Message from Thomas Gardner, M.D., M.S.

It is well known that diabetes affects many parts of the body. However, one of the parts of the body that is most keenly affected by diabetes, yet often overlooked, is the eye. The retina can be badly damaged before a patient with diabetes may notice any change in vision. Diabetic retinopathy affects approximately 10 percent of all persons with diabetes. Diabetic retinopathy is a general term for all retina problems caused by diabetes. The retina is in the back part of the eye, and it contains the cells that needed for seeing. Diabetic retinopathy can only be diagnosed by a specialized eye exam.

When I first started practicing as an ophthalmologist in a rural area, I became frustrated by the fact that the only treatment available for the condition was laser treatment. Although laser treatment is effective, it has some significant drawbacks. I wished that there were medications that patients could put in their eyes to treat retinopathy. This wish led me to eventually start a research career at Penn State which focuses on understanding how retinopathy develops and the development of new medicines to treat diabetic retinopathy.

November is Diabetes Awareness Month and November 14th is World Diabetes Day. In commemoration of these two important events, all persons with diabetes are encouraged to check if they have had a diabetic eye examination in the past year, and if not, to make arrangements to have one. In addition, in this newsletter you will find opportunities to participate in research to help improve our understanding of eye problems for persons with diabetes and how better to treat them. It is only with your help that we will be able to better understand the underlying causes of eye problems for patients with diabetes and how they might be more effectively treated.

Additionally, in this newsletter, you will find spotlights on two Penn State faculty who are working on problems related to diabetes. Dr. Bond received a new grant from NIDDK to study the role of meprins in acute renal failure and urinary tract infections, and Dr. Lynch received internal funding to study why bariatric surgery can have such an astounding effect on glucose control for persons with diabetes.
Dr. Judith Bond is a Distinguished Professor and chair of the Department of Biochemistry and Molecular Biology at the Penn State College of Medicine. She graduated from Bennington College, received her Ph.D. from Rutgers University, and did postdoctoral work at Vanderbilt University. Dr. Bond has a passion for both bench research and teaching. As a result, she has a very successful laboratory research program, and at the same time is the director of an innovative program called Step-UP, which helps individuals from under-represented groups prepare for biomedical research and health science careers. Dr. Bond’s research program has been instrumental in the identification and characterization of meprins. Meprins are an intriguing kind of protein found inside the intestine, kidney, and other parts of the body. Dr. Bond’s research has shown that alterations in a gene coding for meprin are associated with an increased risk for diabetic nephropathy in some ethnic groups. Kidney disease is one of the most devastating complications of diabetes, and Dr. Bond’s work aims to determine how diabetic kidney disease can be prevented or treated. Further work in her laboratory has shown that meprins can break down insulin and other important substances. She recently received a generous grant from the National Institute of Diabetes and Digestive Diseases to conduct a study of the role of meprins in acute renal failure and urinary tract infections.

The Step-UP program is a collaborative project created by the Office of Minority Health Research Coordination (OMHRC) in the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). As part of this program undergraduate students learn about what it takes to conduct biomedical research. Students participate in course work and seminars and are matched with Penn State researchers to gain hands-on laboratory experience. Students interested in participating in the Step-UP program may learn more at www.hmc.psu.edu/biochemistry/stepup or stepup.niddk.nih.gov.

Christopher Lynch received a Bachelor of Science Degree in Biology and Chemistry and a Ph.D. in Pharmacology from Northeastern University. His postdoctoral training took place at Vanderbilt University. Since 1988, Dr. Lynch has been a professor at Penn State in the Department of Cellular Molecular Physiology in the College of Medicine/Hershey Medical Center.

Dr. Lynch is spearheading research on diabetes and obesity at the level of the cell to the whole person. His laboratory has three main lines of research. The first is to characterize the reasons for drug side effects at the level of the molecule. This research may lead to the development of new drugs with reduced side effects for persons with diabetes and obesity.

The second line of research seeks to identify how having gastric bypass surgery leads to changes in the fat cells and blood and how these changes are related to diabetes and obesity. Specifically, using funding from PSIDO, Dr. Lynch and his colleagues are conducting a study to find out why the Roux-en-Y Gastric Bypass Surgery is so effective in reducing the need for insulin for patients who choose have this surgery.

Finally, Dr. Lynch’s laboratory specializes in conducting experiments to learn how fat cells form, and specifically the role that branched chain amino acids (for example, leucine) play in fat cell growth. An article describing the work of his laboratory’s analysis of cells from mice and humans was recently published in the Journal of Physiology, Endocrinology and Metabolism.

