Targeted Cancer Treatments With Ultrasonic Transportation

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Typical cancer treatments like chemotherapy are not targeted treatments and kill healthy cells along with cancer cells, causing negative side effects. Targeted cancer treatments are a solution. This research explored both mechanical means of targeting cancer sites along with chemical means. Ultrasonic transportation is the mechanical means of transporting cancer treatments, where acoustic waves generated by a transducer can push capsules towards targeted sites. A bead of Styrofoam was tied to a sting weighed down to the bottom of a water tank. A pulse generator generated 1 MHz and connected to an amplifier increased the wave amplitude. A transducer then produced the waves in the tank and caused the bead to move. The forces on two shapes beads- hemisphere and sphere- were calculated, along with the torque applied to both. It was found the hemisphere moved more efficiently than the sphere. In addition to this, chemically targeted cancer treatments were tested. Oleocanthal and Clinoptilolite were both proposed as possible targeted cancer treatments but with little data available. Clinoptilolite was tested in low, medium, and high concentrations. Oleocanthal was tested in High and Low concentrations along with treatments that were freeze-dried and those that were not to determine if the method of preparation changed the effectiveness of the compound. The procedure used to derive Oleocanthal was not statistically different with respect to regular cells but was with respect to cancer cells. the best treatment was Oleocanthal (Freeze Dried, High).

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