Intermittent Feedings Promote Lower Body Weight Associated With Redox Imbalance in Sprague-Dawley Rats

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Intermittent Feedings (IF) have been adopted as equivalent to Caloric Restriction (CR) protocols. However, long-term studies have shown that CR improves redox state and glucose tolerance, while IF promotes insulin resistance and oxidative damage\(^1\). Furthermore, IF animals ingest the same amount of food as animals fed ad libitum (AL), but have lower body weights, indicative of a decrease in energy conversion efficiency. The aim of this study was to assess the bioenergetic and redox effects of short-term IF. Sprague-Dawley rats were divided into two groups: AL and IF. After three weeks, IF animals presented lower weight gains and less efficient energy conversion compared to AL animals. The weight of \textit{Musculus soleus} and \textit{Musculus plantaris} was significantly smaller in the IF group, which suggests a loss of lean body mass in these animals. This effect was not associated with malabsorption since feces amounts produced in both groups were similar. There was no difference in oxygen consumption and coupling between isolated skeletal muscle mitochondria in both feeding groups. Reactive oxygen species (ROS) release from skeletal muscle tissue was increased in IF animals. This effect was BSA-sensitive which suggests the involvement of lipids in the elevated ROS release. No difference was observed in ROS release by the cytosolic fraction without mitochondria or in catalase activity, which indicates that mitochondria are the source of this redox imbalance. Overall, we find that IF produces redox changes that may be associated with lower rates of energy conversion in this diet.

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Word Keys: intermittent feeding, mitochondria, redox state, skeletal muscle

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