

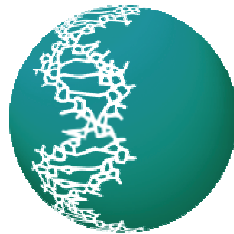
FY2008 Operating Budget Testimony

**University of Maryland Biotechnology Institute
Dr. Jennie C. Hunter-Cevera, President**

**Before the House Subcommittee on Education & Economic Development
February 6, 2008**

and

**Before the Senate Subcommittee on Education, Business & Administration
February 7, 2008**



UMBI

life. science. works.

Introduction

It is an honor to come before you today as President of UMBI for my ninth consecutive year. I want to express my heartfelt thanks to the Members of the Maryland General Assembly, and to Governor Martin O'Malley, for all the support and guidance given to UMBI.

I will share with you some of UMBI's measurable successes in biotechnology during the FY2008 year that, without your support, would not have been possible. I will then ask that you look with me into the future so that together we can envision how your continued support will anchor the future of not only UMBI, but of the state of Maryland in advancing biotechnology.

UMBI is the biotechnology institution of the University System of Maryland. As the only Maryland research institution focused entirely on biotechnology, we take our mandate very seriously. Our mission is to conduct groundbreaking research in key areas of biotechnology, to make fundamental discoveries, generate innovative solutions to practical problems, and develop new technologies for commercial application. UMBI also provides an exceptional environment for specialized training and for mentoring tomorrow's biotechnology workforce while promoting economic growth.

In FY2007, UMBI consisted of five world class centers of excellence that are singularly focused on specific research programs but also collaborate on multi-disciplinary programs. In FY2008, due to its primary focus now being one of clinical research and care, the Institute of Human Virology became part of the University of Maryland School of Medicine. UMBI is proud of the role we played in IHV's successful growth and transition. How did we do so? Exactly the same way we have cultivated all our programs, by providing an unparalleled environment that focuses on excellence, outcomes, sustainability, and accountability. UMBI will focus on expanding our current research programs and initiatives, and continue planning to launch the Center for Agricultural and Environmental Biotechnology. Our research centers are briefly described below.



The Center of Marine Biotechnology (COMB) is located in Baltimore and applies the tools of modern biology and biotechnology to study, protect, and enhance marine and estuarine resources. COMB has an international reputation of excellence in several key areas of marine biotechnology, including aquaculture and fisheries biotechnology, marine functional genomics, natural products and pharmaceuticals, microbial processes and environmental biotechnology.



The Center for Biosystems Research (CBR) is located in College Park and addresses fundamental biological problems in complex biological systems using a comparative approach to the study of pathogen biology, infection, and host response in plant and animal systems.



The Center for Advanced Research in Biotechnology (CARB) is located in Rockville and applies theoretical and experimental approaches to the structure, function, design and evolution of biological macromolecules. Formed through a partnership with the National Institute of Standards and Technology (NIST), CARB scientists advance the state-of-the-art in measurement science as it relates to *in vitro* and *in vivo* interactions between biomolecules.

The Medical Biotechnology Center (MBC) is located in Baltimore, and is a highly integrated, multidisciplinary center, which focuses on molecular signaling and biophysics to advance knowledge in biomedical research and applications by studying the molecular and biochemical basis for a number of prevalent diseases in human health, including heart failure, Huntington's and Alzheimer's disease.

