RGCB
DISCOVERIES FOR A BETTER TOMORROW

Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram 695014, Kerala State, India.
An Autonomous National Institute for Discovery, Innovation & Translation in Biotechnology and Disease Biology,
Government of India, Ministry of Science & Technology, Department of Biotechnology.

राजीव गाँधी जैव प्रौद्योगिकी केन्द्र, तिरुवनन्तपुरम 695 014, केरल, भारत.
जैवप्रौद्योगिकी और रोग जीवविज्ञान में आविष्कार, नवीनता एवं अनुवाद की स्वायत्त राष्ट्रीय संस्थान,
भारत सरकार विज्ञान एवं प्रौद्योगिकी मंत्रालय, जैवप्रौद्योगिकी विभाग.

Justification for Sponsoring the nomination

Dr. Kaustabh Kumar Maiti joined CSIR-NIIST in the year 2012 and quickly established an interdisciplinary research area within the interface of chemistry, biology, and nanoscience. His research focus was on the development of functionalized nano-particle probes for ultrasensitive detection of various human cancer biomarkers and other non-communicable diseases viz., Alzheimer's Disease (AD) using advanced Raman spectroscopy (surface-enhanced Raman spectroscopy: SERS) and Imaging as a diagnostic modality. His pioneering work on label-free ultrasensitive SERS technique enabled the prediction of three major grades of cervical cancer from clinically relevant exfoliated cells of the cervix. He also developed a diagnostic screening SERS kit for concomitant detection of multiple breast cancer biomarkers in breast tissue samples using antibody-conjugated SERS nanotags. The kit has immense potential to evaluate immediate treatment strategies in heterogeneous breast cancer cases. In the current ongoing activity, an innovative technique has been developed for early cancer detection from blood samples using advanced Raman spectroscopy (SERS) and Artificial Intelligence (AI) as a diagnostic modality he is focusing on a new development of SERS-AI-based technology for early detection of multiple cancers from blood.

Moreover, Dr. Maiti showed his strong expertise in the area of nanomedicine and developed several model nano-carrier drug-delivery systems (DDS) for the targeted delivery of various combination therapies. In cancer nanomedicine, he has established multimodal theranostic nano-probes utilizing photodynamic therapy (PDT), photothermal therapy (PTT), chemotherapy as well as immunotherapy. Dr. Maiti, extended his expertise on new phytochemical entities (NPCEs) as anti-cancer Hits using a semi-synthetic modification of potent phytomolecules and evaluated by the standard *in vitro* screening techniques along with Raman Spectroscopy. Dr. Maiti has developed two SERS-based diagnostic technology for breast and cervical cancer and he has acquired several outstanding contributions in high-impact publications in international journals. He is currently well-reputed in this area, Nationally and Internationally.

Therefore, I strongly recommend Dr. Maiti for Sun Pharma Science Foundation Research Fellowship Awards 2024 for his outstanding contributions to Medical Sciences especially in Basic Research for the development of cancer diagnostic nanoprobes using surface-enhanced Raman spectroscopy.

Chandrabhas

Professor Chandrabhas Narayana
Director, Rajiv Gandhi Centre for Biotechnology
Department of Biotechnology, Govt. of India

प्रोफेसर चन्द्रभास नारायणा
PROFESSOR CHANDRABHAS NARAYANA
FNASc, FASc, FRSC
निदेशक / DIRECTOR
राजीव गाँधी जैव प्रौद्योगिकी केन्द्र
RAJIV GANDHI CENTRE FOR BIOTECHNOLOGY
जैव प्रौद्योगिकी विभाग / DEPARTMENT OF BIOTECHNOLOGY
भारत सरकार / GOVERNMENT OF INDIA
तिरुवनन्तपुरम - 695 014 / THIRUVANANTHAPURAM - 695 014

राजीव गाँधी जैव प्रौद्योगिकी केन्द्र
RAJIV GANDHI CENTRE FOR BIOTECHNOLOGY