# Temporal kinetics of light emission from plasma at the interface with animal tissues

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Direct exposure of tissues to atmospheric pressure plasmas is proposed in many clinical applications, in order to induce benefic effects, there were conventional medical methods failed. Examples are plasma induced wound healing, treatment of skin and other tissues, root canals decontamination, blood coagulation [1]. Taking this into account, besides determination of plasma properties, running free in air or in laboratory conditions, it is necessary to study the plasma properties at the interface with biological samples.
In figure 1 it is represented a simplified sketch of the experimental set-up used to study the plasma dynamics at the interface with biological samples. Plasma is generated in a cylindrical barrier discharge in helium. Temporal evolution, with respect to applied voltage pulse and discharge current, of total light emitted by plasma at the interface with the sample is monitored using a photomultiplier. Traces of photomultiplier voltage were stored and analyzed using statistical methods in order to confer high confidence to results. Using interference filters, dynamics of emitted light from selected species such as helium (706 nm), nitrogen molecular ion (391 nm) and oxygen (777 nm) was also studied function on parameters such as amplitude of the driving voltage pulse or its frequency. The influence of tissue type, characterized by its dielectric constant at studied frequencies, was studied using fresh samples of pork muscle, fat and skin.

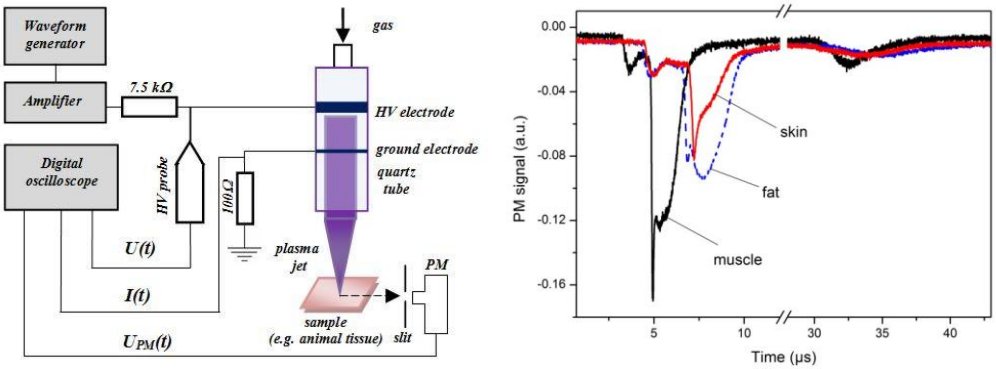


**Figure 1:** *Experimental set-up used for temporal dynamics studies and typical PM traces.*

The PM traces present two peaks from light pulses corresponding to primary and secondary discharges at the surface of the studied samples. Both, duration and area of these peaks, increase with the amplitude of the driving voltage pulse. Differences generated by driving frequency and tissue type are discussed for total light and selected excited plasma species.
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## References

[1] Machala Z., Hensel K., Akishev Y. (Editors), Springer Publishing (2012), Heidelberg, Germany, 1-479.