CDA JOURNAL, VOL 37, Nº5

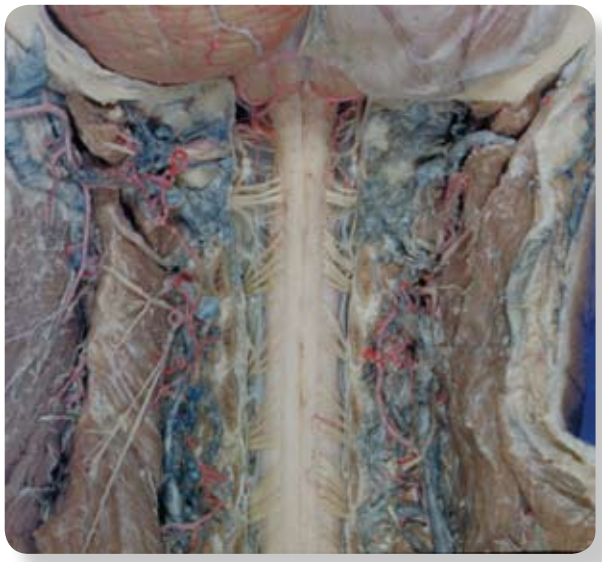


Photo: William Gruber

By removing the rear arches of the neck (cervical) vertebra and the fibrous covering (dura) over the spinal cord one sees the cervical spinal cord and its nerves. The blood vessels nourishing the cord and vertebral column and the origin of the cord from the brain are clearly shown.

Anatomical Image Library Created

W. PAUL BROWN, DDS

In the spring of 1998, Eric Herbranson, DDS, and I, both Bay Area endodontists, joined forces with the original intention of developing a library of very high resolution, digital anatomical models of real teeth to be used in research and teaching in dentistry. The project began within the Division of Anatomy at Stanford University.

At that time, a group of NASA computer scientists had formed the Stanford/NASA Biocomputational Centre and their task was to create surgical simulation programs for the NASA Mars trip. These simulations included programs for head and neck surgical planning. Our goals fit well into this program, and consequently NASA offered us their 3-D interactive

CONTINUES ON 309

Identafi 3000

Trimira, LLC, recently introduced the first of its kind device that aids dentists and doctors in detecting oral cancer. Identafi 3000 is a cancer-screening device intended to detect the early signs of oral cancers. The Identafi 3000 consists of a three-wavelength optical illumination and visualization system that is housed in a compact unit. The device is cordless and handheld, specifically designed for dentists, periodontists, oral surgeons, otolaryngologists, and primary care physicians. Providing the ability to identify biochemical and morphological changes in the cells of the mouth, throat, tongue, and tonsils, the Identafi 3000 is unlike any detection tool used by dental and health professionals alike. For more information go to trimira.net.

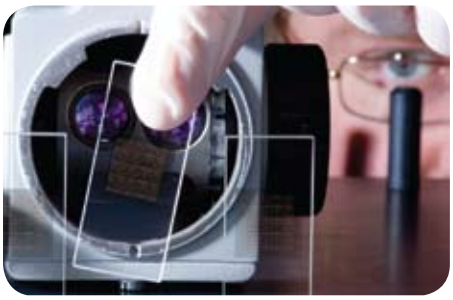
ADA/Kellogg Executive Management Program Offered

Applications are being accepted for the 2009 session of the ADA/Kellogg Executive Management Program, an executive-level series that ranges from learning about business strategy, marketing, finance, and organizational leadership to economics, accounting, quantitative methods, and information systems.

The registration deadline is May 31. The 17-day program, taught by Kellogg professors, will be held at Northwestern University's Chicago campus, near ADA headquarters, and consists of three sessions separated by seven-week intervals. The dates for the 2009 sessions are July 9-14, Sept. 10-15, and Nov. 6-10.

"The ADA/Kellogg Executive Management Program provides dentists with a curriculum that is both intellectually demanding and, at the same time, very stimulating," said John S. Findley, DDS, ADA president. "It expands their business and management expertise, and enhances their ability to manage more effectively in a dynamic environment."

For more information and application materials, go to ada.org/goto/kellogg or contact Connie Paslaski at paslaskic@ada.org or 312.440.3451.



