## Interaction of Nanosecond and Sub-nanosecond Pulsed Dielectric Barrier Discharge Plasma with Living Systems

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Spatially uniform nanosecond and sub-nanosecond short-pulsed dielectric barrier discharge plasmas [1, 2] are gaining popularity in biological and medical applications [3-5] due to their increased uniformity, lower plasma temperature, lower surface power density, and higher concentration of the active species produced. In this presentation we will compare microsecond pulsed plasmas with nano and sub-nanosecond driven systems and their applications in biology and medicine with specific focus on *wound healing and tissue regeneration*. Transition from negative to positive streamer will be discussed with proposed hypothesis of uniformity mechanisms of positive streamer and the reduced dependence on morphology and surface chemistry of the second electrode (human body) being treated.

Uniform plasma offers a more uniform delivery of active species to the tissue/surface being treated thus leading to better control over the biological results. We will discuss interaction of uniform plasmas with living cells and the biochemical interaction mechanisms leading to angiogenesis, cell proliferation, and differentiation of mesenchymal stem cells. Examples of plasma interaction with living systems will be supported with wound treatment of rats and rabbits and treatment of corneal ulcerations in rabbits.

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