

Mechanisms of plasma cancer therapy

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Plasma medicine is a relatively new field that outgrew from research in application of low-temperature (or cold) atmospheric plasmas in bioengineering. One of the most promising applications of cold atmospheric plasma (CAP) is the cancer therapy. Convincing evidence of CAP selectivity towards the cancer cells has been accumulated. The efficacy of cold plasma in a pre-clinical model of various cancer types such as lung, bladder, breast, head, neck, brain and skin has been demonstrated. Both *in-vitro* and *in-vivo* studies revealed that cold plasmas selectively kill cancer cells. Recently mechanism of plasma selectivity based on aquaporin hypothesis has been proposed. Aquaporins (AQPs) are the confirmed membrane channels of H₂O₂ and other large molecules. We have demonstrated that the anti-glioblastoma capacity of plasma could be inhibited by silencing the expression of AQP in glioblastoma cells (U87MG) or using the aquaporins-blocker silver atoms. In general, expression of AQPs varies significantly among different cancer cell lines. This study may facilitate the understanding on the diverse responses of cancer cells to plasma treatment.