Dental Treatment Advances Possible With Genetic Discovery

Researchers have identified Ctip2, a gene that controls the production of tooth enamel, thus bringing forth a new concept in preventing caries, restoration, and even the production of replacement teeth.

Ctip2 is a "transcription factor," already known to be multifunctional in the development of skin and the nervous system as well as immune response and now tooth development.

"It's not unusual for a gene to have multiple functions, but before this we didn't know what regulated the production of tooth enamel," said Chrissa Kioussi, an assistant professor in the College of Pharmacy at Oregon State University. "This is the first transcription factor ever found to control the formation and maturation of ameloblasts, which are the cells that secrete enamel."

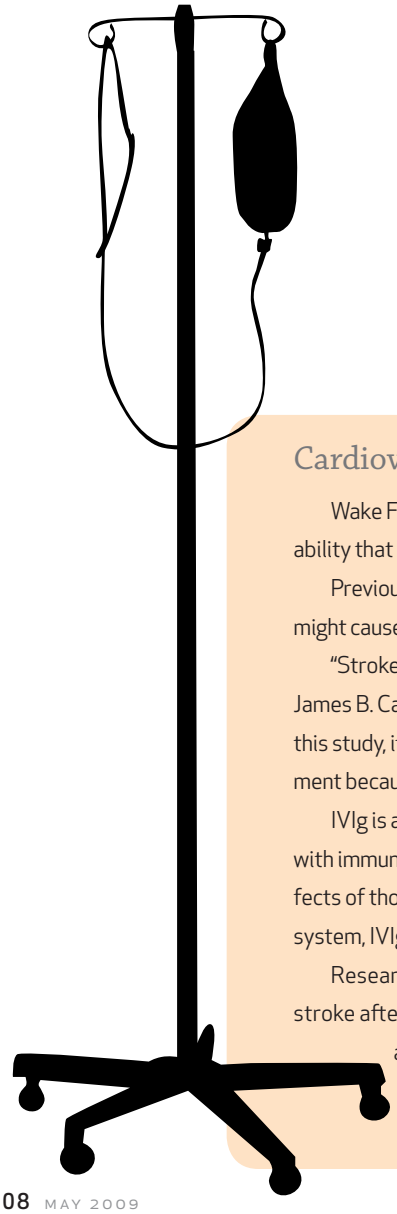
Using a laboratory mouse model, the gene was knocked out and its protein was missing. In cases like this, these mice lack basic biological systems and cannot live after birth but allow scientists to study what is present and what is not. These mice had undeveloped teeth ready to erupt, but lacked a proper enamel coating and never would have been functional.

"Enamel is one of the hardest coatings found in nature, it evolved to give carnivores the tough and long-lasting teeth they needed to survive," said Kioussi.

Kioussi said it may be possible to use tooth stem cells to stimulate the growth of new enamel. Some research groups already are having success growing the inner portions of teeth in laboratory animal experiments; but those teeth have no hard coatings — the scientists lacked the genetic material that makes enamel.

"A lot of work would still be needed to bring this to human applications, but it should work," Kioussi said. "It could be really cool, a whole new approach to dental health."

The findings were published in the *Proceedings of the National Academy of Science*.



Cardiovascular Risk Factors May Compromise Safety of IV Treatment

Wake Forest School of Medicine has identified the presence of cardiovascular risk factors as a sign of the probability that older, hospitalized patients taking intravenous immunoglobulin, IVIg, will suffer a heart attack or stroke.

Previous to this study, which was published in the *Journal of Neurology*, it was known that administering IVIg might cause heart attack or stroke; however, it was not known for certain when those serious side effects would occur.

"Stroke or heart attack has always been considered a fairly rare complication, but it's a catastrophic one," said James B. Caress, MD, an associate professor of neurology and the study's lead researcher, in a press release. Before this study, it was difficult for doctors to counsel patients about their risk for stroke or heart attack from IVIg treatment because previous reports could not identify which patients were at the highest risk, he said.

IVIg is a medicine made from human blood components and used to treat patients with multiple sclerosis and with immunodeficiences, for example. In individuals with autoimmune disease, IVIg can stem the detrimental effects of those antibodies. In people with advanced cancer, where the tumor or chemotherapy damages the immune system, IVIg boosts the immune system to fend off infections.

