Chip checks for oral cancer

Rice’s nano-bio-chip effective in pilot study to detect premalignancies

By Mike Williams, Rice News Staff

The gentle touch of a brush on the tongue or cheek can help detect oral cancer with success rates comparable to more invasive techniques such as biopsies, according to preliminary studies by researchers at Rice University, the University of Texas Health Science Centers at Houston (UTHealth) and San Antonio and the University of Texas-M.D. Anderson Cancer Center.

A new test that uses Rice’s diagnostic nano-bio-chip was found to be 97 percent “sensitive” and 93 percent specific in detecting which patients had malignant or premalignant lesions, results that compared well with traditional tests.

The study is available online in the journal Cancer Prevention Research.

“One of the key discoveries in this paper is to show that the miniaturized, noninvasive approach produces about the same result as the pathologists do,” said John McDevitt, the Brown-Wiess professor of chemistry and bioengineering at Rice.

His lab developed the novel nano-bio-chip technology at the university’s Bio-Science Research Collaborative.

Oral cancer afflicts more than 300,000 people a year, including 35,000 in the United States alone. The five-year survival rate is 60 percent.

‘This Is Your Mouth’ video benefits NCOHF: America’s Toothfairy

By Fred Michmershuizen, Online Editor

‘This Is Your Mouth,’ a new video from Johnson & Johnson Healthcare Products that is narrated by actor Neil Patrick Harris, takes a closer look at the potential effects of rapidly multiplying bacteria in the mouth and illustrates how LISTERINE Antiseptic destroys the millions of germs that are left behind from brushing alone.

Each time the documentary is viewed, a $1 donation will go from Johnson & Johnson Healthcare Products to National Children’s Oral Health Foundation: America’s Toothfairy.

“I never realized how much goes on ‘behind the scenes’ in our mouths, and ‘This Is Your Mouth’ really brings the message home,” said Johnson & Johnson Healthcare Products President Jeff Fitzpatrick. "LISTERINE Antiseptic is a natural fit for this video because it destroys the millions of germs that cause bad breath, fresh breath problems and other oral health problems like mild gingivitis and plaque.
ing a move humane and less painful
way to do that diagnosis, and our
 technique has shown remarkable
success in early trials.”

Nano-bio-chips are small, semi-
conductor-based devices that com-
bine the ability to capture, stain and
analyze biomarkers for a variety of
health woes that also include car-
diac disease, HIV and trauma inju-
ries. Researchers hope the eventual
deployment of nano-bio-chips will
dramatically cut the cost of medical
diagnostics and contribute signifi-
cantly to the task of bringing quality
health care to the world.

The new study compared results
of traditional diagnostic tests to
those obtained with nano-bio-chips
on a small sample of 52 partici-
pants. All of the patients had visible
oral lesions of leukoplakia or eryth-
rophlaikia and had been referred to
specialists for surgical biopsies or
removal of the lesions.

The chips should also be able
to see when an abnormality turns
premalignant before it becomes can-
ger, and get it in stage one. Then
the five-year survival rate is very
high,” he said.

“Currently, most of the time, it’s
captured in stage three, when the
survivability is very low.”

The device is on the verge of
entering a more extensive trial that
will involve 500 patients in Hous-
ton, San Antonio and England. That
could lead to an application for FDA
approval in two to four years.

Eventually, McDevitt said, den-
tists may be the first line of defense
against oral cancers, with the abili-
ty to catch early signs of the disease
right there in the chair.

McDevitt’s co-authors include
Liu senior research scientist Pierre
Floriano, Rice postdoctoral associ-
ate Shannon Weigum and Spencer
Redding, a professor and chair of
the Department of Dental Dia-
gnostic Science at theTHSC in San
Antonio.

Also contributing were: UTBSM
San Antonio’s Chih-Ko Yeh, Ste-
phen Westbrook and Alan Lin, all
of the Department of Dental Dia-
gnostic Science; H. Stan McGill
of the Department of Pathobiol-
ogy and Frank Miller, Fred Villarreal
and Stephanie Rowan, all of the
Department of Otolaryngology,
Head and Neck Surgery; UTHSC
Houston’s Nadarajah Vigneswaran
of the Department of Diagnostic
Science; and Michelle Williams of
the Department of Pathobiology
University of Texas M.D. Anderson
Cancer Center.

The researchers received a
Grand Opportunity Grant from the
National Institute for Dental and
Craniofacial Research Division of
the National Institutes of Health for
the work.

that brushing and flossing alone isn’t
efficient to keep germs at bay,” said
Harris, in a press release announcing
the new video.

“I’m excited that by viewing this
documentary on the website, dona-
tions will be made to the National
Children’s Oral Health Foundation, a
very worthwhile organization. Chil-
dren across the country need to spend
more time on the playground and less
time with a toothache.”

In the video, which blends pop
culture with science and a good dose
of humor, dental professionals and
scientists explain how bacteria multi-
ply and collect in the mouth to form
a thick layer called plaque biofilm,
which is more harmful than freely
moving bacteria and may increase the
potential for bad breath and gingivitis.

The video also depicts when LISTER-
INE Antiseptic was first formulated in
1879 and offers rare glimpses of retro
advertisements.

“Plaque is not a simple matter, and
there is more to be concerned about
than meets the eye,” said Marcelo
Araujo, DDS, PhD, associate director,
scientific & professional affairs, John-
son & Johnson Consumer Products
Worldwide, division of John-
son & Johnson Consumer Companies.

“We all need to understand the
effects of the plaque biofilm. This
documen
tarial will educate view-
ers on the important role that rinsing
plays in fighting the plaque biofilm.

“We are very grateful that the mak-
er of LISTERINE share our commit-
ment to children’s oral health and
choose to direct proceeds from the pro-
duction of ‘This Is Your Mouth’ to
NCOHF smile-saving programs,” said
Fern Ingber, NCOHF president and
ceo.

“This generous donation will
enable NCOHF affiliates to continue
providing quality treatment and criti-
cal preventive services to children
from vulnerable populations, effec-
tively break the cycle of preventable
pediatric dental disease.” The video
may be viewed at www.listerine.com/
yourmouth.