



**Duke University
Office of Licensing & Ventures
Technology Opportunity**

**BIOMARKERS OF MUSCULOSKELETAL DISEASES
USEFUL IN DIAGNOSIS AND PROGNOSIS**

File #2690

Application

Duke University is seeking a company interested in commercializing novel biomarkers of musculoskeletal disease and a novel strategy enhancing the effectiveness of such biomarkers. Musculoskeletal diseases include a multitude of disorders that are prevalent in aging populations, with osteoporosis and osteoarthritis (OA) existing as the most common forms. Currently, OA is a major cause of physical disability in the U.S. affecting nearly 27 million people and costing approximately \$5,700 annually per person living with OA, with the numbers expected to increase dramatically as the population ages (Arthritis Foundation, 2008). Current biomarkers are able to diagnosis musculoskeletal diseases, such as OA, by measuring protein turnover, but do not allow for the age of a given protein or protein fragment to be estimated. By determining the relative age of protein turnover biomarkers the presence, status, and prognosis for a given musculoskeletal disease can effectively be established. This proprietary technology provides novel biomarkers of musculoskeletal disease and novel methods of use that improve the diagnostic and predictive ability of biomarkers of musculoskeletal disease.

This technology may be used in diagnosing, prognosing, and screening for musculoskeletal diseases. In particular, these biomarkers and associated methods will be useful in monitoring the progression of joint degradation and response to treatment.

Advantages

- Enhanced detection of the presence and progression of musculoskeletal diseases relative to current biomarkers and their methods of use
- Identifies individuals at high risk for musculoskeletal diseases
- Dynamic measurement of protein status
- Assays serve as an index of musculoskeletal disease progression
- Biomarkers can be measured from body fluids, tissue extracts, or histological sections
- Potentially applicable to other fields, such as neurodegenerative processes and muscular dystrophies

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Technology

The presence, status, and prognosis for a specific musculoskeletal disorder can be established by determining the relative age of protein turnover biomarkers. This proprietary technology examines protein damage related to aging and distinguishes populations of biomarkers on the basis of identifying and quantifying non-enzymatic posttranslational protein modifications as biomarkers of musculoskeletal disease. A high concentration of modified protein biomarkers, for example, may indicate musculoskeletal disease associated with joint degradation or progression of the disease, whereas a high concentration of unmodified biomarkers may indicate a repair response or low risk of disease progression. Consequently, this novel technology provides improved methods of diagnosis and prognosis of musculoskeletal diseases. A patent application is currently pending on this technology.

Inventors



Dr. Virginia Kraus, MD, Ph.D., is an Associate Professor of Medicine in the Division of Rheumatology at Duke University Medical Center.

Christopher R. McCudden, Ph.D.

This laboratory is devoted to translational research to advance the understanding of the pathogenesis of arthritis, osteoarthritis and cartilage degeneration and regeneration. The work in this laboratory focuses on the mechanisms of joint damage, the discovery of novel biochemical and genetic biomarkers for minimally invasive means of monitoring disease predisposition and severity, and development of approaches to enhance cartilage viability and reduce long-term arthritic consequences of joint injury. We study osteoarthritis in animal models and man. Osteoarthritis is the most common form of joint disease in man and its incidence increases with age. It is a problem of increasing concern to the medical community due to the increasing longevity of the population and thus marked increased prevalence in the US and world. Trained as a molecular biologist and a Rheumatologist, Dr. Kraus endeavors to study osteoarthritis from bedside to bench. As Chairperson on the NIH funded Osteoarthritis Biomarkers Network, she assists in coordinating efforts to discover novel diagnostics and therapeutic markers for arthritis during this decade, declared by the WHO to be the Decade of the Bone and Joint. She is also Treasurer and Executive Committee member of the Osteoarthritis Research Society International that promotes global research toward developing cures for osteoarthritis. Key interests include: osteoarthritis, proteomics, arthritis, biological markers, molecular pathogenesis, and human genetics.

Contact

For further information regarding this opportunity, please contact:

Duke University Office of Licensing & Ventures
Amy Collinsworth, Ph.D.
PO Box 90083
Durham, NC 27708
tel (919) 684-3131
fax (919) 684-8867
amy.collinsworth@duke.edu

