Cell Death in Development & Tumors

Guest Editors

Massimo De Felici[1] and Mauro Piacentini[2]

[1]Department of Biomedicine and Prevention, University of Rome Tor Vergata,
[2]National Institute for Infectious Diseases I.R.C.C.S. 'Lazzaro Spallanzani' and
Department of Biology, University of Rome 'Tor Vergata', Rome, Italy

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Preface

Programmed cell death in development and tumors

Programmed cell death (PCD) plays a fundamental role in animal development and tissue homeostasis. It is now well known that abnormal regulation of this process is associated with a wide variety of human diseases, including cancer.

Historically, the concept of PCD, meaning that cells followed a sequence of controlled (implying an intracellular genetic program) events though their own death, was used by Lockshin and Williams in 1964 in relation to insect metamorphosis (Lockshin and Williams, 1964). However, several years before, embryologists such as Saunders and Glücksmann had observed the frequent occurrence of cell death in various locations and stages of embryo development, and suggested that cell death functions as a crucial mechanism in integrating cells into tissues and organs in normal vertebrate development. Around eight years after the Lockshin and Williams' paper, the term "apoptosis" was coined by three pathologists, Kerr, Wyllie and Currie, to describe common morphologies of cell death in several pathological tissues (Kerr *et al.,* 1972). An essential contribution for the development of this research field was given by the genetic dissection of the cell death pathway in the nematode *C. elegans* carried out by H. Robert Horvitz and his co-workers in the 80s (Ellis and Horvitz, 1986). For these important studies, H. Robert Horvitz together with Sydney Brenner and John E. Sulston received the Nobel Prize in Physiology or Medicine in 2002 *"for their discoveries concerning the genetic regulation of organ development and programmed cell death"*.

Following ideally this temporal sequence in the history of cell death research, after an introductory historical paper, the present Special Issue of *The International Journal of Developmental Biology (Int. J. Dev. Biol.)* starts with a paper describing the role of the ecdysone hormone in inducing cell death during *Drosophila* metamorphosis and continues with papers describing PCD in developmental paradigmatic models such as nervous, reproductive, hind-limb interdigital, eye, and epidermis tissues and ends with reviews dealing with intriguing aspects of PCD in cancer development (cell competition, p63 role, autophagy, immunogenic cell death) and therapies for targeting the PCD pathway. An interview with Guido Kroemer, author of seminal work crucial for understanding the role of mitochondria and autophagy in PCD both in development and cancer embellishes this Special Issue.

Massimo De Felici and Mauro Piacentini
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