WORLD'S CLINICAL NEWS LEADER

VISIT HospiMedica.com DAILY CLINICAL NEWS

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Suspended Animation Successful in Surgery

For the first time, a patient cooled by induced hypothermia has been successfully revived, allowing surgeons more time to correct traumatic injuries. The new technique, which was developed at the University of Maryland School

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Nonlinear Metamaterials Could Revolutionize MR Imaging

A new intelligent metamaterial could make the entire magnetic resonance imaging (MRI) process faster, safer, and more accessible to patients.

Developed by researchers at Boston University (BU; MA, USA; www.bu.edu), the coupled nonlinear metamaterial (NLMM) features a self-adaptive response that amplifies the magnetic field commiserate to the resonance of the radio-frequency (RF) excitation strength. The NLMM is suppressed in response to higher degrees of RF and recovers during a low excitation

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System for Real-Time Perfusion Monitoring

A new monitoring system offers real-time perfusion feedback, enhancing clinician's decision-making in the angiography suite.

The Pedra system is a non-invasive, deep tissue, real-time tissue perfusion monitor intended for use in peripheral angioplasty and vascular surgery. The device is based on advanced speckle laser technology, providing a simple

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COVID-19 Mobilization: Racing for Effective Tests, Vaccines and Drugs

A Special Report on Latest Developments

As the Coronavirus health crisis enters yet another month, researchers and clinicians worldwide intensify their search for effective diagnostic, preventive, and treatment solutions. Several such developments are in the pipeline, with some to reach the market within weeks.

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COVID-16 patient under treatment with the Philips Respironics V60 hospital ventilator; Courtesy of Philips Healthcare.

Double-Sided Adhesive May Replace Surgical Sutures

A novel double-sided tape (DST) that can seal tissues in just five seconds could eventually be used to replace sutures, claims a new study.

Researchers at the Massachusetts Institute of Technology (MIT, Cambridge, MA, USA; www.mit.edu), Harvard Medical School (HMS; Boston, MA, USA; https://hms.harvard.edu), and other institutions made the dry DST by

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Integrated Airway System Reduces Ventilation Complications

A comprehensive multipurpose airway management system protects the lungs and tracheal tissues from infections and tissue injury. AnapnoGuard system is designed to provide persistent monitoring of leaks around an

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Magnetic Blood Filtering System Draws Out Disease

An innovative blood filtering system could draw out deadly infections such as malaria and sepsis from the body using magnets. The MediSieve (London, United Kingdom; www.medisieve.com) filtering technology works in a similar way to dialysis. Blood is taken from a patient and infused with the MediSieve magnetic particles, which attach to specific targets so that they can be subsequently captured by a magnetic filter and removed from the blood before it is pumped back into the body. Particle size, magnetic properties, and number of binding agents coating the nanoparticles

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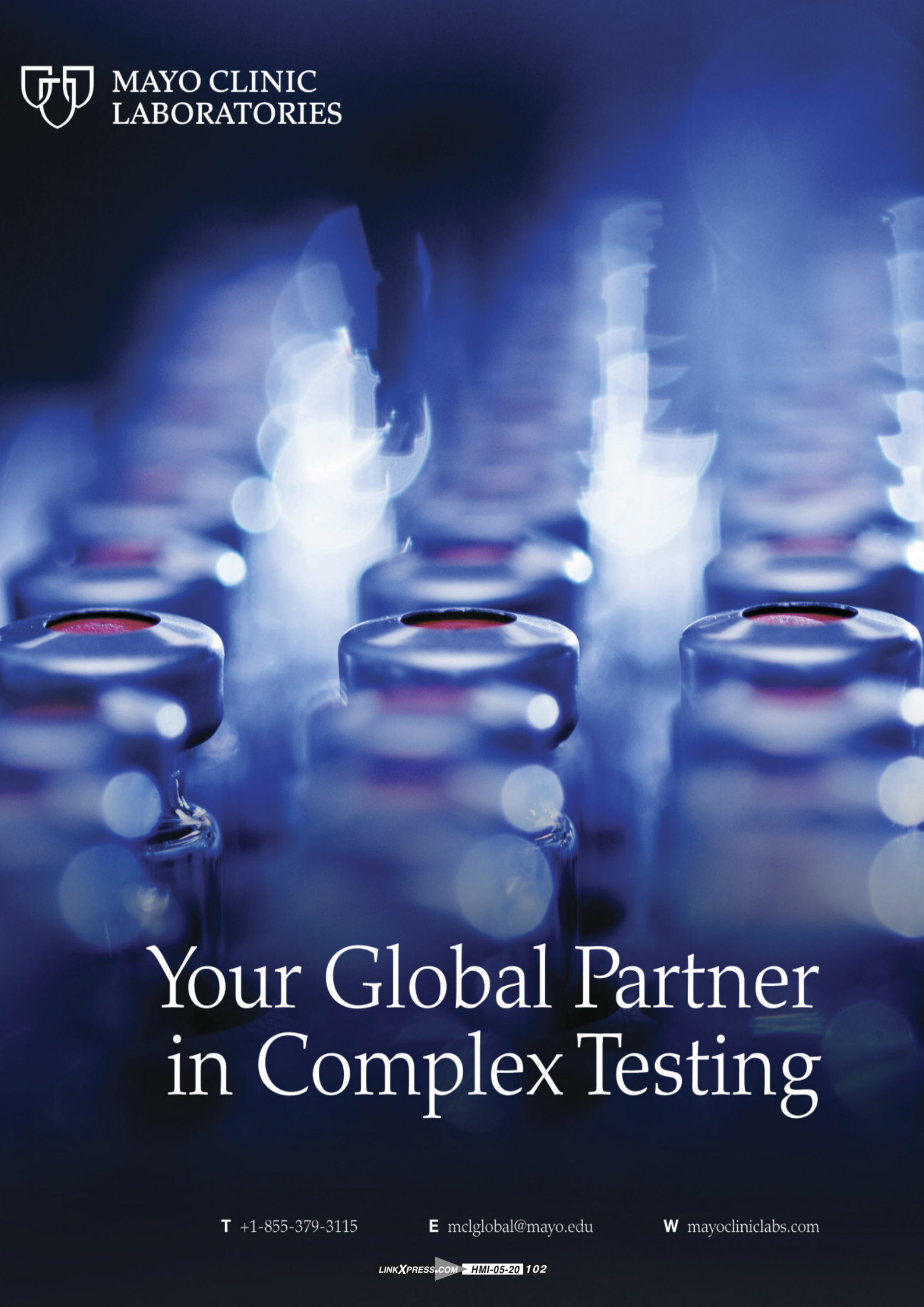

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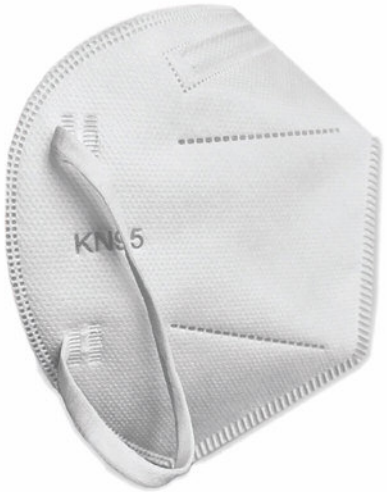

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COVID-19 Update: A Special Report

As the Coronavirus health crisis enters yet another month, researchers and clinicians worldwide intensify their search for effective diagnostic, preventive, and treatment solutions. Several such developments are in the pipeline, with some to reach the market within weeks.

First-in-Human Trial of COVID-19 Vaccine Begins In May

Novavax, Inc. (Gaithersburg, MD, USA; https://novavax.com) has identified a coronavirus vaccine candidate, NVX-CoV2373, a stable, prefusion protein made using its proprietary nanoparticle technology and will initiate a first-in-human trial in mid-May. NVX-CoV2373 was shown to be highly immunogenic in animal models measuring spike protein-specific antibodies, antibodies that block the binding of the spike protein to the receptor and wild-type virus neutralizing antibodies. In addition, the already high microneutralization titers seen after one dose increased eight fold with a second dose. High titer microneutralizing antibodies are generally accepted evidence that a vaccine is likely to be protective in humans. Additionally, Novavax has entered into an agreement with Emergent BioSolutions Inc. (Gaithersburg, MD, USA; www.emergentbiosolutions.com) whereby Emergent will collaborate with Novavax, utilizing its molecule-to-market contract development and manufacturing (CDMO) services to support bringing into the clinic Novavax's novel experimental vaccine candidate. Emergent will produce the COVID-19 experimental vaccine candidate and has initiated work for this program anticipating that the COVID-19 experimental vaccine candidate will be used in a Phase 1 clinical study within the next four months.

Infection Control Best Practices Prevent Nosocomial Coronavirus Transmission

A study conducted at Queen Mary Hospital (QMH; Hong Kong, China; www.ha.org.hk) and the University of Hong Kong (HKU, China; www.hku.hk) has found that meticulous application of best practices for infection control can help protect healthcare workers from coronavirus disease. The study found that vigilance in hand-hygiene practice, wearing surgical masks in the hospital, and appropriate use of personal protective equipment in patient care, especially when performing aerosol-generating procedures, were the key infection control measures to prevent hospital transmission of the virus.

Israeli Scientists Achieve Significant Breakthrough

Scientists from the Israel Institute for Biological research (IIBR; Ness-Ziona, Israel; https://iibr.gov.il) have reportedly had a significant breakthrough in understanding the biological mechanism and qualities of the coronavirus and are expected to announce the completion of the development of a vaccine for COVID-19. The IIBR researchers have also reportedly begun testing a COVID-19 vaccine prototype on rodents and are collecting plasma from people who have recovered from COVID-19 infection to aid their research.

Passive Antibody Therapy for COVID–19 Protection

Researchers from John Hopkins University (Baltimore, MD; www.jhu.edu) have proposed that the use of blood from recovered coronavirus patients could provide short-term protection against COVID–19. According to the experts on infectious diseases, viral antibodies present in the blood serum of patients who have recovered from the new coronavirus can be injected into other people in order to protect them for the short-term. The medical remedy is called passive antibody therapy and could help flatten the curve of the coronavirus pandemic while other treatments are being developed.

First Coronavirus Vaccine Reaches Phase 1 Clinical Trial in China

CanSino Biologics Inc. (Hong Kong, China; www.cansinotech.com) has received approval for its recombinant novel coronavirus vaccine (Adenovirus Type 5 Vector) candidate (Ad5-nCoV), co-developed with the Beijing Institute of Biotechnology (BIB), for beginning Phase 1 clinical trial. It is currently the first novel coronavirus vaccine for COVID-19 to make it to this stage in China.

JNJ Accelerates COVID-19 Vaccine Development

Johnson & Johnson's (New Brunswick, NJ, USA; www.jnj.com) Janssen Pharmaceutical Companies (Beerse, Belgium; www.janssen.com) have entered collaboration with the Beth Israel Deaconess Medical Center (BIDMC; Boston, MA, USA; www.bidmc.org) to support the development of a preventive vaccine candidate for COVID-19. The companies have commenced preclinical testing of multiple vaccine prospects, with the aim of soon identifying a COVID-19 vaccine candidate for clinical trials. Johnson & Johnson has announced the selection of a lead COVID-19 vaccine candidate from constructs it has been working on since January 2020, along with significant expansion of its existing partnership between Janssen and the Biomedical Advanced Research and Development Authority (BARDA). The company expects to initiate human clinical studies of its lead vaccine candidate at the latest by September 2020 and anticipates the first batches of a COVID-19 vaccine could be available for emergency use authorization in early 2021.

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COVID-19 Update: A Special Report

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Plant-Based Vaccine for COVID-19

Medicago, Inc. (Quebec City, Canada; www.medicago.com) has successfully produced a Virus-Like Particle (VLP) of the coronavirus just 20 days after obtaining the SARS-CoV-2 gene. The production of the VLP is the first step in developing a vaccine for COVID-19 which will now undergo preclinical testing for safety and efficacy.

Intranasal Coronavirus Vaccine Under Development

Altimmune, Inc. (Gaithersburg, MD, USA; www.altimmune.com) is collaborating with the University of Alabama (Birmingham, AL, USA; www.uab.edu) for the preclinical testing of a potential vaccine to prevent COVID-19 disease. The COVID-19 vaccine, called AdCOVID, is a single-dose vaccine candidate that is delivered by an intranasal spray. The testing at UAB will investigate immune responses to the vaccine in mice before Altimmune can launch a Phase 1 human safety and immunogenicity trial in patients in the third quarter of this year.

Life Sciences Companies form Consortium to Develop COVID-19 Vaccine

Novartis AG (Basel, Switzerland; www.novartis.com) and a consortium of life sciences companies have entered into a collaboration to accelerate the development, manufacture and delivery of vaccines, diagnostics, and treatments for COVID-19. The companies participating in the collaboration include BD, bioMérieux, Boehringer Ingelheim, Bristol-Myers Squibb, Eisai, Eli Lilly, Gilead, GSK, Johnson & Johnson, Merck (known as MSD outside the US and Canada), Merck KGaA, Novartis, Pfizer, and Sanofi.

Early Testing of Potential COVID-19 Vaccine on Humans

Researchers from the MIGAL Galilee Research Institute (Qiryat Shemona, Israel; www.migal.org.il) are just days away from finishing the production of the active component of a coronavirus vaccine that could be tested on humans by as soon as June 1. The researchers have developed an effective vaccine against avian coronavirus Infectious Bronchitis Virus (IBV) that is being adapted to create a human vaccine against COVID-19.

First Stem Cell Clinical Trial for Protection From COVID-19 Approved by FDA

The FDA has approved a Phase II clinical trial evaluating efficacy and safety of Hope Biosciences' (Sugar Land, TX, USA; www.hope.bio) autologous, adipose-derived mesenchymal stem cells (HB-adMSCs) to provide immune support against COVID-19. The study's primary objective is to determine the efficacy of HB-adMSCs to prepare the immune system so that it is better able to fight the virus, should one become infected. Hope anticipates that this pretreatment will limit the progression and severity of COVID-19, ultimately keeping patients out of the hospital and off of mechanical ventilation.

