Have YOU considered a career in **oral health research?**

National Institute of Dental and Craniofacial Research (NIDCR)

Our mission is to improve the oral, dental and craniofacial health of all Americans through research, research training, and the dissemination of health information.

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Who we are and what we do

The National Institute of Dental and Craniofacial Research (NIDCR) is one of the National Institutes of Health (NIH), located in Bethesda, Md. NIH is part of the Federal government's Department of Health and Human Services.

With a budget of $380 million, the Institute supports grantees at universities, dental schools, and medical schools across the country and around the world. NIDCR also has more than 400 scientists and administrators in its own laboratories and clinics on the NIH campus.

Using the latest molecular and genetic tools, NIDCR scientists conduct research on the full spectrum of topics related to craniofacial, oral, and dental health and disease. Among the areas of study are: oral cancer, chronic pain conditions, infectious diseases, salivary gland function and dysfunction, the genetics of craniofacial development, biomimetics and tissue engineering, and the relationship between oral health and general well-being.

On the following pages you'll meet three people who talk about oral health research from their own unique perspectives:

- Dr. Lawrence Tabak, NIDCR's Director, gives an overview of oral health research and discusses the importance of recruiting young people into science careers.
- Dr. Sylvia Frazier-Bowers, a researcher-clinician-teacher, talks about her journey from college student to assistant professor at the University of North Carolina.
- Dr. Andrew Martinez, a professor at the University of Texas at San Antonio, discusses the combined D.D.S.-Ph.D. degree that some of his students have pursued and the expanded opportunities that come with it.

Join Us!

Progress in the oral health field depends on the availability of a talented, well prepared, and diverse workforce. To achieve this goal, NIDCR supports training and career development programs for everyone from high school students to independent scientists.

See the back inside cover for names and contact information of NIDCR training staff, or visit our Web site at: *www.nidcr.nih.gov* and go to "Funding for Research and Training."

NIDCR Profiles

Lawrence Tabak, D.D.S., Ph.D.

Director, National Institute of Dental and Craniofacial Research

Lawrence Tabak, D.D.S., Ph.D., is the director of the National Institute of Dental and Craniofacial Research. He leads a $380 million research enterprise that includes more than 400 scientists and administrators on the NIH campus and hundreds of grantees around the world. Before joining NIDCR in September 2000, he was the Director of the Center for Oral Biology, Aab Institute of Biomedical Sciences at the University of Rochester.

Dr. Tabak is dedicated to recruiting and developing new investigators. He directed three graduate research training programs while at Rochester and served as a primary adviser to numerous graduate students. Dr. Tabak recently spoke with *Keepsake* about oral health research, science as a career, and the Institute's recruitment efforts.

Is this a good time to get into oral health research?

Dr. Tabak: It is *the best* time to get involved in oral health research. With the completion of the human genome, innovative bioengineering approaches, and new ways of doing clinical research, we now have a tool set that allows us to explore problems that as short as five years ago would have been impossible to deal with. So there has never been a better time to be involved in oral health research.

What's an example of one of those problems you wouldn't have been able to look at five years ago?

Dr. Tabak: There are many examples. We are trying to understand why there is variation among people's responses to medications. Physicians and dentists have long known that some people respond well to a given medication and some don't. For the first time—now that we have a complete blueprint of the genetic code—we can begin to ask questions about what the variation is between and among individuals that account for the differences in the ability to handle the metabolites of different pharmaceuticals. In the future, we'll be able to tailor prescriptions to the person and not some arbitrary 150 kilogram human like we do now.

Another example is restoration—restoration of form and function, which is so important in dentistry. Even today, we really depend a great deal on artificial materials to repair teeth and soft tissues in the mouth damaged by disease or injury. But that's all about to change. Now we have tissue engineering approaches that allow us to combine the best knowledge of chemistry with a fundamental understanding of genetics and the use of so-called "stem cells." Within a decade, we should be able to 'bioengineer' a tooth that will not only look like a real tooth, but function like one because it's made from the same materials as a natural tooth. Tissue engineering will take us light years from where we are today in our ability to repair damage caused by dental caries—that is cavities—or gum diseases.

