The genetic background of pancreatic cancer: Genes that might be biomarkers or indicators of metastasis to the lung.

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Background: Pancreatic cancer is a malignant neoplasm arising from malignant cells which form the pancreas. It is the fourth leading cause of cancer deaths, being responsible for 6% of all cancer-related deaths. Pancreatic cancer is difficult to be diagnosed in its early stages. One major problem is that it metastasizes to regional lymph nodes and later to the liver or to the peritoneal activity and other organs, like lungs. The discovery of new biomarkers for early prognosis, and/or for predicting metastasis to lungs is essential. The present study aims to determine possible genes that are correlated with pancreatic cancer, as well as with other types of malignancies, including lung cancer.

Methods: mRNA was extracted from cancer cell lines representing pancreatic (PANC-1 and BxPC-3), breast (T47D), lung (COLO699N) and colorectal (HT-116) cancer by using oligo-dTs magnetic beads. mRNA was also extracted from breast, lung and cancer stem cells (CSCs) as well as from PBMCs from a non-cancer donor. DNA microarrays were performed in the human Caucasian pancreatic cancer cell line PANC-1 and in the human primary pancreatic adenocarcinoma cell line BxPC-3 by using the Human MI Ready Array platform. Gene expression analysis, for these genes that were over-expressed in both cell lines, was performed by using RT-qPCR in all the above mentioned cell lines. All the reactions were performed in triplicates. A p-value < 0.05 was considered significant.

Conclusions: According to literature and experimental data, there are many biomarkers for pancreatic cancer. PF4 and LYZ are two of them. It has been shown that among toll-like receptors, many of them have been correlated with this type of cancer. However there is no correlation with TLR8. It is remarkable that the above genes are expressed only in pancreatic and differentiated lung cancer cells, demonstrating the common features displaying both types of cancer, as well as the common therapeutic approaches. It is also noteworthy that the above genes are not classified as lung cancer biomarkers. Therefore, they might be considered not only as pancreatic cancer biomarkers, but as potential indicators of metastasis to the lung. It is essential to perform further studies in other cancer cell lines and in more samples, so as to be used clinically. However the first results are quite encouraging.