

Effects of Sleep Loss on Weight Gain

For a number of reasons, sleep loss has been associated with weight gain whether it's because of an increase in appetite due to hormonal imbalances or craving sugar-laden products to stay awake. Few studies, however, have focused on underlying tissue-specific molecular responses to acute sleep loss. In a recent [study](#), adipose and skeletal tissues were obtained after one night of sleep loss and one full night of sleep. What they discovered was that there were critical differences in how these tissues responded to sleep loss.

In summary, sleep loss was associated with a downregulation of the glycolytic pathway in skeletal muscle, but an upregulation of that pathway in the adipose tissue. Sleep loss also affected genome-wide DNA methylation in adipose tissue, which increased adiposity.

This is the first study of its kind to begin to elucidate the different responses of the tissues resulting from sleep loss: gain of fat mass and loss of lean mass. As a result, these tissue-specific findings support previous research, first observed by [Nedeltcheva et al.](#), suggesting that less sleep promotes a catabolic state in skeletal muscle.

“In summary, [these] results indicate that acute sleep loss results in a tissue-specific switch in metabolic fuel utilization, which may be associated with changes in the core circadian clock due to acute circadian misalignment. Furthermore, [it was noted] that sleep loss induces a molecular catabolic signature in skeletal muscle, mirrored by changes in blood, and that this contrasts with an adiposity-promoting molecular and DNA methylation signature in adipose tissue. These tissue-specific findings thus provide novel insight into why chronic sleep loss and circadian misalignment may promote adverse weight gain in humans.”

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