Tweaking energy consumption to combat muscle wasting and obesity

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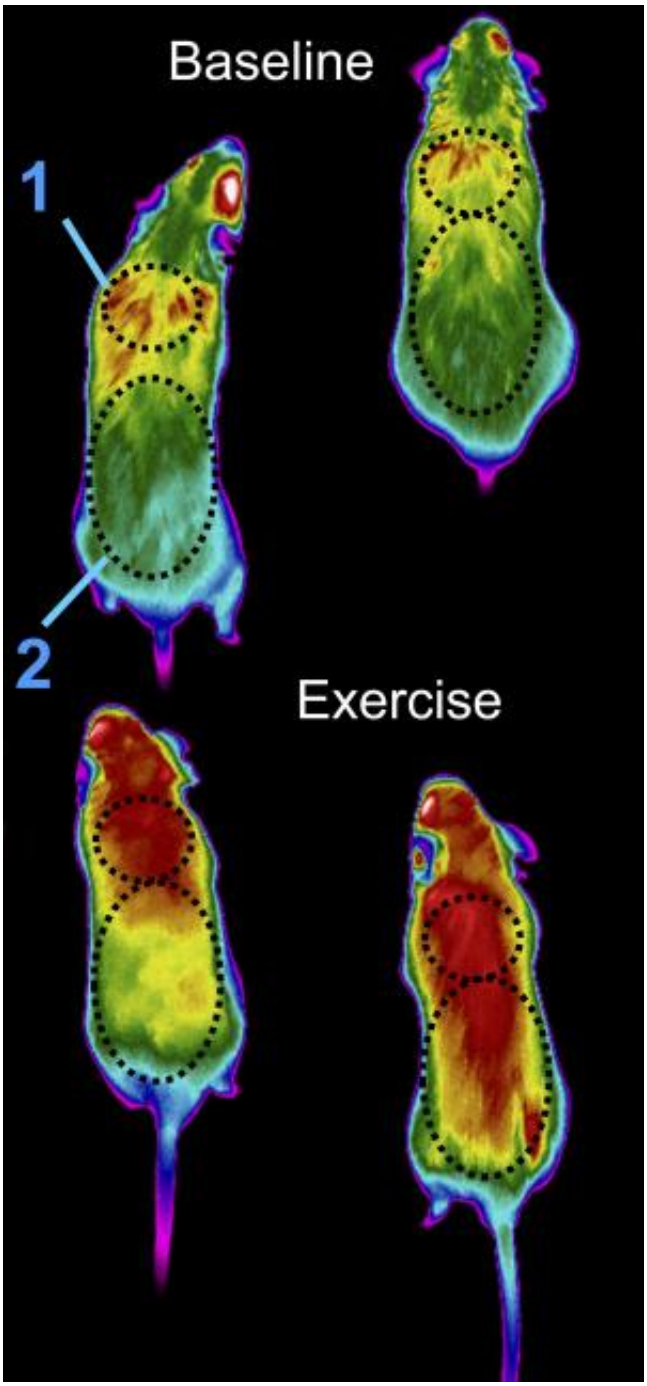

Thermal images show that K_{ATP} channels control energy consumption in muscles during low-level activity. Mice without muscle K_{ATP} channel function (right) showed excessive body heat production (red) after light exercise compared with mice with normal K_{ATP} function (left). Credit: Zhu et al., 2014

Using a new technique to evaluate working muscles in mice, researchers have uncovered physiological mechanisms that could lead to new strategies for combating metabolism-related disorders like muscle wasting and obesity. The study appears in *The Journal of General Physiology*.

ATP-sensitive potassium (K_{ATP}) channels, which link membrane excitability to cell metabolism, are abundant in skeletal muscle and play an important role in regulating muscle function and energy consumption. However, it is not clear how K_{ATP} activation affects muscles under physiological conditions and how this translates to energy use.

Researchers from the University of Iowa Carver College of Medicine developed a technique to evaluate muscle function in the tibialis anterior leg muscle of living mice. They found that, during low-level exercise, which triggered the opening of K_{ATP} channels, muscles with disrupted K_{ATP} function had higher peak force, calcium release, and heat production— which is associated with increased energy consumption— than muscles with normal K_{ATP} function.

The results show how K_{ATP} channels control energy use even during mundane, low-intensity activity. Modulating K_{ATP} channel activity could therefore provide a new strategy to combat metabolic disorders like muscle wasting and cachexia, when the goal is to conserve energy, or obesity, when increasing energy consumption is desired.

More information: Zhu, Z., et al. 2014. J. Gen. Physiol. DOI: 10.1085/jgp.201311063

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