Roux-en-Y Gastric Bypass Surgery. This is the only commonly used procedure that bypasses most of the stomach by directly connecting a pouch before the stomach to the lower small intestine (ileum).
Ongoing PSIDO Research Studies

Volunteers are needed for the following research studies. All studies listed have been approved by either the University Park or Penn State/Hershey Medical Center Institutional Review Board.

**Type 1 Diabetes**

**TrialNet** is an international research study that screens relatives of people with type 1 diabetes to assess their risk for developing diabetes. Relatives (ages 1-45) may be eligible to be screened with one blood test at no cost. This study is aimed at tracking the development of diabetes and in the future. The study will include experimental diabetes prevention treatments. For more information, contact 800-393-0782 or luk10@psu.edu. IRB# 18620; PI: J.S. Ulbrecht.

**Active MOMS** is a NIDDK-funded research study targeting pregnant women diagnosed with gestational diabetes. The purpose of the study is to examine physical activity, health beliefs, and behaviors during pregnancy in an effort to understand the impact on gestational diabetes for women and their babies. Women may be randomized to a standard of care, leisure physical activity, or structured exercise condition in pregnancy. Compensation is provided. For more information, contact dsd11@psu.edu or 814-863-0456. IRB# 24174; PI: D. Downs.

**BEAP (Beliefs about Exercise after Pregnancy)** is a PSIDO-funded research study targeting postpartum women who had gestational diabetes in their most recent pregnancy. The study’s objective is to better understand a woman’s thoughts about exercise and other healthy behaviors in order to develop an intervention program. Compensation is provided. For more information, contact dsd11@psu.edu or 814-863-0456. IRB# 23986; PI: D. Downs.

**Retinal Function Study.** This observational research study is seeking both healthy volunteers and volunteers with a history of diabetes for at least seven years with and without diabetic retinopathy. The study will evaluate several vision tests designed to reveal whether decreased visual function may be used as an identifier in future studies aimed at early diabetic disease. Eligible volunteers will have two visits within three weeks, lasting two to three hours each, provide medical and eye history, and complete various visual function tests. Compensation is available. For more information, contact Laura Walter at 717-531-4696 or lwalter@psu.edu. IRB# 25461EP; PI: G. Jackson.

**Diabetic Retinopathy Eye Study:** This proof-of-concept research study is seeking adults with severe non-proliferative or non high risk proliferative diabetic retinopathy to participate in a 24-month study evaluating the effects of doxycycline versus a placebo on slowing the progression of diabetic retinopathy and/or improve retinal function. Participants must meet medical and ocular study criteria and be willing to come for study visits every 3 months for 24-months. Compensation is available. For more information, contact Mary Wilmarth, COMT at 717-531-6779 or mwilmarth@hmc.psu.edu. IRB# 25234 PI: I.U.Scott.
StrongWomen: A Strength Training Program

StrongWomen is a simple, safe, and effective strength-based and nutrition education program for mid-life and older women who are interested in improving their health, vitality and well-being. Women who participate regularly may increase their bone density and muscle mass while becoming stronger, more energized, and more active. StrongWomen sections are offered at sites near University Park and the Penn State Hershey Medical Center.

For more information, visit:
- app.outreach.psu.edu/extension/newsletter/september/Osteoporosis.htm.

To register for the upcoming session in the University Park area visit:
- www.ohr.psu.edu/HealthMatters
- Call 814-865-3085.

To register for an upcoming session in the Hershey area visit:
- www.hmc.psu.edu/ufc or call 717-531-7075.

PSIDO Diabetes Playbook

PSIDO is focused on Reinventing Diabetes Care™. One of the ways we are reaching this goal is by hearing what our patients have to say. When our patients asked for an easy way to keep track of their diabetes care the Diabetes Playbook was made. Not only does the book offer tips on how to manage diabetes from people who treat diabetes, but it also offers tips from people who live with diabetes every day. To order a copy, go to www.hmc.psu.edu/diabetes.

PSIDO Research Volunteer Database

If the studies listed in this newsletter do not interest you, consider enrolling in the PSIDO Database. This database is used to provide diabetes investigators with contact information for persons interested in participating in diabetes-related research studies. Signing up for the database will allow investigators to contact you directly with information about studies such as the ones described above, but does not obligate you to participate. For more information, contact 1-800-393-0782 or luk10@psu.edu. You can also call this number if you are not sure about participating in one of the studies described in this newsletter. IRB# 20657; PI: K. Peters.