

Antibiotic may reduce stroke risk and injury in diabetics

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Dr. Adviyeh Ergul, physiologist at the Medical College of Georgia, is finding a daily dose of an old antibiotic can help diabetics avoid a stroke or at least minimize its damage. Credit: Phil Jones, Campus Photographer

A daily dose of an old antibiotic may help diabetics avoid a stroke or at least minimize its damage, Medical College of Georgia researchers report.

Minocycline, a drug already under study at MCG for [stroke](#) treatment, may help diabetics reduce remodeling of blood vessels in the brain that increases their [stroke risk](#) and help stop bleeding that often follows a stroke, said Dr. Adviyeh Ergul, physiologist in the MCG Schools of Medicine and Graduate Studies.

"We know that diabetes is bad and that diabetics have more strokes and

that when they have a stroke they do more poorly," said Ergul, corresponding author on the study published in the *Journal of [Cerebral Blood Flow and Metabolism](#)*. Nearly 70 percent of the estimated 24 million Americans with diabetes list a major vascular event such as a stroke or heart attack as a cause of death, according to the American Diabetes Association.

To figure out why, the researchers focused on the blood vessels of diabetic rats, finding that even moderately elevated [blood glucose levels](#) can result in thicker, twisted blood vessels that tend to leak, resulting in the bleeding that can follow a stroke. Clot-based strokes are the most common type while hemorrhagic strokes tend to be most lethal. But diabetics are at risk for a sort of combination in which a clot causes the stroke and leaking from the blood vessels follows - called hemorrhagic transformation - a scenario that can dramatically worsen the stroke's effect, Ergul said.

Much of the bad vascular remodeling that occurs in diabetes results from elevated glucose activating matrix metalloproteinases or MMPs. "They break down things and allow for cells to move so blood vessels change shape," Ergul said. They also destroy the basement membrane of blood vessels, allowing the destructive bleeding that often follows a diabetic stroke. On the good side, MMPs help clean up damage to enable repair and recovery.

One way minocycline works is by blocking MMPs. Less directly, diabetes drugs like metformin, used to lower blood sugar, also reduce MMP levels.

Another MCG research team, led by Dr. David Hess, stroke specialist and chairman of the Department of Neurology, is showing that minocycline given alone or with tPA, the clot dissolver that is the only FDA-approved stroke treatment, can also work after a stroke to help

minimize damage. One great synergy about the pair is that tPA increases bleeding risk and minocycline decreases it.

That could particularly benefit diabetics who already are at increased risk for bleeding, particularly when oxygen is restored to that area of the brain. This damage - called a reperfusion injury - is a primary reason that a diabetic stroke may look small on a magnetic resonance image but can have a devastating, effect, Ergul also has found.

Some of her next studies will include giving both tPA and minocycline to diabetic rats to study bleeding and the impact of the two drugs on [blood vessels](#), particularly the tiny ones that are tightly connected to brain cells.

Provided by Medical College of Georgia

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