

# Scientists show 'swamp gas' protects blood vessels from complications of diabetes

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Hydrogen sulfide is a foul-smelling gas with an odor resembling that of rotten eggs. Sometimes called "swamp gas," this toxic substance is generally associated with decaying vegetation, sewers and noxious industrial emissions. And — as odd as it may seem — it also plays a critical role in protecting blood vessels from the complications of diabetes, according to a new study from the University of Texas Medical Branch at Galveston.

In the last few years, work from several laboratories has shown that [hydrogen sulfide](#) is produced by the body in small amounts, and that this gas plays important roles in the circulatory system. In their new paper, published in the online early edition of the *Proceedings of the National Academy of Sciences*, the UTMB researchers describe experiments with human endothelial cells (cells from the innermost layer of [blood vessels](#)) and diabetic rats that demonstrate the importance of hydrogen sulfide levels in determining whether diabetes will lead to blood vessel complications.

Dr. Szabo's team started by exposing endothelial cells to sugar at a concentration that mimicked a level found in the blood vessels of someone with diabetes. "Upon exposure to such high sugar levels, the cells started to produce increasing amounts of highly reactive toxic free radicals, and as a consequence, they began to die," said Dr. Csaba Szabo, a UTMB professor and the paper's lead author. "Low hydrogen sulfide levels accelerated this process, while constant replacement of hydrogen sulfide protected the cells against the toxic effects of high sugar."

The researchers went on to show that diabetic rats have lower levels of hydrogen sulfide in their circulatory systems than other animals. Furthermore, the team showed that treating diabetic rats for a month with hydrogen sulfide improved the function of their blood vessels.

"The loss of endothelial cell function in diabetes is a first step that leads to many complications, such as eye disease, heart disease, kidney disease, foot disease and others," Szabo said. "The observation that hydrogen sulfide can control an early checkpoint in all of these processes may open the door for new therapies."

Provided by University of Texas Medical Branch at Galveston

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