Pfizer and BioNTech to Jointly Develop COVID-19 Vaccine

Pfizer Inc. (New York, NY, USA; www.pfizer.com) and Biopharmaceutical New Technologies {(BioNTech) Mainz, Germany; www.biontech.de} have entered into a collaboration to advance candidates from BioNTech's mRNA vaccine program, previously announced in March. The collaboration aims to rapidly advance multiple COVID-19 vaccine candidates into human clinical testing based on BioNTech's proprietary mRNA vaccine platforms, with the objective of ensuring rapid worldwide access to the vaccine, if approved.

Vir Biotech and Biogen Collaboration

Vir Biotechnology, Inc. (San Francisco, CA, USA; www.vir.bio) has entered into a collaboration with Biogen Inc. (Cambridge, MA, USA; www.biogen.com) for the development and clinical manufacturing of human monoclonal antibodies (mAbs) for the potential treatment of COVID-19. Biogen would continue cell line development, process development, and clinical manufacturing activities in order to advance the development of Vir's proprietary antibodies. Similarly, Vir has also entered into a research collaboration agreement with the National Institutes of Health (NIH) and the National Institute of Allergy and Infectious Diseases (NIAID), Vaccine Research Center (VRC) to advance characterization and development of mAbs against coronaviruses. The joint project will augment ongoing efforts by both parties to identify antibodies that can be used to prevent or treat infection with existing and emerging viruses and help inform the development of vaccines. Similarly, Vir and GlaxoSmithKline plc (London, UK; www.gsk.com) have entered into collaboration to research and develop solutions for coronaviruses, including SARS-CoV-2. The collaboration will use Vir's proprietary monoclonal antibody platform technology to accelerate existing and identify new anti-viral antibodies that could be used as therapeutic or preventative options to help address the current COVID-19 pandemic and future outbreaks. More recently, Samsung Biologics (Songdo, South Korea;

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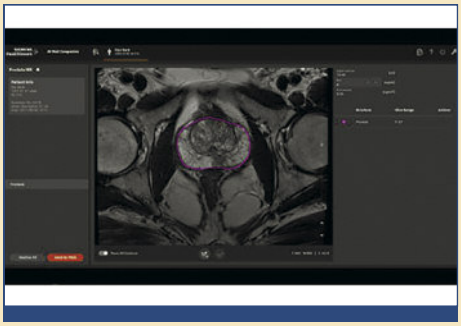

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www.samsungbiologics.com) has entered into a manufacturing agreement with Vir for large scale manufacturing services for Vir's SARS-CoV-2 monoclonal antibody (mAb) program. With Vir planning to proceed directly into a phase 2 clinical trial within the next three to five months, Samsung Biologics is expected to commence its manufacturing as early as October with the first engineering run, with potential commercial batches to be manufactured starting in 2021.

Tiziana TZLS-501

Tiziana Life Sciences (London, UK; www.tizianalifesciences.com) is expediting development of TZLS-501, a novel, fully human anti-interleukin-6 receptor (anti-IL6R) monoclonal antibody (mAb) for treatment of patients infected with coronavirus COVID-19 (SARS-CoV-2). Tiziana plans to administer TZLS-501 using a proprietary formulation technology and believes that the features of TZLS-501 consisting of its dual mechanism of action to inhibit signaling by the membrane-bound and soluble IL-6 receptor and the rapid depletion of circulating IL-6 cytokines, a major cause of lung damage, provides distinct advantages for treatment of COVID-19.

World's First Human Antibody that Could Inhibit Coronavirus

Scientists from the University of Utrecht (Utrecht, the Netherlands; www.uu.nl), the Erasmus Medical Centre (Rotterdam, the Netherlands; www.erasmusmc.nl), and biotech company Harbor BioMed (Cambridge, MA, USA; www.harbourbiomed.com) have developed the world's first human antibody that could inhibit the new coronavirus (SARS-CoV-2) and 'offers potential for prevention and treatment of COVID-19'. The researchers are now making efforts to tie up with a pharmaceutical company that can produce the antibody on a large scale as a medicine.

Regeneron Novel Multi-Antibody Cocktail Treatment Approach

Regeneron Pharmaceuticals, Inc. (Tarrytown, NY, USA; www.regeneron.com) has made progress in its efforts to discover and develop a novel multi-antibody cocktail that can be administered as prophylaxis before exposure to the SARS-CoV-2 virus or as treatment for those already infected. Regeneron scientists have now isolated hundreds of virus-neutralizing, fully human antibodies from the company's VelocImmune mice, which have been genetically-modified to have a human immune system. Additionally, a phase 2/3, randomized, double-blind, placebo-controlled trial has been initiated to evaluate the safety and efficacy of Kevzara, jointly developed by Sanofi S.A. (Paris, France; www.sanofi.com) and Regeneron, in adults hospitalized with serious complications from COVID-19. Kevzara is being investigated for its ability to reduce the overactive inflammatory immune response associated with COVID-19 based on evidence of markedly elevated levels of IL-6, an immune system protein, in severely ill patients infected with coronaviruses.

First Drug Approved for Coronavirus Treatment In China

Fujifilm Toyama Chemical's (Tokyo, Japan; http://fttc.fujifilm.co.jp) flu drug Favilavir, which is currently being promoted with the label, Avigan, became the first-ever antiviral medicine to be approved for use as a treatment for COVID-19 in China after it appeared to be effective in coronavirus patients during clinical studies. Despite its potential, the US FDA has not yet regarded Favilavir as an effective treatment medicine for coronavirus.

ACR's Imaging Recommendations for Suspected COVID-19

The American College of Radiology (ACR; Reston, VA, USA; www.acr.org) has released guidelines on the role and appropriateness of chest radiographs (CXR) and computed tomography (CT) for the screening, diagnosis, and management of patients with suspected or known COVID-19 infection.

AT-100 (rhSP-D) Proposed As Therapeutic for Novel Coronavirus

Airway Therapeutics, Inc. (Cincinnati, OH, USA; www.airwaytherapeutics.com) has announced a filing with the Respiratory Diseases Branch of the National Institutes of Health (NIH), National Institute of Allergy and Infectious Diseases (NIAID), to evaluate AT-100 (rhSP-D) as a therapeutic for the novel coronavirus. AT-100 has the potential to serve as an innovative therapy for the novel coronavirus by targeting critical stages of viral infection through facilitating the binding and clearance of the virus by lung immune cells; regulating the body's immune cells to reduce the overwhelming inflammation that is the primary mechanism of illness in severe viral infections; and inhibiting infectivity and replication for several types of bacteria and viruses, including the primary coronavirus infection and also the secondary bacterial and viral infections that often complicate the care of patients with serious infections.

OyaGen's Lead Compound Could Inhibit SARS-CoV-2

OyaGen, Inc.'s (Rochester, NY, USA; www.oyageninc.com) collaborative research with the National Institute of Allergy and Infectious Diseases (Fort Detrick, MD, USA) has suggested strong dose-dependent antiviral activity of its lead compound OYA1 against live SARS-CoV-2,

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based on in cell culture infectivity studies. OyaGen will conduct further studies for the safety and efficacy of OYA1 in treating COVID-19 as necessary for regulatory approval. The company anticipates that inhibition of SARS-CoV-2 using OYA1 will serve as a stop-gap treatment until appropriate vaccines are developed.

US Patent Application Filed for COVID-19 Treatment Method

BeyondSpring Inc. (New York, NY, USA; www.beyondspringpharma.com) has submitted a provisional US patent application for its pipeline asset BPI-002, for methods of treating viral infections, including COVID-19, when administered alone or in combination with a vaccine. BPI-002 is a novel orally administered small molecule agent that is a potent T-cell co-stimulator.

Gilead Begins Phase 3 Studies of Remdesivir

Gilead Sciences' (Foster City, CA, USA; www.gilead.com) has initiated two Phase 3 studies for evaluating the safety and efficacy of its antiviral drug, remdesivir in adults diagnosed with COVID-19, following the US FDA's rapid review and acceptance of its IND filing. Additionally, Chinese health authorities have initiated two clinical trials in patients infected with COVID-19 to determine the safety and efficacy of remdesivir as a potential treatment. The US National Institute of Allergy and Infectious Diseases (NIAID) has also initiated a Phase II adaptive, randomized, double-blind, placebo-controlled trial into remdesivir, an investigational nucleotide analog with broad-spectrum antiviral activity. Additionally, physician-scientists at UC San Diego Health, UC San Francisco, UC Irvine Health and UC Davis Health have begun recruiting participants for a Phase II clinical trial to investigate the safety and efficacy of treating adult patients with COVID-19 with remdesivir.

RECOVERY Trial Tests Potential Drug Treatments

Researchers from the University of Oxford have launched a new clinical trial to test the effects of potential drug treatments for patients admitted to hospital with COVID-19 and the first patients have been recruited. The Randomised Evaluation of COVid-19 thERapY (RECOVERY) trial will provide doctors and the health service with information they need to determine which treatments should be used. The treatments included in the study are Lopinavir-Ritonavir, normally used to treat HIV, and the steroid dexamethasone, which is used in a wide range of conditions to reduce inflammation. In the future, the RECOVERY trial will be expanded to assess the impact of other potential treatments as they become available.

Developing Plasma-Derived Therapy for COVID-19

XBiotech Inc. (Austin, TX, USA; www.xbiotech.com) and BioBridge Global (San Antonio, TX, USA; www.biobridgeglobal.org) have entered into a collaboration to participate in a US Food and Drug Administration (FDA) investigational program for US blood centers to begin collecting and distributing convalescent plasma from individuals who have recovered from COVID-19. Plasma collected from donors could be used to treat patients with serious and/or life-threatening COVID-19 infections.

Similarly, Takeda Pharmaceutical Company Limited (Tokyo, Japan; www.takeda.com) has initiated the development of an anti-SARS-CoV-2 polyclonal hyperimmune globulin (H-IG) to treat high-risk individuals with COVID-19, while also studying whether the company's currently marketed and pipeline products may be effective treatments for infected patients. Hyperimmune globulins are plasma derived-therapies that have previously been shown to be effective in the treatment of severe acute viral respiratory infections and may be a treatment option for COVID-19. Takeda has the expertise to research, develop, and manufacture a potential anti-SARS-CoV-2 polyclonal H-IG, which the company is referring to as TAK-888.

Human Testing of Promising Potential Treatment for COVID-19

The US FDA has approved an IND application by Drug Innovations at Emory (DRIVE), LLC (Atlanta, GA, USA; www.driveinnovations.org) for an orally available antiviral compound, EIDD-2801, exclusively licensed to Ridgeback Biotherapeutics LP (Miami, FL, USA; www.ridgebackcap.com). This will allow Ridgeback to initiate human clinical testing of EIDD-2801 in the US. EIDD-2801 is an orally bioavailable form of a highly potent ribonucleoside analog that inhibits the replication of multiple RNA viruses, including SARS-CoV-2,

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the causative agent of COVID-19. In animal studies of two distinct coronaviruses (SARS-CoV1 and MERS), EIDD-2801 has been shown to improve pulmonary function, decrease body weight loss and reduce the amount of virus in the lung.

Research Begins for Discovering Novel Coronavirus-Neutralizing Antibodies

AstraZeneca (Cambridgeshire, England; www.astrazeneca.com) is joining forces with government and academia with the aim of discovering novel coronavirus-neutralizing antibodies. By harnessing its internal expertise and entering into new collaborations, the company is aiming to identify monoclonal antibodies that have the potential to recognize, bind to and neutralize the SARS-CoV-2 virus, thereby reducing the impact of COVID-19.

Placenta-Based Cell Therapy Treatment Shows Promise

Pluristem Therapeutics Inc. (Haifa, Israel; www.pluristem.com), which develops novel placenta-based cell therapy product candidates, has released positive preliminary data from its compassionate use program, treating seven patients suffering from acute respiratory failure and inflammatory complications associated with COVID-19 with the firm's PLX cells, in three medical centers in Israel. Previous pre-clinical findings of PLX cells revealed therapeutic benefit in animal studies of pulmonary hypertension, lung fibrosis, acute kidney injury and gastrointestinal injury which are potential complications of the severe COVID-19 infection. Taken together, PLX cells' potential capabilities with the safety profile observed from clinical trials involving hundreds of patients worldwide potentially position them as a therapy for mitigating the tissue-damaging effects of COVID-19.

Philips to Double Ventilator Production by May

Royal Philips (Amsterdam, the Netherlands; www.philips.com) has entered into an agreement with the US government to increase the production of hospital ventilators at its manufacturing sites in the US. The company plans to double its production by May 2020 and achieve a four-fold increase by the third quarter of 2020 for supply to the US as well as global markets. Philips plans to invest several tens of millions in its ventilator manufacturing sites in the US.

Blood Purification Device Receives FDA Clearance for COVID-19

Terumo BCT, Inc. (Lakewood, CO, USA; www.terumobct.com) and Marker Therapeutics AG (Zug, Switzerland; www.markertherapeutics.com) have obtained the US Food and Drug Administration's (FDA) Emergency Use Authorization (EUA) for the use of their blood purification device to treat acute respiratory failure in COVID-19 patients. Terumo BCT's Spectra Optia Apheresis System combined with Marker Therapeutics' D2000 Adsorption Cartridge has been authorized by the FDA for emergency use to treat patients 18 years of age or older with confirmed Coronavirus Disease 2019 (COVID-19) who have been admitted to the intensive care unit (ICU) with confirmed or imminent respiratory failure to reduce pro-inflammatory cytokine levels.

Ping An COVID-19 AI System

An artificial intelligence (AI) based image-reading system can be used to evaluate treatment and prognosis of infected patients, assisting doctors to diagnose, triage, and evaluate COVID-19 patients swiftly and effectively. Patients with COVID-19 need multiple CT scans during the treatment. Utilizing Ping An Smart Healthcare (SHENZHEN, China; www.pingan.com) COVID-19 smart image-reading system can effectively improve the diagnostic accuracy and the doctor's image-reading efficiency.