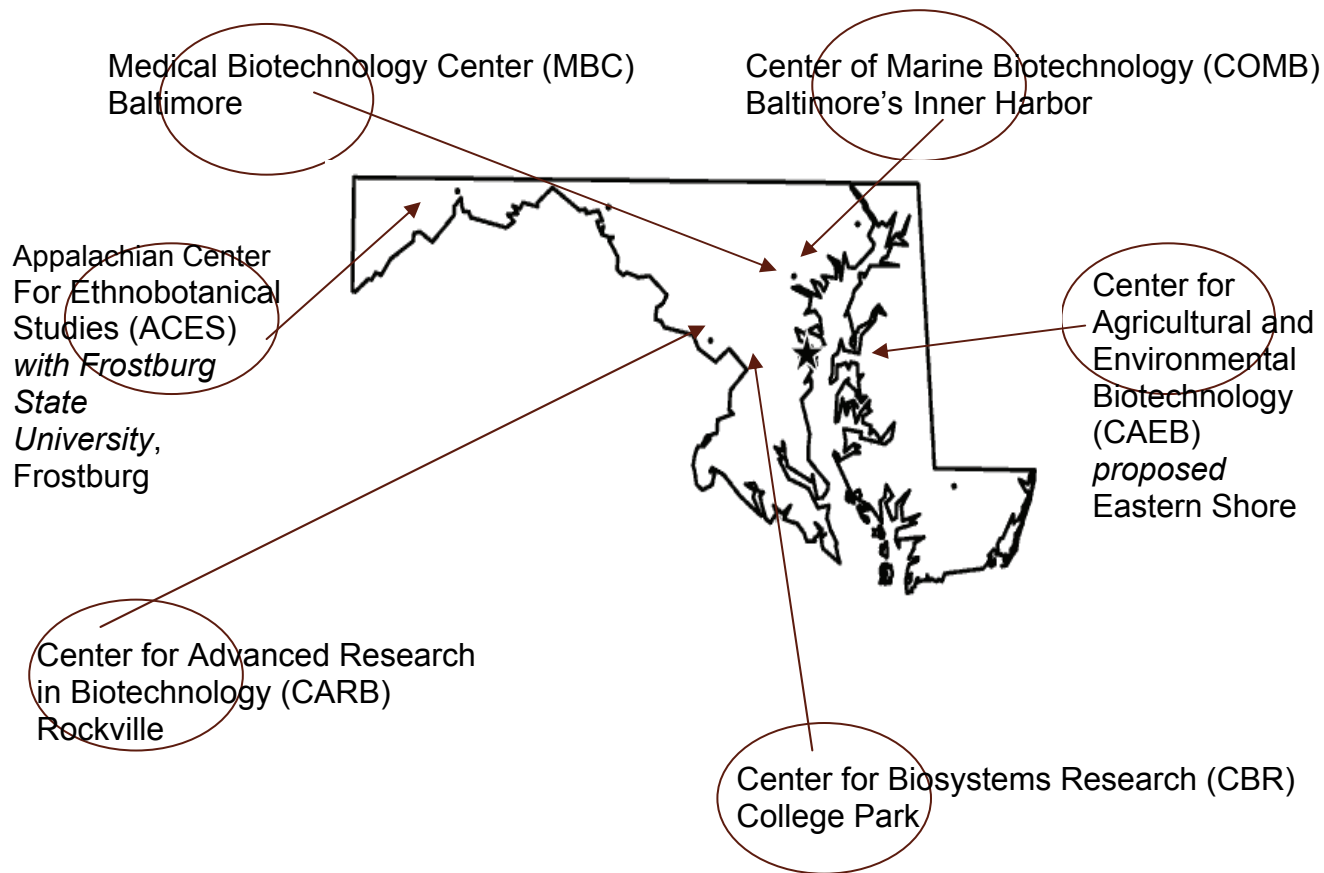


As the youngest and smallest institution within the University System of Maryland, UMBI research and development have played a critical role in the development of diverse biotechnologies that are of great importance to the economy of Maryland, the nation and even at the global level. Our scientists are internationally recognized as leaders in bioscience research.

UMBI continues to help attract new technology partners to Maryland, support the growth of new start-up companies, biotech parks, incubators, and develop new industrial partnerships. Collaborations between our world-class scientific research centers allow us to consistently leverage state funding with both competitive grants and private donations.

UMBI's Managing for Results (MFR) goals and objectives are closely aligned to our 2015 Strategic Plan. We respond to shifts in external funding, such as the impact of reduced NIH funding across the country, through additional collaborations and partnerships.

Our strategic plan reflects our focus on applications that grow out of biotechnology research and development. We are especially skilled at finding practical solutions to real-world problems, and helping the biotech industry develop products that lead to tangible improvements in the quality of life for our citizens.



Excellence, Outcomes, Sustainability, and Accountability

Over the past year UMBI has continued to be a leader in research, economic development, and education and workforce training for the state, the nation, and the world.

Leadership in Research

Hope for Heart Disease

Cardiovascular disease is the leading cause of death in the world. The molecular causes and potential therapies are central to the work of many researchers. UMBI Medical Biotechnology Center Professor and Director W. Jonathan Lederer, M.D., Ph.D., was honored during FY2007 by colleagues for his discoveries and achievements in this field during. In addition, Dr. Lederer was the principal investigator on the only major stem cell grant issued to a USM researcher. These stem cell grants funded by the Maryland General Assembly and the Governor and selected based on merit are a great incentive for Maryland researchers who cannot seek federal grants for stem cell research. Under this grant, Dr. Lederer will explore potential therapeutic benefits of stem cells in heart disease. As an interesting side bar, one of the researchers on the early stages of this project, ultimately leading to the major grant award, was a high school intern in Dr. Lederer's lab who has since matriculated to Stanford University in no small part on the strength of his high school science experience in Dr. Lederer's lab.

