3D Printing: The Model Technology

3D-printed models can help clinicians better conceptualize anatomic features to optimize patient care.
practice-based clinical trials: benefits and barriers
clinical trial participation can benefit both clinicians and patients

help for chronic pancreatitis
patients with this condition should be referred to a designated pancreatic care center

adding a health coach to your team
health coaches can raise patient satisfaction and clinical outcomes

3d printing: the model technology
3d-printed models can help clinicians better conceptualize anatomic features to optimize patient care

Evidence-based medicine in the digital age
Several sources are available to obtain information about evidence-based medicine, but each has its own pros and cons

Programs study rare ALS reversals
Approximately 0.9% of patients with amyotrophic lateral sclerosis could see a reversal of their symptoms

Using the fibula as hip treatment
Duke is the national leader in free vascularized fibular grafts

The benefits of patient-centered medical homes
This comprehensive model provides proactive, preventive, and chronic care management

breakthroughs in glioblastoma treatment
Increase survival
Several clinical trials of immunotherapies are enhancing patient outcomes at Duke

To learn more or to refer a patient, call 844-790-2013
News Briefs

Data on Extremely Premature Births Recently Published

Authors of a New England Journal of Medicine study (May 2015) found that the differences in the care of extremely premature newborns “appear to explain a large portion of the between-hospital variation in survival among such patients and a substantial but lesser portion of the variation in survival without neurodevelopmental impairment.”

Duke neonatologists Michael Cotten, MD, and Brian Smith, MD, stress that survival at 22 weeks without moderate-to-severe impairment applies to only 9% of infants who receive active treatment. Smith says that treatment with corticosteroids, now advised for a fetus at a minimum age of 24 weeks, may well benefit 23-week-old fetuses and should be instituted. Cotten adds that the study provides a basis for further debate and discussion among neonatologists as well as the general public. (Image above depicts a premature infant born at 24 weeks.)

Three-Drug Treatment Works Against Hepatitis C

A 12-week regimen of an investigational 3-drug hepatitis C combination cleared the virus in 93% of patients with liver cirrhosis who hadn’t previously been treated, according to a study in The Journal of the American Medical Association (May 2015).

Bristol-Myers Squibb funded the trial of the 3-drug combination of daclatasvir, asunaprevir, and beclabuvir. Duke Medicine researchers collaborated on design and analysis and wrote the findings. None of the 3 drugs are approved by the United States (US) Food and Drug Administration (FDA); daclatasvir is under review.

“The development of interferon-free treatments has been a tremendous step forward,” says Andrew Muir, MD, MHS, chief of the division of gastroenterology at Duke and lead author. “These drugs are highly effective and well tolerated by patients at all stages of liver disease.”

Enhanced Recovery Efforts Go National

Enhanced recovery after surgery (ERAS) is a multi-modal perioperative care pathway designed to improve recovery in patients undergoing surgery. Spearheaded by Duke surgeon Julie K. Marosky Thacker, MD, co-author of a 2014 study of ERAS, a national initiative is being sponsored by the American College of Surgeons to reduce hospital stays and readmissions with this approach. A 2014 study showed cost savings for about 85% of the ERAS patients, estimated at about $2,000 per patient.

The new recommended practices that became Enhanced Recovery Focus Elements at Duke include allowing patients to ingest clear liquids up to 2 hours before colorectal surgery. Postoperative tactics include an early diet and immediate mobilization to help patients return to baseline health as soon as possible. For information, visit www.enhancedrecovery.org.
Clinical trial participation can benefit both clinicians and patients

Although only about 3% of practicing physicians are involved in the roughly 74,000 registered clinical trials currently under way in the US, developments in health care over the last 10 years help make it easier for office-based clinicians to participate. “The Affordable Care Act is adding layers of infrastructure designed to collect and understand data,” which can set the stage for research activities, says Katherine Kahn, MD, distinguished chair in Health Care Delivery Measurement and Evaluation at the RAND Corporation. In addition, clinical research is increasingly being seen as a team-based activity in which both patients and clinicians should play a bigger role. Establishing new models for clinical research, including patient-centered outcomes research, comparative effectiveness research, and pragmatic (or practical) trials, depends on greater clinician participation.

