

Wayne State major participant in Michigan Life Sciences Corridor research

By Julie O'Connor

In 1998, the State of Michigan and 45 other states were the recipients of the tobacco settlement revenues. Michigan expects to receive periodic payments totaling more than \$8.5 billion over the next 25 years.

In 1999, the Michigan legislature established a Michigan Life Sciences Corridor fund from the tobacco settlement revenues with a commitment of \$1 billion with annual appropriations of approximately \$50 million for 20 years. This fund was established to attract and nurture the life sciences industry and related technologies involving Michigan's research universities and private research organizations around the state.

According to the Michigan Life Sciences Corridor guidelines, over the next two decades the Corridor will encompass the best of academic science along with a robust, entrepreneurial private sector of new and established firms, thereby enhancing economic development in Michigan's private sector and the health and well being for the citizens of Michigan. It has the goal of advancing Michigan from a "top ten" to a "top five" ranked state in life science research and employment by 2020.

Wayne State University has been a major recipient of Corridor funds for the past two competitive rounds. All proposals went through rigorous external peer reviews by the Washington Advisory Group and the American Association for the Advancement of Science prior to the awards announcement. In the first round held in

fiscal year 2001, Wayne State received funding for six individual project proposals submitted to the Michigan Economic Development Corporation for the Michigan Life Sciences Corridor initiative.

The WSU proposals supported include:

- "Mechanism of Eukaryotic Arsenic Transport and Resistance," Hiranmoy Bhattacharjee, Department of Biochemistry and Molecular Biology, School of Medicine. The total grant budget is \$581,386. The goal of this proposal is to understand how humans tolerate the arsenic that often contaminates our water supply.
- "Production of Carbohydrate-Related Enzymes and Products by Biotechnology," Peng George Wang, Department of Chemistry, College of Science. The total grant budget is \$593,512. The goal of this proposal is to explore biosynthetic pathways of sugar-related natural products based on genomics information, incorporate pathways into genetically engineered microorganisms (so-called superbugs), and develop Michigan-based biotech industry to use the superbugs to produce carbohydrate-based pharmaceuticals and nutraceuticals, and carbohydrate-related enzymes.
- "Development of Software for Designing DNA Diagnostics," John Santa Lucia, Department Chemistry, College of Science. The total budget is \$456,037. This software will reduce the development time and

cost and improve the reliability of new DNA-based diagnostics for genetic and pathogenic diseases.

- “Mimic Peptides of human T cell epitopes as HIV vaccines,” June Kan-Mitchell, Barbara Ann Karmanos Cancer Institute. The total budget is \$616,000. This collaborative project with Mixture Sciences, Inc., aims to develop effective human immunodeficiency virus (HIV) vaccines that will have major sociological and commercial consequences.
- “The Michigan Cellular Therapy Center of Excellence,” Barbara Ann Karmanos Cancer Institute. The total budget is \$2,200,509. The new principal investigator on this award is Steve Abella. This joint venture with Aastrom Biosciences Inc., a bioengineering company based in Ann Arbor, aims to optimize cellular therapies in the area of bone marrow transplantation and immunotherapy.
- “Wayne State University Technology Transfer Office Improvements,” Fred Reinhart, Technology Transfer Office, Division of Research and Graduate Studies. The total budget is \$359,007. This award will be used to fund new positions to further develop technology transfer initiatives at WSU. The Technology Transfer Office will also play a part in the commercialization initiative that will be led by MSU. WSU will receive approximately \$150,000 for this initiative.

In addition to these funded proposals, Dr. J. Richard Spears, Department of Internal Medicine, School of Medicine, is collaborating with researchers from Michigan State University, on the MSU – funded grant, “Oxygenation by Liquid Infusion in Medicine/Environment.”

This grant aims to develop and improve existing oxygenation technology in ways most relevant to medical and environmental applications, using a new approach for rapid oxygenation. This technology will be relevant for oxygenation of the cardiac output of patients, and for the remediation of oxygen-deprived rivers in the environment.

The Michigan Economic Development Corporation (MEDC) also funded the grant proposal entitled “Infrastructure for the Michigan Life Sciences Corridor.” A collaborative consortium comprised of Wayne State University (WSU), Michigan State University (MSU), University of Michigan (U of M) and the Van Andel Research Institute (VARI) submitted this proposal. The goal of this consortium, known as the Core Technology Alliance, is to develop linkages with facilities that provide support to researchers in academia, private research institutions and pharmaceutical and biotechnology companies. The five core facilities include: the Michigan Center for Genomic Technologies, Michigan Proteome Consortium, Michigan Animal Model Consortium, Michigan Center for Structural Biology and the Michigan Center for Biological Information. The establishment of these consortia will create leading-edge technologies in Michigan, enabling all Michigan scientists access to these facilities.

