Translational research in cancer

Cancer stem cell in larynx carcinoma: Resistance or sensibility?
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Introduction. Cancer may arise from mutations in stem cell populations. According with this theory, only a specific subpopulation of cancer cells have the ability to sustain cancer growth, and are resistant to chemo and radiotherapy. These cells are called cancer stem cells (CSC). The aldehyde dehydrogenase (ALDH1) a marker for CSC, is a cytosolic isoenzyme responsible for oxidizing intracellular aldehydes and contributing to the oxidation of retinol to retinoic acid in early stem cell differentiation. Furthermore, activity of the ALDH1 enzyme has been identified as being responsible for the resistance to chemotherapeutic agents and radiotherapy.

Objective. We analysed the ALDH1 expression in epidermoid laryngeal carcinoma treated with radiotherapy or radiochemotherapy in attempt to evaluate the role of such a cancer population in the efficacy of radiotherapy.

Methods. The expression of ALDH1A1 was studied in 25 pts treated in our department from January 2006 to December 2011 for larynx carcinoma. A standard immunohistochemical technique for ALDH1A1 was used. The results were correlated with the site of the tumor, stage and prognosis.

Results. 32% of tumors were positive for ALDH1A1. With a median of 35 months of follow up, no differences were founded for the whole group for relapse-free (RFS) or overall survival (OS). When stage I was excluded from the analysis, better RFS was linked with expression of ALDH1 (83.3 vs. 16.9 p: 0.015). In multivariate analysis stage (II–III vs. IV HR 0.055 p: 0.02) and ALDH1 expression (negative vs. positive HR 21.5 p: 0.02), maintained independent prognostic relevance.

Conclusions. Our findings suggest that ALDH1 expression, a CSC marker, is associated with favourable prognosis and better response to radiotherapy. It may be that not all CSC are resistant to radiation or that ALDH1 is not a suitable CSC marker because terminally differentiated cancer cells can preserve its expression.

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Carnosic acid: Radioprotective effects against damage induced by ionizing radiation
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Purpose. To determine the genoprotective and radioprotective capacity of carnosic acid (CAR) in non-tumour cells (lymphocytes and prostate epithelial cells) against damage induced by ionizing radiation with similar effects produced by different antioxidant compounds.

Methods. The genoprotective effect was studied by means of the micronucleus assay for antimutagenic activity in which the reduction in the frequency of micronuclei was evaluated in cytokinesis-blocked cells of human lymphocytes; a method described by Fenech and Morley (1985) and adapted by the International Atomic Energy Agency (2011). To analyze the radioprotective effects of the substances studied on cell viability and survival, we used the MTT assay for 24 or 48 h in PNT2 cell lines when they were administered before and after exposure to different X-ray doses (4, 6, 8, 10 and 0 Gy).

Results. CAR led to a significant drop in the frequency of MN which expresses the significant genoprotective capacity (p<0.001) against X-ray induced chromosome damage with a protection factor of 50%, and a dose reduction factor of 4.3. Cell survival obtained with the substance showed an increase at the highest dose used, which is an expression of radioprotective capabilities,