Scanning Electron Microscopy of Rat Perirenal Adipose Tissue

Ka-Hyung Han, Chang-Hyun Park*, Chang-Sub Uhm

*Department of Anatomy, Brain Korea 21 Biomedical Sciences, *Electron Microscope Facility, Korea University College of Medicine, Seoul, 136-705 Korea*

Adipose tissue is important as an endocrine organ and an energy reservoir. Excess energy storage leads to the obesity. We had reported the scanning electron microscopic observation of adipogenesis in culture at last meeting. In this study, the adipose tissue was observed with a scanning electron microscope, and the size of the adipocytes was measured to understand the adipocyte differentiation.

Male Sprague-Dawley rats were anesthetized, and perirenal adipose tissue was dissected, which was fixed with 2.5% glutaraldehyde in 0.1M phosphate buffer (pH7.4) for 30min. The tissues were post-fixed with 1% osmium tetroxide in the same buffer for 1 hr and processed for scanning electron microscopy by t-butyl alcohol freeze drying method. Dried tissues were teased with a forcep, platinum-coated and observed with a FE-SEM (Hitachi S-4700). Two hundred adipocytes were selected randomly and the diameter were measured using the built-in program.

Adipose tissue were composed of grouped adipocytes and intervening connective tissue septa. Each adipocyte was surrounded by a meshwork of fine reticular fibers, and cells were connected by a dense network of collagen fibers. Capillaries were present in the connective septa. Some capillaries directly contacted adipocytes.

Diameters of the adipocytes varied from 2.95 to 114㎛ with an average of 48.9㎛. However, histogramic analysis revealed two distinct peaks below and above the average diameter. Therefore, adipocytes were arbitrarily grouped in two populations; small and large adipocytes. The mean diameters of the small and large adipocytes were 18.4 and 73.8㎛ respectively. The ratio between small and large adipocytes was 45:55.

Our results confirmed the general architecture of the adipose tissue and the presence of two subpopulation of adipocytes in rat adipose tissue. The nature of two adipocytes population needs to be explored.

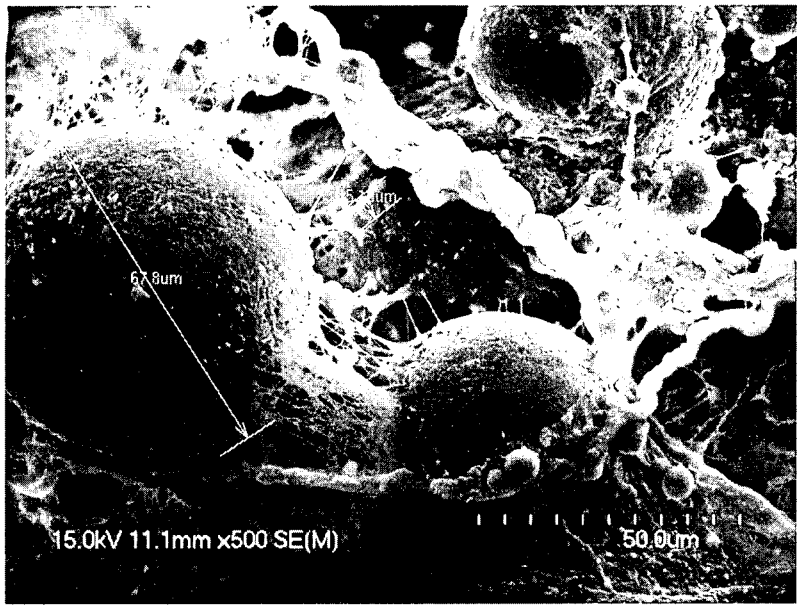

Figure 1. Representative scanning electron micrograph of a fat tissue showing the measurement of a adipocyte diameter.

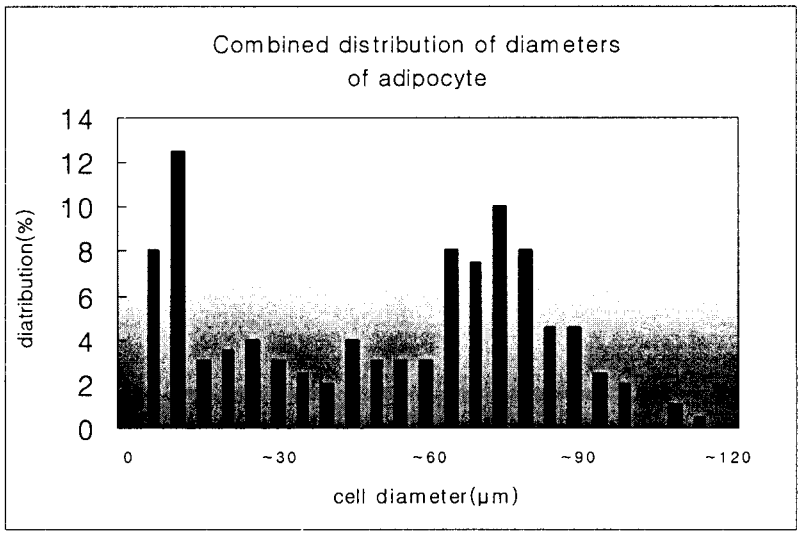

Figure 2. The histogram of adipocyte diameters.