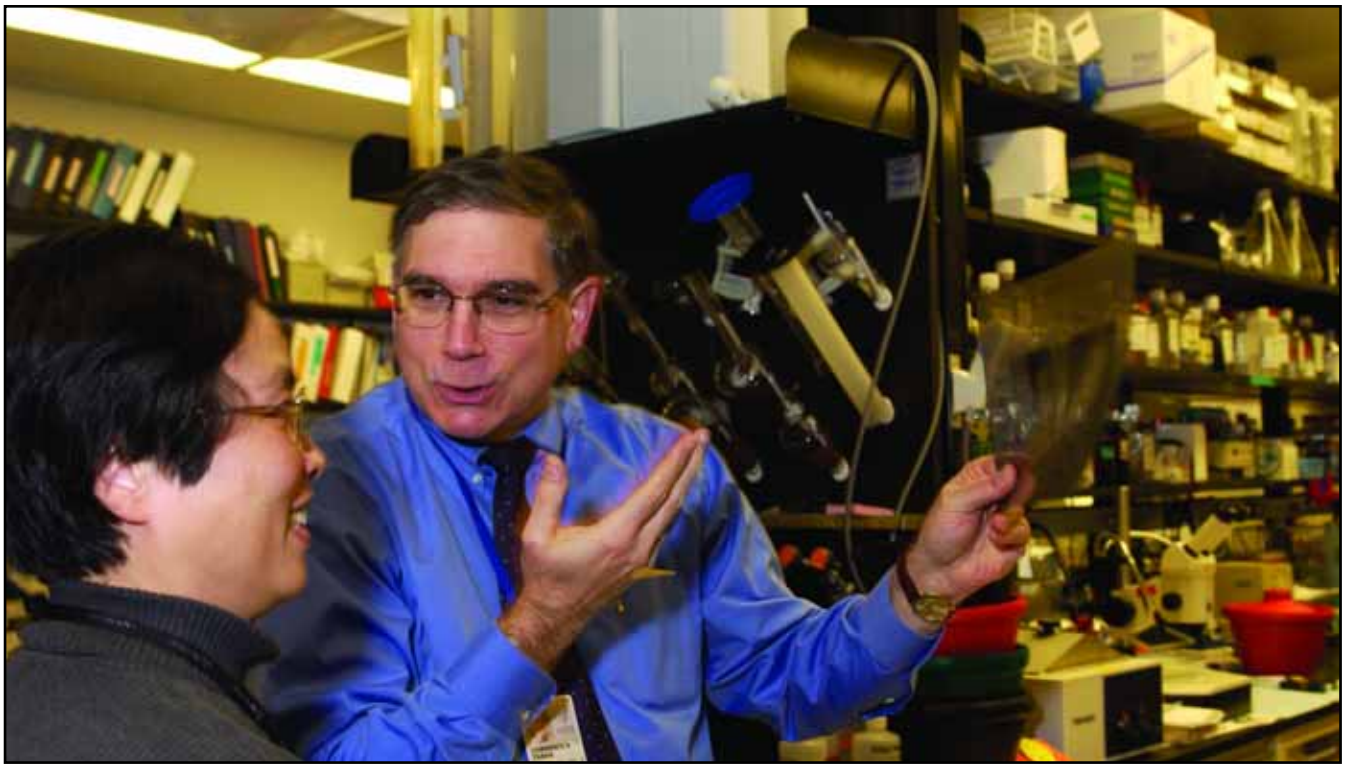
You've mentioned before that research in general could benefit from more interdisciplinary types of work and the fact that folks in oral health research have something to bring to this table. Can you expand on that a little bit?

Dr. Tabak: First it's important to recognize the difference between interdisciplinary research and multidisciplinary research. Both bring together people from more than one discipline to work together. But the goal of interdisciplinary research is to bring people together to form a new discipline, not just to work on a common problem then go back to their lives as biochemists, or imaging specialists, or whatever their primary field of interest. Neuroscience is an example of an interdisciplinary field.

Oral health researchers, by their nature, interact with colleagues from many disciplines: engineers, geneticists, physicians, and the list goes on. I think as science evolves and becomes more interdisciplinary, oral health researchers will play an increasingly large role. In part it's because we are used to that style of research; it's something we've been doing for years.

Another strength that oral health researchers bring to the table is a strong focus on prevention. Preventing disease is frankly a somewhat new idea in some disciplines in medicine. But in dentistry it is rule number one.

Oral health researchers also bring to the table a unique window into the human organism. The accessibility of the oral cav-



ity is real. Just ask the patient to open wide and you have entrée into many biological systems that an investigator would want to study without many of the accessibility problems. You can study bacterial communities in their natural habitat, you can study exocrine glands by studying saliva secretions, you can study how hard tissues—both bones and teeth—repair and remodel themselves. The list just goes on and on.

In the context of oral health researchers working with new tools and with other disciplines, can you tell us about the studies that may lead to using salivary glands for gene therapy?

Dr. Tabak: Most people understand that salivary glands are in the business of producing saliva, which contains water, proteins and other compounds. It turns out that by applying principles of fundamental cell biology, you can "trick" salivary glands into making other substances and secreting them into the bloodstream, rather than into saliva. This could offer a new approach to treating diseases caused by a single gene defect. For example, if you have Type I diabetes, you are unable to produce insulin and must rely on an insulin pump or daily insulin injections. You can conceive of a strategy where the salivary glands would be programmed to produce insulin and release it into the bloodstream when required. Here's how it would work: you transfer the gene for insulin into a patient's salivary glands. On the gene you've attached a chemical "tag" that instructs salivary gland cells to secrete the insulin into the bloodstream. The patient's salivary glands then manufacture insulin and pump it into the circulation, where it's needed.

Another example of who this approach might help is patients who lack an important protein—erythropoietin, or EPO—needed to maintain red blood cell counts. Low EPO levels result in kidney damage. Our scientists are preparing to launch the first phase of studies in humans to transfer the gene for EPO into salivary glands. We hope that some day it will be possible to program salivary glands to replace missing EPO.

Speaking of clinical studies, you've recently announced a new commitment to multi-center, Phase III clinical trials. Can you explain why these are so important and give us an example of some basic research that has led to these clinical opportunities?

Dr. Tabak: The reason we're emphasizing this type of trial is that they are the ones most likely to change the practice of dentistry or medicine. They involve a large number of people and are designed to compare a standard treatment to a new treatment, or in some cases, compare a particular type of treatment to no treatment at all.

