

An Adaptive-thermogenesis hypothesis for the physiological mechanism of obesity/diabetes: A theoretical approach

Eun Bo Shim, Soon Sung Kwon, Hong Kyu Lee and Yoing Min Cho

비만/당뇨병의 생리학적 기전에 대한 적응열발생 가설: 이론적 연구
심은보†(강원대) · 권순성*(강원대 원) · 이흥규** · 조영민**(서울대)

KeyWords: Obesity/Diabetes(비만/당뇨병), Thermogenesis hypothesis(적응열 발생가설), Temperature homeostasis(온도항상성)

Abstract : In this study, we present a newly proposed hypothesis of temperature homeostasis on obesity and diabetes. A new mathematical model incorporating a stochastic process of variable uncertainty is also formulated to verify the hypothesis. The method is based on the energy conservation law for human body weight(mass) and the homeostasis principle of body core temperature. According to the theory, a disturbance in heat production or dissipation induces the energy unbalance and so body weight change as a compensatory mechanism is augmented according to the scaling law of body weight. This mechanism is verified in the simulation results compared with experimental results. It is demonstrated that the broken energy balance augments obesity by sequential events from heat balance, scaling law to energy conservation equation.

판형 히트 스프레더의 열확산 특성 연구

김수현†(LS전선) · 이용덕*(LS전선)

A study on the heat spreading characteristics of a flat heat spreader

Su Hyeon Kim, Yong Duck Lee

Key Words: Heat spreading (열 확산), Flat heat spreader (판형 히트 스프레더), heat spreading (열 확산), electronic device cooling (전자 장비 냉각)

Abstract : This paper presents the characteristics of heat spreading in a flat heat spreader. Two states of natural and forced convections are tested experimentally. A flat heat spreader consists of a wick structure, vapor passage, working fluid and cases. To fabricate a flat heat spreader with 1.6mm in thickness, two 200 screen mesh layers, one 14 screen mesh layer and cases made of a copper are used. Water is used as a working fluid. The thermal characteristics of a flat heat spreader are studied according to various input power in the natural and forced convections. In addition, the thermal characteristics of a flat heat spreader are compared with that of a copper plate. The results indicate that thermal characteristics of a flat heat spreader are much better than that of a copper plate in the natural and forced convection.