Researchers in the recent study reviewed the medical records of 19 patients who suffered a heart attack or stroke after having IVIg administered. The team also reviewed the records of 38 patients who were the same age as the 19 patients in the study but who also received IVIg treatment but did not have a heart attack or stroke. The patients, who had an average age of 71, received treatment between August 1998 and May 2004.

By injecting the arteries and veins with red and blue material, Bassett demonstrates their distribution in these dissected kidneys. The image provides a detailed view of the lymphatic drainage of the region.

Our long-term mission is to create the first "clickable" human, something akin to Google Earth for the human body.

LIBRARY, CONTINUED FROM 307

surgical simulation software platform to use for developing the library.

At this point, giving the group the name "eHuman," we were joined by Bruce Fogel, DDS, an endodontist, and Terry Kessler, DDS, a general dentist. After two years of researching, experimenting, and going through the painful process of learning how to write an NIH grant application, eHuman received its first grant from National Institutes of Dental and Craniofacial Research.

Since then, the scope of eHuman's educational research project has greatly expanded. It has since received 10 NIH grants for $4.7 million and has a staff of 22 people creating content for medical and dental education. The digital anatomical programs that have been developed are now used worldwide. In the United States, they are used by 80 percent of all dental schools and many medical schools. eHuman currently is developing a server-based haptic-enabled dental simulator to completely replace the typodonts and mannequins used in preclinical dental school skill laboratories.

Of enormous importance in the development of our long-term goals was the fortuitous discovery, in its anatomy lab, of shelves and shelves of dusty boxes. These boxes contained booklets of View-Master sets of discs of anatomical dissections called the Bassett Collection. Next door to our lab was the office of Emeritus Professor Robert Chase, MD, an anatomist and a former head and neck surgeon. Chase, an enthusiastic educator and the curator of this collection, introduced us to the spectacular contents and its colorful history.

The quality of the dissection and the quality of the images were simply astounding. Just as remarkable was the fact that this collection, although very well known by anatomists, was not widely used. Some of the images had been licensed for textbook use and a few schools use it with the View-Master in its original form.

The history of the collection is worthy of repetition. Beginning in 1948, Bassett, as associate professor of anatomy at Stanford, known for his meticulous dissections, invited William Gruber, the developer of the View-Master stereoscope, to photograph his work. For 17 years, Gruber traveled back and forth between his home in Washington state and Stanford where, using a two camera set-up, he would photograph the dissections in stereo.

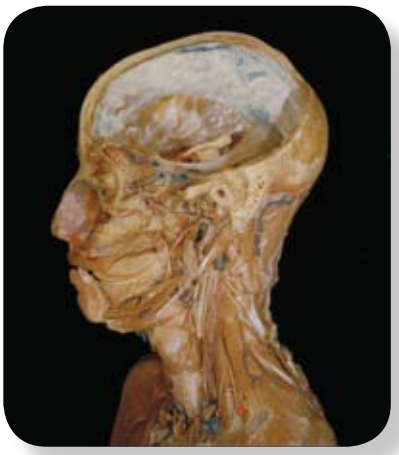
In 1962, Bassett published *A Stereoscopic Atlas of Human Anatomy*, with 1,547 color stereo views of dissections of every region of the human body. They were compiled on 221 View-Master reels tucked inside the back cover of the hardbound volumes. The original photographs, taken on Kodak's highest resolution film, are now archived in the Lane Library of Stanford's Medical School.

The atlas was an immediate success and the images became an important source for medical and dental students. Even the University of the Pacific had an Atlas until it was stolen. Despite its success and importance, the atlas eventually went out of production. Bassett died in 1966.

The raw images and annotations in their analog traditional form while spectacular are difficult to use, consequently five people from our research group have worked full time on the collection for more than a year and transformed it into an interactive, Web-based experience. The digitized images now have Bassett's annotations attached to the images with Chase's voice reading the annotation with correct pronunciations.

The new computerized format, with a quiz built on every page, is appropriate for all students studying anatomy on any level of complexity, including dental and medical students, nurses, physical therapists, and chiropractors.