Dr. Lederer was recognized by his peers for his work to understand the basic molecular signaling inside the heart that is disrupted in many kinds of heart disease. He is the only USM researcher to win a major (\$1.7 million) State stem cell research grant.

Medicines of the Seas

Sometimes unintended consequences are the key to new discoveries. By accident, Dr. Robert Belas discovered that under certain conditions microbes he studies called *Roseobacter* form odd conglomerates under certain growing conditions. Even more interestingly, these microbes emit a natural product that can kill other microbes and which may become a new source of badly needed antibiotics.

Dr. Belas isn't just stopping with his new potential medicine. He's discovered that these microbes are not very tolerant of increased temperature, and they are disappearing among coral reefs. He is studying whether global climate change, bacteria death, and coral bleaching (the death of coral reefs in some areas) are inter-related.

Despite what was once thought, Dr. Place has demonstrated that *Pfiesteria* was not the cause of fish kills in the Chesapeake Bay

Chesapeake Bay Fish Kills

For many years debated raged about whether *Pfiesteria* was responsible for fish kills in the Chesapeake Bay. As the Chesapeake Quarterly reported this year, Dr. Al Place's research at UMBI over many years clearly identifies a different culprit: another microbe called *Karlodinium veneficum*. *Veneficum* is Latin for poisonous, or in our vernacular, toxic.

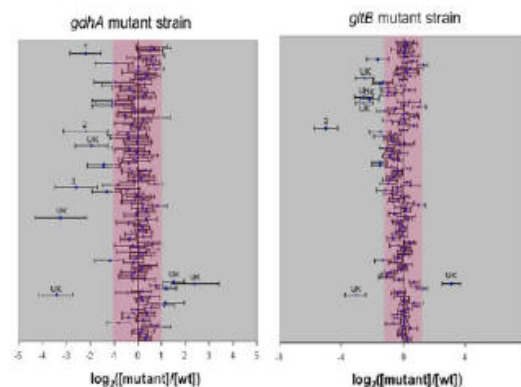
Karlodinium veneficum belongs to a family of tiny algae called dinoflagellates. Place and his colleagues at UMBI were recently awarded a \$1 million National Science Foundation grant to study the unique biology of dinoflagellates, which photosynthesize like a plant, but can hunt and kill other microbes like an animal.

Bioenergy from Natural Methane Factories

Finding the functions of “orphan genes” in microorganisms that naturally produce methane might accomplish several objectives at once—providing new insights into previously unknown enzymes, new methods for producing environmentally-friendly fuels, as well as new methods for conversion of harmful pollutants.

The Department of Energy (DOE) has funded an innovative three-year collaborative study involving three UMBI investigators: Dr. John Urban, Dr. Kevin Sowers and Dr. Zvi Kelman, as well as Dr. Basil Nikolau of the W.M. Keck Metabolomics laboratory at Iowa State University to utilize these orphan genes to turn microbes into factories to make methane, a green energy alternative to petroleum and without the economic impacts of corn-based ethanol.

Non-targeted metabolomics analysis of *E. coli* strains carrying knock out alleles at the *gdhA* or *gltB* locus



Effect of *gdhA* and *gltB* mutations on the metabolome of *E. coli*. The majority of the metabolome is unaffected by the mutations, but a discrete set of metabolites either hyper- or hypo-accumulate in the mutant strain. These are: sucrose (1), 1,4-butanediamine (2), proline (3) and a number of chemically unknown metabolites (UK).

Blue Crab Restoration and New Insight into Female Crab Migration

In FY2007 we released a record 215,000 hatchery produced juvenile crabs. Most of the baby crabs this year were produced at Piney Point in St. Mary’s County.

Working with Maryland watermen, more than half a million juvenile blue crabs have been released, and the survival rate is excellent.

The results continued to be extremely encouraging, as the released crabs grew to sexual maturity extremely fast and survived very well to sexual maturity. This is above expectation, and taken together, all parameters demonstrate that our program and concept of replenishing the spawning stock, and in turn the abundance, of the blue crab in the Chesapeake through releases of hatchery produced juveniles is certainly feasible.

