Jose Lemos, an associate professor in the Department of Microbiology and Immunology and Center for Oral Biology, and colleague Jacqueline Abranches, an assistant professor, are uncovering new clues as to how a bacterium that normally lives in the mouth, Streptococcus mutans, may contribute to serious heart conditions in tens of thousands of people each year.

“For many decades, oral bacteria have been connected to a serious heart condition called endocarditis,” says Lemos. “But we now think we know how an organism that resides in the mouth can become such a threat in the heart.”

The bacteria, called S. mutans for short, make their way into the bloodstream from the mouth when brushing teeth or flossing. Usually, the body’s immune system ferrets out the bacteria and destroys them before they can pose the slightest threat, but in certain people, the bacteria evade the immune system and take up residence in the heart. There, over the course of a few days, the bacteria become a mass large enough to begin to affect blood flow. If antibiotics are not administered quickly, the mass can break off, possibly blocking an artery in the brain, causing a stroke.

“We found that a small percentage of the bacteria, about 15 percent, could hide inside a healthy cell and avoid detection from the immune system,” says Lemos. “We then found that the same 15 percent were expressing a single protein that the other 85 percent were not.”

That protein is a type that binds well to collagen, and the heart has a tremendous amount of collagen in its cells. When those 15 percent make it into the blood supply, they are able to attach to that collagen and effectively hide from the immune system as they start to multiply.

Lemos and Abranches believe the new data will help oral surgeons decide when a patient may need to take antibiotics to ensure that any S. mutans that may enter the bloodstream is eliminated.

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