

Statement from the Applicant regarding the Research work: Dr Kaustabh Kumar Maiti

In the area of cancer diagnostics, significant development has been achieved based on newly evolved spectro-histology and spectro-cytology modalities where functionalized nanoparticle probes were preciously synthesized for ultrasensitive detection of various human cancer biomarkers from cervical, breast, lung, and prostate using an advanced version of Raman scattering (surface-enhanced Raman scattering: SERS) and Imaging as a diagnostic modality. *The most pioneering two works emphasized herewith i.e., (1) SERS-nanotag as a diagnostic kit confirmed the concomitant detection of multiple breast cancer biomarkers (ER, PR, and Her2 as a prognostic/predictive marker) in a single breast tissue samples using antibody-conjugated SERS-nanotags and (2), a label-free ultrasensitive SERS-technique and chemometric algorithm (Machine-Learning Artificial Intelligence platform) was utilized to successfully generate a differential Raman spectral fingerprint for the prediction of three major grades of cervical cancer from clinically relevant exfoliated cell samples of the cervix.*

The SERS-nanotag kit can be used for real-time detection of the breast cancer biomarkers, as and when the sample tissue is extracted from the source. Hence, this kit has immense potential to determine immediate treatment strategies in heterogeneous breast cancer cases. This highly valued cancers diagnostic SERS platform has been developed.

I would like to confirm that no awards or recognition have been received by myself for the mentioned development.

In both the diagnostic probe development a number of researchers were involved and contributed to the construction of nano-probe and clinical samples analysis.

Dr Visnu Priya, Dr Varsha Karunakarn, Dr. Asha Lekshmi, Ms Selvakumar Deepika, Dr. Valliamma N. Saritha, - contributed to the tissue processing and optimization of SERS-nanoprobe-based three biomarker detection.

Mr. Madhukrishnan Murali, Dr. Manu M. Joseph, Dr. Jyothi B. Nair, Dr. Giridharan Saranya, Ms. Shamna Kottarathil, & Dr. Adukkadan N. Ramya- contributed the SERS-nanotag preparation

Dr. Kozhiparambil G. Raghu, Dr. Kunjuran Sujathan, - contributed the general inputs and suggestions of the work.

Dr. Krishnan Nair S. Kumar- contributed to the chemometric analysis of cervical cancer grades.

All the contributors are recognized as co-authors of the publication stated below:

Publications:

- ❖ A clinically feasible diagnostic spectro-histology built on SERS-nanotags for multiplex detection and grading of breast cancer biomarkers; Vishnu Priya Murali, Varsha

Karunakaran, Madhukrishnan Murali, Asha Lekshmi, Shamna Kottarathil, Selvakumar Deepika, Valliamma N. Saritha, Adukkadan N. Ramya, Kozhiparambil G. Raghu, Kunjuraman Sujathan*, Kaustabh Kumar Maiti,* *Biosensors and Bioelectronics*, 227 (2023), 115177 (Impact Factor: 12.54)

- ❖ Diagnostic Spectro-cytology revealing differential recognition of cervical Cancer lesions by label-free surface enhanced Raman fingerprints and Chemometrics; Varsha Karunakaran, Valliamma N. Saritha, Manu M. Joseph, Jyothi B. Nair, Giridharan Saranya, Kozhiparambil G. Raghu, Kunjuraman Sujathan*, Krishnan Nair S. Kumar*, Kaustabh K. Maiti* *Nanomedicine: Nanotechnology, Biology and Medicine*, 2020, 29, 102276 (Impact factor: 6.45)

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14/08/2023