noscendo, as do major regional hospitals and hospital groups such as Asklepios.

Health insurance companies such as TK and IKK Südwest have already signed supply contracts for Noscendo's systems. With DISQVER, Noscendo helps these organisations reduce the length of stay in intensive care units and lower the costs of follow-up care, by treating patients more effectively and helping them recover more quickly. The specific cost savings that can be achieved in patients with sepsis as a result of clinical treatment based on the DISQVER results will be demonstrated in the 'DigiSep' study, which is set to start in September 2021 and will be financed by the Joint National Committee.

The idea of transferring the fluid biopsy procedure used in prenatal diagnostics and oncology into the field of infectiology comes from Dr Kai Sohn, head of the Innovation Field In-vitro Diagnostics at the Fraunhofer Institute for Interfacial Engineering and Biotechnology (IGB) in Stuttgart. Together with Dr Silke Grumaz, who also specialises in molecular biology, Dr Sohn has been carrying out intensive research into this challenging subject since 2010. The breakthrough came in 2016 with the use of the innovative method on patient samples at Heidelberg University Hospital. At that time, Dr Philip Stevens was a research associate at the IGB, prior to receiving his doctorate at the Max F. Perutz Lab (MFPL) in Vienna in 2017. Together with Dr Peter Haug, who as a Founding Angel has already launched life sciences start-ups with a number of technical teams, Grumaz, Sohn and Stevens founded Noscendo GmbH in January 2017. After the founding team succeeded in convincing a number of investors of its idea, product approval of DISQVER followed in July 2019. Noscendo currently employs around 20 staff in Duisburg and Reutlingen.

Noscendo and its founders have already received a host of awards for their pioneering approach. Noscendo was named Health-i Pioneer 2020 by Handelsblatt and the Techniker Krankenkasse (TK). The award honours highly innovative ideas in the healthcare sector. In 2019, the scientific project behind DISQVER was awarded the 'SIK Innovation Prize 2019' by the Stuttgart Intensive Care Congress (SIK).

In 2018, the MIT Technology Review recognised Philip Stevens as 'Innovator with the Most Social Impact 2018', and as an 'Innovator under 35 – Germany'. In 2019 MIT awarded him the 'Innovator under 35 – Europe' prize.

**More information:**

<https://noscendo.com/>

<https://innovationsfonds.g-ba.de/projekte/neue-versorgungsformen/digisep-optimierung-der-sepsis-therapie-auf-basis-einer-patientenindividuellen-digitalen-praezisionsdiagnostik.426>

Grumaz *et al. Genome Medicine*, 2016 <http://bit.ly/2euFBVh>,

Grumaz *et al. CCM*, 2019 <https://bit.ly/36VqDNz>



### About Noscendo

Noscendo GmbH is the leading global provider of software-based pathogen identification technology. With around 20 employees in Duisburg and Reutlingen, we've made it our objective to revolutionise infection diagnostics, thus saving patient lives.

Using conventional diagnostic methods based on blood cultures, clinical or microbiological laboratories usually require from two days to several weeks to identify a limited set of pathogens. The analysis platform DISQVER, approved in 2019, identifies more than 16,000 microbes including 1,500 described pathogens (bacteria, DNA viruses, fungi and parasites) within 24 hours. DISQVER examines the cell-free DNA in the patient's blood or other body fluid using next-generation sequencing, a new, exceptionally fast method for DNA analysis. Noscendo's bioinformatics algorithms then compare this information against a clinical genome database. A report detailing all the germs detectable in the sample is provided within a few hours. This time-saving, precise pathogen identification enables healthcare professionals to treat serious infections in a targeted manner – in intensive care units, for instance, or when dealing with blood diseases such as leukaemia. This reduces the use of broad-spectrum antibiotics which contribute to the development of resistant germs, resulting in serious disease progression and higher mortality.

Scores of well-known university hospitals, such as those in Bonn and Mainz, major regional hospitals and hospital groups such as Asklepios are already using DISQVER. The start-up Noscendo also works with health insurance providers such as TK and IKK Südwest.

Noscendo was named Health-i Pioneer 2020 by *Handelsblatt* and the Techniker Krankenkasse (TK). The award honours highly innovative ideas in the healthcare sector.

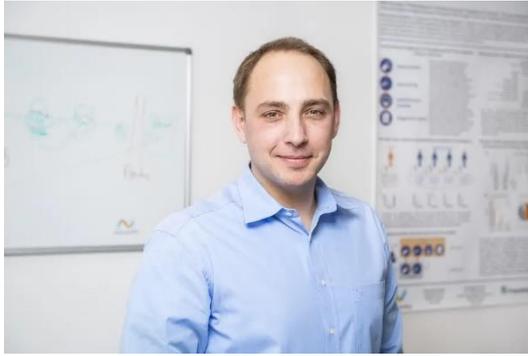
### Image material



The analysis platform DISQVER identifies more than 16,000 microbes including 1,500 described pathogens (bacteria, DNA viruses, fungi and parasites) in the patient's body fluids, within 24 hours. This time-saving, precise pathogen identification enables healthcare professionals to treat serious infections in a targeted manner. (Image source: Noscendo)



## The management team at Noscendo GmbH



Dr Philip Stevens is co-founder and CEO of Noscendo GmbH. A bioinformatician, Dr Stevens earned his PhD at the Max F. Perutz Lab (MFPL) in Vienna, a research centre attached to the University of Vienna and the Medical University of Vienna at the Vienna BioCenter. Together with Silke Grumaz and Kai Sohn, head of the Innovation Field In-vitro Diagnostics at the Fraunhofer Institute for Interfacial Engineering and Biotechnology (IGB), he developed DISQVER, a software platform for rapid pathogen identification. In 2018 the MIT Technology Review recognised Philip Stevens as ‘Innovator with the Most Social Impact 2018’, and as an ‘Innovator under 35 – Germany’. In 2019 MIT awarded him the ‘Innovator under 35 – Europe’ prize. (Image source: Noscendo)



Dr Silke Grumaz studied biology at Hohenheim University in Stuttgart. Having completed her doctorate at the Fraunhofer Institute for Interfacial Engineering and Biotechnology (IGB), Dr Grumaz has continued to work at the Institute since 2013 researching the subject of diagnostics based on next-generation sequencing. She is co-founder and Chief Scientific Officer (CSO) of Noscendo GmbH. (Image source: Noscendo)



As co-founder and Chief Strategy Officer, Dr Peter Haug is responsible within Noscendo for business development and the company’s strategic positioning. After completing his doctorate in chemistry and studying business management, he built up a contract manufacturing group with a turnover of more than EUR 250 million and 1,500 employees from plants at AstraZeneca, Bristol Myers Squibb and Roche. As a Founding Angel, since 2011 he has supported technically oriented teams from various research institutions in launching innovative start-ups in the Life Sciences sector, and particularly in diagnostics. (Image source: Noscendo)



The patient's sample is examined using next-generation sequencing, a new, exceptionally fast method for DNA analysis. Noscendo's bioinformatics algorithms then compare this information against a clinical genome database. A report detailing all the germs detectable in the sample is provided within a few hours.