

## Unraveling the Character of Bacteria

In the lab of Dr. Joseph DiRienzo, Professor of Microbiology, research revolves around questions of character – the character of bacteria, particularly those contributing to periodontal disease and plaque formation. His work has sought to unravel the basic chemistry and genetics of bacteria, with a focus on two primary lines of investigation – the characterization of *Actinobacillus actinomycetemcomitans* and its role in periodontal disease and that of *Fusobacterium nucleatum* and *Streptococcus crista* and how they interact in the growth of plaque. As his investigation into the nature and properties of these bacteria has evolved over the years, so have his specific areas of related research.

“We have been investigating *Actinobacillus actinomycetemcomitans* ever since I came to the School,” says Dr. DiRienzo. “It has been the subject of intensive research because there has been more and more evidence over the years that this microorganism is a predominant pathogen in periodontal disease.” It has been specifically associated with localized juvenile periodontitis (LJP), but it is also believed to contribute to adult forms of periodontal disease.

Much of his early work involved characterizing the basic properties of this gram-negative bacterium, investigating its cell surface components and its structural and functional differences, which led to studying ways to tell how *Actinobacillus actinomycetemcomitans* may be associated with conversion from health to disease.

“We asked: Are there different forms of the bacterium? Do some have a greater potential to cause disease because they make new proteins or toxins or factors related to inflammation, and do others have a reduced role in the disease process, because they fail to express certain components?” explains Dr. DiRienzo. “So we looked for ways to distinguish between the possible virulent and avirulent types.”

In the late 1980s, Dr. DiRienzo was asked to participate in a research grant under the direction of Dr. Norton Taichman, now Professor Emeritus of Pathology. The project, which focused on understanding LJP, began to offer some answers to his question. Dr. DiRienzo’s role in the project was to characterize *Actinobacillus actinomycetemcomitans* isolated from children in LJP

families. Using restriction fragment length polymorphism (RFLP) analysis, a genetic method based on differences in DNA sequences, the study identified 13 different genetic variants and confirmed that a specific genetic variant (RFLP group II) prevailed in children who developed LJP. “This was very exciting, because we were one of the first groups to really ask if there were distinct genetic variants of this particular bacterium in the oral cavity,” notes Dr. DiRienzo.

It was additional investigation of this RFLP fragment of *Actinobacillus actinomycetemcomitans* DNA that led to the current research in Dr. DiRienzo’s laboratory. To determine the fragment’s genetic make-up, they sequenced it, revealing a cluster of genes that coded for a cytolethal distending toxin (CDT), a rather poorly characterized toxin at the time. CDT is so named because it enters nonbacterial cells and destroys the DNA, setting up a cascade of events that arrests the growth of the cell and eventually causes it to die.

Focusing his study on CDT, Dr. DiRienzo confirmed the presence of the CDT gene locus in the virulence-associated region of *Actinobacillus actinomycetemcomitans*. CDT has also been identified in some pathogenic strains of *Escherichia coli*, *Campylobacter jejuni* and *Haemophilus ducreyi*. “This toxin is now studied by a relatively large number of research groups, even though it is produced by a relatively small number of microorganisms,” says Dr. DiRienzo. The interest in this toxin is a result of its unusual mechanism of inducing cell death.

Presently, Dr. DiRienzo’s work involves further characterization of the CDT toxin. “CDT is comprised of three genes, and we are interested in how each of the gene products contributes to the activity of the toxin,” he explains. “That is our main emphasis right now.”

Another key area of investigation in his lab is the interaction of plaque bacteria, with the goal of gaining a better understanding of how they colonize in the oral cavity. Specifically, they have been studying the components involved in the binding of *Fusobacterium nucleatum* and *Streptococcus crista*. “Since the fusobacteria are among the first anaerobic filaments to colonize subgingival plaque, these interactions (continued on page 6)

## Character of Bacteria (continued from page 5)

could serve as one connecting link between the transformation of supra- to subgingival plaque,” notes Dr. DiRienzo. His initial research focused on *Fusobacterium nucleatum*, identifying a cell-surface protein involved in its binding process, and more recently, efforts have concentrated on characterizing the adhesion on the surface of *Streptococcus crista*.

“We confirmed that the streptococci contain hair-like tufts, comprised of structures called fimbriae, on one end of the cell,” explains Dr. DiRienzo. “Through electron microscopy, we could see that the streptococci bind to the fusobacteria through the tips of these tufts, so we have spent a lot of time trying to characterize the composition of the tufts and how this binding takes place. Ultimately, if we can learn how to inhibit these interactions, we can reduce the extent of plaque formation and create a more healthy environment.” ■

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## Predocutorial Students (continued from page 1)

Probably the biggest difference is that the Network offices more closely simulate a private practice setting, note those involved. “Our students also get diverse experience,” says Dr. Miller, “due to the fact that specialists rotate through the offices.”

