

# Thomas Jefferson University

## Research Development Report

### Reporting Period:

July 1, 2009 - June 30, 2010

### Commercial Development of Research

The Office of Technology Transfer and Business Development (OTT) were implemented in 1984. Within this Office, Thomas Jefferson University (TJU) has established procedures in place for the commercial development of new technology from Jefferson research.

- TJU will seek patent protection and proceed with systematic marketing efforts to identify potential licensees where the research results have commercial value.
- TJU has actively promoted commercialization of its technologies since OTT was implemented.
- The OTT has actively engaged in networking with regional pharmaceutical industries and local state funded economic development agencies, to promote partnerships to help further TJU's research results. In the current funding period, OTT invited representatives from the local state-funded economic development agencies to faculty outreach events. Several technologies were evaluated by the Science Center, a Southeast Pennsylvania economic development agency, for its early stage quod erat demonstrandum (QED) proof-of-concept funding program. One of the proposals to QED involved collaborating faculty members from TJU's Kimmel Cancer Center Department of Cancer Biology, the TJU Department of Pharmaceutical Sciences, and University of the Sciences in Philadelphia (USP). Their proposal was selected as one of ten semi-finalists out of 63 applications and was a top 5 finalist.
- The OTT aggressively markets TJU's research results in a systematic fashion coupled with flexible license arrangements.
- The flexible license arrangements provide incentives to TJU's external commercial partners that desire to commercialize TJU's research results.
- In the current funding period, OTT has conducted 76 outreach events, including networking opportunities, business meetings on TJU technologies, and formal training presentations for TJU employees. The training presentations, to research departments as well as to individual faculty members, educated TJU researcher participants about technology transfer processes, marketing processes, and licensing deal structures. The general audience presentations also involved speakers from industry sectors and patent attorneys.
- Small group sessions were held to address specific technology transfer related issues.

Based on the available AUTM FY2009 information, the results for Thomas Jefferson University are:

- \$94,784,221 in total federal and industrial research funding
- \$5,531,467 in gross license income

- 18 licenses or options were executed on a total of 15 TJU technologies.
- 48 active licenses or options yielding license income
- 10 start-up companies were still active.
- With 53 new disclosures received, 1 CURE/Formula grant faculty member cited Commonwealth of PA funding, 16 provisional patent applications were filed (30%) and 29 US applications were filed.
- 6 US patents issued

### **Research Licensing Agreements**

Thomas Jefferson University uses Exclusive and Non-Exclusive licensing agreements that were developed prior to June 30, 2004. The agreements are for use in the licensing of research results related to medical devices, drugs or other research discoveries. Copies of these agreements were previously submitted to the Commonwealth.

### **Training Students and Health Professionals**

In addition to Thomas Jefferson University Hospital and Methodist Hospital, Jefferson's Medical College is affiliated with a wide range of academic medical centers in northeastern, southeastern, central and western Pennsylvania at which we educate our medical students. These institutions provide core undergraduate rotations for third year medical students and elective and subspecialty clerkships for fourth year medical students. These institutions include:

- ❖ Abington Hospital, Abington, PA
  - ❖ Albert Einstein Medical Center, Philadelphia, PA
  - ❖ Bryn Mawr Hospital, Bryn Mawr, PA
  - ❖ Excelsa Health Latrobe Hospital, Latrobe, PA
  - ❖ Frankford-Torresdale Hospital, Philadelphia, PA
  - ❖ Lankenau Hospital, Wynnewood, PA
  - ❖ Magee Rehabilitation Hospital, Philadelphia, PA
  - ❖ Reading Hospital, Reading, PA
  - ❖ Wills Eye Hospital, Philadelphia, PA
  - ❖ York Hospital, York, PA
  - ❖ Chester-Crozier, Chester, PA
  - ❖ Paoli Hospital, Paoli, PA
- The Affiliations Committee met as part of the two day Affiliations Day program with representation from all of the affiliates. The Tenth Annual Curriculum Retreat was held in February 2010.
  - During this academic year, the Division of Graduate Medical Education (GME) continued in its mission to provide oversight, guidance, and support to all GME programs at Jefferson and the affiliates for which the Hospital is the sponsoring institution. Residents rotate to a number of affiliated hospitals for their specialty-specific core and subspecialty graduate programs. The affiliated hospitals for GME include:
    - Albert Einstein Medical Center, Philadelphia, PA

