Indian Institute of Astrophysics

भारतीय खगोलभौतिकी संस्थान

IIA COLLOQUIUM

Prof. Kumar Somasundaram

Microbiology and Cell Biology

Indian Institute of Science, Bangalore

Prof. Kumar Somasundaram is a Professor in the Department of Microbiology Cell Biology at the Indian Institute of Science, Bangalore, India. He obtained his Veterinary Medicine degree (1985) from Madras Veterinary College, a Masters in Biotechnology (1987), and a Ph.D. in bacterial genetics (1993) from Madurai Kamaraj University, Madurai, India. Subsequently, he did his post-doctoral training in cancer genetics at Northwestern University and the University of Pennsylvania before moving to the Indian Institute of Science (1999). The primary focus of his laboratory is the genetics of glioma, the most common primary adult cancer. Prof. Somasunderam is an elected fellow of the National Academy of Sciences, India, the Indian Academy of Sciences and the Indian National Science Academy. The Department of Biotechnology of the Government of India awarded him the National Bioscience Award for Career Development, one of the highest Indian science awards, for his contributions to biosciences in 2006.

Cancer is a genetic disease: Understanding the biology of brain tumors

Cancer can be defined as a genetic disease, as the process of a normal cell becoming a cancer (malignant) cell is driven by mutations, which are changes in the gene/DNA. Cancer can also be defined as a disease with uncontrolled cell proliferation wherein some cells of the body proliferate uncontrollably and often spread to other body parts. Most cells in an adult body, except certain types like cells of blood and the reproductive system, do not divide. Even those cells that divide are highly regulated. Cell division occurs through a process called the cell cycle in which the genome (DNA-Deoxyribonucleic acid) is doubled and divided equally between two daughter cells. While nucleotides form the basic unit of the genome, genes (a fragment of DNA) are a genetic unit and carry information for a specific function. When the genes that directly or indirectly control the cell cycle process are mutated, which results in a loss of regulation, uncontrolled cell proliferation occurs. Unlike single-gene disorders that involve defects in a single gene, cancer arises due to defects in multiple genes wherein alterations occur sequentially. Most cancers arise sporadically, involving the accumulation of mutations throughout life, and hence are called diseases of old age. However, approximately 10% of cancers occur as familial cancer in which individuals of these families inherit genetic mutations. Therefore, they are at a higher rate of developing cancer and at younger age. Glioblastoma (GBM), the grade IV glioma, is the most common primary adult brain tumor. Despite advances in therapy over the past few decades, the prognosis remains poor, with a median survival of 12-15 months. My laboratory at the Indian Institute of Science carries out a comprehensive approach to discovering novel genome defects in GBM to understand the biology of this aggressive cancer. My talk will introduce the biology of cancer in the most simplified manner and discuss some of our recent exciting findings.

3:30 p.m., Tuesday, October 29, 2024, Auditorium, Indian Institute of Astrophysics

High Tea 3:00 pm, First Floor Lounge, IIA