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Involvement of the caspase enzymes in satellite cells apoptosis

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Ageing is characterized by an impairment of muscle regenerative potential and a progressive loss of skeletal muscle. This condition, called sarcopenia, has important health care implications for humans, as it contributes to frailty, functional loss and premature death. The ability of skeletal muscle to regenerate is owed to a population of myogenic stem cells called satellite cells (SCs). In previous papers of our research group we demonstrated an age-related decrease in the antioxidant capacity of human SCs that may negatively affect the ageing SCs ability to repair muscle. Despite the involvement of caspases in muscle wasting, the real role of these enzymes is still controversial. To test the possibility of caspases involvement in SCs death in human ageing muscles, we cultured *in vitro* primary cells derived from *vastus lateralis* of young and aged subjects. We analysed both initiator caspases and effector caspases in the presence or absence of specific or broad pharmacologic inhibitors. Furthermore, we evaluated the expression of various genes that play a critical role in oxidative stress and cell death. Our findings highlighted an increased rate of spontaneous apoptosis and an up-regulation of CASP2, 6, 7, 9 and other cell death genes in aged SCs, supporting the hypothesis of an intrinsic ageing of SCs and previous reports demonstrating an increased susceptibility to apoptosis of SCs from old animals. These results suggest that a greater proportion of SCs from old subjects might undergo programmed cell death *in vivo* in response to stressful stimuli, thereby impairing skeletal muscle regeneration.

Biography

Roberta Di Pietro got the degree in Medicine with Honors in 1985 and the PhD in Sports Medicine with Honors in 1988, University of Chieti, Italy. She worked as a visiting scientist in UK at the Biochemistry Department, AFRC, and Cambridge; in USA, at the Pathology Department, USUHS, Bethesda and at the Institute of Human Virology, University of Maryland at Baltimore. She currently works at the G. d'Annunzio University of Chieti, Italy, as a Full Professor of Histology. Since 2007 she joined the Editorial Board of Current Pharmaceutical Design as an Executive Guest Editor and since 2010 she was recognized as a Registered Referee for Archives of Ophthalmological Reviews and Reproductive Biology and Endocrinology. She is now author of 157 scientific publications plus international e-book and Italian textbook chapters.

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