



भारतीय प्रौद्योगिकी संस्थान मंडी

INDIAN INSTITUTE OF TECHNOLOGY MANDI

Institute Colloquium

**Evolution: The Rise of Chemistry, the Birth
of Biology and Beyond**



28 March, 2025



05:00PM



**Auditorium, North
Campus**

Prof. Padmanabhan Balaram

**Former Director, Indian Institute of Science
Bangalore, India**

Evolution: The Rise of Chemistry, the Birth of Biology and Beyond

Prof. P. Balaram

National Centre for Biological Sciences, Tata Institute of Fundamental Research, Bengaluru,
560 065

Abstract:

“The word evolution is most closely associated with Darwin and Biology. Yet it is the word that changed physics in my lifetime.” These are the words used by the physicist Jacob Bronowski in his now classic narration of “The Ascent of Man”, in the 1970s, on BBC television. Bronowski is at that point trying to explain the formation of the chemical elements in the stars, by nuclear fusion processes, and concludes *“matter itself evolves”*. Indeed, all the natural elements, present on Earth and accessible by mining, were the Earth’s inheritance when it was born. Geological and chemical evolution must necessarily precede evolution of life on Earth. For almost the first 1.5 billion years of its almost 4.6 billion years of existence, the Earth was devoid of life forms. This was the Hadean age, a period when a molten surface began to settle, a time of asteroid impacts, an unimaginably hostile period for any life form. Yet it was the time that geology and chemistry conspired to create the conditions for the birth of biology.

This lecture provides an elementary introduction to the chemical and biochemical prerequisites for the birth of biology. The speaker’s interest in the area was spurred by the apparently sudden emergence of the SARS-CoV-2 coronavirus in December 2019, followed by the Covid-19 pandemic.

Biosketch:

Prof. Padmanabhan Balaram obtained his B.Sc. (1967) from Poona University, M.Sc. (1969) from IIT Kanpur and Ph.D. (1972) in chemistry from the Carnegie-Mellon University, USA. He was a Research Associate at Harvard University (1972-73). He served on the faculty of the Molecular Biophysics Unit, Indian Institute of Science (IISc), Bangalore from 1973 to 2014. He was Director of IISc from 2005-2014. He has been associated with the National Centre for Biological Sciences, Bangalore since 2017. His research contributions have been in the areas of Molecular Biophysics and Chemical Biology.

He was the Editor of *Current Science* from 1995 to 2013, during which he authored over 300 editorials on diverse subjects related to science and scientists.

He is the recipient of several awards and honours, including Padma Shri (2002), Padma Bhushan (2014) and the R. Bruce Merrifield Award 2021 of the American Peptide Society and the Ernesto Scoffone Prize of the Italian Peptide Society 2024.