In this issue

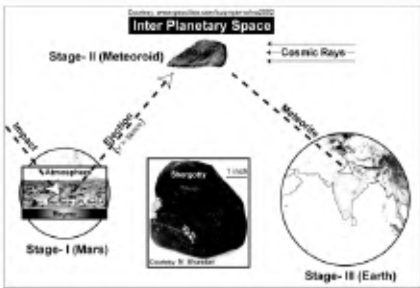
Chandrayaan-1

It has taken forty years for the planetary scientists to realize that the space missions to the Moon and study of rocks brought back by the American and Soviet missions have provided a lot of data but only a brief sketch of the processes responsible for formation and early evolution of the Moon. The key questions of its origin, melting, crust formation, impact history and internal structure remain unresolved. Many of these processes have direct bearing, not only on formation and evolution of the Earth (and possibly life on Earth), but also to our understanding of the formation of the solar system. This realization has led to a renewed interest in lunar exploration with newly developed high resolution sensors. The SMART-1 mission of the European Space Agency, using an electrical propulsion mechanism, is already on its way to Moon and the Indian Space Research Organization has announced a new initiative in planetary exploration starting with Chandrayaan-1, a remote sensing satellite for lunar exploration, to be launched in the next 3 or 4 years. Japan and China are also planning a series of robotic missions culminating in landing and possibly returning samples to the Earth for laboratory analysis. Early this year, the United States announced an ambitious plan of return to the moon, this time to have a continuous human presence by 2020.

Scientific challenges of the Indian moon mission, the proposed payloads and the scientific goals are discussed in this issue (**page 1489**). Chandrayaan-1 is proposed to be a polar orbiter, circling the moon at 100 km for two years, providing topographic, chemical, mineralogic map of the whole lunar surface, with the help of high resolution optical and X-ray imaging systems. This discussion is a follow-up of the article (*Current Science*, 2002, **83**, 377–393) where the current scientific knowledge and the open questions about the Moon were discussed. Hopefully Chandrayaan-1 will answer some of these questions about the Moon and the Earth–Moon system. This mission, in addition to its scientific importance and technical challenges, marks a new direction in ISRO's reorientation into the area of planetary exploration.

Understanding Mars from meteorites…

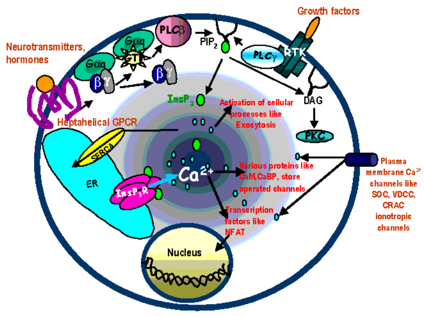
Besides being a neighbour to us in the Solar System, Mars since time immemorial has captured our attention and imagination because of its unique features that highlight its existence as a celestial body. Astronomical observations since the late 19th century and space missions since the late 20th century have significantly advanced our understanding of this planet. However, following the *in situ* analysis of its atmosphere by the Viking Landers and the observation of 'martian atmosphere like' (nitrogen and noble) gases in a meteorite collected from the Antarctic Ice, cosmochemists in the early 1980s discovered a novel and complementary way of studying Mars. Careful examination of the world's meteorite collections (both official and natural) has so far identified more than two dozens of such meteorites, such as Shergotty which fell



in Bihar way back in 1865, linked by unique cosmochemical signatures attesting their origin from the Red Planet. The study of martian meteorites today incorporates a myriad of analytical techniques and provides important insights into the physico-chemical characteristics of their parent body, its origin and evolution in time. R. K. Mohapatra presents (**page 1499**) a concise cosmochemical perspective of Mars based on results obtained from the study of nitrogen and noble gas isotopes in martian meteorites.

The inositol 1,4,5-trisphosphate receptor

The Inositol 1,4,5-trisphosphate receptor ($InsP_3R$) is an intracellular calcium release channel that forms an important component of the Inositol 1,4,5-trisphosphate ($InsP_3$) signalling pathway and is ubiquitously expressed in multicellular organisms. Molecular studies have identified three separate genes in mammals that code for the three isoforms of $InsP_3Rs$. These three isoforms are shown to have



different ligand affinities and modulatory properties. These differences are presently thought to generate the heterogeneity required in calcium dynamics to regulate processes as diverse as secretion, synaptic plasticity, immune responses in T cells and fertilization events in sea urchin eggs. The understanding of these processes mandates an understanding of the single channel properties of the three isoforms as well as splice variants that are expressed in a tissue specific manner. In this issue, Sonal Srikanth and Gaiti Hasan review (**page 1513**) the recent single channel studies performed on point mutants of the $InsP_3R$.

Marine sponges

Sponges (phylum Porifera) represent the phylogenetically oldest metazoans that evolved 750–570 million years ago. N. L. Thakur and W. E. G. Müller (**page 1506**) show that sponges are one of the

richest sources for the isolation of promising bioactive compounds. It is the task of their research to exploit this source under the premises of sustainable use. The article aims to provide an overview of the direct interdisciplinary approaches involved in the exploration of marine sponges for their biotechnological potential.