

# PHOTOACOUSTIC DETECTION OF METASTATIC MELANOMA IN THE HUMAN CIRCULATORY SYSTEM

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## ABSTRACT

Detection of disseminating tumor cells can function as an early warning system, alerting the metastatic spread or recurrence of the disease. Early detection of such cells can result in preventative treatment of the disease while late stage detection can serve as an indicator of the effectiveness of chemotherapeutics. We propose a system for the detection of metastatic circulating tumor cells based upon the thermo-elastic properties of melanoma. The method employs photoacoustic excitation coupled with a detection system capable of determining the presence of disseminating cells within the circulatory system *in vitro*. Detection trials consisting of a human melanoma cell line resulted in a detection threshold on the order of 10 individual cells. Melanoma cells were introduced into human blood *in vitro* to mimic a metastatic environment. Results imply the potential to assay simple blood draws from healthy and metastatic patients for the presence of cancerous melanoma providing an unprecedented method for routine cancer screening.