

WELCOME TO THE BCI BULLETIN

Greetings from the beautiful and primary-colored mountains of Western North Carolina, home of the Bent Creek Institute.

This is the first volume of our News letter and we hope that you will enjoy a snapshot of the many and varied activities that fill our days and thoughts.

You will see that we have made significant progress since receiving our first funding check of \$120,000 just 21 months ago. Research conducted by Dr. Jeff Schmitt and his collaborators has produced patentable results and Dr. Joe-Ann McCoy has established North America's only medicinal germplasm repository.

We are fortunate to have established both research and economic development projects with highly respected partners and have assembled an outstanding Scientific Advisory Committee that you will be learning more about as these newsletters are published. Our primary funders have been the North Carolina Biotechnology Center, The North Carolina University System, Mission Health and Hospitals, Buncombe County Government and The North Carolina Arboretum and we are grateful for their continuing encouragement and support. They have provided the foundation that has allowed us to focus on and bring research and industry attention to the immense possibilities of this exceptional place with its unique biodiversity.

We hope that you will enjoy our first formal communication. Our creative juices seem to be reserved for our principle programs of work so if you come up with a catchier title we'd be very happy to hear about it!

I hope that you're having a healthy and productive autumn. We invite your partnership, ideas and participation at the Bent Creek Institute.

Cheryl S. McMurry



Cheryl McMurry, Executive Director,
Bent Creek Institute, with Dr. Gordon Cragg

Noted Scientist visits BCI Labs

In mid-October BCI had the honor of hosting Dr. Gordon Cragg, one of the Institute's new Science Advisory Committee members. Dr. Cragg is likely one of the most noted figures in the field of natural products and bio-exploration-- a pioneering and brilliant advocate for exploring 'nature's pharmacy' for the benefit of humankind. He has enjoyed a distinguished research career, culminating as head of the Natural Products Division of the National Cancer Institute. Dr. Cragg's also helped establish the International Cooperative Biodiversity Groups (www.icbg.org) a multinational initiative that "addresses the interdependent issues of drug discovery, biodiversity conservation, and sustainable economic growth." The ICBG has become an important global force in ensuring that indigenous populations and fragile ecosystems are not harmed in the process of bioexploration. During his visit Dr. Cragg will be interviewed for a promotional video currently being produced by American Green through a BCI-AdvantageWest collaboration.

GROWING THE NATURAL BIOTECHNOLOGY ECONOMY

AdvantageWest Video and National Media Campaign

AdvantageWest and BCI are working with the documentary film organization AmericanGreen to produce a 7-8 minute promotional video that highlights the "vision and economic potential of BCI as well as the natural and integrative medicine cluster it supports." This project has been funded by a grant from the North Carolina Biotechnology Center and supported by AdvantageWest, the Asheville Chamber of Commerce, Gaia Herbs, Mission Hospital Foundation and two anonymous donors. The video, preliminarily titled "The New Wave" will make its debut in early 2009.



NC Arboretum Provides Context and Support for BCI

BCI's location at The North Carolina Arboretum provides the perfect setting for an organization dedicated to sustainable economic development. In fact, as an affiliate of the UNC system the Arboretum includes economic development as a central element of its institutional mission. The unique proximities and relationships fostered by the Arboretum - spanning climate, biotechnology and cultural heritage - are experienced by the quarter million people who visit this remarkable place each year. In recent years Arboretum staff have provided many forms of assistance not only to support BCI but also to foster other cross-disciplinary initiatives that make The North Carolina Arboretum one-of-a-kind.



"I believe that the concept of Natural Biotechnology will add a new dimension to the field of biotechnology. Tremendous commercial and healthcare value remains to be discovered in places like the Appalachian Mountains. [BCI is] setting a course to realize this value in a sustainable and economically rewarding way."

G. Steven Burrill,
Founder of BIO &
CEO of Burrill & Company

Regional Support

BCI leadership will make presentations in November to the Asheville HUB Cabinet, the Buncombe County Government, the Sequoyah Fund and the Tennessee Valley Corridor. These organizations have expressed interest in partnering with BCI in developing economic programs benefiting the region in education, entrepreneurship, and business expansion, creation and attraction. Finally, BCI is crafting an alliance Earth Exchange, a new philanthropic fund located in Asheville NC.

New Scientific Advisory Committee

BCI has assembled a remarkable group of world renowned thought leaders from prominent institutions (e.g., MIT, the National Cancer Institute and NY Botanical Gardens) to serve on its Science Advisory Committee - a strong testament to BCI's vision for building a sustainable economy through a visionary translational research and technology transfer paradigm. A list of Committee members will be published in our next BCI Bulletin.



DISCOVERY AND VALUE CREATION

BCI Prepares to Submit First Patent

In collaboration with the laboratory of Jack Summers at Western Carolina University, BCI has discovered that a naturally occurring anti-oxidant interacts with an enzyme implicated in cancer, infectious disease and inflammation. This finding may help explain the established health benefits of foods containing this anti-oxidant. The enzyme, called superoxide dismutase, is a target of mounting interest to scientists working to find new medicinal cures for disease. We are leveraging this important discovery using cutting-edge computer modeling and have identified a novel class of patentable cancer drug candidates; the provisional patent is in its final stages of development.