Additionally, using hatchery-produced tagged crabs, Dr. Yoni Zohar and his collaborators mapped the migratory routes of the mated females from the upper Bay to their spawning grounds in Virginia waters. This data provides Maryland and Virginia new justification for protecting females’ migratory routes as state leaders consider policy changes to protect the dwindling blue crab population.

Developing Tools by Learning from the Edge of Life

In 2007 a cover story in *American Scientist*, UMBI’s Dr. Shil DasSarma describes extremophiles, microorganisms that live in high temperature, high salt, and even high radiation

environments. These microscopic organisms possess amazing molecular tools for living, indeed flourishing, in environments once thought completely hostile to all life. By discovering these molecular tools, DasSarma and his colleagues are interested in exploring how to use natural biological processes to identify chemical agents and other weapons in the case of a terrorist attack and to help cancer patients better cope with the devastating affects of radiation therapy.

Frontiers in Research and Innovation

Drs. Bill Bentley and Greg Payne along with collaborators at the Fischell Department of Bioengineering at the University of Maryland's A. James Clark School of Engineering received a National Science Foundation "Emerging Frontiers in Research and Innovation" Award. The scientists plan to build devices that test new drugs using living, human biological components rather than "animal models," thus significantly improving the accuracy and speed of drug development. Only 12 of these awards were given nationwide, making them among the most competitive in America.

The innovative project with University of Maryland Clark School of Engineering's Fischell Department of Bioengineering will improve the accuracy and speed of drug development.

Visualize Change

Dr. Joe Kao and colleagues have recently tested a number of new caged chemicals. These reagents enable light to be used to "trigger" gene expression or change cellular or subcellular concentrations of important regulatory chemicals. These techniques can provide chemical reactions in the tiny spaces inside cells manipulated by researchers, opening new opportunities in using the cell's own mechanisms to understand how it grows and changes. This technique hold the potential to make any cell a small laboratory where a gene or chemical change can be tested one cell at a time thus providing new platforms for diagnostic development.

A New Protein Discovered

Dr. Shengyun Fang and team members discovered a new protein, SUPRESIN that regulates the cellular response to cellular stress. SUPRESIN expression is protective and down regulation of this protein results in cell death. It appears that SUPRESIN plays a role in the development of certain kinds of cancer and will be studied further to see if inhibitors can be found thus preventing the spread of certain cancers.

New Detection Technology for Many Diseases

Dr. Chris Geddes and others have extended their work on metal enhanced fluorescence with "microwave enhancement." Dr. Geddes group has shown proof of concept for Western blots based on this work. An international biotech company has entered into a contract to begin commercializing Dr. Geddes' work to diagnose disease quickly, economically, and with reduced incidence of false negatives.

Leadership in Raising Awareness

BioAgenda East

UMBI hosted the first East Coast meeting of BioAgenda, an international think tank on biotechnology issues and trends. Presentations discussed the appropriate role for government in

research; the pros and cons of manipulating the human genome; the ethics of disease research in the developing world; and a perspective on trends in biotechnology funding and research areas that was carried on NPR across the United States. Media coverage was significant including in California, still the largest state biotechnology industry. I am convinced that Maryland must raise our visibility as a state internationally, and BioAgenda East was an effective effort led by UMBI to do so. An outcome of BioAgenda East is a new think tank formed in Washington, D.C., by global leaders and several Maryland bioscientists have been asked to join.

8th International Marine Biotechnology Conference in Eilat, Israel

In March 2007, 26 faculty, research associates, and graduate students from UMBI's Center of Marine Biotechnology (COMB) played significant roles in 8th International Marine Biotechnology Conference in Eilat, Israel.

Thanks to funding from federal research grants, UMBI faculty and graduate students at COMB gave more than 20 percent of the presentations and posters at the conference, the largest share from any institution at the conference. Graduate student Nilli Zmora received one of three awards for best poster presentation at the conference.

Over 310 scientists from 27 countries and five continents participated in the conference.

