Leon Carlock, Ph.D., and Robert Skoff, Ph.D.: Center Fosters Partnerships Throughout WSU

Three years ago, Center faculty member Leon Carlock, Ph.D., decided it was time to move away from his research focus of Huntington disease. Instead, he hooked up with Robert Skoff, Ph.D., professor of anatomy and cell biology, who had long been studying aspects of multiple sclerosis. Together they received a grant from the National Multiple Sclerosis Society.

“Today, their partnership has grown and so has their funding. Dr. Skoff is now an associate member of the Center. They have more than $2 million in funding from several sources, including a $900,000, four-year NIH grant and two additional Multiple Sclerosis Society grants. And they believe they are on to some important discoveries that will have a great impact on the understanding of multiple sclerosis.

“The Center gave me the opportunity to work with investigators in other units,” says Dr. Carlock. “Bob and I have drawn from unique skills and backgrounds to obtain this funding. Bob needed my molecular biology expertise. I needed his developmental and cell biology expertise. By teaming up we’ve worked across boundaries and have been very successful.”

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Message from the Director

Center Mission Moves Forward with Five-Year Charter Renewal

Revolutionary change demands that you break the rules. Business as usual just isn’t enough to be successful.

As researchers around the world rapidly unravel the mystery of the human genome and change the course of medicine as we know it, the Center has focused its mission on pushing these boundaries of knowledge through unprecedented — and sometimes unconventional — partnerships and outreach.

By stretching traditional boundaries and relationships, the Center’s faculty is poised to conduct the groundbreaking basic and translational research that will profoundly impact the diagnosis, treatment, and prevention of human disease.

This issue of Advances highlights some of the Center’s interdisciplinary partnerships and research. Center faculty member Leon Carlock, Ph.D., and Robert Skoff, Ph.D., professor of...
Translational Genomics To Be Major Focus of WSU Life Sciences Efforts

Center for Molecular Medicine and Genetics faculty member Mark Hughes, M.D., Ph.D., will be one of the driving forces in Wayne State University’s participation in the State of Michigan’s $1 billion Life Sciences Initiative.

Dr. Hughes, who has already helped WSU to explode into the fast-growing area of translational genomics in the two years since he joined the faculty, has been named scientific director for WSU’s life sciences efforts. The University has decided to focus these activities in translational genomics and smart sensors.

In his role, Dr. Hughes will chair WSU’s life sciences internal and external steering committee (in development), which will create a 10-year, long-range plan for the University. He will also lead WSU’s efforts in translational genomics. Greg Auner, Ph.D., associate professor of electrical and computer engineering, will spearhead WSU’s activities in smart sensors.

“… By teaming up, we’ve worked across boundaries and have been very successful…”

For their research, they are studying the ubiquitin-proteasome complex, which is a major player in protein degradation. Ubiquitin is a small protein that links to proteins targeted for degradation. Using tissue culture systems, they are investigating how normal and mutant PLP proteins are processed by the ubiquitin-proteasome system and how oligodendrocyte death is induced.

In particular, they will examine the molecular consequences of specific PLP mutations in programmed cell death; why overexpression of the normal PLP protein produces cell death, and what role the ubiquitin-proteasome complex plays in regulating protein degradation and cell death.

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“By understanding the steps that cause the death of oligodendrocytes, we should be able to develop therapies that prevent their death and this, in turn, could lead to treatment of certain human nervous system diseases,” says Dr. Skoff.

To reach Dr. Carlock, please contact him at (313) 577-1013 or via email at carlock@cnh.biosci.wayne.edu.

To reach Dr. Skoff, please contact him at (313) 577-1165 or via email at rskoff@med.wayne.edu.

Center’s Biotechnology Division Gets New Name

The Division of Research and Biotechnology Development stands poised to serve the needs of WSU’s translational genomics efforts and other activities generated by WSU’s new life sciences program.

The Division, formerly known as the Biotechnology/Technology Transfer Laboratory, recently changed its name to more accurately reflect its translational activities.

