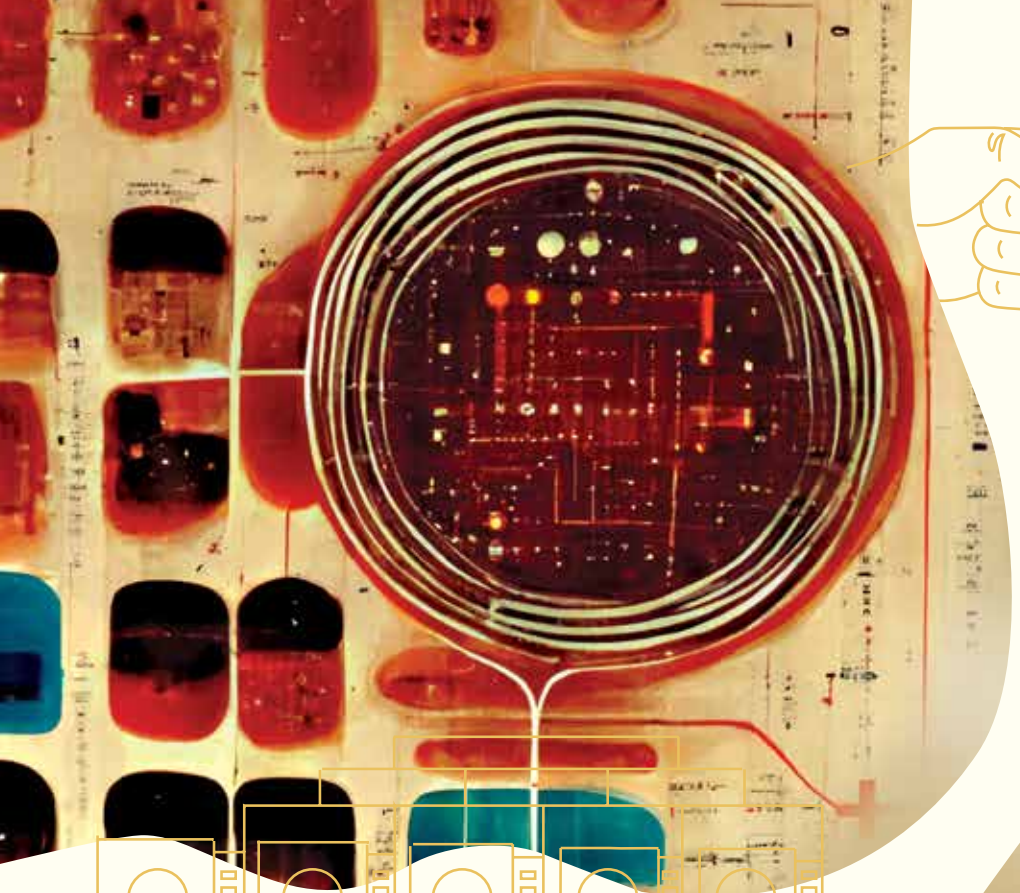

Low-cost Nucleic-Acid Based Rapid Diagnostic Test

Developed a handheld device for diagnosing oral cancer, which doesn't need infrastructure investment

Accurate outcome

Cost efficient

Quick result

The age of microfluidics: From point-of-care to extreme point-of-care

It is often said that we live in the Digital Age. But it wouldn't be too far-fetched to say that this is also the Age of Microfluidics. The discipline of microfluidics developed in the 1980s and since then it has grown in leaps and bounds. The study of how fluids move and function in the tiniest of channels is called microfluidics. Fluids tend to move differently in smaller tubes than they do in larger pipes. And this has important implications for how we understand everything from drug delivery in the human body to diagnostics.

These special properties of fluid behavior in small channels are being exploited to develop new cutting-edge diagnostics and treatment. Microfluidics is the basis of creating benchtop on-chip systems that mimic human physiology. The development of pharmaceuticals and diagnostics can be prohibitively expensive. However, on-chip systems can help reduce costs considerably while providing accurate results. Using microfluidics in diagnostics and treatment has the advantage of making these interventions cost efficient, quick, easy to use, and accurate. Prof. Suman Chakraborty has made important advances in microfluidics, and taken the concept of point-of-care diagnostics to extreme point-of-care diagnostics using his knowledge and findings. During the COVID-19 pandemic, Prof. Chakraborty and his collaborators developed a Nucleic Acid-Based Rapid Diagnostic Test which helped in quick detection of infectious diseases. Based on their study of capillary action of fluids, Chakraborty and his team also devised the Finger-Prick Blood on Paper Strip which is an extremely low-cost diagnostic test that can measure glucose, lipid profile, hemoglobin from a simple pinprick size blood sample, which can be analyzed using a smartphone app. Such a device has the advantage of being widely accessible.

Prof. Chakraborty has used microfluidics to develop a handheld device for diagnosing oral cancer. This device uses thermal imaging to detect changes in blood flow in human tissue thus detecting changes that may indicate tumors. The reason that oral cancer was the focus was because this is a common ailment due to tobacco use. Around 1 million people die of oral cancer annually in India. Lack of access to early detection and diagnosis exacerbates the problem. The device doesn't need specialized training to use and doesn't need infrastructure investment. In initial testing, the device has demonstrated an impressively high 97% accuracy and has passed Phase-1 clinical trials. If rolled out, it could prove to be a game changer for rural areas with no access to healthcare or medical personnel and has the potential to save millions of lives.