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## Preface

During the past decade, a wide range of scientific disciplines have “found” adipose-derived stem/stromal cells (ASC) as a tool for research and discovery. This is reflected by the exponential growth in the number of publications and citations noted by *ISI Web of Science* (*Thomson-Reuters*) (Fig. 1). However, the cells we now recognize as “ASC” were initially identified as “preadipocytes” in seminal studies initiated by Martin Rodbell and his colleagues during the mid-1960s. His laboratory was among the first to use collagenase digestion to separate mature adipocytes from the heterogeneous stromal vascular fraction (SVF) cells in rat fat pads. Since then, primary cultures of preadipocytes have been utilized by endocrinologists and physiologists to perform *in vitro* analyses of adipose tissue metabolism. By the late 1990s, investigators at the University of Pittsburgh, University of California – Los Angeles, Zen-Bio, Inc., and other institutions had begun to draw parallels between the ASC and the more thoroughly characterized bone marrow-derived mesenchymal stem/stromal cells (BMSC). Both ASC and BMSC displayed multipotent differentiation potential *in vitro*, with the ability to form bone, cartilage, hematopoietic supporting cells, and muscle, in addition to adipocytes. Later studies would document that they also share similar immunophenotypic and immunomodulatory characteristics. Unlike bone marrow, subcutaneous adipose tissue is relatively accessible to harvest, abundant, and located in a site that patients are willing, indeed eager, to have biopsied. Consequently, the demand for ASC has grown; they quickly have become the stem cell of choice for many tissue-engineering and regenerative medical projects. Bioengineers, clinicians, entrepreneurs, and research scientists recognized the need to coordinate this emerging field and founded the International Federation of Adipose Therapeutics and Science (IFATS) in 2002. IFATS was envisioned as a society that would promote the free exchange of information and knowledge relating to ASC. In its efforts to provide standardization across laboratories, one of the first steps of IFATS was to establish the acronym “ASC” to describe the collagenase-digested and culture-expanded adipose cell populations. Prior to reaching this consensus in 2004, the nomenclature had been cluttered with multiple terms that led to confusion for newcomers in the field. In this volume of *Methods in Molecular Biology*, we have solicited defined and established protocols from leaders in the field, including many IFATS members. While much of the emphasis is placed on human ASC, additional small and large animal species are included. The chapters are organized around approaches spanning the discovery, preclinical, and clinical processes. While they are designed to be accessible to new students, we hope that they will serve as a reference text for established investigators as well.

The editors have many people to thank for their contributions to this work. First and foremost are the many authors who agreed to take time from their busy schedules and prepare chapters on selected topics (with only a minimum of bribes and arm twisting!). Second is Professor John Walker, Series Editor, whose sage advice and wisdom were greatly appreciated. Third are the members of the Stem Cell Biology Laboratory, Pennington

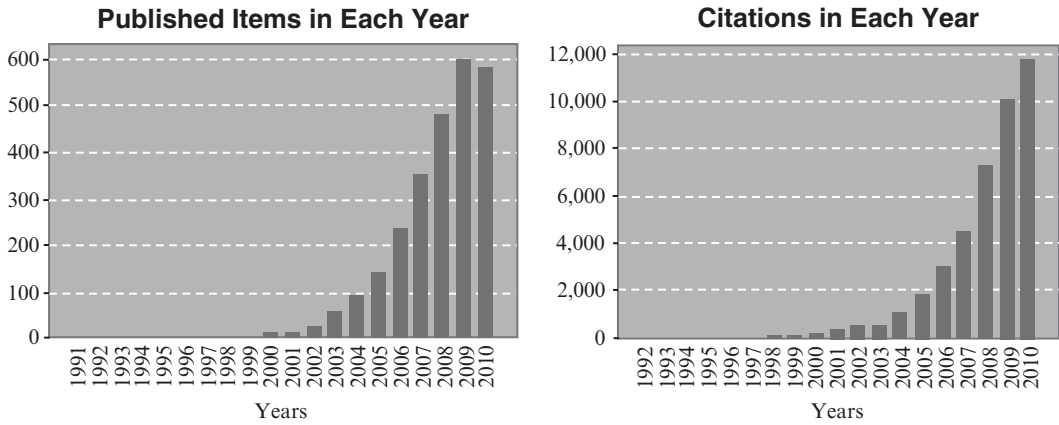


Fig. 1 The ISI Web of Knowledge annual publications and citations for “adipose stem cells”

Biomedical Research Center, and the Center for Stem Cell Research and Regenerative Medicine, Tulane University School of Medicine, for their critiques and insights. Fourth, is Ms. Laura Dallam for her outstanding administrative and editorial assistance. And finally, for sacrificing many evenings and weekends, are our family members: Emma, Jesse, Megan, Paula, and Xiyang.

*Baton Rouge, LA*  
*New Orleans, LA*

*Jeffrey M. Gimble*  
*Bruce A. Bunnell*



<http://www.springer.com/978-1-61737-959-8>

Adipose-Derived Stem Cells  
Methods and Protocols  
Gimble, J.M.; Bunnell, B.A. (Eds.)  
2011, XVI, 474 p., Hardcover  
ISBN: 978-1-61737-959-8  
A product of Humana Press