통증 및 근골격재활

발표일시 및 장소: 10 월 18 일금) 13:35-13:45 Room A(5F)

OP1-1-3

The Effect of Hyperbaric Therapy on the Development of Brown Adipose Tissue: Controlled Animal Study

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Brown adipose tissue (BAT) plays a critical role in energy homeostasis and thermogenesis in mammals, protecting against diet-induced metabolic syndrome and hypothermia via the action of uncoupling protein 1 (UCP-1). The enormous energy-consuming capacity of BAT evidenced by a great amount of oxygen consumption, suggest hyperbaric therapy may promote BAT development. The purpose of our study was to determine the effect of hyperbaric therapy on BAT and to compare the amount of BAT produced with that induced by cold exposure in a rat model. A total of 15 female Sprague-Dawley rats were used. Five rats were randomly assigned to a non-treatment group, a cold temperature group (CTG), or a hyperbaric therapy group (HTG). The expressions of UCP-1 (a marker of BAT production) and PGC-1α (a transcriptional regulator) were measured by western blot. The volume of fluorodeoxyglucose (FDG) uptake was determined by positron emission tomography/computed tomography (PET/CT) in all groups. Significantly more BAT development was observed, as determined by FDG PET/CT volume, in the CTG and the HTG than in the control group [$F(2,12)=185.72$, $p= .000$]. The protein levels of UCP-1 and PGC-1α of BAT had a statistically significant increase in HTG and CTG compared with the control group. These results indicate hyperbaric therapy, like exposure to cold, upregulates the expressions of UCP-1 and PGC-1α in BAT, and contribute to BAT development in rodents. This study shows for the first time that hyperbaric treatment induced BAT development, and thus, suggests hyperbaric treatment as a potential therapeutic means of metabolic disorders with minimal side effects.

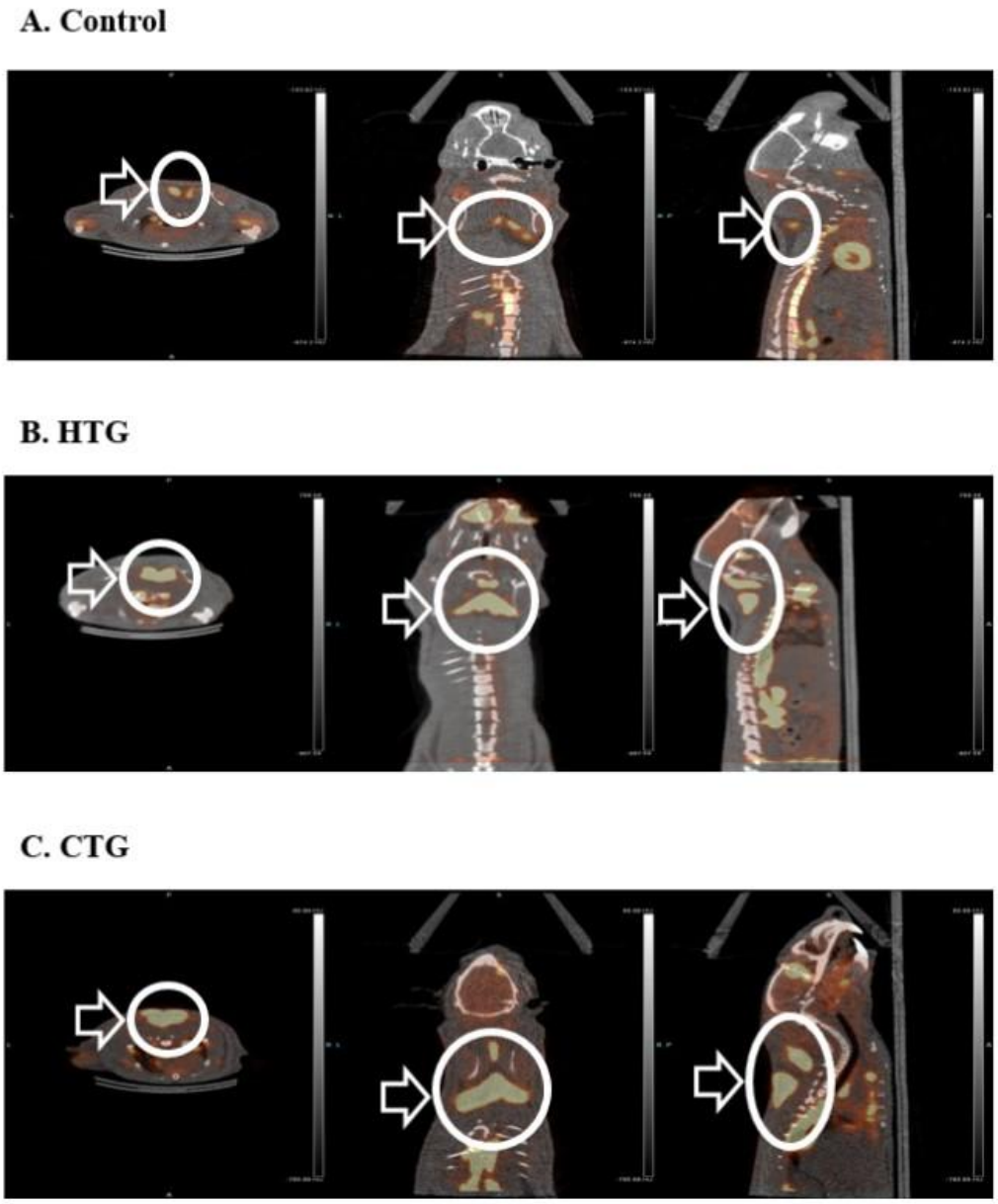

Figure 1 18F-fluorodeoxyglucose positron emission tomography-computed tomography (18F-FDG PET-CT) imaging of rats

