

# Innovation, Translation, Education



*This feature section of JCTR will appear in every issue and include Guest editorials, new listings of biotech companies, and “primers” highlighting new information. We welcome your suggestions.*

## Mayo Clinic Office of Intellectual Property—Exploring and Encouraging Invention and Innovation Through Unique Mayo Clinic Funding Opportunities Kathleen Anderson, J.D

It all begins here. Mayo Clinic’s Office of Intellectual Property (OIP) has made a commitment: work as a team to give Mayo employees the motivation to practice innovation every day. Technology licensing managers, new technology development managers, a new ventures (start-up) manager, patent liaisons, and dedicated patent counsel are taking Mayo ideas to the global marketplace. They all work closely with Mayo inventors, employees who have disclosed an invention idea to OIP. With exacting dedication to improving patient care and patients lives, Mayo Clinic offers unique ways of funding invention ideas from within. The results of such focused efforts are inspiring.

Mayo Clinic’s office of Intellectual Property contributed over \$115 million to Mayo Clinic patient care, education and research since starting operations in 1986. With a diverse portfolio of technologies covering everything from investigational new drugs to medical devices, diagnostics, and therapeutics, OIP encourages invention disclosure from all employees across all Mayo Clinic sites. The approach translates to some impressive numbers:

- 400—the number of invention disclosures Mayo is on pace to receive in 2008. This will break the former record of 336 in 2007.
- 48%—Average commercialization success rate over the last decade

- Current Technology Numbers
- 2700+ patent filings
- 1700+ active technology files
- 500+ active licensing agreements
- 1700+ licensed technologies
- 36—start-up companies based on Mayo Intellectual Property
- 6—FDA approved clinical trials currently ongoing based on Mayo Inventions

### Why Mayo Invests In The Future

While the standard methods for generating technology commercialization funding still prove tried and true, our volatile economy and decreased federal grant funding create ongoing challenges for technology commercialization efforts in academia. Mayo continues to stay ahead of the curve with internal funding sources that reward research, innovation, and translational medicine.

The funding sources described in this article support OIP’s exploration and creation of flexible business models to fit each Mayo medical invention.

Mayo Clinic Internal Funding Sources:

- Innovation Loan Program
- Presidents Discovery Translation Fund
- Mayo Medical Ventures Fund II (MMV Fund II)

These three funding sources are meant to work consecutively. A technology proven successful under the Innovation Loan Program is then eligible for financial support from the President’s Discovery Translation Fund. In turn, the technology may then be eligible for additional financial support through MMV Fund II. Mayo believes coordination of the three funding sources creates the greatest potential for getting Mayo Clinic technologies to patients across the globe.

## Innovation Loan Program

In existence since 2004, Mayo's Innovation Loan Program is administered by OIP, with an eye on developing ideas that fall outside typical funding options. This allows for development of prototype construction, preclinical *in vivo* studies, etc. OIP licensing managers are the advocates for each loan. Working as a team with the inventor, the two must present the idea to a small group within OIP. The timeframe is intentionally kept short; a decision on the loan is made during the same meeting in which the presentation occurs. The Innovation Loan Program offers up to \$200,000 per idea, with funding paid out via development milestones. To date, Mayo has funded 37 technologies via the Innovation Loan Program. OIP management of this funding option ensures program dollars are expended on successful project development.

One such successful project realized through the Innovation Loan Program is the work of Mayo Clinic Cardiologist John Burnett, M.D. and his research in natriuretic peptide drug design.<sup>1</sup> His invention harnesses the heart's own peptides and combines them with peptides made by the green mamba snake. The result is a number of FDA approved clinical trials currently ongoing for both heart failure and myocardial ischemia. The drug is designed to protect the heart from injury and improve function in the circulation and kidneys. Dr. Burnett has worked closely with OIP to take the drug design idea to the clinical trial development phase in rapid fashion. Mayo Clinic has successfully taken this invention and licensed the technology to a new company formed by venture capitalists to commercialize the technology.<sup>2</sup> The company, Nile Therapeutics, is focusing on commercialization of this discovery. This technology has the potential to impact patients around the world.

With financial backing provided through the Innovation Loan Program, repayment of the loan occurs once income from the licensed technology flows back to Mayo Clinic. OIP finances this invention funding opportunity via a retained earnings model. Five percent of the licensing revenue generated by OIP is invested in the Innovation Loan Program.

