G N Ramachandran, FNA, FRS, FRSA
Professor, Mathematical Philosophy;
INSA Albert Einstein Professor,
Mathematical Philosophy Group
Indian Institute of Science, Bangalore

Born on 8th October 1922

Education :

- PhD, University of Cambridge, England
- D.Sc, Indian Institute of Science, Bangalore

Important Research Contributions :

- Discovery of the Triple Helical structure of the connective tissue protein called Collagen
- 'The Ramachandran phi-psi Plot' which has become a standard description of protein structure
- Development of the theory of image reconstruction from shadowgraphs (such as X-radiograms) using the Convolution Technique.

Govindarajan Padmanaban

Department of Biochemistry,
Indian Institute of Science, Bangalore

Professor Govindarajan Padmanaban, born on March 20, 1938, is essentially a home-grown scientist with over 45 years of indulgence in Life Sciences research at the *Indian Institute of Science (IISc) , Bangalore* . His experience spans a life-time ranging from that of a student, faculty, director and now a senior scientist at IISc. He grew up with the initiatives in the country to promote modern life science research and biotechnology. He played a key role in ushering recombinant DNA technology in the country and has significant research contributions in the areas of eukaryotic gene transcription and malaria parasite biology. Professor Padmanaban has been a mentor to several researchers in the country. He is deeply involved in promoting new entrepreneurs in the biotech industry and works closely with the *Department of Biotechnology (DBT), Council of Scientific and Industrial Research (CSIR)* and other agencies. He strongly believes that biotech can contribute to alleviate human suffering. He has not hesitated to take up uncompromising positions even in controversial areas such as nuclear explosion or transgenic crops in agriculture. The country has honoured Professor Padmanaban with several awards including Shanti Swarup Bhatnagar Award and Padma Bhushan.

2nd

G N RAMACHANDRAN MEMORIAL LECTURE

Title

Drugs and Drug Targets against the Malarial Parasite

Speaker

Professor Govindarajan Padmanaban
Department of Biochemistry
Indian Institute of Science, Bangalore

4th February 2011, 2.30 PM

Venue

Science City Mini Auditorium
J. B. S. Haldane Avenue
Kolkata

S N Bose National Centre for Basic Science
Kolkata

S N Bose National Centre for Basic Sciences

Block JD, Sector III, Salt Lake
Kolkata 700098

On behalf of the Centre

I have great pleasure in inviting you

to the

2nd

G N Ramachandran Memorial Lecture

on

Drugs and Drug Targets against the Malarial Parasite

at

2.30 PM on Friday,

the 4th February 2011

at the

Science City Mini Auditorium
J. B. S. Haldane Avenue
Kolkata 700046.

Arup Kumar Raychaudhuri
Director

Abstract

Drugs and Drug Targets against the Malarial Parasite

Malaria is a major killer globally. The parasite infects around 500 mn people and causes mortality in more than a million, mostly children in Africa. Two major species, *Plasmodium falciparum* and *Plasmodium vivax* are responsible for the human disease. *P.falciparum* is responsible for most of the deaths. *P.vivax* causes morbidity and tremendous long-term incapacitation. In India there is no authentic estimate of mortality, but more than 2 mn people are affected. Both *P.falciparum* and *P.vivax* infections are seen in the country.

There is no vaccine available against malaria and the parasite has become resistant to the front-line antimalarials. The only effective drug being artemisinin and its derivatives (ART), it is now being used on a regular basis. There is evidence of possible development of resistance to ART as well, and therefore, there is need to identify new drug targets and potential drug molecules. Different laboratories in the world are looking at various drug targets. In our laboratory, two approaches are being followed. The *de novo* heme-biosynthetic pathway in the parasite was discovered in this laboratory over 15 years ago. The genes involved in the pathway have been cloned and proteins expressed and properties of the enzymes involved have been studied. There are several unique features of the parasite enzymes of the pathway, lending them as ideal drug targets. Efforts are underway to study these enzymes in detail to understand the unique features of parasite biology and to identify inhibitor molecules. In another approach, natural molecules are being screened for antimalarial activity. This effort has led to the identification of curcumin from turmeric as a potential antimalarial. In particular, a combination of ART and curcumin has given complete protection against parasite recrudescence that is seen in ART monotherapy in *P.berghei*-infected mouse model. Curcumin in combination with ART has been found to have a short-term direct parasite killing effect and in the long-term has immune-priming effect. This leads to the generation of anti-parasite antibodies whenever the parasite tends to show up in blood. The study has tremendous implication for malaria treatment, if this combination would work in the human. Therefore, a clinical trial against simple malaria has been initiated with ART-curcumin combination therapy.

G N Ramachandran Memorial Lecture
Past Speaker

Raghavendra Gadagkar
Interrogating an Insect Society
3.11.2010