

# CAMT Seminar

## “Mechanisms of Plasma Therapy”

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**Date: October 6, 2017 (Friday) 14:00-15:00**

Location: Main Conference Room (1st floor), Bldg. A12  
Center for Atomic and Molecular Technologies (CAMT)  
(A12 棟 1 階会議室)

### **Abstract:**

In this talk, I address research directed towards biomedical applications of cold atmospheric pressure (CAP) plasma such as sterilization, surgery, wound healing and anti-cancer therapy. The field has seen remarkable growth in the last 5-10 years, but the mechanisms responsible for the biomedical effects have remained mostly mysterious. It is known that plasmas readily create reactive oxygen species (ROS) and reactive nitrogen species (RNS). ROS and RNS (or RONS), in addition to a suite of other radical and non-radical reactive species, are essential actors in an important sub-field of aerobic biology termed ‘redox’ (or oxidation-reduction) biology. These species clearly play some role, but the time- and space-dependence of observed plasma therapy argues for a more complex mechanism. It is postulated that CAP can trigger a therapeutic shielding response in tissue in part by creating a time- and space-localized, burst-like form of oxy-nitrosative stress on near-surface exposed cells through the flux of plasma-generated RONS. In some cases, electric fields appear to play a key role in assisting transport through membranes. RONS-exposed near-surface layers of cells communicate to the deeper levels of tissue via a form of ‘bystander effect,’ similar to responses to other forms of cell stress such as radiation. There is evidence that plasma exposure can stimulate the adaptive immune system as well. In this proposed model of CAP therapeutics, the plasma stimulates a cellular survival mechanism through which aerobic organisms shield themselves from infection and other challenges.

**(Host: Satoshi Hamaguchi Ext:7913)**