Dr. Hughes, along with WSU’s Interim Vice President for Research and Graduate School Dean George E. Dambach, Ph.D., will also serve on a planning committee for the state’s overall Life Sciences Initiative. The committee, which reports directly to Gov. John Engler, will help identify targets for investment and recommend an application process and structure for the new program.

“We have a great opportunity to enhance research very broadly at WSU by building from the base of these two leading edge technologies,” says Dr. Dambach. “Human genomics and smart sensors are already outstanding here, and we would like to keep them at the leading edge through the life sciences corridor.”

Dr. Dambach says that the dollars available from the state — made available by the Legislature and Gov. Engler from a portion of the state tobacco settlement money — will be allocated to universities in two main areas: recruitment of the next generation of scientists and collaborative projects that link two or more state universities. A primary goal of the Life Sciences Initiative is creation of a life science industry led by research excellence at the universities that transfers to the private sector.

“The goal of our life sciences program is to develop life sciences at the cutting edge in terms of technological development toward applied science where basic science is on the verge of breakthrough and where it can be developed commercially,” says Dr. Dambach. “Because our emphasis is on state-of-the-art technology — in both translational genomics and smart sensors — there will be many opportunities for faculty throughout the campus who are conducting hypothesis-driven research to participate in this far-reaching project.”

Watch for the next issue of Advances for more information about translational genomics activities already underway at Wayne State University.

Center Fostered Partnerships

Continued from the cover

Specifically, Dr. Carlock and Dr. Skoff are investigating one of the causes of the symptoms of multiple sclerosis. Their work looks at the mechanisms underlying the role of proteolipid proteins (PLPs) in oligodendrocyte death. Oligodendrocytes, vital to all vertebrates, are the supporting cells that enshrine the axons of nerves. Without these cells, axons do not conduct electrical impulses properly, and this causes the symptoms of MS.

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Message From the Director

Continued from the cover

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The Division’s unique role at WSU is to use scientific personnel with a dedicated interest in translational research to network and expedite the flow of technology among faculty, the WSU Technology Transfer Office, and local, state, and national biotechnology companies.

“Our mission is to promote academic-industry partnerships and to effectively compete for federal and state funding as these collaborations advance the ‘high-tech culture and growth’ envisioned as critical for the economic development of Michigan in the next century,” says Joan Dunbar, Ph.D.

In fact, the development of a high-tech state was recently mandated by Gov. John Engler in the “State Smart: Michigan Program.” This program was the culmination of Gov. Engler’s Innovation Forum, a year-long series of meetings addressing the relationship between Michigan universities and industry and the efficient conversion of university knowledge into economic growth.

Three Division members — Dr. Dunbar, Wayne Lancaster, Ph.D., and Joseph D. Artiss, Ph.D., — were active participants in the Forum, which identified biotech-
Scott Dulchavsky, M.D., Ph.D., Aims High

It’s not too often that Ph.D. candidates in the Center for Molecular Medicine and Genetics are paged out of class to operate on a gunshot victim or miss a research seminar to fly to NASA’s Johnson Space Center. But Scott Dulchavsky, M.D., has done both.

Dr. Dulchavsky, Ph.D. who received his Ph.D. in molecular biology and genetics from the Center in 1999, wasn’t your typical graduate student. He’s chief of surgery at Detroit Receiving Hospital and a physician consultant investigator with NASA’s Space and Life Science Directorate.

Dr. Dulchavsky is one of a growing number of physicians associated with the Center whose mission brings physicians and basic scientists closer together so that they can move fundamental discoveries from the bench to the bedside more quickly and seamlessly. The Center was the only Ph.D. program at WSU interested in offering him the opportunity to receive basic science training.

“At that time, I had a major grant with a significant molecular biology component but no background to conduct this part of the research,” says Dr. Dulchavsky. “I had asked a Ph.D. lab to help me, but I was uncomfortable farming out such a large portion of the grant. I decided I wanted to be cross-trained as a credible researcher. Robert Rowand (the former Center director), enthusiastically welcomed me. He said translational research is what the Center’s mission is all about.”