- Bryn Mawr Hospital, Bryn Mawr, PA
- Children’s Hospital, Philadelphia, PA
- Chester Crozier Hospital, Chester, PA
- Frankford-Torresdale Hospital, Philadelphia, PA
- Lankenau Hospital, Wynnewood, PA
- Magee Rehabilitation Hospital, Philadelphia, PA
- Moss Rehabilitation Hospital, Philadelphia, PA
- Wills Eye Hospital, Philadelphia, PA

The ACGME Outcome Project and the implementation of competency-based education in all GME programs is fully implemented into all GME programs within the institution. Over the past year, continued institution-wide educational forums, assistance in outcomes-based curriculum development, pilot programs for the development of new resident evaluation instruments, and individualized consultations have occurred.

Jefferson sponsored over 120 CME certified activities in this last year. The number of certified activities remained similar to last year; however, we saw an increase in the number of certified regularly scheduled conferences on campus. In FY 09 (latest completed data), Jefferson OCME designated these activities for 2000 *AMA PRA Category 1 credits*. These activities involved over 25,000 participants.

- Jefferson Medical College (JMC) has been the medical school liaison to the Northeast Pennsylvania AHEC (NEPA AHEC) since 1998. This initiative is funded by HRSA through Penn State University. Although funding remains tight, the program has continued without interruption. Drs. Michael Rosenthal and Susan Rattner continue to serve on the Board of Directors and Dr. Christine Jerpbak maintained her position as the Medical Director for the NEPA AHEC this year.
- JMC has in place a patient encounter log system (PELS) for tracking core educational requirements during clinical clerkships. Counselling for smoking prevention and cessation are core requirements in three clerkships. These data was reported for the 2009-10 academic year. Compliance with this requirement is high.

Clerkship	Number of Students Reporting	% Students Reporting Counseling for Smoking Prevention/Cessation for 3 or more patients
Internal Medicine	249	94
Family Medicine	257	98
Pediatrics	253	97

- Abigail Kay MD (Department of Psychiatry and Human Behavior) has introduced a large group session for all first year medical students, during the Introduction to Clinical Medicine course, on the physiology, impact and treatment of tobacco addiction that includes evaluation for readiness for smoking cessation. There are also a total six lectures in the required second year class, Foundations in Clinical Medicine, that address tobacco-related pulmonary injury (three) and smoking and tobacco cessation (three).

## **Commercial Research Development Training**

Jefferson's Office of Technology Transfer (OTT) conducts numerous outreach training programs throughout the year to educate the faculty, new employees, and research staff about OTT's services and procedures for licensing the university's research results. In the past year, OTT hosted 8 events for the TJU research community on intellectual property and patenting topics, technology transfer activities and services, and industry partnering opportunities. OTT also visited individual departments for small group presentations on the invention disclosure and commercialization process, confidential disclosure agreements and material transfer agreements.

Jefferson's OTT has also formed strong partnerships with the other universities in Philadelphia and with the many Commonwealth agencies and biotech and pharmaceutical companies that support our technology commercialization programs. In particular, under two Keystone Innovation Grants (KIGs) from the Commonwealth of PA, Jefferson's OTT provided technology commercialization services and mentoring to the newly formed Office of Technology Management (OTM) and director at University of the Sciences in Philadelphia (USP). The mentoring and partnership programs provided research collaboration opportunities drawing on the unique expertise at each university.

OTT continues its practice to understand the needs and concerns of faculty members in order to enhance technology transfer services. The internal outreach efforts continue to strengthen the working relationship between OTT and faculty members. A strong relationship between faculty members and OTT increases awareness and fosters interest in technology transfer amongst Jefferson researchers, and may lead to an increase in the number of invention disclosures.

