

Preface

Studies on stem cells have been attracting intense scientific and public attention, not only because of controversies surrounding the use of embryonic stem cells but also because of very provocative data that have been emerging on adult stem cells. Much of the public attention and debate has been focused on the possibility that adult stem cells may be used as a substitute for human embryonic stem cells or as a justification for stopping work on them. This has somewhat diminished attention on very heated scientific debates that take us to the very heart of how the concept of stem cells is perceived. To this author, the latter debates have not been unlike certain philosophical debates of the last century.

Since the seminal studies of Till and McCulloch in the 1960s, the popular paradigm on adult stem cells has been that lineage-restricted stem cells are derived from pluripotent stem cells very early during development. To many, and consistent with much data, the restriction to particular lineages was considered absolute. In other words, there was a sense of determinism in the stem quality of particular stem cells: once they were allocated, they were programmed to specific roles in a given tissue. Furthermore, some adult tissues were considered devoid of detectable stem cell presence or activity. During the last decade, new challenges to our previous notions about stem cells have arisen, one example being the demonstration of stem cells in adult neuronal tissue where they had been said not to exist. Our certainty about stem cell biology has been challenged even further by recent reports that previously designated tissue-restricted adult stem cells might not only be multipotent but also pluripotent. In essence, the debate has become similar to the that between Cartesian and Existentialist philosophers many decades ago. Are stem cells fated to be particular stem cells determined to particular lineage(s) or do they have they the capacity to actualize diverse potentials in diverse environments? In other words, do stem cells exercise “free will”? In a sense, we are debating in a cellular context whether “essence precedes existence” or “existence precedes essence” of stem cells.

In *Adult Stem Cells*, the authors have made an effort, if not to enter the philosophical debate, at least to contribute to current understanding of the potential of several adult stem cell types and their regulation. The debate is certainly still heated and ongoing, and we are confronting new challenges to our understanding of stem cell biology on a weekly basis. Nevertheless, it is hoped that this volume will challenge all of us interested in stem cells to dream about, and to discriminate between, the “essence” and the “existence” of stem cells.

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