A good example of basic research that led to clinical trials is the research in animals suggesting that periodontal, or gum, infections in pregnancy could adversely affect birth outcomes. The idea that infections in the mouth could somehow influence other parts of the body makes sense if you think about it, because the mouth is connected to the rest of the body.

Epidemiologic studies, in which scientists look at health in large populations of people, supported the findings from the animal studies. The population studies revealed relationships, or associations—which may or may not be causal— between periodontal disease in pregnant women and the prevalence of premature, low birth weight babies.

So we're now supporting two multi-site Phase III clinical trials asking the question: If you eliminate periodontal infections in pregnant women, do you lessen their likelihood of giving birth to a premature, low birth weight baby?

Babies born prematurely with low birth weights are at increased risk for serious health problems and require extraordinary medical care. This is very distressing to the parents and, not to mention, very costly. If we can prevent mothers from delivering prematurely by eliminating their periodontal disease, that would have a profound impact on public health. It's also the most satisfying type of science, when you can translate a research finding into a practical means of keeping people healthy. At the end of the day, that's what the NIH is all about, and what our Institute is all about.

You're obviously very interested in science and chose it as your career. So while you're running the NIDCR and working on various NIH-wide initiatives, how do you do science? Are you able to fit it in?

Dr. Tabak: Yes, I have a small lab and it's small because I have focused time there. I think it's very important for me to remain a practicing scientist. First of all, it keeps you humble. It reminds you that the reason it's called "research" is because things rarely work the way you expect them to the first time. I think that remaining a practicing scientist gives me perspective I might otherwise lose. And frankly, my curiosity is insatiable; I still define myself as a scientist. And even though I spend the overwhelming majority of my time in the administration of science these days, I still feel, act, and I hope look like a scientist.

Can you tell us, in lay language, what your lab is studying?

Dr. Tabak: There's a class of proteins in saliva that makes it sticky. So when you think about spit, the reason it is this slimy gooey stuff is because of a class of proteins called mucins. These are jello-like proteins that are decorated extensively with carbohydrate. And what our lab is studying is how that carbohydrate gets placed—how the sugar gets linked to the protein backbone of this mucin. And so, this structure of this enzyme that I was referring to earlier is actually the enzyme that puts the first sugar on the protein backbone. And so as a result, it's the first committed step to the synthesis of this type of molecule. So it went from the structure of the molecule to the function of the molecule and now the most recent phase is how these molecules are put together, how they are synthesized.

The next phase is how to mimic the molecule with inexpensive synthetic analogues—because there are many people who suffer from oral dryness. The substitutes and therapies we have are not particularly effective; and if we could have an inexpensive analogue that could be mass produced then maybe we could provide some relief to a million plus individuals. So that's the next phase of the work.

What advice would you give to a young person who is thinking about research, maybe thinking "it sounds kind of interesting" but not 100 percent sure they want to commit their life to it?

Dr. Tabak: Overwhelmingly, the advice would be "try it, you'll like it." Or you'll try it and you won't like it and that's okay too because you'll find out something very valuable about yourself.

The best way to learn about science and its practice is to do science. That overwhelmingly would be my advice. And there are just an extraordinary array of opportunities for young people to try science out—either during the summer or during the school year. NIH supports a wealth of opportunities here on campus and around the country at home institutions. Science is only one part theoretical and 99 parts practical. You have to do it in order to really appreciate it and understand if it's for you.

The NIDCR strategic plan highlights the importance of recruiting underrepresented minorities into research. How is NIDCR trying to do that?

Dr. Tabak: We're doing that the old-fashioned way, we're trying to do that one person at a time. What we do of course is try to make opportunities available to underrepresented minorities. But that's a programmatic thing. What we do on a personal level is try to identify young people who show an interest, who have a potential in research and we try to engage them in a dialogue and try to interact with them and frankly track them, stay in touch with them, and we don't take "no" for an answer.

Something that's most fun to me is seeing kids who I've tracked for 15-20 years now. In fact, recently a young lady who I knew as an undergraduate dental student just was tenured at a major university. That's the reward of what we do.

So the need to recruit is compelling, specifically in oral health research. For science to continue to be vital, for science to continue to flourish, it needs contributions from all talented persons, regardless of their background. Sadly, there are subsets of the population, for a variety of reasons, who have not typically been given those avenues or opportunities. That's on one level. On another level, one of the issues we face is profound disparities in oral health—dental and oral diseases disproportionately burden members of minority racial and ethnic groups. Research shows that the best way to redress disparities in health care is to include and empower members of those groups as part of the solution.

There is a particularly profound shortfall in the numbers of African Americans, especially males, who are going into dentistry as a profession. I have to say the numbers are disquieting. The number of African Americans in dental schools is no different today than it was in the 1970s. Whereas other racial and ethnic groups have made great progress, the number of African Americans has remained basically constant. That's just unacceptable.

I think part of it is that many of these folks go into medicine because they just don't know about the opportunities in dentistry. And so I would certainly urge members of all underrepresented groups to explore dentistry as a career option. And for those who have no interest in clinical work to explore the opportunities in oral health research, which is a subset of biomedical research.

We need every single person we can get and, in particular, members of underrepresented groups.

