AEROBIC EXERCISE AND BRAIN HEALTH

Words

Look for the following words as you read the passage. Match each word with its correct definition.

Words

1. aerobic
2. capacity
3. cognition
4. concentration
5. counteract
6. dementia
7. deterioration
8. diagnose
9. disorder
10. gravity
11. impaired
12. indicate
13. link
14. mood
15. previously
16. regulate
17. rodent
18. spatial
19. stave off
20. stimulate

Definitions

A. n., the use of mental processes
B. n., the situation of becoming worse
C. adj., of or relating to space
D. v., to cause a response
E. n., a feeling, a state of mind
F. v., to identify an illness
G. n., a large amount of something in the same place
H. v., to show
I. adj., relating to energetic exercise
J. n., seriousness
K. adj., damaged or weakened
L. n., a disease or illness
M. v., to work against
N. n., the group of small animals that includes mice and rats
O. v., to prevent
P. n., total amount available
Q. adv., before
R. n., connection
S. v., to control
T. n., the loss of intellectual functioning of the brain

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Reading

Aerobic Exercise and Brain Health

The disease-fighting, weight-controlling benefits of physical exercise, especially aerobic exercise, have long been known. Now, researchers have discovered another advantage: Physical exercise has a powerful effect on brain health, and the benefits go beyond the release of endorphins, the chemical in the brain that improves mood. Exercise affects the brain's plasticity—that is, its ability to reorganize[1] itself—and can reduce the age-associated loss of brain tissue that decreases cognition in the elderly and in those who have disorders such as Alzheimer's disease.

Recent studies have found that exercise activates a number of factors in the brain, including a protein known as *brain-derived neurotrophic factor* (BDNF), that stimulate the growth and development of brain cells. BDNF regulates the production of synapses, the connections between neurons that are essential for transmitting signals from one nerve cell to the next, and may also be involved in producing new nerve cells. Using rodent models, researchers found increased concentrations of BDNF in the hippocampus, an area of the brain involved in learning and memory and associated with dementia, after only one week of regular exercise. A study in older humans found a correlation between aerobic fitness, the size of the hippocampus, and performance on spatial memory tests. Other human studies noted that aerobic exercise increased the volume of gray[2] matter in some parts of the brain.

Regular exercise can help stave off some effects of normal aging and delay or diminish the gravity of conditions such as Alzheimer's disease, depression, and multiple sclerosis. Even over a relatively short time, exercise can repair some of the loss in brain capacity associated with aging. The greatest effects have been found in processes such as decision-making. Aerobic exercise can also improve short-term memory in the elderly. Exercise has been found to lower the risk of Alzheimer's disease in mice by decreasing the buildup of a protein known as beta-amyloid, which forms the brain plaques that precede Alzheimer's. The mice also outperformed nonexercising mice in a memory test. In a study of multiple sclerosis patients, those who exercised regularly fared better than those who exercised less. The exercise group scored better on tests of cognitive function, and their brain scans showed less deterioration and more gray matter.

In addition to increasing brainpower, exercise can help relieve depression. Although it is well known that endorphins help relieve stress and

[1]BrE: reorganise
[2]BrE: grey

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reduce anxiety and depression, BDNF plays a role as well. Human studies have shown that people who have received a diagnosis of major depression typically have lower concentrations of BDNF in their blood. Animal studies indicate that corticosteroids, which the body produces in response to stress, decrease the availability of BDNF in the hippocampus. Exercise can counteract this effect. Exercise also lessens depression by increasing blood flow to the brain.

The link between aerobic exercise and improved brain function in the elderly and in people with impaired cognition could lead to new ways to prevent and treat brain disorders. Meanwhile, people may have more control over their own brain health than was previously believed.

Answer the questions about **Aerobic Exercise and Brain Health.**

Questions 1–8

Complete the sentences below.
Choose ***NO MORE THAN ONE WORD*** *from the text for each answer.*

1. Exercise helps people feel good mentally because it releases endorphins, which put people in a better ..... .
2. BDNF improves the connections between nerve cells in the brain because it ..... how those connections, or synapses, are made.
3. Studies on rodents showed that there were larger ..... of BDNF in the brain after just one week of exercise.
4. Exercise may lessen the ..... of Alzheimer's disease and other disorders that affect the brain.
5. As people age, they may not function as well because they lose some brain ....., but exercise can repair some of this lost ability.
6. A study with multiple sclerosis patients showed that those who exercised more had less ..... of the brain.
7. Usually, smaller amounts of BDNF are found in the blood of people ..... with depression.
8. Exercise may lessen the effects of stress because it can ..... the effects of corticosteroids, which are produced by stress.

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