

**Georgia Cancer Coalition  
Distinguished Cancer Clinicians and Scientists Program  
2005 Annual Report**

PERIOD: January 1, 2005 – June 30, 2006

**3. Lay abstract of research agenda/priorities/fields of study including its relationship to Georgia Cancer Coalition (GCC) goals and NCI priorities (one page):**

Work in my lab focuses on the molecular etiology of ovarian cancer. Ovarian cancer is thought to arise from a single layer of cells that lines the outside surface of the ovary. In normal ovaries, these are known as normal ovarian surface epithelium (NOSE). In all women, these cells can undergo invagination into the cortex of the ovary. This process forms inclusion cysts (IC) inside the ovary that are often benign. However, some of these cysts further undergo tubal metaplasia and eventually transform into malignant tumors. These malignant tumors are better known as epithelial ovarian cancer (EOC).

The transition from NOSE to IC to EOC is well documented by medical pathologists at the cellular level. However, virtually nothing is known about the molecular changes that occur to these cells. Using Affymetrix Gene Chip Analysis, my colleagues at the Ovarian Cancer Institute have been able to monitor, at the genetic level, the changes in gene expression that occur in EOC. I am investigating the role that many of these genes play in the progression of NOSE to IC to EOC.

Currently, I am focusing my effort on understanding the molecular mechanisms by which a developmental regulatory gene, Pax8, contributes to EOC. We have found that Pax8 is not expressed in NOSE, however is over expressed in both IC and EOC. It is likely that the presence of Pax8 coordinates many of the processes involved in the transition from NOSE to EOC.

By understanding the role that Pax8 and other genes play in the progression of EOC we ultimately hope to develop, with the aid of our clinical colleagues, both (1) molecular markers for the early detection of EOC and (2) molecular therapies of intervention to halt the growth of EOC.

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**4. Description of scholar's most important contribution, finding or discovery using language that can be understood by a non-specialist in the field**

In collaboration with colleagues at Emory University, Dr. Bowen has applied bioinformatics analysis to the Affymetrix Gene Chip experiments performed by the Ovarian Cancer Institute and discovered a number of genes likely to be involved in the etiology of epithelial ovarian cancer (EOC). Currently, he is investigating the role that the gene Pax8 plays in the etiology of EOC.

**5. List of publications including names of co-authors, titles of articles, names of journals, volume numbers, page numbers and dates (please identify co-publications with GCC scholars and Georgia Colleges and Universities)**

Publications 2005-2006

1. Polavarapu N, Bowen NJ, McDonald JF. Newly identified families of human endogenous retroviruses. *J Virol.* 2006 May;80(9):4640-2
2. Bowen NJ, Logani S, Dickerson E, Akhtar M, Benigno BB, McDonald JF. Emerging Roles for PAX8 in Ovarian Cancer and Endosalpingeal Development. *Gyn Onc* 2006.( In revision)

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6. **List of funding with title of project, position held on project, date, and amount, including both direct and indirect, federal and foundation, peer reviewed and non-peer reviewed**

Georgia Cancer Coalition Distinguished Cancer Clinicians and Scientists Award:

The role of global chromatin structure changes and candidate genes in the etiology of ovarian cancer. Bowen, NJ (PI) 12/01/02-6/30/06 \$367,000/total

10. **Names of MDs, PhDs, Post Docs, and other trainees working with scholar**

Mentor:

-John F. McDonald, PhD, Professor and Chair, School of Biology, Ga Tech and Chief Scientific Officer Ovarian Cancer Institute.

Colleagues:

-McDonald Lab: Erin Dickerson, PhD, Lilya Matyunina, PhD, DeEtte Walker, PhD, Nina Schubert, MD.

Trainees: Jennifer Zeitang, undergraduate researcher, Dept. of Biomedical Engineering, Ga Tech; Jung Kim, undergraduate researcher, School of Biology, Ga Tech; Nalini Polavarapu, PhD student in McDonald Lab, Ga Tech. Ishvar Singh, MS student in McDonald Lab, Ga Tech.

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**17. Collaborations with other institutions (list and describe)**

-Ovarian Cancer Institute (OCI), Atlanta, Ga.

The Ovarian Cancer Institute (OCI) is a not-for-profit organization established in 1999 by the Atlanta gynecologist and cancer surgeon, Dr. Benedict Benigno. Ovarian cancer and control tissue samples will be provided by Dr. Benigno and his colleagues at Northside Hospital and St. Joseph's Hospital in Atlanta and by a group of participating gynecologists and surgeons located throughout the state of Georgia.

-Emory Medical School, Atlanta, GA

I am currently collaborating with Dr. Sanjay Logani, a faculty member in the department of Pathology and Laboratory Medicine at the Emory Medical School. Dr. Logani is assisting in the localization of Pax8 in ovarian tissues by immunohistochemical techniques.

-Georgia Institute of Technology

I am currently collaborating with Dr. John F. McDonald, Chair, School of Biology. I am assisting in the bioinformatics analysis of the Affymetrix Gene Chip experiments. I am also a Senior Research Scientist in the Ovarian Cancer Institute Lab at Ga Tech, where I am pursuing independent research on the role of Pax8 in the etiology of epithelial ovarian cancer.

-National Center for Biotechnology Information

I continue to collaborate with Dr. I King Jordan of NCBI on the molecular evolutionary analysis of eukaryotic genomes.