With the support of Ph.D. advisor Mary T. Murray, Ph.D., Dr. Dulchavsky pursued his Ph.D. coursework and thesis, “Biolistic Gene Therapy of Mammalian Kidney Ischemia-Reperfusion Injury and Delayed Wound Healing.” His research led him to develop the use of a “gene gun” to carry mRNA to wound sites to help in the healing process. He has published one article about his work and has an additional three articles and a patent pending.

“As a trauma surgeon, I am concerned with the healing of wounds, especially as they are affected by diabetes, chemotherapy, and obesity,” says Dr. Dulchavsky. “There are ointments available to put on wounds but their effects are often marginal. By delivering the mRNA with a specific vector to a wound site, we can tailor the application for short-term treatment.”

Dr. Dulchavsky appreciates the support he received from faculty and staff throughout the Center, especially Dr. Murray. It was an unusual experience for both Dr. Dulchavsky and Dr. Murray, but one from which they both learned a great deal.

“It was unique for a Ph.D. candidate to come to the student-mentor relationship with a whole body of knowledge different than mine, in fact, from the Center’s entire faculty,” says Dr. Murray. “I learned that many of the things basic scientists take for granted in traditional science can be easily spun off to have clinical significance. And I helped educate him about how basic scientists see things and their approaches to research.”

Dr. Murray and Dr. Dulchavsky are continuing to collaborate on three large grants related to the gene gun (for which Dr. Murray is co-principal investigator), including a $1 million grant application from the National Institutes of Health. As the Center’s graduate officer, Dr. Murray is also involved in a $1 million NIH grant for “Academic Training in Trauma and Burns,” which allows surgical residents to spend two years in basic research.

In addition to conducting exciting, translational research, Dr. Dulchavsky said he believes his Ph.D. is helping him achieve his latest challenge: his goal to be one of the physicians on NASA’s Space Station five years from now.

“The NASA space program is very competitive,” says Dr. Dulchavsky, who travels to the Johnson Space Center every month in his current role as a physician consultant investigator and also conducts some NASA-related research at Detroit Receiving Hospital. “Forty-eight hundred physicians applied for 19 positions in the astronaut corps. I know that my Ph.D. gave me additional credibility in scientific thinking. It will also help me to conduct research for NASA on bone healing which has implications for long-duration space flights.”

Legislative Update

Several faculty members of the Center for Molecular Medicine and Genetics are part of the State of Michigan’s effort to explore legislation that would protect the privacy of genetic information and prevent genetic discrimination. Michigan joins a dozen other states that are also passing or considering legislation.

Mark I. Evans, M.D., who has a joint appointment in the Center and the Department of Obstetrics and Gynecology, is the committee chair of the Michigan State Medical Society (MSMS) Advisory Committee on Genetic Technology. Other Center committee members include Gerald L. Feldman, M.D., Ph.D.; Anne Greb, M.S.; and Mark Hughes, M.D., Ph.D. The MSMS provides leadership to 13,000 Michigan physicians to help influence state health policy initiatives.

The MSMS committee is addressing the implications and merits of a series of bills (SB 589-595) that focus on various genetic privacy issues. In June, the committee met with representatives from the offices of Gov. John Engler and State Sen. John J.H. Schwartz, M.D.

Three of the bills (SB 589-91) prohibit insurance companies from requiring individuals to undergo genetic testing or from asking about genetic test results. Another bill (SB 592) ensures that parents are informed about the nature of newborn screening for genetic conditions and about the option of retaining a sample for later identification purposes. SB 593 requires physicians to obtain written informed consent before ordering genetic testing. SB 594 and 595 require the subsequent destruction of DNA samples used for forensic purposes or for the establishment of paternity. The Senate is expected to consider the bills this fall.

For additional information about this series of bills, browse the Web at http://www.michiganlegislature.org/.

Michigan Teratogen Information Service

A new service that advises expectant parents about how substance exposures may affect their unborn children kicked off earlier this year at the Children’s Hospital of Michigan.

The Michigan Teratogen Information Service (mtTIS) provides facts about teratogens — drugs, medications, chemicals, and environmental toxins — that can cause birth defects.

