

11 December 2020, 11:30 – Online Seminar

## Plasma assisted generation of exogenous reactive oxygen/nitrogen species toward cancer therapy and wound healing

Eloisa Sardella  
CNR-NANOTEC Bari

The plasma is one of the four states of matter, the most widespread form of matter present in the universe (>99%). Plasma can be artificially generated by heating or subjecting a neutral gas to a strong electromagnetic field. It has been decades since began the clinical use of thermal plasma, in which plasma is applied for cauterization as well as blood coagulation. Almost 10 “hot” plasma sources are currently in use in surgery in different hospitals worldwide.

During the last 20 years, with the development in the generation of plasma with low temperature, most plasma applications in the medicine industry were demonstrated for wound healing and cancer treatment.

Almost three CE certified plasma sources are today used in the hospitals for this purpose. Some important milestones were reached during these last years and a nascent field of study known today as “Plasma Medicine” was gradually formed: direct interaction between plasma and biological tissues, cells, and organs. All reported literature attests that the synergy between the plasma and liquid is critical to understanding the outcome of plasma treatment and envision targeted breakthrough in medical therapeutic approaches. The therapeutic use of Plasma Treated Water Solutions (PTWS) is the investigation object of an emerging field known as “Plasma Pharmacy”. In the oncology and neurologic field PALM can be used for harnessing the therapeutic effects of oxidant species against cancer cells or for promoting certain behaviors of Central Nervous System.

The investigation of the effect of Reactive Oxygen and Nitrogen species (RONS) produced in a liquid of biological interest through the plasma, on the survival of tumor cells and their role in promoting Immunological Cell Death (ICD) will be described during the seminar. In this study, the separate contribution of ROS and RNS to the **anti-cancer effects** of plasma conditioned liquids has been investigated thanks to a DBD source designed by E. Sardella, in collaboration with the Leibniz Institute for Plasma Science and Technology (INP), which operates in a closed chamber and a controlled gas environment.

In particular it will be highlighted the role of NO in these modified liquids since NO is involved in the pathophysiology of **neurodegenerative disorders**. Moreover in this seminar will be shown the ability of PTWS containing a balanced level of ROS and RNS to affect primary astrocytes growth, as well as to significantly ameliorate wound healing.

**Short Bio:** Eloisa Sardella is a CNR researcher. She is author of more than 60 papers and has been invited and key note lecturer for more than 10 international congresses.

Eloisa is an expert of non equilibrium plasma processes with different fields of applications including biomedical ones. A recent area of interest is the study of plasma processing of nano- and micro-powders and application of plasma processes on living cells and liquids like cell culture media. She worked in the framework of several National (COFIN/PRIN, FIRB, PON) European Community (IP) projects by collaborating with national /international institutes of research, and companies.

*For info: [alessandrasabina.lanotte@cnr.it](mailto:alessandrasabina.lanotte@cnr.it)*