While cadavers are still used by most anatomy departments, the eHuman Bassett program will immeasurably augment anatomy education. Think "Body Worlds," the traveling exhibit of preserved human bodies viewed by millions, but much larger, with more detail and geared toward providing an encyclopedic volume of information about the anatomy of the human body.



Photos: William Gruber

This classical dissection image shows structures in the neck, oral cavity, and cranium. When viewed in stereo, it gives anatomy students an understanding of anatomical structure relationships.

Our long-term mission is to create the first "clickable" human, something akin to Google Earth for the human body. The annotated Bassett Collection online, an important component of the mission, is available now for the global medical, health care, educational, and consumer communities. A demonstration of the Bassett programs can be seen on www.eHuman.com. An Internet connection and standard browser is all that is required to access this information. An iPhone version will be available through the Apple stores later this year.

Author / W. Paul Brown, DDS, is a consulting associate professor, Stanford University, Department of Surgery, Stanford, Calif.

CDA JOURNAL, VOL 37, Nº5

Research Grant Awarded to NYU College of Dentistry

New York University College of Dentistry has received a five-year $1.9 million NIH grant for its AIDS research team, which is studying HIV's ability to survive in the body and cause disease.

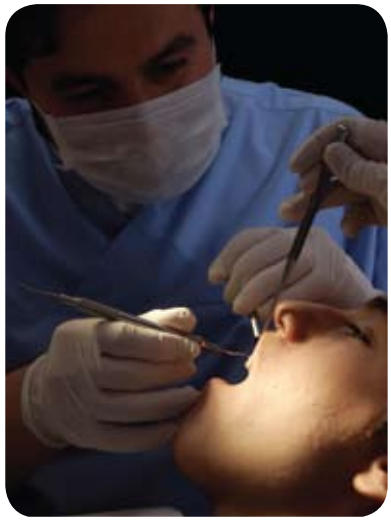
The grant was awarded by the National Institute of Allergy and Infectious Disease to the research team to continue its study of a new mode of HIV replication that involves cooperation between viruses.

In a process called integration, HIV inserts its DNA into the DNA of the cells it infects. This process is considered inefficient, likely to fail, and can result in an aborted virus replication cycle. As such, up to 99 percent of HIV DNA is found in an unintegrated form; and while the profusion of unintegrated DNA has long been known, its biological implications have not been easily evident.

David N. Levy, PhD, an assistant professor of Basic Science and Craniofacial Biology and research team leader, discovered the method in study he conducted previously with the help of a one-year pilot grant from the Center for AIDS Research at the NYU's School of Medicine.

Levy and his team, in a July 2008 article in *Retrovirology*, documented that unintegrated viruses can reproduce when assisted or "complemented" by viruses that successfully integrate with the DNA of infected cells. Levy is of the opinion that this newfound cooperation among HIV viruses aids in HIV's ability to dodge immune response and its persistence in the body.

"HIV rapidly mutates and evolves during infection, which prevents the immune system from successfully stopping virus replication," Levy said in the article, adding, "and we have shown that these cooperative interactions speed up the evolution of the virus by increasing the amount of genetic exchange between viruses through a process called recombination.



Dental Benefits Figure More Prominently in Benefit Packages

Dental benefits are now being ranked higher as an essential part of a benefit package by employers, according to the National Association of Dental Plans' *2008 Group Purchaser Behavior Study*.

An estimated 62 percent view dental coverage as essential to their benefits packages, a nine-point percentage jump from just four years ago. Employers with 250 to 999 employees reported the largest increase since 2005, with 55 to 71 percent.

"Clearly one reason for the dramatic increase in employers' views about the value of dental benefits is growing awareness of the connection between oral and overall health," said Evelyn F. Ireland, CAE, NADP executive director. "NADP's 2007 Consumer Survey and other published reports show that dental benefits have a positive impact on individuals' attitudes and behaviors regarding both their dental and overall health."

A nonprofit trade association, NADP represents dental PPOs and HMOs, dental indemnity products and discount dental plans.