U.S. White House Urges AI Use To Analyze Coronavirus Articles

The U.S. White House has called on experts in AI to analyze scholarly articles on the coronavirus that could offer insights into treating COVID-19 and controlling the pandemic. The recently released COVID-19 Open Research Dataset (CORD-19) of scholarly literature about COVID-19, SARS-CoV-2, and the coronavirus group represents the most extensive machine-readable coronavirus literature collection available for data and text mining to date, with over 29,000 articles, out of which more than 13,000 have full text.

AI Tool Predicts Respiratory Disease Severity In COVID-19 Patients

A new study has found that an AI tool can accurately predict which patients who have been newly infected with the 2019 coronavirus disease (COVID-19) can go on to develop severe respiratory disease. The study was led by the NYU Grossman School of Medicine (New York City, NY; www.med.nyu.edu) and NYU Courant Institute of Mathematical Sciences (New York City, NY; www.cims.nyu.edu) in partnership with Wenzhou Central Hospital (Wenzhou, China) and Cangnan People's Hospital (Wenzhou, China). The study also revealed the best indicators of future severity, and found that they were not as expected.

Free AI Algorithms for Analyzing Chest X-Ray/CT Scan of COVID-19

In an effort to help the medical community in the fight against COVID-19, VUNO (Seoul, South Korea; www.vuno.co), an AI medical imaging software company, is offering special versions of two AI products, VUNO Med- LungQuant and

Cont'd on page 11

Automated Modelling Synthesizes Brain Scan Templates

Automated neural network models accelerate the creation and customization of conditional atlases used in medical-image analysis.

Developed at the Massachusetts Institute of Technology (MIT, Cambridge, MA, USA; www.mit.edu) and Cornell University (Cornell; Ithaca, NY, USA; www.cornell.edu), the probabilistic model is based on one conditional neural network (CNN) that yields either universal or conditional templates, and another CNN that provides efficient alignment of the images to templates. The joint CNN is fed a random image from a dataset encoded with desired patient attributes; from that, it estimates an attribute-conditional atlas. The second CNN aligns the estimated atlas with the input image, generating a deformation field, which is then used to train a loss function to reduce deviations from a given value, thus learning to minimize differences between the learned atlas and each image.

The networks continuously refine the atlas to smoothly align to any given image across the dataset. The result is an atlas that has learned how specific attributes, such as age, sex, and disease, correlate to structural variations across all images in a dataset. By plugging new patient attributes into the function, it leverages all learned information across the dataset to synthesize an on-demand atlas, even if that attribute data is missing or scarce in the dataset. The study was presented at the annual conference on Neural Information Processing Systems, held during December 2019 in Vancouver (Canada).

"A big dream is to build one function that can generate conditional atlases for any subpopulation, spanning birth to 90 years old. Researchers could log into a webpage, input an age, sex, diseases, and other parameters, and get an on-demand conditional atlas," said lead author and study presenter Adrian Dalca, PhD, of MIT. "That would be wonderful, because everyone can refer to this one function as a single universal atlas reference. Atlases are central to many medical image analyses; this method can build a lot more of them, and build conditional ones as well."

Traditional atlas-building methods run lengthy, iterative optimization processes on all images in a dataset. For example, they align all 3D brain scans to an initial (often blurry) atlas, and compute a new average image from the aligned scans. They repeat this iterative process for all images. This computes a final atlas that minimizes the extent to which all scans in the dataset must deform to match the atlas. Doing this process for patient subpopulations can be complex and imprecise if there isn't enough data available.

The atlases are available online at the MIT VoxelMorph library (http://voxelmorph.csail.mit.edu).

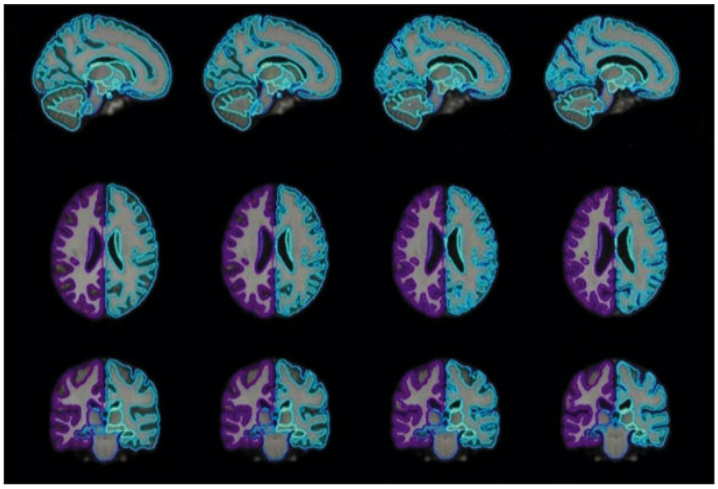

Image: On-demand brain scan templates of various ages generated using the joint CNN platform (Photo courtesy of MIT)

Magnetic Blood Filtering System Draws Out Disease

cont'd from cover

are all engineered to ensure maximal capture and removal by the filter. The whole process takes around two to four hours.

"In theory, you can go after almost anything. Poisons, pathogens, viruses, bacteria, anything that we can specifically bind to, we can remove. So, it's a very powerful potential tool," said George Frodsham, CEO and founder of MediSieve. "When someone has a tumor, you cut it out. Blood cancer is a tumor in the blood, so why not just take it out in the same way? Now we know it's possible; it's just a question of figuring out some of the details."

Blood can be repeatedly passed through the system until the target is at such a low concentration that the immune system or a short course of medication can remove it. The first disease due to be tested for device efficacy is malaria; interestingly, in this case, the first step is not necessary, as malaria targets iron-rich blood cells and consumes hemoglobin, turning it magnetic. Further trials will be conducted to see whether the nanoparticles can remove sepsis-causing bacteria and tone down the deadly immune response.

"Malaria treatment is our flagship product because the infected cells have naturally occurring magnetic properties. The malaria parasite invades the red blood cell and consumes the hemoglobin, and therefore it leaves an iron-based waste product, which it then takes inside itself. So effectively malaria parasites poop is magnetic, and then it eats its poop," explained Mr. Frodsham. "We really feel we can have a material human impact to help those suffering the most from the disease, particularly children and pregnant women."

PRODUCT NEWS

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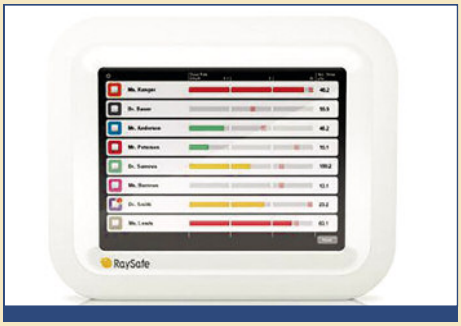
DOSIMETRY SYSTEM
FLUKE BIOMEDICAL



The RaySafe i2 is an active dosimetry system providing real-time insights about radiation exposure, helping medical staff and physicians evaluate and directly adjust their behaviors, offering ease of use with quick set-up.

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MOBILE X-RAY SYSTEM
GE HEALTHCARE

The Optima XR220amx mobile X-ray system takes digital X-ray to the point of care (POC) using the FlashPad wireless digital detector which offers the productivity, image quality and functionality of a RAD room at the POC.

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DISPOSABLE NIV MASKS
HANS RUDOLPH

The new Eagle disposable mask for NIV is made from extremely soft material, ensuring comfortable fit and seal. The multi-purpose mask can be used on site, pre-hospital transportation, from acute to sub-acute Hospital care.

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Suspended Animation Successful in Surgery

cont'd from cover

of Medicine (Baltimore, USA; www.medschool.umaryland.edu), is called emergency preservation and resuscitation (EPR), and involves rapidly cooling a person suffering from acute trauma and cardiac arrest to around 10 to 15°C by replacing all of their blood with ice-cold saline. As the patient's brain activity almost completely stops, they are then disconnected from the cooling system and their body, which would otherwise be classified as dead, is moved to the operating theatre.

The researchers reported they have successfully tried their process on one patient so far, and are now planning a trial with 10 people who will receive EPR, compared to 10 people who would have been eligible for EPR, but for the fact that the correct team wasn't in the hospital at the time of admittance. The study has been approved as participants are just minutes away from death, having lost half their blood and their heart has stopped. The plan of the study was outlined at the New York Academy of Sciences, with study results expected by December 2020. The report was published on November 20, 2019, in *New Scientist.*

"We felt it was time to take it to our patients. Now we are doing it and we are learning a lot as we move forward with the trial. Once we can prove it works here, we can expand the utility of this technique to help patients survive that otherwise would not," said principal investigator professor of surgery Samuel Tisherman, MD. Commenting on the concept of suspended animation, he said "I want to make clear that we're not trying to send people off to Saturn. We're trying to buy ourselves more time to save lives."

Therapeutic cooling is among the most potent interventions for hypoxic-ischemic injury,

a broad constellation of conditions ranging from cardiac and respiratory arrest to carbon monoxide (CO) and other poisonous gas exposure. It appears to limit tissue damage by reducing oxygen metabolism and inflammation, while maintaining cell membrane integrity.

Image: Inducing hypothermia can extend surgery time (Photo courtesy of Shutterstock)

Nonlinear Metamaterials Could Revolutionize MR Imaging

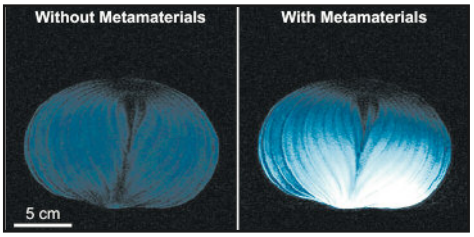
cont'd from cover

strength phase, thus increasing the signal-to-noise ratio (SNR) 10-fold, greatly enhancing image quality and reducing scan time, and thus opening up a new way to obtain crisper MRI images at very low cost.

The nonlinear response of the NLMM behavior is passive, selectively boosting low-energy RF emissions from the patient's body in normal mode, and turning itself off during the millisecond bursts of high-energy RF transmission from the MRI machine. The off-time, which last just a few milliseconds, allows intelligent NLMM to enhance the energy sent back to the MRI. It also diminishes the patient's overall exposure to radio wave radiation and mitigates potential safety concerns. The study was published on October 30, 2019, in *Advanced Materials.*

"The intelligent metamaterial consists of an array of metallic helical resonators closely packed with a passive sensor," said lead author professor of radiology Xiaoguang Zhao, MD. "When the high-energy radio waves are coming in, the metamaterial detects the high energy level and turns off the resonance automatically. With low-energy radio excitation, the metamaterial turns on the resonance and enhances the magnetic component of the radio wave. We can now build smart materials that can interact with radio waves intelligently, enhancing the wanted signal while letting the unwanted signal go."

MRI represents a powerful diagnostic tool in the armamentarium of modern healthcare that is widely applied across a spectrum of diseases, from stroke to cancer imaging and beyond. It can be used to generate images from a range of tissue properties without ionizing radiation, re-



sulting in an inherently high degree of tissue contrast. Chief among the performance metrics of MRI systems is SNR, which may be leveraged to boost overall acquisition performance, from image resolution to the efficiency of image acquisition, and has been demonstrated to improve anatomic delineation and detection of pathology.

Image: Intelligent metamaterials Enhance MRI images (Photo courtesy of BU)

Mobile C-Arm Allows for Fluoroscopy at Point-of-Care

A portable, lightweight fluoroscopy and x-ray C-arm allows imaging of the extremities in rural, isolated, and remote settings.

The Turner Imaging Systems (Orem, UT, USA; www.turnerxray.com) Smart-C-arm x-ray imaging device focuses on mobility and portability, with no need for special equipment to wheel the device around. The collapsible, battery-powered system weighs just seven kilograms, and comes with an integrated surgical platform and an independent articulating arm. It is particularly useful for humanitarian aid workers, sports medicine, in-office outpatient orthopedic surgeries, battlefield care, extremity injections for pain management, mobile radiology units, emergency room use and more.

Fully wireless, the system has no cords, cables, or need for a power supply. Features include a carbon fiber frame for durability and strength; a 15x15 cm high-sensitivity flat panel detector (FPD) with a complementary meta-oxide-semiconductor (CMOS) sensor that provides easy positioning in tight spaces; intuitive imaging software on a touchscreen tablet; and a sophisticated imaging algorithm with automatic detection of dense objects and adjustment of contrast and brightness to optimize images and improve visualization. An independent monitor cart allows for clear field-of-view (FOV) positioning.

"As one of the largest purchasers and evaluators of imaging equipment in the United States, I believe Smart-C is one of the most unique innovations to be introduced to our industry in many years," said Howard Berger, MD, president and CEO of RadNet (Los Angeles, CA, USA). "Its portability, cordless design and high-quality images will attract users in multiple diagnostic imaging settings. As RadNet was an early investor in Turner Imaging Systems, we congratulate the company's management and employee base in receiving FDA clearance."

A C-arm is an imaging scanner intensifier whose name derives from the C-shaped arm used to connect the x-ray source and x-ray detector together. Although C-arms have radiographic capabilities, they are used primarily for fluoroscopic imaging during surgical, orthopedic, and emergency care procedures. Using a C-arm provides high-resolution X-ray images intraoperatively and in real time, allowing the physician to monitor progress and immediately make any corrections.

Image: The portable Smart-C-arm x-ray imaging device (Photo courtesy of Turner Imaging Systems)

COVID-19 Update: A Special Report

cont'd from page 8

VUNO Med-Chest X-ray: COVID-19, encompassing both lung X-ray and CT modalities, respectively all at once. VUNO's one-stop service offering will allow users to choose one or both algorithms to use depending on their own needs by simply visiting one website without the hassle of moving from different AI systems. The web-based services are available for free for anyone who wants to use VUNO's AI algorithms to analyze a chest X-ray or CT scan.

Agfa Offers Free Chest+ Software Upgrade

Agfa (Mortsel, Belgium; www.agfa.com) is offering its Chest+ software upgrade free of charge to healthcare providers in order help them cope with the COVID-19 crisis. Chest imaging is a key part of triage and treatment for the new coronavirus. Agfa's Chest+ software helps improve speed and productivity for these critical X-rays, even for care professionals who are less familiar with mobile X-ray equipment.