Benefits of Clinician Involvement
Community-based physicians bring real-world perspective to clinical trials, resulting in more relevant study questions and a more patient-centered approach to research. For example, Kahn explains, although most studies are conducted in adults aged 18 to 65 years, many physicians are interested in drug effects in the elderly, who take more medications and process them differently than younger patients. Thus, involving practicing clinicians earlier in the research process could result in study questions that more closely reflect the clinical conundrums that physicians and patients face each day.

Community-based physicians may also be the key to reaching special patient populations and boosting minority participation in clinical trials. Although most medications work similarly in people of different backgrounds and ethnicities, some exceptions exist, says Fabian Sandoval, MD. A former clinical researcher at the National Institutes of Health, he is the founder of Emerson Clinical Research Institute, Inc., a company aimed at increasing minority participation in clinical trials by bringing clinical trial capabilities to community-based clinics and practices. As Sandoval points out, Hispanics compose 16% of the US population, yet only 1% of participants in clinical trials are Hispanic. Increasing diversity among clinical trial participants could lead to new insights into risk factors and more equitable and effective care for patients.
Clinical trial participation can also benefit clinicians and staff members. Nitin Damle, MD, president-elect of the American College of Physicians, has been conducting clinical trials in his Wakefield, RI, internal medicine practice since the 1990s. He says, research “brings me close to science and brings a new dimension to my practice.”

It has also helped him develop new skills and improve others, such as documentation and writing grants and journal articles. In addition, clinical trials can boost morale among staff members. “The staff is learning something new about medication and treatment,” Sandoval says, and that keeps coming to work interesting.

Overcoming Barriers
Office-based physicians face several barriers to clinical trial participation. One is the “catch 22” faced by physicians who have an interest in research, but have not previously participated in trials. “Sponsors want to work with experienced practices, but it’s hard to get the experience if you haven’t been part of a trial,” says Sandoval.

Running clinical trials within a practice also requires particular infrastructure. Staff must receive training on informed consent, working with Institutional Review Boards, and clinical trial ethics, for instance.

Additionally, clinicians and staff should be aware of possible ethical issues. Staff members must not put undue pressure on patients to participate in trials and must ensure that patients who refuse or withdraw are not treated differently. Most practices solve this by having separate staff members who oversee enrollment, informed consent, and other research-related processes.

Most practices must also set up another entity to keep the finances and other operations of the clinical trials separate. Sponsors usually pay clinicians a certain amount per study participant recruited at the practice—anything from a couple of hundred dollars to several thousand dollars, depending on the requirements of the trial. The compensation is usually enough to allow a practice to participate without losing income.

Sandoval points out that profit should not be a reason to participate in clinical trials. “If you’re doing it for the money, forget about it,” he says. A much better reason to participate is “for the patients,” Sandoval adds. Participating in clinical trials can give patients access to new treatment options or off-label uses of medications. It can also provide free medications and care for patients who are struggling with health care costs. Patients may receive laboratory tests, procedures, and examinations for which insurance companies would not necessarily pay. As a result, conditions may be discovered earlier, leading to more effective treatment.

Ways to Get Involved With Clinical Trials

1. Contact the Clinical and Translational Research Institute at the academic medical center closest to your practice

2. Register as an interested physician with pharmaceutical companies and other sponsors conducting research in your practice area or in populations similar to your practice population

3. Locate a practice-based research network in your area

4. Research companies like Emerson Clinical Research Institute, Inc. that work with practice-based physicians to recruit study participants

5. Network with researchers in your field at conferences or medical society meetings
By the time patients with chronic pancreatitis are seen by a specialist for relief, the diagnosis is usually known. The common clinical presentation among these patients is intense mid-abdominal pain that radiates to the back and is felt throughout the entire abdomen. Although the diagnosis is infrequent, chronic pancreatitis most often occurs in patients who have a history of alcohol overuse, have gallstones, take certain medications, or have a genetic predisposition.

