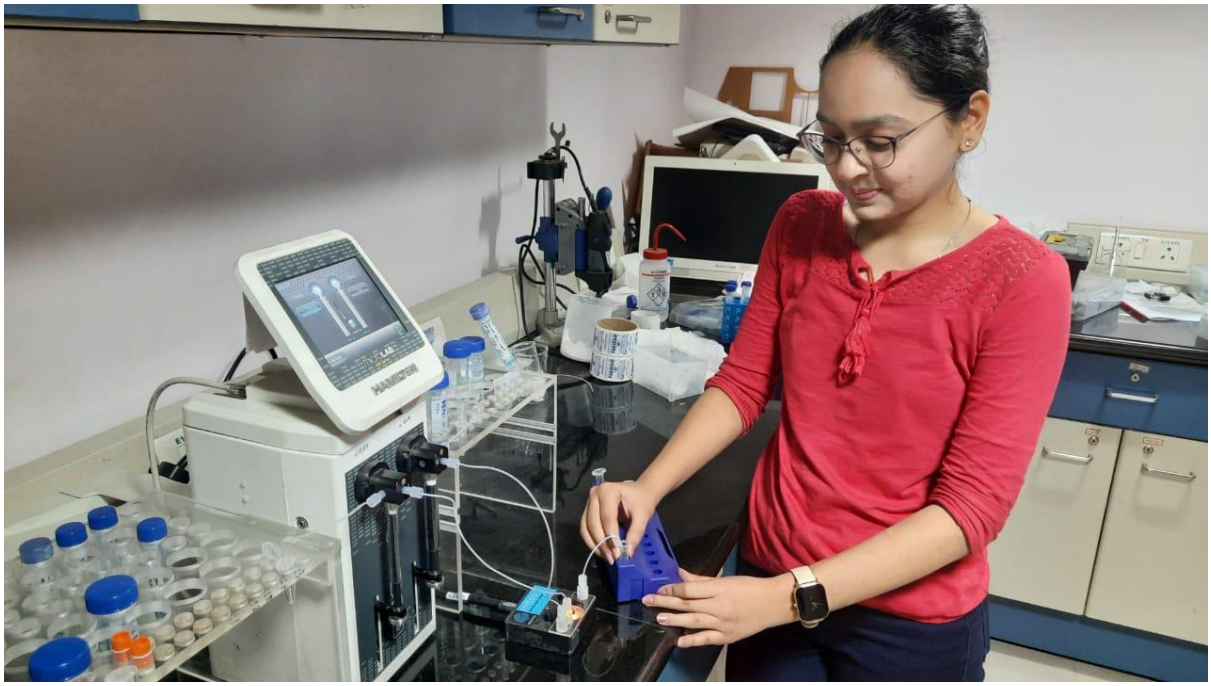
CSIR-CCMB

CCMB & AIC-CCMB leading mRNA vaccine technology in India

Hyderabad, 13th May, 2022: mRNA vaccines are among the leading vaccine technologies today. The world witnessed the power of the first mRNA vaccines during COVID-19 pandemic. Vaccines work by training our immune system to identify disease-causing micro-organisms and eliminate them quickly when they encounter them subsequently. mRNA vaccine technology does this by introducing an mRNA of the micro-organism of concern. This mRNA in the host cells gives rise to the microbial protein or a part of it, which trains the immune system to evade it when the real infection happens with the same live micro-organism.

CSIR-Centre for Cellular and Molecular Biology (CCMB) is leading the development of mRNA vaccine technology in India. It has now announced the development of a potential mRNA vaccine candidate against SARS-CoV-2. The mRNA vaccine technology so developed, is indigenous and devoid of any technology contributions from elsewhere. The team at the Atal Incubation Centre-CCMB (AIC-CCMB) led the development of the vaccine candidate.



Process of mRNA encapsulation into lipid nanoparticles to be used as a potential vaccine

"We observed robust immune response against SARS-CoV-2 Spike protein in mice, upon administration of two doses of the mRNA. The anti-Spike antibodies generated were found to be more than 90% efficient in preventing the human ACE2 receptor

binding to the coronavirus," said Dr Rajesh Iyer, scientist involved in the project. Currently, the mRNA vaccine candidate is undergoing pre-clinical challenge studies to evaluate its efficacy to protect against live virus infection.

"The current war with COVID-19 pandemic had brought to light many vaccine technologies, and India's vaccine programme is highly lauded. However, we lacked the potent mRNA vaccine technology, as developed by Moderna or Pfizer/BioNtech to combat COVID-19 in the U.S.A and Europe. The developed technology is different from mRNA vaccine being developed from Gennova Bio, which is based on self-replicating RNA," said Dr Madhusudhana Rao, CEO, AIC-CCMB and the lead scientist of this work. He added that the AIC-CCMB team were able to establish mRNA vaccine technology and develop a home-grown mRNA vaccine candidate against SARS-CoV-2 in less than a year since the inception of the project.

Even though COVID-19 is waning, the vaccine platform holds promise for many infectious diseases that India faces. "This a proof-of-principle wherein we have shown that we can replicate the mRNA vaccine technology end-to-end. The beauty of this technology is in its modularity and rapid turn-around times. That means with significantly less efforts, the developed technology can be used to sire vaccine for other infectious diseases like dengue, tuberculosis or malaria." said Dr Vinay Nandicoori, Director, CCMB. He also added that CSIR, the largest research and development organization in Ministry of Science and Technology, India, has taken prescient initiatives to establish capacities within India in modern health technologies as part of its program on self-reliance.