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Using VBIM technique to identify carboplatin resistance genes in ovarian cancer cells

Tao Lu, Han Wei and **Yun She**
Indiana University, USA

Ovarian cancer (OC) is the most lethal gynecology cancer in the world. Although carboplatin is one of the major drugs used to treat OC, resistance to carboplatin remains a major barrier to successful treatment. To date, the mechanisms of carboplatin resistance are still poorly understood. The purpose of this study is to use the novel validation-based insertional mutagenesis (VBIM) technique to identify carboplatin resistance gene in A2780 OC cells. A2780 cells were infected with VBIM virus to cause the overexpression of drug resistance genes, then were further selected under carboplatin treatment. Targeted gene was then identified by using VBIM specific primers. In a preliminary screen, we identified the novel carboplatin resistance gene 1 (*NCRG1*). Overexpression of *NCRG1* increased carboplatin resistance in A2780 OC cells, while knocking it down with shRNA had the opposite effect. In an attempt to investigate the molecular mechanism that underlying *NCRG1*-mediated carboplatin resistance, it was found that *NCRG1* is a potential NF-κB activator. In summary, it is concluded that using a novel VBIM technique, a previously unknown carboplatin resistance gene *NCRG1* is discovered, which may mediate drug resistance via NF-κB signaling pathway. This study is of extreme importance by identifying a potential novel therapeutic target NCRG1 in carboplatin resistance. Development of small chemical inhibitors targeting *NCRG1* could ultimately lead to novel therapeutic approach for ovarian cancer treatment.

Biography

Tao Lu is a tenure-track Assistant Professor and principle investigator at Department of Pharmacology and Toxicology, Department of Biochemistry and Molecular Biology, and Department of Medical and Molecular Genetics as well as a member of Experimental and Developmental Therapeutics Research Program at Simon Cancer Center at Indiana University School of Medicine. She obtained her PhD degree from University of Toledo, School of Medicine, USA. She then did her postdoctoral training with the world renowned scientist Dr. George R. Stark at Cleveland Clinic, Ohio. She has been working on discovery of novel regulators of NF-κB, and is particular interested in epigenetic regulation of transcription factors and their role in cancer. She won several international awards, including the First Place Prize of Young Investigator Award at Tri-Society [Society of Leukocyte Biology (SLB) & International Cytokine Society (ICS) & International Society of Interferon and Cytokine Research (ISICR)] conference and Seymour and Vivian Milstein Young Investigator Award at ISICR&ICS International conference.

lut@iupui.edu