

***In vitro* and *in ovo* investigations on the efficiency of plasma-treated sodium chloride on four human cancer cell lines**

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Abstract

Several tumour entities such as the colorectal carcinoma, the pancreatic carcinoma or ovarian and gastric cancers are very likely to induce peritoneal carcinomatosis. Current therapeutic options like chemotherapy or the combination of cytoreductive surgery with intraperitoneal hyperthermic chemoperfusion (HIPEC) are often lacking therapeutic success while coming with severe side effects. Hence there is a need to investigate alternative treatment options and to validate the possibility of their translation into clinical practice. Recently, plasma-treated saline solutions showed a significant antitumor capacity in murine models [1, 2], making them interesting as they could be used as future solutions in peritoneal lavage. To enhance our knowledge about the effect of plasma-treated sodium chloride in human cancer cell lines, we investigated the treatments toxicity and cellular oxidation in 2-dimensional cell culture models, as well as in 3-dimensional tumor spheroids. In addition, solid formed tumors were created in transplanting cancer cells on the chorion-allantois membrane (CAM) of fertilized chicken eggs. Such *in ovo*-grown tumors receive complete blood and nutrients supply through the CAM and they were exposed repetitively to plasma-treated sodium chloride to mimic a possible therapy. Following explanation, the secretion of specific damage-associated molecular patterns (DAMPs), and the expression of immunogenic surface molecules through the cancer cells were analysed. Such marker for the immunogenic cell death (ICD) can be utilized by the body's own immune system in tackling the tumor cells. The knowledge gained in our study should help to investigate if plasma-treated sodium chloride enhances anti-tumor toxicity and could be included in an application for ethical approval.

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2. Tanaka H, Nakamura K, Mizuno M, Ishikawa K, Takeda K, Kajiyama H, Utsumi F, Kikkawa F, Hori M: **Non-thermal atmospheric pressure plasma activates lactate in Ringer's solution for anti-tumor effects.** *Sci Rep* 2016, **6**:36282.

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