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Targeting four pathways of TB

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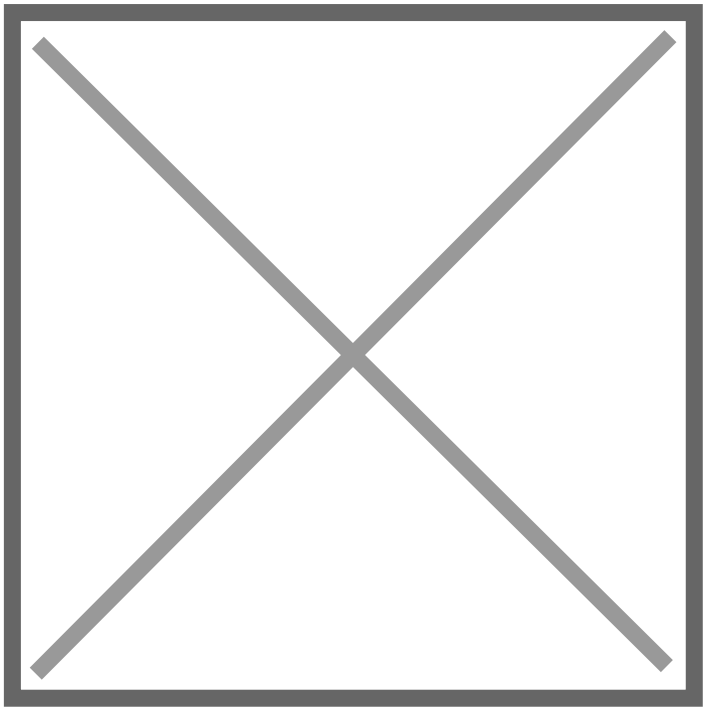
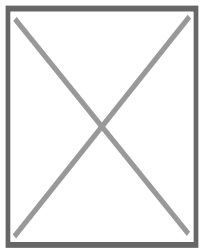
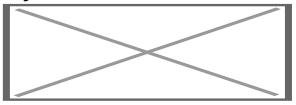




Dr Rajesh Gokhale
director, Institute of Genomics and Integrative Biology, New Delhi

As one of the youngest directors of any research institute in India, Dr Rajesh Gokhale took the initiative of addressing the research deficit in few of the key areas. Challenging the one disease, one drug, one target paradigm, which is dominant in the pharmaceutical industry, Dr Gokhale has been working on an innovative molecule that hits all four of the TB bacterium's crucial metabolic pathways at the same time, weakening and ultimately destroying the pathogen. Setting a new example, Dr Gokhale besides holding the position of director at the Institute of Genomics and Integrative Biology (ICGEB) in New Delhi is also a co-founder of Vyome Biosciences and serves on the board of directors and scientific advisory board of the firms.

Dr Rajesh Gokhale completed his doctorate at the Indian Institute of Science, Bangalore, while working on protein folding under the guidance of Professor P Balaram in 1996. Thereafter, he went abroad to work as a postdoctoral fellow in Dr Chaitan Khosla's laboratory at the chemical engineering department of Stanford University. There he investigated the catalytic mechanisms of modular mega-synthases, such as polyketide synthases. After a distinguished three-and-a-half year stint, he returned to India to pursue research in neglected tropical diseases. He joined the National Institute of Immunology (NII), New Delhi, and continued with his research for 10 years on Mycobacterium tuberculosis. His research group sought to dissect the molecular mechanisms that generate functional diversity through 'enzymatic crosstalk' and thus provide insight into mechanisms employed by pathogens to generate metabolite diversity. During this research, Dr Gokhale was able to find out that Mycobacterium does not produce any secondary metabolites, but makes complex lipids essential for its growth.



Dr Gokhale became a senior research fellow of the Wellcome Trust International Senior Research Fellowship in 2001. In 2003, he was awarded the B M Birla Science Prize. His work was duly recognized in 2006, when he was awarded the Shanti Swaroop Bhatnagar Prize in Biological Sciences. He has published over 40 papers in leading journals, such as Nature, Nature Chemical Biology, Proceedings of the National Academy of Sciences and Molecular Cell. He has been an honorary faculty member of the Jawaharlal Nehru Center for Advanced Scientific Research, Bangalore, and a Fellow of the Indian Academy of Sciences. Ã¢â?¬Å?Science is not an easy job and requires a lot of focus. Thanks to my stint at Stanford, I learnt to think from a different perspective. Deep inside, I always wanted to apply the research outcomes to some beneficial purpose,Ã¢â?¬?

says Dr Gokhale.

At present, Dr Rajesh Gokhale's group is working to understand how metabolic networks are elaborately tuned in nature in three different model systems; is investigating the role of polyketide-synthases in understanding the complex differentiation process of dictyostelium; and is also working on the biochemical mechanisms underlying melanocyte-keratinocyte interactions in context of vitiligo, a disease that hasn't been given due importance so far by researchers in India. At New Delhi-based Vyome Biosciences, Dr Gokhale is playing the role of a mentor and guide to researchers, giving them new ideas to work upon. Dr Gokhale says, Ã¢â?¬Å?We found out that the dermatophytes don't make fatty acids and instead release lipases. Within the next six months, the new innovative product may be launched after undergoing toxicological studies.Ã¢â?¬?

Although dissatisfied with the lack of innovation in the industry, Dr Gokhale believes that research institutes and private companies through joint efforts can play a significant role in changing the scenario. Highly optimistic about the future, Dr Gokhale says, Ã¢â?¬Å?There is a lot of positivity in the country. The next 10 years are expected to be a decade of major opportunities for the biopharma industry.Ã¢â?¬?

Rahul Koul in New Delhi