Kyung-a hwang et al., J Cancer Sci Ther, 3:7
doi: http://dx.doi.org/10.4172/1948-5956.S1.18

OMICS Group Conferences
Accelerating Scientific Discovery

International Conference & Exhibition on
Cancer Science & Therapy
15-17 August 2011 Las Vegas, USA

Coexpression of cytosine deaminase and carboxyl esterase in genetically engineered stem cells migrated ovarian cancer cells and reduced their cell growth through tumor tropic effect

Kyung-a hwang, Min-a park and Kyung-chul choi
College of Veterinary Medicine, Chungbuk National University, Republic of Korea

Genetically engineered stem cells (GESTECs) producing suicide enzymes have recently emerged as an novel therapeutic gene therapy for anticancer treatments. *Cytosine deaminase (CD)* and *carboxyl esterase (CE)* are suicide enzymes that convert non-toxic prodrugs, 5-fluorocytosine (5-FC) and camptothecin-11 (CPT-11) to toxic metabolites, 5-fluorouracil (5-FU) and SN-38, respectively. In this study, we manufactured *CD* or *CE*-expressing neural stem cells (HB1.F3.CD or HB1.F3.CE cells) as GESTECs and evaluated whether they were able to migrate to human ovarian cancer cells and to exhibit a potential therapeutic efficacy against these cancer cells *in vitro* following prodrug (5-FC or CPT-11) administration. Ovarian cancer cells, SKOV-3 (an ovarian adenocarcinoma derived from the ascites of an ovarian cancer patient), and these engineered stem cells were cultured in the DMEM with 10% FBS. Using RT-PCR, we confirmed *CD* and *CE* gene expressions in the neural stem cells and the expressions of chemoattractant molecules such as SCF, CXCR4, c-kit, VEGF, and VEGFR2, in ovarian cancer cells. To determine migration ability of these GESTECs compared to primary cells, we performed a modified trasnwell assay. In this test, HB1.F3.CD and HB1.F3.CE cells appeared to migrate selectively toward ovarian cancer cells due to the inherent tumor-tropic properties of neural stem cells and the chemoattractant molecules secreted by cancer cells. A [^{3}H] thymidine incorporation assay was conducted to measure the proliferative index in which these HB1.F3.CD and HB1.F3.CE cells resulted in an anti-proliferative effect on ovarian cancer cells. In the co-culture system and MTT assay, these GESTECs expressing suicide genes effectively suppressed the growth of SKOV-3 cancer cells *in vitro* with application of prodrug (5-FC or CPT-11). Our results in this study indicate that these GESTECs have an exceptional advantage in anticancer therapy via a strong tropism toward ovarian cancer cells and an effective suppression on tumor growth *in situ*.

Biography

Kyung-A Hwang is doing her Ph.D. course at the Laboratory of Biochemistry and Immunology, College of Veterinary Medicine, Chungbuk National University (Cheongju, Republic of Korea). Kyung-Chul Choi completed his Ph.D. from the University of British Columbia (Vancouver, BC, Canada) and postdoctoral studies from the Cornell University (Ithaca, NY, USA). He has published more than 100 papers in peer-review journals and is an Associate Professor and Department Head in the program of pre-veterinary medicine, College of Veterinary Medicine, Chungbuk National University.