Is there anything else you want to say to the readers of *Keepsake*?

Dr. Tabak: It's a privilege to be a scientific researcher and it's a career path that one can be very, very proud of. It's one that allows you to have so much satisfaction. As a researcher-educator, you have an opportunity to really impact so many different kinds of people's lives—the patient whose disease you might be studying, to the student who is working together with you, and so, it's just this highly rewarding thing and sadly most people don't think about it as a career option. Unfortunately, the movies and television portray scientists/researchers as these nerdy kinds of people and that's just not necessarily true, although we have our fair share of nerds I guess. The readers might be surprised to know, for example, that in my free time, I officiate basketball games, which is not something that you would think a researcher does. Many of my colleagues also have very interesting avocations.

I just hope the readers will consider research as a career. And if they do, they should take a hard look at oral health research.

"There is a particularly profound shortfall in the numbers of African Americans, especially males, who are going into dentistry as a profession. That's just unacceptable."

NIDCR Profiles

Sylvia Frazier-Bowers, D.D.S., Ph.D.
Assistant Professor
Department of Orthodontics
University of North Carolina School of Dentistry

Sylvia Frazier-Bowers, D.D.S., Ph.D. is an assistant professor in the Department of Orthodontics, University of North Carolina School of Dentistry. She has a grant from the National Center for Research Resources and the National Institute of Dental and Craniofacial Research (NIDCR), both part of the Federal government's National Institutes of Health (NIH). Her research focuses on the genetic basis of tooth disorders.

Dr. Frazier-Bowers is an orthodontist who sees patients two days a week and also conducts research and teaches. A native of Chicago, she completed her undergraduate work at the University of Illinois at Champaign-Urbana, and received a D.D.S. at the University of Illinois at Chicago. She earned her Ph.D. at the University of North Carolina and then served as an assistant professor at the University of Texas Health Science Center at Houston in the Dental Branch before accepting her current position. Dr. Frazier-Bowers recently talked with *Keepsake* about her career.

When did you decide you wanted to become a dentist?
Dr. Frazier-Bowers: Originally it was subconscious; unlike many kids, I actually enjoyed going to the dentist. Then formally, when I was finishing college I thought about it as a career.

So you went to dental school right after doing your undergraduate work?
Dr. Frazier-Bowers: Actually, this is an interesting part of my story— I worked first. I worked at Helene Curtis (a hair care and personal products company). I decided to work initially in research and development and then make a formal decision about whether to pursue research or dentistry as a career. I was an electron microscopy technician. I did image analysis, particle analysis, scanning electron microscopy, light microscopy— analyzing hair. I was very hesitant to pursue dentistry. Apparently, dentistry was going through a phase in the early 90's where there was an excess of dentists, especially in large cities, like Chicago, where I'm from.

So when did you apply to dental school?
Dr. Frazier-Bowers: I applied while at Helene Curtis.

Did you assume, while you were in dental school, you were going to be a clinician or did you know you were going to

be on the research side of things?

Dr. Frazier-Bowers: I immediately had an interest in research, but didn't know much about it. Initially, I did make the assumption that I was going be a clinician and set up a practice in my Chicago neighborhood.

How did you find out about research opportunities while in dental school?

Dr. Frazier-Bowers: Someone sent a letter to everyone in the first-year class about research opportunities. There were two fellowships I applied for that I didn't get, and that was disappointing.

But as it turned out I did get to do summer research after my first year. That was in the Department of Pediatric Dentistry at the University of Illinois at Chicago right there in the dental school. I was looking at premature babies and whether or not having a palatal stabilizing device (it holds a nasal-gastric tube) reduced the chance of the tube accidentally coming out. Does the device act as a good anchor? We found that it did.

"That was the defining moment – when I got to NIDR (now NIDCR). I was absolutely enchanted by the environment, by the experience of seeing clinicians doing research."

From then on did you know for sure you wanted to take the research path?

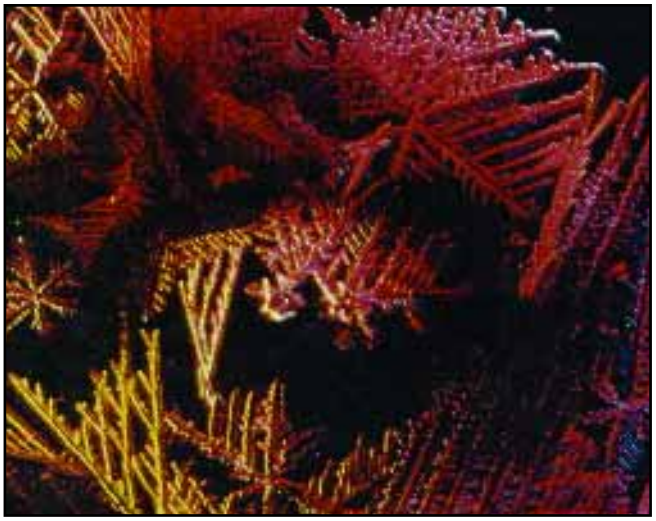
Dr. Frazier-Bowers: Let me tell you about the research path. I received a letter from the NIH and it was advertising the opportunity to do an NIDR (National Institute of Dental Research - now the National Institute of Dental and Craniofacial Research) summer research fellowship. The very same day I received the information I called NIDR and said, "I want to apply for this." Fortunately I got that fellowship and I told my mentor from the previous year about it, and she said, "you should go." I reminded her I had to take the boards that year (after you complete the first two years of dental school, you must take the national boards, part I). She said, "study for your boards while you're there."

