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“Our goal is to make new molecules with new mutations to develop an RSV vaccine in India”

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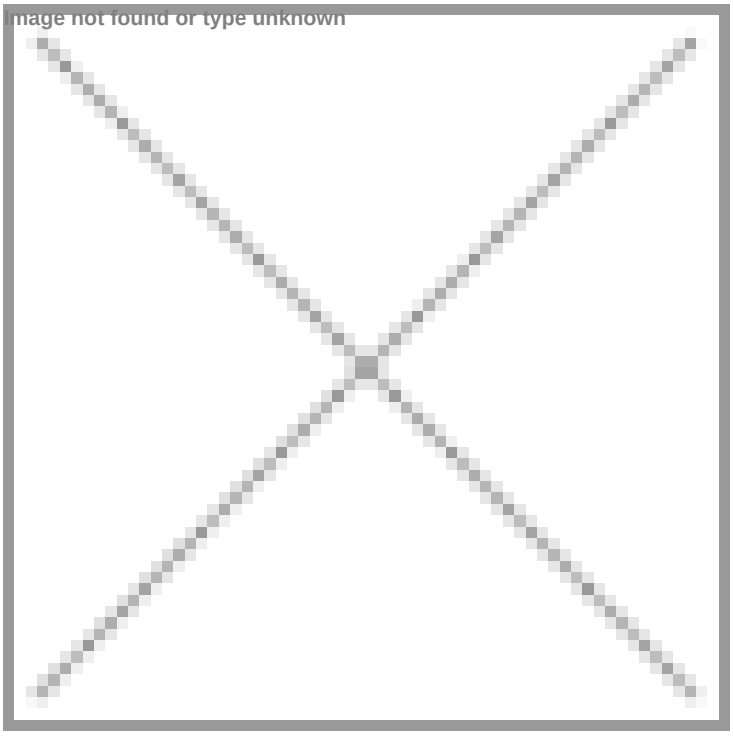
Dr Raghavan Varadarajan, Professor, Indian Institute of Science (IISc), Bengaluru has won the Tata Transformation Prize 2024 in the healthcare category, with a prize money of Rs 2 crore. Dr Varadarajan is currently working to develop a cost-effective Respiratory syncytial virus (RSV) vaccine that will allow for greater access to wide-spread deployment of vaccination programmes. To find out more about his research and the current scenario of RSV vaccine development in India, BioSpectrum spoke, at length, with Dr Raghavan Varadarajan.



At the outset, congratulations for winning the prestigious Tata Transformation Prize 2024. What are your plans post this achievement?

We will be using the prize money to make the antigens for the RSV vaccine and to test them in small animals for their ability to elicit neutralising antibodies and to protect the animals from viral challenges. Once we have the results in hand, we will engage with other partners to take the final formulation forward, first into clinical trials and subsequently commercialisation. Our immediate industry partner is Mynvax, which is a startup that I co-founded a few years ago, and we work closely with them.

Could you shed light on the RSV vaccine that your lab is working on?

Talking about our approach; on the RSV virus, there's a protein called the F protein which is one of the two major surface proteins of the virus, that helps the virus to infect cells. The challenge is that we need to make it in the proper shape because it's a very unstable protein and during the process of infection it undergoes a change in its shape. Thus, we need to focus on that pre-infection shape, and make mutations to increase both the level of expression and to tie it down into the correct shape, that will permit the virus to enter the host cells. We know that antibodies elicited by this form of the protein prevent infection. Currently, we are in the process of screening the F protein for different kinds of mutations that will stabilise it in the correct shape.

Once the molecule is identified, we need to engage with other partners; it has to be produced under GMP conditions, following which we have to do safety toxicity studies prior to subsequent clinical trials which we expect to initiate after 2-3 years.

What are the current challenges facing the RSV vaccine space in India and globally, and how is your research addressing those challenges?

The main challenge is that the current vaccines are priced at around $300 per dose. RSV vaccines in the west have only been approved about a year ago, one from Pfizer, one from GSK and an mRNA one from Moderna. There is also a lot of IP around the vaccines. In order to strike a difference, our goal is to make new molecules with new mutations. Since the RSV surface protein is quite unstable, this is not easy. Early attempts to make an RSV vaccine in the 1960s failed because of a lack of understanding of this issue.

Besides RSV vaccine development, what other projects are you working upon? Are there any industry partnerships in the pipeline for commercialising your research projects?

We have a flu vaccine for which Mynvax has completed a clinical trial in Australia. We also have another version of the vaccine, which will be starting trials in India and then in the EU in the next couple of years. Those are the two immediate things that we have. We earlier developed thermostable vaccines to combat COVID-19 as well as other sarbecoviruses. For those, there is no commercial interest at the moment but we have them available, should there be another outbreak.

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