



COST ACTION CA20114

PlasTHER

THERAPEUTICAL APPLICATIONS OF COLD PLASMAS



Annual Meeting

4th – 7th September 2023, Bologna, Italy

<https://www.plashter.eu/events-archive/2nd-annual-meeting-plashter-bologna-2023/>

1.1 2nd Annual Meeting – 4th – 7th September 2023, Bologna, Italy



The PlasTHER COST Action's primary objective is to exploit the unprecedented potential of atmospheric pressure plasmas in medicine. This endeavor aims to foster the sharing, development, and consolidation of ongoing research into plasma-assisted viable therapies. The ultimate goal is to establish Europe as a leading force in the scientific and healthcare arenas concerning plasma therapies.

The 2nd annual meeting, held in person in Bologna (Italy), September 4th – 7th, 2023, assumes significant importance as it provides a pivotal opportunity for participants to convene, thus contributing to creating a cohesive and solid community. This gathering aims to collectively address community-shared objectives, primarily enhancing plasma therapies' performance to maximize patient benefits.

The essential purpose of the meeting is to facilitate the exchange of the most recent advancements in comprehending the fundamental mechanisms underpinning plasma actions. Additionally, it seeks to generate harmonized protocols that can be adopted throughout the community, extending to various therapeutic domains. A critical outcome of the meeting will be the formulation of individual roadmaps for each area of interest.

Throughout the meeting, we will focus on the COST tasks undertaken by all our working groups, fostering collaboration to produce specific deliverables. From this perspective, the meeting will also involve presenting outcomes from Short-Term Scientific Missions (STSMs) conducted in recent months by the researchers of the cost community.

1.2 Working Groups and Memorandum of Understanding (MOU)

WG1: Fundamental plasma-biological interaction mechanisms

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WG2: Antimicrobial effects of plasma

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WG3: Tissue regeneration

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WG4: Plasma cancer therapy

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WG5: Combination therapies

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WG6: Regulatory, ethics, dissemination & technology transfer

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PDF of the [TECHNICAL ANNEX OF THE MOU](#)

WG4: Plasma cancer therapy

Impact of plasma-activated PBS on human prostate cancer cell line and noncancer prostatic cell line

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Patients with cancer go through difficult treatments that greatly disrupt their lives. Conventional therapies have a strong effect on different aspects of their well-being, such as their physical health, emotions, and overall quality of life. Ideally, an effective treatment modality should possess the ability to selectively target tumor cells, while minimizing harm to healthy cells, ensuring a higher level of resistance in normal tissue. Our research contributes to the growing field of plasma medicine by exploring the potential of cold plasma and plasma-treated liquids as a therapeutic modality [1].

This study focuses on the impact of indirect application of cold plasma via plasma-treated liquids, which contain long-lived reactive oxygen and nitrogen species [2]. The primary objective is to compare the effects of plasma-activated phosphate-buffered saline (PAPBS) treated by cold atmospheric plasma of streamer corona discharge on a human prostate cancer cell line PC3 and human prostatic stromal myofibroblast cell line WPMY-1, used as noncancer cells. Various durations of plasma treating of liquid were examined, alongside different incubation times of cells with plasma-activated PBS. The aim was to assess the effects of these different treatment parameters on noncancer and cancer cells. The outcomes demonstrate a selective effect observed in the targeted cancer cells. Preliminary results of direct plasma treatment by pulsed streamer corona of PC3 and WPMY-1 cells will be also shown.

These findings may pave the way for the development of innovative and more targeted treatment approaches for prostate cancer and potentially other malignancies, aiming to efficient tumor removal and minimize the detrimental impact of therapies on their lives.

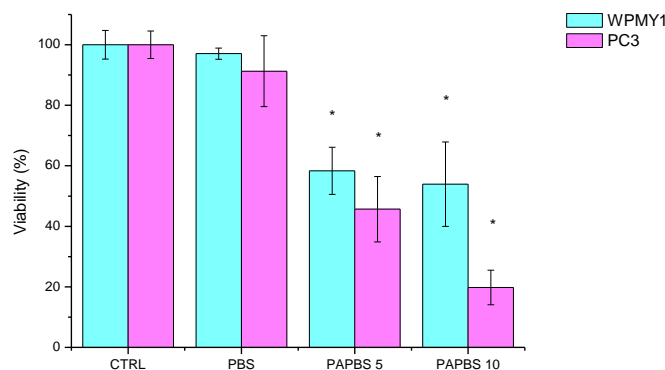


Figure 1: Effect of PAPBS treated 5 and 10 minutes on cell viability of noncancer prostatic cell line WPMY-1 and human prostate cancer cell line PC3 measured by WST-1 assay. The time of PAPBS action was 1 hour, after which PAPBS was replaced with growth medium. Effect of PAPBS was tested compared to PBS. The significant results ($p < 0.05$) are marked with *.

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References

- [1] J. Schlegel et. al., *Clinical Plasma Medicine* **1**, 2 (2013).
 [2] D. Sersenová et al, *Molecules* **26** (14), 4254 (2021)