I got a position in the NIDR Bone Research Branch, and I said I'd accept the position as long as I could study for the boards.

That was the defining moment – when I got to NIDR. I was absolutely enchanted by the environment, by the experience of seeing clinicians doing research. I remember one lecture, in particular, of an M.D. who was studying osteogenesis imperfecta (a disease in which bones can fracture easily and teeth are brittle). He talked about his research on the cellular and molecular levels while also providing information about patients. And I thought, "wow," he is able to make a whole picture of a problem versus attacking it from one perspective. That was it—I thought, "this is great – this is what I want to do!"

Then you took your boards?

Dr. Frazier-Bowers: Yes, I took them in July. That summer I also met Ms. Lorrayne Jackson (from NIDR). She started telling me about opportunities for pursuing a Ph.D., but that didn't interest me at the time. Later, I thought it might be interesting. I called her back and said tell me more about the DSA (Dentist Scientist Award—a former program that helped a dentist work toward a Ph.D.). When she first told me about it I thought "who said I want-



ed to get a Ph.D.?" But I did call her back and ask her to send me the information.

Before that, I was committed to a career in academia. I was thinking, "I like research but I don't need a Ph.D. to prove something." But eventually, I decided that a Ph.D. could only make me stronger. So I decided I was going to go ahead and pursue a Ph.D. through the DSA program. That fall I started calling schools— mind you I'm only a first semester, third-year dental student.

My enthusiasm persisted and by January I was visiting schools. I decided my area of interest was craniofacial development and I chose the University of North Carolina (UNC) to pursue a combined orthodontic residency and Ph.D. in genetics through the DSA program. For the Ph.D. portion of the program I ended up in a lab that studied fungal genetics, looking at the DNA of mushrooms. The reason I decided on this lab was because the head of the laboratory was an excellent teacher.

Would you call the head of that laboratory one of your teachers?

Dr. Frazier-Bowers: Definitely. I can truly say that every situation I've been in someone has been a mentor to me; not necessarily a primary mentor, but definitely a mentor. I try to derive positive influence from every situation.

Why do you think mentors, especially for underrepresented minorities, are so important?

Dr. Frazier-Bowers: One reason is that as an underrepresented minority you might not have the role models in your family. I was fortunate. The community (south side of Chicago) I grew up in was unique—there was a mixture of working class people as well as teachers, doctors, and dentists. On the other hand, because the neighborhood was in a big city, it was plagued with some of the stereotypical negatives of living in a city. I could theoretically have gone either way in life, so having a mentor, someone who can counter negatives, is very key.

Sometimes mentors are where you derive inspiration. Every now and then things can go awry and you can't see the positive. So you really need that mentor to inspire you.

Do you make it a point of mentoring folks who are just coming along in their careers?

Dr. Frazier-Bowers: Absolutely. For me that is an honor and a privilege. If someone says they want to work with me, I'm potentially more excited than they are.

Obviously, you think it's important that minorities be in research careers.

Dr. Frazier-Bowers: Yes. For one, when your community is impacted by certain problems, you should be able to play a role in solving/researching those problems or diseases. Sometimes having a person who is more vested, because it impacts their community, may make the experience more rewarding.

Another reason is that research is a rewarding career—many underrepresented minorities don't have that knowledge. It's important to expose them to that so they know it's an option.

What's your typical week like?

Dr. Frazier-Bowers: I see patients a half day a week, and I teach a few lectures and direct a course in addition to my laboratory research. I'm busy, but I wouldn't enjoy this work without that combination of different things to do.

Is that a satisfying combination—basic and clinical research?

Dr. Frazier-Bowers: To say that it's satisfying would be an understatement. I absolutely *require* that whatever I do in a research area impacts clinical practice.

My goal is to combine clinical practice and research in an academic setting. As a trained clinician-scientist I want to become an academician who uses molecular research tools to answer clinical questions—to translate basic, scientific data into clinical practice. Using my combination of skills is what makes me most inspired – having one area impact the other.

How has funding from NIDCR affected your career?

