Leptin suppresses the rewarding effects of running

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(HealthDay)—Leptin appears to inhibit running reward via signal transducer and activator of transcription-3 (STAT3), according to an experimental study published online Sept. 1 in *Cell Metabolism*.

Noting that leptin can decrease locomotion and running, Maria Fernanda A. Fernandes, from the Montreal Diabetes Research Center, and colleagues examined the mechanisms involved and the influence of leptin on the rewarding effects of running in a mouse model.

Leptin receptor (LepR) signaling involves STAT3 activation, including in dopamine neurons located in the ventral tegmental area (VTA) that are crucial for reward-relevant behavior. The researchers found that greater voluntary running was exhibited by mice lacking STAT3 in dopamine neurons; this effect was reversed by viral-mediated STAT3 restoration. The rewarding effects of running were increased by STAT3 deletion, while intra-VTA leptin blocked the rewarding effect in a manner that was dependent on STAT3. Mesolimbic dopamine overflow and function were reduced with STAT3 loss of function.

"Findings suggest that leptin influences the motivational effects of running via LepR-STAT3 modulation of dopamine tone," the authors write. "Falling leptin is hypothesized to increase stamina and the rewarding effects of running as an adaptive means to enhance the pursuit and procurement of food."

More information: Full Text (subscription or payment may be required)

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