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Decoding deadly pathogens - <I>Dr Suman Kumar Dhar</I>

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Decoding deadly pathogens



Over a period of 20 years, Dr Suman Kumar Dhar has contributed immensely to understand the mechanism of ATPases and DNA binding proteins in prokaryotes and eukaryotes. Dr Dhar's laboratory is one of the very few that focus on the basic DNA replication and cell cycle regulation of pathogens. His pioneering research has helped him carve a niche in the DNA replication sphere leading to collaboration with different organizations in India and abroad. Recently, Dr Dhar hit the headlines for being selected among the eleven elite scientists of India for the prestigious Shanti Swarup Bhatnagar Prize 2012.

One of the major achievements of Dr Dhar as the head of Special Centre for Molecular Medicine (SCMM) located in Jawaharlal Nehru University (JNU) campus, New Delhi, has been the successful study of replication and cell cycle control of two medically important human pathogens-Plasmodium falciparum, that causes human malaria and Helicobacter pylori, that causes gastric ulcer and gastric adenocarcinoma. Dr Dhar started his studies with the aim to find key regulators in DNA replication processes which could be potential targets for therapy. He also established the extremely difficult culture system of both these micro-organisms.

After completing his BSc in chemistry in 1989 from Burdwan University, Dr Dhar pursued his MSc in biochemistry from Kalyani University, West Bengal in 1992. Later, he completed his PhD in molecular parasitology from JNU, New Delhi in 1998. During his post-doctoral tenure (1998-2001), he studied the initiation of mammalian DNA replication at the Brigham and Women's Hospital, Harvard Medical School, Boston, USA, where he identified the human origin recognition complex subunit six (ORC6). He also showed for the first time that human ORC is essential for viral DNA replication (Epstein-Barr and Human papillomavirus) and geminin, a replication inhibitor could block specifically the viral DNA replication without affecting mammalian DNA replication. He has obtained an international and US patent based on his research findings.

During his research career, Dr Dhar has availed various scholarships such as training grant in emerging infectious diseases, National Institute of Health, USA; post doctoral fellowship in breast cancer, breast cancer research program, Department of Army, USA; Wellcome Trust Senior International Research Fellowship; and Swarnajayanti Fellowship, Department of Science and Technology, to name a few.

Dr Dhar and his team have identified a unique DnaB helicase enzyme in H.pylori that can be loaded at oriC without helicase loader DnaC conserved in E.coli. He has also identified several DNA replication proteins in P.Ã¢â?¬â?°falciparum including the bacterial type gyrase, which is an excellent drug target as revealed by his group. One of the drugs which is being tested for the anti-parasite activity that might affect gyrase, showed very promising results at the nanomolar range. A patent has also been filed on this aspect in India.

On how he plans to take it ahead, Dr Dhar says, "The future goals are two fold: One is to understand the basic biology of the P.Ã¢â?¬â?°falciparum and H.pylori in order to find new targets for therapy. The second is to find out the efficacy of gyrase specific drugs as a combinatorial therapy in the malaria patients."