

PUFA changes in white adipose tissue during hibernation in common hamsters

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Hibernation is characterized by strongly reduced body temperature and metabolic rate and therefore saves energy during winter. Polyunsaturated fatty acids (PUFAs), specifically n-6 PUFAs, have repeatedly been shown to positively affect hibernation in several fat-storing hibernators and are usually retained during winter. In food-storing common hamsters, however, we previously showed that white adipose tissue (WAT) PUFA proportions decreased during winter, which indicates a mobilization during hibernation. However, dietary PUFAs were not limited in this laboratory study. To further investigate these patterns, PUFA changes in WAT during hibernation and relations to hibernation performance were investigated in free-ranging and captive common hamsters with lower pre-hibernation PUFA proportions. Under controlled conditions, n-6 PUFAs and SFAs increased during hibernation while n-3 PUFAs and MUFAs decreased. Pre-hibernation n-6 PUFA proportions negatively affected the number of torpor bouts and the time spent in torpor. In free-ranging hamsters, n-6 PUFAs increased and n-3 PUFAs and SFAs decreased during winter, but hibernation performance was not affected by PUFAs. The results indicate that mobilization or retention of (n-6) PUFAs during hibernation depends on their availability. Effects on hibernation performance may differ in common hamsters compared to fat-storing hibernators, but more investigations are necessary.