Melanoma has long been characterized as the deadliest form of skin cancer, causing over 75% of skin cancer deaths, but there remains a lack of effective primary or adjunct biological treatment options\(^1\). Therapy targeting upregulated genes in melanoma, such as BRAF, is one of the most promising treatment options, however, the majority of patients quickly develop resistance\(^2\). A recent case report showed complete eradication of an incompletely excised basal cell carcinoma following extended placement of a vacuum-assisted closure device containing polyurethane\(^3\). Histological analysis showed a lack of residual tumor cells and a macrophage-driven foreign body response to polyurethane particles, suggesting that this response led to the secondary destruction of residual tumor cells. The purpose of this study is to determine if polyurethane activates an inflammatory response in macrophages that can eradicate melanoma cells. We found that RAW 264.7 macrophages exposed to polyurethane displayed significantly higher rates of TNF\(\alpha\) release, as well as increased cell death when compared to controls. Melanoma cells exposed to polyurethane alone did not display changes in cell death; however, co-culture of polyurethane-exposed macrophages with melanoma cells did result in increased melanoma cell death, even more significantly than exposure to macrophages activated with LPS. Initial analysis of rt-PCR from B16 cells following co-culture with polyurethane-stimulated macrophages shows large alterations in gene expression in several biological areas including epithelial-to-mesenchymal transition, cell cycle, and angiogenesis markers. Interestingly, melanoma cells exposed to polyurethane in the absence of any macrophage involvement did not result in melanoma cell death alone, but rather increased melanoma cell migration, indicating a complex reaction that may be dependent on immune cell presence or absence. Future research directions include additional gene expression explorations, flow cytometry analysis of co-cultures, and deeper analysis of the cytokine microenvironment. In conclusion, we believe that polyurethane induces macrophage activation via upregulation of proinflammatory and phagocytic processes, eventually leading to overactivation, frustrated phagocytosis, cell death, and an environment conducive to neighboring melanoma cell death.