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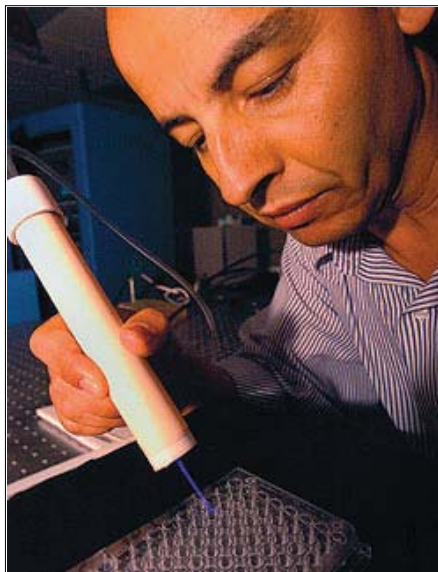
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## ODU pioneer refines the healing power of plasma



**Mounir Laroussi demonstrates his "plasma pencil" at Old Dominion University recently. The tool emits a "plume" of plasma that can be used to kill bacteria on skin.** JOHN H. SHEALLY II / THE VIRGINIAN-PILOT

By **PHILIP WALZER**, The Virginian-Pilot  
© October 15, 2005

NORFOLK — Remember E.T.? The extraterrestrial movie hero had unattractive, leathery skin, but his glowing finger could instantaneously heal wounds.

Old Dominion University researcher Mounir Laroussi thinks he can do the same thing

Laroussi, an associate professor of electrical and computer engineering, has developed a "plasma pencil," harnessing the energies of the lesser-known fourth state of matter.

The pencil, a hand-held cylinder 5 inches long and one inch in diameter, passed its first test: It can kill E. coli bacteria but leaves skin cells unscathed.

week, "we knew we were sitting on something really special."

He says this is just the beginning. The device, he hopes, will do even more: cleansing and healing

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wounds, treating dental plaque, even killing cancer tumors without damaging the surrounding tissue.

Like the whirling electrons and ions that Laroussi has studied for nearly 15 years, scientists have been buzzing since his paper was published last month in the journal Applied Physics Letters .

His progress has been reported on Web sites such as [www.nature.com](http://www.nature.com) and [www.physicsweb.org](http://www.physicsweb.org) .

A plasma researcher in New Mexico calls Laroussi a pioneer in the field.

"It's really the first demonstration of this technology that is embodied in a practical manner," said Edl Schamiloglu , a professor of electrical and computer engineering at the University of New Mexico.

"In general," said another engineering professor, George Collins of Colorado State, "his plasma work is world-class and full of wonderful new innovations that are advancing the state of the art."

**To understand Laroussi's work**, you have to understand plasma.

There are solids, liquids, gases ... and then there's plasma. It's a stew of whizzing electrons, charged ions and neutral particles. It makes up 99 percent of the known matter in the universe, Laroussi said, though it can't be seen.

Its benefits, Laroussi said, have been exploited in such items as fluorescent lights and semiconductor chips.

"We wanted to push plasma where it hasn't been before, which is biotechnology," he said.

First, he needed to cool it off. In its normal state, at hundreds of degrees Celsius, the plasma could burn away the good with the bad.

So he brought it down to room temperature. That way, it can kill the bacteria. But it doesn't harm healthy cells.

Laroussi proved the point at his lab this week.

He turned on the power for the pencil. A narrow, 2-inch-long purple beam – Laroussi calls it a "plume" – shot out of it. He brought it across the hands of two visitors.

Nothing happened. No singed flesh.

He's done this with hundreds of others. The first guinea pig was Laroussi himself.

Of course, he wasn't scared. "I know what I have," he said.

Schamiloglu , the New Mexico professor, said the pencil improves upon two previous inventions in plasma research.

One was a "plasma torch." It was too unwieldy, he said. And, running on uncooled plasma, it could get too hot to handle.

The other was a "plasma needle" the size of a syringe. Much easier to maneuver. But also prone to pricking the fingers of even the most scrupulous technician.

"The plasma pencil represents a good compromise," Schamiloglu said. "It's always satisfying to see something practical emerge from basic research in universities."

**Laroussi has received** nearly half a million dollars in federal grants for his work. His spacious lab is on the fifth floor of the Norfolk Public Health Center on Brambleton Avenue, off Colley Avenue. The lab is part of the Frank Reidy Research Center for Bioelectrics , a partnership between Old Dominion and Eastern Virginia Medical School.

Laroussi has collaborated with a postdoctoral research associate, Xinpei Lu , and he has begun working with other ODU professors in the areas of biology, oceanography and dental hygiene.

One of them, Wayne Hynes , an associate professor of biological sciences, also holds high hopes.



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"If it works and doesn't do any tissue damage," Hynes said, "it would potentially be able to kill the organisms associated with plaque and therefore decrease tooth decay and gingivitis."

Reach Philip Walzer at (757) 222-5105 or [phil.walzer@pilotonline.com](mailto:phil.walzer@pilotonline.com)

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