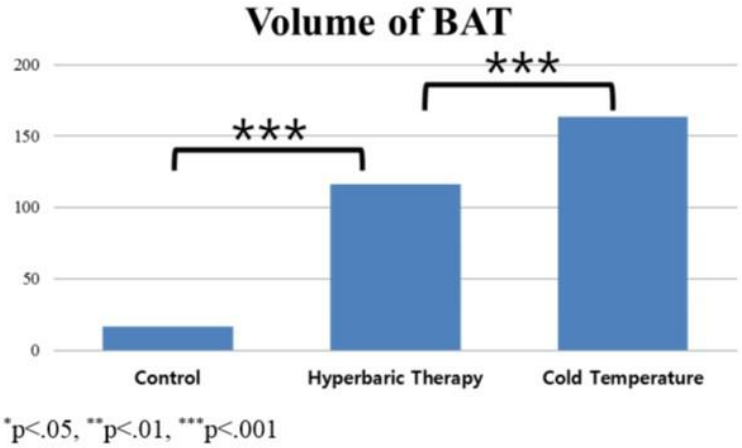

Figure 2 Mean BAT volumes in rats as determined by 18F-FDG PET-CT

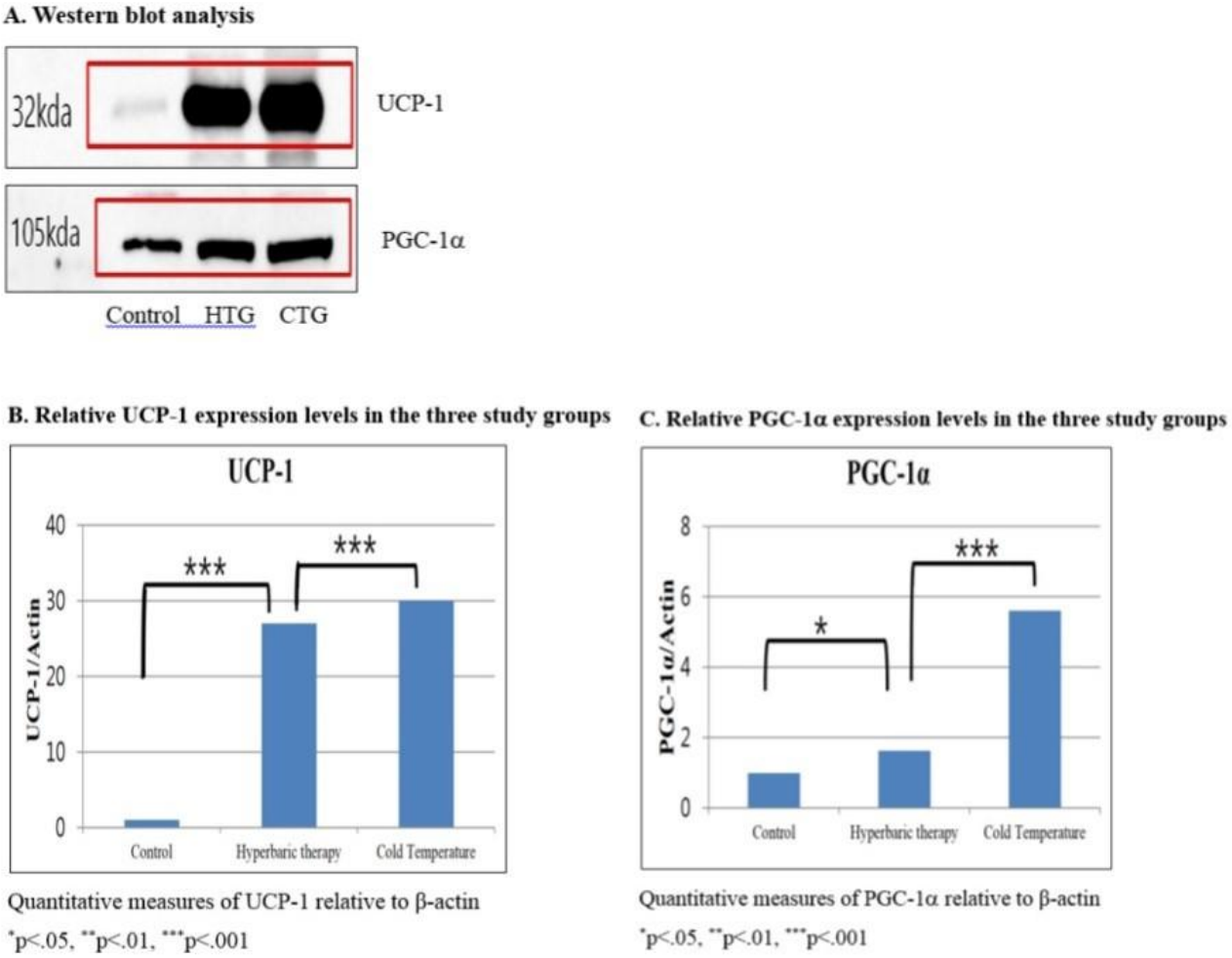

Figure 3 Western blot analysis results for UCP-1 andPGC-1