

Joint Effort Against Degenerative Musculoskeletal Disease

Center of Excellence on Musculoskeletal Disease

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From before the establishment of orthopaedic pathology as a specialty in the 1920's, to the development of rheumatology as a discipline, to the development of the human chondrocyte transplantation protocols in the present decade—NYU Hospital for Joint Diseases, part of NYU Langone, has been making significant contributions to orthopaedic treatment, knowledge and innovation in musculoskeletal diseases for over a century. The new Center of Excellence on Musculoskeletal Disease highlights a world-class research effort that complements the planned NYU Langone strategic initiative in musculoskeletal care, which includes a 110,000 square foot, \$60 million Ambulatory Musculoskeletal Care Center.

The Center of Excellence on Musculoskeletal Disease will establish a multidisciplinary effort that examines the basic biology of joint tissues and their functional decline with aging and the onset of osteoarthritis, methods to promote intrinsic and extrinsic regeneration of these tissues, and applied bioengineering to enhance current clinical treatment and design more effective devices for such treatment. We will also build upon our world-renowned program in autoimmunity to discover the basic mechanisms of tissue injury in systemic lupus erythematosus and lead efforts to bring novel therapies to the clinic. The Seligman Center for Advanced Therapeutics is conducting more than 20 studies, industry and NIH-funded, while the recently created Orthopaedic Office of Clinical Trials has 14 industry-sponsored studies evaluating novel pre- and inter-operative protocols, new devices, and new therapeutics such as osteogenic protein.

The Center of Excellence on Musculoskeletal Disease is pursuing bench to bedside research in five key areas. The Biology of the Joint initiative is utilizing animal models to determine the ability of stem cells and new growth factors to arrest arthritic deterioration, and to induce repair in non-regenerating joint tissues. The Diagnostics, Biomarkers and Predictive Medicine program studies disease progression and the response to treatment, and includes a comprehensive patient database. Our robust Clinical Research program has produced evidence that terminal differentiation and mineralization in articular chondrocytes are major contributors of osteoarthritis progression, and interfering with these events may provide novel therapies to stop or slow down the progression. The internationally recognized Lupus Research Group continues to pursue biomarker studies, while the Division of Rheumatology is engaged in a multi-centered, NIH-funded pharmacogenetics study of TNF antagonists and abatacept, a T-cell co-stimulatory modulator, for the treatment of rheumatoid arthritis and psoriatic arthritis. Finally, Clinical Bioengineering research is improving implant technologies and surgical techniques for joint replacement surgeries, and studying the use of a combination of cells, scaffolds and factors to replace defective or injured bone and cartilage tissues. All of these initiatives will enhance the center's reputation as a leading therapeutic facility to attract patients with the full range of musculoskeletal diseases.

Musculoskeletal problems are the number one cause of disability worldwide, and with the baby boomer generation aging these conditions and diseases will severely strain healthcare systems. Already, their impact in the United States costs \$240 billion annually in lost productivity, according to the NIH. The Center of Excellence on Musculoskeletal Disease is a multidisciplinary effort coordinating the basic translational and clinical science efforts of the Departments of Orthopaedic Surgery and Rheumatology—currently ranked #8 and #11, respectively, by U.S. News & World Report. Bringing together the Department of Radiology and basic scientists at the School of Medicine, the center will create an integrated, world-class program and a top choice for patients seeking cutting-edge care.

