

DBT-NCCS scientists exploring vaccine candidates and therapeutic strategies

A scientist at the Department of Biotechnology's Pune-based National Centre for Cell Science (DBT-NCCS) is developing a mathematical and computational model-based project to explore possibilities to generate peptide-based vaccine candidates. These mathematical model studies would enable identification of those viral sequences which have evolved with time. These diverse sequences could be utilized for designing peptides with different amino acid combinations. Once the combinations are prepared, these could be tested for their efficacy against the covid-19 virus. It is anticipated that, since a combination of peptides identified from diverse viral sequences will be used, these peptides if found active, could act on diverse covid-19 variants and provide cross-protection even if small genetic variations are found. To begin with, the scientist has initiated work on generation of a machine learning model that is based on patient datasets from China (Wuhan), Italy, and USA, besides India. She has generated a peptide library through machine learning techniques and is screening the peptides towards the solved crystal structure of proteases.

Machine learning algorithms would be able to screen diverse sequences, based on which therapeutic peptides could potentially be designed with a high probability of success. While conducting these studies in a regular lab can typically take a long time, these algorithms could identify therapeutic targets against the disease within months. Further, these algorithm studies would help reduce costs and since these algorithms are performed taking into consideration several conditions, the chances for failure of drug discovery are reduced. Once tested, these could help provide a viable therapeutic strategy to combat the pandemic. If found successful, this strategy could serve as the basis to tackle other similar emergency situations in the future, where machine learning could be employed for developing therapeutics in a shorter span of time.

Outreach

NCCS has also been engaged in outreach activities. 'Manav - Human Atlas Initiative', a project undertaken by the Centre collaboratively with IISER-Pune and Persistent Systems, launched a nationwide online science quiz series - "Manav Science Quiz करोना" on 4th of April, to engage students and science enthusiasts during the quarantine in a fun activity that will concomitantly help increase awareness about COVID-19 and SARS-CoV-2. The goal of this weekly quiz contest is to nurture scientific inquisitiveness especially among students, and also to propagate correct scientific information from trusted sources like advisories released by the World Health Organization, Ministry of Health and Family Welfare, Government of India, and the Center for Disease Control and Prevention, USA. Links are provided on the quiz page to encourage the participants to use these credible resources to satiate their curiosity. The first two quizzes in the series received an overwhelming response from twenty-two states. The 'Manav' team will also be conducting webinars on "How to read Scientific Literature". It is envisaged that these quizzes and webinars will help students use their time in a productive manner during the lockdown. The activities could also inspire students to apply science to address problems relevant to the society at large. The links to participate in the quiz will be regularly posted on the 'MANAV - Human Atlas' social media handles.