The Michigan Center for Genomic Technologies will operate at WSU, with satellite facilities at MSU, U of M and VARI. Funding for this center was nearly \$6.8 million for five years. This center will provide life scientists in Michigan with state-of-the-art DNA sequencing, will generate high-volume DNA genotyping information, and will

create a Michigan Microarray Network. The integrated infrastructure will foster the development of translational genomics and aid biotech enterprises to capitalize on this wealth of information and assume leading roles in pharmaceutical development, disease diagnostics, preventive treatment strategies and new microdevices for the life sciences.

Wayne State scientists also will be participants in the other core facilities to help bring those technologies to southeastern Michigan through satellite facilities deployed at WSU. Wayne State will receive approximately \$3.6 million over three years to run these facilities. Dr. Russell Finley is leading WSU's proteome consortium services, "high-throughput yeast two-hybrid screening." Dr. Brian Edwards and Dr. John Santa Lucia are leading WSU's structural biology consortium services. Dr. Stephen Krawetz is leading WSU's Biological Information consortium services.

In the second-year competition held in fiscal year 2002, two Wayne State proposals submitted received funding. The Michigan Economic Development Corporation funded a total of 18 projects in FY02 that will share \$45 million in funding to advance the research and commercialization of cutting-edge life sciences products.

Dr. James Granneman, professor in WSU's School of Medicine, received the highest rating of all proposals submitted in the basic life sciences research grants category. His grant titled, "Michigan Diabetes Research Consortium," was awarded \$3,539,557 over the life of the grant. Dr. Granneman's abstract stated that almost 20 million Americans are afflicted with diabetes, including up to

20% of the US population over age 65. Michigan ranks fourth nationally in the incidence of diabetes, with direct costs to the State in excess of \$5 billion per year. While progress is being made in the treatment of the disease, some therapies are inadequate. The development of type-2 diabetes involves complex interactions among tissues, cells and signaling pathways. Understanding the relevance of different pathways and their interactions will require the development of novel genetic models and the application of sophisticated functional genomic, proteomic and metabolic analyses. This will require a comprehensive, multidisciplinary approach among dedicated researchers. The Michigan Diabetes Research Consortium will focus on new solutions by bringing together Michigan researchers and institutions to coordinate and integrate diabetes research in the state, and will greatly leverage Federal, State and private resources. This infrastructure will include basic research, drug discovery and validation, and technology development. The long-term goal of the Consortium is to elucidate the causes of diabetes, and discover potential therapies. With the unique combination of collaboration between industry and academics, this will serve as a catalyst for biotechnology and economic development in Michigan in the area of metabolic diseases.

Dr. Gregory Auner, professor in WSU's College of Engineering received very high ratings in the applied research and development grants category. His grant titled, "Functionally Active Biocompatible Encapsulation (FABE)," was awarded \$2,635,119 over the life of the grant. Dr. Auner's research will aim to develop new materials for encapsulation – the outer cover of any

implant or biosensor devices - he and his team are developing. The covers for these devices will become a functional part of the device as it interfaces with body tissue. For example, it will serve as the 'bio-sensing' transducing structure for many types of biosensors. It will be the 'diffusion system' for drug-delivering implants, and it will be the nano-electrodes for the neural interfacing in retinal implants. These advances may be incorporated into more complex medical devices and implants customized for specific neurological diseases.

The Michigan Life Sciences Corridor is an important form of investment in economic development for the state of Michigan. For Wayne State University, it provides an excellent opportunity for the advancement of applied research.

"We are pleased that many of our applications for support have been recommended for awards and we will definitely look for new opportunities in the future years," said Dr. George E. Dambach, Vice President for Research at WSU. "Universities are increasingly

moving in the direction of applied research often in collaboration with private sector businesses with well-established and start-up firms."

The action by the Michigan Economic Development Corporation positions Wayne State University, Metropolitan Detroit and the rest of Michigan squarely in the center of the life sciences' map.

"The Michigan Life Sciences Corridor is a unique public-private partnership that combines the technological and scientific muscle of Michigan's leading research institutions while maximizing their individual areas of specialization," Dambach said. "The Michigan Life Sciences Corridor already has attracted the attention of high-tech and biotech companies that are interested in relocating and starting up in Detroit and across the state. The Michigan Life Sciences Corridor is an important component in diversifying Michigan's strong economy and will be a key factor in transferring the technology developed in university laboratories to the marketplace of tomorrow."