

# The state of ORAL BIOLOGY

For more than four decades, the School of Dental Medicine has been a national leader in the science behind oral health. ▲

by Judson Mead



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**W**hat is the School of Dental Medicine's Department of Oral Biology best known for? That will depend on who's answering the question. A historian of the discipline might say that because the department was the first of its kind established in the U.S.—by the dental school's visionary dean, James English, in the early 1960s—it should be known first of all for blazing the trail for the entire science and for establishing an organized scientific research presence in dental schools.

Anyone working in salivary research, whether they know it or not, is probably indebted to the department's program

in that area, directed for two decades by Michael Levine, because it established so much fundamental science and in the process produced a cadre of researchers that continues to influence the course of the science—among them Lawrence Tabak, the current director of the National Institute of Dental and Craniofacial Research.

The department was a pioneer in research into the connections between oral health and systemic health. This rapidly expanding area of inquiry is stimulating collaboration between medical researchers and oral biologists, and has promising implications for future interest in oral biology. Former

chair Robert Genco helped open this field with his studies of the links between periodontitis and heart disease and diabetes.

Current department chair Frank Scannapieco occupies a place on this distinguished academic family tree, having earned his doctorate under Levine in 1991 and succeeded Genco as chair in 2002. An internationally renowned authority on the mechanisms of dental plaque formation, Scannapieco is perhaps best known for demonstrating that amylase—the most common enzyme found in saliva—often binds to a protein that indicates the presence of the bacteria that causes periodontal disease.

Scannapieco is a student of the department's storied history—he has published appreciations of Levine's and Genco's contributions to oral biology. But respectful as he is of that history, he says that the “graying” of the faculty has given the department an opportunity to renew itself.

“We are positioned to increase our funding and to develop new areas of research over the next five to 10 years,” he says, speaking of the newcomers.

The department's research emphases are microbiology; host-response mechanisms as they relate to oral diseases; tissue engineering, especially explorations into bone and

connective tissue growth; and saliva, in particular how salivary molecules interact with micro-organisms.

By contrast, oral biology departments elsewhere can have very different research profiles. The department at the University of Maryland has a strength in the neurosciences and works in the area of pain; the department at the University of Illinois–Chicago is known for its developmental biology.

The UB department's past is shaping its future. Scannapieco says that because of its history of research strength in microbiology and immunology and saliva research, when the department was ready to hire, they conducted a wide search for scientists with expertise in these areas.

The three most recent additions to UB's department are Steven Gill, Chunhao Li and Stefan Ruhl.

Gill, whose laboratory is located at the New York State Center of Excellence in Bioinformatics and Life Sciences, uses genomics and bioinformatics to study bacterial pathogens, oral bacteria and commensal bacteria (the welcome bacteria we depend on) that reside in the human host. Among other research pursuits, his lab is working on a metagenomic examination of the bacterial community that resides in the human oral cavity. Before he joined the UB faculty, Gill had been one of the lead researchers on a project that mapped the ge-

nome of the bacterial colony of the human gut.

Li's research uses genetics, biochemistry, and genomic, proteomic and animal models to explore the basic biology and pathogenesis of pathogenic spirochetes, which include the Lyme disease spirochete and the oral spirochete *Treponoma denticola*.

Ruhl, who is an expert in salivary biology, is studying the interaction of salivary components and the microflora that colonize the mouth. (Ruhl

was profiled in the spring 2008 issue of *UB Dentist*.)

Of the new faculty, Ruhl, who came to UB from Germany, has a background in dental studies, but neither Li, who studied medicine and microbiology, nor Gill trained in dental medicine.

This is something of a departure from a traditional path into oral biology. Scannapieco, like his mentor, Levine, and his predecessor, Genco, holds a degree in dental medicine (he earned a DMD from the University of Connecticut and a certificate in periodontology at UB), which he used as a foundation for his interest in oral biology. Before there were

doctoral programs in oral biology, students who wanted to pursue scientific interests in dental medicine studied such fields as immunology after going to dental school. Now, the science doesn't necessarily require a clinical background.

The department is, nonetheless, part of the School of Dental Medicine. Its quarters in Foster Hall may be separated from the clinical teaching facilities in Squire Hall, but the intellectual traffic between the two is steady. Scannapieco notes that

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clinical faculty with research training enrich the conversation in the department. Students taking postgraduate clinical programs usually complete master's degrees as well, and many study with the department. Also, but regrettably rarely, according to Scannapieco, the department enrolls students studying for both a DDS and a PhD.

Scannapieco was formerly director of the Student Research Group and helped organize the first student research days.

The department tallied \$3.3 million in research expenditures during the 2006-07 fiscal year, the most recent UB has reported. This puts

it in the same league with far larger departments such as biological sciences and psychology among UB's most successful at finding research dollars. Scannapieco has been among UB's top 100 federal grant recipients annually since 2003.

Scannapieco believes that the future of oral biology is bright. The intensifying investigation into the oral health-systemic health connection has aroused interest in oral biology from outside the field and pushed areas of research together, breaking down barriers that in the past kept oral biology isolated. Another hot topic in oral biology is work on the regeneration of tissue, specifically, the possibility of growing teeth. Scannapieco also says that academic research in oral biology is increasing outside the U.S. (Brazil is a leading example.)

As the field grows and evolves, UB will continue to enjoy recognition for what it started in the early 1960s. “There are other dental schools that are not fortunate enough to have departments like ours,” Scannapieco says. He credits James English for having started the department with the resources and faculty lines it would need to succeed. And he looks to the future—of the field and the department—for more history.

If you want to look into that future today, visit the department Web site at [www.sdm.buffalo.edu/oralbiology](http://www.sdm.buffalo.edu/oralbiology). ▀