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American Society for Bone and Mineral Research-Orthopaedic Research Society Joint Task Force Report on Cell-Based Therapies – Secondary Publication

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ABSTRACT: Cell-based therapies, defined here as the delivery of cells in vivo to treat disease, have recently gained increasing public attention as a potentially promising approach to restore structure and function to musculoskeletal tissues. Although cell-based therapy has the potential to improve the treatment of disorders of the musculoskeletal system, there is also the possibility of misuse and misrepresentation of the efficacy of such treatments. The medical literature contains anecdotal reports and research studies, along with web-based marketing and patient testimonials supporting cell-based therapy. Both the American Society for Bone and Mineral Research (ASBMR) and the Orthopaedic Research Society (ORS) are committed to ensuring that the potential of cell-based therapies is realized through rigorous, reproducible, and clinically meaningful scientific discovery. The two organizations convened a multidisciplinary and international Task Force composed of physicians, surgeons, and scientists who are recognized experts in the development and use of cell-based therapies. The Task Force was charged with defining the state-of-the-art in cell-based therapies and identifying the gaps in knowledge and methodologies that should guide the research agenda. The efforts of this Task Force are designed to provide researchers and clinicians with a better understanding of the current state of the science and research needed to advance the study and use of cell-based therapies for skeletal tissues. The design and implementation of rigorous, thorough protocols will be critical to leveraging these innovative treatments and optimizing clinical and functional patient outcomes. In addition to providing specific recommendations and ethical considerations for preclinical and clinical investigations, this report concludes with an outline to address knowledge gaps in how to determine the cell autonomous and nonautonomous effects of a donor population used for bone regeneration. © 2019 Orthopaedic Research Society. Published by Wiley Periodicals, Inc. *J Orthop Res* 38:485–502, 2020

Keywords: animal models; cell/tissue signaling; transcription factors; cells of bone; clinical trials; genetic research

EXECUTIVE SUMMARY

Despite great advances in restorative surgeries involving prosthetic devices, there has been limited progress in the

development of biological technologies for musculoskeletal repair. Cell-based therapies, defined here as the delivery of cells in vivo to treat disease, have recently gained increasing public attention as a potentially promising approach to restore structure and function to musculoskeletal tissues. Although cell-based therapy has the potential to improve the treatment of genetic, degenerative, inflammatory, and traumatic disorders of the musculoskeletal system, there is also the possibility of misuse and misrepresentation of the efficacy of such treatments. The medical literature contains anecdotal reports and research studies, along with web-based marketing and patient testimonials supporting cell-based therapy.

Both the American Society for Bone and Mineral

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Research (ASBMR) and the Orthopaedic Research Society (ORS) are committed to ensuring that the potential of cell-based therapies is realized through rigorous,

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