AI Platform Finds Combination Drug Treatments for COVID-19

Healx (Cambridge, UK; www.healx.io) is using its AI platform to develop drug combinations from approved drugs for finding treatments for COVID-19. Healx's AI platform, Healnet, integrates and analyzes biomedical data from multiple sources to predict those combination therapies that are most likely to succeed in the clinic.

COVID-19 Playbook Released

Signals Analytics, Inc. (New York, NY, USA; www.signals-analytics.com) has unveiled its COVID-19 Playbook, providing access to critical market intelligence and trends surrounding potential treatments for the novel coronavirus. The firm is offering the COVID-19 Playbook at no cost to researchers looking to monitor vaccines that are in development for COVID-19 and other strains of coronavirus; monitor trending drugs that are being tested for COVID-19; and assess which drugs are being repurposed to help treat infected people.

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BLADDER VOLUME MEASUREMENT DEVICE
CR BARD

The BBS Revolution is a fully automated bladder volume measurement device combining the power and safety of ultrasound with sophisticated image processing electronics, providing accurate non-invasive bladder volume measurement.

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VENTILATOR
WEINMANN

The MEDUVENT Standard is one of the smallest turbine-driven ventilators in the world, featuring innovative turbine technology that maintains ventilation even without an external oxygen supply.

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PATIENT MONITOR
INFINIUM MEDICAL

The Omni (K) patient monitor offers an extremely simple and adaptable user interface, allowing patient information along with vital sign settings to be quickly modified to meet the needs of a patient's changing condition.

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Double-Sided Adhesive May Replace Surgical Sutures

cont'd from cover

combining a biopolymer (gelatin or chitosan) and a crosslinked polyacrylic acid grafted with N-hydrosuccinimide ester. The polyacrylic acid first absorbs water from wet tissues, forming weak hydrogen bonds and other weak interactions that temporarily hold both DTS and tissues together. The embedded NHS esters in the polyacrylic acid then form much stronger covalent bonds with proteins in the tissue, a process that takes about five seconds.

In mouse and rat models, the researchers showed that the DST can achieve strong adhesion between diverse wet dynamic tissues, such as the skin, small intestine, stomach, and liver. They also performed tests in pig lungs and trachea, which showed that they could rapidly repair damage to those organs. The researchers added that depending on the application the DST is being used for, its dissolution rate can be controlled by varying the ingredients. While gelatin tends to break down within a few days or weeks in the human body, chitosan can last up to a year. The study was published on October 30, 2019, in Nature.

"There are over 230 million major surgeries all around the world per year, and many of them require sutures to close the wound, which can actually cause stress on the tissues and can cause infections, pain, and scars," said senior author MIT associate professor Xuanhe Zhao, PhD. "We are proposing a fundamentally different approach to sealing tissue. The tape could eventually replace surgical sutures, which don't work well in all tissues and can cause complications in some patients."

Two dry surfaces can instantly adhere upon contact with each other through intermolecular forces such as hydrogen bonds, electrostatic interactions, and van der Waals interactions. However, such instant adhesion is challenging when wet surfaces such as body tissues are involved, because water separates the molecules of the two surfaces, preventing interactions. In addition, existing liquid or hydrogel tissue adhesives suffer from several limitations, such as weak bonding, low biological compatibility, poor mechanical match with tissues, and slow adhesion formation.

Image: A double-sided adhesive can be used to seal tissues together (Photo courtesy of Felice Frankel/MIT)

System for Real-Time Perfusion Monitoring

cont'd from cover

five-minute, non-invasive test to distinguish between ischemic ulcers resulting from peripheral vascular disease (PVD) and neuropathic diabetic foot ulcers (DFUs). The resulting Pedra Blood Perfusion Index can indicate the need for urgent vascular surgery.

During such surgical procedures, the Pedra system, introduced by Pedra Technology (Singapore; www.pedratech.com) provides an accurate and quantitative measure of blood perfusion, a critical factor in wound healing. Current technologies, such as X-ray angiograms, only image the macrovascular blood flow, which could lead to misleading conclusions that may result in adverse outcomes or the need for repeat procedures. By using Pedra, the physician receives precise information on the blood perfusion status to increase the likelihood of surgery success, saving limbs and reducing the healthcare burden.

"Physicians and their industry partners have directed significant resources to determining the optimal treatment for patients with PAD, be it a balloon, a stent or another treatment," said vascular surgeon Paul Hayes, MD of Addenbrookes Hospital (Cambridge, United Kingdom). "Far less time has been spent asking the question 'has the treatment I have chosen for this individual patient really improved outcomes'? PEDRA Technology has developed a new device that could possibly revolutionize the management of patients with PAD."

The current gold standard for frontline diagnosis of ischemia is the Ankle-Brachial Index, which has a real-world sensitivity of 16-20%. ABI is widely appreciated as being a very poor test for diabetic limbs, because patients with diabetics often have calcified blood vessels. As a result, their ankle vessels are incompressible by the blood pressure cuff, resulting in falsely-elevated ABI readings that fall within the healthy range.

Vibro-Acoustic Air Pressure System Clears the Airways

A novel technology removes secretions from the airways of patients suffering from diseases affecting the respiratory tract.

Developed at BGN Technologies (Beer Sheva; Israel; https://in.bgu.ac.il/en/BGN/Pages/default.aspx) through a collaboration between Ben-Gurion University (BGU; Beer Sheva, Israel; www.bgu.ac.il), Cincinnati Children's Hospital (OH, USA; www.cincinnatichildrens.org), and other institutions, the AeroSelf system simultaneously introduces low-frequency, low-pressure, air flow oscillations and high frequency acoustic pulses into the airway and lungs. At first, air pulsations dominate as they penetrate the mucus. Detachment and removal of mucus from the airway wall is then achieved by the acoustic waves, which agglomerate the mucus chunks.

To optimize the process, a software algorithm matches the required frequencies, amplitudes, duty cycle, and relative phases to the specific patient's geometry. The system can thus treat the core of obstructive airways pathophysiology diseases, the buildup of mucus in the small airways, in a range of respiratory conditions, such as bronchiolitis, asthma, chronic obstructive pulmonary disease (COPD), and cystic fibrosis (CF). The system is especially important in the treatment of blocked airways in children, who are more susceptible to secretion obstructions due to their smaller airway cross sectional area.

"The combination of air pulsation and acoustic waves was shown to be effective in a series of lab test that simulated human airway and lungs. Our collaboration with Cincinnati Children's and BGU laid the foundation for developing this novel technique," said Professor Ephraim Gutmark, MD, of UC. "We are now in the process of further developing a device based on a unique clinical protocol that will offer treatment superior to existing solutions."

"Even though airway secretions are a major component in the pathophysiology of numerous serious diseases affecting the respiratory tract, there is currently no effective therapeutic modality that directly or indirectly treats the small airways," said Professor David Katoshevski, PhD, of BGU. "Our colleagues at Cincinnati Children's brought the medical knowledge and an unmet need that was coupled with our technical and engineering capabilities. Together we developed this innovative solution in order to allow bronchiolitis, COPD, and CF patients to breathe freely."

Image: Air pressure and ultrasound pulses help clear the bronchi (Photo courtesy of BGN)

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INFUSION PUMP
ERTUNC OZCAN

The 7000 LITE infusion pump allows digital monitoring from the front panel to set the flow rate and amount of infusion delivered to the patient. Featuring a light compact design with voice and visual warnings for alerts.

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GAS FLOW ANALYZER
MAGNAMED TECNOLOGIA

The VentMeter gas flow analyzer, featuring PulmoTrend software, ensures the safety and reliability of ventilators with traceable standard calibration (RCB) and simple operation and handling.

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VENTILATOR
HEINEN & LOWENSTEIN

The elisa 800 VIT (Ventilator Integrated Tomography) is the world's first fully integrated EIT system in an intensive care ventilator with its non-invasive pulmonary monitoring visualizing ventilation-related complications.

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Electronic Shoe Insole Monitors Diabetic Foot Health

A graphene-based insole embedded with a multitude of sensors measures and detects inflammation that could lead to debilitating diabetic foot ulcers (DFUs).

The Bonbouton (New York, NY, USA; www.bonbouton.com) Smart Insole, developed in conjunction with the Stevens Institute of Technology (Hoboken, NJ, USA; www.stevens.edu), is designed for insertion into a sneaker or dress shoe to passively monitor feet health in people living with diabetes. The proprietary sensors are made of graphene, an extremely thin sheet of pure carbon with a high flexibility, extreme strength, and electrical and thermal conductivity. The monitoring data are sent to a companion smartphone app, which sends out automatic alerts if an ulcer is starting to form.

The data can also be accessed by the patient and shared with family members, a healthcare provider, or others in order to determine if a surgical intervention or other treatment is needed. Features include compatibility with most footwear styles; four different sizes that can also be trimmed to achieve perfect fit, maximum comfort and effectiveness; easy installation; up to four months of continuous temperature and pressure foot monitoring with the included batteries; and a companion app that is free, easy to set up, and simple to use.

"Bonbouton's smart insoles sense the skin's temperature, pressure, and other foot health-related data, which can alert a patient and his or her healthcare provider when an infection is about to take hold," said Linh Le, PhD, founder and CEO of Bonbouton. "This simplifies patient self-monitoring and reduces the frequency of doctor visits, which can ultimately lead to a higher quality of life. I am excited to realize the full potential of Bonbouton, taking a technology that I developed as a graduate student at Stevens and growing it into a product that will bring seamless preventative care to patients and save billions of dollars in healthcare costs."

Graphene is a monolayer atomic-scale honeycomb lattice of carbon atoms which combines the greatest mechanical strength ever measured in any material (natural or artificial) with very light weight and high elasticity. Graphene has unique optical and thermal properties which allow it to release energy in the form of heat in response to light input; it also has very high electrical conductivity. The high surface area allows bioconjugation with common biomolecules. Andre Geim and Kostya Novoselov of the University of Manchester (United Kingdom) were awarded the Nobel Prize in Physics in 2010 for its development.

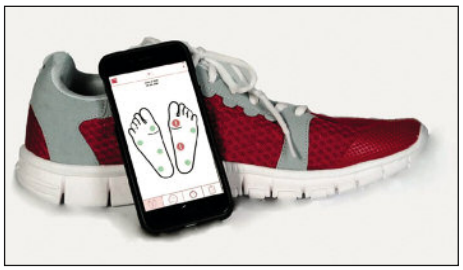


Image: A graphene insole and smartphone can prevent DFU's (Photo courtesy of Bonbouton).

Self-Cleaning Surface Repels Drug-Resistant Bacteria

A new study shows how a flexible plastic wrap that combines a hierarchical wrinkled structure with chemical functionalization can reduce bacterial adhesion, biofilm formation, and the transfer of bacteria through an intermediate surface.

Developed by researchers at McMaster University (Hamilton, ON, Canada; www.mcmaster.ca), the new plastic surface, which resembles conventional cling-wrap, is based on hierarchical wraps that can reduce Gram positive *methicillin-resistant Staphylococcus aureus* (MRSA) and Gram negative *Pseudomonas aeruginosa* colonization by 87% and 84%, respectively. The effectiveness of the surface was studied using electron microscope images, which showed that virtually no bacteria could transfer to the new surface. In addition, the surfaces remain free of bacteria even after coming into contact with a surface contaminated with Gram negative *E. coli*.

The antibacterial properties are the result of broad liquid repellency of the engineered surfaces, and the presence of reduced anchor points for bacterial adhesion on the hierarchical structure. The wrap, which is fabricated using scalable bottom-up techniques, can form an effective cover on a variety of complex objects, making them superior to top-down and substrate-specific surface modification methods. The wrap can be applied onto door handles, railings, intravenous (IV) stands and other surfaces. The treated material is also ideal for food packaging, where it could stop the accidental transfer of bacteria from raw chicken, meat and other foods. The study was published on December 13, 2109, in *ACS Nano*.

"Inspired by the water-repellent lotus leaf, the new surface works through a combination of nano-scale surface engineering and chemistry; the surface is textured with microscopic wrinkles that exclude all external molecules," said senior author Leyla Soleymani, PhD, of the department of mechanical engineering. "We're structurally tuning that plastic; a drop of water or blood, for example, simply bounces away when it lands on the surface. The same is true for bacteria. This material gives us something that can be applied to all kinds of things."

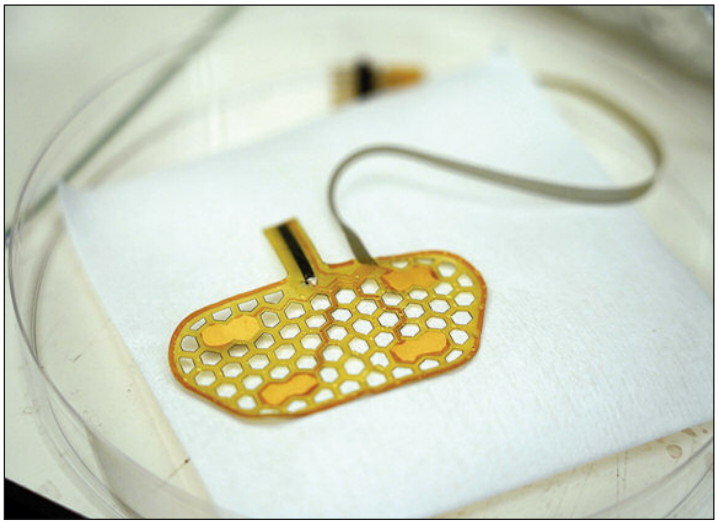
Wearable Monitor Identifies Swallowing Disorders

A flexible submental sensor patch with remote monitoring capabilities helps in the management of oropharyngeal swallowing disorders.

