Research Symposium: Research/Clinical Abstract

The Dual Delivery of Y15 and Metformin in a PLGA Scaffold for the Treatment of Platinum Resistant Ovarian Cancer

Emily M. Jordan[1], Hannah Obregon[1], Arkene Levy[2], Sue Anne Chew[1], Ph.D.

[1]Department of Health and Biomedical Sciences, University of Texas Rio Grande Valley, Brownsville, TX, USA
[2]College of Medical Sciences, Nova Southeastern University, FL, USA

Background: Ovarian cancer is the fifth leading cause of cancer mortality among women in the US. High mortality is linked to resistance to platinum compounds. Currently there is no treatment for platinum resistant ovarian cancer (OCpt). Platinum resistance shows increased activity of focal adhesion kinase (FAK). Y15 is a FAK inhibitor and increases OCpt sensitivity to chemotherapy. Metformin induces apoptosis, has no increased cytotoxicity, and works synergistically with Y15 in OCpt cells. Biomaterial scaffolds deliver drugs locally, maximizing drug concentration and bioavailability while minimizing systemic toxicity. PLGA copolymer has excellent biocompatibility, versatility, and a tailorable degradation rate. The objective of this study is to utilize biomaterials as a dual drug delivery system and investigate if the combined delivery of Y15 and Metformin would result in synergistic effects on cell viability.

Methods: A mold-less technique combining PLGA and the drugs in tetraglycol were injected into PBS to form a globular scaffold. An MTT assay was used to analyze cell viability in OCpt OVCAR3 cells at an absorbance of 570 nm with a microplate reader.

Results: Metformin and Y15 resulted in cell viabilities of 66% and 54%, respectively. When combined, the viability decreased to 23%. In studies with the fabricated PLGA scaffolds, cell viabilities were 74% and 89% for Metformin and Y15. When combined, cell viability decreased significantly to 5%.

Conclusions: The delivery of Y15 and Metformin in a biomaterial scaffold can result in a synergistic effect on cell viability and thus, can be a promising approach for the treatment of OCpt.