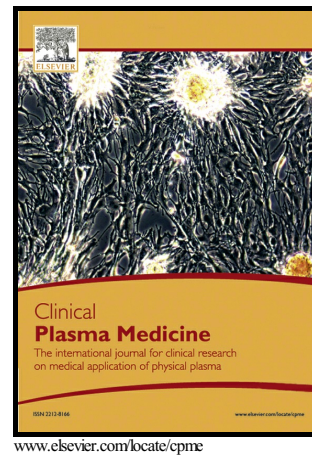


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Enhancement of Cancerous Cells Treatment by Applying Cold Atmosphere Plasma and Photo Dynamic Therapy Simultaneously

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Abstract

Cold atmospheric plasma (CAP) has recently emerged as a novel approach to treat cancer as well as Photo Dynamic Therapy (PDT). The Produced ionized gas (i.e. helium, here) involves highly reactive species which are cell killing responsible in CAP treatments. The photosensitizer 5-Aminolevulinic acid (ALA) was utilized for PDT process. In this paper, the effectiveness of these two techniques separately and also together was examined. The cell killing rates for six groups (i.e. Control, ALA, CAP, ALA&CAP, ALA&LED or PDT, and their combination technique PDT&CAP) on the cancerous human lung carcinoma cells (A549) were investigated using their cell's viabilities obtained from MTT assay. Viability analysis for different time durations of irradiation (plasma and/or light) also showed a decrease in a dose-dependent manner. It was also showed that PDT&CAP treatment could have an enhancement of about 37% relative to PDT and about 41% relative to CAP method (for 60 s irradiation). Hence, combined technique could be known as a promising method for treatment of the cancerous cells which are accessible to light and CAP (e.g. skin cells). Moreover, applying a photosensitizer (e.g. ALA) before CAP therapy could also enhance the treatment process.

Kew words: cancer, cell viability, cold plasma, photodynamic therapy.

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