Developed at Purdue University (Lafayette, IN, USA; www.purdue.edu), the noninvasive skin-mountable sensor patch fits on the curvature of the submental area, providing simultaneous remote monitoring of muscle activity and laryngeal movement during swallowing tasks and maneuvers. The recording of the submental muscle activity is then sent wirelessly to separate unit (clipped on the wearer's shirt) so as to store it for later analysis by a doctor. The sensor patches are built with cheap disposable components, and are meant to be used about 10 times before they are thrown away. A study describing the device was published on December 13, 2019, in *Science Advances.*

Completion of a swallow requires the precise coordination of more than 30 pairs of muscles of the head and neck, six pairs of cranial nerves, and complex circuitry in the brainstem and several brain areas. Any disruption in these pathways can result in severe oropharyngeal swallowing disorders, also known as dysphagia. Swallowing rehabilitation requires frequent performance of both head and neck exercises that primarily rely on biofeedback devices, which are usually available only in large medical centers. This dearth directly affects treatment compliance and outcomes.

"Our device is unique in that we specifically created it to work well with the small and intricate muscles associated with swallowing events," said Chi Hwan Lee, PhD, assistant professor of biomedical and mechanical engineering at the Purdue College of Engineering, and CTO of Curasis (Lafayette, IN, USA), which will develop the product commercially. "The sensor sticker is stretchable and flexible to work well with the skin and curvilinear head and neck shape, while the connected unit has electronic chips and more rigid components."



Dysphagia is difficulty in swallowing that is sometimes classifies as a symptom, and in some contexts it is classified as a condition in its own right. It may manifest as a sensation that suggests difficulty in the passage of solids or liquids from the mouth to the stomach, a lack of pharyngeal sensation, or various other inadequacies of the swallowing mechanism. Dysphagia is distinguished from other symptoms like odynophagia (painful swallowing) and globus, the sensation of a lump in the throat. A person can have dysphagia without odynophagia, odynophagia without dysphagia, or both together.

Image: The Curasis submental swallowing sensor (Photo courtesy of Purdue University))

Integrated Airway System Reduces Ventilation Complications

cont'd from cover

endotracheal tube (ETT) cuff and adjust cuff pressure automatically to ensure sealing at minimal pressure, minimizing induced pressure on the trachea tissue. In addition, the system evacuates subglottic secretions by simultaneous suction and rinsing. The system, introduced by Hospitech Respiration (Kfar Saba, Israel; www.hospitech.co.il), includes the ETT, a cuff pressure monitor, a carbon dioxide (CO2) monitor, and additional irrigation and secretions evacuation modules. There is therefore no direct or indirect contact between the secretions and any of part of the control unit. The AG100s unit, which controls all functions, includes components that monitor leaks between the ETT cuff and the trachea by measuring local CO2 levels in the subglottic area (every millisecond) through a dedicated lumen in the ETT. It also adjusts cuff pressure within the envelope of pressure limits defined by clinicians, or alerts them to decide if adjustment of cuff pressure if needed. The device is designed so that secretions pass only through a disposable, single use connection kit, and the opening and closing of the silicone piping is controlled by external pressure via pinch valves.

"The AG100s Control Unit serves as an integrated, multi-purpose airway management system, highly effective in protecting the lungs and tracheal tissues from infections and tissue injury," stated the company in a press statement. "The AnapnoGuard Endotracheal Tube provides an advanced solution to well-known complications related to prolonged mechanical ventilation, which prevents potential infections and injury of the trachea and vocal cords." The principal function of the ETT cuff is to seal the trachea from leakage of gas or secretions around it. Isolation of the lower airways enables efficient lung ventilation and reduces the risk of aspiration around the cuff and the consequential ventilator associated pneumonia (VAP). Intra cuff pressure is influenced by airway anatomy, cuff location, cuff material and structure, size and volume, and by peak inspiratory pressure, and should be dynamically adapted to changing conditions such as patient and head position, mucosal edema, tracheal mucosa perfusion pressure, tracheal elasticity, and ventilation pressures.

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VENTILATION SYSTEM
HILL-ROM

The Life2000 Ventilation System features an innovative design that is adaptable across multiple settings, from the ICU and long-term care to the home, assisting patients in ICU to transition from bed rest to mobility.

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PATIENT MONITOR
SIGOWILL BIO MEDITECH

The iA-12 is an advanced 12-inch multi-parameter patient monitor that offers a broad range of patient monitoring capabilities for mid and high acuity departments The iA-12 is ideal for use in the critical care environment.

LINKXPRESS.COM HMI-05-20 217

FETAL/MATERNAL MONITOR
HUNTLEIGH DIAGNOSTICS

The Sonicaid Team 3 Series fetal/maternal monitor is easy to use and intuitive via the icon-driven touchscreen, providing cost-effective, reliable and accurate fetal/maternal monitoring.

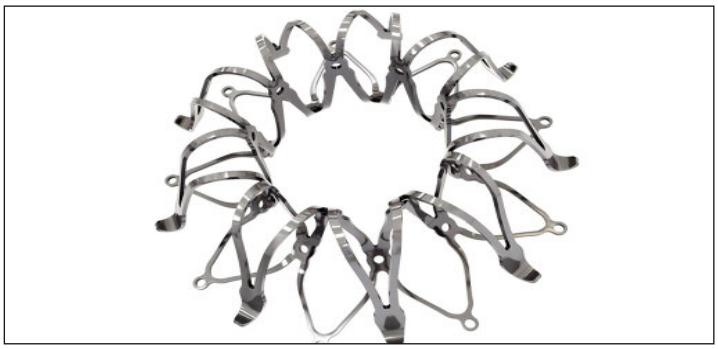
LINKXPRESS.COM HMI-05-20 218

Interatrial Shunt Helps Decompress Failing Heart

A novel implantable cardiac shunt helps treat heart failure (HF) patients with preserved and mid-range ejection fraction.

The Corvia Medical (Tewksbury, MA, USA; http://corviamedical.com) Interatrial Shunt Device (IASD) is an innovative transcatheter implantable device designed to help diastolic HF function by forming a channel that connects left and right atria, thus facilitating continuous and dynamic decompression of the left atrium and enabling it to relax at rest and physical activity. Once in place, a permanent passage is created in the septum between the atria, resulting in reduction in HF symptoms, improved quality of life, and reduced hospitalization rates.

The IASD, which has been granted "Breakthrough Device" designation by the U.S. Food and Drug Administration (FDA), is being studied in the REDUCE LAP-HF II study, a large multi-national prospective, double-blind, sham-controlled trial randomizing 608 HFpEF and HFmrEF patients in the United States, European Union, Australia, Japan, and Canada. One-year follow-up data of the IASD clinical study, held in 64 patients implanted at 18 centers, demonstrated shunt patency for all participants who received the implant. "Receiving Breakthrough Device designation from the FDA underscores the significant unmet need for more effective treatment options for heart failure patients," said George Fazio, President and CEO of Corvia Medical. "We look forward to continuing our work with the FDA through our ongoing pivotal trial in more than 100 hospitals, and providing the clinical evidence which will accelerate the timeline to bring the IASD to the U.S. market."



There are two types of HF; HF with reduced ejection fraction (HFrEF, systolic heart failure), and heart failure with preserved or mid□range ejection fraction (HFpEF/HFmrEF), previously called diastolic heart failure. HFpEF accounts for approximately 50% of all HF, but treatment options are limited, consisting mainly of diuretics and fluid balance control. Although the pathophysiology of HFpEF is complex, many of the symptoms are a result of excessive rises in left atrial pressure, in particular during exercise.

Image: The Corvia InterAtrial Shunt Device (IASD) (Photo courtesy of Corvia Medical).

Robotic Entities Could Improve Institutional Quality of Care

Introducing social and autonomous robotic health assistants (SARAs) to aid nurses interacting with patients could help overcome overwhelming schedules and personnel reduction.

The SARA consortium, led by Bright Cape (Eindhoven, The Netherlands; https://brightcape.nl), Forum Virium Helsinki (Finland; https://forumvirium.fi), GIM Robotics (Helsinki, Finland; www.gimltd.fi) the Technical University of Berlin (TUB; Germanty; www.tu-berlin.de), and other institutions, is working to introduce robots as largely autonomous social entities in nursing homes and hospitals. Using a system called SARA Home, the robots are accessible from a computer or tablet, allowing nurses to elaborate a personalized profile and health plan for every patient.

SARA robots will be used assist patients complete specific exercises several times a week, helping them to improve their mental and physical fitness. For example, the robots could ask the patient to associate a word to the right color, or to choose among different stories in order to define which one is more fit to a certain context. By interacting with the users and presenting them with such simple exercises, their mental condition could be improved, helping to escape deterioration into the second, more acute stage of dementia. Two pilot tests are currently ongoing, in nursing homes in Finland and in the Netherlands.

"We are working in particular with people who are in closed psychiatric departments suffering from dementia in a first stage," said project manager Emmy Rintjema, of Bright Cape. "We believe that robots could give a great contribution to healthcare, not to replace nurses, but to collaborate with them and reduce their workload, so they have more time to spend with patients. We are working together with nursing homes in a collaborative approach, mimicking the work of a nurse with a robot and testing the first functionalities with them."

The rapidly ageing population of Europe is bringing new challenges to a changing society. Hospitals and care institutions are facing serious staffing shortages, as fewer and fewer people choose to become healthcare professionals, while at the same time the number of people suffering from morbidities is constantly on the rise. Heavy work pressure has proven to be related to poor quality of care and to incidents such as medication errors, which 13.8% of nurses deal with weekly.

Home Cervical Cancer Testing May Replace Pap Tests

A new study suggests that home screening could bring down the rates of cervical cancer and associated deaths.

Developed at Queen Mary, University of London (QMUL; United Kingdom; www.qmul.ac.uk), the new kit is a triage classifier that aids detection of early precancerous change, known as cervical intraepithelial neoplasia (CIN) grade 2 and above (CIN2+). The test is based on the detection of DNA methylation of human papilloma virus (HPV) HPV16, HPV18, HPV31, HPV33, and the human gene EPB41L3, collectively known as S5. For the study, the researchers compared S5 classifier results in 503 HPV positive women who self-collected vaginal and urine samples.

The results revealed that S5 had a good, statistically significant separation between <CIN2 and CIN2+ samples for both urine and vagina self-samples. The sensitivity for urine samples was 66% and specificity was 72%, while for vaginal self-samples, sensitivity was 71% and specificity was 68%. While the results are lower than those of a cervical Papanicolaou (Pap) smear, the researchers are confident it will be soon as effective as the official colposcopy program. The study was presented at the National Cancer Research Institute (NCRI) annual Conference, held during October 2019 in Glasgow (United Kingdom).

"We demonstrated that S5 can be successfully amplified in urine and vaginal self-collected samples and that the classifier is able to correctly identify CIN2+ women," concluded lead author Belinda Nedjai, PhD, and colleagues of the molecular epidemiology research team. "The advantages of a DIY kit are obvious: more HPV positive women will test themselves, perhaps repeatedly, thus enhancing the chances of picking up more cervical cancers at an early stage, when they are potentially curable. It would also save doctor time since it is based on self-testing."

"This is exciting research that shows it's possible to detect cervical pre-cancer that is at high risk of developing into invasive cancer in urine and vaginal samples collected by women, in the comfort and privacy of their own homes," commented Manuel Rodriguez-Justo, MD, of University College London (UCL, United Kingdom). "This has the potential to revolutionize the way a positive HPV test is followed up, as well as making it easier for women in countries with no cervical cancer screening program to be tested."

DNA testing for HPV has gained widespread acceptance as an additional cervical cancer screening tool and as follow-up to abnormal changes detected with a PAP smear. There are now several such DNA HPV tests that can detect either the majority of the high-risk types of HPV or specific subtypes, such as HPV-16 and HPV-18. It is generally not recommended for screening women younger than age 30 since infections with HPV are relatively common in this age group, and often resolve without treatment or complications.

Image: Home testing for cervical cancer shows good correlation with PAP smears (Photo courtesy of QMUL)

VIDEO SIGNAL CONVERTER
AMPRONIX

The Scanmaxx Laplinx medical video signal converter is the first of its kind to allow users to connect their laptops via USB to PACS displays, supporting both widescreen and standard aspect ratios.

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SURGICAL DISPLAY
BARCO

The MDSC-2326 is a 26-inch, near-patient surgical display with LED backlight delivering excellent image quality with scratch-resistant optical glass offering durable protection, and allows for the best hand-eye co-ordination.

LINKXPRESS.COM HMI-05-20 220

ENDOSCOPY SYSTEM
OLYMPUS

The EVIS LUCERA ELITE endoscopy system is the complete solution for gastrointestinal endoscopy with ease-of-use functionality and state-of-the-art technologies focusing on advancing visualization, control and workflow.

LINKXPRESS.COM HMI-05-20 221

Pre-Formed Articulation Repairs Infected TKR Joints

An innovative pre-formed knee spacer with attachable modular stems provides a comprehensive solution to the growing clinical challenge of infected total knee replacement (TKR) joints..

The OsteoRemedies (Memphis, TN, USA; www.osteoremedies.com) REMEDY Stemmed Knee system is a modular stemmed knee spacer system that includes a femoral component, a tibial component, stainless steel reinforced stem extensions, and tibial wedges, all in a range of sizes and lengths. Initial preparation includes removal of prior prosthesis and preparation of the joint space with aggressive debridement and pulse lavage. Using a trial kit, the appropriate size femoral and tibial components are selected, including stem extensions, if necessary.

The tibial component is then cemented into place, with the surface in contact with the bone and tibial plateau. If the tibial bone defect is excessive and additional height is required, a wedge insert needs to be cemented to the inferior aspect of the tibial component. Cementation of conical tip of the selected stem extension completes fixation of the tibial component, and the same procedure is used to fix the femoral component. To assure correct alignment, flexion/extension movements and medial/lateral stability are checked before cement curing occurs.

"After five years clinical experience with the current knee spacer design, our surgeon design team and users clearly identified the need for additional knee stem extensions for use in more complex two-stage revisions for infection," said Eric Stookey, COO, of OsteoRemedies. "By incorporating our proprietary premolded and modular approach to the knee stem design, we can offer surgeons the opportunity to improve OR efficiency versus handmade intramedullary dowels."

