PRO-Media Coordinator's Office
Jamia Millia Islamia

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Press Release

JMI alumnus develops novel methodologies to detect COVID virus

Early identification of SARS-CoV-2 infected patients is central to controlling the COVID-19 pandemic with no available treatment option or vaccine . Similar to a recently reported one-minute breathe-analyzer test to detect corona virus by researchers from Israel, in a landmark study Jamia Millia Islamia(JMI) alumnus Dr Amit Dutt and his team at Tata Memorial Centre, Mumbai has developed a proof of concept study describing Raman spectroscopy-based rapid screening methodology that can be offered at a point of care (such as an airport or a railway station) to test for the presence of an RNA virus in human saliva, within minutes at no recurring cost.

This test would be helpful to identify and immediately subject the individual infected with an RNA virus to epidemiological containment measures, while validation for the presence of SARS- CoV-2 virus can be performed based on a qRT-PCR at a specialized facility.

This Raman spectroscopy-based test has prediction accuracy to 91.6% (92.5 % sensitivity and 88.8 % specificity) to detect RNA viral positive samples. This assay comes along with a freely downloadable automated computational tool to analyse the data obtained from Raman spectrometer, which can be performed remotely on the data generated at the point-of-care within few minutes.

A manuscript describing the details of the findings has been published in an international peer-reviewed Journal of Biophotonics, and the computational tool RVD developed by the group has already been downloaded by more than 10 groups from across the globe in just last 2 days.

In another parallel study to complement the Raman spectroscopy-based screening test, Dr Dutt and colleagues have additionally developed a rapid, easy to implement qRT-PCR based assay to validate the presence of SARS-CoV-2 virus. The ACTREC-SARS-CoV-2 diagnostic assay comes with an automated analysis using a novel platform-independent in silico tool, COVID qPCR Analyzer to analyse and generate test report, at an overall cost of under $3 per reaction with a turnaround time of less than 2h. This in-house developed diagnostic assay identifies the uniquely conserved region of the virus using Taqman probes designed against the SARS-CoV-2 genes and human RNase P gene, as control. The kit was evaluated with a panel of 27 clinical samples by performing 184 validations with dilutions of samples ranging from 1-100 ng, that can detect the virus at high sensitivity, with 15 copies of the virus as the limit of detection. The kit was found to be 100% specific and 100% sensitive based on accurate identification that needs to be validated on a larger sample set. The findings from this study have been accepted for publication in another international peer-reviewed Heliyon, a Cell Press group journal.

In brief, while the whole nation was under strict lockdown, Dr Dutt's and his group were relentlessly braving the lockdown working at extended and odd hours—with limited resources in

hand-- to ensure timely development of valuable measures to detect the SARS- CoV-2 in a reliable and cost-efficient manner.

JMI Vice Chancellor Prof. Najma Akhtar congratulated Dr. Amit and his team for developing new methodologies to detect COVID virus. “Our students and alumni must continue to play a significant role locally, nationally and globally and provide both leadership and support to initiatives that address the most significant issues of our times”, she said.

Dr Amit Dutt is a scientist, geneticist and the principal investigator at Advanced Centre for Treatment, Research and Education in Cancer (ACTREC) of Tata Memorial Centre. Known for his outstanding contributions to cancer genetics, in particular the role of novel mutations in Indian lung cancer patients.

He is a Wellcome Trust / DBT India Alliance Intermediate Fellow. He obtained his MSc in Biosciences in 1997 from JMI followed by his doctoral studies in Plant Genetics in 2000, under the mentorship of Dr Vanga Siva Reddy, ICGEB, and Dr Arif Ali, JMI.

Dr Dutt pursued his second Ph.D. degree from the University of Zurich, Switzerland and later moved to the Broad Institute of Harvard and MIT, USA, to complete his postdoctoral research in Cancer Genomics. He relocated back to India in 2011 to join Tata Memorial Centre, Mumbai, as a Principal Investigator to lead his independent research group.

More recently, the Council of Scientific and Industrial Research, the apex agency of the Government of India for scientific research, in recognition of the contributions made by Dutt Laboratory in India, awarded him the Shanti Swarup Bhatnagar Prize for Science and Technology, one of the highest Indian science awards in Medical Sciences in 2017.

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