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Enabling a new era of stem cell medicine: A first technology for determining the dose of therapeutic tissue stem cells

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Adult tissue stem cells have essential roles in the renewal, repair, aging, and diseases (e.g., cancer) of mammalian tissues. These involvements make them the major principle for success in stem cell medicine. Ironically, given their importance, tissue stem cells pose many challenges to scientific investigation and medical use. Their cellular fractions in tissues are extremely low (typically less than 1 per thousand tissue cells), they are difficult to isolate, and it is difficult to expand their numbers by culturing. A particularly troublesome, long-standing barrier to their use has been the lack of a means to count them specifically. This difficulty has persisted for more than half a century because of the well-known lack of specific molecular biomarkers that identify tissue stem cells, but not their more numerous progeny, early committed progenitor cells. Asymmetrex recently solved the specific tissue stem cell counting problem with its AlphaSTEM Test™ technology developed in partnership with computer simulation leader AlphaSTAR Corporation. The new technology can be used to determine the stem cell-specific fraction of complex cell preparations. It can be applied to determine, for the first time, the stem cell-specific dose of stem cell transplantation treatments, including for example hematopoietic stem cells in bone marrow, mobilized peripheral blood, and umbilical cord blood or mesenchymal stem cells derived from bone marrow, adipose tissue, or amniotic fluid. In addition to better informing approved stem cell therapies, dose data will improve the design, optimization, and interpretation of ongoing stem cell transplantation clinical trials. The AlphaSTEM Test™ technology will enable a new era of quantitative measurement of therapeutic tissue stem cells that will greatly accelerate progress in stem cell medicine.

Biography

James L Sherley, MD, PhD is the founder and director of Massachusetts stem cell biotechnology company Asymmetrex, LLC. Asymmetrex develops and markets technologies for advancing stem cell medicine, including the first in kind technology for specific counting of adult tissue stem cells. This technology is also applied to design optimized procedures for more efficient manufacturing of therapeutic adult tissue stem cells at a greatly reduced cost. He is a graduate of Harvard College, with a BA degree in biology, and the Johns Hopkins University School of Medicine, earning joint MD and PhD degrees. Prior to founding Asymmetrex, he held academic research appointments at the Fox Chase Cancer Center, Massachusetts Institute of Technology, and Boston Biomedical Research Institute. His professional awards include Pew Biomedical Research Scholar, Ellison Medical Foundation Senior Scholar in Aging Research, and NIH Director's Pioneer Award.

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