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"Digital" Micro-wells Array Device for Naked-eye based Low-cost, Calibration-free, Rapid Detection of Antimicrobial Resistance

Since the discovery of penicillin in 1928, antibiotics have been a critical public health tool in battling diseases caused by bacterial infection and saving the lives of millions of people around the world. Today, however, the emergence of drug resistance in bacteria is reversing the miracles of the past eighty years, with drug choices for the treatment of many bacterial infections becoming increasingly limited, expensive, and, in some cases, nonexistent. As a rising public health problem, antibiotic resistant bacteria cause at least 2 million infections and 23,000 deaths each year in the United States, according to the Centers for Disease Control and Prevention (CDC). Therefore, there is an urgent need to develop innovative, rapid, low-cost, calibration-free point-of-care laboratory diagnostic devices that identify and characterize antibiotic resistant bacteria and/or distinguish between viral and bacterial infections to reduce unnecessary uses of antibiotics, a major cause of antibiotic resistance. With real-time detection, healthcare providers would be able to identify infecting pathogens and resistance factors within hours, rather than days, and use the knowledge to tailor treatment to each individual.