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Apoptosis in vascular cells induced by cold atmospheric plasma treatment RAYMOND SLADEK, EVA STOFFELS, Eindhoven University of Technology — Apoptosis is a natural mechanism of cellular self-destruction. It can be triggered by moderate, yet irreversible damage. Apoptosis plays a major role in tissue renewal. Artificial apoptosis induction will become a novel therapy that meets all requirements for tissue-saving surgery. Diseased tissues can disappear without inflammation and scarring. This is particularly important in treatment of blockages in body tracts (e.g. cardiovascular diseases). Artificial induction of apoptosis can be achieved by means of cold plasma treatment. In this work an atmospheric micro-plasma operated in helium/air has been used to induce apoptosis in vascular cells. Parametric studies of apoptosis induction have been conducted; the efficiency is almost 100%. The apoptotic factors are ROS/RNS (reactive oxygen and nitrogen species). Their densities in the plasma have been measured by mass spectrometry. For apoptosis induction, RNS seem to be more important than ROS, because of their relative abundance. Moreover, addition of a ROS scavenger (ascorbic acid) to the cell culture medium does not reduce the occurrence of apoptosis. Cold plasma is a very efficient tool for fundamental studies of apoptosis, and later, for controlled tissue removal in vivo.

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