Stranger Danger: A Novel Approach to Cancer Research Using Morphing -- The Correlation between Intercellular Transfer from Cancer-Associated Fibroblasts and Metastatic Capacity, Proliferation Rate and Phenotype of Osteosarcoma Cells

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Cancer’s evasion of traditional therapies due to the constantly changing phenotype of cancer cells is becoming a major clinical problem and is responsible for 90% of cancer deaths worldwide. Many studies have recently suggested that the tumour-stromal microenvironment may play an important role in determining the characteristics of cancer cells because of the newly discovered phenomenon of intercellular transfer via filopodia/tunnelling nanotubes from cancer associated fibroblasts to cancer cells. It was thus suspected that this intercellular transfer may be impacting the metastatic capacity, proliferation rate and phenotype of cancer cells, resulting in the evasion of traditional therapies such as chemotherapy and immunotherapy. This study found a strong positive correlation ($p<0.01$) between the uptake of intercellular material (e.g. mitochondria) from cancer-associated fibroblasts to osteosarcoma cells and the proliferation rate, metastatic capacity, area and lack of circularity of these osteosarcoma cells by using a standard co-culturing system and live cell imaging over 48 hours. This knowledge is critical for the development of novel and more effective anti-cancer drugs that target the source of the ‘energy’ of cancer cells rather than the cancer cells alone as well as for the development of drugs that accommodate the changing phenotype of cancer cells.

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