Professor Autar Singh Paintal, doyen in the field of cardiorespiratory sensory physiology died on December 21, 2004. He was born on September 24, 1925, in the ruby mining town of Mogok in Myanmar, erstwhile Burma. His father Dr. Man Singh was a physician in the British Medical Services. He completed his matriculation from Lahore, and did his intermediate examination of the Panjab University from Forman Christian College. He subsequently obtained admission at King George’s Medical College (KGMC), Lucknow in 1943. His stay at the Medical College (1943-1948) was marked by distinction and awards, including the coveted HEWITT Gold Medal. He did his M.D. in Physiology in 1950 from KGMC, Lucknow (now King George Medical University).

After being appointed as a lecturer in the Physiology Department of KGMC, he proceeded to work for his Ph.D degree (1952) with Prof. David Whitteridge in the Physiology Department of the Medical School in Edinburgh on a Rockefeller Fellowship. While in UK, he developed two innovative techniques in electrophysiology, which revolutionized studies on sensory physiology. The first one involved usage of liquid paraffin for immersing nerves while dissecting and recording from them. The second one was injection of chemicals into the circulation to discover ‘silent’ sensory visceral receptors. For his contributions, he was elected to the British Physiological Society in 1953.

After obtaining his Ph.D, he returned to India to work as a Technical Officer in the Defence Laboratories in Kanpur before taking up the post of Assistant Director at Vallabhbhai Patel Chest Institute, Delhi where he made several discoveries for which he is famous globally. From 1956-1958, he was invited as Visiting Professor at Albert Einstein College of Medicine, New York, USA, University of Utah, Salt Lake City, USA and University of Goettingen, Germany. He was then offered the position of Professor of Physiology at the All India Institute of Medical Sciences (AIIMS), New Delhi where he spent six years (1958-1964). It was during this period that he received his D.Sc degree from the University of Edinburgh in 1960. in 1964, he returned to V.P. Chest Institute as the Director and stayed there till his retirement in 1990. He was the Director-General of the Indian Council of Medical Research during 1986-1991.

During the years 1952-1960, he discovered several sensory receptors in the viscera. These include the type B receptors of the atria, the ventricular pressure receptors, the gastric stretch receptors, the mucosal mechanoreceptors of the intestines, and the pressure pain receptors of muscles. Foremost amongst the receptors discovered by his were the juxtapulmonary capillary or type J receptors which are stimulated by a rise in the interstitial fluid volume and increase in pulmonary blood flow. Their stimulation gives rise to breathlessness and termination of exercise. He described the reflex termination of exercise as one of their most important functions - providing a protective reflex to humans and animals against excessive pulmonary pressures. He and his collaborators showed that these receptors were also stimulated by increased blood flow, as in exercise and that stimulation of J receptors produced respiratory sensations leading to dry cough. His work on the conduction and block in mammalian nerves gave the electrophysiologists a tool to enable them to distinguish between the myelinated and non-myelinated nerve fibres. He also demonstrated that the Head’s paradoxical reflex was an artefact. His contributions came to be described as having opened
a new era in Physiology with Cornelie Heymans and Eric Neil coining the terms “Pre-Paintal” versus “Post-Paintal” while referring to the impact of his discoveries. In his own view, his greatest contribution to science in India apart from his discoveries has been the formation of the Society of Scientific Values, which he helped to establish and served as its first President. This Society, the first of its kind in the world, has as its main objective, amongst others, to promote integrity, objectivity and ethical values in the pursuit of science.

He was widely honoured in India and abroad and was elected to the Fellowship of the Royal Society of Edinburgh in 1966, followed by an election to the National Academy of Medical Sciences, and the Indian National Science Academy. In 1981, he was elected to the Royal Society (U.K.), the first Indian medical scientist to be so honoured. An honorary membership of the Physiological Society (U.K.) and the American Physiological Society followed soon after as did an Honorary Fellowship of the Royal College of Physicians. His outstanding scientific contributions won him several National Awards and Honours viz: Dr. B.C. Roy Award, Medical council Silver Jubilee Research Award, Barclay Medal, Rameswar Birla National Award, First Jawaharlal Award in Science, Acharya J.C. Bose Medal, Silver Jubilee Award, AIIMS, C.V. Raman Award, Jawaharlal Nehru Birth Centenary Award. The President of India bestowed on him the coveted honour of “Padma Vibhushan” in 1986. He was elected as a member of the International Council of Physiological Sciences in 1997 and re-elected for another term up to 2005.

Based on his significant research contributions, the Department of Science and Technology, Government of India set up a Centre for Visceral Mechanisms in the Vallabhbhai Patel Chest Institute to enable him to intensify and extend his work on dyspnoea (breathlessness) and exercise limitation that arise reflexly by stimulation of J receptors. Dr. Paintal continued as the Programme Director of the Centre until his death.

V.K.Vijayan, Director, Vallabhbhai Patel Chest Institute, University of Delhi, Delhi-110007

Professor A.S. Paintal - scientist extraordinaire

During his research career spanning well over five decades, Dr Paintal had less than 400 publications which included original research papers, reviews, papers presented at conferences etc. Most of his papers appeared in international journals but his preference for the British journal - Journal of Physiology (London) is quite clear. The Web of Science, published by the Institute for Scientific Information, Philadelphia lists 236 papers of Paintal from the source journals of the Science Citation Index and as many as 141 from non-source journals. The ‘influence’ of Paintal on biomedical science, especially physiology is distinct and appears to be overwhelming. Until 2004, his papers were cited as many as 3672 times. And they will continue to be cited by researchers paying homage to his outstanding discoveries. Ten of his papers have been cited over 150 times with the reviews were cited extensively - Physiological Reviews (1973) as many as 871 times and Pharmacological Reviews (1964) cited 203 times. That the Physiological Review is cited 12 times even in 2004, underlines its relevance even after 40 years after publication. His path-breaking report on J receptors published in 1969 in Journal of Physiology (London), cited 323 times, and was a Citation Classic. Significantly, all the eight papers that were highly cited appeared in the Journal of Physiology (London). In an era when scientists the world over were fast switching to scientific disciplines which fetched more funding and public glory, Paintal continued to work in a very unfashionable area like physiology. We understand that as a medical student at the King George’s Medical College, Lucknow, he left an unmatched and enviable record of academic accomplishments. True to his style, he has left a legacy for the International science that will be difficult to match.

One of us (KS) has had the privilege of working with Professor Paintal during his brief tenure as the Director-General of the ICMR. While we were overawed by his extraordinary ability as a scientist (a Fellow of the Royal Society in 1981), he was simplicity personified, modest to a fault, and carried his greatness lightly on his slender shoulders. His accessibility to colleagues at all levels was as legendary as were his impeccable manners and old world charm.

K. Satyanarayana & A. Ratnakar