Diagnosis and Initial Treatment

Common indications for referral include pancreatic pain, early satiety, or relapsing pancreatitis, especially in patients with an inflammatory mass in the head or tail of the pancreas, pseudocysts, or an obstructed pancreatic duct.

Imaging studies are often used to identify the underlying problem. "We can see whether the pancreatic duct is dilated or obstructed and see associated atrophy or calcifications. [This] tells us how well the gland is functioning and whether there is a particular area of the pancreas we can focus on," says Alex Perez, MD, chief of pancreatic surgery at Duke.

Gastroenterologists can temporarily relieve an obstruction with a stent. The goal is to drain the pancreas so that secreted enzymes and fluid can move into the intestines. If stent placement improves symptoms or pain, then there is a good chance that diverting or decompressing the duct in a more permanent way would be successful.

Referring a Patient

Duke surgeons are pioneers in minimally invasive pancreatic and foregut surgery. Minimally invasive surgery results in an overall enhanced recovery with fewer wound-related complications, less postoperative pain, and shorter hospital stays.

If you have patients with chronic pancreatitis, it is best to refer them to a designated pancreatic care center, Perez says. These centers perform the procedures for this condition regularly and in higher volumes, which results in improved outcomes. The team approach incorporates all of the needed specialties: abdominal radiologists, gastroenterologists who perform endoscopic retrograde cholangiopancreatography and other procedures, and versatile pancreatic surgeons. Depending on the underlying problem, different sets of team members work on each case. Duke also offers minimally invasive procedures for pancreatic cysts and cancers.

To refer, call 844-790-2013. (Image above shows chronic pancreatitis.)
As any athlete will tell you, a good coach makes all the difference. They inspire confidence, impart knowledge, and motivate their players. The same is true in health care: private practices and medical groups that have added a health coach to their team have reported higher patient satisfaction and improved clinical outcomes.

Health coaches, who are often RNs, social workers, or medical assistants, are trained to pick up where the 15-minute office visit leaves off, helping patients become active participants in their own care. They provide patient education, teach disease-management skills, and answer questions about prescribed therapies.

"A coach is able to go back and review with patients what was important from their visit and expand upon a concept that their doctor maybe couldn’t spend the time doing," says Mott Blair, MD, a family physician in Wallace, NC, who hired a health coach at his 3-provider practice 2 years ago. They may also help patients navigate the health care system, offer emotional support, function as a cultural bridge, and connect patients with community resources, all while maintaining close communication with the patient’s physician.

Health coaching, also called wellness coaching, is particularly effective in treating chronic illness, Blair adds, noting that his practice’s health coach is specifically trained to help manage their large population of patients with diabetes. "She can... spend an hour just sitting with patients and helping them manage their illness," he says, adding that she also flags patients who have been discharged from the hospital to ensure that they follow up with an appointment and identifies patients who are due for blood tests, mammograms, and preventive check-ups.

Most health insurers do not directly reimburse for services provided by a health coach. But Trissa Torres, MD, a preventive medicine physician and senior vice president of the Institute for Healthcare Improvement, says that private practices can defray the expense in several ways. For example, practices that obtain certification as a patient-centered medical home (PCMH; see related article on page 13) often secure a bump in reimbursement from third-party payers. Some insurance contracts also provide additional reimbursement—or shared savings—in certain cases. “It’s not a direct fee-for-service reimbursement, but it can provide additional resources to help pay for a coach,” explains Torres.

In the fight to contain rising health care costs and improve patient outcomes, health coaches are likely to become an integral part of the health care team.
3D Printing: The Model Technology

3D-printed hearts of different complex congenital heart defects. The two rightmost models represent the rare criss-cross heart as the blood pool (white) and myocardium (red).

3D-printed models can help clinicians better conceptualize anatomic features to optimize patient care

Duke is a leader in the Southeast in the use of 3-dimensional (3D) printing for medical purposes. Doctors at Duke study, practice on, and even implant printed structures to help patients with various conditions.

