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## **Abstract**

### **Embryomics: Implications for Regenerative Medicine**

The broad pluripotency and replicative immortality of human embryonic stem (hES) cells may provide a scalable source of all somatic cell types. However, the >1,000- fold complexity of their differentiated fate underscores the need for “embryomics”, a systematic collation of gene expression data useful in the identification and purification of specific downstream embryonic cell lineages. The ACTCellerate platform provides a large-scale and reproducible combinatorial cloning methodology to generate scalable lines of highly purified embryonic progenitor cell types. Approximately 1,100 clones have been generated to date. The lines display a wide array of endodermal, mesodermal, ectodermal, and neural crest types. Initial microarray and non-negative matrix factorization profiling suggests the current library contains at least 140 distinct cell lines with diverse embryo- and site-specific homeobox gene expression. All cell lines studied appear to be telomerase negative, with initial telomere length and proliferative lifespan often greater than cells of neonatal origin. Despite the expression of numerous oncofetal genes, none of the tested lines generated tumors in immunocompromised mice. Microarray data on early passage cultures of the lines is often predictive of protein expression as measured by immunocytochemistry, the detection of cell surface antigens, and measurement of secreted growth factors by ELISA. The growing recognition of the complexity of assay development in manufacturing purified cell types from hES cells underscores the need for expanded research in embryomics and methods to isolate and characterize purified human embryonic progenitor cells.

## Biography

Dr. West is the Chief Executive Officer of BioTime, Inc. and Embryome Sciences, Inc. of Emeryville, California and Adjunct Professor of Bioengineering at the University of California, Berkeley. BioTime, Inc. (OTCBB: BTIM) and its wholly-owned subsidiary Embryome Sciences are companies focused on human embryonic stem cell technologies. He received his Ph.D. from Baylor College of Medicine in 1989 concentrating on the biology of cellular aging. He has focused his academic and business career on the application of developmental biology to the age-related degenerative disease. He was the Founder of Geron Corporation of Menlo Park, California (Nasdaq: GERN) and from 1990 to 1998 he was a Director, and Vice President, where he initiated and managed programs in telomerase diagnostics, oligonucleotide-based telomerase inhibition as anti-tumor therapy, and the cloning and use of telomerase in telomerase-mediated therapy wherein telomerase is utilized to immortalize human cells. From 1995 to 1998 he organized and managed the research between Geron and its academic collaborators James Thomson and John Gearhart that led to the first isolation of human embryonic stem and human embryonic germ cells. From 1998 to 2007 he was President and Chief Scientific Officer at Advanced Cell Technology, Inc. (OTCBB: ACTC) where he managed programs in human somatic cell nuclear transfer, cell differentiation, and ACTCellerate, a technology for the multiplex derivation and characterization of human embryonic progenitor cell lines.