

Herald & News(Passaic, NJ): May 5, 1996
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Research reveals links in smoking, heart disease

WASHINGTON (AP) — Smokers may get the same kind of heart disease that attacks diabetics thanks to sugars in tobacco that form a "molecular glue" to harden their arteries, new research suggests.

Doctors have long warned that some 190,000 Americans die annually from smoking-related heart disease. Chemicals in the cigarette smoke reduce oxygen-carrying ability of blood, force the heart to pump harder and cause blood clots.

But the new research indicates there's yet another way tobacco strikes the heart: Through diabetic-like glucose reactions that occur even in young smokers, said study author Anthony Cerami of Long Island's Picower Institute for Medical Research.

"The results are preliminary but exciting," said Dr. Michael Miller, a cardiologist at the University of Maryland Medical Center who is familiar with Cerami's work.

"Heart attacks combine two distinct processes, hardening of the arteries and blood clots. We know cigarette smoking is an important trigger by activating clotting. Now it appears that cigarette smoke has a direct impact on both sides of the equation."

Cerami, who presented the data to scientists meeting here this weekend, says he "stumbled onto" the finding while studying how high levels of the blood sugar glucose harden diabetics' arteries.

Glucose undergoes chemical reactions to form compounds called advanced glycation endproducts, or AGEs, that bind to certain proteins

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— Dr. Michael Miller

in the blood. They in turn form clogs of cholesterol and other substances that stick to artery walls.

Everybody's body has glucose and everybody's arteries naturally begin hardening, in some people as early as their teens. But high glucose levels accelerate this atherosclerosis, giving diabetics a higher risk of heart disease, Cerami explained.

Cerami was studying how diabetics and non-diabetics react differently to glucose when he noticed the vast majority of non-diabetics who had AGE damage were smokers. So he set out to discover why.

AGE levels in the blood of 23 non-diabetic smokers who did not yet have heart disease were significantly higher than levels in similar non-smokers, Cerami found.

In fact, the smokers' average level of 202 units per milliliter of blood is comparable to the AGE levels of some diabetics, said Momtaz Wassef, the National Institutes of Health's chief of atherosclerosis research.

Then Cerami looked at the vital carotid arteries of smokers diagnosed with cardiovascular disease

and found extensive blockage from AGEs.

That still was indirect evidence, so Cerami exposed healthy rats to cigarette smoke for 22 months. The rats had 75 percent more AGEs in their blood than rats who never inhaled cigarette smoke.

Finally, he studied tobacco itself. Like all plants, tobacco naturally has glucose. But tobacco's drying process promotes the formation of dangerous AGEs, Cerami said.

He put AGEs collected from the smoke of five cigarettes into a test tube with human blood proteins. The smoke-exposed blood formed eight times more of what Cerami calls "molecular glue," the sticky AGE compounds, than blood not exposed to smoke.

"What really surprised us is that these reactive sugars come in with the smoke, go into the lungs and react all over the body," Cerami said.

Tobacco industry officials couldn't be reached for comment, but have said that smoking is not dangerous but may be a "risk factor" for some people.

Cerami's research makes sense, NIH's Wassef said, because other scientists last year studied young adults who died in accidents and found smokers had more hardened arteries than nonsmokers.

If the new findings are confirmed, scientists should "get rid of these things from the cigarette," Cerami said. "We should be able to remove them from the smoke, get rid of them in drying process or filter to remove them."