Using VBIM technique to identify novel carboplatin resistance gene in ovarian cancer

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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 (*NCR1*). Overexpression of *NCR1* 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 *NCR1*-mediated carboplatin resistance, we found that *NCR1* is a potential NF-κB activator. In summary, we conclude that using a novel VBIM technique, we discovered a previously unknown carboplatin resistance gene *NCR1*, which may mediate drug resistance via NF-κB signaling pathway. This study is of extreme importance by identifying a potential novel therapeutic target *NCR1* in carboplatin resistance. Development of small chemical inhibitors targeting *NCR1* could ultimately lead to novel therapeutic approach for ovarian cancer treatment.