Can Tumor Cells Stimulate Macrophages through Cell to Cell Communication without Contact?

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The extent of cell to cell communication between macrophages and tumor melanoma cells in mice was investigated. Two experiments were run. The first was an MTT assay which investigated whether close, but not touching, proximity of the macrophages and tumor cells changed the tumor cell growth. Lipopolysaccharides (an endotoxin on the outside of bacteria that activates macrophages to kill tumor cells) was used as a positive control and would cause the macrophages to secrete and kill tumor cells. It was hypothesized that tumor cells in close proximity but not touching the macrophages would cause the macrophages to secrete nitric oxide which can kill tumors and bacteria. Again, lipopolysaccharide was used as a positive control. In the MTT assay, it was found that all the tumor cells, regardless of being next to macrophages or the Lipopolysaccharides, grew about the same, so thereby the macrophages were causing no growth in the tumor cells. In the Nitric Oxide assay, a statistical significance test showed that the tumor cells were causing the macrophages to express significant amounts of nitric oxide. Because nitric oxide is a secretion of activated macrophages, this means that the tumor cells were causing the J774A.1 cells to show a statistically significant killing phenotype. However, the tumor cells in proximity to the macrophages didn't die, suggesting the tumor cells have become resistant to the nitric oxide. These studies have further developed the relationship of macrophage secretions and their effect on tumor cells. The results of these studies could have an impact on using macrophages to treat cancerous cells and help to understand the full extent of the relationship between macrophages and tumor cells.