At Penn Dental Center at Mayfair, Director Dr. Thomas Therrien adds that students can also take advantage of the opportunity to observe faculty between their own patients. “They can watch a surgery or simply see how we interact with patients,” he says.

Sophomores apply for placement within the Network through an application process that takes place in the spring. Students are selected based on a written statement of interest and an interview.

“It is going well. We are all excited about having the students as part of the office and so are our patients,” adds Dr. Therrien. “We have a lot of elderly patients in our neighborhood who couldn’t travel to Penn, so it is a great benefit to them to be able to access this type of care locally.” ■

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## Predocutorial Students Join Network Offices

Expanding on a model that has been in place at the Dental Care Center since 1979, the satellite offices of the University of Pennsylvania Dental Care Network are now serving as sites for predoctoral clinical training. With the start of this academic year, predoctoral students were assigned to all of the Network offices except Penn Dental Center at Chestnut Hill; students will be integrated into that practice next year.

“When we undertook the expansion of the Dental Care Network, one of our goals in doing so was to provide additional educational sites for our postgraduate and predoctoral programs,” notes Dean Raymond Fonseca. “Now the offices are established to the point where we can realize that goal, having built the resources to accommodate predoctoral students as well as the AEGD residents that have been part of the offices from the outset.”

Two third-year students are at each of the satellites and will continue their clinical training at the same locations during their fourth year. Plans call for another two third-year students to join each satellite, including Chestnut Hill, next academic year. A total of eight predoctoral students – four third-year and four fourth-year – receive their training at the Dental Care Center.

“Students get the same amount of clinical time at the Network offices as they would at the School’s main clinic,” notes Dr. Karen Miller, Director of Penn Dental at The Curtis Center. “The primary difference is the setting – their patient load and experiences are analogous in the satellites.”

Dr. Philip Giarraputo, Director of the School’s Primary Care Unit program, notes that there is a coordinated effort with the Network Directors to ensure consistency in training and evaluation. “The teaching module, instrumentation, materials, and grading system being used in the Network offices are all the same as those being used in the clinic PCUs,” he explains. “So students are getting a very consistent clinical experience regardless of the location.” (continued on page 6)

## Getting the Word on Emergency Closings

In the aftermath of September 11 and in preparation for the winter’s inclement weather, SDM has made some additions to its system for announcing emergency closings.

Now in place is a new procedure for quickly and easily posting a message on the status of School and clinic operations for any outside party calling the School clinics or SDM’s main switchboard number.

“Once the University and the Dean’s office make a decision on an emergency closing, I can place a message giving the details of the closing on the School’s main switchboard,” explains Charlene Ziegler, Director of Clinic Support Services. “The new system then allows us to have all incoming calls to the clinics

routed to the switchboard, so all callers to any of the clinics will be connected to that same message.” Ms. Ziegler worked with Nick Sohler of the University’s telecommunications department to set up this forwarding system.

(continued on page 2)



## Getting the Word on Emergency Closings

(continued from page 1)

The other change to the emergency closing announcement process will be the addition of an e-mail notification from the Dean's Office to all department chairs and their assistants, alerting them to contact their staff directly with the news of a closing. This will supplement the e-mail notification that has already been in place in which a school-wide e-mail is sent to all students, staff, and faculty when a weather or other emergency arises during the workday.

Emergency closing announcements can also be heard through the following sources:

- **215-898-MELT (6358)** – The University's special information number, which has a recorded message from the Division of Public Safety on the status of University operations.

- **KYW News Radio (1060 AM)** – This is the City of Philadelphia's official storm emergency center, as well as the University's (other stations are not to be considered "official" sources of information). The University has two emergency radio identification codes –102 for day classes and schools/centers and 2102 for evening classes. The message that accompanies each of these codes will provide the operating status of the University.

**Please note:** The University makes the official decision on closings and work-schedule modifications for all its schools/centers. However, the Dean has the authority to make decisions regarding SDM clinics. If the University announces that it will be closed before the workday begins, SDM clinics are automatically closed as well. If the clinics are already open, students, staff, and faculty will be notified via e-mail of any decision to close the clinics early due to a weather-related emergency.

In addition, University staff members whose positions are designated as essential are required to report to or remain at work regardless of announced closings. ■

## Dean Fonseca Named William J. Gies Award Winner

Dr. Raymond Fonseca, Dean of the School of Dental Medicine, was named the 2001 William J. Gies Award winner by the American Association of Oral and Maxillofacial Surgeons. Sponsored by the William J. Gies Foundation, the award is given annually in recognition of an educator's distinguished achievement in the field of oral and maxillofacial surgery. The award was announced during the opening ceremony of the association's 83<sup>rd</sup> Annual Meeting in Orlando in September. Dr. Fonseca, who was unable to attend, will receive special recognition during the AAOMS meeting next year in Chicago. ■

## Sandy Scott Retires After 29 Years with SDM

Sandy Scott, a highly valued member of the SDM staff, has retired after 29 years of service with the School. Ms. Scott, whose retirement was effective November 30, was Coordinator of Student Permanent Records in the Office of Student Affairs.

