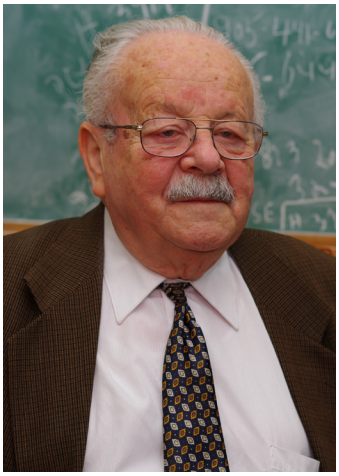

2013 Seeds4Hope Grant Recipient

Dr. Mordechay Schlesinger

"Exploiting Tumour Pressure to Predict Response to Treatment"

SUMMARY OF RESEARCH PROJECT

Cancerous tumours develop interstitial pressure above that of normal tissues. The pressure comes about due to the abnormal tumour vasculature. This extra pressure is predictive of tumour aggressiveness. As such, there is a need to be able to measure the pressure in a straight-forward manner. This project enables us to determine the pressure non-invasively, thus providing the attending physician with information about the progress and utility of the treatment such as chemotherapy and/or radiation. It may be worth pointing out that at present such measurement is possible invasively and so it is impractical to utilize it on a daily basis.

HOW THIS RESEARCH HELPS ADVANCE QUALITY CANCER CARE IN OUR COMMUNITY

Chemotherapy and/or radiation by necessity have detrimental side-effects, some of which may cause morbidity. It is for this reason that it is essential that during treatment physicians need to ensure that patients are benefiting from the therapies. At present, some determination requires invasive methods which can only be applied to accessible tumours. Our approach will not be limited by the location of the tumour, nor will it require cutting or otherwise entering the body. This approach will advance community cancer care by providing a safe means to assess whether a cancer treatment is working and by helping physicians decide when to end treatments that are doing more harm than good.

Another benefit of the proposed research is in forging active, useful, and ongoing collaboration between the medical community (Windsor Regional Hospital) and the academic community (Department of Physics, University of Windsor).

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PROGRESS REPORT

The present research leads to a non-invasive method to determine a tumor's aggressiveness. This involves the accurate determination of the tumor tissue's interstitial pressure. That in turn constitutes an important physiological parameter elevated in aggressive tumours. We have found that it can be determined from three non-invasive measurable parameters: i) an estimate of the velocity of the tumour exudate from the tumour, ii) a measurement of the distance from the tumour surface to where the tumour exudates are absorbed (or normalized), and iii) an estimate of the fluid conductivity of the tissue through which the tumour exudate travels.