ANTI-CANCER THERAPIES ALTER THE EXOSOME PRODUCTION AND FUNCTION OF NASOPHARINGEAL CARCINOMA CELLS

Tarnai Zsófia[1,2]

Gyukity-Sebestyén Edina[1], Harmati Mária[1], Dobra Gabriella[1], Okay Saydam[4], László Janovák[3], Imre Dékány[3], Nagy Katalin[2], Buzás Krisztina[1,2]

[1] Hungarian Academy of Sciences, Biological Research Center, Szeged
[2] Univ. of Szeged, Faculty of Dentistry
[3] Univ. of Szeged, Faculty of Science and Informatics
[4] Med. Univ. of Vienna, Molecular Neuro-Oncology Research Unit

Introduction. Head and neck cancer is the sixth most common cancer worldwide. One of the most remarkable malignancies of the head and neck region is nasopharyngeal carcinoma (NPC). NPC has a high metastatic activity. Beside the conventional metastasis formation pathways, RNA containing exosomes may play a key role in metastatic spread of NPC. Exosomes are nanometer-sized membrane vesicles secreted by cancer cells into the extracellular milieu. NPC-derived exosomes contain microRNAs, which are nowadays in the focus of intense research.
The purpose of this study was to investigate whereby and how the microRNAs packaged into exosomes assist the metastatic mechanism of NPC and how can cytostatic therapy change the characteristics of the tumor derived exosomes. In our model we compared the exosome producing capacity of a NPC cell line under conventional chemoterapy and alternative ($AgTiO_2$ photocatalyst particles generated reactive oxygen species) cytostatic treatment.

Materials and Methods. Cells of the 5-8F NPC cell line were treated with the commonly used chemotherapeutic agent doxorubicin and a new alternative method (photocatalytic activity of visible light active $AgTiO_2$ photocatalyst nanoparticles) to compare the effects on the output of exosomes and microRNA profiles.
MicroRNA content of the nasopharyngeal cell derived exosomes analyzed with SOLiD 5500xl technology. The sequences were annotated in CLC Genomics Workbench version 5.5.1. Nanosight was performed with Nanosight NS500 device.

Results. The cytostatic activity of the $AgTiO_2$ photocatalyst particles generated reactive oxygen species is commensurable with the cytostatic activity of a classic chemotherapic substratum (doxorubicin). Both doxorubicin and $AgTiO_2$ catalysed treatment increased exosome production by the NPC cell line. Our data suggested, that the tumor cell devastation altered both the number and the quality of the exosomes.
We have found significant changes of the expression rate of following microRNAs: miR-205, miR-451a, miR-125a, miR-30d, miR-30c-1, miR-30c-2, miR-425, and miR-17.

Conclusions. We suggest that increased exosome production may potentiate the information-transfer from tumor cells to the surrounding stromal cells and influence metastatis formation during cytostatic treatment. The differences in microRNA profiles after cytostatic versus photocatalytic treatment may lead to the identification of novel therapeutic targets to treat NPC.

A fenti anyagból előadást szeretnék tartani. A téma elméleti jellegű.