The Future of Cancer Treatment: Cancer Derived Exosomes In Angiogenesis

Rosenfarb, Guy (School: Shimon Ben Zvi High School)

Gastric cancer is the fourth most common cancer and the second leading cause of cancer related mortality worldwide. Angiogenesis refers to the growth of new blood vessels from preexisting capillaries, supplying the tumor with oxygen and nutrients, so the tumor could develop. Exosomes are extracellular vesicles, which are released from almost all living cells, including cancer cells. Over the years, studies have led to the conclusion that exosomes are solely the waste of the cell. Recent studies have shown that this is not true, as exosomes are highly important in intercellular communication and may serve as a primary cause of the abnormal angiogenesis process in cancer, and of many other dangerous developments of cancer. The aim of the present study was to examine whether there is a link between exosomes emitted from gastric cancer cells and the angiogenesis process. The hypothesis was that there would be an increase in all aspect related to angiogenesis. For this purpose, various parameters were examined and measured. About 99.31% of the exosomes were absorbed in the endothelial cells. Other results have shown a significant increase in the exosomes-treated cells in comparison to the non-treated cells; there was a 1.3 times increase in growth rate; the migration and invasion measured were increased by 7 and 5 times, respectively; the tube formation ability was 1.5 times the original measurement. Additionally, high concentrations of pro-angiogenic proteins were found in the exosomes. These findings demonstrate the important role of exosomes in intercellular communication and in the process of angiogenesis in particular, as well as in the development of cancerous diseases, which may be essential for the development of new cancer treatment strategies in the future.