Awards and Accolades

UMBI also measures its successes by the number of awards received by its faculty members and students. Here are some of our highlights:

- UMBI President Emeritus Dr. Rita Colwell, my predecessor and the founder of UMBI, was this year awarded the National Medal of Science. This award is America's highest honor for scientific achievement. It is given to individuals "deserving of special recognition by reason of their outstanding contributions to knowledge in the physical, biological, mathematical, or engineering sciences."
- Dr. David O'Brochta received the USM Regents Award for Faculty, the highest award given by the USM Board of Regents, for his mentorship of students at UMBI's Center for Biosystems Research.
- UMBI spin-out company Profectus BioSciences won the Greater Baltimore Committee's Best Academic/Industry Collaboration 2007. Profectus Biosciences worked in partnership with the Institute of Human Virology at UMBI to develop an antiviral therapy for HIV that addresses some of the ongoing problems associated with HIV treatment such as toxicity from treatments and drug resistance.
- MBC scientists received two State of Maryland/TEDCO Stem Cell grants, including the only large (\$1.725M) award received by the USM.
 1. Dr. W. Jonathan Lederer - "Human Mesenchymal Stem Cell Treatment for Heart Damage" (\$1.725M over 3 years)
 2. Dr. Sheng Fang - "Ubiquitination-dependent Regulation of Oct-4 Activity" (\$219K over 2 years)

President Emeritus Dr. Rita Colwell received the National Medal of Science.

- Dr. Yonathan Zohar was honored by the Maryland House of Delegates and the Maryland Senate for his research closing the life cycle of the blue crab in captivity for the first time. Dr. Zohar also received a USM Regents Award for Public Service, the highest award given by the USM Board of Regents, for his tireless efforts to educate the public on the dwindling blue crab population and his efforts to reverse this alarming trend. Dr. Zohar and collaborators received \$4.75M in funding from NOAA for the blue crab research and rescue program.
- Dr. Jonathan Lederer was awarded a \$738,000 instrumentation grant from NIH for a high-speed confocal imaging system useful for heart muscle research.
- A highly competitive Kirschstein- National Research Service Award Postdoctoral Fellowship awarded to Shawn Jackson in Gerardo Vasta's lab, to study immunology in a model system. Gerardo Vasta was also awarded a prestigious J. William Fulbright scholarship to conduct collaborative immunology research and educational activities in Argentina.
- Two scholars from Argentina, Dr. Virginia Albarracin and graduate student Julian Dib, were awarded J. William Fulbright scholarships to conduct research related to malaria and antibiotic resistance in the UMBI laboratory of professor Russell Hill.

Leadership in Creative Collaborations

UMBI is highly committed to inter-center collaborative research and collaboration with other scientists around the world. In fact, more than 60 percent of UMBI external revenues come via collaborative efforts. Every indication is that collaborative, complex, and interdisciplinary research projects are becoming more important as competition for limited NIH, NSF, and other competitive grants becomes more intense. Some important recent collaborations include:

- Dr. Lederer will receive an award from the Leducq foundation. This award funds the creation of a "Transatlantic Network/Consortium - Leducq European-North American Atrial Fibrillation Research Alliance. The consortium involves research groups in the United States, Canada, Germany, the Netherlands, and France.
- John Orban, Zvi Kelman, Kevin Sowers, Basil Nikolau (Iowa State) awarded \$1.6M from DOE for "Annotation of Novel Enzymatic Functions in Methanogens"
- John Orban, Jeff Davis and Marco Colombini awarded a grant from the state nanobiotechnology initiative on "Controlling Nanostructures within Membranes"
- Bill Bentley, Greg Payne, National Science Foundation grant for Emerging Frontiers in Research and Innovation--Cellular and Biomolecular Engineering. UMBI received this grant with the University of Maryland College Park as a partner, and were one of twelve selected nationally.

Leadership in Education and Workforce Training

UMBI also realizes that the scientific discoveries of tomorrow will be made possible by the young students of today. It is imperative that we continue to inspire and support students of all backgrounds who have an interest in the biological sciences. The alarming trend in American students not seeking degrees in science and technology must be reversed, and UMBI is part of that solution within the USM. Although UMBI does not grant degrees, we share our expertise, our technology, our

<p>More than 12,000 K-12 Maryland students were served by UMBI last year</p>
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laboratories, and our successes with students. UMBI has programs designed for the young children who attend elementary school up through those reaching the final stage of a postdoctoral fellowship.

