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Exercise-Induced Molecule Protects the Aging Brain

The Gpld1 molecule seems to improve neurogenesis and cognition in mice.

In both animals and humans, regular exercise improves neurogenesis and cognition. Transfer of blood from young mice to old mice also improves neurogenesis and cognition, which suggests that such improvements are mediated by specific molecules. Might benefits of exercise on the aging brain be conferred by such molecules?

A series of experiments demonstrated several things:

- In older mice, regular exercise, compared with sedentary behavior, improved neurogenesis, learning ability, and memory.
- Blood extracted from older, midlife, or younger exercising mice that was injected intravenously into older sedentary mice produced improved neurogenesis, learning ability, and memory; blood infusions from sedentary mice did not have this effect.

Mass spectrometry identified about 30 molecules that increased following exercise; one of the most prominent was Gpld1, a molecule produced by the liver and not linked previously to aging or neurogenesis. When researchers enhanced liver production of Gpld1, it led to improved neurogenesis and cognition. Levels of Gpld1 also are higher in physically active (i.e., >7100 steps/day) humans than in sedentary humans.

COMMENT

A molecule common to mice and humans has been linked to the benefits of exercise on the aging brain. Whether this molecule ever is used therapeutically, this study is one of many that are beginning to identify the molecular basis for health benefits of exercise. ***— Anthony L. Komaroff, MD***

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Horowitz AM et al. Blood factors transfer beneficial effects of exercise on neurogenesis and cognition to the aged brain. **Science** *2020 Jul 10; 369:167. (https://doi.org/10.1126/science.aaw2622)*