

Technion Team Wins Discovery Award as Part of Nesta's £10 Million Longitude Prize

Team Prismatic developed a rapid antibiotic susceptibility test, winning an international prize as part of Nesta's Longitude Prize competition

Team Prismatic, a collaboration between Prof. Ester Segal research group at the Department of Biotechnology and Food Engineering at the Technion and clinicians from the Bnai Zion Medical Center, was awarded with the Discovery Award for their promising developments in rapid diagnostics for antimicrobial resistance. Team members include Heidi Leonard, a PhD student at the Department of Biotechnology and Food Engineering; Liran Holtzman, a graduate of department; Prof. Ofer Nativ, chairman of the Department of Urology at Bnai Zion Medical Center; Prof. Sarel Halachmi, vice chairman of the Department of Urology at Bnai Zion Medical Center; Prof. Ester Segal, professor in Biotechnology and Food Engineering; Prof. Leigh Canham, a UK representative from the University of Birmingham.



Team Prismatic: Prof. Ester Segal, Heidi Leonard and Liran Holtzman from the Department of Biotechnology and Food Engineering at the Technion (upper panel, left to right). Prof. Leigh Canham from the University of Birmingham, Prof. Ofer Nativ and Prof. Sarel Halachmi from the Department of Urology at Bnai Zion Medical Center.

The team has developed a technology that provides a determination of antibiotic resistance within less than three hours. Using minimal volumes, bacteria are grown on small photonic silicon chips. Heidi Leonard, who leads the research effort, explains that “By measuring how light reflects off the surface of these “bio-chips” (See Figure 1), we can determine whether bacteria are growing or dying in the presence of certain antibiotics and specific antibiotic concentrations. Importantly, our results are in excellent agreement with existing laboratory techniques.” The preliminary findings and concepts were recently published in the prestigious journal *ACS Nano* (“[Unraveling Antimicrobial Susceptibility of Bacterial Networks on Micropillar Architectures Using Intrinsic Phase-Shift Spectroscopy.](#)” *ACS Nano*, 2017, 11 (6), 6167-6177).

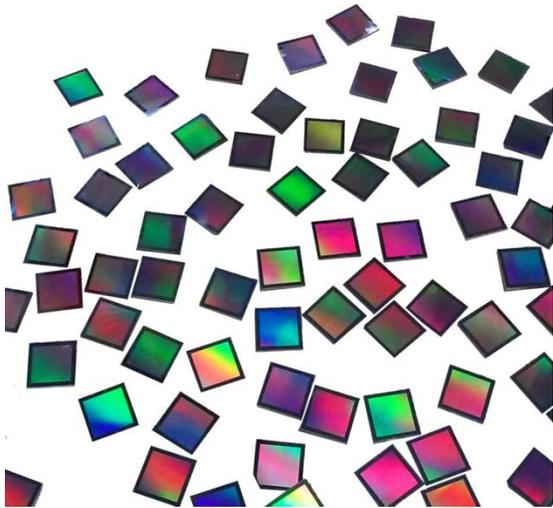


Figure 1: Prismatix “bio-chips” are small photonic silicon chips onto which bacteria can be grown directly from clinical samples. The response of bacterial cells to different antibiotics at varying concentrations can be read optically using simple equipment and provide physicians with the correct type of antibiotics and dose to treat the patient.

In Europe alone, it is estimated that more than four million people acquire hospital-associated infections annually. Determining the correct antibiotic for an infection in a timely manner is critical for both a patient and to prevent the spread of antimicrobial resistance; however, a typical laboratory workup procedure requires 24 hours to confirm the presence of bacteria, and another 24–36 hours to identify the correct antibiotic to use. In total, the routine hospital lab time can take 1–3 days, during which time incorrect antibiotics may be administered, which can facilitate the growth of resistant strains. It is estimated that by the year 2050, antimicrobial resistance will be the cause of 10 million deaths per year worldwide, surpassing cancer to become the leading cause of death.

Innovative teams from companies and academic institutions from all over the world applied for a Discovery Award in 2017, but only thirteen teams of which were granted a Discovery Award. Funding for this round was sponsored by global healthcare company MSD (commonly known as Merck). For Team Prismatix, the award will aid in the fabrication of disposable, microfluidic devices with integrated their photonic biochips in order to facilitate the analysis of clinical samples, such as urine and blood. The seeding grant is aimed to give the teams an advantage when applying for the final prize, sponsored by the innovation charity Nesta, of £10 million by September 2019, which already has over 240 teams (spanning across 41 countries) registered. In order to win the prize, the team must develop an affordable, fast, and easy-to-use test for bacterial infections that will allow health professionals to administer the correct antibiotics.

The Discovery Awards ceremony, in conjunction with the 2017 World Antibiotic Awareness week, was held at the Nesta headquarters in London and was attended by team leader Heidi Leonard and Dr. Sarel Halachmi.

For more information on Team Prismatix and the Longitude Award, visit <https://longitudeprize.org/blog-post/qa-making-30-minute-test-is-our-challenge>.