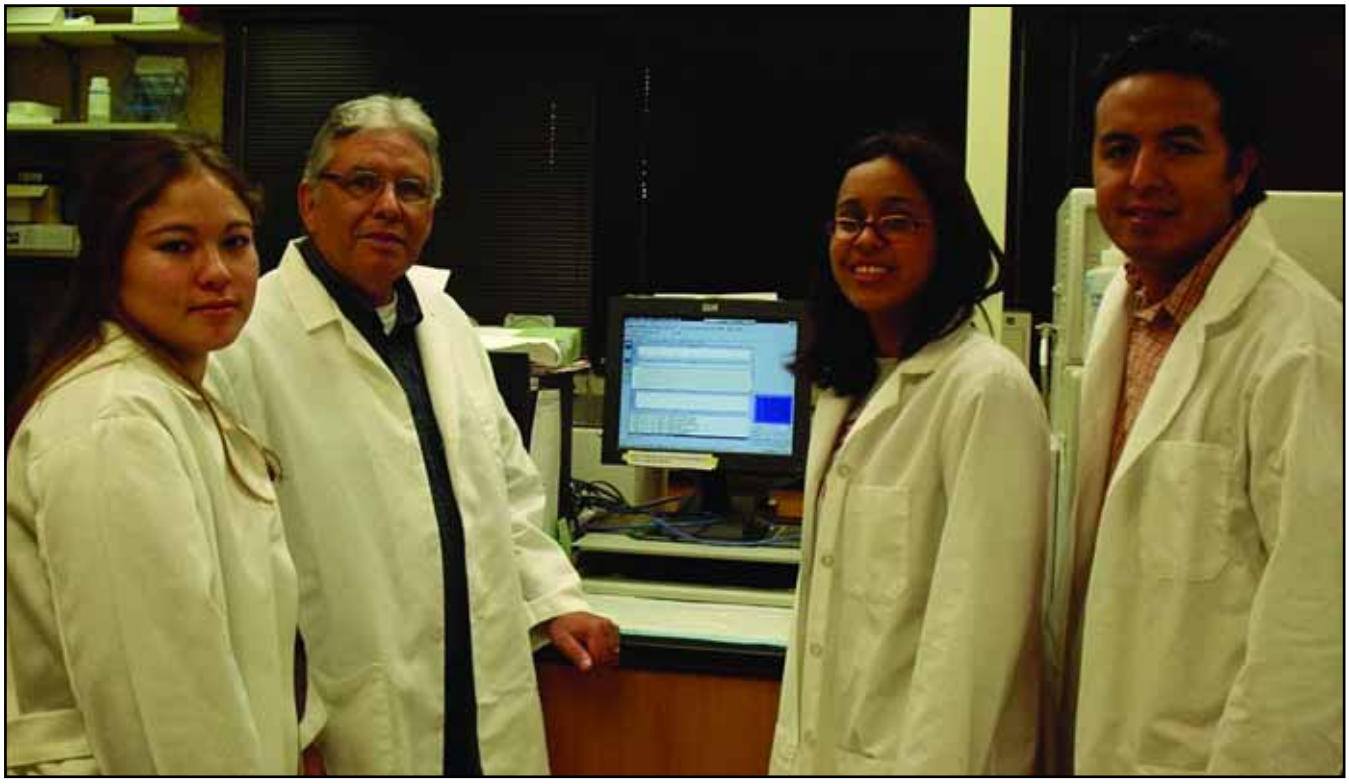
Dr. Frazier-Bowers: To say that the NIDCR has affected my career is definitely an understatement. The NIDCR has completely *created* my career. I've had funding from NIDCR at every step of the way. Someone said at a recent meeting I could be the poster child for the NIDCR. I wouldn't be here without those opportunities, I'm pretty certain of that.

What would you tell an undergraduate student who is thinking about science and research but hasn't really made the commitment?

Dr. Frazier-Bowers: I would tell them the same thing that I tell anyone—try to find your passion and have a vision. Also, be open to exploring. While you're an undergraduate, get different types of summer jobs. If you think your interest is science, don't go get a job at a restaurant, for example. The only way in life you're going to be successful is to be passionate about what you do and enjoy it. One of my favorite sayings is, "work like you don't need the money." And while that may be a bit idealistic, you are much more likely to find happiness by choosing the career that excites you instead of the one that pays the most. If you think you might like research, give it a try; I've found it to be a rewarding and exciting career.

NIDCR Profiles

Andrew Martinez, M.S., Ph.D.
Professor of Genetics
Department of Biology
University of Texas at San Antonio



Dr. Martinez, second from left, with students in his lab

Andrew Martinez, M.S., Ph.D. is a professor of genetics in the Department of Biology, University of Texas at San Antonio (UTSA). About five years ago, Dr. Martinez began a collaboration with the NIDCR that allowed his students to participate in summer research projects at the University of Texas Health Science Center at San Antonio (UTHSCSA) Dental School. The ten students who have taken advantage of this opportunity have gone on to pursue Ph.D. and D.D.S. degrees, and in three cases, a dual D.D.S.-Ph.D. degree.

Dr. Martinez recruited the students through the Minority Access to Research Careers (MARC) and Research Initiative for Scientific Enhancement (RISE) programs, which he directs at UTSA. MARC and RISE programs are offered at most minority schools. They are funded by the National Institute of General Medical Sciences, a sister institute of NIDCR at the National Institutes of Health.

In his own laboratory, Dr. Martinez and his colleagues study Alzheimer's disease in mice that are genetically engineered to manifest disease characteristics such as memory loss. He earned his Master's degree and Ph.D. in genetics at the University of Arizona.

Keepsake recently spoke with Dr. Martinez about his path to a research career, the collaboration with the UTHSCSA Dental School, and the MARC and RISE programs.

What brought you to research?