"Sandy has been an invaluable member of our office," says Sue Schwartz, Director of Student Affairs. "She is a great co-worker and friend who we all will miss."

Throughout her time with SDM, Ms. Scott has been a mainstay in the School's General/Student Affairs Office, starting there in 1972 and supporting students, staff, and faculty through a variety of roles.

"I truly enjoyed working at SDM," says Ms. Scott. "I met a lot of wonderful people from all different walks of life and made a lot of good friends. I am still in contact with many former students." She has also seen the School through many changes and transitions and has worked with five different deans.

"It will be impossible to replace the wealth of knowledge that Sandy has about SDM," notes Dean Raymond Fonseca. "She has been a tremendous resource for students as well as staff and faculty in all areas of the School."

Ms. Scott's experience with the University goes back beyond her years with SDM. In 1965, she was hired for what was to have been a two-week temporary position as a records clerk for the Graduate School of Arts and Sciences and ended up staying. She moved to a full-time position with Penn in 1966 as the admissions coordinator in the Graduate School of Arts and Sciences, where she worked until coming to SDM.

As for her retirement plans, Ms. Scott says she is looking forward to having time to enjoy her four great grandchildren. ■

## InteliHealth: Checking the Pulse of Consumer's Concerns

What does the public want to know about oral health? Since the launch of InteliHealth Dental ([www.dental.intelihealth.com](http://www.dental.intelihealth.com)) nearly one year ago, SDM has been gathering answers to that question and is now using them to strengthen the web site's content. InteliHealth Dental – created through a partnership with SDM and InteliHealth, one of the top health sites on the Internet – features comprehensive dental health information for consumers as well as resources for the professional dental community.

"The 'Ask the Dentist' section of the site is really giving us an opportunity to get to the pulse of the public's concerns and knowl-

<http://www.dental.intelihealth.com>

edge about dentistry," observes Wendy McGeehan (DH'83), director of professional educational programs and director of the InteliHealth project. "Through it, we are able to identify those issues that are most important to the public. One of the biggest surprises is that the questions are much more sophisticated than we ever anticipated." "Ask the Dentist" allows visitors to post oral health questions to members of SDM's clinical faculty.

Ms. McGeehan reports that a significant number of questions have been received on systemic health and how it relates to dental care, oral medicine, oral surgery, anesthesia, implants, and treatment of periodontal disease. An average of 10 to 15 "Ask the Dentist" questions are

being submitted to the site every week, and as trends are recognized, they are being used to help guide the site's content development.

"On the consumer side, we are adding more detailed information on those issues that patients are asking about on a frequent basis," notes Ms. McGeehan. "And, on the professional side, we are using this knowledge to help plan our continuing education courses. With it, we are able to say to the dental professionals visiting the site that these are the areas patients are asking about and that they need to be prepared to address."

As for other recent additions to the site visitors can now access information on a host of dental procedures through the "Oral Health A-Z" section. When typing in the name of a procedure there, they

will get a comprehensive overview that describes what the procedure is, what it is used for, how it is done, follow up, risks, and when to call a professional.

"Previously, we only had dental conditions under this section, but again, from what we are learning through the 'Ask the Dentist' questions, there was an obvious need to add procedures as well," says Ms. McGeehan. This resource is also being linked to the professional side, so members of any oral health care team visiting the site can quickly and easily access and print information to give to their patients.

"Say, for example, that a patient is being referred for an apicoectomy," explains Ms. McGeehan. "A dentist could go to the site and print out a description of the procedure at the time of the referral, so the patient will have a complete overview of it when they

leave the office. Then, if they have additional questions after they read about it, they can simply call back."

Finally, introduced to the site this fall were live forums with SDM faculty. In these hour-long discussions, individuals log on to the site to "chat" with an SDM expert on a particular topic.

"They have been tremendously successful," says McGeehan. "So far, we have selected most of the topics around dates such as National Orthodontic Month or Senior Month, but we will also be developing chat sessions around those trends of interest we identify in the 'Ask the Dentist' section as we move forward."