Researchers at BCI, Gaia Herbs, Inc. and Clemson University Complete 3rd Validation Phase of Natural Product Analysis Technology

Funded by a Presidential Initiative Award from the North Carolina Biotechnology Center, additional validation of a technology for measuring heavy metals, adulterants and active constituents in natural products has been completed. This technology called, *glow discharge particle-beam mass spectrometry*, promises to make more efficient and less expensive QA processes essential in the natural products sector. Future incarnations of the technology are anticipated to have applicability in pharmaceutical and toxicology research and in discovering active components in natural products.



BCI Germplasm Repository Acquires Black Cohosh Collection

The BCI Germplasm Repository has acquired a diverse collection of 22 black cohosh (*Actaea racemosa* L.) populations representing its native geographic range. This unique collection, originally collected by Lorna Lueck and Joe-Ann McCoy, will be used to develop a new black cohosh variety – formally known as a ‘cultivar’ – with enhanced medicinal properties. To assist these and other efforts, the USDA has donated 20 specialized

pollination cages to develop controlled regeneration protocols. In addition an Echinacea seed collection representing all nine species, collected by Kathy McKeown has been acquired from NCSU and a Chinese medicinal seed collection, collected by Robert Newman has been donated. BCI is currently seeking funding to develop a germplasm collection of another commercially important plant, ginseng (*Panax quinquefolius*); this will launch efforts to develop a regional cultivar with both disease resistance and high medicinal activity.

Over 500 Plant Samples of Potential Medical Importance have been Collected or Acquired in Less than a Year

Further augmenting this milestone, scientists from the BCI Germplasm Repository will travel with members of the USDA National Plant Germplasm System in October to collect and study native medicinal plants in NC, SC, and GA. A collaborative collection strategy has been established with Dr. Dan Pittillo and the Biltmore Estate in Asheville, NC to identify, collect, and store the flora of the 6000+ acre Biltmore Estate. BCI will develop a voucher collection image database to represent the ‘Flora of Biltmore’ which will be available on our website.



Funded Research Leads to the Discovery of 12 Plant Species that Kill Cancer Cells

Researchers at BCI and Wake Forest University Health Sciences Comprehensive Cancer Center have discovered twelve distinct plant species that are cytotoxic to breast and/or prostate cancer cells in culture. Many of these plants have been used ethnomedically but have never been studied for use in treating cancer or tumors. Initial toxicology results on a number of these species are very encouraging. This research has been generously supported from grants from The UNC Office of the President and the North Carolina Biotechnology Center.

PARTNERSHIPS & ECONOMIC IMPACT

"BCI is a focused, creative and vital organization that is shaping new sustainable economic opportunity for Western North Carolina. Considering the scarcity of resources and infrastructure, their accomplishments to date have been truly remarkable and are already being felt across the entire State. The NC Biotechnology Center's Advisory Committee for Biotechnology in WNC, which originated and has consistently championed BCI, has a great deal of which to be proud."

John F.A.V. Cecil,
President, Biltmore Farms, LLC

BCI's Vision for Translational Research Takes Shape

A collaboration between BCI, Wake Forest University Health Sciences and Mission Hospitals is underway to launch The Combination Therapy Center, the first clinical research center dedicated to furthering the science and application of combination therapy. An 18 member taskforce has been working on making the Center a reality, with a number of high-value pilot projects already under consideration.

Mounting Partnership with Leader in European Natural Medicines

A leading European natural medicines company plans a multi-faceted alliance with BCI that could span botanical research, analysis of chemical components in natural medicines and clinical research. Company officials have been assisting in the design and development of BCI since its inception, offering advice and counsel based on their success. The company has 6 drugs in clinical trials and has stated its desire to work closely with BCI in anticipation of a partnership that would result in locating a corporate presence in WNC.

BCI Shapes Partnership with Noted Documentary Filmmaker

HealingSeekers, an organization dedicated to documenting and protecting the world's indigenous health and medicine practices, is working with BCI to find new ways of studying these practices to ensure their protection and preservation.



BCI's Collections Strike a Chord with Acclaimed Research Laboratories

Researchers at BCI have been approached by numerous national and international organizations and laboratories (including The World Health Organization and The National Cancer Institute) to collaborate and/or supply source material for their collective research in more than ten diseases of global significance.

BCI - WellGen, Inc. Research Alliance

WellGen, Inc., a spin-out of Rutgers University, and BCI are entering into a research alliance to develop a new approach for optimizing cancer combination therapies. This model utilizes Systems Biology approaches such as gene expression to quickly develop more effective, less toxic cancer treatments. The research team believes that the approach, once fully developed, could be applicable to developing treatments for other diseases.

National Laboratories and Multi-State Consortia Seek BCI Expertise

BCI's Germplasm Repository Director assisted the National Institute of Standards and Technology with 2 projects collecting samples of *Actaea racemosa* (black cohosh) and *Pueraria lobata* (kudzu) for use as research reference standards. BCI was also asked to consult on a collaborative multi-state project led by Auburn University and Alabama A&M to develop medicinal crops for southeastern farmers. This project has resulted in plans to submit a USDA Specialty Crops Grant in January 2009.