**Evaluation of therapeutics for tumor prevention and treatment in genetically engineered mouse models for high grade ovarian cancer**

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We present genetically engineered mouse models (GEMMs) for ovarian cancer that recapitulate the complexity of human disease and response to treatment. These models represent transformation of different cells of origin that are currently considered to lead to ovarian cancer. Moreover, they are immunocompetent, allowing for preclinical testing of treatments affecting the immune system (such as immune checkpoint inhibitors), that cannot be evaluated in xenograft models. GEMMs can be easily adapted to syngeneic allograft models that represent a robust platform for preclinical testing of various compounds and biologicals. Additionally, GEMMs represent initiation and progression of disease and can be utilized in cancer prevention preclinical studies, for which other types of models are not suitable. Due to complexity of GEMMs and their long latencies preventive preclinical studies need specific designs tailored to each model that allow for robust data collection within a reasonable time. Here we present two GEMMs for high grade ovarian cancer, representing two different cells of origin for ovarian cancer: ovarian surface epithelium and Fallopian tube epithelium, and modeling frequently occurring aberration in ovarian cancer: loss of Brca1, loss of p53 and aberrations in Rb pathway. We compare cancer development and histopathology in both models and present considerations and designs that have been optimized for each model for preclinical experiments. Examples of practical application of models for various preclinical studies including cancer prevention will be presented.