UC San Diego Health

Corner Clinic: Our Experts Answer Your Health Questions

This month we talk about exercise, blood pressure and cholesterol

By UC San Diego Health System Experts |
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Experts answer whether exercise makes you smarter, should you worry about fluctuating blood pressure and can you lower cholesterol with diet alone.

- Can exercise make me smarter?
- Should I worry that my blood pressure fluctuates? Sometimes it's higher than normal even though I don't feel particularly stressed.
- Can I significantly lower my cholesterol level by diet alone?

Can exercise make me smarter?

James F. Sallis, PhD, Distinguished Professor of Family and Preventive Medicine, and chief of the Division of Behavioral Medicine

Yes, for your children and your parents too. But it's more precise to say that exercise makes your brain bigger, healthier, and work better.

The most dramatic effects are seen in older adults. Let's start with a comparison. There are multi-million-dollar companies using cognitive training and games to improve the brain, and they often work. Memory training improves memory. Reaction time training improves reaction time. Executive function training helps with reasoning. However, exercise improves all of these functions and more. Sounds like a better way to go, doesn't it?

Why does exercise make the brain work better in older adults? Because exercise stimulates the creation of new nerve cells, increases connections among nerve cells and improves communications among nerve cells. These are important effects that could be related to some of exercise's other benefits on health and quality of life.

One of the most surprising findings about exercise and the brain in the past few years, is that exercise seems to protect against Alzheimer's disease. Because this is one of the most devastating diseases and has no effective prevention or cure, the potential of exercise to prevent Alzheimer's is exciting. Keep your eyes open for more studies on this topic.

If preventing heart disease, stroke, breast and colon cancer, diabetes, depression and premature death were not reason enough to exercise, maybe a bigger and better brain will finally tip you (and your parents and older friends) into becoming regular exercisers. You don't have to be an athlete to obtain dozens of health benefits. Thirty minutes a day of brisk walking is the minimum. Doing a variety of activities like bicycling, dancing and tennis may be even better.

Weight lifting a couple of times a week helps your muscles, bones and probably brain. Make sure you are approaching exercise as play and fun, not drudgery. If you don't enjoy the activities you are doing, try some others, put more variety in your routine or be active in a group.

Don't forget the kids

There are dozens of studies over several decades documenting that physically fit and active youth do better in school, whether measured by grades or standardized tests. Exciting new research is showing why – physical activity builds healthy brains in children too. On brain scans, you can see the brains of active children are turned on and ready to learn. Children do better on cognitive tests just after exercising, so some teachers are having students exercise just before important tests. This new research on physical activity and the brain should be leading educators to consider physical activity as a practical approach for improving academic performance.

However, schools have been going in the wrong direction. Education policies emphasizing high-stakes testing have pushed physical activity out of many schools. Schools with the most to gain through physical activity appear to be doing the least. Schools with many low-income youth who are struggling academically also tend to have more obese and less-fit students. Low-resource schools have fewer PE specialists, fewer PE classes and less recess.

The good news is that several effective school programs were identified in a recent report from the U.S. Department of Health and Human Services. Effective practices like highly active PE, classroom activity breaks and walking and biking to school sound familiar because they used to be common in our schools. There are also ways to make recess and after-school programs more active.

Though there is no single approach to ensuring California kids get enough activity in school, active PE is the cornerstone because PE can reach all students. A study conducted by UC San Diego/San Diego State University doctoral student Jordan Carlson found many schools are implementing practices that get kids active. In schools with multiple effective practices, students were twice as active as those with zero or one practice.

What can you do?

There is no better bargain in health than physical activity. No drug has so many benefits below and above the neck. So, the first thing to do is make sure you are active yourself. Do something fun so you look forward to your daily play (better than workouts). Then, become an advocate for creating better programs for physical activity in local schools and better environments for physical activity in your community. See easy-to-read summaries of research to educate yourself. Then speak up for active schools, walkable communities, good parks and facilities for pedestrians and cyclists in every community.

