Influence of the composition of plasma-activated medium on osteosarcoma

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Over the last few years, significant attention has been paid to biomedical applications of Atmospheric Pressure Plasmas (APP). Plasma chemistry leads to the generation of an abundance of reactive species which are suspected to play a key role in selective cancer cell death [1] without damaging surrounding healthy tissues [2]. The anti-cancer properties of the APP have been described in many cancer cell lines, such as breast, skin, lung, pancreas, cervix and brain cancers and only more recently in bone cancer cells [3-4]. Although the cell death mechanisms are not yet precisely known, this selectivity towards cancer cells is associated in literature to the reactive oxygen and nitrogen species (RONS) generated by the plasma treatment, among other potential actors.

In this work, we aim at comparing the effects of different plasma jets on a variety of cell culture media, and discussing how the differences in liquid media composition and plasma conditions affect bone cancer cell viability and proliferation. To that aim, different osteosarcoma cell lines have been studied (ie. SaOS-2, MG63 & MC3T3), and compared to different healthy cells involved in the bone regenerative process (ie. pluripotent or from either bone or from connective tissue). This allowed evidencing the selectivity of the medium. Moreover, the modifications in medium composition allowed identifying some key actors involved in the bone cancer cell death mediated by plasma-activated media (PAM). The generation of intracellular RONS triggered by PAM, and in general the biological effects observed are discussed with regard to the different reactive species generated in the PAM (ie. $[H_2O_2]$, $[NO_2^-]$, short-lived RONS).

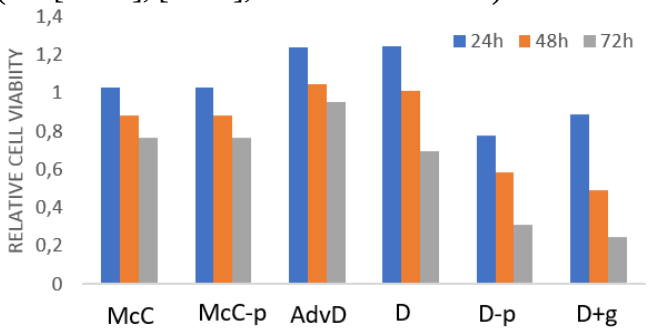

Fig.1: Effect of different PAM & different compositions on bone osteosarcoma cell viability.

Authors acknowledge the financial support of MAT2015-65601-R project (MINECO/FEDER, EU) and from the ERC under the EU's Horizon 2020 research and innovation programme (grant agreement No 714793).

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