

BROWN ADIPOSE TISSUE IS A SOURCE OF MULTIPOTENT STEM CELLS WITH PROPENSITY FOR NEUROGENESIS

Medet Jumabay, , Ashley A. Penton, Jiayi Yao, Li Zhang, Xiuju Wu, Yucheng Yao, Kristina I. Boström, Division of Cardiology, David Geffen School of Medicine at UCLA, Los Angeles, CA USA

Abstract

Adipose tissue-derived stem cells provide a stem cell source for tissue regeneration and tissue repair. We have previously shown that multipotent cells derived from white mature adipocytes, referred to as dedifferentiated fat (DFAT) cells, differentiate into multiple mesenchymal lineages including cardiomyocytes and endothelial cells. However, it is unclear whether DFAT cells from white and brown adipose tissue have similar characteristics. The high innervation of brown adipose tissue by the sympathetic nervous system and dense vascularization suggest it might be a better source of neuronal precursor cells. Thus, we hypothesize that stem cells derived from white and brown adipose tissue, respectively, differ in their ability to undergo neurogenesis. To investigate potential differences, we cultured and optimized conditions for white and brown DFAT cells in neural induction medium or regular culture medium, and compared marker expression of neural precursors, and neuronal and glial cells using fluorescence-activated cell sorting (FACS), bright-field imaging, immunofluorescence, and RNA analysis. The results showed that both brown and white derived DFAT cells were able to generate neuronal cells and glial-like cells in neural induction medium as well as in regular culture medium. The differences were dependent on culture conditions and time of neurogenic induction. Furthermore, brown DFAT cells showed enhanced neurogenesis under neurogenic conditions, whereas white DFAT cells exhibited greater potential of becoming glial-like cells under regular culture conditions. Together, our results suggest that DFAT cells derived from brown adipose tissue have a higher propensity for neurogenic differentiation and may serve as a source of neural precursor cells.

**Biography**

Dr. Medet Jumabay has been serving as a doctor and researcher in the field of cardiovascular medicine for more than twenty years. Dr. Medet Jumabay has graduated from medical school and started her medical career at the Emergency Center of the First Affiliated Hospital of Xinjiang Medical University. Later she became an attendant physician and cardiologist in the department of medicine at the same university. Dr. Medet Jumabay received her Master's degree from the Xinjiang Medical University and a PhD. degree from the Department of Medicine, Nihon University, Tokyo, Japan in medical science. Dr. Medet Jumabay first became Fascinated by the power of cell plasticity when she saw beating cardiomyocytes, which are derived from adipose stem cells. Thus, she became interested in cell regeneration research immediately after completing her PhD. studies. In 2007, she was recruited to the Division of Cardiology, Department of Medicine, UCLA, as a researcher in the field of cardiovascular and stems cell biology.