



Corporal Michael J. Crescenz VA Medical Center's Translational Musculoskeletal Research Center



Carla R. Scanzello, MD, PhD, and Robert L. Mauck, PhD



Musculoskeletal (MSK) conditions are part of normal life and aging however occur more frequently in individuals after a variety of injuries. MSK conditions and joint diseases, such as osteoarthritis, spine and disc degeneration also may arise as a consequence of the high-risk physical activity typical of military service and combat trauma. In fact, Veterans are disproportionately affected by MSK diseases and related disabilities compared to the general population. While improvements in armor and “in theater” medical care have introduced incredible life-saving technologies, an increasing number of our wounded soldiers return home with damaged limbs and joints. Also, as with any population, when veterans age, there is an increasing tendency to develop arthritis and various degenerative joint diseases, each of which can significantly compromise quality of life. In response, the Department of Veterans' Affairs has focused research efforts to improve our understanding of the function of MSK tissues and their response to common injuries. In 2014, the VA created an enterprise located at the Corporal Michael Crescenz VA Medical Center (CMC VAMC) with a focus on developing novel technologies and therapies to enhance musculoskeletal tissue repair, regeneration, and function. This was named the Translational Musculoskeletal Research Center (TMRC), which has grown over these past 8 years to be a research enterprise comprised of 21 Principal Investigators, 11 VA employees and more than 35 WOC employees (Figure 1). The PI's of the TMRC have been awarded over 10 million dollars in VA-funding and over 45 million dollars in NIH awards.

This growth has transformed the TMRC into a truly multidisciplinary enterprise, where individuals with expertise in Orthopedics, Rheumatology, Rehabilitation Medicine, Neurosurgery, Cell and Tissue Engineering, Cell Biology and

Immunology, working together with colleagues from the University of Pennsylvania in these disciplines, collaborate on projects with the goal of improving Veteran musculoskeletal health. These last several years have seen a dramatic growth in VA-sponsored MSK research across the nation, with one of the largest increases occurring at our CMC VAMC in Philadelphia as a result of TMRC investigator efforts. Currently there are more than 15 VA-funded research projects being carried out within the TMRC focused on the injury and repair of MSK tissues, including tendons, ligaments, disc, bone, meniscus, and cartilage, as well as treatment of arthritic conditions.

Critical to our research mission is to keep the research we do focused on the outcomes that relate to improving regenerative and rehabilitative approaches that ultimately will translate into improving the lives of Veterans. To carry out our mission, we are an integral part of the Department of Research & Development at the CMC VAMC, including the Shared Instrument Core which is comprised of high tech-state of the art imaging and analysis instrumentation. Physically, we all under one roof, in approximately 9,000 sq. ft. of renovated research space. Drs. Carla Scanzello and Robert Mauck co-direct this enterprise with input, advice, and support from a joint CMC VAMC / Penn TMRC Advisory Committee and local and central office leadership. As a result of his reputation and productivity, including the establishment and growth of the TMRC, Dr. Mauck was awarded a VA Career Scientist Award in 2021, the first such award at our CMC VAMC to a PhD. This past year has also seen several new grants from both VA and NIH sources including an R21 to Drs. Nathaniel Dymant and Andrew Kuntz to study tendon-to-bone repair, a VA SPiRE award to Dr. Edward Bonnevie to study cellular mechanosensing in synovial fibrosis, a Merit award to Dr. Carla Scanzello to study pattern-recognition in osteoarthritis, a new Merit Award to Dr. Andrew Kuntz to study tendon healing, a renewal of a Merit Award to Dr. Harvey Smith to further develop engineered disc replacements, and funding for a VA multi-center clinical trial for Veteran patients with knee osteoarthritis (the MOVE-OK trial) awarded to Dr. Joshua Baker, MD MSCE. VA grant funding at the VA TMRC totals more than \$2.5 million dollar in direct costs yearly.

The ultimate goal of the TMRC is to develop a focused, internationally recognized research center at the CMC VAMC (Figure 2). The TMRC continues as a center for MSK translational research both at the VA along with partners and collaborators at Penn, CHOP, Drexel and Temple Universities. We will continue to focus on Veteran MSK issues and do so by bringing new resources and regenerative technologies to

all service members, past and present. Overall, the TMRC is on an upward trajectory, with a vibrant multi-disciplinary team of investigators and significant new funding directed towards new discoveries in musculoskeletal repair and regeneration and committed to our goal of translating this research into life changing improvements in patient care and quality of life for both Veterans and the general population.

