

Physical activity needed in order to reap benefits of dietary restriction

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Fruit flies on dietary restriction (DR) need to be physically active in order to get the lifespan extending benefits that come from their Spartan diet. If the same axiom holds true in humans, those practicing caloric restriction in hopes of living longer need to make sure they eat enough to avoid fatigue.

According to research at the Buck Institute, flies on DR shift their metabolism toward increasing [fatty acid synthesis](#) and breakdown, specifically in muscle tissue. "[Dietary restriction](#) is known to enhance spontaneous movement in a variety of species including primates, however this is the first examination of whether enhanced physical activity is necessary for its beneficial effects," said Buck faculty Pankaj Kapahi, PhD, who runs the lab where the research took place. "This study establishes a link between DR-mediated metabolic activity in muscle, increased movement and the benefits derived from restricting nutrients," he said, adding that flies on DR who could not move or had inhibited fat metabolism in their muscle did not exhibit an extended lifespan. "Our work argues that simply restricting nutrients without physical activity may not be beneficial in humans," said Kapahi. The research is published in the July 3, 2012 edition of [Cell Metabolism](#).

The research also points to a potential target that could yield a drug that mimics the beneficial effects of DR. Lead author, Subhash D. Katewa, PhD, Buck Institute staff scientist, said flies genetically engineered to overexpress the circulating peptide AKH (the fly equivalent of glucagon in mammals) showed increased fat metabolism, spontaneous activity and

extended lifespan even though their diet was unrestricted. AKH plays a critical role in glucose and [lipid metabolism](#). "Our data suggests that DR may induce changes in muscle similar to those observed under [endurance exercise](#) and that molecules like AKH could serve as potential mimetics for DR that enhance activity and healthspan," said Katewa.

"A better understanding of the dynamics of fat metabolism is needed in order to clarify its role in aging and disease," Katewa said. "These current results suggest that enhanced fat metabolism could help slow aging and the onset of age-related disease."

Provided by Buck Institute for Age Research

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