## President's Discovery Translation Fund

Created by Mayo's current President and CEO, Denis Cortese, M.D., the President's Discovery Translation Fund

<sup>1</sup> Dr. Burnett's invention also received funding from Mayo's President's Discovery Translation Fund

<sup>2</sup> Nile Therapeutics has an agreement with Mayo whereby Mayo granted Nile an exclusive license to the technology invention. Mayo Clinic owns equity in Nile Therapeutics. Mayo Clinic and Dr. Burnett will receive developmental milestone and royalty payments pursuant to this agreement.

financed its first round of invention ideas in 2005. The fund is considered a "bridge fund." It is intended to span the funding gap between basic and translational research and to advance discoveries from ideas to technologies that improve patient care. Inventors focusing on translational research can apply for funds bi-annually. The application process is more rigorous and time intensive than the Innovation Loan Program and includes an initial letter of intent from the inventor, followed by a full application. Both the letter of intent and application are reviewed by a committee of researchers and clinicians with input from staff in OIP, including licensing managers, a new ventures manager, and legal counsel. Throughout the review process, which takes place over several months, OIP and designated venture capital firms contribute their expertise in the areas of patentability and marketplace analysis. Venture capitalist review also adds additional discipline to the rigorous review involved in deciding if a particular technology is ripe for funding. Since its inception, the President's Discovery Translation Fund has financed 25 Mayo Clinic technologies.

The Presidents Discovery Translation Fund supported another successful invention that resulted in a Mayo Clinic start-up company, NeoChord.<sup>3</sup> NeoChord, based in Minnesota, has licensed technology from Mayo that involves the work of two Mayo cardiac surgeons and their invention for minimally invasive mitral valve repair.<sup>4</sup> This medical device was designed to replace chordae tendineae without cardio-pulmonary bypass and without the need for a sternotomy. The procedure is designed to address the underlying cause of the condition, leaving the patient with a repair that closely mimics the normal anatomy. More importantly, patients should recover more quickly, with less discomfort and can possibly be treated at an earlier stage of disease progression than with the current standard of care. The device is used to grasp a damaged leaflet allowing placement of suture to replace damaged or broken chordae, repositioning the valve into its natural position. Advancements with this new technology are pushing forward and are on track to begin clinical studies in 2009.

## MMV Fund II

Rounding out the trio of Mayo invention funding is the newest financing opportunity, MMV Fund II.

The result of a collaborative relationship between Mayo Clinic Treasury Services and OIP, the fund develops joint

<sup>3</sup> NeoChord has an agreement with Mayo whereby Mayo has granted NeoChord an exclusive license to the technology invention. Mayo Clinic owns equity in NeoChord. Mayo Clinic and physician inventors will receive developmental milestone and royalty payments pursuant to this agreement.

<sup>4</sup> This technology invention also received funding from Mayo's Innovation Loan Program.

investments with leading health care venture capital firms. MMV Fund II is a continuation of the previously successful Technology-Based Ventures investment program. The ultimate goal is financial return to Mayo supporting patient care, education and research. MMV Fund II is operated by OIP and Treasury Services and is funded through Mayo Clinic's investment fund. The initial investment focus targets start-up companies based on Mayo technology or expertise and an Entrepreneur-in-Residence Program designed to work with experienced managers to move technology into new companies. The investment committee for MMV Fund II includes staff from both OIP and Treasury Services.

The first new company benefitting from MMV Fund II is Nevro Corporation.<sup>5</sup> Nevro is creating implantable medical devices for chronic pain management. Through this fund, Mayo was able to invest in the company alongside leading healthcare venture capital firms. Mayo physicians also provide expertise to the company as it develops and tests the new devices.

These funding sources show that Mayo believes in its future and want to invest in it. Mayo also believes patients can and should benefit from the institutions' technology commercialization efforts. OIP's future is very bright as they continue encouraging the spirit of discovery, invention, and innovation at Mayo every day.

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<sup>5</sup> Nevro Corporation has an agreement with Mayo whereby Mayo has granted Nevro an exclusive license to patents and know how. Mayo Clinic owns equity in Nevro. Mayo Clinic and physician inventors may receive developmental milestone and royalty payments pursuant to this agreement.