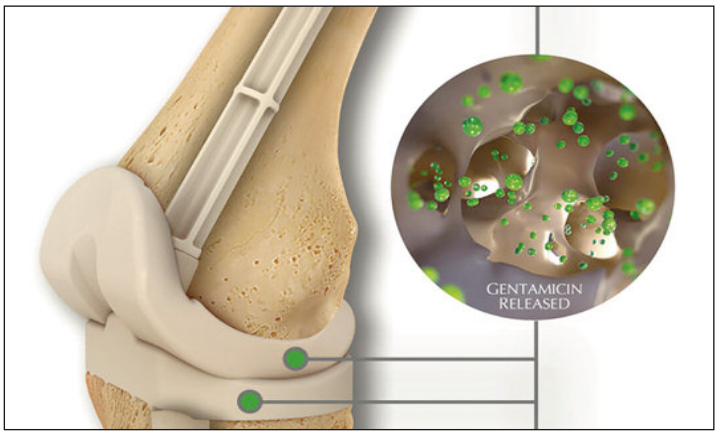

Image: The REMEDY Stemmed Knee Spacer (Photo courtesy of OsteoRemedies)

Surgical Fixation System Helps Treat Frail Spines

A new surgical system helps align the thoracic, cervical, and occipital bones during posterior cervical fusion (PCF) procedures in patients with frailer head and neck bones.

The DePuy Synthes (West Chester, PA, USA; www.depuysynthes.com) Symphony Cervico-Occipital-Thoracic (OCT) system is designed to streamline PCF procedures and generate efficiencies for both the surgeon and operating room staff in the treatment of patients with complex cervical spine disorders in the neck and upper back. The system includes instrumentation and implants that offer the surgeon a range of options in four key areas: fixation, alignment, targeting, and extensions, and is compatible with navigation software to aid in targeting in challenging anatomy.

The Symphony OCT is especially suited for improved fixation in patients with suboptimal bone quality by enabling crossing of the cervical to thoracic junction within one system, reducing the instrument trays needed from six to two. The system is also offered with optional sterile packed implants, providing cost savings in processing and sterilization. As Symphony combines aspects of DePuy's low-profile Synapse and Mountaineer systems, it is compatible with components from those systems; additional rods and connectors are available to link the implant with the Expedium and Viper spine systems.

"The Symphony system builds on the deep expertise of DePuy Synthes in treating diseases that affect the cervical spine, and we are excited to elevate our existing portfolio by offering this new enhanced solution for the treatment of these debilitating conditions," said Nadav Tomer, worldwide president of spine at DePuy Synthes. "This represents an incredible global opportunity to bring a differentiated solution to surgeons looking for reduced complexity, streamlined procedures and more flexibility in treatment options for their patients."

PCF is a technique to surgically fuse two (or more) cervical discs using a posterior incision. PCF may be performed in conjunction with or without a posterior decompression (laminectomy) and with or without stabilizing screws, lates, and rods). Itis most commonly performed for patients with cervical fractures or instability, but is also performed for a variety of other spinal conditions, such as tumors, infections, and deformity. PCF may also be performed in conjunction with anterior cervical surgery, especially when multiple levels are involved.

3D Guiding System Aids Minimally Invasive Vascular Repairs

An innovative intra-operative positioning system (IOPS) provides endovascular surgeons with dramatically improved visualization and guidance.

The Centerline Biomedical (Cleveland, OH, USA; www.centerlinebiomedical.com) IOPS is designed to provide surgeons with a radiation-free method to navigate catheters and guidewires through tortuous anatomy with precision and control. Using three dimensional (3D) visualization and real-time tracking, the system improves device placement accuracy, simplifies complex procedures, and helps decrease endoleaks and secondary procedures, including costly re-interventions. An electromagnetic tracking system limits fluoroscopy and contrast dye use, making endovascular procedure safer for both patients and physicians.

Image registration begins with alignment of intraoperative cone beam computerized tomography (CBCT) and preoperative multidetector computed tomography (MDCT) scans. Once completed, a tracking pad on the patient's back detects the patients motion and corrects potential deviations; catheter, guidewire, and tracking pad sensors data sampling is performed dozens of times a second, minimizing the latency of the rendered updates. The tracking pad does not adjust for automatic movement, such as peristalsis, breathing, or heartbeat.

IOPS provides a 3D, high-definition (HD) image in full color, creating an instantly intuitive experience, without the need for interpretation. Additionally, IOPS offers a four-viewport, multiplaner display of the patient's anatomy and all surgical instruments being used. All sensor-equipped catheters and guidewires are like those used in contemporary operating rooms (ORs), supporting clinical workflows, including more accurate placement of stents and endografts. Since doctors and technologists are accustomed to this type of display, the visualization and controls are familiar and straightforward.

"IOPS has all the key attributes to achieve the triple aim in healthcare – improved patient experience, improved health of populations, and reducing healthcare costs," said Philip Rackliffe, CEO of Centerline Biomedical. "The team has worked tirelessly to develop something that offers more than a stepwise improvement in care. The IOPS technology completely changes the game in endovascular procedures."

"Using IOPS I released the fluoroscopy pedal and felt a sense of calm which I never had before, because for the first time I was navigating without hearing the pumps and sounds of the fluoro system," said Igor Končar, MD, of Serbia Vascular Centre (Belgrade), who participated in the first successful human procedures of IOPS. "We cannulated the AAA contralateral limb on the first attempt with IOPS. Both patients are doing well and the surgeons are pleased with the system."

AAA is the localized dilatation of the abdominal aorta exceeding the normal diameter by more than 50%, and is the most common form of aortic aneurysm; approximately 90% occur below the kidneys. The aneurysms can extend to include one or both of the pelvic iliac arteries. The major complication of AAA is rupture, which is life-threatening, as large amounts of blood spill into the abdominal cavity, and can lead to death within minutes. Mortality of rupture repair in the hospital is 60-90%.

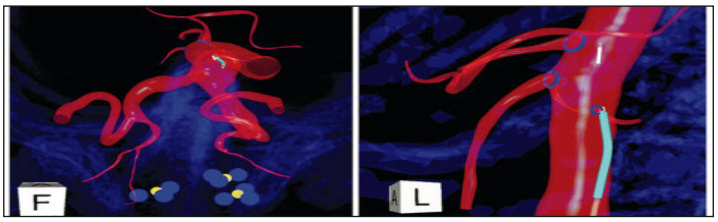

Image: The IOPS system provides a radiation-free method to navigate catheters and guidewires (Photo courtesy of Centerline Biomedical)

PRODUCT NEWS

To receive prompt and free information on products, log on to www.LinkXpress.com or fill out reader service form located on last page, or scan the QR code on your mobile device

SURGICAL HEADLAMP
ENOVA ILLUMINATION

The Qubit Warm (PLT-80F) warm cordless LED surgical headlamp provides 80,000+ lux of pure homogenous light at 4500 degrees Kelvin for true tissue color rendition and reduced eye fatigue.

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ELECTROSURGICAL UNIT
ERBE ELEKTROMEDIZIN

The VIO 100 C is a compact generator with proprietary VIO modes designed for specialty outpatient practices. Compact and lightweight, it has up to four storable programs and enables return electrode monitoring.

LINKXPRESS.COM HMI-05-20 223

OPERATING TABLE
FAMED

The FLARE operating table features an ultra-thin, fully transparent, floating tabletop made of carbon fiber and a comfortable joystick for choosing the right table position and ensuring easy cooperation with the C-arm.

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Mobile Lab Sterilizes Surgical Instruments on Site

A new all-electric mobile surgical instrument lab (eMSIL) will travel between UCLA Health (Los Angeles, CA, USA; www.uclahealth.org) hospitals to sterilize surgical instruments.

The eMSIL, built by Winnebago Industries (Forest City, IW, USA; www.winnebagoind.com), will travel between the UCLA Ronald Reagan and Santa Monica campuses to collect, clean, repair, disinfect, and sterilize surgical suite instruments. It includes all the equipment needed to deliver the same level of performance, productivity, and compliance (from decontamination through sterilization) as a lab located in a building. It also includes two desks in a slide-out area, two workbenches, an industrial sink, and two stations for 5.5 gallon ultrasonic cleaners, among other custom cabinetry and equipment.

The eMSIL is based on the standard Winnebago J33SE all-electric commercial shell platform, and is powered by an all-electric EPIC F-53 ten meter long chassis which was provided by Motiv Power Systems (Foster City, CA, USA; www.motivps.com). It is designed to hold enough battery charge for eight hours of typical service, on top of the round-trip travel to and from its home facility. The vehicle has already completed significant road testing, and can deliver an expected range of 135-200 kilometers on a full charge.

"The vehicle is expected to save UCLA Health Center close to USD 750,000 a year, as compared to contracting with a third-party to service surgical instruments off-site. That adds significant value to the system's bottom line," said Ashis Bhattacharya, VP of Business Development, Specialty Vehicles, and Advanced Technology at Winnebago Industries. "The mobile medical market is a growing industry, with countless applications, from cancer screenings and primary care to opioid treatment and dental services."

Image: A zero-emission vehicle travels between hospitals to sterilize surgical equipment (Photo courtesy of Winnebago)

Cartography Techniques Help Calculate Spine Curvature

Cutting-edge imaging technology can be used to produce three-dimensional (3D) anatomic maps of the spine to aid people with scoliosis, according to a recently launched trial.

The technique, developed at the Hospital for Special Surgery (HSS, New York, NY, USA; www.hss.edu) and the Israel Institute of Technology (Technion; Haifa, Israel; www.technion.ac.il), combines two advanced imaging technologies. The first is stereophotogrammetry via a highly accurate topographical 3D surface imaging system that is manufactured by 3dMD (Atlanta, GA, USA; www.3dmd.com); and the second is the EOS Imaging (Paris, France; www.eos-imaging.com) biplanar x-ray imaging platform, which determines spinal alignment while significantly reducing exposure to ionizing radiation.

The 3dMD system combines information from 30 high-definition cameras to produce a full map of the torso in under a second. EOS imaging provides images of the patients in natural standing positions using perpendicular X-ray beams collimated in two very thin, horizontal, fan-shaped beams, which along with two variable gain detectors, provides a high contrast digital radiograph (DR) that uses a significantly lower radiation dose than a general radiography X-ray. This enables clinicians to make a more informed diagnosis and create individualized treatment plans for children with musculoskeletal disorders.

"This technology is essentially producing the world's most advanced selfie, and the benefit is that there's nothing dangerous about it. When you image with this system, you can count the number of hairs on a person's leg," said senior investigator Howard Hillstrom, PhD, director of the motion analysis lab at HSS. "The speed of the process is a significant advantage over conventional imaging, as up to ten to twenty percent of torso x-rays must be redone because inadvertent movements during the scans distort the picture; 3dMD is immune to that."

"Being able to use this technology to screen patients for scoliosis would be a big improvement over the current method, which uses a carpenter's level on a patient's back and has a very high rate of false-positives," added Roger Widmann, MD, chief of the pediatric orthopedic surgery service at HSS. "You're taking x-rays on a lot of kids who don't need them, so we need a very reliable technology that correlates with x-rays so that you can safely decide if you need one or not. We'd love to have a better tool for this." Scoliosis is a medical condition in which a person's spine is curved from side to side. Although it is a complex 3D deformity, on an X-ray, viewed from the rear, the spine of an individual with scoliosis may look more like an "S" or a "C" than a straight line. Scoliosis is typically classified as congenital, idiopathic, or neuromuscular, when it has developed as a secondary symptom of another condition, such as spina bifida, cerebral palsy, spinal muscular atrophy, or physical trauma.

Doubts Raised on Benefits of Angioplasty and Bypass Surgery

A new trial challenges medical dogma, revealing that early invasive strategies are no better than optimal medical therapy (OMT).

The ISCHEMIA study (funded by the U.S. Government at a cost of USD 100 million and conducted at 320 sites in 37 countries), randomly assigned 5,179 stable patients with moderate-severe ischemia to early invasive coronary catheterization followed by percutaneous coronary intervention (PCI) or coronary bypass surgery plus OMT, or to OMT alone. Angina frequency at baseline was none in 34%, several times per month in 44%, and daily or weekly in 22%. The primary outcome was a composite of cardiovascular death, myocardial infarction (MI), resuscitated cardiac arrest, or hospitalization for unstable angina or heart failure.

The results showed that at 3.3 years follow-up, the primary outcome occurred in 13.3% of the routine invasive group, compared with 15.5% of the OMT group, in multiple subgroups. Invasive therapy was associated with harm (2% absolute increase) within the first six months, and benefit within four years (2% absolute decrease). All-cause death occurred in 6.4% of the routine invasive group, compared with 6.5% of the OMT group. Improvements in quality of life (QOL) were observed among angina patients, but not in those angina-free. The study was presented at the annual American Heart Association (AHA) scientific sessions, held during November 2019 in Philadelphia (PA, USA).

"In line with evidence from prior studies, our results suggest that routine use of heart procedures was not superior in reducing risk for the five-part disease endpoint or death overall compared to treatment only with optimal medical therapy," said senior author Professor Judith Hochman, MD, of NYU Langone Health (New York, NY, USA; www.med.nyu.edu). "On the other hand, patients symptomatic to start that got heart procedures, over the years, had fewer symptoms and felt better."

"Based on our results, we recommend that all patients take medications proven to reduce the risk of a heart attack, be physically active, eat a healthy diet, and quit smoking," said co-senior author David Maron, MD, of Stanford University School of Medicine (CA, USA; med.stanford.edu). "Patients without angina will not see an improvement, but those with angina of any severity will tend to have a greater, lasting improvement in quality of life if they have an invasive heart procedure. They should talk with their physicians to decide whether to undergo revascularization."

Angina is chest pain or discomfort that feels like pressure or squeezing in the chest, and may even feel like indigestion. It is usually a symptom of underlying coronary heart disease (CHD), most often due to ischemia. Variants include stable angina (Angina Pectoris), unstable angina, Prinzmetal angina, and microvascular angina.

Image: Interventional cardiology may not provide benefits to ischemia sufferers (Photo courtesy of iStock)

CAMERA SYSTEM
GIMMI

The AlphaNovoCam II USB single-chip camera system offers all the conveniences and functions of a high-end camera at minimum costs. Its integrated USB interface can be used for saving images and videos.

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VIDEO/AUDIO MANAGEMENT HUB
BRANDON MEDICAL

The i2i video and audio management hub is a simple solution for managing and controlling user access to our medical videos with access to centralized recording and archiving.