Employers cite dental health on medical health as the most important reason for considering a change in dental carriers. Employers offering dental benefits should consider a variety of strategies to keep dental in their benefits portfolio. According to the NADP survey:

- 15 percent are likely to transition to voluntary dental benefits (employee-paid)
- 28 percent are likely to increase the premium paid by employees

This study presents the results of a survey of more than 1,900 employers in the United States last July regarding their attitudes and behaviors toward dental benefits. This recent report, which also offers insight into what drives employer loyalty, the features and benefits employers are looking for in a dental plan, the sales channels used by various-sized employer groups, builds on a similar study conducted four years ago of key findings and trends.

The NADP *2008 Group Purchaser Behavior Study* is available online in the NADP Mall with detailed data tables. For more information, contact Jerry Berggren, director of research and information, (972) 458-6998.

Higher New Bone Regeneration May Be Due to Composite

A factor in dental implant success is in the quality and volume of bone in the recipient and bone regeneration is a well-established solution to the problem of the scarce amount of bone. Recently, a study has found that a composite mix demonstrates complete bone regeneration of critical-size bone defects, according to a study in an issue of the *Journal of Oral Implantology*.

In the article, researchers demonstrated complete bone regeneration of critical-size bone defects using a composite alloplastic graft of beta-tricalcium phosphate (β-TCP) in a calcium sulfate (CS) matrix without a membrane barrier. Tricalcium phosphate, TCP, considered biocompatible and bioactive, is an alloplastic ceramic material showing potential as a bone graft substitute. However, while TCP cements have a slower resorption rate than bone, they are fairly dense. By adding a faster resorbing material, pores may be created, ensuring new bone tissue growing into the defect.

CS may fill that need. The study found that when CS mixed with other bone graft materials, osteogenesis was accelerated. Calcification is increased and the needed quantity of new bone is achieved in a shorter period of time.

To see the full text of the article, go to allenpress.com/pdf/orim35.1_10.1563-2-F1548-1336-35.1.pdf.

Oxford Handbook of Clinical Dentistry, Fourth Edition

The Oxford Handbook of Clinical Dentistry covers clinical dentistry in a concise format. This fourth edition extensively revises cavity classification, diagnosis, resin composites, endodontic, implants, and more. It offers the latest developments in pediatric dentistry and new material on caries risk assessment. New color and text design assist the reader with identifying oral medicine lesions, illustrating pathology and interpreting restorative techniques. The handbook also offers key elements of clinical practice and has been completely updated to include useful Web sites as well as Web-based learning. For more information go to www.researchandmarkets.com.

UPCOMING MEETINGS

2009	
May 14-17	*CDA Presents The Art and Science of Dentistry*, Anaheim, 800-CDA-SMILE (232-7645), cda.org.
Sept. 11-13	*CDA Presents The Art and Science of Dentistry*, San Francisco, 800-CDA-SMILE (232-7645), cda.org.
Sept. 30-Oct.-4	American Dental Association 150th Annual Session, Honolulu, Hawaii, ada.org.
Nov. 8-14	United States Dental Tennis Association fall meeting, Scottsdale, Ariz., dentaltennis.org.
2010	
April 11-17	United States Dental Tennis Association, Amelia Island Plantation, Fla., www.dentaltennis.org.
April 26-28	National Oral Health Conference, St. Louis, Mo., nationaloralhealthconference.com.
May 13-16	*CDA Presents the Art and Science of Dentistry*, Anaheim, 800-CDA-SMILE (232-7645), cda.org.
Sept. 24-26	*CDA Presents the Art and Science of Dentistry*, San Francisco, 800-CDA-SMILE (232-7645), cda.org.
Nov. 7-13	United States Dental Tennis Association, Grand Wailea, Hawaii, www.dentaltennis.org.

To have an event included on this list of nonprofit association continuing education meetings, please send the information to Upcoming Meetings, CDA Journal, 1201 K St., 16th Floor, Sacramento, CA 95814 or fax the information to 916-554-5962.

Clarification

The biography for Fred Fendler, DDS, that appeared on page 259 of the April 2009 issue of the *Journal of the California Dental Association*, should have been "Fred Fendler, DDS, is a full-time assistant professor, Department of Dental Practice, Arthur A. Dugoni School of Dentistry. Prior to his appointment, he maintained a general dentistry practice for 20 years in San Francisco."