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Influence of DBD Plasma Exposure on Normal and Cancer Cells Activity

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Non-thermal plasma has attracted medical researchers, since they showed higher apoptosis rate in cancer cells than normal cells. However, it is hard to conclude general cancer cell specific effect because comparison between normal and cancer cell activities after plasma treatment have not been reported yet. This research proposes a comparison of Dielectric Barrier Discharge (DBD) plasma effect on three normal cells lines and three cancer cells lines. We measured cell number, mitochondria activity (MTS assay) and amount of hydrogen peroxide (H₂O₂) for three days. The results show that the number of cancer cells decreased more than normal cells following of exposure time. On the other hand, mitochondria activities and amounts of H₂O₂ increased following of exposure time. In addition, we found that DBD plasma exposure on cell suspension in media and media only illustrated no difference in mitochondria activity, H₂O₂ quantity, and cell number. Thus, we can confirm higher apoptosis rate in cancer cells which is related to the reactive oxygen species (ROS) generated by DBD plasma. The related molecular mechanisms were investigated further.

Keywords: DBD plasma, Hydrogen peroxide, Mammalian cells, Mitochondria activity