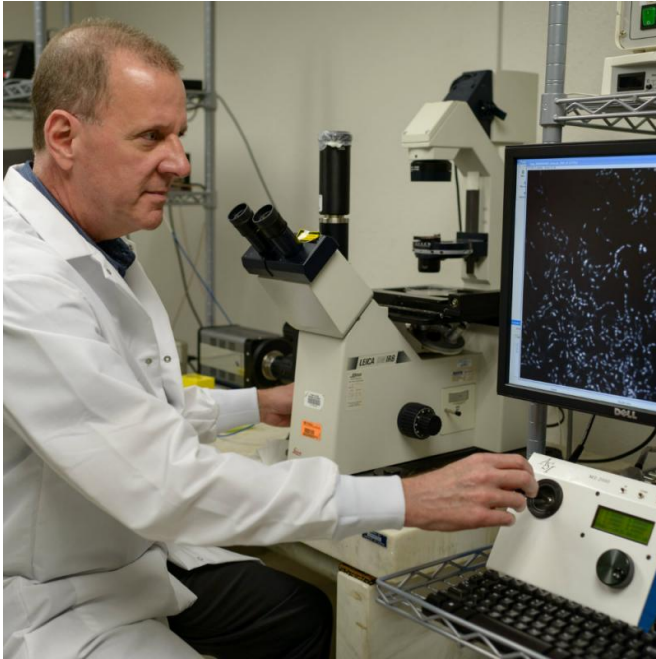


Fighting cavities could one day be as easy as taking a pill, research shows

10 March 2016, by Morgan Sherburne



University of Florida Health researchers have identified a new strain of bacteria in the mouth that may keep bad bacteria in check—and could lead to a way to prevent cavities using probiotics.

The researchers say the findings could lead to the development of a supplement that patients could take orally to prevent cavities.

While developing an effective oral probiotic will require more research, a possible candidate organism has been identified: a previously unidentified strain of *Streptococcus*, currently called A12. Robert Burne, Ph.D., associate dean for research and chair of the UF College of Dentistry's department of oral biology, and Marcelle Nascimento, D.D.S., Ph.D., an associate professor in the UF College of Dentistry's department of restorative dental sciences,

published the findings in late January in the journal *Applied and Environmental Microbiology*.

To maintain a healthy mouth, the oral environment must have a relatively neutral chemical makeup, or a neutral pH. When the environment in the mouth becomes more acidic, [dental cavities](#) or other disorders can develop, according to Burne.

"At that point, [bacteria](#) on the teeth make acid and acid dissolves the teeth. It's straightforward chemistry," Burne said. "We got interested in what activities keep the pH elevated."

Previous research by Burne, Nascimento and others found two main compounds that are broken down into ammonia, which helps neutralize acid in the mouth. These compounds are urea, which everyone secretes in the mouth, and arginine, an amino acid. Burne and Nascimento had also previously found that both adults and children with few or no cavities were better at breaking down arginine than people with cavities. Researchers knew bacteria were responsible for breaking down these compounds but needed to investigate which bacteria do this best, and how this inhibits cavities. Part of the answer is A12.

"Like a probiotic approach to the gut to promote health, what if a probiotic formulation could be developed from natural beneficial bacteria from humans who had a very high capacity to break down arginine?" said Burne. "You would implant this probiotic in a healthy child or adult who might be at risk for developing cavities. However many times you have to do that—once in a lifetime or once a week, the idea is that you could prevent a decline in oral health by populating the patient with natural beneficial organisms."

A12 has a potent ability to battle a particularly harmful kind of [streptococcal bacteria](#) called *Streptococcus mutans*, which metabolizes sugar into lactic acid, contributing to acidic conditions in

the mouth that form cavities. The UF researchers found that A12 not only helps neutralize acid by metabolizing arginine in the mouth, it also often kills *Streptococcus mutans*.

"Also, if A12 doesn't kill *Streptococcus mutans*, A12 interferes with *Streptococcus mutans*' ability to carry out its normal processes that it needs to cause disease," Burne said. "If you grow them together, *Streptococcus mutans* does not grow very well or make biofilms, also known as dental plaque, properly."

Nascimento, a clinician, collected plaque samples for the study. Dental plaque is a mass of bacteria that grows on the surface of teeth and can contribute to the formation of cavities. She isolated more than 2,000 bacteria that the researchers then screened to find bacteria that fit the bill.

"We then characterized 54 bacteria that metabolized arginine," Nascimento said. "Out of these, A12 stood out for having all of the properties we were looking for in a bacteria strain that could prevent cavities in a probiotic application."

The researchers sequenced the entire genome of A12 and plan to turn this discovery into a tool to screen for people who are at a higher risk for developing cavities, in combination with other factors such as a patient's diet and their oral hygiene habits.

"We may be able to use this as a risk assessment tool," Nascimento said. "If we get to the point where we can confirm that people who have more of this healthy type of bacteria in the [mouth](#) are at lower risk of cavities, compared to those who don't carry the beneficial bacteria and may be at high risk, this could be one of the factors that you measure for [cavities](#) risk."

Provided by University of Florida

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