“Pediatric cardiology illustrates how useful the technology can be,” says Piers Barker, MD, a Duke pediatric cardiologist. “With 3D-printed models, physicians can overcome the differences that occur when the echo specialists work from 3D images and the surgeons work on the actual heart. If we both study the same 3D model, we can have a meaningful discussion and plan accordingly.”

Robert “Jake” Jaquiss, MD, chief of pediatric cardiothoracic surgery, is excited about the possibilities. “Although personalized medicine is often discussed in terms of tuning a drug to a unique metabolism, with 3D printing, it will be possible to tune a physical solution to a physical problem, based on the patient’s own anatomic features,” Jaquiss says.

In one unique case, Barker is working with several 3D-printed models of a pediatric patient’s heart to better prepare for that patient’s corrective surgery. The infant has a rare “criss-cross” heart, an abnormality that Barker has seen only 3 times in 17 years.

In a criss-cross heart, the right atrium that collects deoxygenated blood connects across the heart to the left ventricle, and the left atrium that collects oxygenated blood crosses to the right ventricle. Although all 4 chambers of the heart are in their normal positions, the congenital rotational abnormality carries risks, such as recirculating deoxygenated blood through the body.

Heart models made over time are helping Barker and surgeons effectively evaluate different scenarios for the infant’s surgical repair.

One model, produced in white resin, represents the complete pool of blood within the heart. Another model, a red structure made of a thin pliable
The 3D-Printing Process

Tawfiq Khoury, MD, a Duke resident in otolaryngology–head and neck surgery, is a long-time user of 3D-printing technology. He and others are working to centralize Duke’s 3D-printing activities into a dedicated laboratory. Khoury stresses that a simple 3D model is actually complex to produce; in fact, several modeling technologies must be considered for each project. Duke currently has access to several types of printers, including fused deposition modeling (FDM) and stereolithography (STL) printers.

Many factors must be taken into account when making a biologic model. For instance, setting the rate at which the material is extruded for FDM and using a particular technology to harden layers of resin for STL and digital-light-processing printers can drastically change the quality of the model. Identifying the material or alloy that would be preferable for the product and selecting the right type of 3D printer to meet project needs are also essential considerations.

To date, Duke experts have tackled 3D projects for specialties including cardiology, cardiovascular surgery, otolaryngology, craniofacial surgery, orthopaedics, neurology, neurosurgery, and radiology.

plastic, represents the surface of the heart and vessels, with its intricate chambers. The red-shell model has another advantage: its malleability means that it can be physically cut and stitched much as a surgeon would stitch an actual organ.

“The technology can help us understand the patient’s anatomy in the best way possible,” Barker says. “If we didn’t have this information, we would be limiting our ability to provide the best patient care.”

Criss-cross heart is rare enough that “you have to approach each case individually,” Barker says (see photograph below). “These are the first 3D-printed models for criss-cross heart, to the best of our knowledge.”

The risk of complications is higher when only images are used to prepare for surgery. If the repair creates too large of a hole between chambers, heart failure could ensue. In addition, blood flow could be blocked with other repairs. The models are indispensable for imparting knowledge about pediatric cardiac anatomy, Barker says.

Jaquiss notes that even the best anatomic images are seen in 2 dimensions, and it is difficult for experts to conceptualize the actual characteristics.

“3D models provide an unprecedented opportunity to get our hands on reality,” he says. Years of study and the best 2-dimensional technology cannot compare with the 3D models that provide information in a form that doctors can hold in their hands.

Says Barker, “It is the most cutting-edge personalized medicine we can offer our patients.” To refer a patient, call 844-790-2013.

Close-up of myocardial model demonstrating a small membranous ventricular septal defect and a fenestrated secundum atrial septal defect, as viewed from the right atrium and right ventricle.
The tools and approaches used to practice evidence-based medicine (EBM) have evolved significantly since the concept first emerged in the early 1990s, but the core objective remains the same: rather than basing clinical decisions on a mix of the prevailing “expert” opinion, whichever journal or textbook is handy, and anecdotal information, clinicians should instead rely on the best available external clinical evidence produced by systematic research.