This year, through UMBI's educational programs we enhanced the education of

- 704 Science Teachers
- 12,307 K-12 Students
- 53 Graduate Research Assistants

This outreach and workforce development is possible through several programs including:

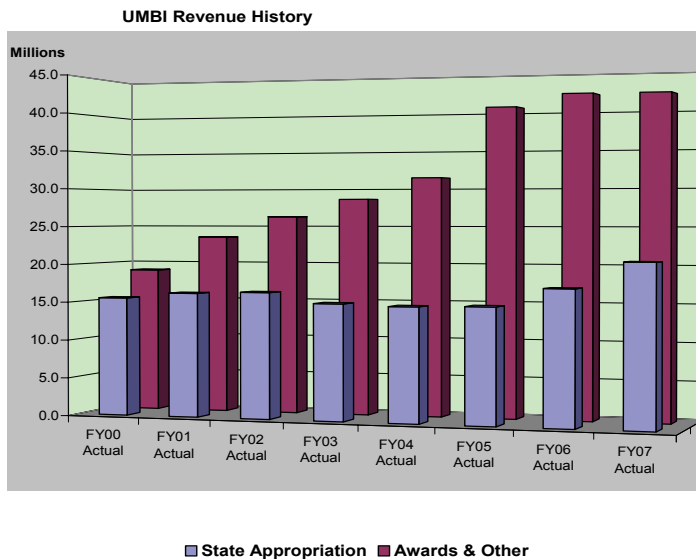
- High school and undergraduate internships in UMBI labs
- Programs for underrepresented minorities
- GMP training
- Science teacher training (in the lab and module "inquiry based" training)
- Scientist training
- molecular and biotechnology training for the non-scientists

Major Educational Programs

- Onsite lab (SciTech Program) where local students visit real research-based lab modules
- The Loaner Lab Program was initially established via philanthropic and industry donations to enhance the onsite experience and for schools in outlying jurisdictions that cannot easily visit the Inner Harbor or Shady Grove.
- LMRCSC (Living Marine Research Cooperative Science Center) in conjunction with University of Maryland Eastern Shore is funded by NOAA to build the field of qualified minority undergraduate and graduate student pursuing science degrees and careers. Currently four Ph.D. candidates from LMRCSC pursue doctoral research at UMBI.

Resources and Development

Unlike almost all other USM institutions, UMBI is not able to rely on tuition dollars to supplement the financial resources received from the State. Therefore UMBI leverages state dollars by competing for outside funding the NIH, NSF, Federal agencies, corporations, and foundations. In FY2007, UMBI received over forty million dollars from outside sources which is approximately double our state appropriation level. The following graph represents revenue trends over the past several years.

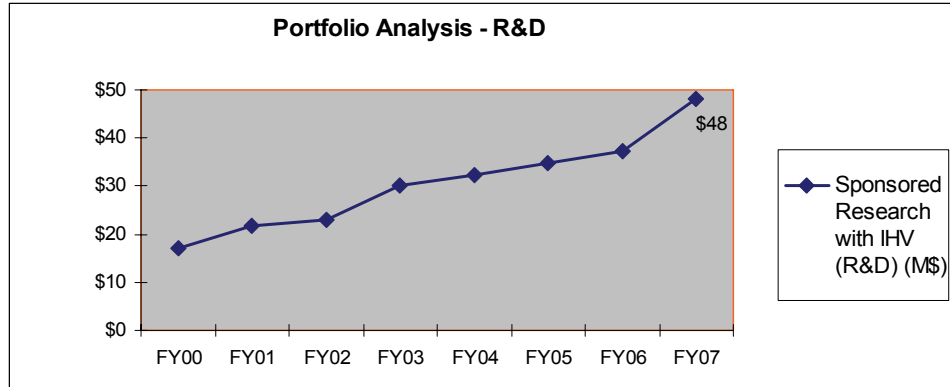


Despite funding challenges, UMBI continues to be successful at obtaining competitive research grants while translating research breakthroughs into jobs and economic growth for Maryland. Extramural research awards grew to \$48 million in FY2007, a 30% increase over FY2006.