Expectant parents, community members, and health care providers are encouraged to call mtTIS with questions about exposure to substances during pregnancy. Using an extensive research database, mtTIS answers most questions immediately and responds to all inquiries within 24 hours. Referrals to genetic counselors, high-risk pregnancy specialists, and community services are available. All information is confidential and services are provided free of charge.

mtTIS is under the direction of Medical Director Yvette R. Johnson, M.D., M.P.H., an assistant professor of pediatrics at WSU in the Department of Pediatrics/Neonatology at the Children’s Hospital of Michigan. mtTIS program coordinator is Robin Gold, M.S., an associate member of the Center.

mtTIS is affiliated with WSU, Children’s Hospital of Michigan, and Hutzel Hospital’s Division of Reproductive Genetics. For more information, please call (313) 966-9368 or 1-877-52-MITIS (64847). You may reach Robin Gold via email at rgold1@dmc.org.

Center Holds Second Annual Scientific Retreat in November

The Center will hold its Second Annual Scientific Retreat on November 19-20, 1999, at the Mambee Bay Resort and Conference Center on Lake Erie in Ohio. The planned activities include a scientific poster session, lectures, and invited speaker. Mark Hughes, M.D., Ph.D., retreat organizer, welcomes any comments, suggestions, and volunteers. You may reach Dr. Hughes at (313) 993-1353 or via email at mhughes@erols.com.
Welcome to Gerald L. Feldman, M.D., Ph.D., who is joining the Center faculty at Wayne State University’s new director of Clinical Genetics Services. He will also be medical director for the Wayne State University School of Medicine at Henry Ford Hospital. He is board certified by the American Board of Medical Genetics in clinical genetics, molecular genetics, and biochemical genetics.

Four CMMG faculty members were recently honored by the Wayne State University School of Medicine. Li Li, Ph.D., received its Research Excellence Award in recognition of excellence in biomedical research. Leon R. Carlock, Ph.D.; Russell L. Finley, Jr., Ph.D.; and Mary T. Murray, Ph.D., received College Teaching Awards for dedication in teaching and contributions to the professional development of students.

STUDENT NEWS

Congratulations to Carol Baker, M.S., Barbara Corey, M.S., and Alicia Salkowski, M.S., who recently became the first graduates of the Wayne State University School of Medicine’s Genetic Counseling Graduate Program. They each earned a master of science in genetic counseling.

To advance academic-small business collaborations, the Division actively promotes and facilitates STTR grants applications to the National Institutes of Health and National Science Foundation. (Please see page 6 for a recent success story.) The Division is working with other faculty members and local as well as national biotechnology companies on additional STTR applications.

Further information about the Division’s activities will soon be available on the Great Technologies Web site at www.GreatTechnologies.org. This Web site was initiated by the Governor’s Innovation Forum as a further mechanism to promote and market the technologies and successes of Michigan’s universities and industry.

You may also contact Dr. Dunbar at (313) 577-5542 or via email at j.dunbar@cmbioisci.wayne.edu or Dr. Lancaster at (313) 577-0028 or via email at wayne@cmbioisci.wayne.edu.
Seminar Series: “Molecular Medicine, Genetics, and Gene Therapy”

Learn about some of the latest research and trends in molecular medicine and genetics at the Center’s Molecular Medicine, Genetics and Gene Therapy Seminar Series. Presentations by leading experts are held every other Thursday at noon in Room 236A, Scott Hall. The following is a list of highlights from the fall semester. For the most up-to-date information on the series, please visit the Center’s Web site at http://cmmg.biosci.wayne.edu.

November Events

4 Jay Tischfield, Rutgers University: “Lost of Heterozygosity” or “How I Learned to Stop Worrying and Love Mitotic Recombination.”
11 Bruce Edgar, Fred Hutchinson Cancer Research Center
14 Peter White, Children’s Hospital of Philadelphia: “Navigating the Human Genome with CompView.”

December Events

2 Lucia Schuger, Wayne State University School of Medicine: “Cell Shape and Smooth Muscle Myogenesis.”
16 Jerry Workman, Pennsylvania State University: “Multisite Complexes that Regulate Transcription by Modifying Chromatin Structure.”

For more information, please contact Li Li, Ph.D., at (313) 577-8749 or via email at lili@med.wayne.edu.