Much of that systematic research now exists at our fingertips in ways it did not 20 years ago. But those interested in adding point-of-care EBM to their practices still face challenges. “There’s no single catchall database where you can just type in a question, and out spits an answer,” notes Daniella Zipkin, MD, associate professor of medicine at Duke, who has studied and actively implemented EBM. “They all have relative pros and cons.”

For more generalized searches or questions on background knowledge, UpToDate® and DynaMed are standouts. “Where UpToDate falls short a little is it’s not truly a systematic synthesis of the data. It relies on the chapter author’s expertise a little too much,” she says.

For specific questions about emerging areas of care, Zipkin recommends ACP Journal Club summaries (created by the American College of Physicians) and BMJ Clinical Evidence (created by the British Medical Journal and McMaster University).

The above services are all fee based. Among free resources, the US Preventive Services Task Force offers the latest EBM data on screening and prevention, and the Agency for Health Care Research and Quality provides a clearinghouse for the latest clinical guidelines. However, it should be noted that not all guidelines are EBM vetted.

Moving forward, Zipkin hopes to see EBM incorporated into electronic health care records: “In a perfect world, we would like EBM recommendations to automatically pop up in the medical record as the doctor is [seeing] the patient in real time.”

David Sackett, MD, is known as the “father” of EBM. He was born on Nov. 17, 1934, and died on May 13, 2015. Photo courtesy of Eric Bosch.
Few people with amyotrophic lateral sclerosis (ALS) meet the criteria for a measurable reversal of ALS symptoms—fewer than 1%, in fact. Despite this low incidence of measurable reversal, Richard Bedlack, MD, PhD, who directs the Duke ALS Clinic, is investigating possible factors related to these improvements in both a retrospective study and a new clinical trial in the hopes that more patients might one day experience measurable reversal.

“ALS reversal is rare, but we are going to study it,” Bedlack says. “This reversal is analogous to human immunodeficiency virus (HIV) elite controllers, a group that represents fewer than 1% of HIV patients.”

Using the PRO-ACT database (Pooled Resource Open-Access ALS Clinical Trials), researchers will try to assemble the records of all of the people in the world who have experienced a documented reversal to learn what they may have in common. Functional improvement is defined by the STAR (Study of ALS Reversals) group as an improvement of at least 4 points in the ALSFRS-R (ALS Functional Rating Scale-Revised) that lasts at least 12 months.

One interesting hypothesis is that antibodies for the disease myasthenia gravis may be involved. Of the 15 cases of reversal that Bedlack knows about, 3 patients have also had diagnoses of myasthenia gravis, an autoimmune disease in which antibodies are directed against muscle.

The researchers aim to obtain blood from all available patients and examine antibody panels. They also plan to perform exome sequencing to learn about any shared genetic polymorphisms.

The second element of the reversal study effort is the ROAR trial series (Replication of ALS Reversal), which will examine ideas that come from the experiences of patients with ALS who noticed improvement in their symptoms while trying various supplements or natural compounds. The first compound to be tested will be lunasin, a 43-chain amino acid peptide found in soybeans. Anecdotal reports have suggested that some patients with ALS who have taken lunasin have seen improvements in functionality.

ROAR will test whether lunasin confers a protective effect in patients with ALS and analyze the clinical profiles of these individuals to possibly find common links. ALS patients with various health statuses will be considered for enrollment.

For more information, visit www.dukealsclinic.com/research.
Losing the integrity of the femoral head due to osteonecrosis presents a problem for younger patients who may be too young for a hip replacement. To address this challenge, Duke orthopaedist James R. Urbaniak, MD, pioneered a successful treatment known as the free vascularized fibular graft. Duke is the national leader in this operation and performs about 75 procedures annually.

“The procedure is used to treat avascular necrosis of the femoral head in the hip, most often for patients who are too young and active to undergo a total hip replacement,” says Marc Richard, MD, an orthopaedic surgeon who specializes in microvascular surgery. “The condition eventually leads to arthritic changes, and this is a biologic procedure to help heal the lesion and prevent arthritis. The hope is to prevent or delay the need for a hip replacement.”