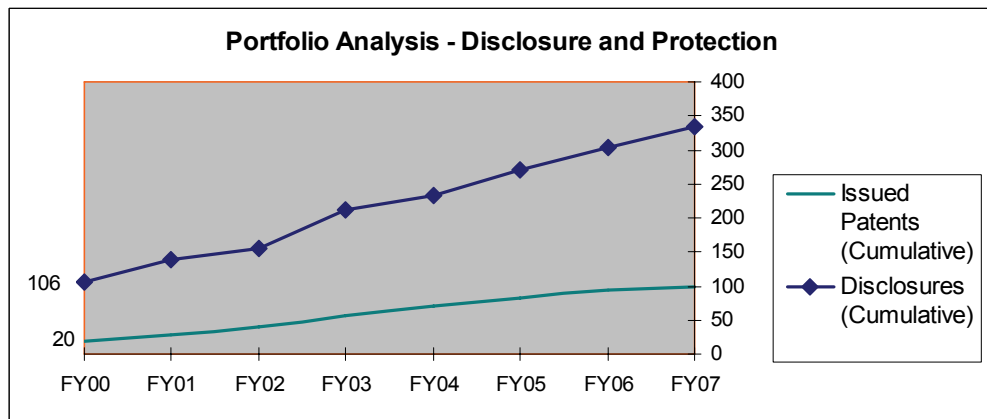
In order to further assist faculty in an ever tightening and competitive grant environment, UMBI planned in FY2007 the inter-center collaborative grant program, which requires multidisciplinary approaches to solving biotechnology problems.

The gap between what the federal agencies will support and what commercial entities are requiring before investing in technology is a barrier to commercialization. By using revenues from licensing income, UMBI has taken the initiative to provide Proof of Concept funding to move faculty disclosures through this gap. One \$50K project was awarded in FY2007, and we anticipate more in FY2008.

UMBI is also unique in that is the only institution in the University System whose mission includes economic development. We take this responsibility seriously and continue to spur the development of the biotechnology resources of the state. As of July 1, 2007, UMBI had over 946 active partnerships through executed agreements (48 License Agreements, 63 MOU's, 306 Material Transfer Agreements, 202 Confidentiality Agreements, and 327 active Research Awards). Seven of our nine start-up companies, are still in business, a remarkable track record for biotechnology companies.



In 2007, UMBI scientists were also issued 6 patents, increasing our portfolio to 98 cumulative worldwide patents. Disclosures, the first step in assessing intellectual property for licenses or co-development, continued a multi-year pattern of positive growth.



UMBI regularly partners with industry to bring products to market; improve existing products, diagnostics, and procedures; co-develop technology; and indeed to serve R&D needs for some, mostly small, biotech and life sciences companies. UMBI has again recognized a dramatic increase in the reimbursement of patent costs by industry partners.

This year agreements and contracts between UMBI included such companies as:

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|--------------------------|----------------------------------|
| MedImmune | Sanaria |
| KeyGene | Profectus Biosciences Inc |
| Novavax | CytImmune |
| Rexahn | Sequoia |
| Zylacta | Merck |
| Sharp Dohme de Spana | Algenol Biofuels |
| Fisher BioServices | Canon US Life Sciences |
| GlaxoSmithKline | Advanced BioNutrition |
| Battelle Energy Alliance | Advanced Resources International |
| Calibrant | |

UMBI also signed several key agreements with outside institutions to forge partnerships which will create collaborative networks for scientists at UMBI and other organizations to share their knowledge and technology for the betterment of our society.

- UMBI and Maryland Department of Natural Resources signed an MOU that extends the partnership for 10 years to allow COMB to expand the use of the Piney Point facility for blue crab grow out in partnership with the Maryland Waterman Association.
- UMBI/COMB and NOAA Cooperative Oxford Laboratory agreed to extend their funded partnership in studying blue crab disease for another year.
- UMBI has signed an expanded MOU with the National Institute for Standards and Technology to address metrics and standards in biotechnology.
- UMBI has signed an MOU with the government of South Korea.
- UMBI also closed a \$15 million grant from the Bill and Melinda Gates Foundation for HIV/AIDS vaccine research.

Research Initiatives Looking Forward

Center for Agricultural and Environmental Biotechnology

Our proposal for a major new research center on the Eastern shore to enhance agriculture and reduce its environmental footprint has moved forward. We continue to work on the planning and approval process for the Center for Agricultural and Environmental Biotechnology (CAEB) on Maryland's Eastern Shore. Through this Center, Maryland will have the opportunity to become a national leader in sustaining and enhancing agricultural economies, while mitigating sprawl. The programs being planned are in collaboration with our sister USM institutions, most particularly the College of Agriculture and Natural Resources at the University of Maryland, and with Chesapeake College. CAEB will focus on alternative crop use, turning waste into dollars, food security and safety, use of plants for bioremediation, enhanced crop production through natural bio-practices, and the role of agriculture in mitigate global climate change.

