

New CREB Gene Signature for Improved Ovarian Cancer Therapy Management



This technology is a new gene-based diagnostic assay based on the CREB pathway that can be used to assist physicians with determining whether ovarian cancer patients would benefit from first-line optimal (or aggressive/ultrradical) cytoreductive surgery. Physicians currently use clinical parameters to decide whether to perform aggressive surgery, but those parameters don't inform them about which patients are likely or not likely to benefit from this high-cost treatment that has a high incidence of perioperative morbidities. Based on gene expression data from a tumor biopsy, our diagnostic could help physicians clearly identify patients with no increased survival benefit from optimal cytoreductive surgery who could therefore receive less costly chemotherapy instead.

COMMERCIAL OPPORTUNITY

- In 2012, over 22,000 women were diagnosed with ovarian cancer in the US with over 15,000 patients dying in that same time frame. Cytoreductive surgery + adjuvant chemotherapy is the most common first-line therapy.
- Currently, the standard of care for these women is to use clinical presentations of the disease and overall health status to make decisions about who is a good candidate for initial surgery with adjuvant chemotherapy—however, here are no reliable biomarkers available to assist the physician.
- In a retrospective study of patient data, our gene signature has shown utility in identifying patients for whom aggressive cytoreductive surgery brings no additional survival benefit over non-aggressive surgery. Since survival outcomes of non-aggressive primary surgery equal those of chemotherapy, our signature could be developed to help guide patient selection for surgery vs. chemotherapy.
- Standard primary chemotherapy (paclitaxel+carboplatin) for ovarian cancer costs about \$5000 for six cycles, whereas cytoreductive surgery can cost over \$86,000. A diagnostic that could aid physicians in selecting patients for primary chemotherapy, would save payers over \$80,000/patient.

TECHNOLOGY

Gene expression data from ovarian cancer cell lines treated with increasing doses of carboplatin, cisplatin, paclitaxel, and carboplatin plus paclitaxel were used to identify the 103-gene CREB pathway signature. Expression of this signature was then analyzed in 142 tumor samples from patients with advanced ovarian cancer. Increased expression of the signature was significantly associated with reduced survival in patients overall ($p < 0.0001$), those who had either a partial or complete response to adjuvant platinum-based chemotherapy ($p < 0.0001$), and those who underwent aggressive/ultrradical cytoreductive surgery ($p = 0.002$) or non-aggressive surgery ($p = 0.02$). There was no statistically significant difference in survival between patients who underwent aggressive or non-aggressive surgery who also had increased CREB signature expression.

PUBLICATION/PATENT

- E. Bicaku, et al., (2012) *British Journal of Cancer*, 106(12):1967–1975
- PCT patent application filed on 3/5/2012 for Dr. Jonathan Lancaster and Ms. Yin Xiong

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LICENSING OPPORTUNITY

