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Biomarkers for Early Detection of Serous Ovarian Cancer

Ovarian cancer is one of the most common cancers among women, with over 21,000 new cases and over 14,000 deaths per year. If detected early, the 5-year survival rate is over 80%, but that drops to just 11% if detected at stage IV, and over 60% of patients are diagnosed with advanced disease. Early detection is hampered by limitations in current biomarkers, false positives from benign ovarian tumors, and low specificity in imaging modalities. Additional biomarkers that can complement existing biomarkers would help in early identification of ovarian cancer.

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Researchers at the Biodesign Institute of Arizona State University and a collaborator at Brigham And Women's Hospital, performed a large-scale proteomic analysis utilizing nucleic acid programmable protein arrays (NAPPA) to identify a set of 11 autoantigens, as potential biomarkers for early detection of ovarian cancer. High density programmable protein microarrays (NAPPA) expressing 10,247 candidate tumor antigens were probed with sera from patients with serous ovarian cancer and bound IgG measured. Then a set of 735 antigens were selected and probed with an independent set of serous ovarian cancer sera. Eleven potential autoantigens were identified with sensitivities ranging from 3-39.7% at >93% specificity as well as a combined sensitivity of 45% at 100% specificity. Further, evaluation of the top two biomarkers, p53 and CTAG2, in pre-diagnostic ovarian cancer sera was performed to determine the lead time of detection of ovarian cancer.

These autoantigens, many of which have not been previously associated with ovarian cancer, represent promising biomarkers for the sensitive and early detection of ovarian cancer.

Potential Applications

- Early diagnosis and prognosis of ovarian cancer
- Personalized therapeutics
- Potential pre-cancer screening

Benefits and Advantages

- The 11 potential antigens have sensitivities ranging from 3-39.7% at >93% specificity as well as a combined sensitivity of 45% at 100% specificity
- Evaluation of the top two current biomarkers, p53 and CTAG2, in pre-diagnostic ovarian cancer sera was performed to determine the lead time of detection of ovarian cancer
- Simple blood-based tests are low cost and minimally invasive
- Sera from a total of 94 patients with serous ovarian cancer along with 30 benign disease and 92 healthy control samples were screened
- Inexpensive blood tests can be performed on a routine basis to determine the longitudinal changes in biomarker levels of high-risk individuals
- These autoantigens have not previously been associated with ovarian cancer
- NAPPA allows for faster identification of AAbs and enables proteome-level study of antibody responses without the need to purify individual protein

For more information about this opportunity, please see

Katchman et al - Gynecol Oncol - 2017

For more information about the inventor(s) and their research, please see

Dr. LaBaer's departmental webpage

Dr. Anderson’s departmental webpage