LIQUID-MEDIATED EFFECTS OF COLD PLASMA ON BONE CANCER

C. Canal[1,2,*], I. Hamouda[1,2], J. Guillem-Marti[1,2] and M.P. Ginebra[1,2,3]
1 Technical University of Catalonia (UPC), Escola d'Enginyeria Barcelona Est (EEBE), Dept. Materials Science and Metallurgy, University Biomaterials, Biomechanics and Tissue Engineering Group
c/ Eduard Maristany 10-14, 08019 Barcelona, Spain
2 Technical University of Catalonia (UPC), Barcelona Research Center in Multiscale Science and Engineering Barcelona, Spain
3 Institute of Bioengineering of Catalonia (IBEC)
c/ Baldiri i Reixach 10-12, 08028 Barcelona, Spain
* e-mail: cristina.canal@upc.edu

Primary bone cancers (arising directly in bone) are usually treated by a combination of therapies, including surgery, chemo and radiotherapy but patients often relapse. Secondary or metastatic bone cancers found most often in patients suffering from breast or prostate cancer have no therapeutic treatment and associate many drawbacks for the patients. Atmospheric pressure plasmas have already demonstrated selective anti-tumour action in a number of carcinomas and in more relatively rare brain tumours [1], and could represent an alternative and/or complementary therapy for bone cancers.

Our preliminary data have shown proof of concept of the lethal efficacy of treating cell culture medium with an atmospheric pressure plasma jet (APPJ) generated with helium on one kind of bone osteosarcoma cells [2].

Herein, we are interested in expanding those studies and investigating the potential selectivity of plasma-activated liquids towards three different osteosarcoma cell lines (SaOS-2, MG63 and MC3T3) versus different healthy cells involved in the bone regenerative process (pluripotent or from either bone or connective tissue). In general, plasma-treated medium showed cytotoxic effects on bone cancer cells and certain treatment conditions lead to progressive bone cancer cell death through apoptosis, with alterations in the cell morphology, while bone healthy cells remained viable and essentially unaffected by the treatment.

Given the mediation of liquid media on the biological effects of plasmas, we discuss the relationship between these effects and the Reactive Oxygen and Nitrogen species (RONS) generated in liquid medium (cell culture medium) at different treatment times, and the effects of different parameters such as volume of liquid treated in the generation of these species. The results obtained provide a promising novel approach for improved bone cancer therapies.

[1] Graves D B 2014 *Plasma Process Polym.* **11** 1120
[2] Canal C, Fontelo R, Guillem-Marti J, Cvelbar U and Ginebra M P 2017 *Free Radic Biol Med.* (accepted, under revisions)

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