Dr. Martinez: My upbringing was very typical of most of the

students who come to UTSA. I was a first generation college student—neither one of my parents graduated from high school. I grew up in a very isolated part of northern New Mexico, so I didn't know about career options. The only role models in the community were school teachers. So I started out with the intention of becoming a high school teacher. But then I went to college and I started taking biology and chemistry courses and I did well. And then a professor at the college offered me a part-time job preparing for labs that he had to teach; preparing chemicals and so forth, and sometimes assisting him in teaching the lab. And I did very well and so this professor asked me, "have you considered going to graduate school?" I said, "no, what is graduate school?" So he explained it to me; he was my role model. He had gone to the University of Arizona and then he went to Berkeley. He recommended the University of Arizona and he wrote a letter of recommendation to people he knew there and that's how I ended up at that school.

It was very difficult for me. I married right out of high school, so while I was going through undergraduate school and graduate school I already had a family—a wife and two daughters. They were very, very supportive.

I had no idea that I was going to end up where I am.

Can you tell me a little bit about the collaboration between your university and the University of Texas Health Sciences Center at San Antonio Dental School?

Dr. Martinez: About five years ago, Ms. Lorrayne Jackson from the NIDCR contacted me about setting up a partnership between UTSA and Dr. Mary MacDougall's lab at UTHSC. NIDCR offered to co-fund our MARC program and co-fund students interested in spending their summer doing research in Dr. MacDougall's lab; this way, students would have the opportunity to explore oral health research. Dr. MacDougall is a long-time NIDCR grantee and has a very productive, interesting lab. Her work focuses on the molecular mechanisms of normal tooth development as well as abnormal tooth development associated with human genetic diseases; she's also an outstanding mentor. And, the dental school is in close proximity to our university. We were fortunate that everything fell into place.

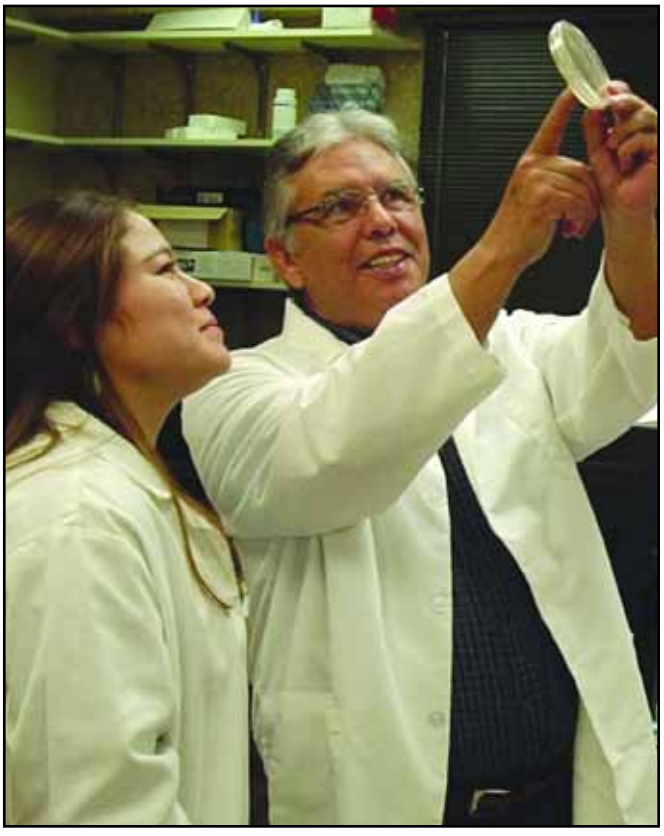
We selected students who were interested in exploring dental school and oral health research (during the summer) as well as the possibility of getting a dual degree: a D.D.S.-Ph.D.

It was a successful collaboration. Out of the 10 students who participated in the summer research program at UTHSC , three are pursuing a D.D.S.-Ph.D. at the dental school. The others are in dental school or pursuing Ph.D. degrees.

Were there any students who came into your MARC or RISE programs who hadn't thought about oral health research?

Dr. Martinez: Many of the students didn't have a background in oral health research; they hadn't been exposed to it. Over the past few years, because of the partnership and mentoring, more students have expressed interest in dental school as well as in pursuing the D.D.S.-Ph.D. degree.

Here's an example of one student: When she came here she didn't know much about career options. She was married and had two kids and wasn't planning on going beyond the bachelor's degree. We recruited her to the MARC program and we put her in a lab with a very good mentor – an endocrinologist. She worked in his lab for two years and did very well. One summer we placed her with Dr. MacDougall at the UTHSC.



This student was turned on by the work and decided she wanted to pursue a D.D.S.-Ph.D.

Can you explain a bit about the MARC and RISE programs?

Dr. Martinez: Both the MARC and RISE programs recruit students interested in research and give them an opportunity to explore research in the laboratories of faculty members at UTSA. It's research training in other words. There are different criteria for each program. [*Visit http://www.nigms.nih.gov/minority/* for information on the MARC and RISE programs.]

Are the MARC and RISE programs primarily for Hispanic students or for all underrepresented minorities?

Dr. Martinez: All underrepresented minorities. But since in San Antonio the "majority minority" is Hispanic we have a lot of Hispanics in our program; we have African Americans in the MARC and RISE programs, too. The selection criteria is based on disadvantaged status, either economic or educational. We have a long list of criteria that we look at – where they grew up, where they went to school, whether they are first generation college students. If there are Anglo students who meet these criteria, they can be accepted into the program too.

What advice do you give undergraduate students who say, "I'm thinking about a career in research but I haven't made up my mind"?