Chat sessions offered to date have included *Replacing a Tooth: Why Is It Important and What Your Options Are* with Dr. Najeed Saleh, Clinical Associate Professor of Restorative Dentistry; *The Seniors' Smile: Living With Dentures and Partials* with Dr. Gerald Weintraub, Associate Professor and Chair of the Department of Restorative Dentistry; *Adult Braces: Improving Your Smile* with Dr. Michael Perillo, Clinical Assistant Professor of Orthodontics; *New Advancements in Gum Disease Treatment* with Dr. Jonathan Korostoff, Assistant Professor-Clinician Educator of Periodontics; and *Oral Hygiene in the Holiday Months* with Dr. Joan Gluch, Director of Community Health. Pediatrics and sports injuries are among those topics planned for the coming months. Transcripts of each chat can be accessed by clicking on "Live Forums" under the "Communités" section of the site.

"With the great popularity of the chat sessions," adds Ms. McGeehan, "we may soon be doing three each month." ■

## Plans Begin for SDM's 125<sup>th</sup> Anniversary Celebration

The SDM will mark its 125<sup>th</sup> anniversary in the 2002-2003 academic year, and a planning committee has been convened to celebrate this important milestone in the School's history.

"This occasion presents a unique opportunity for Penn dental to share its accomplishments and aspirations with alumni, friends and colleagues across the University, and the entire dental community," says Dean Raymond Fonseca, who is chairing the Committee.

The School's anniversary celebration will begin in July 2002, and events are being planned that will include participation from across the School. A schedule of symposia and other events will be presented throughout the year, highlighting the School and dental profession.

The members of the 125<sup>th</sup> Anniversary Committee include Tobe Amsterdam, Director of Development/Alumni Relations; Dr. Peter Berthold, Chair of the Department of Dental Care Systems; Dr. Cyril Evian, Clinical Professor of Periodontics; Dr. James Galbally, Associate Dean; Dr. Elliot Hersh, Associate Professor of Oral Surgery/Pharmacology; Dr. Jonathan Korostoff, Assistant Professor-Clinician Educator of Periodontics; Dr. Syngcuk Kim, Chair of the Department of Endodontics; Sue Schwartz, Director of Student Affairs, and Dr. Robert Vanarsdall, Chair of the Department of Orthodontics. Also a part of the committee are SDM Overseers Dr. Robert Baker, Sr., Dr. William Cheung, Dr. Joseph Gian-Grasso, Dr. John Hellwege, and Zvi Muscal. The committee is being staffed by Ms. Kelly Grady. ■

## Students Named To Honor Society

Eleven third-year students were recently recognized for their academic excellence as the newest inductees to the Matthew Cryer Honor Society. The Cryer Society was established in 1912 in honor of Dr. Matthew Cryer, a Professor of Oral Surgery, who achieved great eminence as a teacher, researcher, and clinician. The major function of the Society is to acknowledge and honor the academic achievements of its members and to act as a resource in the process of introducing prospective students to the School of Dental Medicine.

Membership in the Matthew Cryer Honor Society is the highest scholastic honor conferred at the School. Each year, new members are announced from the junior class, and members are awarded a certificate honoring their achievement at their graduation.

This year's new members include Michelle M. Backhaus, Daniel H.C. Chen, Kai-Zu Chi, Michael A. Lemper, Rene M. Lukasiewicz, Frank Meng, Marissa L. Mikolich, Christopher Overcash, Cyrus A. Ramsey, Mairlys Rodriguez, and Babak Zargari. ■

## SDM Holds 2<sup>nd</sup> Annual Racquetball Tournament

SDM held its second annual racquetball tournament on November 17 and 18, bringing students, staff, and faculty together through some friendly competition, while also honoring the memory of a devoted faculty member.

"Our goal with the tournament is to create an opportunity for students, staff, and faculty to interact in a fun, social event. There are very few activities that bring all three groups together," says Caryn Stivelman, Director of Competency Evaluations, who coordinated the event within the Office of Academic Affairs. "This year, we also wanted to honor Dr. Joseph Dietz, a highly respected faculty member who died this summer, by dedicating the tournament to him." Dr. Dietz, a Clinical Professor of General Restorative Dentistry, had been an instructor at SDM since 1962 and was also an avid racquetball player, having participated in the SDM tournament last year.

The two-day tournament, open to anyone in the School, took place at Club La Maison in Wayne, PA. Following the competition, a reception and dinner was held at John Harvard's Brew House, located across from the club. A total of 35 competitors took part in the tournament and over 100 people attended at the reception and dinner.

The tournament was divided into four levels of competition – A, B, C, and novice. Winners included Ricky Singh (D'02); Dr. Judith Buchanan, Associate Dean of Academic Affairs; Mark Doherty (D'03); and Scott Stuart, the husband of Patricia Sansaricq (D'03), respectively.

Henry Schein, Inc., Omicron Kappa Upsilon, and a number of other SDM vendors sponsored the event. Funds were also raised through a raffle of approximately 36 different prizes donated by West Philadelphia and Center City restaurants and retail stores as well various dental supply companies.

"Many people are already asking when the next tournament will be held," adds Caryn. "We hope to continue this as an annual event." ■