Should I worry that my blood pressure fluctuates? Sometimes it's higher than normal even though I don't feel particularly stressed.

Dena Rifkin, MD, assistant professor, Division of Nephrology and Division of Preventive Medicine, and director of Dialysis Services, VA San Diego Healthcare System

It is normal for blood pressure to fluctuate from hour to hour, and throughout the day and night. In fact, the normal 24-hour pattern of blood pressure variation includes an approximately 10 percent drop-off during sleep at night. If you take blood pressure medication, it is also normal for blood pressure to be higher before and lower after the medication is taken.

Although stress and anxiety can affect blood pressure, changes of 10 - 15 millimeters of mercury (mm Hg) up or down can occur related to exercise, position or cuff error as well.

The best way to assess whether your blood pressure is unusually variable is to keep a log, checking at different times during the day over a few days and to share this with your treating physician.

Normal blood pressure varies, but according to the American Heart Association, healthy blood pressure is measured as less than 120 systolic (the measurement of BP in the arteries when the heart beats) over less than 80 diastolic (the BP measurement of arterial pressure between heart beats.

Can I significantly lower my cholesterol level by diet alone?

Beatrice Golomb, MD, PhD, associate professor, Department of Medicine and Family and Preventive Medicine

Although the answer is yes, I suggest it is the wrong question.

The purpose of lowering cholesterol is to protect health and survival. So the purpose of favorable diets should be to protect health and survival, rather than to lower cholesterol. Diets that have

actually extended life in randomized trials have not been diets that have lowered cholesterol. Diets low in saturated fat and cholesterol, designed to lower cholesterol, have not extended life.

In terms of diet strategies that favorably affect survival, a diet high in fruits, vegetables, nuts, and legumes, with ample amounts of monounsaturated fats (like olive oil, avocado) is a good starting point: A Mediterranean-style diet in one randomized trial dramatically lowered heart disease and also reduced cancer and all-cause mortality.

Avoidance of processed red meat (unprocessed red meat is not an equal culprit) is prudent and indeed, avoidance of chemical-sounding ingredients in general is sensible — essentially all that have been tested and shown to promote "oxidative stress," which causes the damage you are trying to protect against with antioxidants. Oxidative stress in turn promotes inflammation, metabolic syndrome, heart disease, cancer, neurodegenerative disease and other woes.

If you can afford it, you might consider organic; pesticides and herbicides are oxidative stressors, which act to offset the antioxidant benefits from foods. Organic for chicken and eggs may also be sensible, as only organic chickens are not permitted to use arsenic in chicken feed. Arsenic causes oxidative stress and is linked to hypertension, probably accounting for why poultry consumption in one study was linked to higher blood pressure.

Observational data (which look at the relationship between what people eat and how they subsequently fare) show longer life in association with fruit consumption, vegetable consumption, nut consumption and – good news – regular chocolate consumption.

A good rule of thumb, though, is if you feel bad after eating a certain food, it might not be good for you. Coffee consumption is linked to better outcomes extending to lower risk of diabetes, liver disease, dementia and all-cause mortality. But in one study, while people who were genetically fast caffeine metabolizers actually had fewer heart attacks if they drank coffee, for genetically slow caffeine metabolizers, the opposite effect held.

So in general, if you are in the group that coffee keeps awake, who gets heart palpitations, feels anxious on coffee, etcetera – the group more apt to be slow metabolizers – coffee probably isn't doing you any favors. Similar principles may hold with chocolate and tea.

Fatty fish consumption in one trial reduced two-year all-cause mortality in men with prior heart attacks by a whopping 30 percent, a mortality benefit that matched the benefit seen in the most favorable of the statin trials (also predominantly men with prior heart attacks – statins haven't benefited mortality in a lot of other groups).

