Invited speaker: Pierre Golstein
ECDO Honorary Lecture

Cell deaths from Mouse to Dictyostelium.

Pierre Golstein

Centre d'Immunologie de Marseille-Luminy, Parc scientifique de Luminy, 13288 Marseille cedex 9, France

To study cell death, we shifted from Mouse to the protist Dictyostelium discoideum. The latter turns out to be a very favorable, genetically tractable model to study non-apoptotic (eg autophagic, necrotic) cell death. I'll first describe this model, then I'll list several advantages of Dictyostelium to study the induction of non-apoptotic cell death in vitro. First, its small, sequenced and haploid genome facilitates genetic especially mutational approaches. Second, the Dictyostelium genome does not encode the main protein families at play in apoptotic cell death, namely the caspase (except an irrelevant paracaspase) and the bcl-2 families. Thus, the autophagic and necrotic cell death in Dictyostelium can take place with no interference from the apoptosis machinery.
Third, induction of autophagic cell death follows in this case a two-step process, namely starvation-induced sensitization leading to autophagy but not to death, followed by a DIF-1-induced pathway leading to cell death proper. The latter, DIF-1-induced pathway is defined experimentally through sequential additions, and most important also genetically through random mutagenesis leading to the preparation and study of several mutants. Further study of the DIF-1 pathway should shed further light on the induction of autophagic cell death (as opposed to that of just autophagy) in Dictyostelium and by extension perhaps in other organisms. Similar approaches and conclusions also hold for an atg1 mutation and a two-step induction of necrotic cell death.
These and other approaches and results will be described.