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SUCTION UNIT
HERSILL

The V7 mx high vacuum portable suction unit with an ABS ergonomically designed case specifically built for ambulance, transport and emergency field use. The oil-free, maintenance-free unit includes a piston type suction pump.

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Converted TKA Far Riskier than Primary TKA

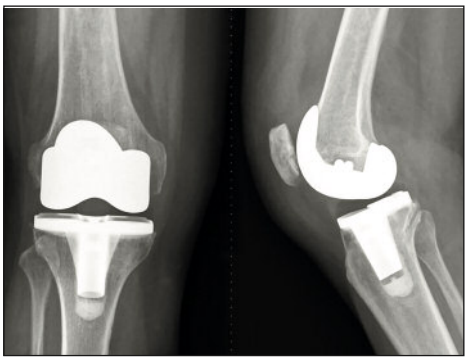
Revision risk for total knee arthroplasty (TKA) converted from unicompartmental knee arthroplasty (UKA) is three times higher than primary TKA, according to a new study.

Researchers at Aalborg University Hospital (Denmark; www.aalborguh.rn.dk) conducted a study to compare conversion to TKA when UKA fails to primary TKA. The researchers analyzed the Danish Knee Arthroplasty Registry from 1997 to 2017, comparing 1,012 TKAs converted from UKAs to 73,819 primary TKAs, and to 2,572 revision TKAs. The primary outcome was the risk of revision, with secondary outcomes including the influence of different knee implants, the indication for the UKA conversion, and surgical volume on the survival of TKA converted from UKA.

The results revealed that patients who underwent TKA converted from UKA were younger than those who underwent primary or revision TKA, and also had less severe knee-joint degeneration (based on Charnley class). For patients who underwent conversion of UKA to TKA, long-term outcomes were similar to those who underwent revision TKA, with both groups showing an estimated 15-year implant survival rate of 78%. In contrast, the 15-year implant survival rate for primary TKA was 94%.

After adjustment, the risk of revision was three times higher for patients who underwent UKA-to-TKA conversion compared with primary TKA. The researchers also showed that implant type did not affect outcomes for patients who underwent conversion of UKA to TKA. Converted UKAs were mainly mobile-bearing (85%), and the main reasons for UKA conversion were implant loosening, unexplained pain, and progression of arthritis. The study was published on November 20, 20189, in *The Journal of Bone and Joint Surgery*.

"TKA converted from medial UKA has a threefold higher risk of revision when compared with primary TKA. Implant survival resembled that of revision TKA, but with a higher prevalence of unexplained pain and instability," concluded lead author Anders El-Galaly, PhD, of the Orthopaedic Research Unit, and colleagues. "We believe that careful consideration is necessary before using medial UKA as treatment for knee osteoarthritis, as a potential conversion to a TKA decreased implant survival when compared with that following primary TKA."



TKA is an orthopedic surgical procedure where the articular surfaces of the knee joint--the femoral condyles and tibial plateau--are replaced. There is at least one polyethylene insert between the tibia and the femur that serves as a shock absorber; in 50% of the cases, the patella is also replaced in order to restore the extensor mechanism. The level of bone loss will dictate which kind of patella prosthesis is placed.

Image: TKA converted from UKA increases revision risk (Photo courtesy of Getty Images)

Versatile Occluder Constricts

An innovative microcatheter-delivered vascular device provides rapid and focal occlusion of a wide range of peripheral arterial targets.

The Okami Medical (Aliso Viejo, CA, USA; www.okamimedical.com) LOw-profile Braided Occluder (LOBO) is a minute embolic device that is designed to occlude a blood vessel by self-expanding when deployed. A unique braiding method that uses wires less than 20 microns in diameter--about ¼ the thickness of a human hair--and a multiple-disk design provide LOBO with a dense-pore scaffold structure that spans the vessel lumen, rapidly reducing flow and accelerating hemostasis in vessels as small as 1.5 mm. Other features include radiopaque marker bands for visualization and instantaneous mechanical detachment.

To provide smooth navigation throughout the peripheral vasculature, the microcatheter-compatible occluder employs a three-disc design that provides excellent trackability in small, tortuous vessels, which allows conformance to curved vessels and focal occlusion. The intuitive, single-click mechanical detachment handpiece allows for precise, instant release of the occluder at the target location and retrievability, if necessary. The device is not indicated for use in blood vessels where crush or bend forces are anticipated, such as in joint areas and superficial vasculature.

"The Okami team brings more than a decade of leadership in braiding technology and minimally invasive vascular solutions," said Bob Rosenbluth, PhD, President and CEO of Okami Medical. "The LOBO system is uniquely designed to provide a one-and-done solution for many occlusion targets, thus potentially avoiding the need for several embolic devices and enabling more efficient interventions."

Low Profile Stent Graft Aids Patients with Aortic Disease

A new thoracic stent graft system enables minimally invasive repair of lesions of the descending thoracic aorta, including thoracic aortic aneurysm (TAA) and dissections.

The CryoLife (Kennesaw, GA, USA; www.cryolife.com) E-nya thoracic stent graft system is designed to increase treatment options for patients with thoracic aortic disease. The endovascular stent graft system offers both bare spring and covered proximal configurations with tip capture technology, enhancing the control and predictability of the minimally invasive procedure during deployment for optimal outcomes. The lower profile textile graft material is designed to provide both flexibility in conformance and long-term durability.

The E-nya thoracic stent graft system is provided with a novel delivery system that addresses the issue of high-deployment forces, one of the major challenges of delivering low-profile transcatheter aortic valve replacement (TAVR) devices. The squeeze-to-release mechanism gives physicians much more control when treating both simple and challenging anatomies. E-nya is designed to complement the E-vita OPEN PLUS hybrid stent graft system, as well as a line of custom-made devices providing clinicians with the complete portfolio of products.

"The E-nya system was designed to give physicians more options and control while treating both simple and challenging anatomies, and will be one of the most versatile grafts on the market," said Pat Mackin, chairman, president, and CEO of CryoLife. "We are pleased to have received CE Mark for the E-nya thoracic stent graft system, further enhancing our position as the leader in the growing EU aortic repair market."

TAA results from continuous dilation of the descending thoracic aorta as a result of the degradation of structural proteins such as collagen and elastin, which eventually leads to medial degeneration and weakening of the aortic wall. Subsequent dilatation results from hemodynamic forces on the arterial wall, as well as intrinsic changes in the composition of the arterial wall itself, which cause the diameter of the aorta to expand further and increase wall tension, thus creating a vicious cycle and eventual life-threatening rupture and hemorrhage, if not treated.

Image: The CryoLife thoracic stent graft system (Photo courtesy of Cryolife)

Robotics Aid Diagnostic and Surgical Bronchoscopic Procedures

A new study confirms that a robot-assisted bronchoscopy platform can successfully localize undiagnosed lung lesions.

Researchers at the Medical University of South Carolina (MUSC; Charleston, USA; www.musc.edu) conducted a study to examine the safety and feasibility of the Auris Health (Redwood City, CA, USA; www.aurishealth.com) Monarch Platform, which visualizes peripheral lung nodules in the bronchial tree using a combination of direct visualization, navigational guidance, and radial endobronchial ultrasound (R-EBUS). The study, which involved 55 patients across five study sites, showed successful localization of the targeted pulmonary lesions in 96.3% of the procedures. Pneumothorax occurred in two patients and required tube thoracostomy in one. No other serious adverse events were reported.

"We were able to safely perform the procedure and successfully localize lesions in 96% of cases. This data suggests robot-assisted bronchoscopy is feasible and may improve bronchoscopists' ability to effectively localize peripheral lesions," said study co-author Professor Gerard Silvestri, MD, a lung cancer pulmonologist at MUSC, when the study was presented at the annual CHEST conference, held in New Orleans (LA, USA) in October 2019. "The promising results of this study warrant further evaluation in additional prospective studies where yield can be better assessed."

The Monarch Platform consists of four major components - the patient side system (PSS), a controller cart, a master device workstation, and the bronchoscope and accessories. The master/slave system uses a controller-like interface to navigate the flexible robotic endoscope to the periphery of the lung. The PSS operates two robot arms with six degrees of freedom, and an instrument drive mechanism (IDM) with four actuated axes. The robotic arms steer the flexible bronchoscope, attached at the end effector of the robotic arm, which also includes a working channel and a camera; the working channel of the bronchoscope is used for irrigation and aspiration.

More patients die every year from lung cancer than from prostate, breast, and colon cancers combined. More than 90% of people diagnosed with lung cancer do not survive, in part because it is often found at an advanced stage. There are a variety of diagnostic options currently available for lung cancer, but all have limitations in accuracy, safety, or invasiveness, which can lead to false positives, false negatives, or side effects such as pneumothorax (collapsed lung) and hemorrhage.

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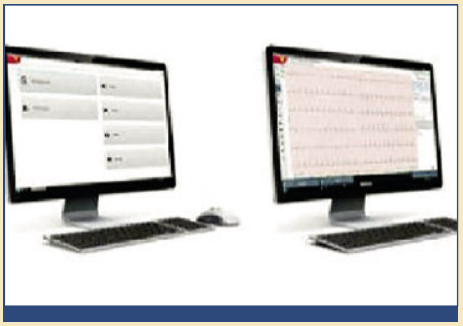

The LifeDataNet G2 ensures that the defibrillators are always ready to use, regularly informing about the status of all devices. The plug and play system automatically connects compatible devices.

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New Imaging Device Identifies Parathyroid Glands During Surgery

A new device that uses autofluorescence imaging to identify the parathyroid glands reduces the incidence of post-thyroidectomy hypocalcemia.

The Fluoptics (Grenoble, France; www.fluoptics.com) Fluobeam LX is an imaging device exclusively dedicated to thyroid and parathyroid surgery that detects the parathyroid gland by autofluorescence in the near-infrared (nIR) light band, with the aid of an optimized real-time display, a high depth of field, and compatibility with ambient operating room lights. Handheld and easily manipulated to cover the surgical field, Fluobeam LX offers an optimized ergonomics with a joystick that simplifies the navigation and selection of the software functionalities, directly by the surgeon.

The system's camera significantly reduced sensitivity to ambient light, allowing real-time visualization of the parathyroid glands in autofluorescence, even with the operating lights switched on (without direct illumination of the surgical field). The camera also provides a high frame rate (25 frames per second) and a high depth of field (over five cm). When combined with proprietary Fluosoft imaging software, the Fluobeam LX allows surgeons to work in optimized conditions, with easy interpretation of images and manipulation of the device.

"For some patients with parathyroid disease, treatment may mean a surgical procedure," said Binita Ashar, MD, director of the division of surgical devices at the US Food and Drug Administration (FDA; Silver Spring, MD, USA; www.fda.gov) Center for Devices and Radiological Health (CDRH). "Real-time identification of parathyroid tissue during surgery can provide surgeons with valuable information to help preserve healthy tissue or to remove diseased tissue."

Unintentional injury to the parathyroid glands during thyroidectomy can impede the secretion of parathyroid hormone (PTH), triggering temporary hypocalcaemia, a decrease in calcium levels in the blood, which needs to be treated by oral calcium calcitriol for an unknown duration. The treatment can also lead to additional complications such as skin necrosis (in case of calcium gluconate extravasation), constipation, and extended hospitalization.

Image: The Fluobeam LX parathyroid imaging device (Photo courtesy of Fluoptics)

Smart Navigation Systems Optimize Total Hip Arthroplasty

The combination of two surgeon-controlled surgical planning and guidance platforms optimizes the treatment of total hip arthroplasty (THA) procedures.

The EOS Imaging (Paris, France; www.eos-imaging.com) hipEOS 3.0 is a three dimensional (3D) surgical planning solution that uses weight-bearing standing and sitting EOS images and 2D/3D patient-specific models and datasets to help select and position implants for the best anatomical fit in order to optimize range of motion, based on each patient's 3D anatomy. This delivers an optimal surgical strategy while taking into consideration patient-specific factors that are key criteria for successful THA, including hip-spine relationship, leg length discrepancy, femoral offset and femoral torsion.

In the first cased performed using the new software, the surgical plan was implemented using Intellijoint Surgical (Waterloo, ON, Canada; www.intellijointsurgical.com) HIP, a mini-optical navigation system that provides accurate intraoperative alignment information. The combination of the two platforms enables surgeons to select the best implant type and size, the ideal position and orientation, and make real-time intraoperative measurements that deliver an accurately executed surgical plan. The entire process is facilitated through EOS imaging EOSlink and EOSapps, that together help reduce leg length discrepancies and risk of dislocation or impingement.

"The combination of hipEOS with the Intellijoint HIP system instills a great deal of confidence that I have an accurate preoperative surgical plan that includes patient-specific modifications based on dynamic pelvic motion and femoral version, and can then execute that plan with a high level of fidelity," said orthopedic surgeon Peter Sculco, MD, of the Hospital for Special Surgery (HSS; New York, NY, USA). "I believe this represents a valuable combination of technologies that are relatively low cost, easy to use, improve operative efficiencies, and ultimately lead to improved patient outcomes."

The intellijoint Surgical HIP is an imageless guidance system based on a miniature camera and tracker that provide surgeons intraoperative measurements to help establish proper cup position, equalization of leg length, and restoration or maintenance of offset and joint center of rotation. Correct alignments are imperative to prevent complications such as dislocation, revision, leg length discrepancies, and readmissions. HIP is suitable for anterior, lateral, and posterior THA surgical approaches and can be used with all major implant vendors.

New System Facilitates Tympanostomy Tube Delivery

An innovative tympanostomy (ear tube) delivery system enables placement of tubes in the comfort of an office environment.

The Tusker Medical (Menlo Park, CA, USA; www.tuskermed.com) Tubes Under Local Anesthesia (Tula) system is designed to enable delivery of an ear tube to patients under local anesthesia in a physician's office setting, obviating the need for general anesthesia. The system is composed of four concentric components that cut, dilate, shield, and stabilize. The cutter first creates the myringotomy; the dilator opens the incision, while the shield introduces the tympanostomy tube through the myringotomy. The system is approved for use in both adults and children as young as six months of age.

