



Main: Exercise boosts the amount of blood circulating through your body by up to 25%.
Below: For muscle-building exercises, try resistance bands.
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KEEP IT PUMPING

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If you take a brisk walk, you'll notice certain changes in your body right away. Your heart beats a little faster, your breathing rate increases, and you may feel your leg muscles working. But you might not appreciate the myriad other physiological changes happening inside your body when you exercise — some of which offer benefits similar to those from common medications.

Together, exercise-induced changes can prevent or improve all the major risk factors that contribute to heart disease, including high blood pressure, diabetes, obesity and unhealthy cholesterol levels.

"Exercise can also improve mental health problems like depression and stress, which are common but often ignored contributors to cardiovascular problems," says cardiologist Dr. Aaron Baggish, a professor at the University of Lausanne in Switzerland and founder of the Cardiovascular Performance Program at Harvard-affiliated Massachusetts General Hospital.

Being physically active also helps people live longer, mainly because regular exercise helps prevent early death from heart disease, as noted in an article published Sept. 13 in the *Journal of the American College of Cardiology* that details the cardioprotective effects of exercise. Here's a closer look at how exercise affects the body and brain and how these adaptations protect your heart.

A stronger heart

Over time, exercise increases the size of the heart's chambers and also conditions the heart. As a result, the heart relaxes more easily and pumps more efficiently because it requires less effort to send blood throughout the body.

Better blood vessels

High blood pressure results from stiff, inflexible arteries. Exercise boosts the amount of blood circulating through your body by up to 25%, which, over time, encourages blood vessels to expand slightly and become more flexible. Exercise also spurs the production of nitric oxide, a molecule that relaxes and widens blood vessels.

Both aerobic and muscle-building exercises can lower blood pressure slightly in people with normal blood pressure. If you have high blood pressure (defined as 130/80 mm Hg or higher), the average reductions are greater — between five and seven points in systolic pressure (the first number in the reading).

"That's similar to the reduction people experience from taking a blood pressure drug," says Baggish.

Exercise recommendations and examples

Every week, strive for at least 150 minutes of moderate-intensity activity or at least 75 minutes of vigorous-intensity activity (or an equal combination of the two). Include muscle-strengthening activities at least two days per week. While the exercise guidelines don't include a suggested time or amount to do at any one time, experts says even a 10- to 15-minute session can be effective.

MODERATE-INTENSITY EXERCISE	VIGOROUS-INTENSITY EXERCISE
■ Walking, level surface, 2.5 to 4.5 mph	■ Walking, level surface, 4.5 mph or faster, or walking briskly uphill
■ Hiking	■ Jogging or running
■ Bicycling, level terrain, 5 to 10 mph	■ Bicycling, 10 mph or faster, or up hills
■ Stationary bike (indoor), moderate pace	■ Spinning class (indoor cycling)
■ Tennis, doubles	■ Tennis, singles
■ Swimming, recreational	■ Swimming, steady laps
MUSCLE-BUILDING EXERCISE (ALSO CALLED STRENGTH, WEIGHT OR RESISTANCE TRAINING)	
■ Weight training using dumbbells, medicine balls, kettlebells, weighted ropes or specialized machines at home or in gyms and fitness centers	
■ Exercises with resistance bands	
■ Body-weight exercises (such as push-ups, sit-ups and squats)	
■ Heavy gardening or yard work (such as digging and shoveling)	
■ Certain forms of yoga (such as Ashtanga, Vinyasa and Iyengar)	

Muscles: The sweet spot?

During a workout, muscles churn out a protein called GLUT-4, which improves the body's ability to process glucose (sugar) for energy, in part by making cells more sensitive to insulin, the hormone that enables cells to absorb glucose. That's why exercise helps prevent and treat type 2 diabetes.

"If everyone exercised enough, there would be almost no type 2 diabetes, which is largely a function of a sedentary lifestyle typical in Western countries," says Baggish. Type 2 diabetes — which is closely linked to excess weight — doesn't exist in primitive societies, where physical activity is a way of life, he adds.

Either type of exercise can lower your HbA1c by 0.7 percentage points, which is similar to the reduction from some diabetes drugs. (HbA1c is an average measure of your blood sugar over the past three months; a normal level is less than 5.7%, and levels of 6.5% or higher signal diabetes.)

Metabolism makeover

Although exercise is widely touted for helping people burn calories and shed pounds, the amount of weight loss from exercise usually isn't dramatic unless routine exercise is coupled with a healthy, balanced, calorie-restricted diet. However, exercise does help reduce vis-

ceral fat — the type that accumulates around the liver and other organs and is strongly linked to a higher risk of heart disease. Exercise has also been shown to modestly lower triglycerides (the most common type of fat in the bloodstream) and harmful LDL cholesterol.

Brain benefits

Regular exercise is believed to help dampen the body's "fight or flight" response, which plays a role in chronic stress and anxiety. Exercise may also release naturally occurring cannabis-like chemicals that may boost your sense of well-being. In addition, Baggish and colleagues recently showed that a single, 30-minute bout of moderate exercise releases a number of proteins into the bloodstream, including brain-derived neurotrophic factor (BDNF). BDNF has direct effects on brain function, especially with respect to mood and thinking ability. All of these effects may explain why regular aerobic exercise is as effective as any antidepressant medication, he says.

And while the heart may reap the bulk of exercise's many benefits, it may be the effect on your brain that inspires you to start moving more.

"You can't feel your nitric oxide level rise or your blood pressure drop. But you can feel the emotional benefits of exercise right away," says Baggish.

