

Preface

Recent advances in stem cell research include the discovery of stem/progenitor cell populations resident in many adult tissues and organs. However, efforts to validate the stem cell-like nature of these populations have been hampered by the fact that many archetypal assays established to study hematopoietic stem cells, such as competitive repopulation and serial transplantation assays, are not applicable beyond the hematopoietic system. This has mandated the development of surrogate assays to discriminate stem from progenitor and somatic cells. These include quantifying the replicative life span of cells cultured in vitro, their capacity to grow at clonal density, exclude specific DNA binding dyes, express telomerase and/or other pluripotency-related genes, and undergo multilineage differentiation. However, because the mechanisms regulating cell proliferation, life span, self-renewal, and senescence are inextricably intertwined, distinguishing between stem, progenitor, and somatic cells based on their in vitro characteristics is often more difficult than anticipated. Therefore, the goal of this volume is to provide a current overview of adult stem cell biology, describe and critically evaluate methods used to assess stem cell self-renewal, and distinguish this process from other aspects of cell survival, such as regulation of life span, senescence, and immortalization at a molecular level. By providing a comprehensive and critical overview of the biology and methods used to characterize adult stem cells, the volume will serve as a valuable resource for both established scientists and those just entering the field of stem cell biology.

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