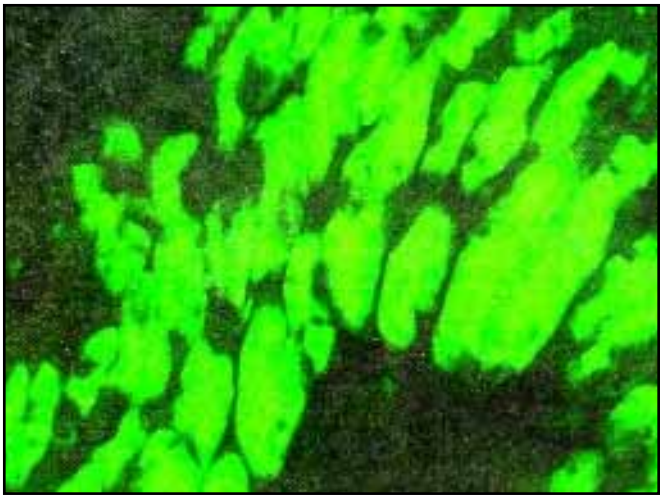
Dr. Martinez: Our program has a pipeline of information that we provide the students with. Of course, our faculty provides advice. We also ask students to take a course about different career options in biology. We cover the typical path that leads to medical school and dental school. We discuss other career options too -- a dual degree in biology and law, for example, and the Ph.D.-M.D. and Ph.D.-D.D.S. degrees.

And then we work with the students so they select the appropriate courses for getting a good education in biology. We try to advise them and work with them and then we meet with them during the semester to find out how they're doing and if they need help.

Do you feel you're giving back to the community by mentoring your students?

Dr. Martinez: Yes. I feel that I owe the community. I don't get any rewards except to see students do better than I have – go on to get dual degrees; go into careers that they never even considered before.

In Texas by 2020, it's estimated that Hispanics are going to be the majority population. Yet the Hispanic population is very undereducated and something needs to be done about that. I understand the problems that Hispanics and other minorities face. So I became involved in mentoring for those reasons.



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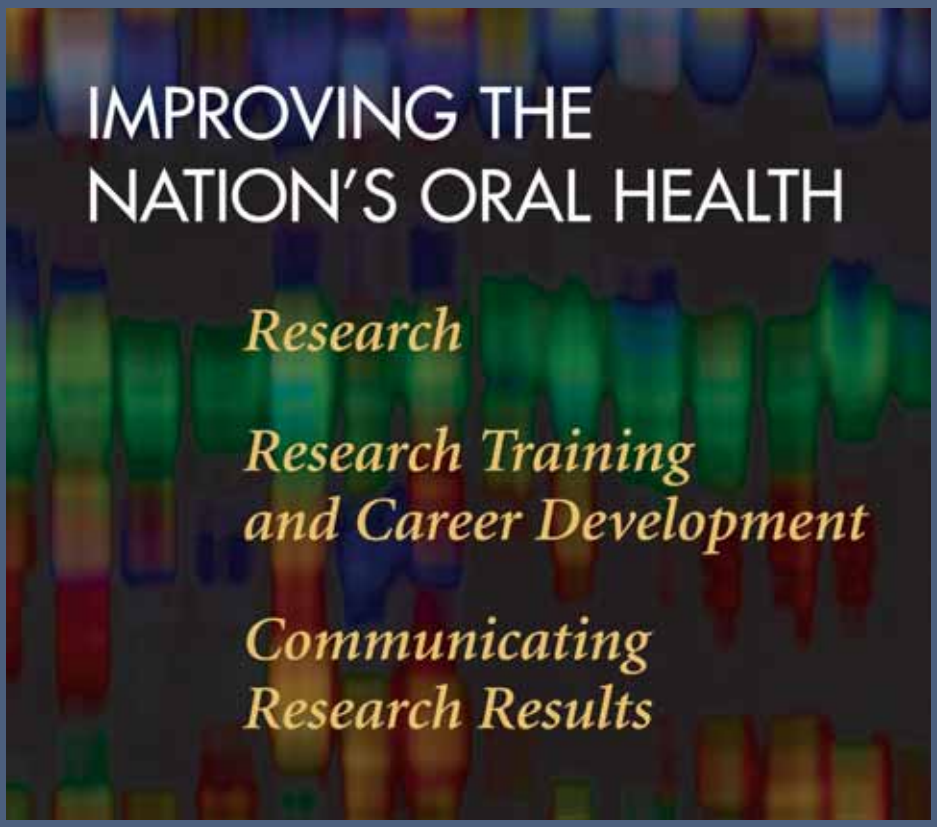

To find out whether there are MARC and RISE programs at your school, visit: http://www.nigms.nih.gov/minority/ and select "Training and Careers." Then scroll down to "Institutional Research Training Program Grant Lists" for a list of schools.

For training opportunities at NIDCR (on the NIH campus in Bethesda, Md.), contact: Dr. Albert Avila (301) 402-3319, nidcrdiredu@mail.nih.gov

For training opportunities sponsored by NIDCR (at locations around the country), contact: Dr. Kevin Hardwick, (301) 594-2765, kevin.hardwick@nih.gov or Ms. Lorrayne Jackson, (301) 594-2616, lorrayne.jackson@nih.gov

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From the Keepsake: A Guide for Minority Science Students