Life Sciences
DISCOVERY FUND

NEWS RELEASE
For Immediate Release

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WASHINGTON STATE LIFE SCIENCES DISCOVERY FUND AWARDS HEALTH RESEARCH PROJECT GRANTS

SEATTLE, Washington, September 15, 2009–Six research project grant awards totaling $5.1 million will be made to Washington life sciences organizations and their partners, the state's Life Sciences Discovery Fund announced today. The projects are aimed at improving human health and will concentrate on promoting bone healing; optimizing limb amputation procedures; enhancing cancer treatment; facilitating the validation of biomarkers; generating a wheat variety that is safe for individuals with celiac disease; and developing novel cancer chemotherapeutics.

The Life Sciences Discovery Fund awardees are: Norman Karin, Battelle, Pacific Northwest Division; Daniel Leotta, University of Washington; Andre Lieber, University of Washington; Daniel Martin, Institute for Systems Biology; Tomikazu Sasaki, University of Washington; and Diter von Wettstein, Washington State University.

"The Life Sciences Discovery Fund is pleased to further expand its diverse portfolio by making awards to these outstanding investigators. Their projects represent an impressive breadth of focus, from novel cancer therapies and cutting-edge agricultural science to new technologies to facilitate biomedical research and enhance human health and quality of life," said executive director Lee Huntsman.

The Life Sciences Discovery Fund Board of Trustees selected the awardees from among 61 proposals that were evaluated by national experts convened by the American Association for the Advancement of Science. In a highly competitive process, each proposal was rated on its scientific merit and its potential to improve health and health care in Washington and provide statewide economic returns.

Overall, the Board of Trustees was impressed with applicants' attention to both health and economic development. Board chairman Lura Powell said that the funded projects in particular "demonstrate a keen understanding of the Life Sciences Discovery Fund's mission and exhibit

potential for both near- and long-term impact on Washington's economy, the well-being of its citizens, and the state's life sciences competitiveness."

Funding for these projects comes from Washington's allocation of bonus payments under the Master Tobacco Settlement, revenues arising from multi-state litigation with tobacco product manufacturers. This group of awardees is the fifth to be funded by LSDF through the tobacco settlement mechanism.

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The Life Sciences Discovery Fund, a Washington state agency established in May 2005, makes grant investments in innovative life sciences research to benefit Washington and its citizens.

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BACKGROUNDER INFORMATION

Life Sciences Discovery Fund 2009 Health Research Project Grants

Norman Karin, Battelle, Pacific Northwest Division - $1,022,867
Project Title: *A Cost-Effective Hydrogel-Growth Factor Complex to Improve Bone Healing*
Project Focus: To develop safe, effective, and inexpensive implant materials to promote bone regeneration.
Approximately 8 million fractures are sustained each year in the U.S., of which 5-10% exhibit impaired healing that requires surgical intervention. Increased bone fragility and impaired healing are prevalent in the elderly, which presents an increasing burden of care as the population ages. Bone healing is also important for integration of dental implants into the jaw. There is a critical need for inexpensive implant materials containing bone healing stimulators that can be handled easily by surgeons. The investigators have identified a growth factor that promotes bone healing in preclinical models with no apparent toxicity and can be manufactured for a fraction of the cost of currently available bone healing stimulators. The research team will embed this growth factor in proprietary "hydrogels" to create an implant that will release the factor in a controlled fashion. In collaboration with Washington State University, they will then test the ability of the hydrogel-growth factor implants to stimulate bone regeneration in preclinical studies. If successful, the investigators will continue development and pursue commercial licensing of the implants for both human and veterinary clinical use.

Daniel Leotta, University of Washington - $509,051
Project Title: *Imaging Oximetry of Peripheral Ischemia for Identification of Amputation Level*
Project Focus: To develop an easy to use, low-cost, non-invasive portable device that can measure local tissue oxygenation and help guide surgeons in performing lower limb amputations.
Approximately 150,000 non-traumatic lower extremity amputations are performed in the U.S. each year; diabetic patients account for over 50% of these. The annual cost of lower extremity amputations due to diabetes alone is more than $1.5 billion. Diabetic patients are also more likely to require re-amputation to a higher level, resulting in additional costs and patient morbidity. The ongoing challenge for surgeons is to balance primary wound healing at the amputation site against maximal limb salvage. Selection of the correct amputation level is essential for maximizing rehabilitation potential and avoiding complicated re-amputations. Current methods for predicting lower extremity amputation level are expensive, invasive,

and/or have limited reliability. This project will develop a new device to measure oxygen levels in limb tissue to assist surgeons in locating poorly oxygenated (ischemic) tissues for excision and well oxygenated (perfused) tissues for salvage. In clinical studies, the investigators will assess correlations between the oxygen levels measured by their device, surgeons' choice of amputation level, and post-surgical healing. Although the initial application of this new device is for amputation level selection, it may also be useful for predicting and monitoring healing of diabetic foot ulcers, pressure ulcers in spinal cord injury patients, and surgically created skin flaps. A Washington-based medical device manufacturing company will provide in-kind market research and commercialization support to the project.