Fish oils (omega-3 fatty acids) don't lower LDL cholesterol and may even raise it a bit. However, the pattern of LDL shifts from the "small dense" type of LDL that is "atherogenic" (promotes heart disease) to the large "fluffy puffy" LDL that does not carry the same adverse portent. In high doses, omega-3s lower triglycerides. Later trials have shown more mixed findings with fish and fish oils, perhaps because of higher rates of contamination that were present, mercury especially, thought lead, cadmium and other potential contaminants – all pro-oxidant – are also an issue, as are PCBs in farmed fish.

One study found that in areas with high mercury contamination, people who ate more fish had higher rates of heart disease. So, seek out sources of fatty fish that are low on the food chain (so accumulate less mercury) and are from less contaminated regions. The National Resources Defense Council and other groups have lists of fish with the least mercury.

Regarding foods and their relation to cholesterol, many fruits, vegetables, legumes and nuts favorably modify the lipid profile – reducing LDL, raising HDL, reducing triglycerides or combinations of these. Oats and especially oat bran have been reported to lower cholesterol and specifically LDL. Garlic lowers cholesterol in some studies and reduces the fraction of LDL that is oxidized. It is oxidized LDL that is primarily responsible for promoting heart disease.

In terms of the usual suspects, fats and cholesterol, complete avoidance of trans fats favorably affects cholesterol profiles. Don't be fooled by "0 grams trans fats" on labels. Look for absence of the word "hydrogenated" in the ingredient list. Trans fats are strongly linked to heart risk. They promote oxidative stress and inflammation, and our data suggest they are also linked to worse brain and metabolic function. In fact, the Food and Drug Administration has a 60-day comment window for their declaration of trans fats as no longer generally regarded as safe.

Saturated fats mostly raise LDL somewhat, but also raise HDL, which is generally protective – and HDL retains a protective association in older age while LDL loses its adverse association.

Butter consumption in a very large study was not linked to higher risk of heart attacks – though margarine consumption (with trans fats) was. Stearic acid – the main fat in cocoa butter – is "saturated," but has been reported to raise (generally favorable) HDL without raising LDL. Polyunsaturated fats like soybean oil lower LDL cholesterol, but also lower the HDL and can have pro-inflammatory effects.

On the subject of fat (but also looking beyond just cholesterol), one randomized study, the A to Z trial, assigned people to one of four diets. At the extreme ends were an Atkins-style high fat, high saturated fat, low carbohydrate diet and at the other extreme an Ornish-style low fat, low saturated fat diet. After one year, the high-fat, high-saturated fat group had considerably better HDL, considerably better triglycerides and a bit worse LDL than the very low fat group.

But the total cholesterol-to-HDL ratio, which has been found to have the full predictive power of the basic lipid profile appeared to be favorably affected in the high-fat relative to the low-fat group. This group also lost more weight, had markedly better systolic and diastolic blood pressure and improvements were present or suggested in other metabolic markers, relative to the low fat diet group.

Some dietary measures that lead cholesterol to drop aren't necessarily good for you, which is among the many reasons why cholesterol should not be the primary focus of diet decisions. Soy lowers cholesterol, but two large studies have reported that people who consume more soy perform worse on cognitive tests and (in one study) develop more brain atrophy on imaging, and later, on autopsy. Both studies looked at tofu; whether other soy products fare better is unknown.

My advice would be to pay attention to "micronutrients" which contain vitamins, minerals antioxidants and so on, macronutrients, which have a balance of carbohydrates, fat, protein, and what I term "antifoods," foods that contain chemical additives or chemically modified products included in products people eat that damage cells rather than benefiting cell health and function. Focus on real, whole foods and particularly an abundance and variety of fresh fruits, vegetables, nuts, legumes to ensure adequate micronutrients. A blender and/or making soups starts the breakdown process and may enable more of the micronutrients to be assimilated. I would also recommend including some unprocessed meat, poultry or fish as they contain important nutrients not found in vegetable products.