The majority of patients who need the procedure have idiopathic causes, but known culprits include corticosteroids, alcohol abuse, and trauma. Most patients complain of hip and groin pain because intra-articular pathology is often felt in the groin. Candidates are generally younger than 35 years.

“Necrotic bone hurts,” Richard says. “Inflammation and pressure as the cells are dying create pain, especially during activity.”

An x-ray is the first step in learning about the condition of the femoral head. MRI can confirm the extent of the damage. Patients who still have a spherical femoral head generally do better with this surgery than those with more-advanced cases.

The surgery is performed by 2 microsurgeons; at Duke, these surgeons are Marc Richard, MD, and David Ruch, MD, both of whom trained as hand surgeons and microvascular surgeons. While one surgeon harvests a portion of the mid-fibula and its vasculature, the other drills into the femoral head to prepare an opening in which to insert the fibula and connect the peroneal vessels to the lateral femoral circumflex blood vessels. As long as the proximal and distal attachments of the fibula to the tibia remain intact, the altered tibia can support the patient’s body weight.

The operation is done on one side at a time to ensure that the other side remains strong. Full recovery for athletic performance may take up to 1 year. Duke has records for 4,000 patients who’ve had the procedure; graft survivorship studies have shown that 75% of patients with pre-collapse lesions kept their native hip for at least 10 years.

To refer, call 844-790-2013. (X-ray above shows the left hip of bilateral free vascularized fibular grafts.)

Using the Fibula as Hip Treatment
The Benefits of Patient-Centered Medical Homes

By Meredith Lidard Kleeman

The PCMH concept has been steadily gaining attention for years. Focused on enhancing patient outcomes by transforming the delivery of care, this unique model is touted as a promising solution to improving health care in the US.

Duke Medicine was an early adopter of the PCMH model nearly 25 years ago, led by efforts from Lloyd Michener, MD, professor and chair of the Department of Community and Family Medicine. Michener first began exploring the concept as part of a statewide effort to organize care for Medicaid recipients. The model was being used by pediatric practices to coordinate care for children with special needs. Michener and others in North Carolina recognized that the PCMH model could be adapted to provide comprehensive, coordinated care in primary care practices and persuaded doctors at Duke and across the state to participate.

The PCMH model is now a standard of care that’s part of primary care physician training. In the medical home model, patients have access to a personal physician who leads a care team that provides proactive, preventive, and chronic care management. The physician is responsible for the patient’s coordination of care across all health systems and is committed to providing high-quality care using EBM. “It’s a coordinated system of care instead of a string of episodic visits,” Michener says. “It’s a better way to practice.”

Nearly every medical need can be addressed through the PCMH model. Specialists can adapt the model to treat patients with chronic conditions, and primary care physicians can offer behavioral and mental health services. “The inclusion of behavioral health...is one of the key elements of success in a coordinated system of care,” Michener notes.

The medical home concept can also increase physicians’ professional satisfaction—and their practice’s bottom line. As the US health care system moves away from a volume-based system to a value-based one, many payers are offering incentives to encourage physicians to participate in a PCMH.

Wanda Filer, MD, president-elect of the American Academy of Family Physicians, notes that many physicians in PCMHs say that they feel better equipped to address their patients’ needs, “which gives them a lot of professional satisfaction.”
Breakthroughs in treating glioblastomas have led to extended survival times and have even raised the prospect that a patient’s own immune system could be switched “on” to eradicate a tumor.

Researchers at Duke’s Preston Robert Tisch Brain Tumor Center are running clinical trials to investigate several approaches using immunotherapy, which is based on the concept that the body itself can respond if given a way to circumvent the defense mechanism that makes cancer so dangerous—its ability to hide from the body’s immune system.

One trial, based on infusing the patient’s tumor with a modified form of the polio virus, has been so inspiring that it was featured on CBS’ “60 Minutes” on March 29, 2015. Matthias Gromeier, MD, an associate professor of molecular genetics and microbiology at Duke, was among the researchers who discovered that virtually all solid neoplasms, including glioblastomas, have receptors for polio virus.

