

Direct treatment on live and cancer cells & process innovation of bio-sensor using atmospheric pressure plasma system with low-temperature arc-free unit

Keunho Lee^{1,*}, Hae-Ryong Lee¹, Seung Ik Jun¹, Jae-Hoon Bahn², and Seung J. Baek²

¹PSM R&D Institute, PSM Inc., 707 Mega-Dong, SK Techno-Park 190-1, Sangdaewon-dong, Seongnam-si, Gyeonggi-do, KOREA

²Department of Pathobiology, College of Veterinary Medicine, The University of Tennessee, 2407 River Drive, Knoxville, TN 37996, USA

* Corresponding author (Keunho Lee, kholee@psm.co.kr)

We have characterized the parametric and functional properties of live cell and cancer cell according to plasma treatment conditions using Atmospheric Pressure (AP) Plasma with uniquely designed low temperature arc-free unit. AP plasma system showed very highly efficient capabilities of reacting and interfacing directly with live and cancer cells. The parametric results with the types of gases, applied power, applied gap, and process times on cells will be presented in accordance with functional studies of the works. The growth of cancer cells is directly influenced by AP plasma exposure with evaluating plasma conditions in several human cancer cells and understanding how plasma exposure alters molecular signaling pathways. The cells exhibit a slower or faster growth rates compared with untreated cells, depending on the cell types. These results strongly support the conclusion that alterations in one or more of each gene are responsible, at least in part, for plasma-induced apoptosis in cancer cells. In addition, it also will be presented that AP plasma has an important role for the improvement of sensor performance due to excellent interface property between enzyme and metal electrode for bio sensor manufacturing process.