## **Outreach to Businesses Regarding Recent Research Developments**

TJU has awarded its Technology Development Grant to Dr. Marja Nevalainen, whose project was a top 5 finalist in the 2<sup>nd</sup> Science Center QED funding cycle. Dr. Nevalainen has a small molecule lead compound inhibitor of an overexpressed gene associated with the development and progression of prostate cancer. She is collaborating with Dr. Vincent Njar, a medicinal chemist at TJU, to design, synthesize and test four new classes of compounds as inhibitors of the prostate cancer-associated protein. She has also collaborated with Dr. Randy Zauhar at the University of the Sciences in Philadelphia (USP) to identify additional compounds from public databases that match the lead compound in shape. In addition, a pharmaceutical company has expressed interest in further evaluation of the lead compound.

Dr. Nevalainen continues to receive requests from companies for a new prostate cancer cell line, following her publication describing the generation and characterization of the cell line. Several companies have also expressed interest in sponsored research projects in Dr. Nevalainen's laboratory.

Dr. Yuri Sykulev submitted an invention disclosure on a recombinant rabies virus-toxin combination to treat rabies and other viral infections, citing PA Department of Health funding in FY2009. The invention was found to be unpatentable. Following the assessment, OTT arranged for the inventors to speak with the patent attorney. The lead inventor participated, and the patent

attorney explained the need for enablement in addition to the single example using an artificial antigen. After the discussion, the lead inventor understood the assessment and intended to modify the research project to examine rabies and other viral antigens and consider revising and resubmitting the invention disclosure in the future.

Dr. Richard Pestell submitted an invention disclosure in 2010, based on work funded by the PA Department of Health, on the role and mechanism of a signalling molecule in mRNA splicing. The patent attorney found the invention to be unpatentable, and two of the inventors sent to the Vice President (VP) for Research a request for TJU to release its rights in the invention in order for the inventors to pursue patent protection at their own expense. The VP for Research called for a review of the request by the Intellectual Property and Patent Committee (IPPC), based on the TJU patent policy. The IPPC approved the inventors' request, and a release letter was sent to the inventor group for acknowledgement signatures followed by the signature of the VP for Research. OTT has not received a copy of the fully-executed release letter for its records.

### **Research Development Collaboration**

Jefferson's faculty members are routinely engaged in collaborative research projects with investigators at other research centers or institutes both within the Commonwealth and around the country. Recent collaborations identified by our researchers receiving support from the Pennsylvania Health Research Formula Funds include the following:

September 2009-A team of researchers from Thomas Jefferson University and the University of Delaware have received a grant from the Department of Defense to create a three-dimensional patient imaging system that will allow surgeons to view and touch selected organs and tissues prior to surgery. The two-year project is focused on the pancreas and pancreatic tumors, and has two aims: 1) the molecular design of a single new imaging ligand for epidermal growth factor receptors, and 2) the surgical simulation of human pancreatic cancer reconstructed from patient CT and PET scans. The Jefferson research team includes Mathew Thaker, Ph.D., professor of Radiology and director of the Laboratories of Radiopharmaceutical Research and Molecular Imaging Chang-Po Chen, Ph.D., from the department of Biochemistry and Molecular Biology; Devadhas Devakumar, Ph.D., from the department of Radiology; John Kairys, M.D., from the department of Surgery; and Martha Ankeny, M.Ed., Director of Learning Resources.

April 2010-The Kimmel Cancer Center at Jefferson hosted the 2nd Annual American Cancer Society Research Symposium: Celebrating the ACS Institutional Research Grant at KCC on April 16, 2010. Dr. Pestell welcomed members of the KCC and TJU community and the American Cancer Society. Michael Lisanti, MD, PhD was the Keynote Speaker presenting "The Reverse Warburg Effect: Stromal-Epithelial Metabolic Coupling in Cancer". After the Keynote Address, Dr. Nevalainen introduced the IRG Pilot Project recipients for 2009, who presented the results of their research: Jonathan Brody, PhD of the Department of Surgery, "The HuR Protein Performs Well Under Stress: Implications for the Treatment of Pancreatic Cancer"; Jun Li, PhD from the Department of Radiation Oncology, "Ultrasound-encoded Optical Imaging" and Janice Walker, PhD of the Department of Pathology, Anatomy & Cell Biology, "Lessons from Wound Healing for Understanding Mechanisms of Cancer Progression". Representing the American Cancer Society were Daneen Baird, Wan Ling Hung, Kate Mastalski, and Larry Slagle.