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I'm Caty Weaver. Welcome back!

Cardiovascular diseases kill about 17 million people around the world every year. Heart attacks and strokes are to blame for a large share of the deaths. And, tobacco use greatly increases the risk of developing the diseases and dying from them.

Today on As It Is, we talk about cardiovascular disease: what some new studies are showing, and ways to reduce your risk.

Have you ever had trouble breathing while outdoors in a busy city with lots of cars and busses rolling down the street? Fine particulate air pollution might be the cause of your trouble. This is the black, dirty gas clouds you see pouring out of the back of buses or the smoke rising from factory chimneys in urban areas.

Air pollution is a big problem in cities. It can lead to cardiovascular disease and other health problems. But now scientists say air pollution and its health risks seem to be localized. They say the level of threat people face may depend on which part of the city they live in. Katherine Cole has more.

Atherosclerosis, or hardening of the arteries, is a leading cause of death around the world. It can block the flow of blood to the heart or brain.

American researchers examined the part that air pollution plays in the development of atherosclerosis. They followed a group of almost 5,400 adults in six major cities. None of the adults were known to have heart disease. They were part of a larger study called the Multi-Ethnic Study of Atherosclerosis and Air Pollution.

Between 2000 and 2005, the researchers performed two non-invasive ultrasound tests on every member of the group. The exams were given three years apart, and measured the thickness of carotid artery walls.

The carotid artery carries blood to the head, neck and brain. Thickening of an arterial wall can be evidence of atherosclerosis throughout the body, even in patients with no other sign of heart disease.

The researchers found a meaningful increase in the thickening among individuals who lived in the neighborhoods with higher pollution levels. The lead researcher was Sara Adar, an epidemiologist at University of Michigan. She says their work confirmed earlier studies of the same group of people.

"Based on another study that was done in the same cohort (group) of people, they found that the amount of change that we saw for living in a high-pollution neighborhood versus living in a low pollution neighborhood would correspond to about a two percent increased risk of stroke."

Fine particulate air pollution is widely believed to cause swelling and other conditions that can add to the development of heart disease. Sara Adar notes that medical officials urge people to stay indoors when pollution levels are especially high. But she says doctors should discuss the dangers of air pollution directly with their patients.

"So, just as they might ask somebody, 'do you smoke?' or think about if someone is obese, how long someone has lived in a highly polluted environment might factor into a physician's notion of whether or not somebody is at high or low risk for cardiovascular disease."

A report about the study of air pollution and artery hardening can be found in the online journal PLoS Medicine.

I'm Katherine Cole.

The World Health Organization reports that cardiovascular diseases kill more people every year than any other disease. And the number of deaths is expected to increase from 17 million to over 23 million by the year 2030.

Yet, development of cardiovascular disease is highly preventable. Behavior plays a big part. Major risk factors are tobacco use and drinking too much alcohol, unhealthy diet and physical inactivity. The WHO says these behaviors are responsible for 80 percent of cardiovascular disease cases around the world.

So, quit smoking or do not start. Drink alcohol in moderation. Eat foods that are low in fat, sugars and salt and include fruits and vegetables in your daily diet. And, make exercise a usual activity.

But, as you try to reduce your chances for cardiovascular disease scientists continue to search for a cure. In the next story we learn how our own immune systems might provide clues to treatment.

Researchers at Yale University and University College London have discovered how some heart disease patients are able to grow new blood vessels. The new vessels permit blood to flow around blockages in arteries and continue on its path around the body. The discovery could mean new treatments for cardiac patients in the future.

Kelly Jean Kelly has details.

It is not uncommon for new blood vessels to grow around blocked arteries in people with heart disease. The new blood vessels keep blood flowing through the body, feeding its organs oxygen. But those emergency blood vessels do not grow in everyone who might need them.

Researchers have been working for more than ten years to find a way to force new blood vessel formation, called angiogenesis. They used human growth factors in their research. These are enzymes and hormones that support cellular growth.

But Yale University cell biologist Michael Simons says that the scientists were not successful. He said they found that growth factors are limited in fueling new blood vessel growth.

“They do that in normal animals and normal people. But they did not work in people with advanced illnesses and we never understood why.”

Mr. Simons and his team decided to look at blood vessel formation at a much earlier period in life. They studied blood vessel formation in fetuses to see why that process does not happen in people with severe heart disease.

Mr. Simons says organs that are damaged by decreased blood flow release a repair molecule. It is called VEGFR. Another molecule called NRP1 attaches to VEGFR and transports it and a second repair molecule to the inside of blood vessels. This process causes healing to begin.

But, in experiments with mice researchers found that repair does not happen in mice that have damaged NRP1. Mr. Simons says angiogenesis is held back because molecules cannot enter damaged blood vessels.

The scientist says he believes heart patients whose bodies do not repair and grow new blood vessels also have damaged NRP1.

"So now that we understand how this works, you can now begin designing therapies that will specifically stimulate this pathway where you need it if you want to grow arteries. On the other hand, if your goal is to inhibit the growth of blood vessels, you could do this of course in reverse."

Reversing blood vessel formation would block arterial blood to cancer tumors. This could destroy tumors which need to grow and spread.

Michael Simons and his co-researchers reported about blood vessel formation in the journal *Developmental Cell*.





I'm Kelly Jean Kelly.

And that's As It Is for today. Thanks for tuning in.

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