To facilitate painless delivery, an iontophoresis device is used to deliver a low-level electrical charge to the tympanic membrane in order to accelerate uptake of a local anesthetic (Tymbion) into the ear drum, providing needle-free local anesthesia. The automated tube delivery system then provides single-button insertion of a preloaded Grommet tympanostomy tube through the myringotomy. The cutter is exposed only for the very brief moment (less than 500 milliseconds) when the myringotomy is created, and is otherwise recessed within the device, an important safety feature when performing procedures in an awake child.

"The Tusker Iontophoresis System uses a small amount of electrical current to accelerate the uptake of the local anesthetic into the tympanic membrane," said Amir Abolfathi, president and CEO of Tusker Medical. "This provides an alternative to phenol (a denaturing acid), ear canal injections, or other local anesthesia methods, none of which have FDA approval for pediatric tympanic membrane anesthesia and are often painful or take an unacceptably long time to achieve anesthesia."

Otitis media is inflammation of the middle ear that occurs in the area between the tympanic membrane and the inner ear, including a duct known as the eustachian tube.

Advanced Metal Alloy Supports Dual Mobility Implants

A novel dual mobility (DM) implant with a small diameter femoral head increases stability and offers improved range of motion.

The Smith & Nephew (London, United Kingdom; www.smithnephew.com) OR3O Dual Mobility System is a modular DM implant system intended for primary and revision total hip arthroplasty procedures in skeletally mature patients. The system consists of diffusion hardened, oxidized zirconium alloy liners with a highly polished inner surface of zirconia, and a machined locking taper and backside made of a Zr-2.5Nb alloy. The locking taper and machined outside profile mate with a dedicated Titanium or modular press-fit acetabular shell and oxidized zirconium or CoCr alloy femoral heads, available in 22 or 28mm.

The final OR3O Dual Mobility construct includes the acetabular shell, an OXINIUM Diffusion Hardened (DH) liner, a cross-linked polyethylene (XLPE) insert, and a femoral head. Indications for use include advanced degeneration of the hip joint as a result of degenerative, post-traumatic, or rheumatoid arthritis; all forms of osteoarthritis; fracture or avascular necrosis of the femoral head; femoral neck fracture or proximal hip joint fracture; and failure of previous hip surgeries such as internal fixation, arthrodesis, hemiarthroplasty, total hip replacement, and others.

"Our new OR3O Dual Mobility System is a groundbreaking product that offers technology not available in competitive systems," said Skip Kiil, president of orthopedics at Smith+Nephew. "The proven success of our VERILAST Technology and OXINIUM DH bearing surface set OR3O apart as a game changing solution in the hip arthroplasty market."

"The OR3O Dual Mobility System is truly a fourth generation dual mobility offering by introducing OXINIUM technologies," said orthopedic surgeon Stephen Duncan, MD, of the University of Kentucky (Lexington, USA). "This is a solution that allows patients to get back to their lives by providing stability and offers unique advantages compared to other systems."

International Calendar

ATTENTION: Due to the CORONAVIRUS PANDEMIC, many events are being rescheduled for a later date, converted into virtual venues, or altogether cancelled. Please check with the event organizer or website prior to planning for any forthcoming event

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▶ June 2020

ASNR 2020 – 58th Annual Meeting of the American Society of Neuroradiology. May 30 - Jun 4, USA; Virtual Venue; Web: www.asnr.org

57th ERA-EDTA Congress – European Renal Association - European Dialysis and Transplant Association. Jun 6-9; Virtual Venue; Web: www.era-edta.org

EHA25 – 25th Annual Congress of the European Hematology Association (EHA). Jun 11-14; Virtual Venue; Web: ehaweb.org

CARS 2020 – Computer Assisted Radiology and Surgery. Jun 23-27; Munich, Germany; Web: www.cars-int.org

SIIM 2020 – Annual Meeting of the Society for Imaging Informatics in Medicine. Jun 24-26; Virtual Venue; Web: siim.org

MedtecLIVE 2020. Jun 30-Jul 2; Virtual Venue; Web: www.medteceurope.com

▶ July 2020

ESHRE 2020 – 36th Annual Meeting of the European Society of Human Reproduction and Embryology. Jul 5-8; Virtual Venue; Web: www.eshre.eu

ISTH 2020 Congress - The International Society on Thrombosis and Haemostasis (ISTH). Jul 11-15; Virtual Venue; Web: www.isth2020.org

ECR 2020 – European Congress of Radiology. Jul 15-19; Virtual Venue; Web: www.myesr.org

EAU20 – 35th Annual Congress of the European Association of Urology. July 17-21; Virtual Venue; Web: eaucongress.uroweb.org

Vietnam Medi-Pharm 2020. Jul 22-25; Hanoi, Vietnam; Web: vietnammedipharm.vn

▶ August 2020

Vietnam Medi-Pharm Expo 2020. Aug 6-8, Ho Chi Minh City, Vietnam; Web: hcm.medipharmexpo.com

ISMRM 2020 – 28th Annual Meeting of the International Society for Magnetic Resonance in Medicine. Aug 8-14; Virtual Venue; Web: www.ismrm.org

SAGES 2020 - Annual Meeting of the Society of American Gastrointestinal and Endoscopic Surgeons. Aug 12-15; Cleveland, OH, USA; Web: www.sages2020.org

KIHE 2020 – Kazakhstan International Healthcare Exhibition. Aug 18-20; Almaty, Kazakhstan; Web: kihe.kz

WCO-IOF-ESCEO 2020 - World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases. Aug 20-23; Virtual Venue: www.wco-iof-esceo.org

ESC Congress 2020 – European Society of Cardiology. Aug 29-Sep 2; Virtual Venue; Web: www.escardio.org

▶ September 2020

SALMED International Trade Fair of Medical Equipment and Instruments. Sep 1-3; Poznan, Poland; Web: www.salmed.pl/en

ECO-ICO 2020 – European and International Congress on Obesity. Sep 1-4; Dublin, Ireland; Web: www.ecoico2020.com

ECCC Dubai 2020 - 16th Emirates Critical Care Conference. Sep 3-5; Dubai, UAE, Web: eccc-dubai.com

13th SIOP ASIA 2020 – International Society of Paediatric Oncology. Sep 4-6; Mumbai, India; Web: www.siopasia2020.com

ERS International Congress 2020 – European Respiratory Society. Sep 7-9; Virtual Venue; Web: erscongress.org

WCES 2020 – 17th World Congress of Endoscopic Surgery. Sep 9-12; Yokohama, Japan; Web: site2.convention.co.jp/wces2020

WCE 2020 – 14th World Congress on Endometriosis. Sep 11-14; Dubai, UAE; Web: endometriosis.ca/world-congress/wce2020

CIRSE 2020– Annual Congress of the Cardiovascular and Interventional Radiological Society of Europe. Sep 12-16; Munich, Germany; Web: www.cirse.org

ESRA 2020 - 39th Annual Congress of the European Society of Regional Anaesthesia and Pain Therapy. Sep 16-19; Thessaloniki, Greece; Web: esra-congress.com

ESMO 2020– Annual Congress of the European Society for Medical Oncology. Sep 18-22; Madrid, Spain; Web: www.esmo.org

EUSEM 2020 – 14th European Emergency Medicine Congress. Sep 19-23; Virtual Venue; Web: www.eusemcongress.org

EASD 2020 – 56th Annual Meeting of the European Association for the Study of Diabetes. Sep 21-25; Virtual Venue; Web: www.easd.org

ExpoMedical 2020. Sep 23-25; Buenos Aires, Argentina; Web: www.expomedical.com.ar

ESVS 2020 – 34th Annual Meeting of the European Society for Vascular Surgery. Sep 29-Oct 2; Krakow, Poland; Web: www.esvs.org

ESMRMB 2020 – 37th Annual Meeting of the European Society for Magnetic Resonance in Medicine and Biology. Sep 30 - Oct 3; Virtual Venue; Web: www.esmrmb.org

▶ October 2020

JFR 2020 - Journées Francophones de Radiologie. Oct 2-5; Paris, France; Web: jfr.radiologie.fr

ANESTHESIOLOGY 2020 - Annual Meeting of the American Society of Anesthesiologists. Oct 2-7; Washington, DC, USA; Web: www.asahq.org

88th EAS Congress - European Atherosclerosis Society. Oct 4-7; Geneva, Switzerland; Web: eas2020.com

REHACARE 2020 – International Trade Fair for Rehabilitation and Care. Oct 6-9; Düsseldorf, Germany; Web: www.rehacare.com

EuGMS Congress 2020 – 16th International Congress of the European Geriatric Medicine Society. Oct 7-9; Virtual Venue; Web: www.eugms.org

UEG Week 2020 – United European Gastroenterology. Oct 11-13; Virtual Venue; Web: www.ueg.eu/week

Africa Health 2020. Oct 13-15; Johannesburg, South Africa; Web: www.africahealthexhibition.com

Medical Japan 2020. Oct 14-16; Tokyo, Japan; Web: www.medical-jpn.jp

EAPS 2020 – 8th Congress of the European Academy of Paediatric Societies. Oct 16-20; Barcelona, Spain; Web: eaps2020.kenes.com

EANM 2020 – 33rd Annual Congress of the European Association of Nuclear Medicine. Oct 17-21; Vienna, Austria; Web: www.eanm.org

ISUOG Virtual World Congress - International Society of Ultrasound in Obstetrics & Gynecology. Oct 16-18; Virtual Meeting; Web: www.isuog.org

CMEF Spring 2020 – China International Medical Equipment Fair. Oct 19-22; Shanghai, China; Web: www.cmef.com.cn

ASTRO 2020 – Annual Meeting of the American Society for Radiation Oncology. Oct 25-28; Virtual Venue; Web: www.astro.org

The Virtual EFFORT Congress 2020 – 21st Annual Congress of European Federation of National Associations of Orthopaedics and Traumatology. Oct 26-30; Virtual Venue; Web: congress.efort.org

Asia Health 2020. Oct 28-30; Bangkok, Thailand; Web: www.medlabasia.com

EADV 2020 - 29th Congress of the European Academy of Dermatology and Venereology. Oct 28-Nov 1; Virtual Venue Web: www.eadv.org

▶ November 2020

ECIO 2020 – European Conference on Interventional Oncology. Nov 2-5; Nice, France; Web: www.ecio.org

44th World Hospital Congress of the International Hospital Federation (IHF). Nov 2-5; Barcelona, Spain; Web: worldhospitalcongress.org

ExpoMED Eurasia 2020. Nov 5-7; Istanbul, Turkey; Web: expomedistanbul.com

ESO-WSO 2020 – Joint Conference of the European Stroke Organisation & World Stroke Organization. Nov 7-9; Vienna, Austria; Web: eso-wso-conference.org

Medica 2020. Nov 16-19; Düsseldorf, Germany; Web: www.medica-tradefair.com

22nd MEDEXPO Africa 2020. Nov 18-22; Nairobi, Kenya; Web: www.expogr.com/kenyamed/

EuroAnaesthesia 2020 – European Society of Anaesthesiology. Nov 28-30; Barcelona, Spain; Web: euroanaesthesia2020.org

RSNA 2020 – Annual Meeting of the Radiological Society of North America. Nov 27 – Dec 4; Chicago, IL, USA; Web: www.rsna.org

ESTRO 2020 – Annual Congress of the European Society for Radiotherapy & Oncology. Nov 28 – Dec 1; Vienna, Austria; Web: www.estro.org

▶ December 2020

ECISM LIVES 2020 – 33rd Annual Congress of European Society of Intensive Care Medicine. Dec 5-9; Madrid, Spain; Web: www.es-icm.org

Zdravookhraneniye 2020. Dec 7-11; Moscow, Russia; Web: www.zdravo-expo.ru/en

Medical Fair Asia 2020. Dec 9-11; Singapore; Web: www.medicalfair-asia.com

▶ January 2021

ISET 2021 - International Symposium on Endovascular Therapy. Jan 17-20; Hollywood, FL, USA. Web: www.iset.org

Critical Care Congress 2020 - 50th Annual Meeting of the Society of Critical Care Medicine (SCCM). Jan 31 – Feb 3; Anaheim, CA, USA; Web: www.sccm.org

▶ February 2021

Arab Health 2021. Feb 1-4; Dubai, UAE; Web: www.arabhealthonline.com

ESOU21 – 18th Meeting of the EAU Section of Oncological Urology. Feb 12-14; Gothenburg, Sweden; Web: esou.uroweb.org

APSCVIR 2021 – 15th Annual Meeting of the Asia Pacific Society of Cardiovascular and Interventional Radiology. Feb 24-27; Taipei; Web: www.apscvir2020.com

Medical Fair India 2021. Feb 25-27; New Delhi, India; Web: www.medicalfair-india.com

▶ March 2021

SIR 2021 – 46th Annual Meeting of the Society of Interventional Radiology. Mar 20-25; Nashville, TN, USA; Web: www.sirmeeting.org

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COVID-19

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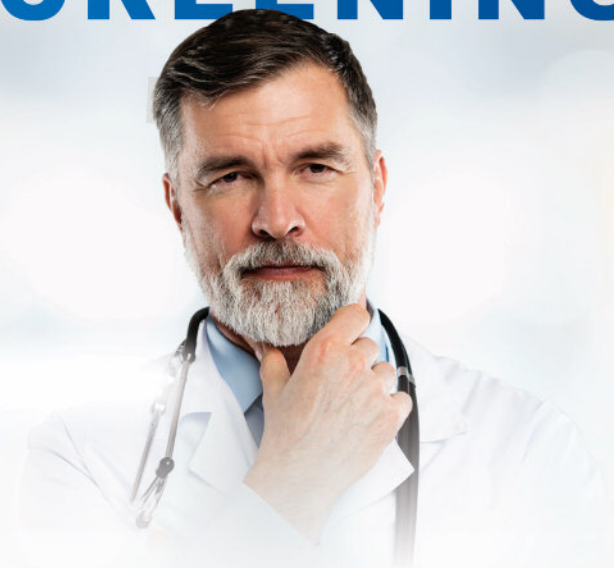

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