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The effect of pressure culture on the differentiation of 3T3-L1 preadipocyte

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Background:It is known that body fat mass decreases by exercise under hyperoxia. Besides, hypoxia plays an important role in maintenance of stem cell niche in regenerative medicine field. Although it is obvious that the oxygen partial pressure affects cell proliferation, the relationship between pressure culture condition and cell signal has hardly been elucidated. Control of adipocyte proliferation is an indispensable technology in regenerative medicine to treat obesity and adipose cell transplantation as a fundamental therapy for lipodystrophy. So, in this study, we examined the effect of adipocyte differentiation under the high-pressure cultivation. Methods:3T3-L1 cells were kept under the normal pressure condition or pressurized condition during differentiation for 14 days. Intracellular lipid droplet was evaluated by Oil Red O staining and expressions of adipogenic genes were determined by real time PCR. Results & Conclusions:Lipid droplet and mRNA level of adipogenic genes decreased under the high-pressure cultivation compared to the normal pressure. These data suggest that the high-pressure condition prevented adipocyte differentiation by suppressing expression of adipogenic genes, which induced a decrease in intracellular lipid droplet.