Andre Lieber, University of Washington - $202,759
Project Title: *Peptides that Increase the Efficacy of Monoclonal Antibody Therapy of Cancer*
Project Focus: To validate the preclinical effectiveness and safety of a novel molecule that enhances the anti-tumor actions of a chemotherapeutic agent.
Monoclonal antibodies are used for the treatment of some cancers. Unfortunately, tumors can develop resistance to these therapies. The investigators have identified a peptide that can enhance the sensitivity of cancer cells to monoclonal antibodies with no apparent toxic side effects. This study will expand preclinical efficacy and safety testing of combined peptide/monoclonal antibody therapy to support future clinical trials with cancer patients. A Washington-based emerging biotechnology company has expressed interest in commercial development of the peptide.

Daniel Martin, Institute for Systems Biology - $791,767
Project Title: *High-Throughput Generation of Monoclonal Anti-Peptide Antibodies for High Sensitivity Targeted MS Analysis of Biomarker Candidates*
Project Focus: To develop new technologies for biomarker verification and conduct initial validation of prostate cancer biomarker candidates.
The use of powerful proteomics technologies has resulted in the identification of hundreds of proteins that could serve as biomarkers for diagnosis and monitoring of cancer and other major diseases. Unfortunately, the translation of this work into clinical assays has been slowed by the lack of methodologies for rapid validation of large numbers of biomarker candidates in biological specimens. This study will develop novel technologies for sensitive, high-throughput verification of biomarker candidates and then use these technologies for the initial validation of candidates isolated from men with prostate cancer. If successful, these technologies could be generally applicable to the analysis of biomarker candidates for multiple diseases, thus facilitating the transition of those biomarkers into commercial assays. This work could also potentially lead to new assays for prostate cancer diagnosis and prognostication.

Tomikazu Sasaki, University of Washington - $1,451,193
Project Title: *Development of Artemisinin Compounds for Cancer Treatment*
Project Focus: To develop new cancer therapeutics from a natural product.

Artemisinin, derived from the plant *Artemisia annua*, is used to treat malaria and is sold as a dietary supplement in the United States. Artemisinin also has potent anti-cancer activity equivalent to that of the chemotherapeutic drug Taxol® (paclitaxel). The investigators will develop a new class of chemotherapeutic agents, artemisinin-based drugs, in collaboration with a Washington-based company and test their efficacy in preclinical models of lymphoma in collaboration with Washington State University. The artemisinin drugs are expected to be relatively inexpensive and to have few side effects. Ultimately, these drugs may be effective against cancers resistant to standard chemotherapy. Additionally, in work that could quickly lead to an economic and health impact, the investigators will collaborate with a separate Washington-based company to exploit the anti-microbial activity of artemisinin in poultry, and will identify *Artemisia* cultivars that will grow well in Washington. This work is expected to help make safer poultry products available to consumers at a significantly lower cost.

Diter von Wettstein, Washington State University - $1,099,998
Project Title: *Wheat for Celiac Patients and Improved Disease Prevention*
Project Focus: To generate lysine-enriched wheat that is safe for individuals with celiac disease. The wheat varieties currently used to make flour for bread and pasta have two major limitations: 1. individuals with celiac disease cannot eat foods containing such flour; and 2. the grains are highly deficient in the essential amino acid lysine. This project seeks to develop new varieties of wheat that produce grain that celiac disease patients can safely consume. This will be accomplished by using molecular technologies to eliminate the proteins responsible for eliciting autoimmune reactions in people with celiac disease. Since the proteins to be removed have low lysine content, the resultant wheat will have higher lysine levels per unit weight. The investigators will assess dough formation and baking properties of the newly developed grains produced in collaboration with local growers. Development and commercialization of celiac-safe wheat is anticipated to have a large impact on the health and quality of life of individuals with celiac disease, and may help prevent induction of the disease in others by limiting their exposure to the immunogenic proteins.

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