James L Sherley, J Cell Sci Ther 2014, 5:4
http://dx.doi.org/10.4172/2157-7013.S1.027

OMICS Group Conferences
Accelerating Scientific Discovery

4th World Congress on
Cell Science & Stem Cell Research
June 24-26, 2014 Valencia Conference Centre, Valencia, Spain

James L Sherley
The Adult Stem Cell Technology Center, USA

Asymmetric Self-Renewal: The fundamental property of tissue stem cells is the fundamental principle for their medical engineering

It is a great irony that the property that defines distributed stem cells (DSCs) is often overlooked. Asymmetric self-renewal, the ability of DSCs to continuously divide and maintain their own phenotype while producing a sister cell committed to a different phenotype, is the defining property of DSCs. The fact that differentiated tissue cells continuously arise in tissues without extinction of the overall tissue development program is implicit evidence of asymmetric self-renewal. The ability of single DSCs to repopulate and renew complex tissues is key experimental evidence. Much of the confusion and skepticism about the existence of DSC asymmetric self-renewal is due to the long-standing academic discussion of its mathematical form. Some schools of thought do not view stochastic mechanisms, based on pools of DSCs, as consonant with asymmetric self-renewal; and others are highly skeptical of deterministic mechanisms, in which individual DSCs undergo asymmetric self-renewal. Somehow the discussion of which mathematical form operates in tissues cast asymmetric self-renewal itself into uncertainty as an essential concept in stem cell biology. As a result of this past, the importance of asymmetric self-renewal concepts in stem cell biology has been under appreciated to a detriment. This essential property of DSCs is an important, but often unconsidered factor in normal tissue biology, cancer, aging, tissue engineering, and stem cell-based biomedicine. The goal of this keynote address is to introduce new generations of cell biologists to the actual clarity of DSC asymmetric self-renewal, towards achieving future acceleration of advances in stem cell biology and biomedicine.

Biography

James L Sherley graduated from Harvard College (1980) and completed joint MD/PhD degrees at the Johns Hopkins University School of Medicine (1988). After Post-doctoral studies at Princeton University, beginning in 1991 he lead cancer cell molecular biology research at Fox Chase Cancer Center. In 1998, he began adult stem cell research at Massachusetts Institute of Technology, and in 2007 continued at Boston Biomedical Research Institute. In 2013, he founded the Adult Stem Cell Technology Center, LLC, (ASCTC), which he currently directs.

jlsherley@gmail.com