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**Application of atmospheric plasma sources in growth and differentiation of plant and mammalian stem cells<sup>1</sup>**  
NEVENA PUAC, Institute of Physics, University of Belgrade

The expansion of the plasma medicine and its demand for in-vivo treatments resulted in fast development of various plasma devices that operate at atmospheric pressure. These sources have to fulfill all demands for application on biological samples. One of the sources that meet all the requirements needed for treatment of biological material is plasma needle. Previously, we have used this device for sterilization of planctonic samples of bacteria, MRSA biofilm, for improved differentiation of human periodontal stem cells into osteogenic line and for treatment of plant meristematic cells. It is well known that plasma generates reactive oxygen species (ROS) and reactive nitrogen species (RNS) that strongly affect metabolism of living cells. One of the open issues is to correlate external plasma products (electrons, ions, RNS, ROS, photons, strong fields etc.) with the immediate internal response which triggers or induces effects in the living cell. For that purpose we have studied the kinetics of enzymes which are typical indicators of the identity of reactive species from the plasma created environment that can trigger signal transduction in the cell and ensue cell activity.

In collaboration with Suzana Zivkovicm, Institute for Biological Research “Sinisa Stankovic,” University of Belgrade; Nenad Selakovic, Institute of Physics, University of Belgrade; Milica Milutinovic, Jelena Boljevic, Institute for Biological Research “Sinisa Stankovic,” University of Belgrade; and Gordana Malovic, Zoran Lj. Petrovic, Institute of Physics, University of Belgrade.

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