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"There are many diseases for which mRNA approaches will be life-saving, including cancers"

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Sir Richard J Roberts, PhD, FRS, who was honoured with the 1993 Nobel in Physiology or Medicine, was recently in India to take part as a keynote speaker for the academic launch of Maharashtra State Skills University. Currently serving as the Chief Scientific Officer at New England Biolabs in the US, Sir Roberts shared his views with BioSpectrum on the importance of doing basic science and research. Edited excerpts;



What are your views on the current application and future perspectives of CRISPR/Cas9 mediated gene editing technology in developing new disease treatments?

CRISPR/Cas9 gene editing is very powerful, but, not yet, as highly accurate as one would like. Certainly it should not be used for germ-line editing at this stage. For somatic cell editing, where one has many cells to choose from as targets of editing and where the products of editing can be carefully assayed to make sure that only those that have been edited perfectly are used for therapy, this technology is both powerful and can be employed. Thus, any disease which affects somatic cells (and not germline cells) would be suitable targets. For instance, Haemoglobinopathies would be obvious choices.

How do you foresee the role of gene and cell therapies in downsizing the cancer burden? Where does India stand in this regard?

Given the success of certain CAR-T therapies in treating some cancers and alternative approaches for yet more, we do seem to be entering an age where cancer may not be the highly feared disease it once was. Nevertheless, we must proceed cautiously and not raise unrealistic hopes for the very near future. India's strengths on the medical front lie elsewhere and I was incredibly impressed by my visit to the Serum Institute in Pune, where the level of the science, the technical proficiency of the employees and the great humanitarianism of the company struck me as worthy of global recognition. If we ever face another pandemic, I would give them full marks for preparedness. We could use them in the US and Europe.

What is your take on the success rate of mRNA-based vaccines in the future?

After the immense global success of the mRNA vaccines to combat COVID-19, it is clear that there are many other diseases for which mRNA approaches will be life-saving. Not only in their use for vaccines, but also for tackling other diseases including cancers. The biggest advantages they offer are the speed with which they can be manufactured once the sequence of the etiological agent is obtained and the opportunity to quickly redesign them if needed. They represent a paradigm shift in disease prevention and it is imperative that we educate the general public about their potential and their inherent safety.

Would you say that we are exploring enough research tools to counter AM)?

Antimicrobial resistance is a very broad category of problems for which no single solution will exist, nor would it be desirable. The extensive deployment of antibiotics when they were first discovered gave them the aura of 'wonder drugs'. And they

were, until the bacteria began to gain resistance. This is a continuing problem with Nature – evolution of organisms in the face of threats leads to mutations that overcome the threat. This is not insurmountable, but does mean that much basic science has to be done so that we constantly learn more about how bacteria work and constantly search for new drugs or tailor old ones to control them. Here is a good example of how basic research will constantly feed the developers with new material and new ideas to combat the deleterious effects of constantly evolving pathogens.

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