Award ID:
RP160145

Project Title:
Early Detection of Ovarian Cancer with Tumor Associated Proteins and Autoantibodies

Award Mechanism:
Individual Investigator Research Awards for Prevention and Early Detection

Principal Investigator:
Bast, Robert

Entity:
The University of Texas M.D. Anderson Cancer Center

Lay Summary:

Currently available surgery and chemotherapy can cure 90% of women with cancer confined to the ovary (stage I) and 70% with disease limited to the pelvis (stage II). When ovarian cancer has spread further (stage III, IV), cure rates plummet to 20% or less. Ovarian cancer is diagnosed in early stage in only 20-25% of cases. We found that annual measurement of CA125 followed by ultrasound and surgery, if indicated, can detect early stage (I, II) ovarian cancer in 9 of 12 cases (75%). Three operations are required to diagnose each cancer using a mathematical formula (algorithm) that determines whether CA125 is rising. As CA125 is expressed by only 80% of ovarian cancers, additional biomarkers will be required to optimize sensitivity. Blood proteins HE4 and CA72.4 can detect 16% of the cases missed by CA125. In addition, autoantibodies to tumor associated antigens have shown even greater promise. Elevated levels of autoantibodies against the protein TP53 have been found in 18% of patients with normal CA125 at the time of conventional diagnosis. Increased levels of anti-TP53 autoantibody could be found in the blood of women who were eventually diagnosed with ovarian cancer an average of 13 months prior to an increase in CA125 and an average of 33 months prior to diagnosis in patients where CA125 never increased. In this proposal, we will develop a new mathematical formula or second generation algorithm to identify each woman's baseline for a combination of CA125, HE4, CA72.4 and anti-TP53 autoantibodies (goal 1). We will determine whether annual measurement of a combination of CA125, HE4, CA72.4 and anti-TP53 autoantibody can detect early stage ovarian cancers and how many operations will be required for each cancer detected (goal 2). Finally, we will test autoantibodies against 5 other proteins to detect cases that are missed by the four biomarkers and to diagnose cancer even earlier than CA125 (goal 3), permitting development of a third generation algorithm.