

New strategy for early detection of breast cancer biomarkers can help treatment

Incidences of breast cancer are rising in India, as is the mortality rate. The key to successful treatment of the disease lies in its early detection.

Currently employed techniques for breast cancer detection require highly skilled personnel to operate them, are expensive, time-consuming, have poor sensitivity, and limited potential for early diagnosis of disease. Some of the techniques in use are immunohistopathology, ELISA, Mammography and biopsy.

Every individual who has been diagnosed with breast cancer have to go through a triple marker test. Simple and early detection of these biomarkers could help in early diagnosis, monitoring, and treatment strategies like Endocrine or Trastuzumab therapy.

Dr. Saurabh Kumar from Centre for Nanoscience and Engineering (CeNSE) at Indian Institute of Science, Bangalore, India, a recipient of the INSPIRE Faculty Fellowship Award instituted by the Department of Science & Technology, Govt. of India is integrating microfluidics devices (exploit the physical and chemical properties of liquids and gases at a microscale) with electrochemical technique for simplifying the multiplexed detection of breast cancer biomarkers.



He, along with his group, is using ‘ultrathin 2D Nanomaterials Based Biosensor for the purpose. Efforts of his group involve automation and simultaneous detection of these biomarkers in a single chip that extends immunocapture beyond single marker recognition. Their proposed detection strategy would increase the sensitivity of detection, rapid analysis, and reduce reagent usage. They have already optimized channel dimension, electrode design, and flow rate to obtain the best signal and explore the properties of the microfluidic biochip. Now they are also trying to detect three biomarkers (ER, PR, and HER2) simultaneously in a single microfluidics chip, enabling more specific diagnosis, therapy, and monitoring of breast cancer.

“This fellowship is helping me to not only pursue my research in the new strategy but also train students in cutting-edge research in biosensor technologies and actively engaged in the development of tools for bio-research and clinical diagnosis,” said Dr. Saurabh Kumar.

The new detection strategy can bring about devices which may save women who cannot access timely treatment of breast cancer due to delay in finding out about the disease.

Publication:

VaishakhKedambaimoole, Neelotpala Kumar, Vijay Shirhatti, Suresh Nuthalapati, Prosenjit Sen, M.M. Nayak, K Rajanna, **Saurabh Kumar***, *Laser-Induced Direct Patterning of Free standing Ti_3C_2 -MXene Films for Skin Conformal Tattoo Sensors*, (Under communication at ACS Sensor)

Saurabh Kumar* et al. (2019) "Nanomaterial Modified Conducting Paper Fabrication, Properties and Emerging Biomedical Applications" **Global Challenges**, 2019, 12, 1900041.

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