He genetically engineered the polio virus so that it can invade glioblastoma cells but lacks the ability to replicate using normal central nervous system cells.

Duke researchers are testing the engineered virus in a phase 1 clinical trial involving glioblastoma patients with extremely poor prognoses. The patients must have a single tumor recur after undergoing the current standard of care: surgery followed by radiation and chemotherapy with temozolomide (Temodar) and often other therapies. For enrolled patients, surgeons place a catheter in the brain to infuse the polio virus into the tumor.

In some cases, the results have been remarkable—tumors have disappeared completely.

Of the 23 patients in the trial, 11 have died, with most deaths occurring early in the trial when larger doses of the virus were used. Annick Desjardins, MD, associate professor of neurology,
says that smaller doses have proven to be more
effective because they induce less inflammation,
require less of the side effect–laden steroid
dexamethasone to control swelling, and allow
the body’s immune system to respond.

A smaller dose is enough because the viral
infection is a sideshow—the main event is the
infection activating the patient’s
immune system and alerting it to
the danger of the tumor. “We are
getting a limited amount of
virus infection in the tumor that
then generates an immunologic
response against the tumor. So we
have a form of immunotherapy
where we simply direct the
patient’s own immune system
to attack and target the infected
cancer,” Gromeier says.

Another approach being tested is an enhance-
ment of a therapy based on the observation
that 90% of glioblastomas harbor a strain of
cytomegalovirus (CMV) that is not present in the
surrounding brain tissue. The original therapy
uses dendritic cells that have been engineered to
be loaded with CMV antigens because dendritic
cells “train” the immune system’s T cells to
respond to specific pathogens. “The T cells sort
of learn that [the CMV antigens in the tumor are]
something they should attack,” explains John
Sampson, MD, PhD, chief of neurosurgery. “Then
those T cells get the immune system revved up,
and they attack the tumors directly.”

Despite this promising theory, the therapy has
had limited success, so researchers looked for
a way to enhance it. Sampson’s team enrolled
12 patients with glioblastoma and randomly
assigned one-half to receive a tetanus/diphtheria
booster the day before they received the dendritic
cell vaccine. The group that received the booster
showed a significant increase in survival time:
one-half lived almost 5 years, which is much
better than the expected 15 months.

Sampson posits that the tetanus/diphtheria
shot primes the dendritic injection site in a way
that prompts a greater migration of the dendritic
and T cells to the lymph nodes, where they find
their way to attack the tumor. The results of the
study were published in Nature
(March 19).

These and other trials at the
Preston Robert Tisch Brain Tumor
Center make it an exciting time in
glioblastoma treatment, according
to Desjardins: “We are making a
lot of progress, and our patients
are surviving longer...with a better
quality of life. In the past few
years, we have completely changed how we treat
these patients.”

To refer a patient, call 844-790-2013. (Image on
previous page shows glioblastoma in the brain.)
How would you manage a patient with potentially malignant thyroid nodules? What do recent guidelines recommend regarding the management of multiple myeloma?

Explore these questions—and earn free CME credits—on ClinicalPracticeToday.com.

**Endocrinology**
Current Best Practices in the Management of Thyroid Nodules and Cancer

**Faculty:** Sanziana Roman, MD, FACS

Review proper evaluation and diagnostic strategies for patients presenting with potentially malignant thyroid nodules in this online CME publication. Recommended approaches to treatment, post-surgical management, and follow-up care of patients with thyroid cancer are also discussed.

This CME activity is free of charge to participants.

**Oncology**
Advances in the Treatment of Multiple Myeloma Through Personalized Care

**Faculty:** Cristina Gasparetto, MD

Read this CME-certified online publication to explore strategies for the optimal management of patients with multiple myeloma, including incorporating patient- and disease-related factors into treatment selection, the role of the multidisciplinary care team, and recent clinical evidence and guideline recommendations.

This CME activity is free of charge to participants.

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