Hierarchically Engineered Nanotheranostic for Ovarian Cancer

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Thousands of people are affected by ovarian cancer each year. Usually, ovarian cancer is not detected in the early stages. Typically, the cancer is detected when a tumor is already formed. The procedure for treating cancer in this situation is having the patient undergo mutilating surgery and then use chemotherapy to treat the remaining cancer cells. However, this treatment is ineffective evidenced by the high mortality of ovarian cancer. The chemotherapeutics only target one part of the cell. This project theorizes if used in combination, the treatment would be more productive because the cell is being damaged in more places. Newer chemotherapeutics are hydrophobic which decreases their bioavailability. The strategy for the experimentation is to exploit the nanoparticle's capacity to accommodate and deliver to ovarian cancer cells various FDA approved hydrophobic drugs that exhibit low bioavailability. The therapies were tested in several concentrations on BR5 ovarian cancer cells for 24 hours. The cell viability percentage was calculated and compared to one another. In addition, the co-therapy effect was evaluated using the cell viability percentages. Co-therapy demonstrated to be more beneficial than free drug therapy in BR5 ovarian cancer cell line. The nanoparticles prevent drugs from precipitating, increases bioavailability of chemotherapeutics, and increased the efficacy of drug combinations containing Afatinib at high concentrations.

Awards Won: