CNRU HAS ACCESS TO LATEST GENERATION MRI LAB

Powerful diagnostic imaging technology enables a look at the function of cells and tissues

The Pennington Biomedical Research Center (PBRC) has acquired a new, state-of-the-art high definition magnetic resonance (HDMR) scanner, the Signa® EXCITE 3.0T HD system from GE Healthcare. The MRI will be the centerpiece of Pennington’s new imaging facilities.

The installation of the high (3T) field strength MRI will allow Pennington investigators to probe metabolism at the cellular level using a new technique called multinuclear spectroscopy.

Dr. Steven Smith, Associate Professor and Chief of the Inpatient Unit at PBRC, says “The purpose of the instrument is not only to collect images of the inside of the body but also to measure the function of the body, specifically energy metabolism, at the cellular and biochemical level. This will allow us to explore how people differ in terms of their cellular and molecular biochemistry, without having to take biopsies, and test the effectiveness of treatment to change the biochemistry and metabolism of the tissues.”

“This technology will also allow PBRC to compete with major medical centers across the U.S. and abroad for grants and contracts that rely upon state-of-the-art technologies,” added Smith.

The GE Magnetic Resonance Imaging (MRI) machine arrived by flatbed truck and was hoisted into its new facility, located in the clinical research building at the Pennington Center.

This is the first 3Tesla MRI in Baton Rouge and the second in Louisiana. The G3 magnet, GE’s third generation 3T design, allows for measurements of cellular biochemistry non-invasively; complementing the molecular and genetic capabilities at PBRC. It also provides more patient comfort due to the size of instrument and by using noise reduction technology.

Fall Retreat

CNRU faculty, staff and advisers plan to huddle up this fall for progress review and a mid-stream check on the CNRU grant during its second cycle.

On the calendar for September 28-29, 2006, the CNRU Retreat will be managed by the Administration Core of the CNRU. Its agenda includes reports on day one from the CNRU-funded Pilot & Feasibility studies. Day two include discussions of progress with our external advisors and convening a mini study section to review the P&F grants for the second cycle.

Attending the retreat will be our four external advisory board members: Dr. Rudy Leibel, Columbia University (chair), Dr. David Kelley, University of Pittsburgh (Human Phenotyping Core), Dr. Dan Kelly, Washington University (Molecular Mechanisms Core), and Dr. Brad Lowell, Beth Israel (Animal Models & Phenotyping Core).
Formed about three years ago, the Pennington Biomedical Research Center’s Stem Cell Interest Group sees the CNRU as “an opportunity for us to talk to cross disciplinary groups from beyond campus – in both nutrition and epigenetics - and the role of epigenetics in nutrition,” according to Jeff Gimble of PBRC.

“Stem cell work is prime to fit into the overarching goals of the CNRU.” Gimble said, “We don’t know how the environment interacts with stem cell behavior.”

The Stem Cell Group centers on a core of four researchers at PBRC but includes nearly 25 total interested scientists. They share information, research goals and progress in epigenetics and environment and the role they may play in stem cell development.

The theme of the group is evolving, but does not stray from the specifics of stem cell development. However, the group recognizes the distinct and vital role of a cross disciplinary approach as it reaches to gene therapists, reproductive biologists, animal sciences and others at Tulane, Louisiana State University, University of Pittsburgh and elsewhere.

Although, according to Gimble, the approach is not new, and other universities have similar stem cell group interest, PBRC may be unique in it concentration of scientists.

“Most universities have one [stem cell group],” said Gimble, “but while they may have achieved critical mass, they may not have coalesced physically into one group. At PBRC, four stem cell researchers share a large laboratory and contiguous offices, staking out a substantial portion of the Center’s new Basic Sciences Laboratory Building.

Coincidentally, about the time the group formed, the Louisiana Legislature began to grapple with the thorny issues surrounding embryonic stem cell research. Gimble and others in the stem cell group created a way to be provide a cohesive message to lawmakers. PBRC directors drew on members of its stem cell group and others to create a sounding board and means to understand the latest findings and to help communicate the science during the last two legislative sessions, effectively stopping a process that seemed to be leading to a restrictive research environment.

“Stem cell biology is alive and well at PBRC,” said Gimble. “We’re thinking and experimenting around epigenetics and stem cell biology. There is a community of scientists from several disciplines meeting regularly to discuss the issues – not just present. And that group consists of interested researchers at all levels: faculty, postdocs, technicians and undergraduate students.”

To further its theme of “Nutritional Programming: Environmental and Molecular Interactions,” the CNRU supports innovative hypotheses involving nutritional programming. To do so, CNRU has set aside $100,000 to support three to five Pilot and Feasibility grants.

“Our hope is that the CNRU will provide enough support to allow an investigator to generate sufficient preliminary data to later obtain research funding by conventional mechanisms,” said Eric Ravussin, principal investigator in the CNRU.

The program is in place to encourage young investigators – or senior investigators in a different field – to approach problems relevant to our understanding of nutritional programming of metabolism and function, and increase understanding of basic and clinical aspects of nutrition in the prevention, etiology, pathophysiology and therapy of diseases.

Currently, the CNRU is supporting four such grants, awarded for one year, with possible renewal through competitive mechanism.

Dr. Brenda Richard’s grant is Dietary Fat Avoidance in ACADS Mutant Mice: A new model of nutrient sensing? She is investigating the interactions among genes and dietary macronutrients in a genetic model of impaired fatty acid oxidation.

Dr. Ken Eilertson’s Maternal Diet and Epigenetic Programming in utero, is testing the hypothesis that in utero exposure to a maternal low protein diet or high fat diet during preimplantation development, then through gestation, or through gestation plus lactation, programs expression of epigenetically regulated genes in organs of mice and that the expression patterns persist into later life.

Dr. David York’s The Neuroprotective Role of Enterostatin is designed to develop a new research direction with a view to the future study of how enterostatin, dietary fat and physical activity interact in the promotion of or protection from neurodegenerative disorders.

Dr. Tiffany Stewart’s Genetics and Binge Eating: A Case-Control Pilot Study aims to identify genetic markers that are associated with the presence of binge eating behavior, primarily investigating the association of a behavioral phenotype, binge eating,
CNRU MEMBERS GET AN EARFUL – AND AN EYE OPENER

CNRU members gathered at the first, but perhaps not the last, in-house symposium to pick the brains of experts in nutritional programming and epigenetics. The two-day session yielded some significant findings, according to Steven Smith, M.D., Director of the CNRU Human Phenotyping Core.

The very basic aim of the symposium was to bring CNRU members up to speed on state-of-the-art research in nutritional programming as it relates to DNA modification – otherwise called epigenetics.

“How do we take this information gleaned from rats and flies and worms, and apply it to the field of research on human nutritional programming?” Smith said.

Members of the CNRU learned the state of research, new tools of the trade in epigenetics and new research paradigms.

Then came the eye-opener. The CNRU is “further ahead in the game than we thought,” Smith said.

CNRU members invited three national experts to be available for two days to give their insights into the new fields of nutritional programming and DNA modification (epigenetics).

“We basically grilled them for two days [laugh],” Smith said. “We thought we were behind in this new area of research, but learned we were further ahead that we thought, simply because we accepted the concept that this was a rational field of study. We learned that this [focus on nutritional programming and epigenetics] is the right big idea for the CNRU. I think we were all a little bit surprised.”

Smith acknowledged that members of the CNRU want to be on the front end of a new field of research, not “last on the bandwagon.” And that the two days of exchange left the CNRU energized and with a clear understanding of what members could do; what technology was available and even some very specific ideas to pursue.

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with the melanocortin system. Stewart said the P&F grant application process was reasonable and that the P&F grants program was "extremely important."

The P&F grants "allow new investigators to obtain funding to begin a research program that will serve as the foundation to a larger line of research that may later be funded by NIH or other funding agencies," Stewart said. "This opportunity allows for a funding 'launch pad' for not only new investigators getting their feet wet in funding, but also allows other investigators to apply for pilot funding for new areas of research maybe slightly outside of their main area of work to build a funding base for further, larger studies."