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Company makes strides in fighting tooth decay

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Jeffery Hillman is working to undo a lifetime of tooth decay that most mothers and caregivers unwittingly pass on to their children.

Each time a mother licks a spoon and then uses that same utensil to feed her baby, she passes along both good and bad bacteria that can remain with her child into adulthood. The bad bacteria can cause tooth decay, and if the mother already has poor oral hygiene, more of the bad is sent to the child.

Hillman has spent more than 25 years researching and creating solutions to prevent tooth decay and to minimize the effect of detrimental bacteria.

"Tooth decay is the most common chronic infectious disease," said Hillman, a professor emeritus of the University of Florida College of Dentistry. "And it's getting worse in this country."

Considered a silent epidemic, the decay is often an indication of other health problems. As Americans continue to eat processed and sugar-filled foods, it gives detrimental bacteria the sustenance it needs to produce lactic acid, which then eats away at enamel and causes cavities.

Hillman, a Harvard-trained dentist and biologist, has a window into the future of oral medicine. Near his desk in Alachua, a glass partition separates his work space from the laboratory where he can view his employees testing strains of good bacteria to fight the bad.

At Orogenics, Inc., a biopharmaceutical company Hillman established almost 15 years ago, they are in the business of putting bacteria back into the mouths of consumers, and mothers.

"It takes a bit of convincing," said Hillman about promoting the daily use of bacteria to improve hygiene. "It's part of the education process we're trying to promote."

It's analogous to Dannon's Activia yogurt, which helps regulate digestion, Hillman said. Just as beneficial bacteria, called probiotics, are placed in the yogurt, three comparable bacteria are put in over-the-counter products — EvoraPlus, EvoraKids and Teddy's Pride for pets — that Orogenics distributes to retailers.

Available at Target.com, Sweetbay, Walgreens and CVS.com, among others, at a cost of approximately \$20, Orogenics labels the line ProBiora3 because they contain three beneficial strains of bacteria that suppress tooth decay, periodontal disease and bad breath.

Two of the strains also produce hydrogen peroxide to whiten teeth.

They differ from other bacteria-fighting products, because, unlike mouthwash, they do not kill all bacteria, just the ones that contribute to disease.

Orogenics may not yet be a household name such as Activia and its actress spokeswoman Jamie Lee Curtis, but Orogenics has a certain star power within the scientific community.

In 2009, Popular Mechanics labeled the work conducted at Orogenics No. 1 in its "20 New Biotech Breakthroughs That Will Change Medicine."

The company's research has not only resulted in the promise of combating tooth decay, but some accidental discoveries at Orogenics show the potential to treat deadly viruses.

"We're trailblazing right now," said David Hirsch, president and CEO, who works from the company's Tampa office. "There really isn't anything out there that can compete with us that we know."

Orogenics is in its second stage of FDA clinical trials for SMaRT Replacement Therapy. Company scientists created SMaRT, a genetically modified organism that which can be applied by swabbing the mouth for a one-time, permanent treatment against tooth decay.

A one-time application could be a cost-effective tool to treat oral health problems in developing countries, said Hillman of his mission to provide such opportunities to people in some the world's poorest communities where dentists can be rare.



Andrew Stanfill/Correspondent

Jeffery Hillman shows some of his products at his office in Alachua. Hillman's company, Orogenics, was founded to develop his research on stopping cavities by minimizing the effect of detrimental bacteria.



"We hope it will be in the marketplace in five or six years," Hillman said.

Researchers at Oragenics manipulated an organism found in the mouth that carries some beneficial properties but sits on the tooth's surface eroding enamel. The organism already had a competitive advantage against the bad bacteria, but it's genetically modified strain, SMaRT, no longer has the negative side effects.

SMaRT was more intelligent than Hillman and his staff realized because it released a lantibiotic, a molecule that can kill other bacteria and is often more powerful than typical antibiotics. The discovery of lantibiotic MU 1140 by Oragenics has the ability to treat MRSA, the hospital-based infection that results in thousands of deaths annually and is resistant to most antibiotics. MU 1140 also has promise to fight tuberculosis, which affects 2 billion people worldwide, Hillman said.

The challenge for scientists was that the MU 1140 molecule took two years to reproduce only a few grams. In 2009, Oragenics partnered with Almac Sciences to apply a new technology to synthesize the molecule for mass production. The hope is the MU 1140 will replace ineffective antibiotics, a new antibiotic of last resort.

"I think the story of Oragenics is a remarkable story," said Hirsch. "We will likely have a stronger presence in Gainesville in upcoming years."

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