

Scientist develops biosensor for the fight against antibiotic resistance

- **Hatice Ceren Ates of the University of Freiburg has been awarded the Klee Prize by VDE DGBMT and the Klee Family Foundation**
- **A multiplex biosensor enables close monitoring of antibiotics and the simple but accurate verification of medication levels in the body**
- **For the first time, the second- and third-place prizewinners also received prize money**

(Frankfurt, June 2, 2022) Our antibiotics are currently at risk of losing their potency as antibiotic resistance reaches dangerous levels. Hatice Ceren Ates of the [FIT Freiburg Center for Interactive Materials and Bioinspired Technologies and the Department of Microsystems Engineering \(IMTEK\)](#) has invented a device that will make an important contribution to the fight against antibiotic resistance and has been awarded the €5,000 Klee Prize in recognition of this.

Current medical practice aims to keep the concentration of medication in a patient's blood within a certain therapeutic range. This is a difficult task, since that range varies widely from person to person. "To make the regular measurements required for this both quick and affordable, I developed an electrochemical multiplex biosensor for temporally monitoring antibiotics. It can work simultaneously with various bodily fluids – such as blood, plasma, urine, saliva or respiratory gas samples," explains Ates, a 30-year-old doctoral student. "In the study, we show that the sensor can even be used to measure the concentration of antibiotics in the breath of mammals, which can then be correlated with the antibiotics level in their blood. That was not possible until now."

Giving resistant bacteria a taste of their own medicine

The test is also based on a penicillin-binding protein, a natural receptor protein used by resistant bacteria to recognize and fight the antibiotics threatening them. "By using this protein to our advantage, we're giving the bacteria a taste of their own medicine," says Ates. Born in Ankara, Ates obtained her Bachelor's degree in Chemical Engineering at [Middle East Technical](#)

[University \(METU\)](#) before completing her Master's degree in Micro and Nanotechnology with Honors. She has been a doctoral candidate at the University of Freiburg since 2019.

For the first time, the second and third place prizewinners also received prize money. €2,000 went to Dr. Maria Francisca Porto Cruz, also from the University of Freiburg. For her dissertation, she developed an implant that can improve the transmission of signals from the brain to a computer. The technology is beneficial in brain-computer interfaces, which could help people who cannot communicate with their voice or gestures. Giorgio Luongo of the [Karlsruhe Institute of Technology \(KIT\)](#) received €1,000. His dissertation presents methods establishing a basis for tailored therapy for atrial fibrillation and atrial flutter using clinical data, simulations and machine learning.

The [Klee Family Foundation](#) and the German Society for Biomedical Engineering in the Association for Electrical, Electronic & Information Technologies (VDE) award the prize to scientists each year for practice-based developments in the field of medical technology.

About the German Society for Biomedical Engineering within VDE (VDE DGBMT)

The German Society for Biomedical Engineering within VDE (VDE DGBMT) is the largest scientific and technical society in the field of medical engineering in Germany. It was founded in Frankfurt am Main in 1961.

VDE DGBMT networks experts from all areas of technology applications in biology and medicine. With approximately 2,000 members and 23 expert committees, it covers the entire range of topics in biomedical engineering. In addition, it offers conferences and workshops for specialist audiences and is the sponsor of two international scientific journals: Biomedical Engineering and Current Directions in Biomedical Engineering published by Walter de Gruyter. The DGBMT also awards prizes for young scientists, for scientific excellence and innovation, and for patient safety in biomedical engineering. Last but not least, it represents German biomedical technologies in international committees.

For more information, visit www.vde.com/dgbmt

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