Appalachian Center for Ethnobotanical Studies

UMBI continues to actively partner with Frostburg State University (FSU) and West Virginia University on the Appalachian Center for Ethnobotanical Studies so that it may someday transition from a virtual center to a hub where scientists, students, and the public can gather to learn about the medicinal properties of indigenous plants found growing in the Appalachia region of our state.

Conclusion

As we look back, it is apparent that UMBI has had a successful year. We can only continue to reach our goals of scientific achievement, educational outreach and support, and economic development with your help. There is still a great deal of work that can be done for the state and our country as we look into the future. As Eric Hoffer, the great American philosopher, once said, "In times of change, learners inherit the Earth, while the learned find themselves beautifully

equipped to deal with a world that no longer exists.” Our world is constantly changing. We must therefore strive to continue learning about it, and the organisms both large and small that live here with us. It is only through understanding the biology of this planet, that we will be able to overcome disease, pollution, and strife.

UMBI's Comments as Requested by the Legislative Analyst

Page 4 of DLS Budget Analysis--Performance Analysis-- Managing for Results:

Realignment of the Institute of Human Virology Will Impact Managing for Results. The President should comment on the impact of the administrative relocation of IHV on the MFR.

Relocation of IHV from UMBI to UMB will impact all performance measures that are based on activity taking place at UMBI's research centers (grant and contract revenues, partnerships, graduate trainees, patents, etc.), but is expected to have little or no effect on the K-12 student and teacher measures.

UMBI anticipates working with the USM Office to develop a fair and rational approach to restructure and/or update UMBI's MFR reporting and/or targets so that accountability is maintained while not penalizing UMBI for this dramatic programmatic shift in institutional priorities and resource base. Clearly, it will be difficult to do simple longitudinal studies of many UMBI MFR measures since we will no longer be comparing apples and apples.

Page 7 of DLS Budget Analysis-- Governor's Proposed Budget:

The Chancellor and the President should comment on the discrepancy in fiscal 2009 bridge funding.

At the time that we budgeted the \$1.3M use of our fund balance for FY2009 it was unclear what funding UMBI was going to receive related to the lost IHV revenues, specifically in support of the operations of the Medical Research Facility. The USM has now proposed, and UMB has agreed, to pay UMBI \$800,000 in rent to help support the cost of the space that they occupy in the Medical Research Facility. We at UMBI see this as a good start in terms of USM's promise to hold UMBI financially harmless with the move of the IHV and in fact they have indicated that this will be addressed again in the FY2010 budget.

Page 10 of DLS Budget Analysis-- Institute of Human Virology Relocated to the University of Maryland, Baltimore:

The President should comment on the impact of using \$1.7 million of its fund balance as bridge funding in fiscal 2008. The President should also address the outlook for future research awards and whether UMBI will be able to increase research awards to replace revenue lost by the relocation of IHV given the MFR space constraints.

The use of \$1.7M of UMBI fund balance, or approximately 20% of our total fund balance as of YE FY2008, reduces the resources needed to enhance UMBI by adding new faculty and support the start-up of the new core facilities in CARB II. This is particularly hurtful to UMBI given that there was no enhancement funding for UMBI in FY2008 and again none planned for UMBI in FY2009 despite the advent of the HEIF, as UMBI will not share in the funding from the HEIF.

Of course the federal research funding picture continues to deteriorate as increased funding doesn't keep pace with inflation, and in the short-term (FY08 and FY09) UMBI is likely to experience flat or slightly reduced award funding. Despite this we are hopeful of our ability to continue to be competitive and well funded as we shift our focus towards industrial and private foundation funding as well as towards inter-center and inter-institutional collaborations that will allow us to be successful in competing for the larger program awards.

In the near-term, and for as long as IHV continues to occupy space in UMBI's Medical Research Facility, it will be very difficult for UMBI to rebuild, through the growth of UMBI's Medical Biotechnology Center, all of the lost award revenues and institutional support that had been provided by IHV. This is a significant lost opportunity for UMBI given that the vast majority of the federal non-defense research funding is to support medical research.

If the excessive use of UMBI's fund balance does not continue beyond the current fiscal year, in the near-term (FY10 to FY12) UMBI will begin to grow it's external research funding and accompanying institutional support through growth at other UMBI centers. Much of this growth was planned prior to the IHV move and will be possible due to the significant expansion of the CARB facility in Rockville and generous State program funding received in FY2007, but this will take time.